WACKER

CREATING TOMORROW'S SOLUTIONS

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MOLDMAKING

SILICONE RUBBER FOR MOLDMAKING, PROTOTYPE CASTING AND PAD PRINTING

SIMPLY FLEXIBLE MOLDMAKING WITH SILICONES

Making a boat hull, a chocolate, a bronze sculpture or a prototype? Silicone rubber is the material of choice for moldmaking in many different situations.

The following pages will show you how to use silicones to make your project a reality.

Rigid vs. flexible molds

Contents

WHY SILICONE ELASTOMERS?

ELASTOSIL® M silicone rubber products have unique properties that pay off – especially in moldmaking and prototyping. The diverse product range means you can find the right moldmaking compound to meet your special requirements no matter what the task.

Highly accurate molds
Silicone elastomers yield molds offering an exceptional level of detail and precision. Also, molds made from addition-curing grades reproduce dimensions with complete accuracy.

“I’ve used different materials at other locations. But with silicone, it was love at first sight. It’s easy to mix, easy to use, feels good and accurately reproduces the details on the original.”

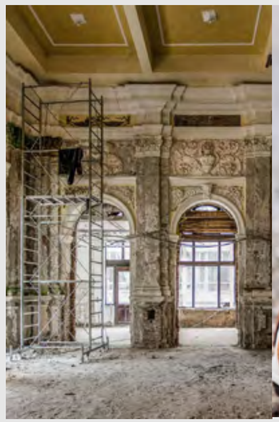
Prof. Annamaria Baciu,
restorer for the Old Casino,
Arad, Romania

“Silicone gives us a chance to create something hyperrealistic for the first time.”

Brigitte Frank,
head of the makeup and hairstyling team,
Munich Kammerspiele

Case Studies

What are customers saying about ELASTOSIL® M? Read below to learn about exciting applications from a range of industries.

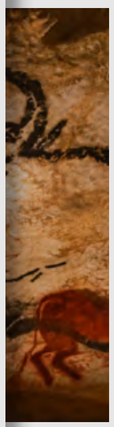


Ornamental elements of the Old Casino in Arad, Romania

Shoe design

WACKER is a Silicone Manufacturing Pioneer

Silicone rubber compounds first left the company’s production facilities back in 1947. Today, WACKER’s plants in Europe, the Americas and Asia produce some 3,000 silicone products and are among the world’s largest silicone producers. WACKER silicones can be found in every household and even in outer space, and are an indispensable component of the technologies of tomorrow, such as electromobility, photovoltaics and medical technology.



ELASTOSIL® MOLDMAKING AND PAD PRINTING APPLICATIONS

Advantages of ELASTOSIL® M in Manufacturing Molds and Texture Mats for Concrete

- Exceptional dimensional stability / non-shrink properties
- No release agent needed
- High tear resistance
- Large number of concrete, artificial stone or plaster castings possible

Molds for concrete and artificial stone in facade elements, face brick, tiles and plumbing fixtures

Advantages of ELASTOSIL® M in Jewelry Making

- Reproduces details with exceptional precision
- Suitable for large-scale production
- Easy to process without expensive equipment

Molds for jewelery / the lost wax process

Advantages of ELASTOSIL® M in Manufacturing Molds for Food and Food Decoration

- Does not affect taste
- Reproduces details with considerable accuracy
- Long-term stability
- Complies with FDA food contact regulations

Molds for cakes, cake decoration, chocolates, desserts, etc.

Advantages of ELASTOSIL® M in Tire Mold Manufacturing

- Easy to process without expensive equipment
- Very good environmental compatibility
- Excellent reproduction fidelity
- Excellent mechanical strength

Molds for manufacturing tire production molds and for developing new tires

Advantages in Creative Moldmaking

- Reproduces details with exceptional precision
- Suitable for large-scale production
- Easy to process without expensive equipment

Creative moldmaking: molds for candles and soap, crafting and DIY

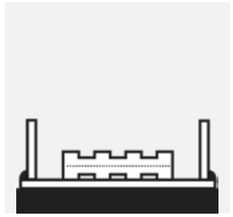
WHAT MOLDMAKING TECHNIQUES ARE THERE?

Silicone moldmaking compounds are suitable for reproducing surface details or entire objects with outstanding accuracy.

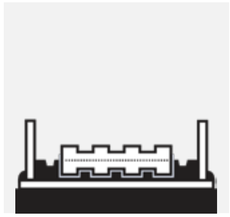
Uses range from single and multi-part block and skin molds to casting, impression and spreading techniques.

This versatility makes it exceptionally easy to find the right moldmaking technique for every need.

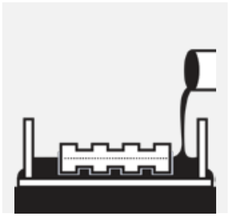
How to cast a two-part silicone block mold



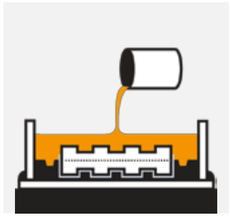
Step 1
Preparation
- Prepare the model: Clean, secure loose parts, seal surface damages or cuts with plasticine / putty
- Define parting line of model giving preferably two identical & symmetrical parts
- Cover lower model part with foil
- Fix model on a base + construct a frame (min 2 cm larger and higher than model)
- Seal joints of frame and base with putty



Step 2
Embed 1st model part: non melting (clay, plasticine)
- Form embedding material to a plate: little bigger than the model, leaving space in the middle for the model
- To ensure good fit of the two mold parts later, add “locks”: cuts or embed pins
- Possibly place tubes or pins as placeholders for venting and casting holes



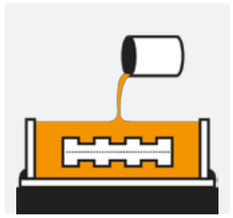
Step 3
Embed 1st model part: melting (e.g. modelling wax)
- Melt and pour the embedding material up to model parting line
- Let material set + possibly correct fit to parting line
- To ensure good fit of the two mold parts later, add “locks”: cuts or embed pins
- Possibly place tubes or pins as placeholders for ventilation and casting holes



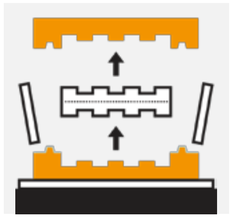
Step 4
Pour the silicone rubber into the molding box
- Mix silicone + degas
- Pour from low height + keep same position
- Without degassing, brush a thin layer of mixed silicone to the model + pour from high height
- Ensure a 1cm coverage on the highest model point

Step 5
Remove embedding material
- After individual demolding time, max. after 24h

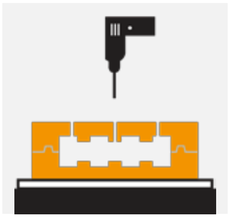
Step 6
Apply release agent
- Re-install frame
- Apply release agent to all visible surfaces of the first mold part
  - To avoid adhesion to the second mold part



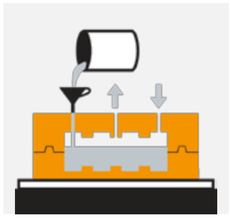
Step 7
Cast second mold part
- Pour from low height + keep same position
- Without degassing, brush a thin layer of mixed silicone to the surface + pour from high height
- Ensure a 1cm coverage on the highest model point



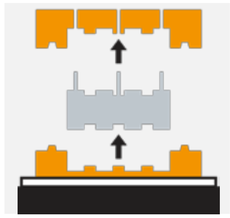
Step 8
Demold



Step 9
Drill casting and venting holes
- In case no placeholders have been used earlier in the process



Step 10
Pour reproduction material
- Fit form parts together supported by the prepared locks, clamp or tie with a fabric tape
- Cast reproduction material slowly + under slight shaking / vibration of the mold

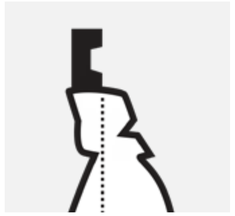


Step 11
Demold casting
- Once reproduction material has set, remove the support and the skin mold from the castin

How to do a two part silicone skin mold in spreading technique

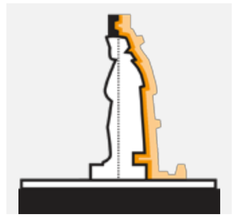
Step 1
Preparation
- Prepare the model: Clean, secure loose parts, seal surface damages or cuts with plasticine / putty
- Define parting line of model giving preferably two identical & symmetrical parts
- If the model will be embedded, cover lower model part with foil to prevent its surface being soiled by the embedding material
- Immobilize model on base

Step 2
Apply a dividing "wall"
- Large models are reproduced in an upright position
- Create a dividing wall:
  - Place a flange of putty along the parting line, approx. 1-2 cm wide / 5 cm high
  - Adjust dividing wall exactly to parting line and press it onto the model



Step 3
Apply locks
- Apply locks into the embedding or dividing wall material
- Cut locks in form of recesses or insert locating pins
- If needed, push tubes or pegs half-way into embedding material as spacers for lateral air escape and as feed channels

Step 4
Apply fine layer 1st part
- Apply catalyzed, flowable or slightly non-sag silicone rubber
  - onto the 1st part of the model surface (0.5 – 1 mm thick)
  - and the entire adjacent surface of the embedding or dividing wall material
  - with a stiff short-haired brush
  - or work by hand to avoid air bubbles
- Leave for 1-2 h to partly cure until the fine layer cannot be shifted, but is still tacky

