Technical Data Sheet

Crystal-Cast™ R300 Series Mercury-Free Water-Clear Rigid Polyurethanes

1. Introduction

Crystal-Cast™ R300 Series Rigid Polyurethanes reacts to form water-white, clear, impact resistant rigid polyurethanes.

The Crystal-Cast™ R300 series are entirely free of mercury catalysts and therefore represent the very latest in clear-casting technology.

The substitution of mercury catalysts normally results in severe compromises to the cure of the polyurethane. However the Crystal-Cast™ R300 series polyurethanes will cure well with similar processing methods.

Nevertheless adjustments to the cure method may be needed (see below).

Crystal-Cast™ R303 is a version of Crystal-Cast™ R301 but with added flame retardants.

2. Applications

The Crystal-Cast™ R300 Series Polyurethane have been formulated for casting components with high clarity and low colour in all the thicknesses.

In addition the pot life of the mixed systems allow them to be fully degassed and poured (carefully) to produce bubble-free castings. Casting without degassing is unlikely to produce bubble-free castings.

3. Specification

Property		CCR300	CCR301	CCR302	CCR303
Gel Time (Mins @ 20°C)	Min.	5 (50g)	20 (100g)	Not applicable (See below)	20 (100g)
	Max.	10	40		40
Hardness at full cure (Shore D)	Min.	75	75	Not applicable (See below)	70
	Max.	85	85		80

4. Mix Ratios (all Grades)

By Weight:	1.00	Part A to 1.00 Part B
By Volume:	1.02	Parts A to 1.00 Part B

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The components should be measured to an accuracy of 2% or better. Care should be taking when measuring by volume as this is an inherently inaccurate method unless specific volumetric measuring equipment is used.

5. Typical Properties

Property	Units	CCR300	CCR301	CCR302	CCR301
Gel Time (20°C)	Mins.	7	30	N/A	30
Demould Time (@20°C)	Hours	6	24	N/A	24
(@40°C)	Hours	1	2	N/A	2
Full Cure (@20°C)	Hours	24	72	N/A	72
(@40°C)	Hours	6	4	N/A	4
Hardness at full cure	Shore D	82	82	N/A	75

Crystal-Cast™ R302 is designed for large and very large castings. Depending on the mass to be cast the Crystal-Cast™ R302 is blended with one of the other grades to get the required cure speed. This is entirely a trial-and error process and subject to trials to obtain the best blend.

6. Preparation of Components

None of the components require preparation other than mixing prior to removal of any product from the containers. Any crystallisation of the Part B may be re-melted by warming to 30-40ºC and allowing to cool again.

The components may be mixed and cast at room temperature and require no pre-warming prior to use.

7. Preparation of Moulds

Moulds should be clean and dry and generally a good quality release agent should be used and allowed to dry fully. For details of suitable release agents please contact REP Industrial Materials Limited.

Moulds pre-warmed to 30-40°C will ensure that the edges of the material to cure well and reduce the differential between the centre of the curing mass and the edges. This will result in fewer defects, such as shrink-marks and voids and also reduce the demould time. Thinner sections may require slightly higher mould temperature. Note that metal moulds should be warmed to at least 20-30°C to avoid chilling the polyurethane in contact with the mould surface, as this will result in extended demould time and may cause differential shrinkage, together with possible surface defect and tackiness problems.

8. Method of Use

Mixing

The components should be mixed together thoroughly by hand use a flat blade such as a palette knife or with a Jiffy type mixer if using a drill. The mixing should be carried out with care to avoid the inclusion of air and also to ensure that material on the sides and bottom of the vessel is removed and mixed in.

Degassing

! ***Degassing is essential if bubble-free mouldings are to be consistently produced.***

This should be done immediately after mixing, however degassing the components separately prior to mixing will reduce the degassing time of the mixed material and result in a better end product.

It is important to remember that degassing should be completed within the pot life of the material to allow for pouring carefully into the mould.
To ensure this the degassing chamber should be just large enough to accommodate the mixing vessel and the vacuum pump should be able to create sufficient vacuum in the chamber to start degassing in less than 5-10 seconds. Once the violent bubbling ceases degassing is almost complete, however for entirely bubble-free castings it is recommended that the product be agitated or mixed again and the degassing repeated to remove as much air as possible.

! **Note that increasing the quantity of mix, or working at higher ambient temperatures (eg. in the summer), will reduce the pot life of the material. Trials should be carried out to establish these parameters.**

Pouring
Care during pouring is essential to avoid entrapped air. Pour the material slowly allowing it to flow gently over the mould surface and to fill cavities and channels from the bottom up.

Take care not to scrape the sides of the mixing vessel to remove the last of the product. This very frequently results in streaks of under-mixed product in the finished casting, which can be clearly seen. A good practice is to transfer the mixed product into a second container, mix again and degass before pouring.

Postcure
Whilst the CCR300 series will usually cure satisfactorily at ambient temperatures best results are obtained by curing at 30-40°C.

Nin addition the CCR300 series benefit from a postcure, especially for thin sections, which increases the hardness and heat distortion temperature of the cured product. This is particularly important if the casting is to be machined or polished. Postcuring the materials for 4-6 hours at 60-80°C will usually be adequate, and is best carried out in the mould to avoid distortion.

! **With thick castings or large masses some shrinkage is to be expected in corners, especially during a postcure. This can be alleviated by allowing the product to gel and the exotherm subside before pouring more resin into the corners and then postcuring in the oven.**

9. Handling and Storage

The relevant Safety Data Sheets should be read carefully before using this material.

Good housekeeping is important with this material as with all chemicals. Spillages should be wiped up immediately and containers wiped clean after use. Isocyanate spillages can be especially hazardous and the Safety Data Sheet should be consulted for the correct cleaning up procedure.

Both components will absorb moisture, which will detract from obtaining satisfactory product primarily by cause bubbling in the cured product.
Exposure to atmosphere should therefore be minimised and containers sealed as soon as possible after use. Ideally part-used containers should be purged with dry nitrogen before resealing. Also it is good practice to store and use the products in the smallest practical containers to minimise absorption of atmospheric moisture.

The components should be stored in in a dry place at 15-25°C. Both components have a minimum shelf life of 12 months from the date of manufacture when stored correctly in unopened containers.

10. Health and Safety

The Safety Data Sheets provide information on the health and safety aspects of these materials. Please contact Creative Resin Systems if you do not have the necessary Safety Data Sheets.

The Crystal-Cast™ R300 Series Part As are classified according to the requirements of the CLP regulations as WARNING and the MSDS must be read prior to use of this material.

The Crystal-Cast™ R300 Series Part B isocyanate is classified according to the requirements of the CLP regulations as DANGER and the MSDS must be read prior to use of this material.

11. Suitability for Use

The information in this datasheet is given to the best of our knowledge and belief but without warranty or liability.

The user must establish the suitability of the material for the intended application by carrying out any appropriate tests.

Finished products produced from any batch of our materials must be subjected to comprehensive standards of quality control by the user.

12. Additional Information

Please note that this product requires testing for given applications. It is strongly recommended that customers carry out adequate trials to determine the suitability of this material for the intended use.

No liability will be accepted for direct or consequential losses arising from the use of this material.

However any comments or suggestions relating to improving the processing or characteristics of this material will be very welcome.