



DUPLEX & SUPER DUPLEX  
**WELDING WIRES AND ELECTRODES**



SECURE WELDS  
IN CORROSIVE  
ENVIRONMENTS

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## DUPLEX & SUPER DUPLEX WHEN CONDITIONS ARE CORROSIVE

Duplex stainless steel was developed in Sweden for the pulp and paper industry more than 75 years ago. Since then, because of its superior strength and resistance to corrosion and abrasion, it has found its way into an array of industries and applications.

Both duplex and super duplex are characterized by an equal or almost equal balance of ferritic and austenitic phases. They consist of iron combined primarily with Chromium, Molybdenum, Nitrogen and Nickel. The result is high-strength stainless steels that, compared with

austenitic steel, are exceptionally resistant to pitting, cracking, abrasion and stress corrosion, and which tolerate chloride solutions and organic acids such as acetic and formic acids.

Techalloy Welding Products, a part of the Central Wire Group, offers duplex and super duplex stainless steel welding consumables as part of its extensive line of stainless steel and nickel alloy welding wires and electrodes. Using these Techalloy products, duplex and super duplex stainless steels can be readily machined and welded.



Duplex and super duplex are the materials of choice in applications where resistance to pitting, cracking and corrosion are mandated:

- Pulp & Paper
- Chemicals & Petrochemicals
- Petroleum Extraction & Refining
- Pollution Control
- Desalinization
- Food Processing & Packaging
- Marine & Military Applications
- Aerospace
- Mining
- Hydraulics
- and more



TECHALLOY 2209 (Duplex) and TECHALLOY 2594 (Super Duplex)  
**ALLOYED FOR STRONG, CORROSION RESISTANT WELDS**

Techalloy 2209 welding wire and Tech-Rod 2209-16 electrodes are used for welding 2205 duplex stainless steel as well as UNS31803.

Techalloy 2594 welding wire and Tech-Rod 2594-16 electrodes are used for welding 2507 and Zeron 100 type super duplex stainless steels.

Each of these welding alloys is over-alloyed by 2-3% in Nickel to provide the optimum ferrite/austenite ratio in the weld deposit.



### Duplex Stainless Steel

	Techalloy 2209 Welding Wire AWS A5.9 ER2209	Tech-Rod 2209-16 Welding Electrode AWS A5.4 E2209-16
Carbon	0.01	0.02
Manganese	1.6	1.5
Silicon	0.4	0.4
Chromium (Cr)	22.8	22.1
Nickel	8.7	9.0
Molybdenum (Mo)	3.1	3.3
Nitrogen (N)	0.16	0.16
WRC FN	40 min	40 min
Tensile Strength	108,000 PSI 740MPA	105,000 PSI 720MPA
Yield Strength	93,000 PSI 640MPA	87,000 PSI 600MPA
Elongation	42%	38%
PREN*	35/36	35/36

### Super Duplex Stainless Steel

	Techalloy 2594 Welding Wire AWS A5.9 ER2594	Tech-Rod 2594-16 Welding Electrode AWS 5.4 E2594-16
Carbon	0.01	0.02
Manganese	0.6	0.7
Silicon	0.4	0.4
Chromium (Cr)	25.1	25.0
Nickel	9.2	9.3
Molybdenum (Mo)	3.9	4.0
Nitrogen (N)	0.27	0.27
WRC FN	40 min	40 min
Tensile Strength	123,000 PSI 850MPA	130,000 PSI 900MPA
Yield Strength	94,000 PSI 650MPA	101,000 PSI 695MPA
Elongation	28%	31%
PREN*	41/43	41/43

