



	<p><b>APPLICATION FOR ESCC CAPABILITY APPROVAL (or its EXTENSION)</b></p> <p><b>CAPABILITY DOMAIN: Hermetic Hybrids Assembly Line</b></p> <p><b>Executive Member: CNES</b>                      <b>Date:06/10/2023</b></p>	<p>Page 2</p> <p>Application No. <b>332D</b></p>
<p>The undersigned hereby certifies on behalf of the ESCC Executive, that the above information is correct; that the appropriate documentation has been evaluated; that full compliance to all ESCC requirements is evidenced except as stated in box 13; that the reports and data are available at the ESCC Executive and therefore applies for ESCC Capability Approval status to be given to the capability domain defined herein.</p> <p>Date: 28/09/2023</p> <p style="text-align: right;"><i>Gianandrea Quadri</i> Gianandrea QUADRI, CNES (Signature of the Executive Coordinator)</p>		11
<p>Continuation of Boxes above:</p> <p><b>THALES ALENIA SPACE IN TOULOUSE IS PROPOSED TO BE APPROVED FOR THE SUPPLY OF HERMETIC HYBRID PRODUCTS AS A <u>CATEGORY 1, OPTION 2</u> MANUFACTURER, IN ACCORDANCE WITH ECSS-Q-ST-60-05C Rev1</b></p> <p># FURTHER DESCRIPTION OF ACTIVITIES LEADING TO EXTENSION OF PROCESS CAPABILITY APPROVAL MAY BE LISTED HERE , IF NECESSARY, LIKE DELTA EVALUATIONS, OTHER REPORTS</p> <p># REVISED PCA ABSTRACT SHOULD BE PROVIDED AS WELL AS ANNEX</p> <p>Changes of PID 39 731 284/924 have been discussed and accepted during meeting.</p>		12


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Page 3

**CAPABILITY DOMAIN: Hermetic Hybrids Assembly Line**

 Application No.  
**332D**

 Executive Member: **CNES**

Date: 06/10/2023

Non compliance to ESCC requirements:

13

No.:	Specification	Paragraph	Non compliance
2566000	ESCC	Chart 2.2 subgroup 3	Endurance (1000h + 1000h) not performed at evaluation phase

Additional tasks required to achieve full compliance for ESCC Capability Approval or rationale for acceptability of noncompliance:

14

**Endurance duration increased at CTA level from 1 000h to 2 000h. Data available for review**
**Executive Manager Disposition:**

15

 Application Approval: Yes  No 

Action/Remarks:

Date:

  
 B. Schade: Head of the Product Assurance & Safety Department



## Appendix: Capability Abstract 2023 (1 / 2)

The Process Capability Approval (PCA) of the Hybrid Line of Thales Alenia Space (Toulouse) has been renewed in accordance with ESCC Basic Specification n° 2566000 requirements.

The associated Process Identification Document (PID) is Ref. 39.731.284/924, Issue 12/-.

This PCA covers the TAS-Toulouse activities on manufacturing, tuning, testing, inspection and Quality Assurance of High-Frequency Hermetic Hybrid technologies, used for high power and low power modules of TAS space equipment and sub-systems.

According to the PID, the hermetic modules are manufactured by encapsulation, of several types of active and passive components, inside customized hermetic package:

- ✓ MMICs,
- ✓ ASICs and digital/analog ICs
- ✓ Bare transistors,
- ✓ Diodes,
- ✓ Capacitors,
- ✓ Resistors,
- ✓ Inductors and transformers,
- ✓ Thermistors.
- ✓ Thin-Film and Thick-Film circuits

Wires and ribbons are used for interconnection between the dies, and between dies and substrates or package.

Hermetic cavities are generated with lid sealing under inert gas atmosphere.

Depending of the application, the hermetic package is metal-based or HTCC-based, with glass or ceramic for DC or RF feedthroughs.

Then, modules are screened, according to the PID and to the generic procurement specification ECSS-Q-ST-60-05C Rev. 1.

The repair provision conditions (element replacement, re-bonding, de-lidding ...), as well as the criteria for lot rejection are also given in the PID, in accordance with ECSS-Q-ST-60-05C Rev. 1.

## Appendix: Capability Abstract 2021 (2 / 2)

Procurements of passive and active components, materials and mechanical parts are performed following internal procurement specifications and incoming instructions, as detailed in PID. The associated internal tests include bondability tests as well as user-LAT tests, as required by ECSS-Q-ST-60-05C Rev. 1.

For Hybrid Circuit Lot Acceptance Test (Hybrid LAT), TAS-Toulouse follows "Option 2", as defined in ECSS-Q-ST-60-05C Rev. 1.

For this purpose, TAS-Toulouse has defined, for the Manufacturing Hybrid Line:

- ✓ The generalization of Statistical Process Control of the manufacturing means,
- ✓ The implementation of a Hybrid Line Management under the control of a Technology Review board (TRB). Organization, missions and responsibilities of this TRB is defined in an internal TAS instruction.
- ✓ The implementation of Standard Evaluation Circuits (SECs), used for LAT acceptance. Several different SECs are requested to cover the whole range of hybrid technologies. These SECs are Flight Model Hybrids, sampled, and submitted to destructive acceptance tests, in accordance to PID and ECSS-Q-ST-60-05C Rev. 1.