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# INSTALLATION PROCEDURES

**KVX**



 2017 edition

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# Installation procedure for cutting-edges

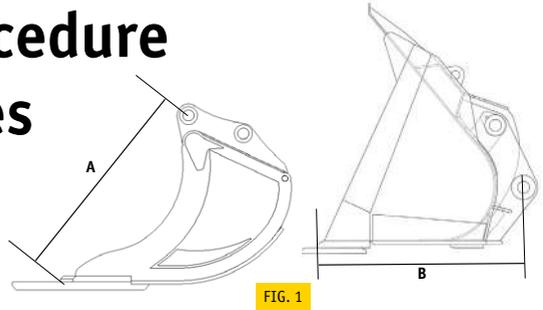


FIG. 1

## Preparations

Note measurements A and B as indicated in the figures above for excavator

and wheel loader buckets respectively. It is imperative that the bucket tip radius and volume remain unchanged when the new cutting-edge is installed.

Remove old edge by flame cutting clear of the existing weld. Cut and grind welding grooves. Remove paint, oil and other impurities as well as any remaining manganese steel from the welding zone. Install new edge to measurements A and B and weld according to these instructions.

## Flame Cutting *(also applies to KVX wear bar and wear products)*

Any flame cutting of the edge requires the following temperature precautions:

1. Preheat steel thicker than 50 mm to 150°C / 300°F.
2. Condition any cold stored steel 45mm or less to 100°C / 210°F before flame cutting.

## Preheating *(also applies to KVX wear bar and wear products)*

For good welds use preheating temperatures in table.

### Plate thickness, mm

	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	
Temperature in Celsius	+ 100 - 150				+ 150 - 200				+ 200 - 230													
Interpass-Temperature	+ 80 - 150				+ 130 - 200				+ 180 - 230													
CEV	0,57				0,66				0,74													
CET	0,42				0,43				0,46													

$$CEV = C + \frac{Mn}{6} + \frac{(Mo + Cr + V)}{5} + \frac{(Ni + Cu)}{15} \quad CET = C + \frac{(Mn + Mo)}{10} + \frac{(Cr + Cu)}{20} + \frac{Ni}{40}$$

Heat the parts evenly with a suitable gas torch, minimum 150 mm into the bucket bottom plate. Maintain recommended preheating temperature during the complete welding operation, otherwise cracks can develop in the Heat Affected Zone. Let the welded parts cool slowly.

Check preheating temperature by chromatic temperature crayons. Preheating and interpass temperatures in excess of 230°C / 450°F will reduce the abrasive properties and the strength of the steel. For cutting edges from 80 mm thickness and up, we recommend preheating with electrical blankets. Temperature measuring is best performed with an infrared handheld gun.

**Welding rods:** *(also applies to KVVX wear bars and wear products)*

Use only low hydrogen welding rods ( $H_2O < 5ml/100g$ ). Heat welding rods according to manufacturers instructions.

**Welding** *(also applies to KVVX wear bars and wear products)*

Weld single beads alternating on either side of the plate as indicated in Fig. 4. Use only straight beads. Grind or gouge the root string prior to welding from the backside. Weld with smooth transitions to the parent material and without any welding defects. We recommend using Voltage, Ampere and weldingspeeds according to manufacturer specifications.

**Welding Sequence:**

- Generally a welding sequence is favoured which minimises the restraining forces between the welded parts. This is ensured by giving the parts the freedom of movement during the welding operation.
- When installing a cutting-edge to a bucket the base plate must be welded prior to the sides in order to minimise any tension in the welding zones.

Weld the last bead on each side with a distance of 3 - 5 mm. to the parent material, to anneal its Heat Affected Zone and reduce the risk of cracks.

