

*FILLER METAL
REFERENCE GUIDE*



Midalloy
PERFORMANCE WELDING PRODUCTS

Midalloy

SPECIAL PURPOSE GRADES

COPPER FREE Mild steel and low-alloy GTAW, GMAW and SAW for excellent x-ray quality welds and lower welding fumes. Many Midalloy low alloy “copper free” wires offer “low residuals” with x-factors ≤ 15 and J-factors under 130. All Midalloy “copper free” products come with MTRS showing actual chemical analysis at no extra charge.

CRYOGENIC CONSUMABLES Midalloy ER308L“LF” and ER316L“LF”, low ferrite cryogenic wires are available in GTAW, GMAW, SAW and FCAW. These wires are pre-impact tested at -320° F for cryogenic applications requiring impact toughness and high strength at low temperatures.

ER209 Midalloy grade 209 is a nitrogen strengthened, austenitic stainless steel grade exhibiting high strength and good toughness over a wide range of temperatures. Used primarily to weld Armco Nitronic® 30 and Nitronic® 50 base metals. Available in GTAW and GMAW.

ER218 Midalloy grade 218 is a nitrogen strengthened, high manganese and silicon, austenite stainless steel grade exhibiting high strength and good toughness over a wide range of temperatures. Primarily used to weld Armco Nitronic® 60 base materials. Available in GTAW and GMAW.

ER2209 Midalloy grade 2209 is a duplex grade used to weld standard duplex stainless steels such as 2205 (UNS 31803) and other duplex stainless, such as 2304, 2101 and 3RE60. It overmatches the base metal by 2-3% in nickel content to give the correct balance of austenite and ferrite in the microstructure in the as-welded condition. Available in GTAW, GMAW, FCAW, SAW and SMAW.

ER2594 Midalloy grade 2594 is a super duplex stainless steel used to weld super duplex stainless steels such as SAF 2507 (UNS 32750) and other 25% chromium duplex stainless steels. (ie. UNS 32760, UNS 32550 and UNS 31260). Available in GTAW, GMAW, SAW, SMAW and FCAW.

ER307Si Midalloy grade 307Si is an austenitic stainless grade with little or no ferrite. This grade is an excellent choice for dissimilar welds such as carbon steel to stainless steel, that requires PWHT, as well as corrosion resistance up to 1560° F. It is the primary product used to weld armor plate, manganese steel and wear plates to themselves and to other carbon and alloy steels. Also used for furnace components and as a buttering alloy under hard facing alloys. Available in GMAW and FCAW.

ER310HC Midalloy 310HC is a fully austenitic stainless steel grade for repairing high alloy heat and corrosion resistant castings of the same general composition, designated H K by the Alloy Casting Institute. Available in GTAW, GMAW and SMAW.

ER316LMn Midalloy 316LMn (Din 1.4455) is an austenitic stainless steel wire primarily used in the cryogenic industry to obtain impact toughness and high strength. Midalloy 316LMn will join type 201, 304L, 316L, as well as 3% and 9% nickel alloy steels. All weld metal results performed at -320° F and -452° F give impact strengths of 25 ft. lbs. and 15 mils of lateral expansion. Available in GTAW, GMAW and SAW.

ER320LR Midalloy 320LR is vacuum melted to reduce levels of carbon, phosphorus and sulfur, which reduces microfissuring. Midalloy 320LR welds metals with similar composition, such as 20CB-3 in wrought and cast forms. Available in GTAW, GMAW and SMAW.

ER25/35R Midalloy 25/35R is designed to weld heat resistant steel castings of similar chemistry. Developed from 800 type alloys with increased chromium and nickel content for improved oxidation resistance. For applications up to 1100° C and resistant to severe thermal shock and fatigue. The major application for this alloy is centrifugally cast tubes for the petrochemical industry. Available in GTAW and GMAW.

SPECIAL MELTS When necessary Midalloy can provide special melts of filler material to meet a customer's exact specification. We use our experience and contacts with a worldwide group of premium alloy mills to produce excellent products for the most critical applications. Working on new product development is our specialty.

WELDING FLUXES

Midalloy stocks a variety of high quality European style agglomerated fluxes for joining and overlaying with Nickel, Stainless and Fe weldstrip and wire. Midalloy fluxes produce excellent bead contours, easy slag removal and higher deposition rates. All fluxes can be recycled according to instructions. Available in cans or bags.

