

Annex to CEN-AI02-WI-0018-EN and CEN-AI02-WI-0034-EN on PFAS

Comments on Risk

The PFAS restriction as laid down in Regulation (EU) No 2025/40 is broad with respect to the substances that must be assessed and, due to the ubiquity of the substances, the vast number of potential sources. Therefore, it is necessary to identify the significant sources of PFAS and the exact PFAS, which they could introduce.

A risk assessment for the production processes including incoming materials, conversion steps, machinery, conveying, packing and warehousing was carried out to identify potential PFAS transfer to the final articles (cans and ends).

The transfer of PFAS follows the same rules as the transfer of any other substances. The exclusion of sources with only insignificant contact time (tooling, conveying), the use of only immobile polymeric PFAS (machinery and conveying), and only a minimal contact surface (transport packaging), leaves only the materials and processing aids like lubricants that are directly applied to the articles as sources of PFAS with the potential to transfer those substances at levels sufficient to reach the thresholds.

The materials and processing aids are produced by our suppliers according to documented formulations. The presence of PFAS substances in formulations is currently the only reliable way to identify PFAS that can reasonably be present in quantities above the limits of the PPWR article 5.5. In many cases, the information is quantitative and can be related to the finished can or end based on specifications. As our coated metal packaging is also not susceptible to PFAS accumulation through recycling due to the organic components being burnt in the process, the approach focussing mainly on material and direct-contact processing aids formulations without added PFAS or with amounts of added PFAS sufficiently low for the article not to reach any thresholds is appropriate to ensure compliance.

Using only analytical means leads to inconclusive results due to insufficient performance which is either inherent to the method or brought about by matrix effects. No analytical method is suitable for the quantitative analysis of multiple thousands of individual PFAS that are affected by the restriction.

Analytical Results

While the main pillar of can and end conformity is using raw materials and lubricants without intentionally added PFAS (PFASNI), AMP-E has submitted samples of different article configurations (PFAS-containing and PFASNI) to total fluorine testing in order compare the outcome.

Most items were sampled directly after production and sent to an external laboratory for testing. Some samples were taken after packing and storage in warehouses.

All investigated PFASNI articles have been found to have total fluorine levels below the established 50 ppm (or mg/kg) limit as shown in [Table 1](#).

Can and end size-based approach to testing

The PFASNI articles analysed (SGS Test report No. **7825076**, **7860852**, **7906478**, and **7942674**) are the following:

Table 1 Results obtained for finished cans and ends sorted by size

Description	total fluorine* content [mg/kg]	sample code Ardagh/ SGS
DIA 200 BPANI end (tab with PFAS-containing coating)**	12,0	26.0283.07/ 260271524
DIA 202 BPANI end 1	2,0	26.0153.04/ 260191329
DIA 202 BPANI end 2	4	25.0878.04/ 250786757
DIA 202 BPANI end 3	7,1	26.0067.05/ 260080368
DIA 202 BPANI end 4	16,0	26.0153.03/ 260191328
DIA 202 BPANI end 5	22,0	26.0283.06/ 260271523
DIA 202 BPANI end 6	12,0	26.0283.08/ 260271525
DIA 202 BPANI end 7	13,0	26.0283.09/ 260271526
DIA 202 BPANI end 8	11,0	26.0283.12/ 260271528
150 ml BPANI can	4,8	26.0283.01/ 260271518
250 ml BPANI can 1	5	26.0153.06/ 260191331
250 ml BPANI can 2	10	26.0153.01/ 260191326
330 ml BPANI can 1	3,4	26.0067.01/ 260087915
330 ml BPANI can 2	6	26.0153.05/ 260191330
330 ml BPANI can 3	15,5	25.0878.01/ 250786754
330 ml BPANI can sleek	5,6	26.0153.02/ 260191327
440 ml BPANI can	5,9	26.0283.04/ 260271521
500 ml BPANI can 1	5,3	26.0153.07/ 260191332
500 ml BPANI can 2	5,8	26.0153.08/ 260191333
500 ml BPANI can 3	4,3	26.0283.05/ 260271522
500 ml BPANI can 4	4,7	26.0283.11/ 260271527
530 ml BPANI can	2,9	26.0283.10/ 260283232
550 ml BPANI can	4,4	26.0283.02/ 260271519
568 ml BPANI can	4,2	26.0283.03/ 260271520

* The method responds to fluorine not only from PFAS, but also mineral and organic fluorine compounds that are not PFAS. The detected fluorine could NOT be attributed to individual PFAS - neither through analytical screening (on samples with the AMP-E codes 25.0878.01 and 25.0878.04) nor formulation data.

