PFAS IN FOCUS

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CONCEPT AND TEXT

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1 Introduction and Problem Statement

With the entry into force of the Packaging and Packaging Waste Regulation (PPWR), new regulatory requirements arise concerning the handling of PFAS (per- and polyfluoroalkyl substances) in packaging. From 12 August 2026, companies must ensure that food packaging complies with the defined PFAS limit values and that the corresponding conformity can be documented in a traceable manner.

The practical implementation of these requirements, however, presents companies with challenges. Packaging frequently consists of complex material combinations with different base materials, coatings, barrier layers, adhesives, printing inks and additives. PFAS can be used intentionally, for example to create water-, grease- or dirt-repellent properties, but can also enter packaging unintentionally via production processes, recycling streams or contamination.

The risk of PFAS occurrence therefore depends not only on the main packaging material, but on several technical and process-related influencing factors.

At the same time, the data situation along the supply chain is often incomplete. Supplier declarations frequently do not contain sufficient technical information for a robust risk assessment. Particularly for complex packaging, detailed information is often missing on:

- coatings,
- adhesives,
- printing inks,
- functional additives,
- processing aids, or
- recycled content.

A complete analytical examination of all packaging is usually not feasible in practice. Companies often manage extensive packaging portfolios with numerous material variants and different supplier structures. Comprehensive laboratory testing would require considerable economic and organizational resources.

In addition, the actual PFAS risks differ between individual packaging types. While certain materials and applications are considered low-risk, other packaging types have a significantly increased risk potential due to their function or manufacturing method.

At present, there is no generally established standard for the systematic assessment of the PFAS risk of food packaging. As a result, companies often lack traceable and consistent decision-making bases for risk assessment and, building on this, for the prioritization of analytical testing.

This document therefore describes a structured, risk-based assessment approach for estimating potential PFAS risks in packaging. The objectives of the approach are:

- to systematically consolidate available information,
- to assess packaging in a traceable manner,
- to prioritize testing efforts on a risk basis,
- to support companies in the practical implementation of regulatory requirements.

2 Assessment Approach

The following section describes the concrete procedure for applying the assessment approach in practice.

First, it must be clarified what falls under the term food contact packaging within the meaning of Art. 5 PPWR, since the specific limit values pursuant to Art. 5(5) apply to this packaging.

“Food contact packaging” within the meaning of the PPWR is understood to mean packaging and packaging components that are intended, or can reasonably be expected, to come into direct or indirect contact with food and could thereby transfer substances to the food. Since the PPWR itself does not contain a standalone definition, interpretation is based on the general definition for food contact materials pursuant to Regulation (EU) 1935/2004 as well as the current FAQ of the European Commission. Accordingly, “food contact packaging” in principle comprises the entire packaging unit, including integrated or separate components such as printing inks, adhesives, coatings or folding cartons, insofar as they are functionally part of the packaging. The treatment of packaging components without a relevant probability of migration, such as labels on glass or metal packaging, has not yet been conclusively clarified.[1]

The reference to Regulation (EC) 1935/2004 in the Austrian information sheet[2] on the EU Packaging Regulation suggests that these packaging components do not have to be included in the assessment; however, due to the regulatory uncertainty, it is recommended to include the entire packaging unit in the PFAS assessment until a final legal clarification is reached.

The basis is the structured collection of all available information on a packaging item. Both supplier declarations and information on material composition are taken into account.

[1] Thanks are due to Dr. Andreas Grabitz (fcmexperts) for his valuable input on this point.
[2] BMLUK (2026): Merkblatt zur EU-Verpackungsverordnung (https://www.bmluk.gv.at/themen/klima-und-umwelt/abfall-und-kreislaufwirtschaft/kreislaufwirtschaft/verpackungen/merkblatt-verpackungsvo.html)

In a first step, it must be checked whether a complete material composition of the packaging is available. A complete material composition exists when all relevant packaging constituents are known. These include in particular:

- base materials
- functional coatings
- barrier layers
- adhesives
- printing inks
- additives, and
- processing aids

Supplier declarations and material information are considered together, as both sources of information are closely interlinked and complement each other.

This procedure aims to obtain the most complete possible understanding of the materials used, their functional properties and potential entry pathways.

For the subsequent, actual risk assessment, two central assessment instruments were developed:

- the PFAS risk matrix, and
- the PFAS application list.

Which assessment instrument is applied depends on the completeness of the available information.

The PFAS risk matrix is used when the material composition of the packaging is sufficiently known. The PFAS application list, in contrast, serves as an alternative screening instrument for packaging with an incomplete data situation.

The combination of both instruments covers the handling of different data situations. This is intended to create a basis for carrying out a structured and traceable assessment even where information is incomplete or missing.

2.1 The PFAS Risk Matrix

The PFAS risk matrix is an instrument for the systematic and traceable assessment of the potential occurrence of PFAS in packaging. It can be used provided that the material composition of the packaging under consideration is known, as this constitutes a central basis for the assessment.

The matrix was developed to consolidate available information in a structured manner and to derive a consistent risk classification from it. In this way, it is intended to create a uniform and robust decision-making basis for the assessment of packaging materials and to support a targeted prioritization of further investigations.

Its development is based on a methodology consisting of three central building blocks:

- First, a screening of relevant data sources is carried out, in which available information from scientific studies, regulatory documents, institutional reports and known fields of application of PFAS in packaging was systematically reviewed and evaluated.
- Building on this, a constituent analysis follows, in which the material composition is assessed concerning possible PFAS functions, for example in connection with barrier, grease- or water-repellent properties as well as their technological necessity in the respective packaging type.
- In addition, contextual influencing factors are considered that can further affect the potential PFAS risk, such as manufacturing processes.

When assessing the risk of packaging, an essential aspect is the base material used, as different materials are associated with different fundamental risk potentials. Recycled materials must also be considered, as these may already be pre-contaminated via material cycles.

Furthermore, manufacturing and processing operations must be included in the consideration, since PFAS can be introduced into packaging not only via materials but also via processes. This includes, for example, additives used as well as printing processes, as these can constitute additional entry pathways or sources of contamination.

Another relevant factor is the functional properties of the packaging, in particular where these are designed for barrier effects or special surface properties. Such functional finishes can favour potential PFAS applications.

Finally, more complex packaging structures must also be considered, as additional material layers, coatings, adhesives or seals can significantly influence the overall risk.

