



CBI  
*Ministry of Foreign Affairs*

# **CBI Product Factsheet:**

## **Exporting LCD and LED Displays to Germany**

## Introduction

The electrical and electronics sector is developing positively in Germany, and it is benefiting from its export orientation. Manufacturers in the automotive industry, as well as in other industrial sectors (for example medical technology) have an increasing demand for LCD or LED displays. These companies are constantly striving to optimise their supply, thus opening opportunities for exporters from developing countries. Although there is a demand for cost-efficient products, these products must meet the prevailing quality and service requirements.

## Product Definition

A liquid-crystal display (LCD) is a flat panel display or electronic visual (video) display that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be either displayed or hidden, including pre-set words, digits and seven-segment displays (as in digital clocks). They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

A light emitting diode (LED) display is also a flat panel or electronic visual display. Basically, it uses the same technology as an LCD display with one fundamental difference: light emitting diodes are integrated into the LCD display in such a way that they are providing the background lighting. For this matter white diodes are used or coloured ones that are able to blend white light.

The following types of LCD and LED displays are typically sold in Europe:

- Monochrome flat panel displays (HS code 85285920)
- Colour LCD displays (HS code 85285931)
- Indicator panels with LCD (HS code 85312010)
- Indicator panels with LED (HS code 85312020, 85312030)
- Indicator panels with LCD or LED (HS code 85312090)

LCD and LED displays are used in many different applications, including computer displays, televisions, instrument panels, aircraft cockpit displays and signage. They are common in consumer devices (such as DVD players, gaming devices, clocks, watches, calculators and telephones), and they have replaced cathode ray tube (CRT) displays in nearly all applications.

Brand names of LCD and LED displays as a component for an end product are not very significant to business-to-business customers; product quality and design are of greater importance. In some applications, however, brand names can play a significant role. Established brands in electronic components are known for their superior quality and design. For this reason, industrial users may prefer established brands. The following are amongst the leading suppliers of LCD displays: [Displaytech](#), [Electronic Assembly](#), [Fujitsu](#), [Hantronix](#), [Lumex](#), [Newhaven Display](#), [Sharp](#), and [Vishay](#).

## Product Specifications

### Quality:

Companies typically look for LCD and LED displays that fulfil the current market requirements.

- LCD and LED displays come in a wide range of specifications, and they can be classified according to the size, shape and brightness.
- Current market requirements for LCD and LED displays include:
  - Picture quality/contrast/brightness;
  - energy efficiency;
  - touch function (depending upon model type);
  - climate resistance (in case of outdoor application);
  - durability/life cycle.
- To assure quality and safety, products must comply with the relevant EU regulations and standards. The materials used, and especially any hazardous substances, must comply with RoHS, and they must fulfill the REACH requirements (see 'Legislative requirements' in this document).

### Labelling:

- LCD and LED displays are typically labeled with the description of content, including the following types of information:
  - type of product;

- model type;
- supplier/manufacturer name;
- supplier/manufacturer location;
- serial number.

### Packaging:

- LCD and LED displays are typically packaged in plastic bags and cardboard boxes

## Legislative Requirements

To assure the durability and safety, products must comply with the relevant EU regulations and standards. Compliance with European legislative and non-legislative requirements is a basic necessity for all exporters in the electronics and electrical engineering sector. The most important requirements that apply to your products are discussed below. Be sure that you are familiar with the applicable legal requirements with regard to labelling, hazardous substances, product safety and liability. Your products must comply with all EU directives.

**Liability for defective products.** The liability applies to all products manufactured or imported into the European market. Although the company that brings the product onto the European market is usually responsible, claims can be passed along to producers or exporters.

#### Tip:

- Be familiar with standards that apply specifically to your products. To ensure that your products are of high quality, review your quality assurance and testing procedure (for example by implementing an accredited quality management system; ISO 9001). Formulate labels, instructions for use and disclaimers carefully. Finally, be sure that your insurance covers product liability. Additional information is available in the document on EU legislation: [Liability for defective products](#). Another resource is the [ITC standards map](#).

