

## TITANIA

PT Tecnobahía, Edif. RETSE, Nave 4, Ctra. De Sanlúcar, Km 7  
11500 El Puerto de Santa María  
Spain

*FOR THE ATTENTION OF*

Pedro ASTOLA GONZALEZ Quality assurance manager  
Miguel Angel RODRIGUEZ CHACON Laboratory manager  
Fernando SERRANO Business Development Manager

*CERTIFICATE PREPARED BY*  
NUNEZ Cesar

*YOUR QTML FOCAL POINT*  
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*DATE*  
27/11/2018

*OUR REFERENCE*  
SUR2018.0082 Ind. G

*ARP-ID of the External Shop*  
276249

*TYPE of External Shop*  
Independent

### Attestation letter for Qualification on Test Methods

Dear Madam, Dear Sir,

We herewith inform that the couples <Test Methods / External Shop> as detailed in the Appendix have been either registered or modified in the Official Airbus Qualified Test Methods List (QTML).

The latest valid status of all qualified <Test Methods / External Shop> couples is published by regular QTML reports:

- On Airbus homepage for Suppliers (<https://www.airbus.com/be-an-airbus-supplier.html>) - Only Independent Labs.
- On Airbus Supply Portal A2QS - All External Shops.

A qualified couple is not linked to a specific product. It is the proof that the External Shop is meeting the requirement of the AP5262: Qualification Process of Couples <Test Method / External Shop>.

We remind you that the maintenance of your Test Methods Qualification depends on your monitoring on quality and technical aspects and is surveyed by Airbus on a regular basis, every year or every 2 years.

- On a quality aspect: we kindly ask you to indicate us any modification which could have a quality impact.
- Concerning technical requirements:
  - \* We kindly ask you to participate at least every 2 years to the PTP for the tests you perform on Airbus Products (see Appendix for details on next PTP participation requirements).  
You can find all necessary information about PTP participation process on the website: <https://ptpscheme.com>.  
In case of PTP results out of tolerances, the couples qualification can be downgraded to an authorisation to proceed or withdrawn and the PTP participation frequency is reduced to one year, subject to acceptance by Airbus of your Root Cause Analysis and associated Corrective Actions.
  - \* On the other hand, you shall supply at least every 2 years the results of your Internal Homogeneity Studies per Test Families.

Airbus reserves the right to withdraw or suspend the qualification at any time for specific reason, e.g.

- Any major incident(s) detected on one or several Test processes
- Lack in quality
- Evidence non-compliance with the AP5262
- Loss of Airbus Supplier Approval
- Stop of the Business

