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Polyurethane resins for concrete moulds

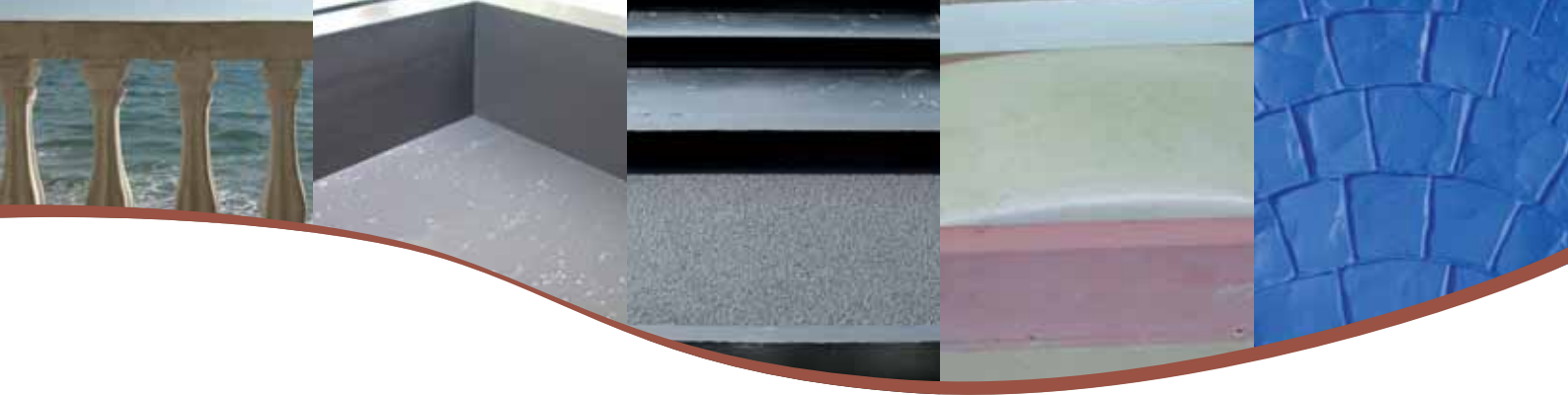


ISO 9001



ISO 14001





Axson have been manufacturing a unique range of cold curing polyurethane elastomers for many years. This broad experience comes from a variety of market needs, from tough and heavy handling (i.e. foundry) to the softest and finest applications (artistic and decorative).

This experience culminates into flexible moulds for casting in the architectural and building Industries for decorative stone and concretes.

This brochure is all about your guidance to Axson Product selection, processes and tips to achieve efficient production.

WHY USING PU ELASTOMERS ?

Before starting lets summarize the main reason to use polyurethane as the most effective production mould.

	SILICONE	POLYURETHANES	RIGID (metal/polyester...)
Flexibility	XXX	XX	N/A
Life Time	X	XX	XXX
Productivity	X	XX	XXX
Details Aspects	XX	XXX	X
Material Cost effectiveness	X	XX	X
Release agent	N/A	YES	YES

