55MM CAST PROFILE BAR KIT
PRODUCT WELDING PROCEDURE

SHARK™ GROUND ENGAGING TOOLS

1.0. INTRODUCTION
This document details the recommended procedure to be followed when welding 55mm Cast Profile Bar (CPB) Kit products to a Blue Pointer™ Extended or MAKO™ bucket lip.

For the Cast profile Bar (CPB) Kit layout and bill of materials (BOM), refer to the Layout drawing (SL0XXX) provided when the Blue Pointer™ or MAKO™ Lip is ordered.

55mm CPB Kit consists of two parts, a Heel Shroud which is suitable for both left & right locations, and a Straight Bar. Refer to Figure 1 for a single CPB Kit layout example.

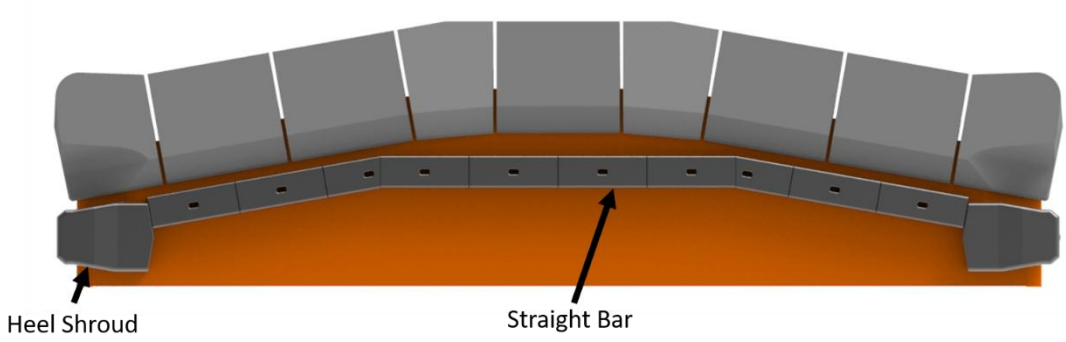

Figure 1 Double CPB Kit Layout

2.0. WELDING SAFETY
Refer to PWP0001 for details.

3.0. QUALITY CONTROL
3.1. The welding contractor requires significant welding knowledge and shall provide the engineering capability, experienced supervision, qualified welding personnel and suitable welding and associated activity equipment to successfully implement this procedure.

The local health and safety regulatory requirements shall be applied during all production activities.

4.0. STANDARDS
4.1. Below listed welding standards are to be followed for all weld quality and weld markings:
- ISO 5817 – Welding – Fusion-welded joints in steel, nickel, titanium, and their alloys.
- ISO 2553 – Welding and allied processes. Symbolic representation on drawings. Welded joints.

4.2. Following standard is used for dimension tolerances:

- ISO 13920 – Welding – General tolerances for welded constructions – Dimensions for lengths and angles – Shape and position.

5.0. WELDING CONSUMABLES

5.1. Refer to document PWP0001 for recommended welding consumables.

6.0. WELD PARAMETERS AND ALTERNATIVE WELDING PROCESSES

6.1. Refer to document PWP0001 for recommended welding parameters.

7.0. PREPARATION AND PROFILING

7.1. Refer to the Layout drawing (SL0XXX) and trim the straight bar/s if required. Typically full-length bars are used as center bars while sidebars appearing behind the spade corner points (or transition shrouds) may require trimming to adjust the lengths.

7.2. Remove paint from the area that will be welded on the Cast profile Bar Kit parts.

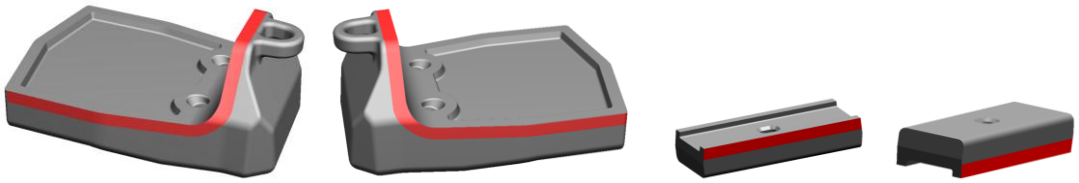

Figure 2 55mm Cast profile Bar Kit Parts

7.3. Remove any paint, grease or other impurities from the primary lip. Remove any existing worn profile bars (if present).

