

ABB ELDS contribution to the ECHA consultation on PFAS

ABB Electrification Distribution Solutions (ELDS)

ABB ELDS is a part of the ABB group covering the segment of electrical distribution systems in medium voltage (MV) up to 52 kV. ABB ELDS is market leader in power distribution solutions. ABB ELDS serves the EU, as well as the global market, with products produced in both within and outside of the EU. For a wide range of products, the lead development centres and the lead factories are located in Europe. ABB ELDS factories in the EU are located in Germany, Finland, Poland, Czech Republic and Italy with a total of several thousand employees. In addition to direct jobs, we are connected to a wide supplier base in the EU, serving ABB with components and material.

The product portfolio of ABB ELDS covers a wide range of products required for the distribution of electricity. These products are important for the EU electrification by upgrading and extending the electrical networks. Due to the growing distributed energy generation in the medium voltage level by wind and solar power, we expect a significant growth of the segment in the coming years.

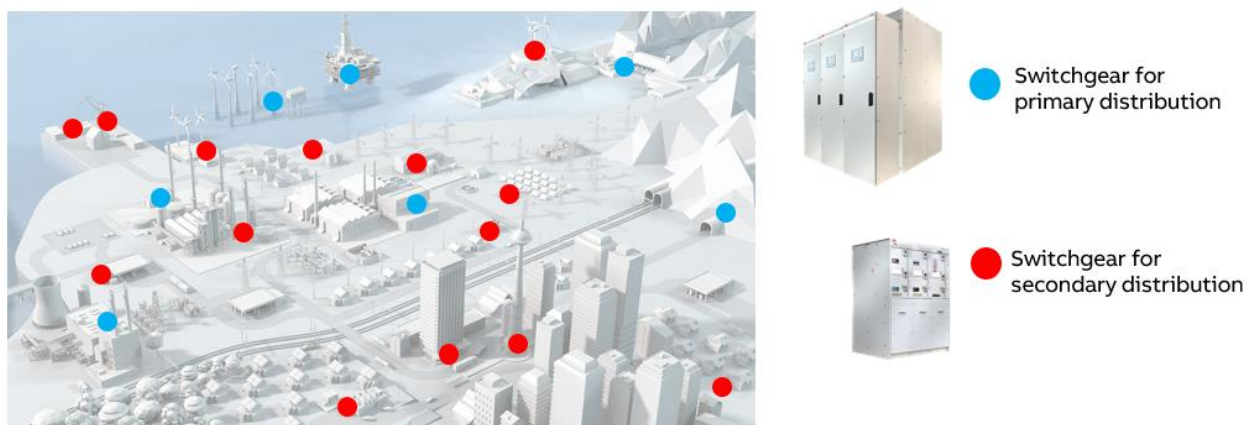


Figure 1: Location of products of ELDS in a typical electrical MV network

Medium voltage switchgear are the top product level in the distribution network. They are either air insulated (AIS) or gas insulated (GIS). Many of the components are designed and manufactured by ABB, such as circuit breakers, cable bushings, instrument transformers and control- and protection relays. These components are used to build ABB switchgear, but are also manufactured for other companies to be used and sold in their own products. In some markets, outdoor circuit breaker are used in the network without a switchgear. Special applications as railway use e.g. a circuit breaker on the train.

The main requirement for the complete product range is the high quality and reliability level, as the lifetime expectation from the market is extremely high (>40 years) and the maintenance effort for the customer has to be kept low. Failure rates of the products are expected to be extremely low. This requires the use of top quality materials with outstanding performance, reliability for a wide temperature range. All these requirements are supported by PFAS materials or PFAS additives in materials. A part of the complex ABB ELDS product portfolio and how they are linked together is shown in figure 2. The red arrows are pointing to the next level product of ABB, but these components are also sold to 3rd parties for their own products.

