



RESISTANCE RW WELDING

MACHINE & ACCESSORY
ResWeld.com

Resistance Welding Product Catalog & Reference Guide

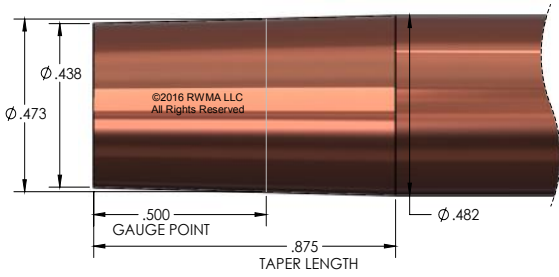
**Saving the world,
one spot weld at a time**

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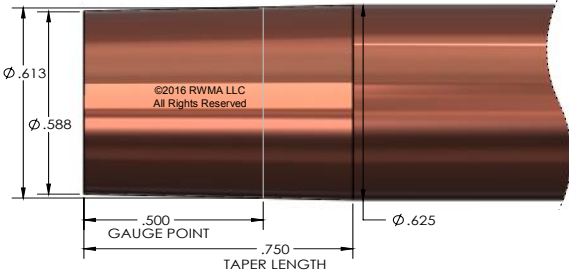
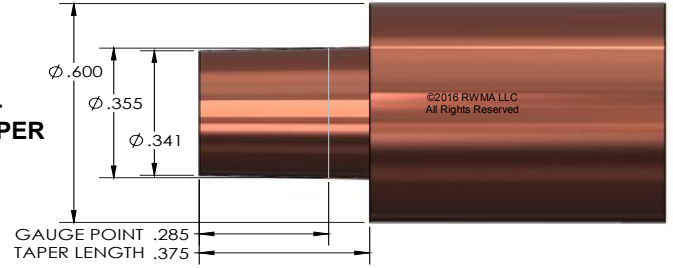
TAPERS

ELECTRODE AND ADAPTER TAPERS

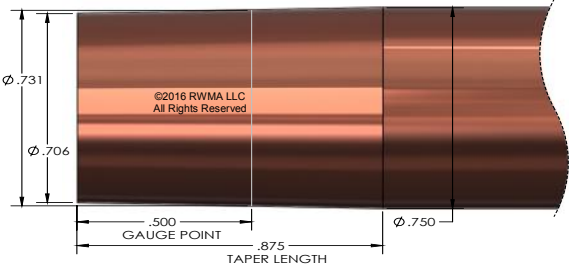
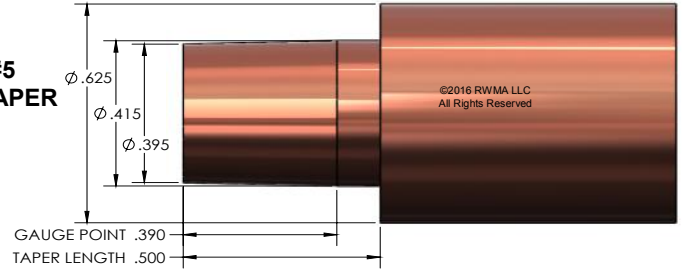
CAP TAPERS



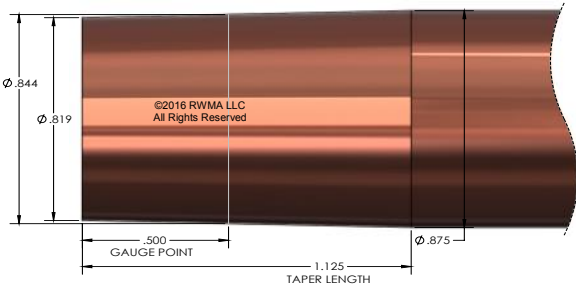
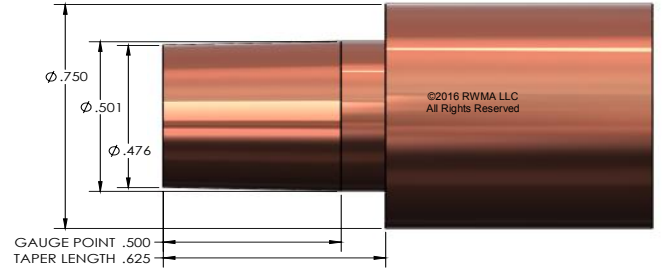
**RWMA #4
1 MORSE TAPER**



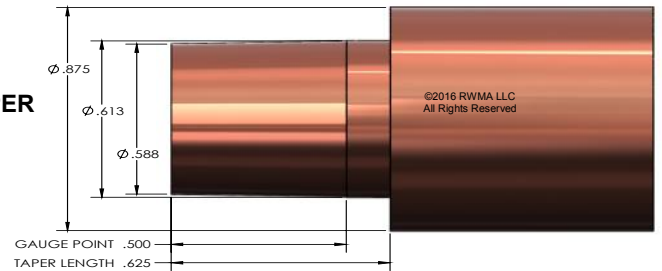
**RWMA #5
2 MORSE TAPER**



RWMA #6



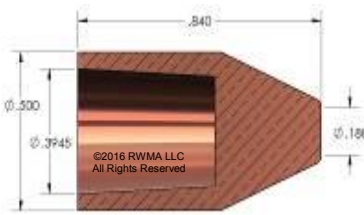
**RWMA #7
3 MORSE-TAPER**



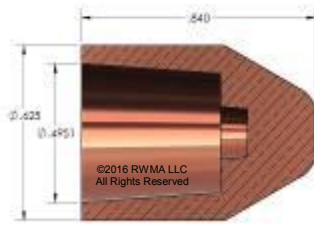
RWMA CODING FOR STRAIGHT TAPERED ELECTRODES			
X X X X X			
NOSE	MATERIAL	ATTACHMENT	LENGTH IN # OF 1/4"
A = POINTED	1 = RWMA CLASS 1	4 = 4RW / 1 MT	04 = 1"
B = DOME	2 = RWMA CLASS 2	5 = 5RW / 2 MT	05 = 1 1/4"
C = FLAT	3 = RWMA CLASS 3	6 = 6RW	06 = 1 1/2"
D = OFFSET		7 = 7RW / 3 MT	07 = 1 3/4"
E = TRUNCATED			08 = 2"
			09 = 2 1/4"
			10 = 2 1/2"
			11 = 2 3/4"
			12 = 3"
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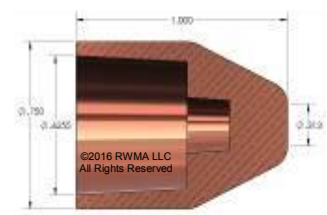
FEMALE CAP ELECTRODES



FA 14
FA 24



FA 15
FA 25



FA 16
FA 26



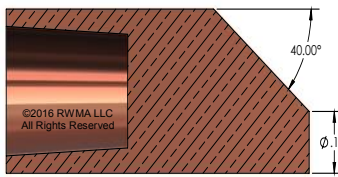
FB 14
FB 24



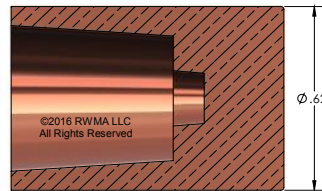
FB 15
FB 25



FB 16
FB 26



FC 14
FC 24



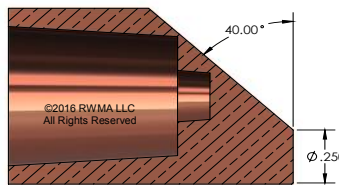
FC 15
FC 25



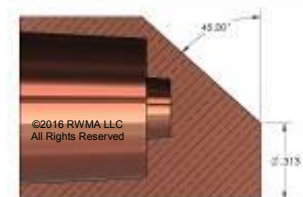
FC 16
FC 26



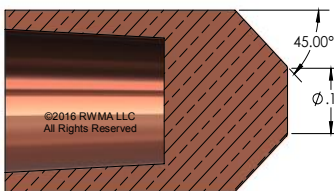
FD 14
FD 24



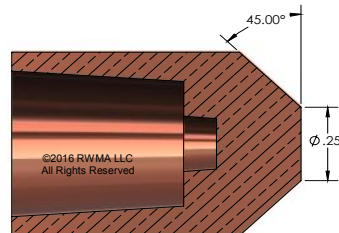
FD 15
FD 25



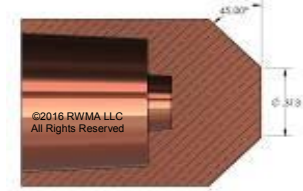
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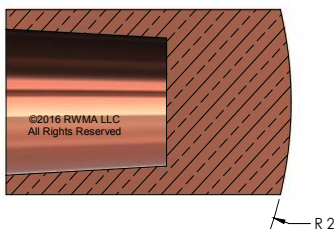
FE 14
FE 24



FE 15
FE 25



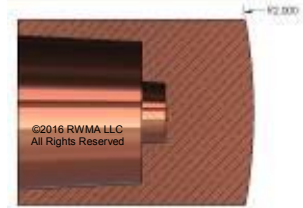
FE 16
FE 26



FF 14
FF 24



FF 15
FF 25



FF 16
FF 26

MATERIALS:

- CLASS 1 COPPER
- CLASS 2 COPPER
- CLASS 3 COPPER

*ALL CAP ELECTRODES ARE ALSO AVAILABLE AS Z-TRODE



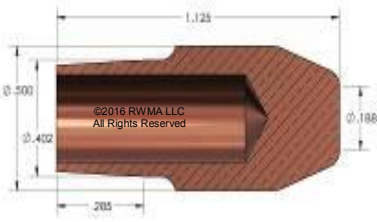
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MALE CAP ELECTRODES



**MA 14
MA 24**



**MA 14
MA 24**



**MA 14
MA 24**



**MB 14
MB 24**



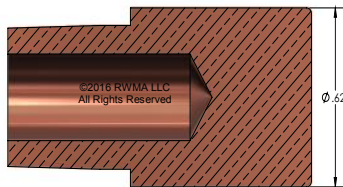
**MB 14
MB 24**



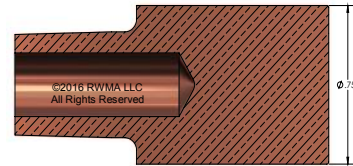
**MB 14
MB 24**



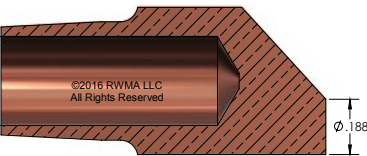
**MB 14
MB 24**



**MB 14
MB 24**



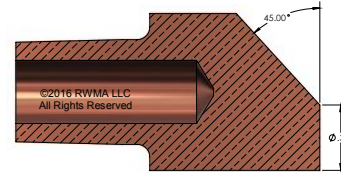
**MB 14
MB 24**



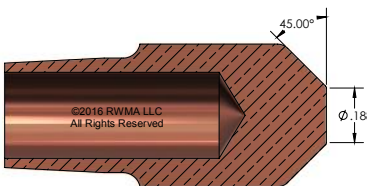
**MB 14
MB 24**



**MB 14
MB 24**



**MB 14
MB 24**



**MB 14
MB 24**



**MB 14
MB 24**



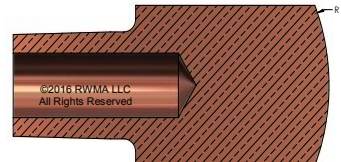
**MB 14
MB 24**



**MB 14
MB 24**



**MB 14
MB 24**



**MB 14
MB 24**

MATERIALS:

- CLASS 1 COPPER
- CLASS 2 COPPER
- CLASS 3 COPPER

*ALL CAP ELECTRODES ARE ALSO AVAILABLE AS Z-TRODE



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A-Trode®

The universal cap electrode for reliable resistance welding of light-to-medium gauge coated and uncoated steels.

Specification - Quality

Alloy	C18150 CuCrZr, EN ISO 5182 A2/2, DIN 17666 Wn 2.1293		
Chemical composition	Cr 0.7% to 1.2%, Zr 0.06% to 0.15%. Others max. 0.2%, Cu remainder.		
Physical material properties at 20°C	Mass	8.9g/cm ³	
	Specific heat	0.376 J/kg.K	
	Thermal conductivity	320 W/m.K	
	Expansion coefficient (20-300°C)	17.0 x 10 ⁻⁶ m/mK	
	Electric conductivity (solution-annealed and hardened)	min. 43 S/m	
	Softening temperature	min. 500°C	
Dimensions and tolerances	To ISO 5821 or other standards as required. Special electrodes to customer drawing.		
Packaging	Most items in cartons of 500 pieces.		
Documentation	Acceptance test certificate EN 10204 3.1 B possible if desired against a charge.		
Area of application	Male and female resistance welding electrodes. Backing dies. Series welding backing dies. Indirect welding backing dies.		

Luvata's A-Trode® is the universal cap electrode for reliable resistance welding of light-to-medium gauge coated and uncoated steels.

Produced by Luvata's proprietary billet casting process, the A-Trode's freedom from oxygen allows us to alloy the copper with the optimum levels of chrome and zirconium to deliver consistent welding results.

The A-Trode is available in all industry sizes, geometries and tapers or cold headed or machined to deliver your custom-made shape.

Specifications - Quality

Form of supply	Tensile strength [N/mm ²]	0.2% Offset yield strength [N/mm ²]	Elongation AS [%]	Hardness HV
Electrodes	≥ 490	≥ 430	≥ 15	≥ 172



Conventional CuCrZr grain structure



Luvata CuCrZr fine grain structure

Errors and omissions excepted. Values given are industry standards.



Nitrode®

No other cap electrode can match Nitrode® for its cost-effective, high quality performance in resistance-welding applications.

Luvata's Nitrode cap is a cold-formed alloy of copper dispersion strengthened with Aluminium Oxide. It consistently outperforms copper chrome and copper chrome zirconium electrodes in resistance to annealing, consistent electrical conductivity, electrode life and maintenance costs.

Longer weld life

Nitrode caps last longer than conventional electrodes by resisting annealing.

Non-stick

Nitrode caps reduce sticking of electrodes on galvanized steel and other coated metals. The refractory qualities of Al₂O₃ reduce the infusion of liquid and gaseous zinc into the copper matrix.

Resists mushrooming

Nitrode's resistance to mushrooming minimizes its dressing frequency to one-fourth that of conventional electrodes, significantly reducing line downtime and re-welds.

Reduces maintenance downtime

Nitrode caps require less overall maintenance than conventional CuCrZr and CuCr electrodes, increasing welding process and production efficiencies.

Reduces energy requirements

Nitrode requires lower current when used on both sides of the weldment. Current settings on your welder can be reduced by up to 10% from conventional settings, with no loss of weld quality.

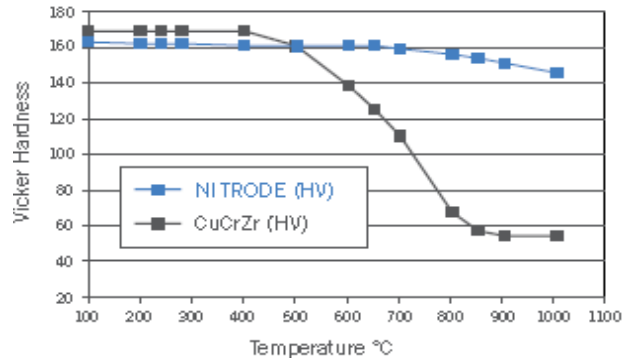
Smoother start-ups

Nitrode caps require no warm-up, conditioning time or initial preparation following electrode changes. If you use automatic step-up controls, the incremental settings can be varied to minimize current adjustments with no loss of weld integrity. The results are fewer electrode changes, fewer interruptions for dressing and smoother start-ups.

Works on all steels

Nitrode has demonstrated superior welding performance for a variety of steels, including HSS, HSLA, micro-alloyed, nitrogenized, low-carbon, electrolytically zinc-coated, galvanized and many others.

Luvata welding electrodes are available in all industry sizes, geometries and tapers.



Nitrode cuts your company's costs

Improved up-time from reduced tip changes, maintenance savings, less tip-dressing, improved weld quality, and lower current settings will increase your company's productivity, and cut your costs compared to conventional electrodes.

Nitrode metallurgy

Nitrode is a composite alloy of copper and Al₂O₃ to become CDA alloy 15760. Conventional copper alloys anneal at temperatures over 500°C. Nitrode does not suffer significant loss of properties till nearly the melting point of 1083°C.

Nitrode's physical properties

Hardness at ambient temperature: Minimum 75 HRB
Conductivity: Minimum 75% IACS

Nitrode's longer weld life

The contact surface of a resistance welding electrode reaches temperatures of up to 900°C during the welding process. As the contact surface on a Cu-CrZr or CuCr electrode anneals, it softens and the contact surface grows, limiting the electrode life. Nitrode electrodes resist annealing and slow the mushrooming effect on the contact surface of the electrode, allowing more welds before tip dressing, heat stepping, or tip change.

Heat stepping

Nitrode electrodes allow more welds per heat step than conventional alloys. Adjusting heat-programs allows you to take advantage of the longer life of Nitrode electrodes.

Traceability

All Luvata materials are fully traceable. Nitrode electrodes can be recognized by their single knurls.



Z-Trode®

The ideal cap electrode for resistance welding of light-to-medium gauge coated and uncoated steels and aluminum alloys

The Luvata Z-Trode® cap electrode is cold-formed from CDA Alloy 15000 zirconium copper. The combination of advanced copper metallurgy and our cold-forming technology gives you an electrode that outperforms conventional electrodes.

Prevents sticking

Electrode sticking is inevitable when welding galvanized steel with conventional electrodes. Chrome in a conventional electrode does not prevent the zinc from alloying into the copper electrode creating a brass intermetallic surface on the electrode weld face, which diminishes the weld nugget size and degrades the weld quality. But Z-Trode is an alloy of pure zirconium and oxygen-free copper. The zirconium discourages the alloying effect on the electrode weld face and prevents sticking. This increases productivity without special dressings or increased power requirements to weld coated materials.

Resists mushrooming

When compared to CuCrZr and CuCr alloys, the zirconium-copper alloy resists mushrooming and wear due to its superior conductivity. Z-Trode's conductivity allows it to be used with lower current settings and less heat, greatly improving the alloy's resistance to mushrooming.

Requires less energy

In comparison to CuCrZr and CuCr alloys, Z-Trode requires lower current due to its higher electrical conductivity, when used on both sides of the weldment. This results in longer electrode life, more consistent welds and energy savings. Welder current settings can be reduced up to 20% from the conventional CuCrZr and CuCr settings, with no loss in weld integrity.

Reduces downtime

Overall maintenance of Z-Trode caps is much less than with conventional electrodes, increasing welding process and production efficiencies.

Produces smooth start-ups

Z-Trode caps require no warm-up, conditioning time or initial preparation following electrode changes.

Most cost-effective electrode

Z-Trode's increased life expectancy, maintenance savings, lower energy requirements and consistent quality welds assure you the most return on your investment.

Z-Trode production

Z-Trode's freedom from oxygen allows us to alloy the copper with the optimum level of zirconium; that's what gives excellent conductivity, and that's what gives you the ability to reduce current settings.

Luvata welding electrodes are available in all industry sizes, geometries and tapers.

Z-Trode's physical properties

All Z-Trode electrodes are cold worked and most items are fully cold formed to ensure the maximum possible amount of cold work. Result: mechanical properties equivalent to conventional CuCrZr and CuCr electrodes, but with better electrical conductivity.

Hardness at ambient temperature: Minimum 65 HRB
Conductivity: Minimum 85% IACS

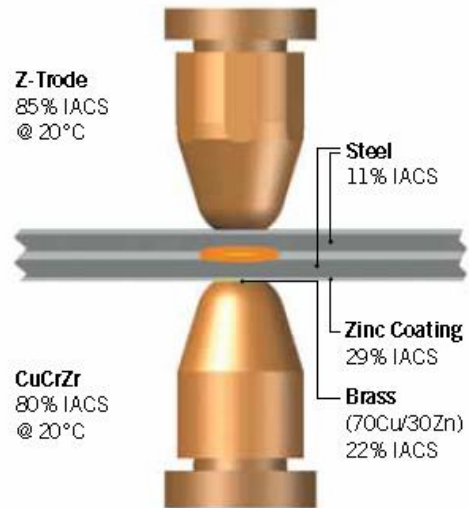
Z-Trode's non-stick properties

A resistance weld forms where the electrical resistance in an assembly is highest. Z-Trode's superior conductivity means that the maximum electrical resistance in an assembly is always clearly between the steel or aluminum sheet. This reduces heat generated between the sheet and electrode, which in turn reduces sticking.

Traceability

All Luvata materials are fully traceable. Z-Trode electrodes can be recognized by their flats around the periphery of the electrode.

