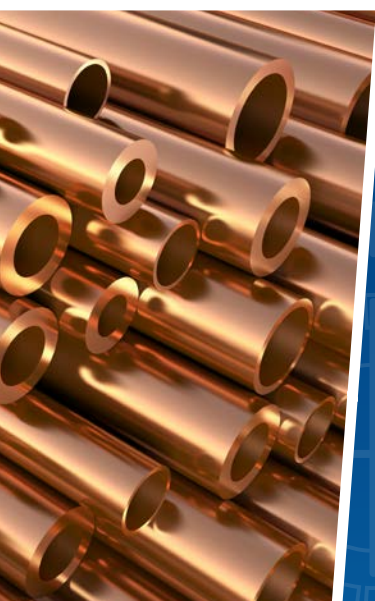




NBM Metals

www.nbmmetals.com

HOUSTON, TEXAS | LORAIN, OHIO | MONTERREY, MEXICO | TOULON, FRANCE



RESISTANCE WELDING PRODUCTS

Bars, Coils, Tubes, Hex Bars, Flat Bars, Roto Bars, Sheet & Plate, Forged Profiles & Rings, Forged Discs, Machined Parts, Special Shapes, and Made to Order Components



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PRODUCT RANGE

Resistance Welding

- Gun Arms / Holders / Shanks / Dies for all kinds of Robots and Guns.
- Caps Manufactured with Cold-Formed Process.
- Straight, Single and Double Bend Electrodes for Spot Welding.
- Projection (Nut & Stud) Welding Electrodes.
- Butt Welding Electrodes.
- Seam Welding Wheels.
- Refractory Tips/ Adapters of Tungsten / Tungsten Copper or Molybdenum Silver Brazed On To Cu.Cr.Zr. / Cr.Cu. Shanks. Especially for Non-Ferrous Spot Welding Application.
- Swivel Head Electrodes.
- Threaded / Button Electrodes.
- Tip Dresser / Tip Remover / Tip Spanner.
- Arms / Horn & Holders for Stationary Welding Machine.
- Ceramic Coated Pins for Projection Welding.
- Locating Pins in Stainless Steel.
- Kickless and Jumper Cables (Water and Air Cooled).
- Flexible Shunts. (We Supply These Items As Per Drawings or Samples)

NBM Metals Also Supplies...

- Bars, Coils, Tube, Plates and Billets.
- Rough and Finished Machined Products.
- Beryllium Copper Mold Materials for Palstic Injection Mold Tooling.
- Mold Plates for Continous Casting.
- Plunger Tips for Aluminium Die Casting.

GUN ARMS AND HOLDERS

In Be.Cu, Cu.Cr.Zr. and Cu.Cr. suitable for all types of Guns



OUR SPECIALITY

As per current industrial specifications, our brand “NBM Metals Gun Arms” meets RWMA Class-III standards which are made from materials having a minimum Rockwell Hardness of 90B and a minimum electrical conductivity of 45% IACS.



SHANKS AND ADAPTERS

Manufacturing Straight, Single and Double Bend Shanks/
Adapters with Cold Bending Process



ELECTRODES

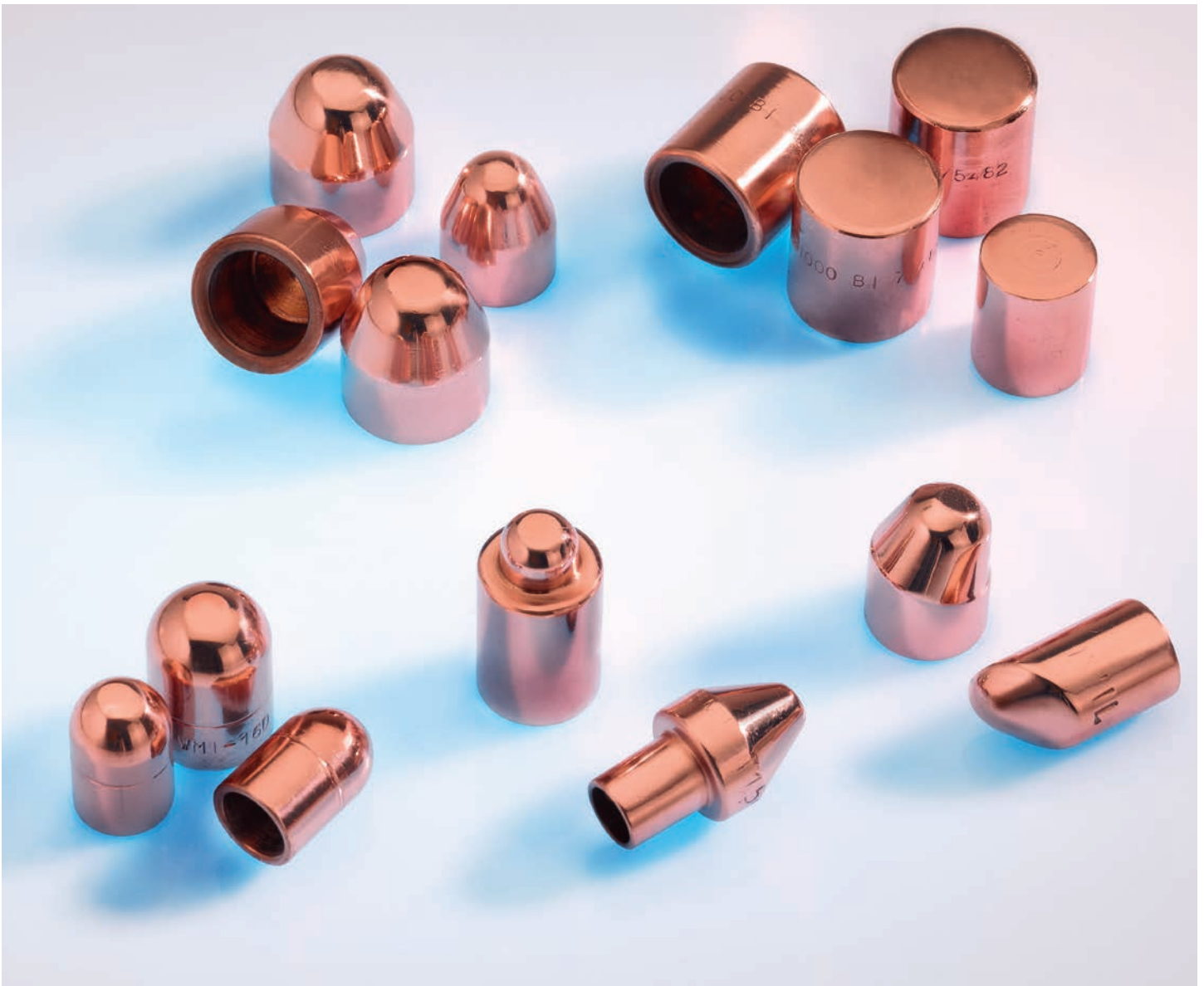
Manufacturing wide range of standard and custom made Electrodes in Cu.Cr., Cu.Cr.Zr., Be.Cu. and Tungsten Copper for Spot and Projection Welding and Applications



CAPS

Our Caps are the most cost effective cap electrodes available for Resistance Welding Application.

Advance cold-forming techniques are used to produce high quality and cost effective Female and Male caps



NUT AND STUD WELDING ELECTRODES

Produced in the following alloys:

C18200 Cu.Cr.

C18150 Cu.Cr.Zr.

C17500/C17510 Be.Cu.

& Tungsten Copper



WELDABILITY OF DIFFERENT METALS AND ELECTRODE MATERIAL TO BE USED

Schedule 1

Weldability of Different Metals and Electrode material to be used

Explanation to schedule 1

WELDABILITY

○ ○	
○ ○	
E	Excellent
G	Good
F	Fair
P	Poor
I	Important

ELECTRODE MATERIAL

○ ○	Left: For Left Line
○ ○	Right: For Upper Line
1	CRM 16
2	CB 4
3	CRM 16
4	Molybdenum
5	Tungsten

REMARKS

○ ○	
○ ○	
a	Strength of Weld Low
b	Danger of Alloying with material to be welded
c	No Longer Protection against corrosion
d	Only possible under certain conditions

		16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Steel Cold Rolled	1	I	F a 1 1	I	I	F a 1 1	F a 1 1	P a P d	F a 1 1	I a 1 1	I a 1 4	I a 1 3	G b 1 1	G b 1 1	G b 1 1	G 1 2	E 1 1
Steel Stainless	2	I	F d 2 1	I	I	F 2 1	F 2 1	P d 2 1	P 2 1	I 2 1	I a 2 4	I	G b 2 1	G b 2 1	G b 2 1	E 2 2	
Steel Tin Plated	3	I	P c 1 1	I	I	F a 1 1	F 1 1	P 1 1	P 1 1	P b 1 1	I a 1 4	I	F b 1 1	F b 1 1	F b 1 1		
Steel Zinc Plated	4	I	P c 1 1	I	I	P 1 1	P 1 1	P 1 1	P 1 1	P 1 1	I a 1 1	I	F b 1 1	G b 1 1			
Steel Cadmium Plated	5	I	F c 1 1	I	I	F a 1 1	F c 1 1	P c 1 1	P 1 1	P 1 1		I	G b 1 1				
Aluminium & Aluminium Alloys	6	I	I		I				F b 3 1	I	P d 3 d	G 3 3					
Copper Silver	7	I	I		I	P 4 1	P a 4 1	F b 4 1	F b 4 1	F b 4 1	I d 4 4						
Brass	8	I	I			F b 1 1	F 1 1	G 1 1	G 1 1	G 1 1							
Bronze	9	I	I			F 1 1	F 1 1	G 1 1	G 1 1								
Nickel Silver	10	I	I			G 1 1	G 1 1	G 1 1									
Nickel	11		F d 1 1			G 1 1	E 1 1										
Nickel Alloys	12		F d 1 1			G 1 1											
Gold	13				F 4 4												
Titanium	14		F 1 5	E 1 1													
Molybdenum Tungsten	15	F 5 5	F d 5 5														
Tantalum	16	E 5 5															

This schedule should serve as a guide and give an indication to weldability of different metals for customary spot welding. It is based on data in technical literature and practical experiences with our electrode materials. The electrode life can be improved by good cooling up to the electrode tip, especially with metals where electrode have tendency of alloying material to be welded. A special electrode tip shape is also of advantage. Best weldability can be achieved by current control of most favourable welding parameters and clean surface of metals to be welded together.

PHYSICAL AND MECHANICAL PROPERTIES

RWMA Class 1, 2, 3, 4 and 20

ALLOY GRADE	NOMINAL COMPOSITION %	International Standards	DENSITY	HARDNESS 30 D2			ELECTRICAL CONDUCTIVITY % IACS	ELONGATION A5%	TENSILE STRENGTH MPa N/mm ²
				HB	HV	HRB			
CRM 16X Cu Cr Zr	Cr : 0.60 to 0.12 ZR : 0.08 to 0.12 Cu : Balance	C18500 alloy RWMA Class 2 DIN 17666 W.N.2.1293	8.9	160	160	78-80	≥ 78	20	480
CRM 16E Cu Cr Zr	Cr : 0.60 to 0.12 ZR : 0.08 to 0.15 Cu : Balance	C18500 alloy RWMA Class 2 DIN 17666 W.N.2.1293	8.9	145	145	78	≥ 78	15	400
CRM 15 Cu Cr	Cr : 0.60 to 0.12 Cu : Balance	C18200 alloy RWMA Class 2	8.9	150	150	78	≥ 78	20	450
ZR 16X Cu Zr	ZR : 0.08 to 0.12 Cu : Balance	C15000 alloy RWMA Class 1 DIN 17666 W.N.2.1580	8.9	120	120	70	≥ 85	18	320
CB 4 Co Be Cu	Co : 2.20 Be : 0.50 Cu : Balance	C17500 alloy MIL46087- RWMA Class 3 DIN 17666 W.N.2.1293	8.9	240	240	101	≥ 45	16	700
NB 4 Cu Ni Be	Ni : 1.90 Be : 0.40 Cu : Balance	C17510 alloy RWMA Class 3 DIN 17672 W.N. 2.0850	8.9	210	210	94	≥ 45	12	680
CBe 2 Co Be Cu	Co : 0.50 Be : 2.0 Cu : Balance	C17200 alloy DIN 17200 RWMA Class 4 W.N.2.1247	8.3	--	340	--	≥ 28	3-10	1150
BICOP CuAl ₃ O ₃	Al : 0.60 Sn : 0.14 Cu : Balance	C 15735 RWMA Class 20	8.8	150	150	80	≥ 85	12	430

► The values indicated in the table are given for information only and should not be used for specifications.

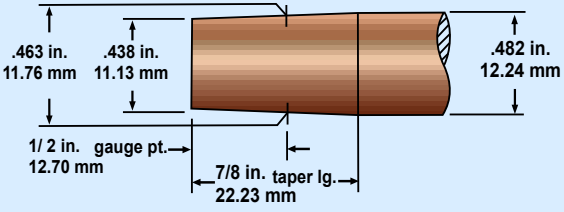
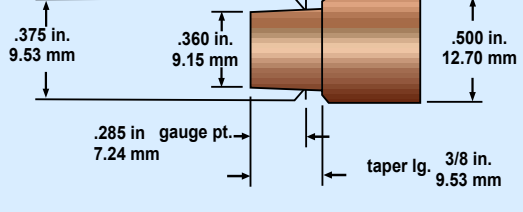
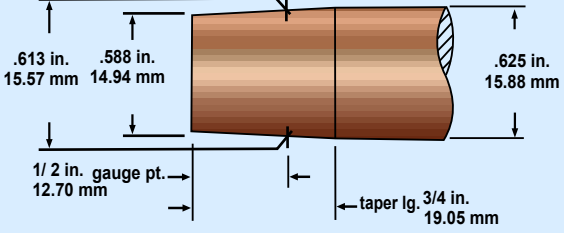
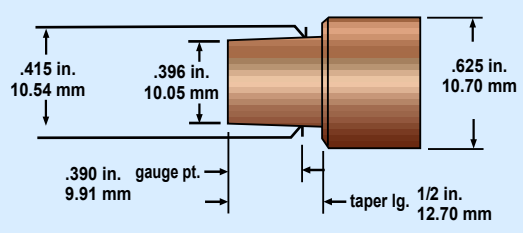
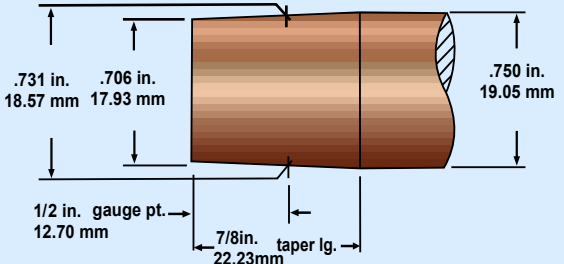
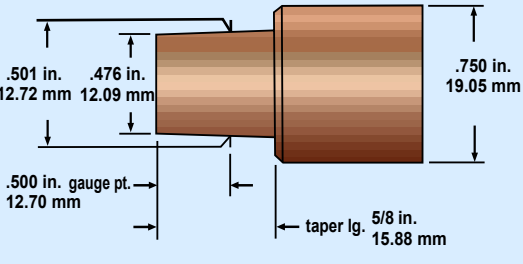
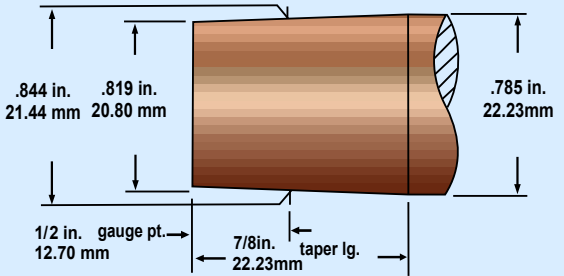
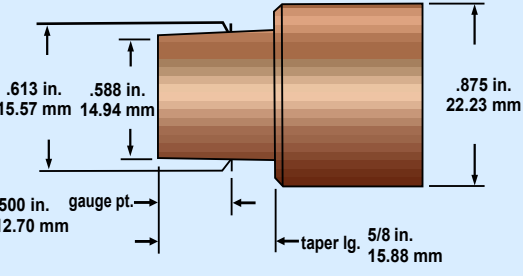
PHYSICAL AND MECHANICAL PROPERTIES

RWMA Class 10, 11, 12, 13 and 14

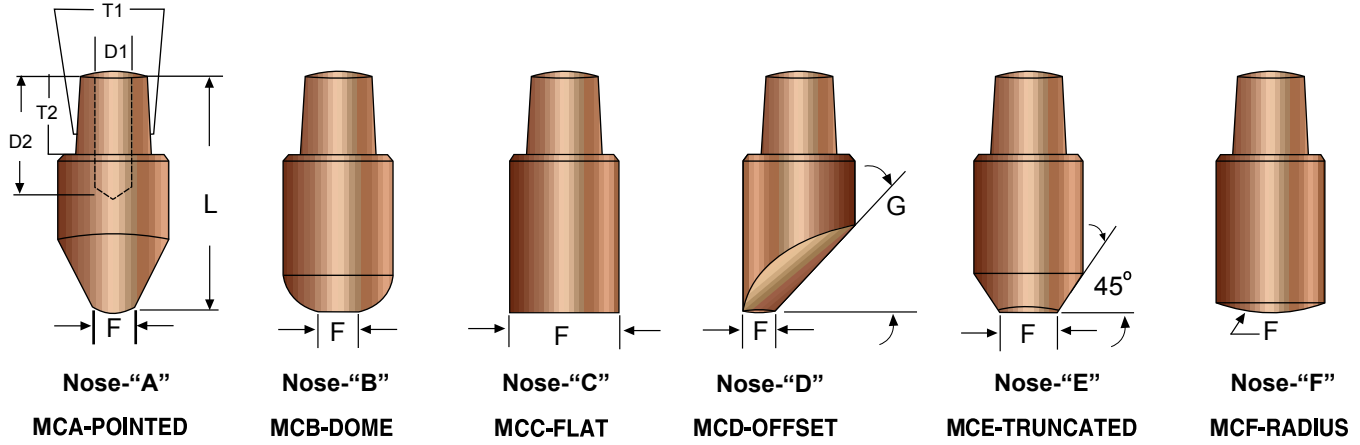
RWMA Classification	Properties	Hardness Rockwell	Conductivity (%)	Tensile Strength	Density
Class 10 (1W3)	70W; 30Cu	88-95 B	47-52	63 KSI	14.18 grams/cc
Class 11 (10W3)	75W; 25Cu	96-99 B	42-50	90 KSI	14.80 grams/cc
Class 12 (30W3)	80W; 20Cu	99-104 B	41-49	98 KSI	15.60 grams/cc
Class 13	100% Tungsten	39 C	31	150 KSI	19.28 grams/cc
Class 14	100% Molybdenum	90 B	30	80 KSI	10.20 grams/cc

► The values indicated in the table are given for information only and should not be used for specifications.

