EU MARKET SURVEY 2003

ENGINEERING PRODUCTS

Mailing address: P.O. Box 30009, 3001 DA Rotterdam, The Netherlands
Phone: +31 10 201 34 34 Fax: +31 10 411 40 81
E-mail: cbi@cbi.nl Internet: http://www.cbi.nl
Office: WTC-Beursbuilding, 5th floor
37 Beursplein, Rotterdam, The Netherlands

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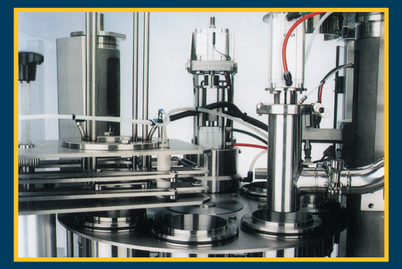

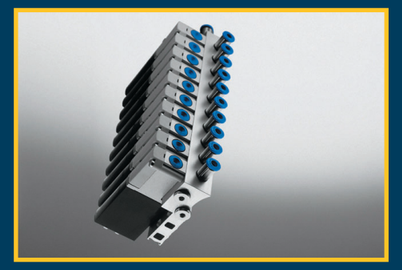

CENTRE FOR THE PROMOTION OF IMPORTS FROM DEVELOPING COUNTRIES

CBI: YOUR EUROPEAN PARTNER FOR THE EUROPEAN MARKET

The CBI (Centre for the Promotion of Imports from developing countries) is an agency of the Dutch Ministry of Foreign Affairs. The CBI was established in 1971. The CBI's mission is to contribute to the economic development of developing countries by strengthening the competitiveness of companies from these countries on the EU market. The CBI considers social values and compliance with the most relevant environmental requirements to be an integral part of its policy and activities.

CBI offers various programmes and services to its target groups:

Market information
A wide variety of tools to keep exporters and Business Support Organisations (BSOs) in developing countries in step with the very latest development on the EU market.
These include market surveys and strategic marketing guides for more than 40 product groups, manuals on export planning and other topics, fashion and interior forecasts and the CBI News Bulletin, a bi-monthly magazine. This information can also be obtained from our website at www.cbi.nl For all information on non-tariff trade barriers in the EU CBI has a special database, AccessGuide, at www.cbi.nl/accessguide
And finally CBI's Business Centre is offering free office facilities, including telephones, computers, internet and copiers for eligible exporters and BSOs. Market reports, international trade magazines, cd-roms and much more can be consulted in the information section of the business centre.

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Training programmes
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Institutional support for capacity building for selected business support organisations.
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Centre for the Promotion of Imports from developing countries
Centrum tot Bevordering van de Import uit de ontwikkelingslanden

Mailing address:
CBI
P.O. Box 30009
3001 DA Rotterdam
Phone +31 (0) 10 201 34 34
Fax +31 (0) 10 411 40 81
E-mail cbi@cbi.nl
Internet www.cbi.nl

Office:
WTC-Beursbuilding, 5th Floor
37 Beursplein, Rotterdam, The Netherlands.

EU MARKET SURVEY

ENGINEERING PRODUCTS

Compiled for CBI by:

IPL Consultants b.v.

in collaboration with
Mr. P. van der Sman

September 2003

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Partly replacing the EU market surveys "Pumps and Compressors" (1999) and "Drives and Transmissions" (1999).

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Kramp Industry, Varsseveld (NL)

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REPORT SUMMARY

A distinction is generally made between mechanical engineering and electrical engineering. The mechanical engineering industry comprises fluid power (hydraulics and pneumatics), power transmission (mechanical drives, pumps and transmissions), handling and tools. Electrical engineering encompasses electrical drives and transmissions (motors and controllers). In recent years, a new technological discipline has been created: mechatronics. The trend is towards considering the fields of mechanical engineering, electrical engineering, electronics and information technology not as separate areas but as an overall system - a development that will lead in future to a loosening of the boundaries between the different areas. At present, however, a clear division still exists between mechanical and electrical engineering. The two terms are used in this chapter.

For the purposes of this survey, engineering products are defined as those components and products made to customer-specific requirements using standard parts (catalogue items). This survey covers not only the parts and assembled products but also the technologies and tools most commonly used to produce these products. For example, the term "Power Transmission engineering" refers to the components of a machine or system that provide motion. Power transmission engineering is therefore required whenever it is necessary to move persons or objects. Motion is transmitted by means of drives, the form of which can vary considerably, but the task of which is always to transmit power and convert torque and rotary motion. No matter what the type (mechanical, electrical, hydraulic, pneumatic or thermal), without drives nothing would move, either in industry or in everyday life.

The manufacture of these engineering products usually entails both engineering and assembly. The term 'engineering' here is used in its broadest sense (functional, technical, value, manufacturing, mechanical and/or electrical). Generally speaking, European companies will carry out the product development, the customer-specific engineering and the final assembly. The detail engineering (including work preparation), production of parts and sometimes also the assembly of parts into intermediate products can and should be the focus for developing country exporters. The focus of this survey, then, is standard parts and intermediate products in the area of Engineering Products.

Product groups
Engineering products have been divided into seven product groups. Each product group is defined in brief below, in order to specify the relative position of each group to the other groups.

This survey focuses on the six major EU markets for engineering products, namely France, Germany, Italy, the Netherlands, Spain and the United Kingdom. These EU member countries are highlighted because of their relative importance in terms of industrial demand, production, imports and exports.

Industrial demand
Industrial demand is defined as the demand for engineering products from all included markets (industrial users). Industrial demand is calculated by adding together production and imports and then subtracting exports. In 2001, industrial demand totalled € 464,301 million (NACE codes 29.1-5 and 31).

Demand declined by 4 to 5 percent in 2002. Italy, Germany, France and United Kingdom suffered most. The forecast growth in industrial demand is about 1 percent for 2003 and 2 to 3 percent for 2004. These expectations may be on the optimistic side, especially for Germany and the United Kingdom. Uncertainty regarding the recovery of the world market, instability

Product group	Characteristics
Electric drives	Assembled products; standard with options and features; batch production (large – small); trade article
Moulds, magnets and elevators	Assembled products; one-of-a-kind, unique, sometimes early supplier involvement Moulds: craftsmanship
Hydraulics	Basic technology
Parts of transmission	Simple to assembled products; standard with options and features; batch production (large – small); trade article
Pneumatics	Basic technology
Pumps	Assembled products; standard with options and features; batch production (large – small); trade article
Tool holders	Conditionally to production; standard; trade article; craftsmanship

in the Middle East (following the war in Iraq, the war against terrorism, the Palestine-versus-Israel question) and volatility in stock markets may lead once more to expectations not being met. The result has been a fall in capital spending in 2002 and 2003. Profit margins are under pressure and slack demand does not create incentives to initiate investments. Also any pick-up in demand will be met initially by an increased use of existing capacity. Only when capacity rates rise above 90 percent willinvestments be prepared. A genuine recovery in the global market is not expected to take place before mid-2004.

Mechanical engineering
Total industrial demand in the fifteen EU member states amounted to € 294,844 million in 2001 (NACE classes 29.1-5). In terms of production, exports and imports, German mechanical engineering is quite clearly dominant within the EU. Total EU production amounted to around 353 billion Euro in 2001, of which Germany was responsible for 41 percent. After Germany come Italy, the United Kingdom and France, that achieved about the same production share between them as Germany. Italy has made significant advances in the last decade, whilst the United Kingdom has steadily fallen behind. The ongoing relocation of manufacturing companies from the UK to other countries poses a real threat to the future of engineering products in the UK. Just 20 percent of EU member production remained to be spread among the other 11 member countries (Sweden lies ahead of Spain and the Netherlands). This means for developing country exporters that it would appear reasonable to focus on Germany first, and then on the United Kingdom, Italy and France.

Electrical engineering
The total industrial demand in the fifteen EU member states was € 32,600 million in 2001 (NACE class 31.10). The industrial demand for electrical engineering products is the highest in Germany, with the United Kingdom and Spain following well behind. The trend in industrial demand in recent years in these countries has been more or less equal to the trend in industrial demand for mechanical engineering products. The other countries are less important in this area, having shown no more than a minor growth or fall in demand. Italy is already losing importance for the long term. France and the United Kingdom are back to 1999 levels.
Denmark, Finland and Ireland have a relatively high industrial demand in terms of electrical motors, generators and transformers compared to their total electrical engineering industrial demand (share is 30 to 50 percent).
Compared to the USA and Japan, Europe is the most important producer and exporter of electrical motors, generators and transformers, whereas the USA is the largest importer.
2001 and 2002 have shown a fall in demand of 6 and 10 to 20 percent (rough estimation) respectively. The market for electronics looks less pessimistic for 2003 than last year. A fairly steady growth for computers and telecommunications is forecast for 2004.

The role of and prospects for developing country suppliers
The Single Market has opened up opportunities for pan-European co-operations. Companies have been busy in cross-border mergers and acquisitions. This development not only contributes to tougher competition among EU firms, but it also enables companies to utilise comparative advantages in different regions to increase overall efficiency. Additionally, the diversity of the supply-side structure among Member States encourages competition, which will also contribute to a more efficient EU industry. In this context the transformation of Central and Eastern European states to market-oriented economies has positive implications for EU mechanical engineering. A division of labour has arisen which enables EU firms to utilise a cheap labour supply to improve price competitiveness in international markets. As a result, many Western European companies have transferred (parts of) their production to countries like Poland, the Czech Republic and Slovakia. Companies are now looking further, into Slovenia and Romania. In most cases it is the manufacture of standard products and parts that is being transferred to Eastern Europe. The same kind of trend is emerging in the direction of the Far East.

Within the EU, the Netherlands and Italy have the highest focus (8 percent of their imports) on developing country exporters, followed by Germany and the United Kingdom (7 percent each). China is their most important supplier. It is important to note that Germany, being the largest producing and consuming country for engineering products, is also a large importer. Their focus is partly on their neighbours, the Czech Republic and Hungary, but mainly on China.
Alongside the Central and Eastern European "low-wage" countries (Czech Republic, Hungary, Slovakia and Poland), the current major developing country suppliers to the European Union are:
- the Far East (China, India, Thailand, Vietnam),
- Latin America (Brazil)
- EU-related countries such as Slovenia and Turkey.

In China, growth is especially strong in parts of transmission. Brazil is losing relevance in pumps, while its exports of parts of transmission and electric drives are growing. Slovenia is growing in all product groups, with all EU countries as a partner. Thailand is losing market share in the growing field of small power dc electric motors. Turkey and Thailand (for most product groups) are not in the top 15 of major suppliers for the selected EU countries.

China is rapidly gaining importance as a major exporter of engineering products. Western European companies are looking for even lower cost prices, offering opportunities for Eastern European countries like Slovenia. as well as those former Russian member states with good technological expertise. The Far East is becoming increasingly interesting to European companies because the market demand is rapidly expanding there. Because of the demand, more and more of these companies are considering building up capacity in the Far East (close distance between demand and manufacturing).

The best opportunities for developing country exporters lie in:

Products	**Industry segments**	**Trade partners**
1. Pumps 2. Parts of transmission (not to complex products) 3. Electric drives (relatively low volumes; high mix of products) Good opportunities (high volumes), but more difficult (because of need for brand names, strong competitors, complexity or high technological standards) 4. Moulds, magnets & elevators	• Construction and installation industry; focus could be on simple parts of transmission, pumps and electric drives • Petrochemical and chemical industries, processing industry; pumps and electric drives • High tech electronics parts of transmission, tool holders, hydraulics/ pneumatics • Automotive industry; parts of transmission • Food industry; • Shipping; • Horticulture, (especially construction and equipment); • Civil engineering; • Water supply and sewerage.	**1. Entrance to Europe:** • Main product suppliers of the OEMs (e.g. Festo, Norgren, SMI for pneumatics); • Traders (smaller importers and agents; often specialised in engineering products). **2. European companies, starting in developing countries:** • System suppliers • OEMs

INTRODUCTION

This CBI survey consists of three sections: EU Market Information (Section A), EU Market Access Requirements (Section B) and Export Marketing Guidelines (Section C).

Market Survey

Part A **EU Market Information** *(Chapter 1-8)*	**Part B** **EU Market Access Requirements** *(Chapter 9)*
Product characteristics Introduction to the EU market Consumption and production Imports and exports Trade structure Opportunities for exporters	Quality and grading standards Environmental, social and health & safety issues Packaging, marking and labelling Tariffs and quotas

Part C
Export Marketing Guidelines: Analysis and Strategy

External Analysis *(Chapter10)*	**Internal Analysis** *(Chapter 11)*

Decision Making
(Chapter 12)

Target markets and segments
Positioning and improving competitiveness
Suitable trade channels and business partners
Critical conditions and success factors

Export Marketing
(Chapter 13)

Matching products and product range
Building up a trade relationship
Drawing up an offer
Handling the contract
Sales promotion

Chapters 1 to 8 (Section A) profile the EU market for Engineering Products. The survey focuses on those products that are of importance to developing country suppliers. The major national markets within the EU for those products are highlighted. The survey includes contact details of trade associations and other relevant organisations. Statistical market information on consumption, production and trade is also provided, as well as information on trade structure and opportunities for exporters.

Whilst Section A provides EU market information, Chapter 9 (Section B) details the requirements that have to be met in order to gain market access for the product sector concerned. Since it is of vital importance that exporters comply with the requirements of the EU market in terms of product quality, packaging, labelling and social, health & safety and environmental standards, these issues are also covered in Section B.

Having read Sections A and B, it is important for an exporter to analyse the target markets, sales channels and potential customers in order to formulate marketing

and product strategies. The purpose of Section C is to assist (potential) exporters from developing countries in their export decision-making process.

Having assessed the external (Chapter 10) and internal environment (Chapter 11), the (potential) exporter should be able to determine whether there are interesting export markets for his company.
By matching external opportunities and internal capabilities, the exporter will be able to identify suitable target countries, market segments and target product(s) within these countries, and possible trade channels via which the selected products can be exported (Chapter 12).

Chapter 13 explains which marketing tools can be used to build up successful business relationships.

The survey is of interest both to starting exporters and to exporters already engaged in exporting (to the EU market). Section C will be of particular interest to more experienced exporters embarking on export to the EU and those exporters looking for new EU markets, sales channels or customers. Starting exporters are advised to read this publication in conjunction the CBI's Export Planner, a systematic guide to setting up export activities.

Part A
EU market information

1 PRODUCT CHARACTERISTICS

1.1 Product groups

The information used in this market survey has been obtained from a number of different sources. Extreme care must therefore be taken in the qualitative use and interpretation of quantitative data, both in the summary and throughout the text, as well as in the drawing of comparisons between different EU countries with regard to market approach, distribution structure, etc.

In this survey, the term 'engineering products' is used to refer to 1) components and 2) products assembled for a specific customer using standard components (catalogue items). As well as components and assembled products, this survey also covers those technologies and tools most widely used in the manufacture of these products. For example, "Power Transmission Engineering" refers to those components of a machine or system that provide motion. Power transmission engineering is required whenever it is necessary to move persons or objects. Motion is transmitted by means of drives. Drives are constructed in an extremely wide variety of forms, but are all required to transmit power and convert torque and rotary motion. Whatever the type (mechanical, electrical, hydraulic, pneumatic or thermal), without drives nothing would move, either in industry or in everyday life.

The production of engineering products generally entails 1)engineering and 2) assembly. The definition of engineering in this context isd (functional, technical, value, manufacturing; mechanical and/or electrical). Generally speaking the product development, customer-specific engineering and final assembly will be carried out by European companies. The detail engineering (including work preparation), production of parts and in some cases the assembly of parts into intermediate products can and should be the focus for developing country exporters. This survey therefore focuses on standard parts and intermediate products in the area of Engineering Products.

The engineering products in question have been divided into seven product groups. Each product group has been described in brief, in order to clarify its position in relation to the other groups.
These product groups serve as a guideline throughout the whole survey.

Electric drives
The focus in this market survey is on alternating current (ac) and direct current (dc) motors and direct current (dc) generators.
Technological advancement is rendering automation products more functional, simpler to use and less expensive. It is also making their adoption by users easier. The wide acceptance of the PC as an integration platform for Human Machine Interface (HMI), logic solving, motion control, and vision systems is making the use of automation easier across the plant floor. Progress in establishing networking standards, a single programming and diagnostic environment and standards for data exchange are serving to facilitate the integration of various automation elements in a consistent manner and further fuelling growth.

Moulds, magnets and elevators
This is a broad category. Moulds are tools used for all types of materials in the production of components (e.g. cast or injected products).. The use of magnets is both extensive and diverse:magnets are used as components in electric drives, but also to separate metal parts from non-metal ones within systems or as tools to hold metal

Observed Product groups

Product group	Characteristics
Electric drives	Assembled products; standard with options and features; batch production (large – small); trade article
Moulds, magnets and elevators	Assembled products; one-of-a-kind, unique, sometimes early supplier involvement Moulds: craftsmanship
Hydraulics	Basic technology
Parts of transmission	Simple to assembled products; standard with options and features; batch production (large – small); trade article
Pneumatics	Basic technology
Pumps	Assembled products; standard with options and features; batch production (large – small); trade article
Tool holders	Conditionally to production; standard; trade article; craftsmanship

components in a certain position. Progressive technology and radical miniaturisation mean that the magnetic properties of the materials have to be able to meet increasingly high requirements.
Elevators (and conveyors) are primarily used to move goods. They are required in many different environments, ranging from transport to the music industry. These products are generally assembled customer-specifically, using standard components.

An example of innovation is the new polyurethane drive belts with steel reinforcing cores. These new belts allow drive solutions to be developed for elevators which are around 70% more compact and considerably less expensive than the conventional steel cable solutions previously used to drive elevator cars.

Hydraulics
Hydraulics is a basic technology used for several kinds of products. It is often used as a basic for engineering products, and must therefore be included in this survey.

Hydraulic technology has reached a stage where it can regarded as irreplaceable. Hydraulics have a high power density, low susceptibility to malfunctioning, flexibility in respect of different application criteria and a good price/performance ratio. Over the last ten years the development of the combination between hydraulics and electronics has been highly significant. Factors such as reliability, accuracy, dynamic performance, variability, quality, flexibility, design adaptability and improved ease of use have contributed to the success of this development. Of course certain familiar disadvantages remain, such as leakage, noise, hazardous fluids and problems with interchangeability of components from different manufactures.
Modern fluid power systems make use of electronics – especially in signal acquisition, processing and the generation of regulation values. The integrated use of electronic control (sensors) and computer technologies are leading to the development of "intelligent subsystems" instead of single components as cylinders. Also, hydraulic fluids have become considerably more environmentally friendly.

Parts of transmission
This is also a broad group, sometimes referred to as mechanical transmission engineering. This latter includes gear units, linear guides, brakes, clutches, couplings, belt and chain drives, freewheels, shaft-hub connections, gearwheels and plain and rolling bearings. In this survey, the focus is on bearings, clutches, shafts and couplings. Attention is given both to the assembled products and to the individual components.

Thanks to the continuous developments taking place in this field, transmission engineering components are delivering ever-higher performance within increasingly compact dimensions. A recent development in bearing technology, for example, is locking bearing units. These allow rotation to be either enabled or totally disabled by remote control. This makes it possible to create simple and compact safety devices to prevent the undesired rotation of shafts.

Pneumatics
Like hydraulics, pneumatics is a basic technology, but it is less widely used and is not subject to the same strict tolerance levels. Here we focus on pneumatic tools, i.e. instruments activated by air pressure. Pneumatic products fall into five categories: drives, valves, controlling & accessories, filters, regulators & lubricants and tubes & fittings.

A current trend is the reduction in Total Cost of Ownership (TCO) being demanded by innovative users. When selecting a supplier, users take into account not only the cost price but also the maintenance and energy costs and the lifetime of the product.. An international standard for the calculation of the TCO is to be introduced in the near future.

Pumps
Pumps perform a variety of tasks reliably and with precision in the transport of liquids and gases in factories, plants, public works and elsewhere in our modern economy.

The differences between compressors and liquid pumps is that the medium being compressed by a compressor is gaseous instead of liquid. Vacuum pumps also have a gas as a medium, but the aim is not to build up pressure but to evacuate gas from a given space.

Tool holders
A specific category, limited to machine tools and their special attachments only. These tools are used in machines to produce parts.

An emerging trend is the move towards the production of a tool in one operation. This reduces set-up times and thus costs. The result is more complex tools and attachments, manufactured in one single set-up. In terms of technology, there is a clear trend towards integrated processes, 5-axis machining centres and multi-axis mill-turn centres, all emphasising the market requirement for ‘one-hit’ machining and the economical machining of small batches. Also, there is more extensive use of eco-friendly features such as sealed lubrication for slideways to avoid the contamination of coolants. But there seems to be a greater emphasis at the moment on low unit prices than on new technology.

Key markets for the selected product groups
In general the products groups are applied in the following type of industries:

- Automotive (motors, passenger cars, commercial vehicles and trucks, buses, planes)
- Agricultural
- Energy (oil, gas, wind) and water
- Machinery (food, beverages, paper, chemicals, mining, textiles, office use)
- Packaging
- Construction
- Material handling
- Medical technology

1.2 HS codes

The range of engineering products is both wide and diverse. We have therefore had to make a broad selection of product groups. Table 1.2 gives a summarised list of the HS codes of products relevant to this survey and for which the value of extra-EU imports is shown (see Appendix 1 for a complete list of HS codes.). These HS codes are also the HS codes that are examined in more detail in this survey.
It is important to note that this selection of HS codes is the basis for most of the survey, especially Chapters 5, 6 and Appendix 1. However, where data has been collected from sources other than Eurostat, different classifications are applied. This has resulted in tables and figures with other classifications (see, for example, chapters 3 and 4). This has implications for the comparability of the figures and tables presented. Conclusions should therefore be drawn with extreme caution.

Product group	HS code[1]	Description[2]
Electric drives	850110 - 53	AC and DC motors, generators
Moulds, magnets and elevators	842832/33	elevators and conveyors for goods
	848010 - 79	moulds (for several types of materials)
	850590	electro-magnets, chucks, clamps and similar holding devices and their parts, n.e.s.
Hydraulics	841090	parts of hydraulic turbines
	841221/90	hydraulic power engines and motors, parts of engines and motors n.e.s.
	841350/60	reciprocating positive displacement pumps, rotary positive displacement pumps
	848120	valves for oleohydraulic transmission
Parts of transmission	842541	built-in jacking systems
	848210 - 99	bearings
	848310 - 90	shafts, bearing housings, gears and gearing, chain sprockets, flywheels and pulleys, clutches and shaft couplings, parts of transmission shafts, ball screws, couplings, n.e.s.
Pneumatics	841231	pneumatic power engines and motors
	848110/20	valves
	903281	pneumatic regulating or controlling instruments and apparatus
Pumps	841311 - 91	pumps for fuel, liquids, cooling-medium, hand pumps, concrete pumps, reciprocating positive displacement pumps, rotary positive displacement pumps, centrifugal pumps, parts of pumps n.e.s., vacuum pumps
	841410 - 90	air pumps, compressors, parts of pumps, compressors; fans, n.e.s.
	841899	parts of refrigerating or freezing equipment and heat pumps n.e.s.
Tool holders	846610 - 30	tool holders, work holders, dividing heads and other special attachments n.e.s.

[1] excluding all HS codes specifically for use in civil aircraft
[2] n.e.s. = not earlier specified

2 INTRODUCTION TO THE EU MARKET

The European Union (EU) is the current name for the former European Community. Since 1 January 1995 the EU has consisted of 15 member states. Ten new countries will join the European Union in 2004. Negotiations are in progress with a number of other candidate member states.

In 2002, the EU population totalled 379.4 million and the average GDP per capita amounted to approximately € 21,023.

Within Western Europe – 15 EU member countries plus Iceland, Liechtenstein, Norway and Switzerland – more than 20 million enterprises are active. Small and medium-sized enterprises (SMEs) account for the lion's share. In 2000, the average turnover per enterprise of SMEs and large enterprises amounted to € 600 thousand and € 255 million respectively.

EU Harmonisation
The most important aspect of the process of unification (of the former EC countries) as it affects trade is the harmonisation of rules in the EU countries. As the unification allows free movement of capital, goods, services and people, the internal borders have been removed. Goods produced or imported into one member state can be moved around between the other member states without restriction. A precondition for this free movement is uniformity in the rules and regulations applying to locally produced or imported products. Although the European Union is already a fact, not all the regulations have yet been harmonised. Work is in progress in the fields of environmental pollution, health, safety, quality and education. For more information about harmonisation of the regulations visit AccessGuide, CBI's database on non-tariff trade barriers at www.cbi.nl/accessguide

Monetary unit: Euro
On 1 January 1999, the euro became the legal currency within twelve EU member states: Austria, Belgium, Finland, France, Germany, Greece, Italy, Ireland, Luxembourg, The Netherlands, Spain, and Portugal. In 2002 circulation of euro coins and banknotes replaced national currency in these countries. Denmark, the United Kingdom and Sweden have decided not to participate in the Euro.

The most recent Eurostat trade statistics quoted in this survey are from the year 1999. In this market survey, the € is the basic currency unit used to indicate value. Values for dates before 1999 are expressed in dollars.

Trade figures quoted in this survey must be interpreted and used with extreme caution. The collection of data regarding trade flows has become more difficult since the establishment of the single market on 1 January 1993. Until that date, trade was registered by means of compulsory customs procedures at border crossings, but, since the removal of the intra-EU borders, this is no longer the case. Statistical bodies like Eurostat cannot now depend on the automatic generation of trade figures. In the case of intra-EU trade, statistical reporting is only compulsory for exporting and importing firms whose trade exceeds a certain annual value. The threshold varies considerably from country to country, but is typically around € 100,000. As a consequence, whilst figures for trade between the EU and the rest of the world are accurately represented, trade within the EU tends to be underestimated.

Overview 15 EU countries, 2002

Population	**379.4 million**
Area	**31,443,000 km²**
Density	**83 people per km²**
Languages	**15 (excl. dialects)**
GDP/capita	**€ 21,023**
Currencies	**€, UK£, DKr., SKr.**
Exchange	**€ 1 = US$ 0.99**

Source: The World Factbook 2002

Population and GDP of selected EU countries, 2002

Countries/category	Population in millions	Age 15-64	GDP (€ billion)
Germany	83.3	68%	2,206
France	59.8	65%	1,556
UK	59.8	66%	1,485
Italy	57.7	67%	1,416
Spain	40.1	68%	836
The Netherlands	16.0	68%	417

Source: The World Factbook 2002

Exchange rates of EU currencies in US$

Country	Currency	1998	1999	2000	2001	2002	February2003
European Union	ECU	1.12	-	-	-	-	-
	_	-	1.06	0.92	0.89	0.95	1.08
Denmark	DKr	0.15	0.13	0.12	0.12	0.13	0.15
Sweden	SKr	0.13	0.12	0.11	0.10	0.10	0.12
United Kingdom	GB£	1.66	1.62	1.51	1.45	1.50	1.61

Source: CBS Statline (March 2003)

Furthermore, the information used in this market survey has been obtained from a variety of different sources. Therefore, extreme care must be taken in the qualitative use and interpretation of quantitative data, both in the summary and throughout the text, as well as in the drawing of comparisons between different EU countries with regard to market approach, distribution structure, etc.

For more information on the EU market, please refer to the CBI's manual Exporting to the European Union.

This survey focuses on the six major EU markets for engineering products, namely France, Germany, Italy, the Netherlands, Spain and the United Kingdom. These EU member countries will be highlighted because of their relative importance in terms of industrial demand, production, imports and exports.

3 INDUSTRIAL DEMAND

The classification of product groups in this chapter has been made according to the NACE-classification and comprises more products than the product groups discussed in Chapter 1, which were based on HS codes. For instance, the NACE product group pumps and compressors contains products that in this survey have been classified in the product group pumps, pneumatics and hydraulics. Most NACE product groups contain several items per group. The table below presents an approximate comparison of NACE with HS classification, making a distinction between mechanical and electrical engineering.

3.1 Market size

Introduction

Mechanical and electrical engineering is an industry with a broad product range and a diverse type of markets in which the products are used. The most important markets for engineering products are:

- Automotive (motors, passenger cars, commercial vehicles and trucks, buses, planes)
- Agricultural
- Energy (oil, gas, wind) and water
- Machinery for … (food, beverage, paper, chemicals, mining, textile, office)
- Packaging
- Construction
- Material handling
- Medical technology

The market size for engineering products is difficult to determine because of the indistinct boundaries between end markets, intermediate users and manufacturers of the products. Also, the definitions of the engineering industry and engineering products used vary, depending on the countries, market sectors and trade promotion

Figure 3.1 The relationship between market and products in the Engineering Industry

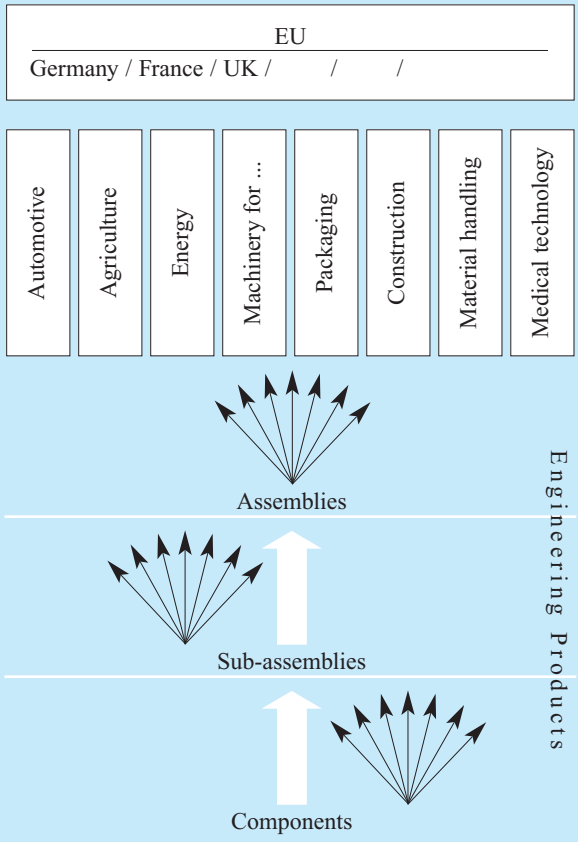


Table 3.1 Product group classification according to NACE (compared with HS codes)

NACE classification	Product groups (HS classification)
Electrical Engineering	
Electric motors, generators and transformers (class 31.10)	Electric drives
Mechanical Engineering	
Lifting and handling equipment (class 29.22)	Moulds, magnets and elevators
Transmission machinery (class 29.14)	Parts of transmission
Pumps and compressors (class 29.12)	Pneumatics
Tapes and valves (class 29.13)	Hydraulics
	Pumps
Machine tool (class 29.40)	Tool holders

organisations (and branch organisations) in question. Figure 3.1 gives the definitions of the engineering industry and its relationships as used in this survey.

Engineering products can be components, sub-assemblies and/or assemblies (products). Components are used in sub-assemblies and sub-assemblies are consequently used in assemblies. The assemblies are delivered to industrial end users. But sub-assemblies or even components can and will also be used by industrial users in the distinct market segments. The industrial users in the market segments will use the engineering products to manufacture end products such as cars, trucks, tractors, oil producing installations, buildings, MRI-scanners, etc. All of the above forms part of the engineering industry. It is usually difficult to allocate data on industrial demand to a specific part of the engineering industry. THe situation is made still more complex by the fact that within the EU and its individual countries the engineering industry is sometimes defined differently.
In this survey we will first present the industrial demand for the complete engineering industry (section 3.1) and then focus on mechanical and electrical engineering, highlighting the various product groups selected for this survey (also section 3.1). Where possible, industrial demand data per country is presented (section 3.1). In section 3.2 the available industrial demand data is presented for the different distinct market segments, per product group where possible.

Industrial demand for the total engineering industry
Industrial demand is defined as the demand for engineering products from all included markets (industrial users).
Industrial demand amounted to € 464,301 million in 2001(NACE codes 29.1-5 and 31). This comprises industrial demand in all the market segments named in Figure 3.1 plus industrial demand at assembly and sub-assembly level as shown in Figure 3.1. Industrial demand is calculated by adding together production and imports and then subtracting exports.

A distinction is generally made between mechanical and electrical engineering. The mechanical engineering industry comprises fluid power (hydraulics and pneumatics), power transmission (mechanical drives, pumps and transmissions), handling and tools.
Electrical engineering encompasses electrical drives (included in this survey) and transmissions (motors and controllers), but also about electric distribution apparatus, insulated wire and cable, accumulators, batteries and lighting (e.g. traffic light systems). In recent years, a new technological discipline has been created: mechatronics. The trend is towards the consideration of the fields of mechanical engineering, electrical engineering, electronics and information technology not as separate areas but as an overall system. In future, this tendency will lead to loosening of the boundaries between the areas. So far, however, the division between mechanical and electrical engineering is still aparent. A separate overview of the industrial demand for mechanical and for electrical engineering industry is presented later in this section.

2000 was an excellent year for the engineering industry, but as 2001 progressed, output clearly dropped in most sectors of the industry. The impact continued to be felt in 2002, which was one of the bleakest years for most of the sectors of the engineering industry. There are now signs of improvement (increasing capacity utilisation in plants, more quotations coming to suppliers), indicating that the worst is over.
During the summer of 2002 and winter of 2003 several factors shook the confidence of industry and investors, leading to a second slowdown in activity. These included accounting scandals, falling share prices and the fact that very high expectations of a better business environment failed to materialise. This underlying uncertainty had an impact on the engineering industry, a field that is heavily dependent on investor confidence. The result was a steep fall in output in the four largest economies - Germany, France, Italy and the United Kingdom. The "medium-sized" countries (Belgium, the Netherlands, Spain, Sweden and Switzerland) were also negatively affected, some of them quite severely (the Netherlands, Spain and Sweden).
Part of the explanation for the poor performance in 2002 lies in the drop in world trade in engineering goods.

As well as the above uncertainties, there have been other more fundamental reasons for the decline in industrial demand for engineering products, one of the most important being a lack of overall economic growth in the EU. "Domestic demand" or growth in Europe as a whole for 2003 gives rise to concern.

Mechanical engineering industry
The expected growth in industrial demand is about 1 percent for 2003 and 2 to 3 percent for 2004, following a decline of 4 percent in 2002. These forecasts may prove too optimistic. Uncertainty regarding the recovery of the world market, instability in the Middle East (following the war in Iraq, the war against terrorism, the Palestine-versus-Israel question) and volatility in stock markets may lead once again to expectations not being met. A real recovery of the world market is not expected earlier than mid-2004. This has resulted in a fall in capital spending in 2002 and 2003. Profit margins are under pressure and slack demand does not create incentives to initiate investments. Any initial pick-up in demand will be met by an increased use of existing capacity.

The industrial demand for total mechanical engineering industry

The total industrial demand in the fifteen EU member states amounted to € 294,844 million in 2001 (NACE classes 29.1-5).

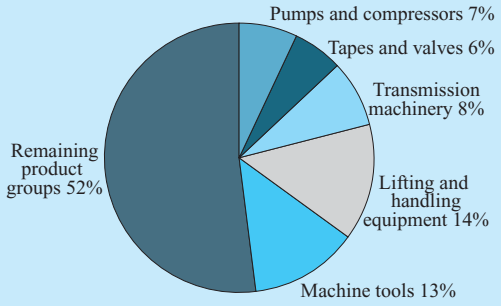
Figure 3.2 presents industrial demand per selected product group. Unfortunately, NACE class detailed data was only available up to 1999. The total industrial demand in the fifteen EU member states amounted to € 267,871 million in 1999.

All product groups show steady growth except pumps and compressors and tapes and valves.

Machine tools and lifting and handling equipment are the fastest growing and most important product groups, according to NACE classification. However, it should be noted that these NACE classes incorporate more products then the corresponding HS selected product groups in this survey. The two groups machine tools and lifting and handling equipment in particular are smaller. The tool holders (HS code 8466) form roughly 15 percent of total NACE class machine tools (according to CECIMO data; machine tool branch organisation of 14 European countries).

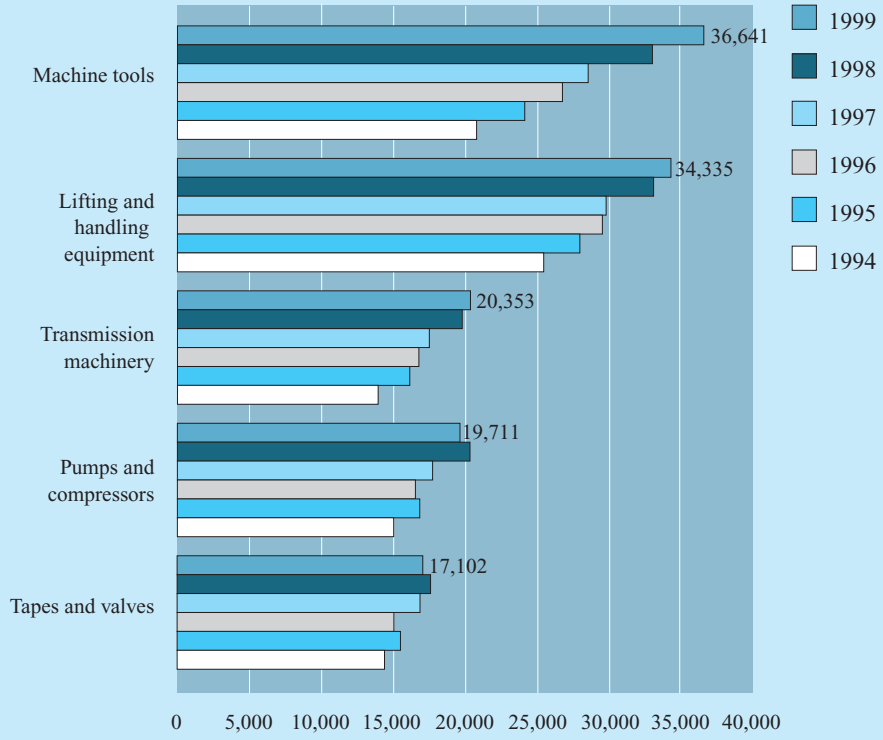
Industrial demand for tool holders will therefore have been around € 5,500 million in 1999. The demand for specific handling equipment as defined in this survey will be about 23 percent of the NACE class lifting equipment (NACE 2922 total EU15 import compared to HS code groups 842832/33, 8480 and 850590 EU import, in 1999). Note that all personal and most goods

Fig 3.3 **Industrial demand for selected mechanical engineering products in the EU, 1999, percentage of value**



Source: VDMA (2001)

Fig. 3.2 **EU industrial demand by selected mechanical product groups according to NACE-classification, 1994-1999, € million**



Source: VDMA (2001)

transport is not included. Industrial demand for specific handling equipment will therefore have been around € 7,900 million in 1999.

Figure 3.3 must be corrected, since in NACE 29.1-5 more products are included than the selected mechanical engineering products (parts of transmission, pumps, tool holders, ..) included in this survey. If only the selected product groups in this survey are taken into account, the following remarks should be made:

- the industrial demand for tools must be corrected; tool holders are only a small part (15 percent) of the group machine tools,
- the industrial demand for lifting equipment must be corrected; magnets, moulds & elevators form roughly 23 percent of the group,
- pumps and compressors plus tapes and valves can be translated into pumps, hydraulics and pneumatics (in the proportion 75 – 15 – 10 percent)

The conclusion is that with regard to industrial demand pumps and parts of transmission are the most important mechanical engineering product groups within the EU. They account for 35 and 30 percent respectively of the total industrial demand. Hydraulics and pneumatics are the smallest products groups, accounting for around 8 and 4 percent of the industrial demand respectively.

Electrical engineering industry

In the terms of reference the electrical engineering industry has been defined by the new NACE 31 (Revision 1). The electrical engineering industry is clearly bigger than the electric drives included in this survey. To a great extent the industry's products are intermediary goods, usually designated as Original Manufacturer Equipment (OEM). In a few cases these products are used independently, but they are almost always integrated into machines, plants or any of a wide range of systems.
Some batteries and accumulators are not applied as intermediary goods but sold direct to final users, e.g. for replacement of expired power stores in cars. Many lighting equipment products are sold directly to private households. Others are integrated into lighting systems, e.g. traffic light systems, airport light systems etc.

Industrial demand for total electrical engineering industry

Total industrial demand in the fifteen EU member states amounted to € 169,457 million in 2001 (NACE 31).

For the electrical-electronic engineering industry as a whole, including ICT, ORGALIME (European subcontracting association) expects output to decrease by 6.7 percent in 2002. Demand in Europe has been extremely low and intra-European trade is expected to drop by 8.7 percent in volume. Overall exports will fall by some 7 percent. Demand has also fallen elsewhere, but not as much as in Europe.
As in the metal goods industry, there are signs of stabilisation. Output of electrical machinery was higher during the summer months than in the winter months of 2002, especially in Germany.
ORGALIME economists expect demand to stabilise in electrical/ electronic engineering as a whole. However, there is little prospect of a return to the boom of previous years. Next year (2003) output is expected to grow by some 1.6 percent. A turnaround is expected in most countries next year, apart from in Sweden, because of the situation in the ICT industry there.

Industrial demand for the selected product groups in electrical engineering industry

Total industrial demand in the fifteen EU member states amounted to € 32,600 million in 2001. Industrial demand for the electrical product group (electric drives) as considered in this survey will be only about a quarter of the observed NACE class 31.10. Electric drives is therefore roughly as big as the mechanical product group moulds, magnets & elevators.

Fig. 3.4 **EU industrial demand by selected product groups according to NACE-classification, 1996-2001, € million**

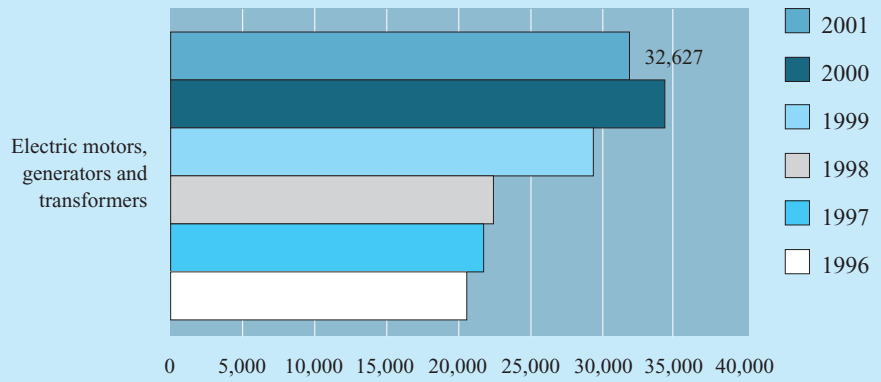


Figure 3.4 presents the industrial demand for the selected product group, as it has developed in recent years.

The data for electric drives in 2000 and 2001 shows that 2000 was a good year with double digit growth in demand. However, in 2001 growth turned to decline, with a loss of about 7 percent in industrial demand. The same trend can be seen for mechanical engineering product groups.

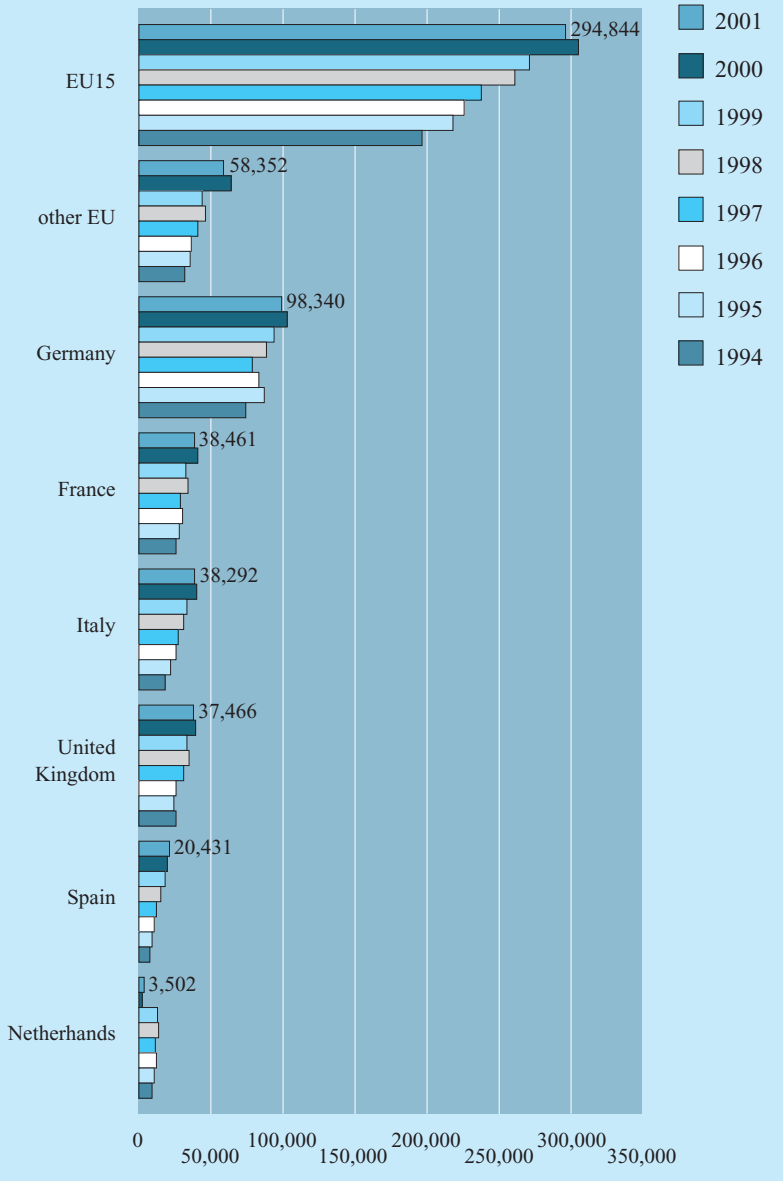
Industrial demand per country

Mechanical engineering

Italy, Germany, France and the United Kingdom suffered most from the economic slowdown in 2001 and 2002. Industrial demand declined by 4 to 5 percent in 2002. The forecast for 2003 is a stabilisation in demand, with less optimistic forecasts for Germany, the Netherlands and the United Kingdom.

Figure 3.5 shows that Germany is by far the most important country in the EU for mechanical engineering products. Germany has the largest industrial demand and is therefore the most interesting country. Italy, France and the United Kingdom are

Fig. 3.5 **Industrial demand for NACE 29.1-5 (mechanical engineering) per country, 1994-2001, € million**



Source: VDMA (2003)

almost equal to each other. In 2001, the growth in industrial demand per country was negative (France minus 4 percent, the rest of the countries minus 1 percent), in all countries except for Spain and the Netherlands. Spain (28 percent), Germany (20 percent) and Italy (19 percent) were the fastest growers when 2001 volumes are compared with 1998 data. The Netherlands (minus 76 percent) showed the most negative growth when 2000 is compared with 1999, the reason being falling imports from € 17 million in 1999 to 5.8 million in 2000 in an attempt to improve the negative trade balance.

Industrial demand for parts of transmission showed the fastest growth in Italy in 2000 (16 percent to 690 million Euro). Demand grew by about 6 percent in Germany (to 1350 million euro) and in the United Kingdom (to 340 million euro). Germany is dominant in terms of demand for mechanical power transmission products (51 percent of total European demand).

In **Germany** especially the machinery (e.g. paper -, textile – or general machines; casting plants), components for machines (hydraulics and pneumatics, pumps), the electronic equipment and the automotive (vehicles) sectors are important. The power transmission and fluid power products saw a fall in sales of approximately 2 percent in 2002. The downturn in the world economy, the weak home-market demands and the threat (and its start) of war were largely responsible. Important and strongly expanding markets are process automation (combination of mechanical engineering products with process and software control), mobile machinery and wind-power generation. The energy and machinery market for German pumps remained good. The water sewerage and the construction sector showed a decline in demand. The limited demand in the public sector (cautious orders in 2002) was the main reason for the fall in demand in the water sewerage sector. The construction market has already been weak for a number of years. A recovery for this market is forecast for the second part of 2003 onwards.