Conductivities



Melting Points

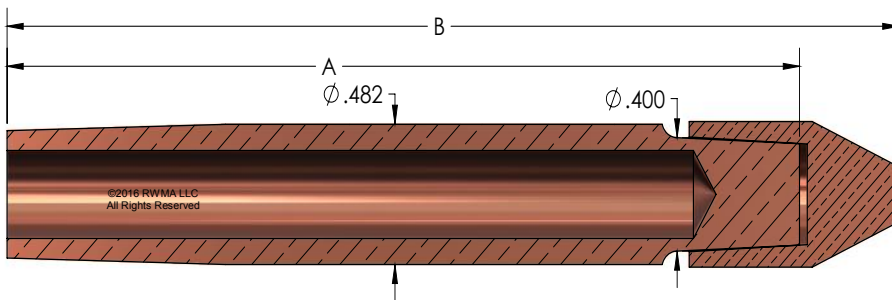
Zinc	~420°C
Brass (70Cu/30Zn)	~1027°C
CuCrZr	~1075°C
Z-Trode	~1080°C
Steel	~1427°C

Electrical and physical constants

STRAIGHT SHANKS FOR FEMALE CAPS

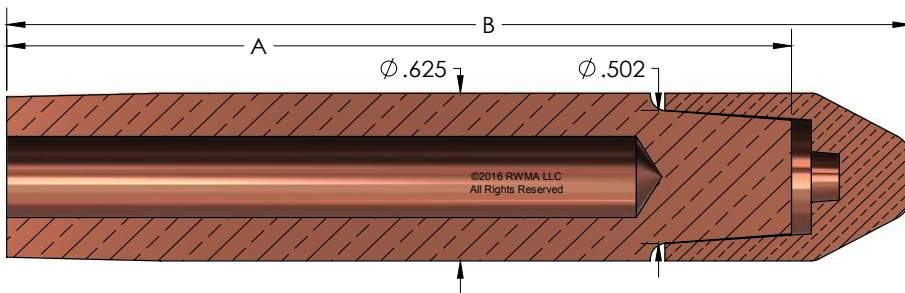


4RW STRAIGHT SHANKS



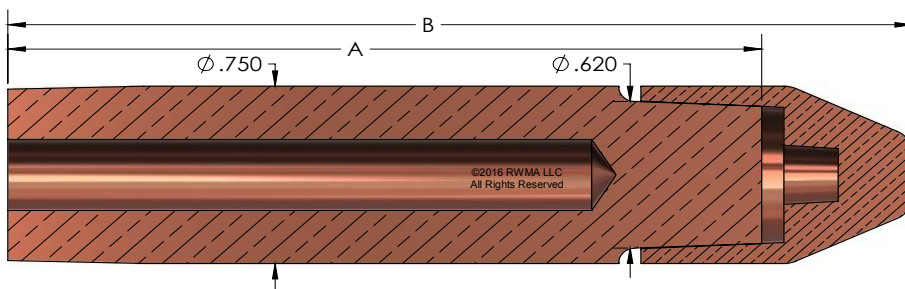
RWMA #	A	B
SF2T406	1.50	2.00
SF2T407	1.75	2.25
SF2T408	2.00	2.50
SF2T409	2.25	2.75
SF2T410	2.50	3.00
SF2T411	2.75	3.25
SF2T412	3.00	3.50
SF2T413	3.25	3.75
SF2T414	3.50	4.00
SF2T415	3.75	4.25
SF2T416	4.00	4.50

5RW STRAIGHT SHANKS



RWMA #	A	B
SF2T506	1.50	2.00
SF2T507	1.75	2.25
SF2T508	2.00	2.50
SF2T509	2.25	2.75
SF2T510	2.50	3.00
SF2T511	2.75	3.25
SF2T512	3.00	3.50
SF2T513	3.25	3.75
SF2T514	3.50	4.00
SF2T515	3.75	4.25
SF2T516	4.00	4.50

6RW STRAIGHT SHANKS



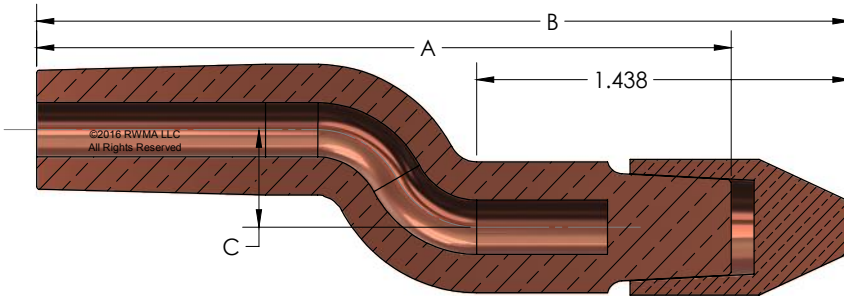
RWMA #	A	B
SF2T606	1.50	2.00
SF2T607	1.75	2.25
SF2T608	2.00	2.50
SF2T609	2.25	2.75
SF2T610	2.50	3.00
SF2T611	2.75	3.25
SF2T612	3.00	3.50
SF2T613	3.25	3.50
SF2T614	3.50	4.00
SF2T615	3.75	4.25
SF2T616	4.00	4.50

AVAILABLE IN DIFFERENT LENGTHS AND TAPERS UPON REQUEST

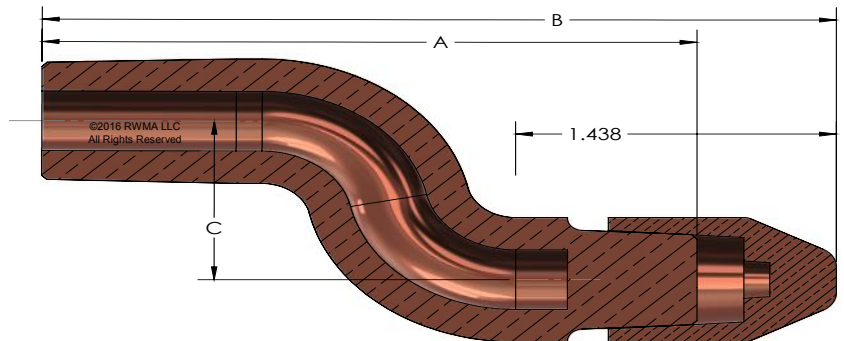
BENT SHANKS FOR FEMALE CAPS



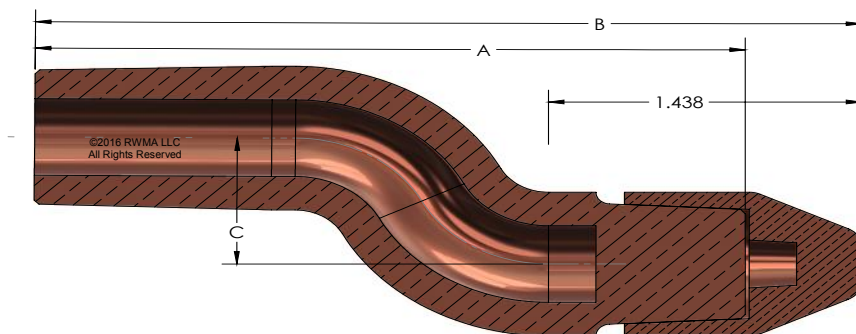
4RW BENT SHANKS



5RW BENT SHANKS



6RW BENT SHANKS



AVAILABLE IN DIFFERENT LENGTHS AND TAPERS UPON REQUEST

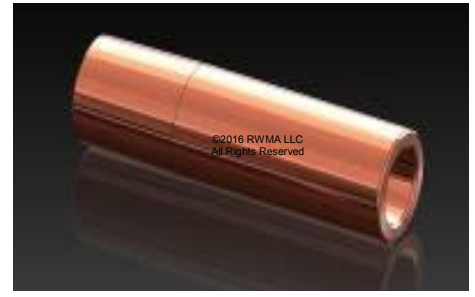
4RW BENT OFFSET SHANKS FOR FEMALE CAP ELECTRODES			
RWMA #	A	B	C
SF-2411-08	2.750	3.250	0.500
SF-2411-12	2.750	3.250	0.750
SF-2411-16	2.750	3.250	1.000
SF-2413-08	3.250	3.750	0.500
SF-2413-20	3.250	3.750	1.250
SF-2413-16	3.500	4.000	1.000

5RW BENT OFFSET SHANKS FOR FEMALE CAP ELECTRODES			
RWMA #	A	B	C
SF-2511-08	2.750	3.250	0.500
SF-2511-12	2.750	3.250	0.750
SF-2511-16	2.750	3.250	1.000
SF-2513-08	3.250	3.750	0.500
SF-2513-20	3.250	3.750	1.000
SF-2513-16	3.500	3.750	1.250

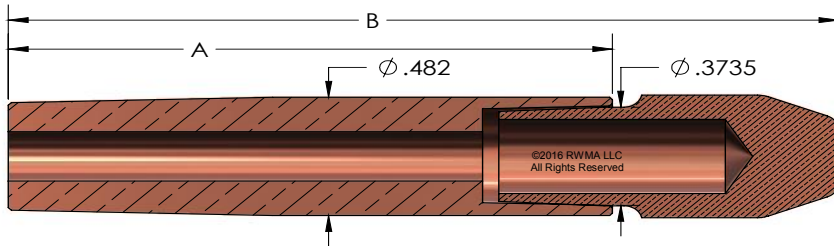
6RW BENT OFFSET SHANKS FOR FEMALE CAP ELECTRODES			
RWMA #	A	B	C
SF-2611-08	2.750	3.250	0.500
SF-2611-12	2.750	3.250	0.750
SF-2611-16	2.750	3.250	1.000
SF-2613-08	3.250	3.750	0.500
SF-2613-20	3.250	3.750	1.000
SF-2613-16	3.500	3.750	1.250

A = LENGTH OF THE SHANK	
B = ASSEMBLED LENGTH OF THE SHANK	
C = OFFSET OF THE SHANK	

STRAIGHT SHANKS FOR MALE CAPS

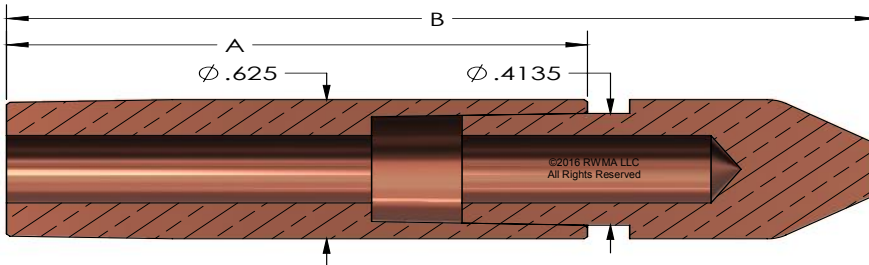


4RW STRAIGHT SHANKS



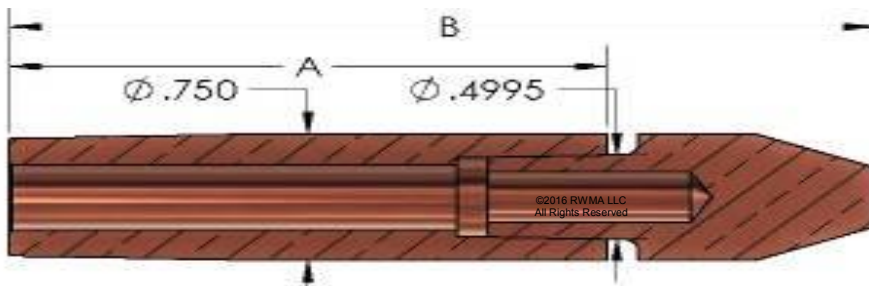
RWMA #	A	B
SM2T406	1.500	2.250
SM2T407	1.750	2.500
SM2T408	2.000	2.750
SM2T409	2.250	3.000
SM2T410	2.500	3.250
SM2T411	2.750	3.500
SM2T412	3.000	3.750
SM2T413	3.250	4.000
SM2T414	3.500	4.250
SM2T415	3.750	4.500
SM2T416	4.000	4.750

5RW STRAIGHT SHANKS



RWMA #	A	B
SM2T506	1.500	2.250
SM2T507	1.750	2.500
SM2T508	2.000	2.750
SM2T509	2.250	3.000
SM2T510	2.500	3.250
SM2T511	2.750	3.500
SM2T512	3.000	3.750
SM2T513	3.250	4.000
SM2T514	3.500	4.250
SM2T515	3.750	4.500
SM2T516	4.000	4.750

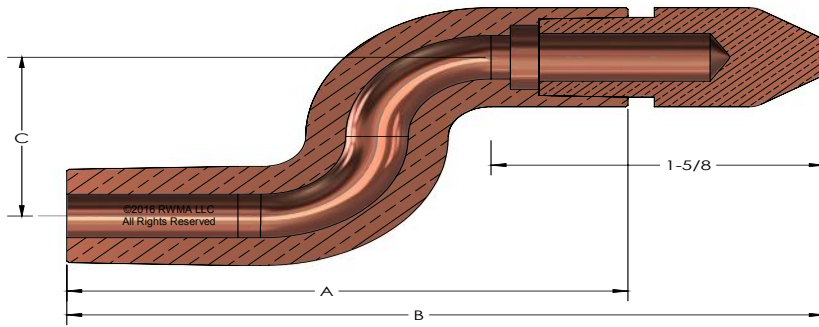
6RW STRAIGHT SHANKS



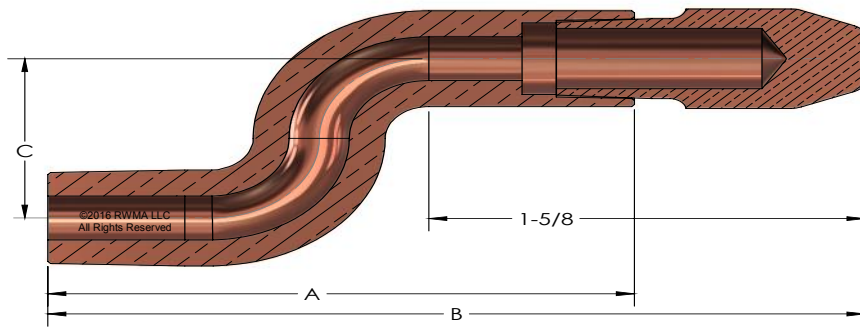
RWMA #	A	B
SM2T606	1.500	2.500
SM2T607	1.750	2.750
SM2T608	2.000	3.000
SM2T609	2.250	3.250
SM2T610	2.500	3.500
SM2T611	2.750	3.750
SM2T612	3.000	4.000
SM2T613	3.250	4.250
SM2T614	3.500	4.500
SM2T615	3.750	4.750
SM2T616	4.000	5.000

AVAILABLE IN DIFFERENT LENGTHS AND TAPERS UPON REQUEST

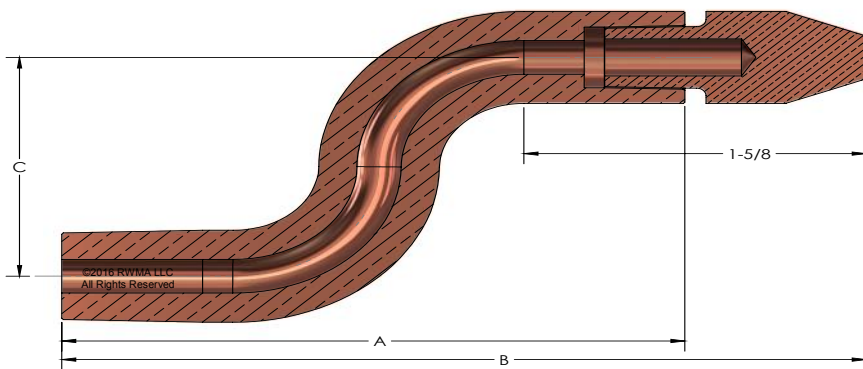
BENT SHANKS FOR MALE CAPS



4RW BENT OFFSET SHANKS FOR MALE CAP ELECTRODES			
RWMA #	A	B	C
SM-2410-08	2.500	3.250	0.500
SM-2410-12	2.500	3.250	0.750
SM-2410-16	2.500	3.250	1.000
SM-2412-08	3.000	3.750	0.500
SM-2412-20	3.000	3.750	1.250
SM-2413-16	3.250	4.000	1.000
SM-2413-20	3.250	4.000	1.250



5RW BENT OFFSET SHANKS FOR MALE CAP ELECTRODES			
RWMA #	A	B	C
SM-2509-04	2.250	3.000	0.250
SM-2510-08	2.500	3.250	0.500
SM-2510-12	2.500	3.250	0.750
SM-2510-16	2.500	3.250	1.000
SM-2512-08	3.000	3.750	0.500
SM-2512-20	3.000	3.750	1.250
SM-2513-16	3.250	4.000	1.000
SM-2513-20	3.250	4.000	1.250



6RW BENT OFFSET SHANKS FOR MALE CAP ELECTRODES			
RWMA #	A	B	C
SM-2610-08	2.250	3.250	0.250
SM-2610-12	2.750	3.250	0.500
SM-2610-16	2.750	3.500	0.750
SM-2612-08	3.250	3.750	0.750
SM-2612-20	3.250	3.750	1.000
SM-2613-16	3.500	4.000	1.000
SM-2613-20	3.500	4.000	1.000

A = LENGTH OF SHANK
B = ASSEMBLED LENGTH OF SHANK
C = OFFSET OF SHANK

AVAILABLE IN DIFFERENT LENGTHS AND TAPERS UPON REQUEST



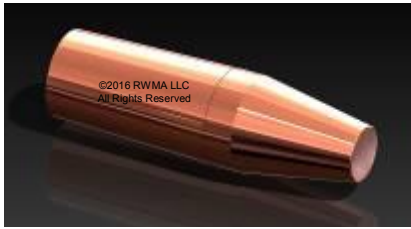
(269) 428-4770



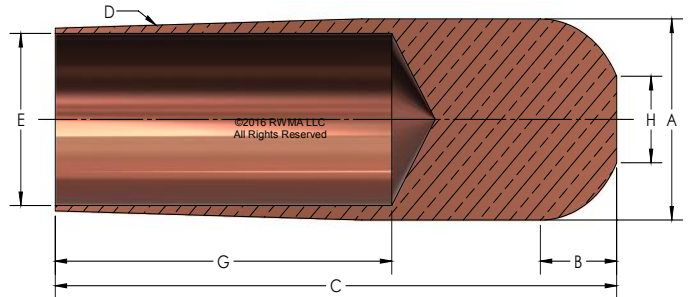
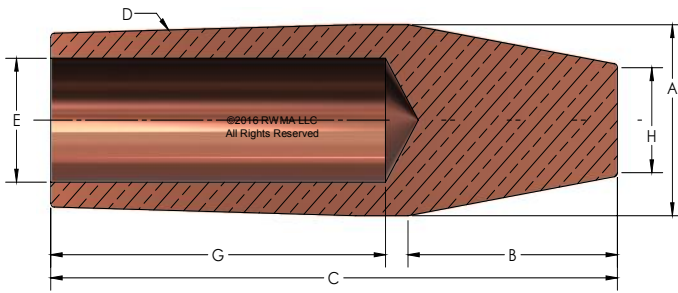
sales@resweld.com

STRAIGHT ELECTRODES

POINTED NOSE (A)



DOME NOSE (B)



STRAIGHT ELECTRODE POINTED NOSE (A)			
4RW TAPER (D)			
CLASS 1	CLASS 2	CLASS 3	NOSE LENGTH B
A 1405	A 2405	A 3405	3/4
A 1406	A 2406	A 3406	3/4
A 1407	A 2407	A 3407	3/4
A 1408	A 2408	A 3408	3/4
A 1409	A 2409	A 3409	3/4
A 1410	A 2410	A 3410	3/4
A 1411	A 2411	A 3411	3/4
A 1412	A 2412	A 3412	3/4
A 1413	A 2413	A 3413	3/4
A 1414	A 2414	A 3414	3/4
A 1415	A 2415	A 3415	3/4
A 1416	A 2416	A 3416	3/4

STANDARD DIMENSIONS (4RW TAPERS)				
FACE DIAMETER (H)	MAJOR DIAMETER (A)	WATER HOLE DIAMETER (E)	OVERALL LENGTH (C)	HOLE DEPTH (G)
3/16	0.482	9/32	1-1/4	3/4
			1-1/2	1
			1-3/4	1-1/4
			2	1-1/2
			2-1/4	1-3/4
			2-1/2	2
			2-3/4	2-1/4
			3	2-1/2
			3-1/4	2-3/4
			3-1/2	3
			3-3/4	3-1/4
			4	3-1/2

STRAIGHT ELECTRODE DOME NOSE (B)			
4RW TAPER (D)			
CLASS 1	CLASS 2	CLASS 3	NOSE LENGTH B
B 1405	B 2405	B 3405	1/4
B 1406	B 2406	B 3406	1/4
B 1407	B 2407	B 3407	1/4
B 1408	B 2408	B 3408	1/4
B 1409	B 2409	B 3409	1/4
B 1410	B 2410	B 3410	1/4
B 1411	B 2411	B 3411	1/4
B 1412	B 2412	B 3412	1/4
B 1413	B 2413	B 3413	1/4
B 1414	B 2414	B 3414	1/4
B 1415	B 2415	B 3415	1/4
B 1416	B 2416	B 3416	1/4

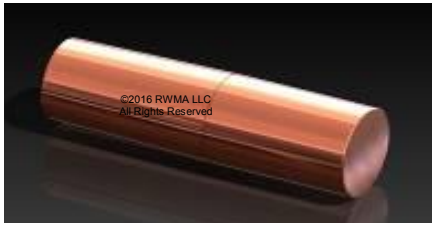
STRAIGHT ELECTRODE POINTED NOSE (A)			
5RW TAPER (D)			
CLASS 1	CLASS 2	CLASS 3	NOSE LENGTH B
A 1505	A 2505	A 3505	1/2
A 1506	A 2506	A 3506	7/8
A 1507	A 2507	A 3507	7/8
A 1508	A 2508	A 3508	7/8
A 1509	A 2509	A 3509	7/8
A 1510	A 2510	A 3510	7/8
A 1511	A 2511	A 3511	7/8
A 1512	A 2512	A 3512	7/8
A 1513	A 2513	A 3513	7/8
A 1514	A 2514	A 3514	7/8
A 1515	A 2515	A 3515	7/8
A 1516	A 2516	A 3516	7/8

STANDARD DIMENSIONS (5RW TAPERS)				
FACE DIAMETER (H)	MAJOR DIAMETER (A)	WATER HOLE DIAMETER (E)	OVERALL LENGTH (C)	HOLE DEPTH (G)
1/4	0.625	3/8	1-1/4	3/4
			1-1/2	3/4
			1-3/4	1
			2	1-1/4
			2-1/4	1-1/2
			2-1/2	1-3/4
			2-3/4	2
			3	2-1/4
			3-1/4	2-1/2
			3-1/2	2-3/4
			3-3/4	3
			4	3-1/4

