

# ACCEPTANCE OF METALLIC MATERIALS USED FOR PRODUCTS IN CONTACT WITH DRINKING WATER

## 4MSI Common Approach

Part A – Methodologies for testing and accepting compositions to be included in the Positive list of compositions for metallic materials

### **Part B – Positive list of compositions for metallic materials**

Part C – Procedure and methods for testing and accepting final materials as used in a product made from compositions on the Positive List

Adopted by the 4MSI Joint Management Committee

17<sup>th</sup> Revision

10<sup>th</sup> January 2023

France, Germany, the Netherlands, the United Kingdom and Denmark work together in the framework of the 4MSI Common Approach as laid down in the Declaration of Intent (January 2011). This common approach aims for convergence of the respective national approval schemes for materials and products in contact with drinking water.

The 4MSI have adopted Part A of this document as a common basis for implementing the concept of accepting metallic compositions. The document is subject to revisions agreed by the 4MSI.

Part B of this document includes a Positive List of metallic compositions accepted in all of the Member States of the 4MSI following the procedure described in Part A.

Part C includes the procedure and methods for accepting metallic products or components.

The structure of this document (Part A, B, C) follows the different implementing acts as described in the new article 11 paragraph 2 (a), (b), (c) of the European Drinking Water Directive.

Further information may be obtained from any of the competent authorities of the 4MSI.

Bundesministerium für Gesundheit (Deutschland)

Ministère du Travail, de l'Emploi et de la Santé (France)

Ministerie van Infrastructuur en Milieu (Nederland)

Department for Environment, Food and Rural Affairs (United Kingdom)

The Danish Transport, Construction and Housing Authority and Ministry of Environment  
(Denmark)

Denmark joined the 4MSI after the development of this common approach, and has therefore not assessed the content of the approach.

# Part B – Positive List of compositions for metallic materials

## 1 Structure of the Positive List (see Part A 2)

The European Positive List contains different categories of metallic compositions.

**A Category** is defined as:

a group of compositions with the same characteristics in respect of their field of application, behaviour in contact with drinking water and restrictions with regard to water composition and/or surface area.

The European Positive List contains the categories' range of compositions. A composition falling within a category has to be tested individually for its acceptance on the list.

Each category has one reference composition.

**A Reference Material** is defined as:

a composition falling within a category for which the characteristics of metal release into drinking water are known and reproducible, the composition is strictly controlled and the elements of interest will be at or near the upper limit of acceptability. Possible effects of some constituents to inhibit the metal release have to be taken into account.

Under each category commercially available metallic compositions accepted for use in PDW will be listed. The compositions may only be used for certain products due to the restrictions with respect to the surface area (Table 3).

*Table 1 Product groups for metallic compositions*

Product Group	Examples of products or parts of products	Assumed contact surface “a”
A	Pipes in buildings installation Uncoated pipelines in water supply systems	100%
B	Fittings, ancillaries in buildings installations  (e.g. pump bodies, valve bodies, water meter bodies used in buildings installations)	10%
C	1. Components of products of product group B (e.g. the spindle of a pump or the moving parts in water meter in building installations). The sum of the surfaces in contact with drinking water of all these components has	1%

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	to be less than 10% of the total wetted surface of the product. 2. Fittings, ancillaries in water mains and water treatment works with permanent flow (e.g. pumps bodies, valves bodies used in water supply systems)	
D	Components of fittings and ancillaries in water mains in water treatment works (C2)	

### 3 European Positive List

## I Copper alloys

### 1 Copper-zinc alloys

#### Category

Constituents (% (m/m)):

Cu	Zn
≥ 57.0%	Remainder

Impurities (% (m/m)):

Al	Fe	Ni	Pb	Sn
≤ 0.1%	≤ 0.5%	≤ 0.2%	≤ 0.2%	≤ 0.5%

Each other impurity < 0.02%

#### 1.2 Reference Material

Constituents (% (m/m)):

Cu	Zn
57.0% - 59.0%	Remainder

Impurities (% (m/m)):

Al	Fe	Ni	Pb	Sn
≤ 0.05%	≤ 0.3%	0.15% - 0.25%	0.15% - 0.25%	≤ 0.3%

Each other impurity < 0.02%

#### Elements for consideration in the migration water:

Cu, Ni, Pb, Zn

#### Most critical test water:

Test water 1 according to EN 15664-2

### 1.3 Accepted Alloys

#### 1.3.1

Notation	Product Group
<b>CW501L-DW* (CuZn10)</b>	C and D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn
89.0% - 91.0%	Remainder

Impurities (% (m/m)):

Fe	Ni*	Pb	Sn
≤ 0.05%	≤ 0.2%	≤ 0.05%	≤ 0.1%

Each other impurity < 0.02%

### 1.3.2

Notation	Product Group
<b>CW502L-DW* (CuZn15)</b>	B - D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn
84.0% - 86.0%	Remainder

Impurities (% (m/m)):

Fe	Ni*	Pb	Sn
≤ 0.05%	≤ 0.2%	≤ 0.05%	≤ 0.1%

*Each other impurity < 0.02%*

#### Basis for acceptance

UBA opinion (21 July 2021)

### 1.3.3

Notation	Product Group
<b>CW503L-DW* (CuZn20)</b>	B - D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn
79.0% - 81.0%	Remainder

Impurities (% (m/m)):

Fe	Ni*	Pb	Sn
≤ 0.05%	≤ 0.2%	≤ 0.05%	≤ 0.1%

*Each other impurity < 0.02%*

#### Basis for acceptance

UBA opinion (21 July 2021)

### 1.3.4

Notation	Product Group
<b>CW506L-DW* (CuZn33)</b>	B - D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn
66.0% - 68.0%	Remainder

Impurities (% (m/m)):

Fe	Ni*	Pb	Sn
≤ 0.05%	≤ 0.2%	≤ 0.05%	≤ 0.1%

Each other impurity < 0.02%

### 1.3.5

Notation	Product Group
<b>CW507L-DW* (CuZn36)</b>	B - D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn
63.5% - 65.5%	Remainder

Impurities (% (m/m)):

Fe	Ni*	Pb	Sn
≤ 0.05%	≤ 0.2%	≤ 0.1%	≤ 0.1%

Each other impurity < 0.02%

### 1.3.6

Notation	Product Group
<b>CW508L-DW* (CuZn37)</b>	B - D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn
62.0% - 64.0%	Remainder

Impurities (% (m/m)):

Al	Fe	Ni*	Pb	Sn
≤ 0.05%	≤ 0.1%	≤ 0.2%	≤ 0.1%	≤ 0.1%

Each other impurity < 0.02%

### Basis for acceptance

UBA opinion (13 March 2016)

### 1.3.7

Notation	Product groups
CW509L-DW* (CuZn40)	B – D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn
59.5% - 61.5%	Remainder

Impurities (% (m/m)):

Al	Fe	Ni*	Pb	Sn
≤ 0.05%	≤ 0.2%	≤ 0.2%	≤ 0.2%	≤ 0.2%

Each other impurity < 0.02%

#### Basis for acceptance

UBA opinion (23 Nov 2011)

UBA opinion (25 March 2013)

