



# ADI Standard Space Products Program

September 2021

## Rich 45+ Year History Serving the Space Market

Our certified facilities have been supplying products for military and space applications since 1972. ADI offers end-to-end state-of-the-art signal chain solutions, including precision linear, data conversion, RF/uW, and power management. ADI's extensive space products portfolio over the many years has supported missions both close to home and distant planets, enabling humanity to continue to expand our knowledge beyond our world and improve life on Earth.

## Broadmarket Space Products: An Alternative to SCD's

Over many years ADI has supplied SMD (5962) and custom Source Control Documents products to support a wide variety of space applications. To address some of the challenges with high-demand SCD products, ADI has developed standard broadmarket offerings (ASD) to continue delivering cost-effective solutions with reduced lead times to our customers. This alternative broad market solution will also provide customers with necessary traceability, reliability, lot qualification, and

manufacturing line certifications traditionally offered with SMD products.

Some benefits of ADI's Standard Space Products include:

- ▶ **Certified Facilities**—All of ADI's standard space products are fabricated, assembled, and tested in our QMLV certified manufacturing lines (except where noted).
- ▶ **WLAT**—Wafer Lot Acceptance Test or SEM analysis is available on most products (except where noted or not applicable).
- ▶ **Traceability**—Standard products are traceable back to the wafer lot or individual wafer level and manufactured from a separately-maintained die bank.
- ▶ **High-Reliability Lead Finishes**—All standard products are available with either gold or hot-solder-dip lead finishes as indicated in their datasheets.
- ▶ **PCN**—Get notified any time a change is made to a product with Product Change Notification.

- ▶ **Standard Part Marking**—All ASD space products are marked with the standard part number, lot seal date code, and the ADI logo (or the LTC logo for certain products released before the acquisition).
- ▶ **Technology/Quality Conformance Inspection**—See the tables below for more information on what is included in the Conformance Inspection.
- ▶ **Group E, Subgroup 2**—Certificate of Conformance and test report; tested per MIL-PRF-38535 with test points at 50krad, 100krad, and post-24hr biased anneal using a standard radiation test plan
- ▶ **Deltas**—Measured over pre- and post-burn-in on selected parameters as defined in the device's datasheet
- ▶ **SEM Inspection**—Available on most products except where not applicable (noted in the datasheet)

## Rigorous Screening and Qualification

Once your satellites reach orbit, the last thing you want is a failure that causes irreparable damage and jeopardizes the mission. That's why ADI screens every standard space product to the same level of quality that we do for our QMLV products. ADI's standard space products receive qualification screening that is in-line with the standards set by MIL-PRF-38535.

Standard Space Products QCI Includes:

- ▶ **Group B**—Per MIL-PRF-38535, Table II with attributes (MIL-STD-883 Method 5005, Table II for legacy Milpitas, CA products)
- ▶ **Group C**—Per MIL-PRF-38535, Table IV with attributes and variables (MIL-STD-883 Method 5005, Table III for legacy Milpitas, CA products)
- ▶ **Group D**—Per MIL-PRF-38535, Table V (MIL-STD-883 Method 5005, Table IV for legacy Milpitas, CA products)

## Optional Test Report Data Packs

ADI's standard space products come with the option to purchase a test report with each shipment that provides data on the specific units you're buying.

ADI's optional test report data packs include:

- ▶ **100% Processing Attributes Data**
- ▶ **Electrical Test Variable Data**
- ▶ **Radiographic Inspection Report**
- ▶ **Failure Analysis Report (if applicable)**
- ▶ **Group A Attributes Data**
- ▶ **Certificate of Conformance (C-of-C)**
- ▶ **Quality Conformance Inspection (QCI) Data**