Note: All joint edges prepared for welding shall exhibit a bright metal finish, free of surface oxide or any other material that may impede weld quality and crack sensitivity.

Figure 3 Mako/Blue Pointer Lip

7.4. Refer to the Layout drawing (SL0XXX) and mark the locations of the CPB Kit. Scribe/mark a line with a minimum of 180mm / 7.1” from the leading edge of the bare lip (or 30mm /1.2” from the back of shrouds), by following the leading edge profile.

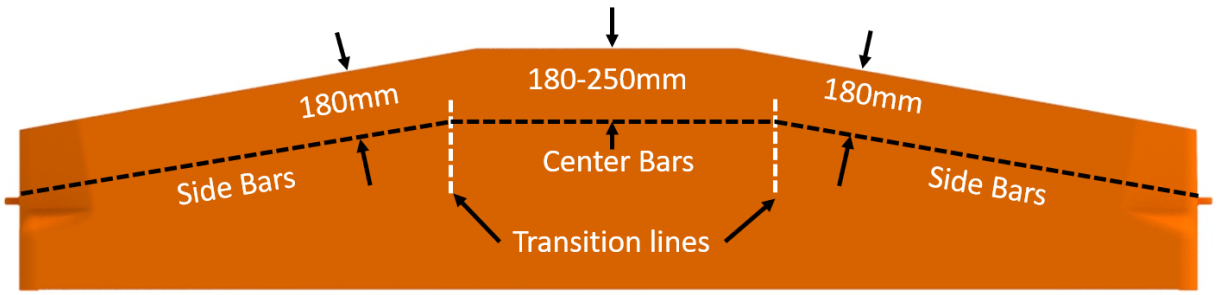

Figure 4 Scribed Line

8.0. PREHEATING REQUIREMENTS & INTERPASS TEMPERATURE

8.1. Before performing any weld operations including tack weld, preheat (refer to Table 1) the lip and the Cast Profile Bar Kit parts to the target temperature, measure at least 75mm / 3" either side of the weld joint or the area being welded.

Material	Target Pre-heat temperature ºC	Max Inter-pass temperature ºC
Sandvik cast profile parts	160-190	225
Lip plate (ASTM A514 Steels)	As per the manufacturer's recommendation	As per the manufacturer's recommendation

Table 1 Preheat, Inter-pass temperature

Refer to Weld Procedure PWP0001 for more details.

Heat should be applied to the CPB segments from inside of the lip as indicated below. The metal temperature readings should be taken on the outside surface of the bucket lip at the weld zone or at the area being welded.

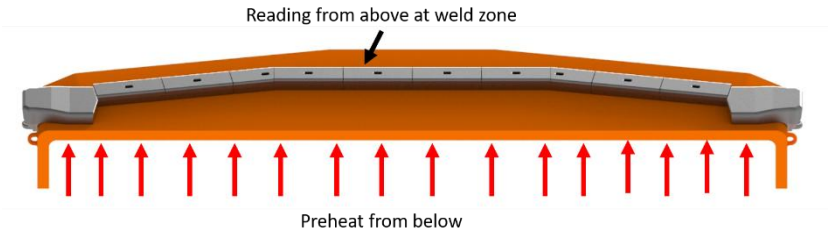

Figure 5 Preheating Lip & Castings.

Preheat methods shall ensure a consistent full-thickness preheat temperature throughout the entire welded zone along the full length of the weld joint during welding operations. Preheat shall not be interrupted until the weld joint is a minimum 30% filled, upon which the cooling conditions specified in PWP001 shall be adopted. Upon resumption of welding, the full extent of minimum preheat shall be established before welding is commenced.

Refer to PWP001 for more details regarding Preheating.

