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HOW TO SELECT THE BEST COMWELD ROD

To assist you in selecting the most suitable alloy and process for the particular application, we have recommended below the alloy and process that would be most suitable for your use. Once you have selected the best alloy, refer to contents for detailed information on its characteristics, technical specifications, applications and procedure.

Process	Comweld Alloy	Comweld Flux
	Joining copper, brass, bronze, etc.	
Braze Welding	Phos Copper	No flux
"	Comcoat T or *Tobin Bronze	*Copper & Brass
"	Comcoat N or *Nickel Bronze	*Copper & Brass
GTA Welding (TIG)	Comweld Aluminium Bronze	No flux
GTA Welding (TIG)	Comweld Silicon Bronze	No flux
Soldering	965 Silver Solder	965 Soldering Flux
	Joining Steel.	
Oxy Acetylene Fusion Welding	Mild Steel, High Test	No flux
GTA Welding (TIG)	Comweld LW1, Super Steel	No flux
Braze Welding	Comcoat C	No flux
Braze Welding	Manganese Bronze	Copper & Brass
Soldering	965 Silver Solder	965 Soldering Flux
	Repairing Cast Iron.	
Oxy Acetylene Fusion Welding	GP Super Silicon Cast Iron	No Flux
GTA Welding (TIG)	GP Super Silicon Cast Iron	No flux
Braze Welding	Comcoat C	No flux
"	Manganese Bronze	No Flux
"	Comcoat N	No flux
"	Nickel Bronze	No Flux
	Joining Stainless Steel.	
Oxy Acetylene Fusion Welding	Comweld 308L, 309L, 316L & 347	No Flux
GTA Welding (TIG)	Comweld 308L, 309L, 316L & 347	No flux
Soldering	965 Silver Solder	965 Soldering Flux
	Joining Aluminium.	
Oxy Acetylene Fusion Welding	AL1188, AL4043, AL4047 & AL5356	Aluminium Welding Flux
GTA Welding (TIG)	AL1188, AL4043 & AL5356	No flux
Braze Welding	AL4047	No Flux
Soldering	Aluminium Solder	No flux

FLAME ADJUSTMENT

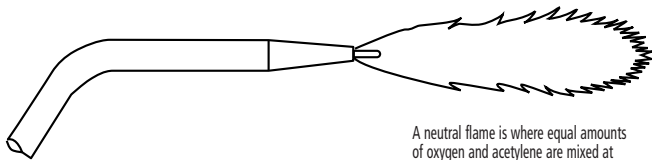
Correct flame adjustment is a most important factor in making a successful oxy-acetylene weld.

Careful consideration should be given to this, so that CIGWELD welding rods and fluxes are used to their best possible advantages.

There are basically three types of flame adjustments, ie. neutral, oxidising (excess oxygen) and reducing or carburising (excess acetylene). The neutral flame setting is used for the majority of welding and brazing requirements.

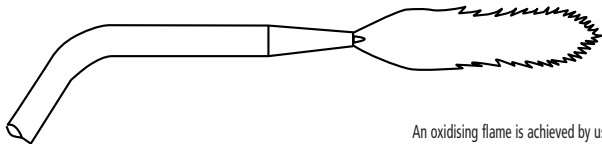
So that you can easily identify each type, a sketch of the different flame settings is shown below.

Neutral Flame: For steel, stainless steel, cast iron, copper, aluminium, etc.



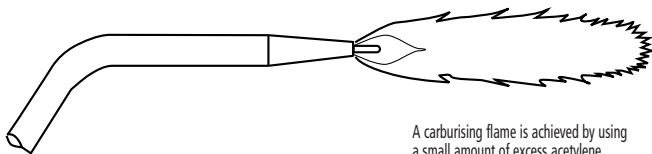
A neutral flame is where equal amounts of oxygen and acetylene are mixed at the same rate. The white inner cone is clearly defined and shows no haze.

Oxidising Flame: An oxidising flame is necessary for welding brass.



An oxidising flame is achieved by using excess oxygen (or reduced acetylene). The white inner cone is very pale and may cause the tip to "pop".

Carburising or Reducing Flame: Excess acetylene is necessary for hard facing.



A carburising flame is achieved by using a small amount of excess acetylene. The white inner cone will show signs of a haze of "feather" at the end of the inner cone.

TERMS AND DEFINITIONS

Alloy:

A mixture of two or more entirely different metals united by melting together.

Annealing:

Process of gradually cooling a metal part after welding or reheating it to make it soft for mechanical working. Annealing will also relieve any stresses that originally existed or that may be set up by the welding operation.

Backhand Welding: (rightward, backward).

Welding with the blowpipe flame pointing in the direction opposite to that in which the weld progresses, that is, toward the finished portion of the weld. The opposite of forehand welding.

Blowhole:

A cavity in weld metal caused by a bubble of gas becoming entrapped in the solidifying metal.

Brazing:

A joining process in which the molten filler metal is drawn by capillary action between two closely adjacent surfaces to be joined. The filler metal is a non-ferrous metal or alloy with a melting point above 450°C, but lower than that of the metal being joined. It is a process more comparable to soldering than to welding.

Braze Welding:

Unlike brazing does not depend on capillary attraction. The parent metal is not melted, but the joint design is similar to that which would be used if a fusion weld were made. The filler metal is generally a non-ferrous metal or alloy, with a melting point above 500°C.

Bronze Welding:

A term which has been used to describe a braze-welding process in which a copper-rich filler materials is used. Can be applied to the fusion welding of bronze.

Butt Weld: (groove weld).

A weld in which the two edges of metal to be united are abutted together.

Cone:

The part of a flame that is conical in shape and located at the end of the welding tip, heating tip or cutting nozzle.

Ductility:

The property which permits metal to be drawn, formed or shaped.

Filler Rod:

A metal rod or wire which is melted and deposited in the weld and used to supply additional material.

Fillet Weld:

A weld made in a corner, as in a lap or T-joint.

Flame Brazing:

A brazing process in which the necessary heat is supplied by means of an oxy-fuel gas flame.

TERMS AND DEFINITIONS CONT.

Flux Inclusion:

A cavity in the weld metal containing flux caused by a quantity of flux becoming entrapped as the metal solidifies.

Forehand Welding: (Leftward, forward).

Welding with the blowpipe flame pointing in the direction in which the weld progresses, that is, towards the unfinished seam. The opposite of Backhand Welding.

Fusion Welding:

The type of welding in which the edges of the two pieces of metal being joined are melted and completely fused together without pressure and in which the filler rod, if used, is of similar composition to the parent metal.

Handigas:

A liquefied petroleum fuel gas supplied by BOC Gases for cutting and heating.

Hardfacing:

A process wherein metal harder than the parent metal is deposited on to a surface.

Neutral Flame:

An oxy-fuel gas flame in which the inner cone, or that portion of the flame used, is neither oxidising nor carburising. It is characterised by an almost colourless outer envelope and a sharply defined inner cone without feather or secondary flame.

Outer Envelope:

The secondary phase of combustion in any oxy-fuel gas flame which surrounds the innercone.

Penetration:

The depth of fusion obtained in a welded joint.

Silver Brazing: (Silver Soldering)

A low temperature brazing process in which a silver alloy is used as filler metal.

Tinning:

The act of coating another metal with tin. The term is also applied in brazing and braze welding, where the spreading out of a thin layer of fluxed brazing metal ahead of the main deposit to form a "tinning" coat provides a strong bond between parent metal and deposit.

COMWELD MILD STEEL



- ▲ Black Annealed, Low Carbon Steel Rod for Oxy-Acetylene Welding.
- ▲ Recommended for Gas Welding of Steels and Wrought Irons.
- ▲ Not Suitable for Gas Tungsten Arc Welding.

Classifications:

AS 1167.2: RG.

AWS/ASME-SFA A5.2: R45.

Description and Applications:

As the name implies, Comweld Mild Steel is an uncoated mild steel filler rod suitable for the oxy-acetylene (fusion) fillet and butt welding of carbon steel and wrought iron.

Comweld Mild Steel produces a free flowing weld pool without the need for an externally applied flux. A neutral to slightly reducing flame setting is recommended for use with Comweld Mild Steel.

Resultant weld deposits are ductile and in the 350 - 400 MPa tensile class. The low deoxidant level of Comweld Mild Steel makes it unsuitable for Gas Tungsten Arc (TIG) welding applications.

JOINING PROCESS:

Gas (Fusion) Welding only.