Based on these factors, the packaging is classified into different risk classes reflecting the probability of PFAS occurrence. In this context, a packaging item is always assessed based on the component with the highest identified risk potential, as this is decisive for the overall classification:

- **Class 1 (very low risk)**: PFAS are not technically required; contamination is not to be expected.
- **Class 2 (low risk)**: PFAS are not required, but possible contamination cannot be completely ruled out.
- **Class 3 (medium risk)**: There are known or historical applications of PFAS in comparable packaging or applications.
- **Class 4 (high risk)**: These are typical PFAS application areas, or there is an increased probability of contamination.

The detailed structure of the PFAS risk matrix is presented in the annex. A distinction is made between a matrix for paper, steel and aluminum packaging and a separate matrix for plastic packaging to adequately reflect material-specific differences in the risk assessment (see Annex A – Risk Matrix). Please note that the risk matrix is to be regarded as a living document and is therefore subject to ongoing updates.

The risk classes simultaneously form the basis for deriving appropriate testing strategies. Packaging with a low risk often does not require additional analytical testing, whereas for higher risk classes the development of a targeted testing strategy may become necessary, as discussed in more detail below (see **Fehler! Verweisquelle konnte nicht gefunden werden.**).

2.2 The PFAS Application List

Complete material information is not available in all cases. Particularly for complex packaging, detailed information on individual constituents or functional finishes is often missing. In such situations, the risk matrix cannot be applied reliably. The complete application list is presented in the annex (see 0

Annex B – Application List).

For these cases, the PFAS application list was developed as a supplement. It serves as an alternative assessment instrument when there is no sufficient data basis for a detailed material assessment.

The application list comprises known packaging applications in which PFAS have been detected in the scientific literature or which are associated with an increased PFAS risk. These include, for example, grease-resistant paper packaging, fast-food packaging, pizza boxes, popcorn packaging or other functionally coated applications.

The list enables an initial estimate of whether a packaging item can potentially be assigned to a known PFAS risk application. At the same time, its use makes clear that relevant information is missing and that a packaging item therefore cannot be reliably classified as “risk-free”.

The application list thus serves in particular as a pragmatic screening instrument for packaging with an incomplete data situation. It enables companies to identify potential risk areas even with limited information and to derive appropriate further measures.

The combination of risk matrix and application list results in a structured and practice-oriented assessment approach that supports companies in systematically assessing PFAS risks, implementing regulatory requirements in a practicable manner and concentrating analytical resources specifically on relevant high-risk applications.

3 Implementing the Risk Matrix in Operational Risk Management

3.1 Concrete Procedure for the Risk Assessment

The concrete procedure for the risk-based assessment of food packaging for PFAS residues follows a systematic, multi-stage process. The aim of this procedure is to reliably identify potentially critical packaging components without every packaging item having to undergo cost-intensive laboratory analysis. This pragmatic approach enables companies to efficiently deploy their resources where the risk of PFAS occurrence is highest.

The assessment builds on the detailed packaging composition and assigns each material layer (including printing and adhesives) a risk class between 1 and 4 in accordance with the risk matrix (Annex A).

In a second step, it is checked whether additional packaging modifications such as grease-proof or waterproof finishing of paper or anti-fog coatings of plastic films have been used. In addition, all flexible plastic laminates receive a classification in risk class 3, as the use of melt-flow additives, which may contain PFAS, cannot be ruled out here.

In a third step, the PFAS risk of the entire packaging is classified by assigning the whole packaging the highest risk classification identified among the individual packaging components.

The final step of the procedure translates the identified risk into concrete quality management and compliance measures. While for packaging with a very low or low risk (risk classes 1 and 2) obtaining standard declarations of conformity from upstream suppliers is generally sufficient, a classification as moderate or high risk (risk classes 3 and 4) triggers a tighter control protocol. This comprises a detailed supply chain enquiry regarding the raw materials used and, where applicable, laboratory analysis. Economical screening methods such as the determination of total fluorine (TF) or total organic fluorine (TOF) are used here. If the assessment indicates potential PFAS use or contamination, further verification should be undertaken. Where non-compliance with Article 5(5) PPWR is confirmed, appropriate corrective measures, which may include material or supplier substitution, must be implemented before the packaging is placed on the market.

3.2 Supplier Declaration

Obtaining and evaluating supplier declarations forms the basis for safeguarding PFAS conformity. However, since the legal framework leaves room for interpretation, a structured and critical approach to document review is essential.

In practice, obtaining reliable data is a major challenge. From a legal perspective, it should be noted that suppliers are under no direct statutory obligation to proactively confirm specific PFAS limit values or to provide laboratory test results. The content, level of detail and format of declarations of conformity are a matter of negotiation between the contracting parties.

When evaluating available documents, a critical review of the exact wording is essential, as standard formulations often leave regulatory grey areas, for example in the following formulations:

Wording	**Risk**
"No intentional addition of PFAS"	This statement does not guarantee the actual absence of PFAS. Unintentional contamination (e.g., via PFAS-containing processing aids) is not excluded by it.
"Limit values are complied with"	Requires a detailed review in every case. The confirmation often refers only to the raw material supplied and may not reflect all packaging components.

The following points are decisive for complete supplier declarations:

- Product name
- Material composition
- Article number, GTIN
- Version/issue date of the packaging or packaging component

Examples of supplier declarations can be found in Annexes C and D (see 0 and. 0). The templates provided in Annexes C and D are voluntary examples intended to support supply-chain information exchange. They do not constitute a legally prescribed PPWR declaration format and do not replace the responsibility of the relevant economic operator for demonstrating conformity of the finished packaging.

3.3 Testing Strategy

To support regulatory compliance in an efficient manner, the establishment of a risk-based testing strategy is recommended. The intensity and frequency of analytical tests is determined by the classification of the material into specific risk classes as well as the reliability of the upstream supply chain.

3.3.1 Classification by Risk Class

The need for analytical testing is primarily controlled via a classification of the materials:

- **Risk classes 1 and 2**: For materials in these low risk classes, **laboratory testing** is not routinely recommended. Complete documentation is generally sufficient here.
- **Risk classes 3 and 4**: In these higher risk classes, **analytical tests** are recommended. The exact testing strategy depends on whether test results from upstream suppliers are already available, whether the supplier is located in the EU or outside the EU (with PFAS regulations that may differ from the PPWR), or whether the supplier states that PFAS are used intentionally in the material.