RWMA TAPER CHART

Electrode and Adapter Tapers	Taper Type	Male Cap Taper Dimensions
 <p> .463 in. 11.76 mm .438 in. 11.13 mm .482 in. 12.24 mm 1/2 in. gauge pt. 12.70 mm 7/8 in. taper lg. 22.23 mm </p>	MT 1 4RW	 <p> .375 in. 9.53 mm .360 in. 9.15 mm .500 in. 12.70 mm .285 in. gauge pt. 7.24 mm taper lg. 3/8 in. 9.53 mm </p>
 <p> .613 in. 15.57 mm .588 in. 14.94 mm .625 in. 15.88 mm 1/2 in. gauge pt. 12.70 mm taper lg. 3/4 in. 19.05 mm </p>	MT 2 5RW	 <p> .415 in. 10.54 mm .396 in. 10.05 mm .625 in. 15.88 mm .390 in. gauge pt. 9.91 mm taper lg. 1/2 in. 12.70 mm </p>
 <p> .731 in. 18.57 mm .706 in. 17.93 mm .750 in. 19.05 mm 1/2 in. gauge pt. 12.70 mm 7/8 in. taper lg. 22.23 mm </p>	6RW	 <p> .501 in. 12.72 mm .476 in. 12.09 mm .750 in. 19.05 mm .500 in. gauge pt. 12.70 mm taper lg. 5/8 in. 15.88 mm </p>
 <p> .844 in. 21.44 mm .819 in. 20.80 mm .785 in. 22.23 mm 1/2 in. gauge pt. 12.70 mm 7/8 in. taper lg. 22.23 mm </p>	MT 3 7RW	 <p> .613 in. 15.57 mm .588 in. 14.94 mm .875 in. 22.23 mm .500 in. gauge pt. 12.70 mm taper lg. 5/8 in. 15.88 mm </p>

MALE CAP ELECTRODES



KEY TO ITEM CODE

MC	Male Cap Designation
A,B,C,D,E,F	Nose Type
1,2,3	RWMA Alloy Class
Z	Class 2 (Cu.Cr.Zr)
4,5,6	RW No.

Part Number Coding

EXAMPLE :

MC

Male Cap

B

Nose-"B"
DOME

3

Class 3

4

RW4
Dia 0.625
(15.88mm)

(To order Dia .625 (15.88mm) Form D
(Offset Tip) in Cr.Zr.Cu **Order : MCD Z 5**)

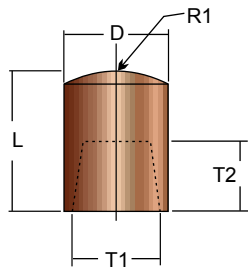
Standard Male Caps

ITEM CODE			DIMENSIONS							
Class 1	Class 2	Class 2	MAJOR DIA	OVERALL LENGTH	TAPER DIA	TAPER LENGTH	WELD FACE DIA	DRILL DIA	DRILL LENGTH	OFFSET ANGLE
Zr.Cu.	Cr.Cu.	Cr.Zr.Cu.	"D"	"L"	"T1"	"T2"	"F"	"D1"	"D2"	"G"
MCA14	MCA24	MCAZ4	.500 (12.7 mm)	1.125 (28.45 mm)	.375 (9.53mm)	.375 (9.53mm)	.19 (4.76 mm)	.28 (7.14mm)	.62 (15.9mm)	-
MCB14	MCB24	MCBZ4					.19 (4.76 mm)			
MCC14	MCC24	MCCZ4					-			
MCD14	MCD24	MCDZ4					.19 (4.76 mm)			
MCE14	MCE24	MCEZ4					.19 (4.76 mm)			
MCF14	MCF24	MCFZ4					2.00" Sphere Rad.			
MCA15	MCA25	MCAZ5	.625 (15.88mm)	1.25 (31.75 mm)	.415 (10.54mm)	0.500 (12.70 mm)	.25 (6.35 mm)	.375 (9.53mm)	1.00 (25.4mm)	40
MCB15	MCB25	MCBZ5					.19 (4.76 mm)			
MCC15	MCC25	MCCZ5					-			
MCD15	MCD25	MCDZ5					.25 (6.35 mm)			
MCE15	MCE25	MCEZ5					.25 (6.35 mm)			
MCF15	MCF25	MCFZ5					2.00" Sphere Rad.			
MCA16	MCA26	MCAZ6	.750 (19.05 mm)	1.625 (41.275 mm)	.501 (12.72mm)	.625 (15.88 mm)	.31 (7.94 mm)	.375 (9.53mm)	.375 (9.53mm)	45
MCB16	MCB26	MCBZ6					.25 (6.35 mm)			
MCC16	MCC26	MCCZ6					-			
MCD16	MCD26	MCDZ6					.31 (7.94 mm)			
MCE16	MCE26	MCEZ6					.31 (7.94 mm)			
MCF16	MCF26	MCFZ6					4.00" Sphere Rad.			

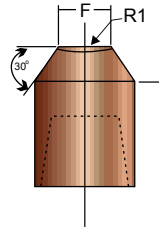
▶ dimensions shown in brackets () are in mm

▶ addition lengths are available on request

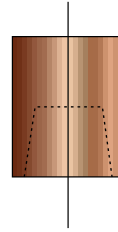
FEMALE CAPS –METRIC-ISO 5821 / NFA 82.104



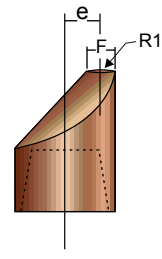
Form "A"



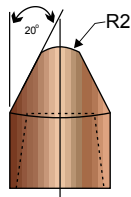
Form "B"



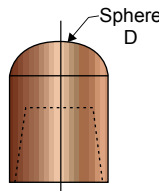
Form "C"



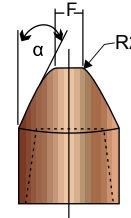
Form "D"



Form "E"



Form "F"



Form "G"

KEY TO ITEM CODE

EXAMPLE :

CM **F** - **13D** - **Z**
 ↓ ↓ ↓ ↓
 Cap Metric Nose Type Major Dia Material : Zr.Cu.
 ISO-5821 13mm (Class 1)

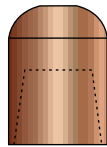
Taper 1:10

ITEM CODE			DIMENSIONS									
Class 1 Zr.Cu.	Class 2 Cr.Cu.	Class 2 Cr.Zr.Cu.	MAJOR DIA "D"	LENGTH "L"	TAPER DIA "T1"	TAPER LENGHT "T2"	WELD FACE DIA "F"	OFFSET ANGLE "α"	R1	R2	e	
CM A-13D-Z	CM A-13D-2	CM A-13D-CZ	13 mm (.512")	18 mm (.709")	10 mm (.394")	8 mm (.315")			32			
CM B-13D-Z	CM B-13D-2	CM B-13D-CZ					5		32			
CM C-13D-Z	CM C-13D-2	CM C-13D-CZ										
CM D-13D-Z	CM D-13D-2	CM D-13D-CZ					5		32		3	
CM E-13D-Z	CM E-13D-2	CM E-13D-CZ									5	
CM F-13D-Z	CM F-13D-2	CM F-13D-CZ										5
CM G-13D-Z	CM G-13D-2	CM G-13D-CZ					5		-			5
CM A-16D-Z	CM A-16D-2	CM A-16D-CZ	16 mm (.625")	20 mm (.787")	12 mm (.472")	10.5 mm (.413")			40			
CM B-16D-Z	CM B-16D-2	CM B-16D-CZ					6		40			
CM C-16D-Z	CM C-16D-2	CM C-16D-CZ										
CM D-16D-Z	CM D-16D-2	CM D-16D-CZ					6		40		4	
CM E-16D-Z	CM E-16D-2	CM E-16D-CZ									6	
CM F-16D-Z	CM F-16D-2	CM F-16D-CZ										6
CM G-16D-Z	CM G-16D-2	CM G-16D-CZ					6		15°		6	
CM A-20D-Z	CM A-20D-2	CM A-20D-CZ	20 mm (.787")	22 mm (.866")	15 mm (.590")	11.5 mm (.452")			50			
CM B-20D-Z	CM B-20D-2	CM B-20D-CZ					8		50			
CM C-20D-Z	CM C-20D-2	CM C-20D-CZ										
CM D-20D-Z	CM D-20D-2	CM D-20D-CZ					8		50		5	
CM E-20D-Z	CM E-20D-2	CM E-20D-CZ									8	
CM F-20D-Z	CM F-20D-2	CM F-20D-CZ										8
CM G-20D-Z	CM G-20D-2	CM G-20D-CZ					8		22.5°		8	

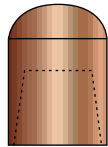
▶ dimensions shown in brackets () are in inches

▶ addition lengths are available on request

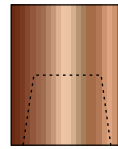
FEMALE CAPS - ASIAN STANDARD



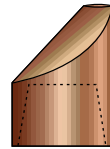
TYPE-D



TYPE-R



TYPE-F



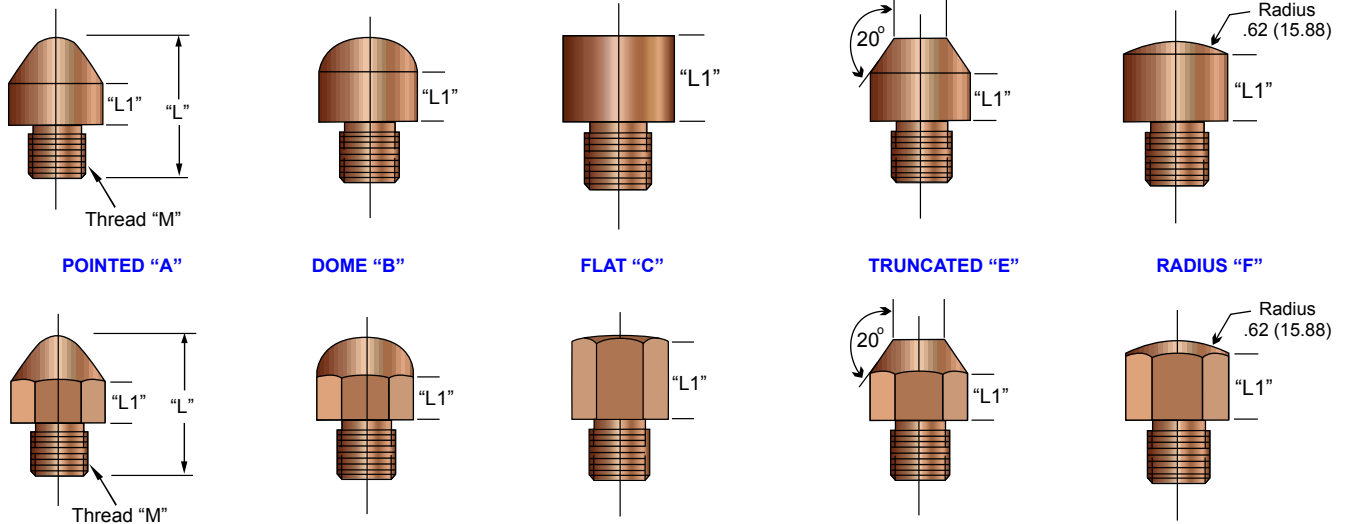
TYPE-E

Common Dimensions Major Dia : 13mm Overall Length : 20mm Taper – 1 : 9.6				
	Zr.Cu. : CD-13D-Z Cu.Cr. : CD-13D-2 CuCrZr : CD-13D-CZ	Zr.Cu. : CD-13R-Z Cu.Cr. : CD-13R-2 CuCrZr : CD-13R-CZ	Zr.Cu. : CD-13F-Z Cu.Cr. : CD-13F-2 CuCrZr : CD-13F-CZ	Zr.Cu. : CD-13E-Z Cu.Cr. : CD-13E-2 CuCrZr : CD-13E-CZ
Major Dia : 16mm Overall Length : 23mm Taper — 1 : 9.6				
	Zr.Cu. : CD-16D-Z Cu.Cr. : CD-16D-2 CuCrZr : CD-16D-CZ	Zr.Cu. : CD-16R-Z Cu.Cr. : CD-16R-2 CuCrZr : CD-16R-CZ	Zr.Cu. : CD-16F-Z Cu.Cr. : CD-16F-2 CuCrZr : CD-16F-CZ	Zr.Cu. : CD-16E-Z Cu.Cr. : CD-16E-2 CuCrZr : CD-16E-CZ

STANDARD BUTTON (Socket) TIPS

Form C (Flat)-Type-1 Class 2 : BT-C1-2 CuCrZr : BT-C1-Z Class 3 : BT-C1-3	Form E (Truncated)-Type-1 Class 2 : BT-E1-2 CuCrZr : BT-E1-Z Class 3 : BT-E1-3	Form D (Offset)-Type-1 Class 2 : BT-D1-2 CuCrZr : BT-D1-Z Class 3 : BT-D1-3	Form F (Radius)-Type-1 Class 2 : BT-F1-2 CuCrZr : BT-F1-Z Class 3 : BT-F1-3
Form C (Flat)-Type-2 Class 2 : BT-C2-2 CuCrZr : BT-C2-Z Class 3 : BT-C2-3	Form E (Truncated)-Type-2 Class 2 : BT-E2-2 CuCrZr : BT-E2-Z Class 3 : BT-E2-3	Form D (Offset)-Type-2 Class 2 : BT-D2-2 CuCrZr : BT-D2-Z Class 3 : BT-D2-3	Form F (Radius)-Type-2 Class 2 : BT-F2-2 CuCrZr : BT-F2-Z Class 3 : BT-F2-3

THREADED TIP



KEY TO ITEM CODE

Nose Type A, B, C, E, F	<p>Dia / Hex in 1/8" (3.18 mm) increment</p> <p>08 = .50" (12.7mm)</p> <p>10 = .625" (15.88mm)</p> <p>12 = .75" (19.02mm)</p> <p>14 = .875" (22.22 mm)</p> <p>16 = 1.00" (25.40mm)</p> <p>18 = 1.125" (28.57mm)</p> <p>20 = 1.25" (31.75mm)</p>
RWMA Class 2 = Class 2 3 = Class 3 Z = Zr.Cr.Cu.	
H = Hex type R = Round type	<p>"L1" in 1/8 or .125(3.18mm) increment</p> <p>Overall Length "L" in .125 (3.18mm) increment</p> <p>02 = 2 x .0625 = .125" (3.18 mm)</p> <p>04 = 4 x .0625 = .25" (6.35 mm)</p> <p>⋮</p> <p>50 = 50 x .0625 = 3.125" (79.37 mm)</p>

TT x x -x - xx - XX xx - M ----- Mention the required Thread

Coding System for making your PART #.

TT H- 3 A 10-12 18 -(5/8-11)

	Thread will be 5/8-11
	Overall Length will be 18 x .0625 = 1.125" (28.57mm)
	"L1" will be 12 x .0625 = .750" (19.02mm)
	Major Hex/ Dia will be .5/8" (15.88 mm)
	Nose type will be Pointed "Form A"
	Will be made from Class 3 Material
	Threaded TIP will be Hex type

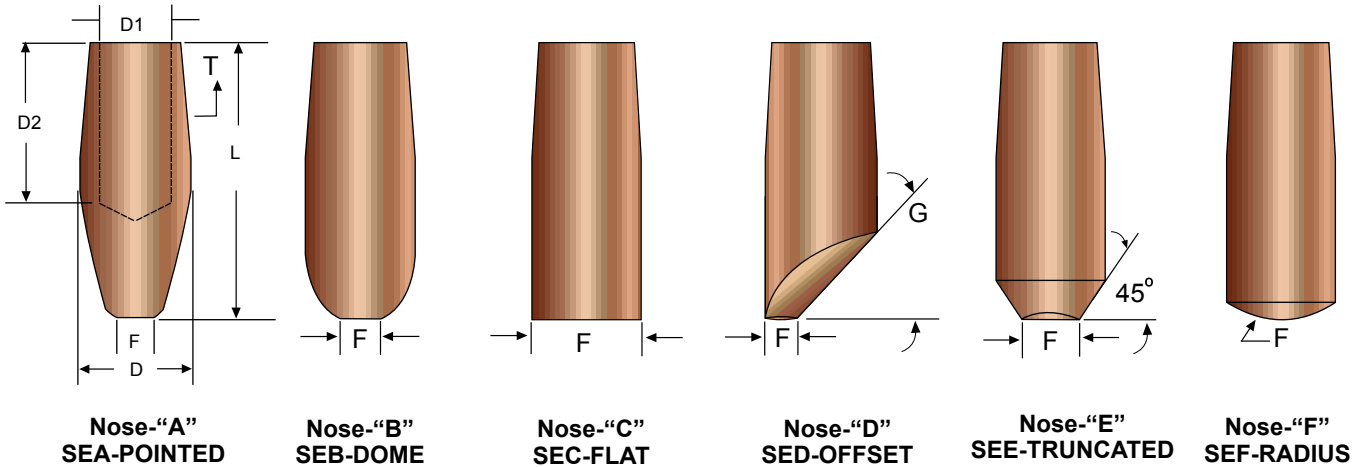
Standard Threaded Tips

ITEM CODE		DIMENSIONS			
Class 2 Cu.Cr.	Class 2 Cu.Cr.Zr.	HEX / Dia "H" / "D"	"L1"	OVERALL LENGTH "L"	THREAD "M"
TTH-2A-08-0410	TTH-ZA-08-0410	.50" (12.7mm)	1/4" (6.35 mm)	5/8" (15.87mm)	Standard Thread type is 3/8-16.
TTH-2A-10-0612	TTH-ZA-10-0612	.625" (15.87mm)	3/8" (9.52 mm)	3/4" (19.05mm)	
TTH-2A-10-0814	TTH-ZA-10-0814		1/2" (12.7 mm)	7/8" (22.23mm)	
TTH-2A-10-1016	TTH-ZA-10-1016		5/8" (15.87 mm)	1" (25.4mm)	
TTH-2A-10-1218	TTH-ZA-10-1218		3/4" (19.05 mm)	1 1/8" (28.57mm)	
TTH-2A-12-1220	TTH-ZA-12-1220		.75" (19.02 mm)	3/4" (19.05 mm)	

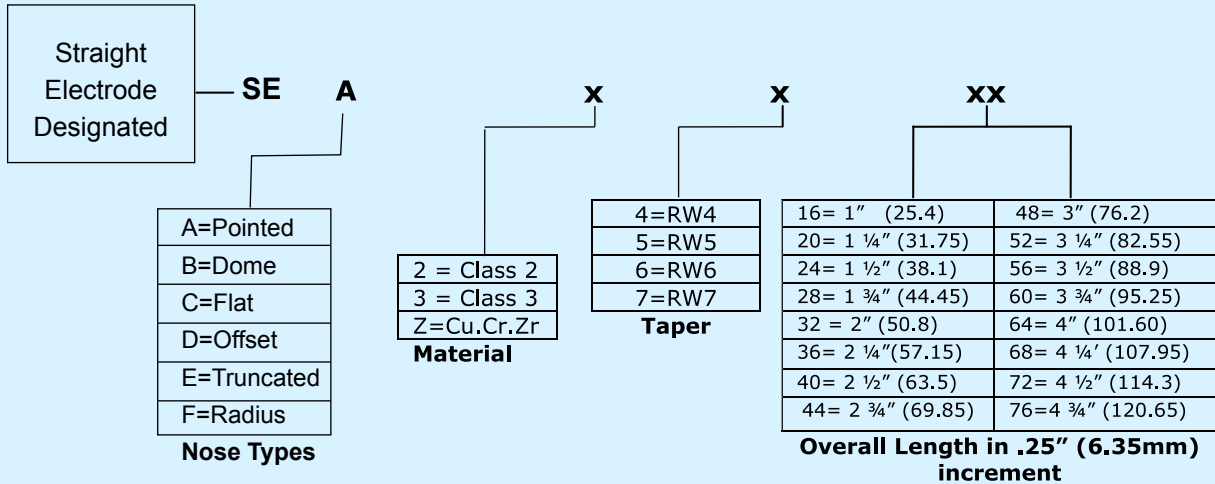
- ▶ Use coding system to order unlisted items.
- ▶ Dimensions shown in brackets () are in mm
- ▶ Other thread sizes are also available.