TYPICAL WELD DEPOSIT PROPERTIES:

All Weld Metal Tensile Strength	370 MPa.
Elongation	30%
Approximate Melting Point	1490°C.
Weld Metal Density	7.85 gms / cm ³

TYPICAL ROD ANALYSIS:

C: 0.07%	Mn: 0.50%	Si: 0.008%
S: 0.008%	P: 0.011%	Fe: Balance

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approximate Rods/kg	Part No
1.6 x 500	1kg Handipack	130	322045
1.6 x 1,000	5kg Pack	64	321334
2.4 x 750	5kg Pack	29	321337
3.2 x 750	5kg Pack	16	321339



- ▲ Copper Coated, Steel Filler Rod for Gas and Gas Tungsten Arc (TIG) Welding.
- ▲ Higher Strength (400-450MPa) Oxy-Acetylene and TIG Welding of Steels.

Classifications:

AS 1167.2: R1.
AWS/ASME-SFA A5.2: R60.

Description and Applications:

Comweld High Test is a copper coated steel filler rod suitable for the oxy-acetylene (fusion) welding and Gas Tungsten Arc (TIG) welding of carbon steels.

Comweld High Test produces a free flowing weld pool when gas welding, without the need for an externally applied flux. Resultant weld deposits are ductile and in the 400 - 450 MPa tensile class. A neutral to slightly reducing flame setting is recommended for use with Comweld High Test which is used extensively for the gas welding of pressure pipelines where higher joint strengths are required.

The nominal 1.2% Manganese and 0.2% Silicon deoxidant levels of Comweld High Test make it suitable for Gas Tungsten Arc (TIG) welding applications.

Procedure for Gas (Oxy-acetylene) Welding:

1. Thoroughly clean all areas to be welded.
2. Adjust flame to a neutral setting.
3. Preheat thicker joint sections.
4. Heat a small area of the joint until molten and progressively add Comweld High Test filler rod to the weld pool. Ensure the rod is melted by the molten weld pool and not the flame.
5. Allow completed joint to cool and remove residual scale by grinding, or wire brushing.

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thick plates, bevel edges to 60°-70° included angle.
3. Use a Thoriated or Ceriated tungsten electrode, ground to a sharp needle point making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the needle point should be approximately 2-3 x the diameter of the tungsten electrode.
4. Use Direct Current Electrode Negative (DC-) and Welding Grade Argon.
5. Preheat thick sections prior to welding. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.

JOINING PROCESS:

Gas (Fusion) and Gas Tungsten Arc (TIG) welding.

TYPICAL WELD DEPOSIT PROPERTIES:

All Weld Metal Tensile Strength	425 MPa.
Elongation	28%
Approximate Melting Point	1490°C.
Weld Metal Density	7.85 gms / cm ³

TYPICAL ROD ANALYSIS:

C: 0.12%	Mn: 1.17%	Si: 0.25%
S: 0.009%	P: 0.015%	Fe: Balance

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approximate Rods/kg	Part No
1.6 x 750	5kg Pack	84	321357
2.4 x 750	5kg Pack	34	321360
3.2 x 750	5kg Pack	21	321362

COMWELD LW1



- ▲ **Copper Coated, Low Carbon Steel Rod for Gas Tungsten Arc Welding Applications.**
- ▲ **GREEN END TIP for Instant I.D.**

Classifications:

AS 1167.2: R4.
AWS/ASME-SFA A5.18: ER70S-4.

Description and Applications:

Comweld LW1 is a copper coated, double de-oxygenated low carbon steel filler rod suitable for the oxy-acetylene (fusion) welding and Gas Tungsten Arc (TIG) welding of a wide range of mild and medium strength steels.

Comweld LW1 is recommended for the TIG welding of steel pipes, plates and castings with a tensile strength in the 500 MPa class. It is tolerant to surface rust and mill scale and is ideal for root pass welding applications where tough and ductile welds are produced.

When using Comweld LW1 for gas welding applications a neutral to slightly reducing flame setting is recommended.

Procedure for Gas (Oxy-acetylene) Welding:

1. Thoroughly clean all areas to be welded.
2. Adjust flame to a neutral setting.
3. Preheat thicker joint sections.
4. Heat a small area of the joint until molten and progressively add Comweld LW1 filler rod to the weld pool. Ensure the rod is melted by the molten weld pool and not the flame.
5. Allow completed joint to cool and remove residual scale by grinding, or wire brushing.

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thick plates, bevel edges to 60°-70° included angle.
3. Use a Thoriated or Ceriated tungsten electrode, ground to a sharp needle point making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the needle point should be approximately 2-3 x the diameter of the tungsten electrode.
4. Use Direct Current Electrode Negative (DC-) and Welding Grade Argon.
5. Preheat thick sections prior to welding. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.

JOINING PROCESS:

Gas (Fusion) and Gas Tungsten Arc (TIG) welding.

TYPICAL ALL WELD METAL MECHANICAL PROPERTIES:

Yield Stress	400 MPa.
Tensile Strength	500 MPa.
Elongation	29%
CVN Impact Values	100 J av @ -20°C

TYPICAL ROD ANALYSIS:

C: 0.08%	Mn: 1.16%	Si: 0.75%
S: 0.010%	P: 0.015%	Fe: Balance

COMPARABLE CIGWELD PRODUCTS:

Autocraft LW1 GMAW wire
AWS A5.18: ER70S-4

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approximate Rods/kg	Part No
1.6 x 750	5kg Pack	84	321411
2.4 x 750	5kg Pack	34	321412



- ▲ Copper Coated, Low Carbon Steel Rod for Gas TIG & Oxy Welding Applications.
- ▲ End stamped with "ER70S-6" for easy I.D.
- ▲ Resealable 5kg cardboard tube.

Classifications:

AS 1167.2: R6.
AWS/ASME-SFA A5.18: ER70S-6.

Description and Applications:

Comweld LW1-6 is a copper coated, low carbon steel filler rod suitable for the oxy-acetylene (fusion) welding and Gas Tungsten Arc (TIG) welding of a wide range of mild and medium strength steels.

Comweld LW1-6 is recommended for the TIG welding of steel pipes, plates and castings with a tensile strength in the 500 MPa class. It is tolerant to surface rust and mill scale and is ideal for root pass welding applications where tough and ductile welds are produced.

When using Comweld LW1-6 for gas welding applications a neutral to slightly reducing flame setting is recommended.

Procedure for Gas (Oxy-acetylene) Welding:

1. Thoroughly clean all areas to be welded.
2. Adjust flame to a neutral setting.
3. Preheat thicker joint sections.
4. Heat a small area of the joint until molten and progressively add Comweld High Test filler rod to the weld pool. Ensure the rod is melted by the molten weld pool and not the flame.
5. Allow completed joint to cool and remove residual scale by grinding, or wire brushing.

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thick plates, bevel edges to 60°-70° included angle.
3. Use a Thoriated or Ceriated tungsten electrode, ground to a sharp needle point making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the needle point should be approximately 2-3 x the diameter of the tungsten electrode.
4. Use Direct Current Electrode Negative (DC-) and Welding Grade Argon.
5. Preheat thick sections prior to welding. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.

JOINING PROCESS:

Gas (Fusion) and Gas Tungsten Arc (TIG) welding.

TYPICAL ALL WELD METAL MECHANICAL PROPERTIES:

Yield Stress	400 MPa.
Tensile Strength	500 MPa.
Elongation	29%
CVN Impact Values	100 J av @ -20°C

TYPICAL ROD ANALYSIS:

C: 0.07%	Mn: 1.55%	Si: 0.88%
S: 0.012%	P: 0.015%	Fe: Balance

COMPARABLE CIGWELD PRODUCTS:

Autocraft LW1-6 GMAW wire
AWS A5.18: ER70S-6

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approximate Rods/kg	Part No
1.6 x 1000	5kg Pack	64	321417
2.4 x 1000	5kg Pack	29	321418

COMWELD SUPER STEEL



- ▲ Low Carbon Steel Filler Rod for Gas Tungsten Arc (TIG) Welding.
- ▲ Triple Deoxidised for Superior Weld Deposit Quality and Resistance to Porosity.
- ▲ End Stamped with AWS Class "ER70S-2".
- ▲ Resealable 5 kg Cardboard Tube.

Classifications:

AS 1167.2: R2.
AWS/ASME-SFA A5.18: ER70S-2.

Description and Applications:

Comweld Super Steel is a copper coated 'triple deoxidised' steel welding rod recommended for the high quality Gas Tungsten Arc (TIG) welding of carbon and carbon-Manganese steels.

Comweld Super Steel is deoxidised with Titanium, Aluminium and Zirconium in addition to Manganese and Silicon for improved weld deposit quality. It is the ideal choice for TIG welding rusty or mill scaled plates and pipes and the root pass welding of pipes, tanks and heavy walled joints where good root toughness and radiographic soundness are achieved under high dilution.

Procedure for Gas (Oxy-acetylene) Welding:

1. Thoroughly clean all areas to be welded.
2. Adjust flame to a neutral setting.
3. Preheat thicker joint sections.
4. Heat a small area of the joint until molten and progressively add Comweld Super Steel filler rod to the weld pool. Ensure the rod is melted by the molten weld pool and not the flame.
5. Allow completed joint to cool and remove residual scale by grinding, or wire brushing.

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thick plates, bevel edges to 60°-70° included angle.
3. Use a Thoriated or Ceriated tungsten electrode, ground to a sharp needle point making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the needle point should be approximately 2-3 x the diameter of the tungsten electrode.
4. Use Direct Current Electrode Negative (DC-) and Welding Grade Argon.
5. Preheat thick sections prior to welding. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.

JOINING PROCESS:

Gas Tungsten Arc (TIG) welding.

TYPICAL ALL WELD DEPOSIT MECHANICAL PROPERTIES:

Yield Stress	425 MPa.
Tensile Strength	520 MPa.
Elongation	34%
CVN Impact Values	150 J av @ -29°C

TYPICAL ROD ANALYSIS:

C: 0.06%	Mn: 1.08%	Si: 0.52%
Ti: 0.08%	Zr: 0.07%	Al: 0.08%
S: 0.007%	P: 0.008%	Fe: Balance

COMPARABLE CIGWELD PRODUCTS:

Autocraft Super Steel GMAW wire
AWS A5.18: ER70S-2

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approx. Rods/kg	Part No
1.6 x 915	5kg Tube*	70	321370
2.4 x 915	5kg Tube*	31	321373

* Resealable



- ▲ Resealable 5kg Cardboard Tube.
- ▲ For the Gas Tungsten Arc (TIG) Welding of Cr - Mo Creep Resistant Steels for Elevated Temperature and Corrosive Service.
- ▲ End Stamped with AWS Class ER80S-B2 for Easy Identification.

Classifications:

AS 1167.2: RB2.
AWS/ASME-SFA A5.28: ER80S-B2.

Description and Applications:

Comweld CrMo1 is a copper coated steel TIG welding rod alloyed with nominally 1.25% Chromium (Cr) and 0.50% Molybdenum (Mo). It is recommended for the TIG welding of 1/2Cr-1/2Mo, 1Cr-1/2Mo and 1 1/4Cr-1/2Mo steel pipes, plates and castings used at elevated service temperatures (up to 550°C) in the power and petrochemical industries etc.

Comweld CrMo1 is also suitable for the dissimilar TIG welding of Cr-Mo steel to carbon steel and for the welding of case hardenable steels or steels which can be subsequently heat treated.

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thicker plates, bevel edges to 60°-70° included angle.
3. Use a Thoriated or Ceriated tungsten electrode, ground to a sharp needle point making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the needle point should be approximately 2-3 x the diameter of the tungsten electrode.
4. Use Direct Current Electrode Negative (DC-) and Welding Grade Argon.
5. The control of preheat, interpass and post weld heat treatment temperatures is critical to avoiding weld cracking. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.

TYPICAL ALL WELD METAL MECHANICAL PROPERTIES:

Welding Grade Argon:	
0.2% Proof Stress	500 MPa.
Tensile Strength	600 MPa.
Elongation (in 2 inches)	20%
CVN Impact Values	60 J av @ +20°C
Post weld heat treated at 620°C as required by AWS A5.28.	

TYPICAL ROD ANALYSIS:

C: 0.09%	Mn: 0.60%	Si: 0.60%
Cr: 1.30%	Mo: 0.50%	P: 0.015%
S: 0.010%	Fe: Balance	

COMPARABLE CIGWELD PRODUCTS:

Alloycraft 80-B2 electrode
AWS A5.5: E8018-B2
Autocraft CrMo1 GMAW wire
AWS A5.28: ER80S-B2

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approx. Rods/kg	Part No
2.4 x 1000	5kg Tube*	29	321379

* Resealable

COMWELD CrMo2



- ▲ Resealable 5kg Cardboard Tube.
- ▲ For the Gas Tungsten Arc (TIG) Welding of Cr-Mo and Cr-Mo-V Creep Resistant Steels for Elevated Temperature and Corrosive Service.
- ▲ End Stamped with AWS Class 'ER90S-B3' for Easy Identification.

Classifications:

AS 1167.2: RB3.
AWS/ASME-SFA A5.28: ER90S-B3.

Description and Applications:

Comweld CrMo2 is a copper coated steel TIG welding rod alloyed with nominally 2.5% Chromium (Cr) and 1.0% Molybdenum (Mo). It is recommended for the TIG welding of 2 1/4Cr - 1 Mo and Cr-Mo-V steel pipes, plates and castings used at elevated service temperatures (up to 600°C) in the power and petrochemical industries etc.

Comweld CrMo2 is also suitable for the dissimilar TIG welding of selected Cr-Mo steels to carbon steel and for the TIG welding of heat treatable steels and case hardenable steels with up to 3% Chromium content.

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thicker plates, bevel edges to 60°-70° included angle.
3. Use a Thoriated or Ceriated tungsten electrode, ground to a sharp needle point making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the needle point should be approximately 2-3 x the diameter of the tungsten electrode.
4. Use Direct Current Electrode Negative (DC-) and Welding Grade Argon.
5. The control of preheat, interpass and post weld heat treatment temperatures is critical to avoiding weld cracking. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.

TYPICAL ALL WELD METAL MECHANICAL PROPERTIES:

Welding Grade Argon:	
0.2% Proof Stress	560 MPa.
Tensile Strength	670 MPa.
Elongation (in 2 inches)	18%
CVN Impact Values	60 J av @ +20°C
Post weld heat treated at 690°C as required by AWS A5.28.	

TYPICAL ROD ANALYSIS:

C: 0.08%	Mn: 0.70%	Si: 0.60%
Cr: 2.50%	Mo: 1.00%	P: 0.015%
S: 0.010%	Fe: Balance	

COMPARABLE CIGWELD PRODUCTS:

Alloycraft 90-B3 electrode
AWS A5.5: E9018-B3

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approx. Rods/kg	Part No
2.4 x 1,000	5kg Tube*	29	321383

* Resealable



- ▲ Resealable 5kg Plastic Tube.
- ▲ Suitable for Gas and GTA (TIG) Welding.
- ▲ End Stamped with AS / AWS Class '308L'.
- ▲ DARK BLUE COLOUR CODED Pack Label for Instant I.D.

WELD DEPOSIT PROPERTIES:

Typical Weld Metal	0.2%
Proof Stress	450 MPa.
Typical Weld Metal Tensile Strength	600 MPa.
Approximate Melting Point	1400°C
Weld Metal Density	7.95 gms / cm ³
All Weld Metal Microstructure	Austenite with 5 – 8 % ferrite

Classifications:

AS 1167.2:	R308L
AWS/ASME-SFA A5.9:	ER308L.

Description and Applications:

Comweld 308L stainless steel is a high quality low carbon rod for the Gas or Gas Tungsten Arc (TIG) welding of a wide range of low carbon and stabilised 300 series stainless steels. It is recommended for the critical welding of 304 and 304L stainless steels in corrosion resistant and cryogenic applications.

Procedure for Gas (Oxy-acetylene) Welding:

1. Thoroughly clean all areas to be welded.
2. Adjust flame to a neutral setting.
3. Apply a Stainless Steel flux to filler rod and joint areas.
4. Preheat thicker joint sections.
5. Heat a small area of the joint until molten and progressively add Comweld 308L filler rod to the weld pool. Ensure the rod is melted by the molten weld pool and not the flame.
6. Allow completed joint to cool and remove residual flux by grinding and wire brushing. For the best cleaning and finishing results use CIGWELD "ChromeBright" pickling paste (Part No. 321918).

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thick plates, bevel edges to 60°-70° included angle.
3. Use a Thoriated or Ceriated tungsten electrode, ground to a sharp needle point making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the needle point should be approximately 2-3 x the diameter of the tungsten electrode.
4. Use Direct Current Electrode Negative (DC-) and Welding Grade Argon.
5. Preheat surfaces to be welded. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.
6. For the best cleaning and finishing results use CIGWELD "ChromeBright" pickling paste (Part No. 321918).

