

Exporting gears and gearing systems to Europe

Since Europe is home to a large machinery production base, it offers interesting opportunities for exporters from developing countries of gears and gearing systems. Germany and Italy are interesting focus countries, with strong potential for developing countries. Potential buyers in Europe are industrial gearbox manufacturers, distributors or importers, and Original Equipment Manufacturers (OEMs).

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1. Product description

The transmission of motion is one of the central themes in mechanical engineering. There are several transmission techniques available, among which are also gears and gearing systems. Other transmission techniques include chain and sprocket systems, and belt and pulley systems.

Gears are mechanical components within machines and mechanical assemblies, which transmit power and motion through successive engagement of their peripheral teeth. Gears perform certain key functions with machines and assemblies, including reversing rotational direction, altering angular orientation of rotary motion, converting rotary to linear motion and vice versa, and altering speed and power transmission ratios.

Gear design is based upon an involute curve form, which imparts a rolling rather than sliding action between engaging teeth. This rolling action provides a uniform rotary action that lowers both friction and wear of the gear teeth.

Materials used to produce gears may include various types of steel, which is the most common material, and various non-ferrous materials including plastics and composites. Manufacturing methods include machining, forging, casting, stamping, powder metallurgy techniques and plastic injection moulding. Of these, machining is the most common manufacturing method used.

When gears or gears and gearing systems are referred to in this survey, it involves the selection of the product codes in the [Harmonised System](#), Chapter 8483, paragraph 40, unless stated otherwise.

Gear types

Gears may have internal or external teeth and are available in forms that typically relate to axis positions. Parallel axes pertain to two or more tangent pitch shafts using either spur gears – the most common type of gear – or helical gears. Intersection axes use straight bevel gears or spiral bevel gears. Non-intersecting, non-parallel axes refer to worms and worm gears, crossed helical gears and hypoid gears. Racks and pinions, used to convert rotary motion to linear motion, are other familiar gear types.

Note that the gear-like device that is used to drive a roller chain is called ‘sprocket’ and is covered in our study of [Sprockets in Europe](#).

Product specifications

The specifications of gears and gearing systems as generally required by European buyers are described below. These involve requirements related to the material used, dimensions and finishing of the gears, and packaging.

Material and design

In almost all cases of subcontracting and manufacturing under license, the buyer will specify the grade of material for the gears, housing and probably the gearbox internals. The buyer will also require conformance certification. In other cases, particularly for commercial-grade open gears, there may be no specification.

Quality

The quality requirements for gears on the European market vary and are application dependent. Very high-precision gearing systems are normally produced “in-house”, whereas more commercial-grade gears are often sourced from lower-cost countries. Examples of very high-precision gearing system applications include aerospace and defence.

European producers will require very high standards of gears should they outsource. (Dimension) tolerances will be tight and the aesthetics will be important. For gearboxes, attention will focus not only on the quality of the internal gears but also on the quality of the bearings and seals. The quality of the casting will also be scrutinised.

Tips:

Whatever the type of buyer, you must identify the requirements and tailor your product offer accordingly.

Make a detailed offer that pays attention to all specifications of the buyer. In most cases, the buyer will provide a document with very detailed specifications: quality, materials, deviations, quantity, delivery date, and more. It is strongly advisable to compose your offer according to these requirements.

You may well be asked to provide first article inspection reports with the sample.

Labelling and packaging

Usually, gears and gearing systems are coated with a rust preventative (the shelf life must be at least two years) before being packaged and shipped. Packaging consists of an inner package and an outer package. The inner package is an oil paper or a plastic envelope, to avoid dispersion of the protective oil, or sometimes hermetically vacuum-sealed synthetic pouches. The outer package is usually a carton lined with plastic sheeting. The outer package should contain the brand name and type number.

The package for ocean transport is a wooden, steel or plastic pallet, wrapped in plastic sheeting and packaged with metal strips. The sizes of the boxes depend on the weight per box and handling possibilities. Moreover, the customer may well have his own additional packaging requirements and preferences. Gears can of course be very small or very large. Especially the packaging for large gears should be agreed with your customer.

Tip:

With regard to packaging, the requirements are often provided by the customer. If this is not the case, ask what they would prefer. You have to be careful to provide the right amount of packaging, not too little but also not too much, since it is expensive to dispose of packaging in Europe.

