



CTL® GMBH
Chemical Technological Laboratory

*Tattoo
Laboratory*

Industry meets authority

Different perspective, common goal

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2nd International Conference on Tattoo Safety

CTL – analysis for the good guys

Good guys

Want to know what the regulation demands



counsel

Want a complete test of their colours



safety

Every test costs money and reduces profit



affordability

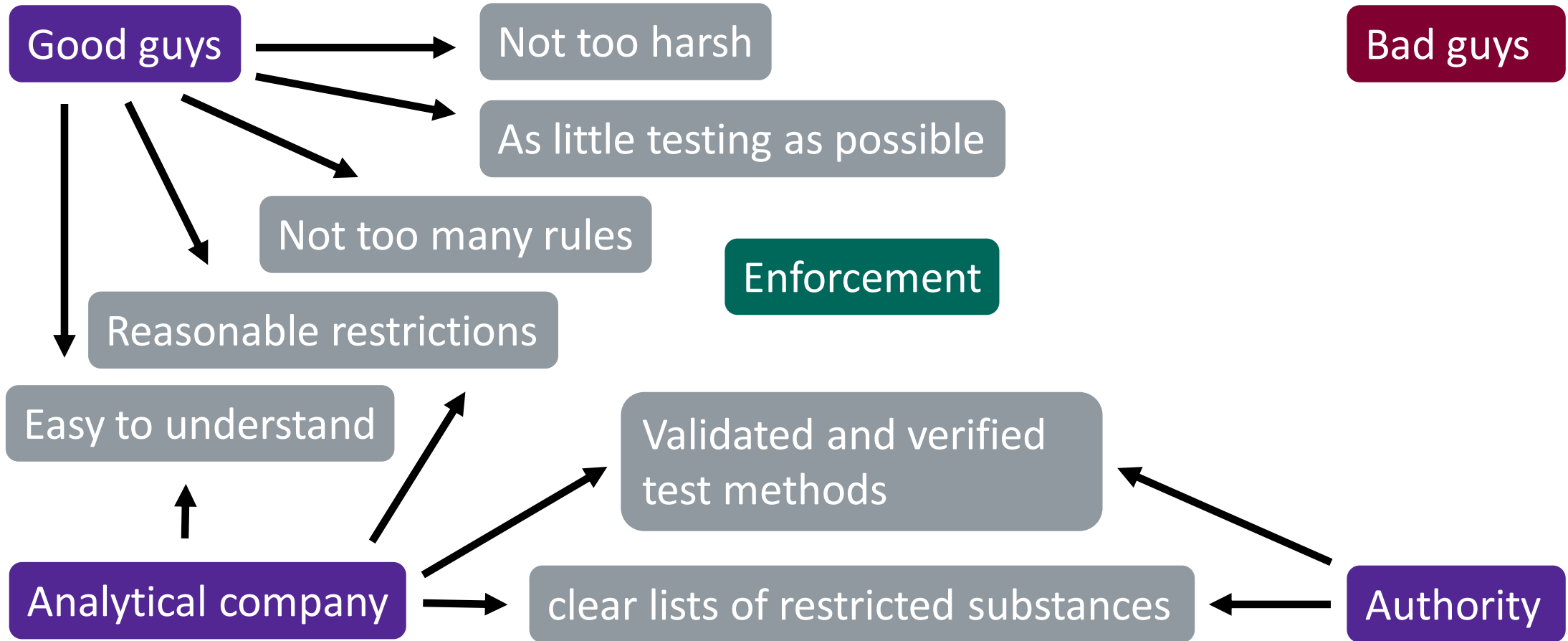
Bad guys

Don't know, don't care

Why spend good money on testing, let's sell it anyway!

