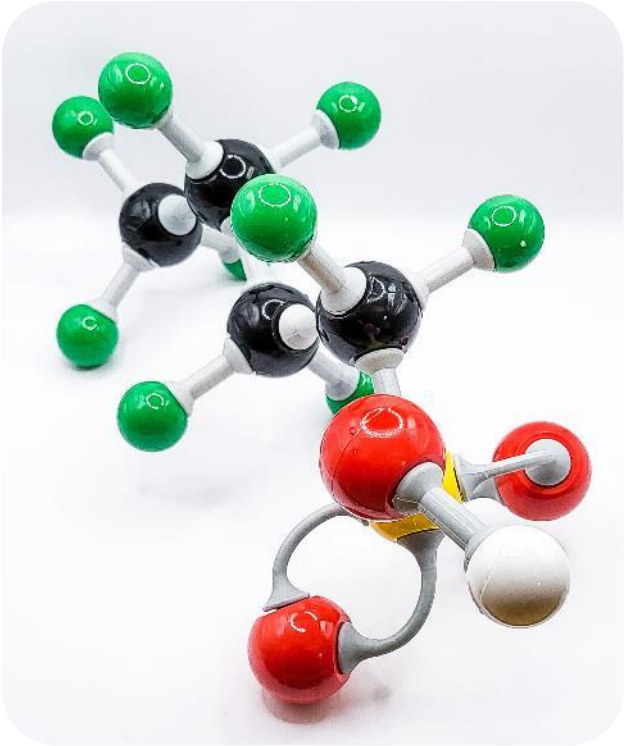
TEMADAG MILJÖKEMI 2023-04-21

Utmaningarna med PFAS inom Återvinningen

David Karis



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PRESENTATION OVERVIEW

- PFAS – What, why, where, (definition)
- PFAS – Challenges in Recycling
- PFAS – What we cannot do, what we can do

STENA – OVERVIEW

STENA R&D

34

EMPLOYEES

RECYCLING GROUP

6 000 000

TONNES RECYCLED AND
REFINED MATERIALS

3367

EMPLOYEES

159

LOCATIONS IN EIGHT COUNTRIES

25,175

NET SALES
SEK MILLION

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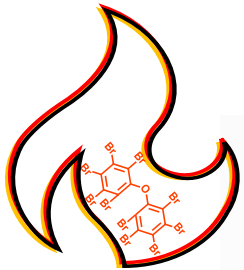
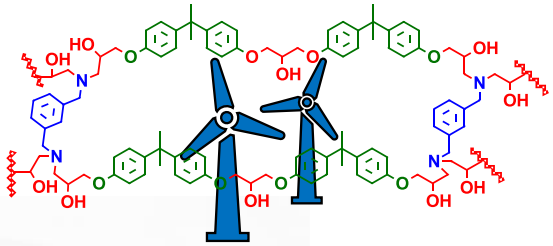
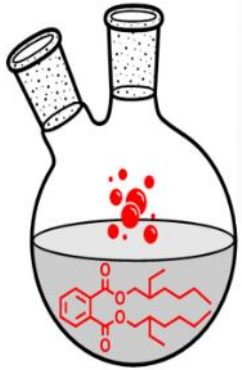
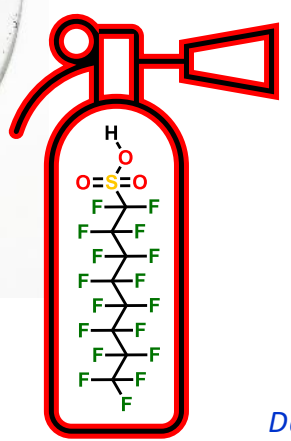
STENA – OVERVIEW – R&D









My Focus Areas

- Plastic separation
- Plastic identification
- Plastic product QC
- Plastic strategy
- Design for recycling
- Additives
- Water purification
- EPOXY
- PFAS

