MTG

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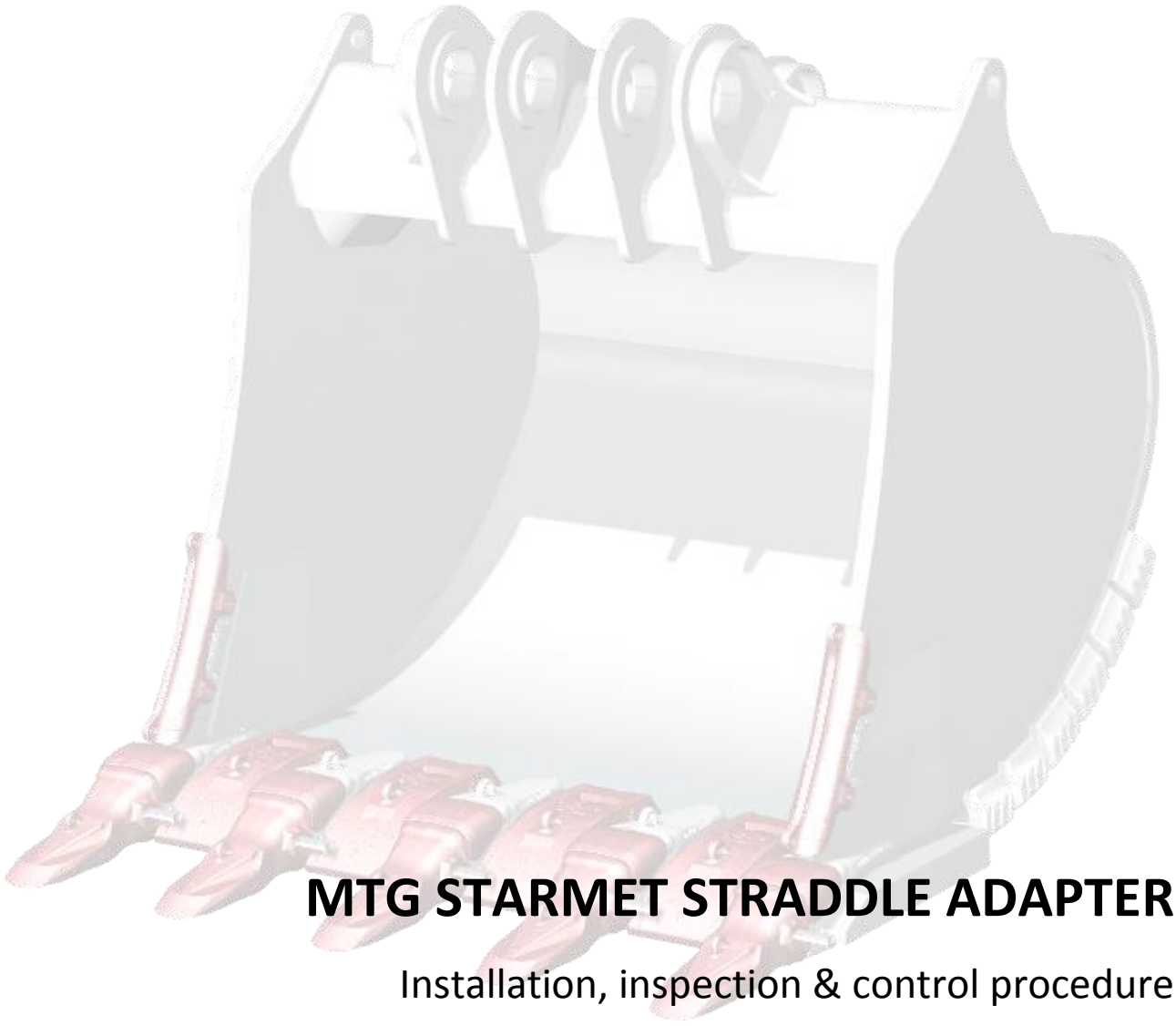


MTG STARMET STRADDLE ADAPTER

Installation, inspection & control procedure

Safety

The practices described in this manual can be taken as guidelines for operating safely in many conditions and in addition to the safety standards that are current and enforceable in your area or region.

Your safety and the safety of third parties is the result of putting into practice your knowledge of the correct operational procedures.

Attention, when performing the work described in these instructions, always work safely and use the personal protection elements required to minimize or avoid injury.

Always wear:

- Hard hat
- Protection globes
- Steel toed boots
- Ear protection
- Safety glasses

To avoid eye injury, always wear safety goggles or a protective mask when using any equipment, hammer or similar tool. When equipment is under pressure or when objects are struck, chips or other debris can be thrown out. Make sure no one gets hurt by the debris that is fired before applying pressure or hitting an object. Wear eye protection that complies with ANSI Z87.1 and OSHA standards. Also wear hearing protection and gloves.