**Recommended welding consumables**

*(other brands can be used with the same mechanical properties):*

MMA (Manual Metal Arc-Electrodes)	GMAW (Mig/Mag Welding-Wire)
ESAB OK 48.15 (AWS: A/SFA 5.1 E 7018-1)	ESAB OK Autrod 12.51 (AWS A5.18-93 ER 70S-6)
	ESAB OK Autrod 16.95 (AWS A5.9:ER307 mod)
ESAB OK 55.00 (AWS: A/SFA 5.1 E 7018-1)	FILARC PZ6105R (AWS: A5.18-93 E70C-6M H4)
	HYUNDAI Supercored 70SB (AWS: A5.20 E71T-5C)

*\*Use recomended polarity and gas as described in welding rod datasheet.*

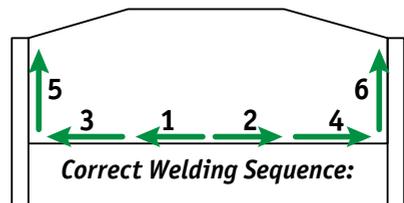


FIG. 2



**Grinding** (also applies to KVX wear bar and wear products)

Grind the weld as indicated in Fig. 3. and with the grinding marks transverse to the welding direction.

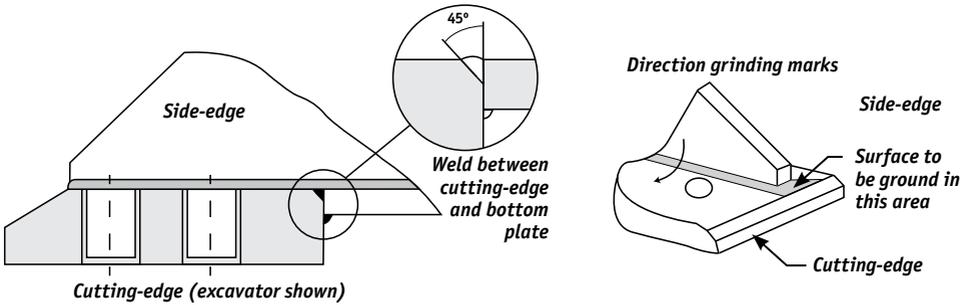


FIG. 3

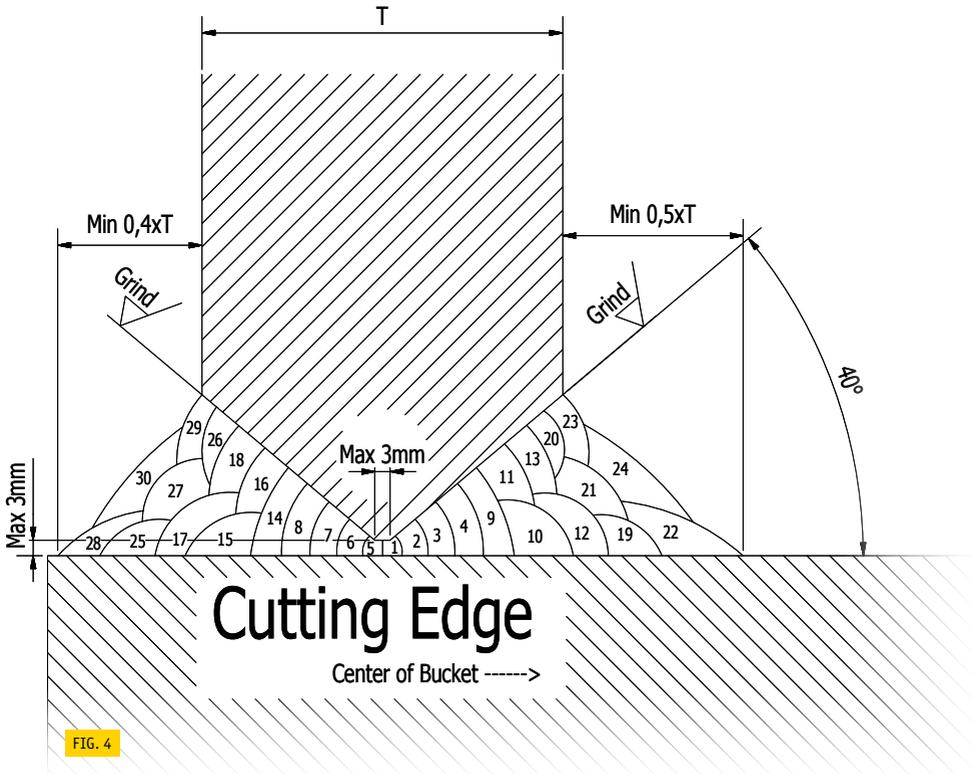


FIG. 4

Typical crack patterns resulting from neglecting procedures for preheating and welding equence.

