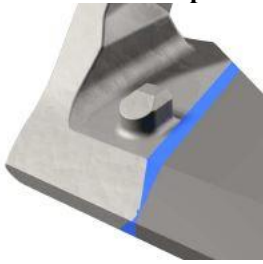


SANDVIK SHARK (G.E.T.) PRODUCT WELDING DOCUMENTATION

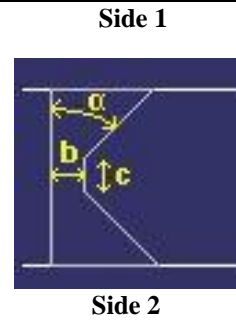
WELD PROCEDURE SPECIFICATION WPS: SS-001 REV: 1 DATE: 06/01/14

Knowledge Source: SANDVIK PPP0007 Rev 1 26.02.2009

Joint details: Cast Corners to Lip Plate (32 and 50mm) butt weld



LIP PLATE



CASTING

Fig. 1. Double-bevel butt weld preparation

Material Thickness 32 and 50m; Root Gap $b = 5\text{mm} \pm 2/-2\text{mm}$; Root Land $c = 3\text{mm} \pm 1\text{mm}$; $\alpha = 35^\circ$

Note 1: Welding Procedure Qualification for 50mm Lip Plate qualifies welding of 32mm Lip Plate

Note 2: If 3-4mm root gap is selected, a special torch gas nozzle is required because of restricted access to root of welds.

Note 3: If 6-7mm root gap is necessary for dimensional control, consideration should be given to acquiring ceramic backing to support the initial root run on Side 1.

Preliminary: Ensure edge preparation on Cast Corner is as shown in Fig. 1. Grind as required. Cut edge of lip plate must be square and free of slag and rust. Grind as required.

Step 1: Preheat Lip Plate to 125°C for HARDOX 400, 150°C for Hardox 450 and 175°C for HARDOX 500 in regions where "strong-back" bars are to be welded using gas heating torch.

Step 2: Stich fillet weld two (2) "strong-back" bars to Side 2 Lip Plate with half the bar lengths protruding for welding to Side 2 of Cast Corner.

Step 3 Preheat edge of Cast Corner (in regions where "strong-back" bars are to be welded) to 125°C for HARDOX 400, 150°C for Hardox 450 and 175°C for HARDOX 500 while setting root gap at 3-7mm according to overall length dimension control.

Step 4 Stich fillet weld strong-back bars to Lip Plate.

Step 5: Tack weld run-on and run-off tabs.

Note 4: Run-on and run-off tabs must replicate the geometry of the weld joint so as to allow the entire joint length to be uniformly filled.

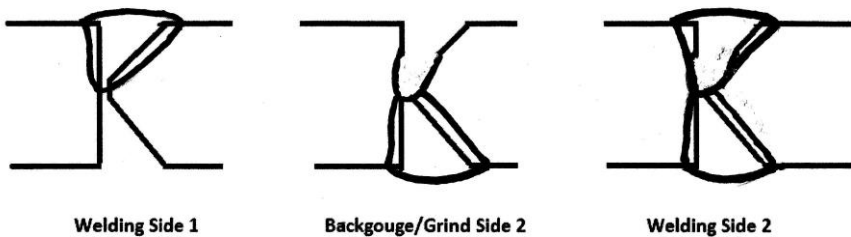


Fig.2: Welding Side 1 / Backgouge and Grind Side 2 / Welding Side 2

Step 6: Progressively weld Side 1 until filled.

Step 7: Install 45° brace on Side 1.

Step 8: Turn assembly over and grind welds on strong-back bars to remove them from Side 2.

Step 9: Maintaining preheat at 125°C , back gouge Side 2 and grind to expose clean parent and weld metal.

Step 10: Allow to cool for MPI testing to ensure root of preparation is sound.

Step 11: Maintaining preheat at $>125^\circ\text{C}$, progressively weld Side 2 until fully welded.

Step 12: Turn assembly over and remove angle brace.

Step 12: Maintaining preheat at $>125^\circ\text{C}$, plasma- or oxy-cut off run-on tab and run-off tab, and grind to clean surface.

Step 13: Dress cut surfaces to remove all notches and clean up weld surfaces.

Step 14: Visual inspection prior to slow cooling to ambient.

Step 14: After cooling to ambient temperature, Visual and MPI testing of both sides and ends of joint to ensure no cracking.

SANDVIK SHARK (G.E.T.) PRODUCT WELDING DOCUMENTATION

WELD PROCEDURE SPECIFICATION WPS: SS-001 REV: 1 DATE: 06/01/14

CLEANING: Wire brush or grind to achieve clean metal surface
INTERPASS TEMPERATURE: Not <125° C for HARDOX 400, 150° C for Hardox 450 and 175° C for HARDOX 500 , and not > 220° C (If joint is incomplete and after completion - SLOW COOL to ambient)
TORCH SETUP: Face of contact tip must not be recessed within gas nozzle more than 5mm.
APPROACH ANGLE: Use PUSH TECHNIQUE with Torch Lead Angle of 10-15° .
ELECTRICAL STICKOUT (ESO): Maintain ESO at 18mm +2/-0
ARC STARTING: TOUCH START, run at constant speed and HOLD Welding Position for 2-4 secs after releasing trigger .

Process	Wire Diam	Gas Shield	Gas Flow Rate	Electrode Classification		Material Qualified	Thickness mm	
GMAW	1.2m	Ar+18 to 20%	16 L/min	AWS A5.18		HARDOX	32 & 50	
		CO ₂				400/450/500		
						Cast Corner	32 & 50	
						Spec -SS2000		

WELDING DETAILS

Pass No.	Weld Pos	Side	Inter Pass temp	Amps	Volts	Polarity	Travel Speed mm/min	Heat Input kJ/mm
1-N	1G	1	220° C max	240-260	26-28	DC+	320 -400	0.94-1.36
1-M		2						

SECTION 2.0 WELDING SUPERVISION DATA

CONSUMABLE TREATMENT: Packaged spools in dry storage .
 Spools on wire feeders to be dry and free of dirt/dust.
 Rusted wire to be discarded.

POST-WELD TREATMENT: Remove weld spatter, silicate patches and wire brush surface

TESTING

Welder MUST visually examine weld to ensure weld joint is crack-free, absence of exposed porosity, absence of undercut, and to ensure that smooth transitions from weld face to material surfaces have been achieved.

Refer WPQR-SS001

SECTION 3.0 PROJECT SPECIFIC DATA

CLIENT NAME: SANDVIK SHARK (G.E.T.)

APPROVALS

FABRICATOR:	NAME:	DATE:
CLIENT: SANDVIK SHARK (G.E.T.)	NAME: MARTEN KARLSSON, ENG. MANAGER	DATE:
THIRD PARTY: AWS(WA) - CONTRACTOR	NAME: IAN HENDERSON, IWE	DATE: