Document Version Control		
Document Number	Version Number	Release Date
WP0003	**2**	**03/10/2014**

Lockjaw Boss Welding Procedure

Welding Safety

Welding, cutting and any allied process are a significant safety risk. Before undertaking any of these processes ensure that all precautions have been considered or implemented as per welding safety standards AS1674: 2007 or ANSI Z49.1: 2005 or equivalent globally recognized standard.

Of particular note please ensure the following is adhered to:

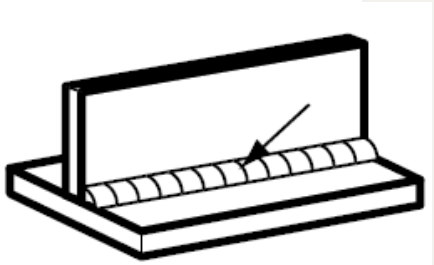
- Wear correct PPE including
  - Full sleeve non-flammable work wear. (No gaps)
  - Non-flammable welding gloves
  - Steel capped work boots
  - Safety glasses
  - Hearing protection
  - Full face welding shield
- Suitable ventilation is available for the person completing the operation.
- Welding is an electrical risk. Ensure the area where welding is to be conducted is not damp or wet.
- Welding is a fire risk. Ensure the area where welding is to be conducted is free of any thing flammable and that suitable fire extinguishers are easily available.
- If welding is to be conducted in an area where other people are working ensure welding flash shields are utilized.
- Good general housekeeping to ensure the work area is safe and free of clutter.
- Ensure appropriate tags for your work place and work environment are used.

Weld Preparation

The surfaces to be welded must be good and free from scale, grease, paint, water, or any other contaminants.

