

Advanced Materials**RenPIM[®] 5213-1 Isocyanate / 5213-1 Polyol****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 Isocyanate / Polyol 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 Isocyanate	RenPIM [®] 5213-1 Polyol
Appearance Colour	visual	Liquid Brown	Liquid Cream
Viscosity at 25°C	m Pa s	160 - 240**	ca. 1300 - 3000**
Density	g/cm ³	ca. 1.2	ca. 1.18

*** Specified data are on a regular basis analysed. Data which is described in this document as 'typical' is not analysed on a regular basis and is given for information purposes only. Data values are not guaranteed or warranted unless if specifically mentioned.*

TYPICAL SYSTEM DATA**PROCESSING**

Mix ratio	Parts by weight	Parts by volume
RenPIM [®] 5213-1 Isocyanate	65	65
RenPIM [®] 5213-1 Polyol	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.

PROPERTIES

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

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

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

¹Test specimen 500x50x5 mm at 25 °C

STORAGE

Provided that RenPim[®] 5213-1 Isocyanate and RenPim[®] 5213-1 Polyol are stored in a dry place in their original, properly closed containers at the storage temperatures mentioned in the MSDS they will have the shelf lives indicated on the labels. Partly emptied containers should be closed immediately after 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 Isocyanate	RenPIM [®] 5213-1 Polyol
Quantity and Weight	16.25 kg	25 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.

Huntsman Advanced Materials
(Switzerland) GmbH
Klybeckstrasse 200
4057 Basel
Switzerland

Tel: +41 (0)61 299 11 11
Fax: +41 (0)61 299 11 12

www.huntsman.com/advanced_materials
Email: advanced_materials@huntsman.com



Huntsman Advanced Materials warrants only that its products meet the specifications agreed with the user. Specified data are analysed on a regular basis. Data which is described in this document as 'typical' or 'guideline' is not analysed on a regular basis and is given for information purposes only. Data values are not guaranteed or warranted unless if specifically mentioned.

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