



Differentiate your portfolio with the Covestro Ultra Line

Advance your business by offering an improved industrial hygiene standard with products comprising $<0.1\%$ monomeric diisocyanates



EU Regulatory Activities on Diisocyanates Are Ongoing

Developments in recent years driven by occupational asthma cases



REACH Restriction:

- ❑ EU regulation since 2020
- ❑ Requires trained personnel to handle diisocyanates containing substances or mixtures from Aug 2023 on

German Cohort Study:

- ❑ Worker Field Study
- ❑ Targets to scientifically support restriction (and OEL) by showing that trainings are efficient to reduce asthma cases
- ❑ Starts in 2023 for 5 years; joint project of industry, authorities and worker compensation funds



OEL:

- ❑ Was started by EU COM* in 2019 as OSH**
- ❑ It's about occupational safety for workers handling diisocyanates
- ❑ Sets maximum exposure limit to ensure healthy conditions at workplaces
- ❑ Target is harmonizing of OEL levels

* EU COM: EU Commission

**OSH: occupational safety and health

REACH Restriction for Diisocyanates

A regulatory approach to further improve safe use of diisocyanates entered into force August 2020



Three main topics regulated:

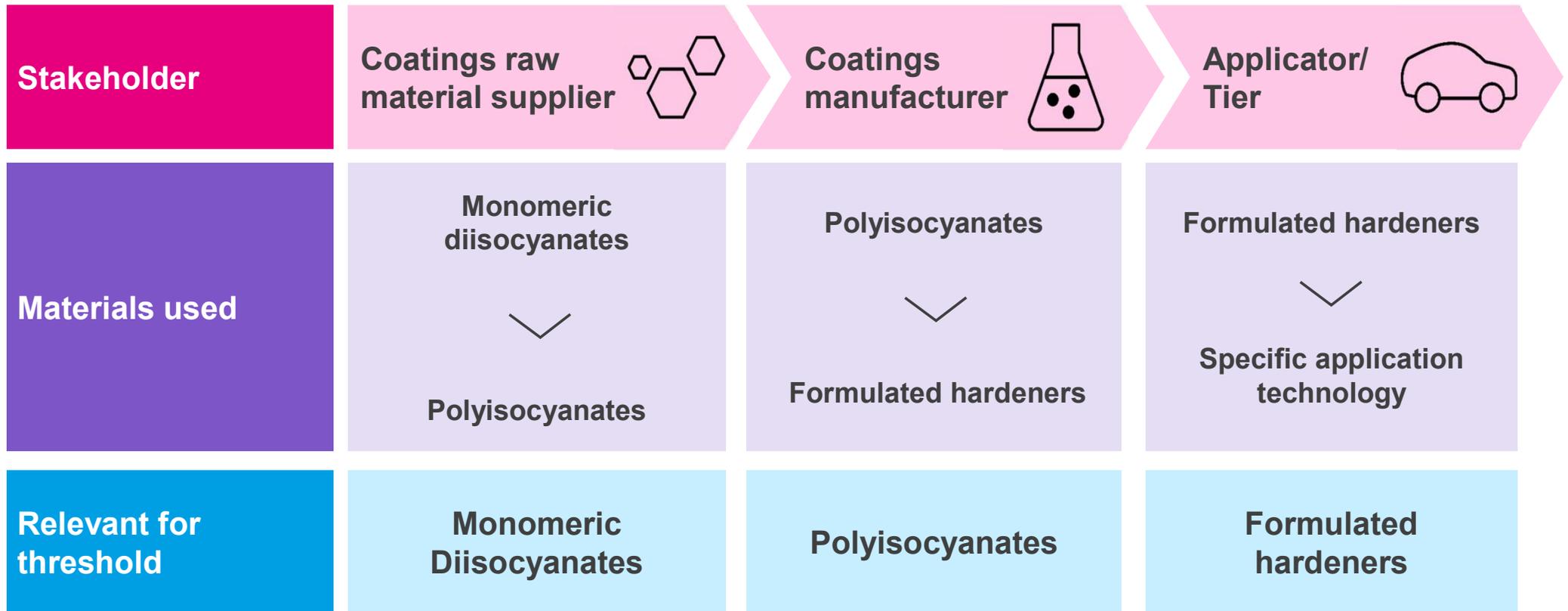
- 1.) Threshold criteria of 0.1% monomeric diisocyanates in products or mixtures
- 2.) Core requirement of the restriction is mandatory training and certification for all users before working with diisocyanates
 - Deadline for respective EU Employees to be trained until 8/2023
 - Responsibility for performing and documenting the trainings is with the employer
 - Training has to be repeated every 5 years
- 3.) Obligation for new labelling of respective packages containing > 0,1 % monomeric diisocyanates from 2/2022 regarding mandatory training requirements

