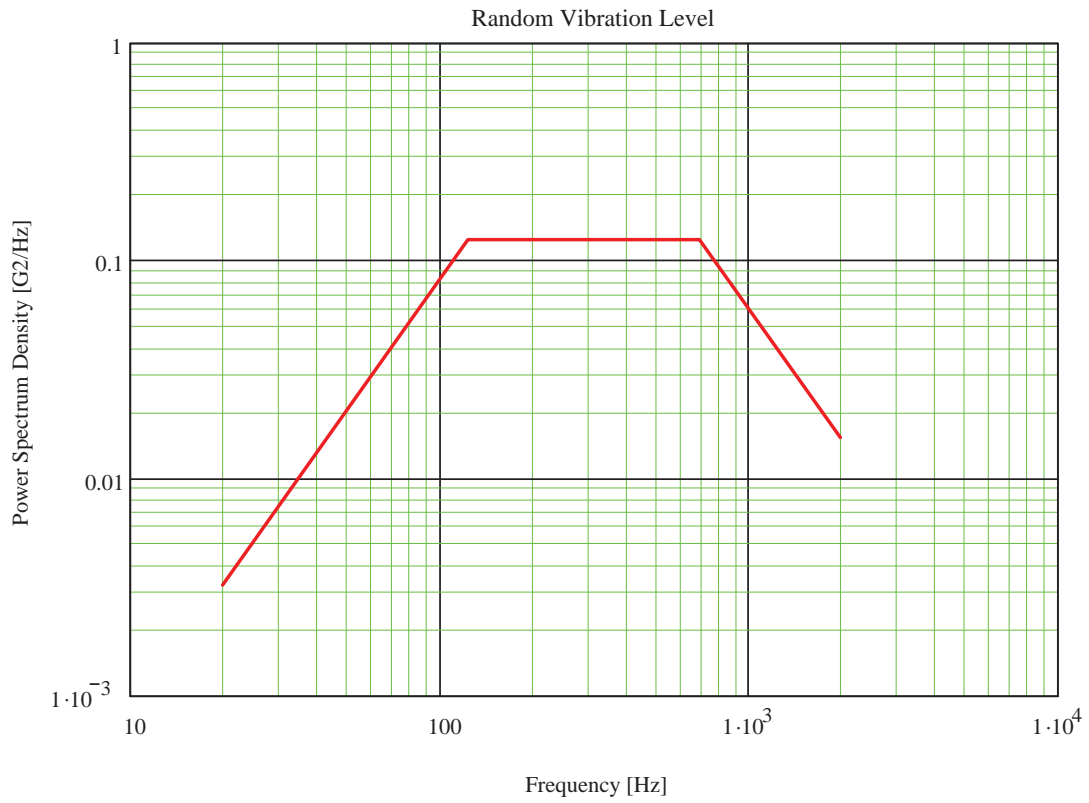


Mechanical characteristics

Mechanical characteristics of the 20 N-class Thruster Valve (hereinafter, the Thruster Valve) are shown in Table 1.

Table 1 Mechanical characteristics of the Thruster Valve

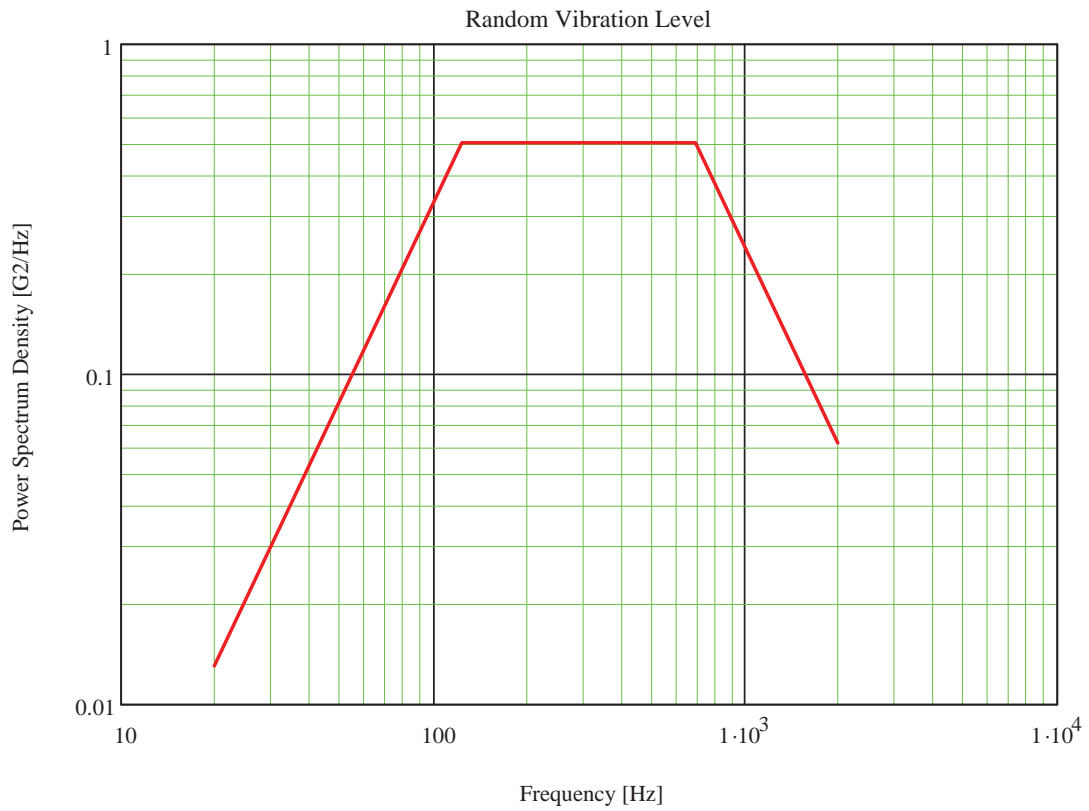
Property	characteristics
Random vibration	<p>[Acceptance Test level]</p> <p>Overall: 11.58 Grms (See Figure 1)</p> <p>Vibration direction: Two orthogonal axes Duration : 4 minutes per axis</p>
	<p>[Qualification Test level]</p> <p>Overall: 23.16 Grms (See Figure 2)</p> <p>Vibration direction: Two orthogonal axes Duration : 4 minutes per axis</p>
Sine wave vibration	<p>See Figure 3</p> <p>Vibration direction: Two orthogonal axes Duration: sweep rate of 2 oct/min, bi-directional for each axis</p>
Shock	<p>See Figure 4.</p> <p>Vibration direction: Two orthogonal axes Duration: 2 times each for positive and negative directions for each axis, 8 times in total</p>



