

Exporting fuses to Europe

In the past, Europe has been a net exporter of fuses. This is still the case, but the share of imports has increased in recent years. This development opens up opportunities for manufacturers from developing countries to supply fuses to the European market. Not only high-end products are in demand; so are products of average quality, as long as they comply with widely recognised quality and environmental standards.

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1. Product Description

An electronic fuse is a low-resistance resistor that provides protection in the event of a load overcurrent. It interrupts an excessive current between the power supply and the power-consuming unit, so that damage of the power-consuming unit or its environment by overheating or fire is prevented. A metal wire melts in the event of an overcurrent, thereby causing an interruption in the circuit. Short circuits, device failure or overloading are the primary causes of load overcurrent. Fuses can be used as alternatives to [circuit breakers](#).

Wiring regulations often define a maximum fuse current rating for particular circuits. Overcurrent protection devices are essential in electrical systems to limit threats to human life and property damage. The time and current operating characteristics of fuses are chosen to provide adequate protection without needless interruption. There are many types of fuses available on the market, but the function of all these fuses is the same.

Fuses can be used in all types of electrical and electronic applications. The following list provides an overview of typical uses and applications:

<ul style="list-style-type: none">• Motors• Air conditioning units• Home distribution boards• General electrical appliances and devices• Laptops• Cell phones• Game systems• Printers	<ul style="list-style-type: none">• Digital cameras• DVD players• Portable Electronics• LCD monitors• Scanners• Battery packs• Hard disk drives• Power convertors
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2. Types of Electronic Fuses

The most common types can be categorised by:

- Maximum working voltage
- Response characteristic
- Operating temperature range
- Size
- Current rating
- Packaging type

These are the categories with their most common technical formats:

Maximum working voltage:

- 24 V
- 32 V
- 125 V
- 250 V
- 600 V
- Max. 250000 V

Response characteristic:

<ul style="list-style-type: none"> • Current Limiting • Fast Acting • Medium Acting • Medium Time Delay • Medium Time Lag • Non-Time Delay 	<ul style="list-style-type: none"> • One Time • Slo-Blo • Time Delay • Time Lag • Very Fast Acting
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Operating temperature range:

<ul style="list-style-type: none"> • -65 to +125 °C • -55 to +105 °C • -55 to +125 °... • -55 to +126 °C • -55 to +150 °C • -55 to +85 °C • -55 to +90 °C • -40 to +105 °C 	<ul style="list-style-type: none"> • -40 to +125 °C • -40 to +150 °C • -40 to +85 °C • -25 to +70 °C • -25 to +85 °C • 15 to 35 °C • 100 to 150 °C
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Size:

<ul style="list-style-type: none"> • 0.56 x 0.88 in • 0603 • 10.31 x 38.1 mm • 1206 • 14.48 x 4.5 mm • 2.8 x 7.11 mm • 3.94 x 7.11 mm • 31.75 x 6.35 mm • 32.72 x 6.99 mm • 5 x 15 mm 	<ul style="list-style-type: none"> • 5 x 20 mm • 6.10 x 2.69 mm • 6.3 x 32 mm • 6.4 x 32 mm • 7.11 x 3.18 mm • 7.24 x 4.32 mm • 8.5 x 8 mm • 9.73 x 5.03 mm • Ø 10.4 x 38.1 mm • Ø 8.5 x 8 mm
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Current rating:

- 0.5 A
- 1 A
- 3 A
- 4 A
- 5 A

Table 1: Categorisation of fuses in Europe for purposes of trade

Type	HS Code
Fuses for a voltage > 1,000 V	85351000
Fuses for a voltage <= 1,000 V	85361000
Fuses for a current <= 10 A, fuses for a voltage <= 1,000 V	85361010
Fuses for a current > 63 A, fuses for a voltage <= 1,000 V	85361090

Product quality and technical design are highly important factors in the procurement of fuses. Therefore, well-known brands from recognised manufacturers can play a crucial role in some applications. Established brands in electronic components are known for their superior quality and design. For this reason, industrial buyers may prefer established brands. The number of fuse suppliers operating worldwide is quite large.

There is a broad range of manufacturers for fuses. Among them are: [Cooper Bussmann](#), [Littlefuse](#), [Schurter](#).