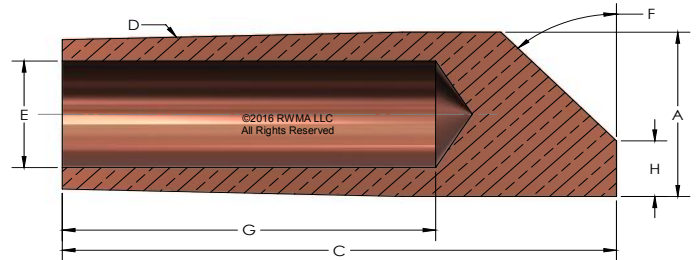
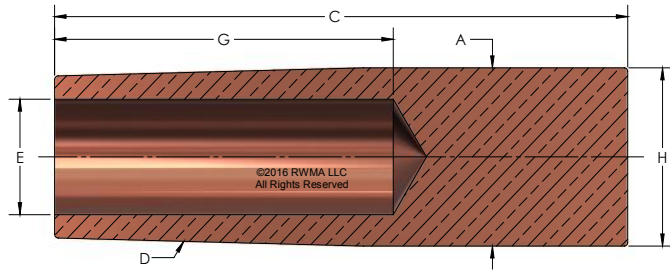
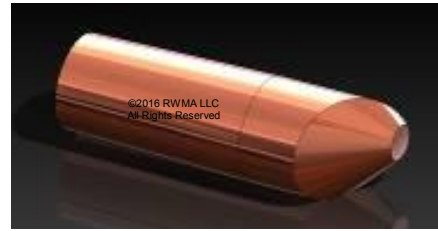
STRAIGHT ELECTRODE DOME NOSE (B)			
5RW TAPER (D)			
CLASS 1	CLASS 2	CLASS 3	NOSE LENGTH B
B 1505	B 2505	B 3505	3/8
B 1506	B 2506	B 3506	3/8
B 1507	B 2507	B 3507	3/8
B 1508	B 2508	B 3508	3/8
B 1509	B 2509	B 3509	3/8
B 1510	B 2510	B 3510	3/8
B 1511	B 2511	B 3511	3/8
B 1512	B 2512	B 3512	3/8
B 1513	B 2513	B 3513	3/8
B 1514	B 2514	B 3514	3/8
B 1515	B 2515	B 3515	3/8
B 1516	B 2516	B 3516	3/8

STRAIGHT ELECTRODES

FLAT NOSE (C)



OFFSET NOSE (D)



STRAIGHT ELECTRODE FLAT NOSE (C)			
4RW TAPER (D)			
CLASS 1	CLASS 2	CLASS 3	FACE DIAMETER (H)
C 1405	C 2405	C 3405	0.482
C 1406	C 2406	C 3406	
C 1407	C 2407	C 3407	
C 1408	C 2408	C 3408	
C 1409	C 2409	C 3409	
C 1410	C 2410	C 3410	
C 1411	C 2411	C 3411	
C 1412	C 2412	C 3412	
C 1413	C 2413	C 3413	
C 1414	C 2414	C 3414	
C 1415	C 2415	C 3415	
C 1416	C 2416	C 3416	

STANDARD DIMENSIONS (4RW TAPERS)				
FACE DIAMETER (H)	MAJOR DIAMETER (A)	WATER HOLE DIAMETER (E)	OVERALL LENGTH (C)	HOLE DEPTH (G)
3/16	0.482	9/32	1-1/4	3/4
			1-1/2	1
			1-3/4	1-1/4
			2	1-1/2
			2-1/4	1-3/4
			2-1/2	2
			2-3/4	2-1/4
			3	2-1/2
			3-1/4	2-3/4
			3-1/2	3
			3-3/4	3-1/4
			4	3-1/2

STRAIGHT ELECTRODE OFFSET NOSE (D)			
4RW TAPER (D)			
CLASS 1	CLASS 2	CLASS 3	NOSE ANGLE (F)
D 1405	D 2405	D 3405	45°
D 1406	D 2406	D 3406	30°
D 1407	D 2407	D 3407	30°
D 1408	D 2408	D 3408	30°
D 1409	D 2409	D 3409	30°
D 1410	D 2410	D 3410	30°
D 1411	D 2411	D 3411	30°
D 1412	D 2412	D 3412	30°
D 1413	D 2413	D 3413	30°
D 1414	D 2414	D 3414	30°
D 1415	D 2415	D 3415	30°
D 1416	D 2416	D 3416	30°

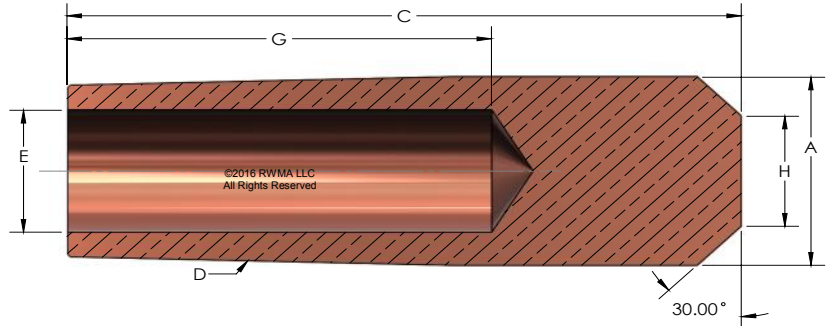
STRAIGHT ELECTRODE FLAT NOSE (C)			
5RW TAPER (D)			
CLASS 1	CLASS 2	CLASS 3	FACE DIAMETER (H)
C 1505	C 2505	C 3505	5/8
C 1506	C 2506	C 3506	
C 1507	C 2507	C 3507	
C 1508	C 2508	C 3508	
C 1509	C 2509	C 3509	
C 1510	C 2510	C 3510	
C 1511	C 2511	C 3511	
C 1512	C 2512	C 3512	
C 1513	C 2513	C 3513	
C 1514	C 2514	C 3514	
C 1515	C 2515	C 3515	
C 1516	C 2516	C 3516	

STANDARD DIMENSIONS (5RW TAPERS)				
FACE DIAMETER (H)	MAJOR DIAMETER (A)	WATER HOLE DIAMETER (E)	OVERALL LENGTH (C)	HOLE DEPTH (G)
1/4	0.625	3/8	1-1/4	3/4
			1-1/2	3/4
			1-3/4	1
			2	1-1/4
			2-1/4	1-1/2
			2-1/2	1-3/4
			2-3/4	2
			3	2-1/4
			3-1/4	2-1/2
			3-1/2	2-3/4
			3-3/4	3
			4	3-1/4

STRAIGHT ELECTRODE OFFSET NOSE (D)			
5RW TAPER (D)			
CLASS 1	CLASS 2	CLASS 3	NOSE ANGLE (F)
D 1505	D 2505	D 3505	45°
D 1506	D 2506	D 3506	30°
D 1507	D 2507	D 3507	30°
D 1508	D 2508	D 3508	30°
D 1509	D 2509	D 3509	30°
D 1510	D 2510	D 3510	30°
D 1511	D 2511	D 3511	30°
D 1512	D 2512	D 3512	30°
D 1513	D 2513	D 3513	30°
D 1514	D 2514	D 3514	30°
D 1515	D 2515	D 3515	30°
D 1516	D 2516	D 3516	30°

STRAIGHT ELECTRODES

TRUNCATED NOSE (E)

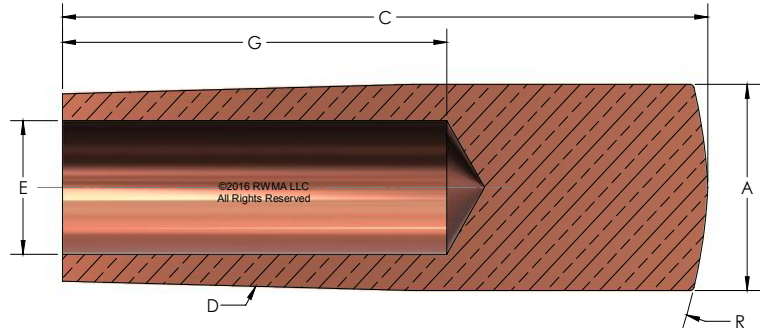


STRAIGHT ELECTRODE TRUNCATED NOSE (E)							
4RW TAPER (D)							
CLASS 1	CLASS 2	CLASS 3	MAJOR DIAMETER (A)	OVERALL LENGTH (C)	HOLE DEPTH (G)	FACE DIAMETER (H)	WATER HOLE DIAMETER (E)
E 1405	E 2405	E 3405	0.482	1-1/4	3/4	3/16	9/32
E 1406	E 2406	E 3406		1-1/2	1		
E 1407	E 2407	E 3407		1-3/4	1-1/4		
E 1408	E 2408	E 3408		2	1-1/2		
E 1409	E 2409	E 3409		2-1/4	1-3/4		
E 1410	E 2410	E 3410		2-1/2	2		
E 1411	E 2411	E 3411		2-3/4	2-1/4		
E 1412	E 2412	E 3412		3	2-1/2		
E 1413	E 2413	E 3413		3-1/4	2-3/4		
E 1414	E 2414	E 3414		3-1/2	3		
E 1415	E 2415	E 3415		3-3/4	3-1/4		
E 1416	E 2416	E 3416		4	3-1/2		

STRAIGHT ELECTRODE TRUNCATED NOSE (E)							
5RW TAPER (D)							
CLASS 1	CLASS 2	CLASS 3	MAJOR DIAMETER (A)	OVERALL LENGTH (C)	HOLE DEPTH (G)	FACE DIAMETER (H)	WATER HOLE DIAMETER (E)
E 1505	E 2505	E 3505	0.625	1-1/4	3/4	1/4	3/8
E 1506	E 2506	E 3506		1-1/2	1		
E 1507	E 2507	E 3507		1-3/4	1-1/4		
E 1508	E 2508	E 3508		2	1-1/2		
E 1509	E 2509	E 3509		2-1/4	1-3/4		
E 1510	E 2510	E 3510		2-1/2	2		
E 1511	E 2511	E 3511		2-3/4	2-1/4		
E 1512	E 2512	E 3512		3	2-1/2		
E 1513	E 2513	E 3513		3-1/4	2-3/4		
E 1514	E 2514	E 3514		3-1/2	3		
E 1515	E 2515	E 3515		3-3/4	3-1/4		
E 1516	E 2516	E 3516		4	3-1/2		

STRAIGHT ELECTRODES

RADIUS NOSE (F)

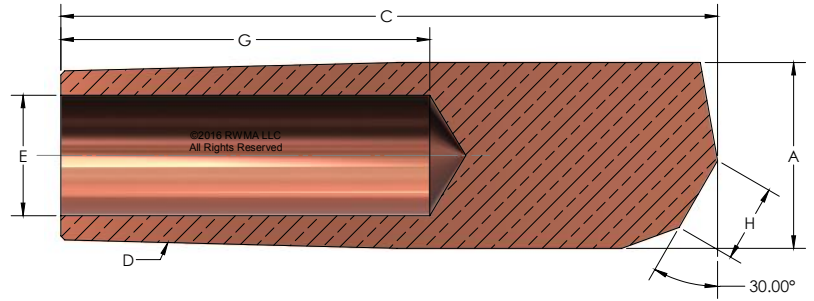


STRAIGHT ELECTRODE RADIUS NOSE (F)							
4RW TAPER (D)							
CLASS 1	CLASS 2	CLASS 3	MAJOR DIAMETER (A)	OVERALL LENGTH (C)	HOLE DEPTH (G)	SPHERICAL RADIUS (R)	WATER HOLE DIAMETER (E)
F 1405	F 2405	F 3405	0.482	1-1/4	3/4	2	9/32
F 1406	F 2406	F 3406		1-1/2	1	2	
F 1407	F 2407	F 3407		1-3/4	1-1/4	2	
F 1408	F 2408	F 3408		2	1-1/2	2	
F 1409	F 2409	F 3409		2-1/4	1-3/4	2	
F 1410	F 2410	F 3410		2-1/2	2	2	
F 1411	F 2411	F 3411		2-3/4	2-1/4	2	
F 1412	F 2412	F 3412		3	2-1/2	2	
F 1413	F 2413	F 3413		3-1/4	2-3/4	2	
F 1414	F 2414	F 3414		3-1/2	3	2	
F 1415	F 2415	F 3415		3-3/4	3-1/4	2	
F 1416	F 2416	F 3416		4	3-1/2	2	

STRAIGHT ELECTRODE RADIUS NOSE (F)							
5RW TAPER (D)							
CLASS 1	CLASS 2	CLASS 3	MAJOR DIAMETER (A)	OVERALL LENGTH (C)	HOLE DEPTH (G)	SPHERICAL RADIUS (R)	WATER HOLE DIAMETER (E)
F 1505	F 2505	F 3505	0.625	1-1/4	3/4	2	3/8
F 1506	F 2506	F 3506		1-1/2	1	2	
F 1507	F 2507	F 3507		1-3/4	1-1/4	2	
F 1508	F 2508	F 3508		2	1-1/2	2	
F 1509	F 2509	F 3509		2-1/4	1-3/4	2	
F 1510	F 2510	F 3510		2-1/2	2	2	
F 1511	F 2511	F 3511		2-3/4	2-1/4	2	
F 1512	F 2512	F 3512		3	2-1/2	2	
F 1513	F 2513	F 3513		3-1/4	2-3/4	2	
F 1514	F 2514	F 3514		3-1/2	3	2	
F 1515	F 2515	F 3515		3-3/4	3-1/4	2	
F 1516	F 2516	F 3516		4	3-1/2	2	

STRAIGHT ELECTRODES

30 DEGREE OFFSET NOSE

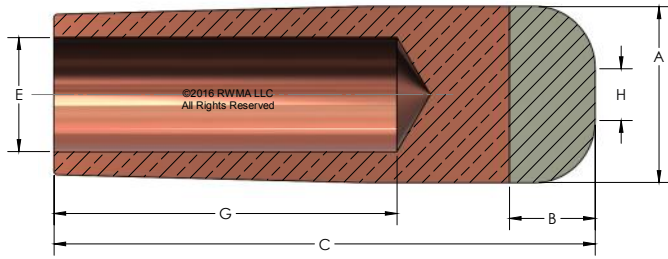


STRAIGHT ELECTRODE 30° OFFSET NOSE						
CLASS 2	MAJOR DIAMETER (A)	OVERALL LENGTH (C)	TAPER (D)	HOLE DEPTH (G)	FACE DIAMETER (H)	WATER HOLE DIAMETER (E)
TD2408	0.482	2	4RW	1-1/2	1/4	9/32
TD2410	0.625	2-1/2	5RW	2	3/8	3/8
TD2412	0.875	3	6RW	2-1/4	1/2	1/2

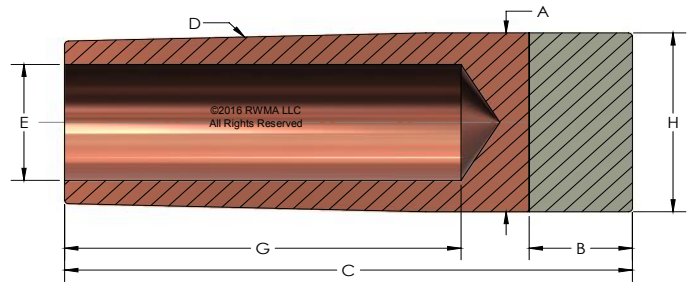
COPPER TUNGSTEN FACED STRAIGHT ELECTRODES

[Return to INDEX](#)

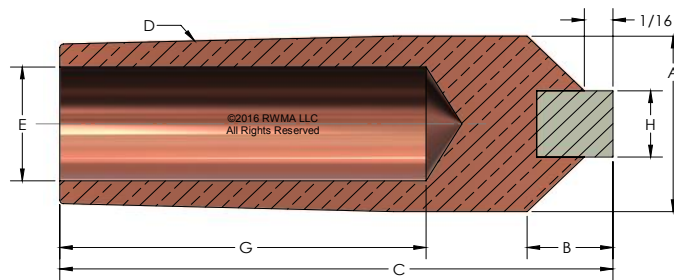
DOME NOSE



FLAT NOSE



INSERT NOSE

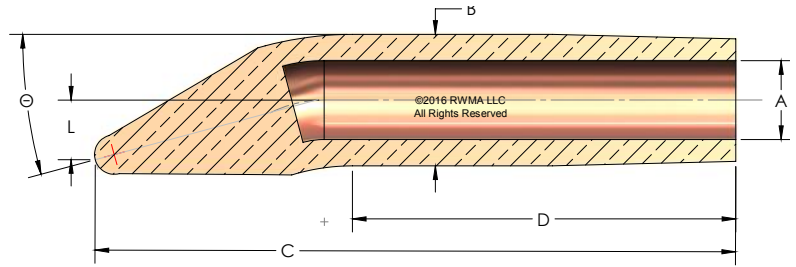


COPPER TUNGSTEN FACED STRAIGHT ELECTRODES

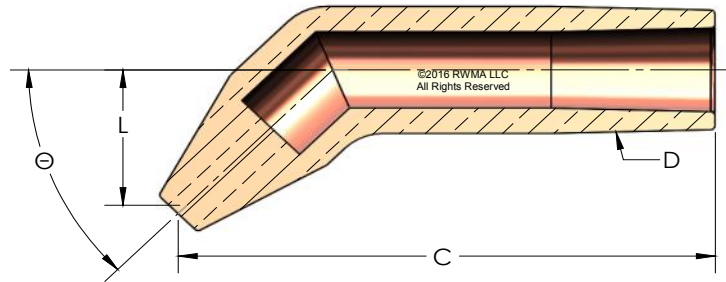
RWMA #	MAJOR DIAMETER (A)	FACE DIAMETER (H)	TAPER (D)	HOLE DEPTH (G)	COPPER TUNGSTEN THICKNESS (B)	WATER HOLE DIAMETER (E)	OVERALL LENGTH (C)	NOSE TYPE
A-1408-100M	0.482	3/16	4RW	1"	3/8	0.282	2"	POINTED (A)
A-1408-100W	0.482	3/16	4RW		3/8	0.282		
A-1508-10W	0.625	1/4	5RW		3/8	3/8		
A-1508-100M	0.625	1/4	5RW		3/8	3/8		DOME (B)
A-1508-100W	0.625	1/4	5RW		3/8	3/8		
B-1408-10W	0.482	0.482	4RW		1/4	0.282		
B-1508-10W	0.625	0.625	5RW		1/4	3/8		FLAT (C)
B-1508-100W	0.625	0.625	5RW		1/4	3/8		
C-1408-10W	0.482	0.482	4RW		1/2	0.282		
C-1408-100M	0.482	0.482	4RW		1/2	0.282		FLAT (C)
C-1408-100W	0.482	0.482	4RW		1/2	0.282		
C-1508-10W	0.625	0.625	5RW		1/4	3/8		
C-1508-100M	0.625	0.625	5RW	1/4	3/8			
C-1508-100W	0.625	0.625	5RW	1/4	3/8			

*ALSO AVAILABLE IN MOLYBDENUM

SINGLE BEND ELECTRODES

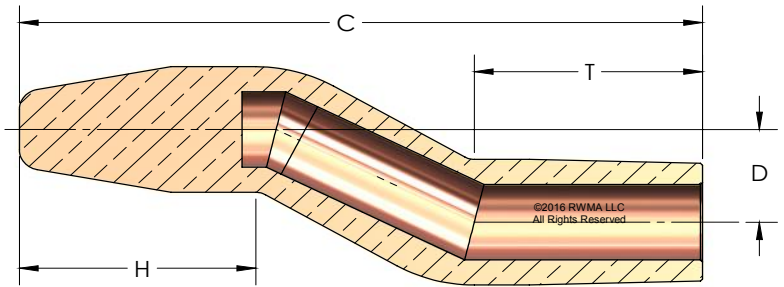


SINGLE BEND ELECTRODES					
RWMA #	TAPER	BENT ANGLE	REFERENCE LENGTH TO FACE (C)	OFFSET TAPER TO FACE (L)	
CRW-3214-04-15	4 RW	15°	1-11/16	1/4	
CRW-3219-04-15			2-15/16	1/4	
CRW-32118-13-15			3-7/8	13/16	
CRW-3215-07-30		30°	30°	1-7/8	7/16
CRW-3219-07-30				2-7/8	7/16
CRW-32118-23-30				3-5/8	1-7/16
CRW-3215-10-45		45°	45°	1-11/16	5/8
CRW-32112-12-45				2-7/8	3/4
CRW-32118-33-45				3-1/8	2-1/16
CRW-3218-23-60		60°	60°	2	1-7/16
CRW-32116-23-60				3	1-7/16
CRW-32118-40-60				2-5/8	2-1/2

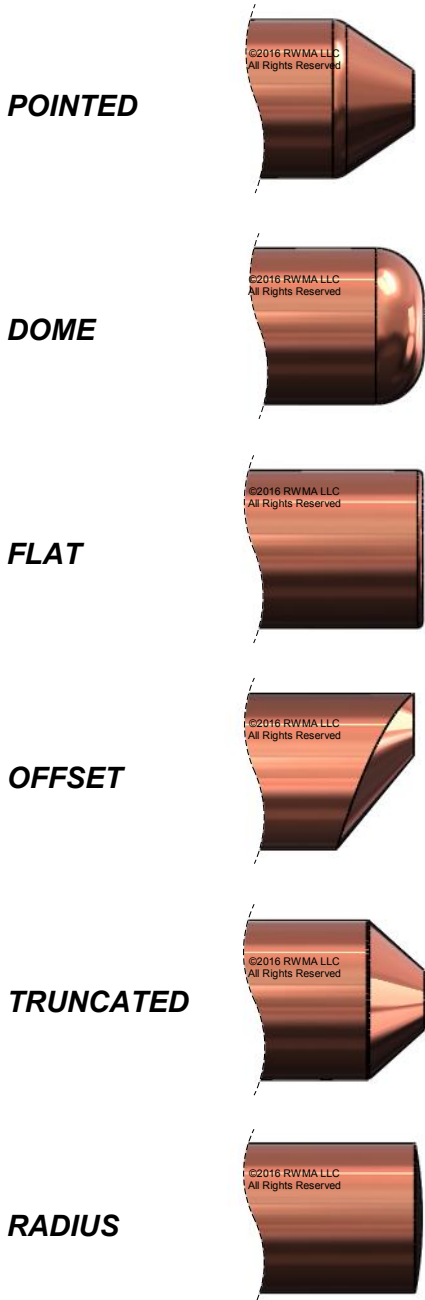


SINGLE BEND ELECTRODES								
RWMA #	TAPER	BENT ANGLE	REFERENCE LENGTH TO FACE (C)	OFFSET TAPER TO TOP OF RADIUS (L)	HOLE DIAMETER (A)	DIAMETER (B)	MIN. STRAIGHT LENGTH (D)	NOSE RADIUS (E)
CRW-16-26015	5 RW	15°	42440	3/8	5/16	5/8	1-5/8	3/16
CRW-16-26030		30°	39512	33/64				
CRW-16-24045		45°	37316	43/64				
CRW-16-26060		60°	39510	27/32				
CRW-16-26075		75°	23443	11689				
CRW-16-26050		90°	42413	37987				

DOUBLE BEND ELECTRODES

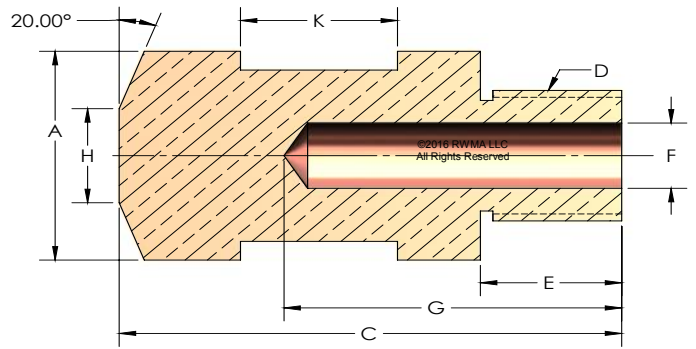
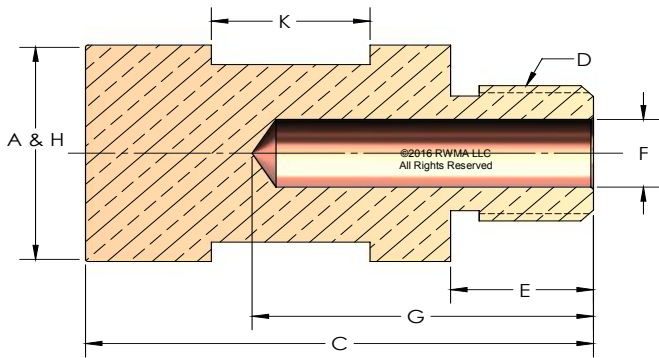


NOSE TYPES



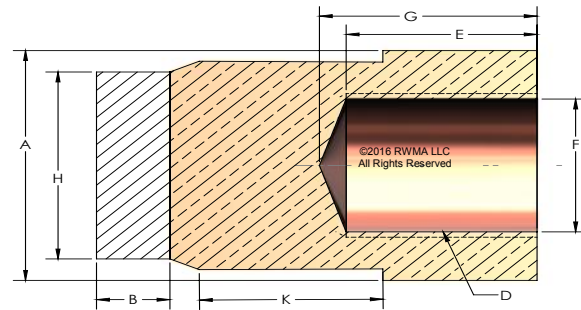
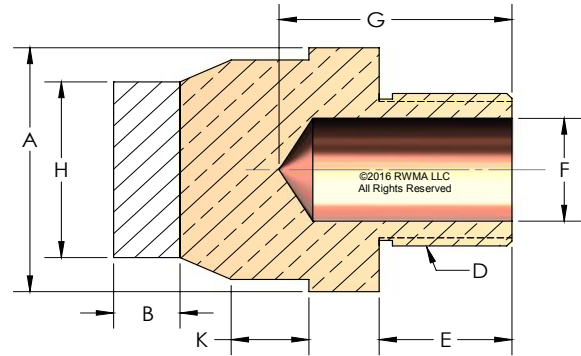
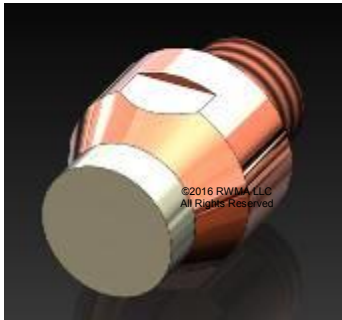
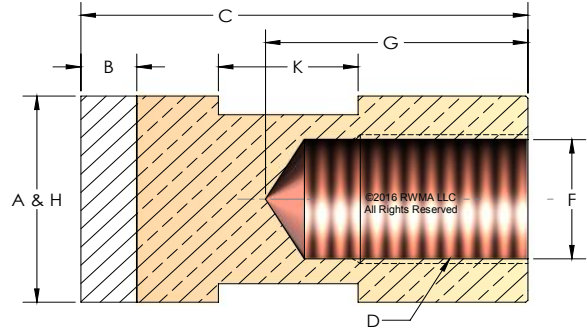
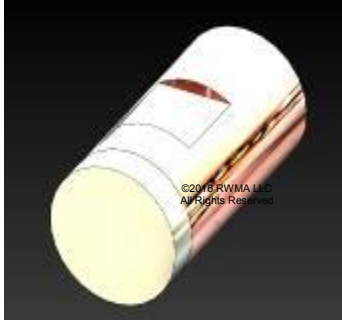
DOUBLE BEND ELECTRODES						
RWMA #	NOSE END LENGTH (H)	OVERALL LENGTH (C)	OFFSET (D)	ALLOY CLASS	TAPER END LENGTH (T)	TAPER SIZE
DA 2T408 08	0.750	2.000	0.500	2	0.875	4RW
DA 2T409 08	0.750	2.250	0.500		0.875	4RW
DA 2T410 08	2.000	2.500	0.500		0.875	4RW
DA 2T510 08	1.000	2.500	0.500	2	1.000	5RW
DA 2T 511 08	1.000	2.750	0.500		1.000	5RW
DA 2T512 08	1.000	3.000	0.500		1.000	5RW
DA 2T513 08	2.000	3.250	0.500	1.000	5RW	
DA 2T408 12	0.750	2.000	0.750	2	0.875	4RW
DA 2T409 12	0.750	2.250	0.750		0.875	4RW
DA 2T410 12	2.000	2.500	0.750		0.875	4RW
DA 2T511 12	1.000	2.750	0.750	2	1.000	5RW
DA 2T512 12	1.000	3.000	0.750		1.000	5RW
DA 2T513 12	2.000	3.250	0.750		1.000	5RW
DA 2T409 16	0.750	2.250	1.000	2	0.875	4RW
DA 2T410 16	0.750	2.500	1.000		0.875	4RW
DA 2T411 16	1.750	2.750	1.000		0.875	4RW
DA 2T412 16	0.750	3.000	1.000	2	1.000	4RW
DA 2T413 16	1.000	3.250	1.000		1.000	4RW
DA 2T414 16	1.000	3.500	1.000		1.000	4RW
DA 2T511 16	1.750	2.750	1.000	2	1.000	5RW
DA 2T512 16	0.750	3.000	1.000		0.875	5RW
DA 2T513 16	0.750	3.250	1.000		0.875	5RW
DA 2T514 16	1.500	3.500	1.000	0.875	5RW	
DA 2T410 20	1.000	2.500	1.250	2	1.000	4RW
DA 2T411 20	1.000	2.750	1.250		1.000	4RW
DA 2T412 20	1.000	3.000	1.250		1.000	4RW
DA 2T511 20	1.500	2.750	1.250	2	1.000	5RW
DA 2T512 20	1.750	3.000	1.250		1.000	5RW
DA 2T513 20	1.000	3.250	1.250		1.000	5RW
DA 2T514 20	1.250	3.500	1.250	1.000	5RW	
DA 2T511 24	1.000	2.750	1.500	2	1.000	5RW
DA 2T511 28	1.250	2.750	1.750		1.000	5RW

MALE THREADED ELECTRODES



MALE THREADED BUTTON ELECTRODES									
RWMA #	OVERALL LENGTH (C)	THREAD (D)	MAJOR DIAMETER (A)	THREAD LENGTH (E)	WATER HOLE DEPTH (G)	WATER HOLE DIAMETER (F)	OVER WRENCH FLATS	LENGTH OF WRENCH FLATS (K)	WELD FACE DIAMETER (H)
5067-18	2.000	5/8-18	7/8	9/16	1-1/4	5/16	3/4	5/8	7/8
5100-18	2.000	5/8-18	1	9/16	1-1/4	5/16	7/8	5/8	1
5075-11	2.000	5/8-11	3/4	15/32	1-1/4	5/16	5/8	5/8	3/4
5087-11	2.000	5/8-11	7/8	15/32	1-1/4	5/16	3/4	3/4	7/8
5100-10	2.000	3/4-10	1	5/8	1-1/4	3/8	7/8	7/8	1
5125-10	2.000	3/4-10	1-1/4	5/8	1-1/4	3/8	1	3/4	1-1/4
5150-09	2.000	7/8-09	1-1/2	3/4	1-1/4	1/2	1-1/4	7/8	1-1/2
5075-11	2.000	5/8-11	3/4	15/32	1-1/4	5/16	5/8	1/2	1/4
5087-11	2.000	5/8-11	7/8	15/32	1-1/4	5/16	3/4	5/8	5/16
5100-10	2.000	3/4-10	1	5/8	1-1/4	3/8	7/8	5/8	3/16
5125-10	2.000	3/4-10	1-1/4	5/8	1-1/4	3/8	1	3/4	1/2
5150-09	2.000	3/4-10	1-1/2	3/4	1-1/4	3/8	1-1/4	3/4	3/4

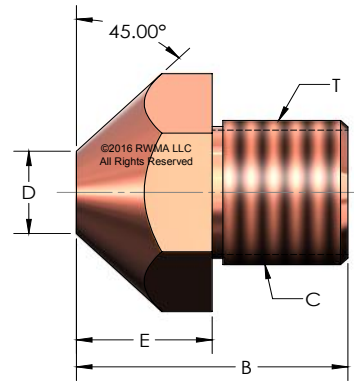
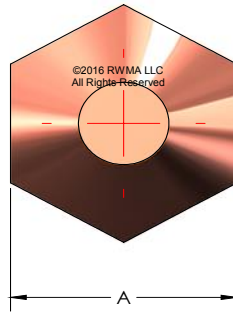
COPPER TUNGSTEN THREADED ELECTRODES



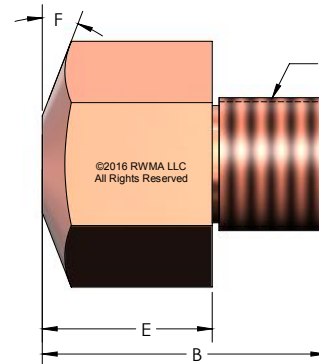
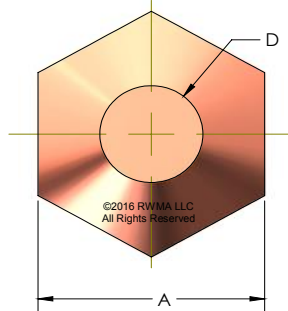
COPPER TUNGSTEN THREADED ELECTRODE

PART #	TYPE	OAL	THREAD D	MAJOR DIAMETER A	THREAD DEPTH E	WATER HOLE DEPTH G	WATER HOLE DIAMETER F	OVER WRENCH FLATS	WRENCH FLAT LENGTH	WELD FACE DIAMETER H	COPPER TUNGSTEN THICKNESS
636308	FEMALE FLAT	1-1/2	5/8-18	1	3/4	1	37/64	7/8	1/2	1	1/4
636310		1-1/2	5/8-18	1-1/4	3/4	1	37/64	1	1/2	1-1/4	1/4
636312		1-1/2	5/8-18	1-1/2	3/4	1	37/64	1-1/4	7/8	1-1/2	1/4
626308	FEMALE CENTERED	1-1/2	5/8-18	1	3/4	1	37/64	7/8	13/16	5/8	1/4
626310		1-1/2	5/8-18	1-1/4	3/4	1	37/64	1	11/16	5/8	1/4
620307	MALE CENTERED	1-1/2	5/8-18	7/8	9/16	1	5/16	3/4	3/4	1/2	1/4
625206		1-1/4	5/8-11	3/4	15/32	7/8	5/16	5/8	3/4	1/2	3/16
625308		1-5/8	5/8-10	1	5/8	1-3/16	3/8	7/8	7/8	5/8	1/4

THREADED ELECTRODES

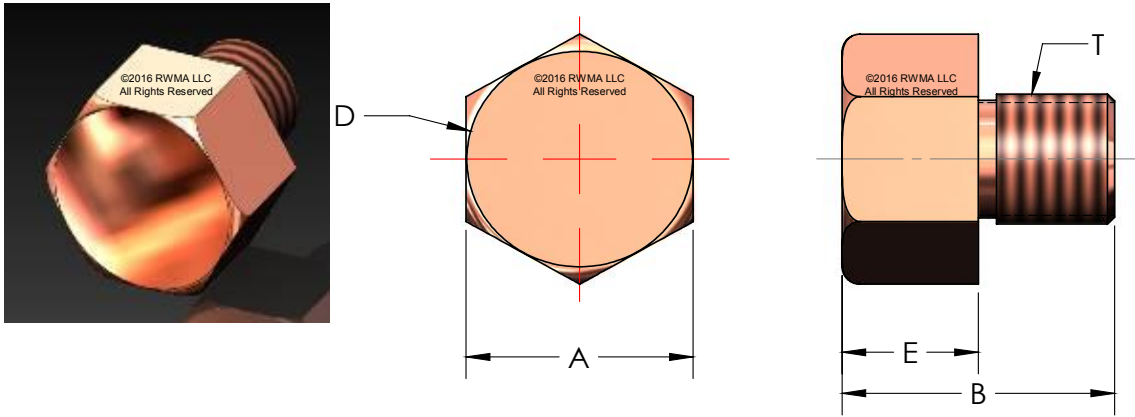


"A" POINTED NOSE THREADED ELECTRODE							
RWMA #	ALLOY CLASS	THREAD SIZE (T)	HEX SIZE (A)	OVERALL LENGTH (B)	WELD FACE DIAMETER (D)	HEX BODY LENGTH (E)	ANGLE
CRW-188-2431-16-A	2	3/8-16	1/2	11/16	1/4	5/16	45°
CRW-188-2431-16-AZ				11/16		5/16	
CRW-188-2437-16-AZ				3/4		3/8	
CRW-188-2450-AZ				7/8		1/2	
CRW-188-3450-16-A				7/8		1/2	



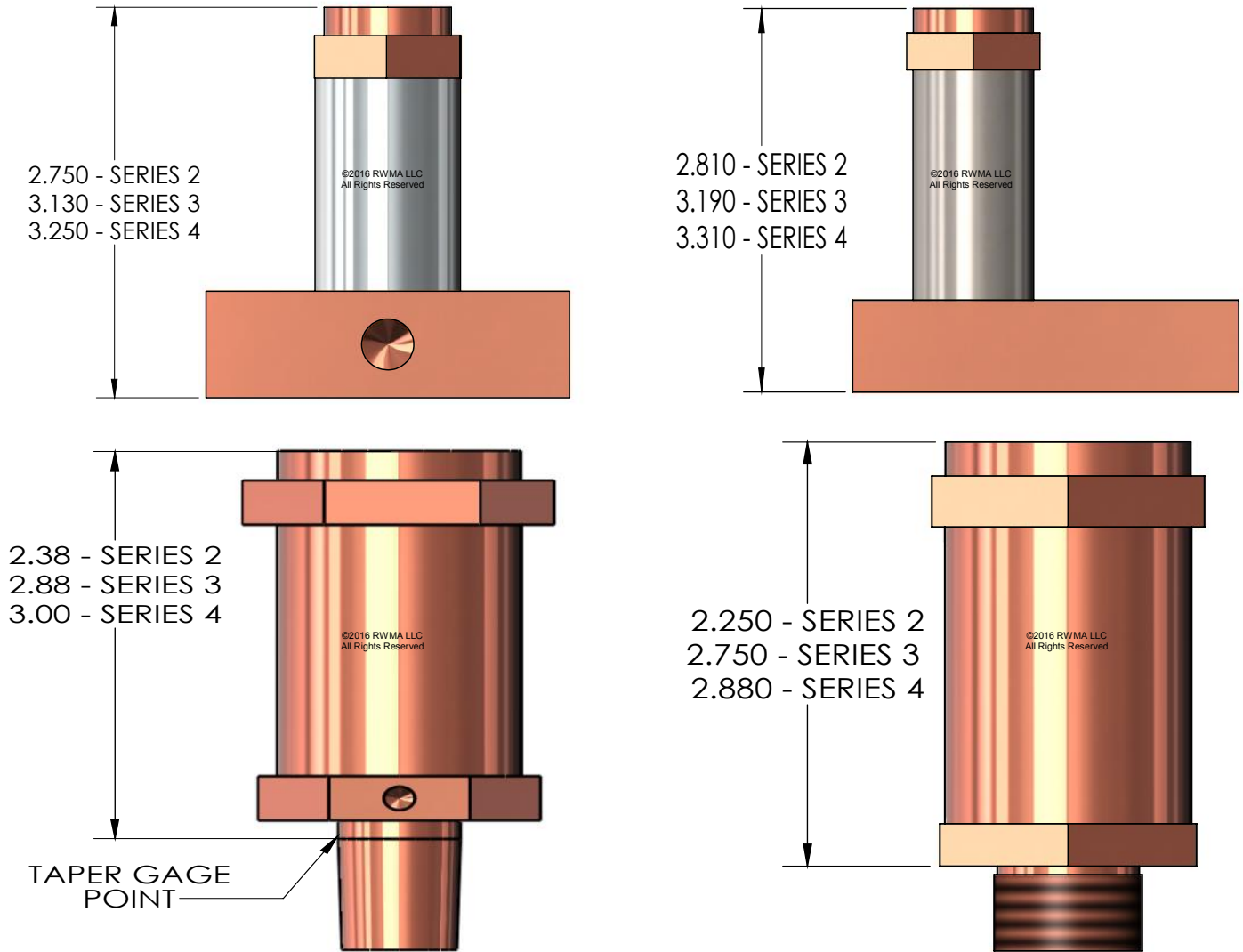
"E" TRUNCATED NOSE THREADED ELECTRODE							
RWMA #	ALLOY CLASS	THREAD SIZE (T)	HEX SIZE (A)	OVERALL LENGTH (B)	WELD FACE DIAMETER (D)	HEX BODY LENGTH (E)	ANGLE
CRW-188-2425-16-E	2	3/8-16	1/2	5/8	3/16	1/4	20°
CRW-188-3425-16-E	3	3/8-16	1/2	5/8	3/16	1/4	20°
CRW-188-3437-16-E	3	3/8-16	1/2	3/4	3/16	3/8	20°
CRW-188-2450-16-E	2	3/8-16	1/2	7/8	3/16	1/2	20°
CRW-188-3450-16-E	3	3/8-16	1/2	7/8	3/16	1/2	20°
CRW-188-5062-16-E	2	7/16-14	5/8	3/4	1/4	3/8	20°
CRW-188-5100-14	2	5/8-11	1	2	1/2	1-3/8	20°
CRW-188-5100-11	2	5/8-18	1	2	1/2	1-3/8	20°
CRW-188-5100-18	2	3/4-10	1	2	1/2	1-3/8	20°
CRW-188-5125-10	2	3/4-10	1	2	1/2	1-3/8	20°

THREADED ELECTRODES



"C" FLAT NOSE THREADED ELECTRODE						
RWMA #	ALLOY CLASS	THREAD SIZE (T)	HEX SIZE (A)	OVERALL LENGTH (B)	WELD FACE DIAMETER (D)	HEX BODY LENGTH (E)
CRW-188-3437-16-C	2	3/8-16	1/2	3/4	1/2	3/8
CRW-188-2450-16-C	3	3/8-16	1/2	7/8	1/2	1/2
CRW-188-3450-16-C	3	3/8-16	1/2	7/8	1/2	1/2
CRW-187-5062-14	2	7/16-14	5/8	3/4	5/8	3/8
CRW-187-5062-16	3	3/8-16	5/8	3/4	5/8	3/8
CRW-187-5100-10	2	3/4-10	1	2	1	1-3/8
CRW-188-5100-10	2	3/4-10	1-1/4	2	1-1/4	1-3/8
CRW-188-5100-11	2	5/8-11	1	2	1	1-3/8
CRW-188-5125-18	2	5/8-18	1	2	1	1-3/8

HOLDERS



We manufacture many types of holders for nut and stud welding electrodes.

Some of the features of our quality holders are:

Internal water cooling.

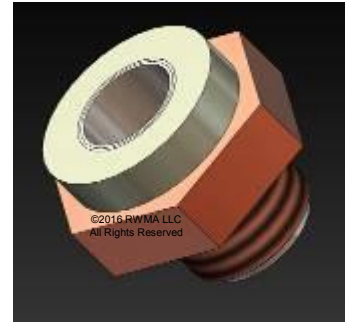
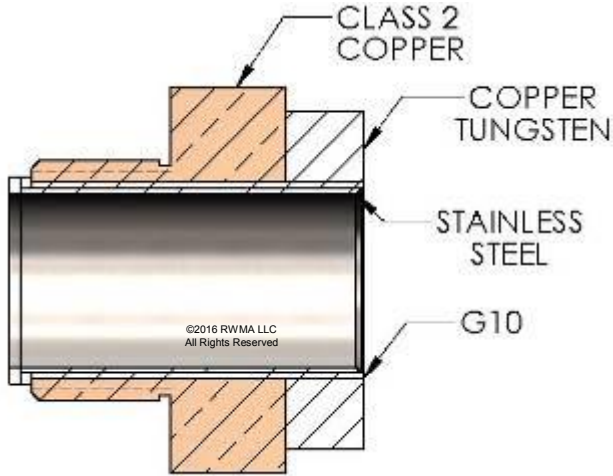
Can be converted from stud to nut welding easily.

Compatible with a number of different sizes and styles of weld heads.

