

Quality is more than a word

ESPEC



AIRCRAFT-RELATED
EQUIPMENT

Large-scale Altitude (Reduced Pressure/Low Temperature) Tests

Testing can be conducted to simulate the reduced pressure and low-temperature environment at altitudes where aircraft operate.

Altitude	Max. 100,000 ft
Pressure range	(Atmospheric pressure) Max. 0.1 kPa
Temperature range	-70°C to +180°C (when the above temperature range exceeds 11.6 kPa)
Interior dimensions	W1.5 m x H1.5 m x D1.5 m

High-rate Vibration Tests

In addition to a maximum vibration force of 45 kN, a maximum temperature change stress of 5°C/min can be applied.

Temperature range	-70°C to +180°C
Interior dimensions	W1.0 m x H1.0 m x D1.0 m
Maximum vibration force	45 kN
Frequency range	5 Hz to 2000 Hz
Maximum displacement	76.2 mm (p-p)

Rapid Temperature Change Tests

Capable of linear temperature change testing at up to 18°C/min. Test sample temperatures can also be controlled.

Altitude	-70°C to +180°C
Temperature change rate	18°C/min (+155°C to -45°C)
Interior dimensions	W0.8 m x H0.5 m x D0.4 m

Medium-scale Temperature Change Tests

Capable of testing capacities up to 1500 L at 5°C/min. Humidity control is also possible.

Temperature range	-70°C to +180°C
Temperature change rate	5°C/min (+155°C to -45°C)
Interior dimensions	W1.2 m x H1.0 m x D1.5 m

HALT/HASS Tests

Products are subjected to “strong stress” (rapid temperature changes and six-degree-of-freedom random vibration) that exceeds their specifications to find their limitations (weaknesses) at an early stage.

Vibration acceleration	5 Grms to 75 Grms
Temperature range	-100°C to +250°C
Temperature change rate	70°C/min (+85°C to -65°C)
Table dimensions	W0.76 m x D0.76 m

List of MIL-STD-810G Test Items

METHOD No.	Test Name	Examples of Compatible Chambers			
		Chamber Model	Test Area Dimensions [mm]		
500.6	Low Pressure (Altitude)	MZH	W	H	D
			1500	1500	1500
501.6	High Temperature	Temperature chamber + Custom equipment	300	300	300
502.6	Low Temperature	TCC-150	800	500	400
503.6	Temperature Shock	FD Series	1200	1000	1500
504.2	Contamination by Fluids	ARS-1100	1000	1000	1000
507.6	Humidity	ARSF-800	1000	1000	800
512.6	Immersion	TSD-101	710	345	230
514.7	Vibration	TSE-11	1000	1000	800
516.7	Shock	PL-4J	1000	1000	800
521.4	Icing/Freezing Rain	FD Series	1200	1000	1500
521.4	Icing/Freezing Rain	ARS-1100	1000	1000	1000
521.4	Icing/Freezing Rain	ARSF-800	1000	1000	800
521.4	Icing/Freezing Rain	EBE-6	3950	2400	2900

List of RTCA/DO-160G Test Items

* Whether or not these tests can be conducted may vary depending on the size of the test sample and any other conditions.

Section No.	Section Name	Sub. Sec.	Test Name	Examples of Compatible Chambers				
				Chamber Model	Test Area Dimensions [mm]			
				W	H	D		
Section 4	Temperature Tests	4.5.1	Ground Survival Low Temperature Test and Short-time Operating Low Temperature Test					
			Operating Low Temperature Test	TCC-150	800	500	400	
			Ground Survival High Temperature Test and Short-time Operating High Temperature Test	FD Series	1200	1000	1500	
		4.5.3		ARS-1100	1000	1000	1000	
				ARSF-800	1000	1000	800	
		4.5.4	Operating High Temperature Test					
			In-flight Loss of Cooling Test					
		4.6.1	Altitude Test	MZH-32H	1500	1500	1500	
			Decompression Test					
			Overpressure Test					
Section 5	Temperature Variation Tests	5.3.1	If the test is a combined test	TCC-150	800	500	400	
			If the test is not a combined test	FD Series	1200	1000	1500	
		5.3.2		ARS-1100	1000	1000	1000	
				ARSF-800	1000	1000	800	
				TSD-101	1000	1000	410	
Section 6	Temperature and Humidity Tests	5.3.3		TSE-11	710	345	230	
		6.3.1	Standard Humidity Environment	Category A	PL-4J	1000	1000	800
					FD Series	1200	1000	1500
Section 7	Operation Shocks and Crash Safety Tests	6.3.2	Severe Humidity Environment	Category B	ARS-1100	1000	1000	1000
					ARSF-800	1000	1000	800
		6.3.3	External Humidity Environment	Category C				
Section 7	Operation Shocks and Crash Safety Tests	7.2.1	For equipment capable of sustaining vertical shock	Category A	Vibration and shock test chamber	600	600	600
						800	800	800
				Category D				

Section No.	Section Name	Sub. Sec.	Test Name	Examples of Compatible Chambers				
				Chamber Model	Test Area Dimensions [mm]			
					W	H	D	
Section 8	Vibration	8.5.1	Standard Sinusoidal Vibration Test	S				
		8.5.2	Standard Random Vibration Test	S				
		8.6	High-level, Short Duration Test	H, Z				
		8.7.1	Robust Sinusoidal Test	R, U, U2	Vibration and shock test chamber	600	600	600
		8.7.2	Robust Random Test	R, U, U2		800	800	800
		8.8.1	Sine-on Random Test - Known Helicopter Frequencies	R, U, U2				
		8.8.2	Sine-on Random Test - Unknown Helicopter Frequencies	U				
		8.8.3	Sine-on Random Test - Known Helicopter Frequencies	U2				
		10.3.1	Condensing Water Proof Test		Thermal test chamber with humidity (upgraded)	650	460	370
Section 10	Water proofness	10.3.3	Spray Proof Test					
		10.3.4	Continuous Stream Proof Test					
		11.4.1	Spray Test	F				
Section 11	Fluids Susceptibility	11.4.2.	Immersion Test					
			Built-up Icing	A				
		24.4.1	In-flight Icing	B	MZH-32H	1500	1500	1500
Section 24	Icing		On-ground Icing	C	EBE-6	3950	2400	2900

