

REACH obsolescence management in the European space sector, current status and future challenges

Paavo Heiskanen
 Tim Becker

ESA REACH Officer / MPTB Chairman
 REACHLaw Ltd, Senior Legal Advisor

2019-10-16 ESA-TECQE-HO-015874

ESA UNCLASSIFIED - For Official Use



Agenda

- 1. REACH Regulation status and outlook
- 2. Organisation in the Space Sector
- 3. Obsolescence risk management activities
- 4. REACH Task Forces and Article 33
- 5. Conclusions and outlook

Annex 1: Lists of key acronyms

ESA UNCLASSIFIED - For Official Use

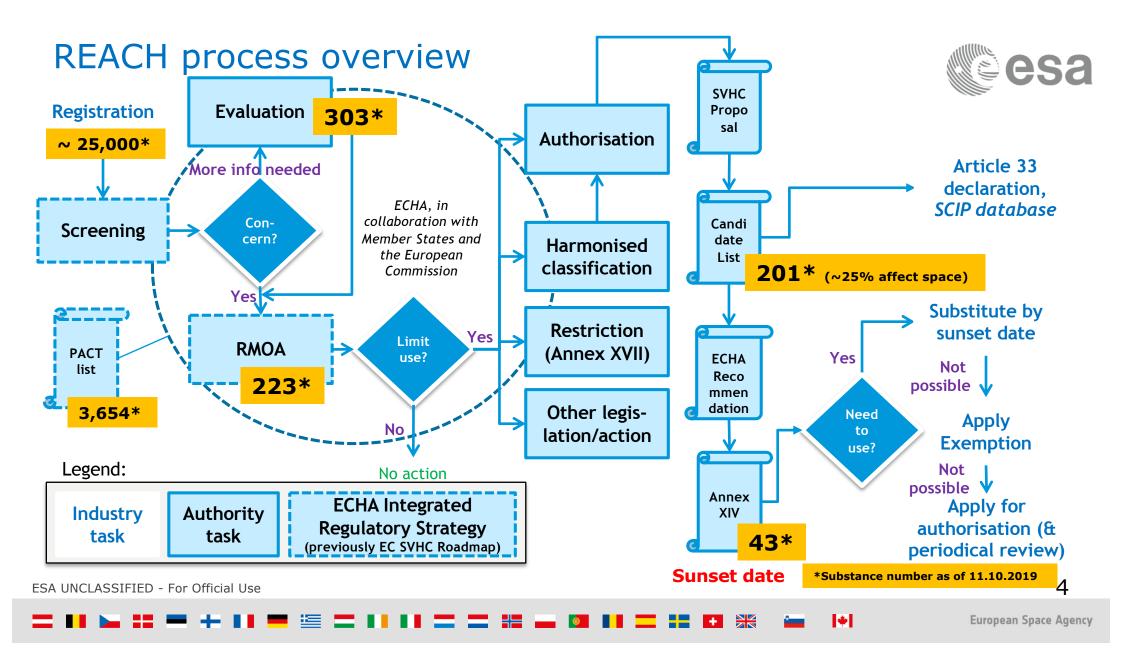




REACH REGULATION STATUS AND OUTLOOK

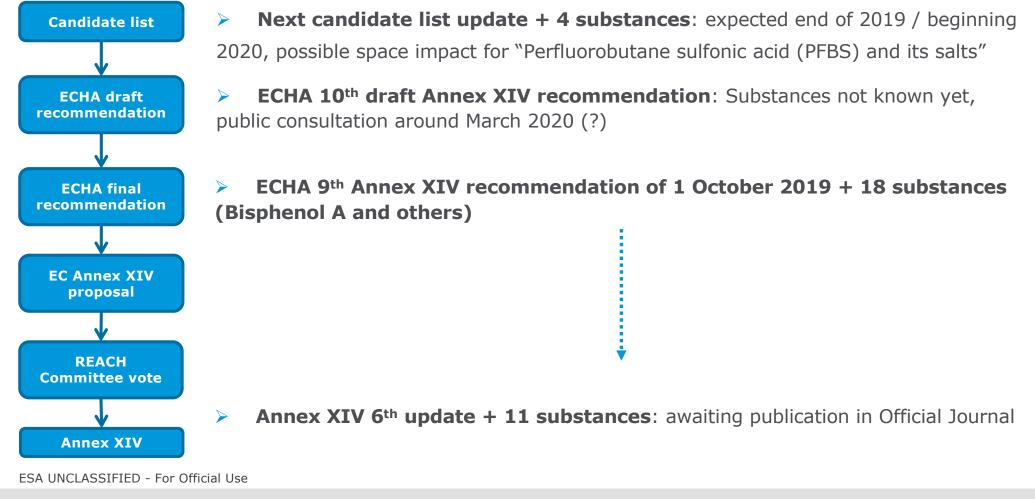
ESA UNCLASSIFIED - For Official Use

European Space Agency



Authorisation listing: Pending decisions / updates

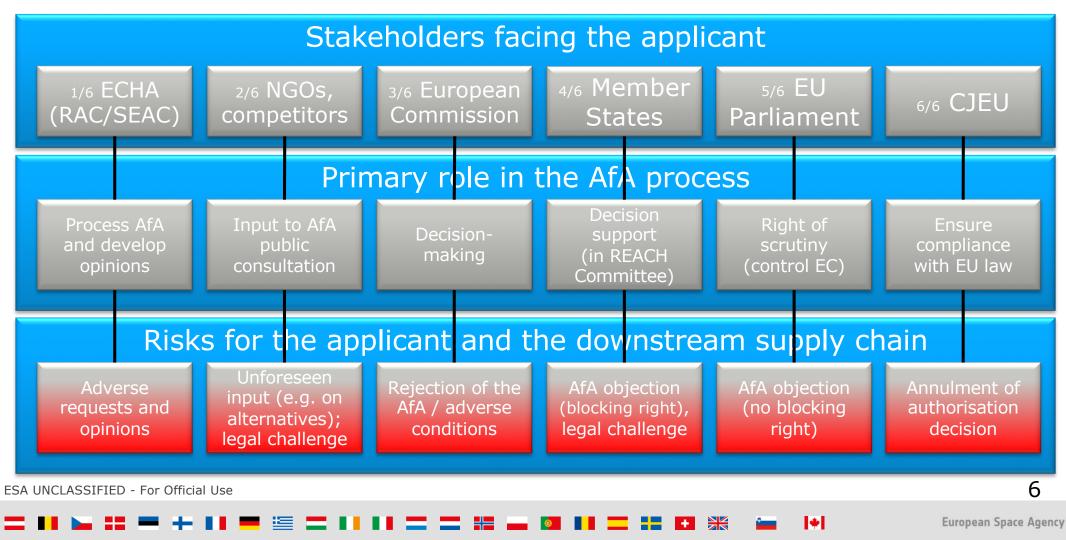




European Space Agency

Applications for Authorisation (AfA): Scrutiny levels





Applications for Authorisation (AfA): Stricter scrutiny and requirements for applicants in 2019



Major developments:

- European Commission (EC): 1st AfA rejection (sodium dichromate / Hapoc, February 2019)
- EU General Court: 1st **annulment** of an authorisation decision, covering multiple operators (lead chromates / DCC Canada, judgment of 7 March 2019 in case T-837/16, currently under appeal)
- European Parliament (EP): Resolution asking the EC to **withdraw** the draft authorisation decision and to submit a new draft (chromium trioxide / Lanxess et al., 27 March 2019)