### 1.3.8

Notation	Product Group
CW510L-DW* (CuZn42)	B – D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn
57.0% - 59.0%	Remainder

Impurities (% (m/m)):

Al	Fe	Ni*	Pb	Sn
≤ 0.05%	≤ 0.3%	≤ 0.2%	≤ 0.2%	≤ 0.3%

Each other impurity < 0.02%

#### Basis for acceptance

UBA opinion (23 Nov 2011)

UBA opinion (25 March 2013)



## 2 Copper-zinc-aluminum alloys

### 2.1 Category

Constituents (% (m/m)):

Cu	Zn	Al
≥ 57.0%	Remainder	0.1% - 0.3%

Impurities (% (m/m)):

Fe	Pb	Sn
≤ 0.3%	≤ 0.2%	≤ 0.3%

Each other impurity < 0.02%

### 2.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	Al
57.0% - 59.0%	Remainder	0.1% - 0.2%

Impurities (% (m/m)):

Fe	Pb	Sn
≤ 0.3%	0.15% - 0.25%	≤ 0.3%

Each other impurity < 0.02%

**Elements for consideration in the migration water:**

Al, Cu, Pb, Zn

**Most critical test water:**

Test water 1 according to EN 15664-2

### 2.3 Accepted Alloys

#### 2.3.1

Notation	Product groups
CuZn42Al	B - D

Constituents (% (m/m))

Cu	Zn	Al
57.0% - 59.0%	Remainder	0.1% - 0.3%

Impurities (% (m/m))

Fe	Pb	Sn
≤ 0.3%	≤ 0.2%	≤ 0.3%

Each other impurity < 0.02%

**Basis for acceptance**

UBA opinion (16 March 2015)

### 3 Copper-zinc-aluminum-tin alloys

#### 3.1 Category

Constituents (% (m/m)):

Cu	Zn	Al	Sn
≥ 62.0%	Remainder	0.5% - 2.0%	0.3% - 1.0%

Impurities (% (m/m)):

Fe	Mn	Ni	Pb	Si
≤ 0.5%	≤ 0.1%	≤ 0.3%	≤ 0.2%	≤ 0.2%

Each other impurity < 0.02%

#### 3.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	Al	Sn
64.0% - 66.0%	Remainder	1.40% - 1.50%	0.66% - 0.70%

Impurities (% (m/m)):

Fe	Mn	Ni	Pb	Si
≤ 0.10%	≤ 0.10%	0.06% - 0.10%	0.15% - 0.25%	≤ 0.2%

Each other impurity < 0.02%

**Elements for consideration in the migration water:**

Al, Cu, Ni, Pb, Zn

**Most critical test water:**

Test water 1 according to EN 15664-2

#### 3.3 Accepted Alloys

##### 3.3.1

Notation	Product groups
<b>CuZn35Al1.5Sn</b>	B - D

Constituents (% (m/m))

Cu	Zn	Al	Sn
64.0% - 66.0%	Remainder	1.40% - 1.60%	0.50% - 0.70%

Impurities (% (m/m))

Fe	Mn	Ni	Pb	Si
≤ 0.10%	≤ 0.10%	≤ 0.10%	≤ 0.2%	≤ 0.2%

Each other impurity < 0.02%

**Basis for acceptance**

UBA opinion (24 Feb 2017)

## 4 Copper-zinc-aluminum-silicon-iron alloys

### 4.1 Category

Constituents (% (m/m)):

Cu	Zn	Al	Si	Fe
≥ 62.0%	Rem.	0.5% - 0.9%	0.5% - 0.9%	0.04% - 0.2%

Impurities (% (m/m)):

Ni	Pb	Sn
≤ 0.1%	≤ 0.2%	≤ 0.1%

Each other impurity < 0.02%

### 4.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	Al	Si	Fe
62.5% - 64.5%	Rem.	0.5% - 0.68%	0.5% - 0.68%	0.12% - 0.15%

Impurities (% (m/m)):

Ni	Pb	Sn
0.05% - 0.09%	0.09% - 0.15%	≤ 0.1%

Each other impurity < 0.02 %

**Elements for consideration in the migration water:**

Cu, Zn, Al, Fe, Ni, Pb

**Most critical test water:**

Test water 1 according to EN 15564-2

### 4.3 Accepted Alloys

#### 4.3.1

Notation	Product groups
<b>CuZn35AlSiFe</b>	B - D

**Constituents (% (m/m))**

Cu	Zn	Al	Si	Fe
62.5% - 64.5%	Rem.	0.5% - 0.85%	0.5% - 0.8%	0.04% - 0.1%

**Impurities (% (m/m))**

Ni	Pb	Sn
≤ 0.09%	≤ 0.15%	≤ 0.1%

Each other impurity < 0.02 %

**Basis for acceptance**

UBA opinion (02 April 2019)

## 5 Copper-zinc-arsenic alloys

### 5.1 Category

Constituents (% (m/m)):

Cu	Zn	As
≥ 61.0%	Remainder	0.02% - 0.15%

Impurities (% (m/m)):

Al	Fe	Mn	Ni	Pb	Sn
≤ 0.1%	≤ 0.5%	≤ 0.1%	≤ 0.3%	≤ 0.2%	≤ 0.5%

Each other impurity < 0.02%

### 5.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	As
61.5% - 63.5%	Remainder	0.10% - 0.15 %

Impurities (% (m/m)):

Al	Fe	Mn	Ni	Pb	Sn
≤ 0.1%	≤ 0.1%	≤ 0.1%	0.21% - 0.35%	0.15% - 0.25%	≤ 0.1%

Each other impurity < 0.02%

### Elements for consideration in the migration water:

As, Cu, Ni, Pb, Zn

### Most critical test water:

Test water 1 according to EN 15664-2

### 5.3 Accepted Alloys

#### 5.3.1

Notation	Product groups
<b>CW511L (CuZn38As)</b>	B - D

Constituents (% (m/m)):

Cu	Zn	As
61.5% - 63.5%	Remainder	0.02% - 0.15%

Impurities (% (m/m)):

Al	Fe	Mn	Ni	Pb	Sn
≤ 0.05%	≤ 0.1%	≤ 0.1%	≤ 0.3%	≤ 0.2%	≤ 0.1%

Each other impurity < 0.02%

### Basis for acceptance

UBA opinion (28 March 2013)

### 5.3.2

Notation	Product groups
<b>CW707R (CuZn30As)</b>	B - D

Constituents (% (m/m)):

Cu	Zn	As
69.0% - 71.0%	Remainder	0.02% - 0.06%

Impurities (% (m/m)):

Fe	Mn	Pb	Sn
≤ 0.05%	≤ 0.1%	≤ 0.07%	≤ 0.05%

*Each other impurity < 0.02%*

#### **Basis for acceptance**

UBA opinion (02 April 2019)

## 6 Copper-zinc-arsenic-aluminium alloys

### 6.1 Category

Constituents (% (m/m)):

Cu	Zn	As	Al
≥ 61.0%	Remainder	0.02% - 0.15%	0.2% - 1.0%

Impurities (% (m/m)):

