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JP4EE comments to MDEP CONCEPT DRAFT LANGUAGE FOR PFAS IN PRODUCTS RULE POSTING DRAFT under Maine law 38 M.R.S. §1614

https://www.maine.gov/dep/rules/index.html#13139124

Name of the associations which make this input:

The Japanese electrical and electronic industrial associations:

JEITA (Japan Electronics and Information Technology Industries Association)
CIAJ (Communications and Information Network Association of Japan)
JBMIA (Japan Business Machine and Information System Industries Association)
JEMA (Japan Electrical Manufacturers' Association)

The four Japanese electrical and electronic industrial associations – JEITA, CIAJ, JBMIA and JEMA (hereinafter JP4EE) – hereby express gratitude to the Maine Department of Environmental Protection (DEP)'s for years of efforts to preserve, improve and prevent diminution of the natural environment of the State. We conduct our businesses in the US and all over the world and are firmly committed to protecting human health and the environment and to complying with chemical substance legislations as defined by the countries and regions where we operate. Also, we support active prevention or minimizing chemical pollution by hazardous PFAS. In this spirit, we have carefully and conscientiously examined the MDEP CONCEPT DRAFT LANGUAGE FOR PFAS IN PRODUCTS RULE POSTING DRAFT and confirmed some of our comments to the concept draft submitted in August 2024 have been reflected. We would appreciate that MDEP accepted industry's concerns and recommendations which make the regulation feasible. However, since there are still concerns remained in the posting draft, we would like to submit our comments and recommendations here.
We would highly appreciate the Maine DEP would carefully consider our input.

We submitted our general comments on the Maine PFAS law at Submission Requirements on Currently Unavoidable Uses (CUUs) conducted in December 2023 and Comment submission to the MDEP CONCEPT DRAFT LANGUAGE FOR

PFAS IN PRODUCTS RULE in August 2024. Nevertheless, we would also like to submit them again in attachment 1 to 3 since our basic position is still unchanged and valid.
Also, we would like to submit our comments to each section on the posting draft language published in this time as follows.

JP4EE comments to each section

1. Definition

(i) The definition of "Article" should be newly added to Subsection 1.

"Article" is solid state products and the chemicals in the articles are designed to be kept in the products in many cases. Especially for the longer life products such as electrical and electronic equipment, the performance and safety must be kept during their expected useful life, therefore the users are seldom exposed to chemicals in products in use phase.

In considering such features of the articles, most of chemical laws including the U.S. TSCA set different requirements for them from the chemical products. For example, TSCA PFAS reporting (Section 8(a)(7))has set special conditions for the imported articles in order to make the reporting feasible for the importers. We consider that Maine regulations should align with the U.S. and global handling of the articles in order to smooth distribution of daily-use products.

Our proposal to Subsection 1 A. 10： We consider the definition of "Article" same as TSCA defined at 40 CFR 704.3 and others. The U.S. EPA proposed this definition also to Section 751.1 of PART 751 "REGULATION OF CERTAIN CHEMICAL SUBSTANCES AND MIXTURES UNDER SECTION 6 OF THE TOXIC SUBSTANCES CONTROL ACT" in May 8th 2024.
https://www.govinfo.gov/content/pkg/FR-2024-05-08/pdf/2024-09606.pdf

Article means a manufactured item
(1) which is formed to a specific shape or design during manufacture,
(2) which has end use function(s) dependent in whole or in part upon its shape or design during end use, and
(3) which has either no change of chemical composition during its end use or only those changes of composition which have no commercial purpose separate from that of the article, and that result from a chemical reaction that occurs upon end use of other chemical substances, mixtures, or articles; except that fluids and particles are not considered articles regardless of shape or design.

(ii) A. 10. Cookware product.

The scope of "cookware products" should be clarified as non-electric cookware products including those exampled in A-10 such as pot, pan and bowl. The definition of "electronics" proposed by this posting draft language may also be applicable to electric cookware products, because they have electrical, digital, magnetic or similar capabilities.

In current posting draft language, “Cookware product” is defined as follows;
“Cookware product” as defined at 38 M.R.S. § 1614(1)(A-10) is limited to houseware intended to be in direct contact with food or beverage.
However, in this definition it is unclear whether “houseware” includes electric cookware products.

Electric cookware may have some parts which may be in direct contact with food but is composed of many electronic parts which are non-contact with foods and considered to be currently unavoidable uses (CUU) , as other consumer electronics (see our comments in Subsection 4 and 9(iii) below). Please note that our proposal for CUU has included many electric cookware such as Microwave Ovens (GPC 10001952). The currently proposed wording in the posting draft creates a legal uncertainty, that is, if an electric cookware has food-contact-parts and electronic parts which would be considered as CUU, how to treat such cookware under this definition? For example, EU REACH Regulation or RoHS Directive set detailed exemptions within a product, but such operation creates so heavy burden both on the authorities and the industry. MDEP has considered CUU to be set for each product category as a whole which is identifiable by GPC, etc.. On the other hand, MRSA §1614(4) has set the exemptions by broader categories than GPC. We support the ways of setting CUU or exemptions not for the parts or applications in a product level but for the whole product level (i.e. broader categories than GPC).
Following case might be happened for example. If the “cookware products” would include electric cookware, Maine people would not be able to buy any Microwave Ovens on and after January 1st , 2026.

About PFAS in electronic products, we consider as follows:
Firstly, electric products (complex articles) contain very small amount of PFAS if used in the first place.
Secondly, exposure of chemical substances from electric products (complex articles) are negligible in normal use since they are designed to be durable so that chemical substances in the article are not exposed to ensure functionality during their long lifetime.
We consider that these are also applicable to electric cookware.

Therefore, as electric cookware poses little risk to human and the environment compared to non-electric cookware, we request that the definition be revised as follows.

Our proposal to Subsection 1 A. 10：
“Cookware product” as defined at 38 M.R.S. § 1614(1)(A-10) is limited to houseware intended to be in direct contact with food or beverage.
<u>“ houseware” does not include electric cookware products, such as microwave ovens, are classified as electronic equipment.</u>

3. Notification

(i) Subsection 3. A indicates as follows.

… this prohibition is effective immediately for all covered products, including those already in the stream of commerce. …

Normally, manufacturers don't have ownership for stocks distributed in the market (i.e. products already in the stream of commerce) after selling their products to distributors and cannot control sales of such stocks. From the perspective of the distributers in Maine, the products which they had already and legally purchased will suddenly become incompliant after the date of prohibition. In such cases, they will be forced to dispose them and owe the cost for it. This might cause confusion in the distribution of consumer electronic products in the State of Maine. In order to make the requirements feasible and manageable for manufacturers of the products and to avoid the possible confusion, we would propose that the prohibition applies to products manufactured after the date of prohibition. This measure will make all the products compliant before they are sold to Maine, and the distributers will be able to keep their business in peace.

Our proposal to Subsection 3. A:

Upon the applicable effective date listed in Section 5 a product containing intentionally added PFAS <u>**and manufactured on or after the date**</u> is prohibited from being sold, offered for sale, or distributed for in the State of Maine, including any products to which a currently unavoidable use determination may apply…

(ii) Subsection 3A(1)(b) should be more flexible for the imported products and should include consideration of the confidentiality.