- EC with REACH Committee: **Re-evaluation** of pending AfAs in the light of case T-837/16 and the (EP) resolution (<u>ongoing</u>); 'Substitution Plan' request where alternatives are generally available.
- ECHA: Improvements of the AfA opinion development (20 June 2019)

Main implications for applicants:

Added decision uncertainty; future applications to be as specific as possible to reflect downstream user situation (conditions of use, alternatives,...), remaining uncertainties are to the applicant's disadvantage

ESA UNCLASSIFIED - For Official Use

Status and outlook on regulatory risk management



Additions to Candidate List and the Authorisation List have **slowed down** in recent years. <u>Main reasons:</u>

- Clear candidates have been dealt with \rightarrow SVHC identification more complex
- Recognition that coherence with other EU policies is needed, such as Circular Economy
- Other tools of EU regulatory risk management are being used instead:
 - **EU workplace legislation**: Setting / review of binding Occupational Exposure Limits (OELs) – new tasks for OEL setting given to ECHA in the beginning of 2019
 - Targeted EU Restrictions (REACH Annex XVII) addressing "unacceptable risks", e.g. banning certain uses while exempting others, concentration limits, harmonized Derived No-Effect Levels (DNELs), training requirements

Authorisation is no longer seen as a necessary consequence of candidate listing, but regulators may still decide to pursue it in the future



Status and outlook on regulatory risk management



Some relevant substances and their regulatory coverage today (space industry perspective)

