Need a huge time to phase-out PFAS used for printers EVEN IF the substitute material of PFAS is available in the future

The substitute materials instead of PFAS to fulfil for many of necessary functions required in printing process is not available yet.

In our comments on this consultation, we request the “time-unlimited for duration of derogation” or “at least 12 years duration”.

This attachment provides with the supplementary explanation of the reasons.

Challenging issues to be addressed for substitution of PFAS (1/2)

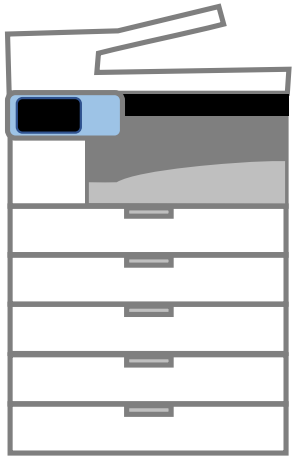
It will take a huge time to explore and develop alternative materials for each part and component itself to fulfil the superior properties of PFAS.
Since each individual part closely interacts with various components and units in the whole printing processes, the material change of a certain part will have an influence on many of various mechanical components, electrical setting, sequential process and software and so on, which are mutually influence each other. As a result, all of them will need to be changed, so a long period will be necessary for research and development of alternative materials.

Material

Materials used for parts and components affect various behaviors.
In case of changing a material of parts or components, a various properties such as friction characteristics, electrical properties, adhesion, etc., will be changed, but only certain single property cannot be changed.
It is quite possible that extending one property may degrade another one.
In particular, since PFAS is a material that satisfies many excellent properties simultaneously, it is impracticable to substitute materials for the parts while maintaining the same properties.
In addition, when a material of the part is changed, the mechanical properties, the electrical properties and the sequence, etc. must be changed and/or modified.

Mechanical parts and units

In case of the material changes for a part, the behaviors between the part and the various mechanical components are also changed. (For example, a change in sliding behavior, torque of a motor, etc.)
In addition, the size, angle, thickness, strength, and material of the component may have to be changed to satisfy the physical behavior.
A change of a material used for part requires to precisely adjust all of various parts and units. Because they interact in complex ways, they cannot be changed independently, and a lot of time is needed to satisfy all conditions.



Software

The printer and copy processes and operations require precise movement of various parts, components and units in conjunction with each other.
Each timing, elapsed time, voltage magnitude and application time, heater temperature and operation time, motor driving speed and time, etc. must be precisely controlled.
In case of changing a certain material used for part, it is absolutely necessary to change all of these timings, operation times, intensities, and sequences.
They also affect each other, so it takes a lot of time to find a configuration change that meets all requirements.

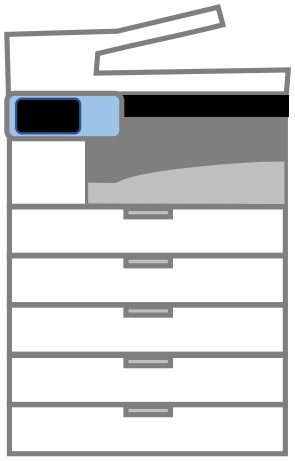
Electrical properties

When materials such as photoconductive drums and intermediate transfer belts are changed, the electrical characteristics must be adjusted too.
When a material of part and component is changed, the electrical settings must be changed too, but because various variables affect each other, it takes a lot of time to find an optimized setting change that meets all the performance requirements.

Challenging issues to be addressed for substitution of PFAS (2/2)

The material change of a certain part will have an large influence on many of various components and properties, which mutually interact with each other. As a result, all of them will need to be changed, so a long period will be necessary for research and development of alternative materials.

Example of typical evaluation steps of material substitution in development process of copier



START

Material
Change to a PFAS substitute

Mechanical parts & units
To change the pressure of the cleaning blade because the cleaning characteristics have been changed.

Mechanical parts & units
To increase the thickness of the photoconductor due to a change in the amount of wear-out

Electrical properties
To increase in the thickness of the photoconductor results in changes of electrical properties

Software
The electrical properties of the photoconductor have been changed, so the charging parameters need to be adjusted.

Material
Adjust the charging characteristics of the toner according to the change in the charging characteristics of the photoconductor.

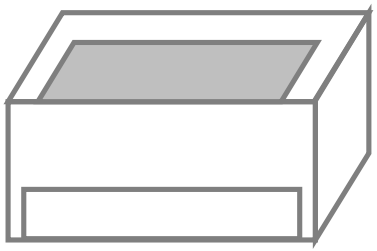
Mechanical devices
Adjust the stirring mechanism of the toner because the developing characteristics change.