Lifting a heavy object can cause serious or fatal injury. DO NOT exceed the maximum rated capacity of lifting and positioning devices: Stay away from the area under a suspended load.

Make sure that the chain is not damaged and that the load is balanced at all times. DO NOT lift an object by connecting only one end to the load chain; Connect both ends to lifting points, if available.

When handling heavy loads (+ 25 kg), use a sling truck according to ISO 7531: 1987.

Welding

Following is a quick reference on consumables that can be used to weld MTG products. For a complete reference on welding procedures, refer to the document entitled "General welding recommendations".

WELDING UNALLOYED & LOW ALLOYED FILLER CONSUMABLES		
Process	**EN Class**	**AWS Class**
SMAW	EN ISO 2560-A E42X	E70X according to A5.1 or equivalent under A5.5
GMAW	EN ISO 14341-A G42X EN ISO 14341-A G46X	E70C-X according to A5.18 or equivalent under A5.28
		ER70S-X according to A5.18 or equivalent under A5.28
FCAW	EN ISO 16834-A T42X	E7XT-X according to A5.20 or equivalent under A5.29

WELDING AUSTENITIC STAINLESS FILLER CONSUMABLES	
Process	**AWS Class**
SMAW	E307-X according to A5.4
GMAW	E307T-X according to A5.22
	ER307 according to A5.9
FCAW	307X according to A5.22

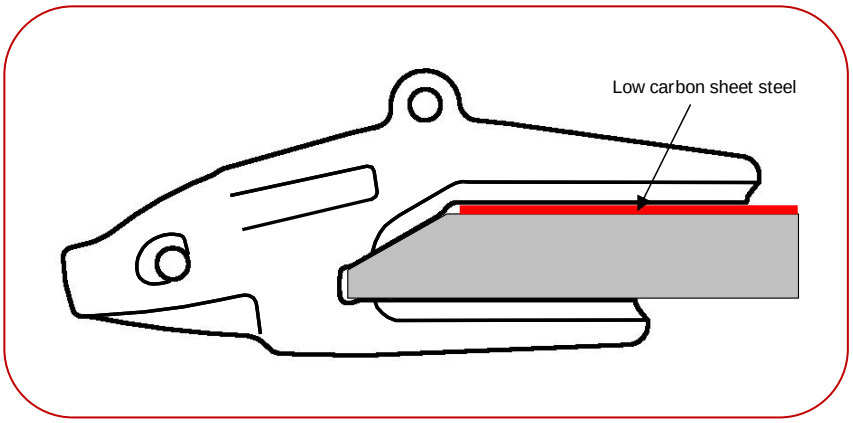
Note that "X" may stand for one or several characters.

Considerations in regards to the gap

The gap between the adapter's upper strap and the lip must be not greater tan 2mm/0.8in.

Just in the event that the clearance space between the upper straddle leg and the lip exceed the previous defined gap, a low carbon steel sheet-metal must be located in order to cover the aforementioned gap.

Alternatively the upper leg adapter may be built up by welding to acceptable dimensions in the follow manner:



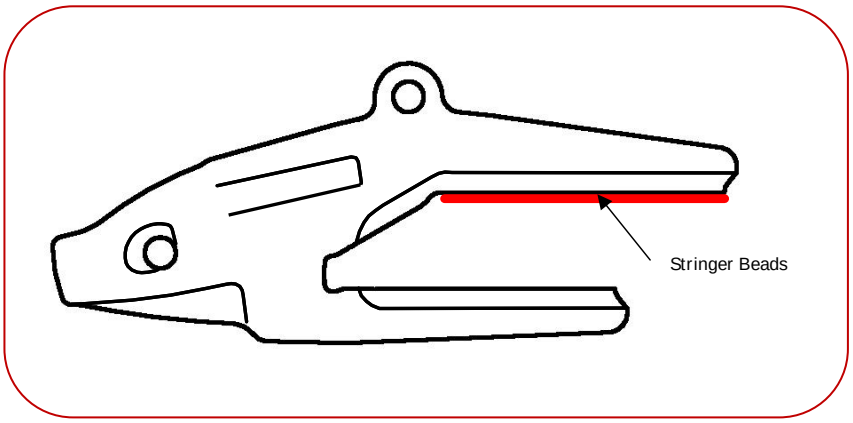
1. Clean the surfaces of any contaminants.