- ▶ Replace 'E' with '3' for Be.Cu. (Class 3) material.
- ▶ For Round Tips replace "H" with "R"

STRAIGHT ELECTRODES

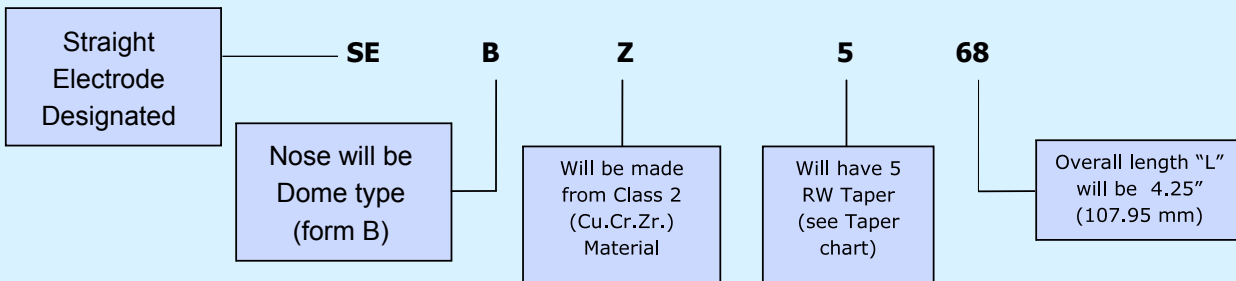


KEY TO ITEM CODE



MAKE YOUR PART NUMBER

EXAMPLE :



NBM Metals

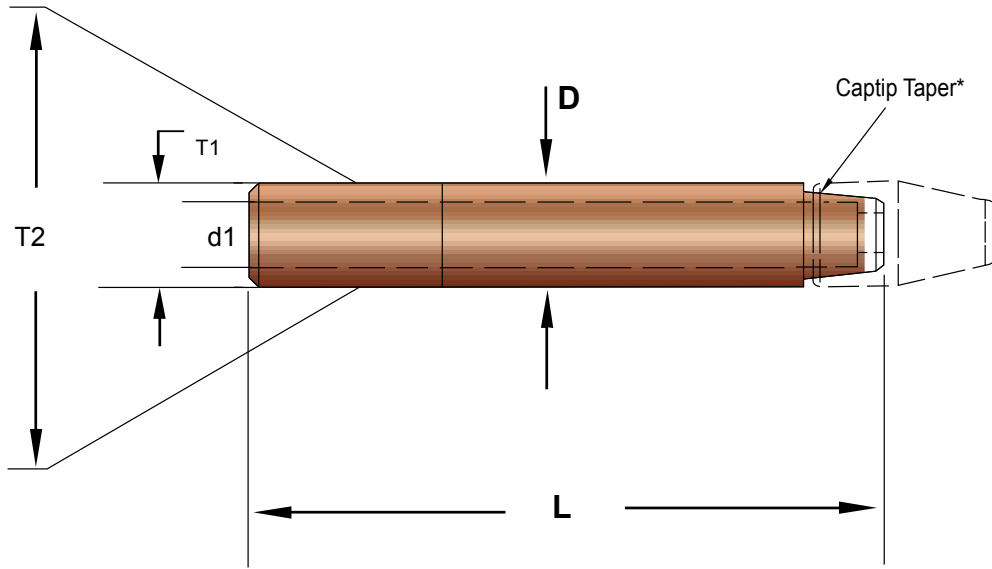
Standard Straight Electrodes

ITEM CODE	DIMENSIONS						
	MAJOR DIA	OVERALL LENGTH	WELD FACE DIA	DRILL DIA	DRILL LENGTH	OFFSET ANGLE	TAPER
	"D"	"L"	"F"	"D1"	"D2"	"G"	"T"
SE*2416	.482 (12.24mm)	1.00 (25.4)	.19 (4.76mm)	.28 (7.14mm)	.625 (15.87)	45°	4 RW MT1
SE*2420		1.25 (31.75)			.75 (19.05)	40°	
SE*2424		1.50 (38.1)			1.00 (25.4)	30°	
SE*2428		1.75 (44.45)			1.25 (31.75)	30°	
SE*2432		2.00(50.80)			1.50 (38.1)	30°	
SE*2436		2.25 (57.15)			1.75 (44.45)	30°	
SE*2440		2.50 (63.50)			2.00 (50.80)	30°	
SE*2444		2.75 (69.85)			2.25 (57.15)	30°	
SE*2448		3.00 (76.20)			2.50 (63.50)	30°	
SE*2452		3.25 (82.55)			2.75 (69.85)	30°	
SE*2456		3.50 (88.90)			3.00 (76.20)	30°	
SE*2460		3.75 (95.25)			3.25 (82.55)	30°	
SE*2464		4.00 (101.60)			3.50 (88.90)	30°	
SE*2516		.625 (15.88mm)			1.00 (25.4)	.25 (6.35mm)	
SE*2520	1.25 (31.75)		.75 (19.05)	40°			
SE*2524	1.50 (38.1)		1.00 (25.4)	30°			
SE*2528	1.75 (44.45)		1.25 (31.75)	30°			
SE*2532	2.00 (50.80)		1.50 (38.1)	30°			
SE*2536	2.25 (57.15)		1.75 (44.45)	30°			
SE*2540	2.50 (63.50)		2.00 (50.80)	30°			
SE*2544	2.75 (69.85)		2.25 (57.15)	30°			
SE*2548	3.00 (76.20)		2.50 (63.50)	30°			
SE*2552	3.25 (82.55)		2.75 (69.85)	30°			
SE*2556	3.50 (88.90)		3.00 (76.20)	30°			
SE*2560	3.75 (95.25)		3.25 (82.55)	30°			
SE*2564	4.00 (101.60)		3.50 (88.90)	30°			
SE*2632	.750 (19.05mm)		2.00 (50.80)	.28 (7.14mm)	.44 (11.11mm)		1.25 (31.75)
SE*2640		2.50 (63.50)	1.75 (44.45)			30°	
SE*2648		3.00 (76.20)	2.25 (57.15)			30°	
SE*2656		3.50 (88.90)	2.75 (69.85)			30°	
SE*2664		4.00 (101.60)	3.25 (82.55)			30°	
SE*2732	.875 (22.23mm)	2.00(50.80)	.31 (7.94mm)	.50 (12.70mm)	1.25 (31.75)	40°	7 RW MT3
SE*2740		2.50 (63.50)			1.75 (44.45)	30°	
SE*2748		3.00 (76.20)			2.25 (57.15)	30°	
SE*2756		3.50 (88.90)			2.75 (69.85)	30°	
SE*2764		4.00 (101.60)			3.25 (82.55)	30°	

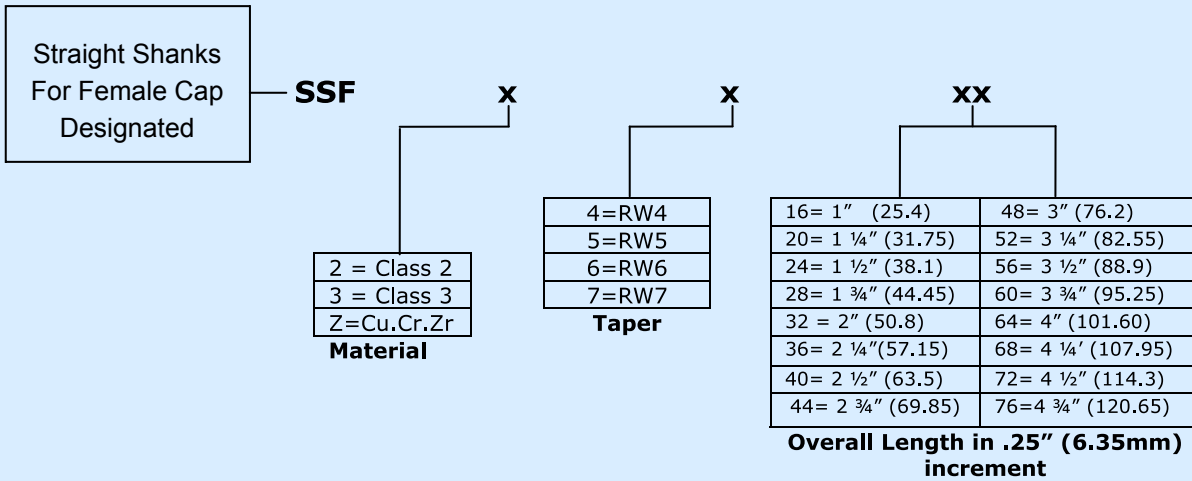
▶ **TO CREATE THE ITEM CODE, REPLACE '*' WITH NOSE TYPE (FORM A,B,C,D,E,F,G)**

- ▶ Use coding system to order unlisted items.
- ▶ See Taper Chart (page # 14) for Taper Dimensions.
- ▶ Dimensions shown in brackets () are in mm
- ▶ Replace 'Z' with '3' for Shanks in Be.Cu. (Class 3) material.

STRAIGHT SHANKS FOR FEMALE CAP ELECTRODES

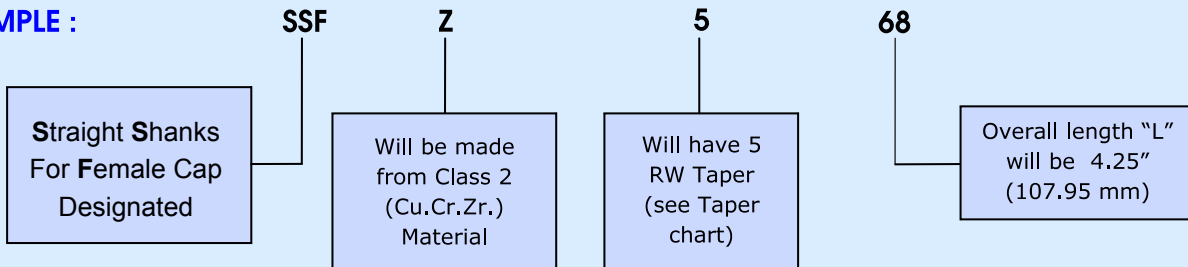


KEY TO ITEM CODE



MAKE YOUR PART NUMBER

EXAMPLE :



NBM Metals

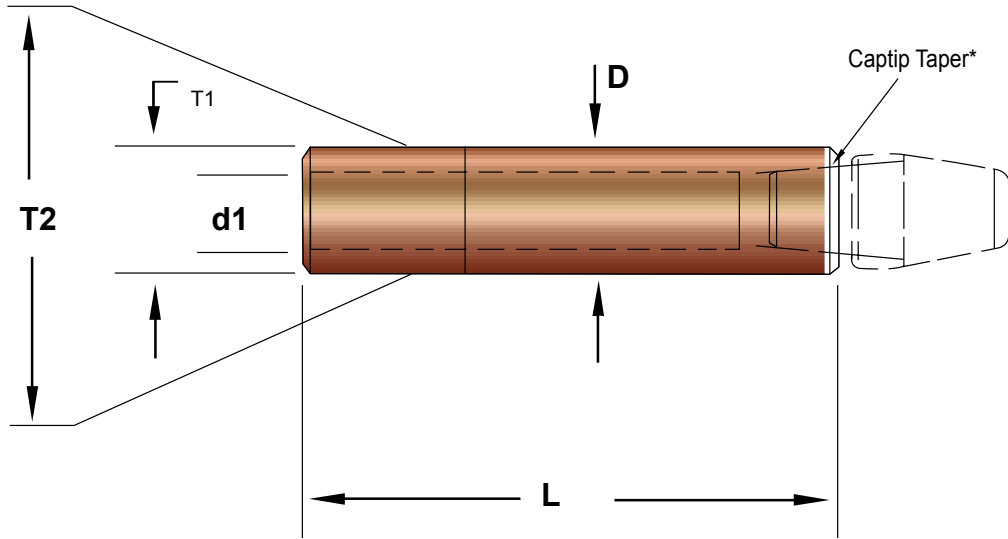
Standard Straight Shanks For Female Caps

ITEM COST		DIMENSIONS					
Class 2 Cr.Cu.	Class 2 Cr.Zr.Cu.	MAJOR DIA "D"	OVERALL LENGTH "L"	Minor Taper Dia "T1"	Dia at Gauge Pt. "T2"	Drill Dia "d1"	Cap-End Taper Dia** "C"
SSF-2416	SSF-Z416	.482 (12.24 mm)	1" (25.4mm)	.438" (11.13 mm)	.463" (11.76 mm)	.28" (7.14 mm)	.402" (10.21 mm)
SSF-2420	SSF-Z420		1 ¼" (31.75mm)				
SSF-2424	SSF-Z424		1 ½" (38.1mm)				
SSF-2428	SSF-Z428		1 ¾" (44.45mm)				
SSF-2432	SSF-Z432		2" (50.8mm)				
SSF-2436	SSF-Z436		2 ¼" (57.15mm)				
SSF-2440	SSF-Z440		2 ½" (63.5mm)				
SSF-2444	SSF-Z444		2 ¾" (69.85mm)				
SSF-2448	SSF-Z448		3" (76.2mm)				
SSF-2452	SSF-Z452		3 ¼" (82.55mm)				
SSF-2456	SSF-Z456		3 ½" (88.9mm)				
SSF-2460	SSF-Z460		3 ¾" (95.25mm)				
SSF-2464	SSF-Z464		4" (101.60mm)				
SSF-2468	SSF-Z468		4 ¼" (107.95mm)				
SSF-2516	SSF-Z516	.625 (15.88 mm)	1" (25.4mm)	.588" (14.94 mm)	.613" (15.57 mm)	.38" (9.53 mm)	.502" (12.75 mm)
SSF-2520	SSF-Z520		1 ¼" (31.75mm)				
SSF-2524	SSF-Z524		1 ½" (38.1mm)				
SSF-2528	SSF-Z528		1 ¾" (44.45mm)				
SSF-2532	SSF-Z532		2" (50.8mm)				
SSF-2536	SSF-Z536		2 ¼" (57.15mm)				
SSF-2540	SSF-Z540		2 ½" (63.5mm)				
SSF-2544	SSF-Z544		2 ¾" (69.85mm)				
SSF-2548	SSF-Z548		3" (76.2mm)				
SSF-2552	SSF-Z552		3 ¼" (82.55mm)				
SSF-2556	SSF-Z556		3 ½" (88.9mm)				
SSF-2560	SSF-Z560		3 ¾" (95.25mm)				
SSF-2564	SSF-Z564		4" (101.60mm)				
SSF-2568	SSF-Z568		4 ¼" (107.95mm)				
SSF-2624	SSF-Z624	.750 (19.05 mm)	1 ½" (38.1mm)	.706" (17.93 mm)	.731" (18.57 mm)	.38" (9.53 mm)	.633" (16.08 mm)
SSF-2628	SSF-Z628		1 ¾" (44.45mm)				
SSF-2632	SSF-Z632		2" (50.8mm)				
SSF-2636	SSF-Z636		2 ¼" (57.15mm)				
SSF-2640	SSF-Z640		2 ½" (63.5mm)				
SSF-2644	SSF-Z644		2 ¾" (69.85mm)				
SSF-2648	SSF-Z648		3" (76.2mm)				
SSF-2652	SSF-Z652		3 ¼" (82.55mm)				
SSF-2656	SSF-Z656		3 ½" (88.9mm)				
SSF-2660	SSF-Z660		3 ¾" (95.25mm)				
SSF-2664	SSF-Z664		4" (101.60mm)				
SSF-2668	SSF-Z668		4 ¼" (107.95mm)				

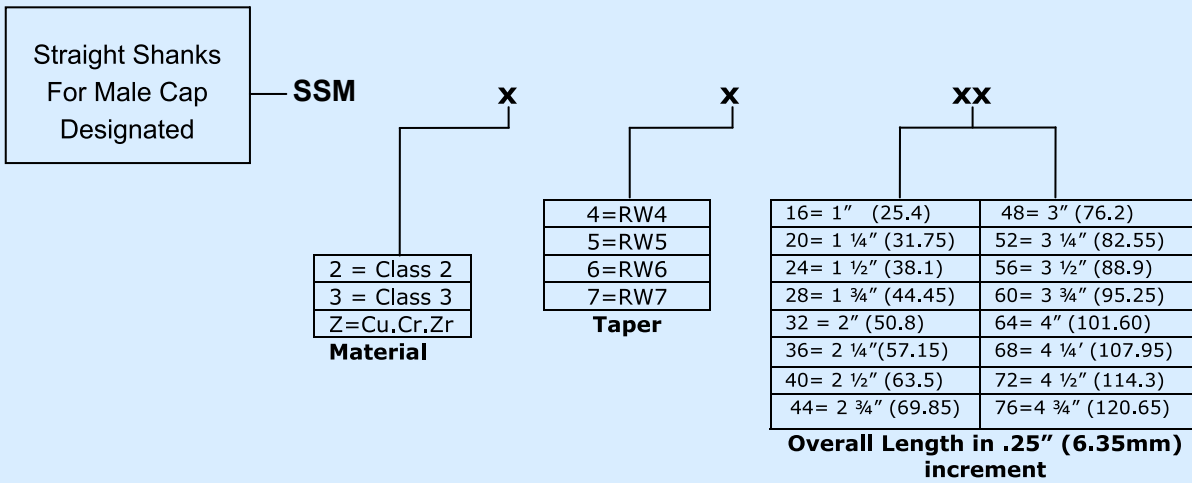
**Cap-end taper is for Female Caps - US Standard. (If shank is required for other type of cap, please mention cap-end taper)

- ▶ Shanks with blind hole can also be ordered by adding "BH" to the basic Item Code.
- ▶ Use coding system to order unlisted items. ▶ See Taper Chart (page # 14) for Taper Dimensions.
- ▶ Dimensions shown in brackets () are in mm ▶ Replace 'Z' with '3' for Shanks in Be.Cu. (Class 3) material.