Welding Position

HORIZONTAL

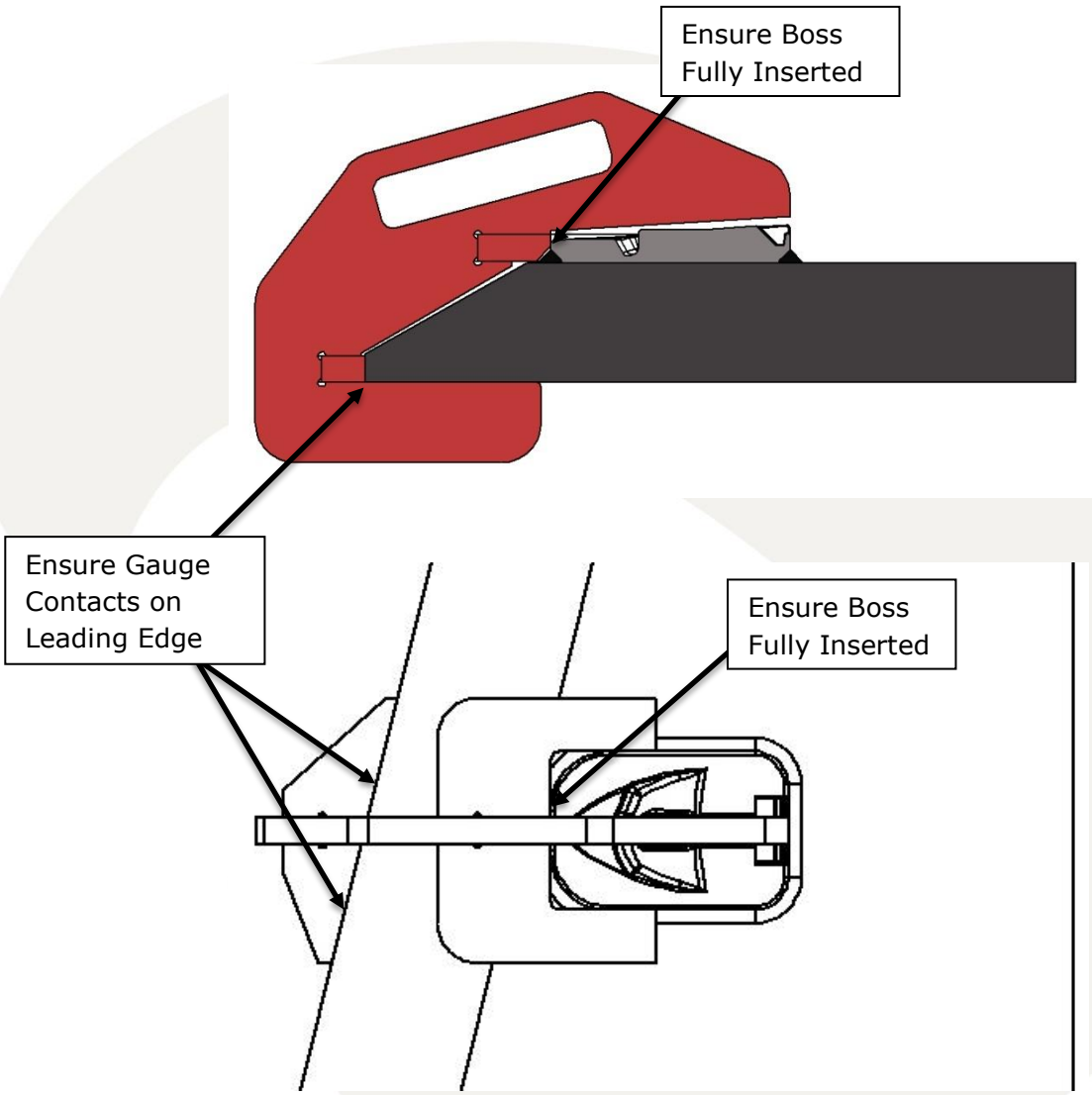


2F / PB

Place Talon Bosses on the lip plate, in the position detailed by the lip assembly drawing which suits your bucket size and configuration. Use the appropriate Talon Lip Template Gauge as determined from the following table to determine the set-back for each Boss on the lip:

Lip Spade	Lip Thickness				
	50mm	70mm	90mm	120mm	140mm
Straight	FGA00007	FGA00009	FGA00001	FGA00004	FGA00012
Right Spade		FGA00010	FGA00002	FGA00005	FGA00013
Left Spade		FGA00011	FGA00003	FGA00006	FGA00014
Transition	FGA00008				

These gauges will locate the Talon Boss on the lip such that the Boss is in line with the direction of bucket operation and front face is set back the correct distance from the leading edge of the lip, as defined on the Lip Assembly drawing. When using the Talon Lip Template Gauges ensure the gauge contacts with the leading edge of the lip and the Boss is inserted fully into the locating cradle.



Welding Process

Welding may be completed by any of the following processes:

- Gas Metal Arc Welding (GMAW)
- Flux-cored Arc Welding (FCAW)

A combination of GMAW or FCAW can be utilised.

Consumables

Process	AWS	AS / NZS	ISO	Shielding Gas
GMAW	AWS A5.18 ER70S-4	2717.1: ES4-GC/M-W503AH		100% CO2 Ar + 10-15%CO2 Ar + 15-25%CO2
GMAW	AWS A5.18 ER70S-6	2717.1: ES6-GC/M-W503AH		100% CO2 Ar + 10-15%CO2 Ar + 15-25%CO2
FCAW	AWS A5.20 E71T-1 H8	17632-B: T49 3 T1-1 CA-K-U H10		100%CO2 Ar + 20-25%CO2
FCAW	AWS A5.18 E70C-6M H4	17632-B: T49 2 T15-1 MA K-U H5		Ar + 20-25%CO2
FCAW	AWS A5.20 E70T-7	17632-B: T49 Z T11-0NA-H15		NR
FCAW	AWS A5.20 E71T-8	17632-B: T49 Z T8-1NA-H15		NR

