

Draft agenda points and questions – meeting with PPE companies (protective clothing)

Introduction

PPE can include items such as safety helmets, gloves, eye protection, hazmat suits, high-visibility clothing, safety footwear, safety harnesses, ear plugs, ear defenders and respiratory protective equipment (RPE). This document focuses on protective clothing.

Agenda point 1 - Critical properties (performance) for protective clothing

Questions

1. Please describe quantitatively critical properties (performance) for protective clothing, see table 1, in the form of comparable measurements / studies between performance for fluorochemistry and alternative non fluorochemistry?
For us it is EN 13034 that is most relevant, with the critical property being protection against oil based chemical splash. As far as we are aware there is no substitute to PFAS on the market today able to protect against oil splash.
EN 343:2019¹/protection against rain and EN ISO 20471:2013/Hi-visibility garments are still being sold on the market with PFAS. The relevant properties should be water and dirt resistance for which there should be other alternatives.
Regarding EN 469:2020² For firefighting activities we are not familiar with required properties as we are not a producer of those garments.
2. Are these data available to us?
No data available.

Agenda point 2 – Standards for protective clothing need for PFAS

Questions and remarks

3. Are there comparable quantitative test results between fluorochemistry and non-fluorochemistry available to us performed with the test standards listed in table 1 (or others, please specify)? *NO*

¹ EN 343:2019,
https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:63371,6143&cs=1B18C11D02C518D1B6A214EAC88838727

² EN 469:2020,
https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:63013,6143&cs=1468ACE394F638F27BB45A2E03DFBDEC2

4. Please indicate which quantitative measurement results/limits are acceptable for your markets for the test methods listed in table 1 below (*or others, please specify*).

EN 13034 lists minimum requirements and test methods.

Table 1: Critical properties (performance) vs Standards for protective clothing (CEN/TC 162)

Critical properties (performance)	Standards for protective clothing (CEN/TC 162)
Electrostatics	EN 1149 series ³
Liquid chemicals	EN 13034:2005+A1:2009 ⁴ EN 14605:2005+A1:2009 ⁵ EN 16523-1:2015+A1:2018 ⁶
Protection against chemicals	EN ISO 17491-3, -4:2008 ⁷ EN ISO 17491-4:2008 ⁸ EN ISO 19918:2017/A1:2021 ⁹ EN ISO 6530:2005 ¹⁰
Liquid and gaseous chemicals, including aerosols and solid particles	EN 464:1994 ¹¹
Against rain	EN 343:2019 ¹²
Splashes of molten metal	EN 348:1992 ¹³

³ EN 1149 series, <https://standards.cen.eu/dyn/www/f?p=204:105:0:::>

⁴ EN 13034:2005+A1:2009, https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:32982,6143&cs=1A0EC674842C38E0EA1FF3289F91BC76C

⁵ EN 14605:2005+A1:2009, https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:32983,6143&cs=1868F123B185CBECCA30C484231EB9233

⁶ EN 16523-1:2015+A1:2018 https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:67114,6143&cs=1753CA3DD9D58A4835043F014216B2C1A

⁷ EN ISO 17491-3, -2008 https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:23098,6143&cs=12D3A8D6D32D899469296826BC259C835

⁸ EN ISO 17491-4:2008 https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:23099,6143&cs=10D51599070E9BD60C8715CAEBF4C7841

⁹ EN ISO 19918:2017/A1:2021 https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:70836,6143&cs=1F09ABC9AAD96F9554D60B9F78952CF49

¹⁰ EN ISO 6530:2005 https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:67778,6143&cs=10DC0A31382F43CA906841B78380B3F27

¹¹ EN 464:1994, https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:6659,6143&cs=165B04976C33240ACD0DD3E668DD67408

¹² EN 343:2019, https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:63371,6143&cs=1B18C11D02C518D1B6A214EAC88838727

¹³ EN 348:1992 https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:6616,6143&cs=147CE63961DE2AC855BCE710EC70E8A6D

Critical properties (performance)	Standards for protective clothing (CEN/TC 162)
For firefighting activities	EN 469:2020 ¹⁴
High visibility	EN ISO 20471:2013 ¹⁵
Use, care and maintenance	CEN/TR 14560:2018 ¹⁶ CEN/TR 15419:2017 ¹⁷ CEN/TR 17330:2019 ¹⁸
Others?	