Within the **Italian** industry, mechanical engineering takes about a 10 percent share with its employment figures. Regionally, this industry is concentrated in northern Italy in the provinces of Lombardia and Emilia-Romagna. The sectors "machinery for food, beverage and tobacco processing", "other agricultural machinery" and "machine tools" have developed better than average.

The **British fluid power markets** were very weak in 2001. The market for hydraulics and pneumatics fell by 8 percent. The demand for fluid power equipment in the UK depends largely on a wide range of manufacturing industries and in particular manufacturing investments. These have suffered in recent years.
The non-automotive market industrial demand for parts of transmission amounted to 770 million euro in 2002. Bearings and gear boxes were the products most in demand (280 million and 180 million euro respectively).

The United Kingdom has declined steadily in importance within the EU mechanical engineering industry. There are several reasons for this decline. Firstly, the demand for machinery has been particularly weak in The United Kingdom for years. Secondly, British companies lost market shares both at home and abroad as they became less competitive in technological terms.

Table 3.2 Key figures for the "metalektro" industry in the Netherlands, in millions of euros

	1999	2000	2001	2002	2003
Nominal value					
Sales	62,900	68,100	68,500	68,300	72,000
Cash flow	13,300	14,200	14,600	15,000	15,500
Investments	3,300	2,400	2,500	2,700	
Employment x 1000 FTE	382	385	382	372	369
annual percentage changes					
In volume					
Sales	2.2	5.2	0.0	-1/4	4 1/4
Prices					
Sales	-0.2	2.9	0.5	-1/4	1 1/4
Unit operating costs	0.5	3.4	2.6	1/4	1/4

Source: CBS (2002)

In **France**, the mechanical engineering industry (measured in terms of employment figures) accounts for about 7 percent of total French industry. The regional centres of French machine production lie in the Île de France and the Bassin Parisien. In France the sectors "lifting and handling equipment" and "other agricultural machinery" are particularly in evidence. Above-average weight is also held by the "pumps and compressors". On the other hand, "machine tools" are very poorly represented.
The **Spanish** mechanical engineering industry accounts for about 5 percent of the employment figures of the domestic manufacturing industry. From the specialisation point of view, the sectors "machinery for iron and steel production" (2951) and "other agricultural machinery" hold above-average weight, while the sectors "pumps and compressors" and "taps and valves" are particularly weak.

The regional clusters of **Dutch** mechanical engineering are situated in the Southern (South-East North-Brabant, Middle Limburg) and Eastern part (Twente) of the Netherlands. Many machine manufacturers are subsidiaries of foreign companies. One of the particular strengths of the Dutch mechanical engineering industry lies in the sectors connected with the agro-industrial cluster (the manufacturers of agricultural machines and particularly of food and packaging machines).

"**Metalektro**" is the complete engineering industry in the Netherlands. This includes not only all engineering products but also sheet metal production, electronic components and PCBs and the production of e.g. screws and bolts (simple metal products). The "metalektro" industry in the Netherlands is not expected to return to positive growth until 2004. The predicted sales for 2003 are too high and will at most reach the level of 2002. Investments in the metalelektro industry dropped in 2001 and 2002 and are expected to stabilise in 2003.
Until 2002, growth was supported by the still growing demand by the inland construction sector. This construction sector is expected to show a negative growth in 2003. Also the production of investment goods (e.g. machinery and the automotive industry) is likely to face further decreases in industrial demand this year, but for the longer term prospects are better. It takes time for general capacity utilisation rates and profitability to return to a normal level. Most of the anticipated production growth will occur in 2004. However, for the Dutch automotive industry and the passenger car industry in particular, progress may be hampered or delayed, due to structural changes in co-ownership in the Dutch automotive industry (from Volvo to Daimler together with Mitsubishi) and the possible need to restructure production lines in 2004. This will result in a postponed return of increased demand for engineering products in the Netherlands in this market segment.

Table 3.3 shows that all markets have experienced a decrease in volume. Machinery is expected to recover sharply in 2003. The present situation (August 2003) indicates that expectations are too high (only 1 percent will be achieved).

Electrical engineering
Total industrial demand in the fifteen EU member states amounted to € 32,600 million in 2001 (see Figure 3.4). About 80 percent (more than € 26,000 million in 2001) of this demand was created in the six countries highlighted in this survey (see figure 3.6).

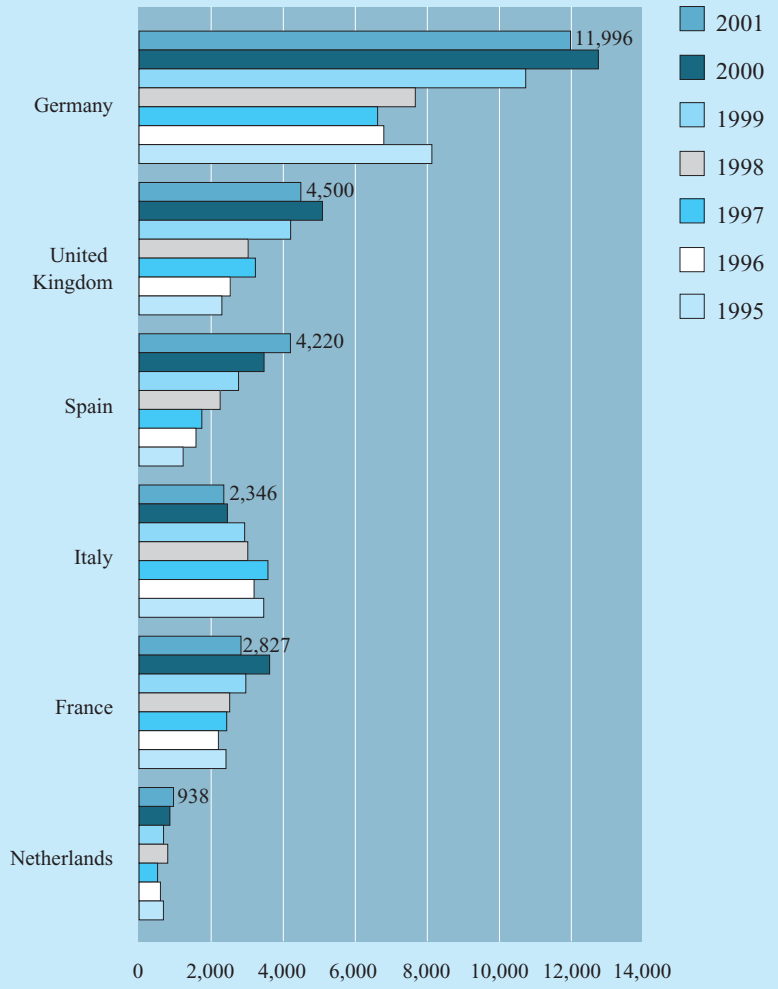
The industrial demand for electrical engineering products is the highest in Germany. The United Kingdom and Spain follow at a considerable distance. The trend in industrial demand in these countries in recent years has been more or less equal to the trend in industrial demand for mechanical engineering products. The other countries are less important in this area, also showing a minor growth or fall in demand. Italy is already losing long-term significance. France and the United Kingdom are back to 1999 levels.
Denmark, Finland and Ireland have a relatively high industrial demand for electrical motors, generators and transformers, relative to their total electrical engineering industrial demand (share is 30 to 50 percent). Compared to the USA and Japan, Europe is the most important producer and exporter of electrical motors, generators and transformers. The USA is the largest importer. The years 2001 and 2002 showed a fall in demand by 6 and 10 to 20 percent (rough estimation) respectively. The market for electronics looks less pessimistic for 2003 than for 2002. A fairly steady growth for computers and telecommunications is forecast for 2004.

Table 3.3 Key figures for the relevant Dutch metal and Electro-technical industries, 1999-2003, annual percentage changes

	1999	2000	2001	2002	2003
Sales volume					
Machinery for ..	1.3	11.0	-0.6	-1	6.25
Automotive vehicles	2.8	0.5	-0.2	-5	-0.25

Source: CBS (2002)

Fig. 3.6 **Industrial demand for electric motors, generators and transformers per country, 1994-2001, € million**



Source: VDMA/ZVEI (2003)

3.2 Market segmentation

This section discusses the developments and requirements of the different market segments demanding engineering products. Often, both mechanical and electrical engineering products are used (separately or combined: mechatronics) by industrial users. Mechanical and electrical engineering products are therefore treated jointly in this section.

Industrial demand fell in 2002, as investment plans were postponed or revised downwards month after month. The situation is particularly difficult inside Europe, since intra-European trade fell 2 percent in 2002. In certain markets outside the EU demand was relatively strong, in particular in Eastern Europe and Asia.

A market slowdown is registered in the automotive market in passengaer-car and commercial-vehicle sales in 2002. The output of passenger cars shrank by 1 percent to 14.8 million vehicles, while truck production figures had to be slashed by as much as 7 percent. Only France and the United Kingdom were able to increase their output of passenger cars while losses were logged in Germany, Italy, Belgium and the Netherlands. Following growth at a moderate rate in the first half of 2003, the third quarter saw a major slowdown due to the change over to new models. This slowdown was however concentrated only on this period and was due principally to this factor. The introduction of new models should boost production in coming quarters. As far as trucks are concerned, despite low investment levels, the outlook for both 2003 and 2004 is fairly positive.
As a conclusion, the automotive market remains stable to positive offering possibilities for developing country exporters, especially for parts of transmission.

The **agricultural** market is expected to remain stable in 2003 and 2004, because of uncertainty in European

Table 3.3 Machinery for … and agricultural market volume, 1999, € million

NACE group	Industrial demand
Machinery for … (steel production, construction, food, beverage, textile, paper, other special purposes)	41,500
Agricultural (equipment)	21,500

agricultural policy and fierce competition with decreasing product prices.

Investments in **machinery** (equipment) have suffered from the economic downturn. Less profits and slack demand have led to minimal equipment investments in industry. Investments in machinery and equipment fell by 4 percent in 2002 and are expected to grow by about 1.5 percent in 2003 and 6 percent in 2004, according to European Commission economists. This last percentage may prove too optimistic in view of volatility in the stock markets, slow growth in the German market and the uncertain global political situation.
The EMA (Europe, Middle East, and Africa) market for automation products (AC drives) and services for discrete industries (machinery, automotive, material handling, medical technology) is expected to grow at a healthy compounded annual growth rate of 6.6 percent over the next three years. This market generated over € 8400 million in 2001 and is forecast to exceed € 11 billion in 2006, according to a new ARC Advisory Group study.
In Europe, manufacturers remain cautious as their economic strength declines. “While the current slowdown in the economy has severely impacted the industrial automation business in the EMA region, many bright spots are ahead with automation products and services for the discrete industries. High growth is projected for Eastern European and Nordic countries. Germany is the largest country for discrete products and services in the region and will also outpace the market growth rate”.

The Integrated Motor Drive (IMD) Survey (1Q2000), Motion Tech Trends (MTT, Inglewood, California) places Europe in the growth stage of market development for overall motors and drives, while North America is still in the early adoption stage—with just € 1.8 million in 1999 sales, growing to € 16.5 million by 2005. MTT's figures refer only to “ac induction IMDs” in sizes of 1 hp and above. Long-term, the U.S. IMD market is likely to grow to 4 to 5 percent of the multibillion dollar overall motors and drives market.

Frost & Sullivan's (London) late-1999 analysis of the European Market for Variable-Speed Motors [another term for IMDs] reflects greater technology acceptance, with a 1999 market value of € 51.5 million, growing to € 195 million by 2006. The compound annual growth rate for the period is reported to be 22.8 percent. The top three European market areas are Germany, Italy, and France with a 57.9 percent, 16.7 percent, and 10 percent share of 1999 revenues, respectively.
Another 1999 British report on European & North American Markets for Motors with Built-in Drive produced by Intex Management Services (Wellingborough, Northants) paints an even brighter picture, projecting growth in the market to top € 500 million by 2005. This includes the substantially smaller U.S. market. You can find more on these reports in the Online Extra article at www.controleng.com.

The market segment Construction shows the following characteristics for 2001:

Country	Market size in 2001 (in Mio €)	% growth 2001 compared with 2000	Estimated market size in 2006 (in Mio €)	Most important subsection
Germany	4850	-17.2	4800	
France	3300	+5	4500	Material production
United Kingdom	1325	+2.1	1220	Earth moving equipment

Industrial demand in Germany for Construction has already been on the decline for 6 years. In the next few years, stabilisation is expected to take place. France is showing strong growth figures and could therefore be interesting for developing country exporters. A strong increase in demand is expected up to 2006. Hydraulic excavators are doing particularly well. The United Kingdom is also showing growth. An expected negative exchange rate between the Euro and the Pound is expected to lead to a decrease in market size in 2006.

Developing country exporters should be aware of the presence of some strong companies like Caterpillar, MAN, Liebherr, O&K Orenstein & Koppel, Case and

Potain. Their strength is due to their brands and market presence. A close observation of those companies and/or a strong relationship will be needed if developing country exporters are to obtain a position.

The **energy** market is expected to grow the coming five years, because of growing capital expenditures in the oil and gas industry and the economic growth in power generation. The oil price is relatively high, resulting in investment projects.
Especially the United Kingdom, Italy and Spain have a relative low installed capacity for power generation in relation tot their GNP. Power generating capacity will grow there the coming years, also offering possiblities for developing country exporters (pumps, electric drives).

3.3 Industrial demand: patterns and trends

Trends in products and markets
The relevant market segments have shifted in recent years from a 'pull-market' to a 'push-market', offering more tailor-made products. This has meant the modularization of (product) concepts, individually finished to customer order. Another factor is the traceability along the chain. The total product must be tracked and traced throughout the chain. This entails heavy registration and controlled processes. Decreasing tariff trade barriers have increased competence. Products are being offered at lower prices. Production costs must therefore also be reduced. This leads to enlargement of scale. At the same time, lead times must be reduced. Lastly, use of Internet is making common products available throughout the world. Suppliers of common parts are selected via Internet auctions. As a result, trade chains are slowly changing.

The **Single Market** has opened up opportunities for **pan-European co-operations.** Companies have been busy in cross-border mergers and acquisitions. This development not only contributes to tougher competition among EU firms, but it also enables companies to utilise comparative advantages in different regions to increase overall efficiency. Additionally, the diversity of the supply-side structure among Member States stimulates competition which in turn will contribute to a more efficient EU industry. In this context the transformation of Central and Eastern European states into market-oriented economies is beneficial to EU mechanical engineering. A division of labour has arisen which enables EU firms to utilise a cheap labour supply to improve price competitiveness in international markets. As a result, many Western European companies have transferred (parts of) their production to countries like Poland, Czech Republic and Slovakia. Companies are now looking further afield, into Slovenia and Romania. In most cases it is the production of standard products and parts that isbeing transferred to Eastern Europe. The same trend is now emerging in the direction of the Far East.
For some time mechanical engineering was an industry that faced little competition from emerging countries. Highly qualified personnel and complex products hindered companies in these countries from accessing mechanical engineering markets. Since the early eighties this has changed, and competition from Non-Industrialised Countries (NICs) has increased, presenting a challenge for firms in many industrialised countries. In mechanical engineering, production processes are often more **labour intensive** than in many other industries, and wage differentials are of major importance.

Another area of activity for improving the efficiency of mechanical engineering is the **application of advanced communication technologies**. Firms have recognised the opportunities offered by these techniques (digitalisation of procedures, knowledge and drawings) and have planned to introduce them in the near future. These technologies will not only improve internal efficiency but also the division of labour between companies. Therefore, they are complementary to outsourcing and the creation of pan-European networks.

Technology has always been an advantage for EU mechanical engineering in international competition, but the ORGALIME analysis revealed that this is particularly true for mature mechanical technologies. In advanced technologies the position of the EU is less striking. In some areas Japan and the USA are in the lead, e.g. in electronic components applied in mechanical engineering. This result must be seen in the context of the overall business environment, because in these areas mechanical engineering is strongly dependent on innovation of upstream industries. EU mechanical engineering firms expect to see advanced technologies playing a more important role in the future, and they have planned to expand their efforts to keep up with the pace of progress. With regard to their business environment it will be difficult because in at least some areas of advanced technologies Japanese and US mechanical engineering can rely on more innovative upstream industries. Upstream dependencies are therefore perceived as a handicap for the EU mechanical engineering - a problem that is likely to grow in years to come.

Numerous other trends can also be observed throughout the field of **power transmission engineering**. Important development criteria include, for example, fail-safe functions, low maintenance, good price-performance ratios and high efficiency. There is also an increasing trend towards the integration of mechanical and electrical transmission engineering components, with, for example, more and more manufacturers offering geared motors and frequency inverters (so-called inverter-fed motors) as single units. These are

ideal for integration into ‘intelligent’ production systems.
Users strongly believe that **leading edge automation** is the key to staying competitive. Users are under pressure to produce better quality products with more variety, brought quickly to the market at a lower cost. This translates into a need for better automation and greater flexibility, the introduction of new technologies and the integration of plant floor to business processes.
With high power digital signal processors, intelligent drives are more powerful and ideal for distributed architecture. Distributed architecture is spreading rapidly in high power drive applications where the incremental cost of distributed intelligence is minimal. PC-based automation in light machine applications, however, pushes for centralised architecture with bus-based controllers as they offer low cost, tightly integrated solutions. Distributed and centralised architectures will continue to exist as they both offer value. Broader solution offerings, miniaturisation of products, one stop shopping, and increased co-ordination between machine and motion control design are other factors currently shaping the market.

One trend in electrical transmission engineering is the **desire for ever-greater dynamism**. Ever-increasing acceleration and speed demands mechanical drive components, such as bearings, with high load capacities. In many areas of machine and plant construction, users are demanding more decentral drives. In order to achieve this, modern drives must become more and more ‘intelligent’. This allows functions formerly provided by a central controller to be realised locally within the drives themselves. Another current trend in the industry is the **‘plug & play’ concept**. In view of the fact that less and less time is available for the commissioning of systems, increasing efforts are being made to create self-configuring drives.

In recent years, a new technological discipline has been created - **mechatronics**. The aim is to stimulate a perception of the fields of mechanical engineering, electrical engineering, electronics and information technology not as separate areas but as an overall system. This holistic approach results in numerous advantages for transmission engineering manufacturers, since it allows the development process to be conducted in an optimised form. Many technical universities are already offering Mechatronics courses.

4 PRODUCTION

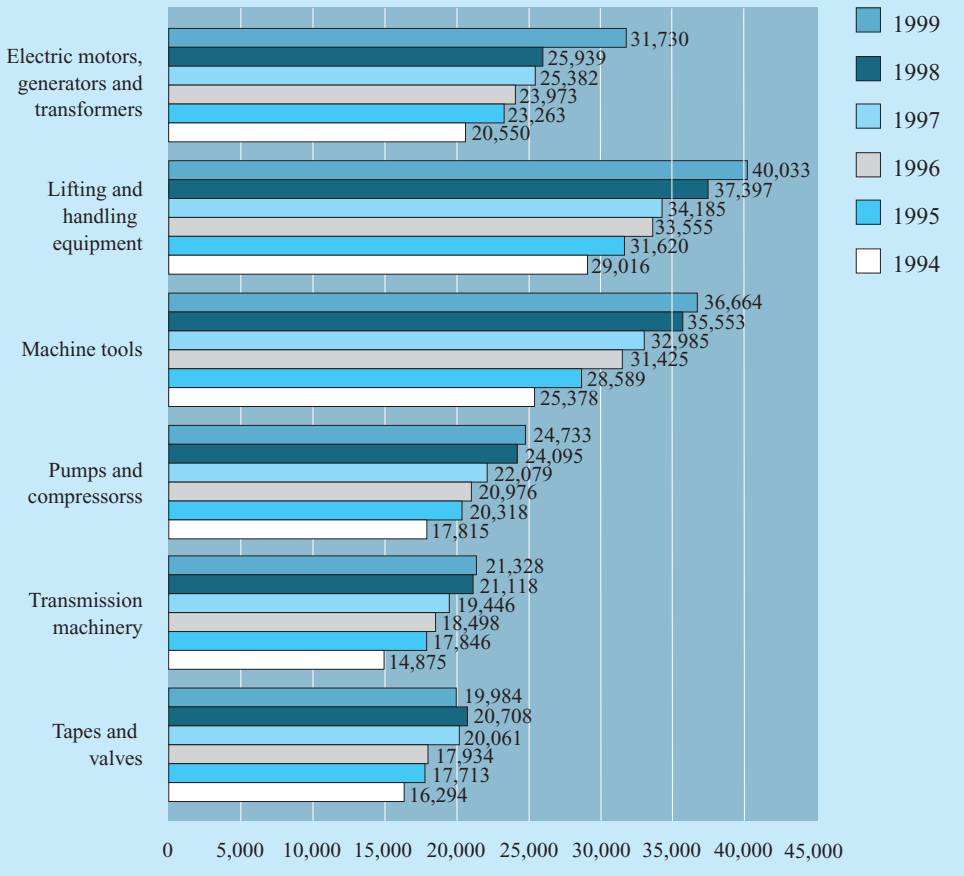
The production figures in this chapter should be interpreted with caution (see chapter 1). The product groups in this chapter have been classified according to the NACE-classification (see Table 3.1 for an overview of classes used) and comprises more products than the product groups as discussed in Chapter 1, which are based on HS codes.
The production of electric motors, generators and transformers amounted to € 37,668 million in 2000 and € 37,741 million in 2001.

It should be noted when interpreting the production data that these NACE classes incorporate more products. Lifting and handling equipment as the product group in this survey represents around 20 percent of the NACE class (about € 8 million in 1999). Tool holders form about 15 percent of the NACE group machine tools (€ 5.5 million in 1999).

The conclusion is that with regard to production electric drives, parts of transmission and pumps are the most significant engineering product groups within the EU. Electric drives showed steady growth in both 2000 and 2001! Mould, magnets & elevators and tool holders are significanctly smaller in production sizes.

The production of both mechanical and electrical engineering products has clearly suffered from the economic slowdown in 2001 and 2002. Production fell by 3 to almost 7 percent in 2002. A small recovery in production is expected for 2003. A real recovery is not expected until the second half of 2004. The problems in production have led to diminished investments in capital goods and employment losses. Employment reductions will continue into 2003 and 2004. Capital investments will gradually start growing again in 2003 and 2004.

Fig. 4.1 **EU production per selected product group according to NACE-classification, 1994-1999, € million**



Source: VDMA (2001)

Table 4.1 European engineering industry, Key figures for the industry as a whole, 2002 and 2003

Sector	2002	2003
Volume of production		
Mechanical engineering	-3.0 %	+1.0 %
Electrical/electronic engineering incl. ICT	-6.7 %	+1.6 %
Foreign trade		
Volume of exports		
Total	**-2.9 %**	**+2.2 %**
Intra trade	-4.2 %	+1.7 %
Extra trade	-1.1 %	+2.7 %
Employment		
Total	**-2.1 %**	**-0.9 %**
Gross fixed investments		
Volume		
Total	**-4.4 %**	**+1.9 %**

Source: Orgalime (2002)

Mechanical engineering
The developments in production discussed here include not only the manufacture of mechanical engineering products in the selected market segments but also related products and related market segments. This will give developing country exporters the opportunity to gain a comprehensive overview of developments in European production. It is possible to select those products and markets of particular interest to developing country exporters.

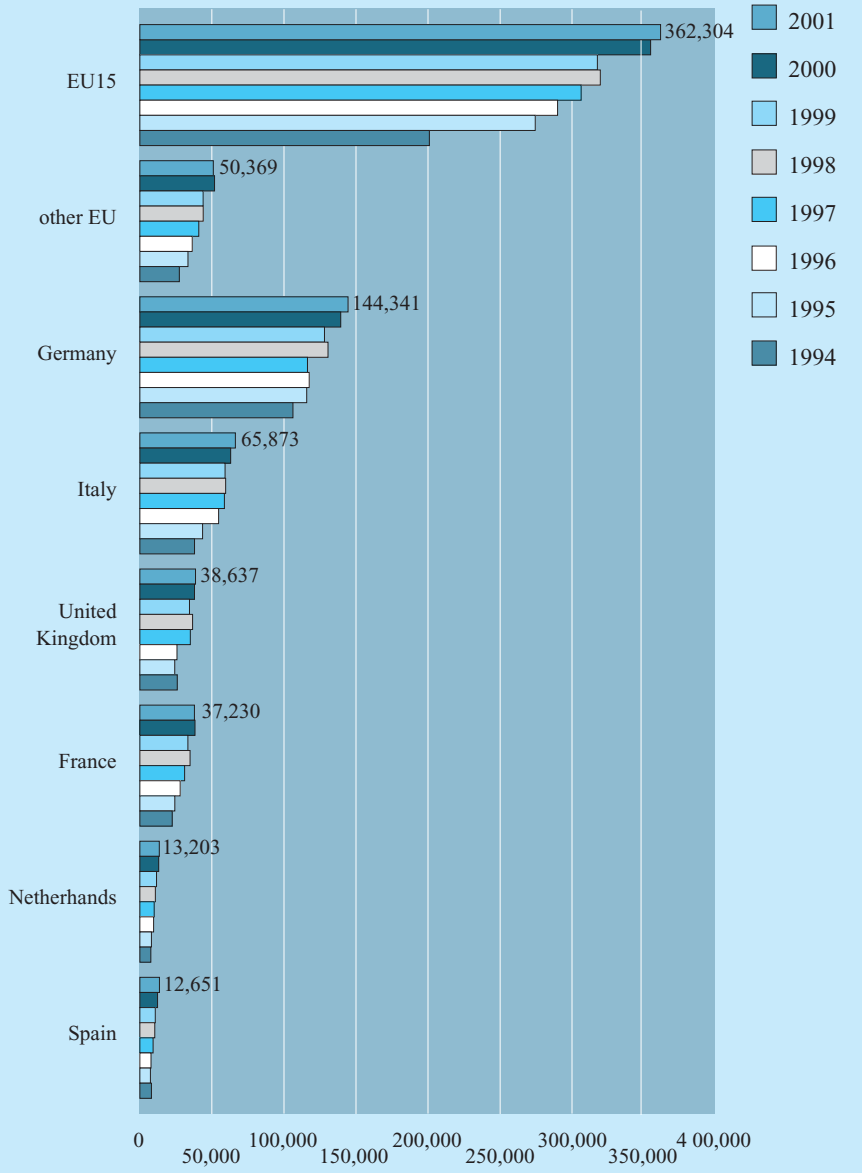
In the market segment machinery for .. (e.g. pulp and paper machines, printing machines, rolling mills and textile machines), European suppliers are in the lead and command a big share of international trade. In other sub-sectors, such as **energy, material handling and construction**, the EU has lost some of its importance in international competition. But a close look shows that within each sub-sector only some product groups have been affected. An example is roller bearings in the subsection of Energy (power transmission). These products groups within subsections should be investigated, as they offer good opportunities for developing country exporters.

Concentrations and developments of the sectors using engineering products:
- Germany: The Ruhr area and around Stuttgart/Munich
- France: Around Paris and the Northern part
- Italy: Northern part
- The UK: between Sheffield and Birmingham
- Spain: around Bilbao and Barcelona

Italy has shown particularly rapid grow in production in mechanical engineering. As number two in the EU in terms of production, its production has increased since 1990 by no less than 40 percent. The introduction of the Euro resulted in the loss of its price advantage. Now it is developing along the same lines as other Euro countries. Germany and especially the UK have shown a decline in production (7 and 22 percent respectively in 2002 compared with 1990). Companies in the UK are facing problems such as the overvaluation of the British pound and a lack of state-of-the-art technology. The production output in the United Kingdom fell by 4 percent in 2001 and 9 percent in 2002. Recovery is not expected to start taking place until 2004, with a forecast growth of 2 percent. A loss of 90,000 jobs in 2003 and 50,000 in 2004 is expected.

German firms are biggest by far with an average number of 190 employees, more than 50 percent above the EU average. This is partly due to a high manufacturing penetration, which is revealed by the value added as a share of production. German mechanical engineering has always focused on domestic production and enjoyed the advantage of a strong industrial cluster of high performance suppliers and challenging clients. Because of the globalisation and growing competence in other countries, this has changed somewhat and induced a restructuring which has affected many of the larger firms. Many

Fig. 4.2 **Production of total EU mechanical engineering industry, 1994-2001, € million**



Source: VDMA (2003)

German firms are in the process of restructuring, focusing on their core business and increasing international sourcing. The result will be equal industrial demand, but less domestic production and increasing imports.
The German mechanical engineering industry probably has the most complete range of products throughout all areas of specialisation in the world. However there are also sectors that are relatively well or poorly represented. “Machine tools” (this sector includes not only metalworking but also woodworking machinery) carry above-average weight, as does “transmission machinery”. On the other hand, the sectors “other agricultural machinery”, “non-domestic cooling and ventilation equipment” and “lifting and handling equipment” represent a relatively low share.

In “machine tools” the traditional **Italian** strength lies in wood processing machines. But Italian manufacturers have also gained considerable status assuppliers of metal working machines. In contrast, the sector “pumps and compressors” is relatively underdeveloped.
Italian mechanical engineering consists of small firms, linked into networks. There are companies with excellent engineering and marketing abilities and firms focusing on production. The latter possess specific production know-how and often have access to local labour markets. Because of their flexibility these

companies are less vulnerable than bigger ones. With the application of advanced communication technologies, efficiency has increased markedly, and common quality assurance has improved product reliability. Moreover, Italian mechanical engineering has improved productivity since 1990 more than any other EU Member State. Although some of this development has been due to the business cycle, Italian competitiveness has been strengthened. Italian firms are expected to continue to improve the quality and technology of their products. Nevertheless, the structure of Italian mechanical engineering restricts its ability to supply products that require extremely high research budgets because of their complexity, e.g. diesel engines for vessels. Italian engineering is expected to continue growing, but at a slower pace than in the last decade. There are two reasons for this: soft-currency countries like Italy have lost their advantage with the introduction of the Euro. In addition, the Federal Republic of Germany has gained additional weight with the inclusion of East Germany, which has cost the partners percentage shares

In the 19th century the **British** mechanical engineering industry was the world market leader and at that time produced far more than domestic demand, with factories spread throughout the country. There are now a number of regional centres, located in the Southeast, the West-Midlands, Yorkshire and Humberside and the Northwest.
From the point of view of specialisation, the British mechanical engineering industry has several definite strengths, but also a number of distinct weaknesses. The NACE sectors “agricultural tractors”, “engines and turbines”, “non-domestic cooling and ventilation equipment” and “transmission equipment” are particularly strong. “Pumps and compressors” is also relatively well developed. On the other hand, fields such as “machinery for iron and steel production” and “machine tools” are remarkably weak nowadays, although there is still a high domestic demand for them. Compared with many EU Member States, British mechanical engineering enjoys low wages and a liberalised labour market. Nevertheless British-owned firms have not been able to utilise this advantage. Many firms are small - similar to their Italian competitors - but there is a lack of engineering and marketing know-how. The ongoing relocation of manufacturing companies from the UK abroad poses a real threat for the future of engineering products in the UK. **On the other hand, it also prsents opportunities for developing country exporters**. They should be aware of this trend and anticipate on it by identifying those British companies planning to relocate and developing a plan to establish a relationship with those companies.

Although British companies complain about a labour force which is not sufficiently qualified, foreign mechanical engineering firms are investing in the United Kingdom and utilising the advantages of the labour market. Japanese companies and firms from other EU member States are active in the United Kingdom. Thanks to foreign direct investment, the United Kingdom has become an important location for mechanical engineering production.

Spanish firms focus on the automotive industry. Among the less industrialised Member States Spain has an outstanding importance in terms of the size of mechanical engineering. Production amounted to 7.3 billion euro in 1999. Additionally the share of mechanical engineering output of manufacturing industries is higher than for the other less industrialised Member States. Spain should therefore be regarded as a semi-industrial Member State.

Compared to EU averages the **Dutch** industry enjoys high out-put in the sectors “non-domestic cooling and ventilation equipment”, “other agricultural machinery” and “engines and turbines”. On the other hand it is pronouncedly weak in the sectors “transmission machinery” and “machine tools”. The main strength of the Dutch mechanical engineering industry is its engineering business. Its customers, who are often large companies with world-wide activities, are demanding the internationalisation of sales, particularly in the food and packaging industries.

Most of the Dutch metal-electro industries have a low value added per worker compared to their foreign counterparts. Particularly the metal products and non-electronic machinery industries have relatively large catch-up or specialisation opportunities left, even when compared to the neighbours Germany and France. Only the electronic machinery and professional instruments industries achieved a higher productivity level than Germany and France. Metal products and non-electronic machinery may realise some additional productivity growth via far-reaching automation and increases in scale, and by utilising opportunities in markets with a larger growth potential. In this, the labour productivity levels of Germany and France has set the targets for the two Dutch industries. This strategy is likely to involve a shakeout of under-performing companies.

Production levels in the Dutch metal-electro industry in 2002 lagged behind 2001 levels, which were already low due to a gradual slowdown ending in a rather deep dip at the end of 2001. Any significant positive growth is not expected until the second quarter of 2004, from which point an upward trend is expected to continue. Profitability will not recover until 2004, supported by an accelerating growth of labour productivity at the cost of employment since the end of 2002. So, following the rise in employment in recent years, the downturn since the second half of 2001 will continue to be felt until well into 2003.

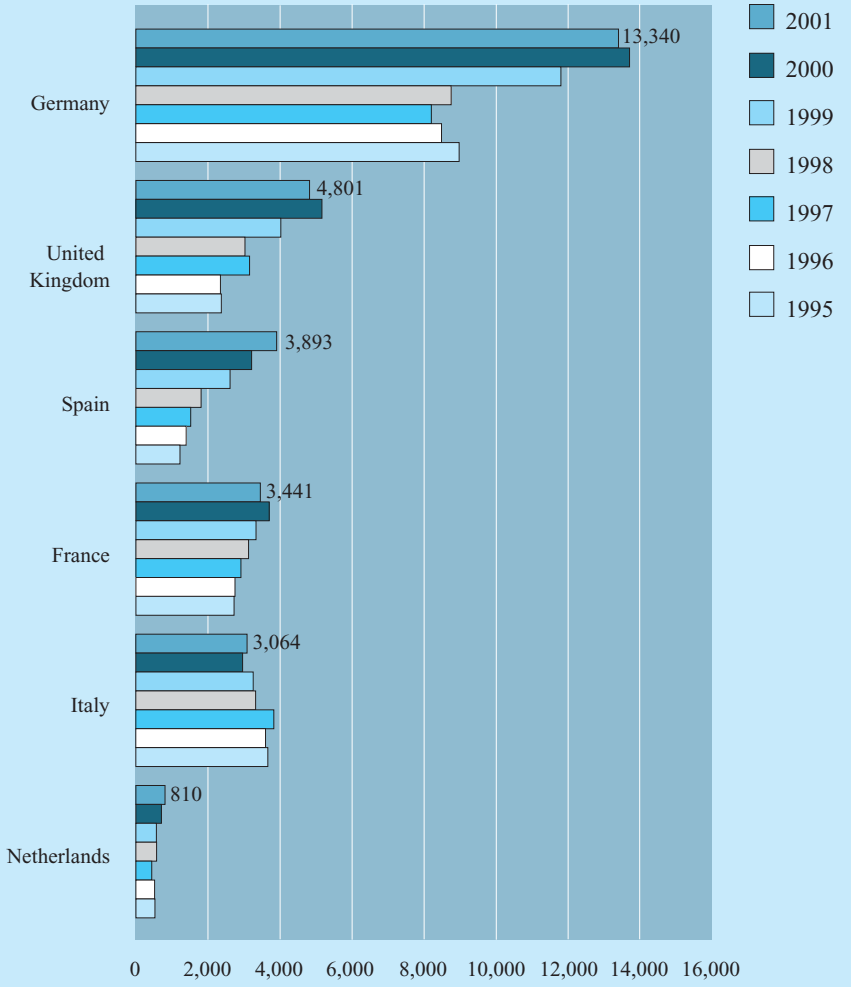
The conclusion must be that the European market can only offer limited possibilities for growth at the moment. This means focussing on cost reduction and cost prices. It is a fact that manufacturing will continue to decline as a percentage of GDP in all mature economies as consumers spend more on services and leisure and manufacturers transfer procurement and production to low cost economies. In the UK, this transition seems to be taking place faster than in the rest of Europe or in the USA, partly because of the uncompetitive exchange rate with the Euro and the openness of the market. The global trend is clear. however, and British manufactures ignore it at their peril.

This opens opportunities to companies from developing countries. Western European companies are following their customers, who are intensively investing in the Far East. Also in the Far East (India, China) but also for example in Ukraine, the technical infrastructure and the machine construction area has developed enormously. With the low wages in Far East and former Russian states there are clear possibilities for the production of standard products. Germany (by far the largest market) and Italy and France (showing minimal loss of growth) offer the best possibilities for mechanical products. More and more German companies are also focussing on core competencies (specialised product development, technology development). See, for example, Mannesmann Rexroth, Flender, Demag, and ZF. The production of standard components is realised in their plants in Latin America or Far East and/or outsourced to companies in that region.

Electrical engineering

The developments in production dealt with here include not only the production of electrical engineering products in the selected market segments but also related products (e.g. electric components) and other

Fig. 4.3 Production of electric motors, generators and transformers per country, 1994-2001, € million



Source: VDMA/ZVEI (2003)

countries. This will allow developing country exporters to gain a comprehensive overview of developments in European production. It is also possible to select those products and markets of particular interest to developing country exporters.

In the **electrical engineering** industry almost all sub-sectors performed poorly in 2002. In traditional **electrical engineering** there was a sharp fall in production in almost all countries. Between January and August production in Europe fell by 6.5 percent compared with the same period last year. This compares with an average annual growth in the sector of 5 percent between 1997 and 2001.
The EU countries highlighted play a minor role in electrical engineering and within that the product group electric drives. The trend in 2002 was that those countries produced 4 percent less compared to 2001 and import showed a reduction of about 6 percent compared to 2001. The order intake was about 9 percent down on 2001.

A general trend is the outsourcing of standard electrical components and products, especially to the Far East. In Europe, volumes are too low and wages too high to manufacture these products cost-effectively here. Employment in electrical engineering in the United Kingdom, for example, is expected to fall further by some 1.5 percent in 2003.
Exporters from developing countries should be aware of this, because this offers possibilities for them. Large European companies like Philips, Siemens and Thompson are focusing on product development and marketing & after sales service. Their production has either been transferred to low-wage countries or outsourced to contract manufacturers or specialised companies abroad.
In Finland the Far East is already a major player (33 percent of total imports) in the imports of computers, automation, parts for computer equipment, components and batteries. Nokia is the most important example, producing and importing many of its components from the Far East.

5 IMPORTS

5.1 Total imports

In this chapter the most important data is presented. A total overview of imports can be found in Appendix 2 (detailed import/export statistics). Total imports amounted to € 46.7 billion in 2001, with Germany by far the biggest importer with € 11.4 billion. France, Italy and United Kingdom are in the middle category with 5 to 7 billion euro imports per country. Spain and the Netherlands are the least important countries of those observed. Total imports were more or less stable compared with 2000 and grew by 15 percent compared with 1999.
The total value of extra-EU imports of engineering products in 2001 by EU countries amounted to €16 billion: in comparison with 1999 this represented an increase of 27 percent and in comparison with 2000 an increase of 3 percent.
The growth of total and extra-EU imports in 2001 compared with 1999 can be explained by the fact that 1999 was a weak year economically for the EU. In a period of continuous growth (from 1995 to 2001) a temporary dip was registered. Especially the four big countries in the EU noticed a decrease in turnover, resulting in diminished industrial demand and a reduction in imports. In the second half of 2001 the industry felt the first signs of a downturn period.
The average EU value to volume ratio bases on extra-EU imports is € 9.51 billion per metric ton. Countries with a high value to volume ratio are Luxembourg (18.99), Ireland (14.65), the United Kingdom (11.67) and France (11.39). This in contrast with Greece (4.40), Italy (5.86), Denmark (7.02), Austria (8.60) and Spain (8.81). The more voluminous products seem to go to Italy and Spain, like large hydraulic systems and moulds, magnets and elevators). The United Kingdom and France import on average smaller (lighter) products with high value, such as parts of transmission and pumps.

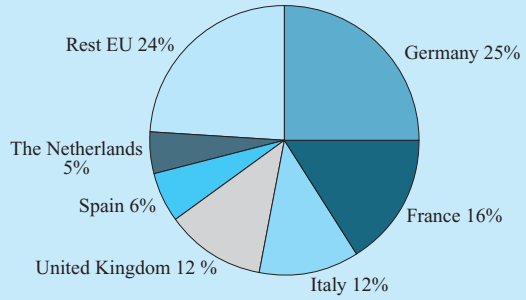
Table 5,1 Total and Extra-EU imports of engineering products per EU country, 1999 – 2001, € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total EU						
EU	40,450,891	4,361,318	46,669,016	5,170,224	46,658,419	5,046,368
Germany	9,810,194	1,028,931	11,466,439	1,145,175	11,402,548	1,147,218
France	6,270,841	635,406	7,063,436	731,824	7,233,746	741,494
Italy	4,944,744	507,318	5,746,688	596,493	5,727,894	611,202
United Kingdom	4,869,593	545,733	5,476,659	482,240	5,564,563	527,919
Spain	2,640,728	295,520	3,320,757	357,109	2,980,198	346,483
The Netherlands	2,069,785	270,986	2,320,360	331,944	2,494,920	227,094
Rest EU	9,845,006	1,077,424	11,274,677	1,525,439	11,254,550	1,444,958
Extra-EU						
EU	12,605,304	1,370,181	15,505,551	1,577,557	16,034,604	1,686,081
Germany	4,424,203	486,443	5,388,418	544,038	5,865,635	587,763
United Kingdom	1,952,441	159,671	2,367,162	172,675	2,395,652	205,322
France	1,465,761	128,135	1,829,028	155,206	1,860,706	163,405
Italy	1,329,500	216,125	1,673,105	273,162	1,731,082	295,470
The Netherlands	732,198	78,395	943,934	94,856	1,016,189	99,022
Belgium	676,569	79,306	828,806	79,903	743,696	65,934
Spain	486,075	51,906	675,087	68,922	625,771	71,036
Austria	444,923	56,378	513,348	59,583	571,113	66,429
Sweden	471,268	40,074	543,454	45,430	492,027	47,467
Denmark	193,454	27,427	223,167	32,103	230,624	32,855
Finland	138,477	13,621	192,283	19,114	184,553	18,891
Ireland	135,702	10,383	159,944	10,893	132,157	9,016
Portugal	70,343	9,535	79,900	8,240	83,418	7,959
Greece	58,407	10,774	56,566	11,329	58,144	13,204
Luxembourg	25,983	2,008	31,349	2,103	43,837	2,308

Source: Eurostat (2003)

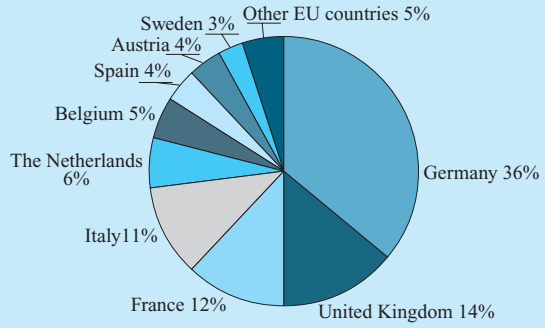
Figure 5.1 shows the importance of Germany as the leading EU country in total and extra-EU trade of engineering products. Germany accounts for a quarter of total EU imports (Figure 5.1a) and more than one-third (36 percent) of extra-EU trade (Figure 5.1b). Other important countries in terms of extra-EU imports are the United Kingdom (14 percent), France (12 percent) and Italy (11 percent). These four countries together account for around 75 percent of EU imports from outside the EU.

Figure 5.1a Total EU imports of engineering products by EU countries, 2001, percentage of total value



Source: Eurostat (2003)

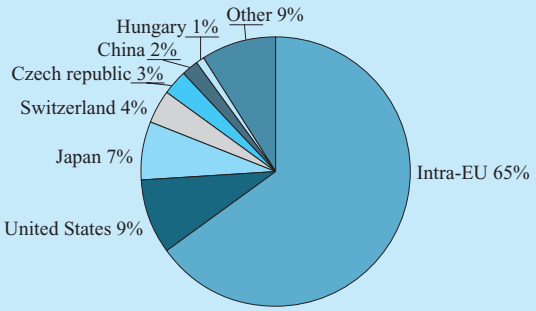
Figure 5.1b Extra-EU imports of engineering products by EU countries, 2001, percentage of total value



Source: Eurostat (2003)

As can be seen from figure 5.2, in terms of value the biggest source of imports of engineering products is the EU itself (65 percent), followed by the United States (9 percent), Japan (7 percent) and Switzerland (4 percent). The other sources of imports are a lot smaller, Czech Republic (3 percent), China (2 percent) and Hungary (1 percent).

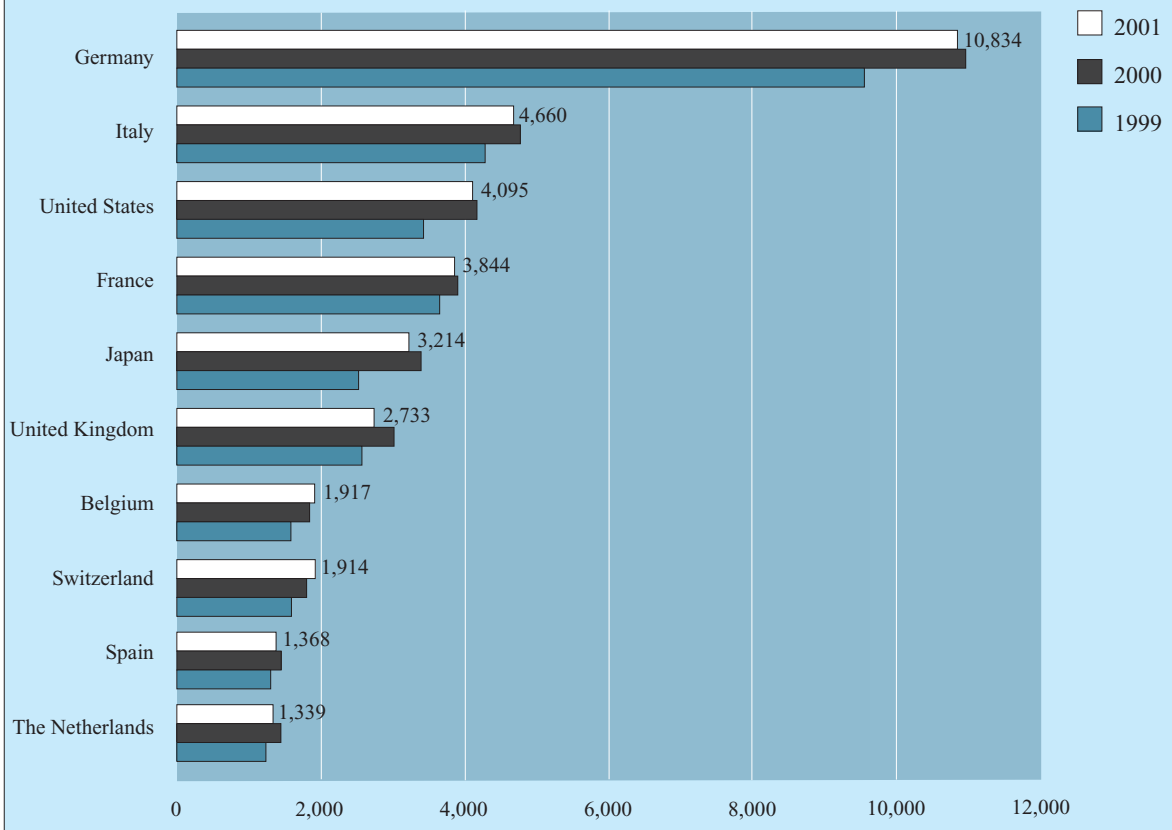
Figure 5.2 Sources of EU imports of engineering products, 2001, percentage of total value



Source: Eurostat (2003)

As well as being the leading importer of extra-EU engineering products, Germany is also the leading supplier of engineering products to other EU members (€ 10,834 million). Other important European suppliers are Italy, the United States, France and Japan with €4,660, €4,095, €3,844, and €3,214 million of exports respectively.