## Manufacturing Locations

Space Level Screening	Wafer Fab	Assembly	Screening and Quality Conformance Inspection
MIL-PRF-38535 Class V Compliant QMLV Devices	<ul style="list-style-type: none"> <li>▶ ADI Wilmington, MA</li> <li>▶ ADI Limerick, Ireland</li> <li>▶ ADI Camas, WA</li> <li>▶ ADI Santa Clara Die Bank</li> </ul>	<ul style="list-style-type: none"> <li>▶ ADI Cavite, Philippines</li> <li>▶ ADI Milpitas, CA</li> </ul>	<ul style="list-style-type: none"> <li>▶ ADI Cavite, Philippines</li> <li>▶ ADI Milpitas, CA</li> </ul>
Standard Space Products (non-QMLV)	<ul style="list-style-type: none"> <li>▶ ADI Wilmington, MA</li> <li>▶ ADI Limerick, Ireland</li> <li>▶ ADI Camas, WA</li> <li>▶ ADI Santa Clara Die Bank</li> <li>▶ TSMC Taiwan</li> <li>▶ Various Foundries</li> </ul>	<ul style="list-style-type: none"> <li>▶ ADI Cavite, Philippines</li> <li>▶ ADI Chelmsford, MA</li> <li>▶ ADI Milpitas, CA</li> </ul>	<ul style="list-style-type: none"> <li>▶ ADI Cavite, Philippines</li> <li>▶ ADI Chelmsford, MA</li> <li>▶ ADI Milpitas, CA</li> </ul>

Space Level Screening	Wafer Fab	Assembly	Screening and Quality Conformance Inspection
Customer Specific Special Flows (SCD's)	<ul style="list-style-type: none"> <li>▶ ADI Wilmington, MA</li> <li>▶ ADI Limerick, Ireland</li> <li>▶ ADI Santa Clara Die Bank</li> <li>▶ TSMC Taiwan</li> <li>▶ Various Foundries</li> </ul>	<ul style="list-style-type: none"> <li>▶ ADI Cavite, Philippines</li> <li>▶ ADI Chelmsford, MA</li> </ul>	<ul style="list-style-type: none"> <li>▶ ADI Cavite, Philippines</li> <li>▶ ADI Chelmsford, MA</li> </ul>

### ADI Space Screening Flow Matrix

Screen/Test	Cavite, Philippines	Chelmsford, MA	Milpitas, CA <sup>6</sup>	MIL-STD-883 Test Method and Condition
<b>1. ESD</b>	No change	No change	No change	Initial qualification
<b>2. Wafer Lot Acceptance</b>	No change	May not be available from certain fabs <sup>1, 2</sup>	No change	TM 5007
<b>3. Non-Destruct Bond Pull</b>	Alternate Flow	No change	No change	100% to TM2023; Alternate Flow equivalent to DSCC QMLV baseline process flow <sup>3</sup>
<b>4. Internal Visual</b>	No change	No change	No change	100% to TM2010, Condition A
<b>5. Temperature Cycling</b>	10 cycles	10 cycles	10 cycles	100% to TM1010, Condition C
<b>6. Constant Acceleration</b>	No change	No change	No change	100% to TM2001, Condition E
<b>7. Visual Inspection</b>	No change	No change	No change	100% to TM2009
<b>8. PIND</b>	No change	No change	No change	100% to TM2020, Condition A
<b>9. Serialization</b>	No change	No change	No change	100% to TM2009
<b>10. X-Ray</b>	No change	No change <sup>4</sup>	No change	100% to TM2012
<b>11. T1 Pre-Burn-In Electrical</b>	No change	No change	No change	100% according to device specification
<b>12. Reverse Bias Burn-In</b>	No change	N/A	No change	100% to TM1015, 72hr at 150C min, if required
<b>13. T2 Interim Electrical</b>	No change	N/A	No change	100% according to device specification
<b>14. Burn-In</b>	No change	No change	No change	100% to TM1015, 240hr at 125C min
<b>15. T3 Post-Burn-In Electrical</b>	No change	No change <sup>5</sup>	No change	100% according to device specification
<b>16. PDA</b>	No change	No change	No change	5%, 3% catastrophic
<b>17. Final Electrical</b>	No change	No change	No change	100% according to device specification

Screen/Test	Cavite, Philippines	Chelmsford, MA	Milpitas, CA <sup>6</sup>	MIL-STD-883 Test Method and Condition
<b>18. Group A</b>	No change	No change	Attributes data where applicable	MIL-PRF-38535
<b>19. Seal, Fine Leak</b>	No change	No change	No change	100% to TM1014
<b>20. Seal, Gross Leak</b>	No change	No change	No change	100% to TM1014
<b>21. External Visual</b>	No change	No change	No change	100% to TM2009
<b>22. Radiation Latch-Up</b>	No change	No change	No change	When specified
<b>OCI--</b>				
<b>23. Group B</b>	No change	No change	MIL-STD-883 TM5005, Table II	MIL-PRF-38535
<b>24. Group C</b>	No change	No change	MIL-STD-883 TM5005, Table III	MIL-PRF-38535
<b>25. Group D</b>	No change	No change	MIL-STD-883 TM5005, Table IV	MIL-PRF-38535
<b>26. Group E</b>	No change	No change <sup>1</sup>	No change	MIL-PRF-38535