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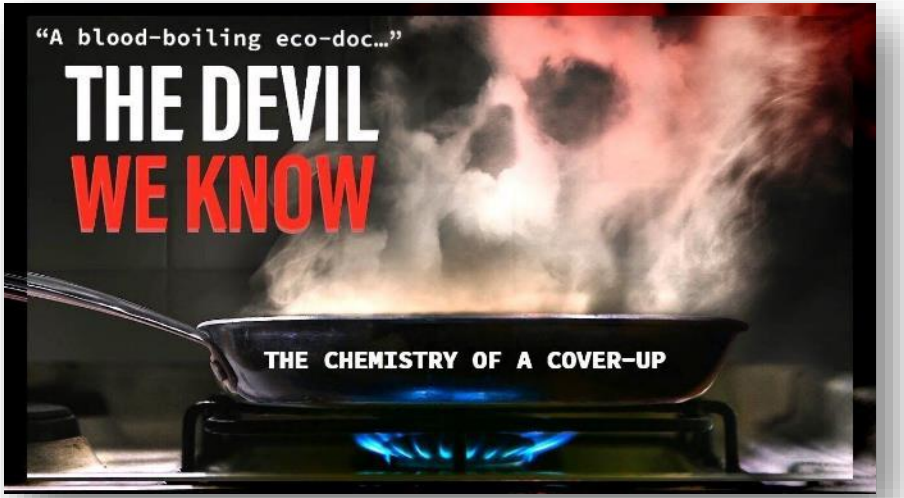
David.karis@stenametall.se

PFAS - MEDIA



YouTube

PFAS TIMELINE - STENA

What ?

Why ?

Where ?

Definition ?

GO PFAS FREE! RI.SE / PoPFREE

Competence Group

PFAS Remediation

Position Paper

ECHA Proposal

2021 **2022** **2023**

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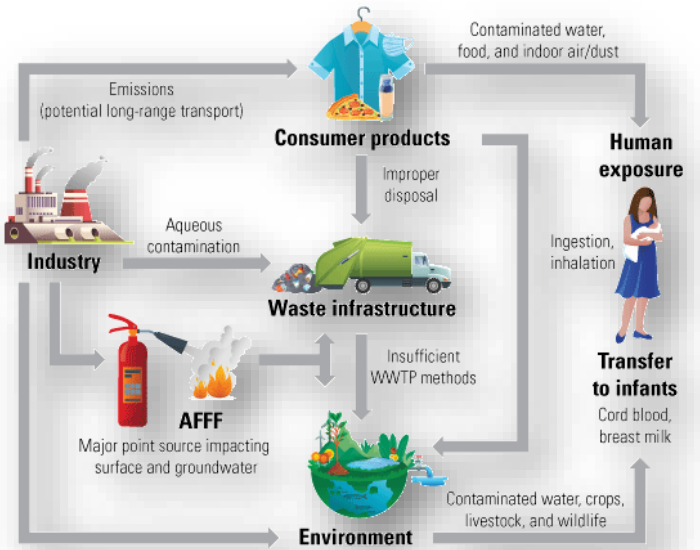
PFAS TIMELINE - STENA



What ?

Why ?

Where ?

Definition ?

GO PFAS FREE! RI.SE / PoPFREE

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PFAS Remediation

Position Paper

ECHA Proposal

2021

2022

2023

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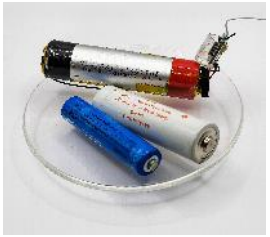
https://doi.org/10.3133/sir20225067 (Occurrence of Per- and Polyfluoroalkyl Substances and Inorganic Analytes in Groundwater and Surface Water Used as Sources for Public Water Supply in West Virginia)

PFAS – WHERE

PFAS – WHERE

PFAS – WHERE



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PFAS – CHALLENGES

1950

1970

1990

2000

4000-5000

+10 000

2020

2022

PFAS → PFBS

https://doi.org/10.1021/acs.est.2c02765 (Outside the Safe Operating Space of a New Planetary Boundary for Per- and Polyfluoroalkyl Substances (PFAS)

PFAS – CHALLENGES

1950

1970

1990

2000

2020

2022

4000-5000

+10 000

OTM (Air)