Yours faithfully,

**NUNEZ Cesar**  
**Airbus Test Methods Auditor POMDT – CE**  
**Your QTML Focal Point**



**SAUX Alexandra**  
**Test Methods Coordinator POMDT – CE**  
**Your Quality Responsible**



Appendix: Matrix of qualified Couples <Test Methods / External Shop>

## APPENDIX: Matrix of qualified Couples <Test Methods / External Shop>

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| Test Standard(s) *      | Test label  | Complex. | Qualif. Status             | Next PTP part. ** | QCS Ref. | Remark   |
|-------------------------|---|----------|----------------------------|-------------------|----------|--|
| AIPS/AIPI 01-02-005     | Preparation of holes in fibre reinforced plastic (FRP) and hybrid materials                           | Low      | Qualified with limitations |                   | 171230   | *Composite test specimen manufacturing and machining<br>Qualified on 19/11/2018    |
| AIPS/AIPI 01-02-008     | Torque tightening of screws, bolts and nuts   | High     | Qualified with limitations |                   | 171230   | *Composite test specimen manufacturing and machining<br>Qualified on 19/11/2018    |
| AIPS/AIPI 01-02-017     | General assembly and installation of fasteners  | High     | Qualified with limitations |                   | 171230   | *Composite test specimen manufacturing and machining<br>Qualified on 19/11/2018    |
| AIPS/AIPI 01-02-022     | Installation of parallel shank threaded fasteners   | High     | Qualified with limitations |                   | 171230   | *Composite test specimen manufacturing and machining<br>Qualified on 19/11/2018    |
| AIPS/AIPI 03-02-018     | Manufacture of structural sandwich parts with thermosetting fibre reinforced skins                    | High     | Qualified with limitations |                   | 171230   | - Composite test specimen manufacturing and machining<br>*Qualified on: 19/11/2018 |
| AIPS/AIPI 03-02-019     | Manufacture of monolithic parts with thermoset prepreg materials                                      | High     | Qualified with limitations |                   | 171230   | *Composite test specimen manufacturing and machining<br>Qualified on 19/11/2018    |
| AIPS/AIPI 03-07-002     | Machining of fibre reinforced plastic (FRP) components  | High     | Qualified with limitations |                   | 171230   | *Composite test specimen manufacturing and machining<br>Qualified on 19/11/2018    |
| AIPS/AIPI 05-05-004     | Wet installation of fasteners   | High     | Qualified with limitations |                   | 171230   | *Composite test specimen manufacturing and machining<br>Qualified on 19/11/2018    |
| AIPS/AIPI 06-01-003     | Surface preparation for thermosetting parts before structural bonding                                 | High     | Qualified with limitations |                   | 171230   | *Composite test specimen manufacturing and machining<br>Qualified on 19/11/2018    |
| AIPS/AIPI 06-01-004     | Mechanical surface preparation of non-structural adherend prior to adhesive bonding                   | Low      | Qualified with limitations |                   | 171230   | *Composite test specimen manufacturing and machining<br>Qualified on 19/11/2018    |
| AIPS/AIPI 06-02-002     | Non-structural adhesive bonding   | Low      | Qualified with limitations |                   | 171230   | *Composite test specimen manufacturing and machining<br>Qualified on 19/11/2018    |
| AIPS/AIPI 06-02-006     | Structural bonding of thermoset and thermoplastic matrices compocite parts                            | High     | Qualified with limitations |                   | 171230   | *Composite test specimen manufacturing and machining<br>Qualified on 19/11/2018    |
| AITM 1-0002 (ISO 14129) | Fibre reinforced plastics - Determination of in-plane shear properties ( $\pm 45^\circ$ tensile test) | Low      | Qualified                  | 2019              |          |  |
| AITM 1-0003             | Determination of the glass transition temperatures (DMA)  | High     | Qualified                  | 2020              | 131066   |  |
| AITM 1-0005 (EN 6033)   | Fibre reinforced plastics - Determination of interlaminar fracture toughness energy - Mode I - G1c    | High     | Qualified                  | 2020              | 140131   |  |

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| AITM 1-0007-A / B / C / D | Fibre reinforced plastics - Determination of plain, open hole and filled hole tensile strength                | Low      | Qualified      | 2020              |          |  |
| AITM 1-0008-A1            | Fiber reinforced plastics - Determination of plain compression strength (Thick specimens, <200kN)             | High     | Qualified      | 2020              | 181245   | -Qualified on: 26/11/2018<br>-Testing machine ID: 11-01-14 |
| AITM 1-0008-A2            | Fiber reinforced plastics - Determination of plain compression strength (Thin specimens, <100 kN)             | High     | Qualified      | 2019              | 160660   | Qualified on: 10/10/2018                                   |
| AITM 1-0010 (EN 6038)     | Fibre reinforced plastics - Determination of compression strength after impact                                | High     | Qualified      | 2019              | 140496   |  |
| AITM 1-0019               | Determination of tensile lap shear strength of composite joints   | Low      | Qualified      | 2019              |          | Also according to I+D-E 352                                |
| AITM 1-0024               | Determination of the completeness of cure of organic coatings   | Low      | Qualified      |                   |          |  |
| AITM 1-0025               | Fiber reinforced plastics - Flatwise tensile test of composite sandwich panel                                 | Low      | Qualified      | 2019              |          |  |
| AITM 1-0030               | Sealants - Determination of lap shear strength  | Low      | Qualified      |                   |          |  |
| AITM 1-0032               | Determination of non hardening characteristic of sealant  | Low      | Qualified      |                   |          |  |
| AITM 1-0033               | Sealants: Determination of the curing rate of sealing materials   | Low      | Qualified      |                   |          |  |
| AITM 1-0036               | Sealants - Determination of assembly time   | Low      | Qualified      |                   |          |  |
| AITM 1-0053               | Carbon fibre reinforced plastics - Determination of fracture toughness energy of bonded joints - Mode I - G1c | High     | Qualified      | 2019              | 130240   | Valid for the Issue 4 of the norm                          |
| AITM 1-0066               | Fibre reinforced plastics – Determination of pull-out / pull-through strength on riveted joints               | Low      | Qualified      |                   |          |  |
| AITM 1-0070               | Surface roughness measurements using surface stylus methods   | Low      | Qualified      |                   |          |  |
| AITM 2-0013               | Determination of sealant adhesion by linear debonding test  | High     | Qualified      |                   | 130754   |  |
| AITM 2-0027               | Determination of colour differences   | Low      | Qualified      |                   |          | Also according to ISO7724 UNE 48073                        |
| AITM 2-0033               | Sealants - Determination of slump   | Low      | Qualified      |                   |          |  |