- **CE marking.** As components, LCD and LED displays are typically sold to equipment manufacturers. When sold within assemblies, sub-assemblies or finished goods, LCD and LED displays are not legally required to bear a CE mark. Driven by market requirements, however, nearly all customers continue to demand the CE mark for most components, particularly those that are critical to the application. The following directives may be relevant for LCD and LED displays:
  - Electromagnetic compatibility (EMC Directive 2004/108/EC),
  - Low-voltage equipment (LVD 2006/95/EC),
  - Eco-design for Energy-related products (Directive 2009/125/EC),
  - Equipment for use in a potentially explosive atmosphere (ATEX Directive 94/9/EC),
 Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive 2002/95/EC).

#### Tip:

- [Apply for CE marking](#), which is required by many customers, even if your product is a sub-system or part of a finished good and is thus not legally required to bear a CE mark. If you are a manufacturer, you should be familiar with the process of affixing the CE marking to LCD and LED displays. The European Commission's insightful website '[Export Helpdesk](#)' illustrates the key steps to take from the beginning to the trading of the product. The following documents provide additional information on EU legislation:
  - [CE marking for Electromagnetic compatibility](#)
  - [CE marking for Low-Voltage Devices](#)
  - [CE marking for Eco-design of energy-related products](#)
  - [Directive 94/9/EC \(ATEX\)](#)
  - [Restriction of Hazardous Substances \(RoHS\)](#)

**Waste of Electrical and Electronic Equipment (WEEE).** If you are considering exporting electronic or electrical products to the European Union (EU), you be aware that EU buyers have obligations regarding the waste of these products. Producers in the EU are obliged to participate in product take-back schemes. Although this does not directly affect exporters from developing countries, such requirements may have an impact when EU buyers ask their suppliers to meet specific design requirements or provide certain information.

**Tip:**

- Ensure that your product design complies with WEEE and enables product recycling, recovery or dismantling (note that these requirements may differ from one EU Member State to another). Formulate labels carefully, and mark products in accordance with WEEE (for example the symbol of the crossed-out wheeled bin). Obtain additional information on the EU legislation concerning [Waste Electrical and Electronic Equipment \(WEEE\)](#).



**Labelling of energy-related products.** Producers and exporters in the EU are obliged to indicate energy consumption by household appliances and other energy-related products (the list is being extended to include products used for industrial purposes. Be sure to check this when importing your products, and discuss it with your European customers).

**Tip:**

- Be sure to indicate all product details (such as energy class, performance, capacity, noise level) required by the EU. Consult the EU legislation on energy labelling for energy-using and energy-related products on the [EU website](#).

The **REACH regulations** are intended to manage risks relating to chemicals and to provide safety information on such substances. This legislation restricts the use of certain hazardous chemicals. It also established requirements regarding information on chemicals that have been used. Manufacturers are required to provide buyers with information on the properties of any chemical substances used.

**Tip:**

- Ask your buyers about their requirements regarding [REACH](#). List all chemicals, including raw materials and additional materials, used in your production process.

## Non-legislative Requirements

Although compliance with non-legislative requirements remains voluntary, buyers often request such compliance. Many 'private' or 'voluntary' standards were originally established by industry players themselves. Although producers often perceive such standards as a barrier entering a market, compliance also constitutes an opportunity to enhance the export competitiveness of your products.



**Quality management systems (QMS) – ISO 9001.** If you plan to export to Europe, all products must meet the quality demands of the buyer. The ISO 9001 system was designed to ensure that products manufactured in and/or exported to Europe meet the needs of customers.

For automotive applications, components within assemblies, sub-assemblies and finished goods must meet the quality demands outlined in ISO/TS 16949 QMS.

**Tips:**

- Apply for ISO 9001 as quickly as possible. Understand the requirements of your target customers and, if you plan to target the automotive industry, obtain ISO/TS 16949.
- Consult the document ISO [Quality management systems](#).
- Requirements relating to automotive applications with regard to quality-management systems are also available on the [ISO website](#).