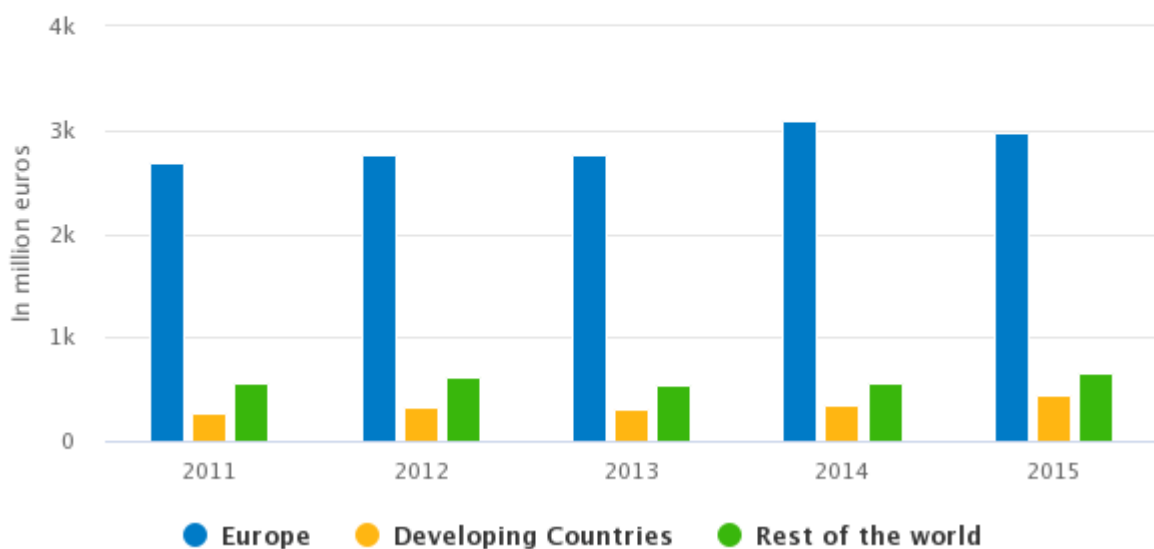
2. What makes Europe an interesting market for gears and gearing systems?

Imports

European import of gears and gearing systems increased by 3.8% per year between 2011-2015 to almost €4.1 billion. European gears and gearing systems are mostly imported from within Europe. Particularly the import from developing countries showed higher growth. With an annual growth of 13% between 2011-2015 (mainly thanks to China), developing countries reached a share of 11% in the total European imports in 2015. For the coming years, the share of developing countries is forecast to grow to 12-13%.

Figure 1: European import of gears and gearing systems by main origin

2011-2015



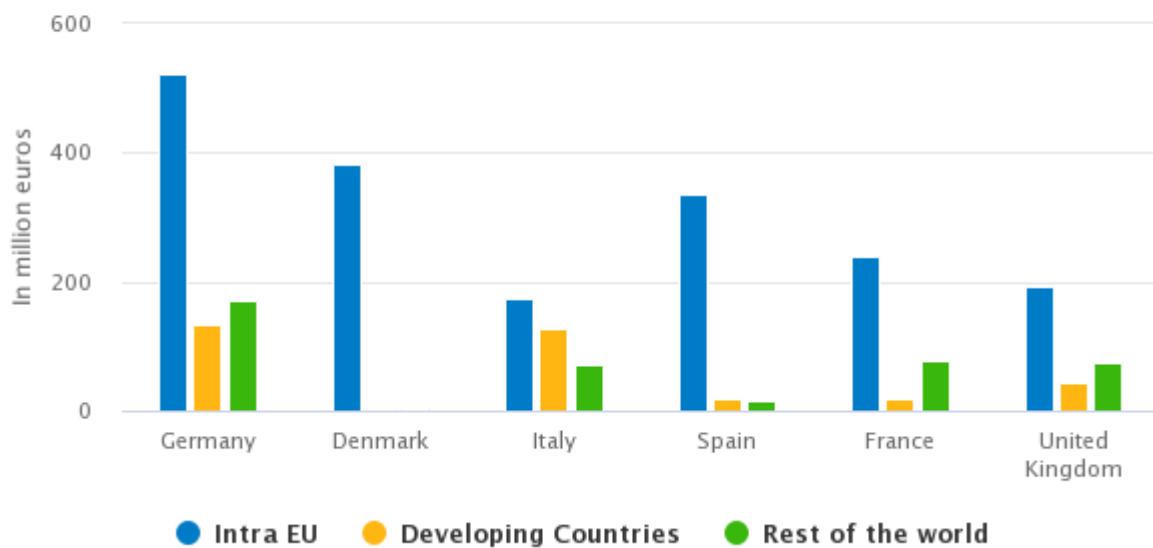
Source: Trademap

Germany is the largest importer of gears and gearing systems, followed by Denmark and Italy. In 2015, 16% (or €134 million) of the total import of gears and gearing systems in Germany was coming from developing countries. However, Italy's share of imports from developing countries was even higher (€129 million, or 34% of the total Italian imports). The import of gears and gearing systems is expected to show a small growth in the next few years, in the range of 0-2%.

Germany showed the largest absolute growth (€97 million over four years' time) in imports from developing countries. Other countries with a high absolute growth are Hungary (€14 million), France and the United Kingdom (both €10 million).

Figure 2: Leading European importing countries of gears and gearing systems

2015



Source: Trademap

Leading suppliers

Germany and Italy are the main European suppliers, followed by the United States from the category of the “Rest of the World”. Together, these suppliers represented 64% of the total European import of gears and gearing systems in 2015. Other leading suppliers are Belgium (5% share), Spain (4%) and China (4%). China’s exports of gears and gearing systems to Europe grew relatively rapidly by 22% per year. India also exports gears to Europe though in much smaller volumes than China.

Tips:

Benchmark your company against your peers from China and other developing countries, as well as those from European countries. Several factors can be taken into account, such as market segments served, perceived price and quality level, raw material supply and countries served, and so on.

You can use [Eurostat](#) and [ITC International Trade Statistics](#) to obtain detailed trade statistics about the industry.

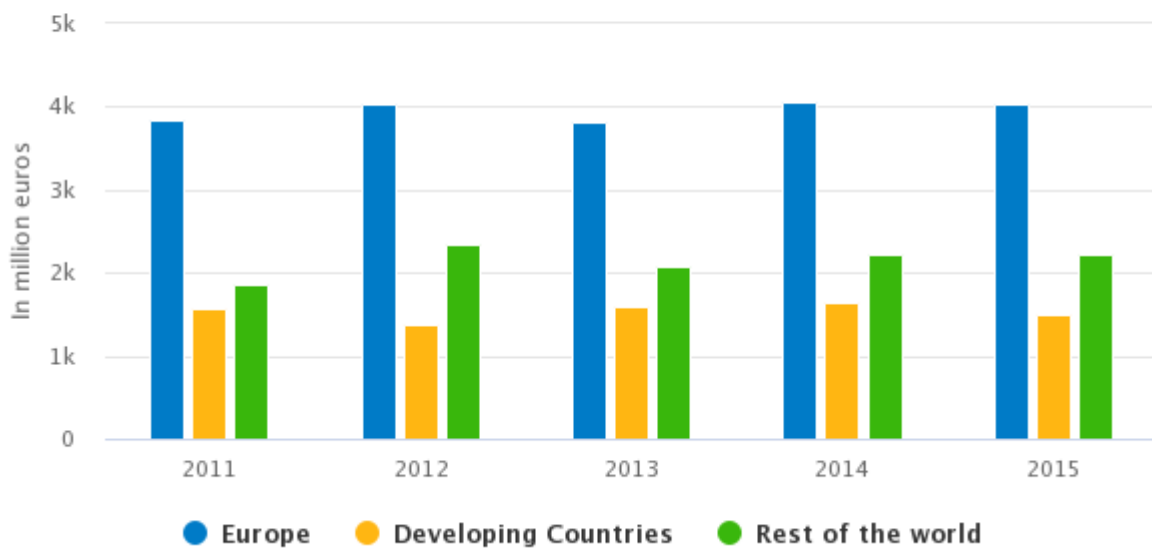
You can find relevant trade fairs on trade fair databases such as [AUMA](#) and [Eventseye](#). Relevant trade fairs for gears and gearing systems suppliers are [Hannover Messe](#), [Agritechnica](#), [Bauma](#) and [EMO](#) (Germany); [Industrie Paris](#), [Midest](#), [SIMA](#) and [Expobois](#) (France); [MECSPE](#), [Sub-fornitura](#), [SPS IPC Drives Italia](#) and [EIMA](#) (Italy); [ESEF](#) and [MOCON](#) (the Netherlands); and [Drives and Controls](#) and [Subcon](#) (the United Kingdom).

Exports

The total European export of gears and gearing systems increased by 1.7% per year between 2011-2015 to €7.8 billion. European exports peaked in 2014 at €7.9 billion and declined slightly in 2015. The share of developing countries in exports is forecast to comprise around 20% in the coming years.

Figure 3: European export of gears and gearing systems to main destinations

2011-2015



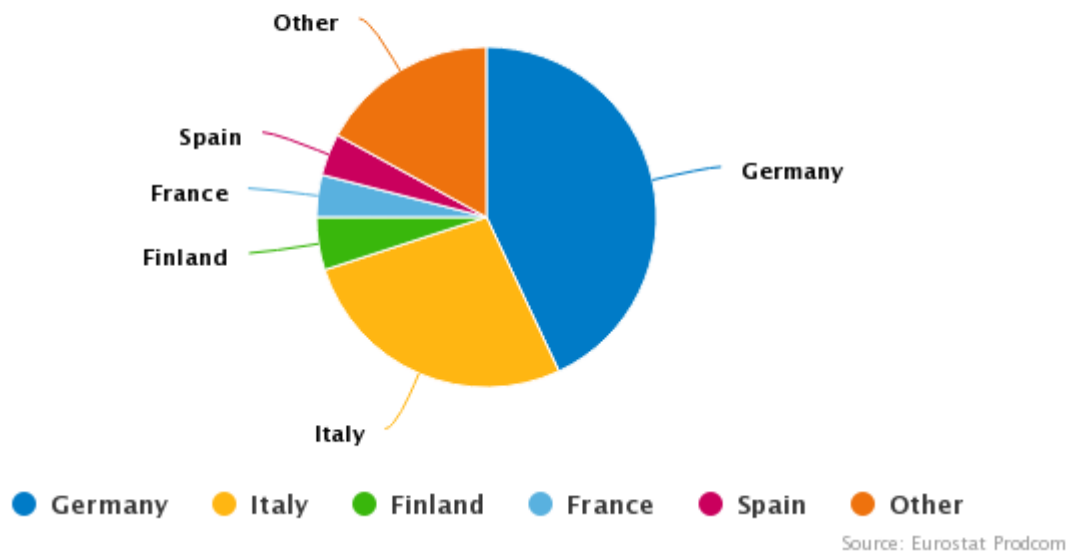
Source: Trademap

Germany is the largest European exporter of gears and gearing systems (€2.7 billion in 2015), followed by Italy (€1.4 billion). Together, they represented 53% of European exports. Other important exporters are Belgium (7% share), France (7%), Finland (6%) and Denmark (5%). German exports to developing countries are substantial, taking up almost 39% of the total European exports to developing countries. The European export of gears and gearing systems is expected to show a small growth of 0-2% in the next few years.

Production

The European production decreased slightly in 2013 to €13.3 billion, after a peak of €13.5 billion in 2012. In 2014, the production recovered slightly, reaching €13.4 billion. Germany is the largest European producer of gears and gearing systems (43% share of European production), followed by Italy (27%) and Finland (5%).

Figure 4: Main European producers of gears and gearing systems
2014



Tips:

As shown in figure 4 above, there is considerable production output in Germany, Italy, Finland, and France. The presence of producers in these countries offers subcontracting opportunities to exporters from developing countries.

[Commisceo Global](#) offers a lot of information about differences in business cultures and etiquette. You should pay some attention to this aspect before you start exporting to Europe.

3. Apparent demand

European apparent demand increased between 2010-2012 but dropped in 2013 to €9.3 billion. In 2014, the demand started to increase again, reaching a peak of €9.4 billion. Germany (39% share of the European market) and Italy (27%) are the largest European markets for gears and gearing systems. Medium-sized markets are Denmark (5% share), Spain (5%), France (4%) and the United Kingdom (4%).

Each European country has its own specific market profile. The main markets in Europe can be described as follows.

Germany

Germany is the number one producer in virtually every industry in Europe. It is well-known for its output of machinery (all segments), cars and electronics. Examples of large market segments within the German machinery and equipment industry include food processing and packaging machinery, construction equipment and building machinery, agricultural machinery and material-handling technology.