3. Product Specifications

Quality:

Fuses have a wide range of specifications, and they can be classified according to construction, permissible power, type of integration and shape. Current market requirements for fuses include:

- fast reaction times and multi-use function to reduce operational risks and maintenance effort;
- ability to handle high temperatures (automotive applications: parts must handle between -40°C and 125°C in the motor compartment and -40°C and 85°C in the interior compartment);
- shock resistance, especially needed in automotive applications;
- size- and weight-optimised devices;
- electronic fuses for Internet of Things (IoT)-oriented devices and products.

The materials used, and especially any hazardous substances, must comply with RoHS, and they must fulfil the REACH requirements (see the heading 'Legislative requirements'). Lead-free products are in demand.

Tip:

- Meet or comply with the relevant European Union regulations and industry-specific standards.

Labelling:

The packaging of fuses is typically labelled with a description of the contents, including the following types of

information:

- Type of product
- Model type
- Quantity
- Net and gross weight (in kilograms)
- Supplier/manufacturer name
- Supplier/manufacturer location
- Serial number

Packaging:

Fuses are packaged in different ways. For example, the company Future Electronics uses the following packing, listed according to its popularity:

- Bag
- Reel
- Box
- Ammo
- Bulk
- Cut tape
- Tube
- STRP

4. Which European markets offer opportunities for exporters of fuses?

Economic recovery and electrification drive the demand for fuses as safety component

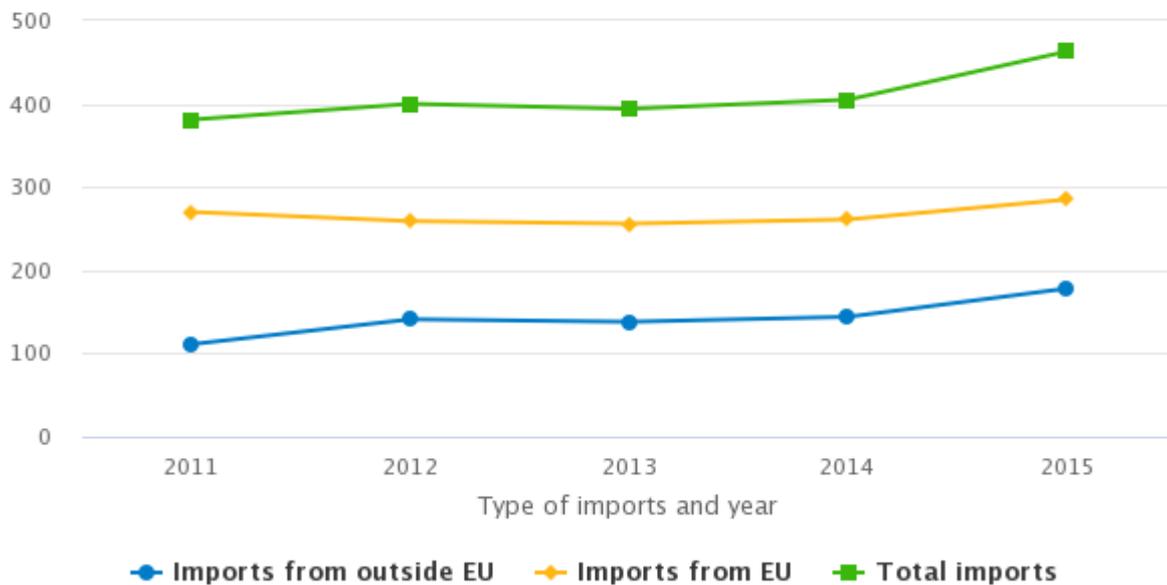
The trade of electronics and electrical engineering components is currently experiencing increasing demand in Europe. Economic recovery and electrification of areas such as automation or automotive and the decentralisation of the energy supply through renewable sources are driving this demand. As all of these applications operate with electrical current, operational safety is a key issue. A key component for safety is the integration of fuses, which drives the demand for this product accordingly. The market does not necessarily demand high-end products, but rather solid, average quality products.

Tip:

Reach out to and connect with potential customers to get more insight into what they need.

Figure 1: Imports of Fuses to Europe

(2011–2015)



Source: Eurostat

Imports grew by 4% on average on an annual basis between 2011 and 2015. This is a very positive development and shows the opportunities for exporters of fuses. In 2014 and 2015, imports of fuses even experienced a two-digit increase, totalling around +14%. There are various drivers for this positive development:

- electrification and digitalisation of manufacturing-based industry;
- electrification of cars;
- conversion of Germany's power grid towards a more decentralised power supply;
- strong demand in the export-driven German economy;
- economic recovery in European countries such as Spain.

