

JOINING & FORMING METHODS

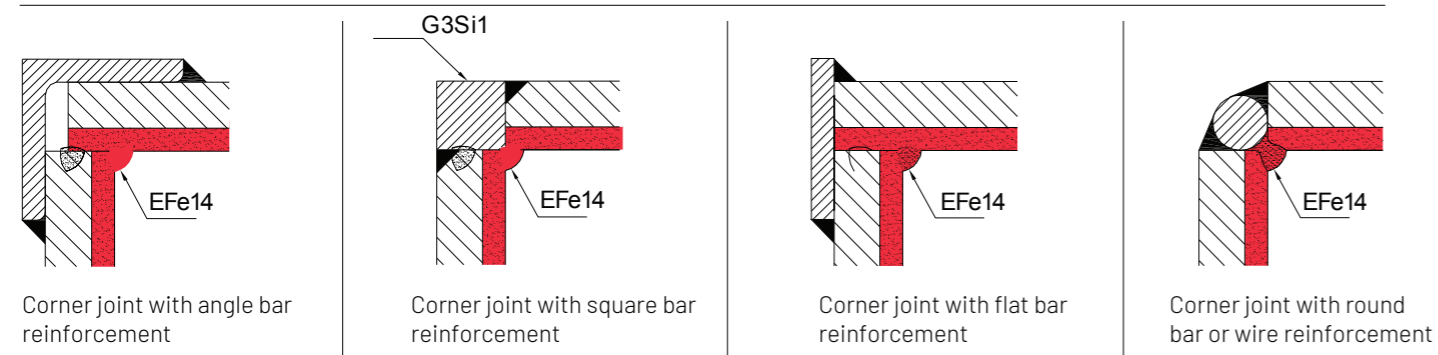


CeraMetal®
SURFACE ENGINEERING

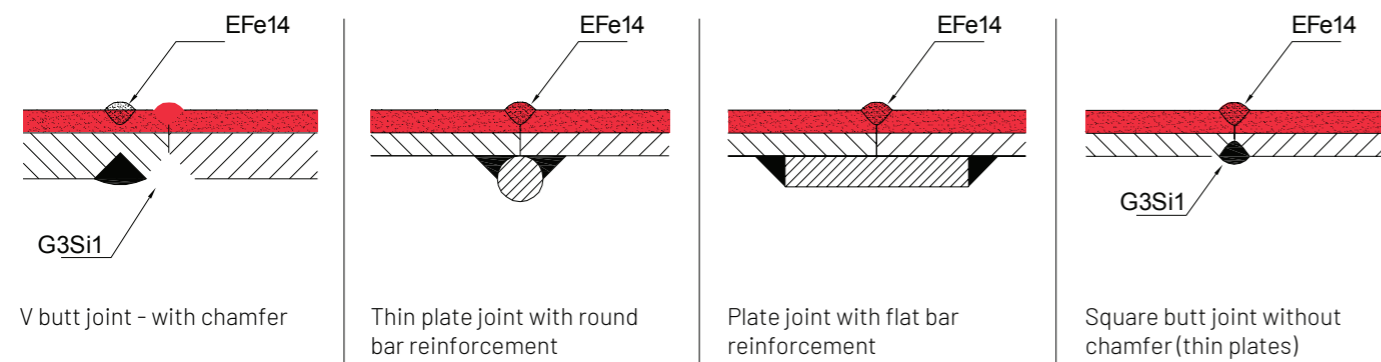
JOINING METHODS

Welding of the base material is performed using standard welding methods without preheating or other special preparations. Standard G3Si1 wire (non-alloyed steel solid wire according to EN ISO 14341-A) can be used for this purpose, provided that the weldment is made on the base plate only and does not interfere with the hardface. Joints on the hardface must be covered with hardfacing electrodes or wires as EFe14 (according to European Standard EN 14700 which applies to welding consumables for hardfacing).

