

UTP AF 155

Unalloyed and low-alloyed steels

Classifications

Gas-shielded flux-cored wire

EN ISO 17632-A

AWS A5.18

T 46 4 M M 1 H5

E70C-6MH4

Characteristics and field of use

UTP AF 155 is a high-efficiency flux-cored wire with metal powder filling, for all position welding with mixed gas M21 acc. to EN ISO 14175. It features outstanding mechanical properties in temperature range down to -40 °C with very low fume level and oxide build up. The stable arc, the smooth droplet transfer, the secure penetration, its high deposition rate in the spray arc range and the high deposition efficiency of 98% approx. are only some of the positive properties of this wire. It is characterized by almost spatter-free welding with good wall wetting, flat and concave weld shape, radiographical soundness and porosity free weld metal. It is suited for manual and mechanized welding for single and multilayers and root pass welding is proven in all positions.

Base materials

S185, S235J2G3, S275JR, S355J2G3, E295, P235GH, P265GH, P295GH, P355GH (HI, HII, 17 Mn 4, 19 Mn 6), P275N, P355N, P355NL2, P460N, S275N, S275NL, S355N, S355NL, S460N, L210, L240, L290, L360, L290NB, L360MB, L415MB, X42 – X65 / StE 445.7 TM (API-5LX), GS-38 – GS-52, shipbuilding steels grade A – E, A32 – F32, A36 – F36, A40 – F40

Typical analyses in %

C	Si	Mn	P	S
0.06	0.6	1.4	≤ 0.02	≤ 0.02

Mechanical properties of the weld metal

Heat treatment	Shielding gas	0.2%-Yield strength	Tensile strength	Elongation (L ₀ =5d ₀)	Impact values CVN	
		MPa	MPa	%	J	-40 °C
AW	M 21	460	560	22	130	50
580 °C / 2h	M 21	460	560	22	120	50

Welding position



Current type DC (+)
Shielding gas (EN ISO 14175) M 21
Consumption: 15 – 18 l / min

Approvals

TÜV (No. 11193), DB (No. 42.132.48), BV, DNV GL, LR

Form of delivery and recommended welding parameters

Diameter [mm]	Amperage [A]	Voltage [V]
1.2	120 – 350	18 – 33

Other diameters upon request

Classifications Gas-shielded flux-cored wire

EN ISO 17633-A	AWS A5.22	Material-No.
T 19 9 L R M21 / C1 3	E 308 LT-0-1 / E 308 LT-0-4	1.4316

Characteristics and field of use

UTP AF 68 LC is a low carbon, CrNi flux-cored wire with rutile slag used for joint-welding of alloyed CrNi steels and cast steels. The weld metal shows sufficient grain stability up to 350°C and is scaling resistant up to 800°C.

Base materials

Material-No.	55AISI	UNS	EN Symbol
1.4300	302	S30200	X12 CrNi 18 8
1.4301	304	S30400	X5 CrNi 18 10
1.4306	304L	S30403	X2 CrNi19 11
1.4311	304LN	S30453	X2 CrNiN 18 10
1.4312	305	J92701	GX10 CrNi 18 8
1.4303	308	S30800	X4 CrNi 18 12
1.4541	321	S32100	X6 CrNiTi 18 10
1.4550	347	S34700	X6 CrNiNb 18 10

Typical analysis in %

C	Si	Mn	Cr	Ni	Fe
0.025	0.6	1.5	19.5	10.0	balance


Mechanical properties of the weld metal

Yield strength $R_{p0.2}$	Tensile strength R_m	Elongation A	Impact toughness K_V
MPa	MPa	%	J [RT]
380	560	35	70

Welding instructions

Clean weld area thoroughly. Welding torch should be held slightly inclined, using the back-hand (drag) technique. Possibly weaving. Ar + 15 – 25 % CO₂ as shielding gas offers the best weldability. 100 % CO₂ can be also used, but the voltage should be increased by 2 V.