2. Preheat adapter leg to 150°C / 300°F

3. Deposit stringer bead(s) on the landing of the adapter to reduce the gap condition.

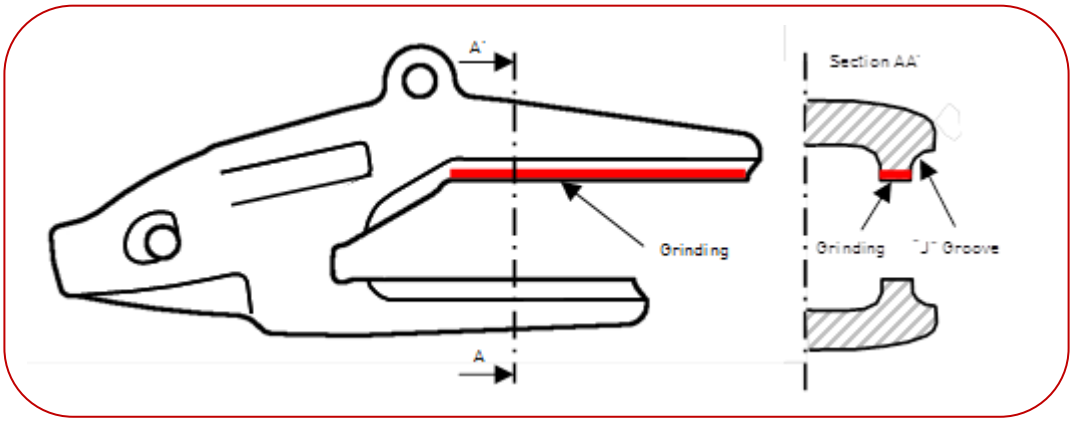
4. Grind weld so that there is a smooth transition in the weld groove area of the adapter.

5. Check fit adapter on lip. Grind or weld as required to eliminate gap condition.



If leg spacing is too narrow to fit the lip, grinding of the lands at the interfering upper leg is permissible.

If more than 3.2mm / 0.13 in. is removed from the weld preps of the upper leg adapter, the weld prep must be widened to restore the original "J" groove weld size.



Installation procedure

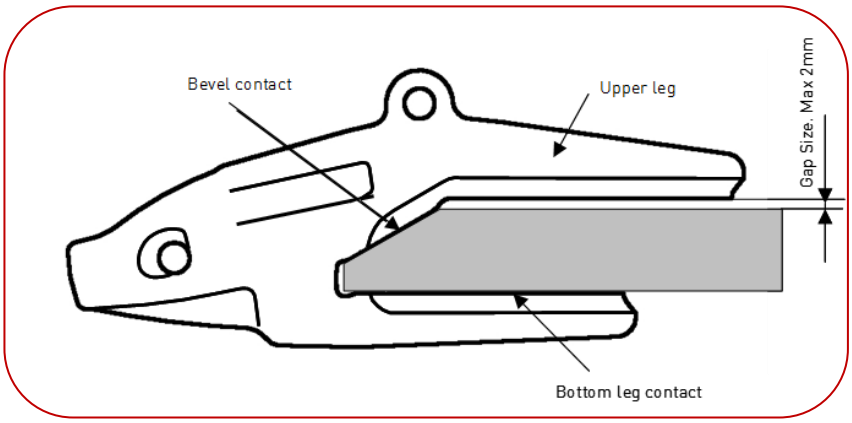
If the lower corner wear cap is expected to be installed, first check the installation instructions out for the lower corner wear cap.

STEP 1:

All mill scale, rust, paint, oil grease, arc air slag or moisture shall be removed from the surfaces within 12.5 mm / 0.5 in. of any weld location. The surfaces must be sufficiently clean so that there is nothing that might contain moisture or hydrocarbons, which break down in the heat of the arc producing hydrogen, which can be absorbed in the weld and cause cracks. Removal may be accomplished by shot blasting, sand blasting, grinding or machining. Any porosity, burned-in sand or other defects visible on the weld prep surfaces must be removed by grinding or arc air gouging.

STEP 2:

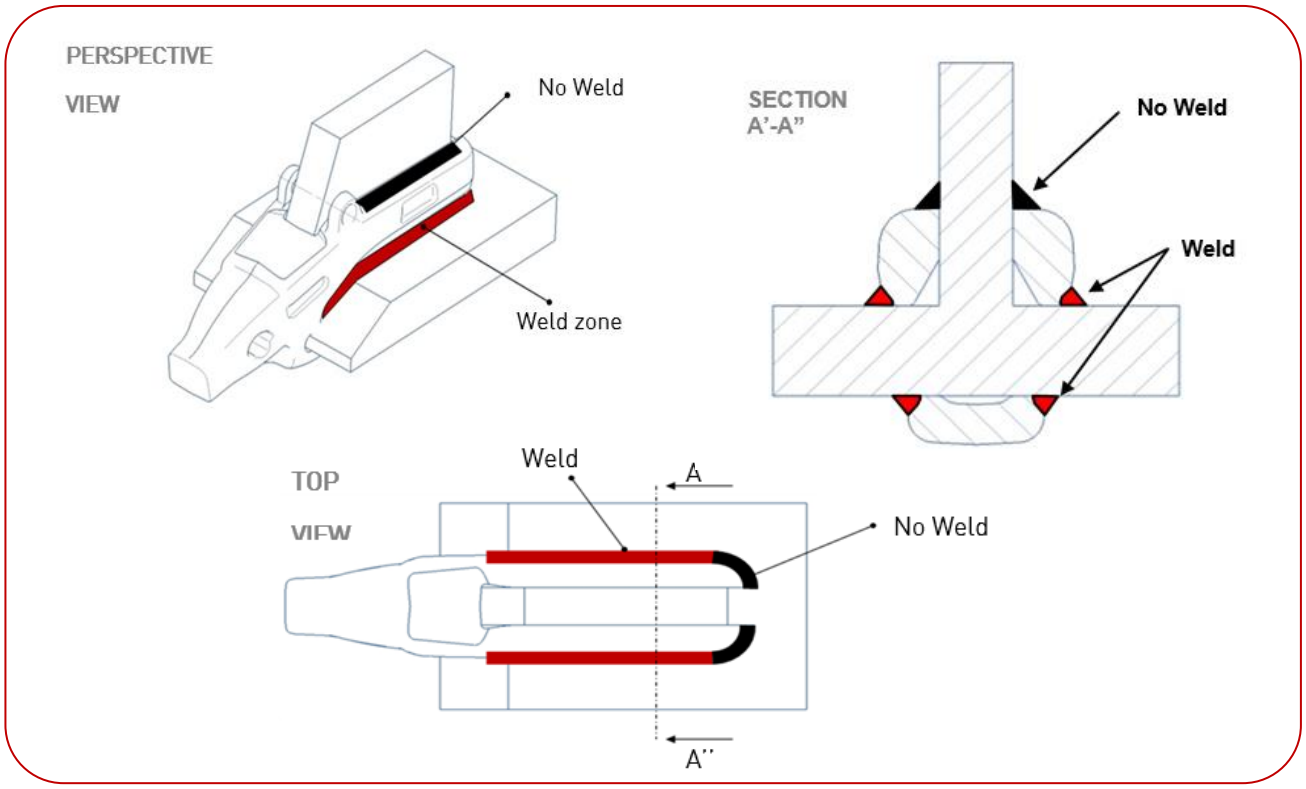
Place adapter on lip plate per desired location from side to side. Bottom leg and bevel angle should be in full contact as show in figure below:



STEP 3:

Preheat adapter and lip to a temperature between 150ºC and 180ºC (302ºF and 356ºF) within an offset of 100mm / 4in all around according to what is exposed on the document entitled “General welding recommendations”. Do not overpass 250ºC / 482ºF.

Take into account the areas to be welded and those that do not according to the following figures:

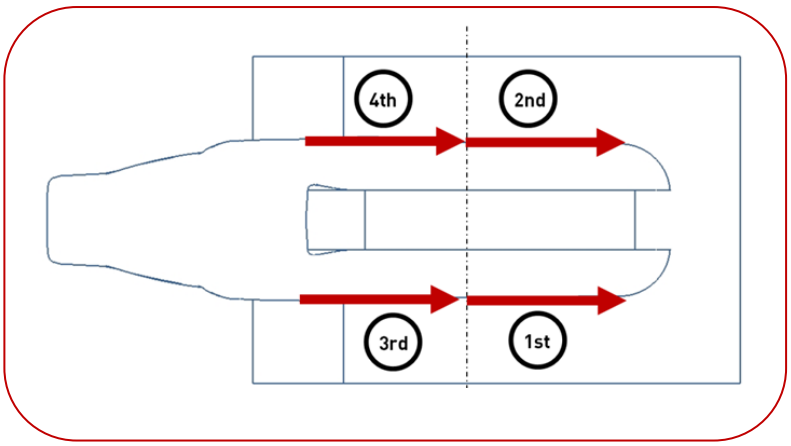


STEP 4:

Apply one 25mm / 1in. long tack weld at the root of the weld groove on each side of the top leg, midway between the end of the leg and the trailing edge of the lip bevel.

STEP 5:

Begin welding at the center of top leg and weld one pass according to the sequence shown in the next figure. Do not weld within 19 - 25mm / 0.75 - 1.00 in. of the lip leading edge.