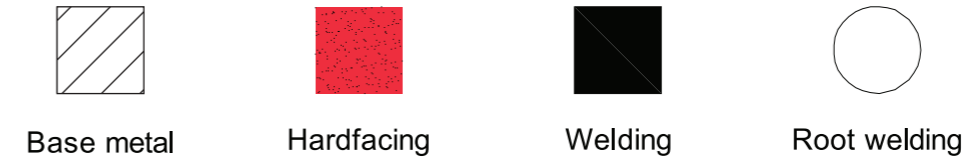
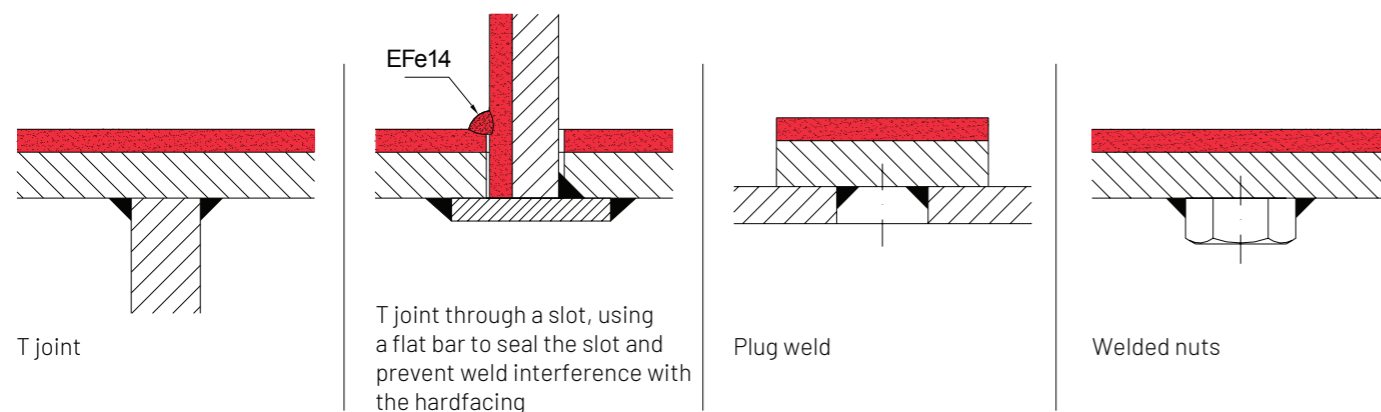
CORNER JOINTS