8.2. Single hand-held burners, using Oxy-Acetylene are not recommended as they can cause local overheating of the GET before the casting body reaches the optimum temperature. Therefore, a row of rose burners (3 or more) using LPG is recommended as it gives a better heat transfer to the work as shown in image below.

Figure 6 Rose burners

8.3. Ensure the bucket lip and CPB Kit temperature does not fall below the target temperature (refer to Table 1) between weld passes. If this does occur, reheat as per the procedure PWP001.

8.4. Refer to Table 1 for the maximum inter-pass temperature permitted during welding This shall be checked and recorded within 12.5 mm (½") of the weld restart location. Where temperatures that exceeded the maximum allowed inter-pass temperature as per Table 1, the location shall be allowed to cool to near the minimum inter-run temperature before welding operations are recommenced.

9.0. PLACEMENT OF HEEL SHROUD

9.1. Using a Mechanical lifting device, position the Cast Profile Bar Heel shrouds on the Lip as pictured.

9.2. Align the front edge of the Heel shroud with the scribed line marked as per step # 7.4

Note: It is recommended to maintain a nominal 50mm / 2" distance from the cast profile bar rear face to the main lip weld to the bucket floor plate as indicated below. If a minimum 30mm / 1.2" cannot be maintained, contact Sandvik representative and discuss for deeper lip options.