TYPICAL ROD ANALYSIS:

C: 0.015%	Mn: 1.90%	Si: 0.50%
Cr: 19.90%	Ni: 9.75%	P: 0.020%
S: 0.005%	Fe: Balance	

COMPARABLE CIGWELD PRODUCTS:

Satinchrome 308L-17 electrode
 AWS A5.4: E308L-17
 Murex Speedex 308L
 AWS A5.4: E308L-18
 Autocraft 308LSI GMAW wire
 AWS A5.9: ER308LSi
 Shieldchrome 308LT FCAW wires
 AWS A5.22: E308LT-1-1/4

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approximate Rods/kg	Part No
1.6 x 914	5kg Tube*	69	321406
2.4 x 914	5kg Tube*	30	321407

* Resealable

COMWELD 309L



- ▲ Resealable 5kg Plastic Tube.
- ▲ Suitable for Gas and GTA (TIG) Welding.
- ▲ End Stamped with AS / AWS Class '309L'.
- ▲ RED COLOUR CODED Pack Label for Instant I.D.

Classifications:

AS 1167.2: R309L.
AWS/ASME-SFA A5.9: ER309L.

Description and Applications:

Comweld 309L stainless steel is a high quality low carbon rod for the Gas or Gas Tungsten Arc (TIG) welding of highly alloyed 309 or 309L type stainless steels. Comweld 309L is also suitable for the dissimilar joining of other 300 series austenitic stainless steels to ferritic steels.

Procedure for Gas (Oxy-acetylene) Welding:

1. Thoroughly clean all areas to be welded.
2. Adjust flame to a neutral setting.
3. Apply a Stainless Steel flux to filler rod and joint areas.
4. Preheat thicker joint sections.
5. Heat a small area of the joint until molten and progressively add Comweld 309L filler rod to the weld pool. Ensure the rod is melted by the molten weld pool and not the flame.
6. Allow completed joint to cool and remove residual flux by grinding and wire brushing. For the best cleaning and finishing results use CIGWELD "ChromeBright" pickling paste (Part No. 321918).

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thick plate, bevel edges to 60°-70° included angle.
3. Use a Thoriated or Ceriated tungsten electrode, ground to a sharp needle point making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the needle point should be approximately 2-3 x the diameter of the tungsten electrode.
4. Use Direct Current Electrode Negative (DC-) and Welding Grade Argon.
5. Preheat surfaces to be welded. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.
6. For the best cleaning and finishing results use CIGWELD "ChromeBright" pickling paste (Part No. 321918).

WELD DEPOSIT PROPERTIES:

Typical Weld Metal	0.2%
Proof Stress	440 MPa.
Typical Weld Metal	
Tensile Strength	590 MPa.
Approximate Melting Point	1400°C
Weld Metal Density	7.95 gms / cm ³
All Weld Metal	
Microstructure	Austenite with 15 - 20 % ferrite

TYPICAL ROD ANALYSIS:

C: 0.015%	Mn: 1.90%	Si: 0.45%
Cr: 23.5%	Ni: 13.5%	P: 0.020%
S: 0.005%	Fe: Balance	

COMPARABLE CIGWELD PRODUCTS:

Satinchrome 309Mo-17 electrode
AWS A5.4: E309Mo-17
Murex Speedex 309L
AWS A5. 4: E309L-16
Autocraft 309LSi GMAW wire
AWS A5.9: ER309LSi
Shieldchrome 309LT FCAW wires
AWS A5.22: E309LT1-1/4

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approximate Rods/kg	Part No
1.6 x 914	5kg Tube*	69	321403
2.4 x 914	5kg Tube*	30	321404

* Resealable



- ▲ Resealable 5kg Plastic Tube.
- ▲ Suitable for Gas and GTA (TIG) Welding.
- ▲ End Stamped with AS / AWS Class '316L'.
- ▲ GOLD COLOUR CODED Pack Label for Instant I.D.

WELD DEPOSIT PROPERTIES:

Typical Weld Metal	0.2%
Proof Stress	470 MPa.
Typical Weld Metal Tensile Strength	640 MPa.
Approximate Melting Point	1400°C
Weld Metal Density	7.95 gms / cm ³
All Weld Metal Microstructure	Austenite with 7 – 10 % ferrite

Classifications:

AS 1167.2:	R316L
AWS/ASME-SFA A5.9:	ER316L

TYPICAL ROD ANALYSIS:

C: 0.012%	Mn: 1.57%	Si: 0.50%
Cr: 19.00%	Ni: 12.6%	Mo: 2.50%
P: 0.015%	S: 0.001%	Fe: Balance

Description and Applications:

Comweld 316L stainless steel is a high quality low carbon rod for the Gas or Gas Tungsten Arc (TIG) welding of Molybdenum bearing stainless steels; in particular matching 316 and 316L alloys. Comweld 316L is also suitable for the general welding of other 300 series stainless steels including 302 and 304; as well as ferritic stainless steels grades such as 409, 444 and 3Cr12.

COMPARABLE CIGWELD PRODUCTS:

Satinchrome 316L-17 electrode
 AWS A5.4: E316L-17
 Murex Speedex 316L
 AWS A5.4: E316L-16
 Autocraft 316LSI GMAW wire
 AWS A5.9: ER316LSI
 Shieldchrome 316LT FCAW wires
 AWS A5.20: E316LT1-1/4

Procedure for Gas (Oxy-acetylene) Welding:

1. Thoroughly clean all areas to be welded.
2. Adjust flame to a neutral setting.
3. Apply a Stainless Steel flux to filler rod and joint areas.
4. Preheat thicker joint sections.
5. Heat a small area of the joint until molten and progressively add Comweld 316L filler rod to the weld pool. Ensure the rod is melted by the molten weld pool and not the flame.
6. Allow completed joint to cool and remove residual flux by grinding and wire brushing. For the best cleaning and finishing results use CIGWELD "ChromeBright" pickling paste (Part No. 321918).

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approximate Rods/kg	Part No
1.6 x 914	5kg Tube*	69	321400
	25 Rod Handipack	-	322054
2.4 x 914	5kg Tube*	30	321401

* Resealable

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thick plates, bevel edges to 60°-70° included angle.
3. Use a Thoriated or Ceriated tungsten electrode, ground to a sharp needle point making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the needle point should be approximately 2-3 x the diameter of the tungsten electrode.
4. Use Direct Current Electrode Negative (DC-) and Welding Grade Argon.
5. Preheat surfaces to be welded. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.
6. For the best cleaning and finishing results use CIGWELD "ChromeBright" pickling paste (Part No: 321918)

COMWELD AL1100



- ▲ 99.88% Pure Aluminium Alloy Rod.
- ▲ Suitable for Gas Welding and Gas Tungsten Arc (GTAW / TIG) Welding Applications.
- ▲ Embossed with AS / AWS Class '1188'.
- ▲ 2.5 kg Cardboard Pack / 15kg Carton.

WELD DEPOSIT PROPERTIES:

Typical Weld Metal Tensile Strength 75 MPa.

Approximate Melting Point 660°C

Post Anodised colour tint Clear

ROD ANALYSIS LIMITS:

Single values are maximum allowable, unless otherwise stated.

Si: 0.06% Fe: 0.06% Cu: 0.005%

Mn: 0.01% Mg: 0.01% Zn: 0.03%

Ti: 0.01% Others each: 0.01%

Al: 99.88% min

COMPARABLE CIGWELD PRODUCTS:

Autocraft AL1188 GMAW wire

AWS A5.10: ER1188

Classifications:

AS 1167.2: R1100.

AWS/ASME-SFA A5.10: R1100.

Description and Applications:

Comweld AL1188 is a premium quality, pure (99.88% min)

Aluminium alloy rod recommended for the Gas or Gas

Tungsten Arc (TIG) welding of selected* 1XXX series

wrought Aluminium alloys. The lower weld deposit

strength, excellent corrosion resistance and high thermal

and electrical conductivity make Comweld AL1188 ideal

for the joining of selected high purity 1XXX series Aluminium sheets and plates used extensively in the electrical and chemical industries.

Comweld AL1188 produces a good colour match in anodised 1XXX series welded joints.

*See CIGWELD Aluminium Alloy Selection Chart for detailed welding consumable selection criteria for a wide range of Aluminium alloy parent

metals.

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thick plates, bevel edges to 65°-75° included angle.
3. Use a Zirconiated tungsten electrode, ground to a tapered blunt point (half the diameter of electrode) making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the point should be approximately 2-3 x the diameter of the tungsten electrode. For best results the tungsten electrode requires a radius or 'balled' end, this is done by heating the newly prepared tungsten at approximately 30 amps higher than the recommended welding current under the welding arc.
4. Use High Frequency stabilised Alternating Current (AC-HF) and Welding Grade Argon.
5. Preheat thick sections before welding. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.

Procedure for Gas (Fusion) Welding:

1. Thoroughly clean all areas to be welded either mechanically or chemically.
2. Adjust flame to a soft neutral setting, or one with a slight haze at the tip of the cone.
3. Apply Comweld Aluminium flux (Part Number: 321740) to filler rod and joint areas.
4. The edges of the joint should be heated to melting point and Comweld AL1188 filler rod added to the molten weld pool. Ensure the rod is melted by the molten weld pool and not the flame.
5. When welding in the downhand position, the blowpipe movement should be straight forward, with no sideways movement or weaving, to confine the heat in the weld area.
6. The blowpipe tip should be held at about 45° to the work piece and slightly decreased as the weld progresses. The filler rod is similarly inclined from 30° - 40°.
7. The flux must be removed on completion by washing in hot water or immersion (for approximately 10 minutes) in a dilute solution (5 - 10%) of nitric acid. The acid must be removed by washing with water after the flux has been removed.

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Carton Size	Approx. Rods/kg	Part No
1.6 x 914	2.5kg Pack	15kg	30	322600
2.4 x 914	2.5kg Pack	15kg	30	322601



- ▲ Aluminium - 5% Silicon Alloy Rod.
- ▲ Suitable for Gas Welding and Gas Tungsten Arc (GTAW / TIG) Welding Applications.
- ▲ Embossed with AS / AWS Class '4043'.
- ▲ 2.5 kg Cardboard Pack / 15kg Carton.

Classifications:

AS 1167.2: R4043.
AWS/ASME-SFA A5.10: R4043.

Description and Applications:

Comweld AL4043 is a premium quality Aluminium - nominal 5% Silicon alloy rod used extensively for the repair welding (fractures and blow holes etc) of selected* aluminium alloy castings.

Its lower weld deposit strength and excellent crack resistance make it suitable for the Gas or Gas Tungsten Arc (GTAW / TIG) welding of cast (mainly 4XX & 6XX series) alloys and wrought (selected 1XXX, 5XXX & 6XXX series) aluminium alloys, except where an accurate colour match is required after anodising.

*See CIGWELD Aluminium Alloy Selection Chart for detailed welding consumable selection criteria for a wide range of Aluminium alloy parent metals.

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thick plates, bevel edges to 65°-75° included angle.
3. Use a Zirconiated tungsten electrode, ground to a tapered blunt point (half the diameter of electrode) making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the point should be approximately 2-3 x the diameter of the tungsten electrode. For best results the tungsten electrode requires a radius or 'balled' end, this is done by heating the newly prepared tungsten at approximately 30 amps higher than the recommended welding current under the welding arc.
4. Use High Frequency stabilised Alternating Current (AC-HF) and Welding Grade Argon.
5. Preheat thick sections before welding. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.

Procedure for the Gas (Fusion) Welding of a Fractured Aluminium Castings:

1. Thoroughly clean all areas to be welded either mechanically or chemically.
2. Apply Comweld Aluminium flux (Part Number: 321740) to the areas to be joined.
3. Adjusting the flame to a soft neutral setting, or one with a slight haze at the tip of the cone, pre-heat the casting and tack weld the parts into position when the correct temperature is reached.
4. Begin at the centre of the fracture completing one side and then the other. Welding speed should be increased towards the ends of the fracture.
5. Allow the repaired casting to cool slowly.
6. The flux residue must be removed on completion by washing in hot water or immersion (for approximately 10 minutes) in a dilute solution (5 - 10%) of nitric acid. The acid must be removed by washing with water after the flux has been removed.

WELD DEPOSIT PROPERTIES:

Typical Weld Metal Tensile Strength	110 MPa.
Approximate Melting Point	630°C
Post Anodised colour tint	Grey

ROD ANALYSIS LIMITS:

Single values are maximum allowable, unless otherwise stated.

Si: 4.5-6.0%	Fe: 0.80%	Cu: 0.30%
Mn: 0.05%	Mg: 0.05%	Zn: 0.10%
Ti: 0.20%	Total others: 0.15%	
Al: Balance		

COMPARABLE CIGWELD PRODUCTS:

Autocraft AL4043 GMAW wire
AWS A5.10: ER4043

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Carton Size	Approx. Rods/kg	Part No
1.6 x 914	2.5kg Pack	15kg	210	321610
2.4 x 914	2.5kg Pack	15kg	90	321611
3.2 x 914	2.5kg Pack	15kg	51	321612

COMWELD AL4047



- ▲ Aluminium - 10% Silicon Alloy Rod.
- ▲ Suitable for Gas Welding and Gas Tungsten Arc (GTAW / TIG) Welding Applications.
- ▲ Embossed with AS / AWS Class '4047'.
- ▲ 2.5 kg Cardboard Pack / 15kg Carton.

Classifications:

AS 1167.2:	R4047.
AWS/ASME-SFA A5.10:	R4047.
AWS/ASME-SFA A5.8:	BA1Si-4.

Description and Applications:

Comweld AL4047 is a premium quality Aluminium - nominal 10% Silicon alloy rod used extensively for the brazing of many types of Aluminium alloy sheets, extruded shapes and castings.

Used in combination with Comweld Aluminium Brazing Flux, the lower melting range and excellent flow characteristics make

Comweld AL4047 ideal for brazing or braze welding applications, producing sound weld deposits with low parent metal distortion.

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thick plates, bevel edges to 65°-75° included angle.
3. Use a Zirconiated tungsten electrode, ground to a tapered blunt point (half the diameter of electrode) making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the point should be approximately 2-3 x the diameter of the tungsten electrode. For best results the tungsten electrode requires a radius or 'balled' end, this is done by heating the newly prepared tungsten at approximately 30 amps higher than the recommended welding current under the welding arc.
4. Use High Frequency stabilised Alternating Current (AC-HF) and Welding Grade Argon.
5. Preheat thick sections before welding. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.

Procedure for Brazing:

1. Thoroughly clean all surfaces to be welded either mechanically or chemically.
2. Apply an Aluminium Brazing flux to areas to be joined.
3. Adjusting the flame to a soft neutral setting, or one with a slight haze at the tip of the cone.
4. Preheat the joint using the envelope of the flame, ensuring that the inner cone is well clear of the parent metal.
5. The blow pipe and filler rod should be held at approximately the same angle as for fusion welding, 45° and 30° - 40° respectively.
6. At the correct temperature the flux will begin to flow smoothly. At this time, a small amount of Comweld AL4047 filler rod should be added and the rod withdrawn.
7. The flux residue must be removed on completion by washing in hot water or immersion (for approximately 10 minutes) in a dilute solution (5 - 10%) of nitric acid. The acid must be removed by washing with water after the flux has been removed.

WELD DEPOSIT PROPERTIES:

Typical Weld Metal Tensile Strength	150 MPa.
Approximate Melting Range	577 - 582°C
Post Anodised colour tint	Grey - Black

ROD ANALYSIS LIMITS:

Single values are maximum allowable, unless otherwise stated.

Si: 11.0-13.0%	Fe: 0.80%	Cu: 0.30%
Mn: 0.15%	Mg: 0.10%	Zn: 0.20%
Total others: 0.15%	Al: Balance	

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Carton Size	Approx. Rods/kg	Part No
1.6 x 914	2.5kg Pack	15kg	210	321620
	100 Rod Handipack	8 Pks	-	322070
2.4 x 914	2.5kg Pack	15kg	90	321621
	50 Rod Handipack	8 Pks	-	322071
3.2 x 914	2.5kg Pack	15kg	51	321622

COMWELD AL5356



- ▲ Aluminium - 5% Magnesium Alloy Rod.
- ▲ Suitable for Gas Welding and Gas Tungsten Arc (GTAW / TIG) Welding Applications.
- ▲ Embossed with AS / AWS Class '5356'.
- ▲ 2.5 kg Cardboard Pack / 15kg Carton.

Classifications:

AS 1167.2: R5356.
AWS/ASME-SFA A5.10: R5356.

Description and Applications:

Comweld AL5356 is a high quality, Aluminium - nominal 5% Magnesium alloy rod suitable for the Gas or Gas Tungsten Arc (TIG) welding of a wide range of cast and wrought Aluminium alloys.

It produces intermediate deposit strength and good ductility and corrosion resistance for the Gas or Gas Tungsten Arc Welding (GTAW / TIG) of a wide range of 3XXX, 5XXX, 6XXX and 5XX Aluminium alloys. See CIGWELD Aluminium Alloy Selection Chart for detailed welding consumable selection criteria for a wide range of Aluminium alloy parent metals.

Procedure for Gas Tungsten Arc (TIG) Welding:

1. Thoroughly clean all areas to be joined.
2. For the butt welding of thick plates, bevel edges to 65°-75° included angle.
3. Use a Zirconiated tungsten electrode, ground to a tapered blunt point (half the diameter of electrode) making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the point should be approximately 2-3 x the diameter of the tungsten electrode. For best results the tungsten electrode requires a radius or 'balled' end, this is done by heating the newly prepared tungsten at approximately 30 amps higher than the recommended welding current under the welding arc.
4. Use High Frequency stabilised Alternating Current (AC-HF) and Welding Grade Argon.
5. Preheat thick sections before welding. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool.

Procedure for Gas (Fusion) Welding:

1. Thoroughly clean all areas to be welded either mechanically or chemically.
2. Adjust flame to a soft neutral setting, or one with a slight haze at the tip of the cone.
3. Apply Comweld Aluminium flux (Part Number: 321740) to filler rod and joint areas.
4. The edges of the joint should be heated to melting point and Comweld AL5356 filler rod added to the molten weld pool. Ensure the rod is melted by the molten weld pool and not the flame.
5. When welding in the downhand position, the blowpipe movement should be straight forward, with no sideways movement or weaving, to confine the heat in the weld area.
6. The blowpipe tip should be held at about 45° to the work piece and slightly decreased as the weld progresses. The filler rod is similarly inclined from 30° - 40°.
7. The flux must be removed on completion by washing in hot water or immersion (for approximately 10 minutes) in a dilute solution (5 - 10%) of nitric acid. The acid must be removed by washing with water after the flux has been removed.

WELD DEPOSIT PROPERTIES:

Typical Weld Metal Tensile Strength	270 MPa.
Approximate Melting Point	640°C
Post Anodised colour tint	White

ROD ANALYSIS LIMITS:

Single values are maximum allowable, unless otherwise stated.

Si: 0.25%	Fe: 0.40%	Cu: 0.10%
Mn: 0.05-0.20%	Mg: 4.5-5.5%	Cr: 0.05-0.20%
Zn: 0.10%	Ti: 0.05-0.20%	
Total others: 0.15% Al: Balance		

COMPARABLE CIGWELD PRODUCTS:

Autocraft AL5356 GMAW wire
AWS A5.10: ER5356

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Carton Size	Approx. Rods/kg	Part No
1.6 x 914	2.5kg Pack	15kg	210	321640
2.4 x 914	2.5kg Pack	15kg	90	321641
	40 Rod Handiack	8 Pks	-	322078
3.2 x 914	2.5kg Pack	15kg	51	321642

COMWELD GENERAL PURPOSE, CAST IRON ROD

**Classifications:**

AS 1167.2:

RC11.

Description and Applications:

A high strength, general purpose, machinable cast iron alloy for joining and building up grey cast iron castings. Applications include maintenance & repair by TIG or oxy-acetylene welding, of machine bases, motor and gear housings and specially cast components. Excellent for thin sections, filling in surface porosity and building up worn or missing sections. Molten cast iron is extremely fluid and welding should be carried out in the downhand position. Colour match of finished welds to that of the parent metal is excellent.

Procedure for Gas (Oxy-acetylene) Welding:

1. Chip file or grind all scale and oxide from areas to be joined.
2. Bevel all breaks and cracks to form a 75°-90° 'V' or groove.
3. Before commencing to weld preheat to a dull red heat = approximately 650°C.
4. Adjust flame to neutral setting.
5. Heat the end of the filler rod.
6. Dip end of heated rod into a Cast Iron and using a slight circular movement of the flame to the end of the rod and the bottom edges of the 'V', bring to melting point.
When the material is ready to melt, it will become soft and have the appearance of being wet. At this point, lower the filler rod onto the base metal and allow about 5mm of the rod to melt in the puddle.
7. Continue this circular movement of the flame playing it on the weld metal and the base metal until they are thoroughly fused.
8. When welding is completed, reheat to a dull red and allow to cool slowly.
9. Remove flux residue by washing in hot water or immersing for 10 minutes in a dilute solution of nitric acid (5-10%). The acid must be rinsed off by washing in water after the flux has been removed.

Procedure for Gas Tungsten Arc Welding (TIG):

1. Chip file or grind all scale and oxide from areas to be joined.
2. Bevel all breaks and cracks to form a 75°-90° 'V' or groove.
3. Before commencing to weld preheat to a dull red heat = approximately 650°C.
4. Use a Thoriated or Ceriated tungsten electrode, ground to a sharp needle point making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the needle point should be approximately 2-3 x the diameter of the tungsten electrode.
5. Use Direct Current Electrode Negative (DC-) and Welding Grade Argon.
6. Apply to the weld pool by melting off small quantities from the end of the rod at a 45° angle (as you would melt a candle with a match).
7. When welding is completed, reheat to a dull red and allow to cool slowly.

TIP COLOUR:

Blue

JOINING PROCESS:

Gas (Fusion) and Gas Tungsten Arc Welding (TIG).

TYPICAL PROPERTIES:

All Weld Metal Tensile Strength	230 MPa.
Approximate Melting Point	1150°C.

TYPICAL ROD ANALYSIS:

C: 3.37%	Mn: 0.75%	Si: 3.25%
S: 0.008%	P: 0.011%	Fe: Balance

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approximate Rods/kg	Part No
5.0 x 700	2.5kg Pack	8	321420



Description and Applications:

COMWELD Galvanising Bar is an alloy which when applied on a heated base metal, will melt and produce a strong corrosion-resistant alloy coating. This alloy can be used as a pre-treatment to protect base metals and forms a strong permanent bond to the surface. COMWELD Galvanising Bar can be used where any welding of galvanised parts is done. It can be used with gas or electric welding.

Procedure:

1. Thoroughly clean all areas to be galvanised removing any rust, slag, flux residue and foreign material.
2. Preheat the base metal to a temperature of 300°C.
3. Rub the end of the bar on the area to be coated. If the base metal is not hot enough the bar will not melt off effectively. If the base metal is too hot the bar will run too freely and excessive coating will result.
4. Allow the molten alloy to cool slightly then wire brush or wipe the deposit to completely cover the weld area. This greatly strengthens and improves the finish.
5. Do not melt the alloy with a flame.

TYPICAL PROPERTIES:

Approximate Melting Point 300°C.

TYPICAL ROD ANALYSIS:

Pb: 57.50% (Lead)

Sn: 32.50% (Tin)

Zn: 10.00% (Zinc)

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Easyweld Handipack	Part No
6.3 x 500	2.5kg Pack		321695
6.3 x 500		2 Rod Handipack	322085

COMWELD MANGANESE BRONZE ROD



- ▲ General Purpose Brazing Alloy.
- ▲ Recommended for Braze Welding of Steels and Cast and Malleable Irons.
- ▲ Not Suitable for Copper Pipes in Hot Water Systems.
- ▲ BLUE End Tip Colour for Instant I.D.

Classifications:

AS 1167. Parts 1 & 2: R Cu Zn-C.
 AWS/ASME-SFA A5.8 / A5.27: RB Cu Zn-C.

Description and Applications:

Comweld Manganese Bronze is a low fuming, general purpose bronze filler rod. Because of its high bond (transverse tensile) strength, it is recommended for the braze welding of steel, cast iron and malleable iron.

Comweld Manganese Bronze is not recommended for the joining of copper pipes which carry hot water or sea water because of dezincification of the bronze causing failure of the joint. For these applications Comweld Tobin Bronze or Comcoat T should be used.

Comweld Manganese Bronze is the ideal maintenance rod for a wide range of braze welding applications including the joining of cast iron, malleable iron, steel, etc - it is a must for the workshop.

Procedure for Braze Welding:

1. Thoroughly clean all areas to be joined.
2. For best results on steel use Comweld Copper and Brass flux (Part Number: 321822) and for cast iron use a Bronze flux. Adjust flame to slightly oxidising.
3. Preheat the edges to be joined to a dull red colour. Dip the end of the heated rod into the flux and, at the same time, heat both edges of the job to an equal degree. Ensure that 'tinning' has taken place on the required joint surfaces.
4. Melting of the base material is not required in braze welding and care should be taken to control the heat in the joint.
5. Continue adding the rod to build up the braze to the desired size and shape.
6. Allow the joint to cool and remove the flux residue with a wire brush or by immersion in a dilute acid solution followed by a water rinse.