Italy

Italy is the second-largest machinery producer in Europe, producing virtually all categories of machinery. The

main industries in Italy are iron and steel, machinery, chemicals, textiles, food processing, motor vehicles, footwear, clothing and ceramics. The most important market segments are machinery for agriculture, textiles, the food industry, packaging, plastics and woodworking.

France

France's leading industries are machinery, chemicals, automobiles, metals, aircraft, electronic equipment, textiles and food. Most machinery production is focused on agricultural machinery, as France is the second-largest European producer in this segment. Other important segments for France are textile, apparel and leather, plastic and food.

The United Kingdom

Key manufacturing sectors in the United Kingdom include aerospace, automotive, chemicals, oil, defence equipment, electronics, food and beverages. The United Kingdom has a long tradition of producing machinery and equipment. Important market segments include agricultural machinery and construction, quarrying and mining machinery.

Tips:

Concentrate on market segments that are strongly represented in the focus countries. Specialisation in any of those segments may give you a competitive advantage, as there is an increasing demand for customised solutions. European importers therefore prefer specialised suppliers that are able to offer customer support and joint engineering in specific market segments.

You can find more information about the gears and gearing systems sector and the companies in different countries by visiting the websites of sector associations such as [CETIM](#) and [FIM](#) (France) or [Manufacturing technologies association \(MTA\)](#), [Engineering industries association](#), [Processing & Packaging Machinery Association \(PPMA\)](#) and [British textile machinery association \(BTMA\)](#) (the United Kingdom).

4. What trends offer opportunities on the European market for gears and gearing systems?

It is very important to turn the blanks prior to machining the gear teeth. This is because it will not be possible to produce a high standard of gearing without the correct tolerances being achieved.

Over the past decade, the gears and gearing systems industry has mainly been driven by the growing demand for “more power”, longer durability and higher reliability. In addition, gearboxes also need to be smaller and have higher tooth and bearing loadings than before. These market requirements, which originated from the automotive industry, have highlighted the following trends.

Green is dominating

Energy-saving concepts have continued to gain in importance, mostly driven by developments in the automotive industry. It has led to the development of highly efficient drives and transmissions, and thus also gears and gearing systems. It has led to smaller gearboxes, lighter materials, higher loads and speeds, higher operating temperatures and higher power density.

Focus on production cost reduction

There is a clear trend toward lowering manufacturing costs among gearbox producers. One important improvement in production efficiency is the use of five-axis machines, mill-turn machines and other

multifunctional machining centres to produce gears. As a rule of thumb, modern machines, tools and processes increase productivity by a factor of two to four, compared to machines that are 10 to 20 years old.

For European producers, more automation is not without risk. While a machine without automation does not offer consistency in terms of product quality and machining time, a completely automated gear-machining tool misses the flexibility to deal with increasingly smaller batch sizes.

Tips:

The trend of more automation in gear production provides opportunities for you, if you are able to offer flexibility and deal with small batch sizes.

In Europe, labour is expensive and therefore new equipment investments involve highly flexible systems, enabling a quick change from one part to another without tools within five to ten minutes. Because labour costs in developing countries are much lower, such systems are not necessary. Instead, you should invest in a cheaper, hybrid (semi-automatic) solution.

Benchmark your products against your industry peers on cost-effectiveness and improve if necessary.

Lightweight gears

An important ongoing product trend in Europe is the demand for lighter gears and gearing systems. It has led to a growing adoption of lightweight materials for gearboxes. Another way to realise a lighter weight in gearboxes is to shift to other processes for the components; for example, forging. In addition, alternative designs such as the use of hollow shafts instead of solid shafts can also offer weight reduction.

Asymmetrical gears

Recent years have seen a development in the direction of a greater contact length on the flanks of the gear tooth. In practice, this has led to more asymmetrical gears. European companies that invested in new equipment benefit from this trend. As such, gears are easier to produce with state-of-the-art equipment and tools than with conventional hobbing machines and HSS tools.

Durability and reliability during operation

The quality of gears continues to be a key product requirement for European machinery producers. The producers continue to see technological advancement in their applied technologies as a unique selling point of their products. Durability, reliability and low operation costs of the gears and gearing system during operation in the machinery are therefore of critical importance.

The most commonly applied method to give gears longer life is to apply surface-hardened material in the production of gears. To reduce the risk of macro pitting, which is the main failure mechanism of hardened materials, the gears also get a hardening treatment (carburising, sometimes nitriding).