STRAIGHT SHANKS FOR MALE CAP ELECTRODES

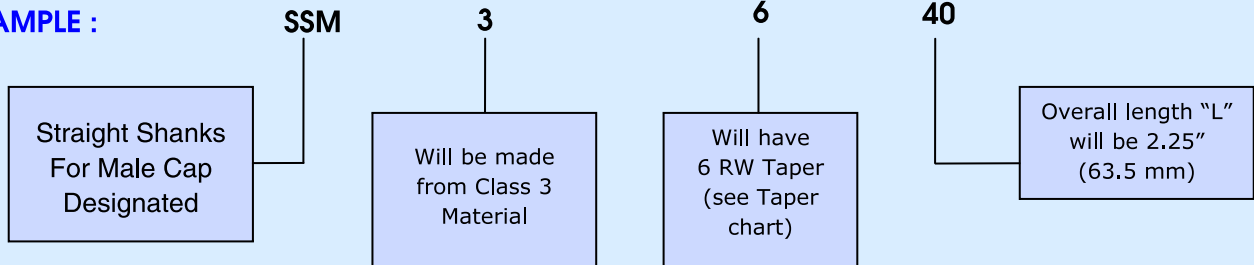


KEY TO ITEM CODE



MAKE YOUR PART NUMBER

EXAMPLE :



NBM Metals

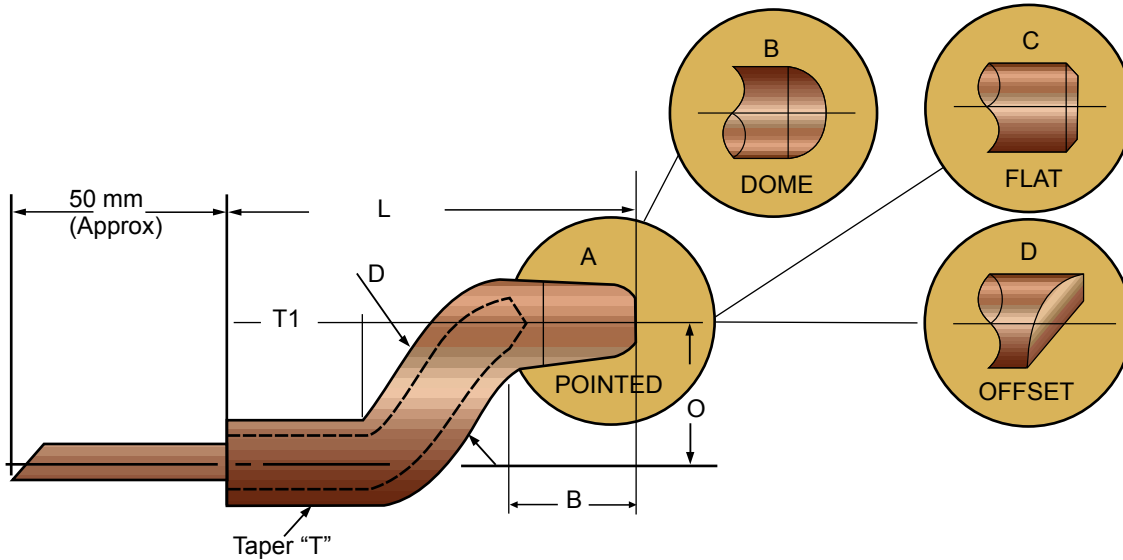
Standard Straight Shanks For Male Caps

ITEM COST		DIMENSIONS					
Class 2 Cr.Cu.	Class 2 Cr.Zr.Cu.	MAJOR DIA "D"	OVERALL LENGTH "L"	Minor Taper Dia "T1"	Dia at Gauge Pt. "T2"	Drill Dia "d1"	Cap-End Taper Dia** "C"
SSM-2416	SSM-Z416	.482 (12.24 mm)	1" (25.4mm)	.438" (11.13 mm)	.463" (11.76 mm)	.28" (7.14 mm)	.375" (9.53 mm)
SSM-2420	SSM-Z420		1 ¼" (31.75mm)				
SSM-2424	SSM-Z424		1 ½" (38.1mm)				
SSM-2428	SSM-Z428		1 ¾" (44.45mm)				
SSM-2432	SSM-Z432		2" (50.8mm)				
SSM-2436	SSM-Z436		2 ¼" (57.15mm)				
SSM-2440	SSM-Z440		2 ½" (63.5mm)				
SSM-2444	SSM-Z444		2 ¾" (69.85mm)				
SSM-2448	SSM-Z448		3" (76.2mm)				
SSM-2452	SSM-Z452		3 ¼" (82.55mm)				
SSM-2456	SSM-Z456		3 ½" (88.9mm)				
SSM-2460	SSM-Z460		3 ¾" (95.25mm)				
SSM-2464	SSM-Z464		4" (101.60mm)				
SSM-2468	SSM-Z468		4 ¼" (107.95mm)				
SSM-2516	SSM-Z516	.625 (15.88 mm)	1" (25.4mm)	.588" (14.94 mm)	.613" (15.57 mm)	.38" (9.53 mm)	.415" (10.54 mm)
SSM-2520	SSM-Z520		1 ¼" (31.75mm)				
SSM-2524	SSM-Z524		1 ½" (38.1mm)				
SSM-2528	SSM-Z528		1 ¾" (44.45mm)				
SSM-2532	SSM-Z532		2" (50.8mm)				
SSM-2536	SSM-Z536		2 ¼" (57.15mm)				
SSM-2540	SSM-Z540		2 ½" (63.5mm)				
SSM-2544	SSM-Z544		2 ¾" (69.85mm)				
SSM-2548	SSM-Z548		3" (76.2mm)				
SSM-2552	SSM-Z552		3 ¼" (82.55mm)				
SSM-2556	SSM-Z556		3 ½" (88.9mm)				
SSM-2560	SSM-Z560		3 ¾" (95.25mm)				
SSM-2564	SSM-Z564		4" (101.60mm)				
SSM-2568	SSM-Z568		4 ¼" (107.95mm)				
SSM-2624	SSM-Z624	.750 (19.05 mm)	1 ½" (38.1mm)	.706" (17.93 mm)	.731" (18.57 mm)	.44" (11.11mm)	.501" (12.73 mm)
SSM-2628	SSM-Z628		1 ¾" (44.45mm)				
SSM-2632	SSM-Z632		2" (50.8mm)				
SSM-2636	SSM-Z636		2 ¼" (57.15mm)				
SSM-2640	SSM-Z640		2 ½" (63.5mm)				
SSM-2644	SSM-Z644		2 ¾" (69.85mm)				
SSM-2648	SSM-Z648		3" (76.2mm)				
SSM-2652	SSM-Z652		3 ¼" (82.55mm)				
SSM-2656	SSM-Z656		3 ½" (88.9mm)				
SSM-2660	SSM-Z660		3 ¾" (95.25mm)				
SSM-2664	SSM-Z664		4" (101.60mm)				
SSM-2668	SSM-Z668		4 ¼" (107.95mm)				

**Cap-end taper is for Male Caps shown on page # 16 (If shank is required for other type of cap, please mention cap-end taper)

- ▶ Shanks with blind hole can also be ordered by adding "BH" to the basic Item Code.
- ▶ Use coding system to order unlisted items. ▶ See Taper Chart (page # 14) for Taper Dimensions.
- ▶ Dimensions shown in brackets () are in mm ▶ Replace 'Z' with '3' for Shanks in Be.Cu. (Class 3) material.

DOUBLE BEND ELECTRODES



KEY TO ITEM CODE

4,5,6,7
RW No.

RWMA Alloy
Class 2,3
Z= Cu.Cr.Zr.

Nose Type
A,B,C,D,E,F

DOUBLE BEND
Electrode Designation

DB x - x x - x x - xx xx **N** Add N to the basic Item Code for without water tube.

A=Pointed
B=Dome
C=Flat
D=Offset

FORM

2 = Class 2

3 = Class 3

Z = Cu.Cr.Zr.

MATERIAL

4=RW4

5=RW5

6=RW6

7=RW7

TAPER

2 = 3/4" (19)
3 = 7/8" (22.22)
4 = 1" (25.4)
5 = 1 1/8" (28.57)
6 = 1 1/4" (31.75)
7 = 1 1/2" (38.1)
8 = 1 3/4" (44.45)
9 = 2" (50.8)

Nose & Taper length

32= 2" (50.8)
36= 2 1/4" (57.15)
40= 2 1/2" (63.5)
44= 2 3/4" (69.85)
48= 3" (76.2)
52= 3 1/4" (82.55)
56= 3 1/2" (88.9)
60= 3 3/4" (95.25)

Overall length

08= 1/2" (12.5)
12= 3/4" (19.05)
16= 1" (25.4)
20= 1 1/4" (31.75)
24= 1 1/2" (38.1)
28= 1 3/4" (44.45)

Offset

EXAMPLE

DB A-2 5 -3 2 -48 20

Offset length "O" will be 20 x .0625 = 1.25" (31.75 mm)
Overall length "L" will be 48 x .0625 = 3" (76.2 mm)
Taper length "T1" will be 3/4" (19 mm)
Nose length "B" will be 7/8" (22.22 mm)
Will have 5 RW Taper (see Taper chart)
Will be made from Class 2 (Cu.Cr.) Material
Nose Type will be Form A (Pointed)

NBM Metals

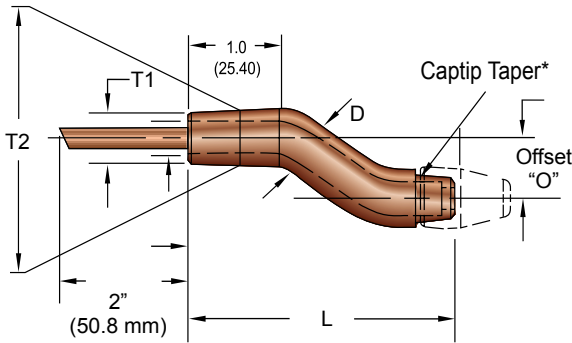
Standard Double Bend Electrodes

ITEM CODE	DIMENSIONS						
	OFFSET "O"	TAPER SIZE	OVERALL LENGTH "L"	NOSE LENGTH "B"	TAPER LENGTH "T1"	Major Dia "D"	
DB*-24-23-3208	1/2" (12.5 mm)	4RW	2" (50.8)	3/4" (19)	7/8" (22.22)	.482" (12.24 mm)	
DB*-24-23-4008			2 1/2" (63.5)	3/4" (19)	7/8" (22.22)		
DB*-24-93-5208			3 1/4" (82.55)	2" (50.8)	7/8" (22.22)		
DB*-25-44-4008		5RW	2 1/2" (63.5)	1" (25.4)	1" (25.4)		.625" (15.88mm)
DB*-25-44-4408			2 3/4" (69.85)	1" (25.4)	1" (25.4)		
DB*-25-44-5208			3 1/4" (82.55)	1" (25.4)	1" (25.4)		
DB*-25-94-5608	3 1/2" (88.9)	2" (50.8)	1" (25.4)				
DB*-24-23-3212	3/4" (19.05)	4RW	2" (50.8)	3/4" (19)	7/8" (22.22)	.482" (12.24 mm)	
DB*-24-23-4012			2 1/2" (63.5)	3/4" (19)	7/8" (22.22)		
DB*-24-93-5612			3 1/2" (88.9)	2" (50.8)	7/8" (22.22)		
DB*-25-44-4412		5RW	2 3/4" (69.85)	1" (25.4)	1" (25.4)		.625" (15.88mm)
DB*-25-44-4812			3" (76.2)	1" (25.4)	1" (25.4)		
DB*-25-94-5612			3 1/2" (88.9)	2" (50.8)	1" (25.4)		
DB*-24-23-3616	1.00" (25.4)	4RW	2 1/4" (57.15)	3/4" (19)	7/8" (22.22)	.482" (12.24 mm)	
DB*-24-23-4416			2 3/4" (69.85)	3/4" (19)	7/8" (22.22)		
DB*-24-83-5216			3 1/4" (82.55)	1 3/4" (44.45)	7/8" (22.22)		
DB*-24-23-5216		3 1/2" (88.9)	3/4" (19)	7/8" (22.22)			
DB*-25-44-4416		5RW	2 3/4" (69.85)	1" (25.4)	1" (25.4)		.625" (15.88mm)
DB*-25-44-4816			3" (76.2)	1" (25.4)	1" (25.4)		
DB*-25-44-5616	3 1/2" (88.9)		1" (25.4)	1" (25.4)			
DB*-25-84-5616	3 1/2" (88.9)	1 3/4" (44.45)	1" (25.4)				
DB*-24-23-4020	1 1/4" (31.75)	4RW	2 1/2" (63.5)	3/4" (19)	7/8" (22.22)	.482" (12.24 mm)	
DB*-24-23-4820			3" (76.2)	3/4" (19)	7/8" (22.22)		
DB*-24-73-4820			3" (76.2)	1 1/2" (38.1)	7/8" (22.22)		
DB*-25-44-4420		5RW	2 3/4" (69.85)	1" (25.4)	1" (25.4)		.625" (15.88mm)
DB*-25-44-5220			3 1/4" (82.55)	1" (25.4)	1" (25.4)		
DB*-25-44-5620			3 1/2" (88.9)	1" (25.4)	1" (25.4)		
DB*-25-74-5620	3 1/2" (88.9)	1 1/2" (38.1)	1" (25.4)				
DB*-25-84-5620	3 1/2" (88.9)	1 3/4" (44.45)	1" (25.4)				
DB*-25-44-4424	1 1/2" (38.1)	5 RW	2 3/4" (69.85)	1" (25.4)	1" (25.4)	.625" (15.88mm)	
DB*-25-64-4824			3" (76.2)	1 1/4" (31.75)	1" (25.4)		
DB*-25-44-4428	1 3/4" (44.45)	5RW	2 3/4" (69.85)	1" (25.4)	1" (25.4)	.625" (15.88mm)	
DB*-25-64-4828			3" (76.2)	1 1/4" (31.75)	1" (25.4)		

▶ TO CREATE THE ITEM CODE, REPLACE '*' WITH NOSE TYPE (FORM A,B,C,D)

- ▶ Use coding system to order unlisted items. ▶ See Taper Chart (page # 14) for Taper Dimensions.
- ▶ Dimensions shown in brackets () are in mm

OFFSET SHANKS FOR FEMALE CAP ELECTRODES



KEY TO ITEM CODE

Offset Shanks For Female Cap Designation

OSF **x** - **x** **xx** **xx** **N** (without water tube)

<p>Material</p> <p>2 = Class 2 3 = Class 3 Z = Cu, Cr, Zr</p>	<p>Taper</p> <p>4 = RW4 5 = RW5 6 = RW6 7 = RW7</p>	<p>Overall length</p> <p>In .25 (6.35mm) increment</p> <p>40 = 2 1/2" (63.5) 44 = 2 3/4" (69.85) 48 = 3" (76.2) 52 = 3 1/4" (82.55) 56 = 3 1/2" (88.9)</p>	<p>Offset length</p> <p>in .25 (6.35mm) increment</p> <p>04 = 1/4" (6.35) 08 = 1/2" (12.5) 12 = 3/4" (19.05) 16 = 1" (25.4) 20 = 1 1/4" (31.75) 24 = 1 1/2" (38.1) 28 = 1 3/4" (44.45)</p>
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EXAMPLE

OSF 2 5 48 20

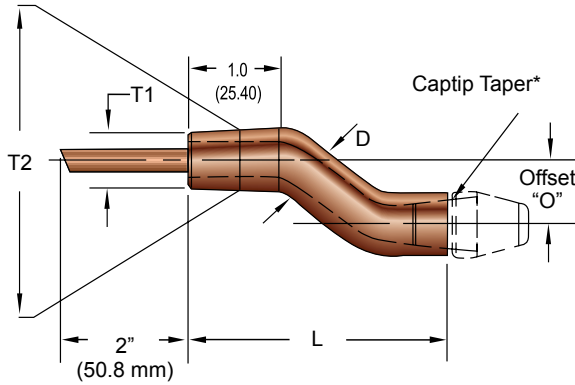
Offset length "O" will be 20 x .0625 = 1.25" (31.75 mm)
Overall length "L" will be 48 x .0625 = 3" (76.2 mm)
Will have 5 RW Taper (see Taper chart)
Will be made from Class 2 Material

Offset Shanks for Female Cap Electrodes

ITEM COST		DIMENSIONS					
Class 2 Cr, Cu.	Class 2 Cr, Zr, Cu.	MAJOR DIA "D"	OVERALL LENGTH "L"	Minor Taper Dia "T1"	Gauging Taper Dia "T2"	Offset "O"	Cap End Taper Dia** "C"
OSF24-4004	OSFZ4-4004	.482 (12.24 mm)	2 1/2" (63.5mm)	.438" (11.13mm)	.463" (11.76mm)	1/4" (6.35mm)	.402" (10.21 mm)
OSF24-4008	OSFZ4-4008		2 1/2" (63.5mm)			1/2" (12.5)	
OSF24-4408	OSFZ4-4408		2 3/4" (69.85)			1/2" (12.5)	
OSF24-4412	OSFZ4-4412		2 3/4" (69.85)			3/4" (19.05)	
OSF24-4808	OSFZ4-4808		3" (76.2)			1/2" (12.5)	
OSF24-4812	OSFZ4-4812		3" (76.2)			3/4" (19.05)	
OSF24-4816	OSFZ4-4816		3" (76.2)			1" (25.4)	
OSF24-5212	OSFZ4-5212		3 1/4" (82.55)			1/2" (12.5)	
OSF24-5216	OSFZ4-5216		3 1/4" (82.55)			1" (25.4)	
OSF24-5220	OSFZ4-5220		3 1/4" (82.55)			1 3/4" (44.45)	
OSF25-4004	OSFZ5-4004	.625 (15.88 mm)	2 1/2" (63.5mm)	.588" (14.94mm)	.613" (15.57mm)	1/4" (6.35mm)	.502" (12.75 mm)
OSF25-4008	OSFZ5-4008		2 1/2" (63.5mm)			1/2" (12.5)	
OSF25-4408	OSFZ5-4408		2 3/4" (69.85)			1/2" (12.5)	
OSF25-4412	OSFZ5-4412		2 3/4" (69.85)			3/4" (19.05)	
OSF25-4808	OSFZ5-4808		3" (76.2)			1/2" (12.5)	
OSF25-4812	OSFZ5-4812		3" (76.2)			3/4" (19.05)	
OSF25-4816	OSFZ5-4816		3" (76.2)			1" (25.4)	
OSF25-5212	OSFZ5-5212		3 1/4" (82.55)			1/2" (12.5)	
OSF25-5216	OSFZ5-5216		3 1/4" (82.55)			1" (25.4)	
OSF25-5220	OSFZ5-5220		3 1/4" (82.55)			1 3/4" (44.45)	

- ***Cap-end taper is for Female Caps- US Standard. (If shank is required for other type of cap, please mention cap-end taper)
- ▶ Shanks with blind hole can also be ordered by adding "BH" to the basic Item Code.
 - ▶ Use coding system to order unlisted items.
 - ▶ Dimensions shown in brackets () are in mm
 - ▶ See Taper Chart (page # 14) for Taper Dimensions.
 - ▶ Replace 'Z' with '3' for Shanks in Be.Cu. (Class 3) material.