Fe	Mn	Pb	Sn
≤ 0.5%	≤ 0.1%	≤ 0.2%	≤ 0.3%

Each other impurity < 0.02%

### 6.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	As	Al
63.0% - 64.5%	Remainder	0.11% - 0.14%	0.2% - 0.4%

Impurities (% (m/m)):

Fe	Mn	Pb	Sn
≤ 0.3%	≤ 0.1%	0.15% - 0.25%	≤ 0.3%

Each other impurity < 0.02%

### Elements for consideration in the migration water:

Al, As, Cu, Pb, Zn

### Most critical test water:

Test water 1 according to EN 15664-2

### 6.3 Accepted Alloys

#### 6.3.1

Notation	Product groups
CuZn35Al-C	B - D

Constituents (% (m/m)):

Cu	Zn	As	Al
63.0% - 64.5%	Remainder	0.04% - 0.14%	0.2% - 0.7%

Impurities (% (m/m)):

Fe	Mn	Pb	Sn
≤ 0.3%	≤ 0.1%	≤ 0.2%	≤ 0.3%

Each other impurity < 0.02%

### Basis for acceptance

UBA opinion (29 July 2014)

## 7 Copper-zinc-arsenic-antimony-aluminum alloys

### 7.1 Category

Constituents (% (m/m)):

Cu	Zn	As	Sb	Al
≥ 60.0%	Remainder	0.02% - 0.10%	0.02% - 0.10%	0.02% - 1.0%

Impurities (% (m/m)):

Fe	Mn	Ni	Pb	Sn
≤ 0.5%	≤ 0.1%	≤ 0.2%	≤ 0.2%	≤ 0.5%

Each other impurity < 0.02%

### 7.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	As	Sb	Al
62.0% - 65.0%	Remainder	0.03% - 0.04%	0.04% - 0.05%	0.45% - 0.58%

Impurities (% (m/m)):

Fe	Mn	Ni	Pb	Sn
≤ 0.2%	≤ 0.1%	0.12% - 0.20%	0.15% - 0.25%	≤ 0.3%

Each other impurity < 0.02%

**Elements for consideration in the migration water:**

Al, As, Cu, Ni, Pb, Sb, Zn

**Most critical test water:**

Test water 1 according to EN 15664-2

### 7.3 Accepted Alloys

#### 7.3.1

Notation	Product groups
<b>CC771S (CuZn38AsSb)</b>	B - D

Constituents (% (m/m))

Cu	Zn	As	Sb	Al
62.0% - 65.0%	Remainder	0.02% - 0.04%	0.02% - 0.05%	0.45% - 0.7%

Impurities (% (m/m))

Fe	Mn	Ni	Pb	Sn
≤ 0.2%	≤ 0.1%	≤ 0.20%	≤ 0.2%	≤ 0.3%

Each other impurity < 0.02%

**Basis for acceptance**

UBA opinion (10 July 2015)

## 8 Copper-zinc-lead alloys

### 8.1 Category

Constituents (% (m/m)):

Cu	Zn	Pb
≥ 57.0%	Remainder	0.2% - 3.5%

Impurities (% (m/m)):

Al	Fe	Ni	Si	Sn
≤ 0.3%	≤ 0.5%	≤ 0.2%	≤ 0.2%	≤ 0.5%

Each other impurity < 0.02%

### 8.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	Pb
57.0% - 59.0%	Remainder	1.9% - 2.2%

Impurities (% (m/m)):

Al	Fe	Ni	Si	Sn
≤ 0.2%	≤ 0.3%	0.05% - 0.15%	≤ 0.03%	≤ 0.3%

Each other impurity < 0.02%

### Elements for consideration in the migration water:

Cu, Ni, Pb, Zn

### Most critical test water:

Test water 1 according to EN 15664-2

### 8.3 Accepted Alloys

#### 8.3.1

Notation	Product groups
CW617N* (CuZn40Pb2) CW612N* (CuZn39Pb2)	B - D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn	Pb*
57.0% - 60.0%	Remainder	1.6% - 2.2%

Impurities (% (m/m)):

Al	Fe	Ni*	Si	Sn
≤ 0.05%	≤ 0.3%	≤ 0.1%	≤ 0.03%	≤ 0.3%

Each other impurity < 0.02%

### Basis for acceptance

German Co-normative Research Report RG\_CPDW\_01\_074

Dossier John Nuttall (March 2006)



### 8.3.2

Notation	Product groups
<b>CW614N* (CuZn39Pb3)</b> <b>CW603N* (CuZn36Pb3)</b>	C and D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn	Pb
57.0% - 62.0%	Remainder	2.5% - 3.5%

Impurities (% (m/m)):

Al	Fe	Ni*	Si	Sn
≤ 0.05%	≤ 0.3%	≤ 0.2%	≤ 0.03%	≤ 0.3%

*Each other impurity < 0.02%*

#### Basis for acceptance

German Co-normative Research Report RG\_CPDW\_01\_074

Dossier John Nuttall (March 2006)

## 9 Copper-zinc-lead-aluminium alloys

### 9.1 Category

Constituents (% (m/m)):

Cu	Zn	Pb	Al
≥ 57.0%	Remainder	0.2% - 1.5%	0.2% - 1.0%

Impurities (% (m/m)):

Fe	Mn	Ni	Si	Sn
≤ 0.3%	≤ 0.05%	≤ 0.2%	≤ 0.05%	≤ 0.5%

Each other impurity < 0.02%

### 9.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	Pb	Al
58.0% - 63.0%	Remainder	1.2% - 1.4%	0.3% - 0.6%

Impurities (% (m/m)):

Fe	Mn	Ni	Si	Sn
≤ 0.3%	≤ 0.05%	0.15% - 0.25%	≤ 0.05%	≤ 0.5%

Each other impurity < 0.02%

### Elements for consideration in the migration water:

Al, Cu, Ni, Pb, Zn

### Most critical test waters:

Test water 1 and 2 according to EN 15664-2

### 9.3 Accepted Alloys

#### 9.3.1

Notation	Product groups
CC757S*(CuZn39Pb1Al-C)	B - D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn	Pb*	Al
58.0% - 63.0%	Remainder	0.2% - 1.4%	0.3% - 0.9%

Impurities (% (m/m)):

Fe	Mn	Ni	Si	Sn
≤ 0.3%	≤ 0.05%	≤ 0.2%	≤ 0.05%	≤ 0.5%

Each other impurity < 0.02%

### Basis for acceptance

UBA opinion (29 Aug 2014)

## 10 Copper-zinc-lead-arsenic-aluminium alloys

### 10.1 Category

Constituents (% (m/m)):

Cu	Zn	Pb	As	Al
≥ 61.0%	Remainder	0.2% - 2.2%	0.02% - 0.15%	0.02% - 1.0%

Impurities (% (m/m)):

Fe	Mn	Ni	Sn
≤ 0.5%	≤ 0.1%	≤ 0.2%	≤ 0.5%

Each other impurity < 0.02%

### 10.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	Pb	As	Al
61.0% - 63.0%	Remainder	1.4% - 1.6%	0.09% - 0.13%	0.5% - 0.7%

Impurities (% (m/m)):

