

Wire/flux combination, unalloyed

Brand Standard AWS Standard EN ISO	Chemical Composition (%) Typical Values	Mechanical Properties Typical Values	Ø (mm)	Approvals	Characteristics and Applications
UNION S EM12K + UV C 401 AWS A5.17: F7A5-EM12K, F7P5-EM12K EN ISO 14171-A: S 42 4 AB S2Si	Wire C: 0.09 Si: 0.25 Mn: 1.1 P: 0.02 S: 0.004 Weld metal C: 0.06 Si: 0.51 Mn: 1.47 P: 0.02 S: 0.005	Heat treatment: As welded UTS: 570 MPa YS: 470 MPa El: 33% CVN Impact: -40°C: 90J	1.6 2.0 2.4 3.2 4.0	ABS (4YM)	Union SEM12K-UV C401 is a wire flux combination for joining and surfacing applications with general-purpose structural steels, boiler and pipe steels. The flux is characterized by low Silicon and moderate Manganese pick-up. The welding characteristics are good producing a smooth weld bead with excellent slag detachability.
UNION S EM12K + UV C 305 AWS A5.17: F7AZ-EM12K EN ISO 14171-A: S 42 Z AR S2Si	Wire C: 0.09 Si: 0.25 Mn: 1.1 P: 0.02 S: 0.004 Weld metal C: 0.05 Si: 0.6 Mn: 1.2 P: 0.03 S: 0.01	Heat treatment: As welded UTS: 530 MPa YS: 450 MPa El: 31% CVN Impact: +20°C: 70J 0°C: 40J	1.6 2.0 2.4 3.2	-	Union S EM12K - UV C 305 is a wire flux combination for joining applications with general purpose steels. It is particularly well suited for single wire or twin-arc fillet welding with small wire diameter (e.g. with 2.0 mm) with high welding speed. Wall thickness <10 mm. The flux is characterized by low silicon and moderate manganese pick up. The welding characteristics are good producing a smooth weld bead with excellent slag detachability.

Wire/flux combination, low alloyed

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UNION S 2 Mo / UV 421 TT AWS A 5.23: F8A6-EA2-A2 EN ISO 14171-A: S 46 4 FB S2Mo	Wire C: 0.10 Si: 0.15 Mn: 1.0 Mo: 0.5 Weld metal: C: 0.07 Si: 0.25 Mn: 1.1 Mo: 0.5 P: ≤0.012 As: ≤0.01 Sb: ≤0.005 Sn: ≤0.005	Heat treatment: 620°C / 1h UTS: >550 MPa YS: >470 MPa El: >24% CVN Impact: +20°C: 140J -20°C: 100J -40°C: 47J	2.0 2.5 3.0 4.0	TÜV, DB, CE, LR	Wire/flux combination suited for fine grained constructional steels of increased strength, specially used in boiler, vessel and pipeline construction. The metallurgical behaviour of the flux UV 421 TT is neutral. The wire/flux combination produces very good low temperature impact properties down to -40°C. Excellent slag detachability, smooth beads and good wetting are further important features. The flux can be used for tandem and multi wire welding on DC and AC. For information regarding UV 421 TT see our detailed data sheet.

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UNION S 3 Mo / UV 418 TT AWS A5.23: F8A5-EA4-A4 / F8P6-EA4-A4 EN ISO 14171-A: S 46 4 FB S3Mo	Wire C: 0.10 Si: 0.15 Mn: 1.50 Mo: 0.50 Weld metal: C: 0.06 Si: 0.25 Mn: 1.35 Mo: 0.45	Heat treatment: 600°C x 2hr UTS: >550 MPa YS: >470 MPa El: >24% CVN Impact: +20°C: >140J -20°C: >80J -46°C: >47J -51°C: >27J	2.5 3.0 4.0	-	Union S 3 Mo - UV 418 TT is a wire flux combination for submerged arc welding of un and low alloyed steel grades. Very good slag detachability also for narrow gap welding. Flux can especially be used for multi-pass butt welding of medium tensile steels. Very good impact toughness of weld metal at low temperatures. UV 418 TT is an agglomerated fluoride-basic flux with high basicity and neutral metallurgical behaviour. For more information regarding this welding flux see our detailed data sheet.
UNION S 2 CrMo + UV 420 TTR / UV 420 TTR-W AWS A5.23: F8P2-EB2R-B2 EN ISO 24598-A: S S CrMo 1 FB	Wire C: 0.12 Si: 0.10 Mn: 0.80 Cr: 1.2 Mo: 0.5 Weld metal: C: 0.08 Si: 0.20 Mn: 1.00 Cr: 1.1 Mo: 0.45 P: ≤0.012 As: ≤0.01 Sb: ≤0.006 Sn: ≤0.008	Heat treatment: 690°C / 2h UTS: 550 MPa YS: 470 MPa El: ≥ 20% CVN impact: +20°C: 130J -20°C: 100J -30°C: 80J	2.0 2.5 3.0 4.0	TÜV, CE	UV 420 TTR / UV 420 TTR-W is an agglomerated fluoride basic flux with high basicity and neutral metallurgical behavior. It is characterized by a high degree of purity. The low pickup of 0.004% max. makes it particularly suitable for use in reactor construction as well as for welding of hydrocrackers. When the combination Union S 2 CrMo - UV 420 TTR / UV 420 TTR-W is used for SAW of high temperature resistant steels of the type 1% Cr-0.5% Mo, it is possible to meet the most stringent toughness requirements at low/subzero temperatures, even after step cooling treatment. UV 420 TTR is suitable for single wire welding with direct current (DC) only while UV 420 TTR-W provides good weldability for single wire with alternating current (AC). Thereby it is possible to achieve higher toughness level than with the flux UV 420 TTR (DC welding). UV 420 TTR-W is also applicable when using the tandem process with DC and AC or AC and AC.
UNION S 1 CrMo 2 / UV 420 TTR-W AWS A 5.23: F9P2-EB3R-B3R EN ISO 24598-A: S S CrMo2 FB	Wire C: 0.10 Si: 0.10 Mn: 0.50 Cr: 2.4 Mo: 1.0 X: <10 All-weld metal C: 0.07 Si: 0.20 Mn: 0.75 Cr: 2.3 Mo: 1.0 X: <12	Heat treatment: 690°C / 10h UTS: 580 MPa (≥550) YS: 480 MPa (≥460) El: 22% (≥20) CVN impact: +20°C: ≥140J -20°C: ≥120J -30°C: ≥100J -40°C: ≥54J	2.0 2.5 3.0 4.0	TÜV	Union S 1 CrMo 2 – UV 420 TTR-W is a wire flux combination for submerged arc welding of creep resistant steel grades with 2¼% Cr – 1% Mo. To prevent long term temper embrittlement the weld metal is characterized by a high degree of purity, and meets the most stringent toughness requirements at low/subzero temperatures, also after step cool heat treatment. The very good welding behavior on AC and DC+ make it possible to weld with single wire (DC+ or AC) and tandem (DC+/AC or AC/AC) in narrow gap joint configurations without limitation in thickness. Highest toughness levels are achieved using AC current.