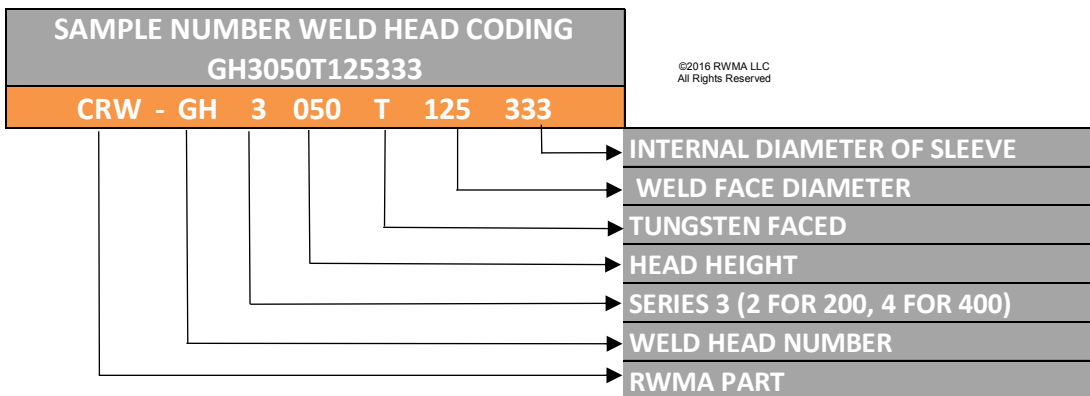
Pins can be retractable through built in air connector.

We also carry many different insulated pins and sleeves to ensure the nut or stud being welded will not arc into the holder.

WELD HEADS



WELD HEADS				
SERIES	THREAD	WELD FACE DIAMETER	MAXIMUM HOLE IN HEAD	HEAD HEIGHT
2	5/8-18	7/8	0.427 (10.85) ID	0.500
3	7/8-14	1-1/4	0.642 (16.31) ID	0.500
4	1-1/8-12	1-1/2	0.852 (21.64) ID	0.625



FRONTLINE NUT WELDING ELECTRODES



Resistance Welding Machine & Accessory is pleased to provide the line of **Frontline Nut Welding Heads** to enhance your weld quality and productivity.



We guarantee your complete satisfaction with this new precision fit sleeve that is heat and wear resistant, **allowing a longer weld head life and a cost savings of 15% or more**. The new Frontline welding head sleeve will not push or fall out like many other sleeves and is available in four different alloys to suit all of your resistance welding needs.

The **Frontline** welding heads have been tested and approved by major U.S. and European auto parts manufacturers. They are available exclusively through Resistance Welding Machine & Accessory.

Quality Characteristics:

- Quicker Turn Around
- Thinner Wall Construction
- Higher Heat Resistance
- More Wear Resistant

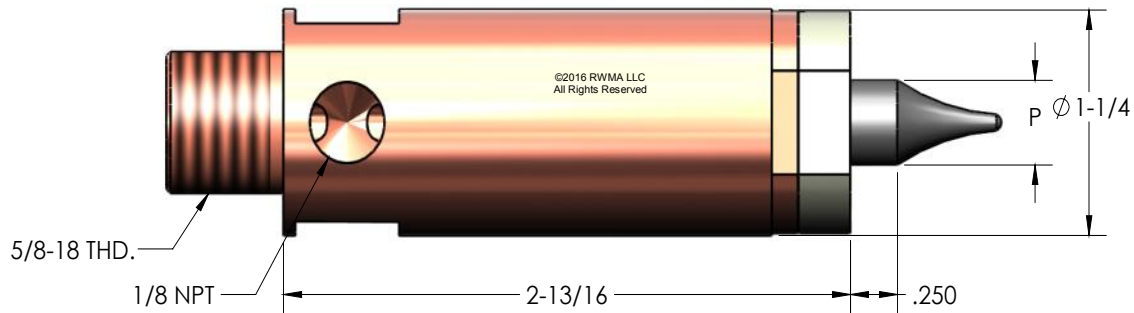
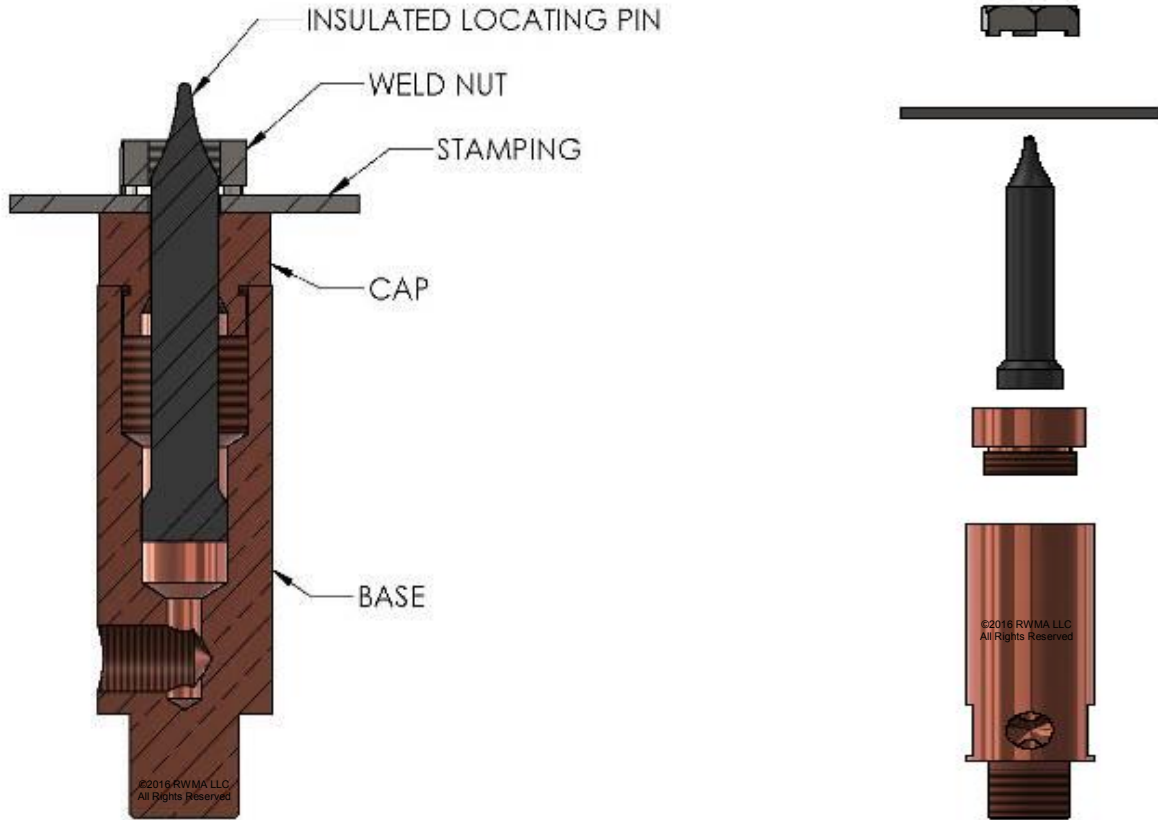
Available In 4 Materials:

- Standard Class 2 Copper
- With Copper Tungsten
- Dispersion Strengthened
- Solid Class 2 Copper
- Solid Class 3 Copper

Available In 3 Sleeves:

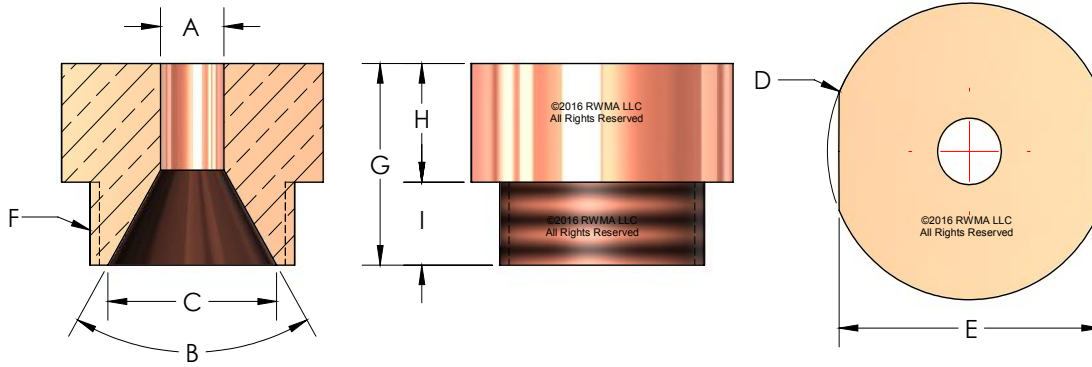
Other Alloy Combinations Are Available Upon Request To Suit Your Job's Specific Requirements.

NUT WELDING ELECTRODE COMPONENTS

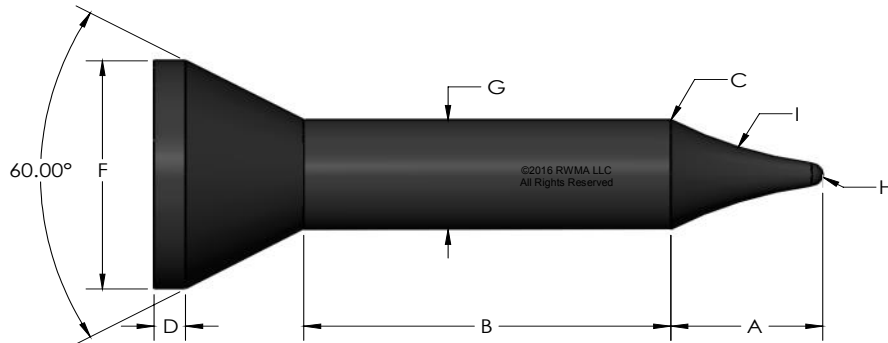


NUT WELDING ELECTRODES						
RWMA #	THREA D	FOR NUT THREAD SIZE "N"	PIN DIAMETER (N)	PIN LENGTH (L)	OVERALL DIAMETER (A)	OVERALL LENGTH (B)
CRW-16-3765-12	5/8-18	0.166	#12	0.375	1"	2"
CRW-16-3765-M6		0.189	6.0MM			
CRW-16-3765-25		0.192	1/4"			
CRW-16-3765-M7		0.223	7.0MM			
CRW-16-3765-M8		0.252	8.0MM			
CRW-16-3765-31		0.257	5/16"			
CRW-16-3765-M9		0.291	9.0MM			

NUT WELDING ELECTRODE COMPONENTS

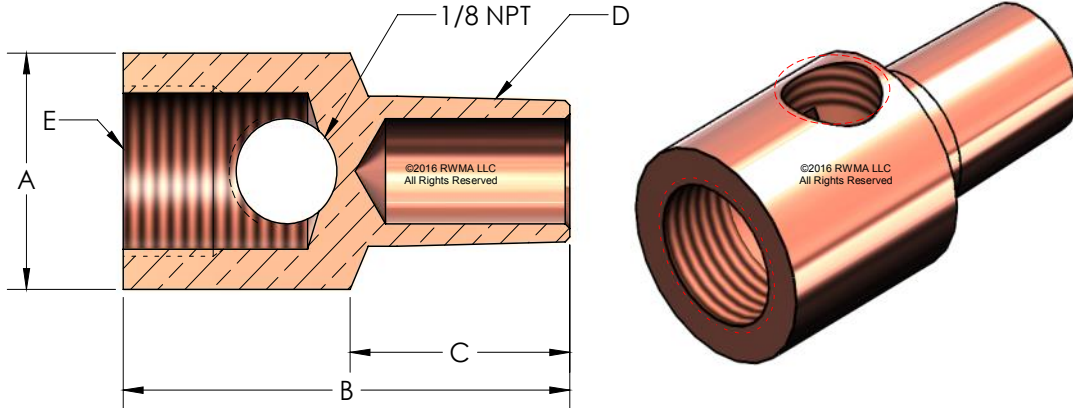


CAPS									
RWMA #	A	B	C	D	E	F	G	H	I
CRW-CNM04	0.197	60°	0.500	0.984	0.866	M18*1.5	0.669	0.393	0.276
CRW-CNM05	0.236	60°	0.500	0.984	0.866	M18*1.5	0.669	0.393	0.276
CRW-CNM06	0.276	60°	0.500	0.984	0.866	M18*1.5	0.669	0.393	0.276
CRW-CNM07	0.315	60°	0.500	0.984	0.866	M18*1.5	0.669	0.393	0.276
CRW-CNM08	0.354	60°	0.500	0.984	0.866	M18*1.5	0.669	0.393	0.276
CRW-CNM09	0.394	60°	0.500	0.984	0.866	M18*1.5	0.669	0.393	0.276
CRW-CNM10	0.433	60°	0.500	1.181	0.866	M22*1.5	0.669	0.393	0.276
CRW-CNM11	0.472	60°	0.500	1.181	0.866	M22*1.5	0.669	0.393	0.276
CRW-CNM12	0.512	60°	0.500	1.181	0.866	M22*1.5	0.669	0.393	0.276
CRW-CNM13	0.551	60°	0.500	1.181	0.866	M22*1.5	0.669	0.393	0.276

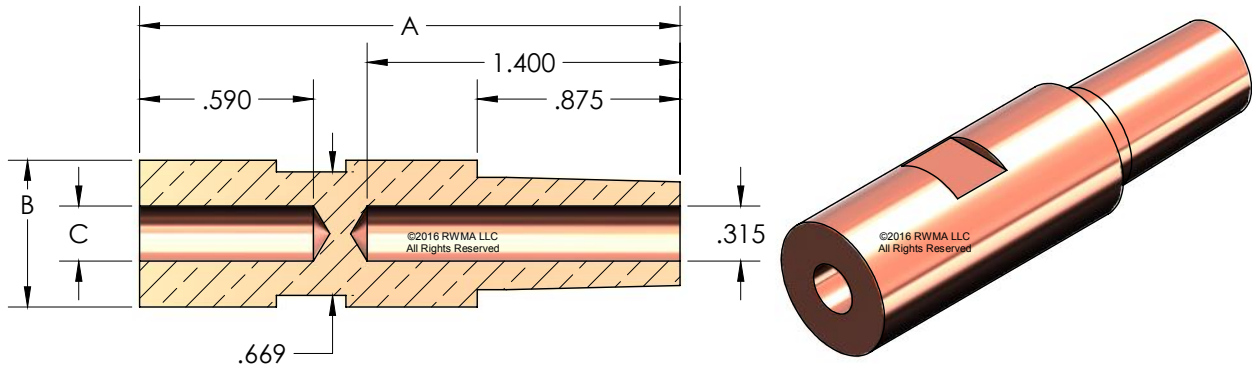


LOCATING PINS									
RWMA #	A	B	C	D	E	F	G	H	I
CRW-DPM04	0.256	0.590	R .06	0.040	60°	0.472	0.188	0.039	.433R
CRW-DPM05	0.334	0.590	R .06	0.040	60°	0.472	0.228	0.039	.590R
CRW-DPM06	0.433	0.590	R .06	0.040	60°	0.472	0.268	0.059	.929R
CRW-DPM07	0.472	0.590	R .06	0.040	60°	0.472	0.306	0.059	.929R
CRW-DPM08	0.492	0.590	R .06	0.040	60°	0.472	0.346	0.059	.854R
CRW-DPM09	0.492	0.590	R .06	0.040	60°	0.472	0.385	0.059	.854R
CRW-DPM10	0.550	0.590	R .06	0.040	60°	0.472	0.425	0.059	.878R
CRW-DPM11	0.550	0.590	R .06	0.040	60°	0.472	0.464	0.078	.878R
CRW-DPM12	0.668	0.590	R .06	0.040	60°	0.472	0.504	0.078	1.086R
CRW-DPM13	0.668	0.590	R .06	0.040	60°	0.472	0.543	0.078	1.086R

NUT WELDING ELECTRODE COMPONENTS

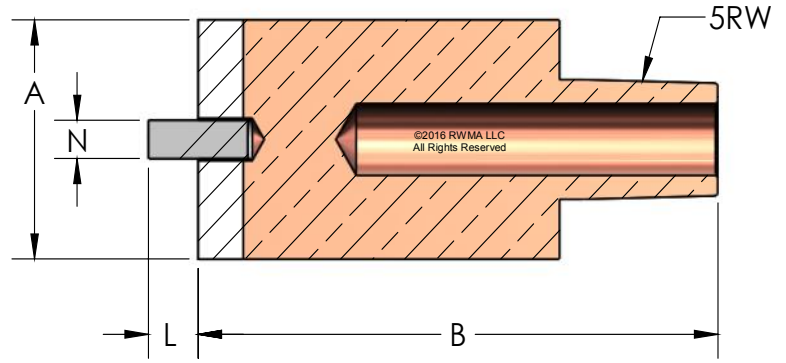


LOWER ELECTRODE BASE					
RWMA #	A	B	C	D	E
CRW-DH25A	0.984	1.780	0.875	4RW	M18-1.5
CRW-DH25B	0.984	1.780	0.787	1/10	M18-1.5
CRW-DH25C	0.984	1.970	0.875	5RW	M18-1.5
CRW-DH25D	0.984	1.970	0.787	1/10	M18-1.5
CRW-DH25E	0.984	1.970	0.787	1/5	M18-1.5
CRW-DH30A	1.180	1.970	0.875	5RW	M22-1.5
CRW-DH30B	1.180	1.970	0.787	1/10	M22-1.5



LOWER ELECTRODE BASE					
RWMA #	A	B	C	D	D
CRW-NFD16-M5-16-3	2.360	0.630	0.197	M5	5RW
CRW-NFD16-M6-16-3	2.360	0.630	0.236	M6	5RW
CRW-NFD16-M8-16-3	2.360	0.630	0.295	M8	5RW
CRW-NFD20-M6-16-3	2.360	0.630	0.236	M6	5RW
CRW-NFD20-M8-16-3	2.360	0.630	0.295	M8	5RW
CRW-NFD20-M10-16-3	2.360	0.630	0.393	M10	5RW
CRW-NFD20-M12-16-3	2.360	0.630	0.472	M12	5RW

SELF-PILOTING NUT WELDING ELECTRODES



NUT WELDING ELECTRODES						
RWMA #	TAPER	FOR NUT THREAD SIZE "N"	PIN DIAMETER (N)	PIN LENGTH (L)	OVERALL DIAMETER (A)	OVERALL LENGTH (B)
CRW-16-3766-38	5 RW	3/8	0.306	0.375	1-3/4"	2"
CRW-16-3766-M10		10MM	0.32			
CRW-16-3766-M11		11MM	0.359			
CRW-16-3766-44		7/16	0.361			
CRW-16-3766-M12		12MM	0.388			
CRW-16-3766-50		1/2	0.415			
CRW-16-3766-M14		14MM	0.455			

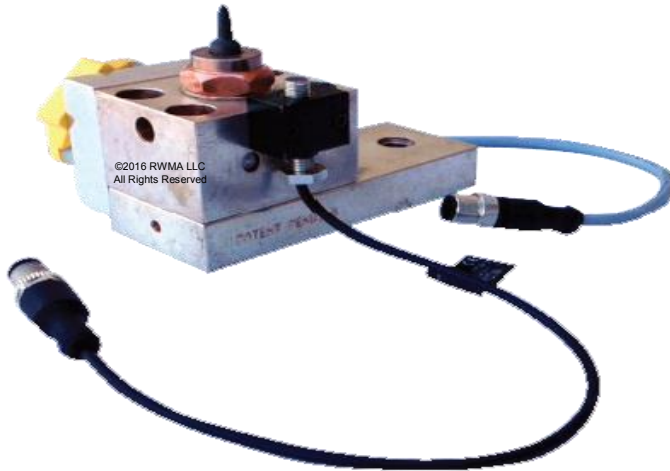
NUT WELDING ELECTRODES						
RWMA #	TAPER	FOR NUT THREAD SIZE "N"	PIN DIAMETER (N)	PIN LENGTH (L)	OVERALL DIAMETER (A)	OVERALL LENGTH (B)
CRW-16-3765-12	5 RW	0.166	#12	0.375	1"	2"
CRW-16-3765-M6		0.189	6.0MM			
CRW-16-3765-25		0.192	1/4"			
CRW-16-3765-M7		0.223	7.0MM			
CRW-16-3765-M8		0.252	8.0MM			
CRW-16-3765-31		0.257	5/16"			
CRW-16-3765-M9		0.291	9.0MM			

Enhanced Nut Welding Holder with Part Load & Guide Pin Sensing

[Return to INDEX](#)

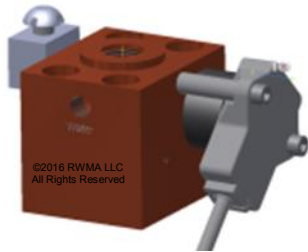
Introducing: **TheGenius** by Marksman

Features:



Load Sensor: Improves quality by insuring parts are loaded over guide pin. Helps prevent winking nuts - from misloading stamping on pin.

Guide Pin Sensor: Improves Quality by monitoring guide pin position. Helps prevent upside down nut, wrong nut and missing nut with new 0....10VDC guide pin sensor.



CRW

Can be used with existing PLC

Meter & Cable sold separately

For use with 201, 301, and 401 series weld heads.

Heavy construction provides long life expectancy.

Compact design; a wide range of mounting styles: Standard, Extended Base, Platen, or Tapered.



5RW
Turck

No rework required to preexisting weld fixtures; All bolt hole patterns are standard.

Withstands wear and tear from dirt, oils or water.

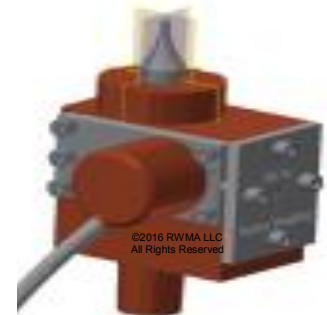
Simply more mechanical / less electrical design.

Use any style locator pin; CVD, KCF, S.S., Ceramic.

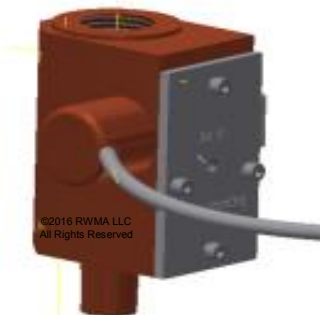
No nuts welded upside down, off center, or absent.

Ultimate solution for ANY problems in nut welding.

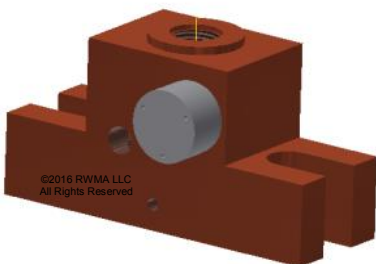
Extremely cost effective.



5RW
Potentiometer



5RW
Potentiometer



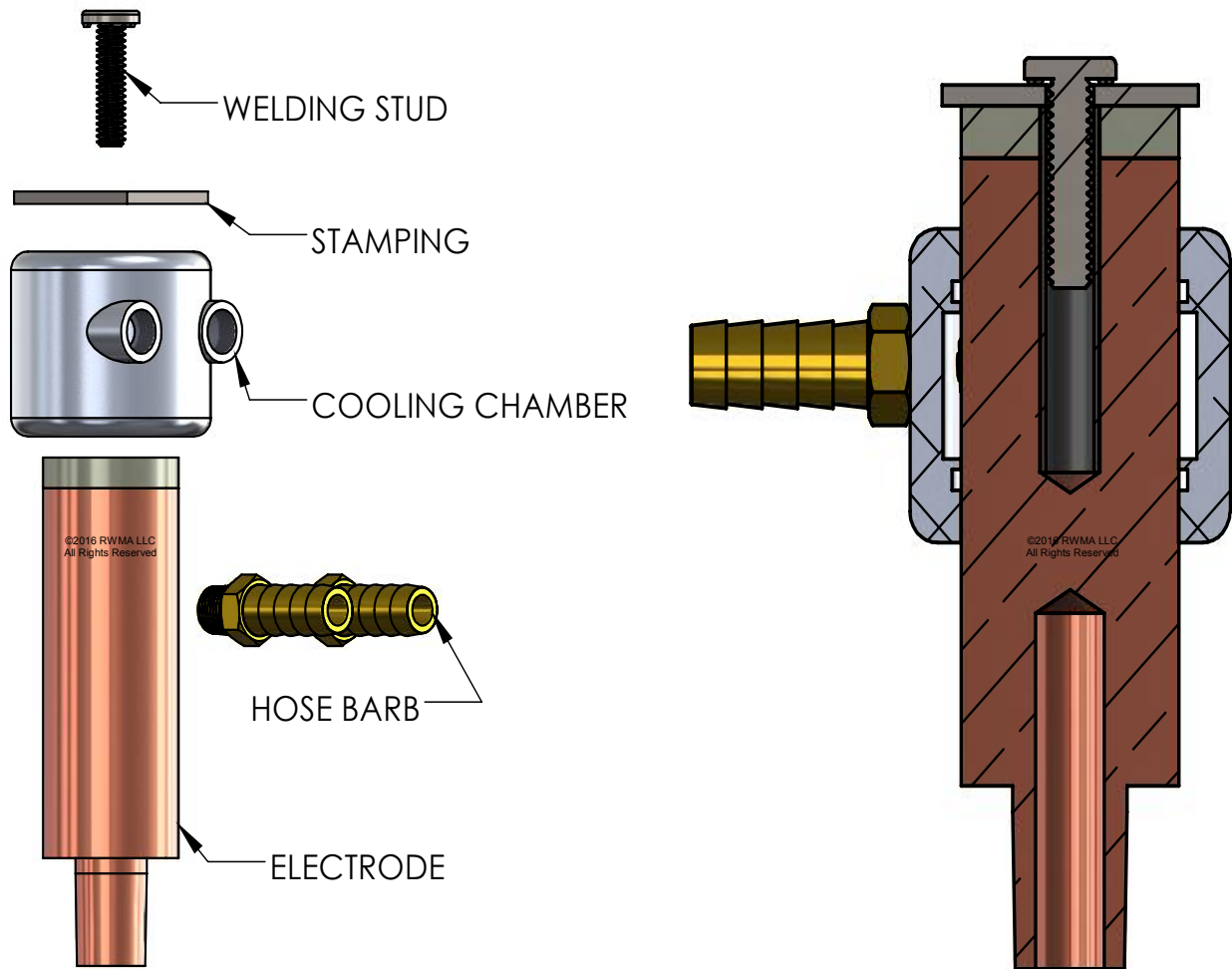
CRW (New)

Special



Call Us For Detailed Specs.

STUD WELDING ASSEMBLY



Features:

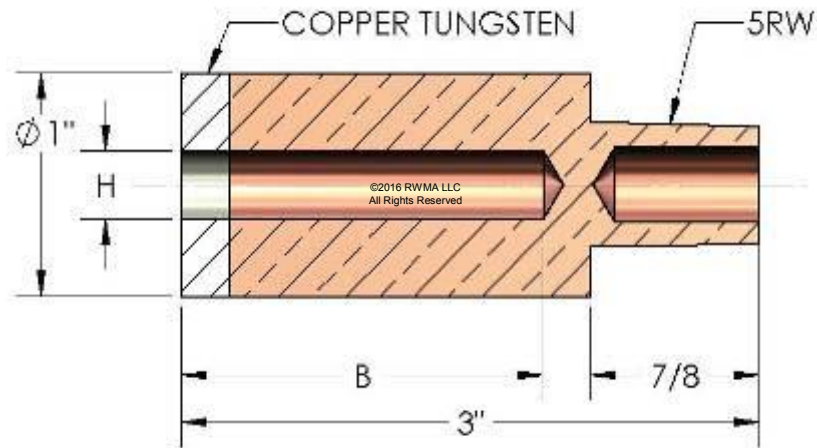
Copper Tungsten faced weld surface prolongs the life of your electrode.

Aluminum water cooling chambers fit most applications, and greatly reduce heat.

Water cooling hole from the bottom of the electrode further removes heat and increases the life of the electrode.

Insulated sleeves ensure the stud will not arc out inside the electrode.

COPPER TUNGSTEN STUD WELDING ELECTRODES



STUD WELDING ELECTRODE				
TAPER	SCREW THD. SIZE	INSULATION I.D. (H)	PIN LENGTH (L)	
5 RW		DEPTH (B)	0.750"	1.500"
	0.250	0.254	CRW-16-3725-2541	CRW-16-3725-2542
		DEPTH (B)	1.000"	2.000"
	--	0.277	CRW-16-3725-2771	CRW-16-3725-2772
	.312	.317 (8MM)	CRW-16-3725-3171	CRW-16-3725-3172
	--	0.339	CRW-16-3725-3391	CRW-16-3725-3392
	--	0.367	CRW-16-3725-3651	CRW-16-3725-3652
	.375	0.380	CRW-16-3725-3802	CRW-16-3725-3802

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TAPERED ELECTRODES FOR PADDLE HOLDERS



TRUNCATED CONE
SE-3247
PART #: 170-3247



FLAT FACED
SE-3249
PART #: 170-3249



OFFSET
SE-3248
PART #: 170-3248

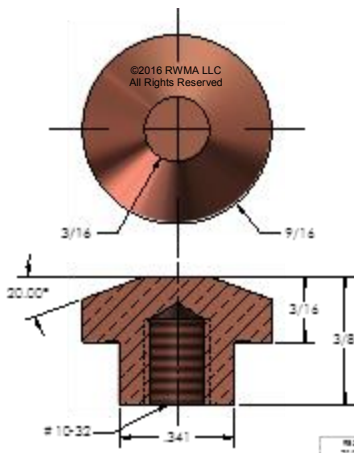
THREADED PADDLE STYLE ELECTRODES

(F) NOSE – TRUNCATED CONE

(C) NOSE - FLAT

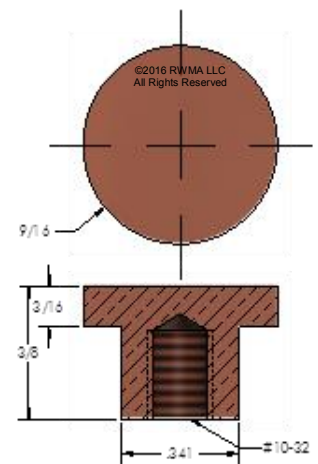
TRUNCATED CONE

- CLASS 1: SE-3101-1
PART #: 170-3101-1
- CLASS 2: SE-3101
PART #: 170-3101
- CLASS 3: SE-3113
PART #: 170-3113
- ZIRC: SE-3101-Z
PART #: 170-3101-Z



FLAT FACED

- CLASS 1: SE-3099-1
PART #: 170-3099-1
- CLASS 2: SE-3099
PART #: 170-3099
- CLASS 3: SE-3111
PART #: 170-3111
- ZIRC: SE-3066-Z
PART #: 170-3099-Z

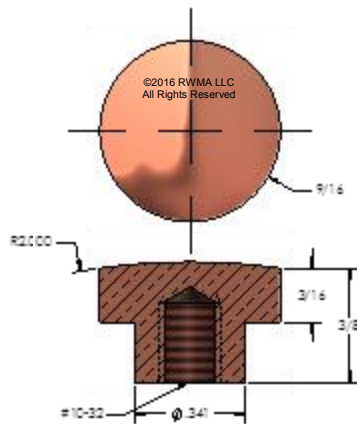


(E) NOSE – RADIUS FACED

(D) NOSE - OFFSET

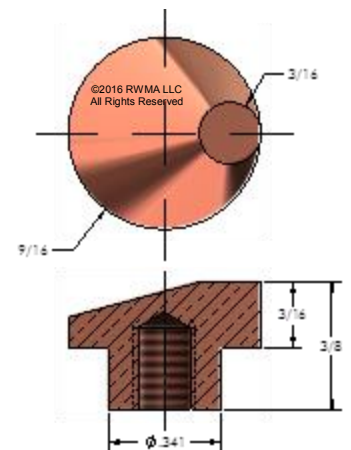
RADIUS FACED

- CLASS 1: SE-3110-1
PART #: 170-3110-1
- CLASS 2: SE-3110
PART #: 170-3110
- CLASS 3: SE-3133
PART #: 170-3133
- ZIRC: SE-3110-Z
PART #: 170-3110-Z

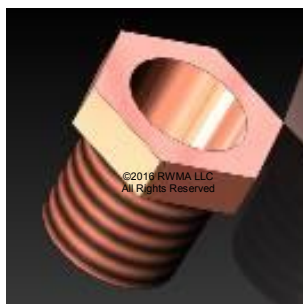


OFFSET

- CLASS 1: SE-3102-1
PART #: 170-3102-1
- CLASS 2: SE-3102
PART #: 170-3102
- CLASS 3: SE-3123
PART #: 170-3123
- ZIRC: SE-3102-Z
PART #: 170-3102-Z



ADAPTERS



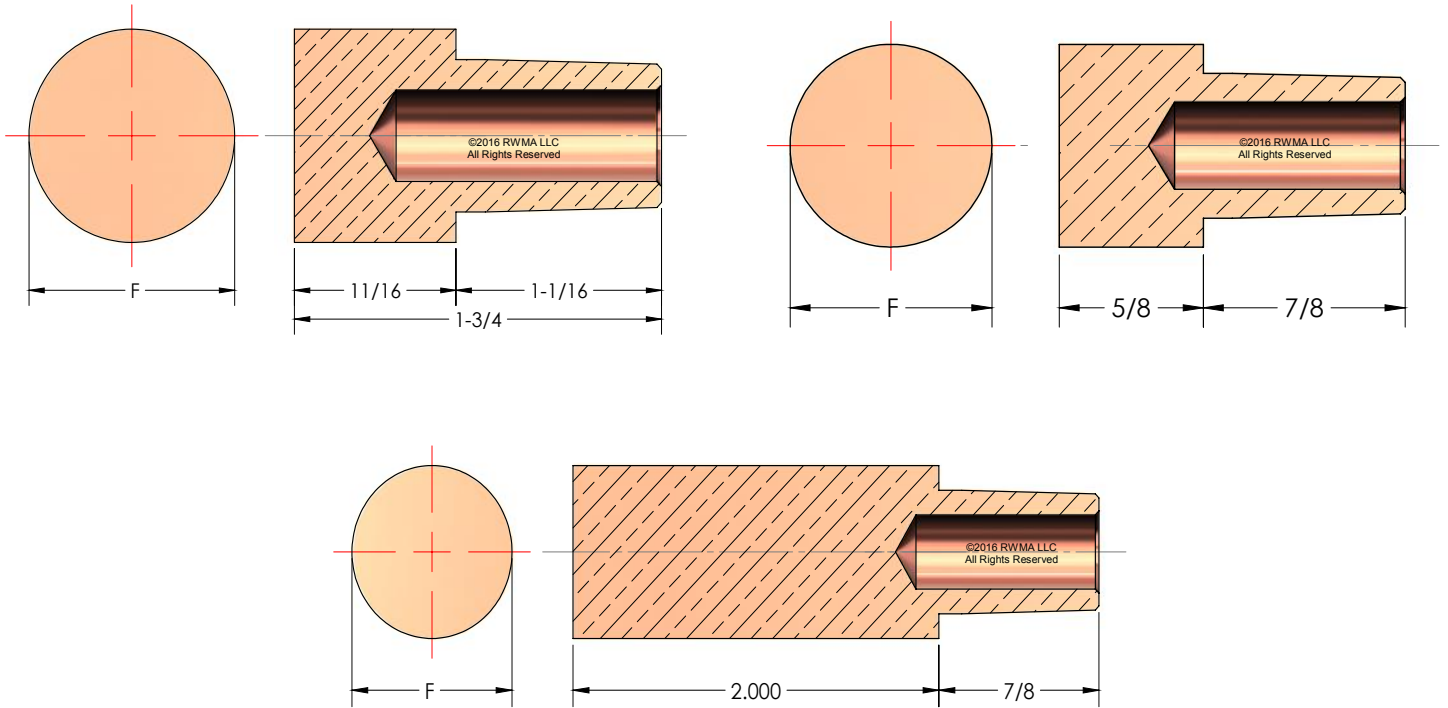
MALE PIPE THREAD TO FEMALE TAPER ADAPTER					
RWMA #	PIPE THREAD OR TAPER A	TAPER SOCKET B	BODY SIZE C	BODY LENGTH D	OVERALL LENGTH E
CRW-AD-124-.8	1/2	4RW	1" HEX	0.250	0.875
CRW-AD-124-1.0	1/2	4RW	1" HEX	0.375	1.000
CRW-AD-124-1.2	1/2	4RW	1" HEX	0.625	1.250
CRW-AD-124-1.5	1/2	4RW	1" HEX	0.875	1.500
CRW-AD-124-1.7	1/2	4RW	1" HEX	1.125	1.750
CRW-AD-124-2.0	1/2	4RW	1" HEX	1.375	2.000
CRW-AD-124-2.2	1/2	4RW	1" HEX	1.625	2.250
CRW-AD-124-2.5	1/2	4RW	1" HEX	1.875	2.500
CRW-AD-124-2.7	1/2	4RW	1" HEX	2.125	2.750
CRW-AD-124-3.0	1/2	4RW	1" HEX	2.375	3.000
CRW-AD-124-3.2	1/2	4RW	1" HEX	2.625	3.250
CRW-AD-124-3.5	1/2	4RW	1" HEX	2.875	3.500
CRW-AD-124-3.7	1/2	4RW	1" HEX	3.125	3.750
CRW-AD-124-4.0	1/2	4RW	1" HEX	3.375	4.000
CRW-AD-124-5.0	1/2	4RW	1" HEX	4.375	5.000
CRW-AD-125-.8	1/2	5RW	1" HEX	0.250	0.875
CRW-AD-125-1.0	1/2	5RW	1" HEX	0.375	1.000
CRW-AD-125-1.2	1/2	5RW	1" HEX	0.625	1.250
CRW-AD-125-1.5	1/2	5RW	1" HEX	0.875	1.500
CRW-AD-125-1.6	1/2	5RW	1" HEX	1.000	1.625
CRW-AD-125-1.7	1/2	5RW	1" HEX	1.125	1.750
CRW-AD-125-2.0	1/2	5RW	1" HEX	1.375	2.000
CRW-AD-125-2.2	1/2	5RW	1" HEX	1.625	2.250
CRW-AD-125-2.5	1/2	5RW	1" HEX	1.875	2.500
CRW-AD-125-2.7	1/2	5RW	1" HEX	2.125	2.750
CRW-AD-125-3.0	1/2	5RW	1" HEX	2.375	3.000
CRW-AD-125-3.2	1/2	5RW	1" HEX	2.625	3.250
CRW-AD-125-3.5	1/2	5RW	1" HEX	2.875	3.500
CRW-AD-125-3.7	1/2	5RW	1" HEX	3.125	3.750
CRW-AD-125-4.0	1/2	5RW	1" HEX	3.375	4.000
CRW-AD-125-4.5	1/2	5RW	1" HEX	3.875	4.250
CRW-AD-584-.8	1/2	4RW	1" HEX	0.250	0.875
CRW-AD-584-1.0	5/8	4RW	1" HEX	0.375	1.000
CRW-AD-584-1.5	5/8	4RW	1" HEX	0.875	1.500
CRW-AD-584-2.0	5/8	4RW	1" HEX	1.375	2.000
CRW-AD-585-.8	5/8	5RW	1" HEX	0.250	0.875
CRW-AD-585-1.0	5/8	5RW	1" HEX	0.375	1.000
CRW-AD-585-1.2	5/8	5RW	1" HEX	0.625	1.250
CRW-AD-585-1.5	5/8	5RW	1" HEX	0.875	1.500
CRW-AD-585-1.7	5/8	5RW	1" HEX	1.125	1.750
CRW-AD-585-2.0	5/8	5RW	1" HEX	1.375	2.000

[Return to INDEX](#)



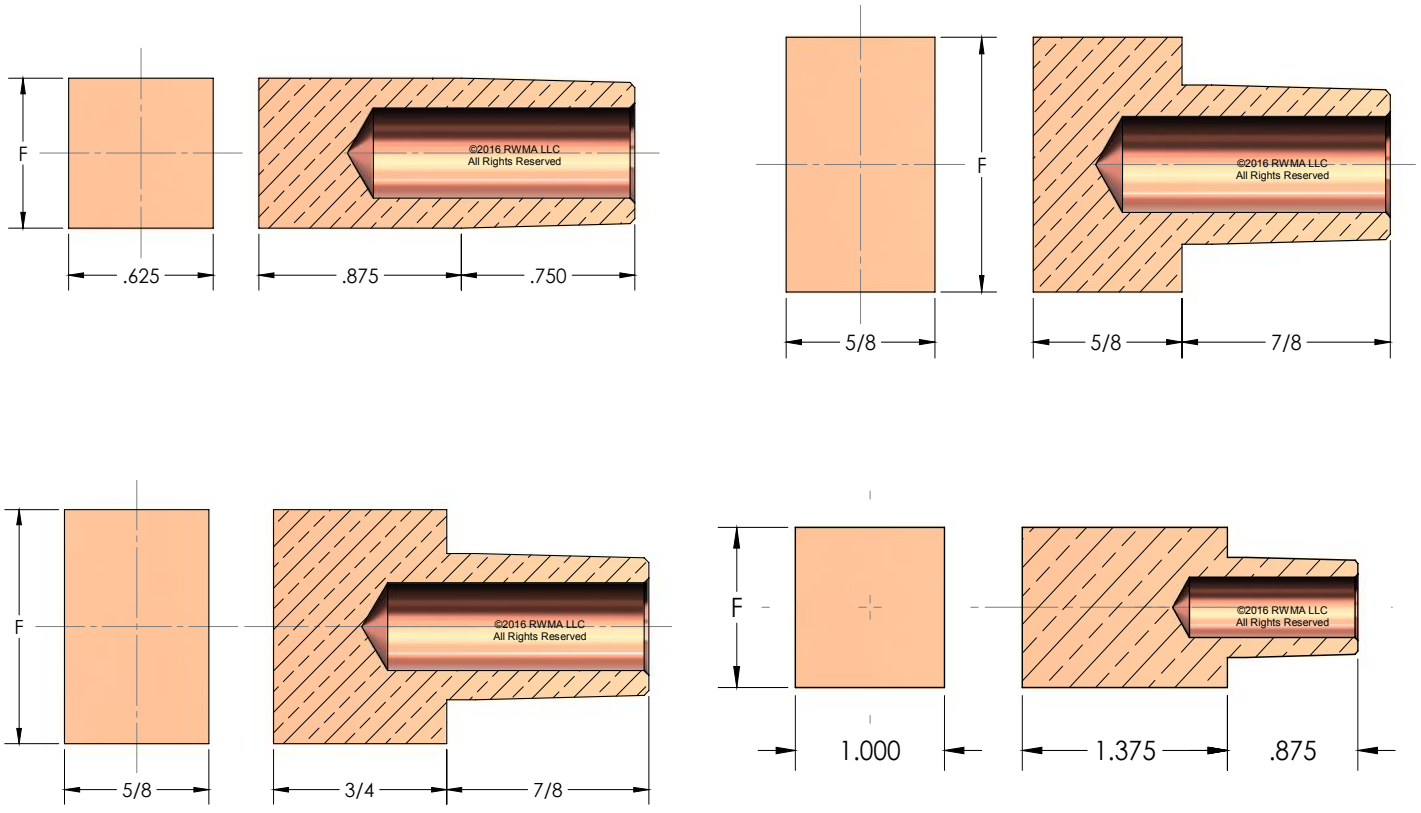
CRW-AD-345-1.3	3/4	5RW	1.250	0.438	1.375
CRW-AD-345-1.5	3/4	5RW	1.250	0.563	1.500
CRW-AD-345-1.7	3/4	5RW	1.250	0.813	1.750
CRW-AD-345-2.0	3/4	5RW	1.250	1.063	2.000
CRW-AD-345-2.5	3/4	5RW	1.250	1.563	2.500
CRW-AD-345-3.0	3/4	5RW	1.250	2.063	3.000
CRW-AD-345-3.5	3/4	5RW	1.250	2.563	3.500
CRW-AD-345-4.0	3/4	5RW	1.250	3.063	4.000
CRW-AD-345-5.0	3/4	5RW	1.250	4.063	5.000
CRW-AD-346-1.2	3/4	6RW	1.250	0.313	1.250
CRW-AD-346-1.3	3/4	6RW	1.250	0.438	1.375
CRW-AD-346-1.5	3/4	6RW	1.250	0.563	1.500
CRW-AD-346-2.0	3/4	6RW	1.250	1.063	2.000
CRW-AD-346-2.5	3/4	6RW	1.250	1.563	2.500
CRW-AD-346-2.7	3/4	6RW	1.250	1.813	2.750
CRW-AD-346-3.0	3/4	6RW	1.250	2.063	3.000
CRW-AD-346-3.5	3/4	6RW	1.250	2-9/16	3.500
CRW-AD-346-4.0	3/4	6RW	1.250	3.063	4.000
CRW-AD-346-4.5	3/4	6RW	1.250	3.563	4.500
CRW-AD-346-5.0	3/4	6RW	1.250	4.063	5.000
CRW-AD-347-1.5	3/4	7RW	1.250	0.563	1.500
CRW-AD-347-2.0	3/4	7RW	1.250	1.063	2.000
CRW-AD-347-2.5	3/4	7RW	1.250	1.563	2.500
CRW-AD-347-3.0	3/4	7RW	1.250	2.063	3.000
CRW-AD-347-3.5	3/4	7RW	1.250	2.563	3.500
CRW-AD-347-4.0	3/4	7RW	1.250	3.063	4.000
CRW-AD-347-4.5	3/4	7RW	1.250	3.563	4.500
CRW-AD-347-5.0	3/4	7RW	1.250	4.063	5.000
CRW-AD-45-2	4RW	5RW	0.875	1.000	2.000
CRW-AD-45-3	4RW	5RW	0.875	2.000	3.000
CRW-AD-45-4	4RW	5RW	0.875	3.000	4.000
CRW-AD-54-1	5RW	4RW	0.875	0.250	1.125
CRW-AD-54-2	5RW	4RW	0.875	1.000	2.000
CRW-AD-54-2.5	5RW	4RW	0.875	1.500	2.500
CRW-AD-54-3	5RW	4RW	0.875	2.000	3.000
CRW-AD-54-4	5RW	4RW	0.875	3.000	4.000
CRW-AD-55-2	5RW	5RW	0.875	1.000	2.000
CRW-AD-55-2.5	5RW	5RW	0.875	1.500	2.500
CRW-AD-55-3	5RW	5RW	0.875	2.000	3.000
CRW-AD-55-4	5RW	5RW	0.875	3.000	4.000
CRW-AD-55-5	5RW	5RW	0.875	4.000	5.000
CRW-AD-56-2	5RW	6RW	1" HEX	1.125	2.000
CRW-AD-64-1	6RW	4RW	1" HEX	0.250	1.250
CRW-AD-65-1	6RW	5RW	1" HEX	0.250	1.250
CRW-AD-74-1	7RW	4RW	1" HEX	0.250	1.500