Fe	Mn	Ni	Sn
≤ 0.3%	≤ 0.1%	0.15% - 0.25%	≤ 0.3%

Each other impurity < 0.02%

### Elements for consideration in the migration water:

Al, As, Cu, Ni, Pb, Zn

### Most critical test water:

Test water 1 according to EN 15664-2

### 10.3 Accepted Alloys

#### 10.3.1

Notation	Product groups
<b>CC770S (CuZn36Pb-C)</b>	B - D

Constituents (% (m/m)):

Cu	Zn	Pb	As	Al
62.0% - 64.0%	Remainder	0.2% - 1.6%	0.04% - 0.14%	0.5% - 0.7%

Impurities (% (m/m)):

Fe	Mn	Ni	Sn
≤ 0.3%	≤ 0.1%	≤ 0.2%	≤ 0.3%

Each other impurity < 0.02%

### Basis for acceptance

UBA opinion (29 Jan 2014)

### 10.3.2

Notation	Product groups
<b>CW626N (CuZn33Pb1.5AlAs)</b>	B - D

Constituents (% (m/m)):

Cu	Zn	Pb	As	Al
64.0% - 66.0%	Remainder	1.2% - 1.7%	0.02% - 0.15%	0.8% - 1.0%

Impurities (% (m/m)):

Fe	Mn	Ni	Sn
≤ 0.3%	≤ 0.1%	≤ 0.2%	≤ 0.3%

*Each other impurity < 0.02%*

#### Basis for acceptance

UBA opinion (02 April 2013)

### 10.3.3

Notation	Product groups
<b>CW625N (CuZn35Pb1.5AlAs)</b>	B - D

Constituents (% (m/m)):

Cu	Zn	Pb	As	Al
62.0% - 64.0%	Remainder	1.2% - 1.6%	0.02% - 0.15%	0.5% - 0.7%

Impurities (% (m/m)):

Fe	Mn	Ni	Sn
≤ 0.3%	≤ 0.1%	≤ 0.2%	≤ 0.3%

*Each other impurity < 0.02%*

#### Basis for acceptance

UBA opinion (29 Jan 2014)

## 11 Copper-zinc-lead-arsenic-antimony-aluminum alloys

### 11.1 Category

Constituents (% (m/m)):

Cu	Zn	Pb	As	Sb	Al
≥ 60.0%	Remainder	0.2% - 1.1 %	0.02% - 0.10%	0.02% - 0.10%	0.02% - 1.0%

Impurities (% (m/m)):

Fe	Mn	Ni	Sn
≤ 0.5%	≤ 0.1%	≤ 0.2%	≤ 0.5%

Each other impurity < 0.02%

### 11.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	Pb	As	Sb	Al
62.0% - 65.0%	Remainder	0.9% - 1.1%	0.03% - 0.04%	0.05% - 0.06%	0.45% - 0.58%

Impurities (% (m/m)):

Fe	Mn	Ni	Sn
≤ 0.2%	≤ 0.1%	0.15% - 0.25%	≤ 0.3%

Each other impurity < 0.02%

**Elements for consideration in the migration water:**

Al, As, Cu, Ni, Pb, Sb, Zn

**Most critical test water:**

Test water 1 according to EN 15664-2

### 11.3 Accepted Alloys

#### 11.3.1

Notation	Product groups
<b>CC772S (CuZn36Pb1.5AsSbAl)</b>	B - D

Constituents (% (m/m))

Cu	Zn	Pb	As	Sb	Al
62.0% - 65.0%	Remainder	0.2% - 1.1%	0.02% - 0.04%	0.03% - 0.06%	0.45% - 0.7%

Impurities (% (m/m))

Fe	Mn	Ni	Sn
≤ 0.2%	≤ 0.1%	≤ 0.2%	≤ 0.3%

Each other impurity < 0.02%

**Basis for acceptance**

UBA opinion (29 Aug 2014)

## 12 Copper-zinc-lead-arsenic-aluminium-silicon alloys

### 12.1 Category

Constituents (% (m/m)):

Cu	Zn	Pb	As	Al	Si
≥ 61.0%	Remainder	0.2% - 1.0%	0.02% - 0.10%	0.02% - 1.0%	0.02% - 0.5%

Impurities (% (m/m)):

Fe	Mn	Ni	Sn
≤ 0.5%	≤ 0.1%	≤ 0.2%	≤ 0.5%

Each other impurity < 0.02%

### 12.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	Pb	As	Al	Si
64.0% - 67.0%	Remainder	0.60% - 0.65%	0.07% - 0.08%	0.1% - 0.25%	0.1% - 0.2%

Impurities (% (m/m)):

Fe	Mn	Ni	Sn
≤ 0.3%	≤ 0.1%	0.15% - 0.25%	≤ 0.3%

Each other impurity < 0.02%

### Elements for consideration in the migration water:

Al, As, Cu, Ni, Pb, Zn

### Most critical test water:

Test water 1 and 2 according to EN 15664-2

### 12.3 Accepted Alloys

#### 12.3.1

Notation	Product groups
CW725R*(CuZn33Pb1AlSiAs)	B - D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Zn	Pb*	As	Al	Si
64.0% - 67.0%	Remainder	0.4% - 0.6%	0.04% - 0.08%	0.1% - 0.4%	0.1% - 0.3%

Impurities (% (m/m)):

Fe	Mn	Ni	Sn
≤ 0.3%	≤ 0.1%	≤ 0.2%	≤ 0.3%

Each other impurity < 0.02%

### Basis for acceptance

UBA opinion (27 July 2014)

## 13 Copper-tin-zinc-lead-nickel alloys

### 13.1 Category

Constituents (% (m/m)):

Cu	Sn	Zn	Pb	Ni
Remainder	4.0% - 13.0%	4.0% - 6.5%	0.2% - 3.0%	0.1% - 0.6%

Impurities (% (m/m)):

Fe	P	S	Sb
≤ 0.30%	≤ 0.04%	≤ 0.04%	≤ 0.10%

Each other impurity < 0.02%

### 13.2 Reference Material

Constituents (% (m/m)):

Cu	Sn	Zn	Pb	Ni
Remainder	4.0% - 4.2%	5.7% - 6.0%	2.8% - 3.0%	0.5% - 0.6%

Impurities (% (m/m)):

Fe	P	S	Sb
≤ 0.30%	≤ 0.04%	≤ 0.04%	0.09% - 0.15%

Each other impurity < 0.02%

### Elements for consideration in the migration water:

Cu, Ni, Pb, Sb, Zn

### Most critical test water:

Test water 1 according to EN 15664-2

### 13.3 Accepted Alloys

#### 13.3.1

Notation	Product groups
CC499K* (CuSn5Zn5Pb2-C)	B - D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Sn	Zn	Pb*	Ni*
84.0% - 88.0%	4.0% - 6.0%	4.0% - 6.0%	0.2% - 3.0%	0.1% - 0.60%

Impurities (% (m/m)):

Fe	P	S	Sb
≤ 0.30%	≤ 0.04%	≤ 0.04%	≤ 0.10%

Each other impurity < 0.02%

### Basis for acceptance

German Co-normative Research Report RG\_CPDW\_01\_074  
Dossier John Nuttall (March 2006)