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UNION S 3 NiMoCr / UV 421 TT AWS A5.23: F11A8-EG-F6 EN ISO 26304-A: S 69 6 FB SZ3Ni2,5CrMo	Wire C: 0.14 Si: 0.10 Mn: 1.75 P: ≤0.012 S: ≤0.012 Cr: 0.35 Ni: 2.10 Mo: 0.60 Weld metal: C: 0.08 Si: 0.20 Mn: 1.60 P: ≤0.015 S: ≤0.012 Cr: 0.32 Ni: 2.00 Mo: 0.58	Heat treatment: As welded UTS: 770 MPa YS: 690 MPa El: 17% CVN Impact: +20°C: 120J -20°C: 80J -40°C: 60J -60°C: 47J	3.0 4.0	TÜV, DB, BV, WIWEB, LR, DNV GL, ABS, CE	Union S 3 NiMoCr – UV 421 TT is a wire – flux combination for Submerged Arc Welding of high strength steel grades. Very good slag detachability also for narrow gap welding. UV 421 TT is an agglomerated fluoride basic flux with high basicity and neutral metallurgical behavior.
THERMANIT MTS 3 / MARATHON 543 AWS A5.23: F9PZ-EB91-B91 EN ISO 24598-A: S S CrMo 91 FB	Wire C: 0.11 Si: 0.25 Mn: 0.50 Cr: 9.0 Ni: 0.45 Mo: 0.95 V: 0.20 Nb: 0.06 N: 0.04 Weld metal: C: 0.09 Si: 0.22 Mn: 0.70 Cr: 8.9 Ni: 0.45 Mo: 0.95 V: 0.18 Nb: 0.05 N: 0.04	Heat treatment: 760°C / 4h UTS: 705 MPa (≥ 620) YS: 565 MPa (≥ 540) El: 19% (≥ 17) CVN Impact: +20°C: 75J (≥ 47)	1.2 1.6 2.0 2.4 2.5 3.0 3.2	TÜV, CE	Thermanit MTS 3 – Marathon 543 is a wire flux combination for Submerged Arc Welding for welding high temperature and creep resistance 9% chromium steel like P91. Marathon 543 is an agglomerated welding flux of the fluoride basic type with high basicity. For more information regarding this welding flux see our detailed data sheet.
THERMANIT MTS 616 / MARATHON 543 AWS A5.23: F9PZ-EG-G EN ISO 24598-A: S S ZCrMoWVNb9 0.5 1.5 FB	Wire C: 0.11 Si: 0.15 Mn: 0.5 Cr: 8.8 Ni: 0.45 Mo: 0.45 W: 1.65 V: 0.2 Nb: 0.06 N: 0.04 Weld metal: C: 0.09 Si: 0.15 Mn: 0.7 Cr: 8.7 Ni: 0.40 Mo: 0.43 W: 1.65 V: 0.18 Nb: 0.05 N: 0.04	Heat treatment: Annealed, 760°C / 4h UTS: ≥ 700 MPa YS: ≥ 560 MPa El: ≥ 18% CVN Impact: +20°C: ≥ 41J	1.2 1.6 2.0 2.5 3.0 3.2	TÜV, CE	Thermanit MTS 616 - Marathon 543 is a wire - flux combination for submerged arc welding of 9% Cr creep resistant steel, especially for P92 (NF616) acc. to ASTM A335. Approved in long-term condition up to +650°C service temperature. Marathon 543 is an agglomerated welding flux of the fluoride basic type with high basicity. For more information regarding Marathon 543 see our detailed data sheet.