

Advanced Materials

RenPIM[®] 5213-1 A / 5213-1 B

PARTS IN MINUTES[®]

FAST CURING, TWO COMPONENT, POLYURETHANE SYSTEM FOR RAPID PROTOTYPING

KEY PROPERTIES

- Flame retardant system
- Approved to UL 94V-0
- High impact strength
- High thermal resistance
- Good dimensional stability

APPLICATIONS / DESCRIPTION

Parts In Minutes[®] polyurethanes simulate the appearance and physical characteristics of engineering thermoplastics for prototyping and short production runs. They can be used to produce functional prototype parts suitable for use in all major industrial areas including automotive, aerospace, consumer goods, electronic and leisure applications.

RenPIM[®] 5213-1 A/B is a buff coloured system and cured parts in their natural colour pass the flame retardant qualification UL94V-0 at 3.0mm minimum thickness. Coloured or pigmented material is not approved to UL94V-0. The parts have high impact strength, thermal resistance and good dimensional stability and simulate PP/ABS.

PRODUCT DATA

Property	Unit	RenPIM [®] 5213-1 A	RenPIM [®] 5213-1 B
Appearance Colour	visual	Liquid Brown	Liquid Cream
Viscosity at 25°C	m Pa s	ca. 190-210	ca. 1600-2400
Density	g/cm ³	ca. 1.2	ca. 1.18

PROCESSING

Mix ratio	Parts by weight	Parts by volume
RenPIM [®] 5213-1 A	65	65
RenPIM [®] 5213-1 B	100	100

Parts In Minutes[®] polyurethanes are specifically formulated to be fast curing systems and therefore require processing via application equipment. Huntsman Advanced Materials are pleased to advise on all types of suitable dispensing and mixing equipment for the processing of these materials. Hand mixing or manual processing of these materials is not recommended. Thorough stirring to ensure uniform dispersion of materials is **critical**, prior to processing.

Moulds

Huntsman Advanced Materials Parts In Minutes polyurethane systems are compatible with most major silicone suppliers products. Further information is available on request.

Huntsman Advanced Materials can also offer alternative polyurethane and epoxy materials for the production of moulds, with appropriate release agents. Please ask your local sales representative for further information.

Colouring of Parts In Minutes[®] polyurethane systems

Huntsman Advanced Materials recommends the use of polyol based colouring pastes. These are available from various suppliers. Astorit AG, Kobiboden, 8840 Einsiedeln, Switzerland,

Tel ++41 55 418 7500, Fax ++41 55 418 7501, for example offer a range of compatible products.

These are supplied in 50 g and 1 kg pack sizes. Other polyurethane compatible pigments or dyes are also acceptable for the colouring of Parts In Minutes prototyping systems.

PROPERTIES

Resin/Hardener mix:		Unit	RenPIM [®] 5213-1 A/B
Gelation time at 25°C		sec	ca. 50-90
Min. Layer thickness		mm	3
Demoulding time (dependent on layer thickness)		mins	ca. 15-30

After cure: 14 hours at 80°C or 7 days at 20-25°C

Density	ISO 1183	g/cm ³	ca. 1.2
Hardness	ISO 868	Shore D	78-83
Deflection temperature	ISO 75	°C	ca. 90
Tg	(DSC)	°C	ca. 99
Impact strength	ISO 179	kJ/m ²	>27
Compressive strength	ISO 604	MPa	ca. 40-55
Tensile strength	ISO 527	MPa	ca. 35-40
Elongation at break	ISO 527	%	ca. 8-12
Flexural strength	ISO 178	MPa	>55
Flexural modulus	ISO 178	MPa	ca. 1300-1500
¹ Linear shrinkage		mm/m	ca. 4

¹Test specimen 500x50x5 mm at 25 °C

STORAGE

The resin and hardeners described in this instruction sheet have the shelf lives shown provided they are stored at 6 - 28°C in a dry place and sealed containers, preferably those in which they are supplied.