Figure 5.3 Leading suppliers of engineering products to the EU, 1999 – 2001, € million



Source: Eurostat (2003)

The Netherlands

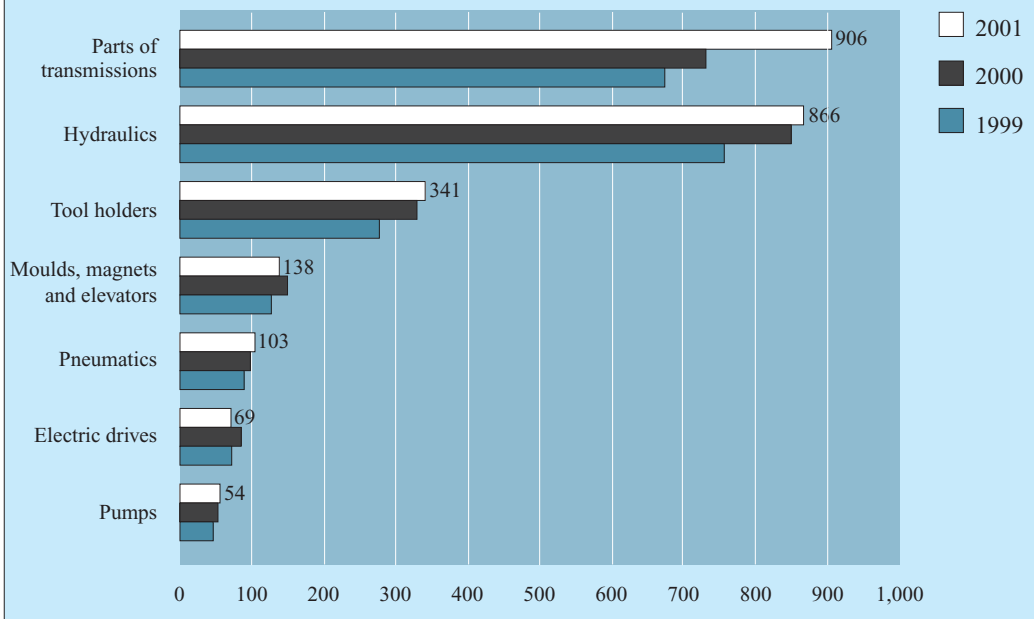
Total imports of engineering products amounted to € 2,495 million in 2001, indicating an increase of 20,5 percent (38.7 percent if only extra-EU imports are taken into account) since 1999 and 7.5 percent since 2000. The most important product groups are parts of transmission and hydraulics constituting 37 and 35 percent of total imports respectively. The import of electric drives and pumps are of relatively little significance.

Table 5.2 Leading suppliers of engineering products to the Netherlands, percentage of total import value in 2001

Leading countries:	
→ United States	14%
→ Japan	12%
→ China	5%
→ Switzerland	2%
→ Vietnam	1%
Share of developing countries:	**8%**
→ China	5%
→ Vietnam	1%

Source: Eurostat (2003)

Figure 5.4 Total Dutch imports of engineering products per product group, 1999 – 2001, € million



Source: Eurostat (2003)

France

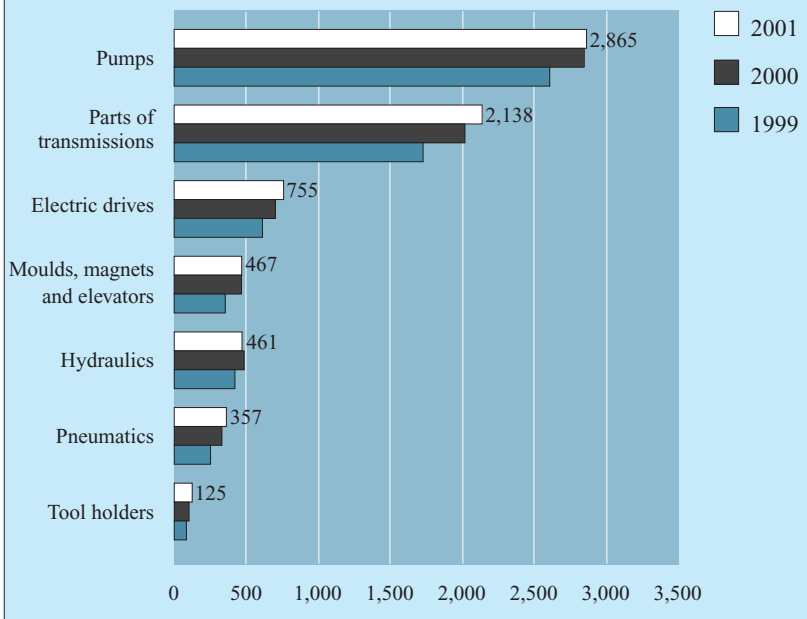
The total value of French imports of engineering products grew by 15.4 percent (27 percent for extra-EU imports only) over a 2-year period to € 7,234 million. With a 16 percent share, France is therefore the second largest importer after Germany. The two most important product groups, pumps and parts of transmission, represent 40 and 30 percent of the imports. The import of tool holders has not been taken into account. The share of developing countries of total imports into France is 4 percent, of which China and South Korea are the biggest, accounting for 1 percent each.

Table 5.3 Leading suppliers of engineering products to France, percentage of total import value in 2001

Leading countries:	
→ United States	9%
→ Japan	5%
→ Switzerland	4%
→ China	1%
→ Poland	1%
Share of developing countries:	**3**
→ China	1%
→ Slovenia	0.5%
→ Brazil	0.3%

Source: Eurostat (2003)

Figure 5.5 French imports of engineering products per product group, 1999 – 2001, € million



Source: Eurostat (2003)

Germany

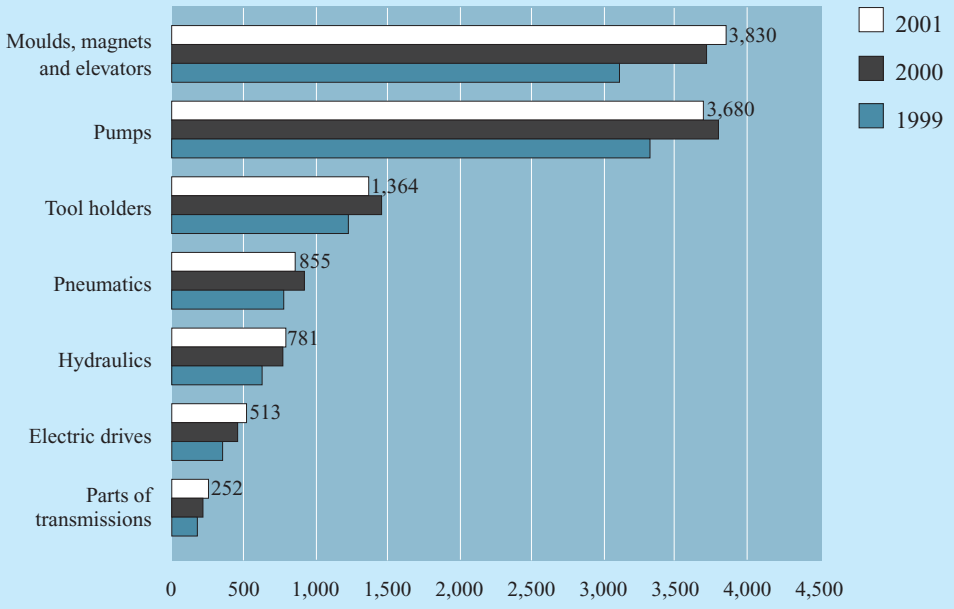
Germany held the highest share of EU imports in 2001, with total imports of engineering products amounting to € 11,403 million. In Germany, moulds, magnets & elevators and pumps together accounted for 67 percent of the total imported value in 2001. Parts of transmission and electric drives account for a very small share of German imports. The leading supplier of engineering products from outside the EU was Japan, followed by the United States and the Czech Republic. China is the most important developing country exporting to Germany.

Table 5.4 Leading suppliers of engineering products to Germany, percentage of total import value in 2001

Leading countries:	
→ Japan	10%
→ United States	9%
→ Czech Republic	8%
→ Switzerland	8%
→ Hungary	3%
Share of developing countries:	**7%**
→ China	2%
→ Brazil	1%
→ Slovenia	1%
→ India	1%

Source: Eurostat (2003)

Figure 5.6 German imports of engineering products per product group, 1999 – 2001, € million



Source: Eurostat (2003)

Italy

Italy was the third largest importer of engineering products in 2001. The value of total imports increased by 15.8 percent compared to 1999 to a total of € 5,728 million. Parts of transmission and hydraulics had more or less equal shares and were by far the largest product groups.

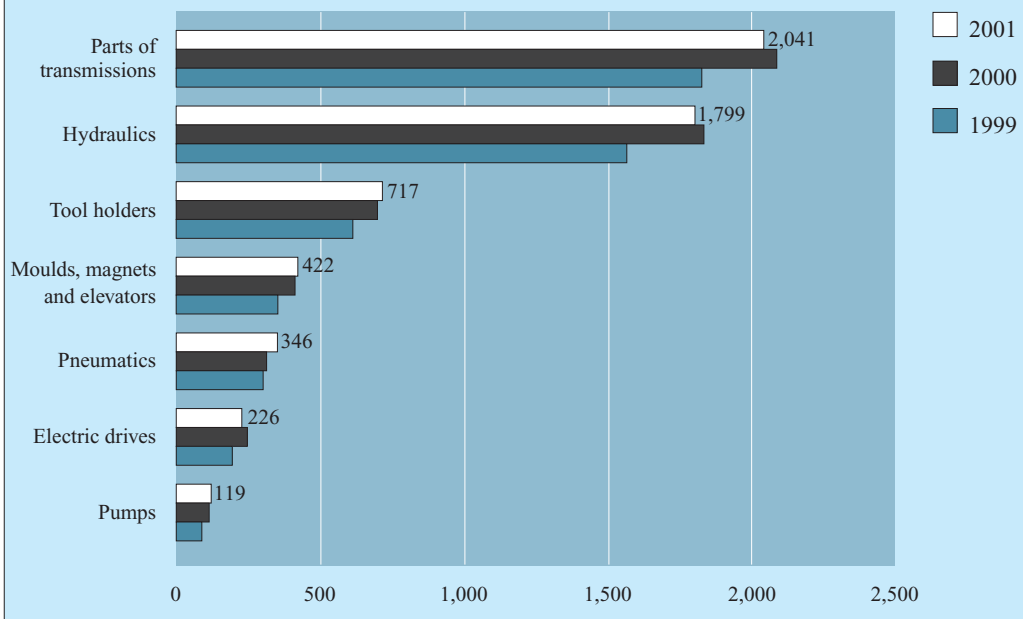
At 9 percent, the share of developing countries in the value of total imports was reasonably high. China was the biggest, followed by Brazil (1 percent), South Korea (1 percent) and Slovenia (1 percent).

Table 5.5 Leading suppliers of engineering products to Italy, percentage of total import value in 2001

Leading countries:	
→ Japan	5%
→ United States	5%
→ China	4%
→ Switzerland	3%
→ Slovakia	2%
Share of developing countries:	**8%**
→ China	4%
→ Brazil	1%
→ Slovenia	1%

Source: Eurostat (2003)

Figure 5.7 Italian imports of engineering products by product group, 1999 – 2001, € million



Source: Eurostat (2003)

Spain

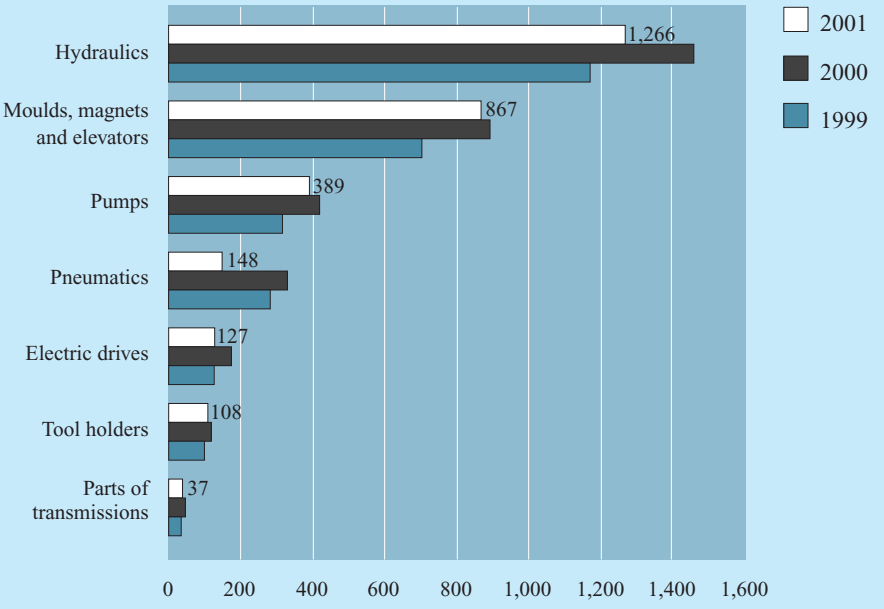
Spain has a share of only 6 percent in total imports of engineering products, for an amount of € 2,980 million. This is relatively low for a middle large European country. It also showed the lowest growth percentage, with 12.9 percent compared to 1999. The main product groups were hydraulics (42 percent) and moulds, magnets & elevators (29 percent). Imports of pneumatics, electric drives, tool holders and parts of transmission were all very small. The leading suppliers were Germany and Italy. The main developing country was China with 1 percent of total imports (in terms of value).

Table 5.6 Leading suppliers of engineering products to Spain, percentage of total import value in 2001

Leading countries:	
→ Germany	29%
→ Italy	18%
→ France	16%
→ Japan	7%
→ United Kingdom	5%
Share of developing countries:	**4%**
→ China	1%
→ Thailand	1%
→ Brazil	0.4%

Source: Eurostat (2003)

Figure 5.8 Spanish imports of engineering products per product group, 1999 – 2001, € million



Source: Eurostat (2003)

United Kingdom

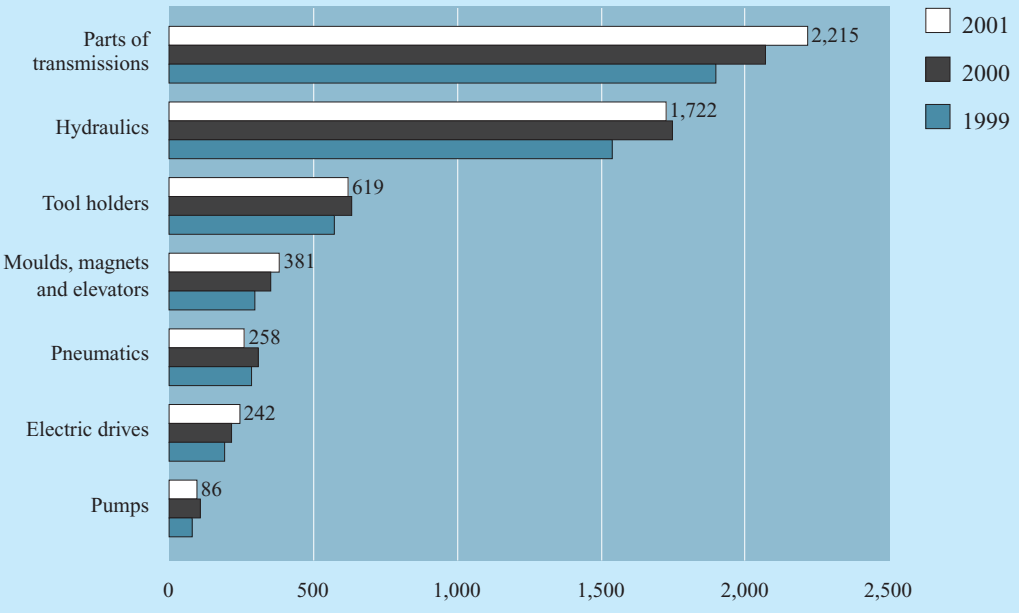
The United Kingdom is the fourth largest importer of engineering products, with a total of € 5,565 million representing a share of 12 percent. The main product groups are parts of transmission and hydraulics. The import of pumps is close to zero. The main exporting country to the United Kingdom is the United States with a 18 percent share, followed by Japan with 10 percent. The total share of developing countries is 8 percent, 2 percent being accounted for by China and Saudi Arabia.

Table 5.7 Leading suppliers of engineering products to the United Kingdom, percentage of total import value in 2001

Leading countries:	
→ United States	18%
→ Japan	10%
→ Switzerland	2%
→ China	2%
→ Saudi Arabia	2%
Share of developing countries:	**7%**
→ China	2%
→ Saudi Arabia	2%
→ Brazil	1%

Source: Eurostat (2003)

Figure 5.9 UK imports of engineering products per product group, 1999 – 2001, € million



Source: Eurostat (2003)

5.2 Imports per product group

This paragraph gives detailed information on how the total imports of € 46.7 million in 2001 were spread amongst the observed product groups. Not only is the value per product group is presented, but also the share of extra-EU imports and the share of developing countries.
On a European level, pumps constituted the largest product group within the total imports, with a value of EUR 16.7 million. In contrast, tool holders accounted for just € 0.9 million. In percentage terms the total imports are divided over the product groups as follows:

Total imports:	1999 value €	2000 value €	2001 value €	% of total
pumps	14,833,224	16,747,069	16,679,689	36%
parts of transmission	13,392,425	15,569,537	15,840,993	34%
electric drives	4,586,802	5,361,680	5,291,200	11%
hydraulics	2,748,639	3,214,065	3,145,267	7%
moulds, magnets and elevators	2,573,695	3,000,544	2,849,188	6%
pneumatics	1,603,179	1,929,741	1,968,013	4%
tool holders	712,927	846,380	884,069	2%
total engineering products	40,450,891	46,669,016	46,658,419	

Pumps and parts of transmission are the most important products groups, together accounting for 70 percent of total imports. 2001 marked an end to growth in imports, with the exception of parts of transmission, pneumatics and tool holders. Of those, the growth in impors of pneumatics and tool holders was relatively small and insignificant.

Intra-EU import is still the leading source of electric drives, as can be seen from table 5.7. Germany is the major supplying country with a share of 24 percent of total imports into the EU. The share of developing countries is 11 percent, of which China is by far the most important supplying country with 6 percent, followed by Slovenia, Thailand and Brazil. Non-developing countries with a share of extra-EU imports are Switzerland (6 percent) and the United States (6 percent).

Table 5.8 shows the sources of EU imports of moulds, magnets and elevators. The most important source for EU countries is imports from other countries within the EU. Intra-EU imports of moulds, magnets and elevators represented 56 percent of total imported value in 2001. There are four important extra-EUsources, namely Switzerland with 11 percent, the United States with 6 percent, Japan with 5 percent and the Czech Republic with 5 percent. The share supplied by developing countries is relatively small (3 percent) compared to other product groups.

Table 5.7 Leading sources of EU imports of electric drives, value and percentage of total import value in 2001, € 1,000

Item	share	value
Total	**100%**	**5,291,200**
Share of intra-EU:	**56%**	**2,980,027**
Germany	24%	1,278,726
Italy	8%	426,296
France	7%	387,058
Share of extra-EU:	**44%**	**2,311,173**
China	6%	330,941
Switzerland	6%	325,561
United States	6%	309,398
Share ofdeveloping countries	**12%**	**647,802**
China	6%	330,941
Slovenia	1%	75,753
Thailand	1%	55,808
Brazil	1%	46,390

Source: Eurostat (2003)

Table 5.8 Leading sources of EU imports of moulds, magnets and elevators, value and percentage of total import value in 2001, € 1,000

Item	share	value
Total	**100%**	**2,849,188**
Share of intra-EU:	**56%**	**1,608,875**
Germany	17%	496,507
Italy	10%	272,076
United Kingdom	6%	157,290
Share of extra-EU:	**44%**	**1,240,313**
Switzerland	11%	309,827
United States	6%	175,248
Japan	5%	137,847
Share of developing countries:	**4%**	**118,234**
Slovenia	1%	31,960
China	1%	31,722

Source: Eurostat (2003)

The major source of EU imports of hydraulics are other countries within the EU (69 percent of the value of the total imports). Other countries with a significant export share to the EU are the United States (14 percent), Japan (5 percent) and Switzerland (5 percent). The total share of developing countries is 2 percent, of which Brazil accounts for around 0.5 percent. Imports from developing countries are so small as to be insignificant.

Table 5.9 Leading sources of EU imports of hydraulics, value and percentage of total import value in 2001, € 1,000

Item	share	value
Total	**100%**	**3,145,267**
Share of intra-EU:	**69%**	**2,154,622**
Germany	31%	964,191
Italy	8%	249,597
United Kingdom	6%	192,371
Share of extra-EU:	**31%**	**990,645**
United States	14%	447,296
Japan	5%	150,123
Switzerland	5%	145,884
Share of developing countries:	**2%**	**73,794**
Brazil	1%	17,142
Slovenia	0%	12,138

Source: Eurostat (2003)

The total share of imports of parts of transmission from extra-EU countries is 30 percent. Once more, the share of intra-EU imports is the biggest with a total of 70 percent. The share of developing countries is average (5 percent), 3 percent of which is accounted for by China, followed by Brazil and India.

Table 5.10 Leading sources of EU imports of parts of transmission, value and percentage of total import value in 2001, € 1,000

Item	share	value
Total	**100%**	**15,840,993**
Share of intra-EU:	**70%**	**11,082,463**
Germany	23%	3,654,508
Italy	11%	1,821,552
France	10%	1,526,868
Share of extra-EU:	**30%**	**4,758,530**
United States	7%	1,089,828
Japan	6%	922,438
Sweden	3%	518,019
Share of developing countries:	**5%**	**856,632**
China	3%	416,453
Brazil	1%	99,334
India	0%	74,465

Source: Eurostat (2003)

The share of developing countries of the imports of pneumatics is very small and at 2 percent falls under the engineering products average. Slovenia is the most important of the developing countries with a share of 0.4 percent, followed by China, also with 0.4 percent. The share of extra-EU imports is 35 percent, of which the United States, Switzerland and Japan contribute the highest share.

Table 5.11 Leading sources of EU imports of pneumatics, value and percentage of total import value in 2001, € 1,000

Item	share	value
Total	**100%**	**1,968,013**
Share of intra-EU:	**65%**	**1,287,954**
Germany	23%	443,690
Italy	10%	204,821
United Kingdom	8%	149,910
Share of extra-EU:	**35%**	**680,059**
United States	15%	295,106
Switzerland	7%	131,396
Japan	5%	106,959
Share of developing countries:	**2%**	**33,135**
Slovenia	0%	8,068
China	0%	7,062

Source: Eurostat (2003)

The leading importer of pumps in the EU is Germany with a share of 22 percent, representing a one-third share of total intra-EU imports (65 percent). The share of developing countries is 4 percent, of which China is the biggest (0.8 percent) followed by Brazil (0.7 percent) and Slovenia (0.6 percent).

Table 5.12 Leading sources of EU imports of pumps, value and percentage of total import value in 2001, € 1,000

Item	share	value
Total	**100%**	**16,679,689**
Share of intra-EU:	**65%**	**10,888,473**
Germany	22%	3,731,527
Italy	10%	1,633,260
France	9%	1,482,946
Share of extra-EU:	**35%**	**5,791,216**
United States	10%	1,701,394
Japan	10%	1,609,768
Czech Republic	3%	567,463
Share of developing countries:	**4%**	**626,953**
China	1%	126,257
Brazil	1%	119,560
Slovenia	1%	99,144

Source: Eurostat (2003)

As can be seen from table 5.13 intra-EU imports are still the leading source of tool holders, although the share of extra-EU imports is increasing. Germany is a major supplier to the EU with a 30 percent share. The share of developing countries is 8 percent. Other countries supplying a share of extra-EU imports are Switzerland, the United States and Japan. China is the biggest developing supplier with 0.8 percent, followed by Slovenia (0.5 percent) and India (0.5 percent).

Table 5.13 Leading sources of EU imports of tool holders, value and percentage of total import value in 2001, € 1,000

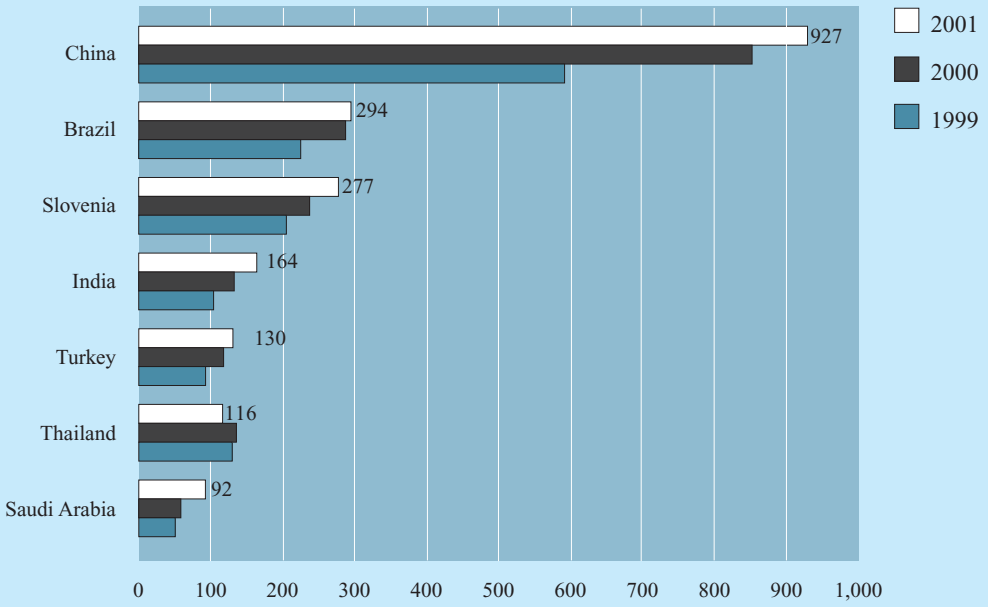
Item	share	value
Total	**100%**	**884,069**
Share of intra-EU:	**57%**	**504,288**
Germany	30%	264,378
Italy	6%	52,171
United Kingdom	5%	47,760
Share of extra-EU:	**43%**	**379,781**
Switzerland	14%	125,495
United States	9%	76,959
Japan	6%	52,782
Share of developing countries:	**3%**	**28,726**
China	1%	7,005
Slovenia	1%	4,829
India	1%	4,547

Source: Eurostat (2003)

5.3 The role of developing countries

Figure 5.19 shows clearly the important position of the Far East and especially China. China is showing a rapid growth and this is expected to continue in the coming years. Brazil has its focus on pumps and parts of transmissions. Together these two product groups make up almost 75 percent of its exports of engineering products to the EU. Slovenia and Saudi Arabia showed the fastest relative growth in 2001. Slovenia is an important developing country supplier of pumps and electric drives. Saudi Arabia has a special relationship with the United Kingdom, and sends it 90 percent of its exports, of which 70 percent comprises pumps.

Figure 5.19 Leading developing countries supplying engineering products to the EU, 1999 – 2001, € million



Source: Eurostat (2003)

Table 5.14 Value and share of developing countries in imports of engineering products to EU countries, 2001, € 1,000

Share of developing countries in the Netherlands:		**8%**
→ China	€ 103	5%
→ Vietnam	€ 32	1%
Share of developing countries in France:		**3%**
→ China	€ 74	1%
→ Slovenia	€ 34	0.5%
Share of developing countries in Germany:		**7%**
→ China	€ 267	2%
→ Brazil	€ 117	1%
→ Slovenia	€ 107	1%
Share of developing countries in Italy:		**8%**
→ China	€ 212	4%
→ Brazil	€ 50	1%
→ Slovenia	€ 41	1%
Share of developing countries in Spain:		**4%**
→ China	€ 42	1%
→ Thailand	€ 23	1%
Share of developing countries in the UK:		**7%**
→ China	€ 98	2%
→ Saudi Arabia	€ 85	2%

Source: Eurostat (2003)

Within the EU the Netherlands and Italy have the highest focus on developing country exporters. China is their most important supplier. It is important to see that Germany, being the largest producing and consuming country of engineering products, is also a large importer. Its focus, apart from its neighbouring countries, is on the Czech Republic, Hungary and China.
On average China is fast gaining in status as a major exporter of engineering products. Western European companies are also looking for even lower cost prices, offering opportunities for Eastern European countries like Slovenia but also former Russian member states with good technological expertise. The Far East is becoming increasingly interesting to European companies as market demand is rapidly expanding there. More and more European companies are considering building up capacity in the Far East (close proximity of manufacture to demand).
As well as the middle and eastern European "low wage" countries (Czech Republic, Hungary, Slovakia and Poland), the current major developing country suppliers to the European Union are the Far East (China, India, Thailand, Vietnam), Latin America (Brazil) and EU-related countries such as Slovenia and Turkey. China's growth is especially strong in parts of transmission. Brazil is losing relevance in pumps, while its export of parts of transmission and electric drives is growing. Slovenia is growing in all product groups, partnering with all EU countries. Thailand is losing market share in the growing field of small power dc electric motors. Turkey and Thailand are not among the top 15 major suppliers for the selected EU countries.

Table 5.15 Major developing country suppliers and most important product groups, 1999 – 2001, in € 1,000

	1999 value €	2000 value €	2001 value €	Product group	Major importing countries
Developing countries					
Major suppliers:					
China	264,398	359,237	416,453	parts of transmission	Italy, Germany
	230,189	339,108	330,941	electric drives	Germany, Italy
	69,621	108,486	126,257	pumps	United Kingdom
	16,142	28,003	31,722	moulds, magnets and elevators	United Kingdom
Brazil	137,147	141,949	119,560	pumps	Germany
	53,507	94,101	99,334	parts of transmission	United Kingdom
	23,073	32,356	46,390	electric drives	Spain
	4,590	9,757	17,142	hydraulics	Germany, The Netherlands
Slovenia	78,273	92,486	99,144	pumps	Germany
	57,462	59,576	75,753	electric drives	Germany, United Kingdom, France
	32,136	39,281	44,976	parts of transmission	Germany, France
	23,608	25,855	31,960	moulds, magnets and elevators	Italy
India	47,884	60,189	74,465	parts of transmission	United Kingdom
	39,799	52,752	54,068	pumps	Germany, United Kingdom
Turkey	37,201	46,734	50,115	pumps	Germany, United Kingdom, France
	25,828	38,110	44,014	parts of transmission	Germany, France
Thailand	90,523	77,989	55,808	electric drives	Spain, Germany
	20,540	33,022	30,209	pumps	United Kingdom, Italy
	15,364	19,651	24,732	parts of transmission	Germany, United Kingdom, Italy
Vietnam	16,644	27,073	37,581	electric drives	The Netherlands
Saudi Arabia	22,508	22,669	69,036	pumps	United Kingdom

Source: Eurostat (2003)

Table 5.16 Total EU import and the value of developing countries, € 1,000

Total imports:	1999 value €	2000 value €	2001 value €	Developing countries value €
electric drives	4,586,802	5,361,680	5,291,200	647,082
moulds, magnets and elevators	2,573,695	3,000,544	2,849,188	118,234
hydraulics	2,748,639	3,214,065	3,145,267	73,794
parts of transmission	13,392,425	15,569,537	15,840,993	856,632
pneumatics	1,603,179	1,929,741	1,968,013	33,135
pumps	14,833,224	16,747,069	16,679,689	626,953
tool holders	712,927	846,380	884,069	28,726
total of engineering products	40,450,891	46,669,016	46,658,419	2.384,556

Table 5.17 Share of developing countries in imports of engineering products to the EU per product group, 1999 – 2001, percentage of total value

percentage of extra-EU imports:	
electric drives	28%
moulds, magnets and elevators	10%
hydraulics	7%
parts of transmission	18%
pneumatics	5%
pumps	11%
tool holders	8%
total of engineering products	**15%**
percentage of total imports:	
electric drives	12%
moulds, magnets and elevators	4%
hydraulics	2%
parts of transmission	5%
pneumatics	2%
pumps	4%
tool holders	3%
total of engineering products	**5%**

Source: Eurostat (2003)

Tables 5.16 and 5.17 indicate that in terms of value parts of transmission, pumps and electric drives are the three most important product groups being supplied by developing country exporters. Electric drives, moulds, magnets & elevators, parts of transmission and pumps are considered to be the most important product groups in relative terms. This means that developing country exporters hold a strong position in electric drives and parts of transmission (important in value and a relatively high share in total imports, especially in the case of electric drives). Pumps exports are high in value but relatively low in import percentage share (11 percent versus 15 percent on average for engineering products).

6 EXPORTS

The total value of exports of engineering products amounted to € 59,262 million in 2001.
As can be seen from table 6.1, the most important European exporters are Germany, Italy, France, Spain and the United Kingdom. These four countries export € 46,635 million. Out of a total of € 59,262 million this represents 79 percent of all the EU exports of engineering products. Of this 79 percent, Germany is by far the largest exporter with 48 percent.

Total exports rose by 12.5 percent in comparison with 1999, due to the healthy economy in 2000. In the year 2001, the increase was considerably lower, namely 2.25 percent. A further stagnation is expected because of the economic recession in a number of European countries.

When considering the product groups shown in table 6.2, several things should be mentioned. First of all the product groups pumps and parts of transmission are by far the most exported. In 2001, pumps accounted for 37 percent of total exports and parts of transmission for 31 percent, representing a total value of € 40,589 million. Parts of transmission is the largest product group in terms of volume, followed by pumps.

Leaving aside the two main product groups, the other five product groups represent a value of € 18,672 million. Electric drives is the main product group, followed by moulds, magnets and elevators, and hydraulics. Pneumatics and tool holders are the two product groups representing the lowest value of the seven, namely € 2,464 million and € 1,173 million respectively.

All the groups increased in value the last two years, except the product groups pneumatics and tool holders.

Table 6.1 Total EU exports of engineering products from EU countries, 1999 - 2001, € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
EU	51,518,620	4,911,215	57,955,724	6,191,356	59,261,906	5,193,195
Germany	19,573,229	1,392,837	22,017,211	1,568,875	22,311,982	1,573,309
Italy	8,270,325	1,032,627	9,166,027	1,139,219	9,603,855	1,170,438
France	6,775,102	574,527	7,152,805	621,504	7,417,854	625,136
United Kingdom	4,823,953	314,191	5,541,368	536,371	5,301,465	323,708
Belgium	2,538,417	203,610	3,081,424	248,990	2,970,316	244,443
Austria	1,772,428	155,469	2,035,753	179,874	2,236,333	185,892
the Netherlands	1,738,484	621,264	1,948,479	1,185,513	2,081,368	330,588
Spain	1,570,647	217,940	1,985,794	288,824	2,033,914	286,252
Sweden	1,755,961	143,630	1,965,035	157,582	1,930,471	162,436
Denmark	1,125,316	88,068	1,197,131	97,559	1,470,641	109,541
Finland	660,937	76,942	847,201	87,216	804,936	94,902
Portugal	420,836	30,745	457,073	33,596	505,472	34,829
Ireland	285,224	17,481	327,582	21,489	335,488	24,219
Luxembourg	145,378	27,457	162,262	7,094	175,740	7,238
Greece	62,374	14,427	70,582	17,650	82,078	20,264

Source: Eurostat (2003)

Table 6.2 Total EU exports of engineering products by product group, 1999 - 2001, € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
pumps	19,024,385	1,481,312	21,568,934	2,192,410	22,024,425	1,617,464
parts of transmission	15,879,918	1,909,062	18,097,536	2,396,672	18,565,740	2,306,328
electric drives	4,972,007	963,048	5,616,695	675,203	5,676,224	659,807
moulds, magnets and elevators	4,442,684	242,505	4,681,896	255,369	4,988,641	261,258
hydraulics	3,967,830	218,593	4,349,870	557,911	4,369,063	236,070
pneumatics	2,269,348	64,950	2,503,274	78,008	2,464,462	77,492
tool holders	962,448	31,745	1,137,519	35,783	1,173,351	34,776

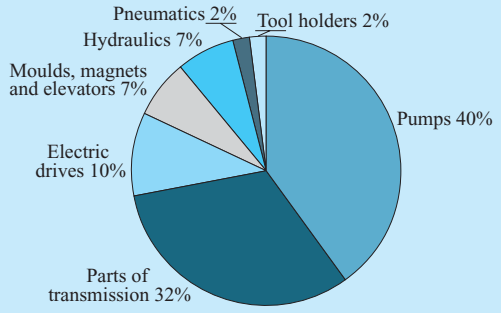
Source: Eurostat (2003)

Most of the conclusions to be drawn from table 6.2 also apply to figure 6.1. The two main export product groups in the Netherlands are pumps (40 percent of total exports) followed by parts of transmission (32 percent of total exports). These two product groups represent a total value of € 1,498 million. The remaining € 0,582 million can be divided between the other product groups:

- electric drives (10 percent),
- mould, magnets and elevators (7 percent)
- hydraulics (7 percent).

In this case pneumatics and tool holders are the product groups with the least value, both with 2 percent.

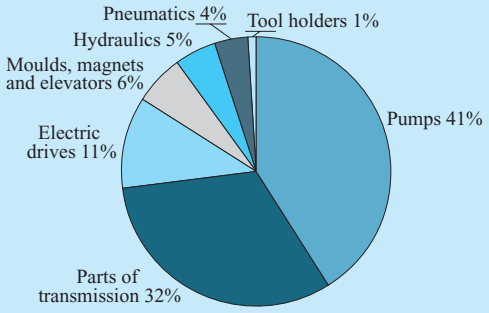
Figure 6.1 Dutch exports of engineering products per product group, 2001, percentage of total value



Source: Eurostat (2003)

For France the same distribution can be extracted from figure 6.2. Again the main product groups are pumps and parts of transmission. For both product groups the percentages are more or less the same as for the Netherlands: 41 and 32 percent respectively. In 2001 these two product groups represented a total value of € 5,414 million. The product group electric drives represents a value of € 0,815 million (11 percent). Only Germany is exporting more than France and Italy is exporting about the same.

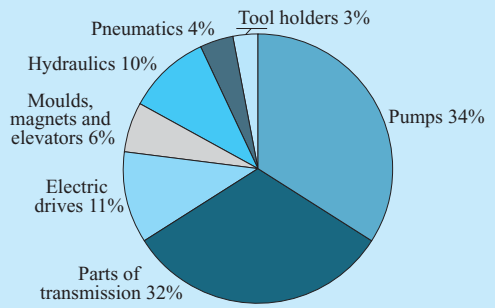
Figure 6.2 French exports of engineering products per product group, 2001, percentage of total value



Source: Eurostat (2003)

Table 6.1 shows that Germany is the main European exporter of engineering products with a total value of € 22,312 million. Exports of pumps represents 34 percent, while parts of transmission account for 32 percent. This represents a total value for these two product groups of € 15,172 million. Just as in France and the Netherlands, these two product groups are followed by electric drives, with 11 percent. Then come hydraulics (10 percent) and, unlike France and the Netherlands, moulds, magnets and elevators. As in other countries the smallest two product groups are pneumatics and tool holders.

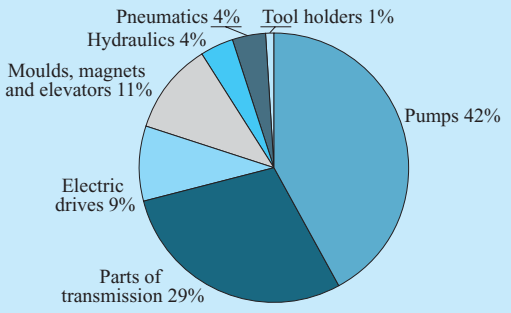
Figure 6.3 German exports of engineering products per product group, 2001, percentage of total value



Source: Eurostat (2003)

Italy is the second largest exporter of engineering products, closely followed by France. Pumps is the main product group with 42 percent of a total of € 9,604 million. The second largest group is parts of transmission. Remarkable is the relatively large share held by the third product group, moulds, magnets and elevators. Of all the major exporters, Italy is the only one with this product group in the third place with a percentage of 11 percent, representing a value of € 1,056 million. Electric drives come next with 9 percent, followed by hydraulics and pneumatics, both equal in size with 4 percent or a value of € 0,384 million. The product group tool holders is again last in line with 1 percent.

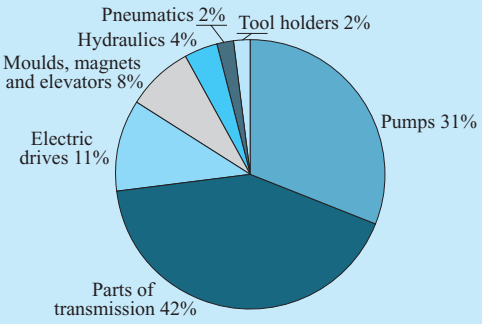
Figure 6.4 Italian exports of engineering products per product group, 2001, percentage of total value



Source: Eurostat (2003)

Spain is the only country where parts of transmission is the largest product group, with 42 percent of total value, i.e. € 0,854 million. Pumps, in most other countries the largest group, is second here with 31 percent of a total value of € 2,034 million. Most of the rest of the pie is taken up by the product group electric drives (11 percent of the total) and moulds, magnets and elevators (8 percent of the total). The remaining product groups represent 8 percent of total value.

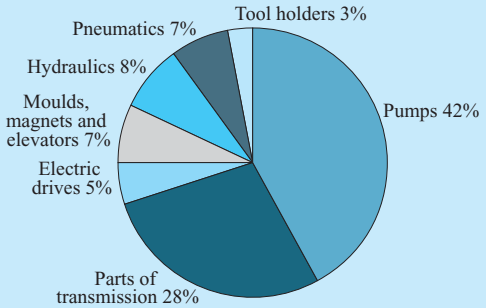
Figure 6.5 Spanish exports of engineering products per product group, 2001, percentage of total value



Source: Eurostat (2003)

The UK is the last EU country to be discussed in this chapter. The UK is the fourth exporter, after Germany, Italy and France. The UK's main engineering export product is pumps. This product group represented a total value of € 2,226 million in 2001 followed by parts of transmission with a value of € 1,484 million. The third product group is surprising enough hydraulics with 8 percent. While in the other countries this product group was relatively small, in the UK it is the third most important with a share of 8 percent of total value. The other groups follow with 7 percent for pneumatics and moulds, magnets and elevators, 5 percent for electric drives and 3 percent for tool holders.

Figure 6.6 UK exports of engineering products per product group, 2001, percentage of total value



Source: Eurostat (2003)

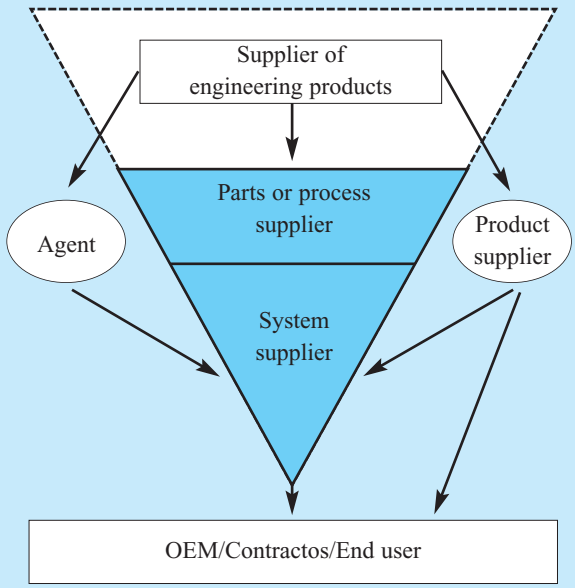
7 TRADE STRUCTURE

7.1 EU trade channels

The consumers of engineering products can roughly be divided into two market segments: Industrial and Construction. The industrial market is characterised by orders and deliveries. The consumer is the original equipment manufacturer, using the product in his machine or installation. The construction market is organised at project level. The consumer is the main contractor (e.g. building contractor or plant contractor) responsible for the realisation of the project. In both type of markets, however, the same structure can be recognised. Figure 7.1 represent the supply chain for both market segments. Different players can feature in the supply chain from manufacturer to end consumer. The product supplier or the Original Equipment Manufacturer (OEM) is responsible for the production and delivery of goods to the end consumer. More and more OEMs are defining their core competences and then setting in motion a procedure for the outsourcing of the non core competences (e.g. parts production) that they still perform.

The flow of goods moves from the parts supplier towards the end user. The developing country exporter is positioned in the upper part of the triangle. It can either be a contract manufacturer directly supplying to a component (parts or process supplier) manufacturer or product supplier in Europe or a provider of components to a system supplier, mostly via an agent.
The triangle in brackets depicts the growing co-operation between the different companies involved in delivering a product to the consumer. Control activities are managed by the system supplier (translating market demand into individual unit and part demand per company) in both demand and supply (checking that companies perform according to plan) management. Product suppliers play an important role. They generally have a significant production function of their own. . At plants in several countries (mainly in China, Korea, Malaysia and India), they manufacture standard products. Examples of such importers of pneumatic articles are Festo and SMI. They trade with a standard assortment. The marketing and sales negotiations with the most important OEMs or contractors are performed by the product supplier itself, the rest being left in the hands of agents. A critical success factor is the availability of brands. This is an absolute must in the field of engineering products.
Where suppliers of components are located in developing countries, agents or importers must be used to find the right foreign system supplier. European OEMs and system suppliers also need to make careful choices when seeking out developing country manufacturers. Their decisions are influenced by price competition, the lack of qualified technical personel and the growth of end markets. For labour-intensive products, the deciding factor tends to be low wages.

Figure 7.1 Trade structure engineering products



The **agent's** activities are increasingly focused on additional services around the product itself. Nowadays agents need to be well informed about their customers and the market, making maximum use of information sources and the available infrastructures.
In order to remain competitive and attractive, importers and agents need to provide more added value, alongside traditional functions. Much attention is paid to transitional functions, including:

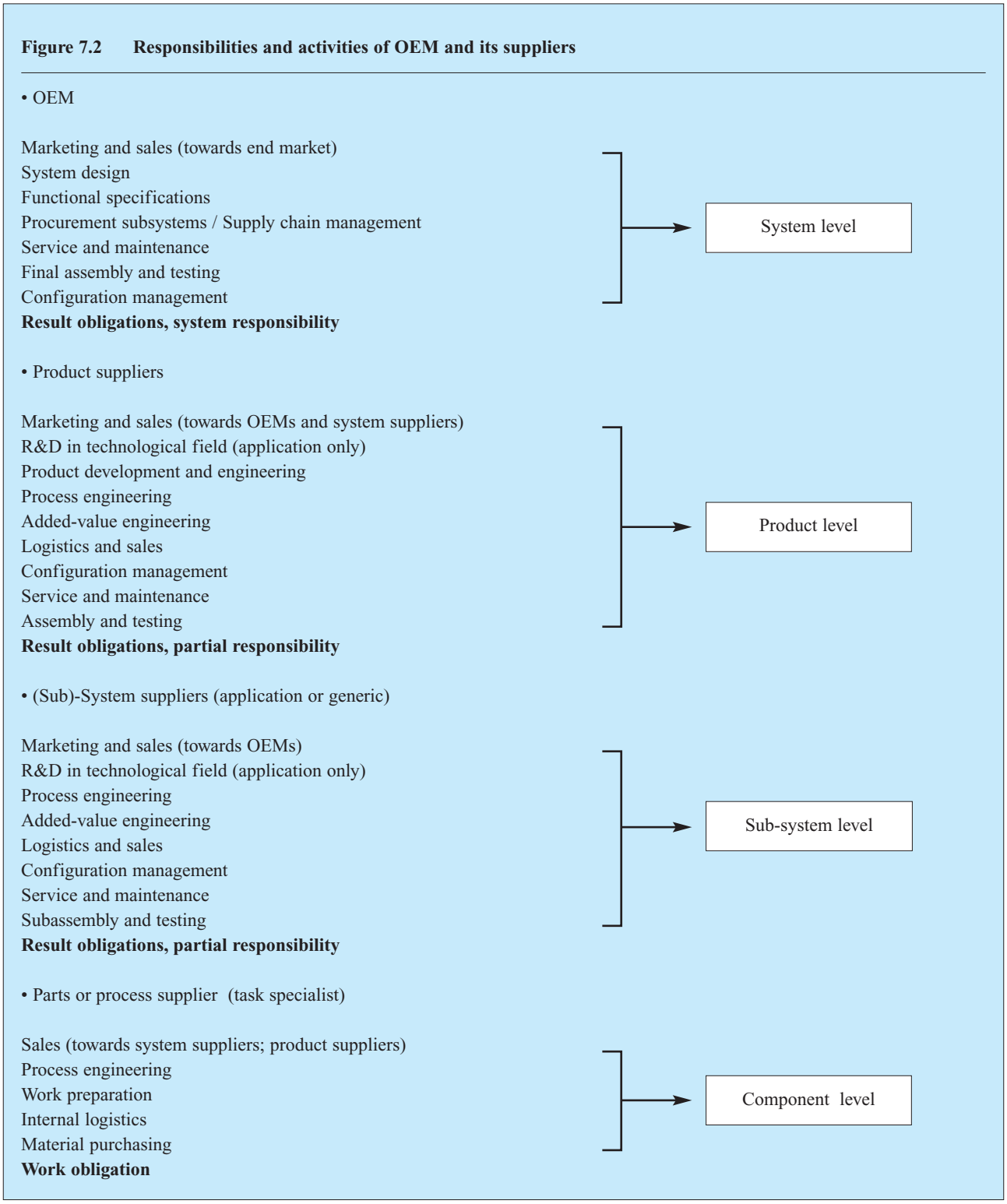
- quality assurance
- sourcing knowledge
- transfer of knowledge
- stock-keeping and fast delivery
- offering different methods of financing.
- co-product development (e.g. with the system supplier) is also considered to be an important added value.