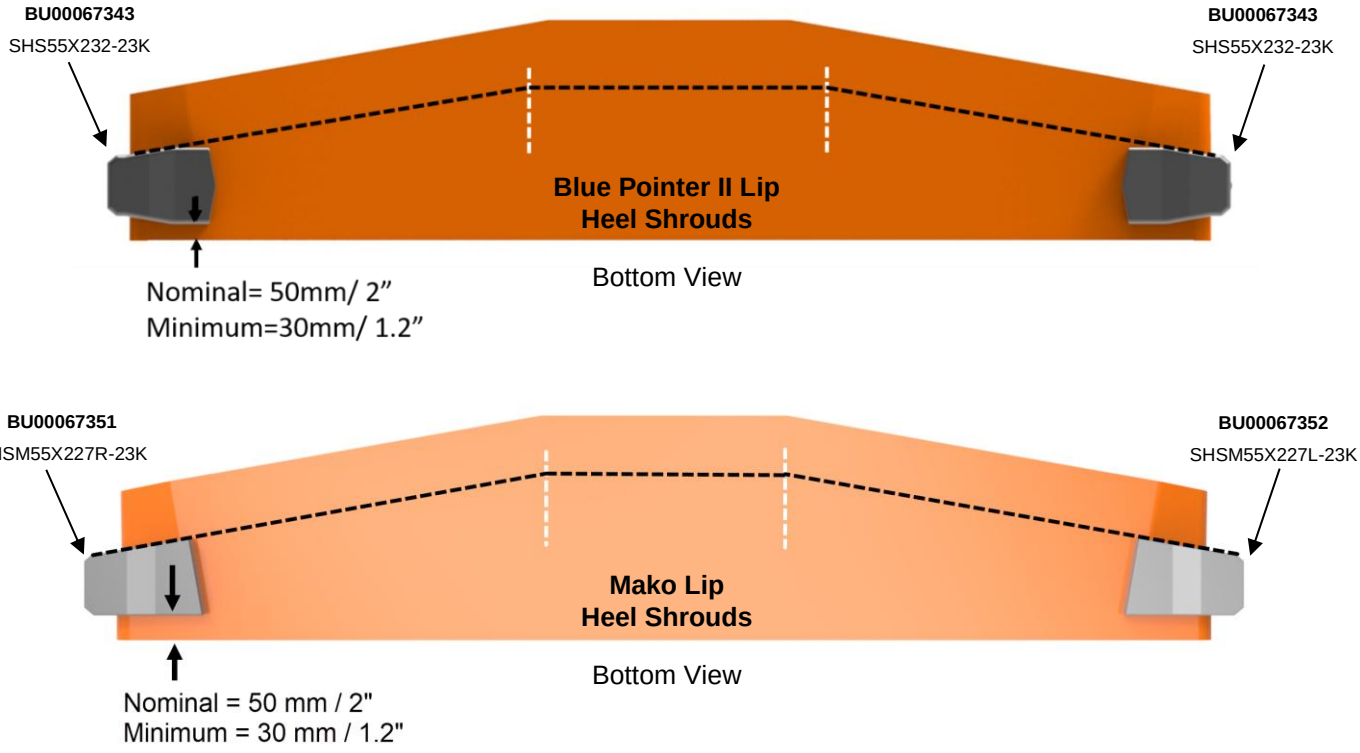

Figure 7 Heel shrouds aligned to the markings

9.3. Ensure the heel shroud is touching to the cast corner as shown in the figure below.

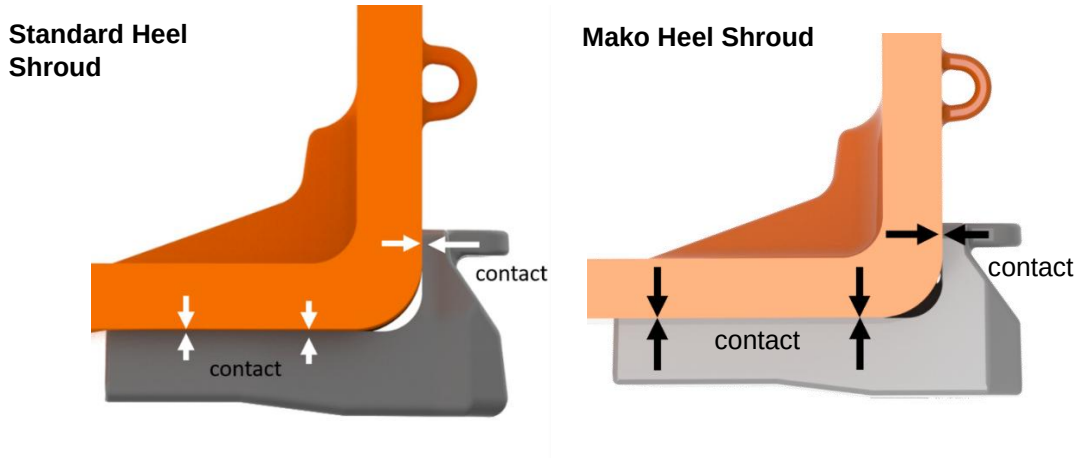

Figure 8 Heel Shroud Placement

9.4. Tack weld the heel shroud in position at preheat conditions mentioned in step # 8.0

10.0. PLACEMENT OF THE STRAIGHT BARS

10.1. **Center Bars**:

Refer to the Layout drawing (SL0XXX) and place the straight bars between the Transition line locations. Ensure the bars are touching each other and also the front edge is aligned to the scribed line as mentioned in step # 7.4

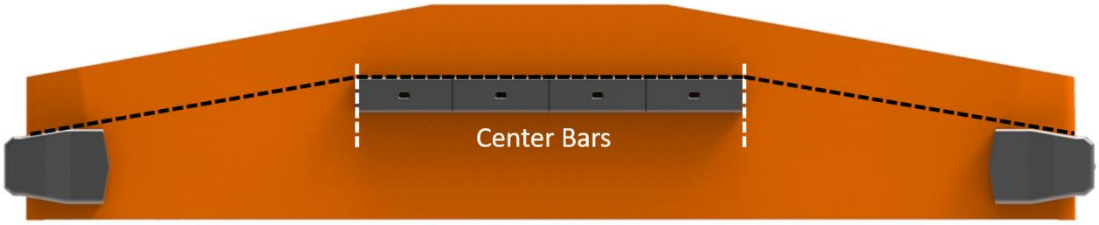

Figure 9 placement of center bars

Note: In order to use the full length of the straight bars, the center bars (not the sidebars) are allowed to be placed from a minimum of 180mm / 7.1” to a maximum of 250mm / 9.8” from the center spade leading edge of the lip (or 30 /1.2” to 100mm /3.9” from the back of the center shrouds). Refer to the Sandvik-issued lip layout drawing (SL0XXX) for details.