PFAS 4

PFAS 11

PFAS 20

LC/MS

TOP

EOF

TOF

TF

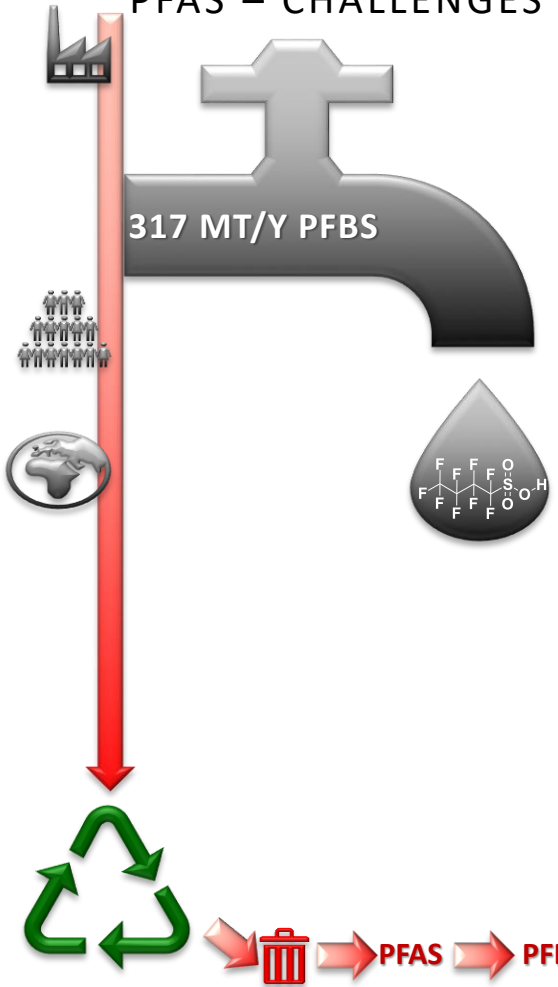
PFAS 4, PFAS 11, PFAS 20

1 Perfluorbutansyra (PFBA)
2 Perfluorpentansyra (PFPA)
3 Perfluorhexansyra (PFHxA)
4 Perfluorheptansyra (PFHpA)
5 Perfluoroktansyra (PFOA)
6 Perfluornonansyra (PFNA)
7 Perfluordekansyra (PFDA)
8 Perfluorundekansyra (PFUnDA)
9 Perfluordodekansyra (PFDoDA)
10 Perfluortridekansyra (PFTrDA)
11 Perfluorbutansulfonsyra (PFBS)
12 Perfluorpentansulfonsyra (PFPS)
13 Perfluorhexansulfonsyra (PFHxS)
14 Perfluorheptansulfonsyra (PFHpS)
15 Perfluoroktansulfonsyra (PFOS)
16 Perfluornonansulfonsyra (PFNS)
17 Perfluordekansulfonsyra (PFDS)
18 Perfluorundekansulfonsyra (PFUnDS)
19 Perfluordodekansulfonsyra (PFDoDS)
20 Perfluortridekansulfonsyra (PFTrDS)

PFAS → PFBS

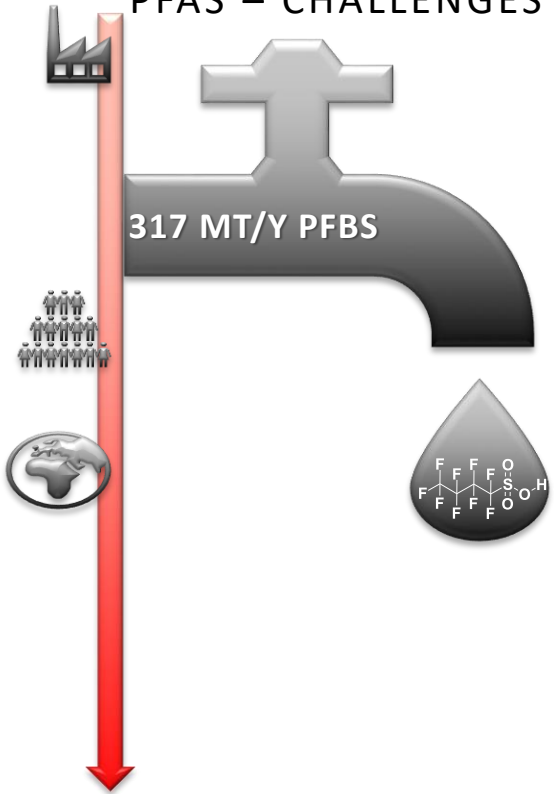
https://doi.org/10.1039%2Fd0em00291g (An overview of the uses of per- and polyfluoroalkyl substances (PFAS))

