Annex 15 Report
Proposal for identification of a substance of very high concern (SVHC)

4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenol (Bisphenol AF, BPAF) and its salts

EC Number(s):-

CAS Number(s):-

July 2026

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1. Proposal

Substance name(s): 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenol (BPAF, Bisphenol AF) and its salts

EC number(s): -

CAS number(s): -

BPAF and its salts are proposed to be identified as substances meeting the criteria of Article 57 (c) of UK REACH owing to their classification in the hazard class toxic for reproduction category 1B[1].

Summary of how the substance meets the criteria set out in Article 57 of the REACH Regulation

4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenol (BPAF, Bisphenol AF) (EC: 216-036-7; CAS: 1478-61-1) is included in the GB Mandatory Classification and Labelling (MCL) list. It is covered by the Index number 604-099-00-7 and is classified as Toxic for reproduction category 1B (H360F: May damage fertility).

In addition, several BPAF salts are assigned the same classification on the basis that they will dissociate rapidly to BPAF in water or biological fluids. They include:

- Benzyl(diethylamino)diphenylphosphonium 4-[1,1,1,3,3,3-hexafluoro-2-(4-hydroxyphenyl)propan-2-yl]phenolate
  (GB MCL Index number: 015-204-00-5; EC: 479-100-5; CAS: 577705-90-9)
- Benzyltriphenylphosphonium, salt with 4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]bis[phenol] (1:1)
  (GB MCL Index number: 015-205-00-0; EC: 278-305-5; CAS: 75768-65-9)
- Reaction mass of 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenol and benzyl(diethylamino)diphenylphosphonium 4-[1,1,1,3,3,3-hexafluoro-2-(4-hydroxyphenyl)propan-2-yl]phenolate (1:1)
  (GB MCL Index number: 015-206-00-6)

[1] Classification in accordance with section 3.7 of Annex 1 to the retained Regulation (EC) No 1272/2008 as amended for Great Britain (hereinafter referred to as GB CLP)

- Reaction mass of 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenol and benzyltriphenylphosphonium, salt with 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (1:1)
  (GB MCL Index number: 015-207-00-1)

Therefore, this proposal applies to BPAF and any of its salts (refer to Section 2.1 for further information on the substance identity).

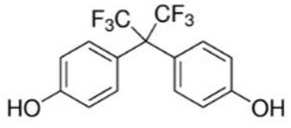
2. Justification

2.1 Identity of the substance and physical and chemical properties

2.1.1 Name and other identifiers of the substance

This report applies to 4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]diphenol (BPAF) and its salts. The salts are expected to dissociate rapidly in water and biological fluids to form BPAF. Information on the identity of BPAF is provided in Table 1 and a non-exhaustive list of BPAF salts is provided in Table 2.

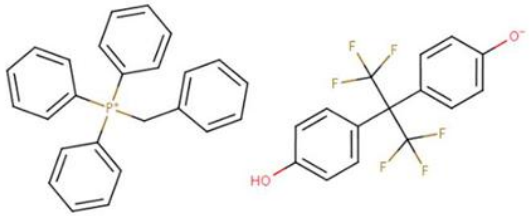
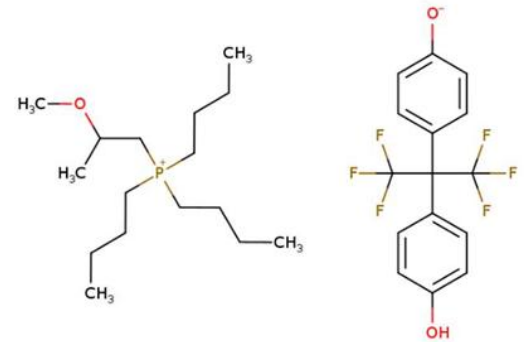
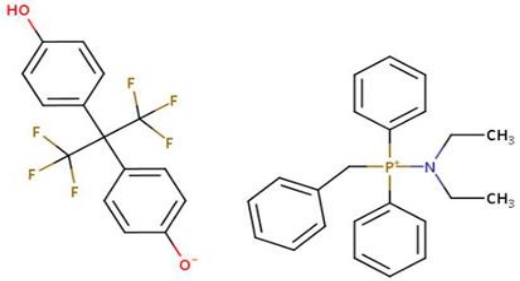
Table 1: Substance identity of BPAF