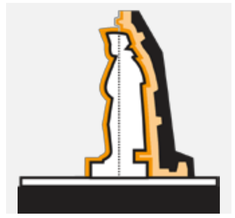


Step 5
Apply top layer 1st part
- Color rubber with WACKER FL pigment paste to allow visual coverage control
- Apply a 5 - 15 mm thick top layer of the catalyzed, non-sag rubber compound using a spatula
  - Completely fill undercuts
  - In case of deep undercuts, apply top layer to the interior surfaces + later make separate supporting wedges
- Possibly do locks to allow to position the skin mold in the support
- Smooth the rest of the top layer before rubber starts to cure using soapy water and your hands

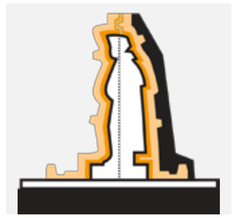
Step 6
Make 1st part of the support
- Spread plaster over the mold
- Or if the model is horizontal, construct a box and pour in the plaster

Alternatively:
- Coat rubber surface with vaseline
- Apply glass-fiber reinforced polyester or epoxy resin

Step 7
Remove embedding or dividing wall material
- Remove dividing wall or embedding material + foil
- Leave skin mold + support on the model
- Treat all exposed surfaces of the 1st part of the skin mold with release agent



Step 8
Apply fine layer 2nd part
- Alike for the first part, apply catalyzed, flowable or slightly non-sag silicone rubber onto the 2nd part of the model surface (0.5 – 1 mm thick)

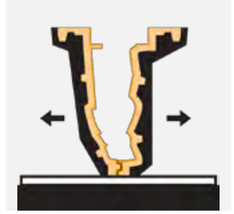


Step 9
Apply top layer 2nd part
- Alike for the first part, apply a 5 - 15 mm thick top layer of the catalyzed, non-sag rubber compound using a spatula

Step 10
Make 2nd part of the support
- Spread plaster over the mold
- Or if the model is horizontal, construct a box and pour in the plaster

Alternatively:
- Coat rubber surface with vaseline
- Apply glass-fiber reinforced polyester or epoxy resin

Step 11
Demold



Step 12
Insert skin mold parts into support
- Place skin mold parts into the upside down support parts using the locks
- Correctly fit support mold parts + clamp or screw in case of PE / epoxy resin
- Drill casting and venting holes if not done via spacers
- Always keep the skin mold in the support during storage

Step 13
Pour reproduction material
- Possibly degas reproduction material and pour slowly into the mold under slight shaking/vibration of the mold

Step 14
Demold casting

permanent deformation of the mold

ELASTOSIL® M 4670 is ideal for faithful reproductions cast in polyamide.

The material is easy to process in mixing and metering equipment, and produces excellent results.

The ELASTOSIL® silicone rubber flows uniformly around the model, making a perfect mold.

PROTOTYPES MADE FROM POLYAMIDE

- Possess all the properties of injection-molded thermoplastics
- Are airtight, gastight and watertight
- Are weldable and bondable
- Exhibit high chemical resistance
- Allow thick and thin-walled designs
- Can replace metal castings

It meets silicone orders for vacuum casting that range from 50 kilograms for small-batch customers to double-digit tons per year for large service companies that might want to mold an entire car fender, for example.

Pronounced Cost Reduction On occasion, the WACKER experts have to tailor their silicone to very specific tasks – as was the case with one auto subcontractor who wanted his silicone molds to last much longer. “Usually a release agent is applied to the inside of the mold to reduce wear and tear,” says Gröer. But in this case, the subcontractor had to speed up the manufacturing process and wanted to eliminate the release agent altogether. Having tested several formulations, the WACKER team incorporated the release agent straight into the silicone formulation itself. The result was that the silicone mold produced some 50% more castings in the same, high quality. Not only was one working step eliminated, but less silicone compound was needed. “All in all, this meant a genuine reduction in costs for the customer,” says Gröer. Wherever such customization or consulting and development support are needed, he and Pohl can rely on the services of their WACKER colleagues in the Burghausen applications lab.

Admittedly, various alternative prototyping methods such as laser sintering and 3D printing exist, but in Gröer’s opinion, small-batch production will offer even greater scope for silicones in the future.

After all, “Personalization counts, and the trend toward small series continues unabated,” he says.

CONTACT

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SILICONE FOR HIGH-QUALITY PROTOTYPES

WACKER’s ELASTOSIL® M 4670 A/B silicone grade is a pourable, two-part silicone rubber that addition-cures at room temperature. By virtue of its excellent resistance to casting resins and good mechanical properties, it is ideal for molding models that do not have intricate undercuts and for making molds which are required to have high stability.

Special features:

- **Good flowability**
- **Fast, shrink-free cure at room temperature, which can be greatly accelerated by heat application**
- **High Shore A hardness (approx. 55)**
- **High tear resistance**
- **Mechanical properties of the cured rubber have outstanding long-term stability**
- **Excellent resistance to casting resins and polyamide**

WHICH SILICONE RUBBER PRODUCT IS RIGHT FOR ME?

ELASTOSIL® M offers optimum solutions to a variety of applications. The following pages will help you find them.

Key Considerations

A few basic questions will help you find the right silicone rubber product. The crosslinking mechanism is one of the most important ones. Other important factors that will help you select a product, however, include pot life, reproduction material and desired number of copies.

Quick Selection Guide

The quick selection guide will give you some initial recommendations for the product that’s right for your application.

WHICH CURING METHOD IS MOST SUITABLE?

Like all silicone moldmaking compounds, ELASTOSIL® M silicone rubber products are two-part compounds. Mixing the two components initiates the crosslinking process. Our portfolio contains two product groups that differ in terms of their crosslinking mechanism and specific advantages.

Inhibition

Certain substances or materials can disrupt the function of the platinum complex catalyst (curing impaired or inhibited).

All it takes is for these substances to be present on the surface of a substrate (model, mixing equipment, etc.) or even in the ambient air. Post-curing ovens or drying cupboards used for curing casting resins can also release inhibiting substances.

The following are the most important of these

- Sulfur, certain sulfur compounds such as polysulfides and polysulfones, other sulfur-containing materials such as natural and certain synthetic rubber compounds (EPDM, etc.), amines, urethanes, certain polyurethanes, amine-containing substances such as amine-cured epoxide resins, etc.
- Organometallic compounds, especially organotin compounds, and materials containing substances such as cured rubber and hardening agents for condensation-curing RTV-2 silicone rubber.
- We strongly recommend conducting appropriate preliminary tests to rule out inhibiting factors.

Shrinkage

Condensation-curing RTV-2 silicone rubber products crosslink through the addition of a liquid or paste-like hardening agent.

The types and quantities of hardening agents are what determine the pot life and curing time, and are defined for every grade of rubber. Exceeding or falling short of specifications can compromise the properties of the cured rubber and may even prevent crosslinking entirely.

If the relative humidity is less than 40%, the surfaces of the rubber in contact with the air may remain sticky to liquid. This will mean having to take appropriate steps (evaporator, atomizer, damp cloths) to raise the humidity of the ambient air. Adding water to the compound will not help!

In condensation-curing systems, the crosslinking reaction typically releases a low alcohol – usually ethanol or propanol. Evaporation of the alcohol reduces the mass, which, in turn, leads to three-dimensional shrinkage.

WACKER® T-SERIES CATALYSTS

for ELASTOSIL® RTV-2 Silicone Rubber

Flexible molds and printing pads can be produced with condensation-curing ELASTOSIL® M products. The best choice of catalyst for the product is indicated on the respective ELASTOSIL® M Technical Data Sheet (TDS).

The following guidelines on WACKER T-Series catalysts show the full choice of catalysts available and support you in choosing the right catalyst or catalyst mixture for your specific use case:

- Achieve high number of copies for polyurethane and polyester resin castings with our specialized catalysts
- Achieve the required pot life and curing time by varying dosage rate or by blending with a fast catalyst
- For a better mixing control the transparent WACKER® T-Series catalysts can be colored by adding a small amount of WACKER® Color Solution Red.

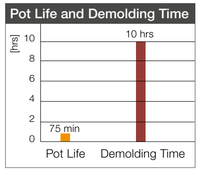
Catalysts with Special Performance

- Standard catalysts: T 21 and T 51
- Catalyst T 21 or T 37 for high numbers of copies for polyurethane casting resins
- Catalyst T 51 for high numbers of copies for polyester casting resins
- Catalyst T 47 for fast and very fast curing rates

Pot Life and Curing Time

The pot life and curing rate of ELASTOSIL® M products can be adjusted within a wide range, either by varying the amount of T-Series catalyst (no more than 2–3% on top of the recommended dosage; may increase linear shrinkage), or by blending with Catalyst T 47.
Pot life can be adjusted from a few minutes up to 120 minutes in this way, with curing rates from 1 to 24 hours at room temperature.

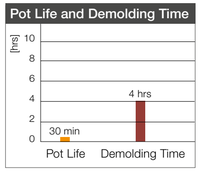
Example: Achieve Faster Curing Rates by Combining Catalysts



1 kg ELASTOSIL® M 4514
50 g (5%) Catalyst T 51

Pot Life = 75 min
Demolding Time = 10 hrs

Example 1:
Add 5% Catalyst T 51 (by weight) to ELASTOSIL® M 4514 (50 g T 51 for 1 kg of M 4514) to achieve a pot life at 23 °C and 50% RH of about 75 minutes. Demolding is possible after 10 hours' curing time.