10.2. **Side Bars:**

As shown in the lip layout drawing (SL0XXX), place the straight bars from the heel shroud up to the center bars. Ensure the bars are touching each other and also aligned to the scribed line as mentioned in step# 7.4.

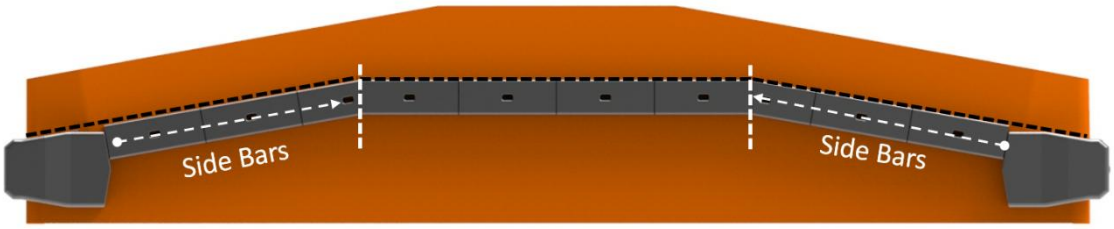

Figure 10 Placement of side Bars

10.3. If any trimmed straight bars are in use while positioning, it is recommended to place the flat/cut face of the bar against the uncut/natural beveled face of the adjacent bar as shown below.

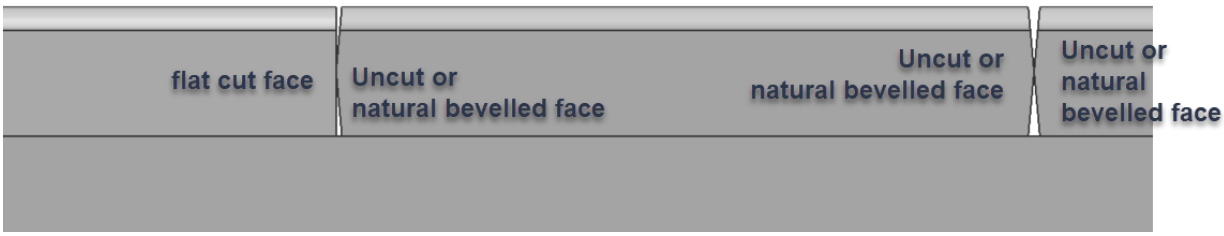

Figure 11 Side face contacts

10.4. Tack weld all straight bars in position at preheat conditions mentioned in step # 8.0.

11.0. CPB KIT WELD

11.1. Refer to step# 8.0 and ensure the CPB Kit is at preheat condition.

Heat should be applied to the CPB segments from inside of the lip as indicated below. The metal temperature readings should be taken on the outside surface of the bucket lip at the weld zone or at the area being welded.

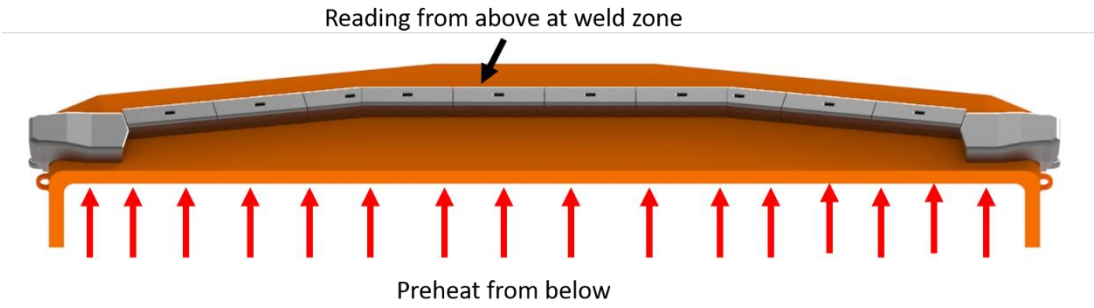

Figure 12 Preheating of the CPB Kit

11.2. Unless otherwise not mentioned in the drawing, perform continuous 12mm (Throat length) fillet weld to the Cast profile Bar heel shroud at areas indicated below in red. 1F/2F weld positions are recommended for the cast profile bar side/bottom side of the lip. 2F/4F positions are recommended for the side face of the lip.

