

## Approval of manufacturer:

**Triplate®** is approved by Lloyd's Register of Shipping, Det Norske Veritas as well as accepted by almost all other class societies.

## Applications:

**Triplate®** is most often used in shipbuilding for example as a transition joint for welding an aluminium superstructure to a steel hull

## The products:

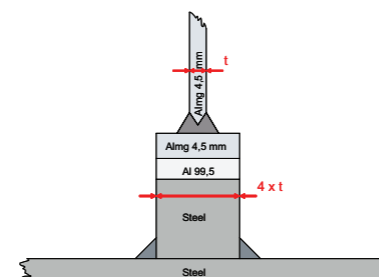
**Triplate®** is constructed in three layers: steel, pure aluminium and sea water corrosion resistant aluminium. These three layers are homogeneously bonded together in a vacuum, with the aid of explosives (explosion cladded, welded or plated).

<b>Base material:</b>	Steel:	LRA Shipplate Gr.A	or St 52-3N
<b>Interlayer:</b>	Pure Aluminium	Al 99,5	(Alloy 1050A)
<b>Superlayer:</b>	Corrosion-resistant Al	AlMg4,5Mn	(Alloy 5083)

## Dimensions:

Standard dimensions are available from stock; custom-made sections can also be supplied quickly (including water-jet cutting). The recommended strip width is 4x thickness of the aluminium plate.

<b>Standard Strip Width:</b>	Variable
<b>Standard Strip Length:</b>	max. 5800 mm
<b>Standard Strip Thickness:</b>	28 mm or 34 mm



## Processing:

**Triplate®** is easy to process and replaces the conventional nut-and-bolt or rivet joint. It is important that the temperature of **Triplate®** remains below the critical limit of 315° C during welding! With reference to bending, use a standard minimum radius of 10 times width or strip thickness.

## Minimum mechanical values:

Shear strength base material - Interlayer	> 55N/nm2
Bend test base material in compression	acceptable
Bend test base material in tension	acceptable
Side bend test:	acceptable
Tensile strength (through thickness):	> 75 N/ mm <sup>2</sup>
Processing temperature	max. 315° C

## Testing:

**Triplate®** meets the requirements of all international standards, including MIL-J-2445A for military applications.

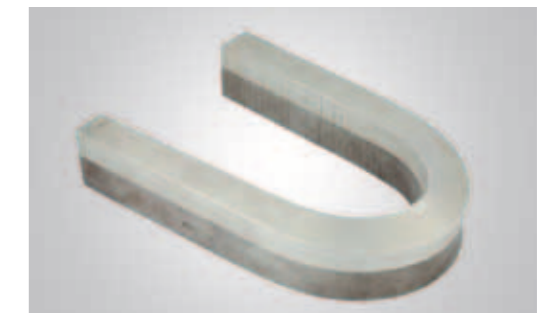
## Possible inspection authorities:

- ✓ Lloyd's Register of Shipping
- ✓ Det Norske Veritas
- ✓ Germanischer Lloyd
- ✓ American Bureau of Shipping
- ✓ RINA
- ✓ Bureau Veritas
- ✓ etc.

## Welding:

The following factors influence the welding process:

Welding speed, dimensions of the transition joint, position of the weld, dissipation of heat into the structure. Most important is that the temperature of **Triplate®** remains below the critical limit of 315° C during welding!



Bendtests

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HIGH GRADE ALUMINIUM PRODUCTS

### Preferred welding process:

The recommended welding methods are similar to those that are used for parent metals.

#### Aluminium:

GTAW or GMAW, TIG and MIG welding are acceptable, Synergic pulse Mig welding is also used. Small diameter wires are recommended, preferably 1,2 mm as well as Argon shielding gas. The aluminium oxide film must be wire brushed away before welding and degreased with a solvent.

#### Steel:

Coated electrode, GMAW, SMAW or FCAW. Small diameters electrodes are recommended (e.g. 2,5 mm).

### DO NOT PRE HEAT THE TRANSITION JOINT!

If possible, the aluminium weld should be made first, in order to minimize temperature rise of the transition joint. It is recommended to use heat sensitive paint on the transition joint in order to monitor the interface temperature.

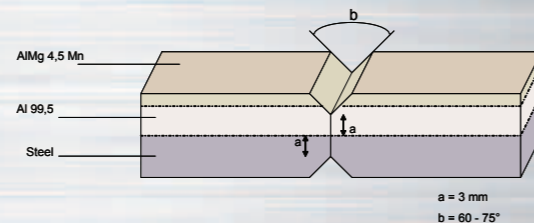
#### But welds:

The strip ends should be chamfered and the butted strips clamped. An area of 3 mm above and below the aluminium/steel interface should not be welded. This unwelded area should be hammered watertight or drilled and injected with epoxy or sealant.

#### Bending:

Triplate® can be bent in three directions:

- Side bend:  $R = 10 \times \text{strip width}$
- Aluminium in tension:  $R = 300 \text{ mm}$
- Aluminium in compression:  $R = 300 \text{ mm}$



### Triplate®

The vacuum-explosion welded transition joint, called Triplate® is a high quality material for welding aluminium to steel.

### Aluminium / Steel Transition Joint:



for welding aluminium to steel



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