Substance	Candidate List	Authorisation List	Restriction / activities	EU OEL / activities	RoHS (EEE)	Obsolescence risk (based on regulation)
Cr(VI) compounds	YES	YES	NO	YES	YES*	High
Aprotic solvents (DMAC, DMF, NMP – see Annex 1)	YES	NO (but recommended by ECHA)	YES (harmonized DNEL)	YES (indicative OELs)	NO	Medium
Lead metal	YES	NO	YES	YES	YES*	Medium
Cadmium	YES	NO	YES	YES	YES*	Medium
Hydrazine	YES	NO	NO	YES	NO	Medium
MonoMethyl Hydrazine (MMH)	NO	NO	NO	NO	NO	To be monitored
Dinitrogen Tetraoxide (NTO)	NO	NO	NO	NO	NO	To be monitored
Unsymmetrical DiMethyl Hydrazine (UDMH)	NO	NO	NO	NO	NO	To be monitored
Diisocyanates	NO	NO	YES	YES	NO	To be monitored
Gallium Arsenide	NO	NO	NO	NO	NO	To be monitored

*Equipment designed to be sent into space and means of transport are excluded from the scope of RoHS (ref. Article 2(4) of Directive 2011/65/EU)

ESA UNCLASSIFIED - For Official Use

European Space Agency

•

Substances in articles: Evolving requirements

REACH Art. 33 supply chain communication

- Court of Justice of the EU (CJEU) judgment "Once an article – always an article" (C-106/14, 10.9.2015) + subsequent ECHA Guidance update (June 2017)
- ASD Guidelines (November 2017) include a pragmatic approach to communication for very complex objects ("consolidated method")

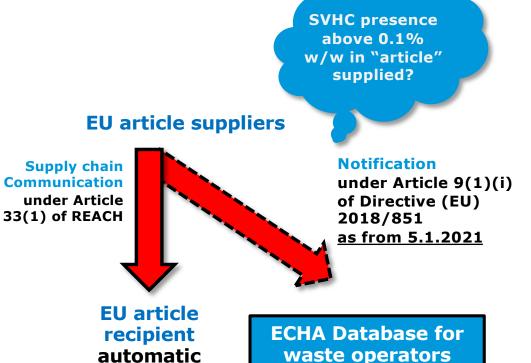
New notification - Art. 9 of Directive (EU) 2018/851

- Complementing Article 33 (see figure), but going even beyond according to ECHA 'SCIP' database plans
- Database prototype to be ready by early 2020
- Transposition by Member States by July 2020

Possible further future requirements, e.g.

- RoHS: Possible extension of restricted substances list
- Tracking "Substance of Concern" in products / waste by 2030 resulting in additional duties?

ESA UNCLASSIFIED - For Official Use



|+|

European Space Agency



"Brexit" implications (in brief)



• The UK is (?) leaving the EU ("Brexit") – both sides are still aiming for orderly withdrawal; to this end EU27 leaders agreed to delay Brexit until <u>31 October 2019</u>

For the Space industry - just like other sectors - Brexit poses challenges for both **supply chain stability** and **compliance** with EU REACH and "UK REACH" post Brexit - Article 33 and
 Authorisation requirements most impacting for Space

- Some UK REACH plans of interest (more in other presentations):
 - REACH Article 33 requirements will remain in place under a UK REACH use of the "consolidated method" described in the <u>`ASD Sectoral Guidance for Substances in Articles under REACH</u>' will continue to be permissible (HSE advice)
 - **Authorisation**: The UK REACH envisages <u>transitional measures</u> to minimize the cost to industry and disruption to supply chains for UK market access with regard to the transitioning from the EU to the UK regime.





ORGANISATION IN THE SPACE SECTOR

ESA UNCLASSIFIED - For Official Use

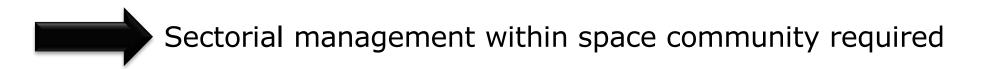
= II 🛌 :: 🖛 🕂 II 🗮 🔚 = II II = = = :: II 🖬 = II = :: II 🕬 💥 📾 🕨

European Space Agency

Impacts of REACH on a Space Supply chain



- REACH **directly affects** the entire space sector through **obsolescence** of materials, processes, and technologies at unprecedented scale
- REACH needs to be taken into consideration already in the **design phase** (*Obsolescence risk management and planning*)
- REACH will affect the project **even after manufacturing** (fueling, pyrotechnics, repairs, recurrent models, ...)
- **Project duration** also increases uncertainty and risk (one-off satellite payload versus multi-decade launcher programme)
- Not only a compliance matter, but risk management in a niche market.