1 kg ELASTOSIL® M 4514
50 g Catalyst T 51 + T 47
(Ratio 9.5 : 0.5)

Pot Life = 30 min
Demolding Time = 4 hrs

Example 2:
Faster curing rates can be easily achieved by blending Catalyst T 51 with Catalyst T 47 in the ratio of 9.5 : 0.5 (T 51 : T 47 / 47.5 g : 2.5 g).

The pot life will decrease to around 30 minutes and the mold needs only about 4 hours before being demolded. By increasing the proportion of T 47, you can achieve even faster curing rates, but your processing window gets shorter. Find the right balance: Fast curing, but sufficient pot life for processing.

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Adjust Pot Life and Demolding Time to Your Needs

ELASTOSIL® M 3503 – M 4511 – M 4512 – M 4514 – M 4541

Catalyst	Property	Blended with Catalyst T 47 (T 21 : T 47)	Amount	Pot Life [min]	Demolding Time [h]
T 21	Standard cat./ excellent polyurethane resin resistance	-	5%	60 - 90	8 - 12
		95 : 5	5%	20 - 40	4 - 6
		90 : 10	5%	20 - 20	2 - 4
		(T 51 : T 47)			
T 51	Standard cat./ excellent polyester resin resistance	-	5%	60 - 90	8 - 12
		95 : 5	5%	20 - 40	4 - 6
		90 : 10	5%	10 - 20	2 - 4
T 47	Fast cure	-	1.50%	3 - 10	1 - 2

ELASTOSIL® M 4503

Catalyst	Property	Blended with Catalyst T 47 (T 35 : T 47)	Amount	Pot Life [min]	Demolding Time [h]
T 35	Long pot life	-	5%	90 - 120	15 - 20
		95 : 5	5%	20 - 40	4 - 6
		90 : 10	5%	10 - 20	2 - 4
T 47	Fast cure	-	2%	3 - 10	1 - 2

ELASTOSIL® M 4400 / M 4440 / M 4470

Catalyst	Property	Amount	Pot Life [min]	Demolding Time [h]
T 37	Excellent polyurethane resin resistance	3%	80 - 100	10 - 12
		4%	50 - 70	8 - 10
T 40	Medium fast	2%	30 - 50	6 - 7
		3%	30	2
T 47	Fast cure	2%	3 - 10	1 - 2

All figures are intended as a guide and should not be used in preparing specifications.

Casting Resin Stability, Pot Life and Demolding Time: in Line with Your Needs

The pot-life and demolding-time figures contained in the table are a guide to reactive rubbers that cure rapidly, but still have enough processing window. Blending ratios in the table are based on parts by weight.

The individual catalyst blends have a long shelf life and can be stably stored in larger quantities. The catalyst blends do not affect the outstanding performance of the silicone molds if Catalyst T 51 is used for polyester casting resins and T 21 for polyurethane casting resins.

The pot life listed indicates how long it takes at 23 °C/50% RH for the catalyzed mix to reach a viscosity of 100,000 mPa s and still just be pourable. The demolding time listed indicates how long it takes at 23°C/50% RH until the rubber can be demolded tack-free.

ELASTOSIL®

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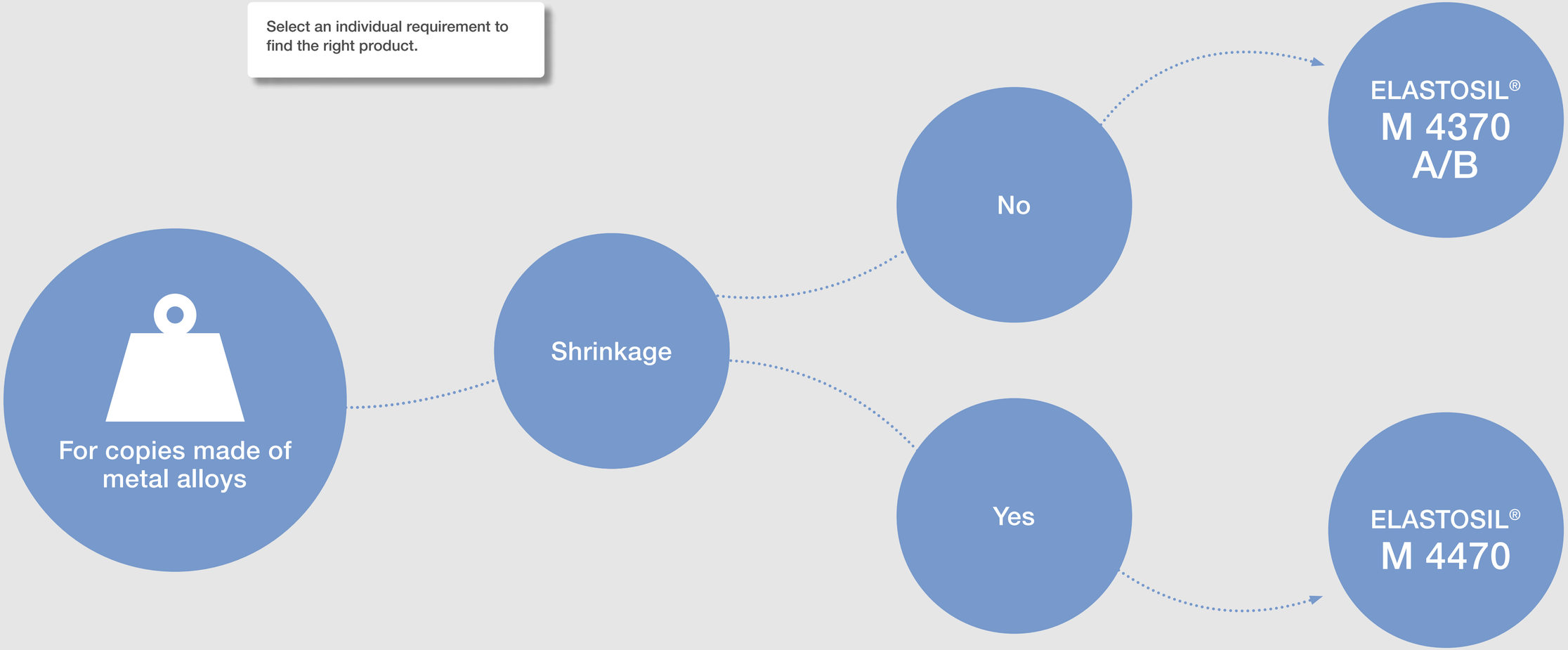
REPRODUCTION MOLDING

Quick Selection Guide

Select an individual requirement to find the right product.



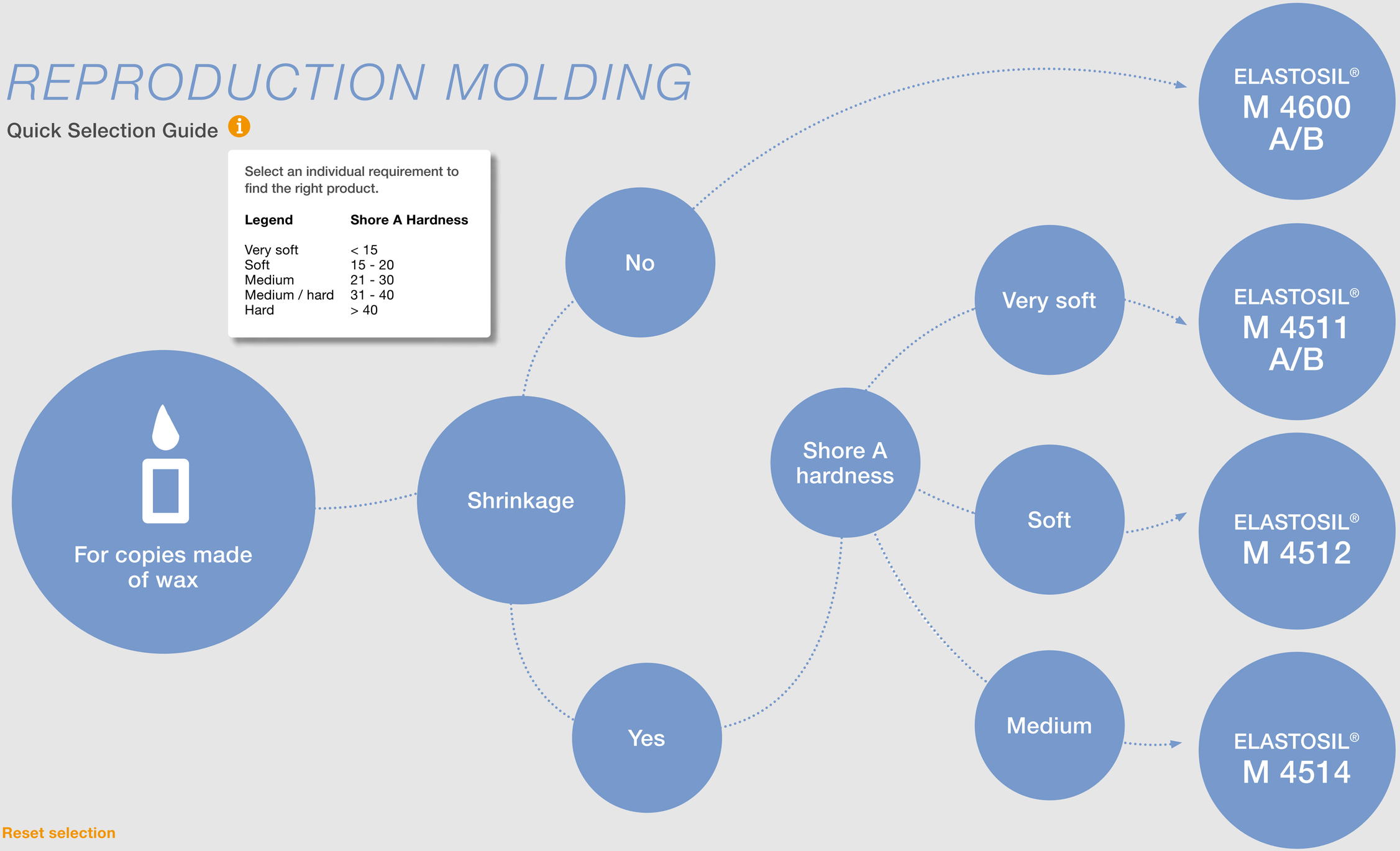
Reset selection

REPRODUCTION MOLDING

Quick Selection Guide

Select an individual requirement to find the right product.