Frequency [Hz]	Power spectral density [G^2/Hz]
20	0.0032 (6 dB/oct)
125	0.125
700	0.125
2000	0.0154 (-6 dB/oct)

Overall : 11.58 Grms

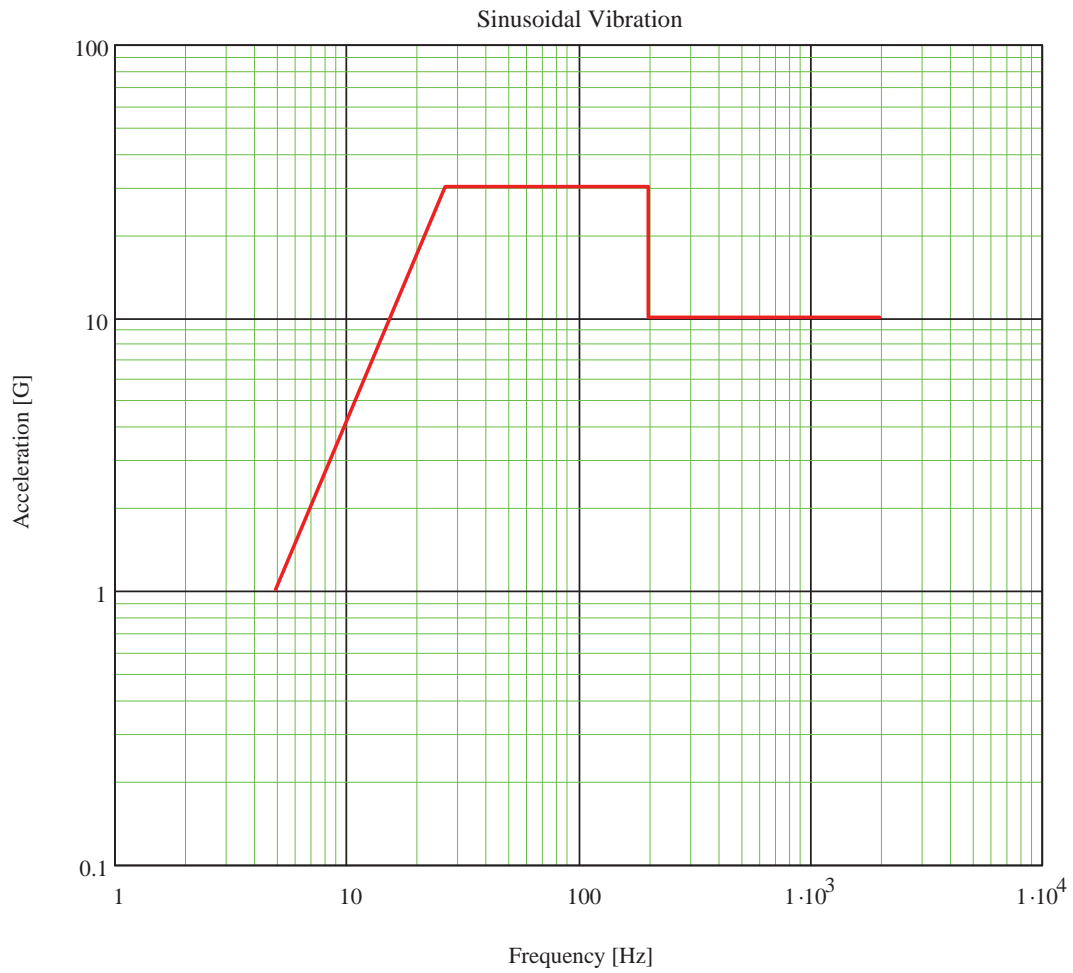
Figure 1. Random vibration level (Acceptance Test)



