SLOVENSKI STANDARD
SIST EN 17681-1:2022

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Tekstil in tekstilni izdelki - Organski fluor - 1. del: Določevanje nehlapnih spojin z ekstrakcijsko metodo s tekočinsko kromatografijo

Textiles and textile products - Organic fluorine - Part 1: Determination of non-volatile compounds by extraction method using liquid chromatography

Textilien und textile Erzeugnisse - Organisches Fluor - Teil 1: Bestimmung des Gehaltes an nichtflüchtigen Verbindungen durch Extraktionsverfahren mittels Flüssigkeitschromatographie

Textiles et produits textiles - Fluor organique - Partie 1 : Détermination de composés non volatils par une méthode d'extraction utilisant la chromatographie en phase liquide

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Textiles and textile products - Organic fluorine - Part 1: Determination of non-volatile compounds by extraction method using liquid chromatography

Textiles et produits textiles - Fluor organique - Partie 1 : Détermination de composés non volatils par une méthode d'extraction utilisant la chromatographie en phase liquide

Textilien und textile Erzeugnisse - Organisches Fluor - Teil 1: Bestimmung des Gehaltes an nichtflüchtigen Verbindungen durch Extraktionsverfahren mittels Flüssigkeitschromatographie

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

European foreword 3
Introduction 4
1 Scope 11
2 Normative references 11
3 Terms and definitions 11
4 Principle of method 12
5 Reagents 12
6 Equipment 12
7 Sampling 13
7.1 General 13
7.2 Sampling based on area 13
7.3 Sampling based on mass 13
7.4 Preparation of test specimen 13
8 Procedure 14
8.1 Preparation of stock solutions 14
8.2 Preparation of the check solution 14
8.3 Preparation of calibration solutions 14
8.4 Extraction 14
8.5 Analysis 14
9 Expression of results 15
9.1 Calibration 15
9.2 Calculation of the results 15
9.3 Calculation of the sums of certain PFAS 16
9.4 Limit of detection (LoD) and limit of quantification (LoQ) 16
9.5 Reliability of the method 16
10 Test report 18
Annex A (normative) Usable ions and reachable quantification limits for PFAS analysis by LC/MS/MS 19
Annex B (informative) Interferences with LC/MS/MS 21
Annex C (informative) Non-regulated PFAS 22
Annex D (informative) Chromatographic conditions 23
D.1 General 23
D.2 Chromatographic conditions 23
D.3 LC/MS/MS conditions 23
Bibliography 24

European foreword

This document (EN 17681-1:2022) has been prepared by Technical Committee CEN/TC 248 “Textiles and textile products”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2023, and conflicting national standards shall be withdrawn at the latest by March 2023.

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Introduction

In the European Union, according to Regulation (EU) 2019/1021 on persistent organic pollutants (POP), Article 3, Clause 1, in connection with Annex I, amended by Commission Delegated Regulation (EU) 2020/784, the manufacturing, placing on the market and use of perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds, whether on their own, in mixtures or in articles, is prohibited. This is in addition to the existing prohibition of perfluorooctane sulfonic acid and its derivatives (PFOS).

According to Article 4 Clause 1. (b) this does not apply in the case of a substance present as an unintentional trace contaminant, as specified in the relevant entries of Annex I in substances, mixtures or articles.

Annex I Part A, describing perfluorooctane sulfonic acid and its derivatives (PFOS), contains the specific exemption (Point 2) to concentrations of PFOS in semi-finished products or articles, or parts thereof, if the concentration of PFOS is lower than 0,1 % mass fraction calculated with reference to the mass of structurally or micro-structurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is lower than 1 µg/m^2 of the coated material. PFOS compounds have the formula $C_8F_{17}SO_2X$ where X = OH, Metal salt (O-M^+), halide, amide and other derivatives, including polymers.

In Annex I Part A, describing perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds, contains the specific exemption (Point 1) to concentrations of PFOA or any of its salts equal to or below 0,025 mg/kg (0,000 002 5 % mass fraction), where they are present in substances, mixtures or articles. In addition, (Point 2) Article 4(1) applies to concentrations of any individual PFOA-related compound or a combination of PFOA-related compounds equal to or below 1 mg/kg (0,000 1 % mass fraction) where they are present in substances, mixtures or articles.

PFOA, its salts and PFOA-related compounds means the following:

i) perfluorooctanoic acid, including any of its branched isomers;

ii) its salts;

iii) PFOA-related compounds which, for the purposes of the Convention, are any substances that degrade to PFOA, including any substances (including salts and polymers) having a linear or branched perfluoroheptyl group with the moiety $(C_7F_{15})C$ as one of the structural elements.

