



ADI Standard Space Products Program

January 2024

Rich 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 challenges with high-demand SCD products, ADI has developed standard broadmarket offerings:

- **ASD** model per MIL-PRF-38535 Class S & Q

- **ASD-lite** model per MIL-PRF-38535 Class S with reduced QCI sample plan.

These will enable us to deliver cost-effective solutions with reduced lead times to our customers. These alternative broad market solutions will 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 D**—Per MIL-PRF-38535, Table V (MIL-STD-883 Method 5005).
- ▶ **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.
- ▶ **Group C**—Per MIL-PRF-38535, Table IV with attributes and variables.

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"> ▶ ADI Wilmington, MA ▶ ADI Limerick, Ireland ▶ ADI Camas, WA ▶ ADI Santa Clara Die Bank 	<ul style="list-style-type: none"> ▶ ADI Cavite, Philippines 	<ul style="list-style-type: none"> ▶ ADI Cavite, Philippines
Standard Space Products (non-QMLV)	<ul style="list-style-type: none"> ▶ ADI Wilmington, MA ▶ ADI Limerick, Ireland ▶ ADI Camas, WA ▶ ADI Santa Clara Die Bank ▶ TSMC Taiwan ▶ Various Foundries 	<ul style="list-style-type: none"> ▶ ADI Cavite, Philippines ▶ ADI Chelmsford, MA 	<ul style="list-style-type: none"> ▶ ADI Cavite, Philippines ▶ ADI Chelmsford, MA

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

ADI ASD / ASD-Lite Space Screening Flow Matrix

Screen/Test	Cavite, Philippines	Chelmsford, MA	MIL-STD-883 Test Method and Condition
1. ESD	No change	No change	Initial qualification
2. Wafer Lot Acceptance	No change	May not be available from certain fabs ^{1,2}	TM 5007
3. Non-Destruct Bond Pull	Alternate Flow	No change	100% to TM2023; Alternate Flow equivalent to DSCC QMLV baseline process flow ³
4. Internal Visual	No change	No change	100% to TM2010, Condition A
5. Temperature Cycling	10 cycles	10 cycles	100% to TM1010, Condition C
6. Constant Acceleration	No change	No change	100% to TM2001, Condition E
7. Visual Inspection	No change	No change	100% to TM2009
8. PIND	No change	No change	100% to TM2020, Condition A
9. Serialization	No change	No change	100% to TM2009
10. X-Ray	No change	No change ⁴	100% to TM2012
11. T1 Pre-Burn-In Electrical	No change	No change	100% according to device specification
12. Reverse Bias Burn-In	No change	N/A	100% to TM1015, 72hr at 150C min, if required
13. T2 Interim Electrical	No change	N/A	100% according to device specification
14. Burn-In	No change	No change	100% to TM1015, 240hr at 125C min
15. T3 Post-Burn-In Electrical	No change	No change ⁵	100% according to device specification
16. PDA	No change	No change	5%, 3% catastrophic
17. Final Electrical	No change	No change	100% according to device specification
18. Group A	No change	No change	MIL-PRF-38535
19. Seal, Fine Leak	No change	No change	100% to TM1014
20. Seal, Gross Leak	No change	No change	100% to TM1014
21. External Visual	No change	No change	100% to TM2009
22. Radiation Latch-Up	No change	No change	When specified

Screen/Test	Cavite, Philippines	Chelmsford, MA	MIL-STD-883 Test Method and Condition
QCI--			
23. Group B	No change	⁶	MIL-PRF-38535
24. Group C	No change	No change	MIL-PRF-38535
25. Group D	No change	⁶	MIL-PRF-38535
26. Group E	No change	No change ¹	MIL-PRF-38535

Notes

- ¹ Noted on datasheet if not available
- ² SEM available on all products when applicable
- ³ Effective March 2003, PCN Number 02_0064
- ⁴ 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
- ⁵ T2 refers to Post-Burn-in for products from the Chelmsford, MA facility, as there is no interim electrical performed
- ⁶ ASD No change, ASD-Lite reduced Group B & D sample size