European-wide coordination through Materials & Processes Technology Board (MPTB)



REACH is affecting European space industry as a whole. Coordination and information exchange of risk analysis and mitigation is to the benefit of the entire community.

The Materials and Processes Technology Board of the European Space Components Coordination (**ESCC MPTB**) is a European platform that includes all major industrial partners and space agencies.

The ESCC MPTB is a partnership between the **European Space Agency (ESA)**, national space agencies, and space industry represented by **ASD-Eurospace**; it is chaired at present by ESA.

Current participants from ASD-Eurospace include: **Airbus Defence & Space, ArianeGroup, Avio, MT Aerospace, OHB, RUAG, TESAT** and **Thales Alenia Space**.

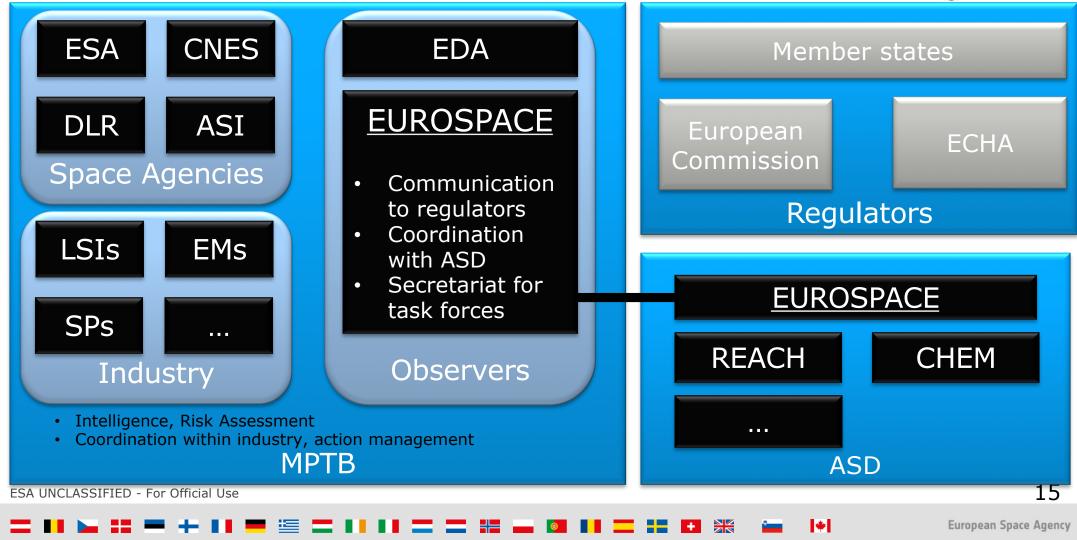
Participating national space agencies are: Agenzia Spaziale Italiana (ASI), Centre National d'Etudes Spatiales (CNES) and Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR).

Other participants are **MAP**, a manufacturer of mixtures, **REACHLaw**, a consultancy supporting the group on REACH and other chemical regulations, and the **European Defence Agency (EDA)** as observer.



Space Sector Organisation (ESA PoV)





Tasks of the MPTB



- Legislation: Intelligence of legislative processes (e.g. REACH, RoHS 1 & 2, WFD, et al.) and coordination of actions.
- Obsolescence risk management: Identify in advance critical Materials and Processes (M&P).
 Propose action plans to mitigate obsolescence risk of M&P.
 Reduce programmatic risks and costs by early replacement.
- Data exchange: Share materials test data and avoid test duplication.
- R&D activities: Coordination of R&D activities, monitoring of alerts, analysis of in-orbit anomalies, etc.
- Communication & information exchange: Coordination of information via stakeholder workshops, symposia, WGs, training. Development of synergies with other industrial sectors.
- Splinter activities: Chromates Space Task Force (STF), Hydrazine Task Force (HTF), Lead Task Force (LTF), WFD Task Force, Pb-free transition joint WG; European Space Materials Database (ESMDB) steering board
- Standardisation: Provide inputs to European Space Standards (ECSS) for example new obsolescence management handbook (ECSS-Q-HB-70-23A)







OBSOLESCENCE RISK MANAGEMENT ACTIVITIES

ESA UNCLASSIFIED - For Official Use

European Space Agency

Risk Management



Risk Management (ECSS-M-ST-80C):

"Risk management is a **systematic** and **iterative process** for **optimizing resources** ... integrated through defined roles and responsibilities into the day-to-day activities in all project domains and **at all project levels**... It is performed in an **integrated, holistic way**, maximizing the overall benefits in areas such as:

• design, manufacturing, testing, operation, maintenance, and disposal, together with their interfaces;

- control over risk consequences;
- management, cost, and schedule."



