CBI
Ministry of Foreign Affairs

CBI Product Factsheet:

Capacitors in Poland

Introduction

The electronics and electronic components sector in Poland is strong and driven by growing investments in the automotive industry, the energy sector, and other manufacturing industries. The outlook for the electronic components industry in Poland is positive; creating market entry opportunities for new suppliers of electronic components in general, and capacitors in particular from developing countries, since they are a key component in consumer electronics built in Poland.

Product Definition

Capacitors are a subcategory of the broader product category of passive components within the sector Electronics and Electrical Engineering (EEE). Capacitors are widely used in electrical circuits in nearly all common electrical devices. Typical capacitor types sold in Europe are:

- Power capacitors (HS code 85321000),
- aluminium capacitors (HS code 85322200),
- ceramic capacitors (HS code 85322300 and 85322400),
- tantalum capacitors (HS code 85322100),
- metallised polyester/polypropylene film capacitors (HS code 85322500),
- variable trimmer capacitors (HS code 85322900).

Typically, capacitors are used as part of electrical circuits in many common electrical devices and in many industries, including industrial, automotive, lighting, energy, communication and consumer electronics.

Brand names of capacitors are not very significant; product quality and design are of higher importance. Nevertheless, brand names can be significant in some applications. Established brands in electronic components are known for their better quality and design. Therefore, industrial users may prefer established brands. The number of global suppliers of capacitors exceeds 100. Some of the leading suppliers of capacitors in Poland are Vishay, Epcos, Electronicon, AVX, as well as Olimex and Polamp.

Product Specifications

Quality:
European companies are typically looking for capacitors that fulfil the current market requirements. Polish companies are applying the same requirements to all imported capacitors in order to be able to successfully re-export quality components and/or finished goods to European countries.

- Typically, capacitors have a large variation of specifications and can be classified based on the materials used. Additionally, voltage, tolerance, nominal capacitance, leakage current, temperature, polarisation, and resistance are key parameters that define product quality.
- Current market requirements for capacitors include:
    - o greater efficiency (higher Q=quality factor) and minimised power losses;
    - o ability to handle high voltages and currents;
    - o more compact sized;
    - o ability to connect the renewable energy sources (e.g., solar panels).
- To assure durability and safety, the products must comply with the relevant European Union (EU) regulations and standards. The materials used, and especially hazardous substances, have to comply with RoHS and must meet REACH requirements (see "Legislative requirements" in this document).

Labelling:

- Capacitors are typically labelled with the following type of information:
    - o type of product,
    - o model type,
    - o supplier/manufacturer name,
    - o supplier/manufacturer location,
    - o serial number.

Packaging:

- Capacitors are typically packaged in plastic bags and cardboard boxes.
- Larger AC power capacitors are exclusively packaged in cardboard boxes to protect them from becoming damaged.

Legislative requirements

To ensure durability and safety, products must comply with the relevant EU regulations and standards. Compliance with EU legislation as well as non-legislative requirements is a basic condition for all exported products in the electronics and electrical engineering sectors. Please find the main mandatory requirements that your products must comply with below. Make sure you have familiarised yourself with the legal requirements in terms of labelling, dangerous substances, product safety and liability.

***Liability for defective products*.**

The liability applies to all products manufactured or imported into the European market. Typically, the company that brings the product onto the European market is responsible, but a claim can be passed on to the producer or exporter

Tip:

- Familiarise yourself with standards that specifically apply to your products. To ensure that your products are of high quality, review your quality assurance and testing procedure, e.g. through the implementation of an accredited quality management system (ISO 9001). Carefully formulate labels, instructions for use, and disclaimers. Finally, make sure your insurance covers product liability. See the document EU legislation: Liability for defective products. Also consult with EU Export Help Desk and ITC standards map.

CE marking.

Capacitors are components and are typically sold to equipment manufacturers. With a few exceptions, capacitors must have the CE mark. When capacitors are sold within an assembly line, sub-assembly line or as part of a finished good, they do not legally require a CE mark. However, as they are bound by market requirements, nearly all customers will still demand the CE mark for most components, in particular when the components are critical to the application (e.g. power capacitors). For capacitors, the following directives may apply:

- 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).