The globalisation and specialisation of companies in the industrial sector is expected to lead in the coming years to other responsibilities and activities for individual companies. Marketing, sales, product development, end assembly and service will stay with the OEM. Engineering and the production of assembled parts (units or modules) will be carried out by "Application System Suppliers". The production of "built to print" units will be executed by Generic system suppliers,

focusing on excellent assembly, project management and logistics (another possible role for system supply). The production of common parts will lie with system suppliers, being further outsourced to parts suppliers (own product) or process suppliers (offering capacity).

Demand and supply chain (OEM consumers) for engineering products, focus on batch-wise deliveries. A distinction can be drawn between **traditional** machine constructors (OEMs), and **innovative** machine constructors within supply chains in the manufacturing (parts-producing) industry. The traditional companies can be found in Italy and Germany. They outsource only for capacity reasons. It is complex for subcontractors, especially foreign and developing country exporters, to get involved in business with them. The Netherlands (less traditional) has relatively more innovative OEMs. These tend to be niche players

Figure 7.2 Responsibilities and activities of OEM and its suppliers

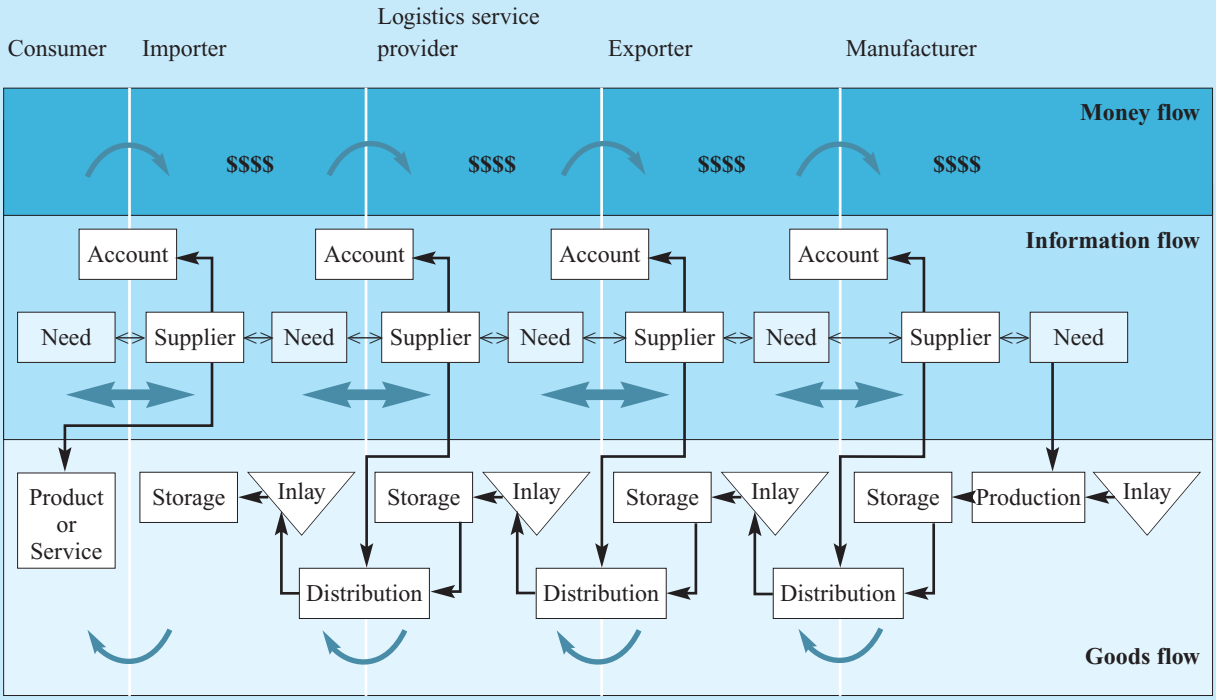


(special equipment, small series, global presence). Because of wage developments and global competition, the same trend is gradually emerging in Germany, France and the UK (less so in Italy and Spain). The trend in Europe, then, is slowly shifting towards co-operation in networks. Every company is defining its core competences and core activities. This results in the restructuring of the company, followed by the outsourcing of parts of engineering and production. Finally, the responsibilities in the chain are also being redefined. Figure 7.2 presents these "new" responsibilities (and activities) per type of company as defined in Figure 7.1.

Product development (Product Creation Process) is characterised by the on-time realisation of (sub)orders according to technology specifications. Prototypes and 0-series are manufactured at project level. OEMs work closely together with companies (importers and system suppliers) in their own locality. The production of series (Order Realisation Process) is outsourced to "low-wages countries". This takes place under pressure from the OEM. System suppliers are outsourcing well-documented parts and sub-assemblies. The challenge is to ensure the on-time availibility of products in volume, using cost-effective techniques. And herein lies the opportunity for developing countries. What must be taken into account when looking at such opportunities is the fact that low price is not the only requirement coming from the OEM and the system supplier. OEMs have increasing expectations in terms of constant quality, effective communication (order processing, stock management e.g.) and delivery reliability. These factors can be regarded as order enablers. System suppliers therefore need to work closely with the producing party, in both the development and the production phases. Being able to communicate effectively and perform in these fields constitutes an 'added value' that may well prove to be the vital order-winner, especially in the non-commodity market. The production of components and assembly should preferably be carried out where it can be done the cheapest. A lot of experience is available in Eastern and Southern Europe. Outsourcing is growing in Europe. At the same time, suppliers in Europe are becoming specialists (in technology, processes, markets, batch sizes, etc.).

Supply chain in 'global trade' (of trade products)
Figure 7.3 shows the structure of the trade process for 'global trade' as applicable to the past and near present. The Figure represents the flow of goods (lower section in light blue), the information flow (middle section in blue) and the money flow (upper section in dark blue). A triangle represents a stock point, a rectangle a point where a process is executed and an arrow the flow of goods, information or money from one point to another. The type of process is depicted in the rectangle. The chain is presented with different players - consumer, producer, exporter, logistics provider, importer. The flows are 'bulk flows', focused on the transport of anonymous products and components between

Figure 7.3 Global supply chain (past/recent)



producers and consumers. The importer and exporter play a major role in the control of goods. The goods flow (from right to left in the Figure) starts with the manufacturer, where raw materials are transformed into products. From there, good are handled in a number of different steps until they reach the end consumer. The information flow (from left to right in the Figure) starts at the point at which the consumer need is detected and ends when that need arrives at the manufacturer. There it leads to a signal to produce goods. The money flow (left to right) states who is paying whom for what. Under the influence of market developments in the "developed western world", a number of starting points have been changed.

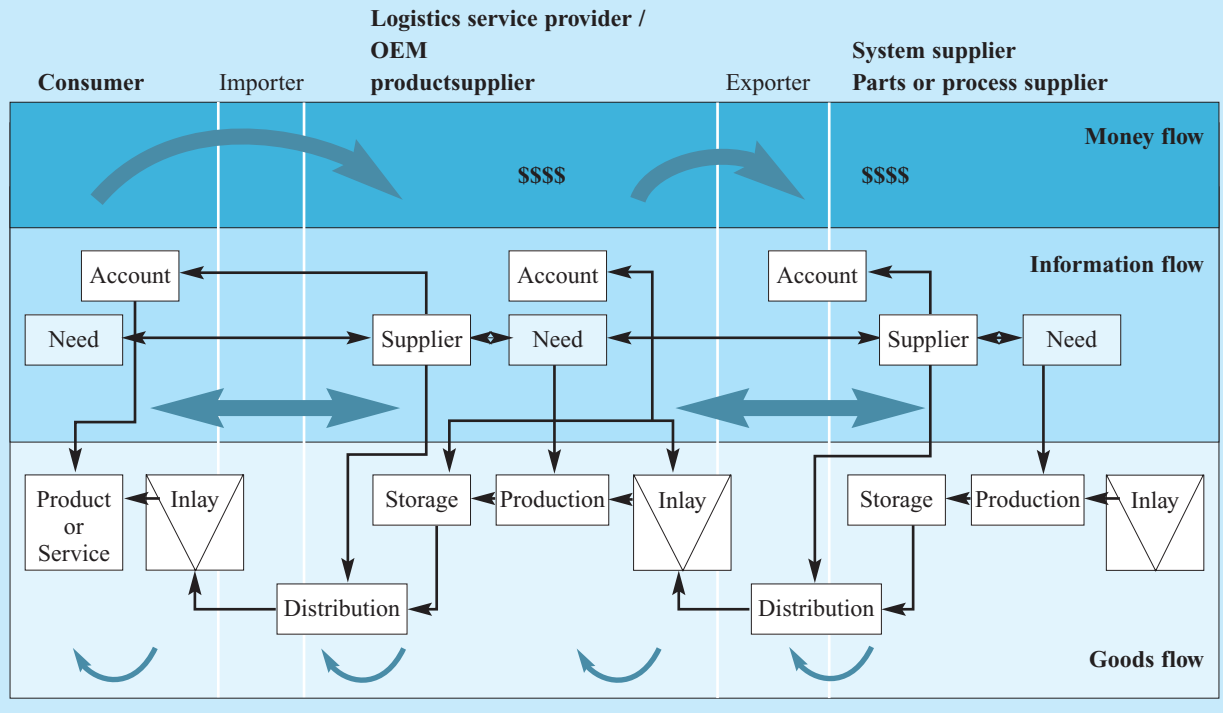
Increasingly, the chain is being directed by consumers, logistics providers and producers. The following new services are therefore necessary:

- The supplier (importer, logistics service provider, main contractor, system integrator) possesses an increasing amount of information about the demands of the customer/consumer (supported by Customer Relationship Management systems) and tries to offer tailor-made solutions to consumers. The goal is to offer those products using standard components whenever possible.
- Value Added Logistics (VAL, meaning transport, distribution and some customer-specific production and customer-specific assembly) ensures the fast delivery of personalised products.
- Manufacturers deliver components (sometimes via VAL processes) to the importer or main contractor specified by the contractor/integrator.

This process is being strongly facilitated by developments in the area of information and communication technology. Figure 7.4 shows the re-engineered chain. Again the goods flow, information flow and money flow are presented in the same way as in Figure 7.3. The closer contact between fewer companies is clear. The diminishing influence of importers and exporters in the future is also indicated. Lastly, the resulting elimination of process steps and stock points is visible. This leads to shorter lead times for products and a better understanding of each other's needs.

Product (original equipment) manufacturers are returning to their core competencies in order to be able to develop the new services needed. Manufacturers (product, system or parts or process suppliers) and service providers develop and supply not only the engineering products but also the related services, based on market information demanded and/or supplied by the OEM and the consumer. Services lie in spare part management, product life cycle management and product re-engineering (if necessary) based on field information.
The closer contact between fewer companies is clear. The diminishing influence of importers and exporters in

Figure 7.4 Global supply chain (recent/future)



the future is also presented. Lastly, the resulting elimination of process steps and stock points is visible. This leads to shorter lead times of products and a better understanding of each other's needs.

7.2 Distribution channels for developing country exporters

The important players for developing country exporters in the distribution chain are the importer/agent (looking for products to handle), the product supplier (as outsourcer of capacity and possibly low-interest or simple products) and the system supplier (looking for production capacity and cheap parts).
Traditionally, the importer/agent has always been the linking pin between European OEM (and increasingly for the system supplier) and local manufacturer (developing country exporter). The developments in restructuring the supply chain (as described in 7.1) have resulted in the need for importers to re-engineer business.

More and more system suppliers responsible for delivery of one-of-a-kind assembled products (units) are looking for their own possibilities in low-wage countries. This development is the result of global competition from networks (e.g. Siemens with General Electric and Philips Medical Systems, or Panasonic with Fuji and Assembléon) and the price pressure European networks are experiencing. System suppliers are entering into co-operation with developing country exporters via the importer/agent. They are also starting research in developing countries on their own initiative. A number of first system suppliers are also starting subsidiaries (e.g. in China and Malaysia). As business grows in developing countries, they will exploit these relationships and other opportunities more and more.

The role of the importer/agent is going to be smaller for these kinds of products. Their role in the importation of standard products (catalogue) such as pumps, electric drives, parts of transmissions will remain solid. Product suppliers are reinforcing their position by focusing on product (portfolio) development. The incorporation of mechanics with electronics and embedded software control is one such development. Under price pressure these product suppliers have moved the production of the parts to low-wages countries.

Developing country exporters should be aware of these developments.
The product supplier and some agents are vital to the winning of contracts for parts of their (standard) products.
The system supplier is already gaining importance in European countries with many OEMs in a niche role (the Netherlands, Germany, UK). Attention should be paid to the level of development per country (publications in local journals).
Exporters should make attempts to contact these kinds of system suppliers, focusing on a particular type of unit and servicing a number of OEMs. One good opportunity is the ESEF (European Subcontracting and Engineering Fair) held every two years in the "Jaarbeurs" (conference centre) in Utrecht and the annual Hannover Messe fair. These are useful events at which to 1) exhibit and 2) seek out potential customers.

More information about trade fairs and journals can be found in Appendix 3.4 and 3.5.

8 OPPORTUNITIES FOR EXPORTERS

The industrial market offers the best opportunities in terms of volume. Many Western European companies are looking for cheap alternatives in low wages countries for components and simple assembled products. The performance of products must conform to required norms and standards. The organisation and process quality (traceability) should also be of a high standard resulting in professional communication and "copy-exactly" processes. Because of the globalisation of competence and price pressure (economic downturn), the number of initiatives and the realisation of outsourcing from Europe to Asia and Latin America or starting joint ventures (with local companies overseas) or local plants is growing rapidly.
In Germany, interesting because of its current status as number 1 in consumption in Europe, the southern part is the most successful at the moment. However, Germany's own production tradition is strong. The market circumstances (low growth, high unemployability) are difficult right now. This will create openings as German companies are forced to reduce cost prices in order to survive in world markets. However, their industrial tradition and technical "superiority" will result in a reluctance to attempt outsourcing.
Western European OEMs are also selling more and more products to the Far East. Compensation orders and the need to keep goods flows close to the market are driving OEMs to start manufacturing in the Far East. In their proximity, system suppliers are also starting manufacturing in the Far East. Most of this manufacturing takes place at assembled product level (intermediate goods) offering possibilities for local parts and process suppliers to sell components and capacity to system suppliers and OEMs.

Chapters 3 and 7 presented an overview of the market and its structure for the different product groups. **The best opportunities and potential for developing country exporters lie in:**
- Parts of transmission (not to complex products)
- Electric drives (relatively low volumes; high mix of products)

In addition, good opportunities (high volumes), but more difficult (because of existence and necessity of brand names, strong competitors, complexity or high technological standards) are to be found in:
- Pumps
- (other) Hydraulic systems

Potential customers for developing country exporters are:
1. Entrance to Europe:
- Main product suppliers of the OEMs (like Festo, Norgren, SMI for pneumatics);
- Traders (smaller importers and agents; often specialised) in engineering products.

2. European companies, starting in developing countries:
- System suppliers
- OEMs

The following industry segments offer the best opportunities:
- Construction and installation industry; focus could be placed on simple parts of transmission, pumps and electric drives
- Petrochemical and chemical industries, processing industry;
  pumps and electric drives
- High-tech electronics
  parts of transmission, tool holders, hydraulics/pneumatics
- Automotive industry;
  parts of transmission
- Food industry;
- Shipping;
- Horticulture, (especially construction and equipment);
- Civil engineering;
- Water supply and sewerage.

Product groups	Of interest because	Not of interest because
Electric drives	Nordic countries and Ireland are main players; imports are extensive, also from Far East and parts of South America	High mix, low volume products
Moulds, magnets and elevators	Germany is a main importer; relative high volumes Note: focus on standard parts and components	Relatively low imports, with the exception of Germany
Hydraulics	Relatively high volumes (quantities and turnover); high cost prices Italy, UK and Spain are main importers	Relatively complex products and high industrial quality demands
Parts of transmission	Very high volumes; low cost prices; Italy, France and UK are main importers Relatively simple products Start with: common parts for e.g. construction industry	
Pneumatics		Relatively small volumes Relatively complex products 3 important global players Note: starting point could be Filters, Regulators and Lubricants (FRL) or pipes and fittings
Pumps	High volumes but also high mix of products Germany and France are main importers	
Tool holders		Small volumes High mix of products High quality standards

Conclusion: the **product groups above are of potential interest for developing country exporters**, taking into account the defined state of markets and products.

In many of the instances where product groups within European mechanical engineering has lost ground in international trade, the products concerned have been serial products manufactured in batch production. Most of the successful suppliers are from Japan, but in some market segments Korean and Taiwanese companies have also been successful. This implies that the key to the competitiveness of mechanical engineering lies in common factors that extend beyond the specific framework conditions applying to a single sector. These findings have led to the classification of three market types especially designed for mechanical engineering and defined according to product properties.
The first type is **series product supply**, the second **customised engineering and plant supply** and the third **key know-how supply**. Opportunities for developing country exporters are especially good in the first type. Here, standard products are made using standardised procedures and drawings. Labour represents a major share of the total product price. This offers good opportunities for developing country exports (reasonably "simple" products and manufacturing procedures plus "low wages" guarantee the best price!).

Part B
EU market access requirements

9 REQUIREMENTS FOR ACCESS

9.1 Non-tariff trade barriers

CBI's AccessGuide is a useful database on non-tariff trade barriers. It can be visited at www.cbi.nl/accessguide.

Quality and grading standards
Quality is a main characteristic of an engineering product, based on the suitability to meet given requirements under a present situation. Customers make considerable demands in terms of the maintenance and replacement of parts. These aspects are becoming increasingly important in influencing the demands of professional customers. Potential buyers take into consideration not only the safety, reliability and price of engineering products but also service costs.

ISO 9000-2000
The International Organisation for Standardisation (ISO) has developed the generally accepted ISO 9000 series, providing a framework for quality management and quality assurance. The ISO 9000 standards represent an international consensus on the essential features of a quality system. Manufacturers in possession of an ISO 9000 series certificate have an important asset. It is a major selling point when doing business in the competitive EU market. Quality, health, safety and environmental management programmes are usually strongly interwoven into the overall ISO management plan.

CE-marking
In the eighties, a "new approach" was introduced to overcome the lengthy adoption process of "old approach"-type legislation. The goal of the European Union's harmonisation program under the "new approach" is to streamline technical harmonisation and the development of standards for certain product groups, including, among others, machinery, toys, construction products, electromagnetic compatibility, personal protection equipment, non-automatic weighing machines, medical devices, gas appliances, hot water boilers, and telecommunication terminal equipment. Under the new approach, Directives cover essential safety and health requirements. The three regional European standards organisations, CEN, CENELEC and ETSI, are mandated by the Commission to develop technical standards consistent with the essential health and safety requirements of EU Directives. The standardisation process is open to EU-based companies only. Products manufactured to these standards adopted by CEN, CENELEC and ETSI and published in the Official Journal as harmonised standards are presumed to conform to the requirements of EU Directives. (The relevant legislation, as well as a list of harmonised standards, can be found on the www.newapproach.org website). The manufacturer then applies the CE Mark and issues a declaration of conformity. The product will then be allowed to circulate freely within the European Union.
Products coming from developing country exporters will usually be supplied to EU countries by importers. This makes the importer responsible for the product. Importers will encourage or force developing country exporters to meet certain standards, for example through legally binding guarantees.
For example, with effect from 1 July 2003 the European Union has prohibited the use of lead, mercury, cadmium and hexavalent chromium in vehicles and components and materials used in vehicles. **For more information about product legislation (through keyword: machinery or mobile equipment; related documents available) visit AccessGuide, CBI's database on non tariff trade barriers at www.cbi.nl/accessguide and your importer / agent.**

A manufacturer can opt not to comply with the CEN/CENELEC/ETSI standards, but it must then demonstrate that the product meets the essential safety and performance requirements. Trade barriers occur when design rather than performance standards are developed by the European standardisation organisation, and when developing country companies do not have access to the standardisation process through a European presence.

A product manufactured in conformity with EU legislation in one Member State will be guaranteed automatic access to the markets of all the other Member States and the European Economic Area (EEA, i.e. the EU plus Iceland, Liechtenstein, Norway and the 10 pre-accession countries). Developing country manufacturers who obtain the CE mark will also be guaranteed access to all markets in the Member States of the European Union as well as the EEA. As the EU recently signed preferential trade agreements with certain Central and Eastern European countries covering specific sectors, self-certified CE marked products will be allowed free access to the markets of these pre-accession countries (i.e. Bulgaria, Republic of Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia).

The assessment of the Directive is laid down in modules. The modules contain specific test regimes as well as indications as to whether a Notified Body has to be called in. After testing of a product by a Notified Body, the producer or his European importer affixes the CE marking. The declaration of conformity must be kept on file. EU Directives are addressed to the

Member States who have to transpose them into national law. The Directives define a schedule for adoption, publication and implementation of national provisions. New approach Directives also recognise a transitional period during which existing national provisions and new legislation will co-exist. In such cases, the manufacturer has a choice of following either of these series of conditions.

The CE mark addresses itself primarily to the national control authorities of the Member States, and its use simplifies the task of essential market surveillance of regulated products. Although CE marking is intended primarily for inspection purposes by EU Member State inspectors, the importer may well perceive it as a quality mark.
The CE mark must be affixed to the product, to its data plate or, where this is not possible or not warranted on account of the nature of the product, to its packaging, if any, and to the accompanying documents by the manufacturer, the authorised representative in the European Union or, in exceptional cases, by those responsible for placing the product on the market. The CE mark must be affixed visibly, legibly and indelibly. Where special provisions do not impose specific dimensions, the CE mark must have a height of at least 5 millimetres.
The CE mark is not intended to include detailed technical information on the product, but there must be enough information to enable the inspector to trace the product back to the manufacturer or the authorised representative established in the EU. This detailed information should not appear next to the CE mark, but rather on the declaration of conformity, the certificate of conformity (which the manufacturer or authorised agent must be able to provide at any time, together with the product's technical file), or the documents accompanying the product.

New approach legislation provides for the issuance of a declaration of conformity by the manufacturer and often requires a certificate of conformity from an independent certification body. The independent certification bodies, known as notified bodies (see the internet address:
www.europa.eu.int/comm/enterprise/newapproach/legislation/nb/listnotifiedbodies.pdf)
have been officially notified by competent authorities to test and certify to EU requirements.

It is important to note that the new approach deals with large families of products--machinery, gas appliances, pressure equipment, toys, and construction products--or horizontal risks, such as those addressed in the EU's Electromagnetic Compatibility Directive (EMC), as opposed to being product-based as under the old approach. It is possible that some products may be governed by more than one Directive because different risks may be dealt with under separate Directives. In cases where more than one Directive may apply, the CE mark can only be affixed if the product complies with all of the
appropriate provisions in all of the Directives applicable to the product.

The Machinery Directive (89/392/EC, 91/368/EC, 93/44/EC, 93/68/EC, 98/37/EC)
As a result of the New Approach to Technical Harmonisation and Standards, the Directive on machines, the Machinery Directive, came into force on January 1, 1995 in the entire European Economic Area. From that date onwards, all machinery, as defined by the Directive, must have a CE marking to be allowed onto and operated in the European market.
According to the European Directive a machine is: “an assembly of linked parts or components, at least one of which moves, with the appropriate actuators, control and power circuits, joined together for a specific application, in particular for the processing, treatment, moving, or packaging of a material”.
As this Directive aims at health and safety, the following requirements are made:
- design, control, safeguarding against other dangers
- materials, safeguarding against mechanical risk, maintenance
- lighting, shields and safety precautions, indications on the machine

Directive 91/368/EC added specific requirements regarding:
- the specific dangers as a consequence of the mobility of machines
- the specific dangers of hoisting and lifting machines
- machines for underground activities.

The “Machinery Directive” is also applicable to parts of machines and to transmission components. This means that a manufacturer of, for instance, gearboxes has to conform to these regulations as well. The only difference is that it is not allowed to affix the CE marking to these components. As the components will be used to build a complete machine, the manufacturer wants proof that the parts he uses conform to the “Machinery Directive”. Such a statement is the “Manufacturer’s Statement” which should be shipped with the product.
Most products dealt with in this report will not be independently-working machines, therefore, the CE marking should not be affixed to the product; however, a “Manufacturer’s Statement” should be handed over with the product. In the case where the Directive refers to norms for details, then those norms must be followed. The European EN or international ISO norms, which have a voluntary and
non-obligatory character, then take the status of prescribed regulations. Even if the Directives do not explicitly demand the use of certain norms or standards,

it is recommended to follow these, as it is easier to state conformity to a set norm than to a self-invented equivalent.

Components for machinery, and therefore pumps and compressors without drives, are in most cases governed by the Machinery Directive. For this reason, they have to comply with those requirements. Regarding products (components) designed and manufactured to be incorporated in a machine, the issuing of a "Manufacturers Statement" is appropriate and the CE marking need not to be affixed.

The Electro-Magnetic Compatibility Directive (EMC) (89/336/EC, 92/31/EC, 93/68/EC)
Electro-Magnetic Compatibility (EMC) is the ability of electric equipment, installations and systems to work together in the same environment without causing or receiving interference. The EMC is applicable to electric and electronic appliances, equipment and installations containing electric and/or electronic components, which can generate electro-magnetic noise and/or of which the proper functioning can be influenced by this. As a result, this will include almost every apparatus incorporating electric energy, from battery-powered products to high-voltage installations. This means that all appliances causing electromagnetic disturbances, or that can be influenced by them, fall under the jurisdiction of this Directive. It should be noted that it is important for a manufacturer or importer to know if his equipment complies with EMC standards.

The Low Voltage Directive (73/23/EC, 93/68/EC)
In the basic safety regulations, there is a reference to the Low Voltage Directive for electrical goods (73/23/EC). If a machine incorporates voltages within the range 50-1000V AC and/or 75-1500V DC, the product should comply with this Directive. As a result, any machine or component within those power ranges is governed by this Directive. The Low Voltage Directive does not incorporate formalities. The Directive purely aims at safety and outlines the safety features with which a product should conform. The safety purpose of the Low Voltage Directive is summarised in harmonised norms. Although it is not imperative, conformity with the harmonised norms implies compliance with the Directive. If the main safety risk of a machine concerns the use of electricity, then the machine only has to comply with the Low Voltage Directive. It is sometime hard to determine if the safety risks involved are purely of an electrical origin. The European Commission acknowledges this problem and has made a list of products that have to comply with the Low Voltage Directive. It should be kept in mind that the Low Voltage Directive does not incorporate any regulations to reduce the risk of mechanical hazards.

Pressurised Equipment Directive (PED) (97/23/EC)
This Directive pertains to pressure vessels, pipelines including connections and attachments such as flanges, LPG equipment and pressurised air equipment. The PED applies to pressurised equipment designed for use with an overpressure of more than 0.5 bar. The Directive came into operation on May 29th, 1999. A transitional period up to 29 May 2002 has been installed. After that date, pressure equipment which does not carry the CE marking may no longer be brought onto the market or put into service in the European Economic Area.
The new Directive particularly focuses on equipment for the processing industry and closely related industries, as well as safety devices to protect all sorts of pressurised equipment. This Directive defines pressurised equipment as general pressurised equipment such as installation pipelines, safety pressure components, fittings, valves and pressure systems composing of these components.
The PED distinguishes between four groups of pressure equipment depending on the hazardous nature of the material. Specific requirements have been set for these four groups. In general, all four groups are bound to requirements for the design, the manufacturing and the materials used. A subdivision of these three aspects leads to products needing to comply with requirements for:

Design
- general
- design for adequate strength (pressure, containment, resistance and stability)
- safe handling and operation
- means of examination, draining and venting
- corrosion or other chemical attack
- wear
- assembly
- provisions for filling and discharge
- protection against exceeding the allowable limits of pressure equipment
- safety accessories
- external fire

Manufacturing
- manufacturing procedures
- final assessment
- marking and labelling
- operating instructions

Materials
- materials specifications

Trade legislation
Companies wishing to make distribution, franchising or agency arrangements need to ensure that the agreements they put in place are in accordance with EU and national laws. Under EU law, because these kind of

agreements can potentially restrict competition within the European Union, they have to be notified to the European Commission prior to their enforcement, unless:
They qualify as “agreements of minor importance”, meaning that the parties' combined market share does not exceed a certain limit.
For example, parties to a “vertical agreement” may not represent more than 10% of market share. (Vertical agreements are agreements between companies operating at different levels of the same manufacturing or distribution chain. Vertical agreements should also not involve price-fixing, nor should they give absolute territorial protection.) **And / or for:**
For franchising agreements, exclusive and selective distribution agreements, industrial supply agreements, and exclusive purchasing and exclusive supply agreements:

- the parties' combined market share is less than 30%; and
- the agreement does not include restrictions, such as price fixing, absolute territorial protection, restriction of sales to end users by members of a selective distribution system, and restriction of cross-supplies between distributors within a selective distribution system.

For more information, please refer to regulation 2790/1999 on vertical agreements and its guidelines on the competition webpage of the European Union: http://www.europa.eu.int/comm/competition/antitrust/legislation/

Regarding agency agreements, the EU has issued a Directive requiring Member States to harmonise their national rules and introduce certain minimum standards of protection for self-employed commercial agents who sell or purchase goods on behalf of their principals (Directive 86/653/EEC). In essence, the Directive establishes the rights and obligations of the principal and its agents; the agent's remuneration; and the conclusion and termination of an agency contract, including the notice to be given and indemnity or compensation for damages to be paid to the agent.
For more information on EU legislation on distribution, franchising, agency agreements and their notification to the European Commission, you should also seek legal counsel, given the complexity of EU competition law.

Non EU patents are not recognised in the European Union; so, companies will need to have corresponding patent protection to cover the EU market. Unfortunately there is not yet a single EU wide patent. This may change soon but for the moment the most effective way for a company to secure a patent across a range of EU national markets is to use the services of the European Patent Office (EPO) in Munich. It offers a one-stop-shop that enables rights holders to get a bundle of nation patents using a single application. It is worth bearing in mind that the EU system is based on the first to file approach, so securing such protection should be considered a priority. The EPO's address is Erhardstrasse 27, D-80331 Munich, Germany (Tel.: 49-89-23990 / Fax: 49-89-23994465). Their website is: **http://www.european-patent-office.org.**

With regards to necessary product documentation, certificates of origin must be completed by the exporter and be certified by the authorised authorities in the country of dispatch. Special conditions apply in the preferential agreements with some East-European countries under which the exporter himself has the right to certify the forms. The document EUR 1 is required by customs authorities for imports from ACP/OCT countries. For imports from developing countries under the GSP agreement FORM A (GSP) is used.

Norms / Standards
It is important to manufacture products according to accepted international standards. Norms not only specify sizes and tolerances but also give strength and finish requirements. Sales of a product will be difficult if the product is not manufactured according the required standards. Moreover, it will not be competitive with other products.

Standard pumps - ISO 2858/ ISO 3069/ ISO 3661
The International Organisation for Standardisation (ISO) has prepared a standard recommendation, ISO 2858, for end-suction centrifugal pumps - pressure rating PN 16 (maximum pressure 1.6 Mpa). This is included in BS EN 22858 and DIN 24256. Pumps conforming to this standard are intended for chemical and corrosive applications, although pumps are available in high silicon iron and Ni-Hard steel for solids handling applications. Stuffing box and seal cavity dimensions conform to ISO 3069, which is based on parts of DIN 24960. Flanges conform to ISO 2084. Overall package dimensions, including motors and baseplates, are given in ISO 3661. ANSI inch standards (American National Standards Institute) are also available. The ANSI B73 standards were originally produced for the chemical industries.
The standards were based on recommendations by users and compiled by a committee consisting mostly of manufacturers. The ANSI B73 standards specify materials and mechanical seal options. In this context, the API 610 standard is also of importance.

API is the American Petroleum Institute, which is predominantly a trade association of pump users concerned with oil and gas production and refining. The API standard is not a dimensional standard, allowing interchangeability between manufacturers, but it is a standard securing robustness. The first two requirements are a 20-year service life and the capability of three years uninterrupted operation.

Compressors
Norms applicable to compressors are ISO 1217, ISO 5390, ISO 8662 and ISO 8662. These norms cover acceptance tests, classification and measurement of mechanical fibes on the handle.

Safety norms
General machinery is covered by EN 292. Pump safety will eventually be covered by EN 809.
An important factor in applying safety considerations is the ability of the system to withstand pressure. Pumps, pipes, valves and flanges are, therefore, constructed to withstand specific pressure ratings associated with temperatures. The pressure/temperature ratings for flanges, pipes, valves and fittings can be found in:
.ISO 7005 .ANSI B16.42 .ANSI B93.75 .BS 3293
.ANSI B16.1 .ANSI B16.47 .BS 10 .BS 4504
.ANSI B16.24 .ANSI B16.5 .BS 1560

The construction and dimensions of pipe fittings are standardised in:
.ISO 49 .ISO 3501 .BS 759 .BS 3799
.ISO /R508 .ISO 3503 .BS 1256 .BS 4346
.ISO 2045 .ISO 4145 .BS 1640 .BS 4772
.ISO 2531 .ISO 4179 .BS 1740 .BS 5114
.ISO 3458 .ISO 8179 .BS 1965
.ISO 3459 .BS 143 .BS 2051

With regard to electrical standards, the following standards will be reviewed:
.IEC 34-1 .IEC 34-5 .EN 60034 Part 5 .BS 5345
Safety requirements for liquid pumps and pump aggregates technical have been defined in DIN 24295.

Vibration and noise
Standards dealing with noise and vibration are basically concerned with the evaluation of maximum permissible vibration levels for various types of machinery. Vibration levels are measured as vibration velocity mm/s rms. Standards dealing with this subject are: VDI 2056, ISO 2372 and BS 4675 / Part 5/ 1976, IEC and EN 60994 for vibration and pulsation measurement at site for rotodynamic pumps and turbines.

When tackling the noise problem, consideration must be given to the complete pump package and not just the pump. Specific areas can be designated “ear protection zones” where ear protectors must be worn. Typical noise level restrictions in current specifications call for 84 dBA maximum. Regarding measurement, evaluation and presentation of noise data, the following standards should be reviewed for suitability of any specific application:
ISO 3740, ISO 3744, ISO 3475, ISO 3746, ISO 3747, ISO 4412, ISO 4871, ISO 6081/2,
EN 27574, ANSI B93.71, ANSI B93.72, ANSI S1.4a, ANSI S1.6, ANSI S1.13, API 615,
BS 4196, BS 7025 and DIN 45635.
The standards ISO/R 1680, IEC 34-9 and BS 4999 Part 109 are applicable for noise generated by electric motors.

Norms for elevators
The international norms applicable for elevators for goods (and persons) are:
prEN 81-70 (from june 2002); **DINV ENV 13269** (01.2001); **DIN EN 13460** (08.2002); *DIN EN 62079* (11.2001); **DIN IEC 0300-3-11** (04.2002); **DIN IEC 60300-3-14 E** (04.2002).
These norms cover user manuals (installation, use, warranty), (function oriented) maintenance and maintenance manuals.

Norms for components
The following standards are the most popular for shape and dimensions of flanges:
.ISO 7005 (metric .DIN 2543 to 2549 .DIN 2628 and inch)
.DIN 2569 (all metric) .ANSI B16.5
.SAE (all inch) .DIN 2531 to 2533 .BS 1650
.DIN 2631 to 2638 .BS 1650

Shaft end dimensions are given in ISO 775 (BS 4506). Shaft centre heights and tolerances for driving and driven machines are standardised in ISO 496 and BS 5186.
Shaft seals are covered by: DIN 3780 (covers stuffing box dimensions for soft packing), DIN 24960 (for mechanical seal cavities and material codes), ISO 3069, API 610, ANSI B73.1 and B73.2, API 382 (covering all aspects of mechanical seals).

Besides meeting product norms and standards, testing the product or having it tested by a Notified Body, there is one other important detail a machine manufacturer should remember. The manufacturer also must compile a file called the “technical construction file”. This file has to contain the following documents:
- drawings of the machine;
- results of calculations and tests executed during the design stages;
- a list giving elementary requirements of the Directive, norms, technical specifications;
- description of elementary safety features;
- technical documents, certificates;
- test results of own test or by certified testing institutes;
- a copy of the manual.

Trade related environmental, social and health & safety issues
The most important aspect of the process of unification (of the former EC countries) which affects trade is the harmonisation of rules in the EU countries. As the unification allows free movement of capital, goods, services and people, the internal borders have been removed. Goods produced or imported into one member state can be moved around between the other member states without restrictions. A precondition for this free movement is uniformity in the rules and regulations applying to locally produced or imported products. Although the European Union is already a fact, not all the regulations have yet been harmonised. Work is in progress in the fields of environmental pollution, health, safety, quality and education. For more information about harmonisation of the regulations visit AccessGuide, CBI's database on non tariff trade barriers at www.cbi.nl/accessguide or www.europe.eu.int/eur-lex.

Social requirements (SA8000)
Most of the requirements in this sector are based on quality and technical safety. However, social requirements are of growing importance, focusing on raising labour standards mainly in developing countries. Currently SA8000 is the most frequently applied management system for guaranteeing of social requirements, such as minimum age of employees, fair payment, working time etc. Application for SA8000 may provide an interesting market opportunity for exporters in developing countries. For more information on SA8000 visit AccessGuide at www.cbi.nl/accessguide (keyword social issues; items: ILO Conventions and SA8000).

Occupational health and safety (OHS)
Standards and methods are developed because of growing concern in Europe about the local social conditions in which products are manufactured. While using machinery, accidents can be caused by technical defects of the machines or by unsafe work practices. A management system "Occupational health and safety (OHSAS) is applied in this sector, which is designed to ensure a systematic approach within a company to ensure proper working conditions. For more information, visit AccessGuide at www.cbi.nl/accessguide (keyword Occupational health and safety; items: Machinery: occupational health & safety and OHSAS).

Environmental requirements (ESP, labels, codes and management systems)
Environmental measures in the production process (also called "environmentally sound production" or in short: "ESP") are not legally compulsory in the EU, contrary to EU product legislation, but you might be confronted with requirements on e.g. waste management that are requested by EU buyers. Environmentally sound production, as per the GATT-agreement, will be an essential prerogative for exporting to EU markets in the future. Developing country exporters should be aware that it is very difficult to meet such stringent demands. There are several instruments used to show environmental and/or health and safety compliance such as labels, hallmarks, management systems and codes of conduct. ISO 14000 is the mostly used environmental management system. For more information, visit AccessGuide at www.cbi.nl/accessguide (keywords ISO 14000 and cleaner production).

Packaging, marking and labelling
The scope of problems encountered by EU exporters with third countries labelling and marking regulations in various sectors is extremely wide. Generally speaking, most critics focus on the following aspects:
- lack of transparency concerning the indications to be put on the label,
- the procedures to be followed before, during and after clearance.

There is a tendency in several countries to impose the labelling in the country of origin. (India, Turkey, US, Indonesia, China). In these cases, the EU companies must (1) know the specific requirements in advance, (2) know some administrative details related to the import country in advance, (3) produce specific labels for these markets (4) afford additional costs.

Conscious of the discrepancies among Member States in product labelling, language use, legal guarantee, and liability, the redress of which inevitably frustrates consumers in cross-border shopping, the EU institutions have launched a number of initiatives aimed at harmonising national legislation.
Suppliers within and outside the EU should be aware of existing and upcoming legislation affecting sales, service, and customer support.
For more detailed information, please look at CBI's publication "Packaging manual". It is particularly important that exporters in developing countries are aware of these regulations and take appropriate measures, in order to become or remain interesting trade partners for European importers. Packaging policy does not specifically affect "foreign" manufacturers because the importers will be held responsible for the packaging. Generally, sound marketing requires taking the obligations for the importer into consideration, meaning that packaging (transport packaging, surrounding packaging and
sales packaging) materials should be limited and re-usable or recyclable. The importer will otherwise be confronted with additional costs, thus reducing the competitive position of the exporter.

Protection is by far the most important packaging aspect where industrial products or instruments are

concerned. This can be subdivided as follows:

- **Protection against mechanical damage**

Handling is the main hazard of transport (instruments often undergo intensive handling).
Most of the damage occurs during the handling of the pack, in operations such as truck loading, truck unloading, palletising and de-palletising.

- **Protection against climatic damage**

The most harmful effect of climatic damage is that caused by condensation of water vapour. In general, a relative humidity which rises above 70 percent RH may cause corrosion on metal surfaces which have not been properly protected by preservatives or lacquers. The effect of corrosion is accelerated when combined with high temperatures. In the case of condensation (the RH rises to 100 percent), the water vapour is so finely dispersed that the attack on metal surfaces is far more intensive than in the case of plain liquid water.

Product liability
The producer is liable for damage caused by a defect in his product. The victim must prove the existence of the defect and a causal link between defect and injury (bodily as well as material). A reduction of liability of the manufacturer is granted in cases of negligence on the part of the victim. A "development risk" can also free the manufacturer from liability. The statute of limitations is ten years.

Product safety (pending adoption):
The Directive on General Product Safety has been revised to include an obligation on the producer and distributor to notify the Commission in case of a problem with the product, provisions for recall, the creation of a European Product Safety Network, and a ban on exports of products which are not deemed safe in the EU to third countries.
Labelling legislation, language use:
A number of nutrition, pricing and information labelling rules have been adopted, not only to facilitate the free movement of goods, but also to ensure better information and protection for the consumer. The use of language on labels has been the subject of a Commission communication, which encourages multilingual information, while preserving the freedom of Member States to require the use of language of the country of consumption.

9.2 Tariffs and quotas

In general, all goods, including Engineering Products, entering the EU are subject to import duties. External trade conditions in the European Union are mostly determined by EU regulations. In the case of Engineering Products, the level of the tariffs depends on:

- the country of origin;
- the product.

The integrated tariff of the European Union, known as TARIC, is designed to show various rules applying to specific products being imported into the customs territory of the EU or, in some cases, when exported from it. To determine whether a license is required for a particular product, check column five of the TARIC. To determine whether a product is prohibited or subject to restriction, check column five of the TARIC for that product for the following codes:

- PROHI Import Suspension
- RSTR Import Restriction

In addition, many EU Member States maintain a list of goods subject to import licensing. For example, Germany's "Import List" ("Einfuhrliste") includes goods for which licenses are required, their code numbers, any applicable restrictions, and the agency that will issue the relevant license. The Import List also indicates whether the license is required under German or EU law. For information
relevant to Member State import licenses, please consult the relevant Member State Country Commercial Guide.
To search the TARIC by country of origin, Harmonized System Code, or product description, please see the Directorate-General Taxation and Customs Union website,
http://www.europa.eu.int/comm/taxation€customs/dds/en/. The TARIC is updated annually in April.

In 2001, the EU Commission established a new scheme of preferential rights (GSP) for the period from 1 January 2002 to 31 December 2004, which also applies to Engineering Products. Under the new GSP (see www.europe.eu.int), which covers the period 2002-2004, the preferential regime includes:

- preferential market access to Europe for industrial and agricultural goods from developing countries, depending on the sensitivity of goods. The 'sensitivity' of goods refers to the degree to which imported products cause, or threaten to cause, serious difficulties to EU producers of similar or directly competing products;
- special treatment for Least Developed Countries(LDCs), and a grouping of Latin and Central American countries;
  1. separate agreements are made between
  → EU and ACP (African, Caribbean and Pacific Countries); separate agreement is made with South Africa (gradual mutual reduction of import duties)
  → EU and Mexico (all industrial products from Mexico are duty free from 2003 on)
  → EU and Mediterranean countries (all industrial products are duty free)

→ EU and Eastern Europe (10 countries that are in accession negotiations); all countries have bilateral "Europe agreements" including substantial trade liberalisation. Less comprehensive trade agreements are in place for Albania, the countries of former Yugoslavia and most of the countries of the former Soviet Union.

- an encouragement regime to stimulate developing countries to establish and implement trade-related social and environment policies.

In order to support exports from developing countries, the EU operates the Generalised System of Preferences. Under the current GSP scheme of the EU (Regulation 2820/98/EC), imports from a number of developing

Table 9.1 TARIC tariffs per product group and HS code

HS group	General Tariff	SPGA[1]	SPGE	SPGL[2]	Chile	Mexico	South Africa
Electric drives							
850110	4.7	0	0	0	0	0	0
850120 till -53	0 / 2.7	0	0	0	0	0	0
Moulds, magnets and elevators							
842832/33	0	-	-	-	-	-	-
848010/20/41/49/50/60/79	1.7	0	0	0	0	0	0
848030	1.7 / 2.7	0	0	0	0	0	0
848071	0 / 1.7	0	0	0	0	0	0
850590	1.8	0	0	0	0[2]	0	0
Hydraulics							
841090	4.5	0	0	0	0	0	0
841221/90	0 / 2.7	0	0	0	0	0	0
841350/60	0 / 1.7	0	0	0	0	0	0
848120	2.2	0	0	0	0	0	0
Parts of transmission							
842541	0	-	-	-	-	-	-
848210 till -99	8	0	0	0	0	0	0
848310	0 / 4	0	0	0	0	0	0
848320	6	0	0	0	0	0	0
848330	0 / 3.4 / 5.7	0	0	0	0	0	0
848340	0 / 3.7	0	0	0	0	0	0
848350	0 / 2.7	0	0	0	0	0	0
848360	0 / 2.7	0	0	0	0	0	0
848390	0 / 2.7 / 5.7	0	0	0	0	0	0
Pneumatics							
841231	0	-	-	-	-	-	-
848110/20	2.2	0	0	0	0	0	0
903281	0 / 2.8	0	0	0	0	0	0
Pumps							
841311/40	1.7	0	0	0	0	0	0
841319/20/30/50/60/70/80/90	0 / 1.7	0	0	0	0	0	0
841410	0 / 1.7	0	0	0	0	0	0
841420	0 / 1.7 / 2.2	0	0	0	0	0	0
841430/80/90	0 / 2.2	0	0	0	0	0	0
841440	2.2	0	0	0	0	0	0
841899	2.2	0	0	0	0	0	0
Toolholders							
846610/20/30	1.2	0	0	0	0	0	0

[1]SPGA (excluding Myanmar)
[2]SPGL (excluding Malaysia)
Source: Dutch Customs Office, www.douane.nl/taric-nl/ (June 16, 2003)

countries are admitted at a reduced tariff and imports from a group of least-developed countries at a zero tariff. The table below presents the actual tariffs for the product groups treated in this market survey Engineering Products.