Particular risk focus on recycled paper and board: The use of recycled paper and board – for example in board sleeves for plastic containers in food contact – must be assessed critically. Due to potential contamination in the recycling stream, regular spot checks (e.g., by means of total fluorine determination [Total Fluorine] or TOF analysis) are recommended in these cases in any event.

3.3.2 Criteria for Adapting the Testing Strategy

The testing strategy is not a rigid construct; it must be adapted dynamically when fundamental safeguards in the supply chain are missing. A more conservative design of the testing strategy should be considered when the following conditions are not met:

- Supplier declarations are not complete.
- Statements on non-intentionally added substances (NIAS) are incomplete.
- The material composition is not fully documented by the manufacturer.

In practice, such a more conservative adaptation takes the form of an increase in test frequency and depth, for example by including materials of risk level 2 in the testing program or by more frequent checks (e.g., systematic batch testing) of at-risk materials.

3.3.3 Supplier Evaluation and Test Frequencies

The concrete definition of test frequency and testing depth ultimately remains a case-by-case decision, for which a well-founded supplier evaluation is recommended. A risk-based differentiation according to the origin and structure of the supplier should be applied:

- **Qualified suppliers operating across Europe**: Often have standardized QM processes and offer a higher quality of documentation, which can reduce the testing effort.
- **Suppliers from countries outside the EU**: May require additional verification due to differences in PFAS definitions, regulatory requirements and limit values, particularly where supplier documentation does not specifically address PPWR requirements.**Validity of evidence**: To ensure continuous safeguarding of the supply chain, a maximum validity period of 3 years is proposed for a supplier declaration as well as for an analytical test result. After this period has expired, in the event of process changes (e.g., formulation adjustments) or changes to the regulatory framework, an update or re-testing is required.

3.3.4 The Role of Analytical Testing

Although various protocols and analytical methods for the examination of PFAS in different matrices exist for industry, there is currently no harmonized standard methodology at EU level specifically for food contact packaging. Until such an official methodology is available, a pragmatic, step-by-step approach is recommended. This is based on state-of-the-art analytical capacities as well as a comprehensive meta-analysis of existing PFAS studies in relevant matrices. The aim is to support effective and proportionate verification of compliance with the applicable PFAS limit values from their official date of application on 12 August 2026.

In this framework, the determination of total fluorine (TF) and total organic fluorine (TOF) in particular serve as supporting analytical screening tools. While TF represents the sum of all organic and inorganic fluorine present in the material, the TOF measurement specifically captures the share of extractable organic fluorine associated with PFAS and related compounds. It is important to note that these parameters serve purely for contextual screening and the interpretation of PFAS relevance; they explicitly do not replace the binding PFAS concentration limit values or the statutory documentation obligations pursuant to Article 5(5) of the PPWR. Consequently, analytical test results must never be regarded as isolated compliance indicators. They must always be interpreted in conjunction with the exact material composition, the functional use and the matrix-based risk classification.

This analytical cascade approach minimizes testing effort and laboratory costs through a logical preliminary check in the screening procedure. In the first step, the total fluorine content (TF) is quantified. If the measured TF value is below the regulatory threshold of 50 mg/kg, the sample can already be regarded as conformant without further examination; verification of the other two specific PFAS limit values is then no longer required. Only if this total fluorine content exceeds the value of 50 mg/kg is the second step of the testing plan initiated. Here, complementary analytical methods such as pyrolysis GC/MS can be used to differentiate whether the fluorine is organic or inorganic fluorine. The PPWR does not establish a separate 50 mg/kg limit for organic fluorine. Organic-fluorine measurements should therefore be interpreted as supporting evidence within the risk assessment and should not be treated as a substitute for verification of the applicable individual-PFAS or sum-of-PFAS thresholds.. Only if a suspicion is substantiated or the preliminary stages are not sufficiently conclusive is a direct TOP analysis (Total Oxidizable Precursors) recommended in the third step. This method simulates the oxidative degradation of precursor substances and is necessary to reliably verify compliance with the strict concentration limit values of 25 µg/kg for individual PFAS and 250 µg/kg for the sum of PFAS. Note, that the TOP-assay does not itself constitute a comprehensive determination of all PFAS.

The need to activate this analytical staged testing at all is closely linked to the quality of the upstream documentation. An adaptation of the testing strategy towards this more intensive, laboratory-based verification should be considered when fundamental conditions in the supply chain are not met. This is the case when available supplier declarations are inadequate or incomplete, essential statements on intentionally added substances (IAS) are entirely missing, or the complete material composition is not documented . In such cases, a considerably more conservative design of the testing strategy must be chosen. This takes the form, for example, of the deliberate inclusion of materials of the actually lower risk level 2 in the active laboratory testing program, as well as significantly more frequent examinations of at-risk materials, which can extend to systematic batch-related testing. Ultimately, the definition of the concrete test frequency and the respective testing depth always remain a case-by-case decision, for which a well-founded, risk-based differentiation by supplier structure is strongly recommended. While reduced testing efforts are often justifiable for qualified suppliers with a high quality of documentation, suppliers with incomplete documentation, limited traceability or relevant differences in the applicable regulatory framework may require considerably closer, evidence-based validation.

3.4 Technical Documentation

To support the demonstration of compliance with the PPWR-requirements, the technical documentation serves as the central source of evidence.

The technical documentation for Art. 5(5) under the PPWR should contain sufficient information to substantiate compliance with the three statutory PFAS concentration limit values:

1. **≤ 25 ppb** for each individual PFAS compound (targeted analysis; polymeric PFAS excluded).
2. **≤ 250 ppb** for the sum of all PFAS (targeted analysis; polymeric PFAS excluded).
3. **≤ 50 ppm** for the total fluorine content (including polymeric PFAS).

To support a robust risk assessment and demonstration of compliance, this whitepaper recommends documenting a precise material composition in the form of a complete, physical breakdown. All layers, substrates, inks used, varnishes, adhesives and functional surface treatments must be documented in detail.

A fundamental building block of this file is the Bill of Materials (BOM). It serves to unambiguously identify all direct suppliers as well as critical sub-suppliers in the upstream supply chain and to make them traceable. The BOM functions as a dynamic control instrument: if, for example, a sub-supplier changes a functional barrier coating, an additive or a printing ink, the existing technical documentation should be reviewed and, where the change may affect PFAS conformity, updated and subjected to a renewed risk assessment.