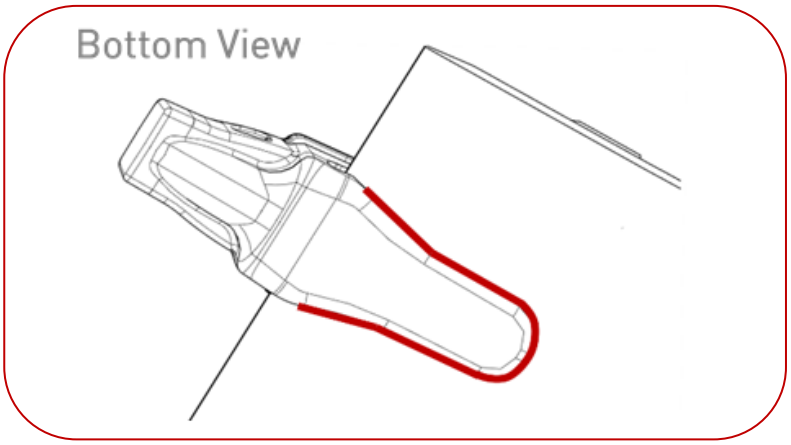


STEP 6:

Repeat this sequence (step 5) three times. Vary the lengths of the beads slightly so that the start/stop positions are not at exactly the same location.

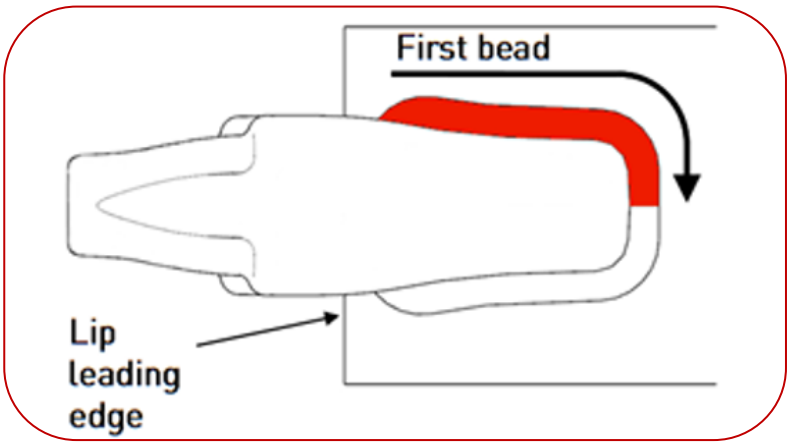
STEP 7:

Turn the lip over.



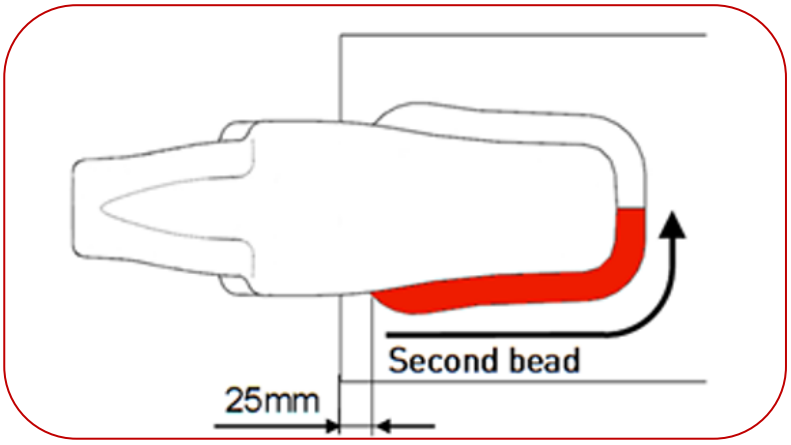
STEP 8:

Begin welding at the front of the weld groove on the bottom leg and weld to the back of the leg. Do not weld within 19-25mm/0.75 - 1.00 in. to the lip leading edge.



STEP 9:

Begin welding at the front of the groove on the opposite side of the leg, joining the initial bead at the back of the leg. Do not weld within 19-25mm/0.75 - 1.00 in. to the lip leading edge.



STEP 10:

Repeat this sequence (steps 8 and 9) three times. Vary the lengths of the beads slightly so that the start/stop positions are not at exactly the same location.

STEP 11:

If the adapter size requires additional weld layers, turn the lip over and weld three layers according to the sequence for the top leg.

STEP 12:

Turn the lip over again and apply three layers according to the sequence for the bottom leg.

STEP 13:

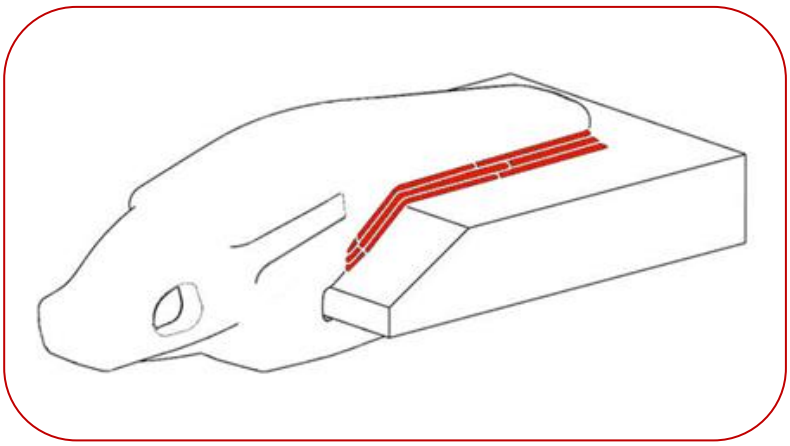
The leg sizes of the fillet must be flush and less than 3.2mm / 0.13 in. above the edge of the cast weld groove. In some adapter patterns, the weld groove height decreases near the leading edge of the lip. With these adapters, the size of the fillet shall decrease correspondingly in the region.