Low operation costs in this case especially mean longer service or relubrication intervals. In that respect, the durability and reliability of the gears play an important role, while the type of gear oil can also make a difference.

Tips:

There are opportunities for you if you are able to supply such precision gears and gearing systems.

Make sure that you can live up to the quality level that European buyers expect.

Trend toward smaller batch sizes

Gear producers have been forced in recent years to become more flexible in their processes. As products and applied technologies change more rapidly, batches have become smaller and more varied in terms of gear profile specifications. This has forced producers to look at other gear cutting methods, such as indexable tooling. Such indexable tooling does not require new equipment, as it can be also achieved with traditional hobbing machines.

Although the older machines can be limited in spindle speed and table feed, indexable tooling can offer productivity gains of 50-300% in practice. This is because the modular/flexible tool technology offers shorter tool set-up time and a higher-quality gear wheel.

Tip:

Although labour costs are relatively low in developing countries, it can be interesting for you to look at new production technologies that offer higher quality and improve productivity, such as indexable tooling systems.

Cleaner production

The trends of sustainability and Corporate Social Responsibility (CSR) have a direct influence on gear production. The growing requirements for cleaner engines have led to gears with a higher power density. To realise this, producers have applied new gear steels, which are cleaner than the steel used before.

The production process has changed as well, enabled by the new technology of indexable tooling. With indexable tooling, dry machining of gear profiles is relatively easy, which also keeps cooling lubricant and oil out of the metal chips. This not only saves the environment and improves the health of the workshop staff, but it also saves time and money.

You should be prepared, as within five to seven years CSR can be expected to be a fundamental issue in the selection criteria for new suppliers to Europe, especially among larger companies in the western and northern parts of Europe.

Tips:

Develop and implement a CSR policy and provide evidence to back it up. Interesting sources may include [OECD Guidelines](#) and [ISO 26000](#), which is the ISO standard for CSR.

Exporters from developing countries that have implemented a solid CSR policy can use this as a Unique Selling Point.

Publicise your compliance to CSR in your marketing material (website and literature) to differentiate yourself.

You can get information about the latest trends and developments in the gears and gearing systems industry from sources such as [Orgalime](#) and [Power in Motion](#).

Also use country-specific sources such as [ME](#), [Industrie](#), [Scope](#) and [Maschinen Markt](#) (Germany); [Axes Industries](#) and [Usine Nouvelle](#) (France); [Organi Di Trasmissione](#) (Italy); [Mechatronica & Machinebouw](#) and [AB](#) (the Netherlands); and [Drives & Controls](#), [The Engineer](#), [Control Engineering](#) and [Industrial Technology](#) from the United Kingdom. You can use online translation services such as Google Translate to convert the texts to English or your own language.

5. What requirements should gears and gearing systems comply with to be allowed on the European market?

See our study of Buyer requirements for motion control for a general overview of requirements. Below are the requirements that apply specifically to gears and gearing systems.

Legal requirements

For gears and gearing systems, no specific legal requirements apply. As soon as the gear or gearing system is part of a finished product, the exporter has the evident obligation to export a safe product to Europe.

Packaging and liability

There is also non-product-specific legislation on packaging (Directive 94/62/EC) and liability (Directive 2004/35/EC) that applies to all goods marketed in the European Union.

The European Union has also restricted the use of certain chemicals in the Registration, Evaluation and Authorisation of Chemicals (REACH) Regulation. In the case of gears, REACH is relevant for the protective and anti-corrosion oils used in the packaging. In practice, this means that you as an exporter from outside the European Union have to provide information on the chemicals/oils used in the product.

Import duties

For gears and gearing systems, a 3.7% duty is levied on European imports from third countries. Several countries benefit from a preferential 0% tariff as a result of the Generalised System of Preferences; for example; Indonesia, Pakistan, Vietnam, the Philippines, Bosnia and Egypt. The TARIC database shows more details for the codes of Chapter 8483, paragraph 4. Note that it is only possible to claim a preferential tariff treatment with a Certificate of Origin.

Tips:

The importance of customer satisfaction should not be underestimated. Of course, customers consider a good quality of the products important, but they also attach great value to compliance with delivery times and delivery volumes.