The technical documentation should contain sufficient evidence to substantiate compliance with the PFAS limit values. Two approaches are fundamentally available as forms of evidence: on the one hand, substantive supplier confirmations (see Annex C and Annex D) that not only declare mere compliance with the limit values, but also state specifically that no intentional use of PFAS takes place, define the scope precisely and, among other things, address supply chain control. On the other hand, analytical laboratory tests (such as TF, TOF or TOP analyses), which enable independent, measurement-based verification.

Depending on the identified risk class and the trustworthiness of the supplier, it must be weighed which form of evidence is appropriate. In the case of low risk and proven reliability of a supplier, a well-documented confirmation may be sufficient. As the risk increases – for example with complex supply chains, new supplier relationships or critical applications – additional proactive measures are recommended, such as the performance of systematic supplier audits, analytical testing and a continuous, evidence-based review of formulation data and safety data sheets in order to uncover logical gaps in the chain at an early stage.

4 Case Studies

4.1 Example of Risk Classification 1

Classification of a PET clamshell tray

- Are all supplier declarations available in full? Yes
- Is the complete material composition known? Yes

⇒ Classification according to the risk matrix is possible

Figure 1: PET clamshell tray

Table 1: Risk assessment of a PET clamshell tray

Packaging composite	Tray	Risk	Lid	Risk
Component 1	PET	1	PET	1
Overall risk classification		**1**		**1**

According to the risk matrix, all components of the PET clamshell tray are to be classified as risk level 1. This results in an overall risk classification in **risk class 1**.

4.2 Example of Risk Classification 2 (Risk Matrix)

Classification of a PET clamshell tray with paper label (virgin, moisture-resistant)

- Are all supplier declarations available in full? Yes
- Is the complete material composition known? Yes

⇒ Classification according to the risk matrix is possible

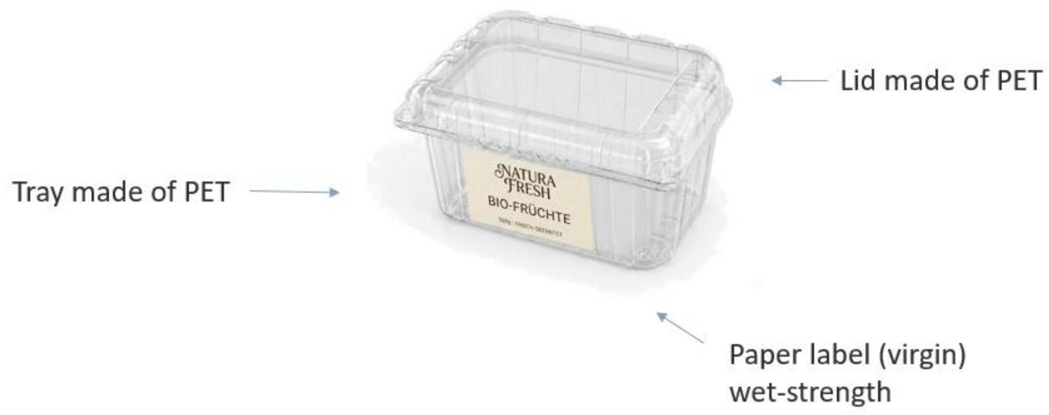

Figure 2: PET clamshell tray with virgin paper label

Table 2: Risk assessment of a PET clamshell tray with virgin paper label

Packaging composition	Tray	Risk	Lid	Risk	Label	Risk
Component 1	PET	1	PET	1	Paper moisture-resistant	2
Component 2					Acrylate adhesive	2
Component 3					Print	1
Overall risk classification		**1**		**1**		**2**

As explained in the example above, the tray and the lid of the PET clamshell are to be classified as risk level 1 according to the risk matrix. The label, in contrast, is rated risk level 2 due to its wet-strength finish. Accordingly, the entire packaging unit is to be rated **risk class 2**.

4.3 Example of Risk Classification 2 (Application List)

Classification of an apple carton

- Are all supplier declarations available in full? No
- Is the complete material composition known? No

⇒ Classification according to the application list

⇒ Risk level 1 is no longer possible

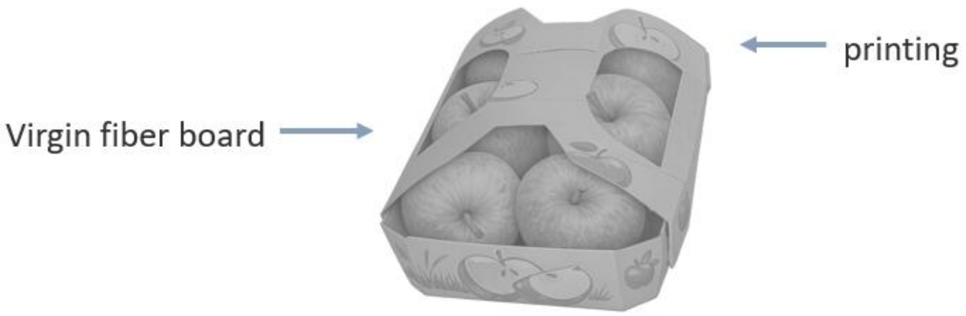

Figure 3: Apple carton

Table 3: PFAS application list

Packaging application (PFAS-relevant)
Paper & Cardboard
Fast food and takeaway paper packaging
Paper-based takeaway containers and trays
Cardboard packaging for pizza and hot food
Paper-based baking and cooking packaging (popcorn, baking paper, muffin cases, etc.)
"Compostable" or "bio-based" paper packaging with coating
Molded fiber packaging made from plant-based materials (bagasse, palm leaves, straw, wheat fibers)
Paper packaging for baked goods and confectionery (bakery, pastry, doughnut and snack bags)
Paper and cardboard packaging for dry goods and confectionery (cereal, spaghetti and confectionery boxes)
Meat, fish and cheese wrapping paper (butcher's/delicatessen paper)
Paper-based beverage cups (coated)
Recycled paper and board
Plastic
Plastic bowls, trays, cups
Flexible plastic packaging in general (bags, tubular bags, films)
Metall
Coated cans (interior paints/coatings)
Lids with fluorinated interior coatings
Composites
Laminated or multi-layer films (e.g., butter packaging)
Beverage composite carton (e.g., milk cartons)

The absence of an application from the PFAS application list does not demonstrate the absence of PFAS. Risk Class 2 reflects the residual uncertainty resulting from incomplete information and the lack of evidence indicating a known or elevated PFAS-risk application.