Imports from European countries to other countries within the EU still make up the larger part of imports (61.5%) in 2015. An important cause for this fact has been the European single market and the geographical proximity between client and supplier. Imports from outside Europe make up 38.4% of the trade in fuses. Compared to the larger share of internal European imports, imports from outside Europe have had a stable share of the trade and even slightly increased their share, as they are competitive in terms of price-to-performance ratio.

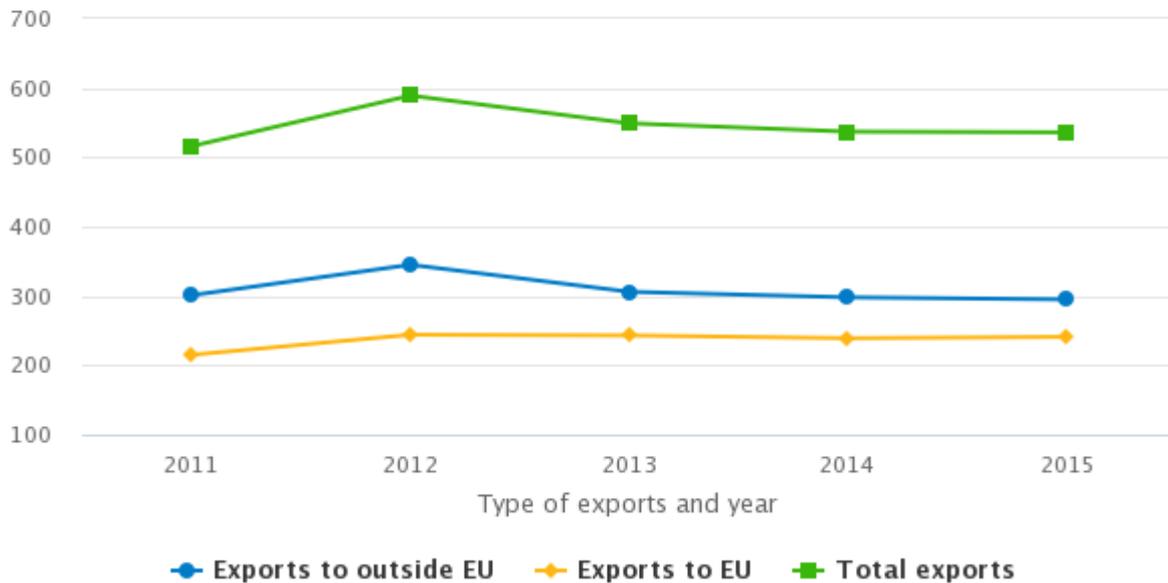
In 2015, European imports of fuses from outside Europe grew by 23.6%, a growth more than twice as strong as the growth of internal European imports. This opens up opportunities for manufacturers of fuses like you planning to enter the European market, as not only high-end quality is in demand. However, basic standards such as ISO (International Standards Organisation) have to be met.

Tip:

Make sure that you are able to deliver at least good or average quality that complies with common standards such as ISO.

Figure 2: Exports of Fuses from Europe

(2014–2015)



Source: Eurostat

Total exports of fuses from Europe have stagnated in the last five years, totalling an average growth rate of 0.1%. Exports to outside the EU made up the larger part of total exports with a share of 55.1%, while exports within Europe made up 44.9%. There is a possibility to target European countries via re-exports through trade hubs. Examples of trade hubs are Belgium, Germany and the Netherlands.

In 2015, Europe remains a net exporter of fuses, but imports have started closing the gap. Manufacturers from outside Europe, mainly from Asia, have improved their competitive position in terms of technology, cost and service, and sell their products successfully on the European market.

