

September 2020

## APM Epicol 33

Description	
System:	2-component or 1-component freezer adhesive
Colour:	colourless, transparent or coloured
Viscosity:	low viscosity, capillary
Solid bodies:	100% / solvent-free
Pot life:	6 hours
Curing:	80°C 30 min or 120°C 5 min
Temp. range:	-70°C to +200 °C

Specifications	
Directive 2011/65/EC:	RoHS compatible
EC No. 1907/2006:	compliant with REACH
ISO 10993:	compliant with 10993-1, -5 and -12

APM Epicol 33 is a very low viscosity epoxy adhesive with excellent capillary tendency. The adhesive is available as a 2-component adhesive or as a deep-frozen 1-component adhesive. APM Epicol 33 is typically used in the optics, electronics and the semiconductor sectors.

Properties of fluid adhesive	
Colour of resin component A:	clear, very slightly yellow
Colour of resin component B:	yellowish
Resin component:	mod. epoxy resin
Hardener component:	mod. amine hardener
Viscosity	
Mixture (25°C):	300 – 660 mPa*s
Mixture ratio A/B:	100 : 10 (g : g)
Pot life at 25°C:	6 hours

temperature. Clean metallic surfaces with aqueous cleaners or clean solvents.

For these materials and in particular plastics, surface pretreatment using oxygen plasma has proven successful. Plasma treatment dries the surface and improves wettability. This achieves good adhesion of the adhesive. With plastics, the surface is also chemically modified. With poor adhesive plastics this produces an adhesive surface. Primers are no replacement for surface pretreatment. Adhesion and ageing resistance can also be improved by using primers.

### Surface pretreatment / cleaning

The surfaces to be bonded must be dry and free from dust, oil, separating agents and other impurities. The selected type of surface treatment depends on the requirements profile (cleanliness, mechanical strength, ageing resistance). Above all, mechanical pretreatment, e.g. grinding or sand-blasting, achieves an improvement in adhesion for metals and in many cases for non-ferrous surfaces as well. It is best to clean glass surfaces using the aqueous ultrasound cleaning method at raised

### Mixing the adhesive components

The two adhesive components are weighed in the clean mixing beakers in the specified mixing ratio. The components must be machine mixed (Speedmixer) or manually without admixing air bubbles. To obtain a perfect mixture, produce between 10 g and 50 g of the mixture. After mixing it must then be free from streaks, clear and colourless.

### Adhesion with deep-frozen mixtures

Remove the deep-frozen adhesive from the deep freeze and allow it to reach room temperature in the air. This requires 5 to 10 minutes depending on the cartridge size. As soon as the cartridge is no longer covered with condensation and the adhesive is fluid, work can start with dosing.

### Applying the adhesive

The ideal processing temperature is between 20°C and 28°C. Viscosity falls at higher temperature and pot life shortens.

Normally, the adhesive can be applied from the cartridge using a dosing device. The capillary tendency of this adhesive is unusually high. This means that the adhesive flows into even very fine adhesive bonds at room temperature and bonds the substrates permanently.

### Curing the adhesive

Heating cabinet	80 °C	30 min
Heating cabinet	100 °C	10 min
Heating cabinet	120 °C	5 min

### Properties of cured adhesive

Colour:	clear, colourless
Shore D (25°C):	80-90
Tensile shear strength (25°C):	12.0 N/mm <sup>2</sup>
Thermal conductivity:	0.20 W/mK
Glass transition temp. (T <sub>g</sub> ; °C):	> 90 °C
CTE below T <sub>g</sub> :	39*10 <sup>-6</sup>
CTE above T <sub>g</sub> :	175*10 <sup>-6</sup>

### Deep-frozen cartridges

Processing 2-component adhesives poses risks to adhesive bond quality which is not tolerated in certain applications, e.g. space, aviation, electronics or medical technology. The individual components may become crystallised during storage or might separate from the filler; the mixing ratio may be incorrect, the mixture inhomogeneous or air bubbles may become admixed with the adhesive mixture.

All these risks can be avoided if the mixing process if small quantities of adhesive (up to 55 cm<sup>3</sup> cartridges) are used and the pot life is not too short (> 30 minutes). If the deep-frozen 1-component version of the same adhesive is used, the adhesive components are decrystallized, homogenized, degassed, machine mixed and filled in cartridges without air bubbles. The cartridges can be stored below -40°C from 2 to 12 months without loss of quality. The adhesion process with deep-frozen cartridges is simple and robust since the adhesive is processed as a 1-component adhesive. Deep-frozen adhesives are used whenever the quality of the bond must be guaranteed and the quantity of adhesive used does not justify use of a 2-component mixing machine.

### Safety instructions

Avoid contact with skin and eyes. When applying the adhesive, always wear gloves and safety goggles. If adhesive comes into contact with the skin, do not use solvents to remove. Instead wash the affected area (hands) with warm water and soap and then dry. Liquid adhesive irritates on contact with the eyes and may lead to permanent eye damage. Before use, please observe the instructions in the safety data sheet.

### Storage

The adhesive has maximum shelf life at temperatures between 15°C and 25°C. The shelf life of the two components is at least 24 months under these conditions. Higher temperatures shorten the standard shelf life. Lower temperatures temporarily cause higher viscosity and may lead to crystallisation.

Deep-frozen 1-component adhesive (in cartridges) must always be stored at a temperature of below -40°C. At this temperature the mixture has a shelf life of at least 6 months. Never defrost the cartridges, otherwise the pot life is shorter or the adhesive is already cured. As a result the product is always delivered with dry ice at -78°C.

### Disposal

The liquid components of the adhesive must be disposed of as hazardous waste in the same way as synthetic resin or paint components. Under no circumstances mix large quantities (> 100 g) of the components for curing since the curing process is strongly exothermic and could result in the mixture heating up to a dangerous extent. Cured adhesive is disposed of as hazardous waste in the same way as thermosetting plastics depending on local legal requirements or as domestic waste.

The specifications in this data sheet are based on meticulous tests and our previous experience in everyday practice. They are non-binding instructions, in the same way as our application advisories are also non-binding, whether verbal, in writing or by trials since we cannot accept any liability due to the wide variety of possible influences during processing and application. APM Technica AG disclaims all other explicit or implicit warranties, conditions and terms, be they of real or legal nature, including those which refer to usual market quality, their suitability for a particular use, satisfactory quality or observance of third-party trademarks. APM Technica excludes all liability to the extent permitted by law – whether arising from contract, quasi contract or tort (including negligence) – for direct, indirect and consequential damages, punitive damages awarded by court, loss of business of all kinds, loss of information or data or any other financial losses which may result from the sale, installation, maintenance, use, performance, failure or interruption of operation of the product or in connection therewith, even if we were informed of the possibility of occurrence of such damages. Data and other specifications concerning the nature and suitability of our products are non-binding general conditions and specifically represent no guarantee of certain characteristics. We advise you to perform your own adequate tests to determine the suitability of our products for your specific application. The user is himself responsible for defining the suitability of production methods mentioned in the technical data sheet for his purposes and for taking precautionary measures which are suitable to protect assets and persons from any danger which may occur during the handling and usage of these products. In all other cases our General Terms and Conditions of Business shall apply.