Section 3A(1)(b) requests manufacturers to submit an estimate of the "*total number of units*" sold annually in the State of Maine or nationally. The appropriate unit for such estimation depends on the form or type of the product. Even under TSCA PFAS reporting, which only requires reporting about the past record, allows to select appropriate unit of measurement for reporting of the imported products <u>under § 705.18 "Article importer and R&D substance reporting options"</u>.

In addition, we assume this consists of sales that were made in the past calendar year prior to the notification submission date, but detailed sales plan or estimation generally belongs to each company's confidential business information. Therefore, this item of the individual notification should not be published if the submitter of the notification states that it is confidential.

Our proposal to Section 3A(1)(b):

(b) An estimate of the total number of units sold annually in the State of Maine or nationally. <u>**For the products imported from the outside of the United States, such estimation may be reported by using any of the following unit of measurement provided that such unit used in the reporting is clearly specified by using following code**</u>:

<u>**Code**</u>	<u>**Unit of measurement**</u>
<u>**LB**</u>	<u>**Pounds.**</u>

<u>TN</u>	**<u>Tons.</u>**
<u>QT</u>	**<u>Quantity of imported products.</u>**
<u>O</u>	**<u>Other (must specify).</u>**

<u>The Department must not publish this part of each notification when the submitter of the notification clearly states that such estimation belongs to business confidential information of the submitter. The data aggregated from the notifications may be published.</u>

(iii) Subsection 3.A.(1)(d) :About the identification of PFAS:

For PFAS substances in which the specific CASRN is unknown, DEP would still require IUPAC chemical name in Section 3A(1)(d)(i) and (ii). However, upstream suppliers may not be able to disclose any more information than that the substances are PFAS due to trade secret (confidentiality) reasons. Especially for many of the article importers, they only purchase the articles and cannot obtain the detailed information on chemical contents in the articles because almost all the global chemical regulations including TSCA do not require Chemical Data Reporting or Safety Data Sheet (SDS) for the articles (Normally, SDS is not created for articles). In that case, we will not be able to obtain such chemical name information and therefore would like DEP to approve a submission that simply indicates the “use of PFAS”. More concretely, an option similar to TSCA §705.18 (a) (2) (ii) should be allowed.

Our proposal: Following subparagraph (iii) should be added after the Section 3A(1)(d)(ii):

<u>(iii) If the specific chemical identity of the PFAS imported in a product (an article) is not known to or reasonably ascertainable to the submitter of the notification (e.g. if the chemical identity is claimed as confidential business information by the submitter’s supplier, or if the submitter knows they have a PFAS but is unable to ascertain its specific chemical identity), the submitter may provide a generic name or description of the PFAS.</u>

(iv) Subsection 3.A.(1)(e): About the amount of each of the PFAS in the product or any product component:

Section 3A (1) (d) (i) to (iii) requires that the amount of each of the PFAS in the product be determined by analysis or, if this is not possible, the total organic fluorine be reported and, if this is neither possible, the amount shall be reported based on information provided by a supplier or “as falling within a Department-approved range”, which seems to be indicated in the online notification system. We would like to ask MDEP for clearly mentioning the range, more concretely, options similar to those under TSCA §705.18 (a) (2) (viii) should be allowed.

The amount of individual PFAS in complex articles cannot be measured by analysis (no commercially available analytical method for PFAS in complex articles), and the analytical method of the total organic fluorine cannot be practically conducted for such articles due to the difficulty of sample preparation. Upstream suppliers may not be able to provide information on PFAS content due to trade secret reason. Even if not, the article purchasers cannot obtain the detailed information on chemical contents in the articles because almost all the global chemical regulations including TSCA do not require Chemical Data Reporting or Safety Data Sheet for the articles as mentioned above.

Our proposal to Subsection 3.A.(1)(e) :

(iii) based on information provided by a supplier or as falling within a range approved by the Department.

<u>For amount of PFAS in the imported products (articles), submitters of the notification may select from among the ranges of concentrations listed in the following table.</u>

<u>TABLE — CODES FOR REPORTING MAXIMUM CONCENTRATION OF PFAS IN AN IMPORTED PRODUCT(ATRICLE)</u>

<u>Code</u>	**<u>Concentration range (% weight)</u>**
<u>AM1</u>	**<u>Less than 0.1% by weight.</u>**
<u>AM2</u>	**<u>At least 0.1% but less than 1% by weight.</u>**
<u>AM3</u>	**<u>At least 1% but less than 10% by weight.</u>**
<u>AM4</u>	**<u>At least 10% but less than 30% by weight.</u>**
<u>AM5</u>	**<u>At least 30% by weight.</u>**

4. Exemptions.

Currently, 38 MRSA §1614(4) and this posting draft exempt only non-consumer electronics regarding electronics products as follows:

(11) A semiconductor, including semiconductors incorporated into electronic equipment, and equipment and materials used in the manufacture of semiconductors;

(12) Non-consumer electronics and non-consumer laboratory equipment not ordinarily used for personal, family or household purposes; and

(13) Equipment directly used in the manufacture or development of products described in subsections 5 through 12, above.

We understand that this Subsection is based on 38 MRSA §1614(4) but would like to explain here again that the unfeasibility of the ban of consumer electronics containing PFAS. And we would like to highlight that consumer electronics should be also exempted in addition to exemptions listed in the Subsection 4.

Our proposal to Subsection 4: Following exemption should be added to the Subsection 4 as follows:

<u>(14) Consumer electronics</u>

Detailed explanation on our proposal:

It is important to understand that the technology used in both consumer and non-consumer electronics is nearly identical. As consumer products increasingly require advanced functionality and digitalization, the need for PFAS becomes unavoidable. Current Subsection 4(11) exempts semiconductors, but currently unavoidable uses of PFAS in consumer electronics are not limited to the semiconductor units.

PFAS plays an essential role in modern consumer electronics, providing critical functionalities that cannot be achieved with other materials. Its unique ability to deliver multiple high-level functions simultaneously is the main reason for its use. These functions include:

1. Optical function
2. High-speed communication/transmission function
3. Piezoelectric function
4. Sliding function in mechanical section
5. Display function (Liquid crystal)
6. Safety and safety functions
7. Functional surface
8. ~~Semiconductor~~ Note: Exempted by 38 MRSA §1614(4)(K)

~~9. Thin film device production process~~ Note: Exempted by 38 MRSA §1614(4)(M)

