

**Joint SEMI and ESIA comments to the European Commission:
Proposed restriction of PFOA, its salts and PFOA-related substances
& the derogation for semiconductor manufacturing equipment**

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SEMI and ESIA welcome the derogation for substances and mixtures used in semiconductor photolithography processes and etching processes of compound semiconductors. We encourage the European Commission to adopt the paragraph 5(b) wording of the final Socio-economic Analysis Committee's (SEAC) opinion.

SEMI and ESIA also welcome the derogation for semiconductor manufacturing equipment and request that the European Commission further refine the text of the derogation, to better clarify its scope and address SEMI's concerns regarding access to spare parts and second-hand equipment.

Below we provide some comments in addition to our previous submissions during the ECHA consultations on the draft Annex XVII dossier and the draft SEAC opinion.

Quick facts about semiconductor manufacturing equipment:

Semiconductor manufacturing equipment are large scale highly complex installed systems, installed in advanced manufacturing sites and operated under strictly controlled, high-precision conditions.

- High-mix products: composed of approximately 10,000 components that are included on the bill of materials as separate part numbers, representing no fewer than 100,000 discrete articles per piece of equipment.
- Global industry with a global supply chain: semiconductor manufacturing equipment is sold and operated in many regions across the world (including Europe, US, Japan, Korea, Taiwan, China). Components are sourced from a large number of suppliers located around the world.
- Low volume/high value products: relatively few pieces of equipment are sold annually. The average price for new equipment varies widely, with many costing tens of millions of Euros and other, less expensive equipment, in the range of €500,000 to €1,000,000. Total revenue of 37 Billion US dollars in 2015.
- Extended service life: depending on the type of equipment, service life varies between minimum 10 to an average of 25, and often 30 years.
- Strong secondary market: due to the high value of the original product and its extended service life, equipment is sold on to other users - in 2014, 19% of 200 mm equipment purchased in Europe was second-hand equipment sourced from outside the EU or from other manufacturing sites in Europe.
- SEMI estimates that the articles incorporated into semiconductor manufacturing equipment placed on the EU market remain a marginal source of PFOA, estimated to be less than 10 kg per year.

How the proposed restriction impacts semiconductor manufacturing equipment

The proposed restriction could potentially impact a number of components and sub-components of semiconductor manufacturing equipment - the sector uses fluoropolymer-containing articles such as chemical containers, tubing, gaskets, ductwork, filtration systems, insulated conductors, small mechanical assemblies and various coatings.

SEMI and ESIA recommendations on the proposed restriction

1/ Non-time-limited derogation for second-hand semiconductor manufacturing equipment to be placed on the EU market, covering equipment both imported from outside the EU and already on the EU market.

- > Second-hand equipment represents a significant portion of the equipment that was bought by semiconductor manufacturers in Europe: in 2013, 20% of all second-hand 200mm equipment was shipped to Europe, and 19% was shipped into Europe in 2014¹.
- > The derogation for second-hand equipment should also cover imports of semiconductor manufacturing equipment from outside the EU:
 - Semiconductor manufacturing takes place in many regions and countries across the world (e.g. in Europe, USA, Japan, Korea, Taiwan, China) and second-hand equipment is sourced from these various sites. In addition, equipment is often relocated between manufacturing sites located in different regions within the same company (where each site is a different legal entity and therefore the relocation would be considered as placing on the market for the purposes of EU law).
 - Limiting Europe's access to quality second-hand equipment would place Europe at a competitive disadvantage compared to other regions of the world, because it would limit the pool of available second-hand equipment that semiconductor manufacturers in Europe can source from. As a result, semiconductor manufacturers will either have to purchase new more expensive manufacturing equipment, if they can, or will not be able to invest in new manufacturing capacity and will therefore fall behind in the global technology race.
- > Cost optimization is increasingly a concern for companies purchasing equipment to manufacture semiconductors, and access to second-hand manufacturing equipment is an important parameter. The next big drive in demand for semiconductors is the Internet of Things (i.e. smart connected objects helping deliver Smart Cities, Smart Mobility, Smart Health etc.). The Internet of Things will require a variety of different electronic devices (semiconductors) in large quantities. To invest in this next wave of semiconductors, companies are increasingly looking to the secondary market for manufacturing equipment to optimize their costs - [see this article for anecdotal evidence to this effect](#). The EU electronics strategy² and related industrial roadmap³ acknowledge and prioritise the Internet of Things as a significant growth opportunity for Europe.

2/ Non-time-limited derogation covering spare parts for semiconductor manufacturing equipment that was lawfully placed on the EU market.

- > Originally designed spare parts are needed to ensure that the semiconductor manufacturing equipment functions correctly for the full duration of its service life, which can vary from between 10 to 30 years, and on average is 25 years.
- > Most alternative spare parts cannot be introduced as drop-in replacements in this type of product. Semiconductor manufacturing equipment are used in advanced high-precision manufacturing – any change in the equipment and its components requires research, testing, validation of the alternative component and re-qualification of the entire piece of equipment to ensure it manufactures to the customer's specifications. This is a lengthy and costly exercise which probably would make little business sense for older models of semiconductor manufacturing equipment. Lack of originally designed spare parts may lead to the premature ending of the equipment's full service life and the unnecessary creation of waste.

¹ Source: [SEMI Secondary Fab Equipment Report, January 2015](#) – full report available upon request.