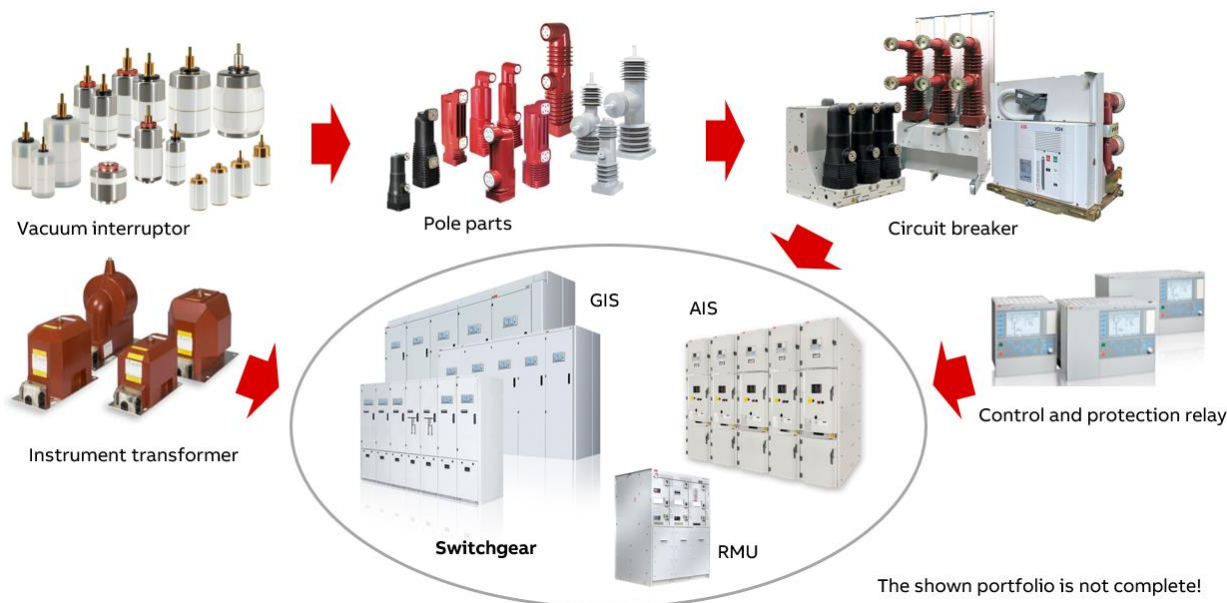


Figure 2: ELDS products and their use in ABB and non-ABB products

Why is ABB contributing to the ECHA consultation on PFAS?

As PFAS are widely used in electrical equipment, ABB ELDS, together with other manufacturers, will be strongly affected by the proposed restrictions, including the very broad ban at very low concentration levels.

ABB is committed to finding an alternative to replace PFAS in a realistic time frame, where it is technically possible, where it is advantageous for the environment and the society. For this we have prepared and uploaded specific contributions on the issue. We ask the ECHA technical experts to review these contributions carefully and consider them in the preparation of the final restriction, taking into account requested exemptions.

In case of additional questions, required background information or direct request for discussion, please feel free to contact us, using the contact details at the end of this document.

Contribution 7:

Topic: Epoxy resin in electrical equipment

Target: Exemption from the restriction for additional 5 years

Epoxy resin is a very important material for electrical equipment, especially for products >1000 V. As thermoset material it is very robust, can fill large volumes without voids (which is not possible for thermoplastics), is very durable and has very good dielectric and mechanical performance. For this it became a central construction material in electrical equipment decades ago in a huge number of applications. It has replaced porcelain which has been used in the beginning of electrification, which had some severe disadvantages and limitations. Epoxy resin is actually the most important insulating material in electrical equipment >1000 V and is used by every manufacturer. Even if for specific applications thermoplastic material is introduced, electrical switchgear >1000 V fully without epoxy resin are not possible today. A very wide range of components for the high voltage section are manufactured using different casting processes. Production volumes can reach very high quantities of several thousand units per year. The investment in manufacturing tools is very high, with several ten thousands of Euros per mold.