STEP 14:

Ensure that the welding technique comply with what is exposed in the document entitled "*General welding recommendations*".

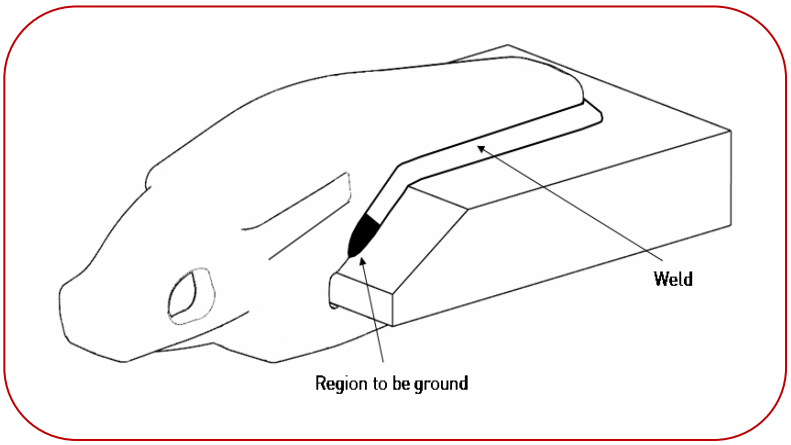
STEP 15:

When welding large adapters, considerable grinding effort can be saved by carefully positioning the starting points of the beads near the leading edge. Start each bead slightly behind those of the preceding layer so as to produce a "rounded" weld end.



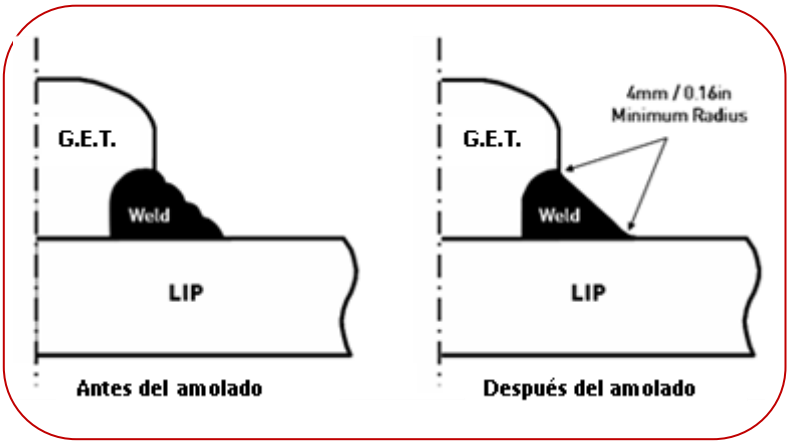
STEP 16:

The surfaces of adapter/lip fabrication welds shall be ground smooth 65 - 75mm / 2.50 - 3.00 in. from the front ends as indicated in the figures below. All welds on both the top and bottom of the lip shall be ground.



STEP 17:

Grinding shall produce a smooth surface free of roughness and unevenness associated with the weld beads. The toes of the welds shall merge smoothly with the lip and the adapter with a minimum radius of 4mm / 0.16 in.

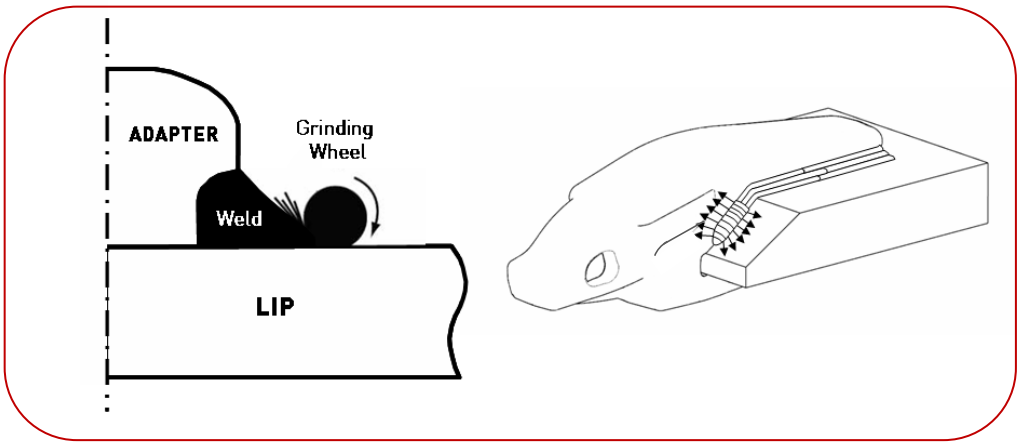


Grinding shall be done using high speed electric or pneumatic grinders with grinding wheels no larger than 50mm / 2.00 in. in diameter. ANGLE HEAD OR DISK GRINDERS ARE NOT ALLOWED FOR THIS WORK.