Tip:

- Apply for CE marking, which is required by many customers, also in cases when your product is a subsystem or part of a finished good and does not legally require the CE mark. If you are a manufacturer, you have to be familiar with the process of obtaining CE marking for capacitors. The European Commission has a very insightful website that illustrates the key steps to take from the start of the manufacturing process up to the trading of the product. See the following documents for more 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)

Waste of Electrical and Electronic Equipment (WEEE).

If you want to export electronic or electrical products into the EU, you have to take into account that your EU buyers have obligations regarding the waste of these products. EU producers are obliged to participate in product take-back schemes. Although this does not directly affect exporters from developing countries, its requirements may have an impact when EU buyers ask their suppliers to meet specific design requirements or to provide certain information.

Tip:

- Make sure your product design complies with WEEE and enable product recycling, recovery or dismantling. (Note that these requirements may differ per EU Member State.) Carefully formulate labels and mark products in accordance with WEEE (e.g., the symbol of the crossed-out wheelie bin). Get more information on the EU legislation on Waste Electrical and Electronic Equipment (WEEE).

Labelling of energy-related products.

EU producers and exporters are obliged to indicate energy consumption on household appliances and other energy-related products (the list is being extended into industrial used products. Check when importing your products and discuss this with your European customers).

Tip:

- Make sure you indicate all product details (including energy class, performance, capacity, noise level, etc.) required by the EU. See the EU legislation on energy labelling of energy using and energy-related products at EU webpage.

REACH regulation

to manage the risks from chemicals. This legislation restricts the use of certain hazardous chemicals used. Furthermore, it sets some requirements regarding information on the used chemicals. Manufacturers are required to provide their buyers with information on the properties of chemical substances used.

Tip:

- Ask your buyer for their requirements regarding REACH. List all chemicals, including raw materials and additional materials, used in your production process. See the EU legislation REACH on chemicals at EU webpage.

Non-legislative requirements

Although compliance with non-legislative requirements remains voluntary, buyers often request it. In effect, 'private' or 'voluntary' standards are often established by industry players themselves. They are regularly perceived by producers as a barrier to entering a market, but compliance equally constitutes an opportunity to enhancing export competitiveness for your product.

Quality management systems (QMS) – ISO 9001.

If you plan to export to Europe, all products must meet buyers' quality demands. ISO 9001 is designed to make sure that the manufactured and/or exported products to Europe meet the needs of customers. This document provides information on the world's most widely used QMS.
For automotive application, components within an assembly, subassembly, and finished goods have to meet quality demands outlined in *ISO/TS 16949 QMS*.

Tips:

- Apply for ISO 9001 as quickly as possible. Understand your target customers' requirements and if you plan to target the automotive industry, get ISO/TS 16949.
- Have a look at the document ISO Quality management systems.
- See automotive application-related requirements in terms of quality management systems also on the ISO webpage.

Functional Safety in accordance with ISO 26262.

ISO 26262 focuses on the functional safety of electrical and electronic systems in vehicles.

Tip:

- Apply for ISO 26262. Even though these requirements are not mandatory, they will definitely give you an advantage over other exporters from developing countries serving partners in the vehicle industry. See the ISO webpage for more information on the guidelines ISO 26262.

Occupational health and safety in the electronic components sector (OHS).

Occupational health and safety issues are all aspects related to labour conditions and are very often part of EU buyers' social requirements for their suppliers.

Tip:

- Consider implementing a management system on OHS (e.g. OHSAS 18000). European buyers are increasingly becoming more sensitive and need transparency in the supply chain and in labour conditions at all levels. Even though these requirements are not mandatory, they will definitely give you an advantage over other exporters from developing country if you can comply with them. Find more information on occupational health and safety in the electronic components sector at ISO webpage.

Electronic Industry Citizenship Coalition (EICC) Initiative.

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

Tip:

- Find out what buyers (what industry) may require the EICC code of conduct. Try to implement this policy; this will give you an advantage over other exporters. Explain your steps in this area on your website and in other company's literature. See the EICC website for more information on the sustainability initiative.