4.4 Example of Risk Classification 3

Classification of a glass bottle with crown cap

- Are all supplier declarations available in full? Yes
- Is the complete material composition known? Yes

⇒ Classification according to the risk matrix is possible

Figure 4: Glass bottle with crown cap

Table 4: Risk assessment of a glass bottle with crown cap

Packaging composition	Bottle	Risk	Crown cap	Risk
Component 1	Glass	1	PE sealing liner	3
Component 2			Inner coating	3
Component 3			Tinplate	1
Component 4			Outer coating	3
Overall risk classification				**3**

The glass bottle is to be rated risk level 1. In the case of the crown cap, in contrast, several of its layers are rated risk level 3. Accordingly, the entire packaging unit is to be rated **risk class 3**.

4.5 Examples of Risk Classification 4

Classification of a steam-cooking tray

- Are all supplier declarations available in full? Yes
- Is the complete material composition known? Yes

⇒ Classification according to the risk matrix is possible

Figure 5: Steam-cooking tray

Table 5: Risk assessment of a steam-cooking tray

Packaging composition	Tray	Risk	Lidding film	Risk
Component 1	PE	1	PE	1
Component 2	Board (virgin)	1	Tie layer (specified)	2
Component 3	PE	1	EVOH	1
Component 4	Tie layer (specified)	2	Tie layer (specified)	2
Component 5	EVOH	1	PE	1
Component 6	Tie layer (specified)	2	Anti-fog coating	4
Component 7	PE	1		
Production process 1	Tray forming	0	Extrusion of flexible film	3
Production process 2	Extrusion of flexible film	3		

Overall risk classification		**3**		**4**

The multilayer structure of the tray is to be rated risk level 3. The decisive factor here is primarily the production process of extruding flexible films. For the lidding film, the overall structure is to be rated risk level 4. This is attributable to the use of an anti-fog coating. Accordingly, the entire packaging unit is to be rated risk **class 4.**

Classification of a steam-cooking tray with paper banderol (recycled fiber)

- Are all supplier declarations available in full? Yes
- Is the complete material composition known? Yes

⇒ Classification according to the risk matrix is possible

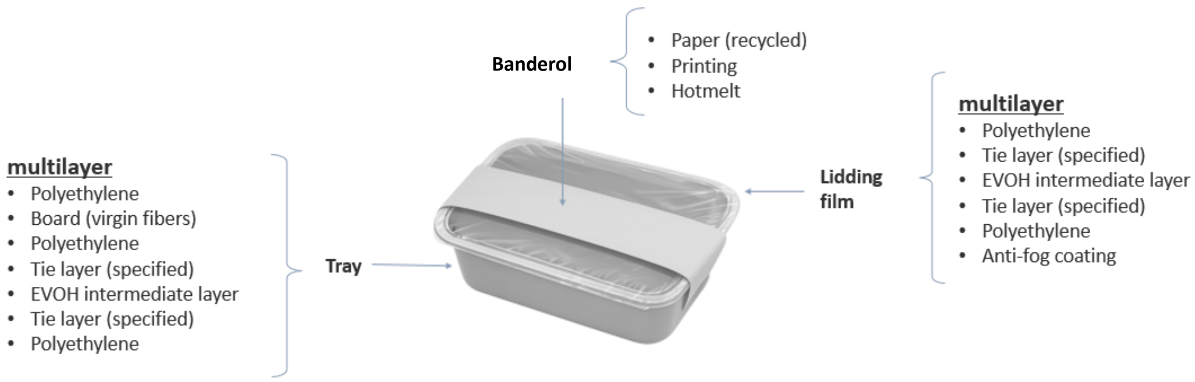

Figure 6: Steam-cooking tray with paper band

Table 6: Risk assessment of a steam-cooking tray with paper band

Packaging composition	Tray	Risk	Lidding film	Risk	Banderol	Risk
Component 1	PE	1	PE	1	Paper (recycled)	4
Component 2	Board (virgin)	1	Tie layer (specified)	2	Printing	2
Component 3	PE	1	EVOH	1	Hotmelt-adhesive	1

Component 4	Tie layer (specified)	2	Tie layer (specified)	2		
Component 5	EVOH	1	PE	1		
Component 6	Tie layer (specified)	2	Anti-fog coating	4		
Component 7	PE	1				
Production process 1	Tray forming	0	Extrusion of flexible film	3		
Production process 2	Extrusion of flexible film	3				
Overall risk classification		**3**		**4**		**4**

The multilayer structure of the tray is to be rated risk level 3. The decisive factor here is primarily the production process of extruding flexible films. For the lidding film, the overall structure is to be rated risk level 4. This is attributable to the use of an anti-fog coating. The paper banderol (recycled fibre) is also to be rated risk level 4. Accordingly, the entire packaging unit is to be rated risk **class 4.**

5 Annexes

5.1 Annex A – Risk Matrix (Version 1 of 1 April 2026)[3]

Table A 1: Risk matrix for paper and board packaging: Qualitative classification of the PFAS probability for constituents of paper-based packaging on the basis of material composition and functional properties. The risk classes reflect the qualitative probability of PFAS relevance (1 = very low probability; 2 = low probability; 3 = medium probability; 4 = high probability).

	Material	Literature	Functional drivers	Risk class
		Paper		
Main Body	Virgin fiber paper		Virgin fiber cellulose is fundamentally not associated with PFAS; occurrence mostly via surface treatments	1
	Recycled paper	(Kaiser 2022; OECD 2020; Du Rietz Dahlström et al. 2026; Lendewig et al. 2025; Morris 2024; Strakowa et al. 2021)	PFAS can be introduced via recycling streams and previously treated paper products	4
	Molded fiber, virgin	(Kaiser 2022; Lendewig et al. 2025; Omer et al. 2025; Strakowa et al. 2021; Teli et al. 2020)	Relevance increases with requirements for grease/water barriers	3
	Molded fiber, recycled material	(Swedish Chemicals Agency 2015; OECD 2020; Du Rietz Dahlström et al. 2026; Morris 2024; Strakowa et al. 2021)	PFAS may already be present in the raw material (recycling loops)	4
	Cellophane		Base material typically PFAS-free; risk via coatings	1
	Starch molded fiber		No need for fluorinated additives	1
Paper treatment	Dry-strength agent PVOH		Polyvinyl alcohol is not fluorinated	1
	Dry-strength agent starch		Starch-based additives with no PFAS relevance	1
	Other dry-strength agents		Common polymers without fluorochemistry	1
	Wetting agents		No fluorinated additives required	1
	Impregnation agents (e.g., grease barrier)	(Kaiser 2022; Bokkers et al. 2019; Ramírez Carnero et al. 2021; Phelps et al. 2024; OECD 2020; Khanashyam et al. 2025; Kiralan et al. 2025; Du Rietz Dahlström et al. 2026; Lendewig et al. 2025; Morris 2024)	Classic PFAS application area (e.g., grease/oil repellency)	4
	Mineral fillers	(Omer et al. 2025)	Inorganic fillers (e.g., calcium carbonate) PFAS-free	1
Barriers and surface finishing on paper	Metallization		PFAS more likely in primers/coatings than in the metal itself	1
	Polymer dispersion coating	(Glüge et al. 2020; Morris 2024)	May contain additives with grease/moisture barrier function	3
	Silicone coating	(Barhoumi et al. 2022)	Low risk, except with functional additives	2