ROUND FACED BACKUP ELECTRODES



ROUND FACE			
RWMA #	TAPER	FACE (F)	ALLOY CLASS
CRW-186-0301	4RW	7/8	2
CRW-186-0302	4RW	7/8	1
CRW-186-0303	5RW	7/8	2
CRW-186-0304	5RW	7/8	1
CRW-186-0305	4RW	7/8	2
CRW-186-0306	4RW	7/8	1
CRW-186-0307	5RW	7/8	2
CRW-186-0308	5RW	7/8	1
CRW-186-0309	4RW	1	2
CRW-186-0310	4RW	1	1
CRW-186-0311	5RW	1	2
CRW-186-0312	5RW	1	1
CRW-186-0313	5RW	1-1/4	2
CRW-186-0314	5RW	1-1/2	2
CRW-186-0315	5RW	1	2

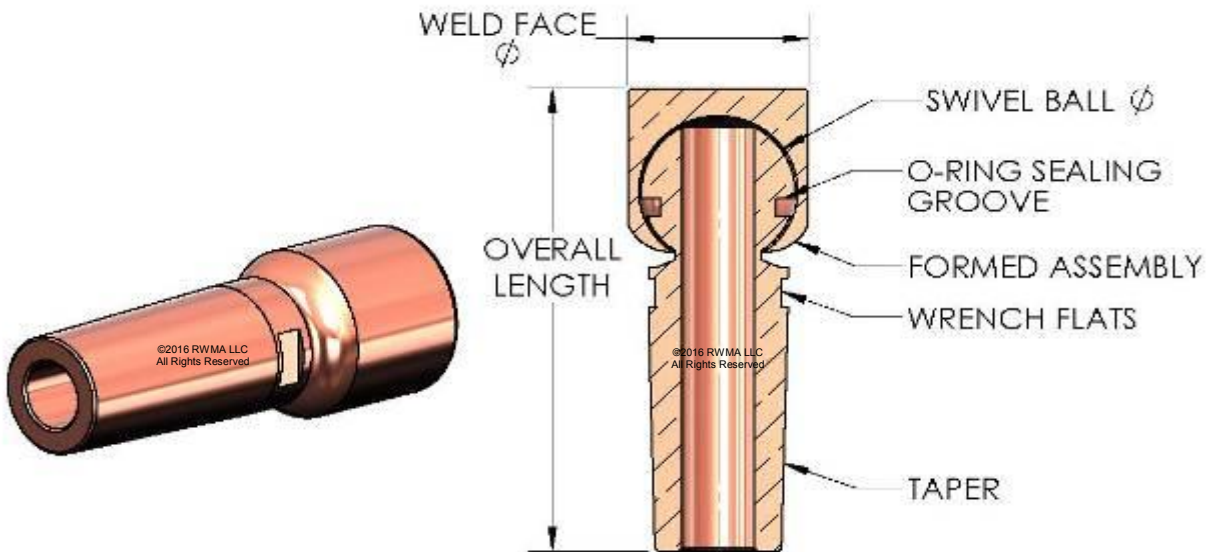
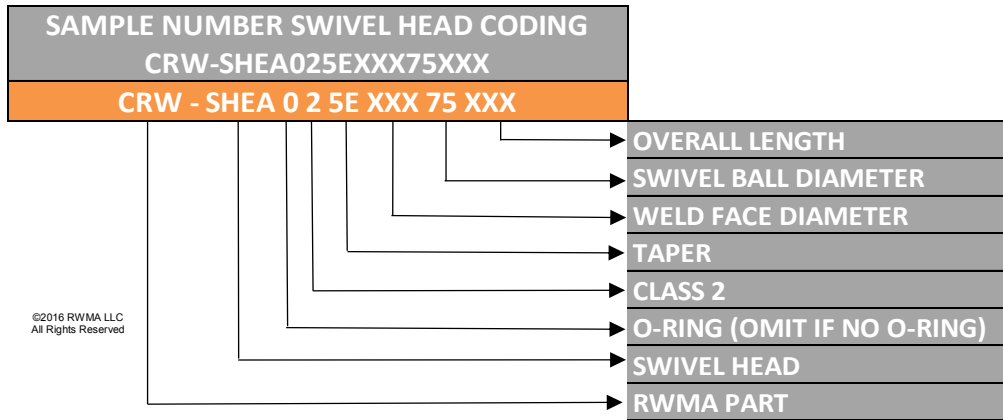
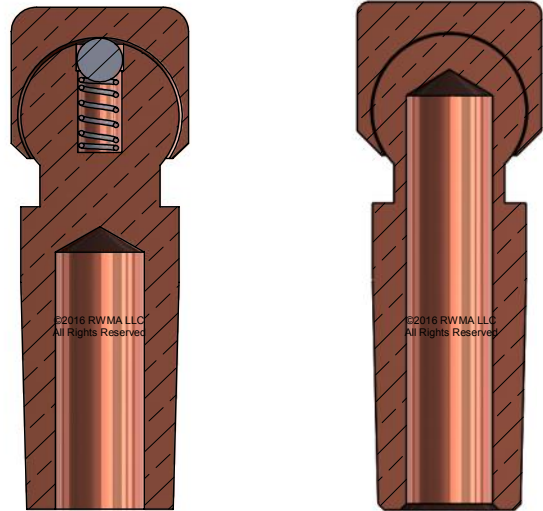
RECTANGULAR FACED BACKUP ELECTRODES



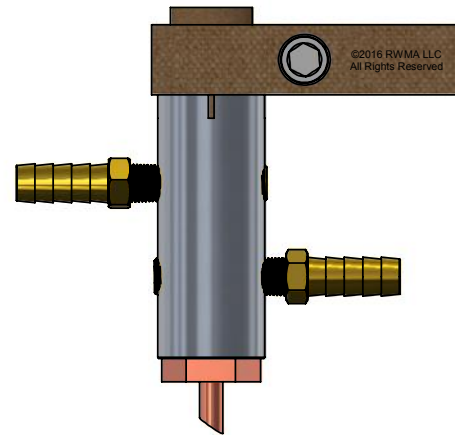
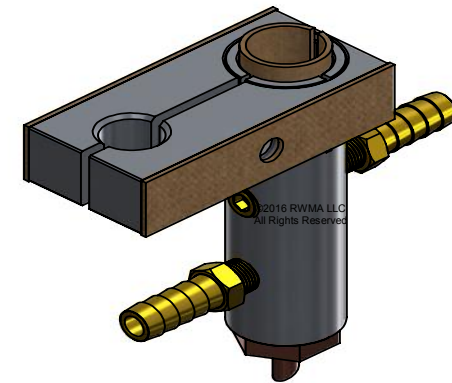
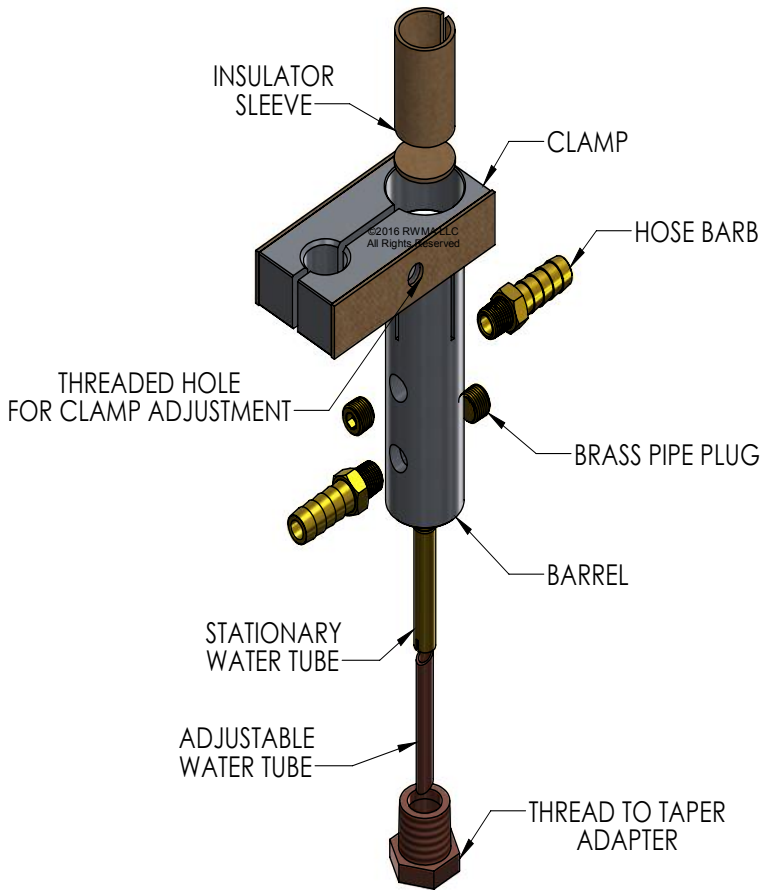
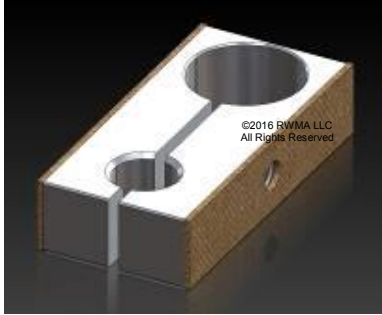
RECTANGULAR FACE			©2016 RWMA LLC All Rights Reserved
RWMA #	TAPER	FACE (F)	ALLOY CLASS
CRW-186-0220	5RW	1	2.00
CRW-186-0221	4RW	1/2	
CRW-186-0223	4RW	1	
CRW-186-0224	5RW	1	
CRW-186-0225	5RW	1	
CRW-186-0226	5RW	2	
CRW-186-0227	4RW	2	
CRW-186-0228	5RW	1-1/2	
CRW-186-0229	4RW	1-1/2	

SWIVEL HEADS

Swivel heads utilize a ball-jointed head that can help compensate for any problems with alignment and issues on the surface of the work piece. They are water cooled and can be made to accommodate any size taper. Water holes can either stop before the ball-joint or continue to the joint and be sealed using an o ring.



BARRELS AND CLAMPS



©2016 RWMA LLC All Rights Reserved	1/2 N.P.T.	3/4 N.P.T.	7/8-14 N.F.	1-12 N.F.
ASSEMBLY NO.	CRW-WH-1010C	CRW-WH-102C	CRW-WH-5010C	CRW-WH-5020C
BARREL	CRW-WH-101-1	CRW-WH-102-1	CRW-WH-501-1	CRW-WH-502-1
CLAMP	CRW-WH-101-2	CRW-WH-102-2	CRW-WH-101-2	CRW-WH-102-2
BUSHING NO.	CRW-WH-101-3	CRW-WH-101-3	CRW-WH-101-3	CRW-WH-101-3
DISC NO.	CRW-WH-101-4	CRW-WH-101-4	CRW-WH-101-4	CRW-WH-101-4

SEAM WHEELS



SEAM WHEELS					
ALLOY	MAIN ELEMENTS	CDA	RWMA GROUP A	(MIN) HARDNESS ROCKWELL	(MIN) CONDUCTIVITY % I.A.C.S.
CP1	CAD-CU	16200	CLASS 1	55B	80
CP2	CHROME COPPER	18200	CLASS 2	65B	75
CP2 PREM	CHROME COPPER	18200	CLASS 2	75B	75
CP3	CU-NI OR CO BERYLLIUM	17510 17500	CLASS 3	90B	45
CP3 BF	COPPER NI, SI	18000	CLASS 3	90B	45

CP1	RECOMMENDED FOR SPOT OR SEAM WELDING ALUMINUM, MAGNESIUM (AND THEIR ALLOYS), COATED METALS AND HOT-ROLLED STEEL.
CP2	RECOMMENDED FOR SPOT AND SEAM WELDING COLD AND HOT-ROLLED STEEL AND COATED METALS; CURRENT CARRYING SHAFTS AND ARMS; BACK-UP BARS FOR BOTH RESISTANCE AND ARC WELDING AND ELECTRICAL CARRYING STRUCTURAL PARTS.
CP2 PREM	RECOMMENDED FOR CP2 APPLICATIONS REQUIRING HIGHER PRESSURES.
CP3 & CP3 BF	RECOMMENDED FOR SPOT AND SEAM WELDING STAINLESS STEEL AND HIGH TEMPERATURE HEAT RESISTING ALLOYS REQUIRING HIGH WELD FORCES; FLAT WELDING DIES; BACK-UP BARS; PROJECTION WELDING ELECTRODES; HIGHSTRENGTH, HIGH CONDUCTIVITY.



WATER TUBES

BRASS

TYPE A - CLT-1000



COPPER

TYPE B - CLT-1200



COPPER AND BRASS

TYPE D - CLT-1400



COPPER

TYPE C - CLT-1300



COPPER AND BRASS

TYPE E - CLT-1500



INTERLOCKED FLEXIBLE

TYPE F - CLT-1600 / TYPE G - CLT-1700



INTERLOCKED FLEXIBLE

TYPE H - CLT-1800



COPPER AND BRASS

TYPE I - CLT-1900



COPPER AND BRASS

TYPE J - CLT-2000



CONTACT OUR SALES TEAM FOR SPECIFIC LENGTHS AND SIZES OF WATER TUBES

SHUNT ORDERING INFORMATION

RESISTANCE WELDING MACHINE & ACCESSORY

255 PALLADIUM DRIVE – ST. JOSEPH, MI 49085
 PHONE: 1-269-428-4770 FAX: 1-269-428-4796
 OHIO SALES: 1-937-778-9313

“EVERYTHING FOR SPOT WELDING”

SHUNTS ARE MADE FROM .005” THICK LAMINATIONS WITH 1/16” COPPER CLIPS RIVETED IN PLACE **UNLESS** OTHER WISE ORDERED.

TYPE OF SHUNT

- TYPE – C _____
- TYPE – J _____
- TYPE – L _____
- TYPE – F _____
- SPECIAL _____

PART NUMBER _____

LENGTH OF LONGEST SHEET _____

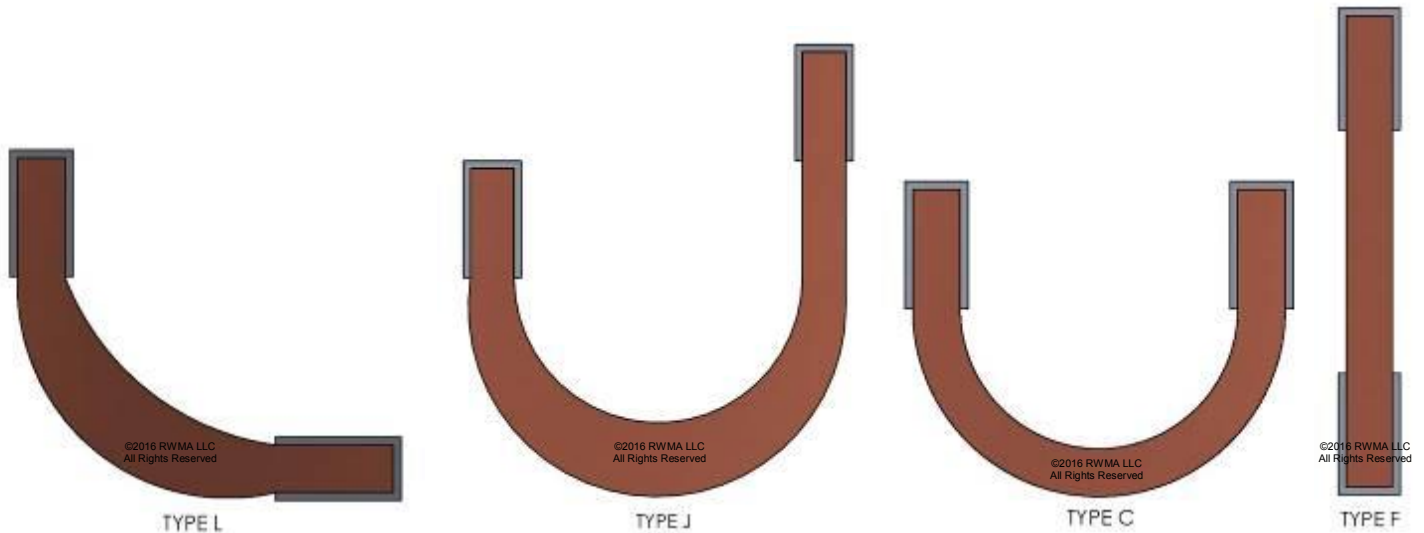
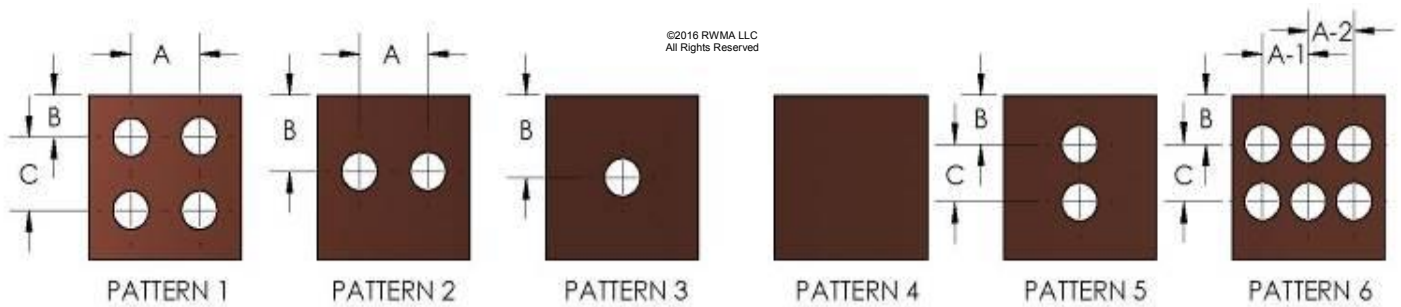
PATTERN NUMBER _____

THICKNESS (LESS CLIP) _____

HOLE SIZE _____ OR BOLT SIZE _____

HOLE PATTERN DIMENSIONS:

A _____ A-2 _____ B _____ C _____



CONTACT OUR SALES TEAM FOR ADDITIONAL INFORMATION



(269) 428-4770



sales@resweld.com

TIPS FOR EXTENDING ELECTRODE LIFE

Use standard electrodes along with ejector type, self-adjusting tube, and water-cooled electrode holder whenever possible. Avoid special or irregular shapes for lower cost.

Use ample cold cooling water as close as practical to the welding contact surface, properly circulated at a minimum of 30 psi pressure, and supplied at a rate of at least 1.5 gallons per minute.

Be sure to select the proper type and size of electrode, taking into consideration electrode pressure, contact area of electrode, gauge, and nature of material to be welded. Overloading as well as overheating shortens the life of your electrode.

Good welds depend upon properly maintained electrodes, which assure an accurate surface contact. Keep tapers clean and dress electrode face with lathe, emery paddle or special dressing file. Use castor oil or graphite grease to facilitate tip removal, and avoid application of insulators such as Teflon tape and other materials.