Quality Conformance Inspection Sampling Plan – ASD Model (All Locations)

Subgroup	Test	Sample Size & Acceptable Failures	Comments
Group B, MIL-STD-883 Method 5005, Table II			
1	Resistance to Solvents	3(0)	Not required for laser-marked parts
2	a. Bond Strength	22(0) ¹	
	b. Die Shear	3(0)	
3	Solderability	22(0) ²	
Group C, MIL-STD-883 Method 5005, Table III			
1	Life Test	45(0)	
Group D, MIL-STD-883 Method 5005, Table IV			
1	Physical Dimensions	15(0)	Electrical rejects may be used
2	a. Lead Integrity	45(0) ² (Leaded Devices) 15(0) ² (Leadless Devices)	Electrical rejects may be used
	b. Seal	45(0) ²	
3	a. Thermal Shock	15(0)	Electrically good parts; destroyed
	b. Temperature Cycling		
	c. Moisture Resistance		
	d. Seal		
	e. Visual Examination		
	f. End-Point Electrical		

Subgroup	Test	Sample Size & Acceptable Failures	Comments
4	a. Mechanical Shock b. Vibration, Variable Frequency c. Acceleration d. Seal e. Visual Examination f. End-Point Electrical	15(0)	Electrically good parts; destroyed
5	a. Salt Atmosphere b. Seal c. Visual Examination	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) ²	Electrical rejects may be used
8	Lid Torque	5(0) ⁴	As Applicable Electrical rejects may be used
9	a. Soldering Heat b. Seal c. External Visual d. End-Point Electrical	3(0) ³	As Applicable
Group E, MIL-PRF-38535, Table B-I⁵			
2	Total Ionization Dose	22(0) per wafer lot, OR 4(0) per wafer	MIL-STD-883 Method 1019, Condition A

Notes

- ¹ Applies to the number of wires in a minimum of 4 devices
- ² Applies to the number of leads on a minimum of 3 devices
- ³ Performed at qualification or design changes that may affect this test
- ⁴ Applies to packages which use glass-frit-seal to lead frame, lead or package body
- ⁵ As required by process technology

**Quality Conformance Inspection with Reduced Sampling Plan – ASD-Lite Model
(Chelmsford, MA)**

Subgroup	Test	Reduced Sample Size & Acceptable Failures	Comments
Group B, MIL-STD-883 Method 5005, Table II			
1	a. Physical Dimensions	2(0)	Performed in Group D
	b. Internal Water Vapor	3(0) or 5(1)	
2	a. Resistance to Solvents	3(0)	Not required for laser-marked parts
	b. Internal Visual Inspection	3(0)	
	c. Bond Strength	22(0) ¹	
	d. Die Shear	3(0)	
3	Solderability	22(0) ²	Post burn-in rejects may be used
4	a. Lead Integrity	45(0) ² (Leaded Devices) 15(0) ² (Leadless Devices)	Performed in Group D
	b. Seal	45(0) ²	
	c. Lid Torque	45(0) ³	
5	Life Test	5(0)	
6	a. Electrical Test	5(0)	
	b. Temperature Cycling		
	c. Acceleration		
	d. Seal		
	e. End-Point Electrical		
Group D, MIL-STD-883 Method 5005, Table IV			
1	Physical Dimensions	5(0)	Electrical rejects may be used
2	a. Lead Integrity	45(0) ² (Leaded Devices) 15(0) ² (Leadless Devices)	
	b. Seal	45(0) ²	
3	a. Electrical Test	5(0)	
	b. Thermal Shock		
	c. Temperature Cycling		
	d. Moisture Resistance		
	e. Visual Inspection		
	f. Seal		
	g. End-Point Electrical		
4	a. Electrical Test	5(0)	
	b. Mechanical Shock		
	c. Vibration, Variable Frequency		
	d. Acceleration		
	e. Seal		
	f. Visual Inspection		
	g. End-Point Electrical		
6	Internal Water Vapor	3(0) or 5(1)	
7	Adhesion of lead Finish	15(0) ²	Electrical rejects may be used

Subgroup	Test	Reduced Sample Size & Acceptable Failures	Comments
8	Lid Torque	5(0) ³	As applicable. Electrical Rejects may be used.
9	a. Soldering Heat b. Seal c. Visual inspection d. End-Point Electrical	3(0)	As Applicable.