OFFSET SHANKS FOR MALE CAP ELECTRODES



KEY TO ITEM CODE

Offset Shanks For Male Cap Designation

OSM x - x xx xx N (without water tube)

2 = Class 2 3 = Class 3 Z=Cu.Cr.Zr	4=RW4 5=RW5 6=RW6 7=RW7	40= 2 1/2" (63.5) 44= 2 3/4" (69.85) 48= 3" (76.2) 52= 3 1/4" (82.55) 56= 3 1/2" (88.9)	04=1/4" (6.35) 08= 1/2" (12.5) 12= 3/4" (19.05) 16= 1" (25.4) 20= 1 1/4" (31.75) 24= 1 1/2" (38.1) 28= 1 3/4" (44.45)
Material	Taper	Overall length In .25(6.35mm) increment	Offset length in .25(6.35mm) increment

EXAMPLE

OSM 2 5 48 24

Offset length "O" will be 24 x .0625 = 1.50" (38.1 mm)
Overall length "L" will be 48 x .0625 = 3" (76.2 mm)
Will have 5 RW Taper (see Taper chart)
Will be made from Class 2 Material

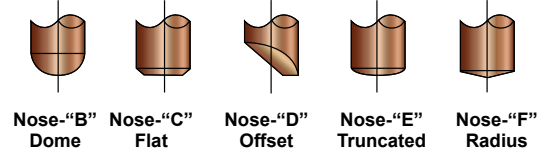
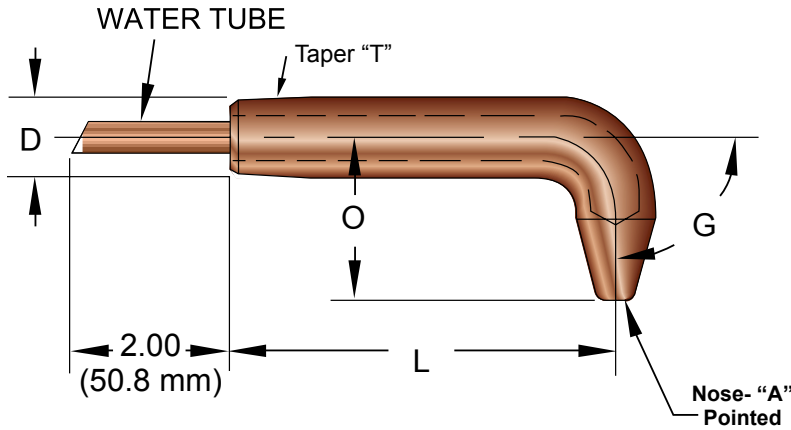
Offset Shanks for Male Cap Electrodes

ITEM COST		DIMENSIONS					
Class 2 Cr.Cu	Class 2 Cr.Zr.Cu.	MAJOR DIA "D"	OVERALL LENGTH "L"	Minor Taper Dia "T1"	Gauging Taper Dia "T2"	Offset "O"	Cap End Taper Dia** "C"
OSM24-4004	OSMZ4-4004	.482 (12.24 mm)	2 1/2" (63.5mm)	.438" (11.13mm)	.463" (11.76mm)	1/4" (6.35mm)	.375" (9.53 mm)
OSM24-4008	OSMZ4-4008		2 1/2" (63.5mm)			1/2" (12.5)	
OSM24-4408	OSMZ4-4408		2 3/4" (69.85)			1/2" (12.5)	
OSM24-4412	OSMZ4-4412		2 3/4" (69.85)			3/4" (19.05)	
OSM24-4808	OSMZ4-4808		3" (76.2)			1/2" (12.5)	
OSM24-4812	OSMZ4-4812		3" (76.2)			3/4" (19.05)	
OSM24-4816	OSMZ4-4816		3" (76.2)			1" (25.4)	
OSM24-5212	OSMZ4-5212		3 1/4" (82.55)			1/2" (12.5)	
OSM24-5216	OSMZ4-5216		3 1/4" (82.55)			1" (25.4)	
OSM24-5220	OSMZ4-5220		3 1/4" (82.55)			1 3/4" (44.45)	
OSM25-4004	OSMZ5-4004	.625 (15.88 mm)	2 1/2" (63.5mm)	.588" (14.94mm)	.613" (15.57mm)	1/4" (6.35mm)	.415" (10.54 mm)
OSM25-4008	OSMZ5-4008		2 1/2" (63.5mm)			1/2" (12.5)	
OSM25-4408	OSMZ5-4408		2 3/4" (69.85)			1/2" (12.5)	
OSM25-4412	OSMZ5-4412		2 3/4" (69.85)			3/4" (19.05)	
OSM25-4808	OSMZ5-4808		3" (76.2)			1/2" (12.5)	
OSM25-4812	OSMZ5-4812		3" (76.2)			3/4" (19.05)	
OSM25-4816	OSMZ5-4816		3" (76.2)			1" (25.4)	
OSM25-5212	OSMZ5-5212		3 1/4" (82.55)			1/2" (12.5)	
OSM25-5216	OSMZ5-5216		3 1/4" (82.55)			1" (25.4)	
OSM25-5220	OSMZ5-5220		3 1/4" (82.55)			1 3/4" (44.45)	

**Cap-end taper is for Male Caps- shown on page # 16 (If shank is required for other type of cap, please mention cap-end taper)

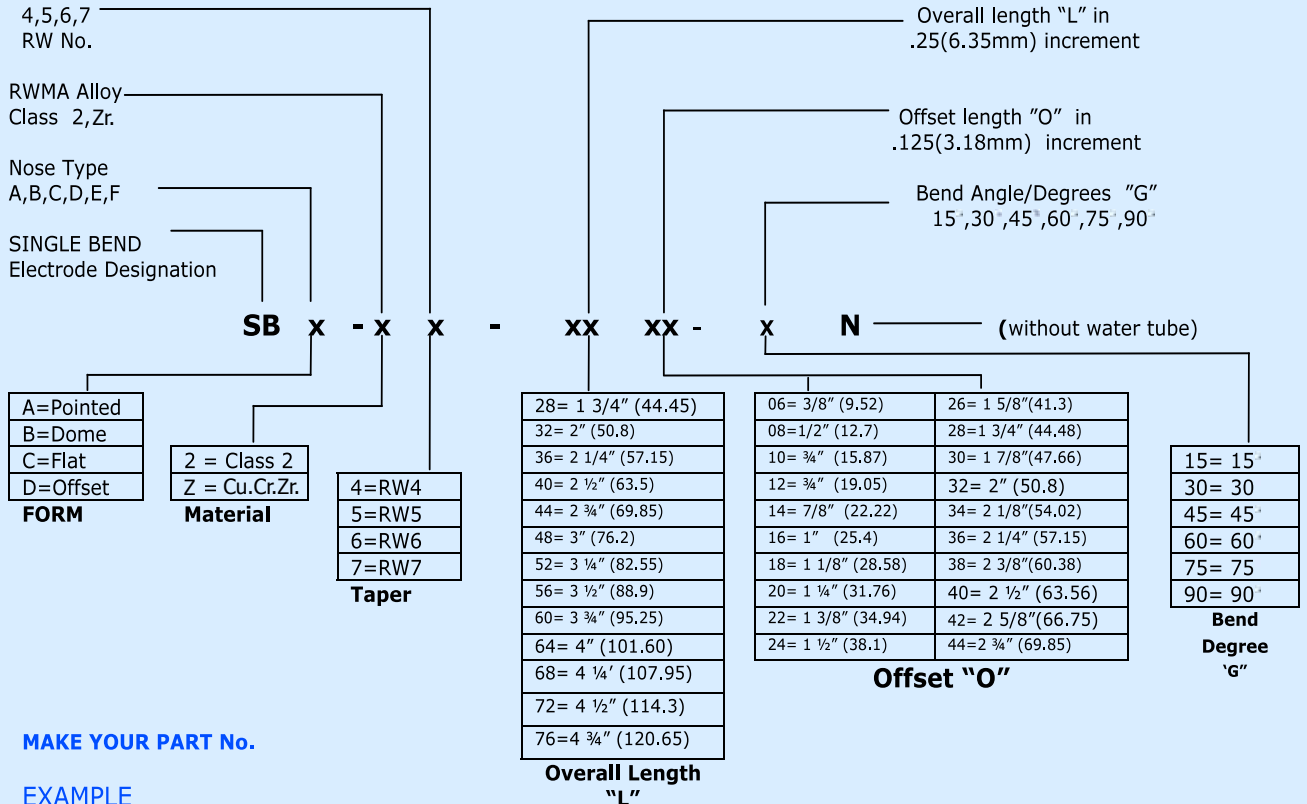
- ▶ Shanks with blind hole can also be ordered by adding "BH" to the basic Item Code.
- ▶ Use coding system to order unlisted items.
- ▶ Dimensions shown in brackets () are in mm
- ▶ See Taper Chart (page # 14) for Taper Dimensions.
- ▶ Replace 'Z' with '3' for Shanks in Be.Cu. (Class 3) material.

SINGLE BEND ELECTRODES



(For other Dimensions of Nose, refer State Electrodes chart)

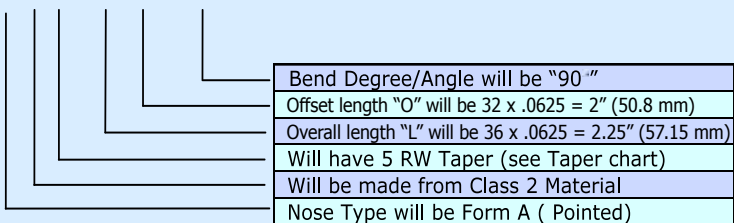
KEY TO ITEM CODE



MAKE YOUR PART No.

EXAMPLE

SB A-2 5- 36 32 - 90



NBM Metals

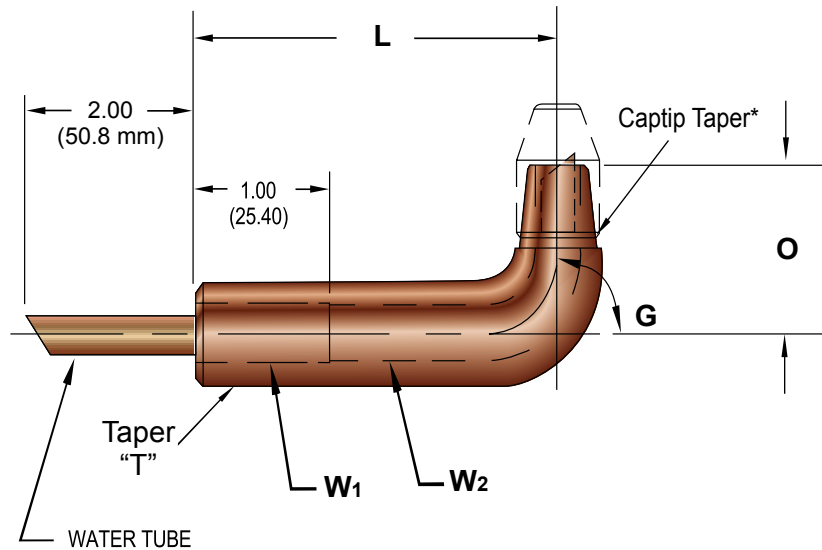
Standard Single Bend Electrodes

ITEM CODE	DIMENSIONS					
	Class 2 Cr.Cu.	OFFSET "O"	TAPER SIZE "T"	Major Dia "D"	OVERALL LENGTH "L"	Bend Angle/Degree "G"
SE*-24-2812-15	3/4" (19.05)	4RW	.482" (12.24 mm)	1 3/4" (44.48)	15°	
SE*-24-4814-15	7/8" (22.22)			3" (76.2)		
SE*-24-5220-15	1 1/4" (31.76)			3 1/4" (82.55)		
SE*-25-3214-15	7/8" (22.22)	5RW	.625" (15.88mm)	2" (50.8)		
SE*-25-4818-15	1 1/8" (28.58)			3" (76.2)		
SE*-25-5628-15	1 1/2" (38.1)			3 1/2" (88.9)		
SE*-24-3216-30	1" (25.4)	4RW	.482" (12.24 mm)	2" (50.8)		30°
SE*-24-4820-30	1 1/4" (31.76)			3" (76.2)		
SE*-24-5228-30	1 3/4" (44.48)			3 1/4" (82.55)		
SE*-25-3616-30	1" (25.4)	5RW	.625" (15.88mm)	2 1/4" (57.15)		
SE*-25-4822-30	1 3/8" (34.94)			3" (76.2)		
SE*-25-5632-15	2" (50.8)			3 1/2" (88.9)		
SE*-24-3220-45	1 1/4" (31.76)	4RW	.482" (12.24 mm)	2" (50.8)	45°	
SE*-24-4828-45	1 3/4" (44.48)			3" (76.2)		
SE*-24-5634-45	2 1/8" (54.02)			3 1/2" (88.9)		
SE*-25-3622-45	1 3/8" (34.94)	5RW	.625" (15.88mm)	2 1/4" (57.15)		
SE*-25-5228-45	1 3/4" (44.48)			3 1/4" (82.55)		
SE*-25-6034-45	2 1/8" (54.02)			3 3/4" (95.25)		
SE*-24-4020-60	1 1/4" (31.76)	4RW	.482" (12.24 mm)	2 1/2" (63.5)		60°
SE*-24-5228-60	1 1/4" (31.76)			3 1/4" (82.55)		
SE*-24-6436-60	2 1/4" (57.15)			4" (101.60)		
SE*-25-4422-60	1 3/8" (34.94)	5RW	.625" (15.88mm)	2 3/4" (69.85)		
SE*-25-5630-60	1 7/8" (47.66)			3 1/2" (88.9)		
SE*-25-6438-60	2 3/8" (60.38)			4" (101.60)		
SE*-24-4822-75	1 3/8" (34.94)	4RW	.482" (12.24 mm)	3" (76.2)	75°	
SE*-24-6442-75	2 5/8" (66.75)			4" (101.60)		
SE*-25-5228-75	1 3/4" (44.48)	5RW	.625" (15.88mm)	3 1/4" (82.55)		
SE*-25-6838-75	2 1/4" (57.15)			4 1/4" (107.95)		
SE*-24-5628-90	1 3/4" (44.48)	4RW	.482" (12.24 mm)	3 1/2" (88.9)		90°
SE*-24-6836-90	2 1/4" (57.15)			4 1/4" (107.95)		
SE*-25-5630-90	1 7/8" (47.66)	5RW	.625" (15.88mm)	3 1/2" (88.9)		
SE*-25-6840-90	2 1/2" (63.56)			4 1/4" (107.95)		

▶ TO CREATE THE ITEM CODE, REPLACE '*' WITH NOSE TYPE (FORM A,B,C,D)

- ▶ Use coding system to order unlisted items.
- ▶ See Taper Chart (page # 14) for Taper Dimensions.
- ▶ Dimensions shown in brackets () are in mm

SINGLE BEND ADAPTER FOR FEMALE CAPS



KEY TO ITEM CODE

Adapter Dia/Taper
RWMA Alloy Class 2,3
Z=Cu,Cr,Zr.
Single BEND Adapter for Female Cap Designation

SBAF X X - XX XX - X N (without water tube)

Adapter Dia	Overall Length "L"	Offset "O"	Bend Degree "G"
5S=Dia .62"(15.88) Straight Shank	40= 2 1/2" (63.5)	16= 1" (25.4)	30= 30°
6S=Dia .75"(19.02) Straight Shank	44= 2 3/4" (69.85)	18= 1 1/8" (28.58)	45= 45°
7S=Dia .88"(22.35) Straight Shank	48= 3" (76.2)	20= 1 1/4" (31.76)	60= 60°
5=RW5 Taper Shank	52= 3 1/4" (82.55)	22= 1 3/8" (34.94)	75= 75°
6=RW6 Taper Shank	56= 3 1/2" (88.9)	24= 1 1/2" (38.1)	90= 90°
7=RW7 Taper Shank	60= 3 3/4" (95.25)	26= 1 5/8" (41.3)	
	64= 4" (101.60)	28= 1 3/4" (44.48)	
	68= 4 1/4" (107.95)	30= 1 7/8" (47.66)	
	72= 4 1/2" (114.3)		
	76= 4 3/4" (120.65)		

MAKE YOUR PART No.

CODING SYSTEM

SBAF- 2 7S- 48 32 -45

Bend Degree/Angle will be "45"
Offset length "O" will be 32 x .0625 = 2" (50.8 mm)
Overall length "L" will be 48 x .0625 = 3" (76.2 mm)
Will be a Dia .88"(22.35) Straight Shank (W/O Taper)
Will be made from Class 2(Cu,Cr.) Material

Chart for Other Dimensions

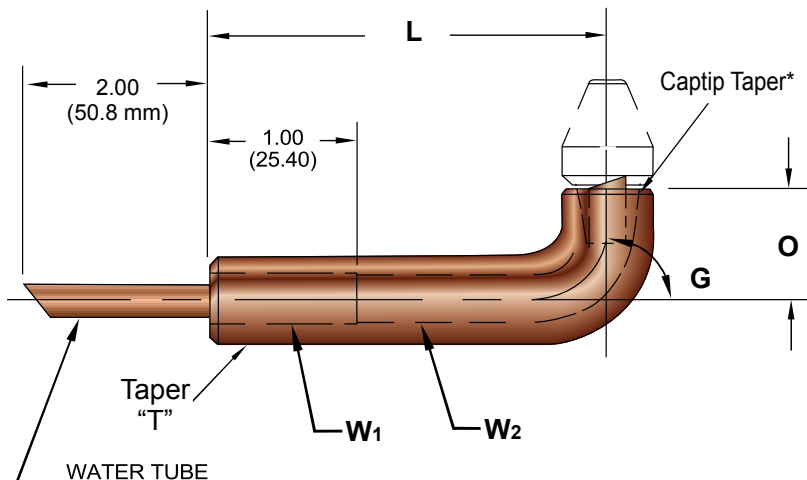
Major Dia "D"	Overall Length "L"	Offset "O"	Bend Degree/ Angle "G"	CAP DIA	Cap-End Taper Dia**	Hole Dia "W1"	Hole Dia "W2"
.625" (15.88mm)	As per Coding System			.500" (12.7 mm)	.394" (10.01 mm)	.38" (9.65 mm)	.28" (7.11 mm)
.750" (19.05mm)				.625" (15.88 mm)	.495" (12.57 mm)	.38" (9.65 mm)	.31" (7.87 mm)
.88" (22.35mm)				.750" (19.05 mm)	.625" (15.88 mm)	.38" (9.65 mm)	.34" (8.64 mm)

**Cap-end taper is for Female Caps- US Standard. (If shank is required for other type of cap, please mention cap-end taper)

▶ USE CODING SYSTEM GENERATING THE ITEM CODE.
▶ See Taper Chart (page # 14) for Taper Dimensions.

▶ Dimensions shown in brackets () are in mm

SINGLE BEND ADAPTER FOR MALE CAPS



KEY TO ITEM CODE

Adapter Dia/Taper ———— Overall length "L" in .25(6.35mm) increment
Minimum Length will be 2.5" (63.5mm)

RWMA Alloy Class 2,3
Z=Cu.Cr.Zr. ———— Offset length "O" in .125(3.18mm) increment

Single Bend Adapter for Male Cap Designation ———— Bend Angle/Degrees "G"
15 ,30,45 ,60 ,75 ,90

SBAM X X - XX XX - X N (without water tube)

Adapter Dia	Overall Length "L"	Offset "O"	Bend Degree "G"
5S = Dia .62"(15.88) Straight Shank	40 = 2 1/2" (63.5)	16 = 1" (25.4)	30 = 30°
6S = Dia .75"(19.02) Straight Shank	44 = 2 3/4" (69.85)	18 = 1 1/8" (28.58)	45 = 45°
7S = Dia .88"(22.35) Straight Shank	48 = 3" (76.2)	20 = 1 1/4" (31.76)	60 = 60°
8S = Dia 1.00"(25.40) Straight Shank	52 = 3 1/4" (82.55)	22 = 1 3/8" (34.94)	75 = 75°
5 = RW5 Taper Shank	56 = 3 1/2" (88.9)	24 = 1 1/2" (38.1)	90 = 90°
6 = RW6 Taper Shank	60 = 3 3/4" (95.25)	26 = 1 5/8" (41.3)	
7 = RW7 Taper Shank	64 = 4" (101.60)	28 = 1 3/4" (44.48)	
	68 = 4 1/4" (107.95)	30 = 1 7/8" (47.66)	
	72 = 4 1/2" (114.3)	32 = 2" (50.8)	
	76 = 4 3/4" (120.65)	34 = 2 1/8" (54.02)	
		36 = 2 1/4" (57.15)	
		38 = 2 3/8" (60.38)	
		40 = 2 1/2" (63.56)	
		42 = 2 5/8" (66.75)	
		44 = 2 3/4" (69.85)	
		46 = 2 7/8" (73.02)	

MAKE YOUR PART No.

CODING SYSTEM

SBAM-Z 6- 52 36 -60

Bend Degree/Angle will be "60"
Offset length "O" will be 36 x .0625 = 2.25" (57.15 mm)
Overall length "L" will be 52 x .0625 = 3.25" (82.55 mm)
Will be a Dia .75"(19.02) 6RW Taper Shank
Will be made from Class 2(Cu.Cr.Zr.) Material

Chart for Other Dimensions

Major Dia "D"	Overall Length "L"	Offset "O"	Bend Degree/ Angle "G"	CAP DIA	Cap—End Taper Dia**	Hole Dia "W1"	Hole Dia "W2"
.625" (15.88mm)	As per Coding System			.500" (12.7 mm)	.375" (9.53 mm)	.38" (9.65 mm)	.28" (7.11 mm)
.750" (19.05mm)				.625" (15.88 mm)	.415" (10.54 mm)	.38" (9.65 mm)	.34" (8.64 mm)
.88" (22.35mm)				.750" (19.05 mm)	.501" (12.72 mm)	.44" (11.18mm)	.50" (12.70 mm)
1.00" (25.40mm)				.875 (22.23 mm)	.613" (15.57 mm)	.44" (11.18mm)	.50" (12.70 mm)

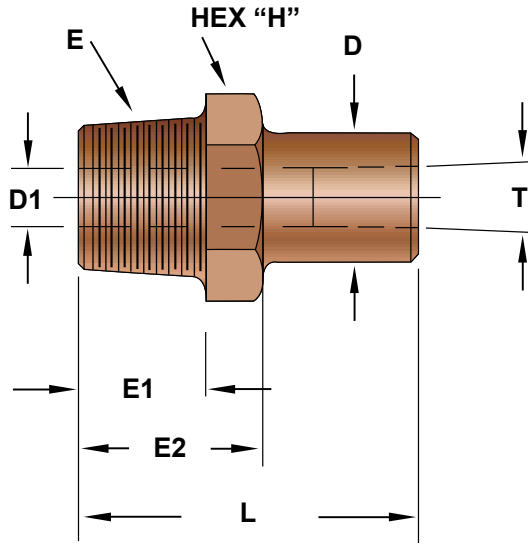
** Cap-end taper is for Male Caps shown on page # 16 (If shank is required for other type of cap, please mention cap-end taper)

▶ USE CODING SYSTEM GENERATING THE ITEM CODE.