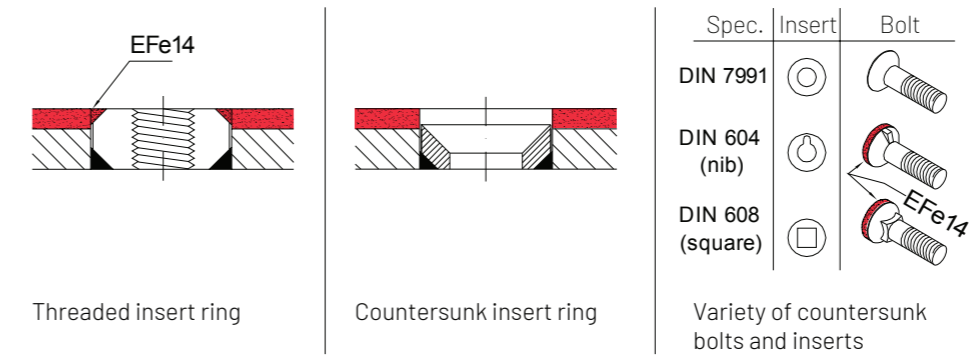
WEARPLATE JOINTS



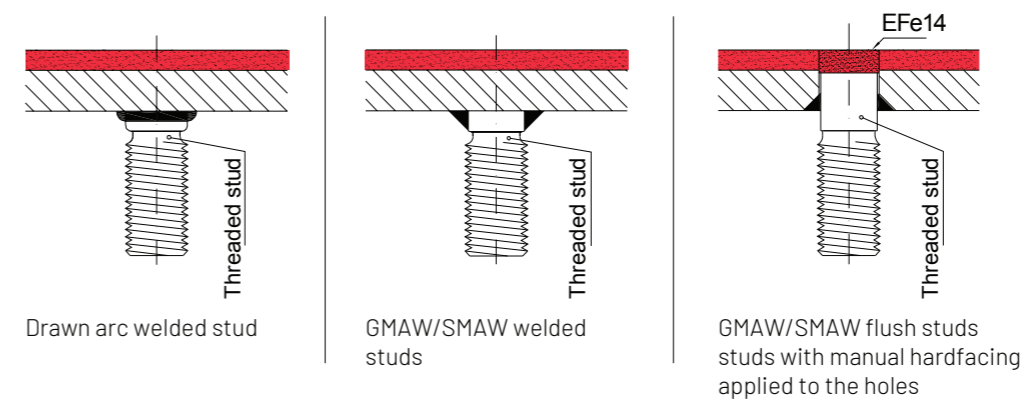
OTHER ARRANGEMENTS



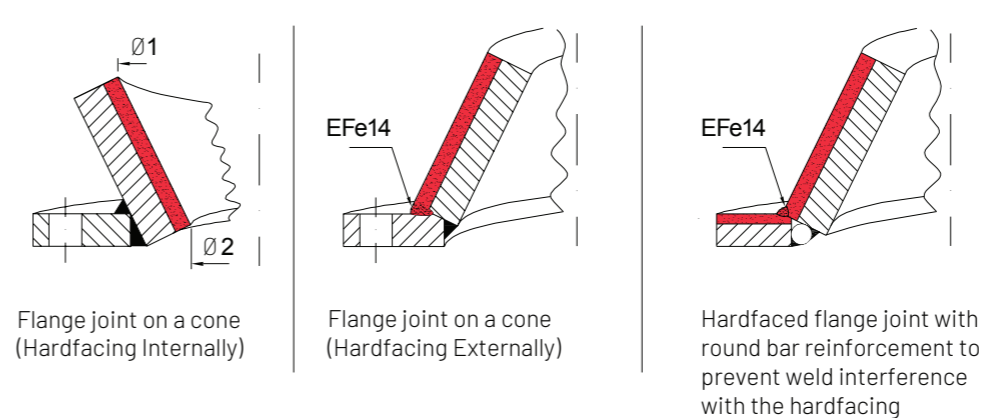
TYPICAL INSERT RING ARRANGEMENTS



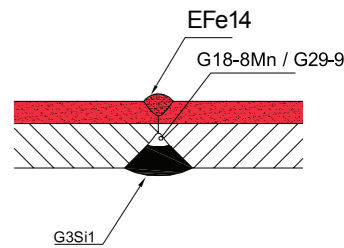
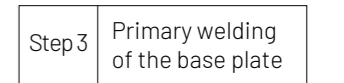
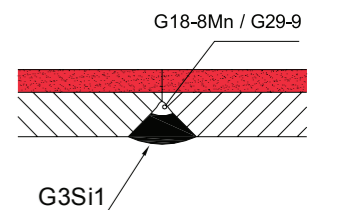
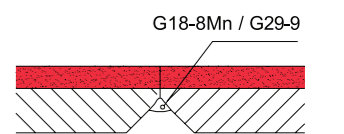
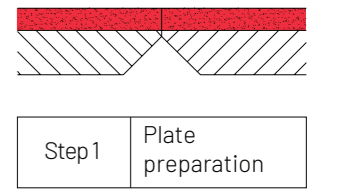
TYPICAL STUD ARRANGEMENTS



FLANGE JOINTS

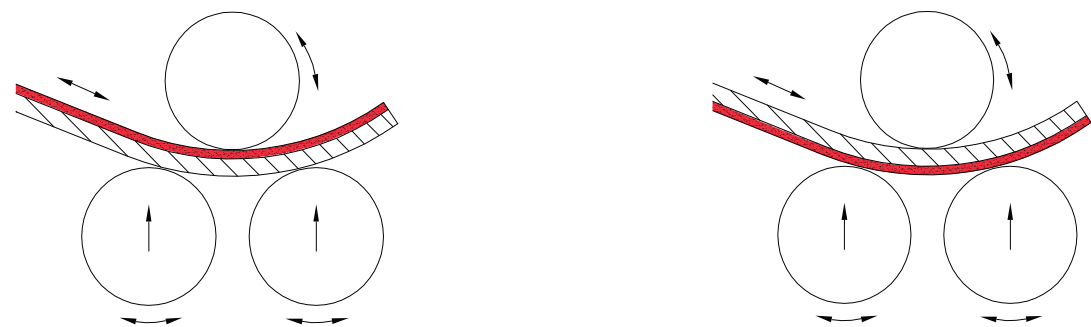


JOINING SEQUENCE



FORMING METHODS

ROLLING MACHINE

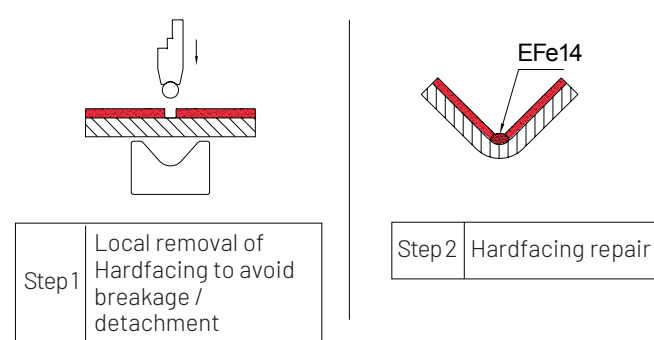


Hardfacing Internally

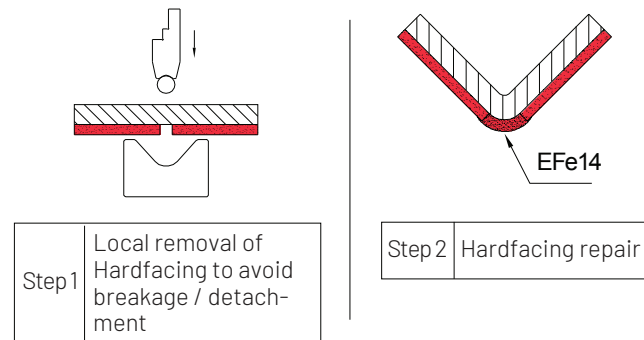
Hardfacing Externally

BENDING MACHINE

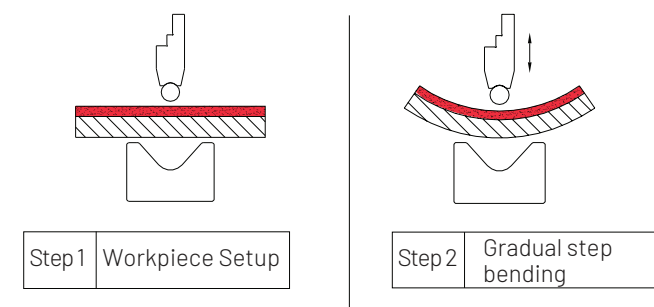
Hardfacing Internally – Small Radius



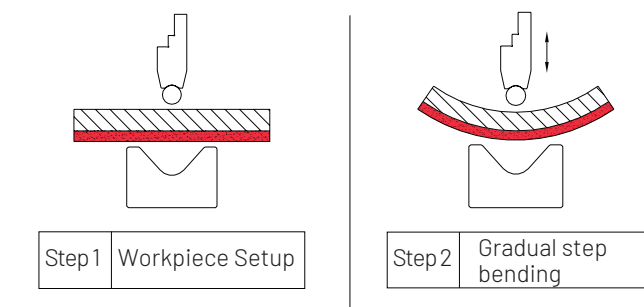
Hardfacing Externally – Small Radius



Hardfacing Internally – Large Radius



Hardfacing Externally – Large Radius



FORMING WITH HARDFACING INTERNALLY

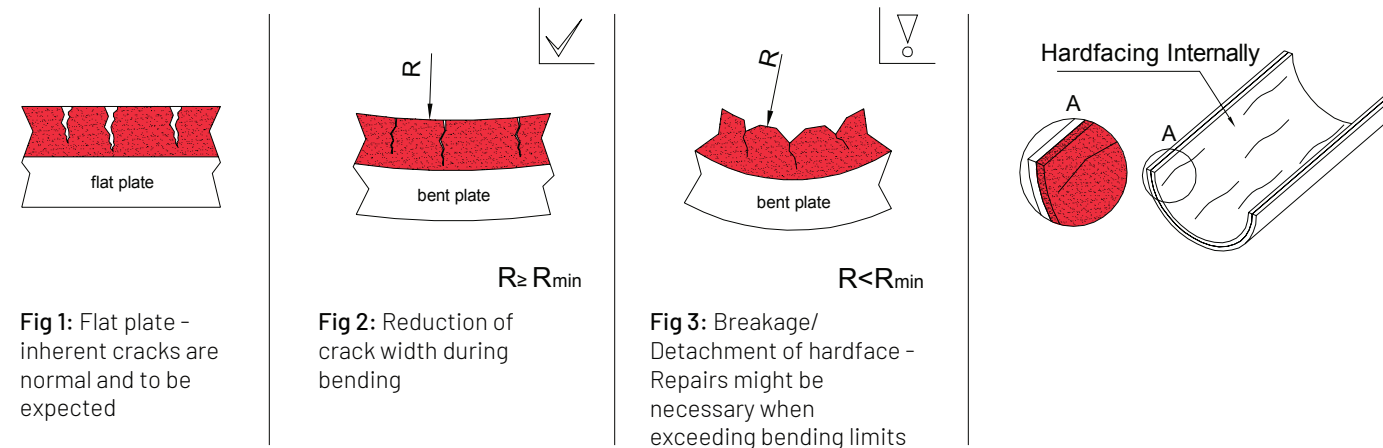


Fig 1: Flat plate - inherent cracks are normal and to be expected

Fig 2: Reduction of crack width during bending

Fig 3: Breakage/ Detachment of hardface - Repairs might be necessary when exceeding bending limits