Legend	Shore A Hardness
Very soft	< 15
Soft	15 - 20
Medium	21 - 30
Medium / hard	31 - 40
Hard	> 40



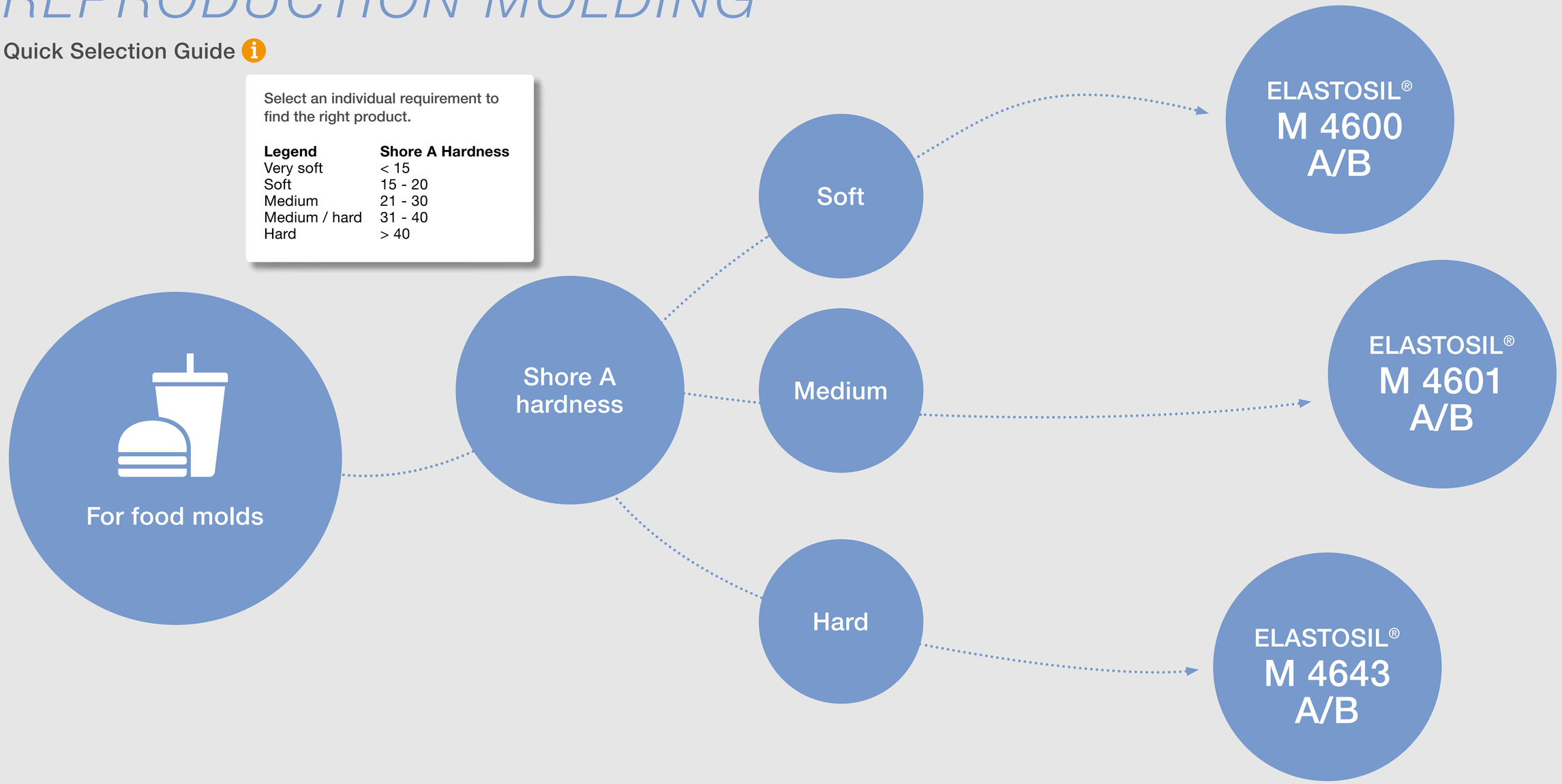
Reset selection

REPRODUCTION MOLDING

Quick Selection Guide

Select an individual requirement to find the right product.

Legend	Shore A Hardness
Very soft	< 15
Soft	15 - 20
Medium	21 - 30
Medium / hard	31 - 40
Hard	> 40



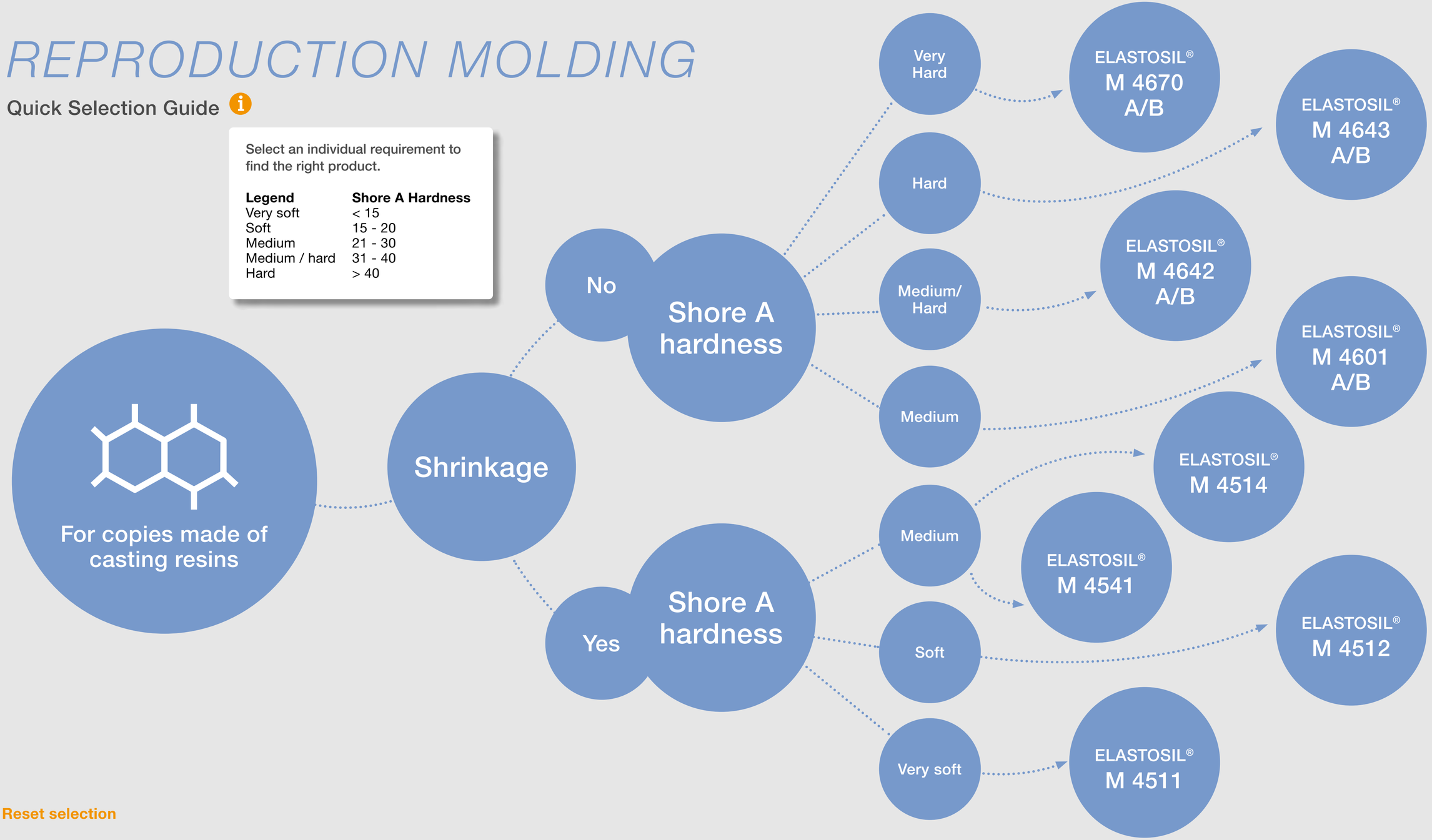
Reset selection

REPRODUCTION MOLDING

Quick Selection Guide

Select an individual requirement to find the right product.