## 14 Copper-tin-zinc-phosphorus-sulphur alloys

### 14.1 Category

Constituents (% (m/m)):

Cu	Sn	Zn	P	S
Remainder	3.0% - 9.0%	1.0% - 5.0%	0.01% - 1.0%	0.2% - 0.7%

Impurities (% (m/m)):

Fe	Ni	Pb	Sb
≤ 0.3%	≤ 0.3%	≤ 0.2%	≤ 0.1%

Each other impurity < 0.02%

### 14.2 Reference Material

Constituents (% (m/m)):

Cu	Sn	Zn	P	S
Remainder	4.6% - 5.0%	1.0% - 3.0%	0.01% - 0.06%	0.52% - 0.65%

Impurities (% (m/m)):

Fe	Ni	Pb	Sb
≤ 0.3%	0.21% - 0.35%	0.15% - 0.25%	0.09% - 0.15%

Each other impurity < 0.02%

**Elements for consideration in the migration water:**

Cu, Ni, Pb, Sb, Zn

**Most critical test water:**

Test water 1 according to EN 15664-2

### 14.3 Accepted Alloys

#### 14.3.1

Notation	Product groups
<b>CuSn4Zn2PS</b>	B - D

Constituents (% (m/m)):

Cu	Sn	Zn	P	S
90.0% - 96.0%	3.0% - 5.0%	1.0% - 3.0%	0.01% - 0.1%	0.2% - 0.6%

Impurities (% (m/m)):

Fe	Ni	Pb	Sb
≤ 0.3%	≤ 0.3%	≤ 0.2%	≤ 0.1%

Each other impurity < 0.02%

**Basis for acceptance**

UBA opinion (13 Feb 2017)



## 15 Copper-zinc-silicon-phosphorus alloys

### 15.1 Category

Constituents (% (m/m)):

Cu	Zn	Si	P
60.0% - 80.0%	Remainder	0.5% - 5.5%	0.01% - 0.3%

Impurities (% (m/m)):

Al	Fe	Mn	Ni	Pb	Sn
≤ 0.1%	≤ 0.5%	≤ 0.05%	≤ 0.2%	≤ 0.1%	≤ 0.5%

Each other impurity < 0.02%

### 15.2 Reference Material

Constituents (% (m/m)):

Cu	Zn	Si	P
75.0% - 77.0%	Remainder	2.7% - 3.0%	0.02% - 0.06%

Impurities (% (m/m)):

Al	Fe	Mn	Ni	Pb	Sn
≤ 0.05%	≤ 0.3%	≤ 0.05%	0.15% - 0.25%	0.09% - 0.15%	≤ 0.3%

Each other impurity < 0.02%

**Elements for consideration in the migration water:**

Cu, Ni, Pb, Zn

**Most critical test water:**

Test water 1 according to EN 15664-2

### 15.3 Accepted Alloys

#### 15.3.1

Notation	Product groups
<b>CW724R (CuZn21Si3P)</b>	B - D

Constituents (% (m/m)):

Cu	Zn	Si	P
75.0% - 77.0%	Remainder	2.7% - 3.5%	0.02% - 0.10%

Impurities (% (m/m)):

Al	Fe	Mn	Ni	Pb	Sn
≤ 0.05%	≤ 0.3%	≤ 0.05%	≤ 0.2%	≤ 0.1%	≤ 0.3%

Each other impurity < 0.02%

**Basis for acceptance**

UBA opinion (24 Feb 2012)

### 15.3.2

Notation	Product groups
<b>CC768S (CuZn21Si3P)</b>	B - D

Constituents (% (m/m)):

Cu	Zn	Si	P
75.0% - 77.0%	Remainder	2.7% - 3.5%	0.02% - 0.10%

Impurities (% (m/m)):

Al	Fe	Mn	Ni	Pb	Sn
≤ 0.05%	≤ 0.3%	≤ 0.05%	≤ 0.2%	≤ 0.1%	≤ 0.3%

*Each other impurity < 0.02%*

*The content of boron and zirconium has to be less than 0.02%.*

#### **Basis for acceptance**

UBA opinion (09 Jan 2014)

## 16 Copper-silicon-zinc-manganese-phosphorus alloys

### 16.1 Category

Constituents (% (m/m)):

Cu	Si	Zn	Mn	P
≥ 80.0%	0.5% - 5.5%	Remainder	0.01% - 0.2%	0.01% - 0.3%

Impurities (% (m/m)):

Al	Fe	Ni	Pb	Sn
≤ 0.3%	≤ 0.3%	≤ 0.1%	≤ 0.1%	≤ 0.5%

Each other impurity < 0.02%

### 16.2 Reference Material

Constituents (% (m/m)):

Cu	Si	Zn	Mn	P
Remainder	2.5% - 3.5%	8.0% - 10.0%	0.03% - 0.09%	0.05% - 0.10%

Impurities (% (m/m)):

Al	Fe	Ni	Pb	Sn
≤ 0.3%	≤ 0.3%	0.06% - 0.10%	0.06% - 0.10%	≤ 0.3%

Each other impurity < 0.02%

### Elements for consideration in the migration water:

Cu, Mn, Ni, Pb, Zn

### Most critical test water:

Test water 1 according to EN 15664-2

### 16.3 Accepted Alloys

#### 16.3.1

Notation	Product groups
CC245E (CuSi4Zn4MnP-C)	B - D

Constituents (% (m/m)):

Cu	Si	Zn	Mn	P
Remainder	2.5% - 4.5%	1.0% - 7.0%	0.03% - 0.09%	0.05% - 0.15%

Impurities (% (m/m)):

Al	Fe	Ni	Pb	Sn
≤ 0.3%	≤ 0.3%	≤ 0.10%	≤ 0.10%	≤ 0.3%

Each other impurity < 0.02%

### 16.3.2

Notation	Product groups
<b>CC246E (CuSi4Zn9MnP-C)</b>	B - D

Constituents (% (m/m)):

Cu	Si	Zn	Mn	P
Remainder	2.5% - 4.5%	7.0% - 11.0%	0.03% - 0.09%	0.05% - 0.15%

Impurities (% (m/m)):

Al	Fe	Ni	Pb	Sn
≤ 0.3%	≤ 0.3%	≤ 0.10%	≤ 0.10%	≤ 0.3%

*Each other impurity < 0.02%*

### 16.3.3

Notation	Product groups
<b>CuSi4Zn4MnP</b>	B - D

Constituents (% (m/m)):

Cu	Si	Zn	Mn	P
Remainder	2.5% - 4.5%	1.0% - 7.0%	0.01% - 0.09%	0.05% - 0.15%

Impurities (% (m/m)):

Al	Fe	Ni	Pb	Sn
≤ 0.3%	≤ 0.3%	≤ 0.10%	≤ 0.10%	≤ 0.3%

*Each other impurity < 0.02%*

### 16.3.4

Notation	Product groups
<b>CuSi4Zn9MnP</b>	B - D

Constituents (% (m/m)):