Agenda point 3 - Potential alternatives to PFAS

In the ongoing restriction work of PFAS in EU/EEA, a range of non-fluorinated alternatives to PFAS have been identified

- Hyperbranched functionalized polymers (dendric polyurethanes)
- Paraffins (hydrocarbons)
- Waxes (fatty acid esters)
- Silicones (polydimethylsiloxanes abbr. PDMS)
- Polymeric compounds such as non-fluorinated (meth)acrylates
- Plasma treatment
- Graphene structures
- Other?

Questions

- For these above listed non fluorinated alternatives (and possibly other) to fluorochemistry, what are the biggest specific challenges to phase in those non fluorinated alternatives that may be feasible for your applications?
 - *The problem is that EN 13034 certifies protection against both oil splash and other chemical splash. Non fluorinated alternatives that we have found do not protect against oil splash.*
 - *To comply with the PPE regulation, we as a service provider (rental and laundry service) are required to maintain the protective properties indicated in the standard, for as long*

¹⁴ EN 469:2020,
https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:63013,6143&cs=1468ACE394F638F27BB45A2E03DFBDEC2

¹⁵ EN ISO 20471:2013
https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:30182,6143&cs=1ECA362937B4D0E8B641C9F80D8E88876

¹⁶ CEN/TR 14560:2018
https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:66982,6143&cs=17067BF89BD9A0B10910D342106B34226

¹⁷ CEN/TR 15419:2017
https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:65002,6143&cs=18D38E936501A138A7C0EB6CFFDB7E8FB

¹⁸ CEN/TR 17330:2019
https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:39246,6143&cs=1557EDC845AD3EF1A19867E8E23C7F2EA

as we are supplying it to the customer, i.e. for the full lifespan. This is regardless if the wearer of the garment needs protecting against oil splash or other chemicals.

6. Have you evaluated other fluorochemicals / materials as substitutes for the currently used fluorochemistry? If so, please specify this chemistry.

For reimpregnation against chemical splash according to EN 13034 we have tested alternative chemistry. It does not protect against oil splash, but otherwise satisfactory. Product sheet and säkerhetsdatablad attached in mail.

Agenda point 4 – Quantities of PFAS in protective clothing

Questions

7. What are the quantities of PFAS¹⁹ used in protective clothing applications in the EEA?

No answer

8. Annex I of the PPE regulation²⁰ (EU 2016/425) divides PPEs into three risk categories. What share of the quantities of PFAS are used in the three risk categories, respectively?

No answer

9. Do you apply industrial re-impregnation of PFAS in your products? If so, what quantities of PFAS are used for industrial re-impregnation of your products?

Yes we do. In 2020 we purchased 1440 kg Saprit Protect Plus and 609 kg Osmafin Aquablock Trippel. We estimate this as more than actual usage, as we had more stock left at end of year.

Agenda point 5 – Emissions and waste management

Questions

10. What are the quantities of emissions of PFAS from reimpregnation of your products?

Don't know.

11. What measures can be taken to minimize the emissions from reimpregnation? What are the costs associated with these measures?

Automatic dosing and controlled laundry programs, which we do already. We cannot minimize reimpregnation due to the PPE regulation.

12. How are your PFAS containing protective clothing dealt with at end-of-life?

Incineration with energy recovery at the local waste management company.

13. What are the quantities of emissions of PFAS from protective clothing in the waste phase?

No idea.

14. What measures can be taken to minimize the emissions from the waste phase? What are the costs associated with these measures?

Could hypothetically be handled as hazardous waste. Considerably more expensive.

¹⁹ PFAS here defined as having the following structural formula: X-(-CF₂-)_n-X' with n equal to or larger than 1 and X, X' not being H (thus including X-CF₃), meaning fluorinated substances that contain at least one aliphatic carbon atom that is both, saturated and fully fluorinated, i.e. any chemical with at least one perfluorinated methyl group (-CF₃) or at least one perfluorinated methylene group (-CF₂-), -, including branched fluoroalkyl groups and substances containing ether linkages, fluoropolymers and side chain fluorinated polymers.

²⁰ EU 2016/425, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R0425>

Suggested company contacts

Invited PPE companies/associations
European Safety Federation
European Textile Service Association (ETSA)
Elis
Blåkläder
Fristads
Swedol
Swedish Armed Forces Materiel Administration (FMV)
Tranemo textil