

D31.1 样本中给出了 G120 变频器在长期存储、运输过程和运行过程中满足的振动标准，如下图所示：

Unless explicitly specified otherwise, the following technical specifications are valid for all the following components of the SINAMICS G120 standard inverters.

General technical specifications	
Mechanical ambient conditions	
Long-term storage acc. to EN 60721-3-1	
• Inverters and components, frame sizes FSA to FSF ¹⁾	Class 1M2
• Inverters and components, frame size FSGX ²⁾	Class 1M2
Transport acc. to EN 60721-3-2	
• Inverters and components, frame sizes FSA to FSF ²⁾	Class 2M3
• Inverters and components, frame size FSGX ²⁾	Class 2M2
Operation acc. to EN 60721-3-3	
• Inverters and components, frame sizes FSA to FSF	Class 3M1
- Vibration test	Test Fc (sinusoidal) according to EN 60068-2-6 Deflection: 0.075 mm at 10 ... 57 Hz Acceleration: 10 m/s ² (1 × g) at 57 ... 150 Hz 10 frequency cycles per axis
- Shock test	Test Ea (semi-sinusoidal) according to EN 60068-2-27 Acceleration: 49 m/s ² (5 × g) at 30 ms 3 shocks in all three axes in both directions
• Inverters and components, frame size FSGX	
- Vibration test	Test Fc according to EN 60068-2-6 Deflection: 0.075 mm ₃ at 10...58 Hz Acceleration: 10 m/s ² (1 × g) at 58 ... 200 Hz
- Shock test	Test Ea according to EN 60068-2-27 Acceleration: 98 m/s ² (10 × g) at 20 ms

1Mx: 长期存储时的振动等级，对应标准 EN60721-3-1

2Mx: 运输过程中的振动等级，对应标准 EN60721-3-2

3Mx: 运行过程中的振动等级，对应标准 EN60721-3-3

运行过程中的振动等级，分为 3M1 到 3M8 共 8 个等级，其中 3M1 的振动最弱，3M8 的振动最强。

下面摘录 EN60721-3-3 对 8 个振动等级的描述和相关参数。

A.2.5 M. Mechanical conditions

Condition of stationary use	Class							
	3M1	3M2	3M3	3M4	3M5	3M6	3M7	3M8
<i>a) Stationary vibration, sinusoidal:</i>								
displacement amplitude mm	0,3	1,5	1,5	3,0	3,0	7,0	10	15
acceleration amplitude m/s ²	1	5	5	10	10	20	30	50
frequency range Hz	2-9 9-200	2-9 9-200	2-9 9-200	2-9 9-200	2-9 9-200	2-9 9-200	2-9 9-200	2-9 9-200
Locations where levels of vibration are insignificant or of a low significance	x	x x	x x	x x	x x	x x	x x	x x
Locations where levels of vibration are significant or high				x	x	x x	x x	x x
Locations where levels of vibration are very high or extremely high							x	x x
<i>b) Non-stationary vibration, including shock:</i>								
shock response spectrum type L, peak acceleration \hat{a} m/s ²	40	40	70	None	None	None	None	None
shock response spectrum type I, peak acceleration \hat{a} m/s ²	None	None	None	100	None	None	None	None
shock response spectrum type II, peak acceleration \hat{a} m/s ²	None	None	None	None	250	250	250	250
Locations with insignificant levels of shock	x	x x	x x	x x	x x	x x	x x	x x
Locations where levels of shock are of low significance or significant			x	x x	x x	x x	x x	x x
Locations where levels of shock are of low significance or significant					x	x x	x x x	x x x x
NOTE Alternative classes are given to allow for product design, mounting and intensity of vibration or shock.								

A.3.5 M. Mechanical conditions

These are covered by eight class notations as follows:

- 3M1 This class applies to locations with insignificant vibration and shock.
- 3M2 In addition to the conditions covered by class 3M1, the class 3M2 applies to locations with vibration of low significance, e.g. for products fastened to light supporting structures subjected to negligible vibrations.
- 3M3 In addition to the conditions covered by class 3M2, the class 3M3 applies to locations with shock of low significance, e.g. shocks transmitted from local blasting or pile-driving activities, slamming doors, etc.
- 3M4 In addition to the conditions covered by class 3M3, the class 3M4 applies to locations with significant vibration and shock, e.g. transmitted from machines or passing vehicles in the vicinity, etc.
- 3M5 In addition to the conditions covered by class 3M4, the class 3M5 applies to locations where the level of shock is high, e.g. adjacent to heavy machines, conveyor belts, etc.
- 3M6 In addition to the conditions covered by class 3M5, the class 3M6 applies to locations where the level of vibration is high, e.g. close to heavy machines.
- 3M7 In addition to the conditions covered by class 3M6, the class 3M7 applies to locations where the level of vibration is very high, e.g. for products mounted directly on machines.
- 3M8 In addition to the conditions covered by class 3M7, the class 3M8 applies to locations where the level of vibration is extremely high, e.g. products mounted on power-hammers, etc.

NOTE Selection of the relevant class is dependent on product design, mounting and intensity of vibration or shock.