The following compounds are not included as PFOA-related compounds:

iv) C_8F_{17}-X, where X = F, Cl, Br;

v) fluoropolymers that are covered by $CF_3[CF_2]_n$-R', where R' = any group, $n > 16$;

vi) perfluoroalkyl carboxylic acids (including their salts, esters, halides and anhydrides) with ≥ 8 perfluorinated carbons;

vii) perfluoroalkane sulfonic acids and perfluoro phosphonic acids (including their salts, esters, halides and anhydrides) with ≥ 9 perfluorinated carbons;

viii) perfluorooctane sulfonic acid and its derivatives (PFOS), as listed in Annex I.

As a further exemption in Annex I Part A (Point 5 c) the manufacturing, placing on the market and use of PFOA, its salts and PFOA-related compounds is allowed in textiles for oil and water repellency for the protection of workers from dangerous liquids that comprise risks to their health and safety, until 4 July 2023.

Commission Regulation (EU) 2021/1297 amending Regulation (EC) No 1907/2006 (REACH), Annex XVII [7] restricts perfluorocarboxylic acids containing 9 to 14 carbon atoms in the chain (C9-C14 PFCAs), their salts and C9-C14 PFCA-related substances from 25 February 2023.

This restriction concerns the following substances:

Linear and branched perfluorocarboxylic acids of the formula C_nF_{2n+1}-C(= O)OH where *n* = 8, 9, 10, 11, 12, or 13 (C9-C14 PFCAs), including their salts, and any combinations thereof;

Any C9-C14 PFCA-related substance having a perfluoro group with the formula C_nF_{2n+1}- directly attached to another carbon atom, where *n* = 8, 9, 10, 11, 12, or 13, including their salts and any combinations thereof;

Any C9-C14 PFCA-related substance having a perfluoro group with the formula C_nF_{2n+1}- that it is not directly attached to another carbon atom, where *n* = 9, 10, 11, 12, 13 or 14 as one of the structural elements, including their salts and any combinations thereof.

The following substances are excluded from this designation:

C_nF_{2n+1}-X, where X = F, Cl, or Br

where *n* = 9, 10, 11, 12, 13 or 14, including any combinations thereof,

C_nF_{2n+1}-C(= O)OX' where *n* > 13 and X' = any group, including salts.

Several per- and poly-fluorinated alkylated substances (PFAS), which are not restricted under the POP Regulation have been added as Substances of Very High Concern (SVHC) to the Candidate List according to Regulation (EC) No 1907/2006 (REACH), Article 59.

Per- and poly-fluorinated compounds from C4 – C14 (PFAS) occur, for example, in soil and water repellent finishes within textiles or can be introduced as contaminants (for example from water sources). Categories of PFAS are shown in Table 1. Table 2 lists classes of regulated compounds (i.e. listed in a Regulation) including acids, telomers, sulfonates and sulfonamidalcohols. Compounds of concern (i.e. not listed yet in a Regulation) are shown in the informative Annex C.

Table 1 — Categories of PFAS

Type of PFAS	Sub-group	Applications		Category
		Use	Sources of contamination [a]	
PFAS salts	K^+, Li^+, diethanolamine (DEA) salt analysed as acids	Surfactant for alkaline cleaners	Surfactant in fire-fighting foam, emulsifier in floor polish, mist suppressant for metal plating baths, surfactant for etching acids for circuit boards, pesticide active ingredient for ant bait traps	A
	Amines	-	Mist suppressant for metal plating baths	B
	Ammonium salts analysed as acids	-	Emulsifier for fluoropolymer production	C
	Amphoterics	Water/solvent repellence for leather/paper	-	D
PFAS substances	Carboxylates	-	Antistatic agent in photographic paper	E
	Amides	-	Pesticide active ingredient	F
	Oxazolidinones	-	Waterproofing casts (electronics)	G
PFAS polymers/oligomers	Alcohols, silanes, alkoxylates, fatty acid esters, adipates, urethanes, polyesters, acrylates	Soil and water repellence for carpets, fabrics, upholstery, apparel, leather, metal, glass	-	H
	Copolymers, phosphate esters	Water repellence for carpets, fabrics, upholstery, apparel, leather, metal, glass	Soil/oil/water repellence for plates, food containers, bags, wraps, folding cartons, containers, carbonless forms, masking papers	I

[a] These substances are not relevant in the manufacturing process of textiles but it is possible to find them as contaminants.