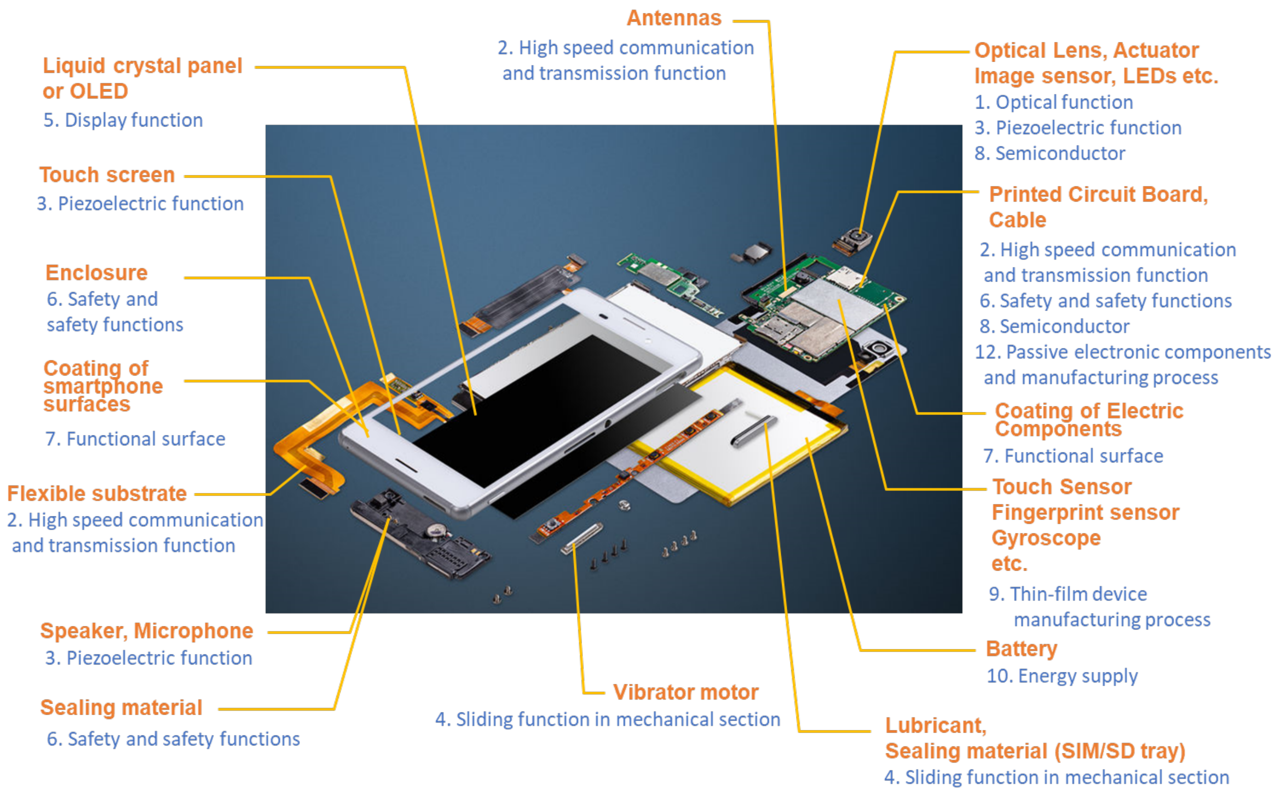
10. Energy supply (Battery, Fuel cells, Solar cells)
11. Refrigeration, Air-conditioning and heat pump sector RACHP (Refrigerant)
12. ~~Passive electronic components and manufacturing process~~ Note: Exempted by 38 MRSA §1614(4)(M)

These functionalities are not abstract or generalized; they are the foundation of modern, high-performance consumer electronics. We would like to illustrate this point using mobile phones as an example.

Mobile phones, which are considered to be classified as consumer electronics, are not covered by the exemptions permitted for non-consumer electronics under proposed Subsection 4. In modern mobile phones, PFAS are needed for many purposes, including semiconductors that handle processing power, displays with high power consumption efficiency, high-speed communication that achieves excellent electrical performance, and coatings for durability and protection. Unlike older analog phones, which could be manufactured without PFAS, today’s mobile phones cannot be produced without it.

PFAS uses which are currently unavoidable in a mobile phone

A mobile phone contains many electronic parts.
Many of those parts use PFAS as listed below.



If consumer electronics are not exempted, Maine residents may face significant challenges in accessing essential devices like mobile phones, televisions, personal computers, and refrigerators.

We understand that 38 MRSA §1614 and the posting draft provide other measure to cope with this issue, that is, applying "Currently-Unavoidable-Use (CUU)" derogations. However, these technological issues are common to the whole industry and the product categories needing CUU are extremely large in number, as we provided the list before. In addition, many other complicated articles in EEE have been already exempted from 38 MRSA §1614 but only the consumer electronics remain to be regulated. In such situation, we believe that setting a new exemption should be better for both MDEP and the industry, from the viewpoint of avoiding administrative burden, than getting huge number of applications from the industries in many countries and regions.

The use of PFAS in consumer electronics is not arbitrary—it is a necessity. When substituting chemicals in EEE, the performance of the finished products must be guaranteed. This performance requirement persists even when potential alternatives with similar uses exist. PFAS's multifunctionality is unmatched, and its use is restricted to situations where no viable alternatives exist.

Accordingly, if a product model does not require such high performance, it would not be necessary to use PFAS.

However, other similar but “high-grade” models may demand higher performance and therefore require PFAS. For example, fixed analog phones could be manufactured without PFAS but current mobile phones cannot be, and the residents in the state of Maine will not be able to purchase the mobile phones within the State if consumer electronics is not exempted nor granted as CUU at least. The situation would be the same for other consumer electronics today such as televisions, personal computers, refrigerators, etc. We are concerned about not only obliging the Maine citizens inconvenience, but also adverse impact to the economy in the state caused by this PFAS prohibition.

Importantly, the necessity of PFAS cannot be distinguished solely by the product category as classified under the Global Product Classification (GPC) system. Moreover, PFAS-based materials are significantly more expensive, often costing several to over ten times more than non-PFAS materials. For this reason, PFAS is only used in applications where its multifunctionality is indispensable and essential to meeting the performance requirements of the product.

In addition to their selective use based on performance requirements, PFAS used in electronics products, whether in consumer or non-consumer applications, have a very low vapor pressure, meaning they do not volatilize at room temperature. These substances are designed to ensure that they remain in the place where they are applied, even under harsh environmental conditions, so that their performance can be demonstrated. As a result, we believe it is highly unlikely that PFASs will be released into the environment from these products during the use phase.

It is also important to note that, according to the European Chemicals Agency (ECHA), the electronics and semiconductor sectors account for less than 1% of PFAS use and emissions. We believe a similar situation exists in Maine. This demonstrates that the environmental impact of PFAS use in electronics is minimal compared to other industries.

Finally, durable, high-performance electrical and electronic equipment is vital for modern society. Without PFAS, it would be nearly impossible to meet the performance demands of modern electronics. Before introducing strict regulations, it is essential to conduct a thorough socio-economic assessment. Such an assessment would ensure that regulations are both feasible and enforceable, avoiding unintended consequences for consumers and businesses alike.

5. Prohibition on Sale of Products Containing Intentionally Added PFAS

Under Subsection 5.H, prohibition provision applies to a retailer who sells, offers for sale or distributes for sale after receiving a notification pursuant Section 8(2). However, for example, it is possible that a company voluntarily notifies a retailer that certain products are subject to prohibition after 2026. Nevertheless, if the retailer continues to sell the PFAS-containing products despite the company’s notification, we believe the retailer will be solely liable for violating the prohibition. The rule should specify who is responsible for violations in such a case.

9. Currently Unavoidable Use.

We would welcome that the DEP clearly specifies the renewal of CUU in the concept draft. In order to ensure the CUU scheme made feasible, we would like DEP to further consider the following issues to be solved.

(i) About the timing of submitting the currently unavoidable use proposals:

In 9.A, the text indicates as follows.