Polish National Standards (PKN) is responsible for the development and content of Polish standards.

National standards are harmonised with European and International Standards. Polish standards are designed for voluntary, common, and repeated use. However, for medical, toy, military, and some other applications, there are some additional standards at a country level, which have sometimes different limits/requirements vis-à-vis the European standards.

Tip:

- You should primarily aim for global compliance, but also consider country-specific requirements. Familiarise yourself with Polish standards, if you plan to enter this market. Even though these requirements are not (legally) mandatory, they are often required by buyers. The decision whether to apply for country-specific standards can be driven by the application industry you are aiming for. Besides, Waste of Electrical and Electronic Equipment standards are regulated on a country level. See the PKN website for more information on the national standards in Poland.

Trade Statistics

Imports and Exports

Poland's strong economy, which has grown by around 200% since 1989, has enabled the positive development of a number of industries and sectors, among which: the electronic components sector, the automotive industry and a number of other manufacturing sectors. Exporters from developing countries can benefit from the positive outlook for the electronic components industry in Poland. Optimise your production process in order to meet the current market requirements in this dynamically developing market (in terms of quality and design, as well as short production time and delivery terms).

Figure 1: Imports of capacitors to Poland in 2014, %

	German share of total import in EU+EFTA, 2014	CAGR* of total imports (2009-2014)	Share from developing countries of imports, 2014	CAGR of imports from developing countries* (2009-2014)
Imports	3.4%	12.9%	10.8%	9.9%

**Compound annual growth rate*

Source: Eurostat (2015)

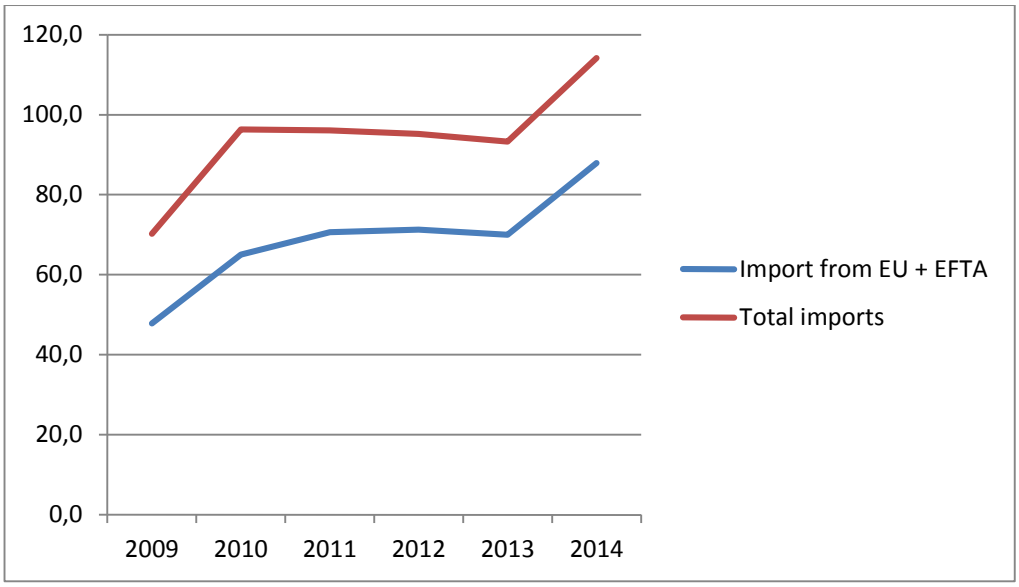
Figure 2: Exports of capacitors from Poland in 2014, %

	German share of total export in EU+EFTA, 2014	CAGR* of total exports (2008-2014)	Share from developing countries of exports, 2014	CAGR of exports to developing countries* (2009-2014)
Exports	1.0%	23%	3.6%	0%