Obsolescence Management is Risk Management



Obsolesence Management (ECSS-Q-HB-70-23A):

"Obsolescence management involves **implementing scheduled and coordinated actions** in order to secure the availability of a product during its entire life-cycle, through technical and economical means"

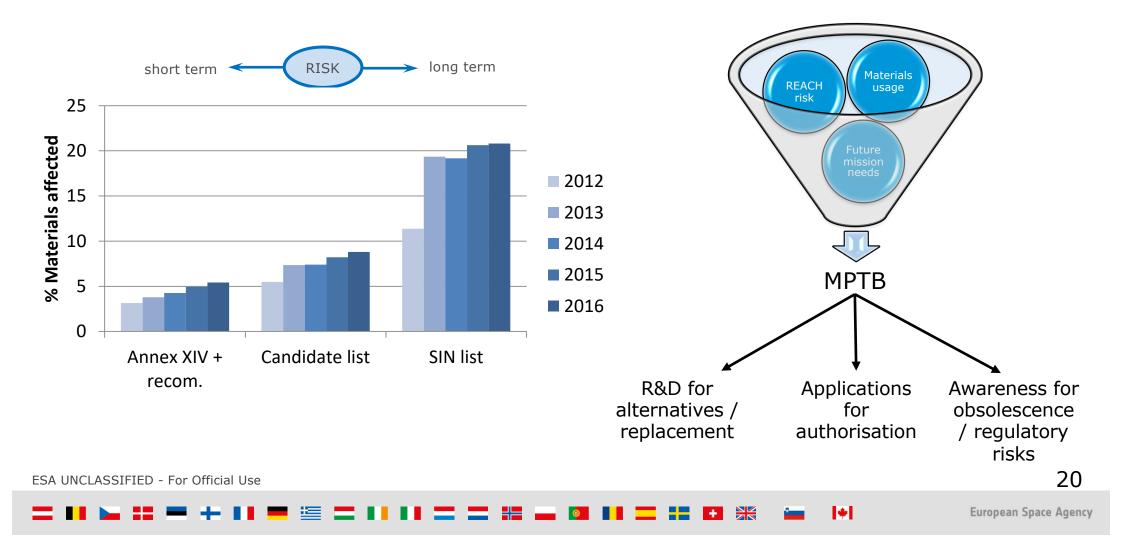
"The proactive OM approach consists of tracking any potential cause of obsolescence ... applied to **all stages of a product life-cycle**, starting from the design phase ... "

"The first step of proactive obsolescence management is to establish for each MMPP (Material, Mechanical Part, Process) an **obsolescence risk analysis**."

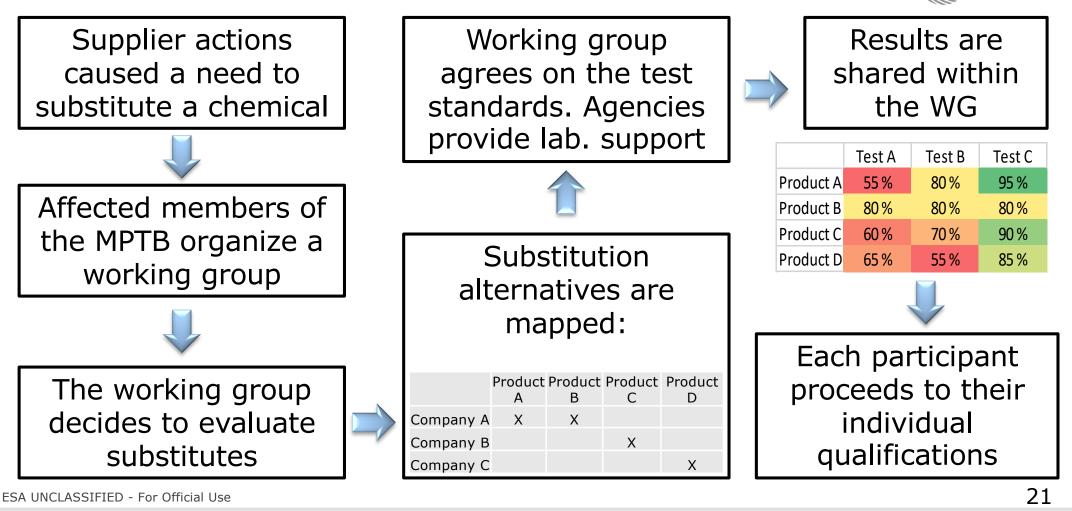
ESA UNCLASSIFIED - For Official Use 19

Trend of REACH obsolescence risk





Example of a an obsolescence mitigation action



European Space Agency

•

an Cases Assas

Examples of substitution efforts in ESA and ESCC



Please contact us if you have an idea for innovative substitution, full- and co-funded mechanisms available.