… *For initial currently unavoidable use proposals, the requester shall submit the information in this Section no later than 18 months prior to the applicable sales prohibition. The Department will not consider any proposals for an initial currently unavoidable use determination prior to 36 months in advance of the applicable sales prohibition …*

We are concerned tha t the CUU proposal submitted within the period will not be determined until just before the date of prohibition or even after the date of prohibition. Also, we are seriously concerned that there is a possibility of causing disruption of the supply chain because of not immediately completing substitution of components containing PFAS in target products and/or inconvenience for the Maine citizens because of not providing necessary products if the CUU proposal would not be granted just before / even after the date of prohibition. A manufacturer who submitted the CUU proposal believes the proposal is to be granted and can continuously distribute the products containing PFAS. He submits the CUU proposal because substitution is impossible. While he must continuously study and examine substitution of PFAS, it cannot be immediately achieved. If the proposal would be rejected, he cannot immediately substitute the PFAS.

As a precedent of prohibiting substances in complex articles, EU RoHS Directive, which is now recognized as de-facto standard for the restriction of hazardous substances in EEE, has an exemption clause for certain uses. RoHS Directive requires to submit renewal application by 18 months before the end of validity period, but the exemption is kept valid even after the validity period during the period of examination of the application. Furthermore, even if the application is not granted, the restriction is not immediately applied but the maximum of 18-month transition period will be given from the decision. In reality, many of the renewal applications which were submitted before January 2018 because July 2020 was the end of validity period are not determined whether the renewal is granted even now (i.e. more than 6 years are passed from their submission).

We recognize that PFAS have more than 10,000 substances and are used in various essential uses. While we cannot estimate how many CUU proposals will be submitted, in order to minimize such confusion, we would like to propose that, at least, followings are clearly indicated in the text.

1. CUU is tentatively granted during examination of the CUU proposal by MDEP
2. Appropriate transition period is given in case of not granting the CUU proposal

Furthermore, proposed timeframe for submission of CUU proposals is quite concerning since the uses of PFAS and PFAS alternatives are still being studied. There should be enough time between DEP's decision and the prohibition date to allow manufacturers to amend the CUU proposal as necessary, or to prepare for the upcoming prohibition. We would request DEP to initiate an examination for CUU proposals which we submitted in February 2024 without waiting until 36-month before.

(ii) About the scope of the CUU proposals: Broader scope should be accepted especially for the complicated manufactured items such as electronics.

MDEP proposed Subsection 3(c) as follows:

C. A manufacturer may submit a single notification to the Department for multiple products if all of the products are covered by the same currently unavoidable use determination found in section 9(B).

To minimize the burden in MDEP and the industries, we would like the CUU proposals can be submitted more broadly, and should not be based on HTS/GPC and NAICS combinations. Due to the ubiquitous nature of PFAS, we would like proposals to be based on industry sector instead (e.g. electronics sector). In most cases, the reasons of PFAS use are almost the same in many EEE categories and it is also very common to EEE that very small amounts of PFAS contained is unlikely exposed outside EEE because of the necessity to maintain the required quality and functionality over the long period of use. Therefore, if CUU is determined for each HTS/GPC code, huge number of CUU applications would be necessary despite the same uses, and DEP would have to verify the approval of CUU for all those applications . Furthermore, importers of consumer electronics in the state of Maine would result to have to owe heavier application cost.

In order to solve this problem, it is desirable to allow CUU determination proposal at a higher level which is similar to the scope of the exemptions. As described in the attachment, PFAS is used in electronics to provide other functions which are essential to the operation of the electronics in addition to low refractive index and heat resistance, and almost all the electronics will be subject to CUU. Therefore, we believe that it is desirable to grant CUU for the consumer electronics field as a whole.

(iii) Our proposal for CUU has already been submitted in February 2024.

As mentioned above, we understand that the comments submitted in the request for comments on CUU in February 2024 are the "proposal for CUU determination by manufacturers" described in section 9A of this Concept Draft, and we request that the CUU be determined based on this proposal. If it is necessary for manufacturers to propose CUU in addition to this, the impact on manufacturers, who need to bear enormous application work and fees, will be immense.

After submission of our comments on CUU above, MRSA §1614 (4) is revised and following items are added to exemptions:

K. A semiconductor, including semiconductors incorporated in electronic equipment, and equipment and *materials used in the manufacture of semiconductors;*

L. Nonconsumer electronics and nonconsumer laboratory equipment not ordinarily used for personal, family or household purposes; and

M. Equipment directly used in the manufacture or development of the products described in paragraphs E to L.

As we explained in our comments to Subsection 4, CUUs of PFAS in electronics are not limited to the semiconductors. Though these technological issues are common to the whole industry and many other complicated articles have been already exempted from 38 MRSA §1614 but only the consumer electronics remain to be regulated. In such situation, we believe that setting a new exemption should be better for both MDEP and the industry, from the viewpoint of avoiding administrative burden, than getting huge number of applications from the industries in many countries and regions.

However, if it is not possible to set a new exemption in Subsection 4, the setting a CUU to all the consumer electronics would be indispensable as the second-best measure.

Therefore, we would like to highlight that the CUU entries we have submitted in February 2024 will hardly be reduced by the revision of MRSA §1614 (4).

(iv) CUU which is submitted by an individual company or group and granted by the DEP should be able to be used by all other entities using the granted uses. We would request to clearly stipulate it in this rulemaking.

We understand that CUU granted will be listed in Section 9(B) and a person other than the submitter can utilize the CUU as long as the same combination of industry sector and product category. We would like to request MDEP to clearly indicate it in the Rule.

For complex articles like EEE, if intentionally added PFAS is contained to a part, such PFAS is most likely not added by the manufacturer of the final product but an actor in far upstream supply chain. A PFAS used in a certain use in a certain product category by a manufacturer is most likely used in the same use in other product categories by other manufacturers. Also, the reason not being able to substitute the PFAS in the use is not basically different. It is simply increasing workload for both industries and the DEP if it needs CUU application each and it needs to examine each application. Therefore, in order for balancing between achievement of policy objectives and effective implementation, it is desirable to apply the use of PFAS granted as CUU to all those who utilize the use in addition to enable CUU application in as high level as possible mentioned above.

EU RoHS Directive, de facto standard of the restriction of certain hazardous substance in EEE, also has the exemption clause. Even under EU RoHS, an exemption granted can apply to all entities using the exemption.

Conclusion:

We hope our input would provide substantive information to ensure the smooth and practical implementation of PFAS management to realize a healthy environment and a sustainable economy for the present and future generation in the State of Maine.

We wish to work together with the MDEP to make the Act and the Rule feasible for implementation. Should you have any questions, please do not hesitate to contact the JEITA secretariat.

Sincerely yours,

Koji Ueno

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About Japanese electrical and electronic (E&E) industrial associations:

About JEITA

The objective of the Japan Electronics and Information Technology Industries Association (JEITA) is to promote the healthy manufacturing, international trade and consumption of electronics products and components in order to contribute to the overall development of the electronics and information technology (IT) industries, and thereby further Japan's economic development and cultural prosperity.