**Functional Safety in accordance with ISO 26262.** The ISO 26262 requirements focus on the functional safety of electrical and electronic systems in vehicles.

**Tip:**

- Apply for ISO 26262. Even though these requirements are not mandatory, they are sure to provide you with an advantage over other exporters from developing countries. Consult the ISO website for additional information on the guidelines of [ISO 26262](#).



**Occupational health and safety in the electronic-components sector.** Occupational health and safety (OHS) issues include all aspects relating to labour conditions, and they are very often part of the social requirements that EU buyers impose on their suppliers.

**Tip:**

- Consider implementing a management system on OHS (for example OHSAS 18000). European buyers are becoming increasingly sensitive and are demanding transparency in the supply chain and with regard to labour conditions at all levels. Even though these requirements are not mandatory, compliance is sure to provide you with an advantage over other exporters from developing countries. Additional information on occupational health and safety in the electronic components sector is available on the [ISO website](#).



**Electronic Industry Citizenship Coalition (EICC) Initiative.** The most important sustainability initiative in the Electronics Sector, in Europe and internationally, focuses on social, ethical, health and safety, and environmental issues. Members are required to comply with the requirements of the Code. Some industry buyers can require their suppliers to follow the EICC code of conduct. This is especially relevant for first-tier suppliers in the automotive industry.

**Tip:**

- Identify which of your potential clients or which industries are likely to require the EICC code of conduct. Try to implement this policy. It could provide you with an advantage over other exporters. Explain the steps that you have taken in this regard on your website and in your company's other literature. Consult the [Electronic Industry Citizenship Coalition \(EICC\)](#) website for additional information on the sustainability initiative.

**TCO** is a series of product certifications for office equipment based on the user-friendliness, safety and eco-friendliness of products. It also covers displays.

**Tip:**

- Exporters should ensure that they meet the expectations of buyers. A [TCO certification](#) is certainly advisable for permanent workplace applications for displays.

## Trade Statistics

### Imports and Exports

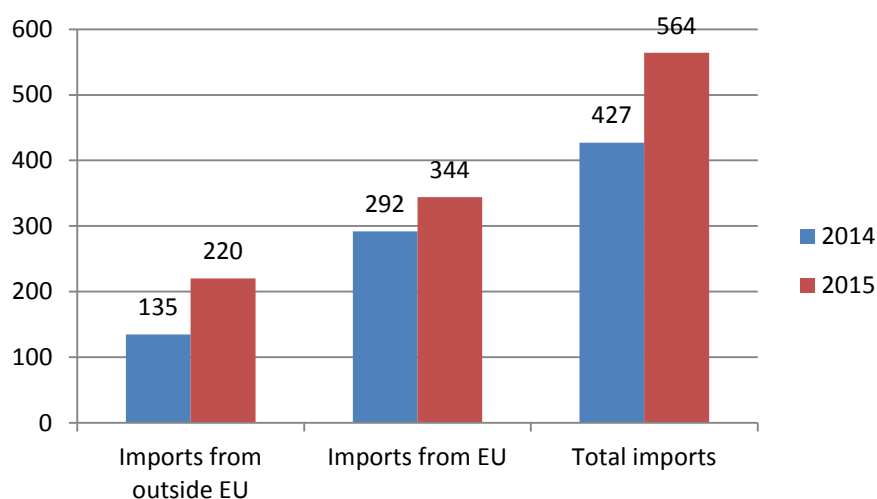
Germany offers exporters from developing countries good prospects for entering the market for LCD and LED displays. These displays have gained considerable significance in the control of electronic systems by humans. They have begun to replace ordinary switches and control panels, due to their increased functionality based on its interface with manifold virtual applications. Germany's automotive and machinery industries are highly innovative and successful, and they provide excellent business opportunities for manufacturers of LCD and LED displays from developing countries.