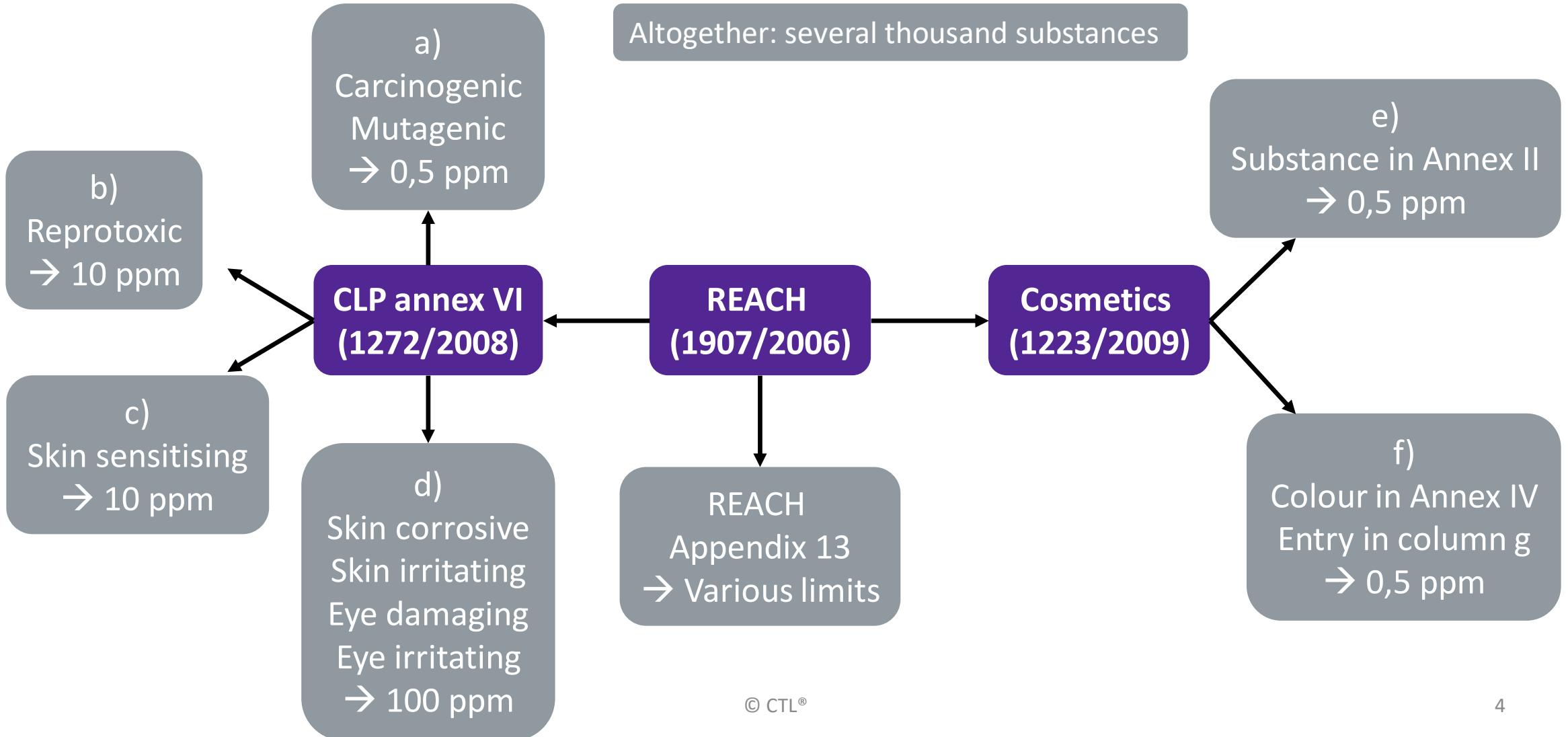
Test nothing, pay nothing – pure profit

Perspectives on Enforcement



Tattoo- PMU-colours and REACH

Altogether: several thousand substances



Performing one analysis (just one method)

Prerequisites:

- Defined test method
- Defined substance (list)

Preparation:

- Buying every reference substance
- Evaluating method parameters
- Validation / Verification

Preparing the sample:

- Washing, diluting, reaction, transformation

Performing measurement

Evaluation of test result

Start

1 -12 months

Receiving a sample

Reduction of tests / costs

Don't test things twice



Structure of tests

- Test pure ingredients
- Test blocks
- Test only few final products

Don't test samples, you know will fail



Information from the customer

- formulations
- Reach information
- Talking to customers

Don't test for something you know is irrelevant



Internal database

- Complete list of impurities
- Cross connection – impurity to ingredient

Information management with REACH

Requirement of REACH Article 31 (3) - SDS lists every ingredient > 0.1 % if dangerous
> 1 % if harmful

Example 1: Chloro-kresol

- Allowed for cosmetics (0.2 %)
- Limit in Tattoo / PMU 10 ppm



Pigment preservation:

$c(\text{preservative}) < 0.1 \% (0.01 \%)$
Use of pigment in colour: 30 %
→ 0.003 % = 30 ppm

Example 2: Acetaldehyde in Glycerol

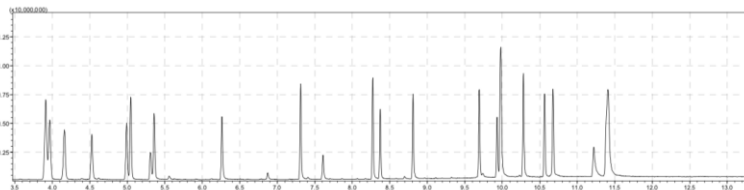
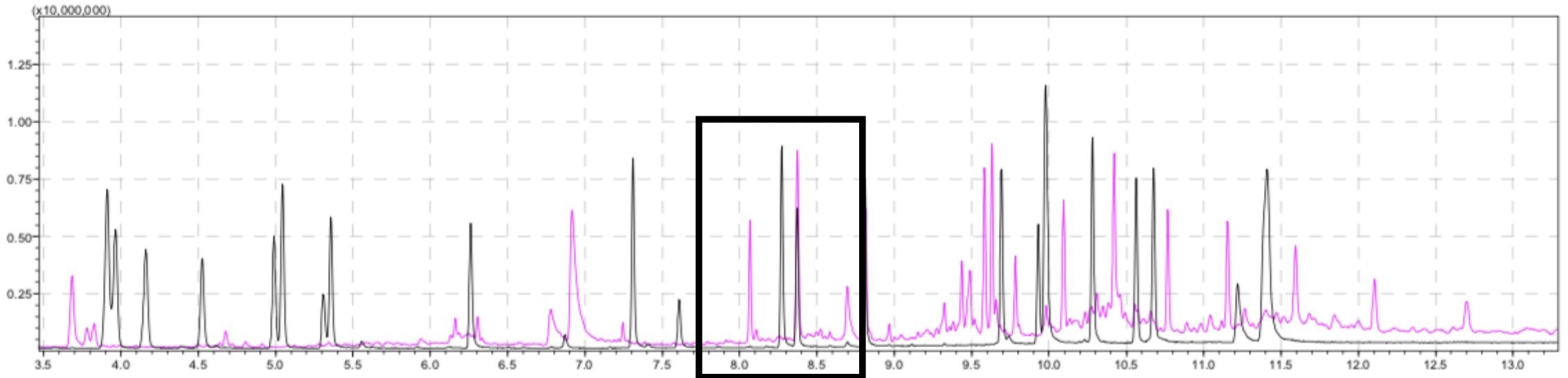
- Glycerol pa.: max 10 ppm
- Limit in Tattoo / PMU 0.5 ppm



Use of Glycerol in colour: easily > 10 %
→ 1 ppm

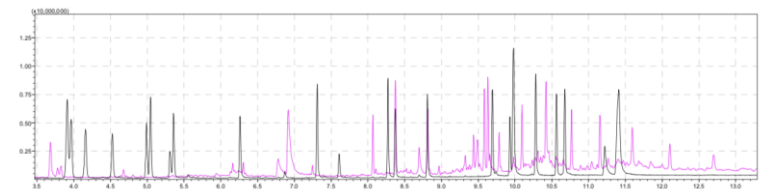
No chance to know without test

More than just a standardised measurement



Known peaks – identification and quantification established

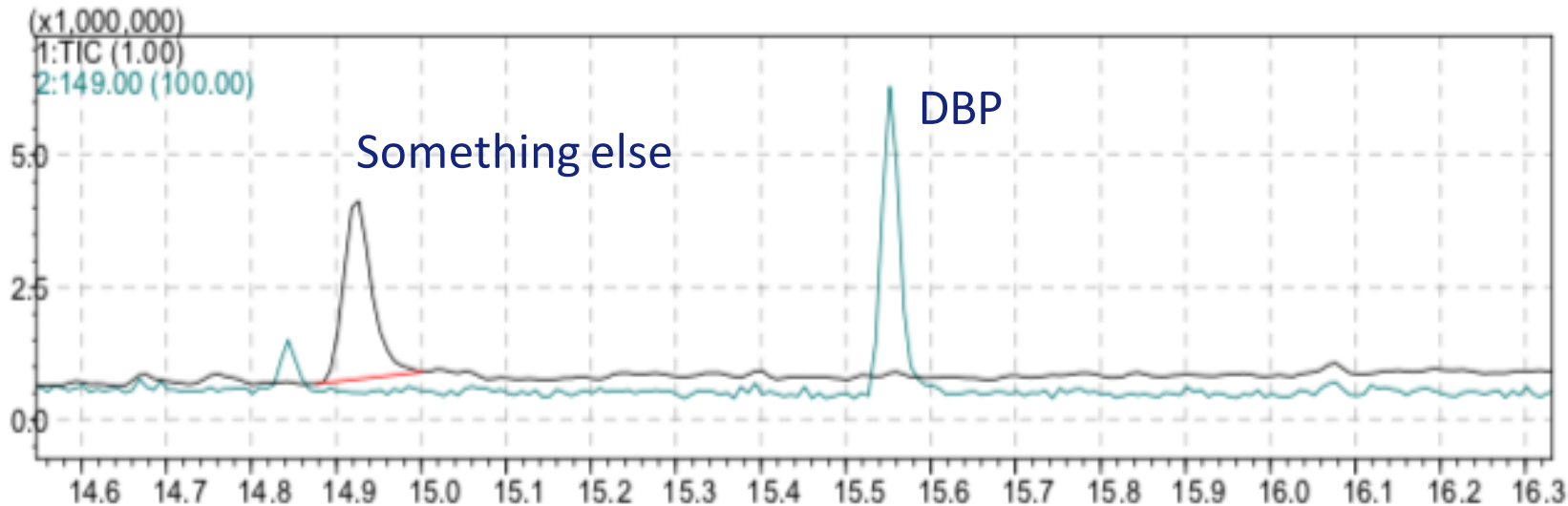
Many unidentified peaks:
A chance to measure more in
one measurement



Chromatogram of PAA-measurement

Screening vs analytical method

Phthalates: DBP – Dibutylphthalate (Limit: 0-5 ppm)