Notes

- ¹ Applies to the number of wires in a minimum of 4 devices.
- ² Applies to the number of leads on a minimum of 3 devices.
- ³ Applies to packages which use glass-frit-seal to lead frame, lead or package body.

ADI Enhanced Class Q Screening Flow Matrix

Screen/Test	Chelmsford, MA	MIL-STD-883 Test Method and Condition
1. ESD	No change	Initial qualification
2. Wafer Lot Acceptance	May not be available from certain fabs ^{1,2}	TM 5007
3. Internal Visual	No change	100% to TM2010, Condition A
4. Temperature Cycling	10 cycles	100% to TM1010, Condition C
5. Constant Acceleration	No change	100% to TM2001, Condition E
6. Visual Inspection	No change	100% to TM2009
7. PIND	No change	100% to TM2020, Condition A
8. Serialization	No change	100% to TM2009
9. Pre-Burn-In Electrical	No change	100% according to device specification
10. Burn-In	No change	100% to TM1015, 160hr at 125C min
11. Post-Burn-In Electrical	No change	100% according to device specification
12. PDA	No change	5%, 3% catastrophic
13. Final Electrical	No change	100% according to device specification
14. Group A	No change	MIL-PRF-38535
15. Seal, Fine Leak	No change	100% to TM1014
16. Seal, Gross Leak	No change	100% to TM1014
17. External Visual	No change	100% to TM2009
QCI--		
18. Group B	No change	MIL-PRF-38535
19. Group C	No change	MIL-PRF-38535
20. Group D	No change	MIL-PRF-38535
21. Group E	N/A	MIL-PRF-38535

Screen/Test	Chelmsford, MA	MIL-STD-883 Test Method and Condition
Notes		
1 Noted on datasheet if not available		
2 SEM available on all products when applicable		

Quality Conformance Inspection Sampling Plan – Enhanced Class Q Model (Chelmsford, MA)

Subgroup	Test	Sample Size & Acceptable Failures	Comments
Group B, MIL-STD-883 Method 5005, Table II			
1	Resistance to Solvents	3(0)	Not required for laser-marked parts
2	a. Bond Strength b. Die Shear	22(0) ¹	
3	Solderability	22(0) ²	
Group C, MIL-STD-883 Method 5005, Table III			
1	Life Test	45(0)	
Group D, MIL-STD-883 Method 5005, Table IV			
1	Physical Dimensions	15(0)	Electrical rejects may be used
2	a. Lead Integrity b. Seal	45(0) ² (Leaded Devices) 15(0) ² (Leadless Devices) 45(0) ²	Electrical rejects may be used
3	a. Thermal Shock b. Temperature Cycling c. Moisture Resistance d. Seal e. Visual Inspection f. End-Point Electrical	15(0)	
4	a. Mechanical Shock b. Vibration, Variable Frequency c. Acceleration d. Seal e. Visual Examination f. End-Point Electrical	15(0)	
5	a. Salt Atmosphere b. Seal c. 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) ²	As applicable. Electrical Rejects may be used.