PFAS – CHALLENGES



https://www.miljodirektoratet.no/globalassets/publikasjoner/M759/M759.pdf (INVESTIGATION OF SOURCES TO PFBS IN THE ENVIRONMENT)

PFAS – CHALLENGES



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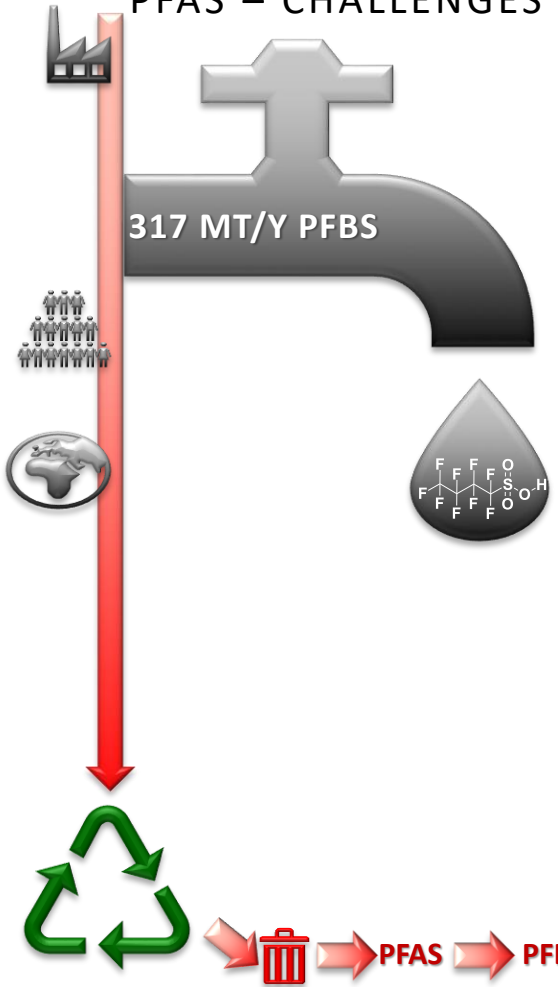
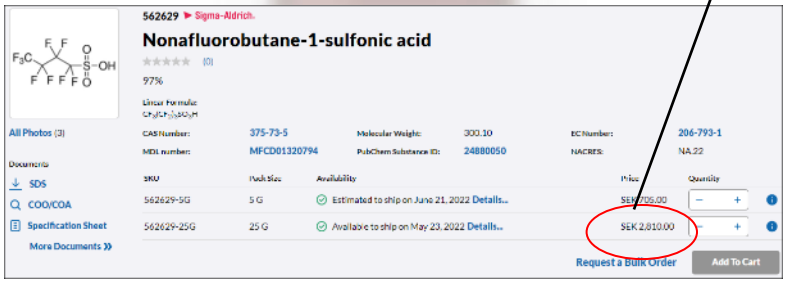
PFAS – CHALLENGES