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## APPENDIX: Matrix of qualified Couples <Test Methods / External Shop>

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|-----------------------|---|----------|----------------------------|-------------------|----------|-----------------------------------|
| AITM 2-0034           | Sealants - Determination of tack-free time of sealing materials   | Low      | Qualified                  |                   |          |                                   |
| AITM 2-0061           | Water pick up test-method to determine the impregnation level of prepreg materials                              | Low      | Qualified                  |                   |          |                                   |
| AITM 3-0002           | Analysis of non metallic material (uncured) by differential scanning calorimetry (DSC)                          | High     | Qualified                  | 2020              | 171331   |                                   |
| AITM 3-0003 (EN 6042) | Analysis of organic compounds by infrared spectroscopy (IR)   | Low      | Qualified                  |                   |          |                                   |
| AITM 3-0004 (EN 6043) | Determination of gel time and viscosity   | Low      | Qualified                  |                   |          |                                   |
| AITM 3-0008 (EN 6064) | Determination of the extent of cure by differential scanning calorimetry (DSC)                                  | High     | Qualified                  | 2020              | 171331   |                                   |
| AITM 3-0025           | Determination of solid content  | Low      | Qualified with limitations |                   |          | Sealants                          |
| AITM 3-0030           | Titration of sulphuric and tartaric acid in anodizing electrolytes  | Low      | Qualified                  |                   |          |                                   |
| AITM 4-0003           | Test method for determining the pore content of fibre reinforced plastics using automatic image analysis        | High     | Qualified                  | 2020              | 170170   |                                   |
| AITM 4-0005           | Macroscopic and microscopic examination of fiber reinforced plastics  | Low      | Qualified                  |                   |          | Risk assesement Ref X029ME1526459 |
| AITM 5-0009           | Determination of resistance to bond line corrosion  | Low      | Qualified                  |                   |          |                                   |
| AITM 7-0003           | Sealants - Determination of application time of sealing materials   | Low      | Qualified                  |                   |          |                                   |
| AMS 2315              | Determination of delta ferrite content  | Low      | Qualified                  |                   |          | Also according to LC-PE-063       |
| ASTM B117             | Standard practice for operating salt spray (Fog) apparatus  | Low      | Qualified                  | 2020              |          |                                   |
| ASTM E112             | Determining average grain size  | Low      | Qualified                  | 2020              |          |                                   |
| ASTM E2602            | Assignment of the glass transition temperature by modulated temperature differential scanning calorimetry (DSC) | High     | Qualified                  |                   |          | QCS Pending                       |
| ASTM E3               | Standard guide for preparation of metallographic specimens  | Low      | Qualified                  |                   |          | Also according to LC-PE-021       |