▶ Dimensions shown in brackets () are in mm

▶ See Taper Chart (page # 14) for Taper Dimensions.

HEX ADAPTER PIPE THREAD



KEY TO ITEM CODE

CAP or Shank/ Adapter Taper

- 4 = 4RW
- 5 = 5RW
- 6 = 6 RW
- 7 = 7RW

RWMA Alloy
Class 2,3
Z=Cu.Cr.Zr.

HEX Adapter
Pipe Thread
Designation

HAP

X

X

X

"E" MALE THREAD SIZE N.P.T

- A = 1/2 N.P.T
- B = 3/4 N.P.T
- C = 5/8 N.P.T

OVERALL LENGTH "L"
in increment of 1/8" (3.18mm)
Minimum should be equal to "E2"

C = ADAPTER to used with MALE CAP
S = ADAPTER to used with
SHANKS/ ADAPTER

2 = Class 2
3 = Class 3
Z=Cu.Cr.Zr.

Material

4 = 4RW
5 = 5RW
6 = 6RW
7 = 7RW

CAP or Shank/
Adapter TAPER "T"

A = 1/2 N.P.T
B = 3/4 N.P.T
C = 5/8 N.P.T

Thread "E"

14= 7/8" (22.22)	32= 2" (50.8)	50= 3 1/8" (79.38)
16= 1" (25.4)	34= 2 1/8" (54.02)	52= 3 1/4" (82.55)
18= 1 1/8" (28.58)	36= 2 1/4" (57.15)	54= 3 3/8" (85.72)
20= 1 1/4" (31.76)	38= 2 3/8" (60.38)	56= 3 1/2" (88.9)
22= 1 3/8" (34.94)	40= 2 1/2" (63.56)	58= 3 5/8" (92.07)
24= 1 1/2" (38.1)	42= 2 5/8" (66.75)	60= 3 3/4" (95.25)
26= 1 5/8" (41.3)	44= 2 3/4" (69.85)	62= 3 7/8" (98.42)
28= 1 3/4" (44.48)	46= 2 7/8" (73.02)	64= 4" (107.95)
30= 1 7/8" (47.66)	48= 3" (76.2)	66= 4 1/8" (111.13)

Overall Length "L"

MAKE YOUR PART No.

EXAMPLE :

HAP- 3 5 - B 76 - S

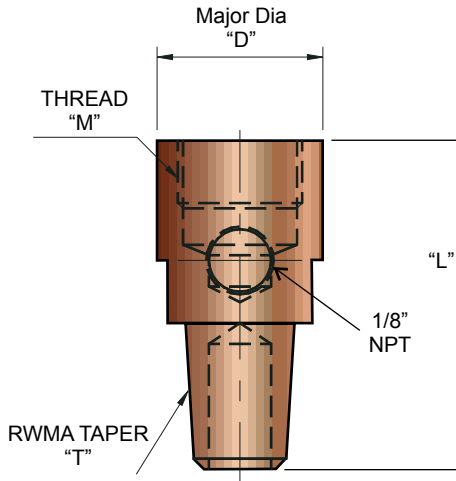
HEX Adapter will be used with Shank /Adapter
Overall length "L" will be 76 x .0625 = 4.75" (120.65 mm)
Will have 3/4 N.P.T. Thread
Cap or Shank/Adapter Taper "T" will be 5RW
Will be made from Class 3 Material

HEX ADAPTER PIPE THREAD

Chart for Other Dimensions

MALE PIPE THREAD TO SHANK / ADAPTER CHART									
Pipe Thread N.P.T. "E"	HEX "H"	Body Dia "D"	Female Taper		Male Thread Dimensions		Overall Length "L"	Thru Drill Dia "D1"	
			Shank / Adapter "T"	Thread Length "E1"	Hex Length "E2"				
1/2 N.P.T.	1" (25.4mm) HEX	.88" (22.35 mm)	4RW	.463" (11.76 mm)	5/8" (15.87 mm)	7/8" (22.23 mm)	As per Coding system	.42" (10.67 mm)	
	1" (25.4mm) HEX	.94" (23.88 mm)	5RW	.625" (15.88 mm)	5/8" (15.87 mm)	7/8" (22.23 mm)		.44" (11.18 mm)	
5/8 N.P.T.	1" (25.4mm) HEX	.88" (22.35 mm)	4RW	.463" (11.76 mm)	3/4" (19.05 mm)	1" (25.4 mm)		.42" (10.67 mm)	
	1" (25.4mm) HEX	.94" (23.88 mm)	5RW	.625" (15.88 mm)	3/4" (19.05 mm)	1" (25.4 mm)		.44" (11.18 mm)	
3/4 N.P.T.	1.25" (31.75mm) HEX	.94" (23.88 mm)	5RW	.625" (15.88 mm)	7/8" (22.22 mm)	1 1/8" (34.95 mm)		.44" (11.18 mm)	
	1.25" (31.75mm) HEX	1.09" (27.69 mm)	6RW	.750" (19.05 mm)	7/8" (22.22 mm)	1 1/8" (34.95 mm)		.50" (12.70 mm)	
	1.25" (31.75mm) HEX	1.24" (31.50 mm)	7RW	.875" (22.22 mm)	7/8" (22.22 mm)	1 1/8" (34.95 mm)		.56" (14.22 mm)	
MALE PIPE THREAD TO MALE CAP CHART									
1/2 N.P.T.	1" (25.4mm) HEX	.50" (12.70 mm)	4RW	.375" (9.53 mm)	5/8" (15.87 mm)	7/8" (22.23 mm)		As per Coding system	.28" (7.11 mm)
	1" (25.4mm) HEX	.625" (15.88 mm)	5RW	.415" (10.54 mm)	5/8" (15.87 mm)	7/8" (22.23 mm)			.38" (9.65 mm)
5/8 N.P.T.	1" (25.4mm) HEX	.88" (22.35 mm)	4RW	.375" (9.53 mm)	3/4" (19.05 mm)	1" (25.4 mm)			.28" (7.11 mm)
	1" (25.4mm) HEX	.94" (23.88 mm)	5RW	.415" (10.54 mm)	3/4" (19.05 mm)	1" (25.4 mm)			.38" (9.65 mm)
3/4 N.P.T.	1.25" (31.75mm) HEX	.94" (23.88 mm)	5RW	.415" (10.54 mm)	7/8" (22.22 mm)	1 1/8" (34.95 mm)	.38" (9.65 mm)		
	1.25" (31.75mm) HEX	1.09" (27.69 mm)	6RW	.501" (12.72 mm)	7/8" (22.22 mm)	1 1/8" (34.95 mm)	.44" (11.18 mm)		
	1.25" (31.75mm) HEX	1.24" (31.50 mm)	7RW	.613" (15.57 mm)	7/8" (22.22 mm)	1 1/8" (34.95 mm)	.56" (14.22 mm)		
<p>▶ USE CODING SYSTEM GENERATING THE ITEM CODE. ▶ Dimensions shown in brackets () are in mm</p> <p>▶ See Taper Chart (page # 14) for Taper Dimensions.</p>									

NUT & STUD WELDING LOWER ADAPTERS / BASE



KEY TO ITEM CODE

<p>THREAD "M" 18 = 18mm 20 = 20 mm 22 = 22 mm</p> <p>RWMA TAPER 4 = 4RW 5 = 5RW 6 = 6RW 7 = 7RW</p> <p>RWMA CLASS 2 = Class 2 3 = Class 3 Z = Cu.Cr.Zr.</p> <p>Nut welding LOWER ADAPTER / BASE Designation</p>	<p>Major Dia "D" 08 = Dia 1.00" (25.40) 09 = Dia 1.125" (28.57) 10 = Dia 1.25" (31.75) in .125" (3.18mm) increment</p> <p>Standard Length is 1.97" (50 mm) Adapter of other Length "L" available in 1/8 or .125" (3.18mm) increments.</p> <p>02 = 2 x .0625 = .125" (3.18 mm) 04 = 4 x .0625 = .25" (6.35 mm) ... 50 = 50 x .0625 = 3.125" (79.37 mm)</p>
---	--

LAB- X X - XX -XX - SL

Coding System for making your PART #.

LAB- Z 5 - 20 09 38

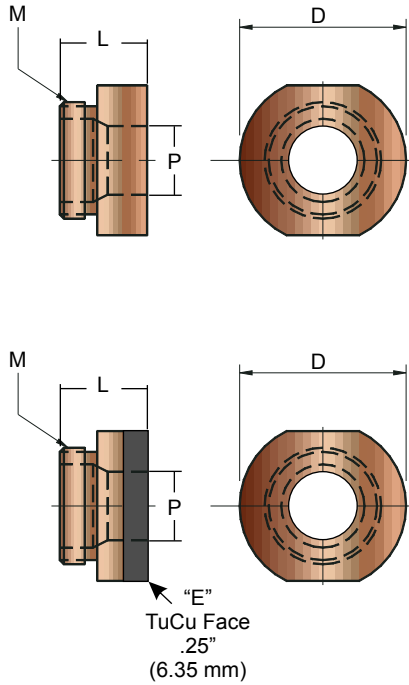
	Overall length "L" will be 38 x .0625 = 2.375" (60.32 mm)
	Major Dia will be 1.125" (28.57mm)
	Lower Adapter will have 20mm Thread
	will have RWMA 5 Taper
	Will be made from Cu.Cr.Zr. material

NBM Metals Standard Lower Adapter/Base

ITEM CODE		DIMENSIONS			
Class 2 Cr.Cu.	Class 2 Cu.Cr.Zr.	Taper "T"	THREAD "M"	MAJOR DIA "D"	OVERALL LENGTH "L"
LAB-24-18-08SL	LAB-Z4-18-08SL	4 RW	18 mm	1" (25.4 mm)	1.97" (50 mm)
LAB-25-18-08SL	LAB-Z5-18-08SL	5 RW	18 mm	1" (25.4 mm)	1.97" (50 mm)
LAB-25-22-09SL	LAB-Z5-22-09SL	5 RW	22 mm	1.125" (28.57 mm)	1.97" (50 mm)

- ▶ Use coding system to order unlisted items.
- ▶ See Taper Chart (page # 14) for Taper Dimensions.
- ▶ Dimensions shown in brackets () are in mm
- ▶ Replace 'Z' with '3' for Shanks in Be.Cu. (Class 3) material.

NUT WELDING CAPS / HEADS



KEY TO ITEM CODE

For Nut Type M4, M5.....,M13

Thread "M"
18=M18
20=M20
22=M22

Nut Welding Caps Designation

Major Dia "D"
07= Dia .88" (22.35)
08= Dia 1.00" (25.40)
09= Dia 1.125" (28.57)
10= Dia 1.25"(31.75)
in .125" (3.18mm) increment

Standard Length is .67"(17mm)
Caps / Heads of other Length "L"
available in .0625" (1.58mm) increments.
02 = 2 x .0625 = .125" (3.18 mm)
04 = 4 x .0625 = .25" (6.35 mm)
.....
50 = 50 x .0625 = 3.125" (79.37 mm)

NWC - xx Mx - xx SL - X → Use "E" for TuCu Face
"3" for Class 3 and
"Z" for Cu.Cr.Zr. Material

Coding System for making your PART #.

NWC-18 M8- 08 13- E

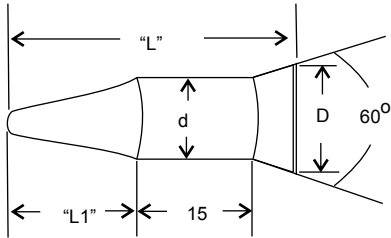
Cap / Head will have Tungsten Copper Face
Overall Length "L" will be 13 x .0625 = .812" (20.6mm)
Major Dia "D" will be 1.00"(25.4 mm)
Cap / Head will be for M8 type Nuts
Cap / Head will have M18 Thread

NBM Metals Standard Nut Welding Caps/Heads

ITEM CODE		DIMENSIONS			
Class 2 Cr.Cu	Class 2 with TuCu Face	PIN Size "p"	THREAD "M"	MAJOR DIA "D"	OVERALL LENGTH "L"
NWC-18M4-08SL	NWC-18M4-08SL-E	4.8mm	M18	1" (25.4 mm)	.67" (17 mm)
NWC-18M5-08SL	NWC-18M5-08SL-E	5.8mm		1" (25.4 mm)	.67" (17 mm)
NWC-18M6-08SL	NWC-18M6-08SL-E	6.8mm		1" (25.4 mm)	.67" (17 mm)
NWC-18M7-08SL	NWC-18M7-08SL-E	7.8mm		1" (25.4 mm)	.67" (17 mm)
NWC-18M8-08SL	NWC-18M8-08SL-E	8.8mm		1" (25.4 mm)	.67" (17 mm)
NWC-18M9-08SL	NWC-18M9-08SL-E	9.8mm		1" (25.4 mm)	.67" (17 mm)
NWC-22M10-08SL	NWC-22M10-08SL-E	10.8mm	M22	1.125" (28.57 mm)	.67" (17 mm)
NWC-22M11-08SL	NWC-22M11-08SL-E	11.8mm		1.125" (28.57 mm)	.67" (17 mm)
NWC-22M12-08SL	NWC-22M12-08SL-E	12.8mm		1.125" (28.57 mm)	.67" (17 mm)

- ▶ Use coding system to order unlisted items.
- ▶ Dimensions shown in brackets () are in mm
- ▶ Replace 'E' with '3' for Be.Cu. (Class 3) material.

NUT WELDING LOCATING PINS



KEY TO ITEM CODE

For Nut Type
M4, M5.....,M13 & 716

Material
CB=Ceramic Bonded
SS=Stainless Steel
MS= Mild Steel

Major Dia "D"
12= Dia 12mm (.472")
16= Dia 16mm (.629")

Standard Length
"Custom made Pins of other Length "L" available upon request

Location Pins Designation

LP - xx Mx - xx SL

Coding System for making your PART #.

LP - SS M10 - 16 SL

will have Standard Overall Length of 40 mm as per below table
Major Dia "D" will be 16 mm (.629")
Pin will be used for M10 type nuts
Pin will be made from stainless steel (SS) material

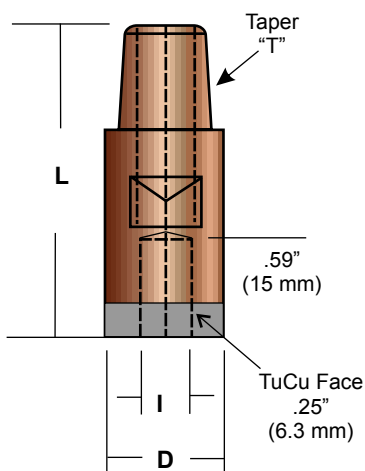
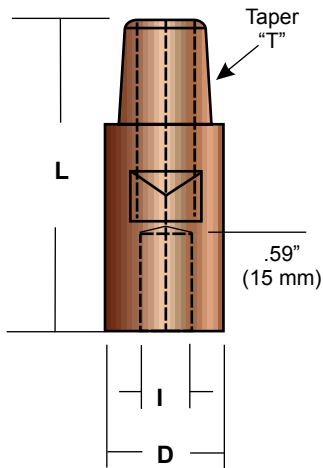
NBM Metals Standard Weld Pins

ITEM CODE			DIMENSIONS			
CEREMIC BONDED "CB"	Stainless Steel "SS"	Mild Steel "MS"	Nut ID "d"	Major Dia "D"	Length "L1"	OVERALL LENGHT "L"
LP-CB-M4-12SL	LP-SS-M4-12SL	LP-MS-M4-12SL	4.8mm	.472" (12 mm)	(6.5 mm)	(32 mm)
LP-CB-M5-12SL	LP-SS-M5-12SL	LP-MS-M5-12SL	5.8mm		(8.5 mm)	(32 mm)
LP-CB-M6-12SL	LP-SS-M6-12SL	LP-MS-M6-12SL	6.8mm		(11 mm)	(32 mm)
LP-CB-M7-12SL	LP-SS-M7-12SL	LP-MS-M7-12SL	7.8mm		(12 mm)	(32 mm)
LP-CB-M8-12SL	LP-SS-M8-12SL	LP-MS-M8-12SL	8.8mm		(12 mm)	(32 mm)
LP-CB-M9-12SL	LP-SS-M9-12SL	LP-MS-M9-12SL	9.8mm		(12 mm)	(32 mm)
LP-CB-M10-12SL	LP-SS-M10-12SL	LP-MS-M10-12SL	10.8mm	.629" (16mm)	(14 mm)	(40 mm)
LP-CB-M11-2SL	LP-SS-M11-2SL	LP-MS-M11-2SL	11.8mm		(17 mm)	(40 mm)
LP-CB-M12-SL	LP-SS-M12-SL	LP-MS-M12-SL	12.8mm		(17 mm)	(40 mm)

▶ Replace "SL" with required length "L" ▶ Use Coding System for unlisted Items ▶ Dimensions shown in brackets () are in mm



NUT WELDING UPPER ELECTRODES



KEY TO ITEM CODE

For Nut Type M4, M5.....,M13 RWMA TAPER 4= 4RW 5= 5RW 6= 6RW 7= 7RW Nut welding UPPER Electrode Designation	ID "I" Major Dia "D" 5= Dia .62"(15.88) 6= Dia .75"(19.02) 7= Dia .88"(22.35) 8= Dia 1.00"(25.40) Overall Length "L" in 1/8 or .125 (3.18 mm) increment 02 = 2 x .0625 = .125" (3.18 mm) 04 = 4 x .0625 = .25" (6.35 mm) 50 = 50 x .0625 = 3.125" (79.37 mm)	Use "E" for TuCu Face
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UPE - x Mx - x - x XX - E-

Coding System for making your PART #.