Welding positions



Current type DC (+)
Shielding gases: Argon + 15 - 25 % CO₂, 100 % CO₂

Approvals

TÜV (No. 06365)

Form of delivery and recommended welding parameters

Wire diameter [mm]	Amperage	Voltage [V]
0.9*	100 – 160	22 – 27
1.2	125 – 270	20 – 33
1.6*	200 – 350	25 – 35

*available on request

UTP AF 68 LC PW

stainless steels

Classifications Gas-shielded flux-cored wire

EN ISO 17633-A	AWS A5.22
T 19 9 L P M21 1 / T 19 9 L P C1 1	E308LT1-4 / E308LT1-1

Characteristics and field of use

UTP AF 68 LC PW is a strip alloyed flux-cored wire with a rutile slag characteristic for position welding of austenitic CrNi steels. The support provided by the fast-hardening slag allows out-of-position welding with high current magnitudes and high welding speeds. The fine droplet, low-spatter, very powerfully welding spray arc, the reliable fusion penetration, the self-releasing slag and the effectively wetting seam formation result in a high weld quality at the same time as short welding times. Additional advantages to its application result from the ease of handling, the low heat input due to the high welding speed, and the small amounts of cleaning and pickling required. UTP AF 68 LC PW is preferred for flat and horizontal welding positions (PA, PB). The weld metal is cryogenic down to $-196\text{ }^{\circ}\text{C}$ and resists intergranular corrosion up to $+350\text{ }^{\circ}\text{C}$.

Base materials

1.4306 X2CrNi19-11, EN 1.4301 X5CrNi18-10, EN 1.4311 X2CrNi18-10, EN 1.4312 GX10CrNi18-8, EN 1.4541 X6CrNiTi18-10, EN 1.4546 X5CrNiNb18-10, EN 1.4550 X6CrNiNb18-10, AISI 304, 304L, 304LN, 302, 321, 347, ASTM A157 Gr. C9, A320 Gr. B8C or D

Typical analysis in %

C	Si	Mn	Cr	Ni
0.03	0.7	1.5	19.8	10.5

Mechanical properties of the weld metal


Welded condition	Yield strength	Tensile strength	Elongation	Impact toughness	
	$R_{p0.2}$	R_m	A	K_V	
	MPa	MPa	%	J [RT]	$-196\text{ }^{\circ}\text{C}$
untreated	380	560	40	70	40

shielding gas Ar + 18% CO₂

Welding instructions

Welding with conventional MAG devices, slightly trailing torch position (angle of incidence about 80°), slight weaving of the torch is recommended in all positions. With 100% CO₂ the voltage must be raised by 2V. The gas quantity should be 15 – 18 l / min.

Welding positions



Current type DC (+)
Shielding gases: Argon + 15 - 25% CO₂, 100% CO₂

Approvals

TÜV (09117.), DB (43.014.23), CWB (E308LT1-1(4)), DNV GL, CE

Form of delivery and recommended welding parameters

Wire diameter [mm]	Amperage [A]	Voltage [V]
1.2	100 – 220	20 – 31
1.6	175 – 260	21 – 29

Classifications Gas-shielded flux-cored wire

EN ISO 17633-A	AWS A5.22	Material-No.
T 19 12 3 L R M21 / C1 3	E 316 LT0-1 / E 316 LT0-4	1.4430

Characteristics and field of use

UTP AF 68 LC is a low carbon, CrNi flux-cored wire with rutile slag for joining and surfacing of CrNi steels and cast steel.

The weld metal shows sufficient grain stability up to 350 °C and is scaling resistant up to 800 °C.

Base materials

Material-No.	AISI	UNS	EN
1.4401	316	S31600	X5 CrNiMo 17-12-2
1.4404	316L	S31603	X2 CrNiMo 17-12-2
1.4406	316LN	S31653	X2 CrNiMoN 17-12-2
1.4571	316Ti	S31635	X6 CrNiMoTi 17-12-2
1.4583	318	S31640	X10 CrNiMoNb 18-12

Typical analysis in %

C	Si	Mn	Cr	Mo	Ni	Fe
0.025	0.6	1.5	19.5	2.7	12.5	balance

Mechanical properties of the weld metal

Yield strength $R_{p0.2}$	Tensile strength R_m	Elongation A	Impact toughness K_V
MPa	MPa	%	J [RT]
400	560	35	55

Welding instructions

Clean weld area thoroughly. Welding torch should be held slightly inclined, using the pushing technique. Possibly weaving.