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|-----------------------|---|----------|----------------|-------------------|----------|--|
| ASTM E340             | Macroetching metals and alloys  | Low      | Qualified      |                   |          |  |
| ASTM E384             | Microindentation hardness of materials  | Low      | Qualified      | 2020              |          |  |
| ASTM E407             | Microetching metals and alloys  | Low      | Qualified      |                   |          |  |
| ASTM F1110            | Sandwich corrosion test   | Low      | Qualified      |                   |          |  |
| ASTM F483             | Standard practice for total immersion corrosion test for aircraft maintenance chemicals   | Low      | Qualified      |                   |          |  |
| ASTM G110             | Evaluating intergranular corrosion resistance of heat treatable aluminium alloys by immersion in sodium chloride + hydrogen peroxide solution | Low      | Qualified      |                   |          | Also according as well to LC-PE-022        |
| ASTM G34              | Exfoliation corrosion susceptibility in 2XXX and 7XXX series aluminum alloys (EXCO Test)  | Low      | Qualified      |                   |          |  |
| EN 2002-1 (ASTM B557) | Tensile testing at ambient temperature  | Low      | Qualified      | 2018              |          |  |
| EN 2002-6             | Metallic materials: Bend testing  | Low      | Qualified      |                   |          | Also According to ASTM E290 and UNE-EN 910 |
| EN 2243-1             | Structural adhesives - Part 1: Single lap shear   | Low      | Qualified      | 2019              |          |  |
| EN 2243-2             | Structural adhesives - Part 2: Peel metal-metal   | Low      | Qualified      | 2019              |          |  |
| EN 2243-3             | Structural adhesives - Part 3: Peeling test metal-honeycomb core  | Low      | Qualified      | 2019              |          |  |
| EN 2557               | Carbon fibre preimpregnates - Determination of mass per unit area   | Low      | Qualified      |                   |          |  |
| EN 2558               | Carbon fibre preimpregnates - Determination of the volatile content   | Low      | Qualified      |                   |          |  |
| EN 2559               | Carbon fibre preimpregnates - Test method for the determination of the resin and fibre content and the mass of fibre per unit area            | Low      | Qualified      |                   |          |  |
| EN 2560               | Carbon fibre preimpregnates - Determination of the resin flow   | Low      | Qualified      |                   |          |  |
| EN 2561               | Carbon Fibre reinforced plastics - Unidirectional laminates - Tensile test parallel to the fibre direction                                    | Low      | Qualified      | 2020              |          |  |

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| EN 2563                        | Carbon fibre reinforced plastics - Unidirectional laminates - determination of apparent interlaminar shear strength                               | Low      | Qualified      | 2020              |          |                              |
| EN 2564                        | Carbon fibre laminates - Determination of the fibre, resin and void contents  | Low      | Qualified      | 2020              |          | Also according to ABT 1-0018 |
| EN 2667-2 (Pren)               | Foaming structural adhesives - Part 2: Compressive tube shear   | Low      | Qualified      |                   |          |                              |
| EN 2823 (prEN)                 | Fibre reinforced plastics - Determination of the effect of exposure to humid atmosphere on physical and mechanical characteristics                | Low      | Qualified      |                   |          |                              |
| EN 2850-B (Pren) (ISO 14126-2) | Carbon fibre thermosetting resin unidirectional laminates - Compression test parallel to fibre direction - Method B                               | Low      | Qualified      | 2020              |          |                              |
| EN 3615                        | Fibre reinforced plastics - Determination of the conditions of exposure to humid atmosphere and of moisture absorption                            | Low      | Qualified      |                   |          |                              |
| EN 3665                        | Paints and varnishes - Filiform corrosion resistance test on aluminium alloys   | Low      | Qualified      |                   |          |                              |
| EN 542                         | Adhesives - Determination of density  | Low      | Qualified      |                   |          |                              |
| ISO 1183-1                     | Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method | Low      | Qualified      |                   |          |                              |
| ISO 1463                       | Metallic and oxide coatings - Measurement of coating thickness - Microscopical method   | Low      | Qualified      | 2019              |          |                              |
| ISO 1518                       | Paints and varnishes - Scratch test   | Low      | Qualified      |                   |          |                              |
| ISO 1519                       | Paints and varnishes - Bend test (cylindrical mandrel)  | Low      | Qualified      |                   |          |                              |
| ISO 2106                       | Anodizing of aluminium and its alloys - Determination of mass per unit area (surface density) of anodic oxidation coatings - Gravimetric method   | Low      | Qualified      |                   |          |                              |