Frequency [Hz]	Power spectral density [G^2/Hz]
20	0.013 (6 dB/oct)
125	0.5
700	0.5
2000	0.062 (-6 dB/oct)

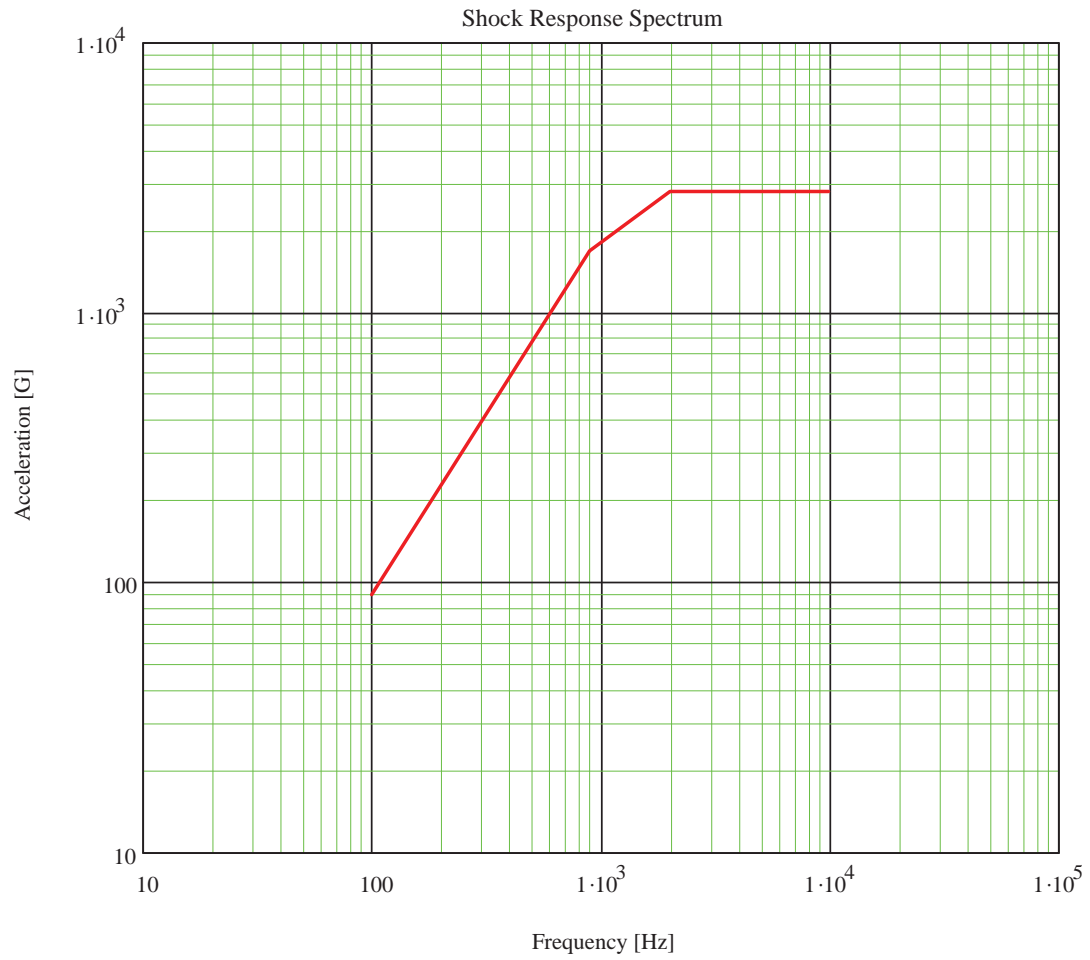
Overall : 23.16 Grms

Figure 2. Random vibration level (Qualification Test)



Frequency [Hz]	Acceleration [G]	
5	1	(Vibration amplitude is 20 mm (peak-peak) from 5 to 27 Hz.)
27	30	(29.37 G)
200	30	
200	10	
2000	10	

Figure 3. Sine wave vibration level



Frequency [Hz]	Acceleration [G]
100	90
900	1700
2000	2800
10000	2000

Figure 4. Shock applied level

Thermal environment

Thermal characteristics of the Thruster Valve are shown in Table 2.

Table 2 Thermal characteristics

Property	Characteristics
Operating temperature range	Operating: +4 to +121°C
	Storage: -40 to +60°C
Thermal cycle	4 to 121°C, 20 cycles