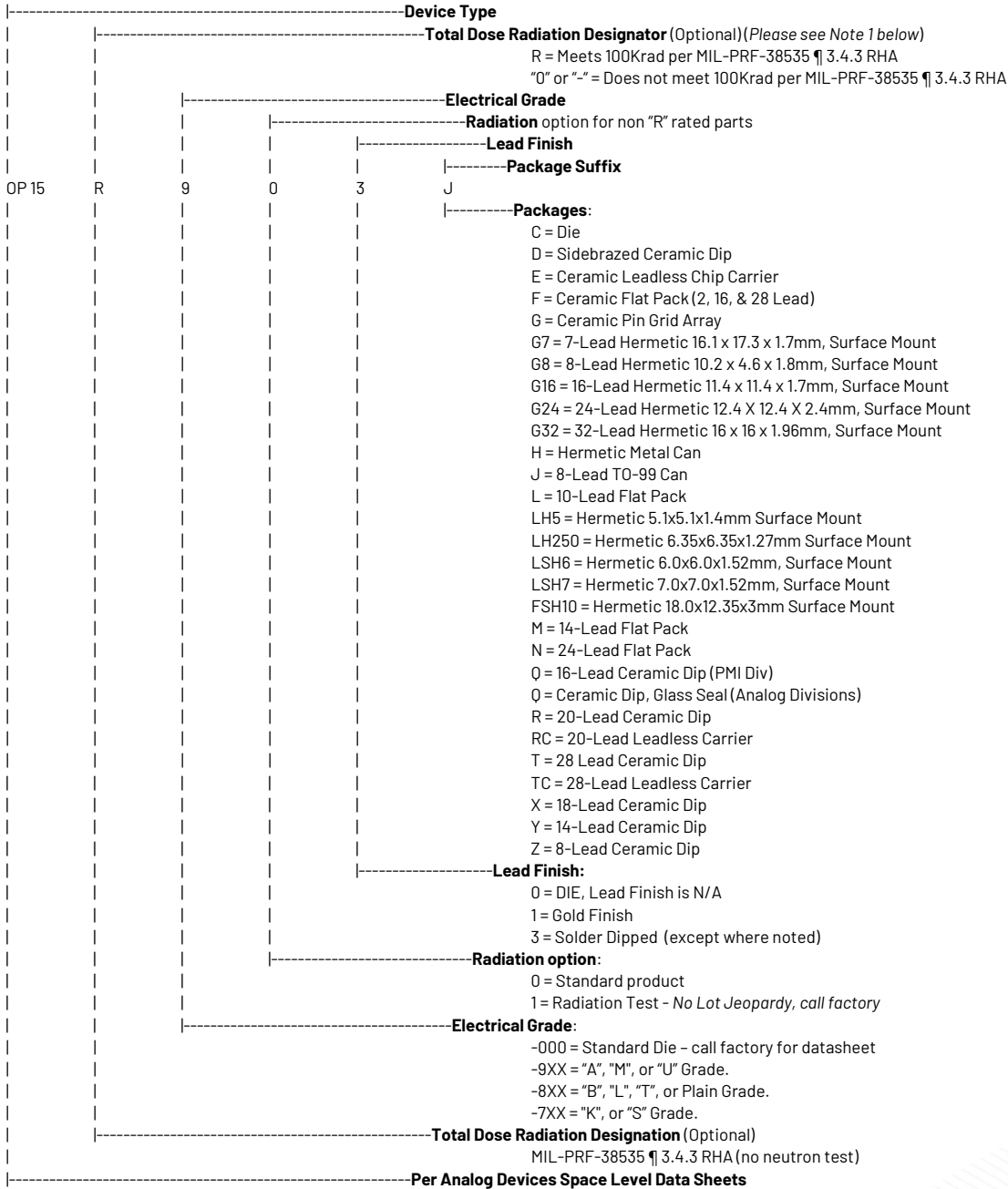
Subgroup	Test	Sample Size & Acceptable Failures	Comments
8	Lid Torque	5(0) ⁴	As Applicable. Electrical Rejects may be used.
9	a. Soldering Heat b. Seal c. Visual Inspection d. End-Point Electrical	3(0)	As Applicable

Notes

- ¹ Applies to the number of wires in a minimum of 4 devices
- ² Applies to the number of leads on a minimum of 3 devices
- ³ Performed at qualification or design changes that may affect this test
- ⁴ Applies to packages which use glass-frit-seal to lead frame, lead or package body

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... AD16710703D).

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-XXXXVXXX.

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