UPE-4 M5-7.5- 6 24

Overall length "L" will be 24 x .0625 = 1.5" (38.1 mm)
Major Dia will be Dia .75"(19.02)
ID "I" will be 7.5 mm
Upper electrode will be for M5 type Nut
will have RWMA 4 Taper

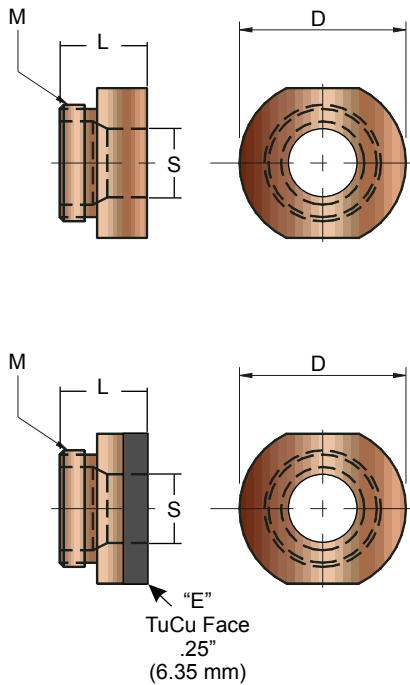
NBM Metals Standard Upper Electrodes

ITEM CODE		DIMENSIONS			
Class 2 Cr.Cu.	Class 2 with TuCu face	ID "I"	MAJOR DIA "D"	OVERALL LENGTH "L"	TAPER "T"
UPE- 5M4-4-538	UPE- 4M4-4-538-E	4mm	.625" (15.88 mm)	2.375" (60.38mm)	5 RW
UPE- 5M5-5-538	UPE- 5M5-5-538-E	5mm	.625" (15.88 mm)	2.375" (60.38mm)	5 RW
UPE- 5M6-6-638	UPE- 5M6-6-638-E	6mm	.75" (19.02mm)	2.375" (60.38mm)	5 RW
UPE- 5M8-7.5-638	UPE- 5M8-7.5-638-E	7.5mm	.75" (19.02mm)	2.375" (60.38mm)	5 RW
UPE- 5M10-10-638	UPE- 5M10-10-638-E	10mm	.75" (19.02mm)	2.375" (60.38mm)	5 RW
UPE- 5M12-12-638	UPE- 5M12-12-638-E	12mm	.75" (19.02mm)	2.375" (60.38mm)	5 RW

- ▶ Use coding system to order unlisted items.
- ▶ Dimensions shown in brackets () are in mm

- ▶ See Taper Chart (page # 14) for Taper Dimensions.
- ▶ Replace 'E' with '3' for Be.Cu. (Class 3) material.

STUD WELDING CAPS / HEADS



KEY TO ITEM CODE

For STUD Type M4, M5.....,M13

Thread "M"
18=M18
20=M20
22=M22

STUD Welding Caps- Designation

Major Dia "D"
07= Dia .88" (22.35)
08= Dia 1.00" (25.40)
09= Dia 1.125" (28.57)
10= Dia 1.25"(31.75)
in .125" (3.18mm) increment

Standard Length is .67"(17mm)
STUDS of other Length "L" available in 1/16 or .0625" (1.58mm) increments.
02 = 2 x .0625 = .125" (3.18 mm)
04 = 4 x .0625 = .25" (6.35 mm)
⋮
50 = 50 x .0625 = 3.125" (79.37 mm)

SWC - xx Mx - xx SL - X → Use "E" for TuCu Face
"3" for Class 3 and
"Z" for Cu.Cr.Zr. Material

Coding System for making your PART #.

SWC-18 M8-08 13-3

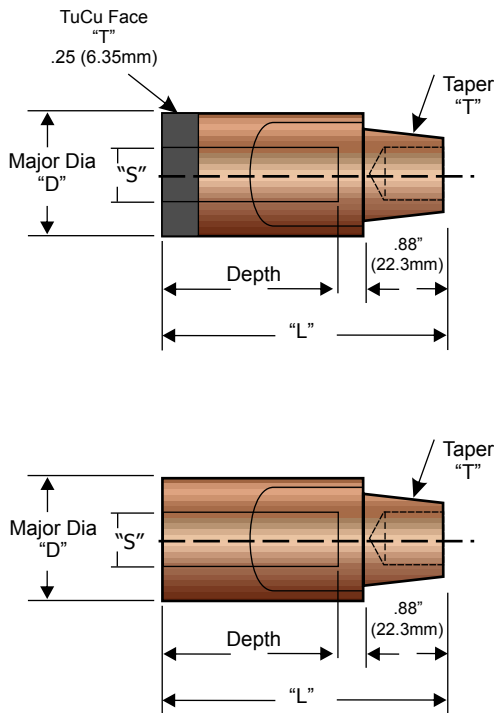
STUD will be made from class 3 materail
Overall length "L" will be 13 x .0625 = .812" (20.63 mm)
Major Dia "D" will be 1.00"(25.4 mm)
CAP / HEAD will be for M8 type STUDS
STUD CAP will have M18 Thread

NBM Metals Standard Caps / Heads For Stud Welding

ITEM CODE		DIMENSIONS			
Class 2 Cr.Cu.	Class 2 with TuCu Face	Sleeve ID "S"	THREAD "M"	MAJOR DIA "D"	OVERALL LENGHT "L"
SWC-18M4-08SL	SWC-18M4-08SL-E	.169" (4.3mm)	M18	1" (25.4 mm)	.67" (17 mm)
SWC-18M5-08SL	SWC-18M5-08SL-E	.204" (5.2mm)		1" (25.4 mm)	.67" (17 mm)
SWC-18M6-08SL	SWC-18M6-08SL-E	.243" (6.2mm)		1" (25.4 mm)	.67" (17 mm)
SWC-18M8-08SL	SWC-18M8-08SL-E	.320" (8.1mm)		1" (25.4 mm)	.67" (17 mm)
SWC-22M10-08SL	SWC-22M10-08SL-E	.399" (10.1mm)	M22	1.125" (28.57 mm)	.67" (17 mm)
SWC-22M12-08SL	SWC-22M12-08SL-E	.477" (12.1mm)		1.125" (28.57 mm)	.67" (17 mm)

- ▶ Use coding system to order unlisted items.
- ▶ Replace 'E' with '3' for Be.Cu. (Class 3) material.
- ▶ Dimensions shown in brackets () are in mm

STUD WELDING LOWER ELECTRODES



KEY TO ITEM CODE

ID "S"
In inches

RWMA TAPER
4= 4RW
5= 5RW
6= 6RW
7= 7RW

Lower Electrode
For Stud Welding
Designation

Major Dia "D"
05= Dia .62"(15.88)
06= Dia .75"(19.02)
07= Dia .88"(22.35)
08= Dia 1.00"(25.40)
09= Dia 1.25"(28.57)
in .125(3.18mm) increment

Overall Length "L"
1/8 or .125(3.18mm) increment
02 = 2 x .0625 = .125" (3.18 mm)
04 = 4 x .0625 = .25" (6.35 mm)
⋮
50 = 50 x .0625 = 3.125" (79.37 mm)

LES - x xxx - xx XX - X → Use "E" for TuCu Face
"3" for Class 3 and
"Z" for Cu.Cr.Zr. Material

Coding System for making your PART #.

LES-4 - 169 -06 24

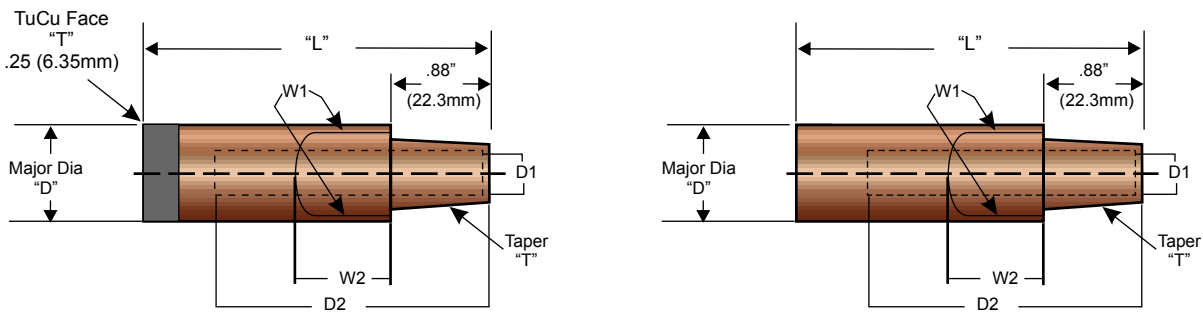
	Overall length "L" will be 24 x .0625 = 1.50" 38.1 mm
	Major Dia will be Dia .75" (19.02)
	Sleeve ID "S" will be .169" (4.3mm)
	will have RWMA 4 Taper

NBM Metals Standard Stud Welding Lower Electrodes

ITEM CODE		DIMENSIONS			
Class 2 Cr.Cu.	Class 2 with TuCu face	Sleeve ID "S"	MAJOR DIA "D"	OVERALL LENGTH "L"	TAPER "T"
LES- 5-169-0538	LES- 5-169-0538-E	.169" (4.3mm)	.625" (15.88 mm)	2.375" (60.38mm)	5 RW
LES- 5-204-0538	LES- 5-204-0538-E	.204" (5.2mm)	.625" (15.88 mm)	2.375" (60.38mm)	5 RW
LES- 5-243-0538	LES- 5-243-0538-E	.243" (6.2mm)	.75" (19.02mm)	2.375" (60.38mm)	5 RW
LES- 5-320-0538	LES- 5-320-0538-E	.320" (8.1mm)	.75" (19.02mm)	2.375" (60.38mm)	5 RW
LES- 5-399-0538	LES- 5-399-0538-E	.399" (10.1mm)	.75" (19.02mm)	2.375" (60.38mm)	5 RW
LES- 5-477-0538	LES- 5-477-0538-E	.477" (12.1mm)	.75" (19.02mm)	2.375" (60.38mm)	5 RW

- ▶ Use coding system to order unlisted items.
- ▶ Dimensions shown in brackets () are in mm
- ▶ Replace 'E' with '3' for Be.Cu. (Class 3) material.
- ▶ See Taper Chart (page # 14) for Taper Dimensions.

UPPER STUD WELDING (BACK-UP) ELECTRODES



KEY TO ITEM CODE

RWMA TAPER
 4= 4RW
 5= 5RW
 6= 6RW

Major Dia "D" in 1/4 " (6.35 mm) increment
 06= Dia .75" (19.02mm)
 08= Dia 1.00" (25.40mm)
 10= Dia 1.25" (31.75mm)
 12= Dia 1.50" (38.1mm)

Overall Length "L"
 1/8 or .125(3.18mm) increment
 02 = 2 x .0625 = .125" (3.18 mm)
 04 = 4 x .0625 = .25" (6.35 mm)
 ...
 50 = 50 x .0625 = 3.125" (79.37 mm)

Back-Up Electrode Designation
BUE - x - xx xx - x → Use "E" for TuCu Face
 "3" for Class 3 and
 "Z" for Cu.Cr.Zr. Material

Coding System for making your PART #.

BUE-5-08 32-E

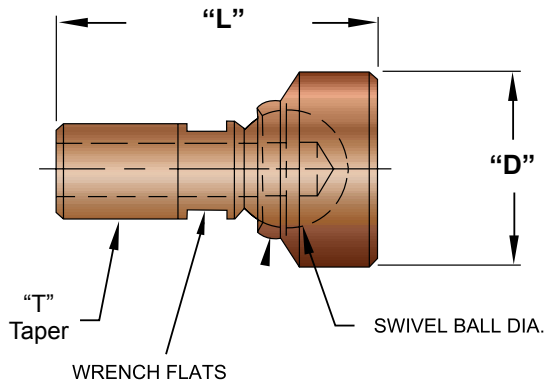
Backup electrode will have Tungsten Copper Face
Overall length "L" will be 32 x .0625 = 2" (50.8 mm)
Major Dia will be 1"(25.4 mm)
will have RWMA 5 Taper

NBM Metals Standard Back-Up Electrodes

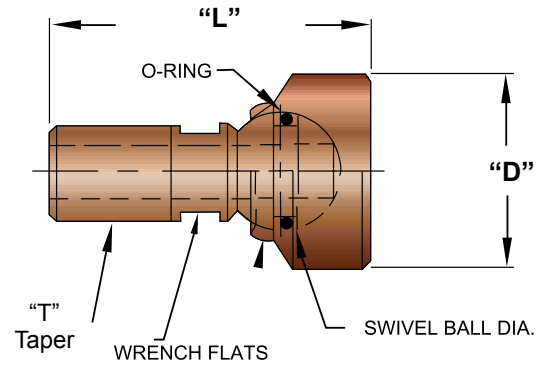
ITEM CODE		DIMENSIONS						
Class 2	Class 2	Wrench Flat Dia	Wrench Flat Length	Drill Dia	Drill Length	MAJOR DIA	OVERALL LENGTH	TAPER
Cr.Cu.	with TuCu Face	W1	W2	"D1"	"D2"	"D"	"L"	"T"
BUE-4-0620	BUE-4-0620-E	.66" (17 mm)	.80" (20.32 mm)	9/32" (7.14 mm)	7/8" (22.22 mm)	.75" (19.02 mm)	1 1/4" (31.75 mm)	4RW
BUE-4-0820	BUE-4-0620-E	.87" (22.09 mm)		9/32" (7.14 mm)		1.00" (25.40 mm)		
BUE-5-0828	BUE-5-0828-E	.87" (22.09 mm)	.80" (20.32 mm)	3/8" (9.52 mm)	7/8" (22.22 mm)	1.00" (25.40 mm)	1 1/2" (38.1 mm)	5RW
BUE-5-0828	BUE-5-0828-E					1.00" (25.40mm)	1 3/4" (44.45 mm)	
BUE-5-0832	BUE-5-0832-E					1.00" (25.40 mm)	2" (50.8 mm)	
BUE-5-0840	BUE-5-0840-E					1.00" (25.40 mm)	2 1/2" (63.5 mm)	
BUE-5-1048	BUE-5-1048-E	1.12" (28.45 mm)	.80" (20.32 mm)	3/8" (9.52 mm)	1.00" (25.40mm)	1.25" (31.75 mm)	3" (76.2 mm)	5RW
BUE-5-1256	BUE-5-1256-E	1.4" (35.56 mm)				1.50" (38.1 mm)	3 1/2" (88.9 mm)	

- ▶ Use coding system to order unlisted items.
- ▶ Dimensions shown in brackets () are in mm
- ▶ Replace 'E' with '3' for Be.Cu. (Class 3) material.
- ▶ See Taper Chart (page # 14) for Taper Dimensions.

SWIVEL HEAD ELECTRODES



BLIND HOLE



THROUGH HOLE WITH "O" RING

KEY TO ITEM CODE

SHE	- X	X -	XX -	XX	XX - O - (through hole)	
Swivel Head Electrodes Designation	2 = Class 2 3 = Class 3 Z=Cu.Cr.Zr. Material	4S = Dia .50" (12.70 mm) Straight Shank (W/O Taper) 5S = Dia .62" (15.88 mm) Straight Shank (W/O Taper) 6S= Dia .75" (19.02 mm) Straight Shank (W/O Taper)	4 = Dia .50" (12.70 mm) 4RW Taper shank 5= Dia .62" (15.88 mm) 5RW Taper shank 6 = Dia .75" (19.02 mm) 6RW Taper shank	50 = .50" (12.70 mm) 75 = .75" (19.05 mm) Swivel Ball Diameter "B"	14=7/8"(22.22) 16= 1" (25.4) 18= 1 1/8" (28.58) 20= 1 1/4" (31.76) 22= 1 3/8" (34.94) 24= 1 1/2" (38.1) 26= 1 5/8" (41.3) 28=1 3/4" (44.48) 30= 1 7/8" (47.66) 32= 2" (50.8) WELD FACE DIA "D"	30= 1 7/8"(47.66) 32= 2" (50.8) 34= 2 1/8"(54.02) 36= 2 1/4" (57.15) 38= 2 3/8"(60.38) 40= 2 1/2" (63.56) 42= 2 5/8"(66.75) 44=2 3/4" (69.85) 46=2 7/8" (73.02) OVERALL LENGTH "L"
		TAPER "T"				

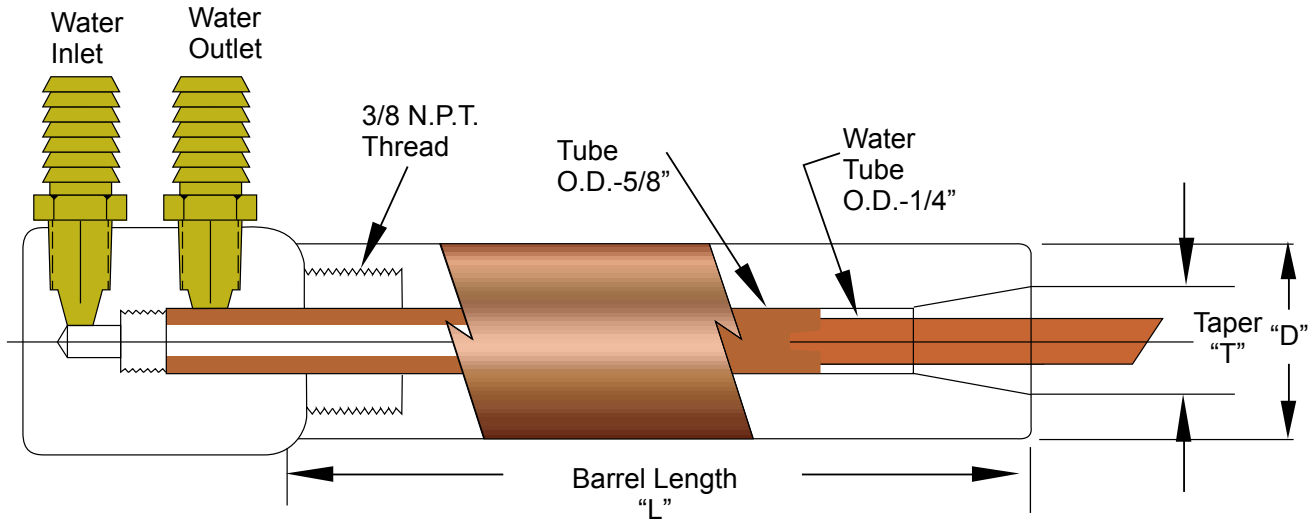
NBM Metals Standard Swivel Head Electrodes

ITEM CODE Class 2 Cu.Cr.	ITEM CODE CLASS 2 Cu.Cr.Zr.	Swivel Ball Diameter "B"	Weld Face Dia "D"	Overall Length "L"	TAPER "T"
SHE-24S-50-1432	SHE-Z4S-50-1432	.50" (12.70 mm)	7/8" (22.22 mm)	2" ("50.8 mm)	No Taper Dia .50" (12.70 mm) Straight Shank
SHE-24-50-1432	SHE-Z4-50-1432	.50" (12.70 mm)	7/8" (22.22 mm)	2" ("50.8 mm)	4RW MT1
SHE-25S-50-1632	SHE-Z5S-50-1632	.50" (12.70 mm)	1" (25.4 mm)	2" ("50.8 mm)	No Taper Dia .635" (15.88 mm) Straight Shank
SHE-25-50-1632	SHE-Z5-50-1632	.50" (12.70 mm)	1" (25.4 mm)	2" ("50.8 mm)	5 RW MT2
SHE-25S-75-2034	SHE-Z5S-75-2034	.75" (19.05 mm)	1/4" (31.78" mm)	2 1/8" (54.02 mm)	No Taper Dia .635" (15.88 mm) Straight Shank
SHE-25-75-2034	SHE-Z5-75-2034	.75" (19.05 mm)	1/4" (31.78" mm)	2 1/8" (54.02 mm)	5 RW MT2

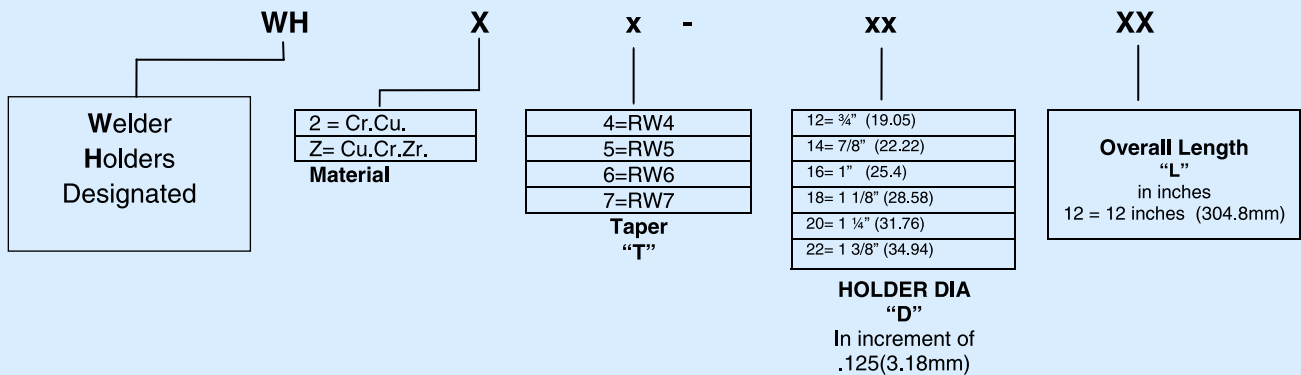
▶ USE CODING SYSTEM GENERATING THE ITEM CODE.
 ▶ See Taper Chart (page # 14) for Taper Dimensions.