Cu	Si	Zn	Mn	P
Remainder	2.5% - 4.5%	7.0% - 11.0%	0.01% - 0.09%	0.05% - 0.15%

Impurities (% (m/m)):

Al	Fe	Ni	Pb	Sn
≤ 0.3%	≤ 0.3%	≤ 0.10%	≤ 0.10%	≤ 0.3%

*Each other impurity < 0.02%*

### Basis for acceptance

UBA opinion (08 Jan 2016)

## 17 Copper-silicon-zinc-iron-manganese-phosphorus alloys

### 17.1 Category

Constituents (% (m/m)):

Cu	Si	Zn	Fe	Mn	P
≥ 80.0%	2.0% - 5.0%	Remainder	0.3% - 1.0%	0.02% - 0.2%	0.01% - 0.03%

Impurities (% (m/m)):

Al	Ni	Pb	Sn
≤ 0.2%	≤ 0.05%	≤ 0.05%	≤ 0.2%

Each other impurity < 0.02%

### 17.2 Reference Material

Constituents (% (m/m)):

Cu	Si	Zn	Fe	Mn	P
80.0% - 88.0%	2.4% - 3.5%	Remainder	0.46% - 0.55%	0.18% - 0.25%	0.01% - 0.02%

Impurities (% (m/m)):

Al	Ni	Pb	Sn
≤ 0.2%	0.03% - 0.05%	0.03% - 0.05%	≤ 0.2%

Each other impurity < 0.02%

### Elements for consideration in the migration water:

Cu, Fe, Mn, Ni, Pb, Zn

### Most critical test water:

Test water 1 according to EN 15664-2

## 16.3 Accepted Alloys

### 16.3.1

Notation	Product groups
CuSi3Zn12FeMnP	B - D

Constituents (% (m/m)):

Cu	Si	Zn	Fe	Mn	P
80.0% - 88.0%	2.4% - 4.1%	Remainder	0.3% - 0.5%	0.1% - 0.2%	0.01% - 0.03%

Impurities (% (m/m)):

Al	Ni	Pb	Sn
≤ 0.2%	≤ 0.05%	≤ 0.05%	≤ 0.2%

Each other impurity < 0.02%

### Basis for acceptance

UBA opinion (12 Apr 2022)

## 18 Copper-tin-phosphorus alloys

### 18.1 Category

Constituents (% (m/m)):

Cu	Sn	P
Remainder	1.5% - 9.0%	0.02% - 0.4%

Impurities (% (m/m)):

Fe	Ni	Zn
≤ 0.1%	≤ 0.2%	≤ 0.2%

Each other impurity < 0.02%

### 18.2 Reference Material

CW453K (CuSn 8) was accepted only for product group C on basis of a scientific dossier. For the acceptance of this composition or another composition belonging to this category for product group A or B a complete test according to EN 15664-1 with all three test waters according to EN 15664-2 is required. A reference material will be defined when a composition is accepted for product group A or B.

### 18.3 Accepted Alloys

Notation	Product group
CW453K (CuSn8)	C and D

Constituents (% (m/m))

Cu	Sn	P
Remainder	7.5% - 8.5%	0.02% - 0.4%

Impurities (% (m/m))

Fe	Ni	Zn
≤ 0.1%	≤ 0.2%	≤ 0.2%

Each other impurity < 0.02%

#### Basis for acceptance

UBA opinion (31 Aug 2017)

UBA opinion (19 March 2019)

## 19 Copper-tin-lead-phosphorus alloys

### 19.1 Category

Constituents (% (m/m)):

Cu	Sn	Pb	P
Remainder	9.0% - 13.0%	0.2% - 1.0%	0.01% - 1.0%

Impurities (% (m/m)):

Fe	Mn	Ni	S	Sb	Zn
≤ 0.2%	≤ 0.2%	≤ 0.2%	≤ 0.05%	≤ 0.1%	≤ 0.5%

Each other impurity < 0.02%

### 19.2 Reference Material

Constituents (% (m/m)):

Cu	Sn	Pb	P
Remainder	10.6% - 11.0%	0.84% - 1.0%	0.01% - 0.10%

Impurities (% (m/m)):

Fe	Mn	Ni	S	Sb	Zn
≤ 0.2%	≤ 0.1%	0.15% - 0.25%	≤ 0.05%	0.09% - 0.15%	≤ 0.5%

Each other impurity < 0.02%

### Elements for consideration in the migration water:

Cu, Ni, Pb, Sb, Zn

### Most critical test water:

Test water 1 according to EN 15664-2

### 19.3 Accepted Alloys

#### 19.3.1

Notation	Product groups
CuSn10-C*	B - D

\* Contents of certain elements are further restricted (see below)

Constituents (% (m/m)):

Cu	Sn	Pb	P
88.0% - 90.0%	9.0% - 11.0%	0.2% - 1.0%	0.01% - 0.2%

Impurities (% (m/m)):

Fe	Mn	Ni*	S	Sb*	Zn
≤ 0.2%	≤ 0.10%	≤ 0.2%	≤ 0.05%	≤ 0.1%	≤ 0.5%

Each other impurity < 0.02%

### Basis for acceptance

UBA opinion (13 Feb 2017)

## 20 Copper alloys for product group D

In addition to the compositions listed for the Product Groups A, B and C for components of the Product Group D further copper alloys can be used.

The copper alloys have to comply with:

- Cu, Zn, Si, Sn, P: no restrictions
- Al, Fe, Mn: max. 3.0% (m/m)
- Pb: max. 3.5% (m/m)
- Ni: max. 3.0% (m/m)
- As, Sb: max: 0.25% (m/m)

All other: max. 0.1% (m/m)



## II Coppers

### 1 Copper

#### 1.1 Category

Constituents (% (m/m)):

Cu	P
≥ 99.9%	≤ 0.04%

Impurities (% (m/m)):

Others total
≤ 0.1%

Each impurity < 0.02%

#### 1.2 Reference Material

CW024A (CU-DHP)

Elements for consideration in the migration water:

None: No need for comparative testing

#### 1.3 Accepted Alloys

##### 1.3.1

Notation	Product groups
CW024A (Cu-DHP)	A - D

Constituents (% (m/m)):

Cu	P
≥ 99.9%	0.015% - 0.04%

##### 1.3.2

Notation	Product group
Cu-ETP (CW004A)	C and D

Constituents (% (m/m)):

Cu	O*
≥ 99.90%	≤ 0.040%

\* Oxygen has a technological function in the composition, it is not possible to specify a minimum content

**1.3.3**

Notation	Product groups
<b>Cu-OF (CW008A)</b>	B - D

Constituents (% (m/m)):

Cu
≥ 99.95%

**1.3.4**

Notation	Product groups
<b>Cu-PHC (CW020A)</b>	B - D

Constituents (% (m/m)):

Cu	P
≥ 99.95%	0.001% - 0.006%

**1.3.5**

Notation	Product groups
<b>Cu-HCP (CW021A)</b>	B - D

Constituents (% (m/m)):

Cu	P
≥ 99.95%	0.002% - 0.007%

**1.3.6**

Notation	Product groups
<b>Cu-DLP (CW023A)</b>	B - D

Constituents (% (m/m)):

Cu	P
≥ 99.90%	0.005% - 0.013%

**Basis for acceptance**

UBA opinion (15 May 2017)

**Restrictions for the use of metallic materials with respect to water composition (health based)**

The formation of the copper compounds on the surface of copper pipes and consequently the dissolution is strongly influenced by minor components of the water composition. In some water compositions, the rate of leaching of copper may be unacceptably high. Member States may need to offer guidance to the water industry and to suppliers and installers of copper pipe on restrictions that may need to be introduced on use of copper pipe in water compositions where excessive leaching of copper might occur.