Welding positions



Current type DC (+)
Shielding gases: Argon + 15 - 25 % CO₂, 100 % CO₂

Approvals

TÜV (No. 06366)

Form of delivery and recommended welding parameters

Wire diameter [mm]	Amperage	Voltage [V]
0.9*	100 – 160	21 – 30
1.2	125 – 260	20 – 34
1.6*	200 – 300	25 – 35

*available on request

UTP AF 68 MoLC PW

stainless steels

Classifications Gas-shielded flux-cored wire

EN ISO 17633-A	AWS A5.22
T 19 12 3 L P M21 1 / T 19 12 3 L P C1 1	E316LT1-4 / E316LT1-1

Characteristics and field of use

UTP AF 68 MoLC PW is a flux-cored wire with a rutile slag characteristic for position welding of austenitic CrNiMo steels. The support provided by the fast-hardening slag allows out-of-position welding with high current magnitudes and high welding speeds. The fine droplet, low-splatter, very powerfully welding spray arc, the reliable fusion penetration, the self-releasing slag and the effectively wetting seam formation result in a high weld quality at the same time as short welding times. Additional advantages to its application result from the ease of handling, the low heat input due to the high welding speed, and the small amounts of cleaning and pickling required. UTP AF 68 MoLC PW is preferred for flat and horizontal welding positions (PA, PB). The weld metal is cryogenic down to -120 °C and resists intergranular corrosion up to +400 °C.

Base materials

1.4306 X2CrNi19-11, EN 1.4301 X5CrNi18-10, EN 1.4311 X2CrNiN18-10, EN 1.4312 GX10CrNi18-8, EN 1.4541 X6CrNiTi18-10, EN 1.4546 X5CrNiNb18-10, EN 1.4550 X6CrNiNb18-10, AISI 304, 304L, 304LN, 302, 321, 347, ASTM A157 Gr. C9, A320 Gr. B8C or D

Typical analysis in %

C	Si	Mn	Cr	Ni	Mo
0.03	0.7	1.5	19.0	12.0	2.7

Mechanical properties of the weld metal

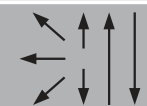
Welded condition	Yield strength	Tensile strength	Elongation	Impact toughness	
	$R_{p0.2}$	R_m	A	K_V	
	MPa	MPa	%	J [RT]	-120 °C
untreated	400	560	38	65	45

shielding gas Ar + 18 % CO₂

Welding instructions

Welding with conventional MAG devices, slightly trailing torch position (angle of incidence about 80 °), slight weaving of the torch is recommended in all positions. With 100 % CO₂ the voltage must be raised by 2V. The gas quantity should be 15 – 18 l / min.

Welding positions



Current type DC (+)
Shielding gases: Argon + 15 - 25 % CO₂, 100 % CO₂

Approvals

TÜV (09118.), DB (43.014.24), CWB (E316LT1-1(4)), LR (DXV and O, BF 316LS), CE, DNV GL

Form of delivery and recommended welding parameters

Wire diameter [mm]	Amperage [A]	Voltage [V]
1.2	100-220	20-31
1.6	175-260	21-29

Classifications Gas-shielded flux-cored wire

EN ISO 12153	AWS A 5.34	Material-No.
T Ni 6625 PM 2	ENiCrMo3 T1-4	2.4621

Characteristics and field of use

The nickel-base-flux-cored wire (NiCrMo) UTP AF 6222 Mo PW is suitable for joining and surfacing on nickel-base materials of the same nature and on C- and CrNi steels as well as for cladding on C-steels, furthermore in high temperature applications.

2.4856	NiCr22Mo9Nb	N 06625	Alloy 625
1.4539	X NiCrMoCu25 20 5	N 08904	Alloy 904
1.4583	X NiCrNb18		
1.0562	12StE 355		
1.5662	X 8Ni9	ASTM A553	Typ 1

UTP AF 6222 Mo PW distinguishes by a hot cracking resistant and tough weld metal. It is suitable for operating temperatures up to 500 °C and above 800 °C. It must be noted that a slight decrease in ductility will occur if prolonged heat treatment is given within the temperature range 550 – 800 °C.

UTP AF 6222 Mo PW provides excellent positional welding. It has excellent welding properties with a regular and fine drop transfer. The weld seam is finely rippled and the transition from weld to base materials is regular and notch-free. The wide parameter range enables an application on different wall thicknesses.