SPGA are the least developed countries benefiting from the generalised system of preferences (Annex IV to Regulation (EC) No 2820/98), SPGE are South and Central American countries establishing programs to combat drug production (Annex V to Regulation (EC) No 2820/98) and SPGL are the countries benefiting from the generalised system of preferences (GSP), minus the countries of the SPGC group (3) (Annexes IV and V to Regulation (EC) No 2820/98).

Having acquired adequate information about the market (section A), you should consider industrial demand, trends in demand and the requirements for market access (section B), in order to determine whether there is potential for your company to export your products to the European Union. Section C outlines the areas which should be analysed before you can take a decision regarding whether exporting can be successful.

Part C
Export marketing guidelines: analysis and strategy

PART C

The EU market information (Section A) identifies the volume of the different product groups. It also indicates the different type of markets and customers with their demands and the trends in the various markets. Finally it presents the sales and distribution channels, with the different type of companies ("players") that can be distinguished.
The EU market access requirements (Section B) name the trade barriers (technical and environmental; tariffs) that exist. The norms and standards (both legally and business-wise) in particular are prerequisites for those seeking to enter into business with EU importers.

The purpose of the Export marketing guidelines (Section C) is to help you as an exporter to decide the following:

- Which markets are most suitable for my actual product portfolio?
- Am I capable of meeting the norms and standards required? Can I follow the technical developments (or are they limited)?
- Can I exploit a profitable business? Are large investments needed and what are the uncertainties? How can I manage the risks?
- What position should I aim at most logically (and in which direction should I consider growing in the near future) ?
- Who will be my most significant competitors; what is their strategy and what should my strategy be (e.g. cost and volume or niche player)?
- Is my internal organisation appropriate or where do I need to improve because actual performance is below market requirements?

Chapters 10, 11 and 12 aim at assisting potential exporters in the decision-making process (whether or not to export) by combining the external and internal analysis with critical conditions and success factors. Is the market for my products large enough? Can I obtain a position (which market segments and/or EU countries)? How long will it take and do I have the financial and marketing means?

Chapter 13 supports the potential exporter who has made a positive decision in considering the steps he has to take in order to successfully penetrate the EU market for his chosen product - market combination(s). How do I get in tough with potential customers? How do I build up a professional relationship with them? How do I expand the business with each customer?

For general export marketing information, please see the CBI's Export Planner. For general information on conducting market research, the exporter should consult the CBI's new manual on market research.

Typical starting positions for potential exporters (from developing countries) are:

1. Capacity supplier (contract manufacturer)
   This kind of company has specific technology and machinery (e.g. turning and milling) and skilled personnel and produces components based on specifications (and drawings) supplied by the customer. The logistics is under control and the company can guarantee short and reliable delivery times. Flexibility is available such that ups or downs of 25% of standard capacity can be managed. Typically this kind of supplier had 5 to 10 large customers and many small customers.
   In Part C an example of a transmission component supplier is used to elucidate and specify the analysis and tools for this kind of supplier.
2. Parts (Simple Product) supplier (FOB)
   An exporter possesses engineering, production, service and a marketing and sales department. Both 0-series (product engineering) and running series can be handled. In the phase of 0-series close contact exists between importer and exporter (in engineering and production: sharing experiences and improving the product).
   A supplier of filters, regulators and lubrificants (FRL) in the field of pneumatics is used as an example.
3. Private label (Product supplier)
   The producer needs to have technological and production expertise. It will have an assortment of products (one or more product types and a number of variants per type). Experience and knowledge of packaging is present and some kind of service can be delivered.
   A pump manufacturer for consumers (e.g. pumps used for ponds) is used as an example.

10 EXTERNAL ANALYSIS

The external analysis should be used to determine **which markets** (for example: aviation and/or automotive and/or high-tech electronics) and within that **which European countries** are of **interest for you** given import volumes, margins and manageable developments (e.g. technical). Having selected markets and countries, you should consider possible competitors and existing sales channels. This should lead to a conclusion on whether **you can obtain a position, and if so, how**.
The way in which a potential exporter can carry out its external analysis is laid out in detail below. You will also find references to websites and other specific information points.

10.1 Market developments and opportunities

Introduction
An experienced exporter knows that he should first identify the most promising export product(s), export market(s) and sales channel(s), and determine whether he is capable of meeting the requirements of those market(s) and sales channel(s). He also knows that he should identify segments and niches in the various markets, and identify competition. And he knows that only then is it time to consider buyers and price issues. This means that a (starting) exporter has to begin with market survey and identify the developments and trends in the targeted markets.

Main markets and market developments
The German Ruhr and Bavaria area, the Italian Po area, the Manchester and Sheffield area in the UK and the southern part of the Netherlands are dominant areas for engineering products. Some European countries like the Czech Republic, Poland, Romania, Bulgaria and Hungary tried to gain an important place in the last decade. But a decline in their presence in the EU market is now evident, because adaptation to the stringent EU regulations and rising wages are driving up the price level. Former Russian member states like Estonia and the Ukraine, and Slovenia and Slovakia are now gaining importance as exporter. The presence of technical expertise and production capabilities is an important success factor. For all countries mentioned, however, the current quality of production (equipment, processes, organisation) is far lower than that being demanded by customers. Rapid innovations in products and processes are only slowly helping Eastern European countries to catch up. Developing country exporters should be aware of the demand forstate of the art equipment and expertise in product(s), technology and logistics. However, for several product groups China, Korea and Taiwan are already important exporters of parts and standard products. These tend to be the most commonly used parts, produced in high volumes with limited demands on technology (developments). But this may be an appropriate route towards building a brand, increasing the product portfolio and upgrading to more complex products with higher added value and margins.

As is clear from Section A, Germany is the most important market for moulds, magnets & elevators, pumps, tool holders and pneumatics in terms of the volume of extra-EU imports. Chapters 3 and 5 and www.vdma.de, www.cecimo.be (specifically for tool holders) are good starting points for those in search of specific market information per product type.
Italy and the United Kingdom (almost equal to each other) are most interesting markets for parts of transmission and hydraulics. Chapters 3 and 5 and www.bga.org.uk (transmission), www.bfma.co.uk (hydraulics), and www.vdma.de/antreibstechnik can provide you with information about markets, product trends and access requirements.
France has the largest extra-EU import volumes for electric drives. Chapters 3 and 5 and www.fieec.fr (also www.zvei.de) can be used for the gathering of market information.
Chapter 9 and CBI's Access guide provides information on specific trade barriers for all products and markets. The Access guide also lists European importers. These can be a major information source on markets and access requirements. In most European countries, producers, importers and sometimes dealers/agents are organised into branch organisations. These organisations can be of use to new exporters to the EU, for the gathering of information about the market and for identifying potential trade partners. Addresses, telephone numbers and fax numbers of Import Promotion Organisations and other organisations that may be of assistance in entering the European Union market can be found in Appendix 3.3. The exporter should also take out subscriptions to specialised trade magazines (e.g. Industrial Engineering News and O+P; see also Appendix 3.3) and attend trade fairs (like the ESEF in March 2004 in the Netherlands, MIDEST in November 2004 in France and the Hannover Messe in April 2004 in Germany ; see also Appendix 3.4). You should also collect information on products, prices and sizes. See for example www.pneumaticsonline.com, www.antriebstechnik-e-market.de or visit the websites of important fellow manufacturers and importers.

All markets require customer-tailored solutions, demanding flexible and efficient production from those active in this field. The trend in most product groups is towards the ongoing integration of mechanics, electronics and software. The physical product and the

control of the function it performs are becoming more and more integrated and miniaturised. The OEM is responsible for developing the customer-specific product using standard parts. More and more standard components are being subcontracted from specialised companies. OEMs deal directly with the manufacturer for crucial parts (determining function or large volumes) of their products. Other parts are acquired via agents. An important condition is the brand. End users prefer to use brands. Exporters do not stand a chance if their product is not considered to be a brand.

Questionnaire export opportunities

The following questions should be answered to get an idea of whether there are market segments (and if so, which ones) offering opportunities that can be met:

1. What (typical) markets can be identified for your product(s)?
   - How can every market be segmented in a more detailed way?
   - How is each segment organised (chain structure)?
   - What type of companies in the chain are potential customers?

Market developments and opportunities: possible product - market combinations

Pneumatics

Pneumatics can be diverted into 5 product categories. The market is not very large and is dominated by 3 important companies. The largest customers are served by the manufacturers themselves. The rest of the market is approached locally via importers and agents. The technical developments are innovative (cylinder, valves; more intelligence in 1 product; product quality). The products must conform to the standards (e.g. ISO 3501 or 3503).

Developing country exporters should focus on FRL or pipes and fittings, given the market size and structure and technical developments. Drives, valves and controlling are dominated by the "3 big players" with several brands.

The market could best be approached via local importers and agents (exporter being a private label producer). Products for the agricultural and installation (building control, e.g. glass houses) markets offer good opportunities. Alternatively the exporter could become a FOB supplier (capacity company) for one of the major product suppliers (like FESTO or IMI Norgren).

See for information: www.festo.com, www.pneumaticsonline.com.

Pumps

Pumps are highly diverse in terms of type of product and use in market. Different types of markets are: industry (professional users), public sector (water and sewerage), consumer (via retail sector) and construction (via installer). Best opportunities are the consumer and the public sector markets. The consumer market is growing in several European countries (e.g. simple displacement pumps used for fountains in ponds) and easily accessible while no strict norms or standards are necessary. The developments in these kind of pumps is minimal. Price is a key issue, offering opportunities for developing country exporters.

The public sector is also interesting but very diverse in Europe. A brand is not necessary for market introduction, lowering the market entry threshold. Germany is of interest because of the new law around domestic use of rain-water (including grants to stimulate use). This will lead to a demand for numerous type of pumps.

Ireland for example has no central waterworks. Each house has its own pump, creating an interesting replacement market.

Spain has pumps underground, demanding long life times of motors.

Conclusion: every European market has its own specific lay-out. Specific opportunities and size of market can only be determined once each country has been investigated.

See for more information: www.metcom.org.uk, www.bpma.org.uk, www.vdma.de

Parts of transmission

The market for parts of transmission is also highly diverse. The European market perspective is good for the automotive industry (up to 2007). The sales channel structure is set. OEMs like Volkswagen and PSA group are outsourcing big units towards 1st tier suppliers, such as Bosch (motor management systems) and Johnson controls (car interiors). They are further outsourcing subunits and components to 2nd and 3rd tier suppliers. Possibilities are available for developing country exporters as 3rd-tier suppliers at first. An example could be rolling bearings. The automotive sector is also characterised by high (continuously improving) product and process quality. This means high access requirements in norms and standards (for example DIN 648 and 71802; and ISO 2000: 9000).

Market information and market entry should be gained via 1st and 2nd tier suppliers like Bosch (1st), Inalfa and Power Packer (2nd).

See also: www.acea.be, www.orgalime.be, www.bga.org.uk, www.bosch.de

2. What are the main developments (standards, barriers, volumes, technical demands, trade structure; opportunities and threats) per identified market (segment) ?
3. What standards (product, process, organisation, quality) are demanded, and can I meet these requirements?
4. What is the expected sales volume (now; in 2005) per market segment?
5. What is the import volume (also from developing countries)?
   - What is the trend (negative; positive; mean; strong changes expected?)?
   - How positive are importers towards exporters from developing countries (for product supplies and or for joint ventures)?
6. What interest is being shown in your product by EU importers ?
   - What contacts already exist?
   - What contacts could be developed?

10.2 Competitive analysis

The analysis of competitors should focus on interesting product - market combinations for developing country exporters. In the previous section the most interesting products and markets are depicted. Now the exporter should get a picture of the most important competitors and its own position in relation to them.

From chapters 3, 5, 7 and 8 it can be concluded that parts of transmissions is the most important product group to target (in terms of import value and percentage share of developing countries). Pumps and electric drives are also interesting in terms of the value of imports. Germany, Italy and France are the most important countries to target. Spain should be included for electric drives, being an important producer within the EU. China, the Czech Republic and to a lesser degree Slovakia, Brazil, Hungary and Poland are the main countries with foreign suppliers to the EU.
The above chapters also outline the trade structure, potential types of customers and places in the chain where the business power lies. In general, powerful companies dominate the market. This means strong

Competitive analysis: key competitors and unique selling points

Pneumatics	Pumps	Parts of transmission
The three dominant product suppliers (Festo, SMC and IMI Norgren) offer a complete product portfolio, including FRL and pipes & fittings. An analysis of their mission, product developments and market strategy will give an initial indication of market requirements for the next few years. Companies like Festo serve main customers. Developing country exporters must focus on their agents and dealers. Make a list of the suppliers of these dealers (like the Biesheuvel group in The Netherlands) and analyse them. More and more pf these dealers have Chinese and Taiwanese suppliers. Also observe these major suppliers via dealers. Market entry for developing country exporters is best achieved as a parts supplier (FOB) via dealers and agents. Prerequisites are that you have access to raw materials, possess state of the art technology and can offer high quality products and processes. See also: www.festo.com or .nl; www.kramp.com, www.biesheuveltechniek.nl and www.pneumaticsonline.com	Developing country exporters could for example focus on simple displacement pumps for consumer markets. Good opportunities are available for developing country exporters while entry barriers are minimal and price is an important issue. These pumps are sold via retailers like Big Boss, Bricomarché (France), OBI and Hornbach (Germany). These retailers have direct suppliers and intermediaries (importers). Chinese companies are becoming important as supplier of these kind of pumps. A list of European and Far East competitors could be made via website and contacting retailers and/or their main suppliers. See e.g. www.obi.de, www.bricomarche.com and www.cbi.nl (for access guide)	The automotive market is characterised by a strict setting of the supply chain and definition of responsibilities per type of company (OEM, tier1, 2 and 3 suppliers). The supply chain and its developments can be identified. Developing country suppliers have opportunities as tier2 or tier3 suppliers. This means that competitors will be the same type of supplier. A list of demands and delivery conditions can be compiled via the websites of tier1 suppliers (like www.bosch.de or www.johnsoncontrols.com). Strategy and a list of competitors can be built up via www.vda.de (German automotive organisation). The VDA site offers links to many automotive suppliers. The websites of tier1 and tier2 organisations will help you to analyse your competitors.

competition. Per product group (and within that possibly per market segment) it is essential to detect the chain structure, the potential customers and competitors. Main product suppliers tend to determine developments in the product and the production structure. Depending of their scope of outsourcing (based on market pressure, culture) there may or may not be opportunities for suppliers.

Per selected product group (within that possibly per market segment to be identified) in which your targeted products fits, you need to identify the most important European and foreign suppliers. The following questions should be answered:

1. Key competitors (also shifts in recent years): their products, markets and strategies
   - How is the competition in the markets you want to enter?
   - How powerful is each type of company?
   - How strong are individual companies (and supporting country policy)?
   - What is the focus of these companies? Are you familiar with their strategies?
   - What is their market share and their specialisation?
   - What are the core capabilities of the competition?
   - What are the weak spots of the competition (products, production, logistics, marketing, see chapter 11)?
   - What is their spare capacity and if they have relevant free capacity, what are they doing with it (e.g. price dumping)?
   - What is their cost price (operational cost)?
2. Your Unique Selling Points (compared with your list of key competitors)
   - How can what you have to offer (product range and services, but also logistics and marketing) compete with the market leaders?
   - What benefits can you identify for developing country exporters (trade quotes, hour rates, availability of resources, …)?

If this investigation gives you enough positive indications you can continue by making a business plan for your target market and products. If not, you should stop looking at this market and find yourself another market or try to find a partner with whom you can join forces.

An exporter to EU countries should study information on competitors from sources such as:

- Chapters 3, 4, 5, 7 and 8 of this survey;
- Internet, e.g. sector organisations such as www.vdma.de, www.orgalime.be and the websites of the key competitors you have found;
- Trade shows and press (trends, who is present, market developments), trade promotion associations and organisations
- ITC;

10.3 Sales channel assessment

Having evaluated the prospective products and markets and your major competitors, you will need to assess the particular sales channels within these markets. Following an assessment of the performance of your own company (next chapter), a comparison of the requirements of the sales channels with your company's performance will enable you to identify the most suitable sales channel(s) (chapter 12).

Based on the trade structure presented in Figure 7.1 the following matrix shows the different possible combinations of products offered and sales channels used:

Table 10.1 Preferred new business development scenarios for developing country exporters

Sales channel / **Type of product**	Product company	Importer agent	System supplier	Parts supplier
Build to print component (capacity supplier; tier3)	X2			X1
Standard component (simple product = parts supplier; tier2)	X3	X1	X3	X1
Standard assembled product (assembled product = system supplier; tier2 or tier1)	X5	X1	X4	
One-of-a-kind assembled product (system supplier; tier1)			X5	

- The number indicates in which direction a supplier could develop itself.
- Build to print: product manufactured, where details, instructions and drawings are supplied by customer
- Parts supplier: manufacturer of (simple) catalogue articles, private ownership of products
- System supplier: manufacturer of (complex) assembled products; major customer-related design of product

Source: IPL, 2003

Most developing country exporters start as tier2 or tier3 suppliers, offering capacity or a simple standard product (component or simple assembly). The exporter can grow towards system supplier (more complex products; engineered with or without own knowledge or technology; X3, X4, X5) or product supplier (own product, distributed via agents or product companies; X2, X3, X5)

The developing country exporter should explore the possibility of an exporting growth strategy, because of:
- The need for a brand (for example: pneumatics for cylinders and controllers);
- The strong position in certain product groups of big importers, viewed as product suppliers
- The existence of high quality levels (product and process);
- The rapid development in products and mechatronics for engineering products.

It is unrealistic to start directly with exporting assembled standard products to Europe, without having a brand and being aware of the field networks and their companies are in. Exporters should start by offering production capacity to European suppliers to OEMs or offering standard components to importers or European suppliers to contractors or OEMs. The export could start with small importers (agents) offering a mixed portfolio of products. They are not part of a product supplier. Later on (once your position has reached a certain level) the step towards parts, system and or product suppliers can be made.

Chapter 7 and the above table indicates the trade structure for engineering products. The potential exporter should examine the existing global trade structure per type of product. The different types of companies should be identified, including the names of the most important companies. The exporter should then conclude what companies could be targeted and how they should be approached.

E-commerce development

Within several sub-sectors of the machinery and equipment industry, intermediation by third parties plays a crucial role in the distribution of products. However, ICTs and e-commerce allow suppliers to transact directly with buyers, pushing dis-intermediation forward. The position of intermediaries will be determined by the type of value-added services they provide, and by the degree of price transparency they provide. E-marketplaces can therefore be expected to gather momentum. An institute of the European Union has issued a report about trends and developments in e-business. For engineering products see: www.ebusiness-watch.org/marketwatch/index.htm, http://www.ebusiness-watch.org/marketwatch/resources/No10-II_Machinery.pdf (mechanical products) and http://www.empirica.biz/marketwatch-mirror/No11-II_Electronics.pdf (electrical products). The site Http://www.ebusiness-watch.org/marketwatch/resources/resources.htm allows users to download reports (autumn 2002, spring 2003) on the indicated products.

Each defined product-specific sales channel should be appraised by answering the following questions:
1. What is the structure of the sales channel (and of

Competitive analysis: sales channel

Pneumatics

The sales channel for pipe and fittings products can be depicted as:

OEM-large	OEM-small
|	|
prod.supplier	agent
(e.g. Festo)	(e.g. Kramp)
|	|
capacity supplier	parts supplier

The developing country exporter could choose the position of supplier to an agent, being an independent company. Prerequisites are specific selection of a limited number of markets (start small), offer a good quality product for a smart price and start via try-outs in combination with agents. See as a start CBI's Access Guide.

Pumps

The sales channel for displacement pumps for consumer markets is:

Consumer
|
Retailers
|
agent
(e.g. Bedu pompen)
|
simple product supplier

Developing country exporters have an opportunity as product suppliers. Availability of materials and technology is a must. Price performance will be the order winner. Best start as market entry goes via agents. See as a start CBI's Access Guide

Parts of transmission

The sales channel for automotive is:

OEM (e.g. Ford)
|
Tier1 suppliers
(e.g. Bosch)
|
Tier2 suppliers
(e.g. Brinks)
|
Tier3 suppliers

Developing country exporters should start as tier3 supplier. Availability of specific technology and high quality standards is a must.
See as a start CBI's Access Guide and/or visit www.vda.de

other available channels); what products are dealt with (here and in other related channels); why should and could I be part of it?
2. What lot sizes, delivery requirements and logistic performance are demanded; can I met these requirements?
3. Which companies should be approached, and how; am I able to create appointments and provide good presentation material?

10.4 Prices & margins

In general prices and margins are under pressure. The global economy is showing slow growth, and the global competition of networks and problems within the European economy (high wages, low consumption) are placing severe price pressure on the whole demand and supply chain. Both importers/agents and system and part suppliers are looking for opportunities to reduce cost prices. Cost price reduction targets ranging from 10 to 20 percent, set by OEMs and contractors, are common at the moment. This is putting pressure on product margins for both importers and suppliers.
The order intake for mechanical engineering is back to 1998 levels at about 22 billion US$ (source: VDMA). The turnover of Western European countries decreased by more than 5 percent overall in 2002. For 2003 a growth of just a few percent is expected. Product prices in the metal and Electrotechnical industry in the Netherlands have shown no increase since 2002. Automation suppliers in Europe are facing the particular challenge of keeping revenue growing while maintaining profit margins.
The marketplace is fiercely competitive with declining revenues as prices keep plunging.

The margins for products are dependent on the added value a company is able to deliver. For the sales channels suppliers with one-of-a-kind products (developing country exporter is supplying capacity, delivering a built to print component) the margins are low. Margins are higher on standard components to suppliers. Most of the time margins are highest for those supplying standard products to importers, provided that they can offer a brand to the market. The box below shows an example of what mark-ups are possible from export price to retail price.

Sources for price information are:
- Internet, e.g. www.vdma.de/ and individual websites of agent and product suppliers (e.g. www.festo.com, www.kramp.com. www.skf.com ;
- ITC;
- reports published by press and other (commercial) agencies. See e.g. www.orgalime.be, www.antriebstechnik-e-market.de

Methods and terms of payment
An experienced exporting firm extends credit cautiously. It evaluates new customers with care and continuously monitors older accounts. Such a firm may wisely decide to decline a customer's request for open account credit if the risk is too great and propose instead payment on delivery terms through a documentary sight draft or irrevocable confirmed letter of credit or even payment in advance. On the other hand, for a fully creditworthy customer, the experienced exporter may decide to allow a month or two to pay, perhaps even on open account.
It is always advisable to check a buyer's credit (even if safest payment methods are employed).
Listed in order from most secure for the exporter to the least secure, the basic methods of payment are:

1. Cash in advance;
Receiving payment by cash in advance of the shipment. In this situation, the exporter is relieved of collection problems and has immediate use of the money. A wire transfer is commonly used and has the advantage of being almost immediate. Payment by check may result in a collection delay of up to six weeks. Therefore, this method may defeat the original intention of receiving payment before shipment. Buyers are often concerned that the goods may not be sent if payment is made in

From export price to retail price, an example

Item	Mark-up	price
FOB (exporter's selling price		100
Freight, insurance, etc. (e.g. 15 percent)	15	
CIF price		115
Duty (if applicable 5-14 percent)	13	
Landed cost		128
Importer / agent / wholesaler's mark-up* (10/20/50 percent)	35	
Selling price before taxes		163
VAT (19 percent)	31	
Selling price to industrial user		194

* mark-up depends on type of product, distribution channels used and competitive situation

advance. Exporters that insist on this method of payment as their sole method of doing business may find themselves losing out to competitors who offer more flexible payment terms.

2. Documentary letter of credit;
Documentary letters of credit are often used to protect the interests of both buyer and seller. This method requires that payment be made based on the presentation of documents conveying the title and that specific steps have been taken. Letters of credit can be paid immediately or at a later date. Since payment is made on the basis of documents, all terms of payment should be clearly specified in order to avoid confusion and delay. A letter of credit issued by a foreign bank may be confirmed by a national bank. This confirmation means that the national bank (the confirming bank), adds its promise to pay to that of the foreign bank (the issuing bank). A letter of credit may either be irrevocable and thus, unable to be changed unless both parties agree; or revocable where either party may unilaterally make changes. A revocable letter of credit is inadvisable as it carries many risks for the exporter.

3. CAD or draft;
CAD (Cash against Documents): the buyer only takes possession of the goods after payment has been made. This method is relatively safe, but negotiations will be necessary to convince the buyer to accept. Drafts that are paid upon presentation are called sight drafts. Drafts that are to be paid at a later date, often after the buyer receives the goods, are called time drafts or date drafts. A sight draft is used when the exporter wishes to retain title to the shipment until it reaches its destination and payment is made. Before the shipment can be released to the buyer, the original ocean bill of lading (the document that evidences title) must be properly endorsed by the buyer and surrendered to the carrier. It is important to note that air waybills of lading, on the other hand, do not need to be presented in order for the buyer to claim the goods. This increases the risk when a sight draft is being used with an air shipment.

4. Open account or clean payment
An open account can be a convenient method of payment if the buyer is well established, has a long and favorable payment record, or has been thoroughly checked for creditworthiness. With an open account, the exporter simply bills the customer, who is expected to pay under agreed terms at a future date. Some of the largest firms abroad make purchases only on open account.

5. Other payment mechanisms, such as consignment sales
The goods are shipped to a foreign distributor who sells them on behalf of the exporter. The exporter retains title to the goods until they are sold, at which point payment is sent to the exporter. The exporter has the greatest risk and least control over the goods with this method. Additionally, receiving payment may take quite a while. It is wise to consider risk insurance with international consignment sales. The contract should clarify who is responsible for property risk insurance that will cover the merchandise until it is sold and payment is received. In addition, it may be necessary to conduct a credit check on the foreign distributor.

Payment methods used most frequently when larger investments are involved are Cash Against Documents or Letter of Credit. Still, the determination of payment conditions for a regular export transaction is part of the package of negotiations between seller and buyer, who actually have more or less opposing interests. Also the experience of importers with trading with developing country exporters will determine the conditions. The necessity to do business and the attractiveness of the offer will also be important for the condition setting .

Most commonly the relation and delivery for more standard products (intended to be produced ultimately in batches for more years) starts with Letter of Credits or bank guarantees. Clean payment is normal when relations are set. Sometimes relations directly start with clean payment.

Most common delivery terms:

- FOB (Free On Board): The buyer arranges for transportation and insurance. FOB must specify the port of departure.
- CFR (Cost & Freight): The exporter pays the freight, the buyer arranges for the insurance.
- CIF (Cost, Insurance & Freight): The exporter pays the freight and the insurance.

It is recommended that quotations to European customers should be made on a CIF basis. The CIF price thus includes all domestic freight costs, ocean/air freight and insurance but not import duty or VAT. Based on the landed cost the importer will calculate his mark-up depending on the type of product, market etc. However, supplier and importer are free to negotiate and agree whether quotations and subsequent trade are based on CFR or FOB prices.

10.5 Product Profiles

Engineering products are specified by high quality standards, mostly brands or trade names, innovative markets (technological developments) and high level market requirements. Potential customers expect you to thoroughly describe your product. The success or failure of your export strategy will depend on your ability to seekout attractive product - market combinations, including developments in market requirements and analysis of competitors. The presented Product profiles show the essential product parameters and the market situation and developments. They will help you to determine whether entering a certain product - market combination can be successful. Developing country exporters should develop product profiles for their own (prospective) export products, in order to help them make a correct decision.

PRODUCT PROFILE HYDRAULICS

1. Product name: Cylinder

2. Market requirements:

Hydraulics and Pneumatics Designers' Guide Cylinders Company - (product name)	Service				Type							Features						Bore - in				Maximum pressure rating - psi	
		Hydraulic																Pneumatic		Hydraulic			
	Pneumatic	Petroleum base	Synthetic	Water	Tie rod	Single-acting	Double-acting	Ram	telescoping	Non-rotating rod	Rodless	Position	feedback	Cushions	Bumpers	Adjustable stroke	Spring ret. Dbl rod end	Minimum	Maximum	Minimum	Maximum	Pneumatic	Hydraulic

There are no specific import regulations or restrictions for these products. Standard import documents will be needed:

- AWB or Bill of Loading
- Commercial invoice
- EUR 1 form for ACP countries
- Form A for other countries.

3. Market structure:

Main markets:

- Process industry (e.g. paper, chemical)
- High-tech electronics
- Automotive

In the European Union the Top 5 countries France, Germany, Italy, The Netherlands and United Kingdom represent over 75 percent of the EU15 consumption.

Market trends: Conglomeration of suppliers in industry, each responsible for a certain part of a machine of installation. This supplier is becoming powerful in his own right (R&D, branding, production and after sales).

4. Main suppliers:

There are a small number of leading suppliers (standard products; customised where needed) and many small suppliers across Europe supplying customer-specific cylinders, most of them concentrated in an area of less than 100 km. Developing country suppliers have a market share of 3 percent in this market of hydraulics, whilst Hydraulics is about 8 percent of all engineering products. Brazil and Slovenia have important hydraulic suppliers.

5. Developments and improvement areas

Mechatronics (incorporation of mechanics, electronics and software)
Synergy (same kind of product for several market types) and scale

PRODUCT PROFILE PNEUMATICS

1. Product name: Couplings, quick connect

2. Market requirements:

Hydraulics and Pneumatics Designers' Guide Couplings, Quick connect, pneumatic Company - (product name)	Type				Material					Lock									Maximum working pressure rating - psi	ID - in		Hard metric dimensions
	Single shut-off	Double shut-off	Vented (safety)	straight through	Aluminium	Brass	Plastic	Steel	Stainless steel	Cam	Ball	Pushbutton release	Screw	Pawl or pin	Wire	Latch	Collet	Threaded		Minimum	Maximum	

The construction and dimensions of fittings and couplings are standardised in:
ISO 49 .ISO 3501 .BS 759 .BS 3799
ISO /R508 .ISO 3503 .BS 1256 .BS 4346
ISO 2045 .ISO 4145 .BS 1640 .BS 4772
ISO 2531 .ISO 4179 .BS 1740 .BS 5114
ISO 3458 .ISO 8179 .BS 1965
ISO 3459 .BS 143 .BS 2051
The basic requirements for the exporting company are: high quality of product, processes and organisation, specialist / knowledge, production flexibility (low and high quantity) and competitive price.
There are no specific import regulations or restrictions for these products. Standard import documents will be needed:

- AWB or Bill of Loading
- Commercial invoice
- EUR 1 form for ACP countries
- Form A for other countries.

3. Market structure:

Main markets:

- Petrochemical and offshore
- (Power) energy
- construction

In the European Union the Top 5 countries France, Germany, Italy, The Netherlands and United Kingdom represent over 75 percent of the EU15 consumption.

Market trends More and more consumables (as couplings) are being produced in low-wage countries. Product suppliers and agents are looking for companies and starting test series.

4. Main suppliers:

There are three leading product suppliers: Festo, Norgren and SMC. They have a number of agents per country, dealing with smaller customers. Developing country suppliers have a market share of 5 percent in this market of pneumatics. China and Slovenia have important pneumatic suppliers.

5. Developments and improvement areas

State of the art in technological improvements (product and processes)

PRODUCT PROFILE PUMPS

1. Product name: Pump

2. Market requirements:

Hydraulics and Pneumatics Designers' Guide Pumps Company - (product name)	Fluid					Type						Displace-ment		Number of sizes	Max. pressure rating - psi		Maximum displacement of smallest size-in.3/rev	Maximum displacement of largest size-in.3/rev	Maximum speed - rpm	Maximum power - hp	Hard metric dimensions
	Petroleum base	Water-oil emilsion	Water glycol	Phosphate ester	ter additives soluble oil	Internal gear	External gear	Vane	Axial piston	Radial piston	Reciprocating plunger	Variable	Fixed		Continuous	Intermittent					

The International Organisation for Standardisation (ISO) has prepared a standard recommendation, ISO 2858, for end-suction centrifugal pumps - pressure rating PN 16 (maximum pressure 1.6 Mpa). This is included in BS EN 22858 and DIN 24256. Pumps conforming to this standard are intended for chemical and corrosive applications, although pumps are available in high silicon iron and Ni-Hard steel for solids handling applications. Stuffing box and seal cavity dimensions conform to ISO 3069, which is based on parts of DIN 24960. Flanges conform to ISO 2084. Overall package dimensions, including motors and base plates, are given in ISO 3661. ANSI inch standards (American National Standards Institute) are also available. The ANSI B73 standards were originally produced for the chemical industry.
The standards are based on recommendations by users and compiled by a committee consisting mostly of manufacturers. The ANSI B73 standards specify materials and mechanical seal options. In this context, the API 610 standard is also of importance
There are no specific import regulations or restrictions for these products. Standard import documents will be needed:

- AWB or Bill of Loading
- Commercial invoice
- EUR 1 form for ACP countries
- Form A for other countries.

3. Market structure:

Main markets:

- Chemicals, petrochemicals
- Processing industry
- Water supply and irrigation
- Shipping industry

In the European Union the Top 5 countries France, Germany, Italy, The Netherlands and United Kingdom represent over 75 percent of the EU15 consumption.
Market trends At the moment water supply and irrigation is the most interesting and growing market. Each EU country has its own industry focus and public infrastructure. This heavily determines the need for certain types of pumps. For example Germany is preparing legislation for the re-cycling of rainwater. Spain and Ireland have households each with their own lavatory installation. The Netherlands has local and regional public water management, with own budget responsibility. Each market should be investigated and will offer special opportunities.

4. Main suppliers:

There are a few large suppliers and many small suppliers in Europe. Developing country suppliers have been very successful in this market with a market share of about 10 percent of all imported pumps. China and Brazil account for a major part thereof.

5. Developments and improvement areas

Looking for energy saving potential; reduction of CO2 emissions
Cost reduction actions
Life time security

11 INTERNAL ANALYSIS

Chapters 8, 9 and 10 (especially 10.1 and 10.2) will have made clear whether there are real exporting opportunities. In this chapter the market demands and requirements (product, process, organisation and quality) are checked against the existing internal capabilities. The internal examination is an analysis of the manufacturer's strength and weaknesses. These strengths and weaknesses indicate how well positioned the company is to seize opportunities and counter threats. The competitive strength of the company has to be measured in relation to the other suppliers in the market, as does the customer's attitude to the developing country exporter. Competitors and customers have to be included in the internal analysis, because a manufacturer's strengths and weaknesses are defined in relation to them.

In order to ascertain whether your company is able to meet the market demands, it is important to evaluate your company's performance on the basis of four criteria:

1. Product standards & quality, Strategy & unique selling points, Technology & production capacity
2. Logistics
3. Marketing
4. Financing

11.1 Product standards, quality, USP and production capacity

First you must check whether your company is capable of meeting the requirements and standards being set by potential customers in the target market (see chapter 10). The basis will be formed by meeting the quality standards required. In general the (product) quality is the order "enabler". Exporters not meeting the requirements are not in business. The basic questions for the different product groups within engineering products can roughly be divided into:

Checklist Market entry thresholds

I **System quality** of the exporter:
Is ISO, VDA6 or QS 9000 certificate(s) or work in line with their basic principles present in the company?
Adequate organisational quality (capable of professional communication in English, French (and German); methods and procedures defined for important activities; prompt response to complaints

II **Process quality:**
How controlled are your production processes and are these demonstrably guaranteed (e.g. CPK measurements)?
What is your waste rate ?

III **Product quality:**
Meets the product the common required standards (like DIN, UL, CE, etc; certificates on time, certificates correct and complete)?
In addition, does the product meet the specifications (build to print, visual appearance, dimensional stability, machined surfaces, packing quality)?

If you are not able to answer all the above questions in the affirmitive, you do not have a sufficient basis for embarking on exports.

If you meet the basic requirements, the next issue to be addressed is the added value of your company. How much chance does your company have of obtaining a position with the typical potential customer? Exporters responding positively to the basic requirements should create order "winners" by offering a unique position (strategy, capabilities) and excelling in price and/or logistics. Sales, communication and marketing should be organised. The next checklist could be used for a brief self-evaluation. The exporter must ask himself which of thepoints mentioned are important items for the importer. The exporter must determine how good the company is in each specific item ("does the current positioning and performance meet the importers demands"?).

Using this checklist, you must be able to come up with an answer to the question: "How well can the demands and required developments be met by my company (reference to company's strong and weak points)?".

Checklist Added Value to (potential) customers

Strategy, Unique Selling Points:

1. Products (what are the unique features?),
2. Markets (what are the customer demands; which product -arket combinations are defined?),
3. Company positioning (focus on low cost price or flexibility or …),
4. Core competences (in what area do you really excell?),
5. Core activities (which technical, logistical activities are performed in-house?),
6. Critical success factors (how do you measure whether you meet market requirements?);
7. Value chain analysis is made (added value demanded versus offered; analysis of existing competition and most important [potential] competitors)
8. Strategy and company proposition (is clearly communicated to market)

Technology, production capacity:

1. Core technology and capabilities
- e.g. manufacturing engineering,
- work preparation,
- high speed milling)

are defined and derived from strategy

Company analysis: USP, quality, production capacity

Pneumatics

Prerequisites for market entry are:
- Start with "consumables", like pipe & fittings or Filter, Regulators & Lubrificants (FRL)
- specific selection of a limited number of markets (start small),
- offer a good quality product for a smart price

This results for a developing country exporter in:
- USP: offers highly skilled personnel, who are flexible and realise a high quality product for a low price. Available conditions are: enough available materials and resources
- Company has access to agents. Presently the agricultural sector is stable and interesting with regard to the use of pneumatic products. Agents with many agricultural customers are therefore attractive.
- Company has process quality standards (like ISO) and is ably to manufacture products "copy exactly"
- Technology is state of the art

Pumps

Prerequisites for market entry are:
- product for a sharp price
- brand is not necessary
- marketing and sales available

This results for a developing country exporter in:
- USP: offers a quality product for a low price, including attractive package and manual. After sales service is a pre. Available conditions are: enough available materials and proven product performance
- Company has access to agents who are directly in control with retailers in the consumer market
- Company has proven technology and track record (products)

Parts of transmission

Prerequisites for market entry are:
- High process and product quality
- Dedicated focus on specific technology and customers

This results for a developing country exporter in:
- USP: offer highly skilled procedures and personnel, a limited number of high quality products for a fair price.
- Company has access to tier2 or tier1 suppliers
- Company has organisation and process quality standards (e.g. ISO) and is ably to manufacture products "copy exactly"
- Technology is state of the art

11.2 Logistics

Customers are demanding customer-specific products and short and reliable delivery times. The exporter must realise that he is part of the goods flow network. The production company must also be reliable with regard to lead times and flexibility (volume, mix of products). This gives rise to the following attention points for the exporter in developing countries:

Checklist Logistics

1. Most important: **Delivery reliability;**
   what is track record of the exporter with regard to deliveries (planning methods, feedback loops, past performance),
   what are normal lead times (crucial for e.g. moulds)?
2. Quantities: what is the average production level, what is maximum possible production per period per product?
3. Logistics system
   How professional is the order management system (order entry, forecast, stock control, order progress control)? Order status reports? Shipping details?
   How are order (requests) treated (paper, fax, EDI)?
   How good is your organisation at carrying out the necessary document preparation?
   How is material availability managed (right kind and quality; price)?
4. Package sorts (e.g. attractive packaging needed for several types of "parts of transmission" for end consumer markets); what are your possibilities?
5. Delivery conditions
   What type of conditions can be managed (EXW and or DDP)?

The exporter must be aware that if he is to remain in business he must inform the importer promptly of production problems that have arisen. The character of the product (quality, time-to-market, consumer power) demands accurate communication of progress and problems (this applies both to the physical product and to paperwork).

An assessment can be made of the order realisation process and its support competencies, in order to indentify strengths and weakness in the logistics control process. This process must be controlled if a good performance is to be realised.

Assessment Logistics

- Supporting competencies:

1. finance management
- upturn and downturn management

2. ICT management
- Systems and tools
- Archive and means
- Primary processes

3. The order realisation process (ORP)
- Process organisation
- Work preparation
- Procurement
- Production (and assembly)
- Organisation and systems
- Tooling, the use of (ICT) systems
- Communication
- Organisation and monitoring

4. The service realisation process (SRP)
- Spare parts and stocks
- Distribution
- Communication
- Organisation and monitoring

11.3 Marketing and sales

One consequence of globalisation is the professionalism of total production networks and the individual companies within those networks. The exporter from developing countries, being part of such a network, must be able to cope with these developments. This entails an awareness of market developments (see subsection 10.1) and sales channel structures (see Chapter 7 and subsection 10.3) and a thorough choice of types of customers (see matrix in subsection 10.3). Per type of customer you should develop a set of marketing and sales tools with which you present your company, its strengths and the way you are doing business. The result must be that importing companies remember your name and what you have to offer. A separate sales department, trade fair attendance, internet presence and availability of sales material are all necessary in order to create awareness of your potential. The quality of your presentation and promotion material is of crucial importance, because of the impression it gives of the professionalism of your company!

Company analysis: logistics

Pneumatics	Pumps	Parts of transmission
• Serial production • Lead time: # weeks • Delivery reliability: 98% • Flexibility • Stock control	• Serial production • Lead time: # weeks • Delivery reliability: 98% • Stock management • Packaging methods (attractive and shock-resistant)	• Lead time: # days • Delivery reliability: 99,9% • PPM = 1 per 100.000 or better

The checklist below can be used to ascertain whether your sales department is ready. You must be able to answer these questions positively to stand a chance of gaining business in Europe.

Marketing and sales

1. Separate sales department? Which languages? (English is a minimum requirement; German is preferred for Germany, French for France and Italian for Italy) and which departments (Sales, Logistics, Quality) speak a foreign language? Are contact persons evident to customers?
2. Presence on internet? (necessary), trade fairs (at least once a year in Europe!); availability of clear and complete sales material (company brochure, leaflets, product information; in English and check whether other languages are necessary)?, What impression are (potential) customers given of you (via your verbal presentation and the available materials)?
3. Presence in Europe (about once a year; combined with trade fair)?
4. Prompt response to queries? Quotes complete and correct? Quotes submitted on time?
5. Easy to contact by phone/fax/e-mail? Information forwarded on time?
6. Invoice and shipping documents in time and correct?

11.4 Financing

Three factors are of importance here. The first is the stability of your company. Are you a solid partner to do business with? Ask yourself how open you are towards (potential) customers about :
1. Your legal structure
2. Relationships between the shareholders
3. How solid and reliable an impression your company makes on your environment

The second factor is your financial position. How much financial capacity do you have to make investments in order to stay competitive? The following aspects are of relevance (in the opinion of potential customers):
1. How good is your cash position and your solvency position?
2. How large is your turnover per product group?
3. How open are you in financial terms?
4. What is your cash flow and invested capital?

The last factor is the financial day-to-day business practice. Your order calculation and management accounting must be professional, and must be such that operational cost are controlled and opportunities for improvement will be recognised. A Letter of Credit (LC) is often used in trade with companies from developing countries. In terms of business it is preferable to obtain a standard relationship with quotes, orders and invoices. A credit check of your company before embarking on a business relationship is normal. To attain such a position, sound financial results and a solid financial position are required.
The term of payment is normally 30 days.

Company analysis: marketing and sales

Pneumatics	Pumps	Parts of transmission
• Marketing directed towards agents and dealers of e.g. Festo or SMC • Skilled sales people • Engineering available for managing try-out products with agents	• Marketing and sales targeted towards importers and/or retailers • Track record of displacement pumps via internet and direct contact presented to (potential) customers • Attractive internet site (more and more buyers are selecting suppliers via internet)	• Proven track record in automotive sector • Clearly chosen core competence, translated into products and performance used by sales people for PR purposes

Company analysis: financing

Pneumatics	Pumps	Parts of transmission
• Limited: financing work in process and some financing of developments of e.g. new fitting types	• Stock (substantial) • Product development (limited) • Marketing and sales material	• Limited: Work in process and some stock

11.5 Capabilities

It is still often the case that interested European importers, agents or system suppliers are disappointed in contacts with potential exporters.

The most frequently heard complaints are:
- they are not responding to any communication;
- communications are very difficult;
- telephone or fax numbers have changed again;
- there is nobody who speaks good English on the phone;
- they have different ideas about the priorities;
- specifications and drawings are interpreted differently;
- the finished product is not up to standard;
- after the first shipment, the quality consistency is not maintained.

When so much effort has been made to generate the initial contacts, it is disappointing for all parties involved to encounter such lack of interest and professionalism.

The EU market is not the same in each country. Each country has its own language and culture. Italy, Germany, France and the United Kingdom have a long tradition in manufacturing. The companies in these countries have always had the total production (including engineering) in their own hands. In addition, their cultures favour a 'do it yourself if at all possible'approach. It is very hard for outsiders to gain a foothold.

Germany and the United Kingdom have a rather formal culture. This means that obtaining openings will require:
- patience (acquisition normally takes a number of years),
- politeness (correct behaviour) and
- a proven track record.

France and Italy have a more informal culture. Doing business means taking time for informal events. However, French and Italian companies are difficult to approach because of their closely internally controlled economic structure. Italy has many small companies, often family-owned and highly internally focused. It is very hard to create an opening without the help of an inside contact.

Although English is the international language, business in Germany, Italy, France and Spain can only be done if you speak their language. Many companies in Germany, France and Italy do not have many people who speak English. This will lead to problems in communication. The Netherlands has a more open culture and less tradition in manufacturing, so gaining entrance here is somewhat easier, although proven added value and political stability are necessary.
In conclusion, starting exporting companies from developing countries must:
- Focus on a limited number of products, for certain targeted market segments;
- Determine clear and reachable goals and commit to them; monitor progress regularly;
- Have good communication skills; be open and clear

in presentation, keep appointments (be on time!) and handle questions and obstacles efficiently;
- Speak English and preferably also German, Italian and/or French;
- Be familiar with the required customs formalities, shipping facilities and packaging in order to guarantee delivery within the contractual time requirements;
- Exercise patience: it will take time to explore the culture and networks in a country, to create initial contacst and find openings into companies. Only after some “bad” experiences will you succeed in building up business.

12 DECISION MAKING

The decision as to whether your company is capable of exporting "engineering products" should be made in steps, as follows:

1. Based on the market developments, opportunities and the existing sales channels (including the evaluation of your [potential] competitors) with present margins, you decide that enough market potential is available (or not) for your products and capabilities (see sections 10.1 to 10.4). Suitable product(s) for export are identified, including necessary modifications for the targeted markets. Market segments are targeted for sales development. You also determine which entity in the sales channel is best suited to sell your products to, and select business partners;
2. The checklist in the introduction to chapter 11 must be answered positively as a prerequisite to becoming a partner for European business. Your basic performance (strength) matches market requirements;
3. The results of your company checklist in subsections 11.1 and 11.2 reveal only minor weaknesses;
4. You can and will commit to the penetration of European market(s) professionally, using adequate materials and reliable communication.
5. If 1 to 4 are positive, you need to decide which product(s) for which market(s) to focus on.

Each (developing country) exporter must consider whether or not the development of an export business tallies with the company objectives:

- How profitable is the export per targeted product - market combination?
- Is the goal of exporting consistent with the other company goals?
- Why should you not spend your resources on existing or new domestic business?

Therefore, the external analysis requirements (opportunities and threats) must match your strengths and weaknesses (internal analysis results). The 3 examples used throughout Chapters 10 and 11 can help you to do the same for your business. Having made the decision to start exporting to Europe, the next phase in the export marketing process is to develop a **market entry plan**. This plan defines the marketing strategy with regard to how to penetrate the identified market. This long-range plan should cover:

- objectives (per year: which product to introduce into which market(s), product turnover and volume forecast for the coming years, growth in foreign customers, …);
- sales channel definition per product - market combination (including which type of potential customer is to be approached (importing product supplier or agent or system supplier or …);
- action plan per market type.