Legend	Shore A Hardness
Very soft	< 15
Soft	15 - 20
Medium	21 - 30
Medium / hard	31 - 40
Hard	> 40



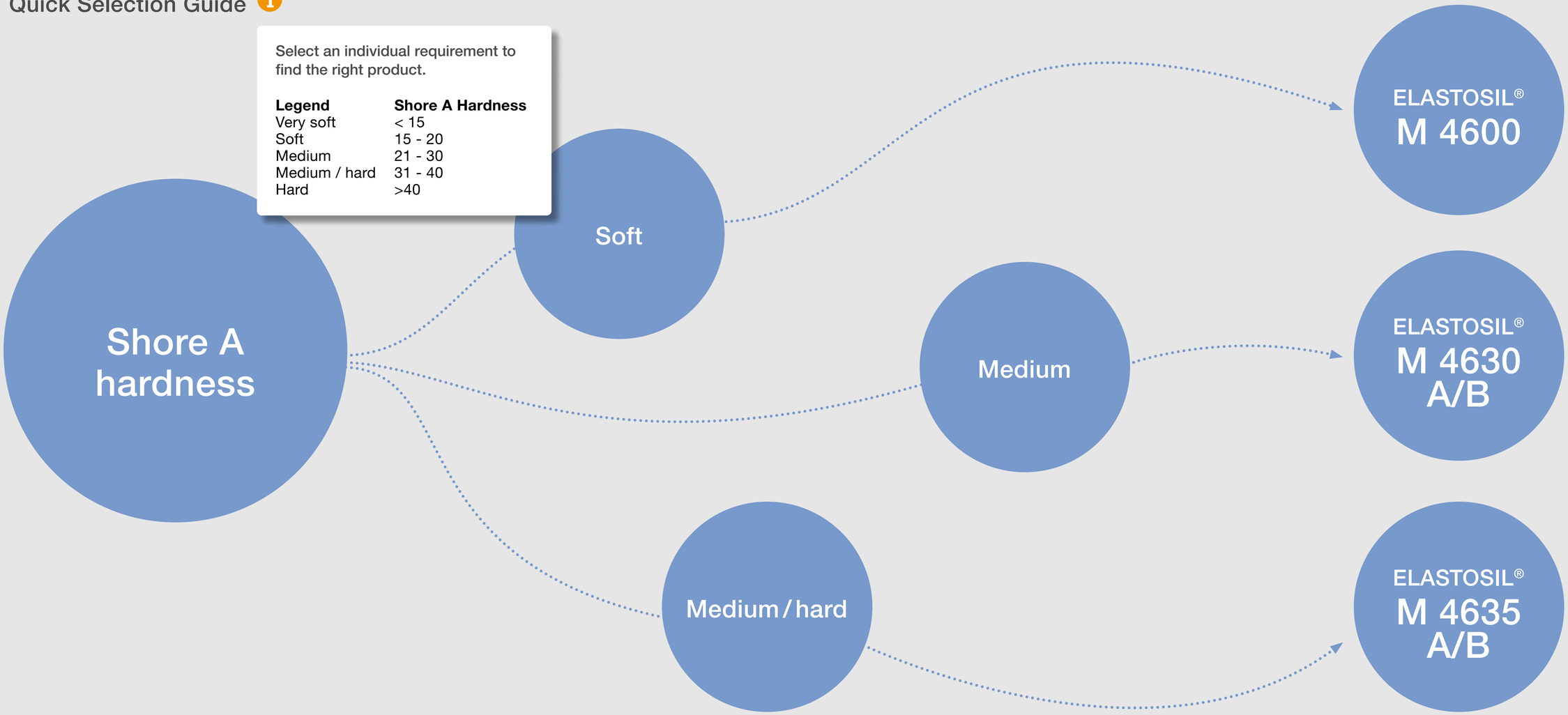
Reset selection

CONSTRUCTION MOLDING (Concrete and Gypsum Casting)

Quick Selection Guide

Select an individual requirement to find the right product.

Legend	Shore A Hardness
Very soft	< 15
Soft	15 - 20
Medium	21 - 30
Medium / hard	31 - 40
Hard	>40



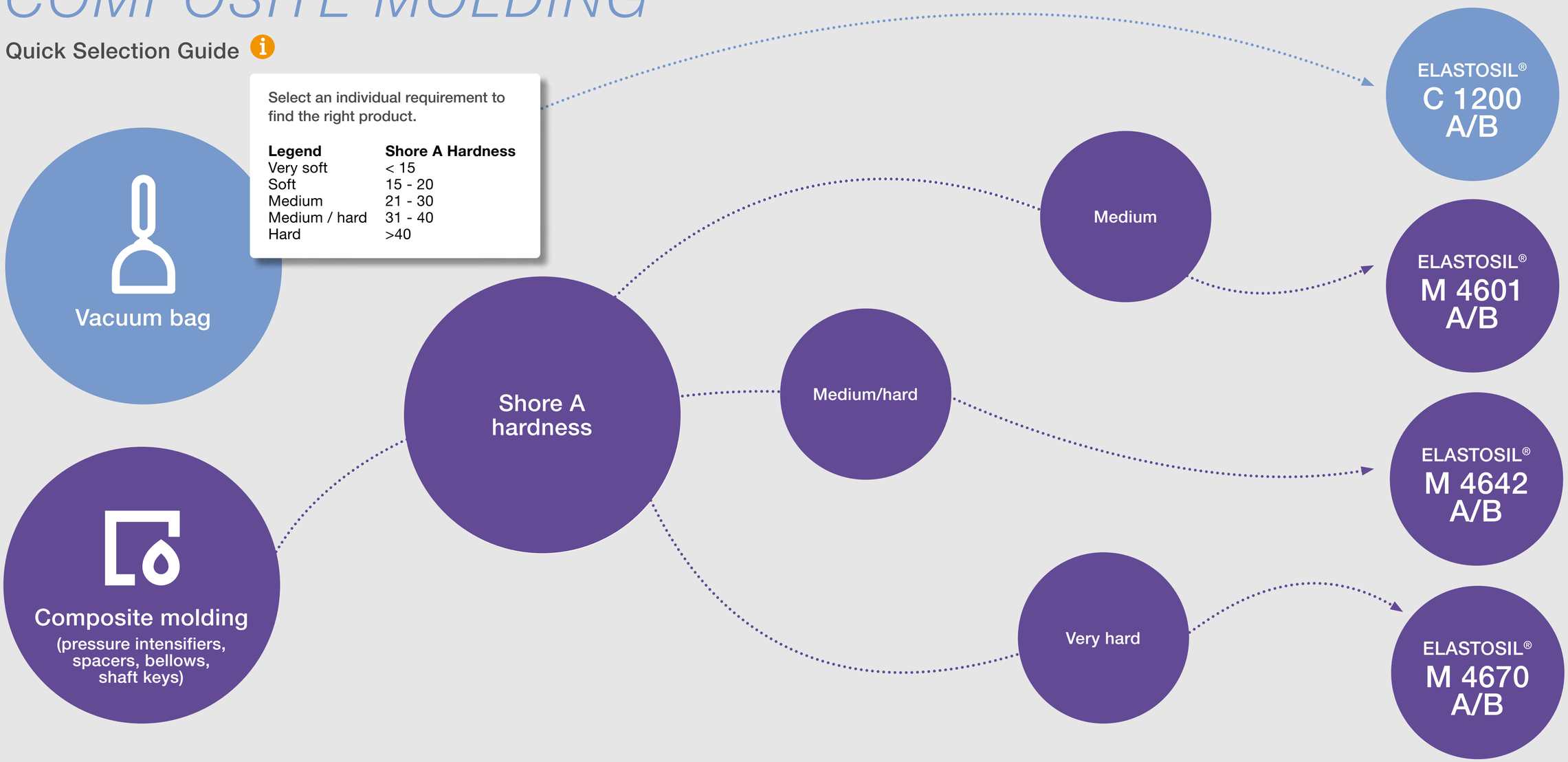
Reset selection

COMPOSITE MOLDING

Quick Selection Guide

Select an individual requirement to find the right product.

