

# UV 420 TTR / UV 420 TTR-W

05.2010  
Rev.: 2

Fluoride basic type

**Classifications**      **EN ISO 14174**  
SA FB 1 65 DC / SA FB 1 65 AC

**Characteristics and field of use**

UV 420 TTR is an agglomerated flux of fluoride basic type, mainly for joining and surfacing applications with creep resistant steels.

It displays neutral metallurgical behaviour and is characterised by a high degree of purity. It is particularly suitable for welding hydrocrackers because of the low P pick-up of 0.004 % max. When used in combination with wire electrodes Union S 2 CrMo and Union S 1 CrMo 2 it is possible to meet the most stringent toughness requirements at subzero temperatures even after step-cooling treatment.

UV 420 TTR-W permits sound welding on AC, by this achieving a higher level of toughness when welding with CrMo-alloyed sub arc wires.

**Grain size**      EN ISO 14174: 3 - 20 (0.3 - 2.0 mm); 3 - 16 (0.3 - 1.6 mm)

**Packaging**      25 kg plastic valve bag, 500/1000 kg Big-Bag

**Advice**      It is advisable to redry the welding flux for about 2 h at 300 - 350 °C (572 - 662 °F) prior to use.

Main constituents in %	SiO <sub>2</sub> +TiO <sub>2</sub>	CaO+MgO	Al <sub>2</sub> O <sub>3</sub> +MnO	CaF <sub>2</sub>
		15	35	21

Basicity (Boniszewski)	Mol.-%	Weight %
		3.4

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Typical analysis for wire and weld metal in wt. %:

Designation	C	Si	Mn	Cr	Mo	Ni	Weld metal classification acc. to EN 756 EN ISO 24598-A • AWS A5.23 - SFA-5.23
Union S 1 CrMo 2 Weld metal	0.10 0.07	0.10 0.20	0.50 0.75	2.40 2.25	1.00 0.95	- -	• S CrMo2 FB F9P2-EB3R-B3R
Union S 2 CrMo Weld metal	0.12 0.08	0.10 0.20	0.80 1.00	1.20 1.10	0.50 0.45	- -	• S CrMo1 FB F8P2-EB2R-B2
Union S 2 Mo Weld metal	0.10 0.07	0.10 0.20	1.00 1.05	- -	0.50 0.45	- -	S 46 4 FB S2Mo F8A4-EA2-A2
Union S 3 NiMo Weld metal	0.08 0.05	0.10 0.20	1.50 1.50	- -	0.45 0.40	1.50 1.40	S 50 6 FB S3Ni1,5Mo F9A8-EG-F1
Union S 3 NiMo 1 Weld metal	0.12 0.08	0.10 0.20	1.60 1.55	- -	0.60 0.55	0.95 0.90	S 50 4 FB S3Ni1Mo F9A6-EG-F3-N
Union S 4 Mo Weld metal	0.12 0.08	0.10 0.20	2.00 1.85	- -	0.50 0.45	- -	S 50 3 FB S4Mo F8P4-EA3-A3

Mechanical properties of the weld metal, as welded:

Wire electrodes used	0.2% Yield strength ≥ MPa	Tensile strength ≥ MPa	Elongation $l_0=5d_0$ ≥%	Impact values* ≥ J (CVN)				
				+20 °C	±0 °C	-20 °C	-40 °C	-60 °C
Union S 2 Mo	470	550	25	140	120	100	47	-
Union S 3 NiMo	560	660	22	140	120	100	47	47
Union S 3 NiMo 1	560	680	22	140	120	100	47	27
Union S 4 Mo	550	630	18	120	100	80	47	-

\* Average values from 3 tests

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Mechanical properties of the weld metal at different heat treatments and test temperatures:

Wire electrodes used	Heat treatment	Test temperature 20 °C (68 °F)*			
		0.2% Yield strength ≥ MPa	Tensile strength ≥ MPa	Elongation $l_0=5d_0$ ≥ %	Impact values ≥ J (CVN)
Union S 1 CrMo 2	A*	460	560	22	140
Union S 2 CrMo	A*	470	550	24	140
	N + A*	330	480	26	120
Union S 2 Mo	S	470	550	24	165
	N + A	290	440	26	120
Union S 3 NiMo	S	560	660	22	150
	N + A	420	540	24	120
Union S 3 NiMo 1	S	560	660	22	140
	SO	500	620	24	140
Union S 4 Mo	S	500	600	24	140
	N + A	355	510	26	110

A = tempered, 580 - 620 °C (1076 - 1148 °F) / air

A\* = tempered, 670 - 720 °C (1238 - 1328 °F)

A\*\* = Special heat treatment, please ask for report

SR = stress relieved, 580 - 620 °C (1076 - 1148 °F)

SO = 60 h 550 °C (1022 °F) + 40 h 620 °C (1148 °F) / air

N = normalized, 920 °C (1688 °F) / air

\* = Average values from 3 tests

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Mechanical properties of the weld metal of different heat treatments and test temperatures:

Wire electrodes used	Heat treatment	Test temperature 350°C (662 °F)*			Test temp. 550°C (1022 °F)*		
		0.2% Yield strength ≥ MPa	Tensile strength ≥ MPa	Elongation $l_0=5d_0$ ≥ %	0.2% Yield strength ≥ MPa	Tensile strength ≥ MPa	Elongation $l_0=5d_0$ ≥ %
Union S 1 CrMo 2	A*	380 <sup>+</sup>	500 <sup>+</sup>	20 <sup>+</sup>	270	360	26
Union S 2 CrMo	A*	380	540	22	280	420	26
	N + A*	200	440	19	180	340	24
Union S 2 Mo	S	370	570	24	280	380	26
	N + A	220	420	25	170	310	30
Union S 3 NiMo	S	450	600	20	320	410	24
	N + A	320	510	25	220	350	28
Union S 3 NiMo 1	S	420 <sup>++</sup>	590 <sup>++</sup>	24 <sup>++</sup>	290	410	25
	SO	420 <sup>++</sup>	580 <sup>++</sup>	24 <sup>++</sup>	190	330	32
Union S 4 Mo	S	400	590	23	290	410	24
	N + A	280	470	20	190	330	30

A = tempered, 580 - 620 °C (1076 - 1148 °F) / air

A\* = tempered, 670 - 720 °C (1238 - 1328 °F)

A\*\* = Special heat treatment, please ask for report

SR = stress relieved, 580 - 620 °C (1076 - 1148 °F)

SO = 60 h 550 °C (1022 °F) + 40 h 620 °C (1148 °F) / air

N = normalized, 920 °C (1688 °F) / air

\* = Average values from 3 tests

+ = Values at test temperature 450 °C (842 °F)

++ = Values at test temperature 400 °C (752 °F)

Approvals:	TÜV	Controlas	TÜV Wien
Union S 1 CrMo 2*	6541		
Union S 1 CrMo 2	2734	0167	574
Union S 2	3437		
Union S 2 CrMo	3439	0162	
Union S 2 Mo	3438		
Union S 3	3440		
Union S 3 Mo	3441		
Union S 3 NiMo	3442		
Union S 3 NiMo 1	3021 / 8015		
Union S 3 NiMoCr	3443		

\* with UV 420 TTR-W, all others only with UV 420 TTR.