

Für Mensch & Umwelt

Umwelt 
Bundesamt

Materials and Products in Contact with Drinking Water

4MS Approach for Metallic Materials

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Section II 3.4 / Distribution of drinking water

Overview

- 1 METAL RELEASE**
- 2 4(5)MS APPROACH FOR METALS**
- 3 CONCLUSIONS**

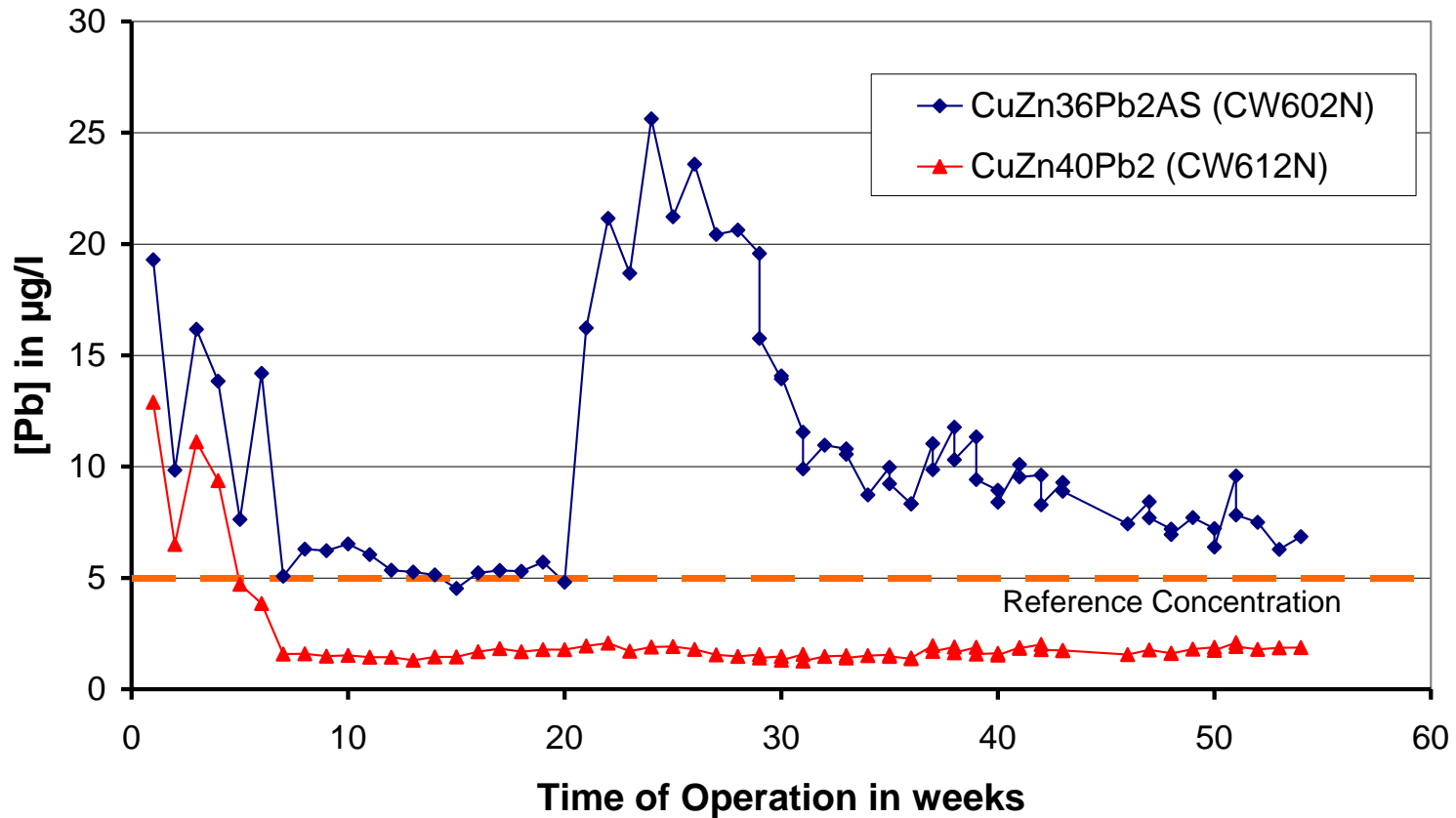
Metal Release

Depends on:

- Metal composition and surface characteristics
- Composition of drinking water
- Design of plumbing system
- Age of plumbing system
- Stagnation time