**Compound annual growth rate*

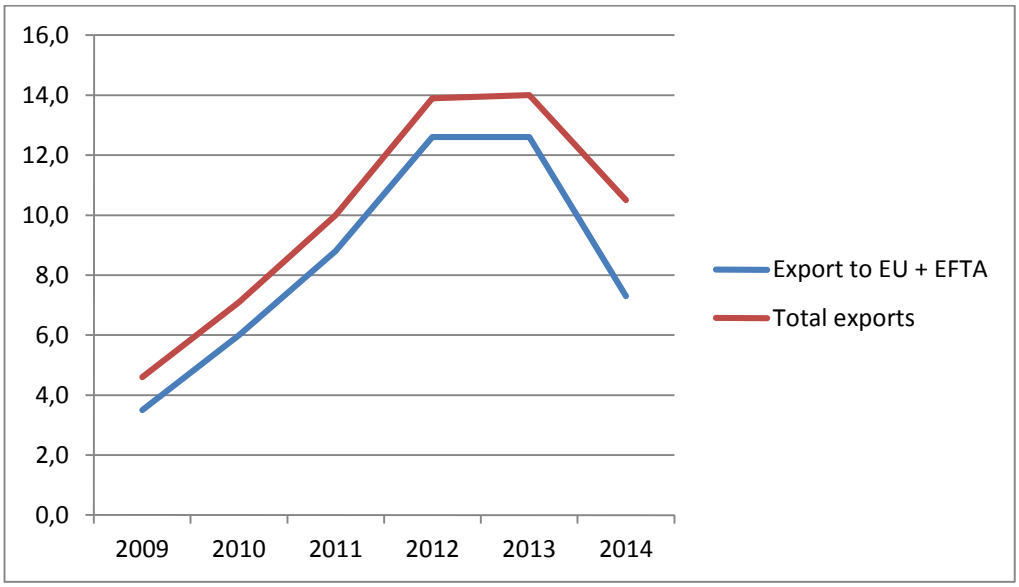
Source: Eurostat (2015)

Figure 3: Imports of capacitors to Poland, value in € million



Source: Eurostat (2015)

Figure 4: Exports of capacitors from Poland, value in € million



Source: Eurostat (2013)

Most important developments

Poland is the only economy in Europe that managed to avoid recession since 2008, benefiting from a positive development of electronics and electronic components, automotive, and other manufacturing sectors. Growing in-country production and demand for electronics in Poland has had a positive impact on the capacitors market in Poland. These developments have made the import of capacitors in Poland resilient to European economic downturn. Imports of capacitors continue to increase in Poland.

Tip:

- Poland's strong economy, growing automotive industry and other manufacturing industries mean a potential source of business for exporters from developing countries entering this market. Work on your value-for-money proposition for capacitors to meet the growing demand of electronic components and the market's requirements such as quality and design, as well as short production and delivery terms.

Poland's import of capacitors from developing countries has shown sustainable growth between 2009 and 2014. The role of imports from Turkey (CAGR 70% in 2009-2014), Malaysia (CAGR 43% in 2008-2012), and Indonesia (CAGR 148% in 2009-2014) has been growing significantly over the last 5 years, partially riding high on some countries' proximity to Poland (e.g., Turkey), as well as on a better-priced product offering compared to European manufacturers, and short production and delivery terms

Tip:

- Any developing country with a profound know-how of the production of capacitors and good product quality (as described in the Product Specifications in this report) has opportunities for entering the European market. Optimise your production process to be able to meet short delivery terms. Geographical proximity may be also advantageous for cooperation initiation (e.g. for suppliers from Turkey and Ukraine).

Poland's export of capacitors saw an upward trend after a drop in 2009. Exports to European markets such as the Czech Republic, Lithuania, Switzerland, and the UK registered a significant growth, demonstrating an increasing role for re-exports. Exports to European markets have fallen since 2013 as the market for re-exports slowed down due to the fact that suppliers decided to supply European countries directly instead.

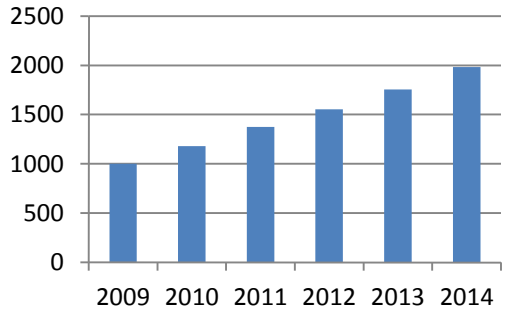
Tip:

- Consider targeting other European countries through re-exports besides direct exports by supplying Polish OEMs and distributors with passive components.