About CIAJ

Mission of Communications and Information network Association of Japan (CIAJ). With the cooperation of member companies, CIAJ is committed to the healthy development of info-communication network industries through the promotion of info-communication technologies (ICT), and contributes to the realization of more enriched lives in Japan as well as the global community by supporting widespread and advanced uses of information in socio-economic and cultural activities.

About JBMIA

Japan Business Machine and Information System Industries Association (JBMIA) is the industry organization which aims to contribute the development of the Japanese economy and the improvement of the office environment through the comprehensive development of the Japanese business machine and information system industries and rationalization thereof.

About JEMA

The Japan Electrical Manufacturers' Association (JEMA) The Japan Electrical Manufacturers' Association (JEMA) consists of major Japanese companies in the electrical industry including: power & industrial systems, home appliances and related industries. The products handled by JEMA cover a wide spectrum; from boilers and turbines for power generation to home electrical appliances. Membership of 291 companies, http://www.jema-net.or.jp/English/

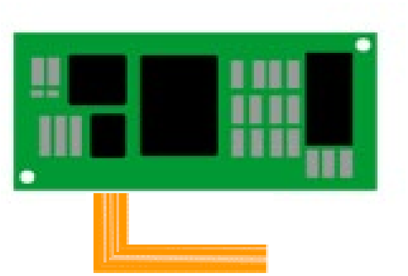
PFAS in Electrical and Electronic Equipment (EEE)

Four Electrical and Electronic Industry Associations in Japan
(JP4EE)

1. PFAS in Electrical and Electronic Equipment (EEE)

- **The Japanese EEE industry**
  - **has consistently supported actions to reduce risks** from hazardous substances, and
  - has taken **practical measures** in a serious and diligent manner to meet the requirements of global chemical legislation such as EU REACH Regulation.
    e.g.: Establishing and utilising chemSHERPA for smooth and effective communication of chemical information between companies throughout the supply chain.
- **The use of PFAS remains unavoidable in a wide variety of EEE**
  - Due to the high cost of PFAS-based parts and materials, we only use them only where the **multi-functionality** of PFAS is required to meet the performance requirements of EEE, making it extremely challenging to find alternatives for current applications.
  - When substituting chemicals in EEE, the performance of the finished product must be warranted. Performance matters, even when there are potential alternatives with similar uses.
- The electronics and semiconductor sectors account for **less than 1% of PFAS uses and emissions.**
- **Durable, high-performance EEE is essential** to modern society and requires close consideration from a socio-economic perspective, feasible and enforceable.

2. Multi-functionality of PFAS
(Not satisfied with a blend of alternative materials)



e.g. Printed Circuit Board in a Mobile Phone System
The component needs
- Low dielectric constant
- Heat resistance
- Flame retardancy

There may be alternative materials that satisfy each specific property, but...
- Formulating a functional blend of alternative materials is in most cases, extremely challenging in practice.

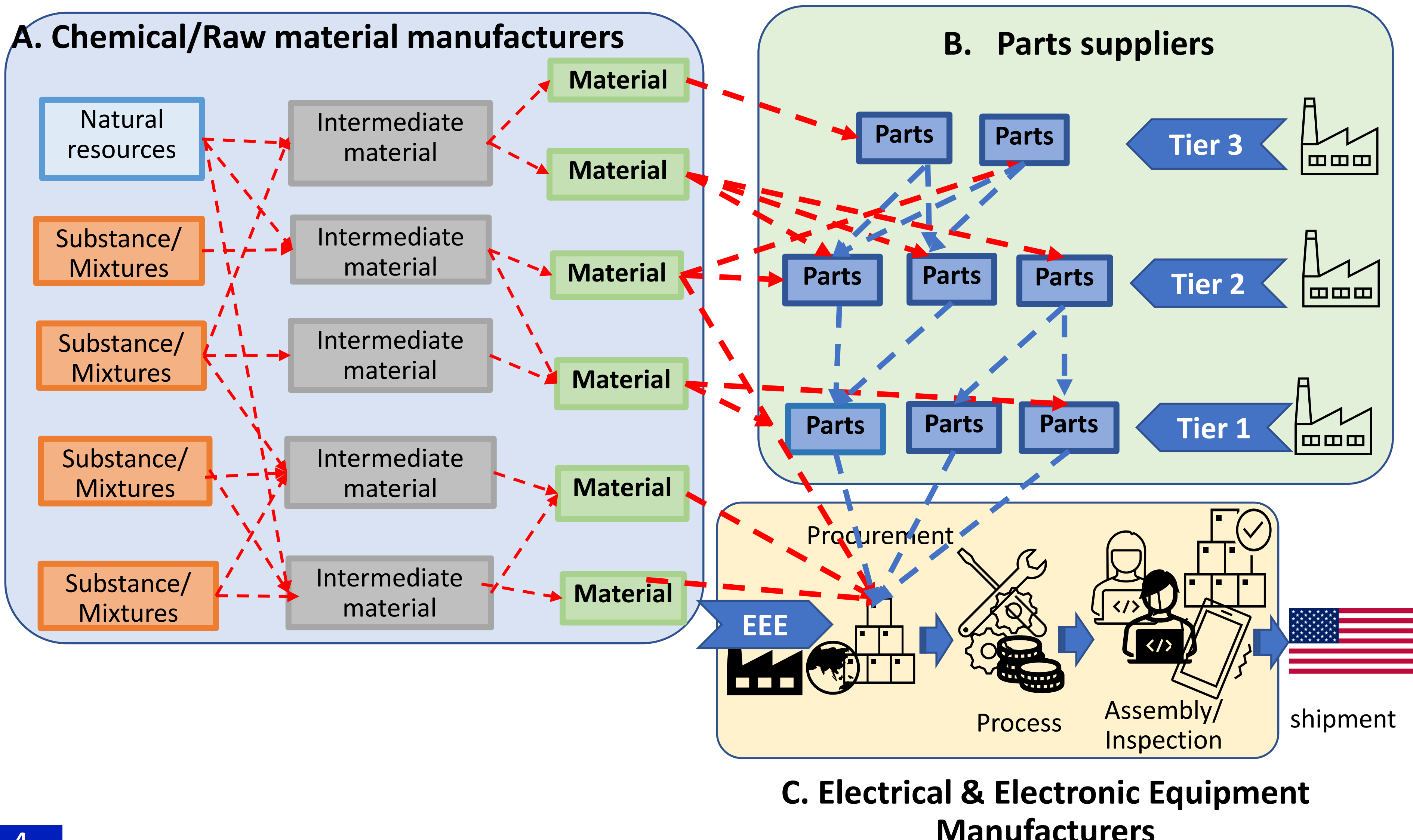
Depending on the property, it is the worst property from the constituent materials that determines the final properties of the blend.