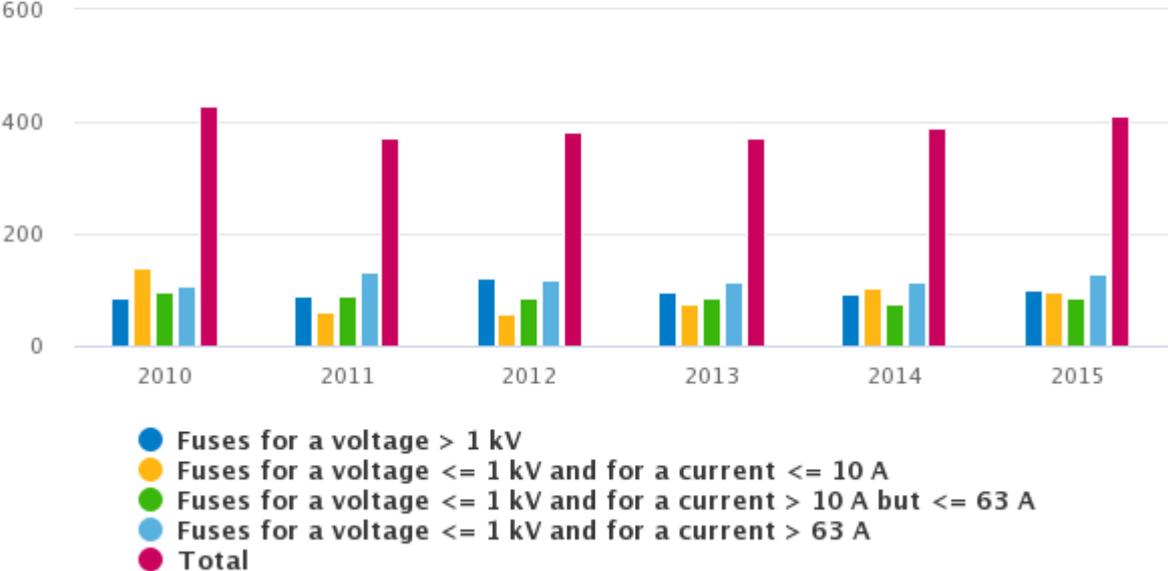
Tip:

Look for and reach out to importers in trade hub regions to identify the re-exporters.

Electrification of application areas and economic recovery drive production and consumption

The production of fuses in Europe has developed positively, reaching a value of € 410 million in 2015. In the last five years an average annual growth rate of 2% was realised. 2010 saw an extraordinary high level of production compared to the following years. This was a consequence of the financial crisis in 2009, which caused a high level of uncertainty among companies in regards to demand and investments. This uncertainty disappeared in 2010 and resulted in a temporary backlog demand.

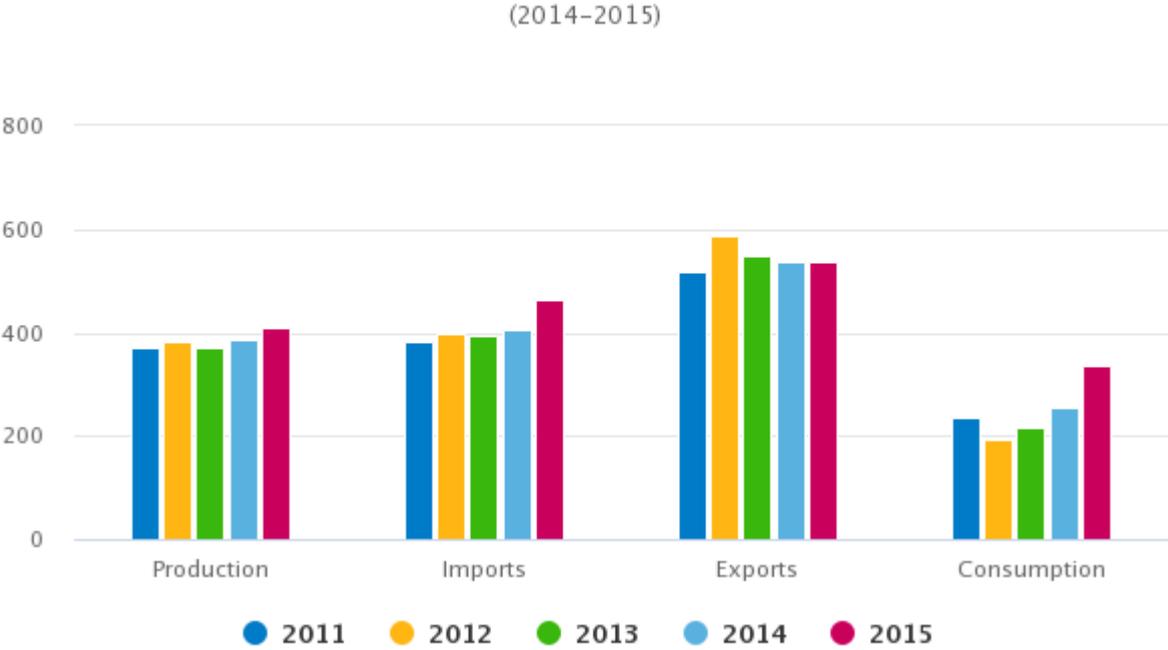
Figure 3: Production of Fuses in Europe, value in € million
(2014–2015)