Grinding shall be done with the perimeter of the wheel and not the face. The grinding direction must be perpendicular to the toes of the welds as in the illustration:

Proper Grinding Directions:

Grinding the radio at the toes of the welds is facilitated by the use of cone-shaped grinding wheels. For final grinding, the abrasive may be no coarser than 24 Grit.



STEP 18:

On StarMet adapters from size 120 onwards, it is recommendable to perform a TIG

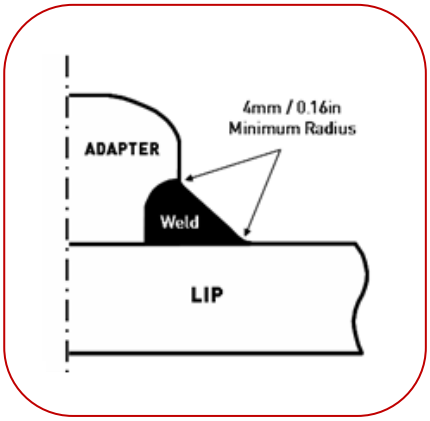
dressing on both upper and lower adapters' straps. This process involves using a GTAW torch to make an autogenous weld pass along the toe of the weld fillet.

The welding power supply shall have high-frequency start capabilities. "Scratch-starting" is not allowed. It is preferable to employ a remote foot-pedal current control so as to permit suitable filling of craters at the ends of beads.

Process	GTAW	
Electrode Type	AWS EWTh-2 (2% Thoriated)	
Electrode Dia.	2.4 to 4mm / 3/32 to 5/32 in.	
Shielding Gas	100% Argon	
Gas Cup Size	13mm / 0.50 in.	
Gas Flow Rate	9.4 to 14.2 1/minute / 20 to 30 ftVhour	
Current Type	Direct	
Polarity	Straight (Electrode Negative)	
Current Range	2.4mm / 3/32 in.	175 to 250 Amperes
	3.2mm / 1/8 in.	250 to 300 Amperes
	4.0mm / 5/32 in.	400 to 500 Amperes
Electrode to Work Distance	1.6 to 3.2mm / 1/16 to 1/8 in.	

Any defects along the toes of the welds must be corrected by grinding or repair welding before the GTAW process. The torch shall be positioned over the weld toe and shall be oriented so as to produce a smooth weld bead without undercut. The welder shall control the travel speed so as to obtain a bead ranging from 4.8 - 8mm / 0.19 - 0.31 in. wide.

The GTAW dressed is recommendable to be performed along to the weld toes on the top and bottom legs.



STEP 19:

Repeat the sequence at all the rest of stations.

STEP 20:

After completion of welding, all welds shall be subjected to visual and magnetic particle inspection. Any detected welding crack must be cleaned and repaired.

Inspection and control procedure

It is recommendable to perform the inspection every 500h or whenever possible.