Legend	Shore A Hardness
Very soft	< 15
Soft	15 - 20
Medium	21 - 30
Medium / hard	31 - 40
Hard	>40



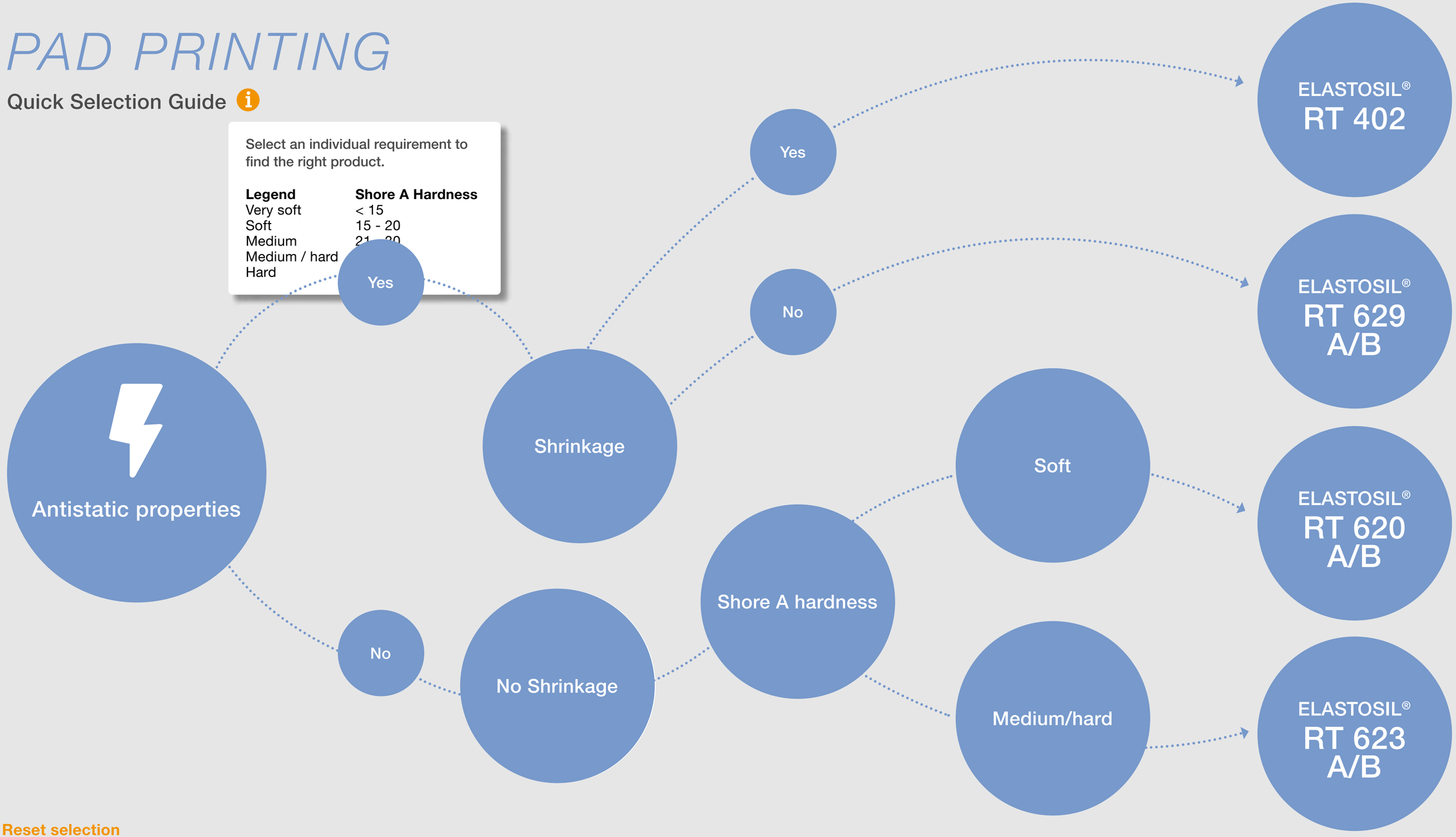
Reset selection

PAD PRINTING

Quick Selection Guide

Select an individual requirement to find the right product.

Legend	Shore A Hardness
Very soft	< 15
Soft	15 - 20
Medium	21 - 30
Medium / hard	
Hard	

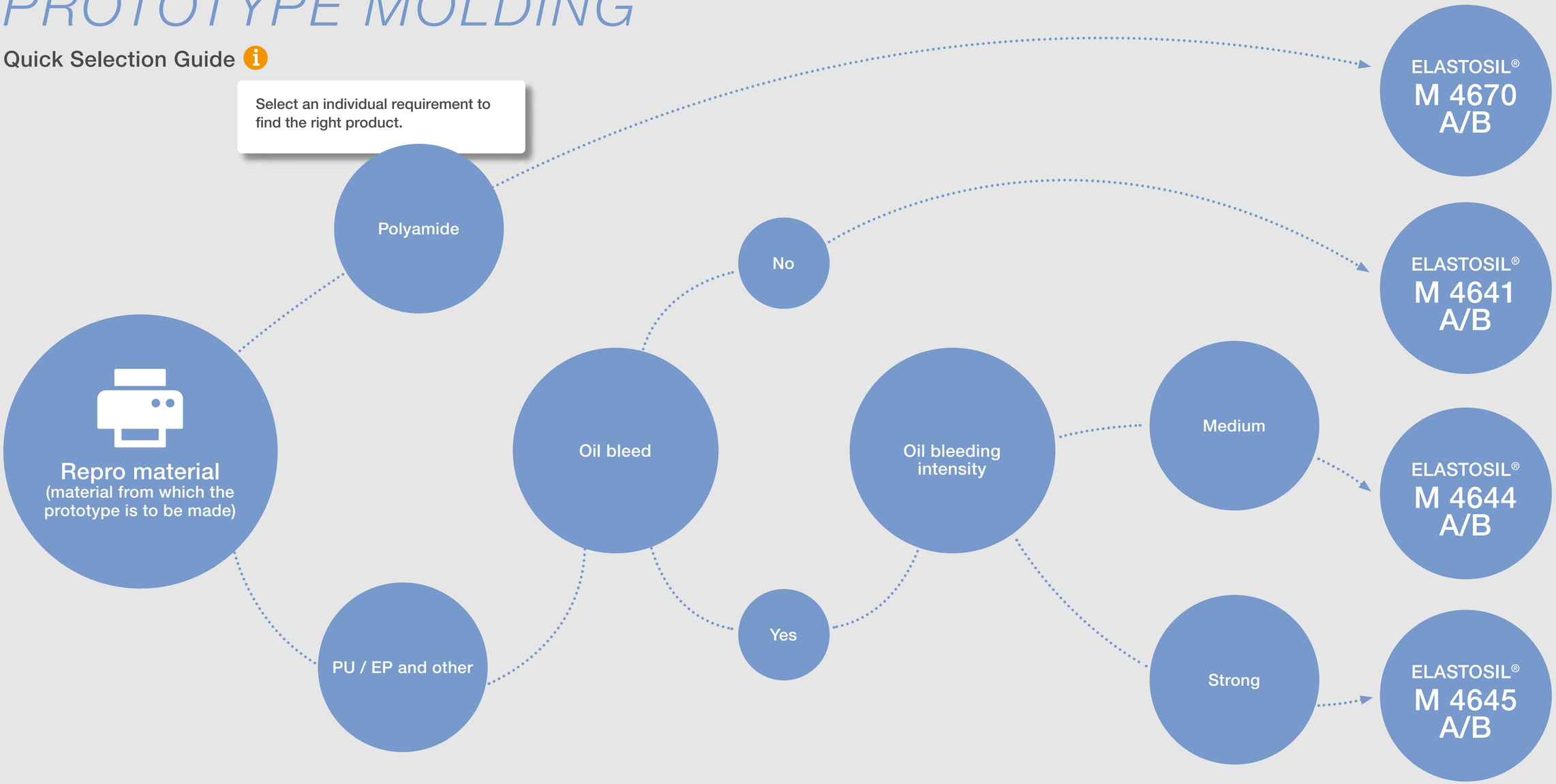


Reset selection

PROTOTYPE MOLDING

Quick Selection Guide

Select an individual requirement to find the right product.



Reset selection

PRODUCT OVERVIEW

CONDENSATION-CURING MOLDMAKING COMPOUNDS

									Large Number of Copies Possible With...		
	Typical Application and Special Properties	Shore A Hardness*	Color	Standard Catalyst	Mixing Viscosity [mPa•s]	Vulcanization Time [h]	Pot Life [min]	Tear Resistance [N/mm]	Plaster/Wax	Resin Resistance: Polyester	Resin Resistance: Polyurethane
	Skin mold										
ELASTOSIL® **M 1470**	Kneadable	Hard	Pink	Paste T40	Kneadable	4 – 5	70	>10	●		
	All-purpose										
ELASTOSIL® **M 4400**	Pourable, all-purpose	Medium	Yellow	T 37/T 40	25,000	9 – 12 / 5 – 7	90/40	>3	●		
ELASTOSIL® **M 4440**	Resin-resistant, all-purpose	Medium/hard	White	T 37/T 40	25,000	8 – 10 / 6 – 7	60/50	4.5	●	●	●
ELASTOSIL® **M 4503**	Highly elastic, excellent mechanical strength	Medium	White	T 40	40,000	12 – 15	75	>20	●		
	All-purpose / casting resins										
ELASTOSIL® **M 4511**	Excellent flowability with low viscosity, casting resin resistance and excellent mechanical properties in a broad Shore hardness range	Very soft	White	T 21/T 51	25,000	8 – 10	60/90	>18	●	●	●
ELASTOSIL® **M 4512**		Soft	White	T 21/T 51	30,000	8 – 10	60/90	>24	●	●	●
ELASTOSIL® **M 4514**		Medium	White	T 21/T 51	35,000	8 – 10	60/90	>25	●	●	●
ELASTOSIL® **M 4541**		Medium/hard	White	T 21/T 51	40,000	8 – 10	60/90	>30	●	●	●
	Pad printing										
ELASTOSIL® **RT 402**	Antistatic, ink-resistant	Soft	Gray	T 12	15,000	5	75	>3	●		
	Low melting metal alloys										
ELASTOSIL® **M 4470**	Excellent thermal stability and thermal conductivity	Hard	Reddish brown	T 37/T 40	15,000	20 – 24 / 3 – 4	90/40	>4	●		