Thermal Treatment

Material	Thickness	Min Preheat Temp	Max Interpass Temp
Talon Castings	All Weld-on Castings	150°C / 300°F	260°C / 500°F
ASTM A514 Steels	Greater than 63mm / 2-1/2"	120°C / 250°F	260°C / 500°F
400 -450 BHN Abrasion Resistant Steel	Greater than 63mm / 2-1/2"	150°C / 300°F	260°C / 500°F

Notes:

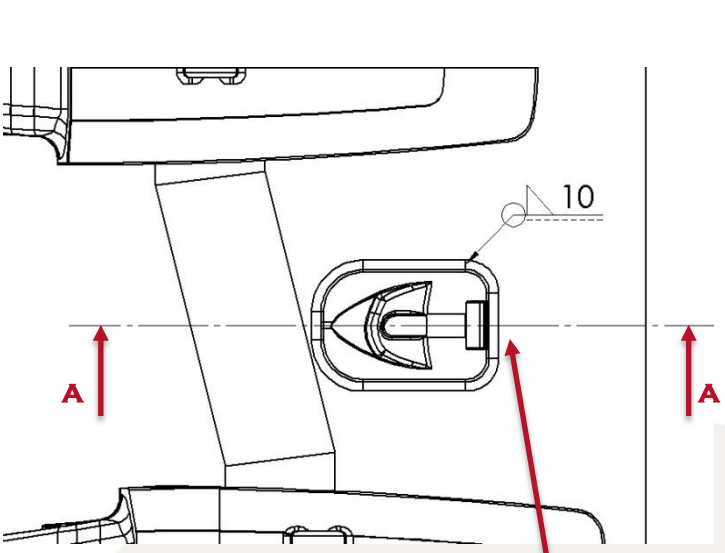
- If the ambient humidity is high and or the temperature is below 4°C / 40°F, the tabulated thermal treatment temperature should be increased by 27°C / 80°F. At no time should any material type or thickness be welded when the temperature of the steel is at or below 4°C / 40°F.
- All material within 100mm / 4" of the weld zone must be within the specified temperature.
- Cool weld slowly, for a minimum of 8 hours, utilising thermal blankets. Do not allow drafts or cool ambient temperatures to cool the parts or assembly. Cool down rate should not exceed 55°C / 130°F, per hour.

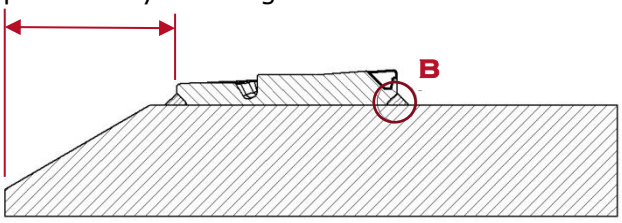
Welding Sequence

Locate each Boss on the lip plate using the Talon Lip Template Gauges. Fix each Talon Boss in place with one 12mm / 1/2" long tack weld at the root of the weld prep on either side of the Boss. Preheat the lip plate and Talon Bosses as required. Complete an all-round 10mm fillet weld as shown in the figures below. Ensure 2 or more weld passes are used to complete the full size fillet weld.

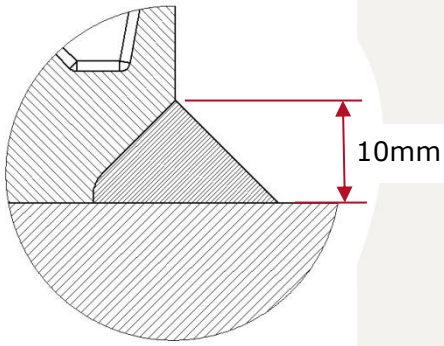
Begin Welding the Talon Bosses to the lip beginning the bosses located in the centre of the lip and work out to the bosses located near the edges.

See Lip Assembly Drawing





SECTION A-A

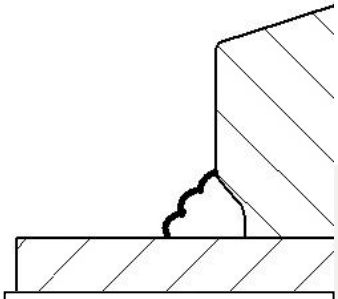


DETAIL VIEW B

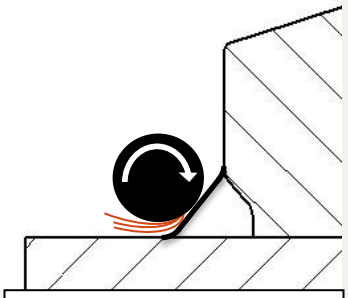
Note: For Surface Mining applications, Boss is located on the centreline between the two Talon Adaptors.

Weld Finishing

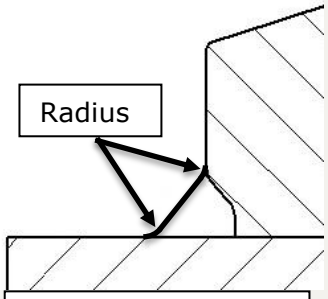
The surface of all welds shall be ground smooth, such that the surface of the welds become a smooth surface free of any roughness or ripples associated with fresh welds. The toes of the weld shall transition to the lip and Talon Boss smoothly. Although various methods of grinding maybe used to remove the bulk of the weld roughness. Grinding shall be finished such that any remaining grinding markings are all perpendicular to the weld.



Weld Before Grinding

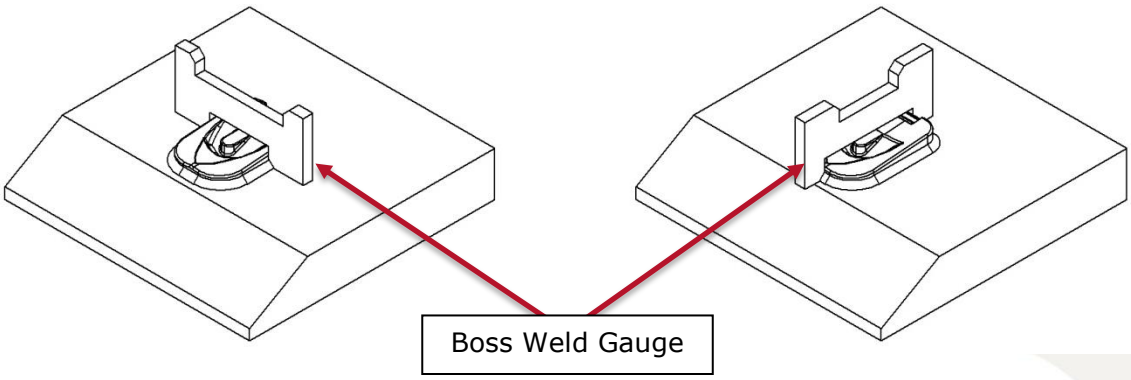


Weld During Grinding



Weld After Grinding

Inspect finished weld size using Talon Boss Weld Gauge. This gauge is a simple GO / NO-GO gauge. The gauge should be able to pass easily over the welded Talon Boss while maintaining contact with the lip surface. If the gauges interfere with the weld surface continue to grind the weld until the gauge can pass over the Boss.



It is recommended that all finished welds are inspected for cracks using either MPI or Dye Penetrant Inspection. It is preferable to use the MPI process. Any cracks detected must be completely gouged out and filled with weld. Finish the repair with grinding and gauge inspection as detailed above and re-inspect for cracks.

CHANGE REGISTER

Rev	Date	Changes from previous version
0	01/05/12	Original Issue
1	03/02/14	Template updated, content altered to be more general allowing for 120mm lip bosses
2	03/10/14	Content altered to allow procedure to suit underground mining application as well. Content made more generic.