

## Cascophen R7132 / Cascoset MCAT 9131

### Phenol Resorcinol Formaldehyde Adhesive for Engineered Wood Products

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This Technical Data Sheet sets out information which, to the best of the knowledge of Momentive Specialty Chemicals, describes the conditions which will lead to optimum performance of Cascophen R7132 and Cascoset MCAT 9131 hardener.

This data sheet also contains important safety information and describes potential hazards that may be involved in using the product. **You should read the information set out below carefully before using the products along with the respective Material Safety Data Sheets.**

#### Adhesive Description

Momentive Cascophen R7132 / Cascoset MCAT 9131 phenol resorcinol formaldehyde adhesive is an exterior, durable liquid-liquid system that is recommended for the manufacture of structural finger joints, I-joists, and glued laminated beams. Properly cured, this adhesive produces a waterproof bond that meets wet use (exterior) specifications as noted below. Cascoset MCAT 9131 hardener is a pre-mixed, ready-to-use hardener developed for use with automatic meter mix equipment and direct application extrusion. Cascophen R7132 resin with hardener Cascoset MCAT 9131 is specifically formulated for use with conventional heating equipment or room temperature cure above 19°C.

#### Third Party Test Standard

Cascophen R7132 / MCAT 9131 has been independently tested and demonstrated to meet the requirements of AS/NZS 4364:2010 (Timber – Bond performance of structural adhesives) including the following structural timber standards:

- ASTM D2559
- CSA 0112.7-M1977
- CSA 0112.9-10
- EN 301/302 & DIN 681141
- ASTM D7247-07a

#### Typical Properties of Cascophen R7132 (at Manufacture)

Appearance:	Deep red-brown liquid
Viscosity:	14 - 24 P at 25°C (using cone and plate)
Solids:	53.0 – 58.0%
pH:	8.5 – 9.5
Flash Point:	64°C Pensky-Martens Closed Cup ASTM D93
Density at 20 C:	1.16

### Typical Properties of Cascoset MCAT 9131 (at Manufacture)

Appearance:	Brown viscous thixotropic liquid
Viscosity:	20 to 80 P at 25°C (Brookfield DVII spindle 3 at 12 RPM)
pH:	3.5 to 4.3 at 25°C
Density:	1.20 g/ml (typical)

### Storage Life

The storage life of R7132 resin is at least 6 months at 20-25°C. Storage life may be extended by storing in a cool place and sealed to prevent evaporation. MCAT 9131 hardener should be used within 6 months to prevent excessive fuming from the mixed adhesive. Rotate stock regularly, using the oldest material first.

**CAUTION: MCAT 9131 hardener should be stored in a cold atmosphere (<10°C) and agitated periodically. Storage at higher temperature will increase fuming from the mixed adhesive, although performance characteristics remain unaffected. Without efficient agitation, MCAT 9131 will stratify and solids can settle to the bottom of the container. Solids that have settled can be re-dispersed by thorough agitation prior to use. Totes and drums that have not been agitated while in storage should be thoroughly agitated prior to use.**

### Mixing Instructions

**The recommended adhesive mix ratio is 2.5 parts resin to 1 part hardener by weight. The allowable range for the mix ratio is 2.2 to 2.7.** This ratio is critical to the performance of the adhesive and must be checked quantitatively during production. It is important that the resin and hardener quantities are determined by weight. If the quantities are to be determined by volume then the density of both the hardener and resin needs to be taken into account.

	Parts by Weight
Cascophen R7132	100
MCAT 9131	40

### Gel Time of Mixed Adhesive

After mixing, Cascophen R7132 / MCAT 9131 remains liquid for a limited period after which it gels and becomes unusable.

PRF adhesives are exothermic, meaning that heat is generated as the resin and hardener react together, increasing the temperature and reducing the observed pot life. The actual pot life or working life, of the adhesive will be considerably shorter.

Gel Time: The time it takes for the gluemix to gel. This is not the cure time.

Table 1 below show the importance of keeping the gluemix cool to achieve a longer working life.

GLUE MIX TEMPERATURE (°C)	15	25	35
Gel time (in minutes)	190-230	110 -130	30-50

**TABLE 1:** Gluemix temperature and gel time of adhesive

Note that gel times are also dependent on factors such as the revolving action of roller type glue spreaders. This tends to prematurely thicken a glue mix by constantly exposing the mix to the atmosphere and encouraging evaporation of water.

