COLTECH R 3100

TECHNICAL DATA SHEET
Date: 01.09.2022 – Version 20

Polyurethane Insulating Resin, Low Viscosity

Product description

COLTECH R 3100 is a two component, solvent free, low viscosity, temperature resistant, rigid Polyurethane electroinsulating Resin.
It provides excellent durability, chemical resistance properties with minimum shrinkage.

Cures by reaction (cross linking) of the two components at room temperature.

Advantages

- **Solvent free**
- **Low Viscosity**
- **Variable pot life depending on requirement**
- **Cold curing**
- **Good adhesion to cables, plastics and metal**
- **Excellent hydrolytic stability**
- **Low exothermic reaction temperature**
- **Minimum shrinkage**
- **High impact strength**
- **Chemical and hydrocarbon resistant**
- **Temperature resistant**

Uses

The COLTECH R 3100 is a low viscosity rigid, temperature resistant Polyurethane electro-insulating resin for:

- Production of low/medium voltage transformators
- Production of low/medium voltage capacitors
- Covering of electronic circuits for copyright protection
- Multipurpose, potting applications

Consumption

1,1 kg / liter

Colors

The COLTECH R 3100 is supplied in Beige and Black. Other colors available on request.

Technical Data *

PROPERTY	RESULTS	TEST METHOD
Composition	Polyurethane Resin + Hardener. Solvent free.	
Mixing Ratio	A:B = 1:1 by volume	
Hardness (Shore D Scale)	40	ASTM D 2240
Density Component A (Resin)	1,05 g/cm^3	ASTM D1475 - DIN 53217-2
Density Component B (Hardener)	1,22 g/cm^3	ASTM D1475 - DIN 53217-2
Density (mixed system)	1,14 g/cm^3	ASTM D1475 - DIN 53217-2
Viscosity (mixed system)	800 Mpas*sec^{-1}	EN ISO 2555
Tensile Strength	15 N/mm^2	ASTM D412
Elongation at break	50%	ASTM D412
Solids Content	100 %	CALCULATED
Water absorption	<0.5%	ISO 62 Method 1:2008
Temperature strength	130ºC (Fully cured)	IN HOUSE LAB
Low Temperature Brittleness	-20º C (Fully cured)	IN HOUSE LAB
Thermal capacity Cp	1,43 °C Jg^{-1}°C^{-1}	ISO 11357-4:2021
DSC Delta Cp	0,267 °C Jg^{-1}°C^{-1}	ISO 11357-4:2021
Glass transition Mid-Point ISO	68,19 ºC	ISO 11357-2:2020
Electric strength	18,2 kV/mm	IEC 60243-1:2013
tan δ (dielectric dissipitation factor)	0,0149	ASTM D150:2011
ε_r (relative permitivity)	2,95	ASTM D150:2011
Loss tangent	0,0442	ASTM D150:2011
Insulating resistance at 23ºC	4,91*10^{13} Ω	IEC 60243-1:2013
Insulating resistance at 70ºC	6,46*10^{12} Ω	IEC 60243-1:2013
Pot Life *	15 min	Conditions:20ºC,50%RH
Tack Free Time *	1-5 hours	
Initial Curing Time	24 hours	
Final Curing time	7 days	

* Pot Life and Tack free times can be adjusted according production requirements with the addition of Catalyst (accelerator).

Chemical Properties

Water	+	Hydrochloric acid 5%	+
Potassium hydroxide 5%	+	Domestic Detergents	+
Sodium hydroxide 5%	+	DMSO, NMP	-
Salt water 20%	+	Xylene	±
{+ stable, - unstable, ± stable for a short period.}			

Application

Surface Preparation

Before adhering make sure that all surfaces to be used are free of any trace of moisture (Maximum surface moisture content should not exceed 4%). Also make sure that the surface is not contaminated with oils, grease, dust, lubricants, release agents and other impurities that could prevent the adhesion.

