

MINIMUM PHYSICAL PROPERTIES FOR RWMA ALLOYS - AWS J1.3:2020-AMD1

Reference Standard: AWS J1.3/J1.3M:2020-AMD1 - Specification for Materials Used in Resistance Welding Electrodes and Related Equipment (Table 5)

GROUP A - COPPER BASE ALLOYS: ROUND ROD STOCK (COLD WORKED)

SIZE RANGE		ROCKWELL HARDNESS			CONDUCTIVITY % IACS			YIELD STRENGTH ksi			TENSILE STRENGTH ksi			ELONGATION % (2" or 4D)		
in.	mm	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3
Up to 1"	Up to 25	65 HRB	75 HRB	90 HRB	80%	75%	45%	45	45	55	60	65	95	13%	13%	9%
>1" to 2"	>25 to 51	60 HRB	70 HRB	90 HRB	80%	75%	45%	45	45	55	55	59	92	14%	13%	9%
>2" to 3"	>51 to 76	55 HRB	65 HRB	90 HRB	80%	75%	45%	45	45	55	50	55	88	15%	13%	9%

GROUP A - COPPER BASE ALLOYS: SQUARE, RECTANGULAR, AND HEXAGONAL BAR (COLD WORKED)

THICKNESS		ROCKWELL HARDNESS			CONDUCTIVITY % IACS			YIELD STRENGTH ksi			TENSILE STRENGTH ksi			ELONGATION % (2" or 4D)		
in.	mm	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3
Up to 1"	Up to 25	55 HRB	70 HRB	90 HRB	80%	75%	45%	45	45	60	60	65	95	13%	13%	9%
>1"	>25	50 HRB	65 HRB	90 HRB	80%	75%	45%	45	40	50	55	55	90	14%	14%	9%

GROUP A - COPPER BASE ALLOYS: FORGINGS

THICKNESS		ROCKWELL HARDNESS			CONDUCTIVITY % IACS			YIELD STRENGTH ksi			TENSILE STRENGTH ksi			ELONGATION % (2" or 4D)		
in.	mm	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3
Up to 1"	Up to 25	55 HRB	65 HRB	90 HRB	80%	75%	45%	45	45	50	60	55	94	12%	13%	9%
>1" to 2"	>25 to 51	50 HRB	65 HRB	90 HRB	80%	75%	45%	45	45	50	55	55	90	13%	13%	9%
>2"	>51	50 HRB	65 HRB	90 HRB	80%	75%	45%	45	40	50	55	55	88	13%	13%	9%

GROUP A - COPPER BASE ALLOYS: CASTINGS

SIZE	ROCKWELL HARDNESS			CONDUCTIVITY % IACS			YIELD STRENGTH ksi			TENSILE STRENGTH ksi			ELONGATION % (2" or 4D)		
	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3
ALL	55 HRB	90 HRB	N/A	70%	45%	N/A	20	45	N/A	45	75	N/A	N/A	12%	5%

- NOTES:
- All materials are in fully heat-treated condition unless otherwise specified.
 - Round bar stock up to 1" (25 mm) diameter is fully heat-treated and cold worked.
 - Values shown are MINIMUMS per AWS J1.3:2020-AMD1 Table 5.
 - Class 4 (C17200 - Copper Beryllium) properties are specified in HRC hardness: 38-45 HRC min., 20% IACS min.