	Material A (e.g. PPE)	Material B (e.g. PI)	Material C (e.g. Br-based material)	blend of Material A/B/C	Fluorinated material
Low dielectric constant	○	△	×	△～×	◎
Heat resistance	△	◎	—	△～×	○
Flame retardancy	×	×	◎	○	◎

◎=Excellent; ○=good; △=not good; ×=bad

3. Complexity of the Supply Chain of EEE and Related Sectors

EEE consists of many components & parts, and **each component or part has its own complex supply chain as shown below.**



4. Wide Variety of EEE

A wide variety of EEE (both B2C and B2B) with different applications exist, many of which require the use of PFAS to achieve their essential functions. **A “One fits all” prohibition of EEE is not feasible.**

1.Large household appliances

2.Small household appliances

3. IT and telecommunications equipment

4. Consumer equipment

5. Lighting equipment

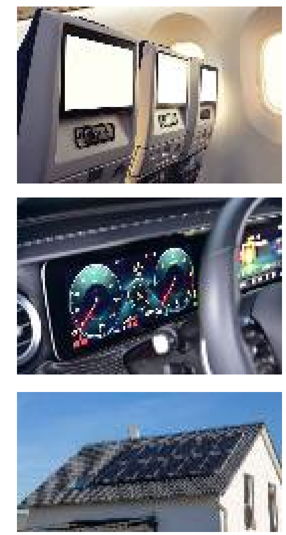
6. Electrical and electronic tools

7. Toys, leisure and sports equipment

8. Medical devices (exempted from 38 MRSA § 1614)

9. Monitoring and control instruments
Industry uses (exempted from 38 MRSA § 1614)

10. Automatic dispensers



11. Other EEE not covered by any other categories

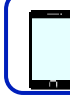
5. Functions of PFAS required in EEE

PFAS's **multi-functionality** is the most important reason for their use in EEE and cannot be achieved by other potential alternatives in most cases.

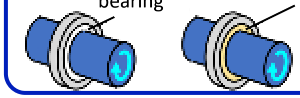
1. Safety and safety functions


cable & connector

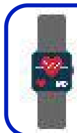
2. High-speed communication/transmission function


mobile phone

3. Sliding function in mechanical section



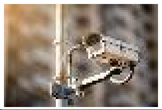
4. Piezoelectric function


Pressure Sensor (Smart watch)

5. Display function (Liquid crystal)

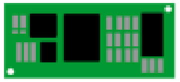

liquid crystal display (Personal Computer)

6. Optical function


security camera

7. Functional surface


oven


printed circuit board

8. ~~Semiconductor~~ **Exempted from 38 MRSA §1614**
9. ~~Thin film device production process~~ **Exempted from 38 MRSA §1614**
10. Energy supply (Battery, Fuel cells, Solar cells) Industry uses are exempted from 38 MRSA §1614
11. Refrigeration, Air-conditioning and heat pump sector RACHP (Refrigerant)
12. ~~Passive electronic components and manufacturing process~~ Exempted from 38 MRSA §1614

6. Many uses of PFAS are currently unavoidable

Mobile phones contain a wide range of electronic parts.
Many of those parts contain PFAS as listed below.

The numbers are linked to the essential functions in "Functions of PFAS required for EEE" in our comment.

Antennas
2. High speed communication and transmission function

Liquid crystal panel or OLED
5. Display function

Touch screen
3. Piezoelectric function

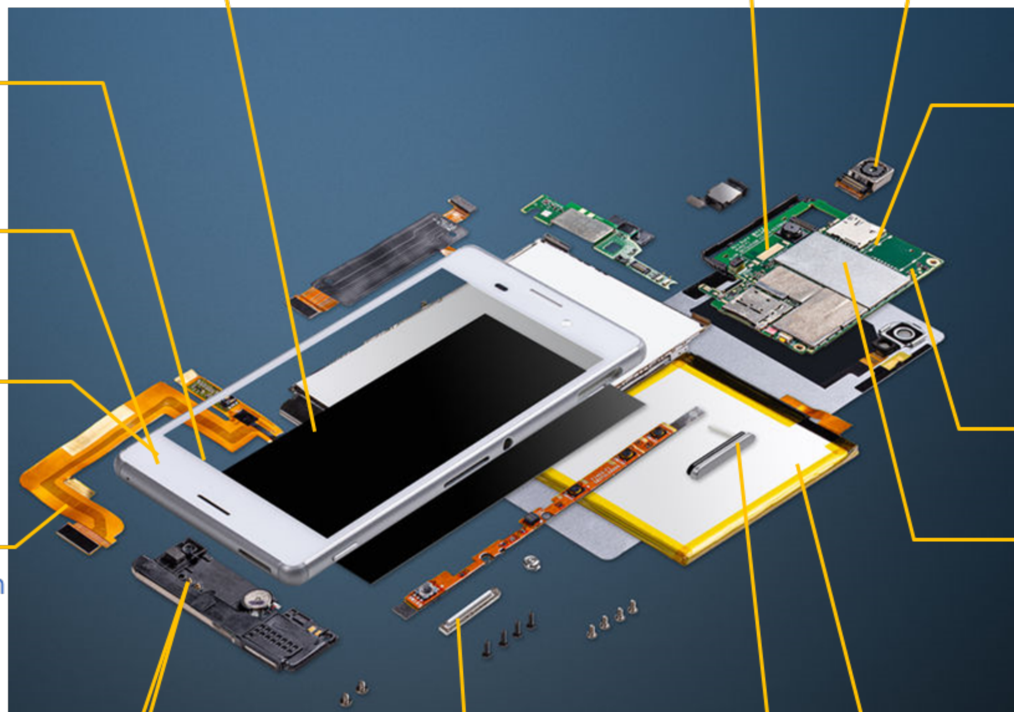
Enclosure
6. Safety and safety functions

Coating of smartphone surfaces
7. Functional surface

Flexible substrate
2. High speed communication and transmission function

Speaker, Microphone
3. Piezoelectric function

Sealing material
6. Safety and safety functions



Vibrator motor
4. Sliding function in mechanical section

Optical Lens, Actuator Image sensor, LEDs etc.
1. Optical function
3. Piezoelectric function
8. Semiconductor

Printed Circuit Board, Cable
2. High speed communication and transmission function
6. Safety and safety functions
8. Semiconductor
12. Passive electronic components and manufacturing process

Coating of Electric Components
7. Functional surface

Touch Sensor Fingerprint sensor Gyroscope etc.
9. Thin-film device manufacturing process

Battery
10. Energy supply

Lubricant, Sealing material (SIM/SD tray)
4. Sliding function in mechanical section

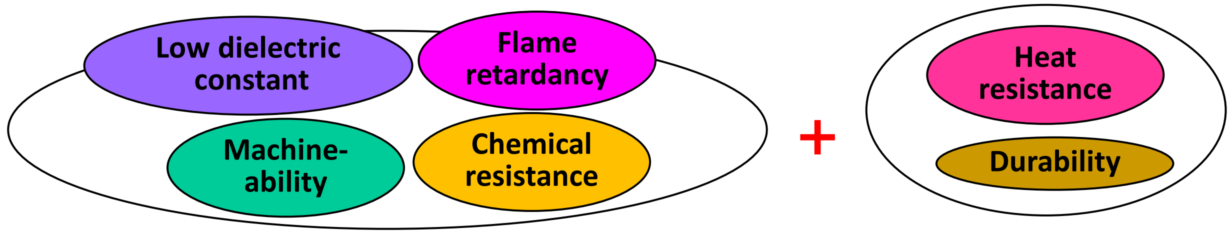
7. PFAS Contribute to Safety and safety functions

Insulating and anti-dripping materials need the multi-functionality of PFAS.

Required functions/properties of EEE: Electric insulation, drip-prevention, heat resistance, durability

Required functions for materials: Low dielectric constant, flame retardancy, chemical resistance, etc.