Additional product data can be found in the **Moldmaking Product Overview**

Find your representative:
www.wacker.com/h/en-de/distributor-and-sales
Please select product group Silicone Rubber

* Shore A hardness:
Very soft: < 15, soft: 15 – 20, medium: 21 – 30, medium/hard: 31 – 40, hard: > 40

PRODUCT OVERVIEW

ADDITION-CURING MOLDMAKING COMPOUNDS – ALL-PURPOSE

Linear shrinkage < 0.1 %

	Typical Application and Special Properties	Shore A Hardness*	Color	Mixing Ratio	Mixing Viscosity [mPa•s]	Vulcanization Time [h]	Pot Life [min]	Tear Resistance [N/mm]	Food (FDA)**	Large Number of Copies Possible With... Plaster/Wax	Resin Resistance: Epoxy	Resin Resistance: Polyester	Resin Resistance: Polyurethane
	All-purpose												
CENUSIL® M 810	All-purpose molding grade, very low hardness	Very soft	White	1:1	3,000	4	40	15		●			
CENUSIL® M 820	All-purpose molding grade, low hardness	Soft	White	1:1	6,000	4	40	20		●			
ELASTOSIL® M 4115 A/B	Low viscosity, 1:1	Medium	Translucent	1:1	2,500	1	12	5		●			
ELASTOSIL® M 4125 F A/B	Low viscosity, fast cure, 1:1	Medium	White	1:1	6,000	2	15	25	●	●			
ELASTOSIL® M 4600 A/B	Low hardness and high mechanical strength	Soft	Translucent	10:1	15,000	12	90	> 20	●	●			
ELASTOSIL® M 4601 A/B	Good flowability and high mechanical strength	Medium	Reddish brown	9:1	10,000	12	90	> 30	●	●	●	●	●
ELASTOSIL® M 4642 A/B	Excellent resin resistance, low viscosity and very high mechanical strength	Medium / hard	Dark red	10:1	15,000	12	90	> 30		●	●	●	●
ELASTOSIL® M 4643 A/B	Good resin resistance, high Shore hardness and very high mechanical strength	Medium / hard	Gray	9:1	25,000	12	90	> 10		●	●	●	●
VARIO® 15	All-purpose tool box system: blend desired hardness with 2 bases, adjust desired reactivity with 2 catalysts: CAT Vario and CAT VARIO F = fast	Soft	Translucent	10:1	3,000	6/0.25	150/2	15	●	●			
VARIO® 40		Hard	Translucent	10:1	10,000	6/0.25	150/2	15	●	●			

Additional product data can be found in the **Moldmaking Product Overview**

Find your representative:
www.wacker.com/h/en-de/distributor-and-sales
Please select product group Silicone Rubber

* Shore A hardness:
Very soft: < 15, soft: 15 – 20, medium: 21 – 30, medium/hard: 31 – 40, hard: > 40

** Compliant with relevant FDA regulations if processed correctly

PRODUCT OVERVIEW

ADDITION-CURING MOLDMAKING COMPOUNDS – THE SPECIALISTS 1

Linear shrinkage < 0.1 %

									Large Number of Copies Possible With...			
	Typical Application and Special Properties	Shore A Hardness*	Color	Mixing Ratio	Mixing Viscosity [mPa•s]	Vulcanization Time [h]	Pot Life [min]	Tear Resistance [N/mm]	Food (FDA)**	Plaster/ Wax	Resin Resistance: Epoxy	Resin Resistance: Polyester	Resin Resistance: Polyurethane
	Concrete Casting												
CENUSIL M 830	Low viscosity, translucent, fast curing	Medium	Translucent	1:1	8,000	14	60	> 20	●	●			
ELASTOSIL® M 4630 A/B	Low viscosity and high mechanical strength	Medium	White	10:1	10,000	12	90	> 30	●	●	●	●	●
ELASTOSIL® M 4635 A/B	Low viscosity, medium hardness and high mechanical strength	Medium / hard	White	10:1	15,000	12	90	> 30	●	●	●	●	●
	Rapid prototyping												
ELASTOSIL® M 4641 A/B	High mechanical strength, “dry” system	Hard	Translucent	10:1	30,000	12	90	> 25	●	●			●
ELASTOSIL® M 4644 A/B	High mechanical strength, slight oil bleeding	Medium / hard	Translucent	10:1	50,000	12	80	> 25		●			●
ELASTOSIL® M 4645 A/B	High mechanical strength, considerable oil bleeding	Medium / hard	Translucent	10:1	35,000	12	80	> 28		●			●
ELASTOSIL® M 4670 A/B	Rapid prototyping, high mechanical strength, excellent polyamide casting resin stability	Hard	Beige	10:1	80,000	12	90	> 12	●	●	●	●	●
	Pad printing												
ELASTOSIL® RT 620 A/B	Ink resistance, low base hardness, very high mechanical strength	Soft	Translucent	10:1	6,000	4	35	> 12	●	●			
ELASTOSIL® RT 623 A/B	Ink resistance, very high mechanical strength	Medium / hard	Reddish brown	9:1	10,000	5	30	> 30		●			
ELASTOSIL® RT 629 A/B	Antistatic, ink resistance, high mechanical strength	Medium / hard	Turquoise	10:1	8,000	3	40	25		●			

Additional product data can be found in the **Moldmaking Product Overview**

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Please select product group Silicone Rubber

* Shore A hardness:
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PRODUCT OVERVIEW

ADDITION-CURING MOLDMAKING COMPOUNDS – THE SPECIALISTS 2

Linear shrinkage < 0.1 %

	Typical Application and Special Properties	Shore A Hardness*	Color	Mixing Ratio	Mixing Viscosity [mPa•s]	Vulcanization Time [h]	Pot Life [min]	Tear Resistance [N/mm]	Large Number of Copies Possible With ... Food (FDA)**	Plaster/ Wax	Resin Resistance: Epoxy	Resin Resistance: Polyester	Resin Resistance: Polyurethane
	Special effects – toolbox system, 4 bases with 4 additives												
ELASTOSIL® FX Gel 30	Low viscosity, fast-curing, broad range of Shore hardness values; adjust to skin-like textures with ELASTOSIL® FX Softener; adjust curing speed with WACKER® Catalyst EP or Inhibitor PT 88; adjust flowability with WACKER® Stabilizer 43	Gel-like	Translucent	1:1	4,000	0.75	8-12	5.5	●	●			
ELASTOSIL® FX 10		Very soft	Translucent	1:1	5,000	0.75	8-12	20	●	●			
ELASTOSIL® FX 20		Soft	Translucent	1:1	5,000	0.75	8-12	25	●	●	●	●	●
ELASTOSIL® FX 28		Medium	Translucent	1:1	10,000	< 1h	10-15	28	●	●	●	●	●
	Vacuum bag												
ELASTOSIL® C 1200 A/B	Vacuum bag for composite molding, sprayable, high mechanical strength	Medium	Blue/ transluscent	1:1	25,000	1	20	25		●	● For prepreg use	●	
	Casting low-melting metal alloys / coating pressure rollers												
ELASTOSIL® 4370 A/B	High heat resistance and good thermal conductivity	Hard	Reddish brown	9:1	8,000	6	80	> 4	●	●	●	●	●

Additional product data can be found in the **Moldmaking Product Overview**

Find your representative:
www.wacker.com/h/en-de/distributor-and-sales
Please select product group Silicone Rubber

* Shore A hardness:
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** Compliant with relevant FDA regulations if processed correctly

PRODUCT OVERVIEW
ADDITIVES

We also offer specialty additives that complement our ELASTOSIL® M product line.

Generating Adhesion to Substrates

WACKER® primers allow you to bond ELASTOSIL® M elastomers with each other or with other materials, such as wood, metal or thermoplastics.

Bonding		
Primer	**ELASTOSIL® M Grades**	**Bonds To:**
WACKER® Primer G 790	Addition-curing	Absorbent surfaces and metal
WACKER® Primer G 795	Addition-curing	Absorbent surfaces and metal
WACKER® Primer FD	Condensation-curing	Absorbent surfaces and metal
WACKER® Primer AV A/B (two-part, exceptionally long processing window)	Addition-curing	Absorbent surfaces, wood or metal

Repairing and Bonding

ELASTOSIL® RTV-1 can be used for repairing cracked molds.

Repairing			
Adhesive	**Curing System**	**Consistency**	**Self-Leveling?**
ELASTOSIL® E4	Acetic-acid-curing	Paste-like	No
ELASTOSIL® E41	Acetic-acid-curing	Spreadable	Yes
ELASTOSIL® E43	Acetic-acid-curing	Spreadable	Yes
ELASTOSIL® E43 N	Neutral-curing	Spreadable	Yes
ELASTOSIL® A07	Amine-curing	Paste-like	No

For more Information:
ADD A SPLASH OF COLOR TO YOUR SILICONES

Color

Transparent ELASTOSIL® M grades can be formulated in different colors through the addition of ELASTOSIL® FL pigments.
ELASTOSIL® Red color concentrate is often used for modifying the color of the tin catalyst of condensation-curing grades. Doing so gives the user a clear means of judging when the catalyst has been uniformly distributed during the mixing process.

Dilution

ELASTOSIL® M grades can be diluted through the addition of WACKER® AK 35 or WACKER® AK 100 silicone fluids, thereby making them softer.