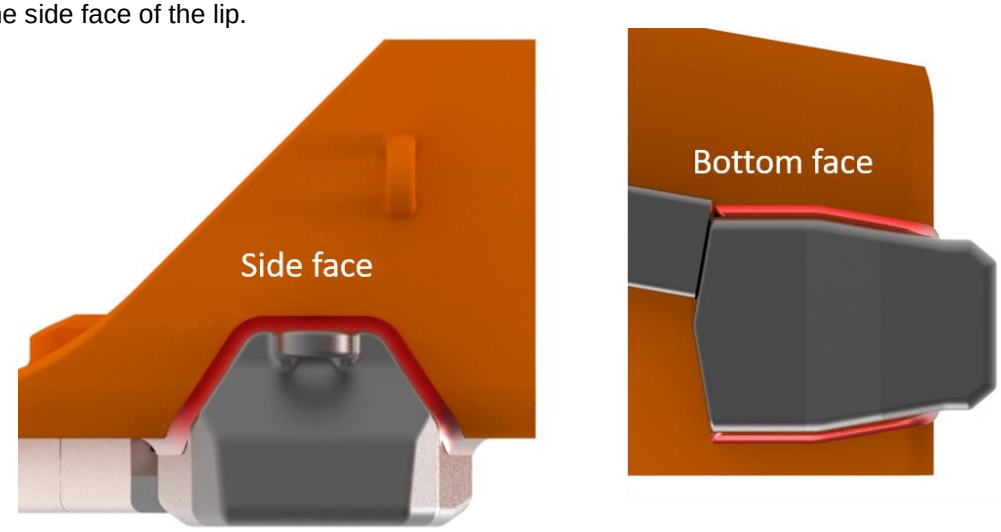

Figure 13 Heel shroud weld

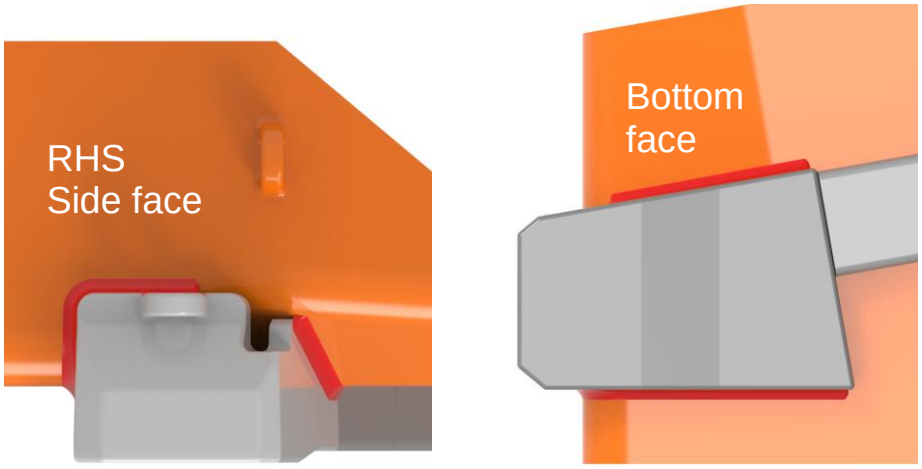

Figure 14 Mako Heel shroud welds

11.3. Unless otherwise not mentioned in the drawing, perform continuous 12mm (Leg length) fillet weld at 1F/2F position at preheat conditions to weld the CPB Straight Bars at the areas indicated below in red.