\* PREN – Pitting Resistance Equivalent Number = %Cr + 3.3Mo + 16N

### Welding Parameters

#### Techalloy 2209 and Techalloy 2594

Welding Process	Sizes	Amperage	Voltage	Shielding Gas
GMAW (MIG) – spray	.035" (.9mm)	160-210	26-30	Argon with 2-5%CO <sub>2</sub>
GMAW (MIG) – spray	.045" (1.2mm)	175-230	26-30	Argon with 2-5%CO <sub>2</sub>
GMAW (MIG) – spray	1/16" (1.6mm)	200-275	26-32	Argon with 2-5%CO <sub>2</sub>
GTAW (TIG)	1/16" (1.6mm)	90-150		Argon and up to 2%N
GTAW (TIG)	3/32" (2.4mm)	120-175		Argon and up to 2%N
GTAW (TIG)	1/8" (3.2mm)	150-220		Argon and up to 2%N
SAW (sub-arc)	3/32" (2.4mm)	275-350	28-31	ESAB 10.93 or 10.94
SAW (sub-arc)	1/8" (3.2mm)	350-475	28-32	ESAB 10.93 or 10.94

#### Tech-Rod 2209-16 and Tech-Rod 2594-16

Welding Process	Sizes	Amperage	Polarity
SMAW (stick electrode)	3/32" (2.4mm)	60-85	DCEP
SMAW (stick electrode)	1/8" (3.2mm)	75-100	DCEP
SMAW (stick electrode)	5/32" (4.0mm)	100-140	DCEP
SMAW (stick electrode)	3/16" (4.8mm)	115-160	DCEP

Techalloy's commitment is to service. Our staff of knowledgeable technicians helps customers select the most appropriate grades for their applications.

With strategically located distribution centers, deliveries can be made promptly and economically to any point in the world.

**Techalloy Welding Products – Duplex**

<b>Techalloy 2209</b>	<b>Welding Process</b>	<b>Sizes</b>	<b>Package Types/Weights</b>
	GMAW (MIG)	.035" (.9mm)	33# spools
	GMAW (MIG)	.045" (1.2mm)	33# spools
	GMAW (MIG)	1/16" (1.6mm)	33# spools
	GTAW (TIG)	1/16" (1.6mm) x 36" (800mm)	10# tubes/30# master carton
	GTAW (TIG)	3/32" (2.4mm) x 36" (800mm)	10# tubes/30# master carton
	GTAW (TIG)	1/8" (3.2mm) x 36" (800mm)	10# tubes/30# master carton
	SAW (sub-arc)	3/32" (2.4mm)	60# coil
	SAW (sub-arc)	1/8" (3.2mm)	60# coil
<b>Tech-Rod 2209-16</b>	<b>Welding Process</b>	<b>Sizes</b>	<b>Package Types/Weights</b>
	SMAW (stick electrode)	3/32" (2.4mm)	8# can/24# master carton
	SMAW (stick electrode)	1/8" (3.2mm)	10# can/30# master carton
	SMAW (stick electrode)	5/32" (4.0 mm)	10# can/30# master carton
	SMAW (stick electrode)	3/16" (4.8mm)	10# can/30# master carton

**Techalloy Welding Products – Super Duplex**

<b>Techalloy 2594</b>	<b>Welding Process</b>	<b>Sizes</b>	<b>Package Types/Weights</b>
	GMAW (MIG)	.035" (.9mm)	33# spools
	GMAW (MIG)	.045" (1.2mm)	33# spools
	GMAW (MIG)	1/16" (1.6mm)	33# spools
	GTAW (TIG)	1/16" (1.6mm) x 36" (800mm)	10# tubes/30# master carton
	GTAW (TIG)	3/32" (2.4mm) x 36" (800mm)	10# tubes/30# master carton
	GTAW (TIG)	1/8" (3.2mm) x 36" (800mm)	10# tubes/30# master carton
	SAW (sub-arc)	3/32" (2.4mm)	60# coil
	SAW (sub-arc)	1/8" (3.2mm)	60# coil
<b>Tech-Rod 2594-16</b>	<b>Welding Process</b>	<b>Sizes</b>	<b>Package Types/Weights</b>
	SMAW (stick electrode)	3/32" (2.4mm)	8# can/24# master carton
	SMAW (stick electrode)	1/8" (3.2mm)	10# can/30# master carton
	SMAW (stick electrode)	5/32" (4.0 mm)	10# can/30# master carton
	SMAW (stick electrode)	3/16" (4.8mm)	10# can/30# master carton

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**NORTH AMERICA'S LEADER IN STAINLESS STEEL AND NICKEL ALLOY WIRES**