



AWS Amendment Notice

The following Amendment has been made and incorporated into the current edition of this document.

2nd Printing: September, 2020

AWS Standard: J1.3/J1.3M:2020, *Specification for Materials Used in Resistance Welding Electrodes and Tooling*

Amendment Number: 1

Subject: Items in Table 4 have been amended as follows:

- Headers for Co and Ni columns have been reversed.
- RWMA Class has been added to four rows where it was missing.
- '0.20 max.' under Si was inadvertently omitted for C17540 row and the value has been added.
- Merged column data for Ni and Co for C17200 row.
- RWMA Class 4 data has been updated to correctly reflect the standard chemical compositions of RWMA class materials

Table 4
Standard Chemical Compositions of RWMA Class Materials

Group A – COPPER BASE ALLOYS														
RWMA Class	UNS Number or Other Designation	Description	Cu^a	Fe	W	Cd	Ni	Co	Cr	Si	Be	Pb	Zr	Al
1	C15000	Zirconium Copper	99.80 min.	—	—	—	—	—	—	—	—	—	0.10–0.20	—
2	C18150	Chromium-Zirconium Copper	REM.	—	—	—	—	—	0.5–1.5	—	—	—	0.02–0.20	—
2	C18200	Chromium Copper	REM.	0.10 max.	—	—	—	—	0.6–1.2	0.10 max.	—	0.05 max.	—	—
3	C17500	Cobalt-Beryllium Copper	REM.	0.10 max.	—	—	—	2.4–2.7	—	0.20 max.	0.4–0.7	—	—	0.20 max.
3	C17510	Nickel-Beryllium Copper	REM.	0.10 max.	—	—	1.4–2.2	0.30 max.	—	0.20 max.	0.2–0.6	—	—	0.20 max.
3	C17540	Nickel-Cobalt-Beryllium Copper	REM.	0.20 max.	—	—	0.8–1.3	0.8–1.3	—	0.20 max.	0.4–0.7	—	—	—
3	C18000	Nickel-Silicon-Chromium Copper	REM.	0.15 max.	—	—	1.8–3.0	—	0.1–0.8	0.4–0.8	—	—	—	—
4	C17200	Beryllium Copper	REM.	—	—	—	<u>Ni+Fe+Co = 0.60 max.</u> <u>Ni+Co = 0.20 min.</u>	—	—	0.20 max.	1.8–2.0	0.02 max.	—	0.20 max.
GROUP B – REFRACTORY METAL AND REFRACTORY METAL COMPOSITES														
10		Copper Tungsten	43– 47	—	REM.	—	—	—	—	—	—	—	—	—
11	ASTM B702 C1 D	Copper Tungsten	23– 27	—	REM.	—	—	—	—	—	—	—	—	—
12	ASTM B702 C1 E	Copper Tungsten	18– 22	—	REM.	—	—	—	—	—	—	—	—	—
13		Tungsten	—	—	99.9 min.	—	—	—	—	—	—	—	—	—
14	ASTM B387 alloy 360 or 361	Molybdenum	—	—	(Mo) 99.9 min.	—	—	—	—	—	—	—	—	—
GROUP C – SPECIALTY MATERIALS														
20	C15760	Dispersion Strengthened Copper	98.77	0.01 max.	—	—	—	—	—	—	—	0.01 max.	—	0.58– 0.62 as Al ₂ O ₃
21	C15715	Dispersion Strengthened Copper	98.77	0.01 max.	—	—	—	—	—	—	—	0.01 max.	—	0.3 as Al ₂ O ₃
22	C15725	Dispersion Strengthened Copper	98.77	0.01 max.	—	—	—	—	—	—	—	0.01 max.	—	0.5 as Al ₂ O ₃

^a Including Ag.

Amendment Number: 1

Subject: The following Table 6 Values have been changed to match the values in Table 1:

- Hardness for Class 10 has been changed to 72 HRB (from 70 HRB)
- Electrical Conductivity for Class 12 has been changed to 35% [20] (from 38% [22])

Table 6
Group B – Physical and Mechanical Properties for Class 10 – 14 (Rod and Bar)

RWMA Class	HARDNESS ROCKWELL	ELECTRICAL CONDUCTIVITY	ULTIMATE COMPRESSIVE STRENGTH ^a
	min.	min. %IACS [MS/m]	ksi [MPa]
CLASS 10	72 HRB	45% [26]	135 [930]
CLASS 11	94 HRB	40% [23]	160 [1103]
CLASS 12	98 HRB	35% [20]	170 [1172]
CLASS 13	69 HRA	30% [17.4]	200 [1379]
CLASS 14	85 HRB	30% [17.4]	88 [607]

^aFor information only
Note: The conductivity and hardness noted may differ from the ASTM standards.

Amendment Number: 1

Subject: The following Table 7 Values have been changed to match the values in Table 1:

- Hardness for C15715 has been changed to 62 HRB (from 63 HRB)
- Hardness for C15725 has been changed to 68 HRB (from 69 HRB)
- Electrical Conductivity for Class 21 has been changed to 92 [53] (from 88 [51])
- Electrical Conductivity for Class 22 has been changed to 87 [50] (from 85 [49])

Table 7
Group C – Physical and Mechanical Properties for Class 20 – 22 (Rod and Bar)

RWMA CLASS	Alloy Number	HARDNESS ROCKWELL	ELECTRICAL CONDUCTIVITY	YIELD STRENGTH 0.2% offset	ULTIMATE TENSILE STRENGTH	TYPICAL ELONGATION %
		Minimum	Minimum % IACS [MS/m]	Typical ksi [Mpa]	Typical ksi [MPa]	2 in [50 mm] or 4×D gage length
Class 20	C15760	75 HRB	75 [43.5]	60 [413]	74 [510]	25
Class 21	C15715	62 HRB	92 [53]	48 [331]	58 [400]	30
Class 22	C15725	68 HRB	87 [50]	54 [372]	65 [448]	27

Note: Acceptance is based on hardness and electrical conductivity only.

The purpose of this amendment notice is to inform the public that a published standard has been technically corrected. An amendment is the correction of an error in substantive content in a published standard that had been inadvertently approved by the required approval procedures.