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| ISO 2143            | Anodizing of aluminium and its alloys - Estimation of loss of absorptive power of anodic oxidation coatings after sealing - Dye-spot test with prior acid treatment | Low      | Qualified      |                   |          |  |
| ISO 2360            | Non-conductive coatings on non-magnetic electrically conductive basis materials - Measurement of coating thickness - Amplitude-sensitive eddy current method        | Low      | Qualified      | 2019              |          |  |
| ISO 2409            | Paints and varnishes - Cross-cut test   | Low      | Qualified      | 2019              |          |  |
| ISO 2431            | Paints and varnishes - Determination of flow time by use of flow cups   | Low      | Qualified      |                   |          | Also according to ASTM D1200<br>ASTM D4212       |
| ISO 2555            | Plastics - Resins in the liquid state or as emulsions or dispersions - Determination of apparent viscosity by the Brookfield test method                            | Low      | Qualified      |                   |          |  |
| ISO 2781            | Rubber, vulcanized or thermoplastic - Determination of density  | Low      | Qualified      |                   |          |  |
| ISO 2808            | Paints and varnishes - Determination of film thickness  | Low      | Qualified      | 2019              |          |  |
| ISO 2811-1          | Paints and varnishes - Determination of density - Part 1: Pyknometer method   | Low      | Qualified      |                   |          |  |
| ISO 2812-2          | Paints and varnishes - Determination of resistance to liquids - Part 2: Water immersion method  | Low      | Qualified      | 2019              |          |  |
| ISO 2813            | Paints and varnishes - Determination of specular gloss of non-metallic paint films at 20°, 60° and 85°  | Low      | Qualified      |                   |          |  |
| ISO 3251            | Paints, varnishes and plastics - Determination of non-volatile-matter content   | Low      | Qualified      |                   |          |  |
| ISO 4624            | Paints and varnishes - Pull-off test for adhesion   | Low      | Qualified      |                   |          |  |
| ISO 6507 (ASTM E92) | Vickers hardness test   | Low      | Qualified      | 2020              |          |  |
| ISO 6508 (ASTM E18) | Rockwell hardness test  | Low      | Qualified      | 2020              |          | Also according to UNE-EN ISO 6508-1 and ASTM E18 |
| ISO 7619-1          | Rubber, vulcanized or thermoplastic - Determination of indentation hardness - Part 1: Durometer method (Shore hardness)   | Low      | Qualified      |                   |          | Also according to ASTM D2240<br>UNE-EN ISO 868   |

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| ISO 9227 (ASTM B117)    | Corrosion tests in artificial atmospheres - Salt spray tests | Low      | Qualified                  | 2020              |          |   |
| NASM 1312-01            | Fastener test methods - Method 1: Salt Spray                 | Low      | Qualified                  |                   |          | Also according to ASTM B117 and UNE-EN ISO 9227   |
| NASM 1312-06            | Fastener test methods - Method 6: Hardness                   | Low      | Qualified                  |                   |          | Also according to UNE-EN ISO 6508-1 & ASTM E18 (Rockwell) / UNE-EN ISO 6507-1 & ASTM E384 (Vickers) |
| NASM 1312-13            | Fastener test methods - Method 13: Double shear test         | Low      | Qualified                  | 2020              |          | Also according to ASTM B565, UNE 7246 and LC-PE-010   |
| NASM 1312-20            | Fastener test methods - Method 20: Single shear              | Low      | Qualified                  |                   |          |   |
| NASM 1312-31            | Fastener test methods - Method 31: Torque                    | Low      | Qualified                  |                   |          | Also according to LC-PE-008   |
| Z_Comp. spec. machining | Composite specimen machining / cutting / tabbing             | None     | Qualified                  |                   |          |   |
| Z_Corrosion             | Corrosion  | None     | Qualified                  |                   |          | According to AMS2700, ASTM A380, ASTM A967 and ISO 8075   |
| Z_Metal. Spec. prep     | Metallic specimen preparation (for mechanical testing)       | None     | Qualified with limitations |                   |          | Only according to LC-PE-021   |
| Z_Opt. metallo.         | Optical metallography  | None     | Qualified                  |                   |          | Steel, Ti, Al   |
| Z_Spectro. OES          | Spectrometry: optical emission (OES)                         | None     | Qualified                  | 2019              |          | According to LC-PE-004  |

\* Unless otherwise specified, last issue of the standard shall apply.

\*\* Next PTP participation year is given for information - It is the External Shop's responsibility to check every year on the PTP Website (<https://ptpscheme.com/>) which kits are proposed.