**Table 1: Imports of LCD and LED displays to Germany (in 2015), in %**

	Share of total EU imports (2015)	Imports from developing countries as a share of total imports (2015)
Imports	34.0%	2.1%

Source: Eurostat (2016)

**Figure 1: Imports of LCD and LED displays to Germany, value in € million**



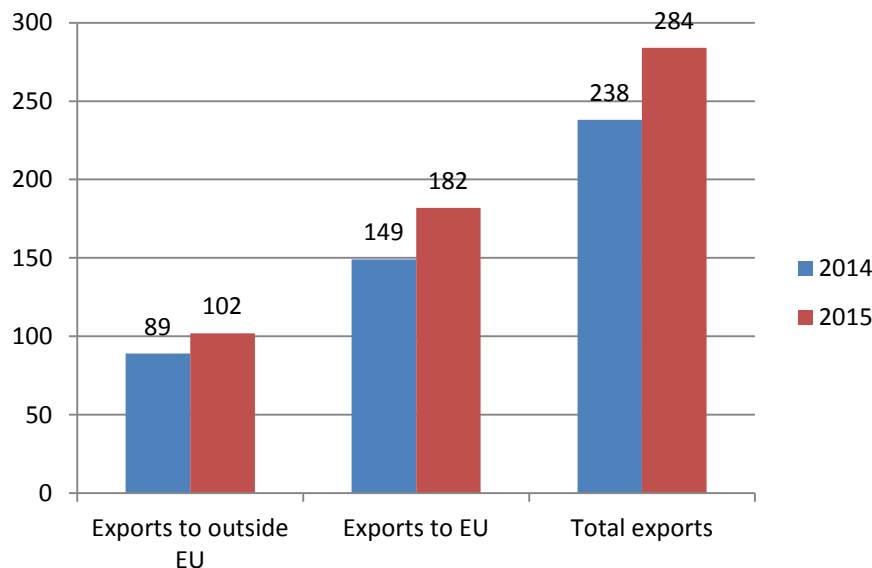
Source: Eurostat (2016)

**Table 2: Exports of LCD and LED displays from Germany (in 2015), in %**

	Share of total EU exports (2015)	Exports to developing countries as a share of total exports (2015)
Exports	14.8%	7.8%

Source: Eurostat (2016)

**Figure 2: Exports of LCD and LED displays from Germany, value in € million**



Source: Eurostat (2016)

### Most important developments

Germany accounts for around 34% of the total imports of LCD and LED displays to the EU and the European Free Trade Association (EFTA). This makes it the largest geographical market for the import of these products within this economic region. At the same time, Germany imports around 61% of its displays from other European countries, with only 2.1% coming from developing countries. Germany is also an exporter of displays. This includes re-exports, as well as exports of displays manufactured in Germany. It is nevertheless clearly a net importer of LCD and LED displays.

**Tip:**

- The fact that most LCD and LED displays are imported from other European countries makes a value-for-money proposition for LCD and LED displays crucial to enter the market in Germany.

The import of LCD and LED displays from China to Germany has been increasing again. Behind China, the largest imports from developing countries came from Tunisia (€5.9 million), Indonesia (€3.2 million), and Mexico (€1 million). Turkey (€0.14 million) and Philippines (€0.03 million) followed. Both could significantly increase their figures from 2014 to 2015. Reasons underlying the increasing trade figures for products entering the German market from non-EU companies include better-priced product offerings, shorter production times and improved delivery terms.

**Tip:**

- Developing countries with solid expertise and high product quality have good prospects for entering the European market. Optimise the production process in order to meet all key market requirements, including those relating to the quality and design of products, short production times and favourable delivery terms.

The German export of LCD and LED displays within Europe improved in response to stronger economic growth in other EU countries.