Examples of parts requiring use of PFAS



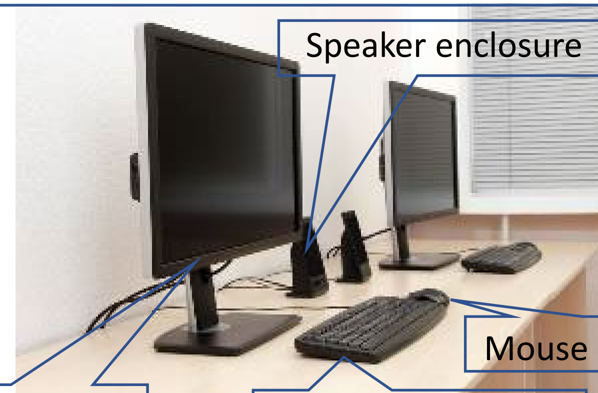
Anti-dripping material needs the use of PFAS

Preventing drip of resin components to minimise damage in the event of a fire.

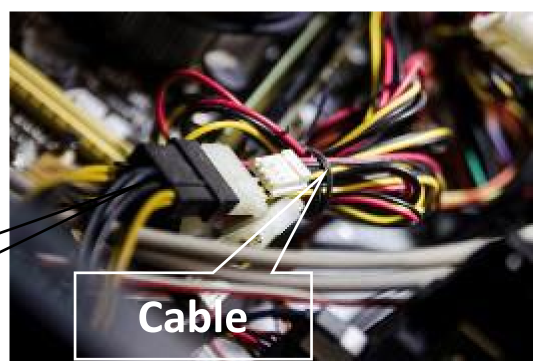
・PTFE as anti-dripping agent.

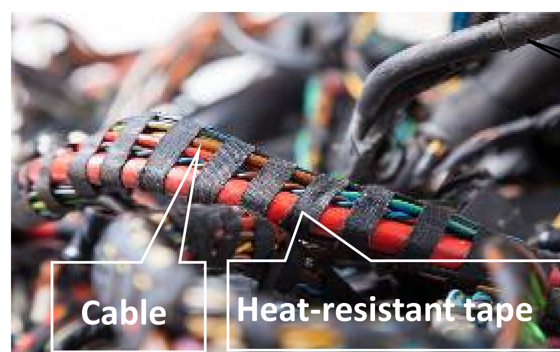
・Resin itself should be heat resistant.

Example: Personal computer (equipment housing)



Wiring parts need PFAS for insulation



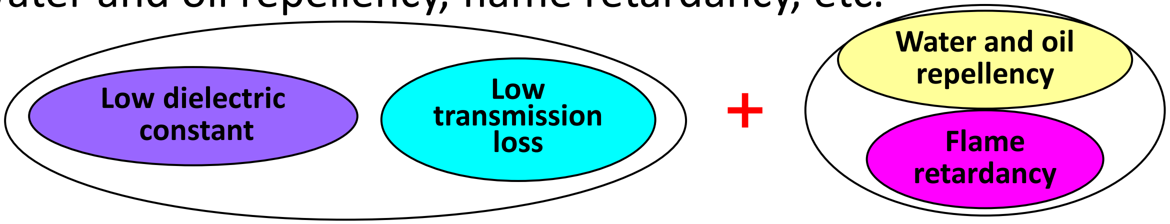


8. PFAS Contribute to High-speed Communication/Transmission Functions

PFAS are the only compounds that provide multi-functionality required by electronic parts for high-frequency applications as shown below:

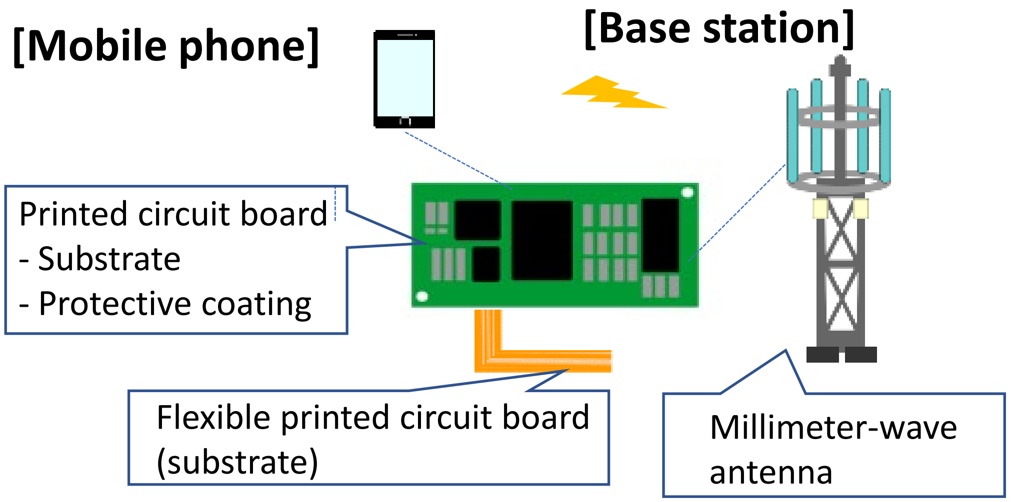
Required functions and properties of EEE : Low dielectric constant at high frequencies and low transmission loss

Required functions for materials : Water and oil repellency, flame retardancy, etc.



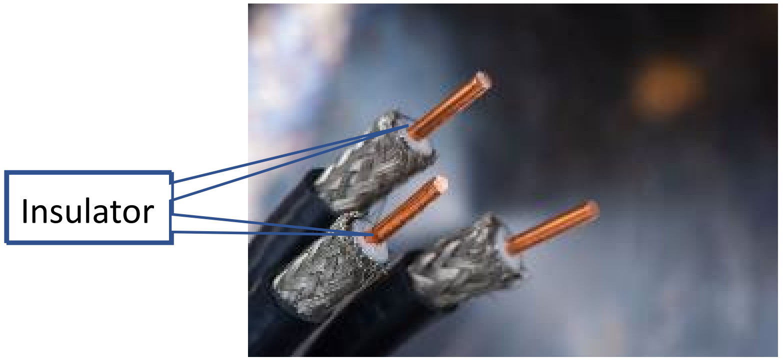
Examples of parts which need the use of PFAS:

Mobile Phone System



Millimeter Wave Band Apparatus

[Coaxial cables (high-frequency wires)]

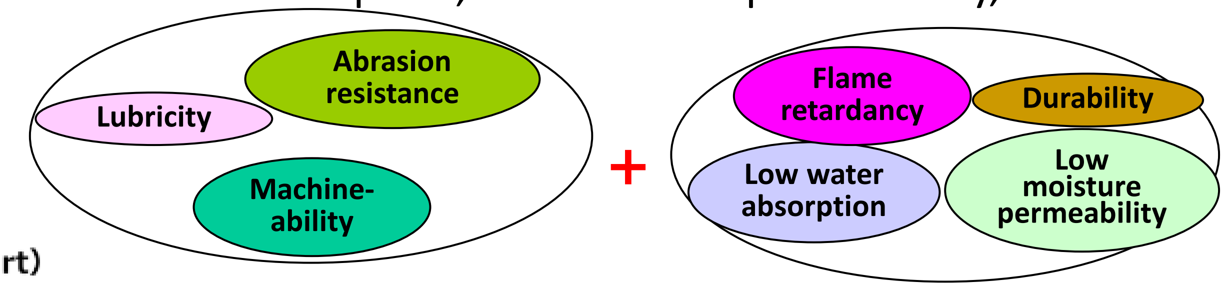


9. PFAS Contribute to the Sliding Function in Mechanical Sections

PFAS are the only compounds that can simultaneously provide multiple functions necessary for EEE as well as manufacturing equipment of components for such EEE **to properly work under various environments**.