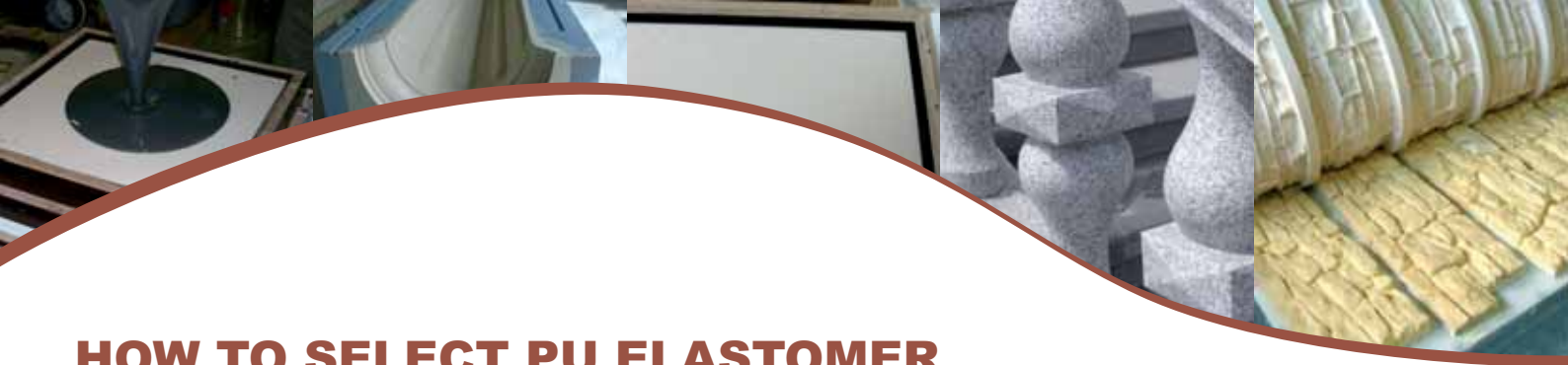
XXX: good
XX: fair
X: poor

As a summary, polyurethane formulations produce many beneficial features as a flexible material:

- Mechanical behavior: no shearing, large range of hardness available, good dimensional stability.
- Good chemical resistance when appropriately maintained.
- Easiness of use: adapted pot life and demoulding time, almost no shrinkage.
- Operator and environmental friendly...
- Cost efficient.

SUMMARY

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HOW TO SELECT PU ELASTOMER

According to the geometrical complexity of parts, surface aspect required as well as number of parts to be cast, the mould's properties are different; also AXSON Technologies gives to the building industry a complete range of elastomers of polyurethane possessing the necessary characteristics.

These products are used on-site or in factory for the molding of structural or ornamental in architectonic concrete.

Understanding the needs of users allowed us to cover numerous applications in concrete casting markets.

Key parameters

Design of the cast stone part

Tile, block, pillar part, baluster, cladding, etc...

The flexible behavior of the PU must favor an easy release of the concrete part according to its size and global geometry.

The choice of the PU hardness (Shore) helps the release of the concrete part due to surface intricacy:

From 30 A Shore for complicated parts to 85 A Shore for easy surfaces.

Number of parts

We split the number of parts in 4 categories:

< 50 - > 50 - > 100 - > 500 parts

Depending on mould and backup structure.

We propose two families for PU casting resins: UR 34xx and UR 58xx.

In these two families you can find the right PU dedicated for your expected series of parts.

Refer to the PU selection chart on the last page of this brochure.



*Automatic demoulding
Equipment (vacuum lifting).*

Type of process

All operations for concrete casting from demoulding by hand (manual) or fully automatic process (industrial).

The production method influences the choice of PU elastomer, according to the mould design needed by production equipment, (self standing or reinforced by frame made by steel, wood or hard PU).

Choice of release agent

Hydrocarbon, vegetable oil in solution, oil blends etc.

Any release agent for concrete is more or less aggressive for PU moulds.

The best PU system choice depends of the release agent type. The best release agent could be also advised for the optimum compatibility with a PU elastomer.

THE RIGHT PU FOR THE

The selection of the material made on criteria such as Sh Hardness or % elongation is not sufficient and should be completed by processing and final parts aspects criteria.

We can differentiate several application segments based mainly on serial production...

Small to medium series for conventional products application:

This segment can be summarized with a few shots – 1 to 100 where the material should be placed in fast production operation for instance to produce pavement, front stones, fake stones reproduction etc... quality of reproduction matters as well as productivity and quick returns.

We propose a single family of product based on polyester based chemistry – **chemical resistant to most release agents** – **low hardness** – **easy set up** – **cost efficient** such as:

FROM FEW to 100 PARTS.
UR 5830 / UR 5848



UR 5830 Mould of column for 10 shots only.

Industrial products large series conventional applications possibly higher in dimension...

This category involves industrial scale of production such as possible automatic casting and demoulding equipment and maximum production lines including heating tunnels etc...

For higher productivity. Our systems are available in 'F' versions.

