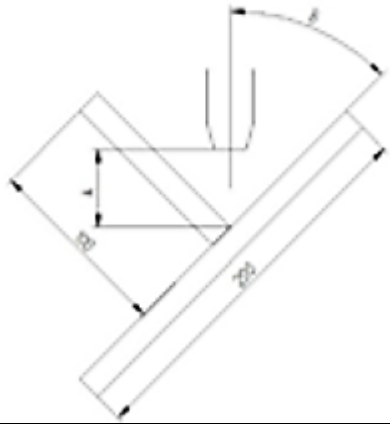
The test weld, that is closest to the selected simulation, is this *Single pass (fillet weld) in an T joint in 13 mm plate thickness*

Base material	Thickness mm	Joint	Joint preparation	Welding process	Filler metal	Shielding gas	Backing gas
SDX 2507 EN1.4410	13	T	None	GMAW (MAG)	25 9 4 NL Solid wire Ø1.2 mm	MISON 2 He*	-

*MISON 2 He (Ar+30%He+2%CO_2+0.03%NO)

Joint preparation

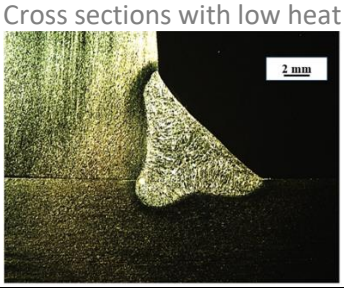


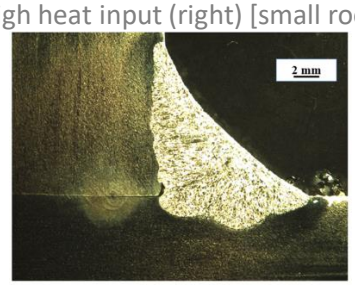
B was 45°. Electrode stick-out length was 13-15 mm for the low heat input weld and 15-17 mm for the high heat input weld.

The test weld was performed as a fillet weld in a T joint and was intended to correspond to a complete single pass weld.
Welds are performed with pulsed arc. Welding position PA.

Welding current A	Voltage V	Heat input kJ/mm	Wire feed speed m/min	Welding speed cm/min	Number of passes
206	25.4	1	8	30	1
215	26.7	1.8	8.6	18	1

Cross sections with low heat input (left) and high heat input (right) [small root defect]





Measured ferrite fraction in the weld (the rest is assumed to be austenite), and the ferrite fraction more in detail in different regions of the weld, are shown in the table below. The fraction is measured using image analysis.

The ferrite fraction is an average value based on several measurements using image analysis in each location and the standard deviation in average values were around 4%.

Heat input kJ/mm	Weld	Top of the weld	Middle of the weld	Bottom of the weld
1	59%	59%	59%	58%
1.8	49%	50%	51%	46%

The measured ferrite content for both low and high heat input was lower in the fusion boundary HAZ (31-42%).

For the low heat input weld, no traces of nitrides were found in the weld. In the HAZ close to the fusion boundary, nitrides precipitate in the middle of ferrite grains. Possibly traces of sigma phase were found locally in the weld zone.

For the high heat input weld traces of sigma phase were found in the weld zone and HAZ. In HAZ next to the fusion boundary, nitrides precipitated.