PROBLEM SOLVING

Expulsion at Weld Interface

- Short Squeeze Time
- Low Weld Force
- Dirty – Scaly Material
- Poor Fit Up
- Insufficient Edge Distance

Surface Expulsion/Electrode Sticking

- Short Squeeze Time
- Long Weld Time
- Short Hold Time
- Low Weld Force
- High Weld Current
- Dirty – Scaly Material

Electrode Mushrooming

- Insufficient Cooling
- Low Weld Force
- High Weld Current
- Small Electrode Face Area
- Long Weld Time
- Welder Head Impacts Work

Low Weld Strength

- Short Weld Time
- Low Weld Force
- Low Weld Current
- Small Electrode Face Area
- Poor Heat Balance
- Welds Too Close Together

Excessive Weld Indentation

- Long Weld Time
- High Weld Force
- High Weld Current
- Poor Fit Up
- Welder Head impacts work

Internal Cracks in Weld Nugget

- Short Hold Time
- Low Weld Force
- Dirty – Scaly Material
- Metallurgy of Material Welded
- Poor Head Follow Up

Displaced Weld Nugget

- Electrode Misalignment
- Poor Heat Balance
- Poor Fit Up

Cracks in Parent Material

- High Weld Force
- Insufficient Cooling
- Metallurgy of Material Welded

HELPFUL RESISTANCE WELDING TIPS

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Use standard RWMA design electrodes whenever possible. Use the RWMA recommended electrode material for the part being welded. Keep the electrodes aligned normal to the working face. Only use offset electrodes or welds at an angle when nothing else will work.

Check the water deflector tubes each time you install electrodes. They should be within one-quarter inch of the bottom of the water hole of the electrode.

Confirm there is water flow from the electrodes, transformer, control and other cooled components before welding.

Always use proper size water hose, if removed check for obstructions that might impede flow.

When a set up will not be used for a period of time remove the electrodes from the holders to avoid freezing into the holder due to corrosion.

Use fine emery cloth to dress electrode faces. If wear is excessive remove from machine and dress in lathe or other controlled machine.

If the use of a hammer is necessary on resistance welding machine or its components, use rubber, plastic, brass, rawhide or other soft material. Never use a steel hammer.

If a water leak is found repair as soon as possible, or report it to the appropriate maintenance personnel.

Check all mechanical connections in the secondary connections. Check all shunts and cables for damage, replace as needed.

Perform maintenance to Resistance Welding equipment as outlined in RWMA Bulletin 14.

Keep in mind that sparks/expulsions are an indication that something is not right at the weld. It could be current, force, time, alignment and many other factors. Take time; check your set up for variance from the desired settings. Expulsion can be dangerous and could also result in questionable product.

GAGE CHART

GAGE NO.	MANUFACTURER'S STANDARD	GAGE NO.	MANUFACTURER'S STANDARD	GAGE NO.	MANUFACTURER'S STANDARD
3	0.2391	12	0.1046	21	0.0329
4	0.2242	13	0.0897	22	0.0299
5	0.2092	14	0.0747	23	0.0269
6	0.1943	15	0.0673	24	0.0239
7	0.1793	16	0.0598	25	0.0209
8	0.1644	17	0.0538	26	0.0179
9	0.1495	18	0.0478	27	0.0164
10	0.1345	19	0.0418	28	0.0149
11	0.1196	20	0.0359	29	0.0135
				30	0.0120

DO'S AND DON'TS OF RESISTANCE WELDING

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DO'S	DON'TS
1. USE THE PROPER ELECTRODE MATERIAL FOR THE JOB.	1. NEVER USE UNIDENTIFIED ELECTRODES OR ELECTRODE MATERIALS.
2. USE STANDARD ELECTRODES WHEREVER POSSIBLE	2. AVOID SPECIAL, OFFSET OR IRREGULAR TIPS WHEN THE JOB CAN'T BE DONE WITH A STANDARD STRAIGHT TIP.
3. USE THE MOST SUITABLE TIP DIAMETER FOR THE THICKNESS OF STOCK BEING WELDED.	3. DON'T USE SMALL TIPS ON HEAVY GAUGE WELDING JOBS OR LARGE TIPS ON SMALL WORK.
4. USE OPEN SIGHT DRAINS TO OBSERVE MORE READILY THE WATER FLOW THROUGH THE HOLDER.	4. DON'T FORGET TO TURN ON THE COOLING WATER FULL FORCE BEFORE STARTING TO WELD.
5. CONNECT THE WATER INLET HOSE TO THE PROPER HOLDER INLET SO THAT THE WATER FLOWS THROUGH THE CENTER COOLING TUBE FIRST.	5. NEVER USE WATER HOSE THAT WILL NOT FIT THE HOLDER WATER CONNECTION NIPPLES SNUGLY.
6. INTERNALLY COOL THE SPOT WELDING TIPS WITH COOL WATER FLOWING AT A RATE OF AT LEAST 1/2 GALLONS PER MINUTE.	6. DO NOT ALLOW WATER CONNECTIONS TO BECOME LEAKY, CLOGGED OR BROKEN.
7. BE SURE THE INTERNAL WATER COOLING TUBE OF THE HOLDER PROJECTS INTO THE TIP WATER HOOLE TO WITHIN 1/4" OF THE HOLE BOTTOM.	7. AVOID USING HOLDERS WITH LEAKING OR DEFORMED TAPERS.
8. ADJUST THE INTERNAL WATER COOLING TUBE OF THE HOLDER TO THE PROPER HEIGHT WHEN CHANGING TO A DIFFERENT HOLDER TYPE.	8. NEVER USE ELECTRODE HOLDERS THAT DO NOT HAVE AN ADJUSTABLE INTERNAL WATER COOLING TUBE.
9. BE SURE TOP OF ADJUSTABLE WATER COOLING TUBE IN HOLDERS IS CUT AT AN ANGLE SO AS TO AVOID JAMMING TIP DOWN AND SHUTTING WATER OFF.	9. DO NOT PERMIT ADJUSTABLE WATER TUBE TO BE FROZEN BY ACCUMULATION OF DEPOSITS. A FEW DROPS OF OIL PERIODICALLY WILL KEEP THE TUBE FREE.
10. PLACE A THIN FILM OF CUP GREASE ON THE TIP TAPER PRIOR TO INSERTING IN THE HOLDER, TO MAKE IT EASIER TO REMOVE.	10. DO NOT ALLOW ELECTRODES TO REMAIN IDLE IN TAPERED HOLDER SEATS FOR EXTENDED PERIODS.
11. USE EJECTOR TYPE HOLDERS FOR EASY REMOVAL OF TIPS AND TO AVOID DAMAGE TO THE TIP TAPERS.	11. DON'T USE PIP WRENCHES OR SIMILAR TOOLS IN REMOVING ELECTRODES.
12. KEEP THE TIP TAPER AND HOLDER TAPER CLEAN, SMOOTH AND FREE OF FOREIGN DEPOSITS.	12. AVOID USING WHITE LEAD OR SIMILAR COMPOUNDS TO SEAL A LEAKING TAPER.
13. DRESS SPOT WELDING ELECTRODES FREQUENTLY ENOUGH TO MAINTAIN THE QUALITY OF THE WELDS.	13. NEVER PERMIT A SPOT WELDING TIP TO MUSHROOM ENOUGH TO MAKE DRESSING DIFFICULT.
14. DRESS ELECTRODES IN A LATHE TO THEIR ORIGINAL CONTOUR WHENEVER POSSIBLE.	14. NEVER DRESS ELECTRODES WITH A COARSE FILE.
15. USE A RAWHIDE OR RUBBER Mallet FOR STRIKING HOLDER OR TIPS IN ALIGNING OPERATIONS.	15. DON'T POUND ON THE HOLDER OR TIP WITH A STEEL HAMMER IN ALIGNING THE WELDER ARMS.
16. PROVIDE FLOOD COOLING ON BOTH SIDES OF THE SEAM WELDING WHEEL.	16. AVOID THE USE OF SEAM WELDER WHEELS TOO THIN TO STAND THE HEAT OR PRESSURE OF YOUR JOB.

RESISTANCE WELDING MATERIALS

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GROUP A – COPPER BASE ALLOYS										
CLASS	RWMA NO.	GENERAL USE	DESCRIPTION	AVAILABILITY						
				1	2	3	4	5	6	
RWMA CLASS 1 ZIRCONIUM	1.15000	ELECTRODES FOR WELDING ALUMINUM ALLOYS, MAGNESIUM ALLOYS, COATED MATERIALS, BRASS AND BRONZES. CAN BE USED FOR BOTH SPOT AND SEAM WELDING.	A SPECIALLY HEAT TREATED ZIRCONIUM COPPER ALLOY THAT MEETS THE MINIMUM ELECTRICAL CONDUCTIVITY AND HARDNESS SPECIFICATIONS OF CLASS 1 ALLOY.		X	X				
CADMIUM	1.16200		A HIGH CONDUCTIVITY CADMIUM COPPER ALLOY, NOT HEAT TREATABLE, BUT CAN BE WORK HARDENED.		X	X				
CHROMIUM	1.18200		A SPECIALLY HEAT TREATED CHROMIUM COPPER ALLOY THAT MEETS THE MINIMUM ELECTRICAL CONDUCTIVITY AND HARDNESS SPECIFICATIONS OF CLASS 1.	X	X	X	X			
RWMA CLASS 2 CHROMIUM ZIRCONIUM	2.18150	THESE MATERIALS ARE STRONGER THAN CLASS 1 MATERIAL BUT HAVE SLIGHTLY LOWER CONDUCTIVITY. THEY ARE USED FOR THE SPOT AND SEAM WELDING OF HOT AND COLD ROLLED STEEL, STAINLESS STEEL, AND LOW CONDUCTIVITY BRASS & BRONZE. THEY ARE ALSO USED AS FLASH WELDING DIESEL AND AS ELECTRODES FOR THE WELDING OF STEEL & OTHER CURRENT CARRYING STRUCTURAL PARTS.	A SPECIALLY HEAT TREATED CHROMIUM ZIRCONIUM COPPER ALLOY, THAT MEETS THE MINIMUM ELECTRICAL AND HARDNESS SPECIFICATIONS OF CLASS 2 ALLOYS.	X	X	X				
CHROMIUM	2.18200		A HIGH CONDUCTIVITY CHROMIUM COPPER ALLOY, WHICH OBTAINS ITS OPTIMUM PROPERTIES FROM A COMBINATION OF BOTH HEAT TREATMENT AND COLD WORK.	X	X	X	X	X	X	X
RWMA CLASS 3 COBALT-BERYLLIUM COPPER NIKEL-BERYLLIUM COPPER BERYLLIUM-FREE COPPER	3.17500 3.17510 3.18000	THEIR HIGH HARDNESS MAKES THEM IDEAL FOR ELECTRODES FOR THE SPOT AND SEAM WELDING OF HIGH RESISTANCE MATERIALS SUCH AS STAINLESS STEEL, NICHROME AND MONEL METAL. AS A CASTING, THEY ARE USED FOR FLASH, BUTT AND PROJECTION WELDING ELECTRODES & FIXTURES. THEY CAN ALSO BE USED FOR SEAM WELDER BEARINGS AND OTHER CURRENT CARRYING STRUCTURAL PARTS.	HEAT TREATABLE COPPER ALLOY HAVING THE UNUSUAL COMBINATION OF VERY HIGH TENSILE STRENGTH AND GOOD ELECTRICAL AND THERMAL CONDUCTIVITY.	X X X	X X X	X X X	X X X	X X X	X X X	
RWMA CLASS 4 BERYLLIUM	4.17200	ELECTRODE MATERIAL FOR SPECIAL FLASH, FLASH BUTT AND PROJECTION WELDING APPLICATIONS WHERE PRESSURES ARE EXTREMELY HIGH AND WEAR IS SEVERE BUT WHERE HEAT IS NOT EXCESSIVE. USED IN THE FORM OF INSERTS & FACINGS.	HEAT TREATABLE COPPER ALLOY HAVING THE UNUSUAL COMBINATION OF VERY HIGH STRENGTH AND LOWER ELECTRICAL CONDUCTIVITY THAN CLASS 3. CAN BE ANNEALED, MACHINED AND REHEAT TREATED TO REGAIN ITS PROPERTIES.	X	X	X	X	X	X	X
RWMA CLASS 5 ALUMINUM	5.95300	TYPICAL USES ARE FLASH WELDING ELECTRODES, SECONDARY CIRCUIT WELDER ARMS, KNEES, PLATENS AND OTHER CURRENT CARRYING FIXTURES WHERE HIGH STRENGTH, WEAR RESISTANCE, AND NON-MAGNETIC PROPERTIES ARE REQUIRED.	COPPER BASE ALLOY USUALLY FURNISHED IN THE FORM OF CASTINGS. IT IS NOT HEAT TREATABLE.	X						



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GROUP B – REFRACTORY METAL COMPOSITION									
CLASS	RWMA NO.	GENERAL USE	DESCRIPTION	AVAILABILITY					
				1	2	3	4	5	6
RWMA CLASS 10 COPPER-TUNGSTEN	10.7445	FLASH AND BUTT WELDING ELECTRODES WHERE HIGHER ELECTRICAL AND THERMAL CONDUCTIVITY IS NECESSARY AND WHERE A DEGREE OF MALLEABILITY IS DESIRED. THEY CAN ALSO BE USED FOR SPOT WELDING LOW CONDUCTIVITY STEELS -- STAINLESS.	A POWDER METALLURGICAL COMBINATION OF 45% COPPER AND 55% OF THE REFRACTORY METAL TUNGSTEN. NOT A TRUE ALLOY. THIS COMBINATION PRODUCES DENSE, HARD METALS OF SUPERIOR WEAR RESISTANCE AND STRENGTH AT ELEVATED TEMPERATURES.			X			X
RWMA CLASS 11 COPPER-TUNGSTEN	11.744	PROJECTION WELDING ELECTRODES, FLASH AND BUTT WELDING ELECTRODE, LIGHT UPSETTING ELECTROFORGING & SEAM WELDER BUSHINGS. HARDER THAN CLASS 10 & USED WHERE MODERATE PRESSURE IS REQUIRED.	A POWDER METALLURGICAL COMBINATION OF 25% COPPER AND 75% REFRACTORY METAL TUNGSTEN. NOT A TRUE ALLOY. THIS COMBINATION PRODUCES DENSE, HARD METALS WITH GOOD THERMAL AND ELECTRICAL CONDUCTIVITY.				X		X
RWMA CLASS 12 COPPER-TUNGSTEN	12.7435	HEAVY DUTY PROJECTION WELDING ELECTRODES, ELECTRO-FORMING & ELECTROFORGING ELECTRODES. ELECTRODE FACING FOR UPSETTING OF STUDS AND RIVETS, CROSS WIRE WELDING OF LARGE DIAMETER WIRE AND ROD.	A POWDER METALLURGICAL COMBINATION OF 20% COPPER AND 80% OF THE REFRACTORY METAL TUNGSTEN. NOT A TRUE ALLOY. THIS COMBINATION PRODUCES DENSE, HARD METALS, OF SUPERIOR WEAR RESISTANCE AND STRENGTH AT ELEVATED TEMPERATURES.			X			X
RWMA CLASS 13 TUNGSTEN	13.743	CROSS WIRE WELDING OF COPPER AND BRASS ELECTROBRAZING AND SOME ELECTRO UPSETTING. WELDING OF BRAIDED COPPER WIRE TO OTHER MATERIALS.	TUNGSTEN IS EXTREMELY HARD AND HAS LOW DUCTILITY. IT CANNOT BE MACHINED BUT CAN BE GROUND TO REQUIRED CONTOURS. IT DOES NOT ALLOY WITH NON-FERROUS MATERIALS.			X	X		X
RWMA CLASS 14 MOLYBDENUM	14.423	CROSS WIRE WELDING OF COPPER AND BRASS ELECTROBRAZING AND SOME ELECTRO UPSETTING. WELDING OF BRAIDED COPPER WIRE TO OTHER MATERIALS.	MOLYBDENUM IS NOT AS HARD AS CLASS 13 AND CAN BE DRILLED AND MACHINED TO SPECIAL CONTOURS.			X	X	X	X

GROUP C – SPECIALTY MATERIAL									
CLASS	RWMA NO.	GENERAL USE	DESCRIPTION	AVAILABILITY					
				1	2	3	4	5	6
RWMA CLASS 20 DISPERSION STRENGTHENED COPPER	20.1576	WELDING OF METALLIC COATED METAL SUCH AS GALVANIZED STEEL, TERN PLATE, ETC.	A POWDER METALLURGY MATERIAL CONSISTING OF COPPER AND ALUMINUM OXIDE WITH HIGH TEMPERATURE HARDNESS AND PHYSICAL PROPERTIES DIFFERENT THAN THE COPPER ALLOYS.		X	X			

AVAILABILITY CODING EXPLANATION
1 = CASTING
2 = FORGING
3 = ROD AND BAR
4 = PLATE
5 = TUBE
6 = INSERTS

COPPER TUNGSTEN								
SIZE	CLASS 11 COPPER TUNGSTEN	CLASS 13 TUNGSTEN	CLASS 13 MOLYBDENUM	SIZE	CLASS 11 COPPER TUNGSTEN	CLASS 13 TUNGSTEN	CLASS 13 MOLYBDENUM	
1/8 X 3/8	-	A V A I L A B L E	A V A I L A B L E	5/8 X 1-1/2	-	A V A I L A B L E	A V A I L A B L E	
1/8 X 1/2	-			5/8 X 2	-			
1/8 X 5/8	-			3/4 X 3/4	-			
1/8 X 3/4	-			3/4 X 1	-			
1/8 X 1	-			3/4 1-1/4	-			
1/8 X 1-1/4	-			3/4 X 1-1/2	-			
1/8 X 1-1/2	-			3/4 X 2	-			
1/8 X 2	-			1 X 1	-			
1/4 X 1/4	-			1 X 1-1/4	-			
1/4 X 3/8	-			1 X 1-1/2	-			
1/4 X 1/2	-			1 X 2	-			
1/4 X 5/8	-			1/16 DIA.	-	U P O N	R E Q U E S T	U P O N
1/4 X 3/4	-			3/32 DIA.	-			
1/4 X 1	-			1/8 DIA.	-			
1/4 X 1-1/4	-			3/16 DIA.	-			
1/4 X 1-1/2	-			1/4 DIA.	-			
1/4 X 2	-			5/16 DIA.	-			
3/8 X 3/8	-			3/8 DIA.	-			
3/8 X 1/2	-			7/16 DIA.	-			
3/8 X 5/8	-			1/2 DIA.	-			
3/8 X 3/4	-	9/16 DIA.	-					
3/8 X 1	-	5/8 DIA.	-					
3/8 X 1-1/4	-	3/4 DIA.	-					
3/8 X 1-1/2	-	7/8 DIA.	-					
3/8 X 2	-	1 DIA.	-					
1/2 X 1/2	-	1-1/8 DIA.	-					
1/2 X 5/8	-	1-1/4 DIA.	-					
1/2 X 3/4	-	1-3/8 DIA.	-					
1/2 X 1	-	1-1/2 DIA.	-					
1/2 X 1-1/4	-	1-3/4 DIA.	-					
1/2 X 1-1/2	-	2 DIA.	-					
1/2 X 2	-							
5/8 X 5/8	-							
5/8 X 3/4	-							
5/8 X 1	-							
5/8 X 1-1/4	-							



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ALLOY COPPER BAR STOCK			
SOLID ROUNDS		RECTANGLES	
DIAMETER	LBS/FT	SIZE	LBS/FT
1/8	0.05	1/4 X 1/2	0.480
3/16	0.11	1/4 X 7/8	0.840
1/4	0.19	1/4 X 1	0.960
5/16	0.29	1/4 X 1-1/2	1.440
3/8	0.42	1/4 X 2	1.920
7/16	0.58	1/4 X 3	2.880
0.482	0.70	3/8 X 3/4	1.080
1/2	0.76	3/8 X 1	1.440
9/16	0.95	3/8 X 2	2.880
5/8	1.18	1/2 X 1/2	0.960
3/4	1.70	1/2 X 3/4	1.440
7/8	2.30	1/2 X 1	1.920
1	3.02	1/2 X 1-1/2	2.880
1-1/8	3.81	1/2 X 2	3.840
1-1/4	4.72	1/2 X 3	5.760
1-3/8	5.71	5/8 X 5/8	1.500
1-1/2	6.79	5/8 X 3/4	1.800
1-3/4	9.24	5/8 X 1	2.400
2	12.06	5/8 X 1-1/2	3.600
2-1/4	15.27	5/8 X 2	4.860
2-1/2	18.86	3/4 X 3/4	2.160
2-3/4	22.81	3/4 X 1	2.880
3	27.14	3/4 X 1-1/2	4.320
3-1/8		3/4 X 1-3/4	5.040
3-1/4		3/4 X 2	5.760
3-3/8	34.36	3/4 X 2-1/2	7.200
3-1/2		3/4 X 3	8.640
3 -5/8	39.63	1 X 1	3.840
3-7/8	45.29	1 X 1-1/4	4.800
4		1 X 1-1/2	5.760
4-1/8	51.23	1 X 2	7.680
4-3/8	57.73	1 X 2-1/2	9.600
4-1/2		1 X 3	11.520
4-5/8	64.52	1-1/4 X 1-1/4	6.000
5-1/8	79.14	1-1/4 X 1-1/2	7.200
6-1/8	111.68	1-1/4 X 1-3/4	8.400
		1 1/4 X 2	9.600
		1 3/8 X 3	15.840
		1-1/2 X 1-1/2	8.640
		1-1/2 X 2	11.520
		1-1/2 X 3	17.28
		1-3/4 X 2	13.44
		1-3/4 X 3	
		2 X 2	15.36

SIZES NOT LISTED
ARE AVAILABLE
UPON REQUEST

HEXAGON ROD		
SIZE	RWMA - CLASS 2	
	LBS/IN	LBS/FT
5/8	0.157	1.88
3/4	0.183	2.20
7/8	0.212	2.54
1	0.276	3.33
1-1/8	0.351	4.21
1-1/4	0.433	5.20
1-1/2	0.625	7.50

RWMA CLASS 2 AND CLASS 3		
1/4	0.157	
3/8		
1/2		
5/8		
3/4		
1		
1-1/4		
1-1/2		
1-3/4		
2		
2-1/2		
3		
4		