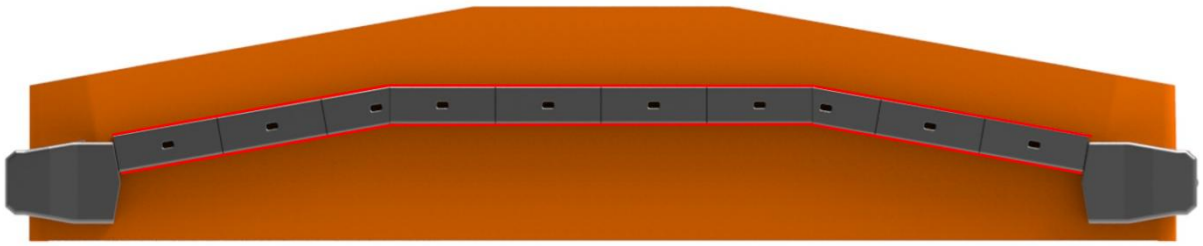

Figure 15 CPB Kit continuous weld

11.4. Use as many runs as required. Clean weld before each run. Apply and maintain minimum inter run temperature as shown in section#8.0 Table 1. Where temperatures greater than the maximum allowed interpass temperature recorded, the location shall be allowed to cool to the recommended inter-run temperature before welding is recommenced.
11.5. Clean welds by following procedure PWP0001.

12.0. WELD FINISHING & COOLING CONDITIONS

12.1. Refer to the Product Welding Procedure- PWP0001, for Sandvik's recommended Weld finishing and Post Weld Cooling requirements.

13.0. WELD INSPECTION

13.1. Refer to Product Welding Procedure- PWP0001 for Weld Testing and avoiding Hydrogen Assisted Cold Cracking (HACC) and stress cracking

Where NDE methods in addition to visual inspection are applied, the acceptance criteria for welds shall satisfy AS/NZS: 1554 Part 4 – SP criteria of AWS D1.1 cyclically loaded connection.

14.0. DOUBLE CAST PROFILE BAR KIT

14.1. For the double CPB Kit, unless otherwise not mentioned in the drawing, place the 2nd set of the straight bars at a 35-40mm distance from the first by following step# 10.0.
14.2. Complete weld of the 2nd set of straight bars as per step# 11.0.

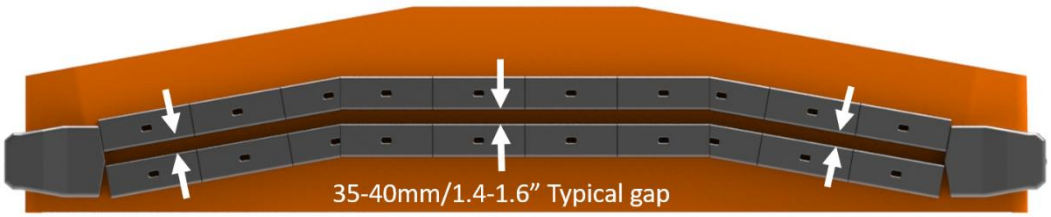

Figure 16 CPB second Kit layout

55mm CPB Kit welding steps are now completed.

15.0. REVISION HISTORY

Rev #	Notes	Prepared By	Checked By	Approved By	Date
0	Initial Release	J.J	I.H	M.J	11/09/2020
1	Section#7.1 updated to add full length bars to be used at center. Section#7.4 & 10.1, side bars location corrected as 180mm. Center bars to be located at 180-250mm. Section#10.1 & 10.2, order of adding bars changed. Center bars to be placed first.	J.J	-	M.J	22/06/2021
2	Added Mako Heel Shroud images	R.L	J.J	M.J	13/03/2023
3	Section#6.0, Reference Doc#PWP0022 had been removed as it is obsolete. Section#8.4 & 11.4, Max inter pass Temperature changed to 230°C from 250°C.	J.Jose	-	-	08/06/2023
4	Added new welding temperature Table 1. Cross reference to PWP001 added for weld finishing and Testing	R.L	J.J	M.J	23/11/2023
5	Updated max interpass temps	R.L	-	R.L	19/12/2024