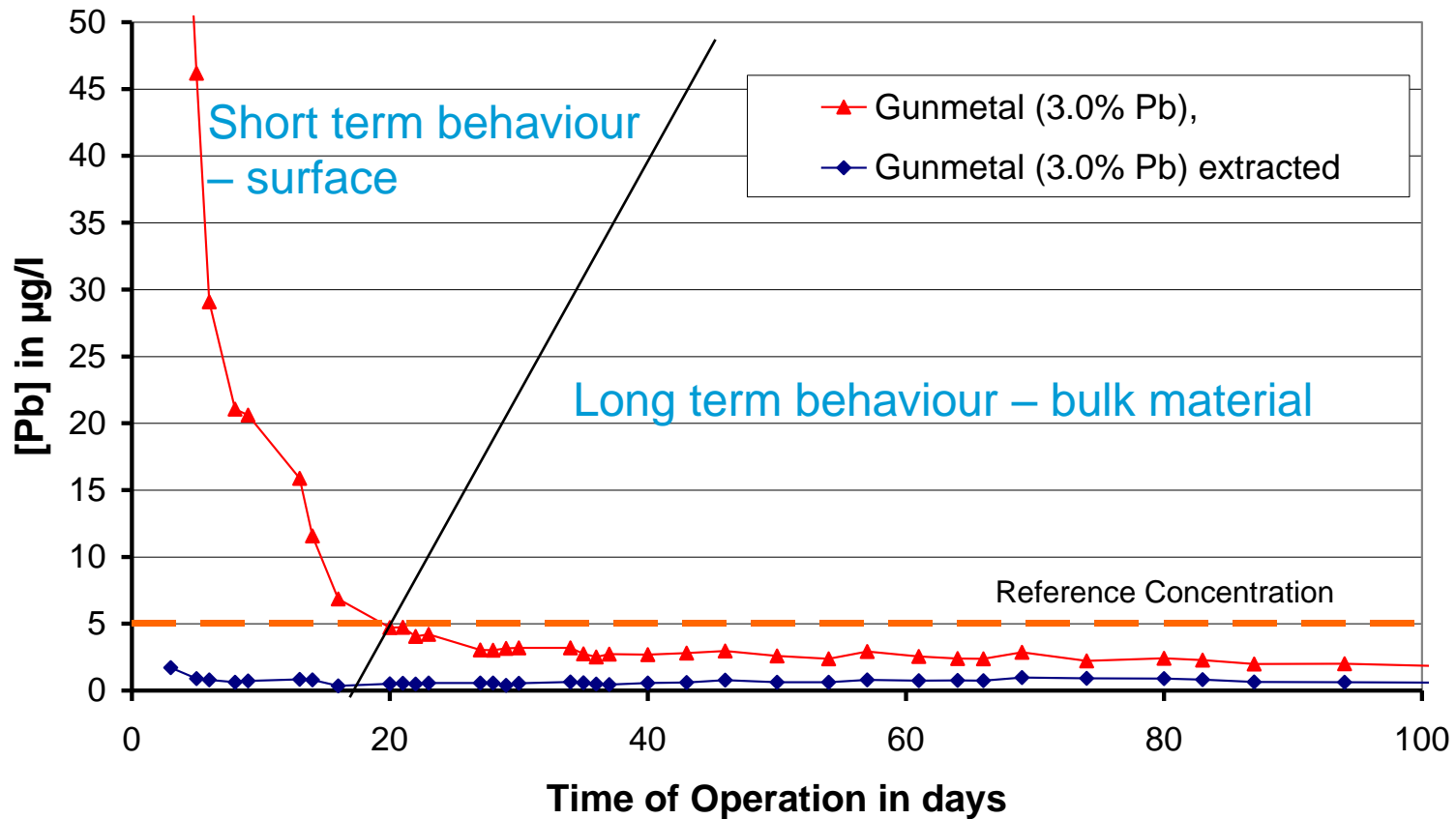
Metal Release

Lead Release - 4 h stagnation samples
(Berlin tap water - surface fraction 10%)