Opportunities for exporters of engineering products arise from the global markets in which companies (within networks) compete and the innovative and cost price pressure with which they are confronted. Outsourcing is a key item for many European companies, in order to be able to realise the required cost prices. This presents opportunities for exporters from developing countries. The sector policies adhered to by most of the end markets of engineering products favour knowledge economy (in technology, logistics, processes). This means focusing on product development, production engineering and the production of prototypes. As soon as normal (mass) production has been reached these companies are expected to transfer production to low- wage regions (optimal price-performance ratio). As a result, European importers and suppliers are outsourcing production and/or opening local plants, mainly in Eastern Europe and the Far East.
Another important item is the growth of the Far East market and the resulting compensation orders from European companies to local Far East companies. Local sector organisations in the European countries pose a threat. They are focused on the goals and objectives of local industry and employability. They will not encourage the outsourcing of work to developing countries. A further threat lies in the capital which is needed to transfer your product to a brand and to improve the companies' abilities to match European standards. As an exporter you must have the financial capacity and the technical knowhow to invest in European markets and standards.
Possible routes to success are:

1. Business relationship (perhaps legal relationship) with European product supplier, system supplier or small importer or agent
2. Joint venture with a European supplier
3. Individual growth strategy

CBI's Export Planner should be used to draw up a thorough Export Marketing plan, once you have made the decision to work towards becoming an exporter to European countries (or to improve your exporting qualities).

13 MARKETING TOOLS

13.1 Matching products and the product range

As already mentioned, the term 'engineering products' emcompasses a broad range of products and a diversity of end markets (industrial demand). It is therefore very important to define first what kind of products you are supplying at the moment and in which direction you are planning to move (stable; improvement of products and or processes; diversification in product / market combinations). You must able to specify your Unique Selling Points for (potential) customers. See also section 11.1. The box below will help you to specify your supply. It also outlines the basic prerequisites per product type for dealing with Europe.

Secondly, you will have to determine the type of markets you are aiming at. All end markets can be characterised by:

- On-going product advancements and technological developments
- Integration of mechanics, electronics and software into one product
- Customer-specific products, built up from standard components wherever possible
- Globally competing companies, with resulting price pressure
- Global sourcing; resulting in continuous search for competent partners offering a optimal combination of quality, logistics, (process) innovation and cost performance

Exporters looking for possibilities to expand their European business should consider:

- Visiting trade fairs such as Midest, Hannover Messe and ESEF
- Visiting websites such as www.VDMA.de (especially for statistics and links) and www.orgalime.be (especially its links) to select companies whose sites, trends and developments can stimulate you to new business.

13.2 Building up a relationship with a suitable trading partner

Among the many potential customers, you must identify those whose problems, demands and wishes (stated in needed products and translated in required technologies, price, logistics, services and company drive and ambitions) match your own company core competencies, capabilities and product range. These companies are potentially the most suitable for building up a trading link. Industrial needs and products always require a thorough understanding of the consumer demands and wishes and of the common business practice. Many (general intermediary) organisations have major problems in understanding exactly what the product is (also trade organisations). Area-specific organisations are normally only interested in the needs of their members. Therefore Internet, trade fairs and examination of specific countries (business trips) are a useful means of selecting potential partners.

Start by gaining market information from the countries you are aiming to export to. Potential sources for information are internet, country promotion offices (especially local market surveys, list of importers), your Embassy. See also section 11.3 and Appendices 3.3 and 5.

The next step should be participation in international trade fairs. Trade fairs and exhibitions will become more important (to get a feeling what and how people are purchasing) as increased use of e-procurement keeps people more office-based. There the company looking for a partner can determine the required profile, existing problems, demands and wishes and judge the “hit” results (Internet). Trade fairs are thus an important means of creating contact with future co-operation partners. It is important to know in advance who the target groups are at the fair. Approach suitable exhibiting importers with written / printed material about your company and products.
Before exhibiting it is often advisable to participate in

Product type	Product group	Brand	Basic requirements	Organisation
Serial	Pumps Compressors Electric drives Parts of transmission	Standard product Own brand or under licence	High quality product and processes After-sales service Perfect logistics	Sales and marketing staff, direct and customer friendly response
One of a kind	Moulds, magnets, elevators Tool holders	Unique product Own brand or under licence	Early supplier involvement (engineering) Craftsmanship Prototype production	Sales and marketing staff, close market contact R&D staff; close market contact

Sources of information

In the **producer country:**
- **Internet**
- The foreign-trade chamber of commerce of the country of destination.
- The Economic Affairs departments of the official representative (Embassy or Consulate) of the country of destination.

In the **country of destination:**
- **Internet**
- Trade associations; trade fairs and trade fair organisations
- Business support organisation
- Your own country's public and private trade promotion bodies
- Your own country's diplomatic and consular representatives
- Chambers of commerce
- Trade fair organisers (catalogues)

Points of attention:
- Many sources of information only answer written inquiries!
- As a general rule: a concise but detailed inquiry improves the chances of precise identification.

the fair as a visitor. A well prepared and properly executed visit to a trade fair can constitute a very cost-effective market research. At the fair it is possible to meet both future competitors and potential customers. The important ones take place in Germany (Hannover Messe), Italy (Fluidtrans Compomac) and France (Midest). See Appendix 3.5 for details.

The research and trade fair results can be used to develop a plan for approaching promising companies. It is also useful as check on the present strategy and operations of the exporter.

At the end of the identification phase, the supplier should have selected the names and addresses of suitable trading partners. It is advisable to fill out a contact exchange form per potential partner (see Appendix 7). Always check your potential buyers' financial status and credibility. Request a copy of the company's annual reports. Other sources of financial information are business directories, credit rating agencies and chambers of commerce.

Evaluate the names and addresses you receive or find, using the following criteria:
- Is the information complete?
  - full address;
  - telephone and fax number, e-mail;
  - name of the person to contact.
- Is the importer active in the country you have selected?
- Is the importer focussing his activities on the corresponding product groups?
- Do you have enough sound information about the reliability of this partner?

Using these criteria, draw up a priority list of the contact addresses you have received.

13.3 Drawing up an offer

There are two different kinds of offers:
(a) a general offer;
(b) a specific offer.

(a) Drawing up a general offer
The first contact is of paramount importance to the subsequent success of your venture. The importer can pick and choose among many uninvited offers from qualified suppliers. The purpose of a general offer is to make the first contact with potential trading partners with whom the supplier is not yet personally acquainted.
A general offer consists of sending a:
- short profile of your own company; if you are already a certified supplier (e.g. ISO certification), say so;
- summary of your product range (introduce prices as close to your best price);
- thorough description of your product, substantiated by brochures, photographs or samples;
- references (if possible).

In a personal letter, briefly introduce your company and tell what you have to offer.

If an importer wants to contact you on the basis of your business offer, he might give it just one try. It is therefore of vital importance that it is possible to get in contact with you. Make sure that telephone / fax numbers and e-mail addresses are correct. The availability of English-speaking staff to pass on messages is equally important.
This first follow-up will give you an idea of the needs, purchase pattern and maybe even an impression of the

importer's regular business channels. Such information may enable you to judge the compatibility of your product and the status of your initial price suggestion. Unless your product is unique, in shortage, or extremely cheap compared to world market prices, you should never expect the importer to contact you – even on the basis of an introduction with samples. After the first follow-up from your side has been made, there is still a lot of quality standard and organisation level discussion, price adjustment and persuasion to be done before you can expect to be the target of calls from the importer.

Personal contact by means of a business visit is essential and necessary. This will include the inspection of your production facility and discussions with members of your staff. A visit to the importer in the early stages of the relationship is advisable. If your product and general presentation are of relevance to the importer's line of business, it will normally be no problem to set up meetings directly. It is completely acceptable to ask for guidelines such as how to get to their place of business, how much time to allow for getting there from point X, and what they would like to discuss in particular. It is advisable that you are well-prepared and ready to respond to very direct questions about quality, quantities and prices. People will be reluctant if there are no samples available and no concrete negotiations are conducted during the meeting.

(b) Drawing up a specific offer
A specific offer is legally binding for a certain period of time. You must therefore be capable of fulfilling the terms of contract. You should draw up a specific offer only when you know the business partner personally or after you have made the initial contact.

A specific offer should consist of three parts:
(1) written offer:
- Name of the person responsible in your company;
- Need of the customer and your solution;
- Exact description of the goods offered (preferably using an internationally valid quality standard specification);
- Price of the goods offered in accordance with the Incoterms 2000 (ICC publication; if applicable, split up by delivery quantities or quality); and
- Possible delivery date and terms of delivery.

(2) product samples:
- Product samples must correspond to the goods available for delivery (if they do not, this can have a lasting negative effect on business relations);
- State the treatment methods used (if possible, provide quality certificates from an internationally recognised inspection organisation);

(3) commercial information:
- a profile of your company including a statement of your policy, also in respect of the quality;
- a reference list of existing customers.

13.4 Handling the contract

Incoterms 2000 are the standard trade definitions most commonly used in international sales contracts. Devised and published by the International Chamber of Commerce, they are at the heart of world trade. Among the best known Incoterms 2000 are EXW (Ex works), FOB (Free on Board), CIF (Cost, Insurance and Freight), DDU (Delivered Duty Unpaid), and CPT (Carriage Paid To).
For more details, see:
www.iccwbo.org/incoterms/understanding.asp

Trading relations between exporter and importer are based on trust and can only be built up by meeting the high expectations of the importer. If an importer finds that the product does not meet his expectations, this will immediately backfire on the business relationship with the exporter.

The contract

Details to be included in a contract are:
1. The contract parties: the seller, the buyer, the broker and/or buying/selling agent. Of course all names and addresses must be correctly spelled.
2. The product, price and quality of the product, sufficiently specified so that no misunderstandings can arise.
3. The quantities. If the buyer and the seller agree to more or less than the agreed quantity, this must be specifically mentioned.
4. The delivery terms, according to the description specified in the Incoterms 2000 (please refer to www.iccwbo.org/home/incoterms/the_thirteen_incoterms.asp).
5. The payment terms, spelt out in detail.
6. The delivery time: a vital piece of information on which the seller and the buyer will have to agree.
7. Packaging details, including measurements and weights.
8. Any special conditions negotiated by one of the parties.
9. What will be done if the two parties disagree with each other (to which arbitration court / district they will turn)

Be aware that in business in Europe today logistics are of great importance. Most importers do not want high volume deliveries as these raise their supply costs. They want the amount they ordered in the time agreed upon. This is stressed by almost all major importers in Western Europe.

When handling the contract, you should consider both the terms and the fulfilment:

(a) Contract terms:
- Draw up the delivery conditions according to international guidelines (e.g. Incoterms 2000)

∑ When delivering for the first time, it is usual to deliver the goods free on commission and freight-paid.

(b) Contract fulfilment:
- Procure the delivery documents in good time.
- Comply strictly with all parts of the supply agreement.
- If you cannot comply with any part of the agreement (e.g. delivery delays or quality problems), inform the customer clearly and in good time, and ask whether he is prepared to accept this unforeseen deviation.
- Co-operate on a partnership basis and seek a common solution even if conflicts arise.
- Fulfilling the contract should have a high priority, particularly when delivering for the first time.

13.5 Sales promotion

Sales promotion measures relate to developing and expanding the following:
- customer relations;
- supply quantities.

a) Advertising and communication

Definition
The term 'advertising' refers to communication measures with the aim of increasing the sales of your products. The prerequisites for successful communication measures are:

A clearly defined target group
→ "Who buys (wants to buy) my products?"

A well-formulated message
→ "What do I want to tell the customer?"
→ "How do I want to tell him that?"

Costs and dispersion losses
Two parameters are used to measure the costs of any communication measure:

Cost per contact
→ "How much does it cost to convey the message to one target company/person?"

Total costs
→ "How much does the whole campaign cost?"

Search engines make it attractive for importers to use the Internet if they are looking for new producers in a certain region. If you use the Internet be sure that your site will be found by the regular search engines they use or through business directories.

Internet
Internet is rapidly changing the way business is done. Every industry is under the influence of rapidly developing insights in the new ways companies can position themselves. It is tempting to look at the technical side of the global network of computers but what really matters is the way in which your customers' expectations of your company are evolving. Applied to the promotion of the company image, Internet offers

Developing customer relations:
- Take good care of existing customers. This includes e.g. expressions of thanks to business partners, regular information on the product range, etc.
- Brochures on your company and the product range can be useful for promoting sales.
- Ask existing customers for letters of reference. Such recommendations are particularly important when approaching new initial contacts.
- Give your customer the opportunity to track the status of his order via the Internet (password guarded).

Expanding supply quantities:
- In some cases, you may be able to increase supply quantities to existing customers.
- The product range should be guided by the demand. Changes to the product range may become necessary.
- If you can increase the present quantities produced, you may wish to look for new sales outlets.
- You can use your existing export experience to trade with other importing countries.
- Always answer a letter of inquiry. If you cannot supply this contact, say so, explaining that you will get in touch with him if/when the supply situation changes.

Criteria Measures	Target group	Amount of planning and Co-ordination	Cost per Contact	Total costs	Dispersion losses
Standard printed matter (letterheads etc.)	Existing customers	+	+	+	+
Telephone and mailing campaigns	Existing and potential customers (known by name)	++	++	++	+++
Advertising in trade journals	Existing and potential customers (partly unknown)	+++	++	++	++
Promotion through an Internet site	Existing and potential customers (partly unknown)	+++	+	++	+

+++ = high, ++ = medium, + = low
Source: IPL Consultants

you the possibility to serve your (prospective) buyers one-on-one. Your customer will expect to be able to find all the information he needs quickly on a well developed, clear and up-to-date website.
All the questions your customer has should basically be answered by your Internet presence (a combination of company background, an overview of the staff, the products and their full specifications etc).
Not only is direct sales promotion of importance, but the demand for online support is also growing rapidly. A customer posing questions expects at least a first line of support.
The fact that it has become easy and technically possible to publish massive amounts of information places a burden on your company to actually provide the relevant information to your customer in an organised way.
As new buyers carry out more and more of their background checks by means of visiting the suppliers' websites, it is clear that your presence on the Internet should be planned and executed very carefully. It should reflect, be consistent with and form an integral part of the company image as formulated in the other promotion methods.

B-to-B portals
One practical development is that suppliers of engineering components are participating more and more in global sites promoting these products. Often these sites are private company initiatives, supported by government bodies. A number of “country” sites are developing, the aim of which is to promote the national industry. It is not always in the form of a marketplace, with direct buy-sell possibilities, but often in the form of brokering trade leads or b-to-b portals. At these sites all kinds of additional services such as consultancy, trade information, etc. is provided. Each of these sites aims to function as a meeting point for customers and suppliers, quite often for more than one industry.
You should therefore consider developing a promotion policy whereby a shortlist of these market sites is compiled and used to promote (a part of) your product range.

A number of relevant sites for the engineering components industry:
China Trade Directory: “The most Comprehensive Database of China & Taiwan Manufacturers”

http://www.manufacturers.com.tw/search_keyword.php?st=1&sk=transmission

Trade - N - Business Global Yellow Pages Network, for Indian businesses . An organisation in the field of Trade Promotion, through both the print and Internet Media
http://www.trade-n-business.com/ , search for e.g. transmission

Alibaba.com is the world's largest marketplace for global trade and is the leading provider of online marketing services for importers and exporters. Alibaba.com is the number one destination for buyers and sellers looking for trade opportunities and seeking to promote their businesses online.
www.alibaba.com, keyword e.g. transmission.

A good Internet marketing policy can present your company to every potential client in any country with access to the Internet. You must realise, however, that your organisation must be thoroughly prepared for requests from all over the world.

(b) Sales organisation

The term "sales organisation" refers to the organisational system that carries out the sales of the company's products and pursues quality control. A sales organisation usually consists of office personnel and a field force.

Office personnel	**Field force**
• Handling correspondence	• Selling
• Handling offers and orders	• Visiting customers
• Issuing forwarding instructions	• Presenting new products
• Issuing and checking invoices	• Discussing and implementing campaigns
• Controlling schedules	• Discussing listings
• Keeping customer records	• Holding yearly reviews with customers
• Expediting product samples	• Implementing selling prices
• Keeping sales statistics	
• Evaluating markets	
• Dispatching goods	
• Quality control	

Organising sales

Business with partners overseas is often concluded on the telephone, by fax or by e-mail. A well-functioning sales department is therefore an absolute prerequisite for successful market participation.

- The essential tool used in the sales department is a detailed and up-to-date customer database. The customer database contains the following information:
  - → Basic data on the customer (e.g. long-term data such as name, address, telephone number, e-mail, etc.);
  - → Changing data on the customer (data resulting from business with the customer such as telephone calls, offers, sales statistics, news on his web site etc.).

- The customer database gives a sales person a quick review of the most important customer data when planning to contact the customer whether by telephone, fax or e-mail.

- If possible, the customer database should be computerised, because this simplifies changes, updating, sorting and selection procedures, etc. If computerisation is not possible, the customer data should be kept on file cards (see samples).

Appendices

APPENDIX 1 DETAILED HS CODES

Product group	HS code[1]	Description[2]
Electric drives	850110	motors of an output =<37.5 W
	850120	universal ac/dc motors of an output > 37.5 W
	850131	dc motors of an output > 37.5 W but =< 750 W; dc generators of an output =< 750 W
	850132	dc motors and dc generators of an output > 750 W but =< 75 kW
	850133	dc motors and dc generators of an output > 75 kW but =< 375 kW
	850134	dc motors and dc generators of an output > 375 kW
	850140	ac motors, single-phase, of an output > 37.5 W
	850151	ac motors, multi-phase, of an output > 37.5 W but =< 750 W
	850152	ac motors, multi-phase, of an output > 750 W but =< 75 kW
	850153	ac motors, multi-phase, of an output > 75 kW
Moulds, magnets and elevators	842832	continuous-action elevators and conveyors for goods or materials, bucket type (excl. those for underground use)
	842833	continuous-action elevators and conveyors for goods or materials, belt type (excl. those for underground use)
	848010	moulding boxes for metal foundry
	848020	mould bases (other than of graphite or other carbon, ceramic materials or glass)
	848030	moulding patterns (excl. moulds of graphite or other carbons and ceramic or glass moulds)
	848041	injection or compression type moulds for metal or metal carbides (excl. moulds of graphite or other carbons and ceramic or glass moulds)
	848049	moulds for metal or metal carbides (excl. moulds of graphite or other carbons, ceramic or glass moulds, linotype moulds or matrices, injection or compression type moulds and ingot moulds)
	848050	moulds for glass (excl. moulds of graphite or other carbons and ceramic moulds)
	848060	moulds for mineral materials (excl. moulds of graphite or other carbons and ceramic or glass moulds)
	848071	injection or compression type moulds for rubber or plastics
	848079	moulds for rubber or plastics (other than for injection or compression)
	850590	electro-magnets and their parts (excl. magnets for medical use); electro-magnetic or permanent magnet chucks, clamps and similar holding devices and their parts, n.e.s.
Hydraulics	841090	parts of hydraulic turbines and water wheels n.e.s.; hydraulic turbine regulators
	841221	hydraulic power engines and motors, linear acting, 'cylinders'
	841290	parts of engines and motors n.e.s.
	841350	reciprocating positive displacement pumps, power-driven (excl. those of subheading nos 8413.11 and 8413.19, fuel, lubricating or cooling-medium pumps for internal combustion piston engines and concrete pumps)
	841360	rotary positive displacement pumps, power-driven (excl. those of subheading nos 8413.11 and 8413.19 and fuel, lubricating or cooling-medium pumps for internal combustion piston engines)
	848120	valves for oleohydraulic or pneumatic transmission

[1] excluding all HS codes specifically for use in civil aircraft
[2] n.e.s.: not earlier specified

Parts of transmission	842541	built in jacking systems of a type used in garages
	848210	ball bearings
	848220	tapered roller bearings, including cone and tapered roller assemblies
	848230	spherical roller bearings
	848240	needle roller bearings
	848250	cylindrical roller bearings
	848280	roller bearings, incl. combined ball/roller bearings (excl. ball bearings, tapered roller bearings, incl. cone and tapered roller assemblies, spherical roller bearings, needle and cylindrical roller bearings)
	848291	balls, needles and rollers for bearings (excl. steel balls of heading no 7326)
		parts of ball or roller bearings (excl. balls, needles and rollers) n.e.s.
	848299	transmission shafts - incl. cam shafts and crank shafts - and cranks
	848310	bearing housings, incorporating ball or roller bearings, for machinery
	848320	bearing housings for machinery, not incorporating ball or roller bearings; plain shaft bearings for machinery
	848330	gears and gearing for machinery, other than toothed wheels, chain sprockets and other transmission elements presented separately; ball screws; gear boxes and other
	848340	speed changers, including torque converters
	848350	flywheels and pulleys, including pulley blocks
	848360	clutches and shaft couplings, incl. universal joints, for machinery
	848390	parts of transmission shafts, ball screws, couplings and other articles of heading no 8483, n.e.s.
Pneumatics	841231	pneumatic power engines and motors, linear-acting, 'cylinders'
	848110	pressure-reducing valves
	848120	valves for oleohydraulic or pneumatic transmission
	903281	hydraulic or pneumatic regulating or controlling instruments and apparatus (excl. manostats and taps, cocks and valves of heading 8481)
Pumps	841311	pumps fitted or designed to be fitted with a measuring device, for dispensing fuel or lubricants, of the type used in filling-stations or in garages
		pumps for liquids, fitted or designed to be fitted with a measuring device (excl. pumps for dispensing fuel or lubricants, of the type used in filling-stations or in garages)
	841319	hand pumps (excl. those of subheading nos 8413.11 and 8413.19)
	841320	fuel, lubricating or cooling-medium pumps for internal combustion piston engines concrete pumps
	841330	reciprocating positive displacement pumps, power-driven (excl. those of subheading nos
	841340	8413.11 and 8413.19, fuel, lubricating or cooling-medium pumps for internal combustion piston engines and concrete pumps)
	841350	rotary positive displacement pumps, power-driven (excl. those of subheading nos 8413.11 and 8413.19 and fuel, lubricating or cooling-medium pumps for internal combustion piston engines)
	841360	centrifugal pumps, power-driven (excl. those of subheading nos 8413.11 and 8413.19, fuel, lubricating or cooling-medium pumps for internal combustion piston engines and concrete pumps)
	841370	pumps for liquids, power-driven (excl. those of subheading nos 8413.11 and 8413.19, fuel, lubricating or cooling-medium pumps for internal combustion piston engines, concrete pumps, general reciprocating or rotary positive displacement pumps and centrifugal pumps of all kinds)
	841381	parts of pumps for liquids n.e.s.
	841391	vacuum pumps
	841410	hand or foot-operated air pumps
	841420	compressors for refrigerating equipment
	841430	air compressors mounted on a wheeled chassis for towing

	841440	air pumps, air or other gas compressors and ventilating or recycling hoods incorporating a fan, whether or not fitted with filters, having a maximum horizontal side > 120 cm (excl. vacuum pumps, hand- or foot-operated air pumps, compressors for refrigerating equipment and air compressors mounted on a wheeled chassis for towing)
	841480	parts of : air or vacuum pumps, air or other gas compressors, fans and ventilating or
	841490	recycling hoods incorporating a fan, n.e.s.
	841899	parts of refrigerating or freezing equipment and heat pumps n.e.s.
Tool holders	846610	tool holders -incl. tool holders for any type of tool for working in the hand- and self-opening dieheads, for machine tools
	846620	work holders for machine-tools
	846630	dividing heads and other special attachments for machine-tools n.e.s.

APPENDIX 2 DETAILED IMPORT AND EXPORT STATISTICS

Imports of engineering products into the EU by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**40,450,891**	**4,361,318**	**46,669,016**	**5,170,224**	**46,658,419**	**5,046,368**
Extra-EU	**12,683,788**	**1,376,354**	**15,613,470**	**1,585,685**	**16,151,717**	**1,694,561**
Developing countries	**3,448,478**	**735,503**	**4,506,086**	**913,175**	**5,305,431**	**1,031,903**
Major suppliers:						
Germany	9,556,758	893,658	10,876,054	975,499	10,833,527	1,015,830
Italy	4,232,384	623,726	4,703,163	750,411	4,659,773	728,688
United States	3,512,593	218,510	4,161,649	209,255	4,095,229	191,186
France	3,701,444	411,780	3,867,386	669,869	3,844,159	395,679
Japan	2,566,521	173,662	3,394,990	195,467	3,213,945	215,814
United Kingdom	2,605,875	212,082	3,048,990	276,307	2,732,650	223,918
Belgium	1,658,541	142,650	1,897,430	153,312	1,916,854	145,729
Switzerland	1,630,526	68,980	1,840,603	76,170	1,914,151	73,678
Spain	1,284,869	191,755	1,414,482	199,319	1,367,534	219,671
the Netherlands	1,180,861	101,971	1,418,294	135,070	1,339,178	123,526
Czech Republic	774,058	153,307	978,222	187,878	1,268,612	211,065
Sweden	1,008,039	111,757	1,072,608	107,715	1,047,487	198,251
China	590,780	160,933	854,692	202,906	927,196	235,411
Austria	789,106	89,985	869,614	97,221	847,267	89,249
Denmark	863,033	86,144	902,191	108,929	829,052	76,590
Hungary	309,303	50,887	414,994	70,256	526,117	83,268
Slovakia	264,732	60,294	386,223	82,511	484,376	103,490
Poland	267,099	75,738	362,899	88,956	467,720	104,775
Finland	329,769	42,421	357,014	48,952	398,407	61,900
Portugal	240,486	26,241	279,825	32,924	302,151	35,817
Brazil	227,384	37,626	287,577	54,137	294,125	56,341
South Korea	246,796	29,947	323,639	37,590	282,236	33,683
Canada	214,903	13,902	269,400	12,961	277,815	13,614
Slovenia	206,715	45,202	237,329	53,648	276,868	57,079
Ireland	222,315	14,857	252,783	18,153	255,791	17,119
Romania	184,449	48,144	218,183	57,324	235,287	57,628
Norway	228,415	21,044	194,550	16,952	185,641	15,041
India	104,261	17,564	139,362	21,816	164,289	27,453
Singapore	132,366	18,596	167,840	20,628	132,772	13,852
Turkey	94,452	34,100	118,274	40,596	129,872	41,939
Thailand	131,330	9,308	134,738	10,589	115,615	9,692
Saudi Arabia	52,564	639	58,646	312	92,280	629
Malaysia	73,648	6,908	88,767	8,282	80,158	6,814
Luxembourg	50,424	4,251	53,663	4,008	67,880	3,823
South Africa	53,009	7,461	55,955	7,176	63,388	8,063
Liechtenstein	47,180	7,019	54,532	6,847	58,606	7,707
Mexico	42,206	8,025	49,655	6,305	57,265	7,871
Bulgaria	46,539	16,855	51,805	17,850	53,823	15,607
Russia	36,060	13,167	44,580	14,128	53,314	15,640
Australia	65,175	2,673	65,460	3,097	49,731	2,583
Israel	46,592	4,045	38,125	2,692	49,703	3,502
Hong Kong	56,038	3,937	46,948	3,378	39,738	2,246
Vietnam	17,116	1,174	28,084	2,369	38,351	3,275
Indonesia	-	-	-	-	33,639	3,846

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Croatia	28,691	6,858	32,728	7,922	30,726	7,065
Argentina	15,710	1,239	21,968	1,749	29,017	2,273
Greece	28,110	6,005	27,180	5,333	22,934	12,394
Serbia-Montenegro	12,481	3,708	13,528	4,206	17,795	5,547
United Arabic Emirates	9,950	451	12,646	584	13,474	584
Ukraine	10,340	6,213	11,049	4,239	12,646	4,486

Imports of electric drives into the EU by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**2,748,639**	**192,714**	**3,214,065**	**202,811**	**3,145,267**	**187,542**
Extra-EU	**814,219**	**60,806**	**982,481**	**66,505**	**990,645**	**63,985**
Developing countries	**102,057**	**17,826**	**134,937**	**20,115**	**163,528**	**24,053**
Major suppliers:						
Germany	808,546	38,406	951,614	46,966	964,191	42,787
United States	408,391	25,565	483,490	24,385	447,296	19,925
Italy	209,984	15,624	240,835	19,822	249,597	22,089
United Kingdom	201,760	12,481	235,497	16,771	192,371	10,795
Belgium	123,591	4,062	167,310	5,193	176,099	4,991
France	175,361	13,668	180,038	13,216	151,540	11,556
Japan	93,706	5,669	148,867	7,954	150,123	6,800
Switzerland	103,162	3,756	122,939	5,326	145,884	5,670
Denmark	132,919	8,315	145,633	10,003	132,890	8,943
Sweden	81,801	6,058	86,676	5,470	81,473	5,490
the Netherlands	68,885	7,499	73,640	7,296	73,770	6,724
Spain	70,650	8,968	76,454	4,937	61,221	4,082
Czech Republic	39,547	5,731	45,607	6,252	40,876	5,535
Austria	32,515	2,116	38,701	2,598	38,256	2,599
Norway	34,709	3,396	26,969	4,060	23,307	2,792
Brazil	4,590	368	9,757	1,105	17,142	2,224
South Korea	22,261	892	14,970	988	15,240	1,124
Finland	12,131	1,142	17,724	2,209	14,467	1,856
Poland	7,580	2,272	10,687	1,957	14,290	2,857
Canada	11,616	1,376	17,996	1,249	13,480	1,054
Ireland	11,252	1,311	13,309	1,677	12,479	1,450
Slovenia	6,214	924	11,132	1,579	12,138	1,482
India	3,117	283	6,144	540	11,653	913
Bulgaria	10,920	2,765	10,402	2,487	11,003	2,280
Hungary	6,978	880	10,191	1,122	10,626	1,100
China	2,385	345	6,995	889	7,756	1,744
Turkey	4,650	1,014	5,415	1,119	7,337	1,701
Slovakia	3,802	865	6,311	1,236	7,119	953
Argentina	185	5	129	9	6,033	412
Romania	3,982	1,391	4,206	1,413	5,535	1,939
Russia	2,147	649	3,296	895	5,361	1,151
United Arabic Emirates	1,047	75	2,064	97	4,373	113
Israel	1,740	130	749	40	3,069	35
Tunisia	918	74	413	8	2,990	205
Philippines	1,086	11	2,769	15	2,546	13
Ukraine	945	548	552	351	2,387	330
Luxembourg	3,981	376	2,605	109	2,146	63
Singapore	1,073	112	1,046	58	1,930	124
Mexico	2,238	141	1,474	38	1,821	33
Hong Kong	2,450	114	3,712	87	1,676	93
South Africa	316	16	794	86	1,452	89
Australia	14,279	390	7,531	158	1,153	35
Serbia-Montenegro	108	25	324	27	896	178
Portugal	719	64	735	11	782	15
Greece	174	8	371	8	671	7
Croatia	942	71	373	35	592	40
Thailand	583	38	383	4	565	6
New Zealand	323	6	219	11	474	18
Malaysia	358	34	683	27	457	59
Sri Lanka	334	3	440	-	416	5

Imports of moulds, magnets and elevators into the EU by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**2,573,695**	**178,509**	**3,000,544**	**184,004**	**2,849,188**	**177,173**
Extra-EU	**985,786**	**60,818**	**1,204,726**	**71,110**	**1,240,313**	**79,442**
Developing countries	**302,652**	**34,058**	**366,397**	**40,452**	**421,158**	**45,334**
Major suppliers:						
Germany	453,095	36,657	522,205	35,203	496,507	33,090
Switzerland	253,100	5,883	269,194	6,060	309,827	7,219
Italy	262,420	19,388	275,707	21,105	272,076	16,857
United States	158,856	6,465	194,540	6,290	175,248	6,271
United Kingdom	165,517	5,773	215,798	6,022	157,290	5,997
France	168,768	22,471	149,528	11,933	142,426	10,282
Japan	104,393	3,114	174,342	7,780	137,847	6,964
Czech Republic	96,780	8,604	122,107	11,947	129,041	11,835
Portugal	77,823	5,654	91,088	4,612	95,133	3,735
Austria	99,314	5,557	93,567	5,741	89,786	4,585
Belgium	85,756	4,847	110,980	9,475	87,049	6,688
Hungary	58,264	4,298	67,726	6,263	80,360	7,344
the Netherlands	76,433	5,299	79,395	5,011	77,775	4,338
Spain	87,554	6,013	122,551	6,192	73,353	6,161
Poland	43,846	8,992	48,322	8,998	59,044	9,871
Denmark	45,297	2,667	50,556	2,856	39,979	2,013
Canada	26,747	903	35,476	1,339	38,644	1,392
South Korea	24,800	1,295	38,169	1,992	35,983	2,293
Slovenia	23,608	1,507	25,855	1,759	31,960	1,790
China	16,142	1,605	28,003	2,822	31,722	3,662
Luxembourg	15,687	844	20,491	994	29,360	1,234
Sweden	26,172	1,367	35,416	1,778	22,204	998
Ireland	16,592	823	18,108	1,098	19,377	1,389
Slovakia	7,657	1,033	10,171	1,499	16,635	3,083
Romania	5,233	520	9,865	942	13,614	1,424
Norway	18,344	2,425	13,006	637	13,367	743
Australia	8,876	574	13,361	623	12,620	651
Singapore	11,854	237	16,291	221	12,242	181
Hong Kong	8,477	420	8,977	819	10,499	599
Mexico	3,787	144	5,224	168	8,710	388
Turkey	7,409	585	9,229	743	8,578	839
Croatia	7,587	496	8,089	601	7,739	935
Russia	7,053	3,862	7,377	1,715	6,208	1,243
Malaysia	2,803	125	4,083	459	5,926	148
Brazil	5,222	211	5,463	265	5,915	466
Estonia	5,969	350	5,296	579	5,681	334
Bulgaria	4,603	605	4,441	831	5,377	699
Finland	4,161	228	8,476	731	4,893	201
India	2,618	374	2,959	504	4,202	448
Latvia	2,018	126	3,677	209	4,093	204
Tunisia	3,020	91	3,119	31	3,915	76
South Africa	4,867	355	2,857	302	3,631	246
Thailand	2,490	169	2,559	135	3,043	69
Israel	5,254	225	2,428	87	2,833	92
Liechtenstein	2,908	153	2,764	234	2,406	158
New Zealand	1,307	143	2,840	226	2,377	159
Lithuania	1,411	45	504	35	1,671	84
Ukraine	990	397	1,365	370	1,568	425
Bosnia-Herzegovina	1,078	34	1,568	168	1,447	35
Argentina	1,488	103	1,526	96	1,446	69

Imports of hydraulics into the EU by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**4,586,802**	**558,905**	**5,361,680**	**641,910**	**5,291,200**	**672,587**
Extra-EU	**1,825,279**	**225,744**	**2,262,542**	**264,666**	**2,311,173**	**289,935**
Developing countries	**464,232**	**179,743**	**603,275**	**219,644**	**581,343**	**243,685**
Major suppliers:						
Germany	1,141,557	130,594	1,299,022	128,001	1,278,726	113,570
Italy	418,070	71,759	478,756	84,049	426,296	119,200
France	365,948	37,546	396,258	57,462	387,058	39,398
China	230,189	39,480	339,108	48,467	330,941	56,159
Switzerland	274,158	8,763	318,653	8,626	325,561	8,876
United States	244,654	9,786	291,057	11,135	309,398	10,778
Czech Republic	168,494	44,404	205,762	53,767	237,206	56,076
Japan	186,283	7,338	220,566	7,101	234,028	8,752
Hungary	94,513	14,438	137,892	21,708	169,211	24,472
Spain	96,868	12,012	121,124	15,807	158,032	23,247
Finland	114,186	18,900	110,001	20,821	136,809	30,125
United Kingdom	168,161	13,388	206,341	13,360	122,925	8,301
the Netherlands	120,065	8,889	119,448	8,672	118,981	8,872
Sweden	92,332	14,583	113,952	14,336	110,010	16,088
Slovakia	67,445	16,734	84,901	20,314	103,876	27,005
Austria	77,399	9,441	79,327	10,788	76,757	8,911
Slovenia	57,462	7,316	59,576	7,619	75,753	9,682
Denmark	86,839	7,775	88,210	14,179	69,307	5,655
Romania	49,420	20,400	57,079	23,364	63,084	24,589
Belgium	48,570	4,562	55,922	6,473	56,198	5,931
Thailand	90,523	4,136	77,989	3,792	55,808	2,744
Poland	34,436	11,467	41,555	13,323	47,863	14,914
Brazil	23,073	7,352	32,356	10,059	46,390	12,163
Vietnam	16,644	1,117	27,073	2,287	37,581	3,141
South Korea	25,057	3,139	55,095	3,525	36,080	2,908
Malaysia	38,846	2,811	36,887	2,603	30,756	2,230
Singapore	12,465	614	42,777	551	29,928	513
Canada	31,794	1,755	33,398	1,628	22,619	1,115
Luxembourg	4,861	202	8,849	378	14,313	284
India	6,096	1,140	11,930	1,864	13,911	2,215
Turkey	15,249	5,135	14,242	4,614	13,760	4,510
Saudi Arabia	12,058	81	12,743	17	11,270	26
Bulgaria	9,017	3,226	11,456	3,744	10,799	3,547
Russia	6,881	2,102	13,192	4,108	9,682	5,052
Australia	5,278	193	9,748	315	9,489	400
Portugal	8,720	2,221	8,619	1,963	9,473	1,820
Indonesia	-	-	-	-	9,387	264
Norway	11,378	920	6,402	559	7,470	551
Ireland	11,769	1,101	8,460	806	7,425	663
Hong Kong	32,272	2,357	15,344	977	6,494	407
Morocco	1,646	189	2,796	215	5,637	247
Croatia	4,596	1,084	5,518	1,029	4,201	836
Israel	3,719	267	3,600	154	4,104	200
Mexico	4,025	217	3,500	149	4,005	215
Serbia-Montenegro	4,554	1,823	5,224	2,130	3,455	1,220
Liechtenstein	3,692	116	3,251	104	3,291	97
Ukraine	4,010	758	4,068	438	2,470	228
Philippines	6,674	26	18,463	134	1,886	57
Oman	1,985	5	1,943	9	1,590	1
Venezuela	127	4	247	14	1,471	49

Imports of parts of transmission into the EU by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**13,392,425**	**1,962,841**	**15,569,537**	**2,150,998**	**15,840,993**	**2,401,140**
Extra-EU	**3,569,419**	**608,522**	**4,509,279**	**698,418**	**4,758,530**	**764,610**
Developing countries	**1,164,926**	**364,618**	**1,570,858**	**443,604**	**1,856,444**	**500,821**
Major suppliers:						
Germany	3,156,647	436,488	3,544,701	451,859	3,654,508	571,477
Italy	1,663,372	256,618	1,855,536	282,509	1,821,552	292,105
France	1,348,299	184,166	1,444,476	173,648	1,526,868	194,785
United States	889,452	81,280	1,069,033	76,208	1,089,828	69,993
United Kingdom	872,547	101,023	1,003,041	111,802	948,982	117,220
Japan	761,333	73,345	972,047	82,102	922,438	103,023
Belgium	671,859	64,683	720,296	68,112	724,981	71,824
Spain	469,108	99,519	571,561	118,715	563,432	134,979
Sweden	470,122	61,325	502,972	58,672	518,019	64,957
the Netherlands	465,703	50,252	605,807	73,915	496,431	69,525
Austria	375,016	46,558	448,089	53,936	433,580	47,246
China	264,398	99,281	359,237	122,204	416,453	141,344
Switzerland	337,506	26,294	392,369	29,254	389,773	24,978
Czech Republic	185,541	67,373	216,639	75,679	267,193	87,713
Slovakia	132,174	28,559	191,304	35,811	255,561	45,087
Poland	129,256	39,515	198,254	49,246	233,678	57,059
Finland	139,017	17,529	155,658	20,520	174,464	24,691
Canada	101,174	7,331	136,369	7,023	145,224	7,642
Hungary	68,103	23,793	91,743	29,866	131,341	37,139
Denmark	93,433	16,415	104,173	16,073	99,407	14,460
Brazil	53,507	13,190	94,101	23,105	99,334	19,857
Romania	75,134	22,331	93,989	27,324	93,170	25,299
India	47,884	11,115	60,189	12,497	74,465	16,348
South Korea	49,166	8,950	71,408	11,656	72,362	10,192
Portugal	45,882	8,530	50,268	11,922	56,334	13,573
Slovenia	32,136	12,441	39,281	15,190	44,976	16,548
South Africa	37,588	6,127	40,494	5,613	44,082	6,685
Turkey	25,828	11,515	38,110	15,726	44,014	14,970
Norway	52,406	7,070	51,708	5,895	41,313	5,470
Liechtenstein	27,417	6,011	34,012	5,879	37,791	7,033
Malaysia	21,832	2,626	36,982	4,079	31,558	3,353
Singapore	31,759	2,493	27,830	1,993	31,322	2,406
Thailand	15,364	1,098	19,651	1,684	24,732	2,248
Ireland	23,420	3,751	25,396	4,956	23,865	5,227
Mexico	14,912	5,864	22,303	4,617	22,209	4,902
Russia	16,058	6,009	15,891	6,812	17,614	7,672
Bulgaria	15,921	9,306	18,749	10,108	16,808	8,158
Greece	13,363	4,511	12,609	3,618	14,319	11,361
Indonesia	-	-	-	-	13,506	1,137
Croatia	10,474	4,622	13,019	5,114	13,123	4,247
Hong Kong	5,175	675	8,733	782	11,331	607
Saudi Arabia	15,220	166	20,517	140	10,954	405
Israel	9,750	910	10,304	859	10,299	845
Luxembourg	6,930	1,427	9,636	1,692	9,650	1,163
Serbia-Montenegro	6,300	1,625	5,811	1,735	9,097	3,414
Australia	8,440	426	6,968	428	6,983	428
Ukraine	3,921	4,441	4,539	3,041	5,651	3,389
Argentina	5,828	399	6,318	626	5,251	529
Latvia	3,033	1,609	2,874	1,509	3,642	1,681
Bosnia-Herzegovina	1,818	1,041	2,825	2,102	2,878	2,487

Imports of pneumatics into the EU by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**1,603,179**	**55,461**	**1,929,741**	**62,041**	**1,968,013**	**64,984**
Extra-EU	**527,717**	**18,062**	**643,624**	**17,494**	**680,059**	**19,536**
Developing countries	**43,466**	**3,025**	**58,158**	**3,962**	**97,420**	**6,135**
Major suppliers:						
Germany	369,832	10,344	439,893	12,705	443,690	12,415
United States	252,525	8,979	290,600	6,394	295,106	6,257
Italy	168,873	8,447	200,596	10,911	204,821	11,290
United Kingdom	135,281	5,844	165,957	6,347	149,910	5,477
Belgium	100,863	1,781	127,429	1,781	138,893	1,830
Switzerland	112,568	1,787	129,930	2,139	131,396	2,107
France	105,821	3,778	124,416	4,054	126,602	4,468
Japan	70,823	2,289	118,929	3,292	106,959	2,998
Denmark	84,778	3,557	95,574	4,321	93,153	5,758
Poland	3,719	503	7,712	903	40,482	2,313
Sweden	36,617	1,182	40,120	1,329	36,798	1,141
the Netherlands	23,971	706	28,591	896	36,769	1,035
Spain	18,212	842	25,123	1,202	22,963	1,030
Hungary	10,960	410	15,640	665	18,028	736
Ireland	10,400	235	14,156	442	12,694	351
Austria	12,614	428	16,346	392	12,661	388
Czech Republic	5,375	410	6,526	410	8,124	686
Slovenia	4,452	266	5,479	361	8,068	550
Canada	6,682	320	7,787	134	7,902	134
Norway	6,546	246	7,683	224	7,105	129
China	4,292	767	6,291	902	7,062	1,207
Israel	3,211	194	4,060	186	5,989	347
South Korea	5,331	462	5,040	439	4,696	435
Brazil	2,314	100	3,132	143	3,871	141
Finland	4,993	155	4,108	100	3,820	102
Australia	920	11	851	4	3,336	86
Hong Kong	2,782	8	4,577	12	2,725	11
Philippines	1,027	12	2,905	28	2,676	14
Luxembourg	1,881	43	1,991	40	2,493	88
Mexico	1,713	27	1,993	38	2,127	38
Turkey	1,628	187	1,757	252	2,047	291
Singapore	721	15	1,418	22	1,940	22
India	1,759	215	1,799	169	1,443	183
Oman	21	-	849	-	1,187	1
Estonia	2,026	84	1,505	56	1,076	49
Malaysia	1,079	6	1,265	4	989	1
Nigeria	53	1	4	-	987	61
United Arabic Emirates	575	16	1,088	-	886	11
Argentina	227	7	438	15	826	8
Bulgaria	608	92	684	112	808	92
Romania	118	3	165	30	781	68
Portugal	344	2	1,210	15	752	13
Thailand	1,245	41	861	28	682	17
Slovakia	663	51	364	40	619	71
Serbia-Montenegro	41	7	208	26	468	80
Kuwait	830	-	565	1	464	4
Greece	408	17	362	7	441	11
New Zealand	809	8	406	6	388	5
Colombia	349	1	12	-	364	5
Iran	64	18	230	1	338	10

Imports of pumps into the EU by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**14,833,224**	**1,384,435**	**16,747,069**	**1,897,236**	**16,679,689**	**1,511,116**
Extra-EU	**4,663,643**	**390,381**	**5,664,834**	**456,098**	**5,791,216**	**463,277**
Developing countries	**883,070**	**130,743**	**1,158,689**	**179,122**	**1,469,835**	**204,335**
Major suppliers:						
Germany	3,423,950	234,366	3,867,731	291,463	3,731,527	233,961
United States	1,494,087	84,283	1,753,024	83,416	1,701,394	76,842
Italy	1,462,975	249,353	1,603,218	329,444	1,633,260	264,444
Japan	1,311,441	81,225	1,703,417	86,530	1,609,768	86,305
France	1,511,792	148,073	1,541,047	407,682	1,482,946	133,856
United Kingdom	1,030,531	72,266	1,168,430	120,538	1,113,412	74,694
Belgium	621,498	62,439	705,159	61,741	719,855	53,677
Czech Republic	260,612	25,380	363,421	38,091	567,463	48,008
the Netherlands	386,951	28,257	467,295	37,500	495,583	31,840
Switzerland	444,917	20,920	487,080	23,146	486,215	23,260
Spain	531,080	63,758	483,927	51,554	471,698	49,302
Denmark	412,878	47,274	412,495	61,347	390,194	39,621
Sweden	283,736	27,007	273,806	25,808	260,101	109,197
Austria	184,146	25,548	183,078	23,417	186,883	25,247
Ireland	147,009	7,508	172,640	9,154	176,817	7,911
Portugal	105,651	9,709	126,091	14,293	138,820	16,582
China	69,621	18,602	108,486	26,220	126,257	29,559
Brazil	137,147	16,377	141,949	19,445	119,560	21,474
South Korea	116,866	15,034	135,787	18,868	113,649	16,573
Hungary	64,080	6,623	84,550	10,137	108,159	11,975
Slovenia	78,273	22,434	92,486	26,866	99,144	26,627
Slovakia	50,337	12,656	90,589	23,313	98,159	26,993
Norway	102,927	6,942	87,778	5,543	91,419	5,287
Saudi Arabia	22,508	316	22,669	109	69,036	170
Finland	53,812	4,409	58,095	4,406	62,144	4,876
Poland	39,775	11,805	47,391	13,426	58,549	15,980
Romania	49,547	3,209	52,133	4,004	57,853	3,915
Singapore	74,331	15,121	78,032	17,778	54,589	10,595
India	39,799	4,318	52,752	6,068	54,068	7,120
Turkey	37,201	15,430	46,734	17,918	50,115	19,316
Thailand	20,540	3,789	33,022	4,932	30,209	4,545
Canada	29,500	1,925	34,780	1,552	29,913	1,319
Israel	19,940	2,211	14,248	1,329	20,116	1,946
Mexico	14,376	1,605	13,816	1,263	17,993	2,287
Australia	26,546	1,056	26,092	1,542	15,077	912
Argentina	7,735	706	13,240	998	14,472	1,146
Russia	3,606	482	4,253	477	13,910	447
South Africa	7,659	790	9,558	1,059	10,698	886
Malaysia	8,685	1,305	8,677	1,100	10,368	1,022
Indonesia	-	-	-	-	9,545	2,106
Liechtenstein	9,324	658	8,734	501	8,812	270
Egypt	11,813	3,384	17,452	6,182	8,387	2,505
Luxembourg	2,892	601	4,400	693	6,853	881
Hong Kong	4,580	346	5,372	689	6,673	521
Greece	6,785	1,301	8,792	1,567	5,824	941
Bulgaria	3,693	662	3,841	379	5,748	594
Kuwait	760	16	321	20	5,695	28
United Arabic Emirates	5,607	194	6,048	220	5,367	204
Croatia	4,607	553	4,991	1,034	3,948	739
Serbia-Montenegro	843	116	1,570	231	3,153	483