During prolonged storage these products may crystallize, either fully or partly. If they have turned cloudy, granular or semi-solid, they should be conditioned overnight in their original containers at 50-60°C (e.g in a temperature controlled oven), stirred or dispersed fully and allowed to cool to room temperature before use.

**EQUIPMENT AND
MAINTENANCE****Application equipment**

Huntsman Advanced Materials is able to recommend equipment suppliers and provide technical help and assistance with respect to selection and operation of application equipment. A list of recommended suppliers is available on request.

Maintenance

Maintenance and cleaning of equipment is expected to be minimal but daily cleaning of mixers may be necessary, depending on the type of mixer used. Huntsman Advanced Materials responsibility for the environment means we do not recommend the use of solvents for cleaning. Static mixers can be discarded directly when the product has gelled, and dynamic mixers should be flushed through with the pure polyol component. Please also refer to the recommendations of the equipment supplier.

PACKAGING

System	RenPIM [®] 5213-1 A	RenPIM [®] 5213-1 B
Quantity and Weight	16.25 kg or 15.75 kg	25 kg
Quantity and Weight	4x3.3 kg	4 x 5 kg

**HANDLING
PRECAUTIONS****Caution**

Our products are generally quite harmless to handle provided that certain precautions normally taken when handling chemicals are observed. The uncured materials must not, for instance, be allowed to come into contact with foodstuffs or food utensils, and measures should be taken to prevent the uncured materials from coming in contact with the skin, since people with particularly sensitive skin may be affected. The wearing of impervious rubber or plastic gloves will normally be necessary; likewise the use of eye protection. The skin should be thoroughly cleansed at the end of each working period by washing with soap and warm water. The use of solvents is to be avoided. Disposable paper - not cloth towels - should be used to dry the skin. Adequate ventilation of the working area is recommended. These precautions are described in greater detail in the Material Safety Data sheets for the individual products and should be referred to for fuller information.

IMPORTANT LEGAL NOTICE

Huntsman Advanced Materials warrants only that its products meet the specifications agreed with the user. Typical properties, where stated, are to be considered as representative of current production and should not be treated as specifications.

The manufacture of materials is the subject of granted patents and patent applications; freedom to operate patented processes is not implied by this publication.

While all the information and recommendations in this publication are, to the best of Huntsman Advanced Material's knowledge, information and belief, accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, WHETHER EXPRESS OR IMPLIED, INCLUDING BUT WITHOUT LIMITATION, AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

The behaviour of the products referred to in this publication in manufacturing processes and their suitability in any given end-use environment are dependent upon various conditions such as chemical compatibility, temperature, and other variables, which are not known to Huntsman Advanced Materials. It is the responsibility of the user to evaluate the manufacturing circumstances and the final product under actual end-use requirements and to adequately advise and warn purchasers and users thereof.

Products may be toxic and require special precautions in handling. The user should obtain Safety Data Sheets from Huntsman Advanced Materials containing detailed information on toxicity, together with proper shipping, handling and storage procedures, and should comply with all applicable safety and environmental standards.

Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent on manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.

Except where explicitly agreed otherwise, the sale of products referred to in this publication is subject to the general terms and conditions of sale of Huntsman Advanced Materials LLC or of its affiliated companies including without limitation, Huntsman Advanced Materials (Europe) BVBA, Huntsman Advanced Materials Americas Inc., and Huntsman Advanced Materials (Hong Kong) Ltd.

Huntsman Advanced Materials is an international business unit of Huntsman Corporation. Huntsman Advanced Materials trades through Huntsman affiliated companies in different countries including but not limited to Huntsman Advanced Materials LLC in the USA and Huntsman Advanced Materials (Europe) BVBA in Europe.

Parts In Minutes and RenPIM are registered trademarks of Huntsman Corporation or an affiliate thereof.

Copyright © 2007 Huntsman Corporation or an affiliate thereof. All rights reserved.

Main Office :
Huntsman Advanced Materials (Switzerland) GmbH
Klybeckstrasse 200
CH-4057 BASEL
Switzerland
+41 61 966 3333