Typical analysis in %

C	Si	Mn	P	S	Cr	Mo	Ni	Nb	Fe
0.03	0.4	0.4	0.01	0.01	21.5	9.0	balance	3.5	0.5

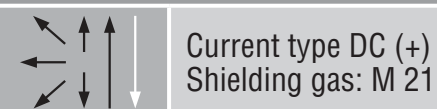
Mechanical properties of the weld metal

Yield strength $R_{p0.2}$	Tensile strength R_m	Elongation A	Impact toughness K_V	
MPa	MPa	%	J [RT]	- 196 °C
490	750	30	70	60

Welding instructions

Clean welding area cautiously, slightly trailing torch position.

Welding positions



Approvals

TÜV (No.10991)

Form of delivery and recommended welding parameters

Wire diameter [mm]	Amperage	Voltage [V]
1.2	170 – 200	26 – 32

UTP AF 6824 LC

stainless steels

Classifications		Gas-shielded flux-cored wire
EN ISO 17633-A	ASME II C SFA 5.22	Material-No.
T 23 12 L RM3 / T 23 12 L RC3	E 309 LT 0-1 / E 309 LT 0-4	1.4332

Characteristics and field of use

UTP AF 6824 LC is a low-carbon flux-cored wire with rutile slag used for joint-welding of alloyed CrNi steels among each other or with other unalloyed or low-alloyed steels / cast steels.
(b+w joining).

Properties of the weld metal: The weld metal shows sufficient grain stability up to 350 °C and is scaling resistant up to 800 °C.

Base materials

Material-No.	AISI	UNS	EN Symbol
1.4301	304	S 30400	X5 CrNi 18 10
1.4306	304 L	S 30403	X2 CrNi 19 11
1.4311	304 LN	S 30453	X2 CrNiN 18 10
1.4401	316	S 31600	X5 CrNiMo 17 12 2
1.4404	316 L	S 31603	X2 CrNiMo 17 13 2
1.4541	308	S 30800	X6 CrNiTi 18 10
1.4550	347	S 34700	X6 CrNiNb 18 10
1.4571	316 Ti	S 31635	X6 CrNiMoTi 17 12 2
1.4583	318	S 31640	G-X5 CrNiNb 19 11

Joining these materials with unalloyed and low-alloyed steels is possible.

Typical analysis in %

C	Si	Mn	Cr	Ni	Fe
0.025	0.6	1.5	24.0	12.0	balance

Mechanical properties of the weld metal

Yield strength $R_{p0.2}$	Tensile strength R_m	Elongation A	Impact toughness K_V
MPa	MPa	%	J [RT]
400	550	35	60

Welding instructions

Clean weld area thoroughly. Welding torch should be held slightly inclined, using the backhand (drag) technique. Possibly weaving.

Welding positions



Current type DC (+)
Shielding gases: Argon + 15 - 25 % CO₂, 100 % CO₂

UTP AF 6824 LC

Approvals

TÜV (No. 06364)

Form of delivery and recommended welding parameters

<i>Wire diameter [mm]</i>	<i>Amperage</i>	<i>Voltage [V]</i>
0.9*	100 – 160	21 – 30
1.2	125 – 280	20 – 34
1.6*	200 – 350	25 – 35

*available on request

FCAW-G – gas-shielded cored wires

219

UTP AF 6808 Mo PW

stainless steels

Classifications		Gas-shielded flux-cored wire
EN ISO 17633-A	AWS A5.22	
T 22 9 3 N L P M21 1 / T 22 9 3 N L P C1 1	E2209T1-4 / E2209T1-1	

Characteristics and field of use

UTP AF 6808 Mo PW is a duplex steel rutile flux-cored wire for position welding of duplex steels in the chemical apparatus, plant and container construction, for chemical tankers and in the offshore industry. The support provided by the fast-hardening slag allows out-of-position welding with high current magnitudes and high welding speeds. The advantage of the slag is its supporting effect on the weld pool. This permits, for example, welding with the stringer bead technique at a correspondingly high welding speed even in difficult pipe welding positions (5G, 6G). The fine droplet, low-spatter, very powerfully welding spray arc, the reliable fusion penetration, the self-releasing slag and the effectively wetting seam formation result in a high weld quality at the same time as short welding times. Additional advantages to its application result from the ease of handling, the low heat input due to the high welding speed, and the small amounts of cleaning and pickling required.