Imports of tool holders into the EU by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**712,927**	**28,453**	**846,380**	**31,224**	**884,069**	**31,826**
Extra-EU	**297,725**	**12,021**	**345,984**	**11,394**	**379,781**	**13,776**
Developing countries	**53,330**	**5,490**	**59,400**	**6,276**	**72,996**	**7,540**
Major suppliers:						
Germany	203,131	6,803	250,888	9,302	264,378	8,530
Switzerland	105,115	1,577	120,438	1,619	125,495	1,568
United States	64,628	2,152	79,905	1,427	76,959	1,120
Japan	38,542	682	56,822	708	52,782	972
Italy	46,690	2,537	48,515	2,571	52,171	2,703
United Kingdom	32,078	1,307	53,926	1,467	47,760	1,434
the Netherlands	38,853	1,069	44,118	1,780	39,869	1,192
France	25,455	2,078	31,623	1,874	26,719	1,334
Canada	7,390	292	3,594	36	20,033	958
Sweden	17,259	235	19,666	322	18,882	380
Czech Republic	17,709	1,405	18,160	1,732	18,709	1,212
Spain	11,397	643	13,742	912	16,835	870
Poland	8,487	1,184	8,978	1,103	13,814	1,781
Belgium	6,404	276	10,334	537	13,779	788
Austria	8,102	337	10,506	349	9,344	273
Hungary	6,405	445	7,252	495	8,392	502
China	3,753	853	6,572	1,402	7,005	1,736
Liechtenstein	3,567	70	5,459	110	5,846	130
Slovenia	4,570	314	3,520	274	4,829	400
India	2,988	119	3,589	174	4,547	226
South Korea	3,315	175	3,170	122	4,226	158
Denmark	6,889	141	5,550	150	4,122	140
Turkey	2,487	234	2,787	224	4,021	312
Israel	2,978	108	2,736	37	3,293	37
Bulgaria	1,777	199	2,232	189	3,280	237
Ireland	1,873	128	714	20	3,134	128
Luxembourg	14,192	758	5,691	102	3,065	110
South Africa	1,111	75	295	20	2,442	82
Slovakia	2,654	396	2,583	298	2,407	298
Brazil	1,531	28	819	15	1,913	16
Finland	1,469	58	2,952	165	1,810	49
Norway	2,105	45	1,004	34	1,660	69
Romania	1,015	290	746	247	1,250	394
Australia	836	23	909	27	1,073	71
Croatia	330	25	709	102	1,032	252
Portugal	1,347	61	1,814	108	857	79
Singapore	163	4	446	5	821	11
Argentina	13	-	64	1	807	106
Bosnia-Herzegovina	47	3	18	-	699	31
Thailand	585	37	273	14	576	63
Mexico	1,155	27	1,345	32	400	8
Hong Kong	302	17	233	12	340	8
Russia	226	38	344	105	319	65
Saudi Arabia	335	-	1,754	2	238	3
Ukraine	2	-	2	1	217	79
New Zealand	78	3	200	3	216	8
Kuwait	-	-	1	-	139	1
Serbia-Montenegro	211	45	79	29	113	26
Malaysia	45	1	190	10	104	1
Estonia	59	18	188	9	98	7

Exports of engineering products from the EU to country of destination, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**52,165,475**	**4,944,683**	**58,760,226**	**6,272,340**	**60,093,611**	**5,233,794**
Extra-EU	**20,419,473**	**1,643,853**	**24,087,687**	**2,737,978**	**25,208,277**	**1,960,724**
Developing countries	**9,214,556**	**856,192**	**11,189,751**	**1,311,970**	**12,451,019**	**1,107,715**
Major destinations:						
Germany	6,269,033	563,398	6,816,849	702,209	7,203,701	786,158
France	5,605,582	482,409	5,938,517	543,904	5,668,915	512,241
United States	4,703,749	323,135	5,547,237	357,407	5,316,829	342,388
Italy	3,286,171	290,599	3,858,449	346,196	3,925,161	321,244
United Kingdom	3,583,527	292,261	3,764,799	390,137	3,784,798	305,239
Spain	2,932,388	286,653	3,252,705	327,601	3,245,577	316,068
Belgium	2,249,728	657,390	2,279,251	413,760	2,162,009	219,135
the Netherlands	1,975,413	168,728	2,107,967	167,775	2,106,028	158,576
Austria	1,574,234	161,183	1,868,685	184,254	1,900,573	186,730
Sweden	1,618,728	140,594	1,842,703	165,333	1,781,532	162,563
Switzerland	1,346,934	99,046	1,541,610	331,181	1,607,190	105,246
Poland	669,824	62,566	1,096,354	85,692	1,227,055	93,923
China	653,751	56,596	850,829	63,961	1,121,605	82,586
Czech Republic	673,219	62,626	859,580	243,952	1,081,752	95,348
Denmark	900,151	90,526	923,100	95,783	1,023,247	104,808
Japan	575,046	28,328	769,442	33,668	794,591	40,424
Finland	584,592	48,577	698,142	60,234	786,221	65,931
South Korea	563,820	33,086	697,001	39,804	771,466	45,855
Brazil	555,143	40,011	618,143	44,053	713,666	53,221
Hungary	560,763	82,194	661,148	91,053	692,825	98,994
Norway	724,261	48,993	575,714	209,165	661,260	48,035
Singapore	476,666	36,111	568,069	41,098	599,461	40,527
Canada	517,029	35,426	615,787	42,611	560,239	39,282
Russia	248,157	18,147	390,695	27,075	557,578	39,641
Portugal	493,071	56,627	547,080	70,059	542,117	65,983
Turkey	560,336	49,461	733,655	67,050	537,941	44,500
Mexico	436,466	31,687	435,640	35,718	468,532	40,535
Australia	478,063	38,250	469,429	38,041	463,863	38,824
Iran	218,378	14,991	386,253	21,882	454,826	27,381
South Africa	337,319	25,802	384,555	30,916	408,322	33,896
United Arabic Emirates	364,567	26,727	358,184	30,185	390,280	34,940
India	342,884	21,646	389,782	196,060	371,105	26,480
Saudi Arabia	278,762	23,826	330,286	25,798	370,679	29,040
Ireland	304,019	24,807	335,173	26,581	337,164	29,039
Hong Kong	283,357	21,801	344,234	24,099	329,137	20,249
Greece	299,212	31,528	336,269	33,290	326,110	32,471
Slovakia	231,063	28,138	251,343	37,541	286,587	44,917
Malaysia	194,038	12,453	181,504	14,415	274,177	20,633
Egypt	355,644	39,005	282,577	35,888	268,101	31,619
Algeria	219,287	15,117	198,406	16,243	257,302	20,378
Israel	223,859	19,790	243,167	19,287	223,237	17,482
Slovenia	157,259	21,845	190,844	23,081	219,612	25,676
Thailand	143,010	10,082	153,359	12,740	199,888	16,163
Argentina	225,798	21,654	217,424	20,931	165,091	16,467
Iraq	52,409	1,426	98,718	3,666	160,710	8,386
Romania	104,890	11,079	122,852	13,223	149,922	17,053
Venezuela	164,876	10,264	329,449	14,208	145,693	13,814
Morocco	124,800	15,325	124,731	16,855	142,127	17,867
Nigeria	99,649	9,241	153,947	11,608	136,603	10,944
Libyan Arab Jamahir	113,670	7,425	100,571	5,169	136,178	9,529

Imports of engineering products into France by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**6,270,841**	**635,406**	**7,063,436**	**731,824**	**7,233,746**	**741,494**
Extra-EU	**1,472,156**	**128,781**	**1,836,558**	**155,947**	**1,868,688**	**164,226**
Developing countries	**288,422**	**47,256**	**373,315**	**60,300**	**409,716**	**69,379**
Major suppliers:						
Germany	2,103,021	189,653	2,298,647	204,996	2,238,570	194,722
Italy	863,776	144,434	989,798	172,597	1,118,455	168,929
United States	529,641	35,854	608,720	36,610	632,281	37,932
United Kingdom	529,729	41,683	614,773	49,924	615,490	44,597
Belgium	334,743	34,781	377,596	42,506	408,882	40,727
Japan	247,646	19,216	362,103	27,389	372,548	28,476
Spain	419,109	50,819	375,990	50,194	372,430	59,336
Switzerland	221,635	7,393	257,442	9,470	266,567	8,009
the Netherlands	135,403	10,428	147,971	14,124	169,130	14,232
Denmark	127,612	11,223	134,928	11,792	121,789	10,130
Sweden	104,832	8,314	93,973	7,665	98,569	10,867
Portugal	40,675	4,898	62,252	10,456	79,496	14,095
China	46,644	13,880	73,956	15,136	74,226	17,170
Poland	37,911	6,155	56,030	8,661	60,835	9,820
South Korea	49,800	4,389	83,157	5,465	58,534	4,420

Imports of engineering products into the Netherlands by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**2,069,785**	**270,986**	**2,320,360**	**331,944**	**2,494,920**	**227,094**
Extra-EU	**734,921**	**78,556**	**948,146**	**95,056**	**1,020,011**	**99,193**
Developing countries	**146,284**	**41,090**	**214,847**	**49,582**	**259,173**	**56,155**
Major suppliers:						
Germany	647,320	77,943	650,611	93,448	750,837	57,586
United States	253,206	10,969	331,898	16,960	340,473	12,849
Japan	165,267	12,690	237,623	17,024	263,781	18,104
United Kingdom	160,305	14,082	199,122	54,348	201,927	16,995
Italy	130,894	16,619	134,059	44,875	129,836	16,256
Belgium	123,604	22,531	123,519	16,657	118,955	11,529
France	99,151	8,670	101,867	8,173	107,402	10,339
China	45,657	13,339	83,505	17,307	103,062	21,776
Sweden	70,151	9,419	60,098	5,668	65,563	5,071
Switzerland	61,463	2,540	64,289	2,517	57,092	2,711
Vietnam	14,384	963	23,887	1,598	32,371	2,100
Poland	15,038	5,171	18,220	6,242	29,881	7,587
Czech Republic	20,973	8,019	25,181	8,556	25,912	6,716
Finland	15,605	2,277	21,046	3,160	22,936	3,690
Romania	14,526	4,169	18,230	4,839	18,936	5,067

Imports of engineering products into Germany by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**9,810,194**	**1,028,931**	**11,466,439**	**1,145,175**	**11,402,548**	**1,147,218**
Extra-EU	**4,452,210**	**488,392**	**5,427,197**	**546,713**	**5,914,006**	**591,053**
Developing countries	**1,539,559**	**304,917**	**1,964,837**	**357,015**	**2,389,732**	**402,609**
Major suppliers:						
Italy	1,261,895	172,646	1,338,101	175,769	1,208,216	161,840
Japan	929,627	53,932	1,220,999	60,308	1,167,406	60,355
France	1,098,930	94,251	1,181,887	107,752	1,151,396	106,762
United States	798,055	46,010	949,612	42,408	1,005,614	42,110
Czech Republic	550,572	102,409	695,888	127,152	912,619	142,375
Switzerland	746,474	34,901	849,284	38,115	909,844	38,402
United Kingdom	613,633	45,619	768,233	47,528	609,299	43,328
Belgium	451,751	30,989	554,900	31,308	583,164	32,364
Austria	498,311	44,644	569,386	55,014	530,666	47,908
the Netherlands	399,221	34,110	497,469	43,633	379,372	29,664
Spain	389,412	45,269	424,619	53,427	351,477	54,970
Hungary	192,963	32,987	255,336	40,932	309,554	48,114
China	170,570	34,911	246,900	43,493	267,099	51,307
Slovakia	161,132	31,148	207,949	34,691	264,186	42,627
Denmark	241,710	25,716	270,245	28,736	255,639	25,421

Imports of engineering products into Italy by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**4,944,744**	**507,318**	**5,746,688**	**596,493**	**5,727,894**	**611,202**
Extra-EU	**1,336,337**	**217,245**	**1,687,217**	**274,767**	**1,743,546**	**296,652**
Developing countries	**507,779**	**151,518**	**697,176**	**201,678**	**830,012**	**233,517**
Major suppliers:						
Germany	1,715,081	109,605	1,947,209	129,583	1,870,078	121,173
France	698,739	64,241	725,544	67,418	753,953	65,151
United Kingdom	365,469	22,976	402,736	24,882	390,080	23,532
Japan	257,578	17,648	334,587	19,818	280,805	17,956
United States	239,622	11,517	274,038	12,149	278,098	10,460
Belgium	239,767	17,291	260,611	18,530	256,271	18,138
China	135,008	44,073	193,840	59,469	211,527	71,879
Spain	136,627	25,014	209,735	30,470	190,921	34,907
Switzerland	129,811	5,236	165,191	6,245	162,073	6,234
Slovakia	61,549	17,687	114,266	31,741	141,942	39,644
the Netherlands	100,460	6,501	118,412	7,730	131,950	8,497
Austria	122,630	24,578	121,991	21,131	128,405	23,010
Romania	67,734	26,488	88,035	30,232	111,819	30,876
Sweden	67,363	5,656	93,933	7,359	75,576	5,365
Denmark	72,804	5,140	83,291	5,823	72,479	5,098

Imports of engineering products into United Kingdom by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**4,869,593**	**545,733**	**5,476,659**	**482,240**	**5,564,563**	**527,919**
Extra-EU	**1,963,502**	**160,128**	**2,378,030**	**172,966**	**2,405,377**	**205,582**
Developing countries	**344,940**	**51,770**	**415,763**	**62,987**	**483,970**	**74,072**
Major suppliers:						
Germany	1,160,241	134,692	1,303,948	115,923	1,329,566	124,458
United States	841,892	45,759	1,018,246	46,796	983,850	42,477
Japan	420,634	35,070	518,685	33,767	531,732	57,876
Italy	491,680	58,106	508,044	56,429	502,277	54,035
France	506,219	95,388	463,828	36,461	481,197	45,090
Belgium	152,093	8,551	172,190	8,304	176,387	12,546
the Netherlands	130,381	15,517	151,613	29,153	153,864	16,479
Denmark	125,520	19,211	128,402	18,028	128,142	14,904
Spain	90,559	15,210	87,079	13,534	117,243	16,855
Sweden	109,040	21,894	130,820	17,246	115,298	16,145
Switzerland	109,762	3,312	113,834	3,261	103,244	2,842
China	78,298	19,050	97,461	21,731	97,707	22,508
Saudi Arabia	46,804	192	54,464	139	85,293	457
Ireland	45,330	2,537	66,206	2,864	68,384	4,008
Canada	47,623	3,165	66,836	3,324	61,615	3,010

Imports of engineering products into Spain by country of origin, 1999-2001 € 1,000 / tonnes

	1999		2000		2001	
	value €	volume	value €	volume	value €	volume
Total	**2,640,728**	**295,520**	**3,320,757**	**357,109**	**2,980,198**	**346,483**
Extra-EU	**488,319**	**52,124**	**678,227**	**69,138**	**628,332**	**71,203**
Developing countries	**112,456**	**23,019**	**142,059**	**30,529**	**149,221**	**35,153**
Major suppliers:						
Germany	703,792	62,034	955,830	79,085	875,932	72,274
Italy	482,823	82,867	588,693	101,858	530,986	100,056
France	470,321	49,303	529,642	52,983	464,308	55,413
Japan	134,239	8,560	236,755	12,666	207,445	11,171
United Kingdom	183,328	20,069	200,027	20,723	148,914	15,849
United States	117,204	8,890	154,376	9,490	128,907	8,293
Belgium	80,509	7,149	95,016	7,725	85,376	8,584
the Netherlands	44,551	4,729	63,300	5,769	61,742	5,781
Switzerland	56,642	1,970	55,309	1,960	57,041	2,062
Portugal	48,517	5,657	56,968	6,346	49,322	5,341
Denmark	74,586	5,031	61,897	3,690	43,504	1,953
China	32,942	10,826	41,459	13,131	41,917	14,230
Sweden	33,893	2,963	37,940	3,438	35,724	3,596
Finland	13,082	1,862	28,708	4,130	27,206	3,718
South Korea	17,974	3,193	32,954	5,631	26,031	5,571

APPENDIX 3

Appendix 3.1 Standards organisations

INTERNATIONAL

Council on Economic Priorities Accreditation Agency (CEPAA)
Address: 30 Irving Place, New York NY10003, USA
Telephone: +1 212 3587697
Fax: +1 212 3587723
E-mail: info@cepaa.org
Internet: www.cepaa.org

International Standardisation Institute (ISO)
Address: Rue de Varembé 1, P. O. Box 56, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 749 01 11
Telefax: +41 22 733 34 30
E-mail: central@isocs.iso.ch
Internet: www.iso.ch

EUROPEAN UNION

Comité Européen de Normalisation (CEN)
European Normalisation Committee
Address: Third countries Unit, Rue de Stassart 36, B-1050 Brussels, Belgium
Telephone: +32 2 550 08 11
Telefax: +32 2 550 08 19
E-mail: infodesk@cenclcbel.be
Internet: www.cennorm.be

Comité Européen de Normalisation de Electrotechnique (CENELEC)
Address: Third countries Unit, Rue de Stassart 36, B-1050 Brussels, Belgium
Telephone: +32 2 519 68 71
Telefax: +32 2 519 69 19
E-mail: cenelec@cenclcbel.be

SGS European Quality Certification Institute E.E.S.V.
Address: P.O. Box 200, 3200 AE Spijkenisse, The Netherlands
Telephone: +31 181-693750
Telefax: +31 181-693582
Email: sgs.ti.nl@sgsgroup.com
Internet: www.sgs.nl

FRANCE

Association Française de Normalisation (AFNOR)
Address: Tour Europe - Cedex 7, 92080 Paris la Défense, France
Telephone: +33 1 429 15 555
Telefax: +33 1 429 15 656

GERMANY

Deutsches Institut für Normung eV (DIN)
Address: Burggrafenstrasse 6-10, D-10787 Berlin, Germany
Telephone: +49 30 260 11
Telefax: +49 30 260 11 263
E-mail: briesenmeister@vertr.de
Internet: www.din.de

RAL, Deutsches Institut für Gütesicherung & Kennzeichnung
Address: Siegburger Strasse 39, D-53757 Sankt Augustin, Germany
Telephone: +49 2241 1605 23
Telefax: +49 2241 1605 11

ITALY

Ente Nazionale Italiano di Unificazione (UNI)
Address: Via Battinotti Stassi 11, 20100 Milano, Italy
Telephone: +39 02 700 24 1
Telefax: +39 02 701 06 106
E-mail: presidenzi@uni.unicei.it

THE NETHERLANDS

Stichting Aboma+Keboma
EC-Certification sound production motor compressors
Address: P. O. Box 141, 6710 BC Ede, The Netherlands
Telephone: +31 318 631481
Telefax: +31 318 632013
E-mail: info@aboma.nl

Nederlands Normalisatie Instituut (NNI)
Netherlands Standardisation Institute
Address: P. O.Box 5059, 2600 GB Delft, The Netherlands
Telephone: +31 15 269 0390
Telefax: +31 15 269 0190
Internet: www.nni.nl

SPAIN

Instituto Español Normalization y Certificacion (AENOR)
Address: Genova 6, 28004 Madrid, Spain
Telephone: +34 91 432 6000
Telefax: +34 91 310 4032
E-mail: informacion@aenor.es
Internet: www.aenor.es

UNITED KINGDOM

British Standards Institution (BSI)
Address: 389 Chiswick High Road, London W4 4IL, United Kingdom
Telephone: +44 171 6299000
Telefax: +44 171 9967400
Internet: www.bsi.org.uk

3.2 Price information

The following sites supply information about material and product price developments:
www.hasco.com
www.pneumaticsonline.com
www.steelworld.com
www.vdma.de

See also websites from product suppliers like Festo (www.festo.com) and tier1 suppliers like bosch (www.bosch.de) and focus on their products and catalogus.

See also the websites from statistical bodies like Eurostat (www.europa.eu.int/comm/eurostat) en CBS (www.cbs.nl).

3.3 Trade associations

EUROPE

CETOP
Comité Européen des Transmissions Oléohydrauliques et Pneumatiques European Fluid Power Committee
Address: Lyoner Straße 18, D-60528 Frankfurt am Main,Germany
Telephone: +49 69 66031319
Fax: +49 69 66031459
E-mail: info@cetop.org
Internet: www.cetop.org

Employers' Organisation of the Metal Trades in Europe (WEM)
Address: Diamant Building, Bd. A. Reyers 80, B-1030 Bruxelles BELGIUM
Telephone: +32 2 706 84 65
Fax: +32 2 706 84 69
E-mail: secretariat@wem.org
Internet: www.wem.org

European Automobile Manufacturers Association (ACEA)
Address: Rue du Noyer 211, B-1000 BRUSSELS
Telephone: +32 2 7325550
Fax: +32 2 7387310
Internet: www.acea.be

Comite de Liaison des Industries Europeennes de l'Estampage et de la Forge (Euroforge)
Address: Goldene Pforte 1, D-58093 Hagen, Germany
Telephone: +49 23 31 95 88 13
Fax: +49 23 31 5 10 46
E-mail: -
Internet: www.euroforge.org

Committee of Associations of European Foundries (CAEF)
Address: P.O. Box 101961, D-40010 Düsseldorf, Germany
Telephone: +49 (0)211 68 71 215
Fax: +49 (0)211 68 71 205
E-mail: info@caef-eurofoundry.org
Internet: www.caef-eurofoundry.org

European Committee for the Co-operation of the Machine Tool Industries (Cecimo)
Address: Avenue Louise 66, B-1050 Brussels, Belgium
Telephone: +32 2 502 70 90
Fax: +32 2 502 60 82
Email: info@cecimo.be
Website: www.cecimo.be

European Scientific Association for Material Forming (Esaform)
Address: Ecole des Mines de Paris/CEMEF, BP 207, F-06904 Sophia Antipolis Cedex, France
Telephone: +33 (0)4 93 95 75 75
Fax: +33 (0)4 92 38 97 52
E-mail: esaform@esaform.org
Internet: www.esaform.org

European Association of Machine Tool Merchants (EAMTM)
Address: Villalaan 83, B-1190 Brussels, Belgium
Telephone: +32 (0)2 5341515
Fax: +32 (0)2 5381214
E-mail: info@eamtm.org
Internet: www.eamtm.org

European Confederation of Iron and Steel Industry (EUROFER)
Address: Rue du Noyer 211, B-1000 Brussels, Belgium
Telephone: +32 (0)2 7387920
Fax: +32 (0)2 7363001
E-mail: -
Internet: www.eurofer.org

European Federation of Associations of Steel, Tube and Metal Merchants (EUROMETAL)
Address: Boulevard de la Woluwe 46 B7, B-1200 Brussels, Belgium
Telephone: +32 (0)2 7715340
Fax: +32 (0)2 7721977
E-mail: contact@eurometal.net
Internet: www.eurometal.net

Euro-Moulders, c/o FEDICHEM
Address: 49, Square Marie-Louise B-1000 BRUSSELS (Belgium)
Telephone: + 32 (0)2 238 97 42
Fax: + 32 (0)2 230 19 89
E-mail: tspeeleveld@fedichem.be
Internet: www.euro-moulders.org

EUROTRANS
Telephone: +49-69-6603-1526
Fax: +49-69-6603-1459
Address: Lyoner Strasse 18, D-60528 Frankfurt/Main, Germany
E-Mail: schaefer_ant@vdma.org

European Federation of Materials Handling Equipment Manufacturers (FEM)
General Secretariat c/o ORGALIME
Diamant Building
80 Boulevard A. Reyers
B - 1030 BrusselsPhone +32-2-706 82 35
Fax +32-2-706 82 50
Email: guy.vandoorslaer@orgalime.org
Internet: www.fem-eur.com

European Federation of Materials Handling Equipment Manufacturers (FEM)
Continuous Handling Equipment Division - Section II FEM c/o Syndicat SIMMA
Contact: Madame E. Codevelle
Address: 39-41 rue Louis Blanc Courbevoie, F-92038 Paris la Défense cedex, France
Telephone: +33 1 4717 6335
Fax: +33 1 4717 6230
Email: simma@wanadoo.fr
Internet: www.fem-eur.com

European Federation of Materials Handling Equipment Manufacturers (FEM)
Series Lifting Equipment c/o VDMA Fachverband Fördertechnik
Contact: Mr. K. Pokorny
Address: Lyoner Strasse 18, P.O.Box 710864, D-60528 Frankfurt Niederrad, Germany
Telephone: +49 69 6603 1500
Fax: +49 69 6603 1496
Email: klaus.pokorny@vdma.org
Web: www.vdma.org

International Cold Forging Group
ICFG Secretary's Office Erlangen
Contact: Alexander Putz
Address: Egerlandstr. 11, D-91058 Erlangen, Germany
Telephone: +49 (0)9131 85-27140
Fax: +49 (0)9131 930142
E-mail: icfg@lft.uni-erlangen.de
Internet: www.icfg.info

International Council of Sheet Metal Presswork Associations (ICOSPA)
Address: Goldene Pforte 1, D-58093 Hagen, Germany
Telephone: +49 2331 958819
Fax: +49 2331 51046
E-mail: klehmann@ibu.wsu.de
Internet: www.icospa.com

International Institution for Production Engineering Research
Address: 9, rue Mayran, 75009 Paris - France
Telephone: +33 1 45 26 21 80
Fax: +33 1 45 26 92 15
E-Mail: cirp@cirp.net
Website: www.cirp.net

European Power and Electronics and Drives Association (EPE)
c/o VUB-TW-ETEC
Contact: Brigitte Sneyers
Address: Pleinlaan 2, B-1050 Brussels, Belgium
Telephone: +32 2 629 28 19
Fax: +32 2 629 36 20
Email: secretariat@epe-association.org
Internet: www.epe-association.org

European Lift Association (ELA)
Address: Avenue Louis Gribaumont 1, Box 6, B-1150 Bruxelles, Belgium
Telephone: +32 2 779 50 82
Fax: +32 2 772 16 85
Contact: Mrs G. Janfils
Email: gjp@efla-aisbl.org
Internet: www.efla-aisbl.org

European Pump Manufacturers Association (Europump)
Address: Diamant Building, Boulevard A. Reyers 80, B-1030 Brussels, Belgium
Telephone: +32 2 706 82 30
Fax: +32 2 706 82 50
Email: secretariat@europump.org
Internet: www.europump.org

AUSTRIA

Fachverband der Maschinen- und Stahlbauindustrie Österreichs (FMS)
Address: Wiedner Hauptstrasse 63, A-1045 Wien, Austria
Telephone: +43 1 50105
Fax: +43 1 50510 20
Email: maschinen@fms.at
Website: www.fms.at

Fachverband der Metallwarenindustrie Österreichs (FMWI)
Address: Wiedner Hauptstrasse 63, P.O. Box 335, A-1045 Wien, Austria
Telephone: +43 1 50105
Fax: +43 1 50509 28
Email: fmwi@fmwi.at
Website: www.fmwi.at

FEEI - Fachverband der Elektro- und Elektronikindustrie
Address: Mariahilfer Straße 37-39, A-1060 Wien
Telephone: +43 (0)1/588 39-0
Fax: +43 (0)1/586 69 71
E-Mail: info@feei.at
Internet: www.feei.at

Fachverband der Fahrzeugindustrie Österreichs (FV)
Address: Wiedner Hauptstraße 63, 1045 Wien
Telephone: +43 (1) 501 05 4800
Fax: +43 (1) 501 05 289
E-mail: fahrzeuge@wko.at

BELGIUM

The Multisector Federation for the Technology Industry AGORIA
Address: Diamant Building, Boulevard Auguste Reyers 80, B-1030 Brussels, Belgium
Telephone: +32 (0)2 7067800
Fax: +32 (0)2 7067801
E-mail: info@agoria.be
Internet: www.agoria.be

DENMARK

Association of Danish Pump Manufacturers
c/o Iron Pump A/S
Address: Generatorvej 10, DK-2730 Herlev, Denmark
Telephone: +45 44 916 788
Fax: +45 44 911 644
Email: vl@ironpump.dk
Internet: -

Dansk Industri
Confederation of Danish Industries
Address: DK- 1787 Kobenhavn V
Telephone: +45 3377 3377
Fax: +45 3377 3320
Email: di@di.dk
Internet: www.di.dk

Dansk Industri - Danske Støberiers Brancheforening
Address: H. C. Andersens Boulevard 18, DK-1787 Kobenhavn V, Denmark
Telephone: +45 3377 3377
Fax: +45 3377 3300
E-mail: tr@di.dk
Internet: www.di.dk

FINLAND

Metalliteollisuuden Keskusliitto
Address: Eteläranta 10, FI-00130 Helsinki, Finland
Telephone: +358 91 923 1372
Fax: +358 96 24462
Email: riitta.strang@met.fi
Website: www.met.fi

FIMET c/o OTIS OY
Address: P.O.Box 473, FIN-33101 Tampere, Finland
Telephone: +358 204 868841
Fax: +358 204 868212
Contact: Mr. I. Mäntyvaara
Email: ilkka.mantyvaara@otis.com
Website: www.met.fi

Federation of Finnish Metal, Engineering and Electrotechnical Industries (MET)
Finnish Foundry Group
Address: P.O. Box 10, FIN-00131 Helsinki, Finland
Telephone: +358 (0)9 1923292
Fax: +358 (0)9 624462
E-mail: pentti.kangasmaa@met.fi
Internet: www.met.fi

Federation of Finnish Electrical and Electronics Industry (SET)
Address: P.O. Box 10, FIN-00131 Helsinki, Finland
Telephone: +358 9 19231
Fax: +358 9 6235 855
E-mail: @electroind.fi
Internet: www.electroind.fi

FRANCE

Federation Des Industries Electriques, Electroniques Et De Communication (FIEEC)
Address: 11-17, Rue Hamelin, F-75783 Paris Cedex 16, France
Telephone: +33 (0)1 45 05 70 70
Fax: +33 (0)1 45 53 03 93
Internet: www.fieec.fr

Association Française des Industries des Pompes et de la Robinetterie (AFPR)
Address: Maison de la Mécanique, 41 Rue Louis Blanc, F-92400 Courbevoie, France
Telephone: +33 1 47 17 62 98
Fax: +33 1 47 17 63 00
Email: gcardona@asso-afpr.org
Website: www.asso-afpr.org

Centre De Developpement Des Industries De Mise En Forme Des Materiaux (CTIF; centre for materials forming industries)
Address: 44 avenue de la Division Leclerc, 92318 SEVRES Cedex, France
Telephone: + 33 1 41 14 63 00
Fax: + 33 1 45 34 27 54
E-mail: contact@ctif.com
Internet: www.ctif.com

Centre technique des industries mécaniques
Address: 52, avenue Félix-Louat - BP 80067, 60304 Senlis Cedex
Telephone: +33 (0)3 44 67 30 00
Fax: + 33 (0)3 44 67 34 00
Internet: www.cetim.fr

Fédération des Ascenseurs
Address: Boulevard Malesherbes 48, F-75008 Paris, France
Telephone: +33 1 40080423
Fax: + 33 1 40080422
Contact: Mr. G. Chambard
Email: federation@ascenseurs.fr
Website: www.ascenseurs.fr

Association Technique de Fonderie
Address: 45 Rue Louis Blanc, F-92400 Courbevoie, France
Telephone: +33 (0)1 47 17 68 09
Fax: +33 (0)1 47 17 68 10
E-mail: hourlier@atf.asso.fr
Internet: www.atf.asso.fr

Fédération des Industries Mécaniques (FIM)
Address: 39-41 Rue Louis Blanc, F-92400 Courbevoie, France
Telephone: +33 1 47176000
Fax: -
E-mail: info@mail.fimeca.com
Internet: www.fim.net

Les Fondeurs de France
Address: 45 Rue Louis Blanc, F-92400 Courbevoie, France
Telephone: +33 (0)1 43 34 76 30
Fax: +33 (0)1 43 34 76 31
E-mail: contact@fondeursdefrance.org
Internet: www.fondeursdefrance.org

Groupement Français des Industries Transformatrices des Metaux en Feuilles Minces (GIMEF)
Address: 39/41, Rue Louis-Blanc, F-92400 Courbevoie, France
Telephone: +33 1 47176410
Fax: +33 1 47176360
E-mail: gimef@gimef-france.com
Internet: www.gimef-france.com

Mouvement des Entreprises de France (MEDEF)
Address: 31 av Pierre 1er de Serbie, F-75784 Paris Cédex 16, France
Telephone: +33 1 40694444
Fax: +33 1 47234732
E-mail: -
Internet: www.medef.fr

SNEF
Address: F-92038 Paris la Defense Cedex, France
Telephone: +33 1 47176417
Fax: +33 1 47176423
E-mail: forgesnef@wanadoo.fr
Internet: www.mecanet.net

Syndicat des industries de matériels de manutention
Address: 39-41, rue Louis Blanc, F-92038 Paris la Défense Cedex
Telephone: +33-1 4717 6327
Fax: +33-1 4717 6330
E-mail: simma@wanadoo.fr
Internet: www.simma.com

Union Nationale des Industries de Transmissions Mécaniques (UNITRAM; National association of mechanical transmissions industries)
Address: 39/41, rue Louis-Blanc, 92038 PARIS LA DEFENSE CEDEX
E-mail: unitram@iway.fr
Internet: www.unitram.org

GERMANY

Bundesverband Deutscher Stahlhandel (BDS)
Address: Max-Planck-Strasse 1, D-40237 Duesseldorf
Telephone: +49 211 86497 0
Facsimile: +49 211 86497 22
Email: Info-BDS@stahlhandel.com
Web: www.stahlhandel.com

Fachgemeinsamschaft Pumpen im VDMA
Address: Lyoner Strasse 18, Postfach 71 08 64, D-60528 Frankfurt A/M, Germany
Telephone: +49 69 66 030
Fax: +49 69 66 031690
Email: hueggelmeier.pu@vdma.org
Website: www.pu.vdma.org

Verband der Elektrotechnik, Elektronik und Informationstechnik (VDE)
Address: Stresemannallee 15, d-60596 Frankfurt am Main, Germany
Telephone: +47 69 6308 0
Fax: +47 69 6312 925
Email: service@vde.com
Internet: www.vde.de

VDMA
Address: Lyoner Strasse, 18, D-60528 Frankfurt A/ Main, Germany
Telephone: +49 69 66031661
Fax: +49 69 66031665
Contact: Mr. P. Günther-Ms. E. Gemici
Email: gemici_auf@vdma.org or guenther_auf@vdma.org

VFA-Interlift e.V.
Address: Hinschenfelder Stieg 17, D-22041 Hamburg, Germany
Telephone: +49 40 72730150
Fax: +49 40 72730160
Contact: Mr. Hütter-Ms. A. Stamm
E-Mail: info@vfa-interlift.de
Website: www.vfa-interlift.de

VMA
Address: Robert-Bosch Strasse 12, D-85701 Unterschleissheim, Germany
Telephone: +49 89 3104014
Fax: +49 89 3106084
Contact: Mr. S. Scheller
Email: info@vma.de
Website: www.vma.de

Deutscher Giessereiverband (DGV)
Address: P.O. Box 10 19 61, D-40010 Düsseldorf, Germany
Telephone: +49 (0)211 68 71 215
Fax: +49 (0)211 68 71 205
E-mail: info@dgv.de
Internet: www.dgv.de

Fachverband Dampfkessel-, Behälter- und Rohrleitungsbau e.V. (FDBR)
Address: P.O. Box 320420, D-40419 Düsseldorf, Germany
Telephone: +49 (0)211 498700
Fax: +49 (0)211 4987036
E-mail: info@fdbr.de
Internet: www.fdbr.de

Gesamtverband Deutscher Metallgiessereien (GDM)
Address: P.O. Box 10 54 63, D-40045 Düsseldorf, Germany
Telephone: +49 (0)211 47 96 152
Fax: +49 (0)211 47 96 409
E-mail: info@gdm-metallguss.de
Internet: www.gdm-metallguss.de

Industrieverband Blechumformung (IBU)
Address: P.O. Box 944, D-58093 Hagen, Germany
Telephone: +49-2331-958831
Fax: +49-2331-51046
E-mail: klehmann@ibu.wsu.de
Internet: www.ibu.wsm-net.de

Industrieverband Deutscher Schmieden e. V. (IDS)
Address: Goldene Pforte 1, D-58093 Hagen, Germany
Telephone: +49 (0)2331 9588-0
Fax: +49 (0)2331 51046
E-mail: ids@ids.wsm-net.de
Internet: www.ids-wsu.de

Verband Deutscher Machinen und Anlagenbau e.V. (VDMA)
German Engineering Assocation
Address: Lyoner Strasse 18, P.O. Box 710864, D-60498 Frankfurt am Main, Germany
Telephone: +49 (0)69 66031394
Fax: +49 (0)69 66031421
E-mail: vtma@vdma.org
Internet: www.vdma.org

Wirtschaftsverband Stahl- Und Metallverarbeitung E.V. (WSM)
Address: P.O. Box 4009, D-58040 Hagen, Germany
Telephone: +49 (0)2331 9588 0
Fax: +49 (0)2331 958717
E-mail: mschlieper@fpm.wsm-net.de
Internet: www.wsm-net.de

Wirtschafts Vereinigung Metalle (WVM)
Address: Haus der Metalle, Am Bonneshof 5, D-40474 Düsseldorf, Germany
Telephone: +49.(0)211.4796 0
Fax: +49.(0)211.4796 400
E-mail: info@wvmetalle.de
Internet: www.wvmetalle.de

Greece

Union of Greek Metal Industries
Address: Loudovikou Street 1, EVEP Building, GR-18531 Piraeus, Greece
Telephone: +30 141 78412
Fax: +30 141 73974

HUNGARY

ASSOCIATION OF HUNGARIAN FOUNDRIES
Address: H-1211 Budapest, Gyepsor u. 1., H-1751 Budapest, P.O.B. 200/19.
Telephone/fax: +36 1 420-4812
E-mail: foundry@matavnet.hu
Internet: www.foundry.matav.hu

ITALY

Federazione Nazionale Imprese Elettrotecniche ed Elettroniche (ANIE)
Address: Via Gattamelata, 34 - 20149 - Milano
Telephone: +39 02 3264.1
Fax: +39 02 3264.212
E-mail: info@anie.it
Internet: www.anie.it

Associazione Italiana Costruttori Organi di Trasmissione e Ingranaggi (ASSIOT)
Address: Viale Enrico Martini n. 9, I - 20139 MILANO
E-mail: assiot@assiot.it
Internet: www.assiot.it

Assofermet
Address: 20121 Milano - MI - Corso Venezia, 47-49
Telephone: +39 02 7600 8807 – 7600 8824
Fax: +39 02 7810 27
E-mail: assofermet@tin.it
Internet: www.assofermet.it

ASSOPOMPE c/o Fast
Address: Piazzale Morandi 2, I-20121 Milan, Italy
Telephone: +39 02 7601 5672
Fax: +39 02 78 2485
Email: assopompe@fast.mi.it
Website: www.fast.mi.it

ASSOASCENSORI
Address: Via Gattamelata, 34, I-20149 Milano
Telephone: +39 02 32641
Fax: +39 02 3264212
Contact: Mr. A. Poli
Email: alberto.poli@anie.it
Website: www.anie.it

Associazione Italiana Fornitori Macchine E Materiali Per Fonderi (AMAFOND)
Address: Milano Corso Venezia, 47/49/51
Telephone: +39-02-7750219
Fax: +39-02-7750470
E-mail: info@amafond.com
Internet: www.amafond.com

Associazione Italiana Sistemi di Sollevamento, Elevazione et Movimentazione
Address: Via L. Battistotti Sassi 11, I-20133 Milano
Telephone: +39-02-7397 356
Fax: +39-02-7397 7845
E-mail: broggi@anima-it.com
Internet: www.anima-it.com

ASSOFOND
Address: Via Copernico 54, I-20090 Trezzano s/N (MI), Italy
Telephone: +39 (0)2 48 40 09 67
Fax: +39 (0)2 48 40 12 82
E-mail: ponzini@assofond.it
Internet: www.assofond.it

Comitato Italiano Costruttori Forni Industriali (CICOF)
Address: Via Battistotti Sassi 11, I-20133 Milano, Italy
Telephone: +39 (0)2 7397 1
Fax: +39 (0)2 7397 316
E-mail: anima@anima-it.com
Internet: www.anima-it.com

Federazione delle Associazioni Nazionali della Industria Meccanica Varia ed Affine (ANIMA)
Address: Via Luisa Battistotti Sassi 11/b, I-20133 Milano, Italy
Telephone: +39 (0)2 73971
Fax: +39 (0)2 7397316
E-mail: anima@anima-it.com
Internet: www.anima-it.com

Unione Nazional e Italiana Stampatori Acciaio (UNISA)
Address: Via Le Sarca 336, I-20126 Milano, Italy
Telephone: +39-02 66114431
Fax: +39-02 66114431
E-mail: unisa@unisa.org
Internet: www.unisa.org

Latvia
Association of Mechanical Engineering and Metalworking Industries of Latvia
Address: Talivalza Str. 21, Riga, LV-1006 Latvia
Telephone: +371 755 4825
Fax: +371 755 4825
Email: masoc@apollo.lv

LUXEMBOURG

Fédération luxembourgeoise des Ascenseurs (ASBL) C/O OTIS Sarl
Address: 44, rue des Bruyères, BP 1056, L-1010 Luxembourg
Telephone: +352 4245111
Fax: +352 424525
Contact: Mr. N. Daubenfeld

Fédération des Industriels Luxembourgeois (FEDIL)
Address: P.O. Box 1304, L-1013 Luxembourg, Luxembourg
Telephone: +352 (0)43 53661
Fax: +352 (0)43 2328
E-mail: fedil@fedil.lu
Internet: www.fedil.lu

THE NETHERLANDS

Algemene Vereniging van Nederlandse Gieterijen (AVNEG)
Address: P.O. Box 190, NL-2700 AD Zoetermeer, The Netherlands
Telephone: +31 (0)79 353 12 52
Fax: +31 (0)79 353 13 65
E-mail: jke@fme.nl
Internet: www.fme.nl/frames/branches/avneg.html

Federatie Het Instrument (FHI) – Industriële Automatisering
Address: P.O. Box 2099, NL-3800 CB Amersfoort, The Netherlands
Telephone: +31 (0)33 4657507
Fax: +31 (0)33 4616638
E-mail: info@fhi.nl
Internet: www.fhi.nl

METAALUNIE/MGB
Address: P.O. Box 2600, NL-3430 GA Nieuwegein, The Netherlands
Telephone: +31 (0)30 605 33 44
Fax: +31 (0)30 605 32 08
E-mail: info@metaalunie.nl
Internet: www.mkbnet.nl/sector/industrie/metaalunie

NEVAT
Address: P.O. Box 190, NL - 2700 Zoetermeer, The Netherlands
Telephone: +31 (0)79 3531147
Fax: +31 (0)79 3531365
E-mail: info@nevat.nl
Internet: www.nevat.nl

Staalfederatie
Address: P.O. Box 30447, NL-2500 GK The Hague, The Netherlands
Telephone: +31 (0)70 3450200
Fax: +31 (0)70 3636681
E-mail: info@staalfederatie.nl
Internet: www.staalfederatie.nl

Vereniging FME-CWM
Address: P.O. Box 190, NL-2700 AD Zoetermeer, The Netherlands
Telephone: +31 (0)79 353 11 00
Fax: +31 (0)79 353 13 65
E-mail: alg@fme.nl
Internet: www.fme.nl

Holland Pomp Groep, Vereniging FME
Address: P.O. Box 190, NL-2700 AD Zoetermeer, The Netherlands
Telephone: +31 79 353 12 63
Fax: +31 79 353 13 65
Email: hsl@fme.nl / hpg@fme.nl
Website: www.fme.nl/frames/branches/hpg.html

VLR
Address: P.O. Box 190, NL-2700 AD Zoetermeer, The Netherlands
Telephone: +31 79 3531140
Fax: +31 79 3531365
Contact: Mr. C. Van Der Sluijs
Email: vlr@fme.nl

Vereniging van Staaltoeleveranciers in Nederland (VEST)
Address: P.O. Box 30447 , NL-2500 GK, The Hague
Telephone: + 31 70 3450200
Facsimile: + 31 70 3636681
Email: info@vest.nl
Web: www.vest.nl

NORWAY

HLF
Address: P.O.Box 7178 Majorstua, N-0307 Oslo, Norway
Telephone: +47 2308 7756
Fax: +47 2308 7757
Contact: Mrs. E. Lote
Email: emse.hlf@telfo.no
Poland

Polish Forging Association (ZKP)
Address: Al. Mickiewicza 30, PL-30-059 Kraków, Poland
Telephone: +48 12 6172908
Fax: +48 12 6338421
E-mail: zkp@zkp.pl
Internet: www.zkp.pl

PORTUGAL

AIECE
Address: Praça de Aguas Livres 8, P-1250 Lisboa, Portugal
Telephone: +351 21 3880310
Fax: +351 21 3886592

Associação dos Industriais Metalúrgicos Metalomecânicos e Afins de Portugal (AIMMAP)
Address: Rua dos Platanos, 197, P-4100-414 Porto, Portugal
E-mail: aimmap@aimmap.pt

Associação Nacional das Empresas Metalúrgicas e Metalomecânicas (ANEMM)
Address: Estrada do Paço do Lumiar, Pólo Tecnológico de Lisboa, Lote 13, PT-1600 Lisboa, Portugal
Telephone: +351 (0)21 7152172
Fax: +351 (0)21 7150403
E-mail: anemm@anemm.pt
Internet: www.anemm.pt

Associação Portuguesa de Fundição (APF)
Address: Rua do Campo Algre 672 - 2°Esq., P-4150 Porto, Portugal
Telephone: +351 (0)22 609 06 75
Fax: +351 (0)22 600 07 64
E-mail: apf@esoterica.pt
Internet: -
Russia

Russian Pump Manufacturers' Association-RPMA
Address: B Tatarskaya 13, CIS-113184, Moscow, Russia
Telephone: +70 95 951 8353
Fax: +70 95 951 8353
Email: rpmamail@mtu-net.ru

SPAIN

Associacion Espanola de Fabricantes de Bombas para Fluidos
Address: Principe de Vergera 74, ES-28006 Madrid, Spain
Telephone: +34 91 411 1881
Fax: +34 91 411 1881

FEEDA
Address: Dr. Fleming 55-6 Dcha, E-28036 MADRID, Spain
Telephone: +34 91 3452024
Fax: +34 91 3593392
Contact: Mr. J. Ladero
Email: feeda@inicia.es

Asociación Española de Exportadores de Fundición (Fundigex)
Address: Alameda Recalde, 50, E-48008 Bilboa, Spain
Telephone: +34 944706506
Fax: +34 944220061
E-mail: fundigex@camaranet.com
Internet: www.fundigex.es