**Notes**

- <sup>1</sup> Noted on datasheet if not available
- <sup>2</sup> SEM available on all products when applicable
- <sup>3</sup> Effective March 2003, PCN Number 02\_0064
- <sup>4</sup> MIL-STD-883, Test Method 2012 X-Ray inspection acceptance requirements may include solder fillet as part of design seal width for LH, LSH, and G packages
- <sup>5</sup> T2 refers to Post-Burn-in for products from the Chelmsford, MA facility, as there is no interim electrical performed
- <sup>6</sup> As of February 19th, 2021, there will be no more assembly in Milpitas, CA; these products have been transferred to Cavite, Philippines and are screened to their original Class S screening flows used in the Milpitas, CA site

**Quality Conformance Inspection Minimum Sampling Plan (All Locations)**

Subgroup	Test	Sample Size & Acceptable Failures	Comments
<b>Group B, MIL-PRF-38535, Table II</b>			
1	Resistance to Solvents	3(0)	Not required for laser-marked parts
2	Bond Strength	22(0) <sup>1</sup>	
3	Die Shear	3(0)	
4	Solderability	22(0) <sup>2</sup>	
<b>Group C, MIL-PRF-38535, Table IV</b>			
1	Life Test	45(0)	MIL-PRF-38535, Appendix B, Paragraph 4.2 c-1
<b>Group D, MIL-PRF-38535, Table V</b>			
1	Physical Dimensions	15(0)	Electrical rejects may be used