Black:
Chromatogram
Green:
Mass-graph; 149 g/mol
Measured concentration:
2.5 ppm

Screening:
You see more, but not very precisely

Analytical Method:
You see only, what you prepared, but you see it well

Heavy Metals – good idea, bad side effects

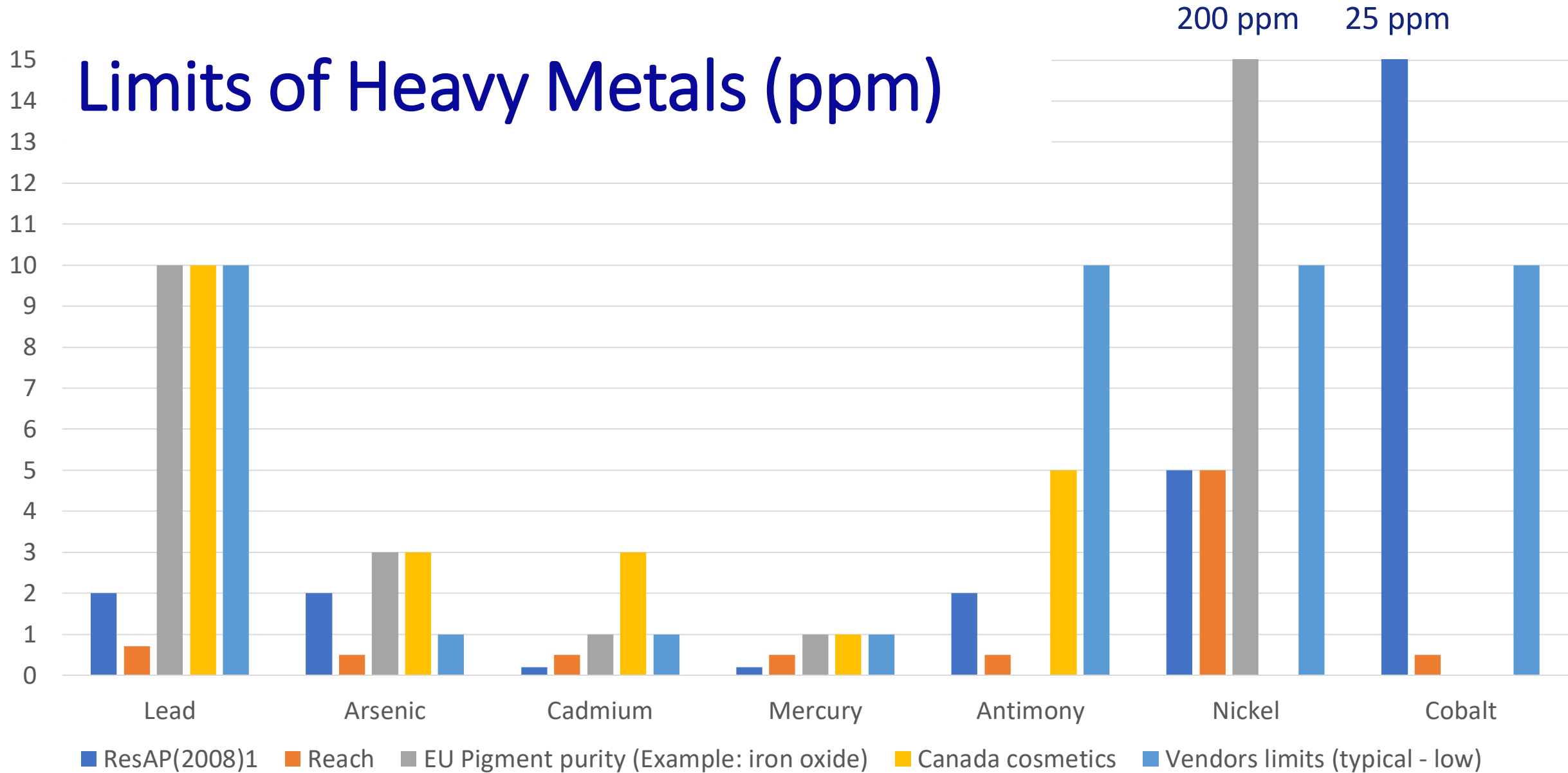
Mercury	0.5 ppm
Nickel	5 ppm
Tin (only tin-organic)	0.5 ppm
Antimon	0.5 ppm
Arsenic	0.5 ppm
Barium (soluble)	500 ppm
Cadmium	0.5 ppm
Chromium (as Chromium (VI))	0.5 ppm
Cobalt	0.5 ppm
Copper (soluble)	250 ppm
Zinc (soluble)	2000 ppm
Lead	0.7 ppm
Selenic	2 ppm