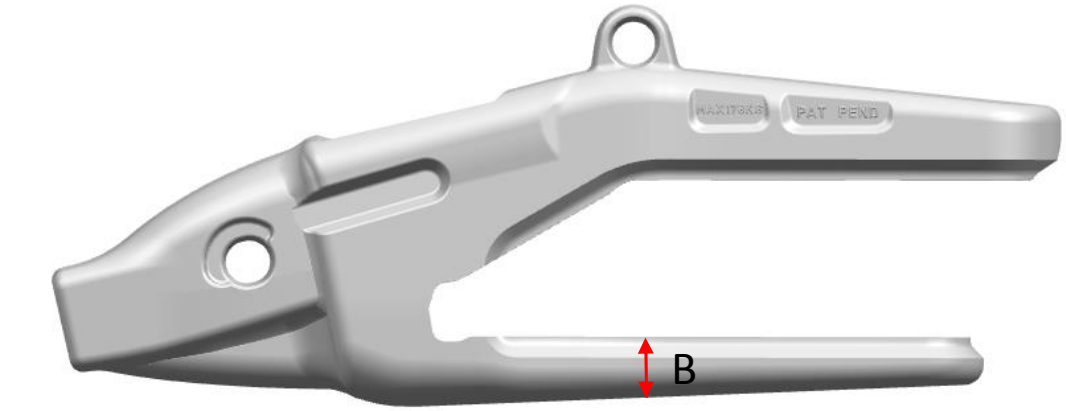
Dimensional control

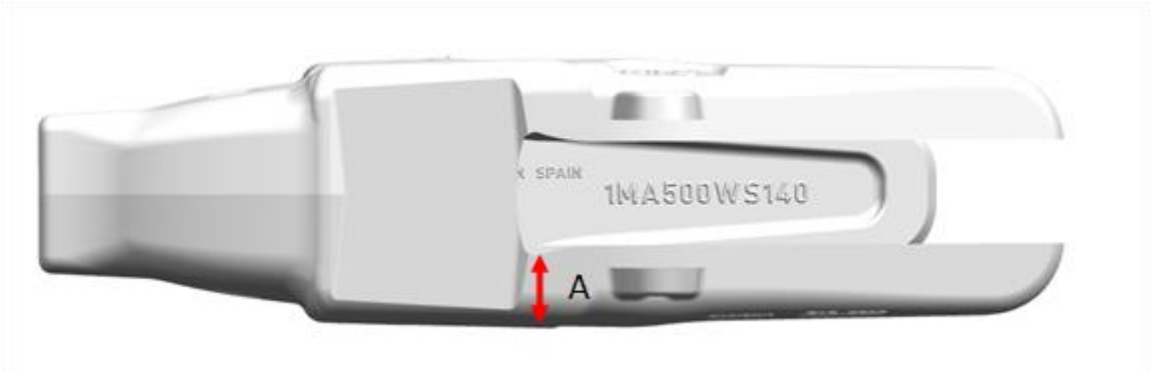
The measurement can be made by means of ultrasonic equipment or measuring tape according to the following procedure:

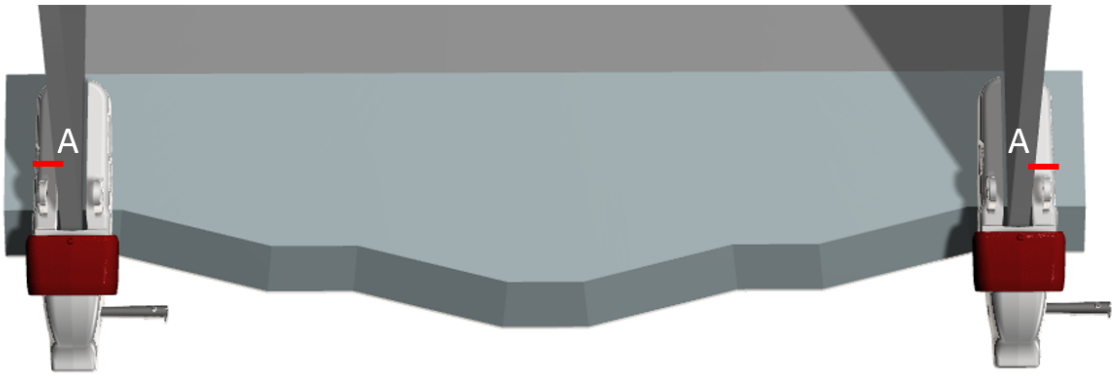
- Clean the areas where the measurement will be performed.

- Apply contact liquid in the area (in the case of ultrasonic measurement)

- Take measurement at each point as shown below:







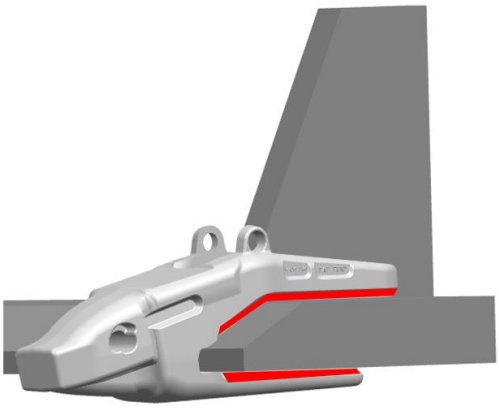
BY MEANS OF ULTRASONIC EQUIPMENT			BY MEANS OF MEASURING TAPE	
Size	A (mm)	B (mm)	A (mm)	B (mm)
1MA120WS	25	10	25	20
1MA180WS	30	20	30	30
1MA240WS	35	20	35	30
1MA500WS	35	20	35	30

Visual control

Plastic deformation on the adapters' noses.

Cracks control

Visual and liquid penetrating inspection of the adapter welds against the blade must be performed.



In the event of cracks in the weld, they must be cleaned and repaired as soon as possible in order

to avoid their propagation to the adapter causing the breakage.

In case of cracks detection at any other area of the adapter, contact your dealer for evaluation.

The replacement of the adapter must occur when one of the dimensions, A, B, or C is below what is exposed on the previous table.

NOTE: These measures are measures of maximum wear and does not imply the need for the element to reach them to be replaced. The fact of replacing the element before reaching any of these dimensions does not suppose a bad behavior of them.

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