## REQUIREMENTS

<table>
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<tr>
<th>Normative references</th>
<th>MIL-J-24445A, EN 10028-7, EN 485, ASTM B265, EN 10288-4, ASTM E165</th>
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</table>
| **Base materials**   | - X2CrNiMo18-14-3 (1.4435) stainless steel plate, solution annealed. Thickness: 12 mm – 14 mm  
                        - EN AW-5083-H111 aluminium alloy plate. Thickness: 12 mm – 14 mm  
                        Both base materials might be provided by CERN upon request. Any additional thermal treatment on the base materials should be agreed with CERN |
| **Allowed interlayer materials** | - Commercially pure titanium grade 1 or grade 2 sheet  
                              - EN AW-1050 or EN AW-1060 aluminium alloy sheet  
                              The combined thickness of all the interlayers shall equal or lower than 5 mm |
| **Bonding technique** | Explosion bonding |
| **Plate quantity and dimensions** | - 2 plates of 1 m x 1 m  
                                - Optional: 1 additional plate of 1 m x 1 m |
| **Surface quality** | Rough machined in order to allow ultrasonic testing on the plate surface and penetrant testing on the plate lateral surfaces.  
                         Surface shall be clean and free from scale, paint and any other foreign matter which could adversely affect the ultrasonic and dye penetrant testing test sensitivity or cause errors in interpretation |
| **Tensile testing** | Ultimate tensile strength of the bonded interface as measured in the ram test shall be higher than 80 MPa |
| **Shear testing** | Ultimate shear strength of the bonded interface shall be higher than 60 MPa |
| **Ultrasonic testing (UT)** | UT inspection shall be carried out for each explosion bonded interface and according to EN 10288-4. For each interface, calibration shall be performed with 3 mm diameter Flat Bottom Holes (FBH) perpendicular to the interfaces and with its bottom coinciding with the bimetal interface. The following indications will be cause of rejection:  
                         - Any cracks  
                         - Any linear indication  
                         - Rounded indications with dimensions exceeding 3 mm  
                         - Rounded indications separated by less than 3 mm edge to edge |
| **Liquid penetrant examination (PT)** | PT shall be performed on 100% of the lateral surfaces (including the bonding interface on them) of the plate. Prior to PT, the surfaces shall be conditioned to be suitable for the latter. Liquid penetrant examination shall follow ASTM E165 and fluorescent examination through a water-washable method (Type I, method A) shall be used. The following indications shall be cause for rejection:  
                         - Relevant linear indications are not allowed (a linear indication is defined as such if it has a length greater than three times its width) |
- Notability for non-linear indications is set to $d \geq 1$ mm, where $d$ is the major axis dimension
- Relevant isolated non-linear indications are accepted up to $d \leq 3$ mm
- Four or more relevant notable rounded indications in a line separated by 0.5 mm or less (edge to edge) would be cause of rejection

<table>
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<tr>
<th>Quality control</th>
<th>Before manufacture and processing, the supplier shall submit a manufacturing and inspection plan to be approved by CERN</th>
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<tr>
<td>Certifications</td>
<td>Inspection documents: specific inspection type 3.1, according to EN 10204</td>
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