FROM FEW to 500 PARTS.
UR 5830 F* / UR 5848 F* / UR 5863 F*

* F for quick setting

Material:

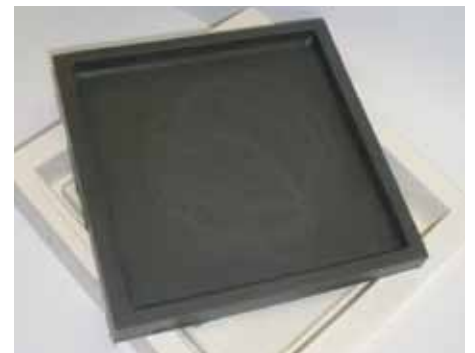
- Short pot life, and short demoulding time.

Industrial process:

- Low resilience, high chemical resistance and good stability.
- Dedicated for all industrial concrete casting application.



UR 5863 MOULD making over F18 fastcast master mould.



UR 5863 for decorative pavement.

RIGHT APPLICATION

Special products when high mechanical properties are required.

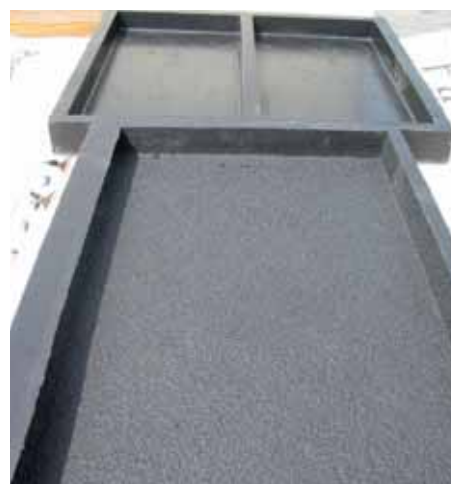
This segment of activity shows mainly specific parts to be produced by the size, and overall part dimensions – requiring then higher mechanical features and or the ability not to use any side reinforcements – **self standing** – medium range production – under 500 parts per year – but with specific process, such as vibrating tables, pressure casting, heating process.

Heavy handling: intensive production.
UR 3460 / UR 3440



UR 3440 for swimming pool dressing translucent.

Those products are used when high mechanical properties are required, high tear strength, high elongation at break. More resilient for the same hardness.



UR 3460 for swimming pool dressing.

Horizontal concrete stamping

Soft but rigid for low deformations.
UR 5895

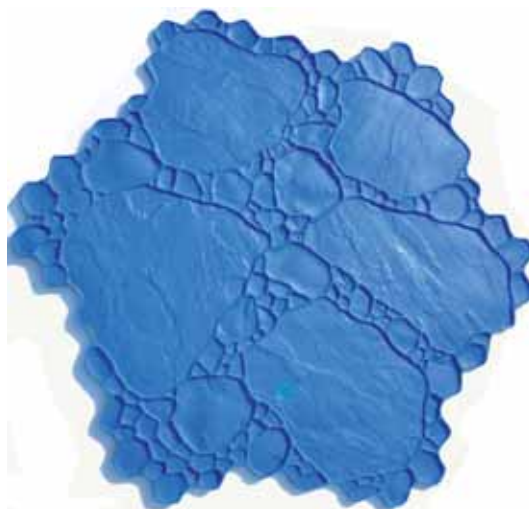
Key parameters are: rigidity, 95 A shore hardness and abrasion resistance.

You may press the moulds on fresh concrete by walking on or with tools.

Processing for moulds making is similar to moulds for concrete casting.

It exists in different colours and reactivity depending of process.

This PU could be washed with high pressure cleaning device after use to keep it clean for the next application.



UR 5895 Pu stamps for concrete pressing.

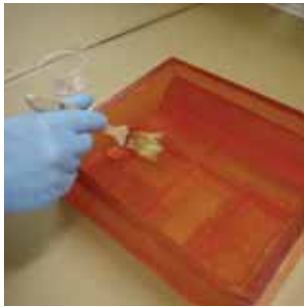
FIX TIPS AND TECHNICAL

How to make original models and master models

YOU ARE LOOKING FOR SERIAL PRODUCTION OF PU MOULDS:

Start from an original stone, a carved plaster model, an assembly of stones, a wood/slab model and make a few copies. Create as many models as you need to cover the PU casting schedule. Take a print and cast a working model by a filled PU.