10 EUR/g



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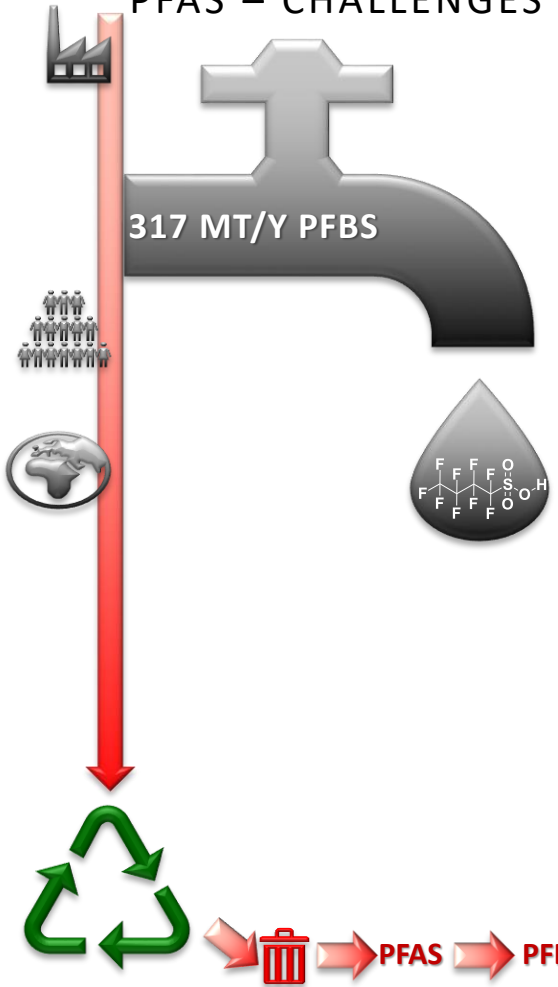
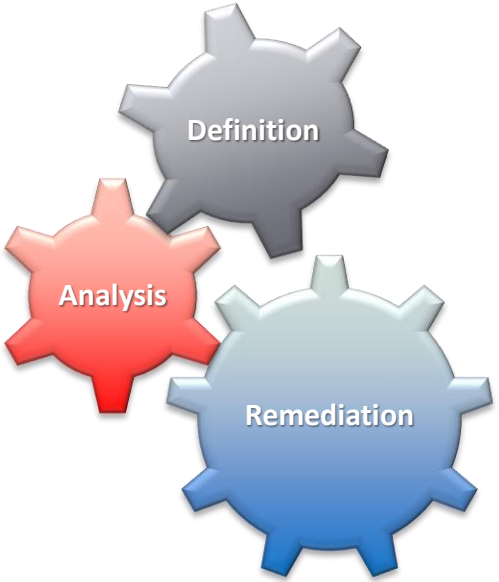
PFAS – CHALLENGES





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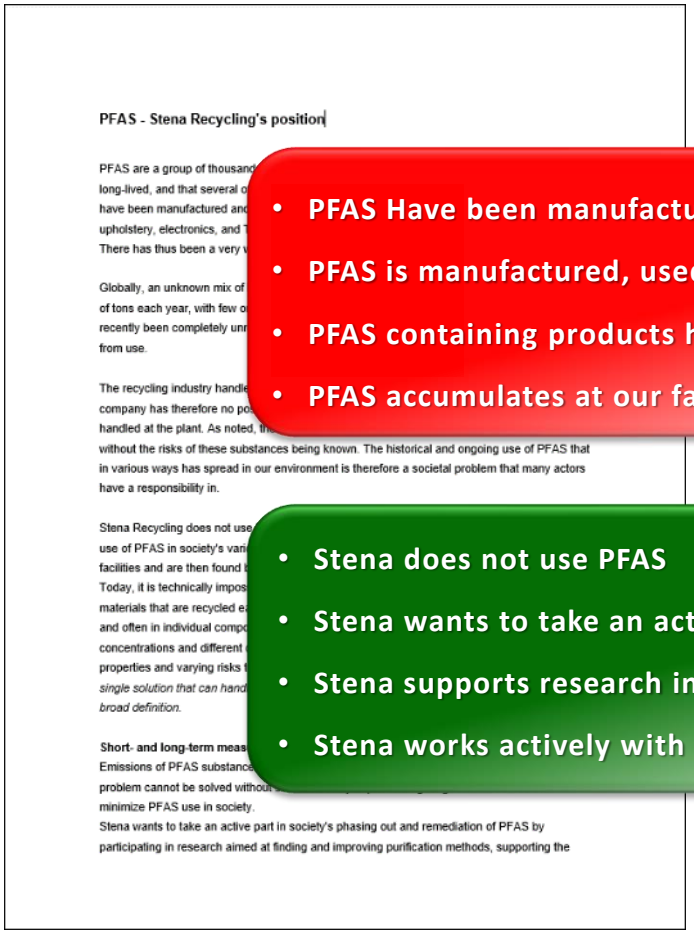
PFAS – POSITION PAPER