**Do not cure Cascophen R7132 / MCAT 9131 at temperatures below 19°C as the adhesive may not cure properly.**

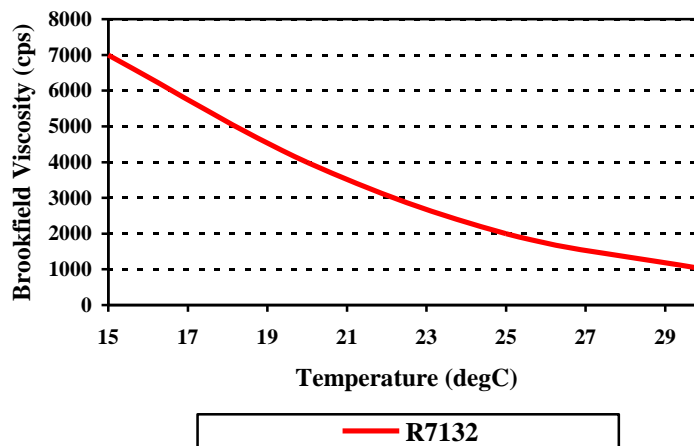
Do **NOT** adjust the resin to hardener ratio in an attempt to lengthen or shorten the gel time as this can pose a significant risk to the bond quality.

**Resin Viscosity and Mixed Adhesive Viscosity**

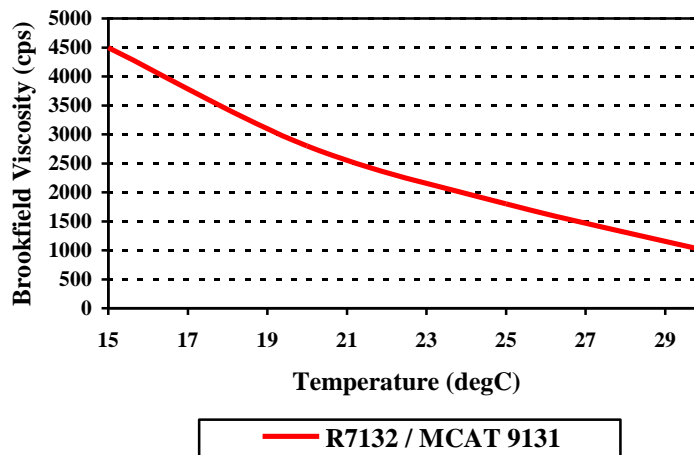
Temperature has a very strong influence on both resin viscosity (Figure 1) and mixed adhesive viscosity (Figure 2). Temperatures higher than 30°C cause the adhesive to become thin and runny, while temperatures below 20°C may cause pumping problems due to the high viscosity.

All viscosity measurements are made using a Brookfield RVT viscometer at 20 rpm. Resin viscosity is recorded using a #3 spindle after 1 minute and mixed adhesive viscosity using a #4 spindle after 5 minutes.

**Figure 1 - Resin Viscosity vs. Temperature**



**Figure 2 – Mixed Adhesive Viscosity vs. Temperature**



**Preparation of Wood**

The lumber should be between 10% and 16%\* moisture content to produce satisfactory bonding. Pockets of high moisture content, especially during RF cure, will result in a starved glueline due to excessive squeeze-out and/or over-penetration of the adhesive. However moisture contents below 8% can prevent penetration of the adhesive at all and also limit the permissible assembly period, particularly at temperatures above 26°C. Moisture contents of adjacent laminations should not vary by more than 3% and the range of moisture contents of all laminations in a beam should not exceed 5%. For radio frequency gluing this moisture range should be closely controlled at 12 – 15%

\* Note: Moisture content refers to an allowable range (minimum and maximum that is acceptable) and not an average.

Wood surfaces should be free of dirt, dust, wax, grease and other foreign materials prior to gluing. The best bonding is obtained when final surfacing of the timber has been performed immediately, and within 24 hours prior to gluing so that smooth, clean accurately fitting surfaces are provided. In some situations a shorter time period may be required, for example with solvent borne preservative treatments, some wood species and different production methods.

Surfaces should be free from raised or torn grain, skips, burns, glaze or any other imperfections, which will prevent good contact. The planer should provide a clean cut without bruising or damaging wood fibres. Timber which is cupped or warped so that it will not straighten when pressure is applied should not be used.

Timber should have a maximum thickness variation of 0.2 mm across the width, with best results achieved at less than 0.1 mm. It is especially important to control lumber tolerances when using PRF cure.

## Assembly Time (Cold Set)

- *Open Assembly Time:* The time interval in which the surface has been spread but the adhesive remains exposed to the air and subject to evaporation.
- *Closed Assembly Time:* The time period that the spread surface is in close contact with another surface but not under pressure. Evaporation is minimized during this period.
- *Total Assembly Time:* The time interval from the spreading of the first surface until the package is under full pressure.

The assembly time for the Cascophen R7132 / MCAT 9131 system varies with the amount of adhesive applied, the moisture content of the wood and other variables involved. For best results, open assembly time should be kept as short as possible, (5 minutes is the maximum allowed) while a closed assembly time of 20-30 minutes is generally beneficial. Total assembly time must not exceed the pot life of the glue mix and final pressure must be applied whilst the glueline is still wet. Maximum allowable assembly times are provided in the following tables.