See ideas.esa.int or contact reach.officer@esa.int

4. Lead (Pb) metal

Joint task force drafting a road map for a Pb-free transition ESA UNCLASSIFIED - For Official Use

•



22



qualification left to industry

2. Chromium Trioxide

1.

TRL4)

Used extensively in corrosion protection for aluminum structures

Ammonium Dichromate (pyrotechnic powder)

Replacement studied under Cleanspace funding (TRP, target

Project qualification complete at a subsystem level, full pyro

Several projects and collaborative actions ongoing to evaluate substitute materials (for example Cr(III)O), in cooperation with industry and NASA

3. Strontium Chromate

Replacement assessment ongoing at laboratory testing level





REACH TASK FORCES AND ARTICLE 33

ESA UNCLASSIFIED - For Official Use

= II 🛌 :: = + II = 🔚 := = II II = = = :: = II = II = :: II =

European Space Agency

REACH Task Forces vs. MPTB

See also: https://eurospace.org/working-groups



European Space Agency

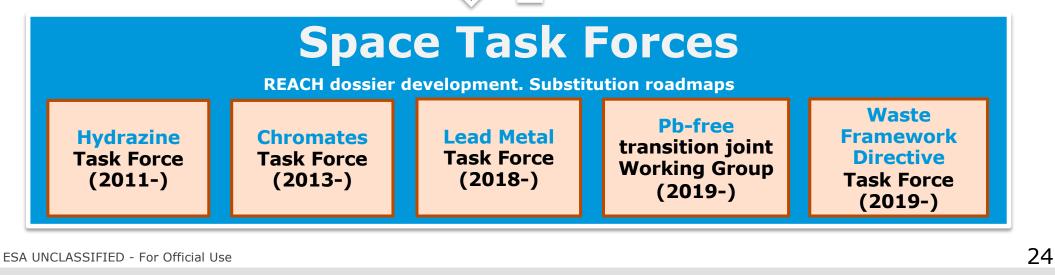
•

MPTB*

REACH obsolescence risk analysis. Regulatory monitoring. General studies and sector positions

*Materials and Processes Technology Board of the European Space Components Coordination (ESCC MPTB). The ESCC MPTB is a partnership between the European Space Agency (ESA), national space agencies, and the European space industry represented by ASD-EUROSPACE; it is chaired at present by ESA. The European Defence Agency (EDA) is an observer.





Waste Framework Directive Task Force (July 2019-)

Task Force Participants

Companies	Agencies		
Airbus Defence & Space ArianeGroup	ASI, CNES, DLR, ESA		
Avio MT-Aerospace	Trade association		
OHB RUAG	Eurospace		
Tesat	Consultant		
TAS	REACHLaw		

<u>Objective(s) – general</u>

▶ :: ■ + !! ■ !! = !!

Jointly take the required actions to communicate its special case to the regulators and industry stakeholders at EU and national levels, in order to be taken into account for the implementation of the revised WFD 2008/98/EC.

<u>Current priorities</u>

- Ensure that Member States take the opinion into account when transposing the revised WFD into their national laws (required by 5 July 2020)
- Communicate / explain the Position to Member States, the Commission, ECHA and MEPs
- Work to avoid adverse impacts from the forthcoming ECHA 'SCIP' database. The current plans raise serious concerns with regard to confidentiality, legality, practical feasibility and proportionality.
- <u>Deliverables (to date)</u>

 Position Paper of 9 September 2019 regarding Article 9 of the revised WFD with view to launched `non-waste' hardware (see next slide for the opinion), see <u>https://eurospace.org/spaceindustry-position-regarding-article-9-of-the-revisedwaste-framework-directive-2008-98-ec</u>



25

Waste Framework Directive Task Force: Opinion

İVYYYY

RESIDUAL

WASTE

"... the notification duty under Article 9(1)(i) of the revised Waste Framework Directive 2008/98/EC does not apply to equipment designed to be sent into space and related means of transport (launch vehicles and spacecraft, such as satellites for telecommunication, navigation or space exploration) which do not result in "waste" on the EU *territory*. While an explicit 'exemption' for space products is not foreseen in the Directive, such products - not being part of the Circular Economy - are considered to fall outside the scope of the Directive. This interpretation should apply uniformly across EU Member States, because supply chains are very complex and transnational. Besides, any notification (e.g. for ground equipment) should not go beyond REACH Article 33(1) data."