[3] Wack et al. (2026). Development of a Risk Matrix for Assessing PFAS in Food Packaging. *Foods*, *15*(7), 1183. https://www.mdpi.com/2304-8158/15/7/1183

	Paraffin, wax, oil	(Barhoumi et al. 2022)	Conventional hydrophobic barriers without PFAS	1
Additional layers	AlOx, SiOx, metallization		Inorganic barriers PFAS-free	1
Adhesives in multilayer structures	Dispersion adhesive	(Glüge et al. 2020)	Potentially formulation-dependent	2
	Hotmelt adhesive		PFAS-free thermoplastic systems	1
	Starch adhesive		Natural systems without fluorochemistry	1
Composite materials	Aluminum lamination		Increased risk via laminating adhesives	2
	Plastic film lamination		PFAS possible in adhesives/coatings	3
Decoration	Direct printing	(Strakowa et al. 2021; Glüge et al. 2020)	inks mostly PFAS-free	1
	Foil stamping		Multilayer; PFAS possible in release layers	3
	Varnish	(Lendewig et al. 2025)	Functional coatings possibly fluorinated	3
			Label	
a. Material	Paper (not wet strength)		See corresponding material	1
	Paper (wet strength)		See corresponding material	2
	Plastic		See corresponding material	
b. Adhesive	Dispersion adhesive	(Glüge et al. 2020)	Possible depending on formulation	2
	Hot melt	(Glüge et al. 2020)	Typically PFAS-free	1
	Starch-based	(Glüge et al. 2020)	Bio-based, PFAS-free	1
Seam bonding	Dispersion adhesive	(Glüge et al. 2020)	Formulation-dependent risk	2
	Hot melt		No typical PFAS relevance	1
	Starch-based		No typical PFAS relevance	1
			Metal	
Aluminum	Aluminum	(Phelps et al. 2024)	The metal itself is PFAS-free	1
	Inner coating	(Barhoumi et al. 2022; Bisht et al. 2026)	Typical application area: carbonated beverages with long shelf life	3
	Outer coating	(Phelps et al. 2024)	Functional coatings may contain fluorinated additives (abrasion-resistant, anti-fingerprint)	3
	Compound (closures)	(Bokkers et al. 2019; Glüge et al. 2020)	For closures (screw caps, crown caps, etc.) class 3 where the composition is specified; otherwise class 4	3;4
Steel	Steel can	(Phelps et al. 2024)	The steel substrate is PFAS-free	1
	Inner coating	(Bisht et al. 2026; Barhoumi et al. 2022)	Coatings for food contact may contain fluorinated additives. Typical application area: carbonated beverages with long shelf life	3
	Outer coating	(Phelps et al. 2024)	For high-performance coatings (abrasion-resistant, anti-fingerprint)	3
	Compound (closures)	(Bokkers et al. 2019; Glüge et al. 2020)	The presence of PFAS depends on the composition of the sealing compound. For closures (screw caps, crown caps, etc.), classification 3 applies provided the formulation is disclosed	3

Table A 2: Risk matrix for plastic and metal packaging: Qualitative classification of the probability of PFAS occurrence in plastic and metal packaging on the basis of material composition and functional properties. The risk classes reflect the qualitative probability of PFAS relevance (1 = very low probability; 2 = low probability; 3 = medium probability; 4 = high probability).

	Material	Literature	Additional information	Risk class
Polymer Mono	PET-A; PET-G; PET-C (polyethylene terephthalate, amorphous, glycol-modified and crystalline), virgin		PFAS may enter the material during processing (e.g., extrusion) as impurities from additives or auxiliaries; not intentionally added	1
	rPET (recycled PET)	(Barhoumi et al. 2022)	PFAS may enter the material during processing, for example during extrusion, as impurities from additives or processing aids, rather than being added intentionally to modify material properties	1
	HDPE (high-density polyethylene), virgin	(Tanzer et al. 2025; Barhoumi et al. 2022; Morris 2024)	PFAS may occur as impurities from additives or auxiliaries during processing	1
	rHDPE (recycled HDPE)	(Barhoumi et al. 2022; Morris 2024)	Not for food contact materials	2
	LDPE (low-density polyethylene), virgin	(Barhoumi et al. 2022; Morris 2024)	PFAS may enter the material during processing, for example during extrusion, as impurities from additives or processing aids, rather than being added intentionally to modify material properties	1
	rLDPE (recycled LDPE)	(Barhoumi et al. 2022; Morris 2024)	Not for food contact materials	2
	PP (polypropylene), virgin	(Barhoumi et al. 2022)	PFAS may enter the material during processing, for example during extrusion, as impurities from additives or processing aids, rather than being added intentionally to modify material properties	1
	rPP (recycled PP)	(Barhoumi et al. 2022)	Not for food contact materials	2
	PEF (polyethylene furanoate), virgin		PFAS may enter the material during processing, for example during extrusion, as impurities from additives or processing aids, rather than being added intentionally to modify material properties	1
	PS (polystyrene), virgin		PFAS may enter the material during processing, for example during extrusion, as impurities from additives or processing aids, rather than being added intentionally to modify material properties	1
	rPS (recycled PS)		Not for food contact materials	2
	PBT (polybutylene terephthalate), virgin		PFAS may enter the material during processing, for example during extrusion, as impurities from additives or processing aids, rather than being added intentionally to modify material properties	1
Polymer multilayer	EVOH layer (ethylene vinyl alcohol copolymer)	(Kaiser 2022; Barhoumi et al. 2022)	PFAS relevance depends mainly on adhesives or tie layers in multilayer structures	2
	PVOH layer (polyvinyl alcohol)	(Barhoumi et al. 2022; Kaiser 2022)	PFAS are unlikely to be contained in the polymer itself; the risk relates to coatings or additives	3
	PE release layer	(Barhoumi et al. 2022; Kaiser 2022)	Additives used to improve peelability may contain PFAS	3
	PP release layer	(Barhoumi et al. 2022; Kaiser 2022)	Additives used to improve peelability may contain PFAS	3
	PVDC (polyvinylidene chloride)	(Barhoumi et al. 2022; Kaiser 2022)	The barrier polymer itself is generally PFAS-free; additives may influence the risk	2
	Laminating adhesive	(Kaiser 2022)	PFAS may occur as surfactants or formulation additives	3
Coating/varnishing/vapor deposition	Coating (not defined)		The composition of the coating is unknown and may contain fluorinated additives	4