FLUX

S46T
INT 101
NFT 201
NiCuT
EST 122
EST 201

FOR CLADDING IN COMBINATION WITH STRIP ELECTRODE:

Fe for low carbon, mild steel deposit
300 and 400 series stainless
NiCrMo-3 and NiCr-3, nickel base
NiCu-7, nickel base-copper bearing
300 and 400 series stainless using the electroslag process
NiCrMo-3 and NiCr-3, nickel base using the electroslag process

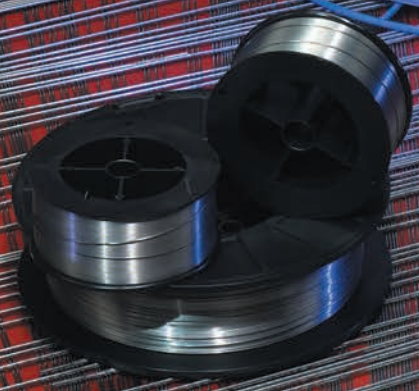
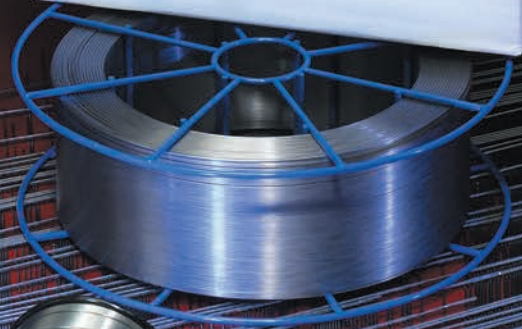
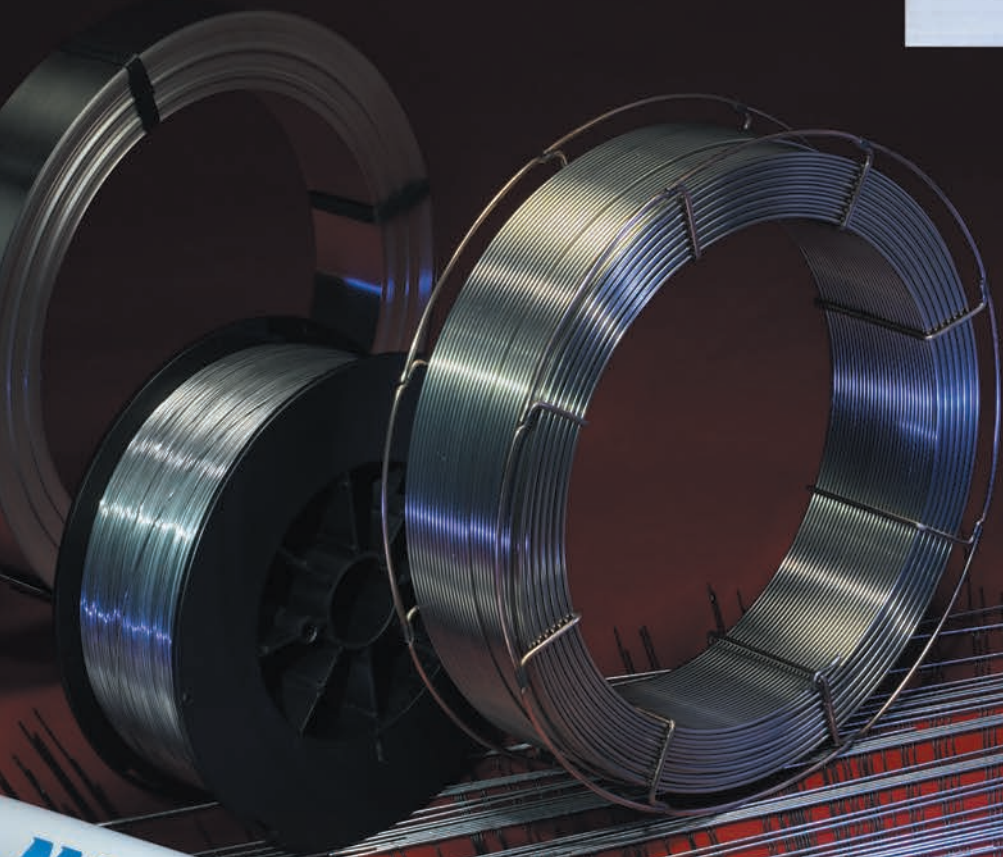
FLUX