Required functions and properties: Lubricity, abrasion resistance, machineability (elasticity)

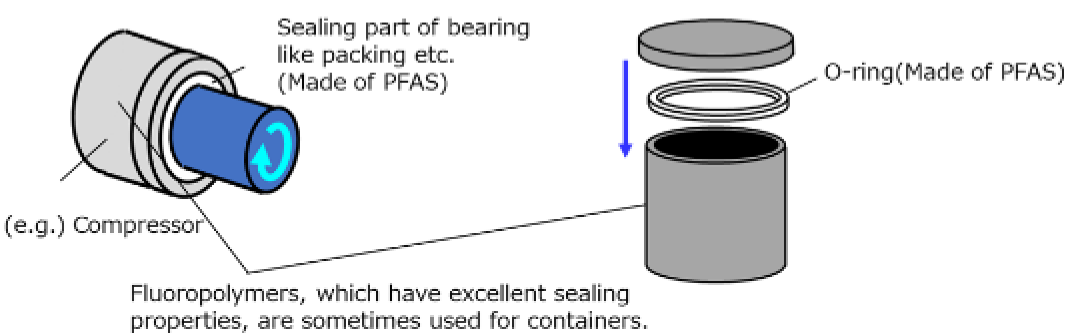
Required functions for materials: Low water absorption, low moisture permeability, etc.

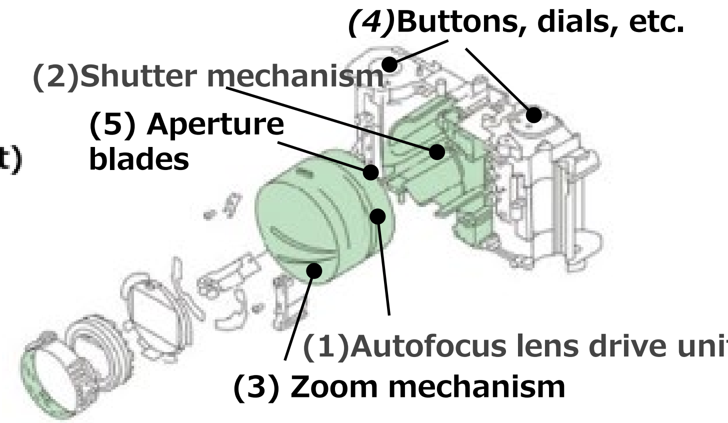


Examples of parts which require the use of PFAS:

1) Lubrication improvement (Sliding part)

2) Seal improvement (Sliding part) **3) Seal improvement (Fixed part)**





10. Why cannot blend of materials achieve the necessary specifications that multi-functional PFAS has?

(1) It is difficult to blend the different materials.
(2) Even if blending is successful, material with poor properties makes the mixture property impossible to achieve the desired properties.
(Blend of materials shows not the best of the property of each original material has but the worst of each.)

For example;

- Heat resistance Light/weather resistance
- Chemical resistance

(The material with **poorest property** will decompose first, making the blend unsatisfied the specification)

- Low refractive index
- Low dielectric constant / low dielectric tangent
- Oil repellency

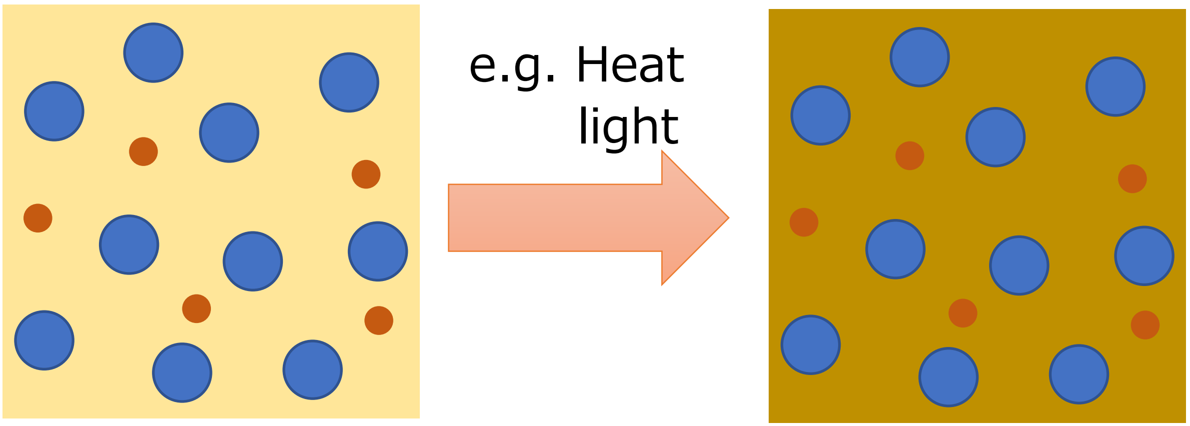
(Blended materials will lower its property)

- Cleanliness

(Blend will leach additives, fluoropolymers don’t need additive)

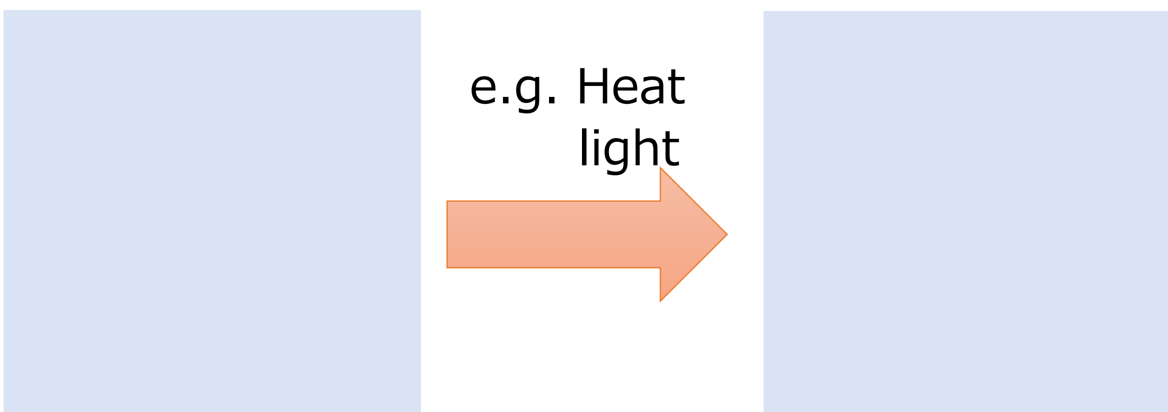
11. Difference of blended material vs fluorinated material

Blended material



The material with the worst property deteriorates, and the blended material (overall product) no longer meets the specifications.

Fluorinated material



No change