Source: Eurostat Prodcom (2016)

The consumption of fuses in the EU has experienced a strong annual average growth rate of 7.4% over the last five years. This represents a growth rate significantly above the average growth rate of the electronics and electrical engineering sector in Europe, which is around 3 to 4%.

Figure 4: Consumption compared to Production, Imports and Exports of fuses in Europe
(2014–2015)



Source: Eurostat

Tips:
Attend trade fairs to gain market exposure and to inform yourself about the specifics of demand in

Europe.

See our study on [Finding Buyers in Europe for more information about entering the European Electronics and Electrical Engineering market](#).

5. What trends offer opportunities on the European market for fuses?

Technological development – from classical to intelligent fuses

Multi-use fuses have been in the focus of technological innovations. **Manufacturers** have developed intelligent fuses that restore their readiness once the device temperature has fallen below a certain level. Classical thermal fuses are cheap to buy; however, intelligent fuses provide significant cost advantages over the course of their lifetime and in terms of handling. Electronic fuses react around four times faster than classical thermal fuses and can more easily define the maximum bearable current.

Manufacturers of electronic fuses face better market opportunities in the long term as electronic fuses have started to replace classical thermal fuses due to their functional advantages. In the short term manufacturers of classical thermal fuses will still have a significant market share, but this will decline steadily.

Electronic fuses contribute to the reduction of size and material which in the end helps to reduce costs of production and weight. Due to the distinct definition of bearable currents, cable trees can be designed more accurately and thinner. Electronic fuses have the advantage that they can be built into devices such as cars in all kinds of places and are not dependent on a central switch box. This also helps to reduce weight as cables can be shorter. Through the increased integration of electronic components in cars, nowadays around 1.5 km of cable is installed in a single car. In case of failure, electronic fuses have the advantage that they are able to detect the location of the failure reliably.

Manufacturers that focus on the production of electronic fuses and pay attention to reducing the size and amount of material used face better market opportunities in the short and long term as electronic fuses experience an increase in demand due to their superior functionality over classical thermal fuses.

Political development – legislation a driver for innovation

Legislation aiming to reduce CO₂ has been a driver for the introduction of electronic fuses, especially in the automotive sector. Cars with a higher weight have a higher fuel consumption and are therefore responsible for more emissions. Legislation tries to tackle this issue by fining non-compliance with emission limits with 95 euro per gram of CO₂ exceeding the legal limit.

Electronic fuses have brought weight savings of 5 to 8 kg of copper and thereby contributed directly to the reduction of emissions, which is why manufacturers of electronic fuses have better chances of selling their product to the automotive industry in the short and long term than manufacturers of non-electronic fuses.

Tips:

Stay up-to-date with legislative developments in order to anticipate changes that are likely to affect the market demand for certain technologies.

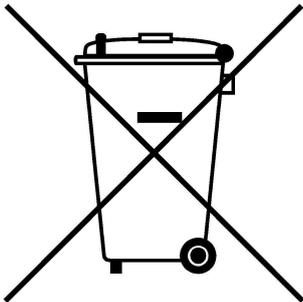
See [our study about trends in the Electronics and Electrical Engineering sector](#) for more information.

6. What requirements should fuses comply with to be allowed on the European market?

To assure their durability and safety, fuses must comply with the relevant European Union regulations and sector standards. Compliance with European legislative and non-legislative requirements is a basic necessity when exporting fuses to the European market. There are requirements that apply to all electronic and electrical engineering products and those specific to fuses.

Here is an overview of the requirements that apply to all electronic and electrical engineering products, including fuses.