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approximate Rods/kg	Part No
1.6 x 750	5kg Pack	83	321195
2.4 x 750	5kg Pack	37	321199
3.2 x 750	5kg Pack	20	321202
5.0 x 750	5kg Pack	8	321203
6.3 x 750	5kg Pack	5	321204

JOINING PROCESS:

Gas (Braze) Welding only.

TYPICAL WELD DEPOSIT PROPERTIES:

Weld Metal Tensile Strength	460 MPa
0.2% Proof Stress	165 MPa
Elongation	35%
Approximate Melting Point	890°C.
Weld Metal Density	8.39 gms / cm ³

TYPICAL ROD ANALYSIS:

Zn: 40.5%	Mn: 0.10%	Si: 0.10%
Sn: 1.0%	Fe: 0.50%	Cu: Balance

COMPARABLE CIGWELD PRODUCTS:

Comcoat C Flux Coated Manganese Bronze
 AS 1167.1 & .2: R Cu Zn-C

COMWELD COMCOAT C



- ▲ Flux Coated Manganese Bronze Rod.
- ▲ General Purpose Brazing Alloy.
- ▲ Recommended for Braze Welding of Steels and Cast and Malleable Irons.
- ▲ Not Suitable for Copper Pipes in Hot Water Systems.
- ▲ BLUE Flux Colour for Instant I.D.

JOINING PROCESS:

Gas (Braze) Welding only.

TYPICAL WELD DEPOSIT PROPERTIES:

Weld Metal Tensile Strength	460 MPa
0.2% Proof Stress	165 MPa
Elongation	35%
Approximate Melting Point	890°C.
Weld Metal Density	8.39 gms / cm ³

TYPICAL ROD ANALYSIS:

Zn: 40.5%	Mn: 0.10%	Si: 0.10%
Sn: 1.0%	Fe: 0.50%	Cu: Balance

COMPARABLE CIGWELD PRODUCTS:

Comweld Manganese Bronze Bare Rod
AS 1167.1 & 2: R Cu Zn-C

Classifications:

AS 1167. Parts 1 & 2:	R Cu Zn-C.
AWS/ASME-SFA A5.8/A5.27:	RB Cu Zn-C.

Description and Applications:

Comweld Comcoat C a self fluxing, low fuming, Manganese Bronze filler rod. Because of its high bond (transverse tensile) strength, it is recommended for the braze welding of steel, cast iron and malleable iron.

Comweld Comcoat C is not recommended for the joining of copper pipes which carry hot water or sea water because of dezincification of the bronze causing failure of the joint. For these applications Comweld Tobin Bronze or Comcoat T should be used.

Comweld Comcoat C Manganese Bronze is the ideal maintenance rod for a wide range of self fluxing braze welding applications including the joining of cast iron, malleable iron, steel, etc - it is a must for the workshop.

Procedure for Braze Welding:

1. Thoroughly clean all areas to be joined.
2. Adjust flame to slightly oxidising.
3. Preheat the edges to be joined to a dull red colour. Melt the end of the flux coated rod and, at the same time, heat both edges of the job to an equal degree. Ensure that 'tinning' has taken place on the required joint surfaces.
4. Melting of the base material is not required in braze welding and care should be taken to control the heat in the joint.
5. Continue adding the rod to build up the joint to the desired size and shape.
6. Allow the joint to cool and remove the flux residue with a wire brush or by immersion in a dilute acid solution followed by a water rinse.

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Easyweld Handipack	Blister Pack	Approximate Rods/kg	Part No
2.4 x 500	2.5kg Pack			50	321191
		20 Rod Handipack		-	322020
3.2 x 750			5 Rod Blister Pack	-	322206
	5kg Pack			19	321186
		15 Rod Handipack		-	322021

COMWELD TOBIN BRONZE ROD



- ▲ Low Strength Copper - Zinc Brazing Alloy.
- ▲ Recommended for the Fusion or Braze Welding of Selected Brasses and Bronzes.
- ▲ Suitable for Low Strength brazing of Steels.
- ▲ Not Suitable for Cast Irons.
- ▲ WHITE End Tip Colour for Instant I.D.

JOINING PROCESS:

Gas (Fusion and Braze) Welding only.

TYPICAL WELD DEPOSIT PROPERTIES:

Weld Metal Tensile Strength	400 MPa
0.2% Proof Stress	110 MPa
Elongation	45%
Approximate Melting Point	900°C.
Weld Metal Density	8.41 gms / cm ³

TYPICAL ROD ANALYSIS:

Zn: 37.5% Si: 0.30% Sn: 0.50%
Cu: Balance

COMPARABLE CIGWELD PRODUCTS:

Comcoat T flux coated Tobin Bronze
AS1167.1 & 2: R Cu Zn-A

Classifications:

AS 1167. Parts 1 & 2: R Cu Zn-A.
AWS/ASME-SFA A5.8/A5.27: RB Cu Zn-A.

Description and Applications:

Comweld Tobin Bronze is a low fuming rod recommended for the fusion welding or braze welding of selected brass and bronze alloys. It is also suitable for the non-critical brazing of mild steel in low stress applications. Comweld Manganese Bronze is the preferred filler rod for the higher strength braze welding of ferrous metals.

Comweld Tobin Bronze is ideal for braze welding joints in brass and bronze and is also used for the braze welding of mild steel in low stress applications such as the 'filling' of car body panels.

Procedure for Braze Welding:

1. Thoroughly clean all areas to be joined.
2. For best results on Copper and Copper alloys use Comweld Copper and Brass flux (Part Number: 321822) and adjust the flame to contain a slight excess of oxygen.
3. Preheat the edges to be joined to a dull red colour. Dip the end of the heated rod into the flux and, at the same time, heat both edges of the job to an equal degree. Ensure that tinning has taken place on the required surfaces.
4. Continue adding the rod to build up the joint to the desired size and shape.
5. Allow the joint to cool and remove the flux residue with a wire brush or by immersion in a dilute acid solution followed by a water rinse.

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Easyweld Handipack	Approximate Rods/kg	Part No
1.6 x 750	5kg Pack		83	321246
2.4 x 750	5kg Pack		37	321247
3.2 x 750	5kg Pack		20	321249
		15 Rod Handipack	–	322038
5.0 x 750	5kg Pack		8	321250



- ▲ Flux Coated Tobin Bronze Rod.
- ▲ Recommended for the 'Self Fluxing' Fusion Braze Welding of Selected Brasses & Bronzes.
- ▲ Suitable for Low Strength brazing of Steels.
- ▲ Not Suitable for Cast Irons.
- ▲ WHITE Flux Colour for Instant I.D.

JOINING PROCESS:

Gas (Fusion and Braze) Welding only.

TYPICAL WELD DEPOSIT PROPERTIES:

Weld Metal Tensile Strength	400 MPa
0.2% Proof Stress	110 MPa
Elongation	45%
Approximate Melting Point	900°C.
Weld Metal Density	8.41 gms / cm ³

TYPICAL ROD ANALYSIS:

Zn: 37.5%	Si: 0.30%	Sn: 0.50%
Cu: Balance		

COMPARABLE CIGWELD PRODUCTS:Comweld Tobin Bronze Bare Rod
AS1167.1 & .2: R Cu Zn-A**Classifications:**

AS 1167. Parts 1 & 2:	R Cu Zn-A.
AWS/ASME-SFA A5.8/A5.27:	RB Cu Zn-A.

Description and Applications:

Comweld Comcoat T is a low fuming Tobin Bronze filler rod recommended for the self fluxing fusion welding or braze welding of selected brass and bronze alloys. It is also suitable for the non-critical brazing of mild steel in low stress applications. Comweld Manganese Bronze or Comcoat C is the preferred filler rod for the higher strength braze welding of ferrous metals. Comweld Comcoat T Tobin Bronze is the ideal self fluxing filler rod for welding selected brass and bronze alloys and is also used for the braze welding of mild steel in low stress applications such as the 'filling' of car body panels.

Procedure for Braze Welding:

1. Thoroughly clean all areas to be joined.
2. Adjust the flame to slightly oxidising.
3. Preheat the edges to be joined to a dull red colour. Melt the end of the flux coated rod and, at the same time, heat both edges of the job to an equal degree. Ensure that tinning has taken place on the required surfaces.
4. Continue adding the rod to build up the joint to the desired size and shape.
5. Allow the joint to cool and remove the flux residue with a wire brush or by immersion in a dilute acid solution followed by a water rinse.