Production and Consumption

Manufacturing in Poland has been enjoying an output growth during times of Eurozone crisis (started in 2009), being in a more advantageous position in terms of costs, geographical position, and economic growth than other European countries. Suppliers of electronic components are recommended to target Polish distributors of components and Original Equipment Manufacturers (OEMs) of electronics and electrical engineering, as well as automotive, automation of manufacturing processes, and electronic lighting.

Figure 5: Total production of electronics and electrical engineering in Poland, value in € million



Source: Prodcom data extrapolated, 2015

Most important developments

According to experts from Business Monitor International, Poland's electronics and electronic components industry will see a gradual growth in 2013 and 2014. Poland is far behind the top-5 countries in terms of the production of electronics and electrical engineering, but it posted the third strongest growth (CAGR 13% in 2009-2014) in Europe, following Croatia (CAGR 21.6% in 2007-2011) and Ireland (CAGR 42.5% in 2007-2011). Growth is expected to continue at a two-digit pace in the near future (meaning 2016).

Tip:

- Consider supplying Polish distributors and OEMs of electronics and electrical engineering, as well as automotive, automation of manufacturing processes, and electronic lighting with low-cost passive components, including capacitors, to support the expected growth of the electronics and electronic components industry.

The demand for capacitors is driven by the growing amount of electronic components required in automotive application, growing energy demand, and renewable energy development, as well as the growing importance of new markets such as electronic lighting and automation of manufacturing processes. All these sectors saw a sustainable growth in Poland, thus driving up demand for passive components. Moreover, the market for power transmission solutions is expected to grow by 9% in 2008-2015 in Eastern Europe, also pushing up the demand for power capacitors. (Source: Siemens Energy MOP3 – scenario "Base" Case 2008).

Tip:

- Depending on your production capacity and know-how, consider supplying capacitors to new markets such as electronic lighting and automation of manufacturing processes. Both are rapidly developing in Poland. When, supplying power capacitors, mind the performance, quality, and efficiency improvement trends in electronic solutions.

Market Trends

Most important developments

Product innovation: Miniature electronic products for safer and more exact works are increasingly penetrating the market. Thus, miniature robots are an important development for the installation and test purposes that can be applied for catastrophe or disaster regions.

Tip:

- Continue innovating and investing in new product design and launching capacitors that answer the market trends. Expand your product range, launching miniature capacitors (examples can be found at the leading capacitors makers such as AVX).

Product quality: As the demand for energy grows, contemporary electronic systems need to be able to handle higher voltages. This means that there will be more stringent requirements for product quality, safety, and efficiency. However, the Polish electronics industry is specifically focused on consumer electronics or white goods, which has to comply with considerably fewer high-quality requirements than the military, aerospace or automotive industries.

Tip:

- Meet the safety and quality demands by integrating a quality assurance programme in your production process. Work on production process optimisation and delivery time reduction. Make your production process more efficient and flexible 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.

Service quality: The lead time shortens and supplier reliability plays an even more significant role in cooperation.

Political measures: A number of EU Directives has been issued in the last few years that accelerate the development of renewable energy sources and diminish the industrial impact on the environment (CO2 emissions). As a result, electronic systems and components become more efficient and environment-friendly.

Tip:

- Work on the efficiency improvement of capacitors through energy loss reduction, thus reducing the environmental burden (CO2 emissions) and making the electric systems more cost effective.

Product design: Not only the product quality is essential for European OEMs, but also the product design is increasingly important. developing countries need to work on acquiring Europe's best practices not only in quality standards implementation, but also in product design and presentation; e.g. no signs of handwork on the product surface, clean and accurate packaging.

Tip:

- Work on the improvement of product design and packaging. Work in line with European standards and follow all buyer requirements.