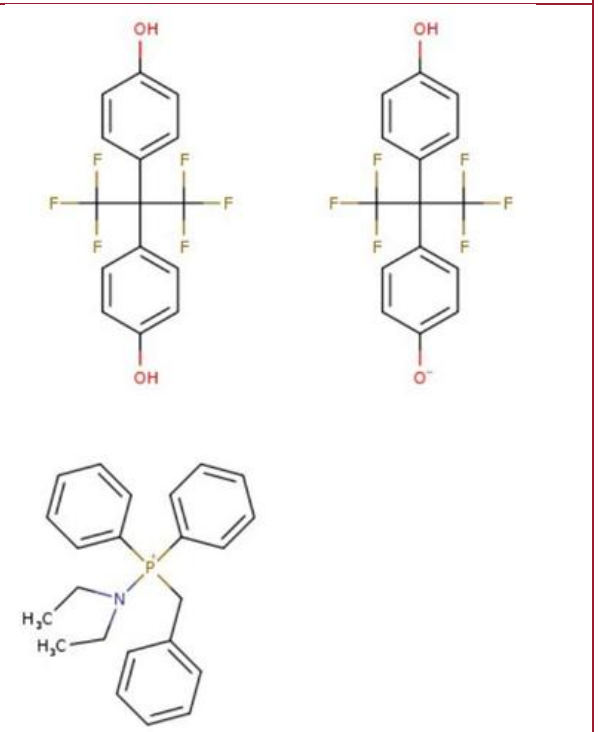
EC number:	216-036-7
EC name:	4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]diphenol
CAS number:	1478-61-1
IUPAC[a] name:	4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]diphenol
Index number in GB Mandatory Classification and Labelling (MCL) List[b]:	604-099-00-7
Molecular formula:	$C_{15}H_{10}F_6O_2$
Molecular weight range:	336.2 g/mol
Synonyms:	bisphenol AF, BPAF
Structural formula:	

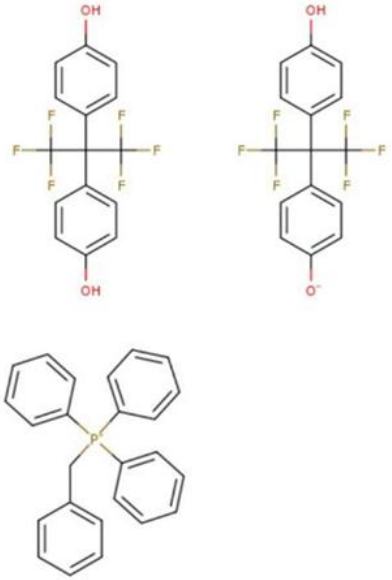
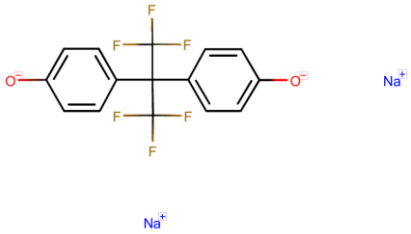
[a] IUPAC: International Union of Pure and Applied Chemistry

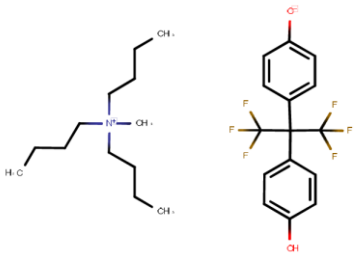
[b] GB MCL list in accordance with the retained Regulation (EC) No 1272/2008 as amended for Great Britain