	AlOx	(Kaiser 2022; Glüge et al. 2020)	Inorganic barrier layer PFAS-free; a risk may arise from primer layers	2
	Anti-fog coating	(Glüge et al. 2020; Kaiser 2022)	Typical application containing PFAS	4
	EVOH coating		The risk depends on the additives in the formulation of dispersion coatings	3
	PVOH coating	(Kaiser 2022; Glüge et al. 2020)	The risk depends on the formulation additives in dispersion coatings	3
	SiOx	(Kaiser 2022)	The inorganic layer is PFAS-free; primers may contain PFAS	2
	Metallization	(Kaiser 2022)	The metal layer is PFAS-free; primers may contain PFAS	2
	Acrylate coating	(Kaiser 2022; Glüge et al. 2020)	Low risk, but fluorinated additives may be used to modify surface properties	2
	Functional coating / varnish	(Kaiser 2022; Glüge et al. 2020)	High-performance coatings are typical sources of PFAS and may contain fluorinated additives	3
	Varnish	(Kaiser 2022)	PFAS may occur where surface-active additives are used	2
	Direct printing	(Kaiser 2022)	PFAS may occur where surface-active additives are used	2
Adhesive	Adhesive (not defined)		The composition is unknown and may contain fluorinated additives	4
	Acrylate adhesive	(Glüge et al. 2020)	PFAS may occur as surfactants or processing aids	2
	PU adhesive		Depending on the chemical composition, additives may contain PFAS	3
	Hotmelt		Thermoplastic adhesives are generally PFAS-free	1
Other	Composite/sealing material	(Glüge et al. 2020; Bokkers et al. 2019)	Sealing compounds may contain fluorinated additives depending on their composition	3
	Absorbent layers – PE, PP, PS	(Barhoumi et al. 2022; Glüge et al. 2020)	PFAS may occur in multilayer absorbent structures via additives or processing aids.	3

Annex B – Application List[4]

Table B 1: Packaging applications for which PFAS contamination has been documented in the scientific literature.

Packaging application (PFAS-relevant)	Literature
Paper packaging for fast food and takeaway meals	(Kaiser 2022; OECD 2020; Barhoumi et al. 2022; Ohoro und Ngole-Jeme 2026; Du Rietz Dahlström et al. 2026; Lendewig et al. 2025; Bisht et al. 2026; Strakowa et al. 2021)
Takeaway containers and trays made of paper	(Kaiser 2022; Strakowa et al. 2021; Bisht et al. 2026; Lendewig et al. 2025)
Board packaging for pizza and warm food	(Swedish Chemicals Agency 2015; Kaiser 2022; Bokkers et al. 2019; Barhoumi et al. 2022; Ohoro und Ngole-Jeme 2026; Lendewig et al. 2025; Kiralan et al. 2025; Strakowa et al. 2021; Ramírez Carnero et al. 2021)
Paper-based baking and cooking packaging (popcorn, baking paper, muffin cases, etc.)	(Bokkers et al. 2019; OECD 2020; Ohoro und Ngole-Jeme 2026; Bisht et al. 2026; Khanashyam et al. 2025; Strakowa et al. 2021; Ramírez Carnero et al. 2021)
"Compostable" or "bio-based" paper packaging with coating	(OECD 2020; Lendewig et al. 2025; Bisht et al. 2026; Strakowa et al. 2021; Ramírez Carnero et al. 2021)
Molded fiber packaging from plant-based raw materials (bagasse, palm leaves, straw, wheat fibers)	(Kaiser 2022; Strakowa et al. 2021; Lendewig et al. 2025; Bisht et al. 2026; Omer et al. 2025)
Paper packaging for baked goods and confectionery (bags for bread, pastries, donuts and snacks)	(Swedish Chemicals Agency 2015; Kaiser 2022; Barhoumi et al. 2022; Du Rietz Dahlström et al. 2026; Lendewig et al. 2025; Strakowa et al. 2021; Bisht et al. 2026)
Paper and board packaging for dry goods and confectionery (packaging for cereals, spaghetti and confectionery)	(OECD 2020; Strakowa et al. 2021; Ohoro und Ngole-Jeme 2026; Stroski und Sapozhnikova 2026)
Wrapping paper for meat, fish and cheese (butcher/deli paper)	(Khanashyam et al. 2025; Stroski und Sapozhnikova 2026)
Paper beverage cups (coated)	(Trier et al. 2011)
Plastic bowls, trays, cups	(Barhoumi et al. 2022; Morris 2024; Bisht et al. 2026; Stroski und Sapozhnikova 2026)
Flexible plastic packaging in general (bags, pouches, films)	(Barhoumi et al. 2022; Morris 2024; Bisht et al. 2026; Stroski und Sapozhnikova 2026)
Coated cans (interior paints/coatings)	(Phelps et al. 2024)
Lids with fluorinated interior coatings	(Phelps et al. 2024)

[4] Wack et al. (2026). Development of a Risk Matrix for Assessing PFAS in Food Packaging. *Foods*, *15*(7), 1183. https://www.mdpi.com/2304-8158/15/7/1183

Laminated or multilayer films (e.g., butter packaging)	(Barhoumi et al. 2022; Morris 2024; Khanashyam et al. 2025; Bisht et al. 2026)
Beverage cartons (e.g., milk cartons)	(Khanashyam et al. 2025)
Recycled paper and board	

5.2 Annex C – Supplier Declaration of PFAS Conformity – Example 1 (Brand Owner)

We hereby declare that the products / materials / packaging components supplied by us under the following designation:

[Product name / material composition / article number (GTIN)]

meet the requirements pursuant **to Article 5(5) of Regulation (EU) 2025/40 (Packaging and Packaging Waste Regulation – PPWR)**, where applicable.