**TABLE I**  
**Maximum Total Assembly Time Using R7132 / MCAT 9131**

Lumber Temperature	GLUE SPREAD RATE				
	340 gsm	390 gsm	440 gsm	490 gsm	540 gsm
15°C	80 min.	100 min.	120 min.	150 min.	180 min.
20°C	60 min.	80 min.	100 min.	110 min.	120 min.
25°C	45 min.	60 min.	80 min.	85 min.	90 min.
30°C	30 min.	40 min.	50 min.	55 min.	60 min.

## Pressure

A clamping pressure between 620 - 1030 kPa is recommended for face bonding softwood lumber, with the preferred pressure 860 kPa. For hardwoods pressures between 1000 - 1400 kPa are required.

Clamps should be spaced close enough to give a uniform applied pressure whilst bolts should be checked with a torque wrench to ensure that sufficient and uniform pressure is applied. If a large assembly is placed in a heated chamber for curing, the pressure should be checked several times during the first hour of heating and should be adjusted if necessary. A glueline thickness of 0.05 – 0.18 mm is recommended.

## Cure Temperatures

Glueline temperature determines the time that any assembly to be bonded with formaldehyde based adhesives should be kept under pressure to affect a complete cure. The rate of chemical reaction that takes place between Cascophen R7132 and MCAT 9131 increases at higher temperatures.

Conversely, the reaction rate is slower at lower temperatures. The rate of reaction before the adhesive is applied can be somewhat controlled by cooling the adhesive mixture to obtain a longer pot life. After the adhesive has been applied, heating the clamped assembly may allow the pressure period to be shortened. This must be monitored very carefully however.

The glueline can be heated in many ways. For example pre-heating of the timber to 20°C or above, placing the assembly in a heated chamber, hot pressing or using resistance heaters placed adjacent to the glueline. The rate of temperature rise in the glueline will vary with each type of heat application, size of assembly and production facility. The pressure periods detailed in this document assume that the entire glueline is at the specified temperature.

**Cascophen R7132 / MCAT 9131 adhesive will not properly cure at temperatures below 19°C.** If cold wood is used the entire package must be heated so that the glueline reaches at least 19°C for the required amount of time.

**Clamping Times**

This is the period under which the joint is held under pressure (it does not apply for fingerjointing). The glue line core temperature governs the rate of resin cure therefore clamp times and glue line strength development.

**TABLE II  
Minimum Clamp Time Using Cascophen R7132 / MCAT 9131**

	15°C	20°C	25°C	30°C
Minimum Clamp Time	12 hours	9 hours	7 hours	5 hours

**Conditioning of joints**

During clamping the glue will gel however full strength is not obtained. Joints need to be conditioned for 2 - 3 days before further processing. The conditioning period will need to be longer at temperatures below 20°C or if treated timber is being used. If treated timber is being glued (especially CCA) then the joints should be heated to 30 – 40°C for 6 – 8 hours so that full cure may be achieved. If joints are machined too early there is a much higher probability that they will be broken or poor wood failure of the final bonds will result. Maximum bond strengths are reached 5 - 8 days after gluing at 20°C.

Studies of the curing characteristics of Cascophen R7132 / MCAT 9131 show that this system should **not** be cured at temperatures below 15°C. Below this temperature maximum strength is never obtained.

### **Storage, Handling and Cleaning**

- Storage tanks, pipes, fittings, etc. for both Cascophen R7132 resin and Cascoset MCAT 9131 hardener can be made from mild steel, stainless steel, or most common plastics (polyethylene, polypropylene, PVC, Teflon). Avoid extended contact when possible with magnesium, aluminum, zinc, tin, chromium, brass, and bronze.
- We recommend placing a filter between the bulk holding tank(s) and day use tank(s) or meter mix unit. If utilizing a day use tank, we also recommend a filter between it and the meter mix unit. Lastly, in-line filters should be used at the meter mix unit itself prior to the static mix tube. We recommend 20 mesh filters.
- We recommend that the in-line slurry filter at the meter mix unit be removed and cleaned of any debris on a daily basis.
- Rubber gloves and safety glasses/goggles/face shield should be worn whenever the resin, slurry, or mixed adhesive is handled. Wash thoroughly with water if any glue is split onto skin.
- Adequate ventilation should be provided in areas where the adhesive or its components are stored, mixed/applied, or cured.
- Hot water is used for clean up of the mixed adhesive while it is still wet. Use of a dilute caustic solution may aid clean up (safety glasses, gloves and an apron are required when handling caustic soda as it is highly corrosive). The use of a glue release agent on machinery will help to stop the build up of adhesive on the machinery.

Momentive has an Emergency Response Team that may be contacted 24 hours a day, 7 days a week. In the case of any SH & E incidents involving the adhesive system, in New Zealand call 0800 734 607, or in Australia call 1800 033 111 for advice.

Safety Data Sheets for Cascophen R7132 and Cascoset MCAT 9131 should be read before using these products.

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