

## Environmental Specification

### Scope of the document

This document specifies the environmental requirements for Genelec monitoring products. This includes two-way, three-way, and subwoofers. This document applies also to the accessories and supporting products used with monitoring products.

The environmental requirements are different for the products with MDF enclosures.

### Influence to product warranty

Operating the products outside the environmental specifications voids the Genelec product warranty unless the environmental requirements are agreed with Genelec case by case in writing.

### Environmental specification summary

The products are intended for indoor use only. Prolonged exposure to direct sun light and other sources of intense ultraviolet radiation sources can reduce the lifetime of plastics, rubbers, and other materials used in drivers as well as change the dyes in paints and such use is not covered by the product warranty.

The environmental requirements for the enclosures using MDF enclosures are tight because of the nature of the MDF material. For these enclosures, observing the correct humidity and temperature combinations is essential.

There should never be condensation of humidity inside or outside the product. If there is a threat of condensation, for example when a cold product is brought to a warm space, the packing should remain unopened until the product temperature is equal to the environmental temperature.

If the packing of the product is opened, for example because of a demonstration, the product packing must be reliably closed again completely according to the Genelec instructions for the non/operating storage specification to apply. Otherwise, the environmental requirements for the operating conditions must be applied.

Table 1. Overview of environmental specifications for Genelec products

parameter	minimum	maximum	notes
optimal ambient temperature, operating	+20 oC	+25 oC	no condensation, stable
ambient temperature, operating	+15 oC	+35 oC	no condensation, stable
ambient temperature, non-operating or storage (other than MDF enclosures)	+5 oC	+50 oC	no condensation
ambient temperature, non-operating or storage (MDF enclosures)	+15 oC	+35 oC	no condensation; observe the humidity requirements
optimal target humidity, operating	40 %	60 %	no condensation
humidity, operating	20 %	80 %	no condensation
humidity, operating, MDF enclosures	40 %	60 %	no condensation

humidity, non-operating or storage (other than MDF enclosures)	0 %	95 %	no condensation
humidity, non-operating or storage (MDF enclosures), product inside packing and packing closed at the factory - short term transient, less than 6 hrs - long term	20 % 20 %	80 % 60 %	no condensation
humidity, non-operating or storage (MDF enclosures), product not inside packing - short term transient, less than 6 hrs - long term	40 % 40 %	60 % 60 %	no condensation
altitude, operating		1500 m	
altitude, storage or transit		3000 m	wait at least 24 hours before operating after an altitude change
ingress protection (IP class), default	IP 00	IP 00	product has no ingress protection
shock, inside shipping package		30 G	single impact
vibration		0.1 G	not continuous
mains supply voltage, from nominal	-10%	+10%	
mains voltage harmonic distortion		0.1%	
mains voltage DC component		10 mV	

## Acclimatization

When determining how long you must allow a system to acclimatize after delivery, before power can be applied to the system without causing damage, you should compare the temperature and humidity of the environment in which the system had been stored to the conditions in the installation facility. Equipment damage can occur if the rate of temperature or humidity change is too great.

If it is necessary to compensate for significant temperature or humidity differences, place the systems, in their shipping containers, in a location that has a similar temperature and humidity environment as the installation facility. Wait at least 24 hours before removing the systems from their shipping containers to prevent thermal shock and condensation.

## Contaminants

The impact of contaminants on sensitive electronic equipment is known, but the most harmful contaminants are often overlooked because they are so small. Particles smaller than 10 microns are not visible to the naked eye. Yet it is these particles that are most likely to migrate to areas where they can do damage.

Some sources of contaminants include the following:

- Personnel activity – Tobacco smoke, artificial smoke sources, handling of liquids and food close to the products are potential hazards. Ingress of solid materials, liquids or chemicals can reduce performance over time or cause malfunction.
- Hardware movement – Moving the products without proper packing can lead to ingress of dust and sand and expose the product to moisture.

- Cleaning activity – Many chemicals used in office cleaning solutions can damage electronic equipment. Gases from cleaning chemicals or direct contact with the hardware can cause component or material failure. Solutions that can damage hardware include chlorine-based products, phosphate-based products, bleach-enriched products, petrol-based products, and floor strippers or reconditioners.
- Air conditioning – Improper cooling air circulation or insufficient filtering of the cooling or air conditioning air can accumulate particle dust in the products, leading to reduction of performance and even failure over time.

## Cooling

The products heat up during operation and also in the idle state. It is essential to ensure sufficient cooling. Pay attention to the following:

- Natural convection cooling requires that there is minimum clearance to allow air to move freely around the product and supply of cool air. Cool air can be provided by air conditioning or exchange of air from an outside source (ventilation).
- Forced air cooling has different minimum clearance requirements but supply of cool air and sufficient is essential also in the case of forced air cooling.
- The minimum clearance is specified for each product in its Operating Manual.
- Air circulation is sufficient when the product ambient temperature remains stable and within the specification during operation at all times.