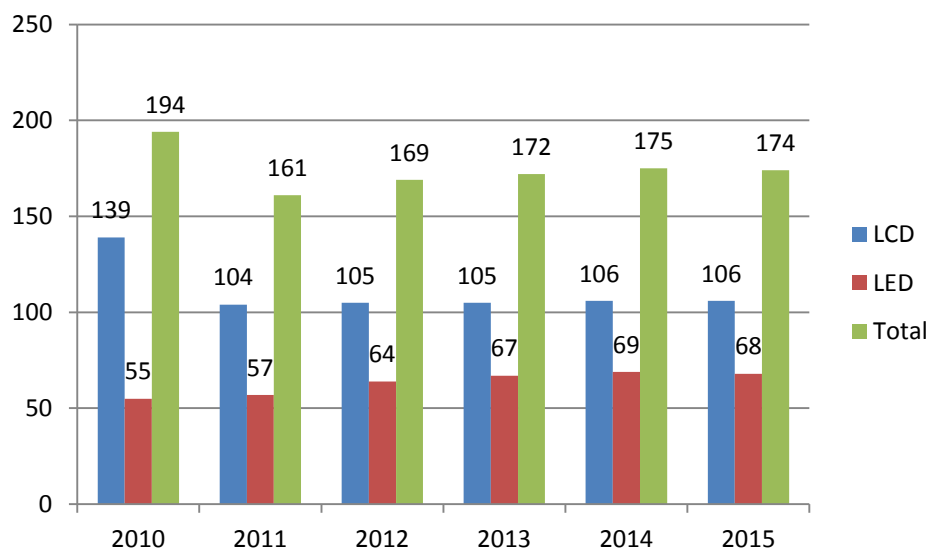
**Tip:**

- There is an option to target other European countries through re-exports. It is nevertheless important to be aware of the economic stagnation in some European countries (such as France, Italy and the UK). Germany is the only major national market in Europe to exhibit stable or relatively strong demand.
- Observe carefully the consequences of the Brexit vote and its impact on business with the UK.

## Production and Consumption

Germany is the largest sales market for displays in Europe. Over the years, it has largely depended upon the import LCD and LED displays. The automotive industry is an important market segment, and control applications in the industrial, energy and medical technology segments are gaining a large market share.

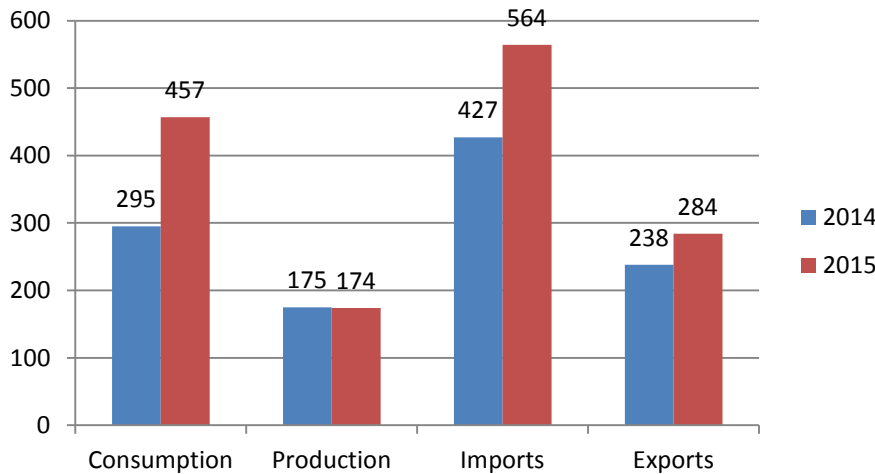
**Figure 3: Production of LCD and LED displays in Germany, value in € million**



Source: Eurostat Prodcop (2016)



**Figure 4: Demand, production and trade of LCD and LED displays in Germany, value in € million**



Source: Eurostat (2016)

### Most important developments

Production remained stable over the recent years in Germany or even increased slightly. Companies have benefited from an increasing demand of LED displays. Yet, German companies are being forced to improve their cost base in the international competition, and this will involve the identification of less expensive sourcing options.

#### Tip:

- Aim to supply Germany with LCD and LED displays that meet the local market requirements in terms of product quality, design and service. Targeting the market with low-cost LCD and LED displays could provide a competitive edge.

The market for LCD and LED displays is driven by the growing demand for navigation systems in cars and control panels across applications that accompany the virtualisation of control systems.

#### Tip:

- Be sure that you understand the specific requirements of the various market segments (for example automotive or automation control applications, indoor or outdoor applications).

Colour displays are clearly dominating market demand, with 88% of all displays imported to Germany being colour, and only 12% being monochrome.