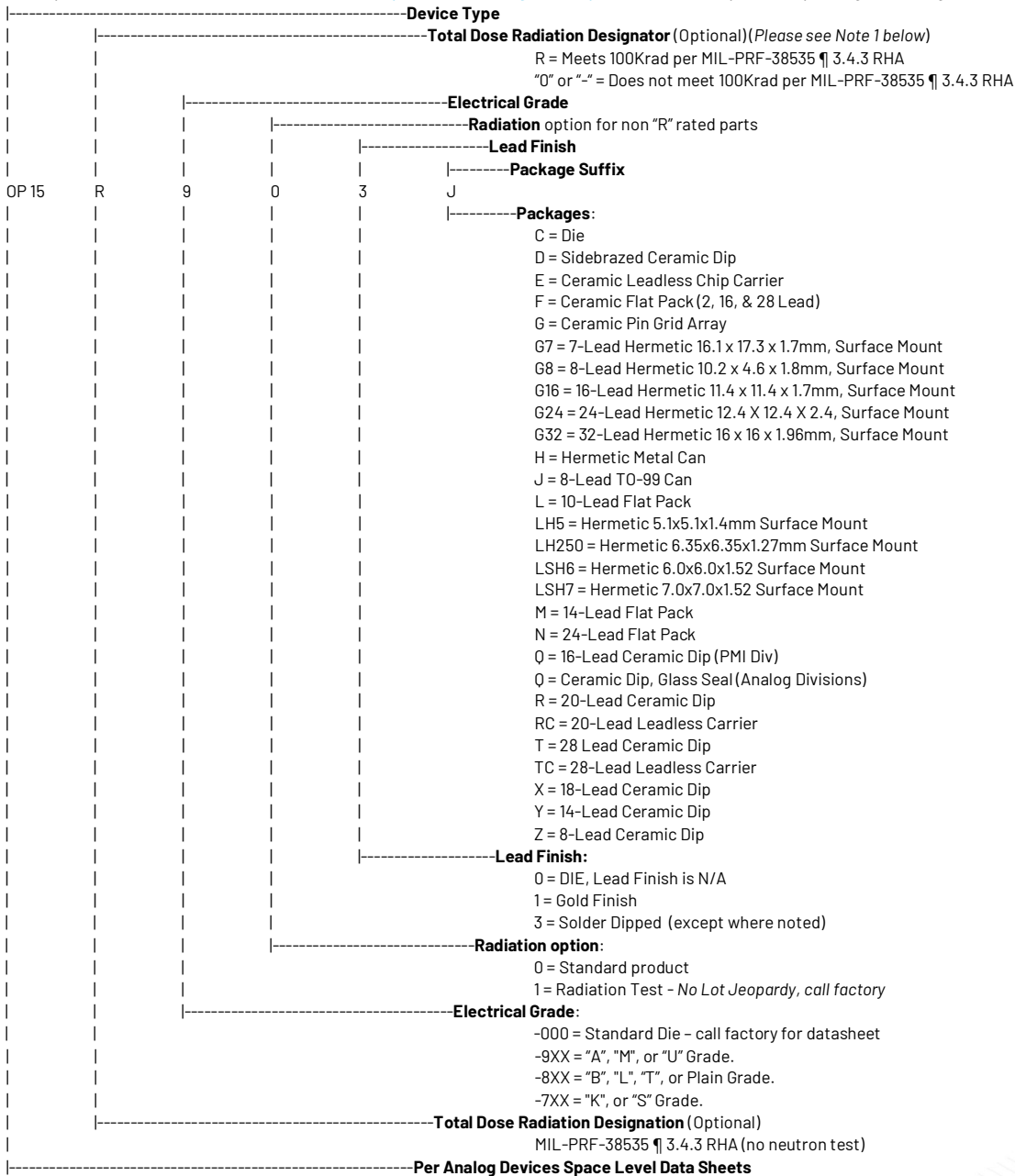
Subgroup	Test	Sample Size & Acceptable Failures	Comments
2	a. Lead Integrity b. Seal	45(0) <sup>2</sup>	Electrical rejects may be used
3	a. Thermal Shock b. Temperature Cycling c. Moisture Resistance d. Seal e. Visual f. End-Point Electrical	15(0)	Electrically good parts; destroyed
4	g. Shock h. Vibration, Variable Frequency i. Acceleration j. Seal k. Visual Examination l. End-Point Electrical	15(0)	Electrically good parts; destroyed
5	m. Salt Atmosphere n. Seal o. Visual	15(0)	Not performed on RF/uW Products
6	Internal Water Vapor	3(0) or 5(1)	Electrical rejects may be used
7	Adhesion of Lead Finish	15(0) <sup>2</sup>	Electrical rejects may be used
8	Lid Torque	5(0)	Electrical rejects may be used
9	Soldering Heat	3(0) <sup>3</sup>	
<b>Group E, MIL-PRF-38535, Table B-I</b>			
2	Total Ionization Dose	22(0) per wafer lot, OR 4(0) per wafer	MIL-STD-883 Method 1019, Condition A

**Notes**

- <sup>1</sup> Applies to the number of wires in a minimum of 4 devices
- <sup>2</sup> Applies to the number of leads on a minimum of 3 devices
- <sup>3</sup> Performed at qualification or design changes that may affect this test

## ADI Standard Space Product Model Naming Convention

See Space Qualified Parts List Brochure at <http://www.analog.com/space> for a list of product/package offerings.



**Note 1:**

Due to previous ordering system limitations, ADI uses the "0" and "-" interchangeably to indicate that the part is not radiation qualified. Orderable part number and system generated documentation (System C of C and packing list) will indicate part # (ex... AD16710703D). Manual generated documentation (Space Level C of C, Test Report if ordered) and the actual part marking will indicate part # (ex... AD1671703D).

**Examples:**

AD9058-803D..... AD9058, "T" Grade, Sidebrazed package, Solder-Dipped Lead Finish.  
AD9058R803D..... AD9058, "T" Grade, Sidebrazed package, Solder-Dipped Lead Finish, Qualified to 100Krad  
PM139-000C..... PM139, Standard Die.  
PM139R000C..... PM139, Standard Die, Qualified to 100Krad

For QML Class "V" products, see the appropriate Standard Military Drawing 5962-XXXXXXVXX.

For package drawings and dimensions, please see MIL-STD-1835 for all standard packages or [Package Index | Design Center | Analog Devices](#) for ADI packages.