“As from 24 August 2023 adequate training is required before industrial or professional use.”

What does it mean for our future product portfolio products?



Monomeric diisocyanate content of the specific product/mixture handled by the respective stage in the value chain determines the impact of REACH regulation on diisocyanates



Production of polyurethane hardeners with specified ultra-low content of monomeric diisocyanates as a drop in solution



Market requirements for new polyurethane hardeners

1. Technical performance

Keep the known technical performance



2. Keep threshold value

Fall below the new threshold value of 0.1% by weight of diisocyanates in mixtures



No additional efforts to comply with the use restriction on diisocyanates

3. Adapted product portfolio

Improved products with lower diisocyanates content substitute previous grades



Covestro's Ultra Line combines the advantages of isocyanates technology with a new level of industrial hygiene.

Why is a better hygiene profile important for your customers and their downstream users?



Training and safety measures are essential for you to continue to be successful in the future.

Opportunity to differentiate your portfolio by offering customers a product with a better industrial hygiene standard with <math><0.1\%</math> residual monomeric content (r.m.c.).

With the new Covestro Ultra Line you and your customers will be **prepared for the new legislative requirements.**



With safety measures and sufficient training, you can leap over the current bar.



But with the new Ultra Line it will be easier for you to achieve even higher targets with the current level of training.

Development of Desmodur[®] Ultra

Transformation of an entire existing portfolio of crosslinkers



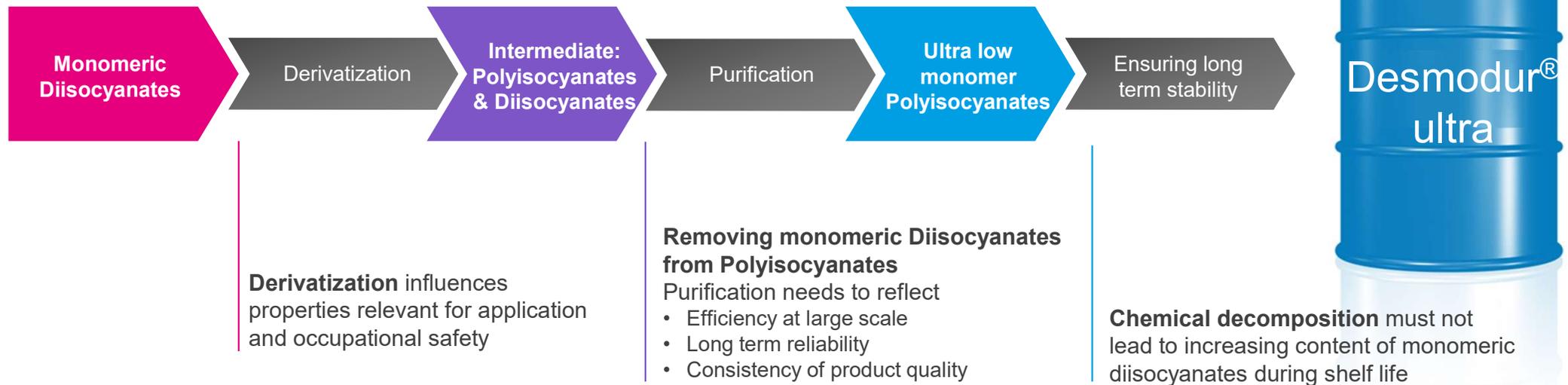
Monomeric Diisocyanates

- are chemical basis for polyurethane coatings
- can be sensitizing
- are not used for coatings