#### Tip:

- Colour displays have considerable market potential. Be sure to have a variety of models in your product portfolio, in order to accommodate a wide range of customer needs.

## Market Trends

### Most important developments

*Technological development:* Electronics are increasingly being incorporated into mechanical applications. For example, in the automotive industry, electronics are gaining additional significance in connection with driving assistance systems. Virtualisation is replacing manual switches and increasing the demand for displays as control systems. At the same time, LED displays are attracting attention, due to their superior performance and resolution.

**Tip:**

- Consider offering LCD and LED displays to industries that have a high demand (automotive, medical technology or energy-control applications). Consider sharing your knowledge with potential partners and clients.

*Product innovation:* Touch screens are amongst the ground-breaking innovations in the field of LCD and LED displays. Other new trends include sensitive touch screens that provide a haptic feedback, flexible or curved displays. Curved displays are used primarily in the consumer market. Continuous product innovation is taking place with regard to the colour intensity and contrast in the picture.

**Tip:**

- Continue innovating and investing in new product designs and launching LCD and LED displays that meet the needs of the market. Expand your product range by introducing LCD and LED displays of

*Product quality:* In Europe, the economic slow-down and increased costs (including energy costs) have motivated users to extend the period of usage of their equipment. For this reason, consumers of LCD and LED displays are demanding more robustness and durability in their products. The temperature resistance of displays for outdoor or other industrial applications is also gaining importance. The relevant range is between -30°C and +80°C.

**Tip:**

- Meet the safety and quality demands by incorporating a quality-assurance programme into your production process. Work to optimise the production process and reduce delivery time. Increase the efficiency and flexibility of the production process by introducing a modular production approach and using different technologies. Minimise the risk of damage during production, and meet customer requirements in terms of product quality and delivery time.

*Political measures:* Various EU Directives have been issued in recent years that are aimed at accelerating the development of renewable energy sources and diminishing industrial impact on the environment (CO<sub>2</sub> emissions). As a result, electronic systems and components have become more efficient and environmentally friendly.

**Tip:**

- Work to improve the efficiency of LCD and LED displays by reducing energy loss, thereby reducing the environmental burden (CO<sub>2</sub> emissions) and increasing the cost-effectiveness of electrical systems.

*Product design:* In addition to the essential importance of product quality, product design is becoming increasingly important to Original Equipment Manufacturers (OEMs) in Europe. The demand for individualisation in LCD/LED display experiences is increasing. In this context individualisation entails customer choice (for example for certain materials or colour for the display frame). Developing countries should work to adopt European best practices in the implementation of quality standards, as well as in product design and presentation (for example no signs of handwork on the product surface, clean and accurate packaging).

**Tip:**

- Work to improve the design and packaging of your products. Work according to European standards, and follow all of the buyer's requirements.

*Minimisation of the total cost of ownership:* With the growing role of international cooperation, European companies will increasingly be facing various risks that must be measured and managed in order to keep the total cost of ownership (TCO; a financial estimate intended to help buyers or owners to determine the direct and indirect costs of a product) at a reasonable (low) level. Both smaller and larger companies will increasingly be looking for the most reliable suppliers, and they will try to eliminate risks through supplier contracts and cost management.

**Tip:**

- European SMEs present better opportunities as potential customers for exporters from developing countries, although larger companies may also contact you as a potential supplier. Visibility on the market is therefore crucial. Develop your sales and marketing strategy:
  - Develop well-structured and up-to-date content on your company's website;
  - Attend trade shows several years in a row; Start preparations for the trade show far in advance;
  - Work on your *unique selling proposition* (why European OEMs should buy your product);
  - Work on the product pricing.

For additional information on market trends, consult [CBI Trends for Electronics and Electrical Engineering](#).

## Market Segments and Channels

### *Area of application:*

Market segments for displays are diverse and depend on the area of application. Displays used for wearables require a high resolution of around 300 pixels per inch (ppi) as icons, scripture, or videos have to be represented crystal clear on small screens and are read by users at a short distance.