Minimisation of the total cost of ownership: European companies will increasingly face a variety of risks (e.g. increased international competition) that need to be measured and managed in order to keep the total cost of ownership (TCO: means financial estimate to help buyers or owners to determine the direct and indirect costs of a product) reasonably low. Both smaller and larger companies will increasingly be looking for the most reliable suppliers and will try to eliminate risk through supplier contracts and cost management.

Tips:

- Make sure that you constantly work to increase efficiency of all your processes including the value chain (e.g. transport). This will help you to keep the TCO low.
- European SMEs present better opportunities as potential customers for exporters from developing countries , but also larger companies may contact you as a potential supplier. That is why visibility on the market is crucial. Develop your sales and marketing strategy:
    - Work on 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 shows far in advance;
    - Work on your *Unique Buying Proposition, i.e.* why should European OEMs buy your product;
- Work on the product pricing.

For more information on market trends, please refer to CBI Trends for Electronics and Electrical Engineering.

Market Channels and Segments

See CBI Market Channels and Segments for Electronics and Electrical Engineering, as the viable trade route of capacitors in Poland does not differ significantly from the general trade route.

Market Competitiveness

See Competition for Electronics and Electrical Engineering, as the market competitiveness of Capacitors in Poland does not differ significantly from this general overview.

What are the end market prices for capacitors?

Price range for capacitors

Capacitors have a wide price range, which is indicated in the table below. For example, the price range of tantalum capacitors starts from € 0.04 to € 30 in Europe, depending on the specifications.

Main groups of capacitors for industrial, automotive, lighting, communication, and consumer applications	OEM volume price range, €
Aluminium capacitors	0.04 - 1
Ceramic capacitors	0.03 - 8
Tantalum capacitors	0.04 - 30
Metallised polyester film capacitors	0.06 - 3
Metallised polyester/polypropylene, AC	1 - 30
Variable trimmer capacitors	0.15 - 7

Producers from developing countries have to be aware of different costs and value chain margins that add to the product price. Production and administration costs of the manufacturer usually make 44-51% of the end price (OEM volume price). The production and administration costs should include all raw material costs, development, labour, and other fixed and administration costs. To develop a unique selling proposition, Exporters from developing countries will have to understand their own costs, liabilities, and responsibilities, and to analyse product market price levels.

OEM volume price breakdown	Margin
Production and administration costs	44-51%
Marketing and sales costs in developing countries	3%
Freight to Europe and other related costs	6%
Import and other (e.g. VAT, financing) costs	4%
Marketing costs in Europe	7%
Importer margin	8-10%
Distributor margin	20%

Main Sources

- Eurostat, URL: http://ec.europa.eu/eurostat/web/main/home
- Eurostat Prodcom, URL: http://ec.europa.eu/eurostat/web/prodcom/overview
- Manufacturers database in Poland: http://www.electro-poland.com/
- Online news portal: http://ep.com.pl
- Online news portal: http://elektronikab2b.pl/
- The institute of electronic market in Poland: http://www.ire.pl
- Electronics and electrical web directory: http://www.elecdir.com
- FBDI, URL: www.fbdi.de

Useful Sources

Leading trade fairs in Europe

- Electronica (www.electronica.de)
- CeBIT (www.cebit.de)
- Hannover Messe (www.hannovermesse.de)
- EFA (www.efa-messe.com) Embedded World (www.embedded –world.de/en)
- belektro (www.belektro.de)
- PCIM (www.pcim.com)
- SPS IPC DRIVES (www.mesago.de/sps)
- Light & Building (www.light-building.messefrankfurt.com

Leading trade fairs in Poland

- International power industry fair Expopower (www.expopower.pl)
- Electrotechnika (http://www.biztradeshows.com/trade-events/electricity-warsaw.html)
- Light Expo (http://www.biztradeshows.com/trade-events/light-warsaw.html).

More information

CBI market information:

- Trade Statistics for Electronics and Electrical Engineering;
- Trends for Electronics and Electrical Engineering;
- Market Channels and Segments for Electronics and Electrical Engineering;
- Competition for Electronics and Electrical Engineering;
- Product Fact Sheet Capacitors in the UK.

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