Mixtures of Polyisocyanates and monomeric Diisocyanates may be used e.g. for adhesives applications in case of MDI comprising prepolymers, but then the REACH restriction will apply.

Desmodur[®] ultra falls **below the threshold value of 0.1%** by weight of diisocyanates which enables

- <0.1% residual monomer content in entire value chain
- Improvement of industrial hygiene standards
- Easy drop-in solutions



World of Polyisocyanates Comprising Free NCO Groups

Target to offer most Polyisocyanates as ultra – except Uretdiones and MDI based products



Based on aliphatic isocyanates (HDI, IPDI, PDI,...)		Based on TDI	Based on MDI
Trimer / Isocyanurates  e.g. Desmodur ultra N 3300	Allophanates  e.g. Desmodur ultra N 31100	Urethanes   e.g. Desmodur ultra L 75	Prepolymers   e.g. Desmodur E 23
Biuret  e.g. Desmodur N 75	Hydrophilic PIC  e.g. Bayhydur ultra 3100	Isocyanurates   e.g. Desmodur ultra IL e.g. Desmodur HL	Specialties
Uretdiones  e.g. Desmodur N 3400	Prepolymers  e.g. Desmodur ultra E30500	Prepolymers   e.g. Desmodur ultra E 15	e.g. Desmodur RFE 

Desmodur[®] ultra sets a new standard in occupational hygiene



Bayhydur [®] CQ ultra 701-90 PGDA	Desmodur [®] ultra IL BA
Bayhydur [®] ultra 2487/1	Desmodur [®] ultra IL EA
Bayhydur [®] ultra 2655	Desmodur [®] ultra L 75
Bayhydur [®] ultra 2700	Desmodur [®] ultra N 31100
Bayhydur [®] ultra 2759	Desmodur [®] ultra N 31280
Bayhydur [®] ultra 2858	Desmodur [®] ultra N 3300
Bayhydur [®] ultra 304	Desmodur [®] ultra N 3368 BA/SN
Bayhydur [®] ultra 305	Desmodur [®] ultra N 3368 SN
Bayhydur [®] ultra 308	Desmodur [®] ultra N 3386 BA/SN
Bayhydur [®] ultra 310	Desmodur [®] ultra N 3390 BA
Bayhydur [®] ultra 3100	Desmodur [®] ultra N 3390 BA/SN
Bayhydur [®] ultra 401-70 MPA	Desmodur [®] ultra N 3580 BA*
Bayhydur [®] ultra 401-70 MPA/X	Desmodur [®] ultra N 3600
Desmodur [®] blulogiq 3190 BA	Desmodur [®] ultra N 3700
Desmodur [®] CQ ultra N 7300	Desmodur [®] ultra N 3790 BA
Desmodur [®] ultra 2822	Desmodur [®] ultra N 3800
Desmodur [®] ultra DA-L	Desmodur [®] ultra N 3900
Desmodur [®] ultra DN	Desmodur [®] ultra NZ 200
Desmodur [®] ultra E 15	Desmodur [®] ultra RN
Desmodur [®] ultra E 30500	Desmodur [®] ultra Z 4470 BA
Desmodur [®] ultra E 30600	Desmodur [®] ultra Z 4470 MPA
Desmodur [®] ultra E 3370	Desmodur [®] ultra Z 4470 MPA/X
Desmodur [®] ultra IL 1351 BA	Desmodur [®] ultra Z 4470 SN

* Available as of Q2 2023

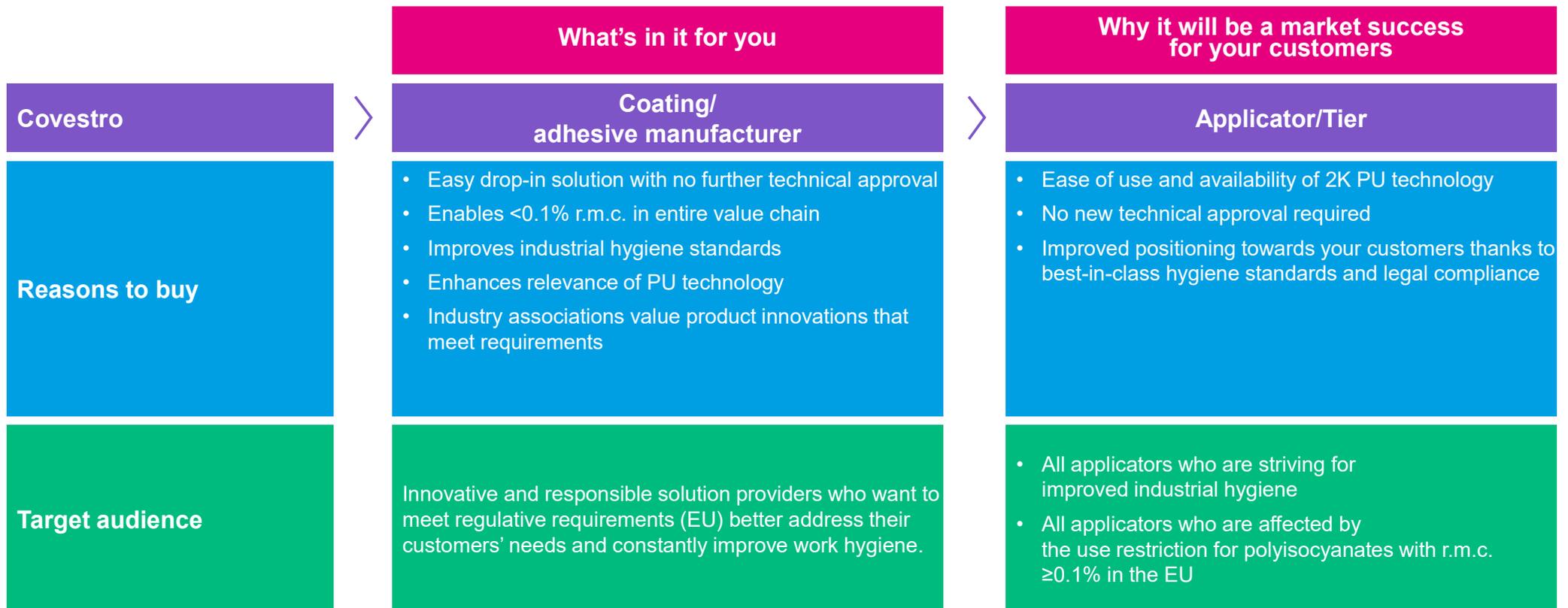
- Application and performance of the products fully compares with the previous products.
- Direct substitution possible.
- Differentiation from competition.



Covestro's new Ultra Line



Differentiate your portfolio with innovative solutions that outperform current industrial hygiene standards



Your and your downstream customers' added value:



Ease of use – new industrial hygiene standards – supports compliance with EU regulations

- Position yourself as a **responsible innovator** and **solution provider**: Covestro's ultra-low monomer technology **addresses your customers' pain points**.
- **Set new industry standards** in industrial hygiene.
- Rely on our **core expertise** as a strong player and **innovator** of aliphatic and aromatic isocyanates.