Further research into the compatibility of copper with certain compositions of water needs to be carried out using harmonised procedures for investigation and evaluation.

**Basis for acceptance**

Research results and practical experience in several Member States are needed to characterise the conditions for safe use.

**Note**

The contamination of drinking water by copper pipes depends on several characteristics of water composition. There is no consensus view on their combined action and interaction at this time. In particular, there is inadequate information on the range of compositions of drinking water where non-compliance with the DWD is likely to occur.

## 2 Tinned copper pipes and tinned copper fittings

For tinned copper tubes and tinned copper fittings as base composition copper according to 1 is used. On this substrate composition a tin layer is deposited by different processes. By diffusion of copper ions into the tin layer the formation of an increasing intermetallic phase consisting of tin and copper ( $\eta$ -phase =  $\text{Cu}_6\text{Sn}_5$ ) is formed.

### 2.1 Category

Constituents of the tin layer (% (m/m)):

Sn + Cu
≥ 99.90%

Impurities of the tin layer (% (m/m)):

As	Bi	Cd	Cr	Ni	Pb	Sb
≤ 0.01%	≤ 0.01%	≤ 0.01%	≤ 0.01%	≤ 0.01%	≤ 0.01%	≤ 0.01%

Each other impurity < 0.02%

### 2.2 Reference Material

CW024A (CU-DHP)

### 2.3 Accepted Alloys

Notation	Product groups
<b>CW024A (Cu-DHP) with a tin layer thickness of 1 <math>\mu\text{m}</math></b>	A - D

Constituents of the tin layer (% (m/m)):

Sn	Cu
> 90%	< 10%

Impurities of the tin layer (% (m/m)):

As	Bi	Cd	Cr	Ni	Pb	Sb
≤ 0.01%	≤ 0.01%	≤ 0.01%	≤ 0.01%	≤ 0.01%	≤ 0.01%	≤ 0.01%

Each other impurity < 0.02%

### Basis for acceptance

1. Leaching tests:
  - a. Rig tests in representative German drinking waters, published: A. Baukloh, S. Priggemeyer, U. Reiter, B. Winkler, Chemically inner tinned Copper Pipes, Less Copper in Corrosive Drinking Waters, Metall 10-11 (1998) 592 - 600.
  - b. Rig tests according to DIN 50931 (rig test): Technical report DVGW/TZW, 2000
2. Already existing approvals without restrictions in drinking waters
  - a. Netherlands: according to BRL-K19005,
  - b. Germany: according to DIN 50930, T6 and DVGW GW 392
  - c. Denmark, ETA

## III Steel / Iron

### 1 Galvanised steel

#### 1.1 Category

Constituents of the zinc coating (% (m/m)):

Zn

Impurities of the zinc coating (% (m/m)):

As	Bi	Cd	Cr	Pb	Sb
≤ 0.02%	≤ 0.01%	≤ 0.01%	≤ 0.02%	≤ 0.05%	≤ 0.01%

Each other impurity < 0.02%

#### 1.2 Reference Material

Not defined

#### 1.3 Accepted Alloys

Notation	Product groups
Galvanised steel	A - D

Constituents of the zinc coating (% (m/m)):

Zn

Impurities of the zinc coating (% (m/m)):

As	Bi	Cd	Cr	Pb	Sb
≤ 0.02%	≤ 0.01%	≤ 0.01%	≤ 0.02%	≤ 0.05%	≤ 0.01%

Each other impurity < 0.02%

### Guidance on restrictions for the use of metallic compositions with respect to water composition

The following formula is proposed as a means identifying water compositions where corrosion rates for galvanised steel is acceptable.

- AND pH ≥ 7.5 or free CO<sub>2</sub> ≤ 0.25 mmol/L
- AND Alkalinity ≥ 1.5 mmol/L
- AND S<sub>1</sub> < 2 (*definition of S<sub>1</sub> below*)
- AND Calcium ≥ 0.5 mmol/L
- AND Conductivity ≤ 600 μS/cm at 25 °C
- AND S<sub>2</sub> < 1 or S<sub>2</sub> > 3 (*definition of S<sub>2</sub> below*)

$$S_1 = \frac{c(\text{Cl}^-) + c(\text{NO}_3^-) + 2 c(\text{SO}_4^{2-})}{c(\text{HCO}_3^-)} \text{ concentrations in mmol/l}$$

$$S_2 = \frac{c(\text{Cl}^-) + 2 c(\text{SO}_4^{2-})}{c(\text{NO}_3^-)} \text{ concentrations in mmol/l}$$

**Basis for acceptance**

There are regulations with respect to water composition in France (DTU 60.1 / NF P 40-201) and in Germany (DIN 50930-3). These limits are based on practical experience but are expressed in different ways. The proposal covers mainly the same water compositions as both regulations. The proposal takes into account available results from research in Germany and co-normative research.

The proposal incorporates also the recommendations given EN 12502-3 with regard to the risk of localised corrosion. This localised corrosion frequently leads to deterioration in water quality as a result of corrosion products of iron.

The proposal is based on results that have been obtained with galvanised steel pipes with lead concentrations between 1.0% and 0.6% in the zinc layer, assuming a similar behaviour of pipes with lower lead concentrations.

## 2 Carbon steel

### **Carbon Steel for pipes and tanks**

Carbon steel without permanent protective layers is not suitable for use in contact with drinking water.

### **Carbon Steel for ancillaries**

Unprotected carbon steel can be used for specific applications (e.g. pumps, valves) and only for small surface in contact with water.

#### **2.1 Category**

Not defined

#### **2.2 Reference Material**

Not defined

#### **2.3 Accepted Alloys**

Notation	Product groups
<b>Carbon Steel according to EN 10025 / EN 10213 / EN 10222</b>	C2

Constituents (% (m/m)):

Fe	C	Cr	Mo	Mn	Ni
	0.02% - 0.25%	0.02% - 0.30%	0.02% - 0.12%	0.02% - 1.65%	0.02% - 0.50%

Impurities (% (m/m)):

Al	Cu	Nb	P	S	Si	Ti	V
≤ 0.05%	≤ 0.55%	≤ 0.05%	≤ 0.03%	≤ 0.03%	≤ 0.6%	≤ 0.05%	≤ 0.12%

*Each other impurity < 0.02%*

#### **Basis for acceptance**

Draft Italian Regulation

Calculation of possible impact on DW

UBA opinion (21 April 2017)

### 3 Cast iron

#### **Cast iron for pipes and tanks**

Cast iron without permanent protective layers is not suitable for pipes and fittings in contact with drinking water.