IN
IND 24
NiCrW
NiCrW-412
NiCuW
UV420TTR
UV420TTRC
543

FOR JOINING OR CLADDING IN COMBINATION WITH WIRE ELECTRODE:

300 and 400 stainless steels, stabilized
300 and 400 stainless, non-stabilized, stabilized, duplex
NiCrMo-3 and NiCr-3, Nickel base
Nickel base alloys
NiCu-7, nickel base-copper bearing
1 1/4 Cr - 1/2 Mo, 2 1/4 Cr - 1 Mo, and other low alloy wires
Low Alloy, High Strength
9% Chromium Steels, P91 and T91





Grade*	AWS	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Other
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Midalloy Copper Free MILD STEEL AND LOW ALLOY BARE WIRE

ER70S-2	5.18	.06	.49	1.12	.013	.016	.04	.03	.04	.02	
ER70S-6	5.18	.08	.85	1.49	.017	.011	.03	.02	.02	.01	
ER70S-B2L	5.28	.02	.50	.60	.007	.005	1.40	.05	.40	.15	
ER80S-B2	5.28	.10	.53	.55	.016	.014	1.40	.03	.47	.08	
ER80S-D2	5.28	.10	.60	1.72	.011	.014	-	.05	.53	.03	
ER80S-B6	5.28	.06	.42	.50	.006	.010	5.67	.05	.54	.13	V-.018, Al-.015
ER80S-B3L	5.28	.02	.50	.60	.007	.005	2.40	.03	1.00	.13	
ER80S-B8	5.28	.09	.41	.56	.009	.010	8.70	.06	.89	.12	
ER80S-Ni1	5.28	.11	.58	1.02	.012	.010	.04	.92	.01	.14	V-.002
ER80S-Ni2	5.28	.11	.58	1.02	.012	.010	.04	2.35	.01	.14	V-.002
ER80S-Ni3	5.28	.08	.58	1.02	.012	.010	.04	3.5	.01	.14	V-.002
ER90S-B3	5.28	.09	.57	.59	.016	.018	2.58	.05	1.04	.09	
ER90S-B9	5.28	.09	.20	.59	.007	.002	8.93	.63	.87	.05	V-.21, N-.045, Nb-.07
ER100S-1	5.28	.06	.45	1.40	.005	.005	.20	1.70	.30	.15	V-.04, Ti-.10, Zr-.10, Al-.10
ER120S-1	5.28	.08	.50	1.50	.007	.005	.30	2.20	.30	.16	V-.04, Ti-.10, Al-.10, Zr-.10
EB2/EB2R	5.23	.09	.20	.55	.012	.006	1.35	-	.55	.15	AS-.005 Max, Sn-.005 Max, Sb-.005 Max
EB3/EB3R	5.23	.10	.20	.62	.009	.006	2.55	-	1.08	.12	AS-.005 Max, Sn-.005 Max, Sb-.005 Max
EB6	5.23	.08	.37	.54	.008	.010	5.04	.09	.53	.01	V-.018, Al-.012
EB8	5.23	.08	.46	.57	.008	.005	8.58	.10	1.01	.15	V-.024, Al-.016
EB9	5.23	.09	.20	.59	.006	.010	5.67	.05	.54	.13	V-.018, Al-.015
ER4130	AISI4130	.31	.22	.50	.007	.010	.90	.04	.17	.04	