Source: https://eurospace.org/space-industry-position-regarding-article-9-of-the-revisedwaste-framework-directive-2008-98-ec

ESA UNCLASSIFIED - For Official Use

00 RAW MATERIALS DESIGN PRODUCTION REMANUFACTURING CIRCULAR ECONOMY Ę DISTRIBUTION **Image: European Parliament** Launched items not resulting in waste on FU territory

•



26

REACH Article 33 communication

Remains a "hot topic" given the tightening requirements \rightarrow MPTB-level activities to support REACH Article 33 compliance

- **Evaluation of guidelines** (ECHA, Member States, sector-level)
- Article 33 "Minimum Declaration" template
- Article 33 best practice survey (2018)
- Discussion / clarifications on specific questions: Main issues
 - Article 33 declaration for long-duration projects
 - Required effort in case of non-EU imports
 - Candidate list entries without identifiers

Customer C Customer C System Integrator A B Manufacturer M M





Picture source:

European Unior

http://blogs.esa.int/cleanspace/2018/11/06/reach-article-33-and-the-supply-chain 27

*

ESA UNCLASSIFIED - For Official Use

REACH Space Task Forces: Current priorities



• Chromates Space TF (STF): Authorisation decision monitoring and developing support scenarios for Space industry DUs for decision compliance and REACH Article 66 notifications

- Sunset dates passed on 21 September 2017 / 22 January 2019
- Adoption of upstream AfA for CrO3 (Lanxess et al.) now expected Q1 of 2020

• Hydrazine TF (HTF): Extension of REACH exemption analysis to other liquid propellants "used as fuels in closed systems" pursuant to REACH Article 56(4)(d) 2^{nd} alt. (MMH, UDMH, NTO/MON-x*) *Mixed Oxides of Nitrogen mixtures. "X" indicates the % of Nitric Oxide (NO) inside NTO: MON-1 and MON-3 mixtures are currently in production.

No sunset date today

• Lead metal TF (LTF): Input to cross-sector activities to map the essentiality of lead (Q4/2018-); monitor regulatory evolutions (REACH priority setting, new OEL)

No sunset date today





CONCLUSIONS AND OUTLOOK

ESA UNCLASSIFIED - For Official Use



European Space Agency

Trends on REACH in the Space Sector



• Sector has become more proactive – start early (at pre-design stage, in regulatory process, ...)

• Make chemicals regulators understand the sector complexities and need for product-tailored rather than "one size fits all" solutions (*impossibilium nulla obligatio est*, see e.g. CJEU judgment in case C-664/15)

 Joint efforts looking more and more beyond REACH → issues multiplication due to regulatory evolutions and political developments, esp. for substances in articles

 Benefits of increased collaboration & communication on regulatory issues within the Space Sector and beyond (aerospace & defence, automotive, electronics, etc.)
 ESA UNCLASSIFIED - For Official Use

Summary of current activities and priorities



Task Forces	 STF: EC decision on upstream AfA for CrO3 by Lanxess et al. ('CTACSub') & determination of follow-up needs HTF: Re-activation and re-scoping to include other liquid propellants LTF: Respond to regulatory initiatives, collaborate with other sectors Pb-free WG: Create a roadmap for Pb-free transition 		
"Business as usual" (MPTB)	 Continued routine obsolescence risk assessment; update of obsolescence risk assessment for propellants & explosives (first done in 2014) Promote joint substitution activities if suitable alternatives are identified Deepen collaboration, increase member engagement & communication 		
Beyond REACH	 WFD: Communicate Space Sector special case to decision-makers; avoid adverse impacts from the forthcoming ECHA 'SCIP' database Miscellaneous (e.g. OELs, RoHS2, Conflict Minerals Regulation (EU) 2017/821, Brexit): Monitoring and response where needed 		

ESA UNCLASSIFIED - For Official Use

31

European Space Agency

|+|

Reference material



- ECHA Annex XIV authorisation list
- <u>ECHA Candidate list for authorisation</u>
- PACT list of substances under scrutiny
- ASD-Eurospace REACH Section
- <u>ECSS-Q-HB-70-23A Materials, mechanical parts and processes obsolescence</u> management handbook (20 November 2017)
- Presentations from the last MPTB REACH Stakeholder Day at ESTEC on 11 June 2019





THANK YOU FOR YOUR ATTENTION!