Manual Mixing & Application

Stir COLTECH R 3100 Component A well before using. Stir COLTECH R 3100 Component B well before using.
COLTECH R 3100 Component A and Component B should be mixed by low-speed mechanical stirrer, according to the indicated mixing ratio in this technical data sheet, for about 1-3 min if applied manually. When mixing, care must be taken to avoid the introduction of excessive amounts of air. After mixing of the Components A+B, transfer the mixture in a second clean container and mix again for 15-20 sec. Following to that we recommend to use a Vacuum Chamber (@-1bar for 60-120 sec) to remove any air bubbles from the mixture prior to use.

ATTENTION: The mixing of the components has to be performed very thoroughly, especially on the walls and bottom of the pail until the mixture becomes fully homogeneous and streak free. Please ensure consumption within the Pot Life. Containers of Part A (Resin) and Part B (Hardener) should be kept hermetically sealed at all times when not in use to prevent the ingress of moisture. Never use if the viscosity of the adhesive/resin is starting to rise as this is a sign that the end of the Pot Life is reached and the resin should not be used any more.

WARNING: Incomplete mixing or use of the wrong mix ratio will result in erratic or partial curing. Containers of Part A (Resin) and Part B (Hardener) should be kept sealed at all times when not in use to prevent the ingress of moisture. If moisture ingress, the resin mixture will create foam while curing. Containers of Part A (Resin) and Part B (Hardener) should be kept stored at a Temperature between 10-30^{o}C. When storing under very cold conditions, the hardener may crystallize. If this occurs, simply warm (40^{o}C) the container gently until all crystals have re-melted.

Apply COLTECH R 3100 resin by manual pouring or dispensing equipment to the object to be potted.

RECOMMENDATION: Before use or change in surface to be adhered make an adhesion test to make sure that adhesion is optional.
RECOMMENDATION: Use Post-curing in a heating apparatus (@50-60^{o}C for 2-24h) to accelerate curing and lower final curing time.

Dual Chamber Mixing & Application

COLTECH R 3100 is supplied in a dual-chamber pouch, in the proper mixing ratio. The resin (A component) and the hardener (B component) are mixed by removing the clip and moving the content inside the pouch, for 2-4 minutes, until the content becomes homogenous. The clip should be removed gently and it is suggested to be used to move the content of the pouch from the corners to the middle. After thoroughly mixing, the corner of the pouch should be cut and the package can be used as a simple dispenser.

Plural Component Machine Mixing & Dispensing

Automatic mixing equipment is available which will not only mix both the resin and hardener accurately in the correct ratio but do this without introducing air. Set the automatic, plural component machine for both parts (Component A and Component B) at a temperature higher than 18°C. Make sure that the Component A is constantly under low speed (50-100 RPM) agitation.

Acceleration

If the Pot life of the adhesive is to be adjusted to production needs, add the recommended quantity of the COLTECH C 299 catalyst / accelerator (from 0,01 to 0,2%) into the COLTECH R 3100 Component A and mix well, for about 3 min, by low-speed mechanical stirrer. Allow mixture to rest for 5-10 minutes. Following to that add the COLTECH R 3100 Component B as described above, and use.

Packaging

Packages should be stored in dry and cool rooms for up to 12 months. Protect the material against moisture and direct sunlight. Storage temperature: 10^{0}-30^{0}C. Products should remain in their original, unopened containers, bearing the manufacturers name, product designation, batch number and application precaution labels. After long storage period, please put extra effort in mixing to make sure the product is homogenous.

Safety measures

Please study the Material Safety Data Sheet. PROFESSIONAL USE ONLY

Our technical advice for use, whether verbal, written or in tests, is given in good faith and reflect the current level of knowledge and experience with our products. When using our products, a detailed object-related and qualified inspection is required in each individual case in order to determine whether the product and /or application technology in question meets the specific requirements and purposes. We are liable only for our products being free from faults; correct application of our products therefore falls entirely within user's scope of liability and responsibility. Our aggregate liability in damages or otherwise shall in no event exceed the amount, if any, received by us with respect to the relevant products. We will, of course, provide products of consistent quality within the scope of our General Conditions of Sale and Delivery. Users are responsible for complying with local legislation and for obtaining any required approvals or authorizations. Values in this technical data sheet are given as examples and may not be regarded as specifications. For product specifications contact our R+D department. The new edition of the technical data sheet supersedes the previous technical information and renders it invalid. It is therefore necessary that you always have to hand the current code of practice.