Table 2: Substance identity of selected BPAF salts

Substance Name	EC number/ CAS number	Index number in the GB MCL List	Molecular formula	Molecular weight range	Structural formula:
Benzyltriphenylphosphonium, salt with 4,4' [2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]bis[phenol] (1:1)	278-305-5/ 75768-65-9	015-205-00-0	$C_{40}H_{31}F_6O_2P$	688.6 g/mol	
Tributyl-2-methoxypropylphosphonium salt with 4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]bis[phenol]	468-740-0 /126049-00-1*	Not applicable	$C_{31}H_{45}F_6O_3P$	610.6 g/mol	
Benzyl(diethylamino)diphenylphosphonium 4 [1,1,1,3,3,3-hexafluoro-2-(4 hydroxyphenyl)propan-2-yl]phenolate	479-100-5/ 577705-90-9	015-204-00-5	$C_{38}H_{36}F_6NO_2P$	683.7 g/mol	

Substance Name	EC number/ CAS number	Index number in the GB MCL List	Molecular formula	Molecular weight range	Structural formula:
reaction mass of 4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]diphenol and benzyl(diethylamino)diphenylphosphonium 4 [1,1,1,3,3,3-hexafluoro-2-(4 hydroxyphenyl)propan-2-yl]phenolate (1:1)	Not applicable/ Not applicable	015-206-00-6	Not applicable	Not applicable	

Substance Name	EC number/ CAS number	Index number in the GB MCL List	Molecular formula	Molecular weight range	Structural formula:
reaction mass of 4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]diphenol and benzyltriphenylphosphonium, salt with 4,4' [2,2,2-trifluoro-1-(trifluoromethyl) ethylidene]bis[phenol] (1:1)	Not applicable/ Not applicable	015-207-00-1	Not applicable	Not applicable	
Disodium 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenolate	425-060-9/ Not applicable	Not applicable	Not applicable	Not applicable	

Substance Name	EC number/ CAS number	Index number in the GB MCL List	Molecular formula	Molecular weight range	Structural formula:
N,N-dibutyl-N-methylbutan-1-aminium 4-[1,1,1,3,3,3-hexafluoro-2-(4-hydroxyphenyl)propan-2-yl]phenolate	443-330-4/ Not applicable	Not applicable	Not applicable	Not applicable	
Reaction products of benzene, chlorine and sulfur chloride (S_2Cl_2) with 4,4'- [2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]diphenol	469-080-6/ 921213-47-0	Not applicable (UVCB**)	Not applicable (UVCB**)	Not applicable (UVCB**)	Not applicable (UVCB)

* CAS number not in the EC Inventory

** Substance of Unknown or Variable composition, Complex reaction products and or Biological Materials

Data source: EU Annex 15 report (ECHA, 2025)

2.1.2 Composition of the substance

BPAF is a mono-constituent substance, but other substances covered by this proposal may be mono-constituent, multi-constituent or UVCB substances.

There are no other constituents, impurities or additives that are of relevance to this proposal.

2.1.3 Identity and composition of degradation products/metabolites relevant for the SVHC assessment

Not relevant for the identification of the substance as a SVHC in accordance with Article 57 (c) of UK REACH.

2.1.4 Identity and composition of structurally related substances (used in grouping or read-across approach)

Not relevant for the identification of the substance as a SVHC in accordance with Article 57 (c) of UK REACH.

2.1.5 Physicochemical properties

Not relevant for the identification of the substance as a SVHC in accordance with Article 57 (c) of UK REACH.

2.2 Mandatory classification and labelling

Table 3: Mandatory classification in the GB MCL list

Index No	International Chemical Identification	EC No	CAS No	GB MCL list Classification		Aligned with EU CLH[a]
				Hazard Class and Category Code(s)	Hazard statement code(s)	Y/N
604-099-00-7	4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethyliden e]diphenol; bisphenol AF	216-036-7	1478-61-1	Repr. 1B	H360F	Y