ESA UNCLASSIFIED - For Official Use

__ II 🖕 ::: 🖛 += II 💻 🚝 __ II II =_ __ ::: 🖬 🛶 🔯 II __ ::: II 👀 💥 🖕 IV

European Space Agency



ANNEX 1: LISTS OF KEY ACRONYMS

ESA UNCLASSIFIED - For Official Use

= !! 🛌 :: 🖛 🕂 !! 🖛 들 = !! !! = = = :: 🖬 🛶 🔯 !! = :: !! :: !! 💥 🖕 !!

European Space Agency



List of key acronyms: Space-related

Abbreviation	Explanation
ASI	Agenzia Spaziale Italiana
CNES	Centre National d'Études Spatiales
СТВ	Component Technology Board
DLR	Deutsches Zentrum für Luft- und Raumfahrt
ECSS	European Cooperation for Space Standardization
EM	Equipment Manufacturer
ESA	European Space Agency
ESCC	European Space Components Coordination
ESMDB	European Space Materials Database
ESTEC	European Space Research and Technology Centre (at ESA)
HTF	Hydrazine Task Force
LSI	Large System Integrator
LTF	Lead Task Force
M&P / MMPP	Materials and Processes / Material, Mechanical Part, Process
МРТВ	Materials & Processes Technology Board (previously M&P WG)
SP	Service Provider
STF	Chromates Space Task Force

ESA UNCLASSIFIED - For Official Use

Image: Imag Image:
European Space Agency

List of key acronyms: Regulations and public bodies CSA



Regulation	Explanation
CLP	Classification, Labelling and Packaging of substances and mixtures (Reg. (EC) N0 1272/2008)
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (Reg. (EC) 1907/2006)
RoHS	Restriction of Hazardous Substances ("RoHS 2" Directive 2011/65/EU)
WFD	Waste Framework Directive (Directive 2008/98/EC on waste)

Public body	Explanation	
CJEU	Court of Justice of the European Union	
EC	European Commission	
ECHA	European Chemicals Agency	
EEA	European Economic Area (EU MS + Norway, Iceland, Liechtenstein)	
EP	European Parliament	
HSE	Health and Safety Executive (UK)	
MS	Member State	
RAC	Committee for Risk Assessment (at ECHA)	
SEAC ESA UNCLASSIFIED - For Official Us	Committee for Socio-Economic Analysis (at ECHA)	36

• •• × +

European Space Agency

1+1

List of key acronyms: REACH / Chem



· · · · · · · · · · · · · · · · · · ·	
Abbreviation	Explanation
AfA	Application for Authorisation
ΑοΑ	Analysis of Alternatives
CCST	Miscellaneous Chromium VI Compounds for Surface Treatment REACH Authorization Consortium
CSR	Chemical Safety Report
CTACSub	CTAC Submission Consortium relating to uses of chromium trioxide
DU	Downstream user of a substance or mixture
EEE	Electrical and Electronic Equipment
OEL	Occupational Exposure Limit
PACT	Public Activities Coordination Tool
RMO(A)	Risk/Regulatory Management Option (Analysis)
SCIP	Substances of Concern In articles, as such or in complex objects (Products)
SEA	Socio-Economic Analysis
SiA	Substances in Articles
SVHC	Substances of Very High Concern (as defined in REACH Article 57)
See also "ECHA-te	rm" database with REACH terms and definitions, available at https://echa-term.echa.europa.eu

See also "ECHA-term" database with REACH terms and definitions, available at <u>https://echa-term.echa.europa.eu</u>

ESA UNCLASSIFIED - For Official Use 37

List of key acronyms: Substances



Abbreviation	Explanation	CAS number	EC number
CrO ₃	Chromium trioxide	1333-82-0	215-607-8
Cr(III)O	Chromium (III) oxide	1308-38-9	215-160-9
Cr(VI)	Hexavalent chromium	various	various
DMAC	N, N-Dimethylacetamide	127-19-5	204-826-4
DMF	Dimethylformamide	68-12-2	200-679-5
GaAs	Gallium Arsenide	1303-00-0	215-114-8
ММН	MonoMethyl Hydrazine	60-34-4	200-471-4
NMP	N-Methyl-2-Pyrrolidone	872-50-4	212-828-1
ΝΤΟ	Dinitrogen Tetraoxide	10544-72-6	234-126-4
Pb	Lead metal	7439-92-1	231-100-4
UDMH	Unsymmetrical DiMethyl Hydrazine	57-14-7	200-316-0

Note: This does not represent an exhaustive list of substances for which the Space Sector is affected by REACH.