The structure of the weld metal consists of austenite and ferrite (FN 30-50). The pitting resistance equivalent is $PRE_N \geq 35$ (% Cr+3.3 % Mo+16 % N). Testing the weld metal in accordance with ASTM G48 Method A resulted in a CPT (critical pitting temperature) of 25 °C. Also suited to joining different materials and to weld cladding. Usable between -46 °C and +250 °C.

Base materials

Same and similar alloyed duplex steels, as well as dissimilar joints or weld claddings. EN 1.4462 X2CrNiMoN22-5-3, EN 1.4362 X2CrNiN23-4, EN 1.4162 X2CrNiMoN21-5-1; UNS S32205, S31803, S32304, S32101; Outokumpu 2205, 2304, LDX 2101®, SAF 2205, SAF 2304; 1.4462 X2CrNiMoN22-5-3 with 1.4583 X6CrNiMoNb17-13-3, 1.4462 X2CrNiMoN22-5-3 with P235GH/ P265GH, S255N, P295GH, S460N, etc.

Typical analysis in %

C	Si	Mn	Cr	Ni	Mo	N	PRE _N	F _n
≤0.03	0.8	0.9	22.7	9.0	3.2	0.13	≥35	30–50

Mechanical properties of the weld metal

Welded condition	Yield strength	Tensile strength	Elongation	Impact toughness			
	$R_{p0.2}$	R_m	A	K_V			
	MPa	MPa	%	J [RT]	-20 °C	-40 °C	-46 °C
untreated	600	800	27	80	65	55	45

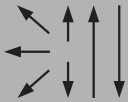
shielding gas Ar + 18 % CO₂

UTP AF 6808 Mo PW

Welding instructions

Welding with conventional MAG devices, slightly trailing torch position (angle of incidence about 80°) ; slight weaving of the torch is recommended in all positions; with 100% CO₂ the voltage must be 2V higher. The gas quantity should be 15 – 18l / min.

Welding positions



Current type DC (+)
Shielding gases: Argon + 15 - 25% CO₂, 100% CO₂

Approvals

TÜV-D (07666.), ABS (E 22 09 T1-4(1)), CWB (E2209T1-1(4)), DNV GL, LR (X (M21,C1)), RINA (2209 S), CE

Form of delivery and recommended welding parameters

Wire diameter [mm]	Amperage [A]	Voltage [V] [V]
1.2	100 – 220	20 – 31

UTP AF 6808 Mo

stainless steels

Classifications

Gas-shielded flux-cored wire

EN ISO 17633-A

AWS A5.22

T 22 9 3 N L R M21 3 / T 22 9 3 N L R C1 3

E2209T0-4 / E2209T0-1

Characteristics and field of use

UTP AF 6808 Mo is a duplex steel rutile flux-cored wire for gas-shielded arc welding primarily in flat and horizontal welding positions. It can provide an economical and qualitatively advantageous alternative to MAG welding of duplex steels.

The easy handling and high deposition rate of UTP AF 6808 Mo result in high productivity with excellent welding performance, self-releasing slag, very low spatter formation and surface oxidation, finely rippled weld pattern with good wetting behaviour and even, reliable fusion penetration. In addition to the significant savings in time and costs of processing techniques, including the lower requirement for cleaning and pickling.

The structure of the weld metal consists of austenite and ferrite (FN 30-50). The pitting resistance equivalent is $PRE_N \geq 35$ (% Cr+3.3% Mo+16% N). In the welded and pickled condition, the weld metal is resistant, according to ASTM A262 – 93a, Pr.E, Pr.C, Pr.B and ASTM G48 / Method A up to 22 °C, and according to ASTM G48 / Method A (24 h) in the solution treated and pickled condition up to 30 °C. The welding consumable can be used in a temperature range from -40 °C up to +250 °C.

Base materials

Same and similar alloyed duplex steels, as well as dissimilar joints or weld claddings. EN 1.4462 X2CrNiMoN22-5-3, EN 1.4362 X2CrNiN23-4, EN 1.4162 X2CrNiMoN21-5-1; UNS S32205, S31803, S32304, S32101; Outokumpu 2205, 2304, LDX 2101®, SAF 2205, SAF 2304; 1.4462 X2CrNiMoN22-5-3 with 1.4583 X6CrNiMoNb17-13-3, 1.4462 X2CrNiMoN22-5-3 with P235GH/ P265GH, S255N, P295GH, S460N, etc.