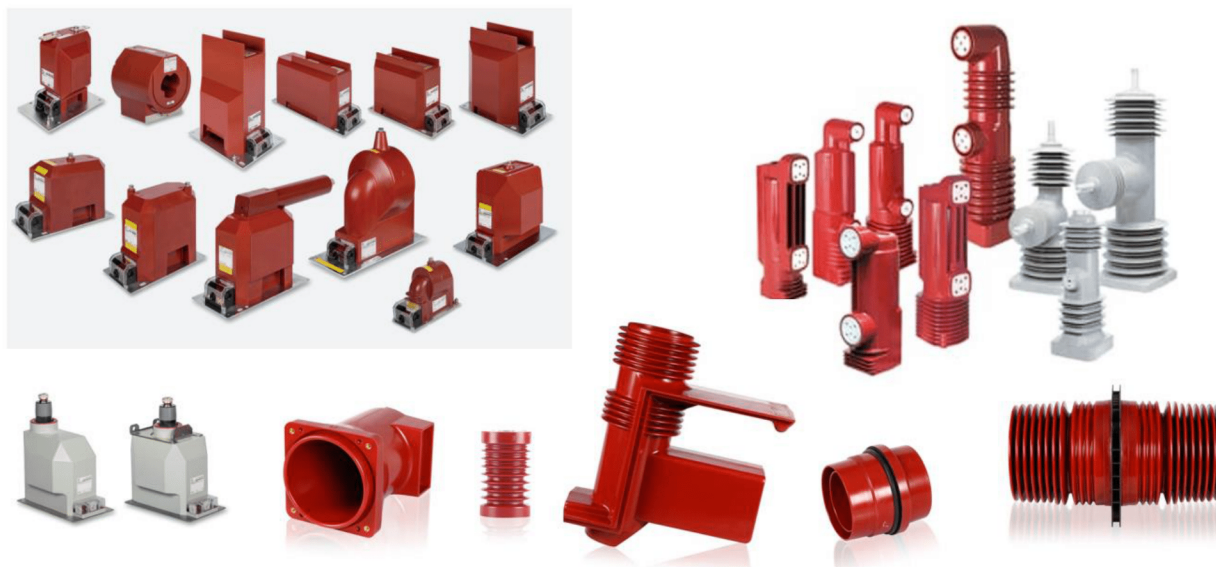


Figure 3: Some examples of the ABB ELDS products made with epoxy resin

Epoxy resin itself is no PFAS, but actually used brands that contain PFAS in the production process which are planned to be prohibited. The product itself might contain at least traces above 25 ppb, in case the PFAS is part of the chemical reaction in the curing of the epoxy from the components.

ABB is already working on the identification of PFAS in epoxy resin and has identified first materials from supplier not containing PFAS, covering at the time only a part of the applications. As the requirements on the epoxy resin are depending on the applications, e.g. if indoor or outdoor, the same epoxy resin cannot be used for every application. As the PFAS used for the curing process has also a significant impact on the quality, e.g. the generation of voids, not all alternatives working in principle and other applications can cover the high quality needs of epoxy resin used as insulation material.

The process of substitution in products is about to start, but it will take significant time to identify the acceptable material and afterwards to transfer all components and production sites to new epoxy resin materials. As epoxy resin components are vital for the electrical equipment, a multiple supplier requirement as company rule has to be considered. It is not possible to install single sources for such important materials as it would create an unacceptable supply risk. For the final products it needs to be considered where type tests or long-term aging tests need to be completed before the products can be launched to the market.

For this ABB ELDS asks for an extended transition time of additional 5 years to complete the transition to PFAS-free solutions.

Dr. Maik Hyrenbach

Corporate Executive Engineer

ABB AG

Oberhausener Str. 33

40472 Ratingen

Mobile: [REDACTED]

Phone: [REDACTED]

E-mail: [REDACTED]@de.abb.com