PFAS - Stena Recycling's position

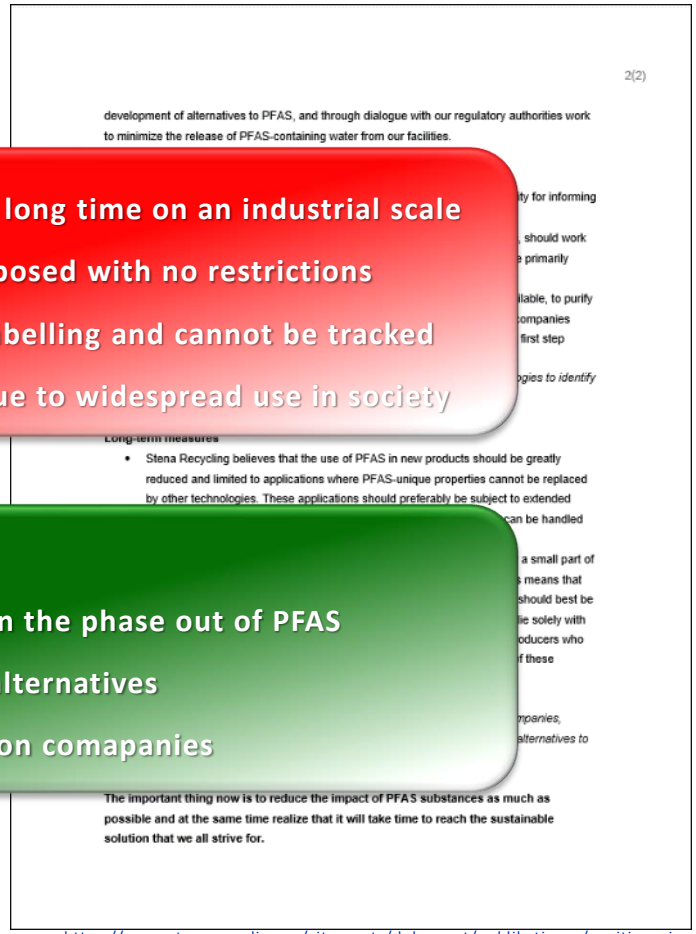
PFAS are a group of thousand
long-lived, and that several o
have been manufactured and
upholstery, electronics, and T
There has thus been a very v

Globally, an unknown mix of
of tons each year, with few o
recently been completely unr
from use.

The recycling industry handle
company has therefore no po
handled at the plant. As noted, th
without the risks of these substances being known. The historical and ongoing use of PFAS that in various ways has spread in our environment is therefore a societal problem that many actors have a responsibility in.

Stena Recycling does not use
use of PFAS in society's vari
facilities and are then found i
Today, it is technically impos
materials that are recycled e
and often in individual compo
concentrations and different
properties and varying risks f
single solution that can hand
broad definition.

Short- and long-term meas
Emissions of PFAS substance
problem cannot be solved without
minimize PFAS use in society.
Stena wants to take an active part in society's phasing out and remediation of PFAS by participating in research aimed at finding and improving purification methods, supporting the



2(2)

development of alternatives to PFAS, and through dialogue with our regulatory authorities work to minimize the release of PFAS-containing water from our facilities.

ity for informing

, should work

e primarily

ilable, to purify
companies
first step

ogies to identify

Long-term measures

- Stena Recycling believes that the use of PFAS in new products should be greatly reduced and limited to applications where PFAS-unique properties cannot be replaced by other technologies. These applications should preferably be subject to extended
can be handled

a small part of
s means that
should best be
ie solely with
oducers who
f these

mpanies;
alternatives to

The important thing now is to reduce the impact of PFAS substances as much as possible and at the same time realize that it will take time to reach the sustainable solution that we all strive for.

- **PFAS Have been manufactured for a long time on an industrial scale**
- **PFAS is manufactured, used and disposed with no restrictions**
- **PFAS containing products have no labelling and cannot be tracked**
- **PFAS accumulates at our facilities due to widespread use in society**

- **Stena does not use PFAS**
- **Stena wants to take an active part in the phase out of PFAS**
- **Stena supports research into PFAS alternatives**
- **Stena works actively with remidiation comapanies**

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https://www.stenarecycling.se/siteassets/dokument/publikationer/positionering-pfas-stena-recycling-sverige.pdf