Table 2 — Regulated PFAS

No.	Substance		CAS Registry Number® (CAS RN®)[1]	Applicable test method		EU regulation [a]	PFAS category (Table 1)
				EN 17681-1	EN 17681-2		
Perfluorinated carboxylic acids							
1	PFHxA	Perfluoro-n-hexanoic acid	307–24–4	x		under evaluation (REACH)	A and C
2 [b]	PFOA	Perfluoro-n-octanoic acid	335–67–1	x		POP and REACH (SVHC)	A and C
2.2 [b]	APFO Na-PFO K-PFO Ag-PFO F-PFO	Perfluoro-n-octanoic acid salts - Ammonium pentadecafluorooctanoate - Sodium perfluorooctanoate - Potassium perfluorooctanoate - Silver perfluorooctanoate - Perfluorooctanoyl fluoride	 3825–26–1 335–95–5 2395–00–8 335–93–3 335–66–0	x		POP	C A A A A
3 [b]	8:2 FTS	1H,1H,2H,2H-Perfluorodecanesulfonic acid	39108–34–4	x		POP	A
4 [b]	Me-PFOA	Methyl perfluorooctanoate	376–27–2		x	POP	H
5 [b]	Et-PFOA	Ethyl perfluorooctanoate	3108–24–5		x	POP	H
6	PFNA	Perfluoro-n-nonanoic acid	375–95–1	x		REACH Annex XVII and SVHC	
6.2	NH_4-PFN Na-PFN	Perfluoro-n-nonanoic acid salts - Ammonium perfluorononanoate - Sodium perfluorononanoate	 4149–60–4 21049–39–8	x		REACH Annex XVII and SVHC	

[1] CAS Registry Number® (CAS RN®) is a trademark of CAS corporation. This information is given for the convenience of users of this document and does not constitute an endorsement by CEN of the product named. Equivalent products may be used if they can be shown to lead to the same results.

No.	Substance		CAS Registry Number® (CAS RN®)[1]	Applicable test method		EU regulation [a]	PFAS category (Table 1)
				EN 17681-1	EN 17681-2		
7	PFDA	Perfluoro-n-decanoic acid	335–76–2	x		REACH Annex XVII and SVHC	
7.2	NH_4-PFD Na-PFD	Perfluoro-n-decanoic acid salts - Ammonium perfluorodecanoate - Sodium perfluorodecanoate	3830–45–3 3108–42–7	x		REACH Annex XVII and SVHC	
8	PFUnA	Perfluoroundecanoic acid	2058–94–8	x		REACH Annex XVII and SVHC	
9	PFDoA	Perfluorododecanoic acid	307–55–1	x		REACH Annex XVII and SVHC	
10	PFTrDA	Perfluorotridecanoic acid	72629–94–8	x		REACH Annex XVII and SVHC	
11	PFTeDA	Perfluorotetradecanoic acid	376–06–7	x		REACH Annex XVII and SVHC	
12	PF-3,7-DMOA	Perfluoro(3,7-dimethyloctanoic acid)	172155–07–6	x		REACH Annex XVII	
13 [b]	4HPFUnA	2H,2H,3H,3H-Heptadecafluoroundecanoic acid	34598–33–9	x		POP	

No.	Substance		CAS Registry Number® (CAS RN®) [1]	Applicable test method		EU regulation [a]	PFAS category (Table 1)
				EN 17681-1	EN 17681-2		
Perfluorinated sulfonic acids							
14	PFBS	Perfluorobutanesulfonic acid	375–73–5	x		REACH (SVHC)	A
15	PFHxS	Perfluorohexanesulfonic acid	355–46–4	x		REACH (SVHC)	H
16 [c]	PFOS	Perfluorooctanesulfonic acid	1763–23–1	x		POP	H
16.2 [c]	PFOS-X	Perfluorooctane sulfonic acid salts $C_8F_{17}SO_2X$ - Potassium perfluorooctane sulfonate - Lithium perfluorooctane sulfonate - Ammonium perfluorooctane sulfonate - Bis2(hydroxyethyl)ammonium perfluorooctane sulfonate - Tetraethyl ammonium heptadecafluorooctane sulfonate	 2795–39–3 29457–72–5 29081–56–9 70225–14–8 56773–42–3	x		POP	 A A A A A
Perfluoro-octanesulfonamides (FOSA)							
17 [c]	PFOSA	Perfluorooctane sulfonamide	754–91–6	x		POP	F
18 [c]	N-MeFOSA	N-Methylperfluoro-1-octanesulfonamide	31506–32–8	x		POP	F
19 [c]	N-EtFOSA	N-Ethylperfluoro-1-octanesulfonamide	4151–50–2	x		POP	F
Perfluoro-octanesulfonamido ethanol (FOSE)							
20 [c]	N-MeFOSE	2-(N-methylperfluoro-1-octanesulfonamideo)-ethanol	24448–09–7	x	x	POP	H
21 [c]	N-EtFOSE	2-(N-Ethylperfluoro-1-octanesulfonamido)-ethanol	1691–99–2	x	x	POP	H
Fluorinated telomer alcohols (FTOH)							
22 [b]	8:2 FTOH	2-Perfluorooctylethanol	678–39–7	x		POP	H
23	10:2 FTOH	2-Perfluorodecylethanol	865–86–1	x		REACH Annex XVII [a]	H