In terms of packaging legislation, meeting the wood packaging material (WPM) requirement can be challenging. Make sure that your WPM qualifies for the European market. If you are unsure, ask your WPM supplier for clarification. Your WPM supplier should take any further action required in order to comply with the Directive. If the supplier is unable to do so, you may be able to switch to another supplier.

Exporters from a country with a preferential 0% tariff have a small competitive advantage over competitors from countries without such a preferential tariff.

Additional requirements

European buyers have requirements for every gear type including spur, helical, bevel, hypoid, crown, worm, epicyclic, rack and pinion.

The requirements for “open gears” or unassembled gears are different from the requirements for gearboxes. Unlike other areas of power transmission, open gears tend not to have any elements of brand attraction. They are specified, applied and sold entirely according to their individual aspects of quality, grade, module and tolerance.

However, as an industrial gearbox manufacturer, you must provide branded systems. You may consider exporting your own brand, subcontracting and additionally manufacturing under license.

Buyer requirements

The customer’s main requirements will be related to the gear itself, including elements such as design and load capacity. Customers will often refer to ISO standards, of which there are many for gears. There is in fact a range of standards for each type of gear, including topics such as calculation of load capacity, inspection methods and design.

When quoting for gears or gearboxes with reference to a drawing, you may be required to sign a Non-Disclosure Agreement (NDA) with the buyer. This confirms that you will not disclose details of the drawings, as they are confidential to the client. Failure to comply with the NDA could well lead to legal proceedings being taken against your company. Following the quotation, in almost all cases you will be invited to provide a sample prior to any order being granted.

In fact, showing compliance with relevant quality standards is key in the sample phase. If the customer accepts the samples and all other conditions have been agreed upon, the contract can be signed. After this, the main challenge for you is to deliver the products according to the agreed specifications, delivery times and volumes.

Tips:

See our [10 tips for doing business with European buyers of motion, drives, control and automation](#) and our [10 tips for finding buyers in the motion control sector](#) for more information on which topics are decisive for European buyers when searching for (new) suppliers.

You can find more information about public standards at the [International Organization for Standardization](#) and the [British Standards](#) Institution.

You can use the [EU Export Helpdesk](#), the [ITC Market Access Map](#) and the [ITC Standards Map](#) for more information on gaining access to the European market.

6. Through what channels can you get gears and gearing systems on the European market?

Both distributors/importers and producers of gears and gearing systems are important trade channels for exporters of gears and gearing systems from developing countries. The best way for you to approach prospects is to exhibit at leading trade fairs in Europe; in particular, MDA at the Hannover Messe (held in Germany every odd year) or Motek (held annually in Germany).

Europe hosts several interesting potential buyers. Since each company is unique in terms of its own customers, market segments and products, the profile of the potential partner is very important. You are likely, however, to find a match. Figure 5 below reveals that potential buyers may be equipment manufacturers, distributors/importers and small to medium-sized producers of industrial gearboxes. Note that the thickness of the arrows emphasises the importance of the different trade channels for you.

