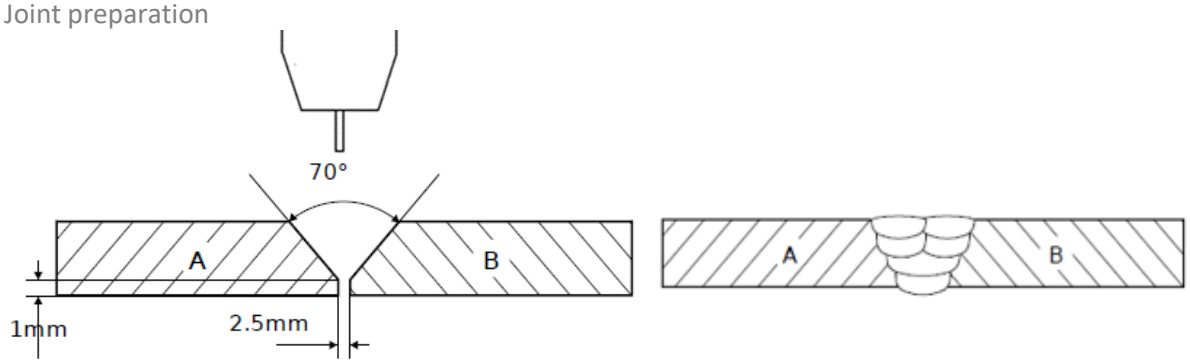
The test weld, that is closest to the selected simulation, is this *multi pass weld using GTAW in the root and SAW in the filling passes in a V joint in 15 mm plate thickness*

Base material	Thickness mm	Joint	Joint preparation	Welding process	Filler metal	Shielding gas	Backing gas
SDX 2507 EN 1.4410	15	V	Joint angle 70° Face 1 mm Gap 2.5 mm	Root GTAW (MMA) Fill SAW(UP)	25 9 4 NL Ø2.4 mm (root) Ø3.2 mm (fill)	Root Ar-2%N_2 Fill No gas	Nitrogen

For the SAW weld Sandvik Flux 15W was used

Joint preparation

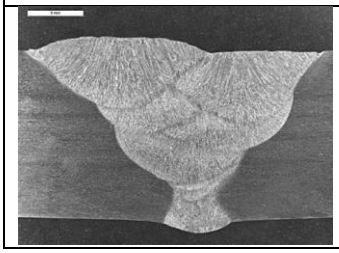


The joint angle was 70° (bevel angles 35°), the root face was 1 mm and the root gap 2.5 mm .

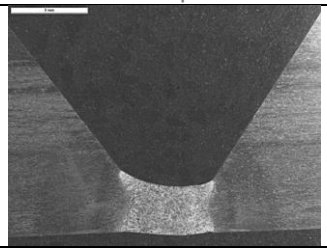
The test weld was a complete multi pass weld (4 root passes and 5 fill passes). Root passes were welded with GTAW (TIG) and fill passes with SAW(UP). Welding position PA.

	Welding current A	Voltage V	Heat input kJ/mm	Wire feed speed m/min	Welding speed cm/min	Pass number
Root (TIG)	90	9.5	0.6-0.7		4.6	1
Root (TIG	180	9.8	0.4-0.5		13.8	2-4
Fill (SAW)	300	28	1.6-1.8		30	5-9

Cross section of the weld



After the root passes



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.

Ferrite measurements are made in the final weld. All passes but the last cap-pass are reheated by following weld passes 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 2-10%.

Pass	Heat input kJ/mm	Average of the pass	Top of the pass* L/M/R	Middle of the pass	Bottom of the pass
Root**, 4 passes Reheated	0.4 – 0.7	40	43/43/39%	37%	35%
Fill Reheated	1.6 – 1.8	53	47/55/59%	55%	51%
Fill Reheated	1.6 – 1.8	51	50/54/48%	48%	52%
Fill Reheated	1.6 – 1.8	61	56/63/60%	61%	65%
Cap/Fill Reheated	1.6 – 1.8	62	66/62/66%	56%	60%
Cap As-welded	1.6 – 1.8	61	63/66/65%	60%	54%

*L/M/R indicates measuring position at the top of each pass (Left, Middle and Right)
** The root passes were analysed before rehating using manual point counting and resulted in a ferrite fraction of 44-72%

The content of nitrides and secondary austenite was low, and no sigma phase was found in the weld.