Thickening

Condensation-curing ELASTOSIL® M grades become more paste-like through the addition of WACKER Thickening Agent C. For addition-curing ELASTOSIL® M grades, we recommend adding WACKER Stabilizer 43.

Modifying Pot Life and Curing Time

Addition of WACKER Inhibitor PT 88 extends the pot life of addition-curing ELASTOSIL® M grades. WACKER Catalyst EP accelerates crosslinking.

TIPS AND TRICKS

Advice on handling, storage and processing

1. Safety

Always read the safety data sheet for each of our products. This document contains relevant information on how to stay safe and healthy when working with our products. You will receive a safety data sheet (MSDS) with the product, but you can also download it from **www.wacker.com**.

2. Storage

In order to avoid compromising quality, please note the following:

- The optimum storage temperature lies between 5 °C and 30 °C.
- Seal opened containers as tightly as possible immediately after taking out your material.
- Use up the material remaining in the containers as quickly as possible.
- Make a note of the use by date indicated on the label.
- The product is not necessarily unusable once the use by date has passed; simply check to make sure the desired properties of the material have not changed.

3. Pretreating Models

Silicone rubber does not stick to many materials. Nevertheless, we recommend pretreating the surface of the model:

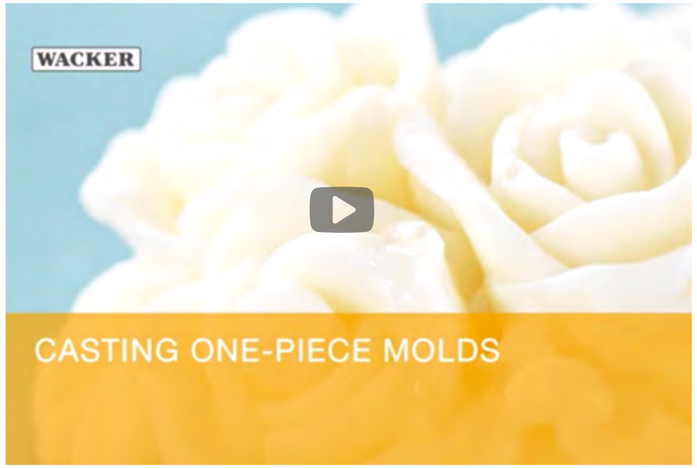
- Remove any dust, dirt or oil.
- Secure or remove any loose parts.
- Seal any cracks, gaps or other damage to the surface using model putty or mastic.
- Seal any porous or highly absorbent surfaces.
- Protect sensitive surfaces that could discolor or be stained, or that could be destroyed during the demolding process. Please contact us if needed.
- Silicone rubber forms chemical bonds with models made of glass, porcelain, ceramic, silicone rubber, etc. In these cases, apply a release layer such as a soap solution,Vaseline, paraffin or a liquid or diluted wax (freshly cured).

TIPS AND TRICKS

Advice on handling, storage and processing

4. Prep the Material

- For addition-curing ELASTOSIL® M grades only: check if the batch numbers are identical for A and B component.
- For all colored ELASTOSIL® M grades: in order to ensure even distribution of the pigments, mix each individual grade in its container prior to use. This step does not apply to transparent grades.
- Weigh out the components using different mixing tools:
  – For addition-curing products: A + B components
  – For condensation-curing products: base product + hardening agent
- Weigh out all additives used (pigment pastes, silicone fluid, thickening agents, etc.). Seal all containers immediately after removing the required amount product.



5. Mixing and Dearating

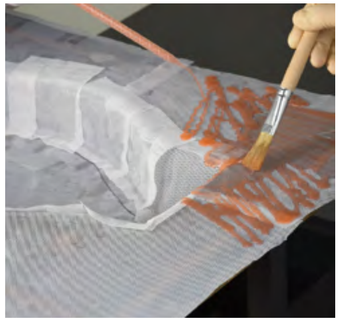
- If you would like to deaerate the blended silicone rubber in a vacuum container, prepare this container prior to mixing.
- Deaeration should be performed under reduced pressure (10 to 20 mbar) in a vacuum chamber.
- Carefully mix the components, making sure no materials remain in the corners and along the bottom; scrape the interior walls of your mixing vessel.
- Crosslinking starts now, as well as the processing window.

6. Applying the Silicone Rubber

- Pour the liquid, deaerated silicone rubber into the mold in a thin stream from the lowest possible height. If the material has not been deaerated, pour it into the mold from as high up as possible. Keep the position of the stream as constant as possible.
- For spreadable silicone rubber, first apply a thin, bubble-free oating using a stiff, short-bristled brush; apply the actual layer after this.
- Kneadable silicone rubber is usually applied by hand.

7. Curing

- Wait until the specified curing time has elapsed before demolding.
- For addition-curing ELASTOSIL® M grades, curing can be accelerated with heat.



TIPS AND TRICKS

Troubleshooting

Troubleshooting		
Material	**Problem**	**Frequent Cause**
All ELASTOSIL® M grades	Curing takes too long	• Processing temperature too low or incorrect dosing
	Entrapped air, bubbles, holes	• Material insufficiently deaerated; crosslinked too fast
	Cured rubber is not homogeneous	• Material not mixed adequately
Condensation-curing ELASTOSIL® M grades	Curing takes too long	• Incorrect mixing ratio • Too little moisture in the base component
	Cured rubber is too soft and sticky	• Byproducts cannot escape/evaporate • Incorrect mixing ratio • Temperature too high during crosslinking • Too little moisture in the base component
	Entrapped air, bubbles, holes	• Temperature too high during crosslinking (over 90°C) / cured too quickly
	Surface is sticky, insufficiently cured	• Ambient humidity is too low
Addition-curing ELASTOSIL® M grades	Curing takes too long	• Incorrect mixing ratio • Presence of inhibiting substances* or temperature too low
	Properties of the cured rubber (hardness, mechanical characteristics, etc.) are not suitable	• Incorrect mixing ratio • Presence of inhibiting substances* • Failure to stir material carefully enough before taking it from the container
	Material cures too fast	• Incorrect mixing ratio • Temperature too high
	Cured rubber is sticky	• Presence of inhibiting substances*
	Uncured material on the surface of the model	• Presence of inhibiting substances* (contact inhibition)
	Entrapped air, bubbles, holes	• Model surface was damp • Water contamination • Curing was too fast

Didn't get the results you expected? Check this list of common causes.

* These include sulfur and sulfur-containing compounds such as EPDM, amine-cured epoxy resins, organometallic or organotin compounds or substances that contain these compounds (such as tin catalysts for condensation-curing silicone rubber).

THE WACKER ACADEMY
CONNECTING THE BEST

The global forum for learners, networkers, creators and discoverers

WACKER ACADEMY offers cutting-edge expertise for regional markets. Participants can meet and swap experiences with colleagues from similar areas – at 14 locations around the world.

Global Expertise For Regional Needs

All WACKER ACADEMY training centers focus on local challenges, and our facilitators are always regional experts. Our training centers are all networked together, allowing participants to make use of best-in-class solutions from all over the world.

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Experience training that is perfectly matched to your needs. Take courses that, along with an in-depth grasp of theory, also give you thorough hands-on experience. Each of our 14 training centers is affiliated with a technical center. You can take what you learn at a morning seminar and apply it in the lab that very afternoon.

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Knowledge is the engine driving progress and development. Knowledge grows. It changes the world and offers all of us new opportunities and prospects. If we share it. This is the clear guiding principle behind the WACKER ACADEMY. Laboratory work is where solutions to questions take root. Dialog is the cradle of ideas for new products.

CREATING TOMORROW'S SOLUTIONS

A Diverse Array of Products for Growing Markets

Our product portfolio ranges from silicones, binders and polymeric additives all the way up to bioengineered pharmaceutical actives. Rounding these out is hyperpure silicon for semiconductors and solar applications.

Innovations that Improve Quality of Life

As a technology leader focusing on sustainability, WACKER promotes products and ideas that offer a high value-added potential to ensure that current and future generations enjoy a better quality of life, based on energy efficiency and protection of the climate and environment.

Global Knowledge for Local Markets

When you work with WACKER, you have 100 years of chemistry expertise at your disposal, with access to the research findings and best practices of our experts throughout the world. Our knowledge base consists of a network of 21 technical competence centers,14 WACKER ACADEMY training centers and our basic research center.

And most importantly: we are there wherever you need us – worldwide. Our local specialists know your markets and speak your language. Working with them, you will find innovative solutions that win over your customers and make you more competitive.

Follow us:
Find us on LinkedIn, YouTube and Twitter, and we'll keep you up to date on the latest and discuss current issues with you.

All figures are based on fiscal 2024.

Silicones and Polymers

3,200 specialty products from organic and inorganic chemistry

Global Market Leader

In dispersions and dispersible polymer powders based on vinyl acetate-ethylene (VAE), in building-protection silicones and in the production of cyclodextrin and cystein.

Globally Active

- Sites worldwide
- Headquartered in Munich
- 27 production sites in Europe, Asia and the Americas
- 21 technical competence centers
- 14 WACKER ACADEMY training centers
- 48 sales offices

Employees: 16,600

Total Sales

€5.7 billion

WACKER

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81671 Munich, Germany

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www.wacker.com/h/en-de/distributor-and-sales
Please select product group Silicone Rubber.

7854en/10.25 replaces 7854e/10.23