Typical analysis in %

C	Si	Mn	Cr	Ni	Mo	N	PRE _N	Fn
≤0.03	0.8	0.9	22.7	9.0	3.2	0.13	35	30-50

Mechanical properties of the weld metal

Welded condition	Yield strength	Tensile strength	Elongation	Impact toughness	
	$R_{p0.2}$	R_m	A	K_V	
	MPa	MPa	%	J [RT]	-40 °C
untreated	600	800	27	60	45

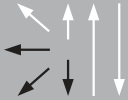
shielding gas Ar + 18% CO₂

UTP AF 6808 Mo

Welding instructions

Welding with conventional MAG devices, slightly trailing torch position (angle of incidence about 80°); with 100% CO₂ the voltage must be 2 V higher.
The gas quantity should be 15 – 18 l / min.

Welding positions



Current type DC (+)
Shielding gases: Argon + 15 - 25 % CO₂

Approvals

TÜV (07133.), ABS (E 2209 T0-4), CWB (E2209T0-4), DNV GL, LR (X (M21)),
RINA (2209S), CE, DB (43.014.31)

Form of delivery and recommended welding parameters

Wire diameter [mm]	Amperage [A]	Voltage [V]
1.2	125 – 280	22 – 36

UTP AF 6824 LC PW

stainless steels

Classifications

Gas-shielded flux-cored wire

EN ISO 17633-A

AWS A5.22

T 23 12 L P M21 1 / T 23 12 L P C1 1

E309LT1-4 / E309LT1-1

Characteristics and field of use

Rutile, flux-cored wire with fast freezing slag for position welding of dissimilar joints, and for the first layer of weld claddings of unalloyed and low-alloy base materials. The support provided by the fast-hardening slag allows out-of-position welding with high current magnitudes and high welding speeds.

The fine droplet, low spatter, very intense spray arc, the reliable fusion penetration, the self-releasing slag and the good wetting behaviour result in a high weld quality at the same time as short welding times. Additional advantages to its application are the ease of handling, the low heat input resulting from the high welding speed, and the small amounts of cleaning and pickling required. UTP AF 6824 LC PW should be used for flat and horizontal welding positions (PA, PB). The weld metal is suitable for operating temperatures between -60 °C and +300 °C.

Base materials

Joints: of and between high-strength, unalloyed and alloyed quenched and tempered steels, stainless, ferritic Cr and austenitic CrNi steels, austenitic manganese steels and weld claddings: for the first layer of chemically resistant weld claddings on the ferritic-pearlitic steels used for boiler and pressure vessel construction up to finegrained structural steel S500N, and for the creep resistant fine-grained structural steels 22NiMoCr4-7, 20MnMoNi5-5 and GS-18NiMoCr 3 7

Typical analysis in %

C	Si	Mn	Cr	Ni
0.03	0.7	1.4	23.0	12.5

Mechanical properties of the weld metal

Welded condition	Yield strength	Tensile strength	Elongation	Impact toughness	
	$R_{p0.2}$	R_m	A	K_V	
	MPa	MPa	%	J [RT]	- 60 °C
untreated	400	540	35	65	50

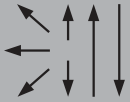
shielding gas Ar + 18% CO₂

Welding instructions

The gas quantity should be 15 – 18 l / min. Slightly trailing torch position (angle of incidence about 80°), slight weaving of the torch is recommended in all positions. It is recommended that the voltage is increased by 2 V if the shielding gas is 100% CO₂. Preheating and interpass temperatures are to be adapted to the base material.

UTP AF 6824 LC PW

Welding positions



Current type DC (+)
Shielding gases: Argon + 15 - 25 % CO₂, 100 % CO₂

Approvals

TÜV (09115.), DB (43.014.22), ABS (E309 LT 1 – 1(4)), LR (DXV and O, CMn / SS),
CWB (E309LT0 – 1(4)), CE, DNV GL, RINA

Form of delivery and recommended welding parameters

Wire diameter [mm]	Amperage [A]	Voltage [V]
1.2	100 – 220	20 – 31
1.6	175 – 260	21 – 29