Midalloy High Tensile STAINLESS BARE WIRE

ER209	5.9	.05	.90	5.9	.03	.03	20.9	10.1	1.7	.30	V-.2
ER218	5.9	.07	3.9	8.2	.03	.02	17.2	8.6	.16	.30	
ER2209	5.9	.13	.41	1.75	.015	.002	22.7	8.7	3.2	.11	
ER2594	5.9	.014	.35	.50	.015	.005	25.0	9.5	3.9	.07	N-.17
ER307Si	-	.07	.85	6.85	.015	.008	19.0	8.85	.05	.07	N-.22
ER308/308H	5.9	.05	.45	1.89	.016	.003	20.18	9.75	.10	.10	
ER308L	5.9	.01	.50	1.75	.010	.015	20.0	10.0	.06	.01	
ER308LSi	5.9	.01	.80	1.75	.010	.015	20.0	10.2	.06	.01	
ER309	5.9	.08	.49	1.70	.013	.003	23.87	13.18	.02	.04	
ER309L	5.9	.01	.50	1.75	.010	.015	23.5	13.7	.06	.01	
ER309LMo	-	.01	.45	1.51	.021	.004	21.35	14.59	2.61	.22	
ER309LSi	5.9	.01	.80	1.75	.010	.015	23.5	13.7	.06	.01	
ER316/316H	5.9	.05	.54	1.70	.017	.002	19.25	12.69	2.25	.11	
ER316L	5.9	.01	.50	1.75	.010	.015	18.5	12.0	2.55	.01	
ER316LSi	5.9	.01	.80	1.75	.010	.015	18.5	12.0	2.55	.01	
ER308H	5.9	.06	.50	1.70	.016	.006	20.0	9.7	.10	.01	
ER310	5.9	.10	.41	1.71	.012	.001	25.82	20.04	.07	.03	
ER310HC	-	.43	.86	1.16	.008	.002	25.21	20.08	.02	.11	
ER312	5.9	.09	.40	1.80	.016	.005	30.0	9.0	.10	.01	
ER316H	5.9	.06	.50	1.70	.018	.010	19.5	13.5	2.60	.20	
ER317L	5.9	.03	.40	1.80	.015	.015	19.0	13.5	3.60	.05	
ER320LR	5.9	.01	.05	1.82	.011	.004	20.02	32.75	2.40	3.38	Cb-.228, Ta-.007
ER330	5.9	.22	.49	1.80	.010	.001	16.20	34.60	.02	.02	V-.04
ER347	5.9	.04	.50	1.30	.016	.008	19.2	9.5	.10	.01	Cb-.50
ER410	5.9	.11	.30	0.40	.030	.030	12.4	0.6	.75	.75	
ER410NiMo	5.9	.03	.40	0.50	.030	.030	12.2	4.5	.50	.75	
ER630	5.9	.03	.42	0.52	.015	.001	16.29	4.99	.06	3.38	

Midalloy NICKEL ALLOY BARE WIRE

ERCuNi	5.7	.02	.10	0.75	.010	.010	-	31.0	-	67.50	Ti-.30
ERNiCu-7	5.14	.03	1.00	3.50	.010	.010	-	65.0	-	27.00	Ti-2.20
ERNi-1	5.14	.06	.40	.30	.010	.010	-	96.0	-	-	
ERNiCr-3	5.14	.02	.20	3.00	.200	.007	20.0	72.0	-	-	Cb + Ta-2.50, Ti-.55
ERNiCrMo-3	5.14	.05	.40	.50	-	.001	21.0	BAL.	9.0	-	Fe-5.0, W-.8, Co-1.0
ERNiCrMo-4	5.14	.01	.04	.47	.004	.001	15.6	57.6	15.4	.20	W-3.6, Ti-.02, Fe-6.45
ERNiCrMo-10	5.14	.01	.02	.25	.005	.002	21.4	BAL.	13.4	.09	Co-1.9, W-2.9
ERNiCrCoMo-1	5.14	.03	.50	.50	.010	.010	22.0	52.0	9.0	.10	Co-12.5, Ti-3.0, Al-1.2, Fe-1.5
ERNi-CI	5.15	.01	.02	.23	.011	.001	-	99.54	-	.01	Fe-.20
ERNiFe-CI	5.15	.03	.09	.70	.002	.001	.05	54.54	-	.02	Fe-44.58

Midalloy STRIP ELECTRODES FOR CLADDING

EQ308L	5.9	.01	.09	1.90	.015	.003	20.0	10.5	.40	.11	
EQ309L	5.9	.01	.30	1.65	.010	.001	23.6	13.3	.08	.06	
EQNiCr-3	5.14	.01	.08	3.15	.003	.004	20.7	72.8	-	.01	
EQNiCrMo-3	5.14	.01	.08	.05	.002	.004	22.2	63.2	9.15	.03	
EQNiCu-7	5.14	.01	.14	3.25	.001	.002	-64.7	-	29.06	Ti-2.43, Al-.07	

Midalloy LOW ALLOY COATED ELECTRODES

E8018-B2H4	5.5	.06**	.45	.64	.016	.014	1.23	-	.55	-	
E8018-B6H4	5.5	.08**	.15	.40	.030	.010	5.3	.12	.64	.15	
E8018-B8H4	5.5	.08**	.15	.43	.030	.010	8.25	.13	1.10	.09	
E9018-B3H4	5.5	.07**	.45	.66	.190	.014	2.25	-	1.05	-	
E9015-B9H4	5.5	.09**	.20	.97	.010	.010	9.5	.10	.95	.01	V-.21, Cb-.04, N-.05