13 Elements – 4 test methods

Chemical point of view:
elements are tested as they are used
and dangerous
→ Well thought through

Analytical point of view:
4 methods are too much for 13
elements, 2 methods for 1 element each
→ Too much, too costly

Limits of Heavy Metals (ppm)



Consequences of limits

Example 1: Arsenic

Limit ResAP	2 ppm
Limit REACH	0.5 ppm
Limit Cosmetics EU (example iron oxide)	3 ppm
Guarantee of vendors	< 1 ppm

Raw pigment with 1 ppm arsenic



ResAP: unlimited
use possible



REACH: 50 % use
possible

Example 2: Cobalt

Limit ResAP	25 ppm
Limit REACH	0.5 ppm
Limit Cosmetics EU (example iron oxide)	No limit
Guarantee of vendors	< 10 ppm

Raw pigment with 10 ppm cobalt



ResAP: unlimited
use possible

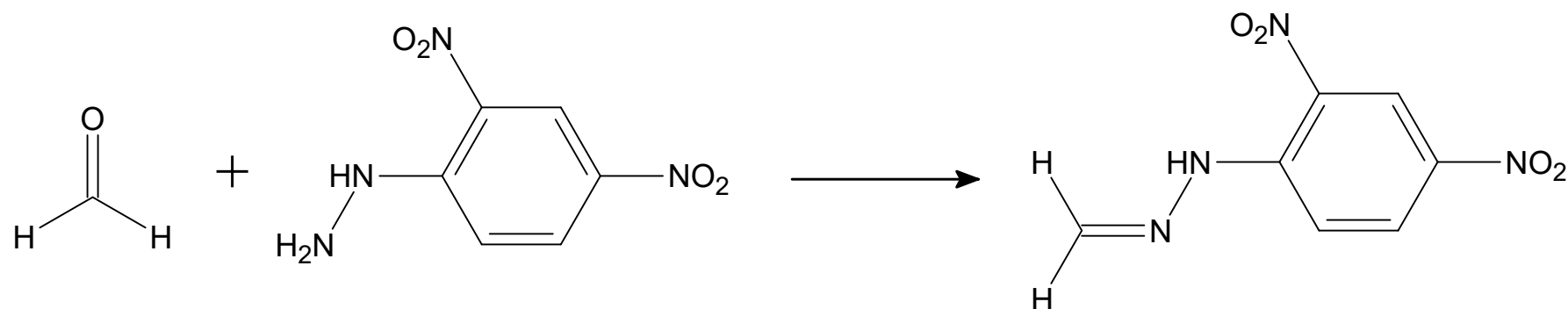


REACH: 5 % use
possible

Using standardised methods (Formaldehyde)

Example: Formaldehyde

- DIN EN ISO 17226-1:2019-04 Leather – Chemical determination of formaldehyde content – Part 1: Method using high performance liquid chromatography.



dilution

reaction

measurement

Method designed solely for formaldehyde, partially applicable for acetaldehyde too.

No extraction necessary.

Limit: 0.5 ppm; LOQ: 0.5 – 1 ppm

Changes in REACH – textile vs tattoo

Textile:

Regulation 2018/675 October 2018

Added: annex XVII entry 72 + appendix 12

Changes:

- Restriction of: heavy metals / PAHs / Chloro-aromates / Formaldehyde / Several colours / Several organic substances

Tattoo:

Regulation 2020/2081 December 2020

Added: annex XVII entry 75 + appendix 13

Changes (to ResAP):

- Restriction of: multiple substances via link to CLP
- Different limits for existing restrictions

Difference:

All changes for textiles were established in labels, RSLs and standard methods

Perspectives for the future

Good guys:

- Establishing legal formulations
- Regular testing of their products

Bad guys:

- Trying not to get caught

Common goal: safer colours
Working together instead of competing

Analytical company:

- Establishing test methods
- Offering affordable tests

Authorities:

- Establishing test methods
- Deciding what parameters to test

Questions?



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