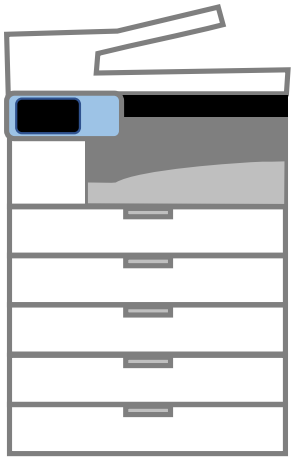
Continuous adjustments

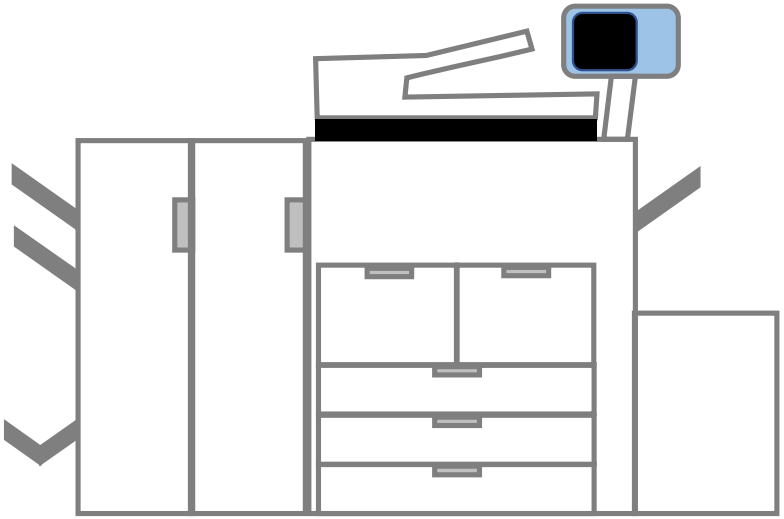
Can the development period of copiers and printers be shortened?

=> We believe that it will be Impracticable

Performance requirements for copiers and printers, quality requirements for printed and copied images, and durability vary by model.
Since there are few common development items in these developments, it is not easy to shorten the development period.
For substituting materials, it will take at least two or three years for equipment development, matching with toner and ink, and production preparation respectively, and multiplied by the number of models.







	Consumer model	Office model	High-performance/production model
Examples of performance required	・Maintenance Free ・Space-saving	・High productivity (speed) ・energy-saving property	・Printed image quality ・low running cost
Examples of Output	・Documents used at home	・Office documents	・Catalogs, publications, posters, etc.
Examples of print volume	・10 - 100 sheets/month	・500 - 5000 sheets/month	・more than 10000 sheets/month

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exploration and development of materials	parts development	development of equipment & matching	production preparation	Delivery / Sales / Service
The substitute material for PFAS is not currently available for key parts and components for printers and copiers, so the joint research and development with materials manufacturers will be required. ・Confidentiality agreement ・Joint development agreement ・Testing of chemical substances and registration ・Screening test for basic characteristics ・Performance tests for material selection ・Adjustment work for improving characteristics (Material shape, size, mixing ratio, etc.)	Development of part takes time even after material determination ・Matching of new materials with materials used for other components and units. ・Adjustment of properties such as friction coefficient, dielectric constant, electrical resistance, heat resistance, etc. ・Durability to maintain performance over long periods of time ・Maintaining characteristics under various environments such as high temperature and humidity	After the development of the parts, it is necessary to verify whether the functions are appropriately work in the copying and printing processes. ・Whether charging is done properly ・Is the image development done properly? Is it necessary to change the agitation? Is it necessary to adjust the nip width between the developer and the photoconductor? ・Is the toner remaining in the photoconductor properly cleaned? Is the cleaner adjustment needed? ・Is the transfer of toner at the intermediate transfer belt (ITB) done properly? ・Is there any unnecessary toner adhesion on the fixing belt?	It is necessary to verify that the quality of the product meets a various requirements as final product prior to production processes. (For example, it is necessary to measure VOCs emitted from machines and inspect that they fall below the permissible value specified by environmental labels, etc.) ・If production processes and/or facilities need to be changed, it is necessary to develop an investment plan and to carry out modification of facility or construction. ・It is necessary to carry out equipment tests, etc. depending on modification of facility or construction. In some cases, it is necessary to undergo statutory inspections and occupational safety audits.	Some countries require customs clearance procedures, so it is necessary to do so in advance. It may take several months to ship products by sea. For a stable delivery of products, it is necessary to establish a supply system by multiple raw material manufacturers. It is quite important from the view point of the Business Continuous Plan.
3-4 years	2-3 years multiply by "# of models"	2-3 years multiply by "# of models"	A few years	

Each EU member country's PL law under Council Directive 85/374/EEC (Product Liability Directive) imposes product liability for 10 years, meaning that after selling, the company must continue to provide spare parts for another 10 years.
In other words, **the development period of equipment and parts (7 to 10 years or more) plus the provision period of spare parts (10 years) is required** to complete the PFAS-free measures.