* GRADE ANALYSIS SHOWN IS TYPICAL

Grade**	AWS	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Other
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Midalloy LOW ALLOY FLUX CORED WIRE

E81T1-B2M/C	5.29	.06	.52	.65	.040	.012	1.37	-	.55	-	
E81T1-B2LM/C	5.29	.02	.35	.80	.010	.007	1.25	-	.50	-	
E81T1-Ni1M/C	5.29	.03	.41	1.25	.010	.007	.03	1.0	-	-	
E81T1-Ni2M/C	5.29	.04	.30	.83	.01	.007	-	2.4	-	-	
E81T1-B6M	5.29	.08	.27	.47	.010	.007	4.85	-	.56	-	
E81T1-B8M	5.29	.08	.30	.53	.010	.007	9.91	.31	1.17	.03	
E91T1-B3M/C	5.29	.05	.54	.55	.015	.015	2.21	-	1.10	-	
E91T1-B3LM/C	5.29	.04	.60	.95	.01	.01	2.5	-	.99	-	
E91T1-B9MH8	5.29	.10	.25	.50	.009	.010	9.50	.83	1.05	0.1	V-.20, Al-.006, B<.001, N-.035, Cb-.05

Midalloy CHROMAX STAINLESS COATED ELECTRODES

E308/308H-16	5.4	.05	.43	1.40	.009	.020	20.7	10.0	.05	.08	N-.06
E308L-16	5.4	.03	.34	1.40	.020	.010	18.6	10.5	.05	.05	N-.06
E309-16	5.4	.04	.46	1.40	.030	.002	23.2	13.3	.06	.17	N-.06
E309L-16	5.4	.02	.46	1.70	.040	.002	24.0	13.1	.06	.16	N-.06
E310-16	5.4	.12	.52	1.50	.029	.003	25.3	21.3	.13	.11	N-.06
E310HC-16	5.4	.42	.68	1.60	.013	.008	26.7	20.5	.07	.10	N-.06
E312-16	5.4	.12	.60	2.00	.025	.015	28.0	9.3	.10	.05	N-.06
E316/316H-16	5.4	.04	.37	1.30	.030	.012	17.4	13.1	2.30	.06	N-.06
E316L-16	5.4	.02	.41	1.80	.025	.010	17.7	11.7	2.10	.12	N-.06
E317L-16	5.4	.03	.50	1.50	.030	.007	19.5	13.3	3.70	.06	N-.06
E320LR-16	5.4	.01	.07	1.64	.010	.003	20.3	34.9	2.70	3.60	N-.06, Cb-.23
E330-16	5.4	.20	.60	1.80	.015	.015	15.0	34.5	.05	.05	N-.06
E347-16	5.4	.04	.60	1.30	.015	.012	19.3	10.8	.11	.06	N-.06, Cb-.52
E385-16	5.4	.02	.45	2.10	.018	.009	20.5	25.2	4.60	1.75	N-.06
E630-16	5.4	.03	.52	.50	.024	.019	16.5	4.8	.09	3.75	N-.06, Cb+Ta-.22
E2209-16	5.4	.03	.46	.80	.020	.020	22.7	8.8	3.00	.07	N-.17
E2553-16	5.4	.04	.53	1.20	.014	.013	25.7	8.4	3.50	1.72	N-.20
E410-16	5.4	.10	.60	.80	.015	.015	12.0	.5	.05	.05	N-.06
E410NiMo-16	5.4	.03	.29	.40	.030	.035	12.2	4.5	.50	.75	N-.06