ORIGINAL PREPARATION



THINGS TO CARE

A porous model must be sealed prior to be cast.
An original part could be prepared as a model with 851 release agent.

NEGATIVE MAKING



Make a print of original model with silicone or resin (casting or laminating).

MASTER



The goal of the working model is to be resistant enough to withstand several PU shots.
In this case, random shapes of floor tiles. These models have been cast in rigid PU resin.



Section of the casing preparation
(Open thickness for PU: 6mm).

The purpose of this type of master models is to produce thin wall PU moulds dedicated to be fitted in a wood or steel frame.

Wood made frame around model made by PU.

RECOMMENDATIONS

How to make production moulds for concrete casting

All of Axson PU dedicated to achieve soft moulds for concrete casting could be cast by hand or with a 2 K low pressure mixing machine.

Up to 50 kg and for a few moulds only, mixing and casting is possible by hand with a electric drill and paddle. Use the 20 kg KITS for that purpose.

The release agent 851 is advised on model surfaces before casting.

MOULD SIZING:

For self standing moulds, thickness of walls is 10 to 40 mm.

For moulds with back up structure, thickness of walls is 5 to 6 mm.

Back up could be plywood or casting PU (wet to wet casting).



PU casting on model.



"prior to cast the PU, the master model surface must be treated with '851' release agent".

THINGS TO CARE

Always drill some vents underneath resin model to avoid air trapped in the PU mould.

You can cast bi hardness moulds by casting 2 different PU resins successively wet on wet.



Mould casting with 2K machine using UR 5863 L (long pot life) for 700 kg mould.

Soft PU for moulds could be cast by hand or 2 K machines. By hand, for detailed surfaces degas prior to casting is advised.

Let the PU stabilize for 24h minimum before using in production.

AXSON SERVICING

International:

An entire Axson international network operating in more than 50 countries offers its knowledge and expertise to advise you and set up our products in your premises wherever your location is.

Release agent:

In order to completely fulfill the product recommendation, Axson Technologies will check in its nearest laboratory the compatibility between the release agent presently used, together with our advised PU for ageing performances.

The release agent used remains crucial for the mould behavior and lifetime. This compatibility is determined by checking Axson PU behavior - absorption and rejection capacity - with your release agent.

Customized tailor made product:

Axson Technologies may develop a specific product on request when production volumes and process demand minor modifications such as rheology/colour/package or from development specifications lists.

Selector guide

PRODUCTION MOULD

PRODUCTS	HARDENESS A SHORE	PROCESS		TIME TO RUN	STIFFNESS		NUMBER OF PARTS**			
		HAND	MACHINE		RIGID	SOFT	< 50	> 50	> 100	> 500
UR 5830	30A	X	X*	24h		x			x	
UR 5848	53A	X	X*	24h		x			x	
UR 5863	63A	X	X*	24h		x				x
UR 3440	65A	X		36h	x				x	
UR 3460	85A	X		36h	x					x
UR 5895	95A	X	X*	24h	x		FOR STAMPING ONLY			

* Accelerated version

** Estimated depending on mould/back up structure.

MASTER MODEL

PRODUCTS	APPLICATIONS	DENSITY	HARDENESS	TG (°)	POT LIFE	VISCOSITY
F18 + filler	Durable master models of stones, high stability and good ageing.	1.67	85D	80	3'30"	60
ESSIL 291	Silicone dedicated for Mastermodels casting. Good quality of surface reproduction. Long term stability.	1.10	38A	NC	60'	40 000
Prolab 65	All models by direct milling. Low density and good surface quality.	.65	63D	85	NC	NC

ANCILLIARY PRODUCTS

Sealers & release agent

WAX 827:

Multipurpose wax in paste form for low porous supports, apply with a rag.

Release agent 841:

Wax in solvent phase for non porous supports, polishable product.

Release agent 851:

Heavy wax in spirit suspension, not polishable.

Release agent 870:

Wax in aerosol in solvent phase. Sprayable.

Fillers

RZ 30150

Mineral filler (aluminium oxyde) dedicated to be mixed with F18 fastcast.

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