#### **Cast iron for ancillaries**

Unprotected cast iron can be used for specific applications (e.g. pumps, valves) and only for very small surface in contact with water. Their composition needs to be regulated.

#### **3.1 Category**

Not defined

#### **3.2 Reference Material**

Not defined

#### **3.3 Accepted Alloys**

Notation	Product groups
<b>Cast Iron according to EN 1561 / EN 1563</b>	C2

Constituents (% (m/m)):

Fe	C	Cu	Cr	Mo	Mn	Ni	Si
	0.02% - 4.0%	0.02% - 1.0%	0.02% - 1.0%	0.02% - 1.0%	0.02% - 1.0%	0.02% - 1.0% <sup>1</sup>	1.5% - 3.5%

Impurities (% (m/m)):

As	Mg	P	S	Sn	V
≤ 0.05%	≤ 0.1%	≤ 0.15%	≤ 0.1%	≤ 0.1%	≤ 0.1%

Each other impurity < 0.02%

#### **Basis for acceptance**

Draft Italian Regulation

French regulation

Calculation of possible impact on DW

UBA opinion (21 April 2017)

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<sup>1</sup>For some special products (e.g. pumps for the backwash of filters, pumps which draw raw water in river with possible high rates of suspended matters, pumps for lime milk), if it is justified, this content can be higher (up to max. 6.0% (m/m)) in order to resist the abrasion or for some steps of water treatment



## **4 Stainless steel**

Stainless steels according to EN 10088 and EN 10283 can be applied for all product groups (A-D)

### Restrictions:

Some stainless steels show a higher probability of occurrence of local corrosion (e.g. pitting or crevice corrosion) caused by the contact with certain drinking waters or in case of disinfection with high chlorine concentrations. For this purpose EN 16056 can be used to compare the passivity behaviour of the different stainless steel grades.

## IV Platings

### 1 Tin plating applied by a galvanic process on the external surface

Components made of copper alloys (Chapter I) corresponding to the European Positive List can be plated galvanically with a layer composition of copper and tin.

Restrictions:

- Bulk composition of components to be tinned:
  - Copper alloys corresponding to the European Positive List: I Copper alloys
- Layer composition: 1.) Cu 2.) Sn
- applied process: galvanic tin plating
- Purity of the used anodes:  $\geq 99.90\%$

Additional requirement:

For the respective production process it has to be proven that the manufactured products are not contaminated with organic substances used in the galvanic process baths. This can be demonstrated by a migration test according to EN 12873-1. The evidence can be provided in the course of an approval/certification process of respective plated products. In this process a test of the metal release is not required. Additionally, a quality assurance scheme for the production process is required. In UK additional product tests might be necessary.

**Basis for acceptance**

UBA opinion (12 Aug 2015)

Anses opinion (6 July 2018)

### 2 Sn/Ni platings applied by a galvanic process on the external surface

Components made of copper alloys (Chapter I) corresponding the 4MSI Composition List can be plated galvanically with a plating of tin and nickel.

Restrictions:

- Bulk composition of components to be plated:
  - Copper alloys corresponding 4MSI Composition List: I Copper alloys
- composition of the plating: Sn ( $66 \pm 1\%$ ) and Ni ( $34 \pm 1\%$ ) (molar ratio 1:1)
- applied process: galvanic plating
- purity of the used nickel-anodes: 99.90%

Additional requirement:

For the respective production process, it has to be proven that the manufactured products are not contaminated with organic and inorganic substances used in the galvanic process baths. This can be demonstrated by a migration test according to EN 12873-1. The evidence can be provided in the course of an approval/certification process of respective plated products. In this process a test of the metal release is not required. Additionally, a quality assurance scheme for the production process is required. In UK additional product tests might be necessary.

**Basis for acceptance**

UBA opinion (1 July 2020)

## V Passive compositions

### 1 Category

Not defined

### 2 Reference Material

Not defined

### 3 Accepted Alloys

#### 3.1

Notation	Product groups
NiCr7030	B - D

Constituents (% (m/m)):

Ni	Cr	Si
≥ 60.0%	29.0% - 32.0%	0.50% - 2.0%

Impurities (% (m/m)):

Al	C	Co	Cu	Fe	Mn	P	S
≤ 0.30%	≤ 0.10%	≤ 1.5%	≤ 0.50%	≤ 5.0%	≤ 1.00%	≤ 0.020%	≤ 0.015%

Each other impurity < 0.02%

#### Basis for acceptance

UBA opinion (22 Feb 2018)

#### 3.2

Notation	Product groups
Ni55Ti45	C and D

Constituents (% (m/m)):

Ni	Ti
54.0% - 56.0%	Remainder

Each impurity < 0.02%

#### Basis for acceptance

UBA opinion (16 Jan 2019)

#### 3.3

Notation	Product groups
Titanium Grade 1 according to ASTM B265	B - D

Constituents (% (m/m)):

Ti
Remainder

Impurities (% (m/m)):

C	O	N	H	Fe
≤ 0.08%	≤ 0.18%	≤ 0.03%	≤ 0.015%	≤ 0.20%

Each other impurity < 0.1%, Other impurity in total < 0.4%

### 3.4

Notation	Product groups
<b>Titanium Grade 2 according to ASTM B265</b>	B - D

Constituents (% (m/m)):

Ti
Remainder

Impurities (% (m/m)):

C	O	N	H	Fe
≤ 0.08%	≤ 0.25%	≤ 0.03%	≤ 0.015%	≤ 0.30%

*Each other impurity < 0.1%*

*Other impurity in total < 0.4%*

### 3.5

Notation	Product groups
<b>Titanium Grade 3 according to ASTM B265</b>	B - D

Constituents (% (m/m)):

Ti
Remainder

Impurities (% (m/m)):

C	O	N	H	Fe
≤ 0.08%	≤ 0.35%	≤ 0.05%	≤ 0.015%	≤ 0.30%

*Each other impurity < 0.1%*

*Other impurity in total < 0.4%*

### 3.6

Notation	Product groups
<b>Titanium Grade 4 according to ASTM B265</b>	B - D

Constituents (% (m/m)):

Ti
Remainder

Impurities (% (m/m)):

C	O	N	H	Fe
≤ 0.08%	≤ 0.40%	≤ 0.05%	≤ 0.015%	≤ 0.50%

*Each other impurity < 0.1%*

*Other impurity in total < 0.4%*

### 3.7

Notation	Product groups
<b>Titanium Grade 5 according to ASTM B265</b>	B - D

Constituents (% (m/m)):

Ti	Al	V
Remainder	5.5% - 6.75%	3.5% - 4.5%

Impurities (% (m/m)):

C	O	N	H	Fe
≤ 0.08%	≤ 0.20%	≤ 0.05%	≤ 0.015%	≤ 0.4%

*Each other impurity < 0.1%*

*Other impurity in total < 0.4%*

#### **Basis for acceptance**

Kiwa opinion (06 Jan 2020)

*Denmark is in the process of reviewing the assessment.*

## **4 Further passive metallic compositions for product group D**

For product group D further passive metallic compositions can be used in contact with drinking water. These compositions do not need to be listed in this European Positive List.