** The sample was deemed suitable for testing due to only a minimal contribution of the tab coating to the overall total fluorine content of ends.

The analytical results show no correlation with the can sizes.

Table 2 illustrates why no pronounced size-based variation is to be expected within our product range. The percentages of metal and non-metal components do not differ significantly, making the composition of all our products effectively uniform.

Therefore, the total fluorine levels obtained on PFASNI cans and ends of the tested sizes are **relatable to any other can or end size**.

Moreover, the information we provide as the downstream user (mentioned under PPWR Art. 5.5. letter c) of the metal and the substances and mixtures that constitute the organic components of our packaging materials is, that none of the total fluorine measured can be attributed to PFAS and, as a result, does not count towards the threshold of 50 ppm applicable to total fluorine from PFAS. This means that compliance would be ensured even in the unlikely case of measured total fluorine levels reaching above 50 ppm (or mg/kg).

Table 2 Can and end composition

article	Nominal total weight [g]	Nominal non-metal material weight [g]	non-metal material [%]
DIA 200 end	2,3	0,060	2,6
DIA 202 end	2,5	0,064	2,6
15cl slim	6,0	0,15	2,5
18,7cl	8,1	0,2	2,5
20cl slim	7,6	0,2	2,6
20cl slim thick wall	9,2	0,3	3,3
25cl slim	7,8	0,2	2,6
25cl slim thick wall	9,4	0,3	3,2
33cl std	9,7	0,3	3,1
33cl slk	9,6	0,3	3,1
35,5cl	10,0	0,3	3,0
37,5	11,7	0,3	2,6
44cl std	11,4	0,3	2,6
47cl	13,1	0,3	2,3
50cl std	12,4	0,4	3,2
53cl	12,4	0,4	3,2
55cl	13,5	0,4	3,0
56,8cl	14,5	0,4	2,8

Process-based approach to testing

A set of samples were taken to investigate the impact of specific steps in the can/ end making process on the total fluorine levels (Table 3).

The bodystock aluminium sheet material meant to provide a baseline value was not found to contain detectable fluorine. After the sheet was processed into a cup and went through a washing and drying process, the total fluorine content increased to 4,2 mg/kg, and, as the result for the finished can sample shows, stayed at approximately the same level throughout the process.

With the point of introduction being narrowed down to the washer, it can be concluded that the measured total fluorine originates from the metal washing process which relies on hydrofluoric acid (inorganic fluorine compound) solutions. The salt residues still present after the final washing step

with water are subsequently covered by the applied coatings and inks and, in that way, remain on the metal surface.

The storage of produced cans and ends in contact with the used packaging materials does not show any impact on the total fluorine levels.

Table 3 Process step measurements

Description	total fluorine* content [mg/kg]	sample code Ardagh/ SGS
Aluminium bodystock sheet	< 1.0	26.0067.03 / 7860852
Derived cup after washer	4,2	26.0067.02 / 7860852
Derived finished can before palletizer	3,4	26.0067.01 / 7860852
Stored can from warehouse (10 weeks)	6,0	26.0153.05 / 7906478
Stored end from sleeve (2024)	4,0	25.0878.04 / 7825076

* The method responds to fluorine not only from PFAS, but also mineral and organic fluorine compounds that are not PFAS. The detected fluorine could NOT be attributed to individual PFAS - neither through analytical screening (on samples with the AMP-E codes 25.0878.01 and 25.0878.04) nor formulation data.

Material-based approach to testing

Table 4 shows the same analytical data as Table 1 grouped by the used materials.