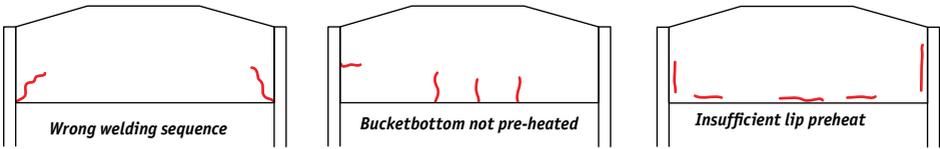


FIG. 5.1

## General notes:

1. All dimensions are min. values
2. Number of beads vary according to plate thickness.
3. All transitions shall be smooth and without defects, grind if nessary.

*These instructions provide specific guidance on the welding of KVX plates, but assume that welding is carried out by suitably qualified personnel experienced in the welding of hardened plate materials. KVX bear no responsibility for damage to lip or bucket resultant from inexperienced personnel or poor welding practice/procedures.*

Areas susceptible to cold cracks in weld joints of high-strength wear steel material.

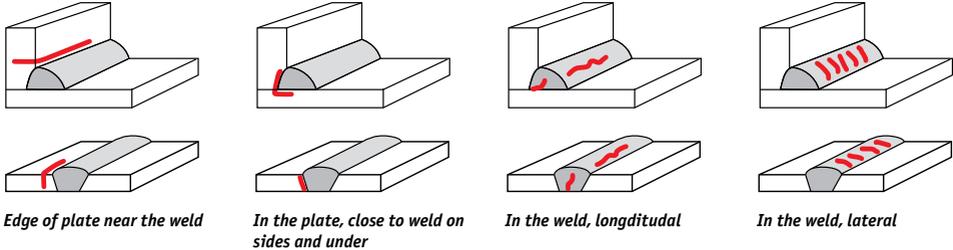


FIG. 5.2



**Recommended procedure for Welding of Highly Constrained Joints, welding thicknesses > 100 mm and/or welding across the plate thickness.**

When welding Highly Constrained Joints, welding thicknesses > 100 mm and/or welding across the plate thickness (fig 6.1), it is best to cover the surfaces to be welded with weld deposit (butter beading) prior to welding the actual joint. In doing so, the HAZ (Heat Affected Zone) of the base material will be annealed during the welding of the joint. This will reduce the hardness and the stresses in the coarse-grained HAZ, thereby reducing the risk of hydrogen-induced cracks (cold cracks), (see fig. 6.2) It is generally beneficial to use a welding technique that involves first placing the weld bead on the base material prior to filling up with weld deposit (see fig 6.3). It is also beneficial here to hammer the weld using, for instance, a pneumatic slag pick, in order to reduce the shrinkage stresses in the welded joints. For butter beading applications EASB OK Autrod 16.95 is particularly well suited.