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REACH Restriction (Trainings)

Ensure safe handling of Isocyanates

German Cohort Study

OEL Occupational Exposure Limits

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Production of polyurethane hardeners with specified ultra-low content of monomeric diisocyanates as a drop in solution

Market requirements for new polyurethane hardeners



1. Technical performance	2. Keep threshold value	3. Adapted product portfolio
<p>Keep the known technical performance</p> 	<p>Fall below the new threshold value of 0.1% by weight of diisocyanates in mixtures</p>  <p>No additional efforts to comply with the use restriction on diisocyanates</p>	<p>Improved products with lower diisocyanates content substitute previous grades</p>  <p>Covestro's Ultra Line combines the advantages of isocyanates technology with a new level of industrial hygiene.</p>

January 2023 | Desmodur ultra



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These factors include those discussed in Covestro's public reports, which are available on the Covestro website at www.covestro.com.

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Covestro Ultra Line

Available Desmodur[®] ultra / Bayhydur[®] ultra products



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[Ultra line – keeping the quality up and your business future-ready. | Covestro AG](#)

If you need more details concerning the REACH restriction, please follow our webinar:

[2021 09 Diisocyanate Use Restriction | Covestro AG](#)

Definition of Diisocyanates

The sum of all diisocyanate monomers is relevant for the threshold value of 0.1 % and not the sum of all bifunctional isocyanates in a product mixture



Legal text

“O=C=N-R-N=C=O, with R an aliphatic or aromatic hydrocarbon unit of unspecified length”

(Definition according to Entry 74 of Annex XVII REACH acc. to EU 1907/2006)

Background document

“R does not contain urethane, urea, uretdione, biuret, allophanate or isocyanurate linkages (i.e. the diisocyanate entity is not the result of prepolymerisation of a parent diisocyanate)”

(annex to the background document to the opinion on the Annex XV dossier proposing restrictions on diisocyanates)

ANNEX TO BACKGROUND DOCUMENT TO RAC AND SEAC OPINIONS ON DIISOCYANATES

B. Information on hazard and risk

B.1 Identity of the substance(s) and physical and chemical properties

B.1.1 Name and other identifiers of the substance(s)

Diisocyanates according to the following structure, whereby the group R is an aliphatic or aromatic hydrocarbon unit of unspecified length. R does not contain urethane, urea, uretdione, biuret, allophanate or isocyanurate linkages (i.e. the diisocyanate entity is not the result of prepolymerisation of a parent diisocyanate):

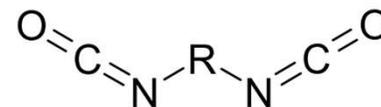


Figure 1: Chemical structure of diisocyanates

Detailed information and examples of diisocyanates covered by this restriction is given in Table 1 and Table 2.

Please note that in the way the proposal for the scope of the restriction has been formulated in Section A.1.2.1, oligomers and prepolymers that contain >0.1 wt % of the diisocyanates that meet the above definition (of which a non-exhaustive list is shown below), would still be in scope of the restriction.

<https://echa.europa.eu/documents/10162/708cca92-3d8b-316b-a814-18d85288676d>

REACH Restriction for Diisocyanates (DII)

A regulatory approach to further improve safe use of DII entered into force August 2020



Where do we stand?

- Industry has implemented labelling of respective products
 - The training materials are made available by industry
 - Comprehensive training procedure in French, Italian, Spanish, German and English available from July 2022 see [Safe use of Diisocyanates - Home EN \(safeusediisocyanates.eu\)](https://safeusediisocyanates.eu)
 - Trainer: qualified, knowledgeable in Isocyanates and HSE – personal training to be preferred
 - Web-based trainings are available to all modules
-
- Some National authorities are interested in seeing / reviewing the training materials

Where do you get additional information to stay up-to-date?



Please check ALIPA & ISOPA websites and check your respective national/European trade associations who are member of the PU exchange panel.

ISOPA/ALIPA webpages:

www.isopa.org and www.alipa.org

Safe use of diisocyanates:

<http://www.safeusediisocyanates.eu/>

EU legislation:

<https://eur-lex.europa.eu/eli/reg/2020/1149/oj>