Regarding displays in cars for example, a 150 ppi resolution is sufficient. Maps and icons are presented at larger sizes and displays are read from an arm's-length distance. A 250 ppi resolution for example would be sufficient in luxury cars.

Screen sizes are another factor defining market segments. Until 2016, 3.5 to 5" have been the standard diagonal size for displays in cars. This will change in future product generations, increasing the size of displays from 7 to 10 or even 12".

The [CBI Market Channels and Segments for Electronics and Electrical Engineering](#) provides a general overview.

**Tip:**

- Be aware of trends and dynamics that have impact on market segments and change them. They can impact the competitiveness of your product portfolio.

## Market Competitiveness

### *Potential substitutes and product competition:*

OLED (Organic LED) displays provide advantages compared to LCD displays with pure LED backlight function. They are thinner, lighter and more flexible which is especially advantageous in regards to wearable applications. OLED displays can be combined with plastic screens while LCD displays depend on glass screens. Apart from this, glass screens absorb light compared to plastic screens, which reduces the picture efficiency. Moreover, OLED displays do not need LEDs as backlight as they illuminate themselves.

Competitive-wise LED displays have reached price range levels comparable to those of LCD displays.

The document [CBI Competition for Electronics and Electrical Engineering](#) provides an additional general overview.

**Tip:**

- Be aware of trends and dynamics that have impact on your company's competitiveness and the competitiveness of your product portfolio.

## What are the end-market prices for displays?

Prices for LCD and LED displays vary widely. The price range is indicated in the table below. For example, In Europe, prices for LCD displays range from €3 to €2,000, depending upon specifications. LED displays are in a price range from €5 to €3,000. There are significant differences in price between numeric and graphic displays, with the latter being more expensive. Suppliers in several European countries have harmonised their prices. Differences in pricing may occur due to differences in logistics, taxes and other local costs.

Most important groups of LCD and LED displays for industrial, automotive, communication and consumer applications	OEM volume price range, in €
Monochrome flat panel displays (HS code 85285920)	5 – 180 (numeric displays) 3 – 2,000 (graphic displays)
Colour LCD displays (HS code 85285931)	6 – 180 (numeric displays) 3 – 2,000 (graphic displays)
Indicator panels with LED (HS code 85312010, 85312020)	5 – 250 (numeric displays) 8 – 3,000 (graphic displays)

Producers in developing countries should be aware of differences in costs and value-chain margins that could add to the product price. The production and administration costs of the manufacturer usually account for 44%–51% of the end price (OEM volume price). The production and administration costs should include all costs for raw materials, development and labour, as well as other fixed and administration costs. To develop a unique selling proposition, exporters from developing countries should understand their own costs, liabilities and responsibilities, and they would do well to analyse product market price levels.

OEM volume price breakdown	Margin
Production and administration costs	46%
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	7%
Importer margin	10%
Distributor margin	20%

## Useful resources

### Leading trade fairs in Europe

- [Electronica](#), world's largest fair for electronic parts
- [CeBIT](#), world's largest fair for computers
- [Hannover Messe](#), world's largest fair for industry applications (for example automation)
- [PCIM](#), Europe's largest fair for control electronics, intelligent power trains and energy management
- [Light & Building](#), world's largest fair for light and building applications

## Important resources

- [Eurostat](#)
- [Eurostat Prodcom](#)
- [Organisation for Economic Co-operation and Development \(OECD\)](#)
- [Online news portal](#)
- [Rohm Semiconductor](#)
- [Mouser](#)

## Additional information

CBI market information:

- [Trends for Electronics and Electrical Engineering;](#)
- [Market Channels and Segments for Electronics and Electrical Engineering;](#)
- [Competition for Electronics and Electrical Engineering;](#)
- [Finding Buyers in the Electronics and Electrical Engineering sector](#)
- [10 Tips for Doing Business in the Electronics and Electrical Engineering sector](#)
- [10 Tips for Finding Buyers in the Electronics and Electrical Engineering Sector](#)
- [Buyer Requirements in the Electronics and Electrical Engineering Sector](#)



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