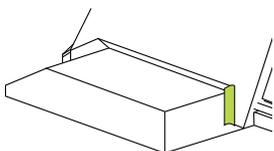


FIG. 6.1

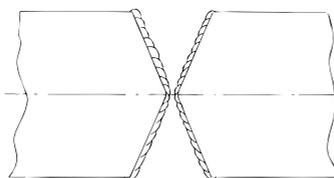


FIG. 6.2

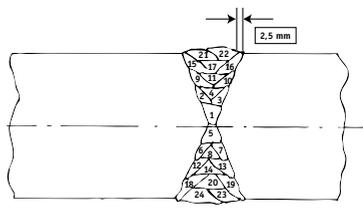


FIG. 6.3

## Welding of Wear Bars

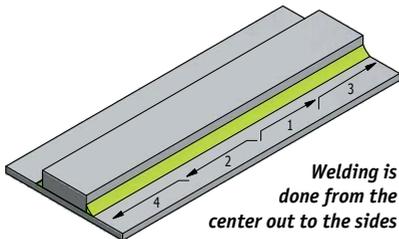
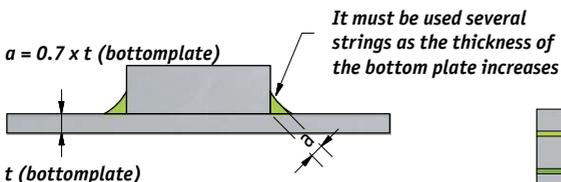
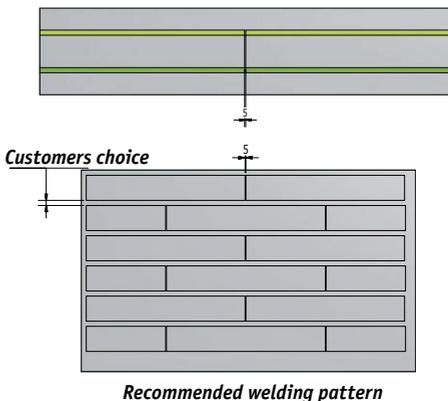


FIG. 7



# Installation of teeth

When these installation procedures are followed, the K VX bolt-on wear parts will stand up to extreme loads without loosening. The procedures are applicable to all types of bolt-on wear parts even though teeth only are specifically mentioned.

**All surfaces must be clean and free of debris:** Clean the surfaces with a steel brush and remove any burrs. Check that adjoining surfaces are flat and that threads and cones are undamaged.

**Use only K VX recommended grease:**

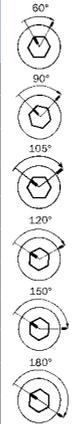
Apply the recommended grease on threads and cones. Use of other grease may cause bolts to become loose or bolts snapping.

**Install teeth:** Place the tooth in position on the cutting edge and insert the bolts. To ensure good contact in the cone give the tooth a couple of blows sideways.

**Tighten bolts to specified torque:** Apply torque

listed in table below. Smaller bolts, up to M16, can be tightened by means of any appropriate torque wrench and hand power. Bigger bolts require special K VX spanners. M20 bolts can be tightened by hitting the spanner with a 1,5 kg sledgehammer until it stops. Consult table for bolts bigger than M20. Hit the spanner until it stops, which gives a sufficient pre-torque value. Alternatively, use a torque wrench and apply 5% of final specified torque value as the "pre-torque" value. The specified final torque can be achieved by turning the bolts the additional angle by means of hand tools, spanner stand or hydraulic tool. Various brands of hydraulic torque tools can be adapted for K VX bolts. Always assess procedures with reference to local safety regulations and guidelines.

**Spanner stand:** When using the K VX spanner stand make sure to consult the K VX Spanner Stand Operating Instruction booklet. Follow safety procedures for the torque-up of K VX bolts where safety regulations permit.

Dimension	Tool		DOWELLED PARTS		NON-DOWELLED PARTS	
			Angle	Torque	Angle	Torque
M16	Hand power	60°	-	-	-	250 Nm
M20	Sledgehammer 1-2 kg	90°	-	-	-	500 Nm
M27	Sledgehammer 3-4 kg	105°	-	-	60°	1500 Nm
M36	Sledgehammer 8-10 kg/Spanner stand	120°	-	-	60°	3000 Nm
M48	Spanner stand or Hydraulic tool <sup>1)</sup>	120°	-	-	90°	7500 Nm
M52	Spanner stand or Hydraulic tool <sup>1)</sup>	150°	150°	12000 Nm	105°	10500 Nm
M60	Spanner stand or Hydraulic tool <sup>1)</sup>	150°	180°	18000 Nm	120°	15000 Nm
M68	Spanner stand or Hydraulic tool <sup>1)</sup>	180°	180°	26500 Nm	120°	22500 Nm
M80	Spanner stand or Hydraulic tool <sup>1)</sup>	180°	180°	44000 Nm	150°	37000 Nm
M90	Hydraulic tool <sup>1)</sup>	180°	180°	65000 Nm	150°	52000 Nm
M100	Hydraulic tool <sup>1)</sup>	180°	180°	89000 Nm	150°	73000 Nm



<sup>1)</sup> Instructions for K VX's own hydraulic tools available separately.



1



All surfaces must be clean and free of debris.

2



Pre-torque with 1-2 kg hammer.

3



Tighten all bolts to the specified torque.

***KVX is a Norwegian based company that has gained worldwide recognition for its highly wear resistant bolt-on ground engaging tool system for Excavators, Front Shovels and Wheel Loaders. Feel free to contact us for further information!***



Hydraulic power pack and torque tool.



Spanner stand



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