Index No	International Chemical Identification	EC No	CAS No	GB MCL list Classification		Aligned with EU CLH[a]
				Hazard Class and Category Code(s)	Hazard statement code(s)	Y/N
015-205-00-0	benzyltriphenylphosphoni um, salt with 4,4'-[2,2,2 trifluoro-1 (trifluoromethyl)ethyliden e]bis[phenol] (1:1)	278-305-5	7576 8-65-9	Repr. 1B	H360F	Y
015-204-00-5	benzyl(diethylamino)diph enylphosphonium 4 [1,1,1,3,3,3-hexafluoro 2-(4 hydroxyphenyl)propan-2 yl]phenolate	479-100-5	5777 05-90-9	Repr. 1B	H360F	Y
015-206-00-6	reaction mass of 4,4' [2,2,2-trifluoro-1 (trifluoromethyl)ethyliden e]diphenol and benzyl(diethylamino)diph enylphosphonium 4 [1,1,1,3,3,3-hexafluoro 2-(4 hydroxyphenyl)propan-2 yl]phenolate (1:1)	-	-	Repr. 1B	H360F	Y
015-207-00-1	reaction mass of 4,4' [2,2,2-trifluoro-1 (trifluoromethyl)ethyliden e]diphenol and benzyltriphenylphosphoni um, salt with 4,4'-[2,2,2 trifluoro-1 (trifluoromethyl)ethyliden e]diphenol (1:1)	-	-	Repr. 1B	H360F	Y

[a] EU CLH is harmonised classification and labelling in accordance with Regulation (EC) 1272/2008

2.3 Human health hazard assessment

Please see Section 2.2 (Mandatory classification and labelling).

2.4 Conclusions on the SVHC properties

2.4.1 CMR assessment

BPAF is covered by the entry with Index number 604-099-00-7 in the GB MCL list and is assigned the hazard class toxic for reproduction category 1B (H360F: May damage fertility).

Several BPAF salts are likewise included in the GB MCL list with the same classification, including:

- Benzyl(diethylamino)diphenylphosphonium 4-[1,1,1,3,3,3-hexafluoro-2-(4-hydroxyphenyl)propan-2-yl]phenolate
  (GB MCL Index number: 015-204-00-5; EC: 479-100-5; CAS: 577705-90-9)
- Benzyltriphenylphosphonium, salt with 4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]bis[phenol] (1:1)
  (GB MCL Index number: 015-205-00-0; EC: 278-305-5; CAS: 75768-65-9)
- Reaction mass of 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenol and benzyl(diethylamino)diphenylphosphonium 4-[1,1,1,3,3,3-hexafluoro-2-(4-hydroxyphenyl)propan-2-yl]phenolate (1:1)
  (GB MCL Index number: 015-206-00-6)
- Reaction mass of 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenol and benzyltriphenylphosphonium, salt with 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (1:1)
  (GB MCL Index number: 015-207-00-1)

The classification is based on read-across from BPAF and the expectation that they will dissociate quickly to BPAF in water and biological fluids. As such, this proposal covers BPAF and its salts as the substances are considered to satisfy the criterion in Article 57 (c) of UK REACH.

3. Information on use, exposure and alternatives

3.1 UK and EU REACH registration status and tonnage

BPAF and the selected salts in this dossier are not currently registered under UK REACH.

Information regarding their registration status and tonnage (tonnes per annum; tpa) under EU REACH and number of Downstream User Import Notifications (DUINs)[2] submitted under UK REACH is provided in Table 4.

Table 4: EU REACH Registration information[3] and DUIN submissions for BPAF and selected salts

Substance	EU REACH Registration Information	UK REACH DUINs
4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]diphenol	Registered at 100 to 1,000 tpa	7
Benzyltriphenylphosphonium, salt with 4,4' [2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]bis[phenol] (1:1)	Registered at 1-10 tpa	1
Tributyl-2-methoxypropylphosphonium salt with 4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]bis[phenol]	Registered at 1-10 tpa	0
Benzyl(diethylamino)diphenylphosphonium 4 [1,1,1,3,3,3-hexafluoro-2-(4 hydroxyphenyl)propan-2-yl]phenolate	Ceased	1

[2] GB-based companies who imported substances from EU-based suppliers before UK REACH became law on 1 January 2021 had no EU REACH registration obligations as they were classed as Downstream Users (DUs). As they are now importers from outside of GB, they may have registration obligations under UK REACH. However, a transitional measure allows former DUs to suspend the registration until one of three deadlines (depending on tonnage and hazard). Where the identity of these imported substances was known, they could be included in a Downstream User Import Notification (DUIN) submitted to the Agency.