Midalloy Mastercor® STAINLESS FLUX-CORED WIRE

E307T1-1/4AP	5.22	.10	.75	4.0	.03	.02	19.2	9.1	.55	.20	N-.05
E308/308HT0-1/4	5.22	.06	.58	1.10	.015	.015	18.9	9.9	.10	.10	N-.05
E308/308HT1-1/4AP	5.22										
E308LT0-1/4	5.22	.03	.87	1.22	.015	.015	20.3	10.7	.20	.20	N-.05
E308LT1-1/4AP	5.22										
E309/309HT0-1/4	5.22	.06	.80	1.00	.03	.02	24.0	12.6	.30	.02	N-.05
E309/309HT1-1/4AP	5.22										
E309LT0-1/4	5.22	.03	.80	.95	.03	.02	24.02	12.5	.30	.02	N-.05
E309LT1-1/4AP	5.22										
E309LMoT1-1/4AP	5.22	.03	.72	1.16	.022	.004	23.1	13.3	2.46	.09	N-.05
E310T1-1/4AP	5.22	.10	.82	1.40	.015	.005	25.9	20.4	.10	.08	N-.05
E312T1-1/4AP	5.22	.13	.50	1.2	.03	.02	29.0	9.0	.03	.05	N-.05
E316/316HT0-1/4	5.22	.06	.85	1.10	.03	.02	18.5	12.06	2.50	.05	N-.05
E316/316HT1-1/4AP	5.22										
E316LT0-1/4	5.22	.03	.85	1.10	.03	.02	18.5	12.06	2.50	.08	N-.05
E316LT1-1/4AP	5.22										
E317LT1-1/4AP	5.22	.03	.80	.80	.03	.02	18.5	12.7	3.84	.20	N-.05
E347T1-1/4AP	5.22	.06	.72	1.15	.03	.02	19.0	9.7	.08	.20	N-.05 Nb(Cb)8XC to 1.0% MAX
E2209T1-1/4AP	5.22	.03	.60	.95	.03	.015	22.5	9.7	3.25	.20	N-.14
E2553T1-1/4AP	5.22	.02	.70	.80	.03	.015	25.3	9.8	3.37	1.87	N-.14
E2594T1-1/4AP	5.22	.033	.61	.75	.019	.008	24.8	8.9	4.0	.20	N-.22

Midalloy NIMAX NICKEL ALLOY COATED ELECTRODES

ENiFe-CI	5.15	1.30	1.40	.90	.010	.002	-	51.0	-	.02	AL-.60
ENi-CI	5.15	.82	1.70	.27	.010	.005	-	91.6	-	-	-
ENiCu-7	5.11	.15	1.50	4.00	.020	.015	-	67.5	-	31.00	Ti-1.0, Al-1.0, Cb+Ta-2.50
ECuNi	5.6	.10	.35	1.25	.006	.007	-	31.7	-	68.0	-
ENiCrFe-2	5.11	.10	.50	2.30	.009	.004	16.6	67.9	1.40	.01	Cb-2.40
ENiCrFe-3	5.11	.10	.50	6.50	.010	.005	16.0	65.0	.07	.01	Cb-1.65
ENiCrMo-3	5.11	.10	.50	.50	.015	.015	23.0	61.0	9.00	.25	Cb+Ta-3.50, Al-.40, Ti-.40
ENiCrMo-4	5.11	.01	.20	.50	.020	.020	15.5	BAL.	16.00	.30	V-.30, W-4.0
ENiCrCoMo-1	5.11	.08	.32	.88	.010	.003	23.3	53.4	9.37	.04	Cb+Ta-.06
ENiCrMo-10	5.11	.02	.16	.49	.006	.004	20.9	58.9	13.48	-	-

Midalloy Mastercor® NICKEL FLUX-CORED WIRE

ENiFeT3-CI	5.15	.90	.35	3.75	.01	.008	-	55.0	-	.10	Fe 45.0
ENiCr3T1-1/4AP	5.34	.04	.25	3.30	.01	.003	21.0	BAL.	-	.10	Nb+Ta 2.6, Fe 1.5
ENiCrFe-2T1-1/4AP	5.34	.03	.25	3.10	.01	.01	16.9	BAL.	1.80	.02	Nb+Ta 2.5, Fe 6.6
ENiCrFe-3T1-1/4AP	5.34	.03	.30	6.1	.01	.004	16.5	BAL.	-	.02	Nb+Ta 2.2, Fe 7.3
ENiCrMo-3T1-1/4AP	5.34	.03	.30	.20	.01	.004	22.0	BAL.	8.5	.02	Nb+Ta 3.4, Fe .50
ENiCrMo-4T1-1/4AP	5.34	.02	.20	.40	.005	.001	15.5	BAL.	15.60	.02	Co .25, W 3.8, V .05, Fe 5.3
ENiCrMo-10T1-1/4AP	5.34	.018	.20	.29	.006	.004	21.0	BAL.	13.7	.02	Co .20, W 3.14, V .02, Fe 5.48

** GRADE ANALYSIS SHOWN TYPICAL AS WELDED



■ OFFICE *and* STOCKING WAREHOUSE

Midalloy

ST. LOUIS

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