Forming with hardfacing internally reduces the crack width. Under certain circumstances forming can lead to breakage. Care should be taken to avoid breakage & detachment.

FORMING WITH HARDFACING EXTERNALLY

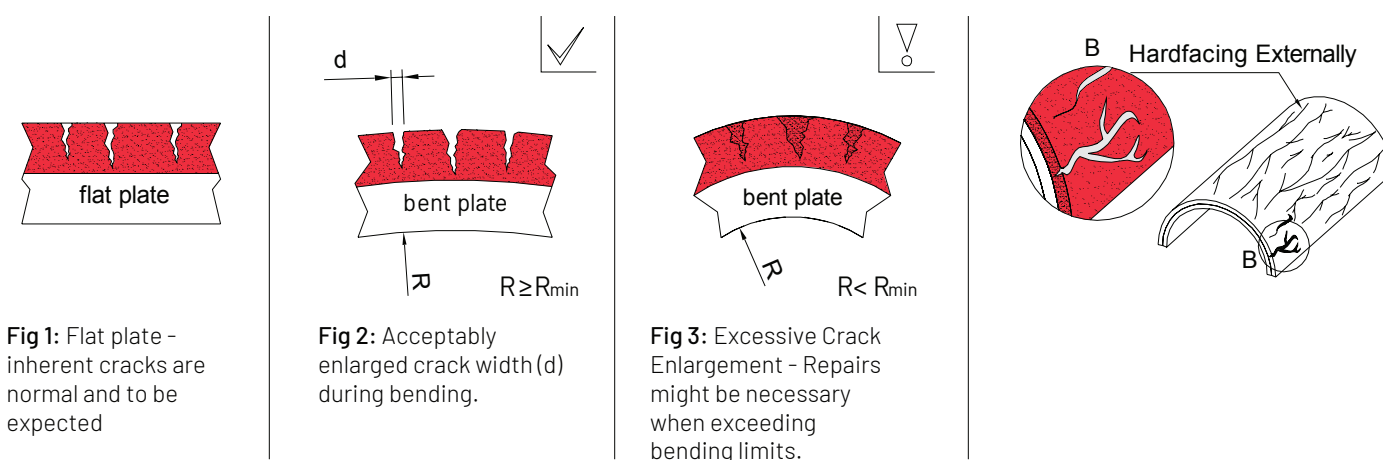


Fig 1: Flat plate - inherent cracks are normal and to be expected

Fig 2: Acceptably enlarged crack width (d) during bending.

Fig 3: Excessive Crack Enlargement - Repairs might be necessary when exceeding bending limits.

Forming with hardfacing externally increases the crack width. Large cracks can be corrected by welding using matching consumables.

Indicative bending radii *

Popular Plate Sections (base plate + hardfacing)	Hardfacing Internally (Rmin)	Hardfacing Externally (Rmin)
3+3	90	140
5+3	100	180
6+4	113	190
8+5	150	280
10+5	175	290
10+10	350	350

*These values are only indicative and greatly depend on the hardfacing type and on the bending method used.