Figure 5: Trade structure for gears and gearing systems in Europe

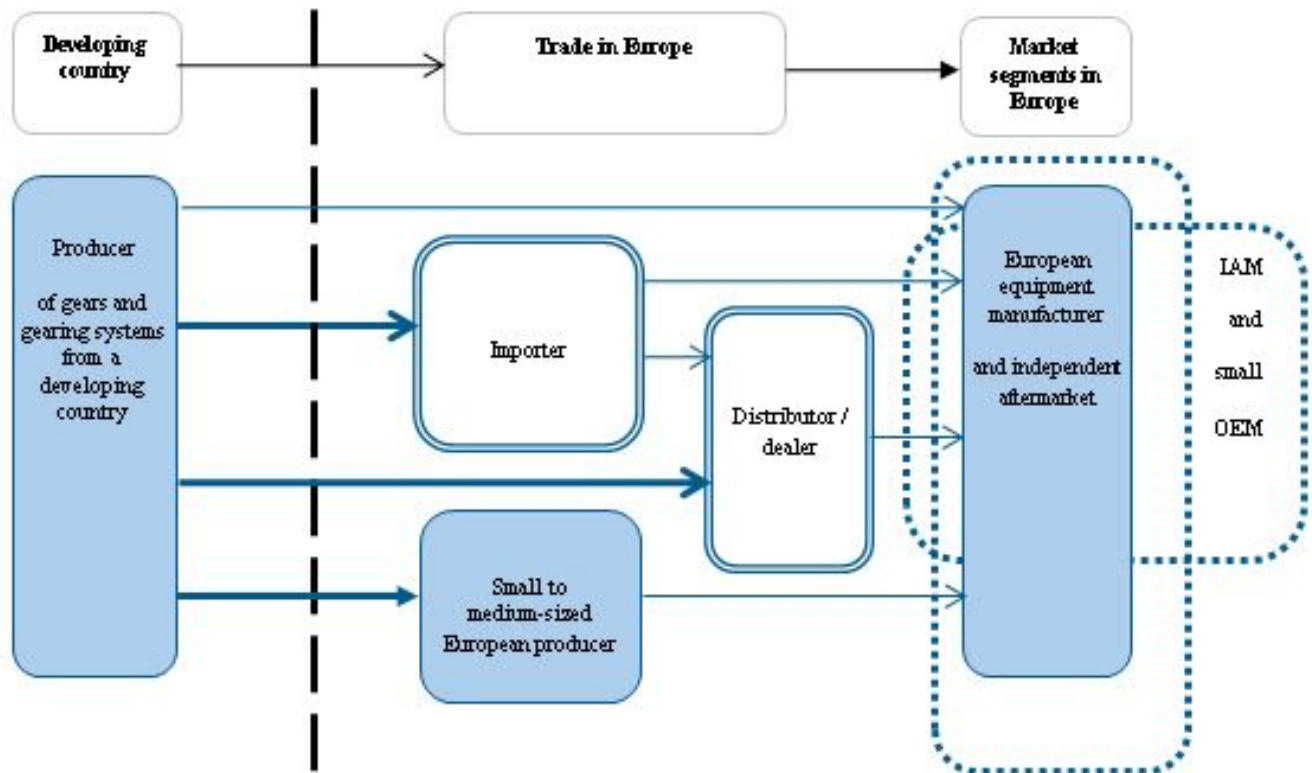


Figure 5 also reveals that a distinction can be made between two market segments: the Original Equipment Manufacturers/Suppliers (OEM/OES) and the Independent Aftermarket (IAM). You will find opportunities in each of the market segments. The potential buyers' main reason for buying from you will be the opportunity to buy and sell more competitive products.

In contrast to open gears, which tend not to have any elements of brand attraction, gearboxes are only sold under a brand name. You can choose from several options: exporting your own brand, subcontracting for European manufacturers and manufacturing under license.

Tip:

For more information on finding buyers, refer to [Finding Buyers in the Motion Control Industry](#). Another must-read is [Doing Business in the Motion Control Industry](#).

Interesting players

Europe, and Germany in particular, is home to two of the three largest gear and gearbox producers in the world: ZF and Volkswagen. Both are notable as providers to the automotive market. In addition, there are a number of other companies operating in the production of gears and gearing systems.

Examples include CMD, Nozag, Sadev and Segor in France; SEW-Eurodrive, Lenze, ZF, Siemens (Flender), Eisele Getriebe and Nord in Germany; Bonfiglioli, Brevini, Ghirri, Rossi, Hydro-Mec, Poggi, Sati, SITI and STM in Italy; B&H Gears, D.G. Steel, Renold, Muffett Gears and Radicon in the United Kingdom; and Bierens, Hankamp Gears and Sanders in the Netherlands.

Importers/Distributors

Most European importers are specialised in power transmission components, such as Graffeuille in France; DB Componenti Industriali, Sati, Chiaravalli, BEA Ingranaggi and DC Trasmissioni in Italy; and Medway, HPC and Challenge Power Transmissions in the United Kingdom.

A few importers are distributors offering a wide range of industrial products, such as Eriks and Brammer. Both companies are globally operating distributors of industrial products. They are among the market leaders in distribution in several European countries and offer a wide range of motion control products.


Other generalists include companies such as AFC and Hayley Group in the United Kingdom; Mädler in Germany; FIAP and Fortek Automazioni in Italy; and Biesheuvel Groep in the Netherlands.


Tip:


Find prospects in Europe via [Artema](#) in France; [Association of gears and transmission elements producers](#) and their company directory in Italy; [Sachon](#) and [Wer liefert was?](#) in Germany; [British Gear Manufacturers Association](#), [Applegate Directory](#) and [Hotfrog](#) in the United Kingdom; and [ABC Business Directories](#) in France, the Netherlands and Belgium.

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