² European Commission Communication '[A European Strategy for micro- and nanoelectronic components and systems](#)', May 2013

³ [A European Industrial Strategic Roadmap for Micro- and Nano-Electronic Components and Systems](#), February 2014

- > Each piece of semiconductor manufacturing equipment will require a significant number of spare parts over its service life, as part of preventive maintenance to ensure the equipment functions to a high standard throughout its service life and also to prepare for resale.
- > Access to originally designed spare parts is in line with the 'repair as produced' principle, which is also enshrined in other EU legislation such the RoHS directive, and with the principles set out in the EU Circular Economy policy.
- > The derogation for spare parts for semiconductor manufacturing equipment should not be limited in duration by way of expiry date or links to date of production and should address spare parts for:
 - equipment already placed on the market before the restriction was adopted
 - equipment placed on the market before the expiration of the derogation for semiconductor manufacturing equipment
 - second-hand equipment.

3/ Derogation for at least 10 years for semiconductor manufacturing equipment, followed by a possibility to review

- > SEMI does not dispute the possible availability of alternative substances and alternative components. SEMI requests a derogation of at least 10 years, because the industry believes this is the minimum amount of time needed to continue our transition towards compliance, based on past experience in introducing alternative substances and components. For example, over the past 5 years the industry has been successfully transitioning to more suitable alternatives for certain known factory applications of PFOA, such as in certain filters and piping materials which have simple supply chains.
- > The extended derogation period will allow the industry to communicate with their supply chain to identify components potentially containing restricted substances and source suitable alternatives with an equivalent function and comparable lifecycle. The sophistication of the equipment and variety of operating processes means this is a complex and rigorous process requiring extensive testing and validation of alternatives to ensure a high level of confidence prior to customer qualification, and may require a similarly rigorous process to be applied in the development and approval of a new supply chain.
- > Companies producing semiconductor manufacturing equipment do not have any significant influence over the use of PFOA or PFOA-related substances. The bill of materials for Semiconductor Manufacturer Equipment can easily contain 10,000 or more unique items. Many of these items, however, are complex products designed by other companies and also each consisting of further components, and so on, representing several tiers of supply chain and thousands of upstream company design choices in that chain. Therefore the total number of simple articles in a piece of semiconductor manufacturing equipment can be 10 or 100 times higher. The manufacturer of semiconductor manufacturing equipment typically does not have access to the bills of materials used by their suppliers.

SEMI and ESIA proposed language for the restriction

SEMI and ESIA suggest the following language to clarify the scope of the derogation for semiconductor manufacturing equipment *[language in bold signifies additions/revisions to SEAC proposed language]*:

Paragraph 6

6) By way of derogation, paragraph 2 shall not apply to:

...

f) the placing on the market of semiconductor manufacturing equipment ~~for a period of 5 years after before~~ [date of entry into force + 10 years], as well as for an unlimited period of time the articles intended to maintain, repair, refurbish or reuse such equipment; and, the placing on the market of second-hand semiconductor manufacturing equipment produced before [date of entry into force + 10 years], as well as for an unlimited period of time the articles to maintain, repair, refurbish or reuse such second-hand equipment.

Regarding the derogation for spare parts, SEMI and ESIA recommend that the generic derogation under draft paragraph 6(d) is also revised to reflect the 'repair as produced' principle and acknowledge the technical requirements for integrating new/different spare parts into older products. In this respect, we also support the proposals submitted by DIGITALEUROPE.

Paragraph 6

d) the placing on the market of ~~spare parts~~ articles intended for the repair, reuse, updating of functionalities or upgrading of capacity of products placed on the market for the first time before the date of entry into force ~~if the spare parts are already produced at the date of entry into force, and the date of production can be demonstrated;~~

Final Comments

SEMI and ESIA would like to state our concern that the proposed thresholds and lack of practical standardised analytical methods make compliance infeasible. This restriction will meet the EU's Better Regulation principles, only if it is practically actionable and enforceable both by industry and by public authorities. Analytical methods for the proposed thresholds that are applicable to a wide array of articles and standardized methods of conveying the information need to be available at the time the restriction is published at the latest, so that companies can test their products, and ensure they comply with the restriction at the end of the transition period.

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About SEMI

SEMI is the global industry association serving the nano- and microelectronics manufacturing supply chains. SEMI's 2,000 member companies are the engine of the future, enabling smarter, faster and more economical products that improve our lives. SEMI Europe represents around 280 companies headquartered in Europe and active on the global market, and over 80% of these are small or medium-sized enterprises. Since 1970, SEMI has been committed to helping members grow and meet common industry challenges, with activities including trade shows, conferences, industry standards, research and market data and industry advocacy.

About ESIA

The European Semiconductor Industry Association (ESIA) is the voice of the Semiconductor Industry in Europe. Its mission is to represent and promote the common interests of the Europe-based semiconductor industry towards the European Institutions and stakeholders in order to ensure a sustainable business environment and foster its global competitiveness. As a provider of key enabling technologies the industry creates innovative solutions for industrial development, contributing to economic growth and responding to major societal challenges. Being ranked as the most R&D intensive sector by the European Commission, the European Semiconductor ecosystem supports approx. 200.000 jobs directly and up to 1.000.000 induced jobs in systems, applications and services in Europe. Overall, micro- and nano-electronics enable the generation of at least 10% of GDP in Europe and the world.