All results are uniform with a few elevated values, which are not relatable to specific materials. For each material that is part of a configuration with > 10 mg/kg total fluorine (except internal coating 6, for which only one sample type could be tested), a configuration with lower measured fluorine content is available.

As stated in the section on the process-based approach to testing, the fluorine stems from the inorganic compounds present as (top-coated) residues from the washing process.

The results below may have been obtained from articles with specific material configurations, but **can be related to any articles produced without PFAS in the raw material formulations** (PFASNI cans and ends) that go through our production process due to the equivalent risk related to PFAS.

Table 4 Results obtained for finished cans and end sorted by materials

Description article / inside coating / outside coating	total fluorine* content [mg/kg]	sample code Ardagh/ SGS
Ends with internal coating 1 + External coating 1	4,0	25.0878.04/ 250786757
Ends with internal coating 1 + External coating 1	16,0	26.0153.03/ 260191328
Ends with internal coating 1 + External coating 2 (tab with PFAS-containing coating)**	12,0	26.0283.07/ 260271524
Ends with internal coating 1 + External coating 3	2,0	26.0153.04/ 260191329
Ends with internal coating 1 + External coating 11	12,0	26.0283.08/ 260271525
Ends with internal coating 1 + External coating 12	13,0	26.0283.09/ 260271526
Ends with internal coating 1 + External coating 13	11,0	26.0283.12/ 260271528
Ends with internal coating 2 + External coating 2	7,1	26.0067.05/ 260080368
Ends with internal coating 6 + External coating 2	22,0	26.0283.06/ 260271523
Can with internal coating 3 + External coating 4	5,0	26.0153.06/ 260191331
Can with internal coating 3 + External coating 8	4,4	26.0283.02/ 260271519
Can with internal coating 3 + External coating 8	4,2	26.0283.03/ 260271520
Can with internal coating 4 + External coating 4	4,8	26.0283.01/ 260271518
Can with internal coating 4 + External coating 4	15,5	25.0878.01/ 250786754
Can with internal coating 4 + External coating 5	10	26.0153.01/ 260191326
Can with internal coating 4 + External coating 6	3,4	26.0067.01/ 260087915
Can with internal coating 4 + External coating 7	2,9	26.0283.10/ 260283232
Can with internal coating 4 + External coating 7	6,0	26.0153.05/ 260191330
Can with internal coating 4 + External coating 9	5,3	26.0153.07/ 260191332
Can with internal coating 4 + External coating 10	5,8	26.0153.08/ 260191333
Can with internal coating 4 + External coating 14	4,3	26.0283.05/ 260271522
Can with internal coating 4 + External coating 15	4,7	26.0283.11/ 260271527
Can with internal coating 5 + External coating 8	5,9	26.0283.04/ 260271521
Can with internal coating 5 + External coating 8	5,6	26.0153.02/ 260191327

* The method responds to fluorine not only from PFAS, but also mineral and organic fluorine compounds that are not PFAS. The detected fluorine could NOT be attributed to individual PFAS - neither through analytical screening (on samples with the AMP-E codes 25.0878.01 and 25.0878.04) nor formulation data.

** The sample was deemed suitable for testing due to only a minimal contribution of the tab coating to the overall total fluorine content of ends.

Conclusion of the Risk Assessment and Management Related to Regulation (EU) No. 2025/40 (PPWR) Article 5.5

Based on the risk assessment carried out for our PFASNI articles and supported with total fluorine measurement results in the so manufactured cans and ends, AMP-E confirms that the PFAS contents in the articles are below the thresholds applicable to low-molecular and polymeric PFAS as laid down in the PPWR article 5.5.

Neither the can or end size nor the specific used PFASNI materials have a significant impact on the measured total fluorine levels.

Kindly note that AMP-E is not responsible for any processing, filling or other use of the articles after the point of delivery or for the overall conformity of the customer's packaging with the PPWR. A documented customer risk assessment for operations not under the control of AMP-E is required to relate the certificates and documentation from AMP-E to such packaging.

Klaus Markfort
Director Learning and Transformation Quality
Zug 07.04.26