

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

WELD PROCEDURE SPECIFICATION WPS: SS-003 REV: 0 DATE: 01/01/14

Knowledge Source: SANDVIK PPP0007 Rev 1 26.02.2009

Joint details: Lip Plate Assembly (32mm) to Bucket Butt Welds

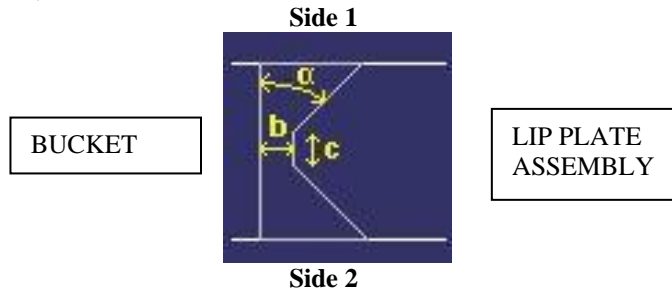


Fig. 1. Double-bevel butt weld preparation

Material Thickness 32mm; Root Gap $b = 3\text{mm} +0/-1\text{mm}$; Root Land $c = 3\text{mm} +/- 1\text{mm}$; $\alpha = 45^\circ$

Preliminary: Ensure edge preparations on Lip Plate Assembly are as shown in Fig. 1. Grind as required.

- Step 1: Preheat 75mm wide zone along mating edge of Lip Plate Assembly to achieve through-thickness minimum temperature of 125°C using gas heating torch .
- Step 2: Stich fillet weld two (2) “strong-back” bars to Side 2 of Lip Plate Assembly with half the bar lengths protruding for aligning weldments and for welding to Side 2 of Bucket.
- Step 3 Preheat Bucket edge (75mm width from weld joint) to 125°C for HARDOX 400, 150°C for Hardox 450 and 175°C for HARDOX 500 while setting root gap at 3mm
- Step 4 Stich fillet weld strong-back bars to Bucket.
- Step 5: Tack weld run-on and run-off tabs (where appropriate).

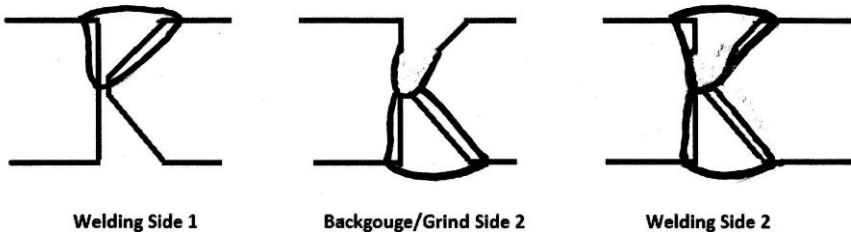


Fig.2: Welding Side 1 / Backgouge and Grind Side 2 / Welding Side 2

- Step 6: Progressively weld Side 1 until filled.
- Step 7: Grind welds on strong-back bars to remove them from Side 2.
- Step 8: Maintaining preheat at 125°C , back gouge Side 2 and grind to expose clean parent and weld metal.
- Step 9: Maintaining preheat at $>125^\circ\text{C}$, progressively weld Side 2 until fully welded.
- Step 10: Maintaining preheat at $>125^\circ\text{C}$, plasma cut off run-on tab and run-off tab, and grind to clean surface.
- Step 11: Dress cut surfaces to remove all notches and clean up weld surfaces.
- Step 13: Visual inspection prior to slow cooling to ambient.
- Step 14: After cooling to ambient temperature, Visual and MPT testing of both sides and ends of joint to ensure no cracking.

CLEANING: Wire brush or grind to achieve clean metal surface

INTERPASS TEMPERATURE: Not $<125^\circ\text{C}$ for HARDOX 400, 150°C for Hardox 450 and 175°C for HARDOX 500 , and not $>220^\circ\text{C}$ (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 $10-15^\circ$.

ELECTRICAL STICKOUT (ESO): Maintain ESO at $18\text{mm} +2/-0$

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	Process	Material Qualified	Thickness mm
GMAW	1.2m	Ar+18 to 20%	16 L/min	AWS A5.18	GMAW	HARDOX	32
		CO ₂				400/450/500	

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WELDING PROCESS

It is strongly recommended that a "melt & freeze" vertical-up programmed GMAW welding process be used for assembly welding of the Bucket Lip Assembly to Bucket.

WELDING DETAILS

Pass No.	Weld Pos	Side	Inter Pass temp		Amps	Volts	Polarity	Travel Speed mm/min	Heat Input kJ/mm
1-N	3G	1	220 ⁰ C max		Program for 32mm		DC+	175 -200	TBA
1-M	UP	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: