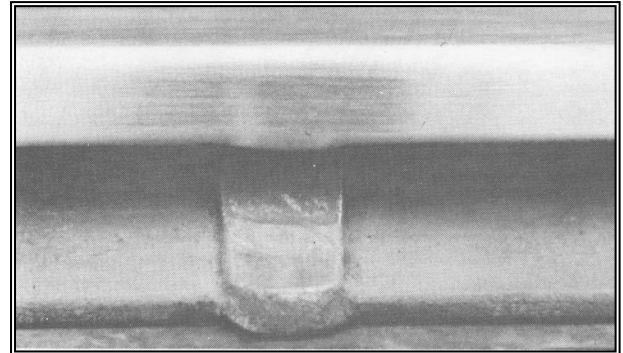


Welding Crane Rails – The Thermit SkS Process

The Thermit **SkS** welding process is designed to be used when joining heavy section crane rails.

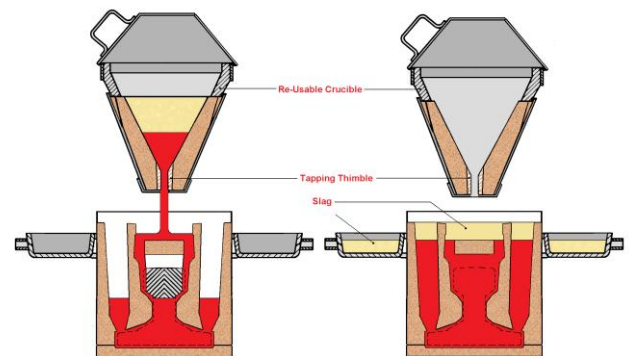
The welding process combines a uses a combination of an extended preheat with a central pour to ensure full fusion across the rail profile. Three piece moulds are used with a choice of base slab to produce a weld collar on the underside of the rail of 3, 5 or 7mm thickness. On a fully supported base the collar may be completely removed by grinding.



Welding Method

The welding gap may be prepared either by adjustment of the rails, rail saw, abrasive disc cutter, or flame cutting. After the rails have been accurately aligned, the three piece preformed moulds are fitted and sealed with refractory sand,.

The correct Thermit® Portion for the grade and section of the rail being welded is charged into the Thermit® Long Life Crucible which has been fitted with the automatic tapping device.

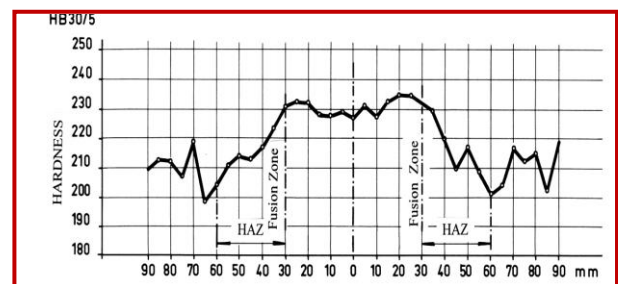
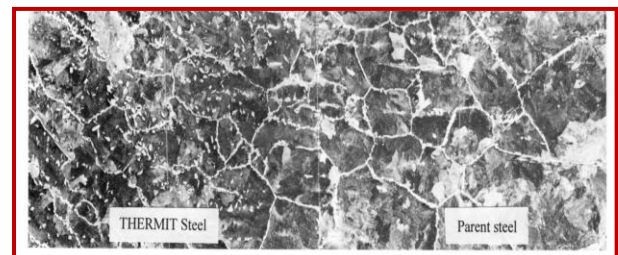


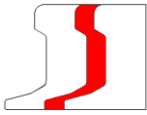
Preheating is timed from insertion of the preheat burner, using preset pressures. The preheating times provided in the summary are for guidance as the precise time is determined by inspection of the rail ends which must be evenly heated to a temperature of 950 -1000°C.. For larger section rails, the preheater position may have to be adjusted during the process. On completion of the preheat, the portion is ignited, and when the aluminothermic reaction has completed, the Thermit® steel is automatically tapped and discharged into the moulds. When cooled, the weld is trimmed, after which the welded joint may be ground to profile.

Full operating instructions for all applications are provided in the **process operating manual**.

Weld Performance

The welding process and portion has been developed to produce a welded joint with compatible metallurgy to the parent rail. The weld metal hardness is marginally greater than that of the rail to prevent preferential wear under the high rolling loads to which crane rails are subject.

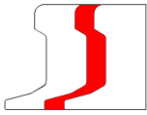




Thermit Welding is a hazardous and safety critical activity, and all operators must have attended a training course approved by The Company and be in possession of a valid Permit or Certificate of Competence for the process.

Operating parameters for a number of the common Crane rail types are provided below, for information.

Crane Rails		Dimensions					
		A45	A55	A65	A75	A100	A120
	A (mm)	55	65	75	85	95	105
	B (mm)	125	150	175	200	200	220
	C (mm)	45	55	65	75	100	120
	D (mm)	24	31	38	45	60	72
	Ixx (cm4)	91	182	327	545	888	1420
	Wt. (kg/m)	22.2	32	43.5	56.6	75.2	101.3
	Welding Consumables						
Portion	Generic Type	412	512	612	612	812	1012
	TW part – Z80	403000	405000	406000	406000	422000	410000
	TW part – SHTS					427000	426000
moulds	TW part – 3 mm collar	m.t.o.	m.t.o.	m.t.o.	m.t.o.	213830	213930
	TW part – 5mm collar						
	TW part – 7 mm collar					213870	
Welding Method							
Preparation	Rail Gap (mm)	20 - 22	20 -22	20-22	20-22	20-22	20-22
	method	saw	saw	saw	saw	saw	saw
Oxy propane Preheating	Preheater type	65.504	65.504	65.504	65.504	30.506	30.506
	Burner height (mm)	80	80	80	80	60	60
	Oxygen pressure (B)	4.0	4.0	4.0	4.0	4.5(1)	4.5(1)
	Fuel gas pressure (B)	1.0	1.0	1.0	1.0	0.7(1)	0.7(1)
	PREHEAT TIME (mins)	3-4 (2)	4-5 (2)	7-8 (2)	8-9 (2)	10-11 (2)	12-14 (2)
Dismantling –timed from completion of pour (mins)	Remove crucible /SUC	1.0	1.0	1.0	1.0	1.0	2.0
	Remove slag bowls	2.0	2.0	2.0	2.0	2.0	3.0
	Remove mould shoes	3.0	3.0	3.0	3.0	3.0	4.0
Weld Trimming	HYDRAULIC SHEAR	5.0	5.0	5.0	5.5	6.5	8.0
NOTES	1	pressures measured at the preheater					
	2	Preheat time determined by inspection					



Crane Rails		Dimensions					
		56CR	89 CR	101 CR	164 CR	MRS 87a	MRS 151
	A (mm)	101.5	114	155	150	152.4	150
	B (mm)	171	178	165	230	152.4	220
	C (mm)	76	102	100	140	101.6	150
	D (mm)	35	51	45	75	35	80
	Ixx (cm4)	836	1502	3415	4789	3068	4271
	Wt. (kg/m)	56.8	89.8	100.4	166.8	86.8	151.3
	Welding Consumables						
Portion	Generic Type	812	912	912	2 x 612	912	2 x 612
	TW part – Z80	422000	418000	418000	406000	418000	406000
	TW part – SHTS	427000					
moulds	TW part – 3 mm collar	213730	214530	213530	214730	m.t.o.	219900
	TW part – 5mm collar	213750	214550	213550	214750		
	TW part – 7 mm collar	213770	214570	213570			
Welding Method							
Preparation	Rail Gap (mm)	20 - 22	20 -22	20-22	20-22	20-22	24-26
	method	saw	saw	saw	saw	saw	Saw
Oxy propane Preheating	Preheater type	30.506	30.506	30.506	30.506	30.506	30.506
	Burner height (mm)	30	45	45	40>52(3)	45	40>52(3)
	Oxygen pressure (B)	4.5(1)	4.5(1)	4.5(1)	4.5(1)	4.5(1)	4.5(1)
	Fuel gas pressure (B)	0.7(1)	0.7(1)	0.7(1)	0.7(1)	0.7(1)	0.7(1)
	PREHEAT TIME (mins)	7-8(2)	12-13(2)	12-13(2)	24-25(3)	12-13(2)	25-27(3)
Dismantling –timed from completion of pour (mins)	Remove crucible /SUC	1.0	1.0	1.0	1.0	1.0	2.0
	Remove slag bowls	2.0	2.0	2.0	2.0	2.0	3.0
	Remove mould shoes	4.0	4.0	4.0	3.0	3.0	4.0
Weld Trimming	HYDRAULIC SHEAR	5.0	5.0	5.0	5.5	6.5	8.0
NOTES	1	pressures measured at the preheater					
	2	Preheat time determined by inspection					
	3	Special preheating procedure – refer to operating manual					