1. Compliance with Concentration Limit Values
The above-mentioned products do not exceed the following concentration limit values established pursuant to Article 5(5) PPWR for food contact packaging:

- 25 ppb for each individual PFAS (targeted analysis; polymeric PFAS excluded)
- 250 ppb for the sum of PFAS (targeted analysis; polymeric PFAS excluded)
- 50 ppm for total PFAS, including polymeric PFAS

2. PFAS Definition Applied
The assessment is based on the structural definition of PFAS as referenced in the PPWR, i.e., substances containing at least one fully fluorinated methyl ($–CF_3$) or methylene group ($–CF_2–$), subject to regulatory clarifications and exemptions.

3. No Intentional Use of PFAS
PFAS are not intentionally added to the supplied products as:

- Raw materials
- Monomers
- Additives
- Coating components
- Processing aids
- Surface treatments
- Lubricants, release agents or cleaning agents
- Other substances that may reasonably migrate into or remain in the finished product

4. Basis of the Conformity Assessment
This declaration is based on:
☐ Knowledge of formulations and material specifications
☐ Supplier declarations from upstream suppliers
☐ Structured PFAS risk assessment
☐ Analytical testing (where applicable)

If analytical testing has been carried out:

- Test method:
- Detection limits (LOD/LOQ):
- Testing laboratory (including accreditation, if applicable):
- Date of testing:

The supporting technical documentation is retained and can be made available to the competent authorities upon substantiated request.

5. Scope

This declaration covers all relevant components of the supplied packaging, including:

- Base materials
- Coatings and barrier layers
- Adhesives and laminating layers
- Printing inks and varnishes
- Additives and processing aids
- Recyclates (where applicable)

6. Supply Chain Control

We maintain internal material specifications and contractual obligations that require our upstream suppliers to comply with the PFAS requirements of Article 5(5) PPWR.

7. Obligation to Notify Changes

We undertake to inform the customer promptly and in writing in the event of:

- Any changes to the formulation of the packaging or packaging component
- Changes to raw materials or additives
- Changes to the production site of the packaging or packaging component
- Changes to upstream suppliers
- Regulatory reclassifications or newly identified PFAS relevance, which may affect the PFAS conformity of the supplied products.

8. Deviation Management

Should we become aware that a supplied product does not comply with the above declaration, we will inform the customer promptly in writing and cooperate in implementing appropriate corrective and preventive measures.

9. Document Retention:

The relevant technical documents supporting this declaration will be retained for a period of at least 10 years and made available to the competent authorities upon legitimate request.

Place, date

Signature

Name:
Function/title:
Company:
Company address:

5.3 Annex D – Upstream Supplier Declaration of PFAS Conformity – Example 2 (for Material Suppliers to Packaging Manufacturers)

PFAS conformity of raw materials for use in food contact packaging
(Article 5(5) PPWR)

1. Supplier Identification
Company name:
Registered address:
Production site(s):
Contact person (Regulatory / Quality Assurance):
E-mail / phone:

2. Raw Material Identification
Material / product name:
Type / product code:
CAS number(s) (if applicable):
Intended function (e.g., resin, coating, pigment, additive, adhesive):
Date of issue:
Version number:
This declaration applies exclusively to the raw material(s) named above.

3. Legal Context
Our company manufactures food contact packaging placed on the EU market. Pursuant to Article 5(5) of Regulation (EU) 2025/40 (PPWR), we are obliged to ensure that PFAS concentration limit values in finished packaging are not exceeded. We therefore require confirmation that the supplied raw materials meet the PFAS requirements listed below.

4. Compliance with PFAS Concentration Limit Values
The undersigned supplier declares that the above-mentioned raw material does not exceed the following limit values pursuant to Article 5(5) PPWR:

- ≤ 25 ppb for each individual PFAS (targeted analysis; polymeric PFAS excluded)
- ≤ 250 ppb for the sum of PFAS (targeted analysis; polymeric PFAS excluded)
- ≤ 50 ppm for total PFAS, including polymeric PFAS

Where relevant, concentration data for the raw material itself may be provided.

5. Definition Applied

PFAS are assessed in accordance with the structural definition referenced in the PPWR (substances containing at least one fully fluorinated methyl (–CF_3) or methylene group (–CF_2–)), subject to regulatory clarifications and exemptions.

6. Confirmation of Intentional Use

Please confirm one of the following options:

☐ No PFAS are intentionally added to this raw material. This includes:

- Monomers
- Additives
- Surface treatments
- Processing aids
- Impurities above regulatory thresholds

OR

☐ The following PFAS are intentionally present (please provide details, CAS numbers and concentration ranges):

7. Basis of the Conformity Assessment

Conformity is based on:

☐ Complete knowledge of the formulation

☐ Internal raw material control

☐ Supplier declarations from the upstream supply chain

☐ Analytical testing

If analytical testing has been carried out, please provide the following information:

Test method (e.g., LC-MS/MS, TOF):

Detection limits (LOD/LOQ):

Laboratory (incl. accreditation):

Test date:

Supporting documentation must be made available upon request.

8. Scope

This declaration includes:

- All components of the supplied material
- Impurities and by-products
- Auxiliary substances (co-formulants)
- Processing aids used in manufacturing
- Recyclates (if applicable)

9. Obligation to Notify Changes
The supplier undertakes to inform us in advance, promptly and in writing, of all changes that may affect PFAS conformity, in particular in the event of:

- Changes to the formulation
- Changes to raw material sourcing
- Introduction of new additives
- Other significant process changes that may affect PFAS conformity

10. Documentation and Retention
The supplier confirms that the relevant technical documents supporting this declaration:

- Will be retained for a period of at least 10 years
- Can be made available to competent authorities upon substantiated request

11. Deviation and Non-Conformity
Should the supplier become aware of a deviation from this declaration, prompt written notification is required.

12.Legally Binding Signature
Place, date:
Authorized representative:
Name:
Function/title:
Company:
Signature:
Company stamp (if applicable)

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