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Easyweld Handpack	Blister Pack	Approximate Rods/kg	Part No
2.4 x 500			5 Rod Blister Pack	–	322207
3.2 x 750	5kg Pack			19	321236

COMWELD NICKEL BRONZE ROD



- ▲ High Strength, Wear Resistant Brazing Alloy.
- ▲ High Strength Braze Welding of Steels and Cast or Malleable Irons.
- ▲ Fusion Welding of Copper Based Alloys of Similar Composition.
- ▲ CRIMSON End Tip Colour for Instant I.D.

Classifications:

AS 1167. Parts 1 & 2: R Cu Zn-D.
 AWS/ASME-SFA A5.8/A5.27: RB Cu Zn-D.

Description and Applications:

Comweld Nickel Bronze (sometimes termed Nickel Silver) is a premium quality bronze filler rod recommended for the high strength braze welding of steel, cast and malleable irons.

It is also an excellent choice for the fusion welding of Copper based alloys of similar composition and for the brazing of Nickel based alloys where high temperatures are allowable.

Because of its high strength and excellent wear resistance, Comweld Nickel Bronze is regarded as the number one maintenance brazing alloy. It produces joints in mild steel which, when tested to destruction, fail in the parent metal. Its superior wear resistance makes it ideal for the build up of worn ferrous metal components including gear teeth, valve seats, bearings and shafts etc.

Procedure for Braze Welding:

1. Thoroughly clean all areas to be joined.
2. For best results on steel use Comweld Copper and Brass flux (Part Number: 321822) and for cast iron use a Bronze flux. Adjust flame to slightly oxidising.
3. Preheat the edges to be joined to a dull red colour. Dip the end of the heated rod into the flux and, at the same time, heat both edges of the job to an equal degree. Ensure that 'tinning' has taken place on the required joint surfaces.
4. Continue adding the rod to build up the joint to the desired size and shape.
5. Allow the joint to cool and remove the flux residue with a wire brush or by immersion in a dilute acid solution followed by a water rinse.

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approximate Rods/kg	Part No
2.4 x 750	5kg Pack	35	321224
3.2 x 750	5kg Pack	19	321225
5.0 x 750	5kg Pack	8	321226

JOINING PROCESS:

Gas (Fusion and Braze) Welding only.

TYPICAL WELD DEPOSIT PROPERTIES:

Weld Metal Tensile Strength	560 MPa
0.2% Proof Stress	250 MPa
Elongation	18%
Hardness	170 HV
Approximate Melting Point	910°C.
Weld Metal Density	8.39 gms / cm ³

TYPICAL ROD ANALYSIS:

Zn: 43.5% Mn: 0.20% Si: 0.20%
 Ni: 10.0% Cu: Balance

COMPARABLE CIGWELD PRODUCTS:

Comcoat N Flux Coated Nickel Bronze
 AS 1167.1 & 2: R Cu Zn-D



- ▲ Flux Coated Nickel Bronze Rod.
- ▲ High Strength, Excellent Wear Resistance.
- ▲ High Strength Braze Welding of Steels and Cast or Malleable Irons.
- ▲ Fusion Welding of Copper Based Alloys of Similar Composition.
- ▲ PINK Flux Colour for Instant I.D.

JOINING PROCESS:

Gas (Fusion and Braze) Welding only.

TYPICAL WELD DEPOSIT PROPERTIES:

Weld Metal Tensile Strength	560 MPa
0.2% Proof Stress	250 MPa
Elongation	18%
Hardness	170 HV
Approximate Melting Point	910°C.
Weld Metal Density	8.39 gms / cm ³

TYPICAL ROD ANALYSIS:

Zn: 43.5%	Mn: 0.20%	Si: 0.20%
Ni: 10.0%	Cu: Balance	

COMPARABLE CIGWELD PRODUCTS:

Comweld Nickel Bronze Bare Rod
AS 1167.1 & .2: R Cu Zn-D

Classifications:

AS 1167. Parts 1 & 2:	R Cu Zn-D.
AWS/ASME-SFA A5.8/A5.27:	RB Cu Zn-D.

Description and Applications:

Comweld Comcoat N (sometimes termed Nickel Silver) is a 'self fluxing' Nickel bronze filler rod recommended for the high strength braze welding of steel and cast or malleable irons.

It is also an excellent choice for the fusion welding of Copper based alloys of similar composition and for the brazing of Nickel based alloys where high temperatures are allowable.

Because of its high strength and excellent wear resistance, Comweld Comcoat N is regarded as the number one maintenance brazing alloy. It produces joints in mild steel which, when tested to destruction, fail in the parent metal. Its superior wear resistance makes it ideal for the build up of worn ferrous metal components including gear teeth, valve seats, bearings and shafts etc.

Procedure for Braze Welding:

1. Thoroughly clean all areas to be joined.
2. Adjust flame to slightly oxidising.
3. Preheat the edges to be joined to a dull red colour. Melt the end of the flux coated rod and, at the same time, heat both edges of the job to an equal degree. Ensure that 'tinning' has taken place on the required joint surfaces.
4. Continue adding the rod to build up the joint to the desired size and shape.
5. Allow the joint to cool and remove the flux residue with a wire brush or by immersion in a dilute acid solution followed by a water rinse.

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Easyweld Handipack	Blister Pack	Approximate Rods/kg	Part No
2.4 x 500			3 Rod Pack	–	322208
		10 Rod Handipack		–	322029
3.2 x 750	2.5kg Pack			19	321215
		8 Rod Handipack		–	322030

COMWELD SILICON BRONZE ROD



- ▲ Premium Quality Deoxidised Silicon - Bronze alloy.
- ▲ Suitable for Welding Si-Bronze (Everdur and Cusilman).
- ▲ CANARY YELLOW End Tip Colour.

Classifications:

AS 1167 Parts 1 & 2: R Cu Si-A.
 AWS/ASME-SFA A5.7: R Cu Si-A (UNS No. C65600).

Description and Applications:

COMWELD Silicon Bronze is a premium quality, general purpose, silicon bronze filler rod producing excellent joints on copper, brass, copper-silicon and copper-zinc sheet, tube and extruded section base metals to themselves and also to steel.

Outstanding features of this alloy are:

1. Low thermal conductivity (hence preheat is not necessary).
2. The deoxidising effect of the silicon and the glassy skin formed by its oxide.
3. A narrow hot-short range (800°C-950°C) just below solidus.

COMWELD Silicon Bronze is used extensively in applications where superior corrosion resistance and tensile strength is required such as marine engineering, repair and fabrication, including propellers, naval brass fittings, gear wheels, valves, shafts and pumps, and is also used on hot water system applications.

Procedure for Braze Welding:

1. Thoroughly clean all areas to be joined or rebuilt of foreign material.
2. For best results use COMWELD Copper and Brass flux (321822).
3. Adjust the flame to neutral or slightly oxidising (excess oxygen).
4. For thick plate bevel edges 60°-90° included angle.
5. Generally preheat is not required because of the lower melting point and low thermal conductivity.
6. Dip the heated end of the rod into the flux.
7. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool. Ensure that the weld pool is as small as possible.
8. Allow to cool and remove flux residue with a wire brush.

Procedure for Gas Tungsten Arc Welding (TIG):

1. Thoroughly clean all areas to be joined or rebuilt of foreign material.
2. For thick plate bevel edges 60°-70° included angle.
3. Use a Thoriated or Ceriated tungsten electrode, ground to a sharp needle point making sure the grinding lines run with the length (longitudinally) of the electrode's axis. The length of the needle point should be approximately 2-3 x the diameter of the tungsten electrode.
4. Use Direct Current Electrode Negative (DC-) and Welding Grade Argon.
5. Heat a spot on the base metal until it shows signs of melting and progressively add the filler rod to the weld pool. Ensure that the weld pool is as small as possible.

JOINING PROCESS:

Gas (Fusion and Braze) and Gas Tungsten Arc Welding (TIG).

TYPICAL WELD DEPOSIT PROPERTIES:

Weld Metal Tensile Strength	370 MPa.
Approximate Melting Range	970-1020°C
Weld Metal Density	8.85 gms / cm ³
Hardness	90 HV (90HB)

TYPICAL ROD ANALYSIS:

Fe: 0.25%	Mn: 1.00%	Pb: 0.02%
Si: 3.40%	Sn: 0.90%	Zn: 0.90%
Cu: Balance		

Packaging Data:

Rod Size (mm)	Pack Weight/Type	Approx Rods/kg	Part No
3.2 x 750	5kg Pack	19	321295