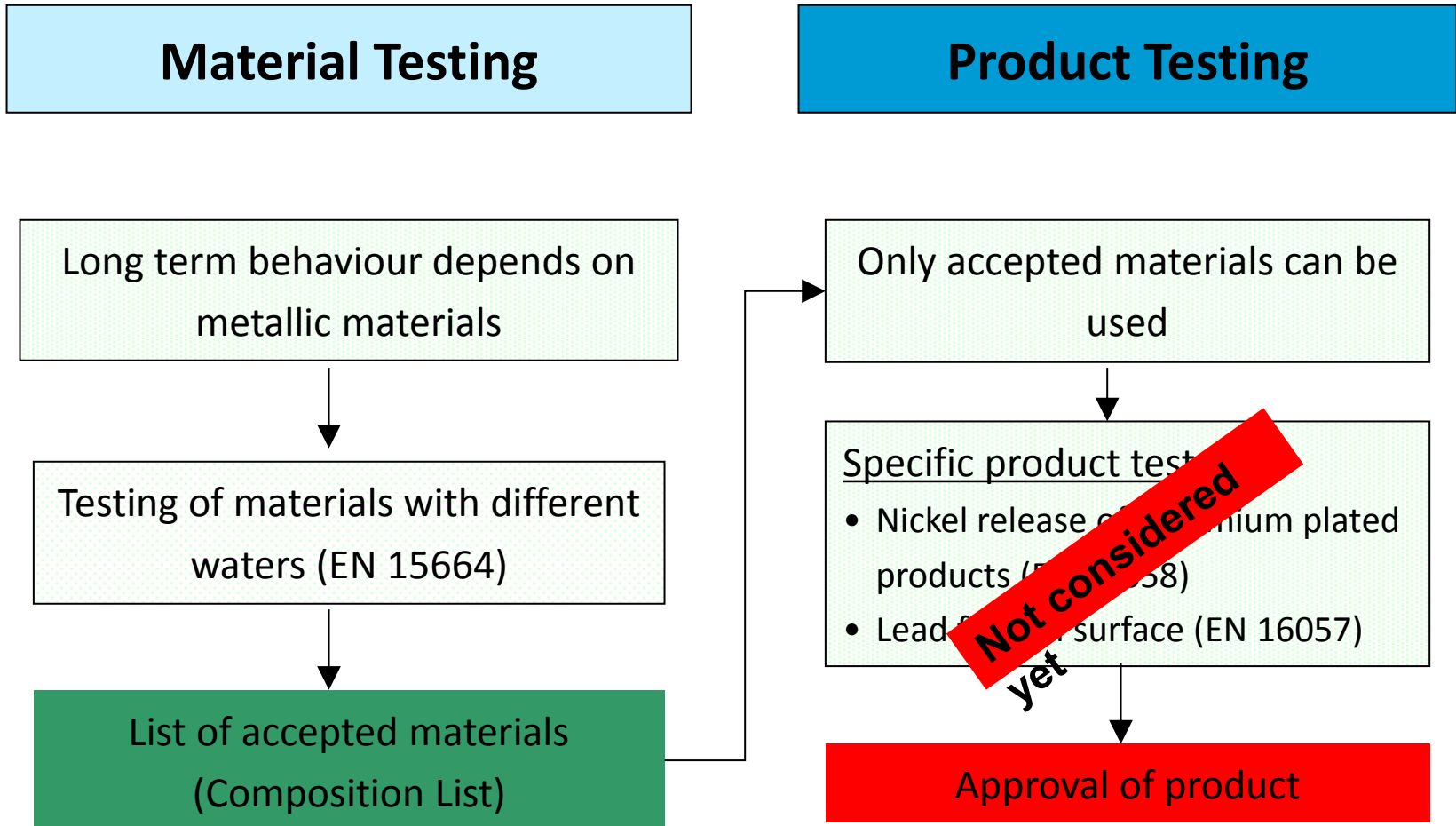


Metal Release

Lead Release - 4 h stagnation samples
(Berlin tap water - surface fraction 10%)



4(5)MS Approach for Metallic Materials



4(5)MS Approach for Metallic Materials

4 MS Common Approach: Procedure for the Acceptance of Metallic Materials Used in Contact with Drinking Water

1st revision 30th March 2011

Composition List: 3rd revision 20th December 2013

www.umweltbundesamt.de/4MS.htm

4(5)MS Approach for Metallic Materials

List of accepted materials (Composition List)

- **Categories of materials** (e.g. Copper-Zinc-Lead alloys)
 - Reference material
 - Commercial alloys
- **Materials can be accepted for 3 product groups**
 - pipes,
 - fittings & ancillaries,
 - small parts in products

4(5)MS Approach for Metallic Materials

Procedure for the acceptance of materials for 4MS list

- **Acceptance in one of the MS acc. to 4MS concept**
 - Opinion will be circulated
 - Common acceptance

=> Common Composition List

4(5)MS Approach for Metallic Materials

Material test – EN 15664

Absolute Testing

For testing a **new reference material**

- Tests with 3 test waters
- Restricted composition

Comparative Testing

For testing a **commercial alloy** for an existing category

- Test against the reference material
- Test with 1 suitable test water
- Restricted composition of the test specimens

Hygienic requirements for metals

4(5)MS Approach for Metallic Materials

Material test – EN 15664-1



Hygienic requirements for metals

4(5)MS Approach for Metallic Materials

Material test – EN 15664-1



Hygienic requirements for metals

4(5)MS Approach for Metallic Materials

Material test – EN 15664-1

22 Flow periods per day (each 1 or 2 min)

Flow rate: 5 l/min

Total water flow: 145 l/d

Operation time: min. 26 weeks

Sampling: 8 samples after 0,5; 0,5; 1; 1; 2; 4; 8 and 16 h stagnation

4(5)MS Approach for Metallic Materials

Material test – EN 15664-2

Test Waters for Absolute Testing

	Characteristics	pH	[HCO₃⁻] in mmol/l	[Cl⁻] + [SO₄²⁻] in mmol/l	TOC in mg/l
1	very hard, neutral water	7.1- 7.5	> 5	> 3	> 1.5
2	soft water, weakly acidic	6.7- 7.1	0.5- 1.3	-	-
3	soft water, alkaline	8.0- 8.4	0.7- 1.3	-	-

4(5)MS Approach for Metallic Materials

Acceptance criteria for Absolute Testing

Criteria	Acceptance Level
Compliance with reference concentrations	After 16 weeks (formation of corrosion layers)
Acceptable contribution to DWD parametric values (= reference concentration)	<ul style="list-style-type: none">• 50%, if other source exist• 90%, if PDW are main source

Conclusion

- 4MS approach and common Composition List available
- National or European implementation necessary

Thank you for your attention

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www.umweltbundesamt.de/themen/wasser/trinkwasser/trinkwasser-verteilen