Copper Powders - Dimensionally Controlled Grades

RXL-RXM-RXH family of copper powders to provide low, medium and high growth bronze mixes respectively.

This family of copper powders is primarily designed for use in the manufacture of oil-impregnated sintered bronze bearings. They allow the bearing manufacturer to control the dimensional change of bronze during sintering. These copper grades may also be used for copper-iron P/M parts, for carbon brushes, for brazing formulations and for other uses where the selection is based on particle size and purity.

Five main grades of high quality copper powder are produced by an oxidation-reduction process that yields an irregular sponge-like particle. They are Resistox treated to resist oxidation during storage or use, and are available in controlled particle sizes, which give stepped dimensional changes in 1/2% intervals when sintered with tin to produce 90/10 bronze.

SCM Grades/Characteristics

150 RXM
Is the standard grade in this family. All other grades offer specific growth values relative to this grade

100 RXH
A -100 mesh (-149 µm) copper powder for highest growth in bronze mixes, i.e. 1.5% more than 150 RXM at 1530°F (832°C).

100 RXM
A -100 mesh (-149 µm) copper powder for high growth in bronze mixes, i.e. 1.0% more than 150 RXM at 1530°F (832°C).

150 RXH
A -150 mesh (-105 µm) copper powder for medium growth in bronze mixes, i.e. 0.5% more than 150 RXM at 1530°F (832°C).

150 RXM
A -150 mesh (-105 µm) copper powder designed to give nominal growth during sintering of 90/10 bronze mixes at 1530°F (832°C) when processed under normal production conditions.

150 RXL
A -150 mesh (-105 µm) copper powder for lowest growth in bronze mixes, i.e. 0.5% less than 150 RXM at 1530°F (832°C).

TECHNICAL DATA SHEET
COPPER POWDERS
(DIMENSIONALLY CONTROLLED GRADES)

DESCRIPTION

An atomization-reduction process, which yields an irregular sponge-like particle, produces these five grades of high quality copper powder. They have been Resistox treated to resist oxidation during storage or use and are available in controlled particle sizes, which give stepped dimensional changes in ½% intervals when sintered with tin to produce 90/10 bronze. See specific powder property information on reverse side.

SCM GRADE	CHARACTERISTICS
100 RXH	A -100 mesh copper powder for highest growth in bronze mixes, i.e. 1.5% more than 150 RXM at 1530°F (832°C).
100 RXM	A -100 mesh copper powder for high growth in bronze mixes, i.e. 1.0% more than 150 RXM at 1530°F (832°C).
150 RXH	A -150 mesh copper powder for medium growth in bronze mixes, i.e. 0.5% more than 150 RXM at 1530°F (832°C).
150 RXM	Standard -150 mesh copper powder designed to give nominal growth during sintering of 90/10 bronze mixes at 1530°F (832°C) when processed under normal production condition.
150 RXL	A -150 mesh copper powder for lowest growth in bronze mixes, i.e. 0.5% less than 150 RXM at 1530°F (832°C).

APPLICATION

This family of copper powders is the industry standard for use in the manufacture of oil-impregnated copper-based sintered metal powder bearings. They allow the bearing manufacturer to control the dimensional change of his bronze material through the selection of the grade of copper.

MATERIAL SAFETY DATA

See MSDS before using this product.

SAMPLES AND SERVICES

To obtain a sample or additional information, please contact our Customer Service Department.
Visit our website at www.scmmetals.com

POWDER PROPERTIES

		SCM GRADE/SPECIFICATION									
		100 RXH		100 RXM		150 RXH		150 RXM		150 RXL	
	TEST METHOD	Spec.	Typ.	Spec.	Typ.	Spec.	Typ.	Spec.	Typ.	Spec.	Typ.
Chemical Properties											
Total Copper, %		99.5 min.	99.82	99.5 min.	99.80	99.5 min.	99.79	99.5 min.	99.78	99.5 min.	99.75
Hydrogen Loss, %	MPIF 02	0.3 max.	0.10	0.3 max.	0.11	0.3 max.	0.12	0.3 max.	0.13	0.3 max.	0.14
Acid Insolubles, %		0.1 max.	0.04	0.1 max.	0.05	0.1 max.	0.05	0.1 max.	0.05	0.1 max.	0.06
Iron, %		-----	0.01	-----	0.01	-----	0.01	-----	0.01	-----	0.01
Lead, %		-----	0.01	-----	0.01	-----	0.01	-----	0.01	-----	0.01
Total Other Elements, %		-----	0.05	-----	0.05	-----	0.05	-----	0.05	-----	0.05
Physical Properties											
Apparent Density, g/cm^3	MPIF 04	2.9 to 3.1	2.98	2.8 to 3.0	2.90	2.7 to 2.9	2.83	2.65 to 2.85	2.80	2.6 to 2.8	2.78
Flow Rate, s/50 g	MPIF 03	30 max.	22	30 max.	22	30 max.	24	30 max.	25	30 max.	26
Sieve Analysis, Tyler, %	MPIF05										
+100 (>149µm)		3.0 max.		3.0 max.							
-100 +150		-----	0.2	-----	0.1	3.0 max.	0.2	3.0 max.	0.1	3.0 max.	0.1
-150 +200 (-105/+74 µm)		-----	17.5	-----	12.5	-----	10.3	-----	8.3	-----	7.1
-200 +325		-----	44.2	-----	43.5	-----	33.1	-----	30.6	----	25.1
-325 (<44 µm)		30 to 45	38.1	35 to 50	43.9	45 to 60	56.4	50 to 65	61.0	55 to 70	67.7
Compacting Properties											
Green Density, g/cm^3	MPIF 42	6.0 min.	6.25	6.0 min.	6.22	5.9 min.	6.19	5.9 min.	6.16	5.9 min.	6.10
Green Strength, psi	MPIF 15	700 min.	1370	800 min.	1500	800 min.	1580	900 min.	1600	900 min.	1610
Green Strength, N/mm^2		4.8 min.	9.5	5.5 min.	10.4	5.5 min.	10.9	6.2 min.	11.1	6.9 min.	11.1
Sintering Properties											
Dimensional Change, %	MPIF 44	+2.75 to +3.25	+2.99	+2.25 to +2.75	+2.50	+1.75 to +2.25	+2.07	+1.25 to +1.75	+1.61	+0.75 to +1.25	+1.10
TRS, psi		25000 min.	30300	25000 min.	31400	30000 min.	34800	30000 min.	34500	30000 min.	35000
TRS, N/mm^2		172 min.	209	172 min.	216	207 min.	240	207 min.	238	207 min.	241

Notes: A) Compacting properties are determined on unlubricated powder pressed at 12 tsi (165 N/mm^2) in transverse rupture bar die using die wall lubrication.

B) Sintering properties are determined on a mixture of 90% indicated copper, 10% M-40 tin, .75% lubricant (0.5% stearic acid +0.25% zinc stearate) pressed to a green density of 6.3 g/cm^3, sintered 15 minutes at 1530°F (832°C) in hydrogen. Dimensional change is based on die size.

SCM Metal Products, Inc. • 2601 Weck Drive • Box 12166 • Research Triangle Park, NC 27709-2166, USA
TEL: (919) 544-8090 • FAX: (919) 544-7996