Asociación Nacional de Fabricantes de Bienes de Equipo (SERCOBE)
Address: P.O. Box 1313, E-28001 Madrid, Spain
Telephone: +34 (0)91 4357240
Fax: +34 (0)91 5770910
E-mail: sercobe@sercobe.es
Internet: www.sercobe.es

Confederación Española de Organizaciones Empresariales del Metal (CONFEMETAL)
Address: Príncipe de Vergara 74, E-28006 Madrid, Spain
Telephone: +34 (0)91 5625590
Fax: +34 (0)91 5635758
E-mail: confemetal@confemetal.es
Internet: www.confemetal.es

Federción Española de Asociaciones de Fundidores (FEAF)
Address: Alda. Urquijo, 33-1°D, E-48008 Bilbao, Spain
Telephone: +34 94 470 07 07
Fax: +34 94 421 19 88
E-mail: feaf@feaf.es
Internet: www.feaf.es

SIFE
Address: General Concha, 22-2°, E-48010 Bilbao, Spain
Telephone: +34 94 4433450
Fax: +34 94 4433454
E-mail: sife@coiib.es
Internet: -

Asociacion Espanola de Manutencion
Address: Diagonal, 647, E-08028 Barcelona, Spain
Telephone: +34-93-401 60 60
Fax: +34-93-401 60 58
E-mail: fem-cne@jazzfree.com
Internet: www.fem-cne.com

SWEDEN

Swedish Pump Suppliers Association (SWEPUMP)
Address: P.O. Box 5510, SE-11 485 Stockholm, Sweden
Telephone: +46 8 782 08 00
Fax: +46 8 660 33 78
Email: swepump@vi.se
Website: www.vi.se

Svenska Gjuteriföreningen
Address: P.O. Box 2033, S-550 02 Jönköping, Sweden
Telephone: +46 36) 30 12 00
Fax: +46 36) 16 68 66
E-mail: info@gjuteriforeningen.se
Internet: www.gjuteriforeningen.se

Sveriges Verkstads Industrier (VI) - Smidesgruppen
Address: P.O. Box 5510, S-11485 Stockholm, Sweden
Telephone: +46 (0)8 7820800
Telefax: +46 (0)8 7820966
E-mail: per.westerhult@vi.se
Internet: www.vibab.se/smidesgruppen

Swedish Association of Suppliers of Mechanical Handling Equipment MHG
Address: Storgatan 5 , P.O. Box 5510, S-11485 Stockholm
Telephone: +46-8-782 08 00
Fax: +46-8-660 33 78
E-mail: kerstin.delgado@vi.se
Internet: www.vibab.se

SWITZERLAND

Verein Schweizerischer Maschinen-Industrieller (SWISSMEM)
Address: Kirchenweg 4, CH-8032 Zürich, Switzerland
Telephone: +41 1 384 41 11
Fax: +41 1 384 42 42
Email: info@swissmem.ch
Internet: www.swissmem.ch

Schweizer Maschinen-, Elektro- und Metall-Industrie (SWISSMEM)
Address: Kirchenweg 4, CH-8008 Zürich, Switzerland
Telephone: +41 (0)1 3844111
Fax: +41 (0)1 3844242
E-mail: info@swissmem.ch
Internet: www.swissmem.ch

VSA
Address: Rùsslimattstrasse, 37, Postfach 4926, CH-6002 Luzern, Switzerland
Telephone: +41 41 3608777
Fax: +41 41 3608788
E-mail: info@aufzuege.ch , info@ascenseurs.ch Info@ascensori.ch
Website: www.aufzuege.ch , www.ascenseurs.ch , www.ascensori.ch

Aluminium-Verband Schweiz
Address: Dufourstrasse 31, CH-8024 Zürich, Switzerland
Telephone: +41 (0)1 251 29 52
Fax: +41 (0)1 252 72 88
E-mail: info@alu.ch
Internet: www.alu.ch

Giesserei-Verband der Schweiz (GVS)
Address: P.O. Box 7190, CH-8023 Zürich, Switzerland
Telephone: +41 43 366 66 10
Fax: +41 43 366 66 01
E-mail: gvs@jgp.ch
Internet: www.jgp.ch/gvs/
Turkey

POMSAD
Address: Istanbul Karayolu 16, Km No 153 P.K. 3, TR-06790 Etimesgut, Ankara, Turkey
Telephone: +90 312 255 9651
Fax: +90 312 255 9650
E-mail: karaveli@aydiner.com.tr

UNITED KINGDOM

British Cold Forging Group (BCFG)
Address: School of Mechanical, Materials, Manufacturing Engineering and Management, University of Nottingham, University Park, Nottingham NG7 2RD, United Kingdom
Telephone: +44 (0)115 9514061
Fax: +44 (0)115 9514062
Email: peter.standring@nottingham.ac.uk
Internet: www.bcfg.co.uk

British Electrotechnical & Allied Manufacturers' Association (BEAMA)
Address: Westminster Tower, 3 Albert Embankment, London, SE1 7SL,
Telephone: +44 (0)20 7793 3000
Fax: +44 (0)20 7793 3003
Email: info@beama.org.uk
Internet: www.beama.org.uk

British Foundry Association (BFA)
Address: 6th Floor, McLaren Building, 35 Dale End, Birmingham B4 7LN, United Kingdom
Telephone: +44 (0)121 200 2100
Fax: +44 (0)121 200 1306
E-mail: admin@bfa.co.uk
Internet: www.bfa.co.uk

British Gear Association/ British Mechanical Power Transmission Association
Address: Suite 43, IMEX Business Park, Shobnall Road, Burton on Trent, DE14 2AU
Telephone: +44 (0) 1283 515521
Fax: +44 (0) 1283 515841
E-mail: admin@bga.org.uk
Internet: www.bga.org.uk

British Industrial Furnace Construction Association (BIFCA)
Address: The McLaren Build., 6th Floor, 35 Dale End, Birmingham B4 7LN, United Kingdom
Telephone: +44 (0)121 200-2100
Fax: +44 (0)121 200-1306
Email: enquiry@bifca.org.uk
Internet: www.bifca.org.uk

British Materials Handling Federation
Address: 6th Floor, The McLaren Building, 35 Dale End, Birmingham B4 7LN
Telephone: +44 (0) 121 200 2100
Fax: +44 (0) 121 200 1306
e-mail: enquiry@bmhf.org.uk dcorns@bmhf.org.uk
Website: www.bmhf.org.uk

British Pump Manufacturers' Association (BPMA)
Address: 6th Floor, The McLaren Building, 35 Dale End, Birmingham B4 7LN, United Kingdom
Telephone: +44 121 200 1299
Fax: +44 121 200 1306
Email: enquiry@bpma.org.uk
Website: www.bpma.org.uk

Cast Metals Federation
Address: National Metalforming Centre, 47 Birmingham Road, West Bromwich B70 6PY, United Kingdom
Telephone: +44 (0)121 601 6390
Fax: +44 (0)121 601 6391
E-mail: admin@cmfed.co.uk
Internet: www.castmetalsfederation.com

Confederation of British Metalworking
Address: The National Metalforming Centre, 47 Birmingham Road, West Bromwich B70 6PY, United Kingdom
Telephone: +44 (0)121 601 6350
Fax: +44 (0)121 601 6373
E-mail: info@britishmetalforming.com
Internet: www.britishmetalforming.com

Foundry Equipment & Supplies Association (FESA)
Address: Queensway House, 2 Queensway, Redhill, Surrey RH1 1QS, United Kingdom
Telephone: +44 (0)1737 855280
Fax: +44 (0)1737 855469
E-mail: marywhite@uk.dmgworldmedia.com
Internet: -

GTMA
Address: 3 Forge House, Summerleys Road, Princes Risborough, Bucks, HP27 9DT, UK
Telephone: +44 (0)1844 274222
Fax: +44 (0)1844 274227
E-mail: gtma@gtma.co.uk

Lift and Escalator Industry Association (LEIA)
Address: Devonshire Street, 33/34, W1G 6PY London, United Kingdom
Telephone: +44 207 9353013
Fax: +44 207 9353321
Contact: Mr. D. Fazakerley
Email: enquires@leia.co.uk
Website: www.leia.co.uk

Mechanical and Metal Trades Confederation (METCOM)
Address: Savoy Tower, 77 Renfrew Street, Glasgow G2 3BZ, United Kingdom
Telephone: +44 (0)141 332 0826
Fax: +44 (0)141 332 5788
E-mail: mikegregory@metcom.org.uk
Internet: www.metcom.org.uk

Metalforming Machinery Makers' Association
Address: 6th Floor, The McLaren Building, 35 Dale End, Birmingham B4 7LN, United Kingdom
Telephone: +44 (0)121 200 2100
Fax: +44 (0)121 200 1306
E-mail: dbrotherton@mmma.org.uk
Internet: www.mmma.org.uk

Manufacturing Technologies Association (MTA)
Address: 62 Bayswater Road, London, W2 3PS. Tel : +44 020 7298 6400
Fax: +44 020 7298 6430
E-Mail : Marketing@mta.org.uk
Internet: www.mta.org.uk

Rotating Electrical Machines Association (REMA)
Address: Westminster Tower, 3 Albert Embankment, SE1 7SL
Telephone: +44 (0)20 7793 3041
Fax: +44 (0)20 7582 8020
E-mail: rema@beama.org.uk
Internet: www.rema.uk.com

Engineering Industries Association
Address: Broadway House, Tothill Street, Westminster London UK SW1H 9NS
Telephone: +44 (0) 20 7222 2367
Fax: +44 (0) 20 7799 2206
E-mail: enquiries@eia.co.uk
Internet: www.eia.co.uk

3.4 Trade fairs organisers

AUSTRIA

Aquatherm
Topic: International trade fair for heating, sanitary, climate control and building services
Date: 27-30 January 2004
Location: Messezentrum Vienna
Frequency: Every 2 years
Organiser: Reed Messe Wien G.m.b.H.
Address: P. O. Box 277, A-1021 Vienna, Austria
Telephone: +43 (0)1 727 20-351
Fax: +43 (0)1 727 20-440
E-mail: aquatherm@messe.at
Internet: www.aquatherm.at

Viet
Topic: International electrical engineering, electronics, lighting, automation and drive engineering fair
Date: 30 September - 3 October 2003
Location: Messezentrum Vienna
Frequency: Every 2 years
Organiser: Reed Messe Wien G.m.b.H.
Address: P. O. Box 277, A-1021 Vienna, Austria
Telephone: +43 (0)1 727 20-278
Fax: +43 (0)1 727 20-279
E-mail: viet@messe.at
Internet: www.viet.at

Intertool

Topic:	International trade fair for finishing
Date:	12-15 May 2004
Location:	Messezentrum Vienna
Frequency:	Every 2 years
Organiser:	Reed Messe Wien G.m.b.H.
Address:	P. O. Box 277, A-1021 Vienna, Austria
Telephone:	+43 (0)1 727 20-351
Fax:	+43 (0)1 727 20-440
E-mail:	intertool@messe.at
Internet:	www.intertool.at

THE NETHERLANDS

Aandrijftechniek

Topic:	Trade fair for power transmission and industrial automation
Date:	2004
Location:	Utrecht
Frequency:	Every two years
Organiser:	Jaarbeurs Exhibitions & Media
Address:	P.O. Box 8800, NL-3503 RV Utrecht, the Netherlands
Telephone:	+31 (0)30 295 27 20
Fax:	+31 (0)30 295 28 04
E-mail:	info@aandrijftechniek-online.nl
Internet:	www.aandrijftechniek-online.nl

Machevo

Topic:	Process equipment, automation and engineering
Date:	2004
Location:	Utrecht
Frequency:	Every two yearss
Organiser:	Koninklijke Nederlandse Jaarbeurs
Address:	P. O. Box 8500, NL-3503 RM Utrecht, the Netherlands
Telephone:	+31 30 295 59 11
Fax:	+31 30 295 03 79
E-mail:	info@jaarbeursutrecht.nl
Internet:	www.machevo.nl

Electronics and automation

Topic:	Biannual trade fair for industrial electronics and industrial automation
Date:	26-28 March 2003
Location:	Jaarbeurs Utrecht
Frequency:	Every two years
Organiser:	FHI, Federatie van Technologiebranches
Address:	P.O. Box 2099, NL-3800 CB Amersfoort, the Netherlands
Telephone:	+31 (0)33 465 75 07
Fax:	+31 (0)33 461 66 38
E-mail:	eabeurs@fhi.nl
Internet:	www.eabeurs.nl

ESEF

Topic:	European subcontracting and engineering fair
Date:	16-19 March 2004
Location:	Jaarbeurs Utrecht
Frequency:	Every two years
Organiser:	Jaarbeurs Exhibitions & Media
Address:	P.O. Box 8500, NL-3503 RM Utrecht, the Netherlands
Telephone:	+31 (0)30 295 57 93
Fax:	+31 (0)30 295 58 68
E-mail:	esef@jaarbeursutrecht.nl
Internet:	www.esef.nl

Maintenance en Techniek

Topic:	Maintenance and technology trade fair
Date:	3-5 February 2004
Location:	Maastricht
Frequency:	Every two years
Organiser:	MECC Exhibitions
Address:	P.O. Box 1630, NL-6201 BP Maastricht, the Netherlands
Telephone:	+31 (0)43 3838383
Fax:	+31 (0)43 3838300
E-mail:	info@mecc.nl
Internet:	www.mecc.nl

BELGIUM

IFEST

Topic:	Trade fair for environment, energy and safety at work
Date:	19-22 October 2004
Location:	Flanders Expo Ghent
Frequency:	Every two years
Organiser:	Exhibition Centre Flanders Expo
Address:	Maaltekouter 1, B-9051 Gent, Belgium
Telephone:	+32 9 241 9211
Fax:	+32 9 241 9495
E-mail:	ifest@flandersexpo.be
Internet:	www.ifest.be

FRANCE

INDUSTRIE - MECANELEM-MECATRONIC

Topic:	8 Trade shows including international fair on components and drive systems
Date:	22-26 March 2004
Location:	Paris-Nord Villepinte Exhibition Centre
Address:	1 Rue du Parc, F-92593 Levallois Perret Cedex, France
Telephone:	-
Fax:	-
E-mail:	-
Internet:	www.industrie-expo.com

MIDEST

Topic:	International sub-contracting exhibition
Date:	18-21 November 2003
Location:	Paris
Frequency:	Every year
Organiser:	Reed Exhibitions France
Address:	70 Rue Rivay, F-92532 Levallois Perret Cedex, France
Telephone:	+33 (0)1 47562131
Fax:	+33 (0)1 47562140
E-mail:	info@midest.com
Internet:	www.midest.com

GERMANY

Euromold

Topic:	World fair for moldmaking and tooling, design and application development
Date:	3-6 December 2003
Location:	Exhibition Centre Frankfurt/Main
Frequency:	Every year
Organiser:	DEMAT GmbH
Address:	P.O. Box 11 06 11, D-60041 Frankfurt/Main, Germany
Telephone:	+49 (0)69 27 40 03-0
Fax:	+49 (0)69 27 40 03-40
E-mail:	info@demat.com
Internet:	www.demat.de

Fakuma

Topic:	International trade fair for plastics processing
Date:	14-18 October 2003
Location:	Messe Friedrichshafen
Organiser:	P.E. Schall GmbH
Address:	Gustav-Werner-Straße 6, D-72636 Frickenhausen-Linsenhofen, Germany
Telephone:	+49 (0)7025 9206-0
Fax:	+49 (0)7025 9206-620
E-mail:	-
Internet:	www.fakuma-messe.de

ALUMINIUM

Topic:	World fair for aluminium
Date:	22-24 September 2004
Location:	Messe Essen
Frequency:	Every two years
Organiser:	Reed Exhibitions Deutschland GmbH
Address:	Völklinger Straße 4, D-40219 Düsseldorf, Germany
Telephone:	+49 (0)211 90191-202
Fax:	+49 (0)211 90191-193
E-mail:	info@aluminium-messe.com
Internet:	www.aluminium-messe.com

AMB

Topic:	International exhibition for metalworking
Date:	14-18 September 2004
Location:	Messe Stuttgart
Frequency:	Every two years
Organiser:	Stuttgarter Messe- und Kongressgesellschaft mbH
Address:	Am Kochenhof 16, D-70192 Stuttgart, Germany
Telephone:	+49 (0)711 25890
Fax:	+49 (0)711 2589440
E-mail:	info@messe-stuttgart.de
Internet:	www.messe-stuttgart.de

EUROGUSS

Topic:	International trade fair for pressure die casting
Date:	2-4 March 2004
Location:	Nürnberg Messe
Frequency:	Every two years
Organiser:	NürnbergMesse GmbH
Address:	Messezentrum, D-90471 Nürnberg, Germany
Telephone:	+49 (0)911 86 06-4916
Fax:	+49 (0)911 86 06-4917
E-mail:	besucherinfo@nuernbergmesse.de
Internet:	www.euroguss.de

MatLog

Topic:	Trade fair for in-house material flow and logistics
Date:	21-24 October 2003
Location:	Messe Sinsheim
Organiser:	P.E. Schall GmbH
Address:	Gustav-Werner-Straße 6, D-72636 Frickenhausen-Linsenhofen, Germany
Telephone:	+49 (0)7025 9206-0
Fax:	+49 (0)7025 9206-620
E-mail:	-
Internet:	www.matlog-messe.de

GIFA / METEC / NEWCAST

Topic:	International castings and metallurgy trade fairs
Date:	16-21 June 2003
Location:	Düsseldorf
Frequency:	Every four years
Organiser:	Messe Düsseldorf GmbH
Address:	P.O. Box 101006, D-40001 Düsseldorf, Germany
Telephone:	+49 (0)211 45 60 01
Fax:	+49 (0)211 45 60 668
E-mail:	-
Internet:	www.gifa.de / www.metec.de / www.newcast-online.de

Powtech

Topic:	International trade fair for mechanical processing technologies and instrumentation
Date:	16-18 March 2004
Location:	Nürnberg
Frequency:	Every two years
Organiser:	Nürnberg Messe GmbH
Address:	Messezentrum, D-90471 Nürnberg, Germany
Telephone:	+49 (0) 9 11 86 06-0
Fax:	+49 (0) 9 11. 86 06-82 28
E-mail:	powtech@nuernbergmesse.de
Internet:	www.powtech.de

HANNOVER MESSE

- **World Fair Motion, Drive & Automation**
- **World Fair for Factory Equipment & Tools**

Topic:	Trade fair on mechanical engineering, electrical engineering, information technology
Date:	7-12 April 2003
Location:	Hannover
Frequency:	Every year
Organiser:	Deutsche Messe AG
Address:	Messegelände, D-30521 Hannover, Germany
Telephone:	+49 (0)511 890
Fax:	+49 (0)511 8932626
E-mail:	info@messe.de
Internet:	www.hannovermesse.de

Interlift

Topic:	International trade fair for elevator technology
Date:	14-17 October 2003
Location:	Augsburg
Frequency:	Every two years
Organiser:	AFAG Messen und Ausstellungen GmbH
Address:	Messezentrum, D-86159 Augsburg, Germany
Telephone:	+49 (0)1805 86 07 00 340
Fax:	+49 (0)1805 86 07 00 349
E-mail:	interlift@afag.de
Internet:	www.interlift.afag.de

METAV

Topic:	International fair for manufacturing technology and automation
Date:	15-19 June 2004
Location:	Düsseldorf
Frequency:	Every two years
Organiser:	Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)
Address:	Corneliusstrasse 4, D-60325 Frankfurt, Germany
Telephone:	+49 (0)69 756081 54
Fax:	+49 (0)69 7411574
E-mail:	j.roedelbronn@vdw.de
Internet:	www.messe-duesseldorf.de/metav/

ITALY

MOVINT

Topic:	Material handling and logistics
Date:	2004
Location:	Fierra Milano
Frequency:	Every two years
Organiser:	Promexpo srl
Address:	Via Caldera, 21/C, I-20153 Milan, Italy
Telephone:	+39 02 409 221
Fax:	+39 02 409 223 22
E-mail:	info@fieremostre.it
Internet:	www.fieremostri.it

Fluidtrans Compomac

Topic:	International exhibition of power and motion transmission, drive, control equipment and industrial design
Date:	18-21 February 2004
Location:	Milan
Frequency:	Every two years
Organiser:	Fiere & Mostre
Address:	Via Caldera, 21/C, I-20153 Milan, Italy
Telephone:	+39 02 409493 1
Fax:	+39 02 409493 350
E-mail:	info.ftc@fieremostre.it
Internet:	www.fieremostri.it

PORTUGAL

INTERMÁQUINA

Topic:	Trade fair for machinery for the stone, rock, marble, ceramics and glass industries
Date:	13-16 March 2003
Location:	Porto
Frequency:	-
Organiser:	EXPONORT - Feira Internacional do Porto
Address:	4450 Leca da Palmeira, Portugal
Telephone:	+351 (0)229 981400
Fax:	+351 (0)229 957499
E-mail:	info.uk@exponor.pt
Internet:	www.exponor.pt

SPAIN

BIEMH

Topic:	International machine tool exhibition
Date:	2004
Location:	Bilbao
Frequency:	Every two years
Organiser:	Feria Internacional de Bilbao
Address:	P. O. Box 468, ES-48080 Bilbao, Spain
Telephone:	+34 94 428 54 31
Fax:	+34 94 427 69 91
E-mail:	biemh@feriadebilbao.com
Internet:	www.feriaint-bilbao.es/biemh/

CUMBRE INDUSTRIAL Y TECNOLOGICA
International exhibition of manufacturing machinery and technology; 11 trade shows including:
- Subcontratación: Subcontracting and inter-company co-operation.
- Soldadura: International welding fair.
- Siderometalúrgica: International fair for the iron and steel metallurgy industry.
- Trasmet: International fair of equipment and supplies for the foundry, forging, rolling and surface treatment sectors.
- Mantenimiento: International maintenance fair.
- Automacion: International fair of components and systems for machinery.

Date: 24-27 September 2003
Location: Bilbao
Frequency: Every two years
Organiser: Feria de Bilbao
Address: Basterrechea, 2, ES-48013 Bilbao, Spain
Telephone: +34 (0)94 428 54 00
Fax: +34 (0)94 442 42 22
E-mail: visicumbre@feriadebilbao.com
Internet: www.feriadebilbao.com/cumbre

UNITED KINGDOM

TOTAL Processing and Packaging (including Eurochem and PPMA)
Topic: All aspects of processing, packaging and production
Date: 29 March – 1 April 2004
Location: NEC Birmingham
Frequency:
Organiser: Reed Exhibition Companies
Address: Oriel House, 26 The Quadrant, Richmond, Surrey TW9 1DL, United Kingdom
Telephone: +44 (0)20 8910 7910
Fax: +44 (0)20 8940 2171
E-mail: inquiry@reedexpo.co.uk
Internet: www.totalpp.co.uk

MACH, including:
- Welding & Metal Fabrication
- Automation & Robotics
- Engineering Lasers

Topic: International exhibition of machine tools, tooling and manufacturing technology
Date: 26-30 April 2004
Location: NEC Birmingham
Frequency: Every two years
Organiser: The Manufacturing Technologies Association
Address: 62 Bayswater Road, London W2 3PS, United Kingdom
Telephone: +44 (0)20 7298 6400
Fax: +44 (0)20 7298 6430
E-mail: mach@mta.org.uk
Internet: www.mach2004.com

Subcon
Topic: International exhibition on engineering subcontracting
Date: 2004
Location: NEC Birmingham
Frequency: Every two years
Organiser: Centaur Engineering Media Group
Address: St. Giles House, 50 Poland Street, London W1F 7AX, United Kingdom
Telephone: +44 (0)20 79704000
Fax: +44 (0)20 79704099
E-mail: -
Internet: www.subconshow.co.uk

3.5 Trade press

Aluminium International Today
Publisher: dmg world media (uk) ltd
Address: Queensway House, 2 Queensway, Redhill, Surrey, RH1 1QS United Kingdom
Telephone: +44 (0)1737 855524
Fax: +44 (0)1736 855474
E-mail: aluminium@uk.dmgworldmedia.com
Internet: www.aluminiumtoday.co.uk
Contents: aluminium production and processing industry
Language: English
Distribution: world-wide
Frequency: 8 times per annum

Antriebstechnik
Publisher: Vereinigte Fachverlage GmbH
Publisher: Vereinigte Fachverlage GmbH
Address: P. O. Box 4068, 55030 Mainz, Germany
Telephone: +49 (0)6131 992 0
Fax: +49 (0)6131 992 100
E-mail: info@vfmz.de
Internet: www.antriebstechnik.de
Contents: the construction, development and use of drives and controls
Language: German
Distribution: world-wide
Frequency: 12 times per annum

CIRP Journal of Manufacturing Systems
Publisher: WISU-Verlag Aachen & Faculty Press International
Address: P. O. Box 721, D-52066 Aachen, Germany
Telephone: +49 241 9571 457
Fax: +49 241 9571 464
E-mail: wisu.aachen@t-online.de
Internet: www.cirp.net
Contents: production engineering research
Language: English
Distribution: world-wide
Frequency: 6 times per annum

Equipos Productos Industriales

Publisher: Elsevier-Thomas Publication
Address: Rue des Palais 100, B-1030 Brussels, Belgium
Telephone: +32 2 240 26 11
Fax: +32 2 245 77 40
E-mail: ien@ebi.be
Internet: www.ien-online.com
Contents: new industrial products and equipment for the high-tech sector in Spain
Language: Spanish
Distribution: Spain
Frequency: 10 times per annum

The Fabricator / Practical Welding Today

Publisher: The Croydon Group Ltd.
Address: 833 Featherstone Road, Rockford, Illinois 61107, 6302 USA
Telephone: +1 (0)815 3998700
Fax: +1 (0)815 3997279
E-mail: info@thefabricator.com
Internet: www.thefabricator.com
Contents: hydroforming, bending, welding, cutting, sawing, coil and material handling, end forming and preparation, testing and quality control, and tooling
Language: English
Distribution: world-wide
Frequency: 12 / 6 times per annum

F+H (Fördern und Heben)

Publisher: Vereinigte Fachverlage GmbH
Address: P. O. Box 4068, 55030 Mainz, Germany
Telephone: +49 (0)6131 992 0
Fax: +49 (0)6131 992 100
E-mail: info@vfmz.de
Internet: http://195.145.129.179/vfmz_cms/industrie-service/fuh_content.nsf
Contents: conveying engineering, flow of material systems, camps and automation in production and in-plant transport as well as envelope systems and mobile crane
Language: German
Distribution: world-wide
Frequency: 12 times per annum

Forging Magazine

Publisher: Penton Media Europe
Address: Penton House, 288-290 Worton Road, Isleworth, Middlesex TW7 6EL England, United Kingdom
Telephone: +44 (0)11 44 208 232 1600
Fax: +44 (0)11 44 208 232 1650
E-mail: information@penton.com
Internet: www.forgingmagazine.com
Contents: forging equipment and supplies, new plants or additions, new process developments, case histories, and industry news
Language: English
Distribution: world-wide
Frequency: 6 times per annum

FOUNDRY Management & Technology Online

Publisher: Penton Media Europe
Address: Penton House, 288-290 Worton Road, Isleworth, Middlesex TW7 6EL England, United Kingdom
Telephone: +44 (0)11 44 208 232 1600
Fax: +44 (0)11 44 208 232 1650
E-mail: information@penton.com
Internet: www.foundrymag.com
Contents: technical developments, foundry management problems and operating practices in metal casting
Language: English
Distribution: world-wide
Frequency: 12 times per annum

Foundry Trade Journal

Diecasting World (bi-monthly supplement)
Publisher: dmg world media (uk) ltd
Address: Queensway House, 2 Queensway, Redhill, Surrey, RH1 1QS United Kingdom
Telephone: +44 (0)1737 855524
Fax: +44 (0)1736 855474
Email: annmontgomery@uk.dmgworldmedia.com
Internet: www.foundrytradejournal.com
Contents: technical features, company and regional profiles, news specials and previews of the industry's key exhibitions and conferences
Language: English
Distribution: world-wide
Frequency: 12 times per annum

The Foundry Yearbook and Castings Buyers'Directory

Publisher: dmg world media (uk) ltd
Address: Queensway House, 2 Queensway, Redhill, Surrey, RH1 1QS United Kingdom
Telephone: +44 (0)1737 855391
Fax: +44 (0)1736 855369
Email: cathyberghofer@uk.dmgworldmedia.com
Internet: www.dmgworldmedia.com
Contents: detailed information on UK foundries and their capabilities, plus a guide to international suppliers of foundry equipment, consumables and services to the foundry industry
Language: English
Distribution: world-wide
Frequency: annually

IEN (Industrial Engineering News)

Publisher: Elsevier-Thomas Publication
Address: Rue des Palais 100, B-1030 Brussels, Belgium
Telephone: +32 2 240 26 11
Fax: +32 2 245 77 40
E-mail: ien@ebi.be
Internet: www.ien-online.com
Contents: new industrial products and equipment for the high-tech sector in Europe
Language: English
Distribution: Europe
Frequency: 11 times per annum

IEN-Italia (Industrial Engineering News)

Publisher: Elsevier-Thomas Publication
Address: Rue des Palais 100, B-1030 Brussels, Belgium
Telephone: +32 2 240 26 11
Fax: +32 2 245 77 40
E-mail: ien@ebi.be
Internet: www.ien-online.com
Contents: product tabloid for industrial engineers serving OEM industries
Language: Italian
Distribution: Italy
Frequency: 9 times per annum

Industriepumpen + Kompressoren

Publisher: Vulkan-Verlag GmbH
Address: Hollestraße 1g, 45127 Essen, Germany
Telephone: +49 201 82002 0
Fax: +49 201 82002 40
Email: helga-pelzer@t-online.de
E-mail: -
Internet: http://www.oldenbourg.de/vulkan-verlag/rou-ipkc.htm
Contents: practice of the pumping and compressor technology
Language: German
Distribution: Germany
Frequency: 4 times per annum

International Journal of Forming Processes

Publisher: Esaform
Address: Ecole des Mines de Paris / CEMEF, BP 207, F-06904 Sophia Antipolis Cedex,France
Telephone: +33 (0)4 93 95 75 75
Fax: +33 (0)4 92 38 97 52
E-mail: esaform@esaform.org
Internet: www.esaform.org
Contents: computational and physical methods for forming processes and materials
Language: English
Distribution: world-wide
Frequency: 4 times per annum

Iron & Steel International Directory

Publisher: dmg world media (uk) ltd
Address: Queensway House, 2 Queensway, Redhill, Surrey, RH1 1QS United Kingdom
Telephone: +44 (0)1737 855524
Fax: +44 (0)1736 855474
Email: annmontgomery@uk.dmgworldmedia.com
Internet: www.dmgworldmedia.com
Contents: list of companies that supply goods and services to the metallurgical industry
Language: English
Distribution: world-wide
Frequency: 1 time per annum

Konstruktion + Engineering

Publisher: verlag moderne industrie AG & Co. KG
Address: Justus-von-Liebig-Straße 1, D-86899 Landsberg, Germany
Telephone: +49 (0)8191 1250
Fax: +49 (0)8191 125339
E-mail: ke@mi-verlag.de
Internet: www.k-e.de
Contents: trends and developments in products and processes, implementation of components and systems, as well as organisational aspects of design engineering management
Language: German
Frequency: 12 times per annum

Manutenzione (Maintenance)

Publisher: Elsevier Thomas Italia srl
Address: Centro Commerciale Milano San Felice, 20090 Segrate, MI, Italy
Telephone: +39 02 70 30 631
Fax: +39 02 70 30 6350
E-mail: manutenzione@elsevier-thomas.it
Contents: the maintenance and in the management of industrial systems
Language: Italian
Distribution: Italy
Frequency: 11 times per annum

METAL INDUSTRIES

Publisher: Metal Industries
Address: 81 rue de Fontenay, F-94300 Vincennes, France
Telephone: +33 (0)1 41 74 69 69
Fax: +33 (0)1 41 74 89 91
E-mail: info@metal-industries.com
Internet: www.metal-industries.com
Contents: sheet metal, wire, structural steel and tube work
Language: English and French
Distribution: world-wide
Frequency: 12 times per annum

MM-International

Publisher: Vogel-Verlag
Address: Max Planck Straße 7/9, 97082 Würzburg, Germany
Telephone: +49 931 418 0
Fax: +49 931 418 20 22
Email: infos@mm-europe.com
Internet: www.maschinenmarkt.de
Contents: technical and business magazine for Europe
Language: German and English
Distribution: Europe
Frequency: 6 times per annum

MPT Metallurgical Plant and Technology International

Publisher: Verlag Stahleisen GmbH
Address: P.O. Box 105164, D-40042 Düsseldorf, Germany
Telephone: +49 (0)211 67070
Fax: +49 (0)211 6707517
Language: Chinese, English and Russian
Contents: branch orientated international magazine for metallurgical processing
E-mail: mpt@stahleisen.de
Internet: www.stahleisen.de
Distribution: world-wide
Frequency: 6 times per annum

Oil, Gas & Petrochem Equipment

Publisher: PennWell Publishing Company
Address: P.O. Box 1260, Tulsa OK 74101-1260, United States
Telephone: +1 (0)918 9329351
Fax: +1 (0)918 9329201
E-mail: jba@penwell.com
Internet: www.ogpe.com
Contents: oil industry equipment, products, systems, and services
Language: English
Distribution: world-wide
Frequency: 12 times per annum

O+P (Ölhydraulik and Pneumatik)

Publisher: Vereinigte Fachverlage GmbH
Address: P. O. Box 100465, 55135 Mainz, Germany
Telephone: +49 (0)6131 992 0
Fax: +49 (0)6131 992 100
E-mail: info@vfmz.de
Internet: 195.145.129.179/vfmz_cms/industrie-service/oup_content.nsf
Contents: oil-hydraulic and pneumatic power transmission, control and regulation
Language: English
Distribution: world-wide
Frequency: 11 times per annum

PEI (Produits Equipements Industriels)

Publisher: Editions Elsevier-Thomas
Address: 2 Rue Maurice Hartmann, F-92133 Issy-les-Moulineaux Cedex, France
Telephone: +33 (0)1 46 29 46 29
Fax: +33 (0)1 46 29 23 23
E-mail: info@pei-france.com
Internet: www.pei-france.com
Contents: product tabloid for industrial engineers
Language: French
Distribution: France
Frequency: 10 times per annum

PT Industrie

Publisher: Ten Hagen & Stam uitgevers
Address: P.O. Box 34, NL-2501 AG Den Haag, The Netherlands
Telephone: +31 (0)70 3045700
Fax: +31 (0)70 3045797
E-mail: info@ptindustrie.nl
Internet: www.ptindustrie.nl
Contents: technical and industrial management
Language: Dutch
Distribution: the Netherlands
Frequency: 12 times per annum

Stainless Steel World

Publisher: KCI Publishing B.V.
Address: P.O. Box 396, NL-7200 AJ Zutphen, The Netherlands
Telephone: +31 (0)575 585270
Fax: +31 (0)575 511099
E-mail: vw@kci-world.com
Internet: www.stainless-steel-world.net
Contents: stainless steel and corrosion resistant alloys
Language: English
Distribution: world-wide
Frequency: 10 times per annum

Steel Times International
Publisher: dmg world media
Address: Equitable House, Lyon Road, Harrow HA1 2EW, United Kingdom
Telephone: +44 (0)20 8515 2000
Fax: +44 (0)20 8515 2169
E-mail: timsmith@uk.dmgworldmedia.com
Internet: www.steeltimesint.com
Contents: developments in the industry from raw materials to semi-finished product
Language: Chinese, English, Russian, Spanish
Distribution: world-wide
Frequency: 10 times per annum

Steel Week
Publisher: Cru International
Address: 31 Mount Pleasant, LONDON WC1X 0AD, United Kingdom
Telephone: +44 (0)20 7903 2150
Fax: +44 (0)20 7903 2172
E-mail: info@steelweek.com
Internet: www.steelweek.co.uk / www.cru.co.uk
Contents: production and trade information in the European market
Language: English
Distribution: world-wide
Frequency: 50 times per annum

Subcon
Publisher: Centaur Engineering Media Group
Address: St. Giles House, 50 Poland Street, London W1F 7AX, United Kingdom
Telephone: +44 (0)20 79704000
Fax: +44 (0)20 79704099
E-mail: -
Internet: www.centaur.co.uk
Contents: subcontracting in the manufacturing industry
Language: English
Distribution: world-wide
Frequency: 6 times per annum

World Pumps
Publisher: Elsevier Advanced Technology
Address: P. O. Box 150, Kidlington, Oxford OX5 1AS, United Kingdom
Telephone: +44 1865 84 32 84
Fax: +44 1865 84 39 73
Internet: www.worldpumps.com
Contents: selection, application, installation and maintenance of pumps and pumping machinery, components and ancillary equipment.
Language: English
Distribution: world-wide
Frequency: 12 times per annum

Appendix 3.6 Other useful adresses

Enviro Tech Pumpsystems BV
Manufacturer centrifugal, piston and diaphragm pumps
Address: P. O. Box 249, 5900 AE Venlo, The Netherlands
Telephone: +31 77 389 52 00
Telefax: +31 77 382 48 44
E-mail: envirotech@envirotech.nl
Internet: http://www.envirotech.nl

IHC Holland NV
Manufacturer centrifugal pumps for dredgers
Address: P. O. Box 50, 2960 AA Kinderdijk, The Netherlands
Telephone: +31 78 691 09 11
Telefax: +31 78 691 04 39
E-mail: sales@partservices.ihcholland.com
Internet: http://www.ihc.com

Beta BV Alfa Laval Flow
Distributor dosage, peristaltic and diaphragm pumps
Address: P. O. Box 1227, 2280 CE Rijswijk, The Netherlands
Telephone: +31 70 3199 700
Telefax: +31 30 3199 790

Eekels/Samson BV
Distributor diaphragm pumps
Address: P. O. Box 210, 3750 GE Bunschoten, The Netherlands
Telephone: +31 33 299 19 50
Telefax: +31 33 298 42 02

KSB
Manufacturer + distibutor chemical, sewage, centrifugal and self-priming pumps
Address: P. O. Box 211, 1160 AE Zwanenburg, The Netherlands
Telephone: +31 20 407 98 00
Telefax: +31 20 407 98 02
E-mail: ksb@wxs.nl
Internet: http://www.ksbgroup.com

Reko Industrial Equipment BV
Distributor centrifugal, sewage, magnet coupled pumps
Address: P. O. Box 41, 3250 AA Stellendam, The Netherlands
Telephone: +31 187 49 29 88
Telefax: +31 187 49 27 81
E-mail: info@reko.nl
Internet: http://www.reko.com

Landre en Merrem NV
Distributor pumps
Address: P. O. Box 63, 4130 EB Vianen, The Netherlands
Telephone: +31 347 32 93 29
Telefax: +31 347 32 92 20

Transmark Nederland BV
Distributor all kinds of pumps
Address: P. O. Box 1100, 1300 BC Almere, The Netherlands
Telephone: +31 36 538 73 87
Telefax: +31 36 538 73 00
E-mail: info.tin@transmark.nl

Van den Borne
Manufacturer high pressure cleaners, distributor all kinds of pumps
Address: P. O. Box 200, 5550 AE Valkenswaard, The Netherlands
Telephone: +31 40 201 68 66
Telefax: +31 40 201 79 27

Watson-Marlow BV
Distributor high flow peristaltic pumps
Address: P. O. Box 11138, 3004 EC Rotterdam, The Netherlands
Telephone: +31 10 462 16 88
Telefax: +31 10 462 34 86
E-mail: wmbv@worldonline.nl
Internet: http://www.watson.marlow.com

Creemers Compressors
Manufacturer and distributor of screw and piston compressors
Address: P. O. Box 7054, 5605 JB Eindhoven, The Netherlands
Telephone: +31 40 251 65 21
Telefax: +31 40 252 88 28
E-mail: info@creemers.nl
Internet: http://www.creemers.nl

GrassAir Compressoren BV
Manufacturer screw and piston compressors
Address: P. O. Box 316, 5340 AH Oss, The Netherlands
Telephone: +31 412 63 29 56
Telefax: +31 412 63 97 65

Mechatechniek
Distributor compressors and water pumps
Address: P. O. Box 497, 2800 AL Gouda, The Netherlands
Telephone: +31 182 53 88 77
Telefax: +31 182 57 10 11
E-mail: email@mechatechniek.nl
Internet: http://www.mechatechniek.nl

Airtec
Distributor compressors
Address: P. O. Box 234, 8160 AE Epe, The Netherlands
Telephone: +31 578 62 78 66
Telefax: +31 578 62 78 39

Atlas Copco Compressors Benelux
Distributor screw and piston compressors
Address: P. O. Box 200, 3330 AE Zwijndrecht, The Netheralnds
Telephone: +31 78 623 02 30
Telefax: +31 78 610 06 70
E-mail: toolsaisnl@atlascopco.com
Internet: http://www.atlascopco.com/tools

Contimeta BV
Distributor stationary and portable compressors
Address: P. O. Box 40200, 3504 AA Utrecht, The Netherlands
Telephone: +31 30 248 48 48
Telefax: +31 30 241 06 33
E-mail: info@contimeta.nl

Econosto Nederland BV
Distributor measuring equipment
Address: P. O. Box 8988, 3009 TJ Rotterdam, The Netherlands
Telephone: +31 10 284 11 00
Telefax: +31 10 284 13 11

Geveke Werktuigbouw BV
Distributor screw, piston, turbo and vane compressors
Address: P. O. Box 820, 1000 AV Amsterdam, The Netherlands
Telephone: +31 20 582 91 11
Telefax: +31 20 686 16 04
E-mail: info@wtb.geveke.nl

Itho BV
Distributor hydraulic components and cooling compressors
Address: P. O. Box 21, 3100 AA Schiedam, The Netherlands
Telephone: +31 10 427 85 40
Telefax: +31 10 427 88 88
E-mail: info@itho.nl
Internet: http://www.itho.nl

Ravebo BV
Distributor compressed air products
Address: P. O. Box 280, 3230 AG Brielle, The Netherlands
Telephone: +31 181 419 419
Telefax: +31 181 412 757
E-mail: emenro@wxs.nl

Rietschle BV
Distributor low pressure compressors
Address: P. O. Box 391, 1380 AJ Weesp, The Netherlands
Telephone: +31 294 41 86 86
Telefax: +31 294 41 17 06
E-mail: info@rietschle.nl
Internet: http://www.rietschle.nl

Watts Ocean
Distributor vacuum pumps
Address: P. O. Box 98, 6960 AB Eerbeek, The Netherlands
Telephone: +31 313 65 90 28
Telefax: +31 313 65 20 73
E-mail: 113322,1667@compuserve.com
Internet: http://www.watsregulator.com

APPENDIX 4 LIST OF DEVELOPING COUNTRIES

Afghanistan
Albania
Algeria
Angola
Anguilla
Antigua and Barbuda
Argentina
Armenia
Aruba
Azerbaijan
Bahrain
Bangladesh
Barbados
Belize
Benin
Bhutan
Bolivia
Bosnia & Herzegovina
Botswana
Brazil
Burkina Faso
Burundi
Cambodia
Cameroon
Cape Verde
Central African Rep
Chad
Chile
China
Colombia
Comoros
Congo
Cook Islands
Costa Rica
Côte d'Ivoire
Croatia
Cuba
Djibouti
Dominica
Dominican Republic
East Timor
Ecuador
Egypt
El Salvador
Equatorial Guinea
Eritrea
Ethiopia
Fiji
French Polynesia
Gabon
Gambia
Georgia
Ghana
Gibraltar
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Honduras
India
Indonesia
Iran
Iraq
Jamaica
Jordan
Kazakstan
Kenya
Kiribati
Korea, Republic of
Kyrghyz Rep.
Laos
Lebanon
Lesotho
Liberia
Libya
Macao
Macedonia
Madagascar
Malawi
Malaysia
Maldives
Mali
Malta
Marshall Islands
Mauritania
Mauritius
Mayotte
Mexico
Micronesia, Federal States of
Moldova
Mongolia
Montserrat
Morocco
Mozambique
Myanmar
Namibia
Nauru
Nepal
Netherlands Antilles
New Caledonia
Nicaragua
Niger
Nigeria
Niue
Northern Marianas
Oman
Pakistan
Palau Islands
Palestinian Admin. Areas
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Rwanda
Saint Helena
Saint Kitts-Nevis
Saint Lucia
Saint Vincent and Grenadines
Samoa
Sao Tome and Principe
Saudi Arabia
Senegal
Seychelles
Sierra Leone
Slovenia
Solomon Islands
Somalia
South Africa
Sri Lanka
Sudan
Suriname
Swaziland
Syria
Tajikistan
Tanzania
Thailand
Togo
Tokelau
Tonga
Trinidad & Tobago
Tunisia
Turkey
Turkmenistan
Turks & Caicos Islands
Tuvalu
Uganda
Uruguay
Uzbekistan
Vanuatu
Venezuela
Viet Nam
Virgin Islands (UK)
Wallis & Futuna
Yemen
Yugoslavia, Federal Republic of
Zaire
Zambia
Zimbabwe

APPENDIX 5 USEFUL INTERNET SITES

http://www.eevl.ac.uk/engineering/index.htm
EEVL is the Internet Guide to Engineering, Mathematics and Computing. EEVL's mission is to provide access to quality networked engineering, mathematics and computing resources, and be the national focal point for online access to information in these subjects. It is an award-winning free service, created and run by a team of information specialists from a number of universities and institutions in the UK. EEVL's target audience is students, staff and researchers in higher and further education, as well as anyone else working, studying or looking for information in Engineering, Mathematics and Computing.

www.cecimo.be
Cecimo is the European Committee for the Co-operation of the Machine Tool Industries, representing the common interests of the European machine tool industry, particularly in relation to authorities and other associations. The website contains information about Machine Tool Statistics and studies, technical information and standards, links and press releases.

www.europa.eu.int/comm/trade/
Website of the European commission with information of sectoral issues (statistics, tariffs and non-tariff barriers, technical barriers to trade), market access database (statistics, studies, barriers and formalities) and information per sector (/goods/index_en.htm: general and economic information for a number of sectors).

www.europa.eu.int/comm/enterprise/newapproach/legislation/nb/listnotifiedbodies
Website of the European commission with a list and information of independent certification bodies which are amongst other aspects, officially authorised to test and certify EU requirements

www.ien-online.com
Website of the International Engineering News magazine, offering information of new engineering products on the European market.

www.pneumaticsonline.com
International site with actual technical and company information around pneumatics. Articles,distributors and manufacturers presents themselves, giving you information of the state of the art in products and companies. Also latest news, trade shows and links are available.

www.vdma.de
The VDMA is the German Engineering Federation. All kind of information about trends in industrial demand, consumption data and forecasts, technical developments for several sectors within mechanical engineering can be found here. Also per sector specific technical (innovations and rules) and economic information and information about companies and trade fairs can be found (e.g. sector power transmission engineering or pumps or fluid power).

www.bpma.org.uk
The British Pump Manufacturers' Association (BPMA) is a trade association representing the interests of UK suppliers of liquid pumps and pumping equipment. The site contains information about economic development and statistics, technical developments and useful links.

www.bfma.co.uk
BFPA is formed in 1986 (formerly AHEM 1959-1986) to promote the technical, trade and commercial interests of British manufacturers and suppliers of hydraulic and pneumatic equipment. The Association is a member of CETOP - the European Oil-Hydraulic and Pneumatic Committee.
BFPA website offers a wide range of services: Technical Standards & Guidelines, Marketing & Statistical Data

www.zvei.org
The "Zentralverband der Elektrotechnik und Elektronikindustrie (ZVEI) e.V.", the German electrical and electronic manufacturers' association, promotes the common economic, technological and environmental policy interests of the German electrical and electronics industry.
On the internet pages you will find the principal data and facts concerning the electrical and electronic engineering sector, its products, services, markets, political framework conditions as well as the objectives and activities of the association.