Legal requirements:

<ul style="list-style-type: none">• Liability for defective products;• CE marking;• Waste of Electrical and Electronic Equipment (WEEE);• Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) and Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).	
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Non-legal requirements:

<ul style="list-style-type: none">• Quality management systems (QMS) – ISO 9001;• Occupational health and safety (OHS) in the electronic components sector;• Electronic Industry Citizenship Coalition (EICC) Initiative.	
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Specific certifications required in application industries

There are standards and requirements that apply to all electronic and electrical engineering products in application industries. Manufacturers and associations have agreed on these standards in Europe, but also beyond. It is necessary to comply with them when targeting potential customers in these industries.

For automotive applications the following specific standards apply:

- [ISO/TS 16949](#) – fuses within assemblies, sub-assemblies and finished goods must meet the quality demands outlined;
- [ISO 26262](#) requirements focus on the functional safety of electrical and electronic systems in vehicles.

For rail applications the following specific standard apply:

- [IRIS](#) – the International Railway Industry Standard.

For aviation applications the following specific standards apply:

- [EN/AS 9100 certification](#) (for development, production, manufacturing, installation, construction, and

maintenance);

- [EN/AS 9110 certification](#) (for maintenance operations and service organisations);
- [EN/AS 9120 certification](#) (for traders, storekeepers, and distribution).

See our study about [buyer requirements in the Electronics and Electrical Engineering sector](#) for more information and tips.

7. Requirements that specifically apply to fuses

There are a range of non-legal requirements for fuses. They are standards defined by the industry or sector and, in practice, they are as important as legal requirements. They ease procurement for buyers tremendously.

Basically, these standards are valid for high-voltage applications and low-voltage applications.

High-voltage applications:

- IEC/EN 60269-1: Requirements for fuses for closed and current limiting fuse links with designing criteria of >6 kA which are used for the protection of operating frequent alternating currents of nominal voltage of up to 1000 V or direct current of voltage of up to 1500 V.
- IEC/EN 60282-1: Requirements for all high-voltage fuses in indoor and outdoor use on alternating current systems of 50 Hz and 60 Hz for allowable stress of more than 1 kV.
- IEC/EN 60549: Requirements for high-voltage fuses for the external protection of shunt capacitors.
- IEC/EN 60644: Requirements for high-voltage protection for motor circuits.

Low-voltage applications:

- IEC/EN 60269-1: Requirements for fuses for closed and current limiting fuse links with designing criteria of >6 kA which are used for the protection of operating frequent alternating currents of nominal voltage of up to 1000 V or direct current of voltage of up to 1500 V.
- IEC/EN 61000: Requirements for limit values for harmonic current (≤ 16 A).
- IEC/EN 61095: Requirements for electromechanical protection for home and similar applications.

Tip:

Apply the relevant standards if you plan to supply customers in the mentioned industries or focus on high-voltage or low-voltage fuses.

8. Through what channels can you get fuses onto the European market?

See our study about [segments and channels in the Electronics and Electrical Engineering sector](#) for more information.

9. What are the end-market prices for fuses?

The prices of fuses vary based on their response characteristics. Within each of their product groups, they also differ significantly in price.

Table 2: Prices of fuses

Most important groups of fuses	Original Equipment Manufacturer, volume price range, in €
Current Limiting	14.71 to 19.69
Fast Acting	0.0449 to 329.98
Medium Acting	0.3052 to 1.96
Medium Time Delay	0.1975 to 11.33
Medium Time Lag	0.6041 to 9.33
Non-Time Delay	0.9964 to 8.84
One Time	2.00 to 2.86
Slo-Blo	0.0449 to 28.72
Time Delay	0.0718 to 268.04
Time Lag	0.1688 to 5.06
Very Fast Acting	0.1059 to 376.08

You have to be aware of differences in costs and value-chain margins that need to be considered when calculating the product price. The production and administration costs of the manufacturer usually account for 45-50% of the end price (OEM volume price). The production and administration costs include all costs for raw materials, development and labour, as well as other fixed and administration costs.

Table 3: Breakdown of prices

OEM volume price breakdown	Margin
Production and administration costs	45-50%
Marketing and sales costs in developing countries	3%
Freight to Europe and other related costs	6%
Import and other (for example VAT, financing) costs	5%
Marketing costs in Europe	8%
Importer margin	8-10%

Distributor margin	15-25%
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Tips:

Develop a unique selling point, considering your costs, liabilities and responsibilities

Also make sure that you analyse product market price levels when coming up with a selling proposition.

Please review our [market information disclaimer](#).