[3] ECHA Chemicals database; ECHA CHEM https://chem.echa.europa.eu/

Substance	EU REACH Registration Information	UK REACH DUINs
reaction mass of 4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]diphenol and benzyl(diethylamino)diphenylphosphonium 4 [1,1,1,3,3,3-hexafluoro-2-(4 hydroxyphenyl)propan-2-yl]phenolate (1:1)	No active registrations	0
reaction mass of 4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]diphenol and benzyltriphenylphosphonium, salt with 4,4' [2,2,2-trifluoro-1-(trifluoromethyl) ethylidene]bis[phenol] (1:1)	Registered at 100 to 1,000 tpa	0
Disodium 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenolate	Ceased	0
N,N-dibutyl-N-methylbutan-1-aminium 4-[1,1,1,3,3,3-hexafluoro-2-(4-hydroxyphenyl)propan-2-yl]phenolate	Ceased	0
Reaction products of benzene, chlorine and sulfur chloride (S_2Cl_2) with 4,4'- [2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]diphenol	Registration no longer valid	0

It should be noted that the BPAF salts above are not an exhaustive list. DUINs and UK/EU REACH registrations may exist for BPAF salts that fall within the scope of this proposal but are not explicitly named.

3.2 General description of uses and exposure

BPAF and its salts are primarily used in industrial settings in the manufacture and processing of polymer materials and in rubber production and processing (ECHA, 2025). They may also be used as a crosslinking agents in fluoroelastomers and as a monomer in the production of specialty polymers, including polyimides, polyamides, polyesters and polycarbonate copolymers (ECHA, 2025). No uses by professional workers or consumers have been reported, and there is no indication of use in applications such as colour developers in thermal paper. However, it is possible that BPAF may be present in cured fluoroelastomeric articles.

BPAF and its salts are handled predominantly during formulation, compounding, and industrial processing activities, including mixing, blending, and incorporation into polymer matrices (ECHA, 2025).

Therefore, exposure is expected to occur primarily in occupational settings. As BPAF is often chemically bound within polymer matrices following curing or crosslinking, the potential for release during the service life of articles is expected to be limited. However, some available information indicates that residual, extractable, BPAF may be present in cured fluoroelastomer-based materials at low levels (ECHA, 2025).

3.4 Alternatives

No information available.

References

ECHA (2019) CLH Report proposing harmonised classification and labelling at EU level of 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenol; bisphenol AF Date: 16/12/2019; Accessed date: 04/2026; Available at: https://www.echa.europa.eu/documents/10162/b5cd80fe-60ad-e5e8-216c-e1d4691bcd4a

ECHA (2025) Annex 15 report: Proposal for identification of 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenol (BPAF, Bisphenol AF) and its salts as substances of very high concern (SVHC) on the basis of the criteria set out in REACH Article 57; Submitted by: Sweden; Date: August 2023; Accessed date: 04/2026; Available at: https://www.echa.europa.eu/documents/10162/c432399b-6ab0-2ce7-7f73-d19eacc35bd5

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.: European Commission. Available at: http://data.europa.eu/eli/reg/2006/1907/2022-12-17

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (Text with EEA relevance). European Commission. Available at: http://data.europa.eu/eli/reg/2008/1272/2026-05-01

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Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (Text with EEA relevance). UK Government. Available at: https://www.legislation.gov.uk/eur/2006/1907/contents

Glossary

Agency, the	HSE
BPAF	4,4'-[2,2,2-trifluoro-1 (trifluoromethyl)ethylidene]diphenol
CLH	Harmonised Classification and Labelling
CLP	Classification, labelling and packaging
DU	Downstream User
DUIN	Downstream User Import Notification
ECHA	European Chemicals Agency
EU	European Union
HSE	Health and Safety Executive
IUPAC	International Union of Pure and Applied Chemistry
MCL	Mandatory Classification and Labelling
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals regulation
SVHC	Substance of very high concern
UVCB	Unknown or variable composition, complex reaction products or biological materials

Further information

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