▶ Dimensions shown in brackets () are in mm
 ▶ Add "O" to the basic Item Code for through Hole Electrodes

HOLDERS



KEY TO ITEM CODE



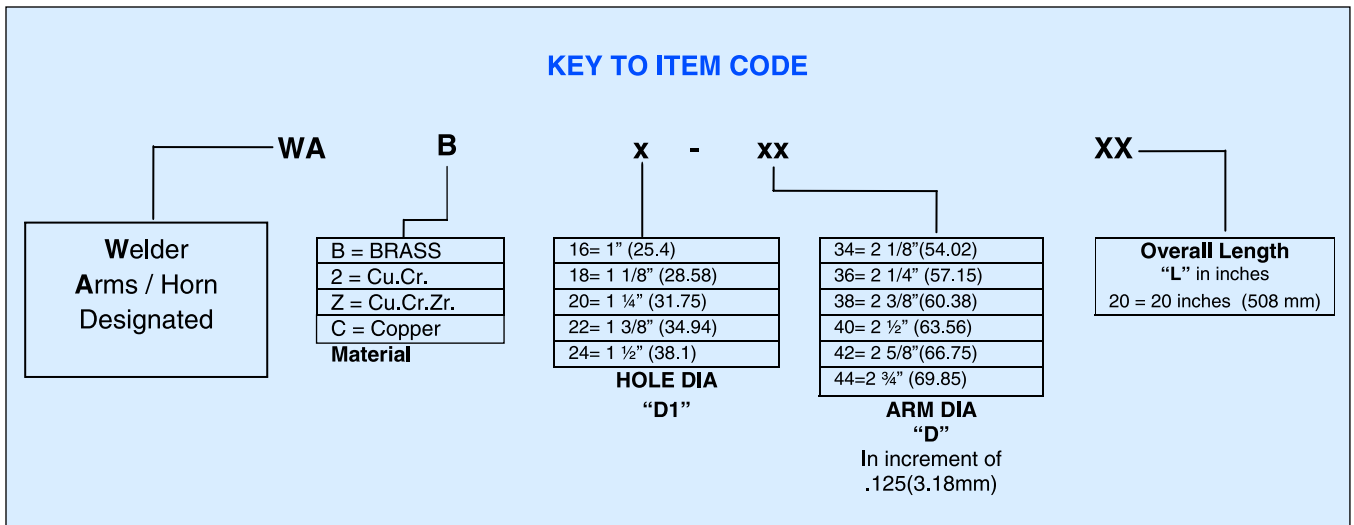
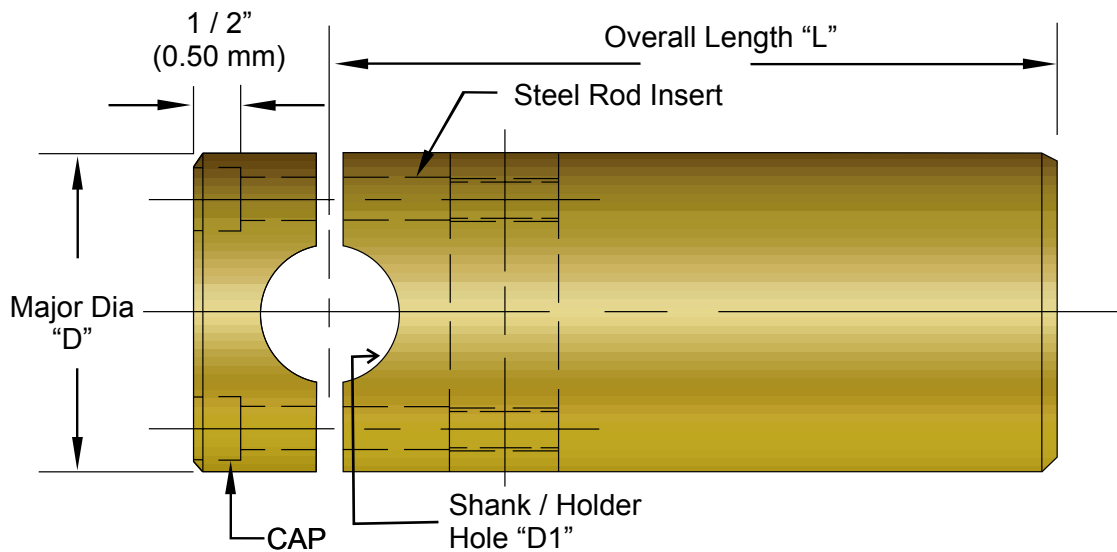
NBM Metals Standard Holders

ITEM CODE	ITEM CODE	TAPER	TAPER DIMENSIONS "T"	HOLDER DIA "D"	OVERALL LENGTH "L"
Cu.Cr.	Cu.Cr.Zr.				
WH 24-1610	WH Z4-1610	4RW	.463" (11.76 mm)	1" (25.4)	10" (254 mm)
WA 24-2012	WA Z4-2012	4RW	.463" (11.76 mm)	1 1/4" (31.76)	12" (304.8 mm)
WA 25-1612	WA Z5-1612	5RW	.613" (15.57 mm)	1" (25.4)	12" (304.8 mm)
WA 25-2014	WA Z5-2014	5RW	.613" (15.57 mm)	1 1/4" (31.76)	14" (355.6 mm)
WA 25-2014	WA Z5-2014	5RW	.613" (15.57 mm)	1 1/4" (31.76)	14" (355.6 mm)
WA 26-2216	WA Z6-2216	6RW	.731" (18.57 mm)	1 3/8" (34.94)	16" (406.4 mm)

▶ USE CODING SYSTEM FOR UNLISTED ITEMS

▶ DIMENSIONS IN BRACKETS () ARE IN MM

WELDER ARMS / HORNS



NBM Metals Standard Welder Arms / Horns

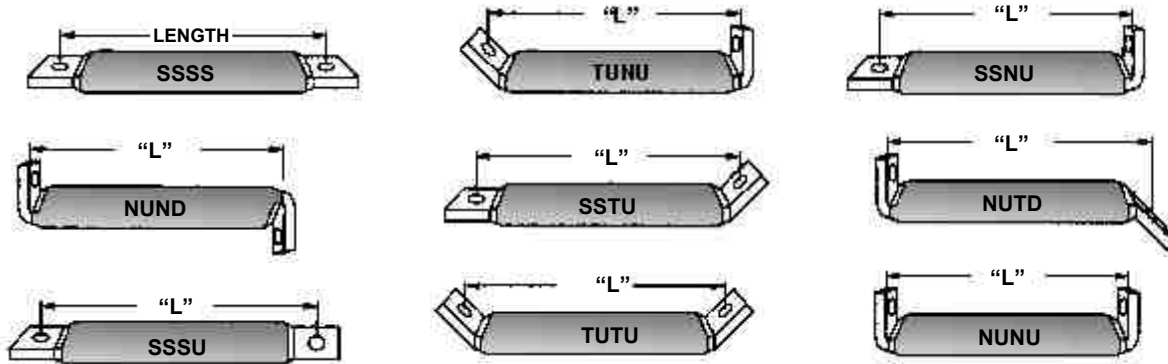
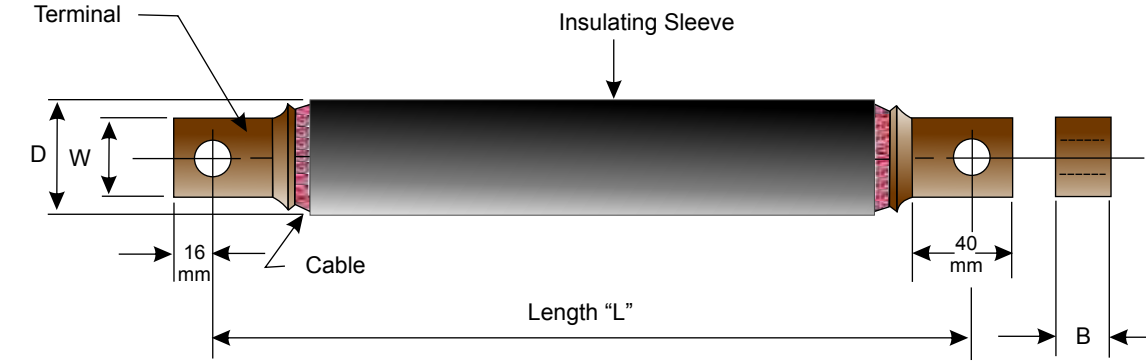
ITEM CODE "BRASS"	ITEM CODE "Cu.Cr."	HOLE DIA "D1"	ARM DIA "D"	OVERALL LENGTH "L"
WA B16-3608	WA 216-3608	1" (25.4mm)	2 1/4" (57.15)	08" (203.2 mm)
WA B16-3812	WA 216-3812	1" (25.4mm)	2 3/8" (60.38)	12" (304.8 mm)
WA B18-3812	WA 218-3812	1 1/8" (28.58mm)	2 3/8" (60.38)	12" (304.8 mm)
WA B20-3812	WA 220-3812	1 1/4" (31.75mm)	2 3/8" (60.38)	12" (304.8 mm)
WA B20-3814	WA 220-3814	1 1/4" (31.75mm)	2 3/8" (60.38)	14" (355.6 mm)
WA B22-4016	WA 222-4016	1 3/8" (34.94mm)	2 5/8" (66.75)	16" (406.4 mm)

▶ USE CODING SYSTEM FOR UNLISTED ITEMS

▶ DIMENSIONS IN BRACKETS () ARE IN MM

AIR COOLED JUMPER CABLES

A wide range of Air-Cooled Jumper Cables are available to suit your required length and shape.



Terminal Dimensions	MCM							
	300	400	500	600	800	1000	1200	1500
B	11	11	13	15	18	21	24	32
W	32	32	32	32	32	32	38	38
Sleeve O.D.	D	36	36	38	40	45	50	65

KEY TO ITEM CODE

ACJC - xxx - xxxx - xxxx

- ACJC: Air-Cooled Jumper Cables Designated
- xxx: M.C.M (2 M.C.M = 1 mm²)
- xxxx: Terminals Styles
- xxxx: Overall Length "L" In mm

Coding System for making your PART #

Example :

ACJC - 500 - NUSU - 0600

- Length "L" will be 600 mm
- Terminal will be of type NUSU
- M.C.M will be 500

A wide range of **Water-Cooled Jumper Cables** and **Kickless Cables** are also available as per customer's requirements and specifications.



Water-Cooled

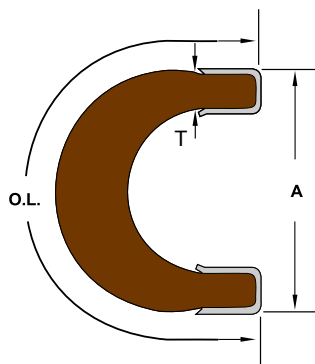
(wide range of connectors/terminals are available)



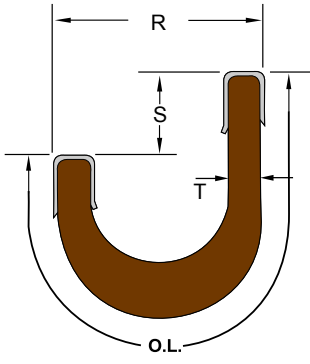
Kickless Cables

SHUNTS

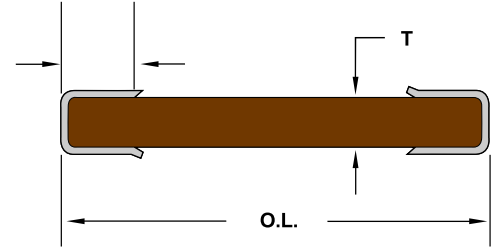
A wide range of Laminated Copper Shunts are available to suit your required length, shape, pattern and other specifications.



Shape "C"

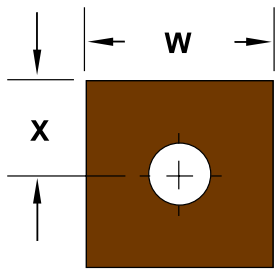


Shape "J"

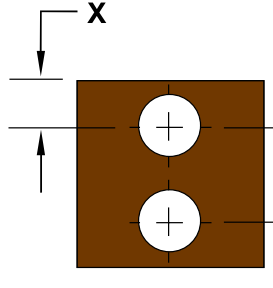


Shape "F"

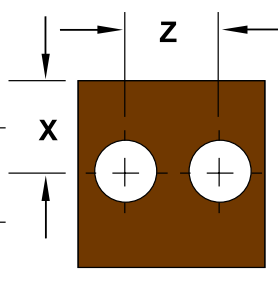
HOLE PATTERN



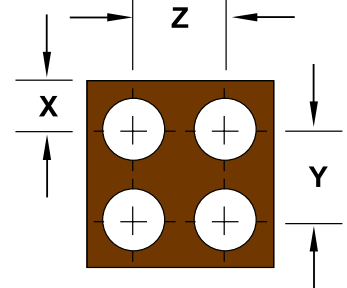
HOLE PATTERN "A"



HOLE PATTERN "B"



HOLE PATTERN "C"



HOLE PATTERN "D"

Provide the following information while ordering:

Description	Dimension
Shunt Type (Shape)	C,F,J, L,V,S
Shunt Length (outside length)	O.L
Shunt Thickness (not counting the end clip)	T
Shunt Lamination thickness	
Shunt Width	W
Hole Pattern (pattern letter)	A,B,C,D
Hole Diameter	
Hole Dimensions (X, Y, Z)	X,Y,Z
Other dimension where applicable	R,S
End Treatment	Clip, Solder, etc.

TIP MAINTENANCE

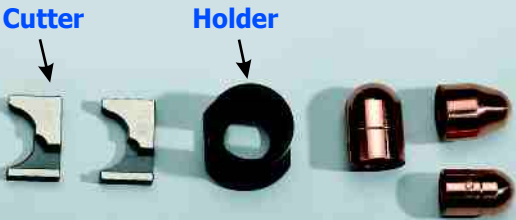
Tip Spanner

Item Code	Description
WM-TS-13D	For 13 Dia Electrodes and Shanks
WM-TS-16D	For 16 Dia Electrodes and Shanks



Tip Remover

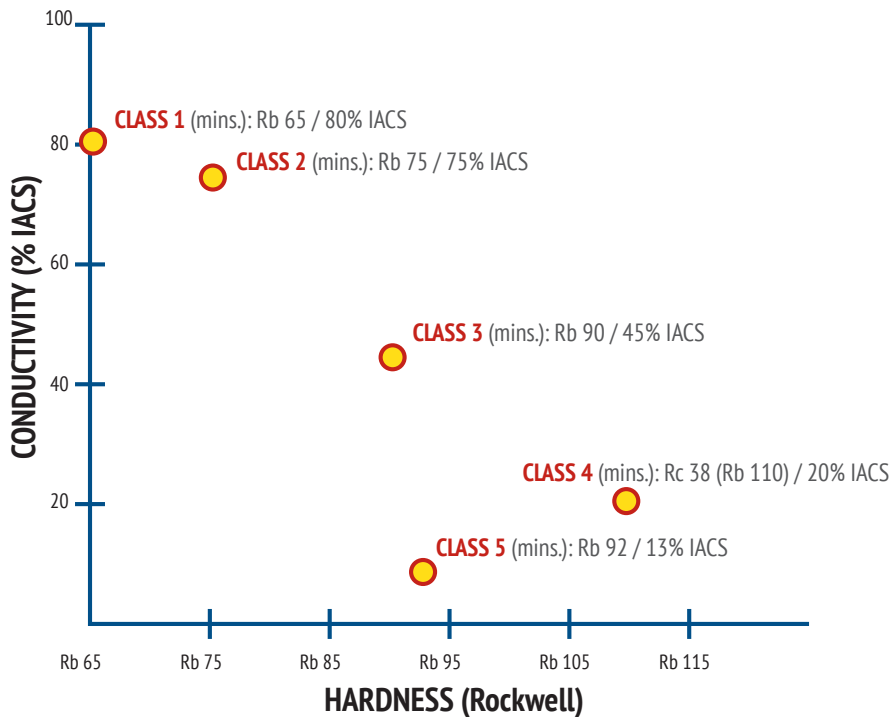
Item Code	Description
WM-TR-13D	For 13 Dia Caps
WM-TR-16D	For 16 Dia Caps



Tip Dresser

Item Code	Description
WM-TDN	<ul style="list-style-type: none"> ◆ Length 280 mm ◆ Weight 1.3 Kg. ◆ RPM 1300 r.p.m.

RWMA Class Applications



CLASS 1:

Welding Caps, Electrode Adapters, Seam Welding Wheels

CLASS 2:

Welding Caps, Electrode Holders, Welding Arms, Nozzles, Butt Welding Dies, Seam Welding Wheels

CLASS 3:

Butt Welding Dies, Electrode Holders, Seam Welding Wheels, Electrode Forming Dies, Welding Arms

CLASS 4:

Seam Welding Wheels, Butt Welding Dies, Electrode Holders, Welding Arms

We also have abundant inventories of C10100 (Oxygen Free Electronic Copper), C10200 (Oxygen Free Copper), C11000 (ETP Copper), C14500 (Tellurium Copper), C15000 (Zirconium Copper), C17200 (Beryllium Copper), C17510 (Beryllium Copper) and C18000 (Copper Chromium Nickel Silicon).

<p>RWMA CLASS 1: C15000 (Cu Zr) Zirconium Copper EN: CW120C 12163 12167 DIN: 17666 2.1580 Conductivity.....80% IACS Hardness.....65 HRb</p>	<p>RWMA CLASS 2: C18200 (Cu Cr1) Chromium Copper EN: CW105C 12167 DIN: 2.1293</p>	<p>C18150 (Cu Cr1 Zr) Chromium Zirconium Copper EN: CW106C 12163 12167 DIN: 17666-2,1293 17672 44759 Conductivity.....75% IACS Hardness.....75 HRb</p>
<p>RWMA CLASS 3: C17500 (Cu Co2 Ni Be) Beryllium Copper (CO) EN: CW104C DIN: 17666-2,1285 17672 44759 CB4 Conductivity.....45% IACS Hardness.....90 HRb (Annealed Temper available from stock)</p>	<p>C17510 (Cu Ni Be) Beryllium Copper (NI) ASTM: B441 / B534 EN: CW110C DIN: 17666-2,0850 17672 Conductivity.....45% IACS Hardness.....90 HRb (Annealed Temper available from stock)</p>	<p>C18000 (Cu Ni Si Cr) Beryllium Free Copper EN: CW110C 12163 CuNi2Si Conductivity.....45% IACS Hardness.....90 HRb (Annealed Temper available from stock)</p>
<p>RWMA CLASS 4: C17200 (Cu Be2) Beryllium Copper EN: CW101C DIN: 17672 2,1247 NFL: 14709 AMS 4533D 4535C Conductivity.....20 % IACS Hardness.....33 HRC</p>	<p>RWMA CLASS 5: C95400 Aluminum Bronze ASTM: B505 Conductivity.....13 % IACS Hardness.....82 HRb</p>	



NBM Metals

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