



**OBO-Werke
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Further Information

You can obtain the following information by fax or e-mail:

- machining data
- material safety data sheets
- information to individual applications:
 - thermoforming
 - injection mould tooling
 - sheet metal pressing
 - cast blocks



obomodulan[®]

Board and block materials made of polyurethane
for model-, tool- and mould making



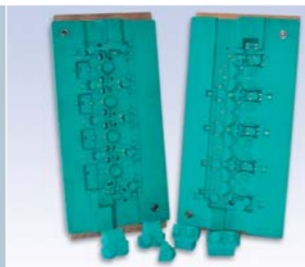
obomodulan®

The OBO-Werke company is a specialist in the production and development of polyurethane based board and block materials for model, tool and mould making applications. We give advantage through:

- a comprehensive range of differing densities from 80 up to 1600 kg/m³
- probably the largest range of standard board dimensions up to 2000 x 1000 x 200 mm depending on type and density to optimize efficient use of our material
- cast blocks and mould casting
- bonded blocks
- full service program offering cutting bonding and machining of boards



Design model of a helmet made of obomodulan® 652



water jacket core box made of obomodulan® 750



Injection mould tool made of obomodulan® 1600

Properties

obomodulan® convinces by:

- homogeneous and smooth surfaces
- even, fine cell structure
- high edge strength
- low coefficient of thermal expansion
- free machining with low dust generation

- being generally recognized as physiologically neutral
- being odourless

Fields of application

obomodulan® is used in the following areas:

- Design models
- Styling and architectural models
- Data control models
- Operational models
- Flow patterns
- Original and master models
- Foundry patterns
- Checking fixtures
- Test units
- Laminating models
- Pressing tools
- Hammer form tools



Design model Uttern X7 made of obomodulan® 500 (by kind permission of Uttern, Designer: Jonas Samrelius)

obomodulan® cast blocks/mould casting

To meet with your requirements obomodulan® is produced bespoke cast to size blocks; thus optimizing your costs through a reduction of time and raw material consumption. At present, we offer you this service for the obomodulan® types 700, 1000 and 1200. Most shapes

and profiles are possible in a wide range of dimensions.

Cast blocks can be produced either to your design data or a supplied mould tool.

We are able to supply the cast blocks to your specified dimen-

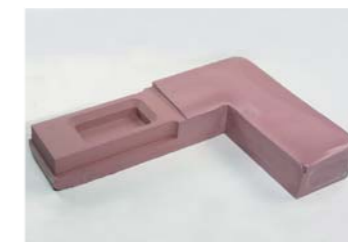
sions. Please allow an additional 10 mm per dimension on finished sizes, plus any machining allowance you require when specifying cast blocks and boards.

Cast blocks will be delivered tempered but un-machined.

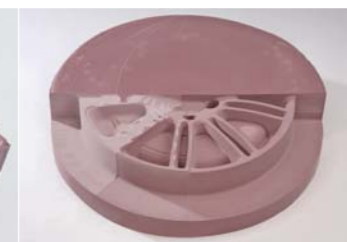
Advantages and properties:

- Our cast forms are produced using the identical formulation as our board material.
- improved economic efficiency by reduced material consumption
- no glue lines
- close contour cast block
- reduced machining time by optimized shape

obomodulan® 700 terra mould casting, 2600 x 1000 x 300 mm



machined cast block



wheel rim, with three machining steps



cast block for the tire industry

Bonding facility

You can have all obomodulan® standard types bonded according to your requirements with our bonding press.

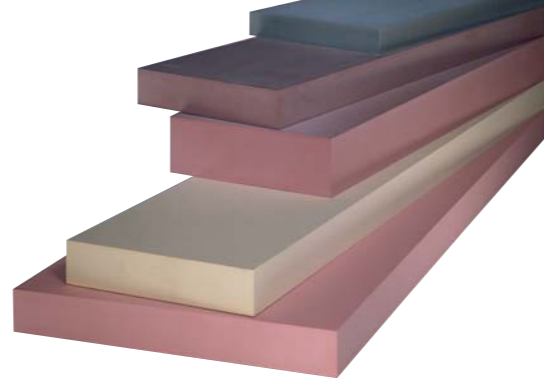
We can provide blocks up to 6000 x 1500 x 800 mm, depending on type and weight.

This procedure offers the following important advantages:

- **Bonded boards and block construction** of this facility give the highest level of stability during machining.
- **Minimal** and uniform glue lines
- **Time and cost saving** production and processing
- **Increased** efficient use of material



Our standard types and dimensions



Technical Data (measured average values)									Dimensions (mm)																Fields of application								
Boards, finished tools and models should be stored flat in dry conditions at room temperature. The material should be acclimatized to 18-25°C prior to machining. Temperature variations should be kept as moderate as possible.									● standard dimensions, X possible dimensions																								
Types	Colour	Model No.	Density kg/m ³ (approx.)	Compressive strength MPa (approx.) DIN EN ISO 604	Bending strength MPa (approx.) DIN EN ISO 178	Coefficient of the thermal expansion (approx.) according to DIN 53752 Temperature range of approx. 25-70 °C	Shore D (approx.) DIN 53505	heat resistance	750x500x50	1000x500x50	1500x500x50	2000x500x50	750x500x75	1000x500x75	1500x500x75	2000x500x75	1000x1000x75	750x500x100	1000x500x100	1500x500x100	2000x500x100	2000x800x100	1000x1000x100	2000x1000x100	1500x500x150	2000x500x150	2000x800x150	2000x1000x150	1500x500x200	2000x500x200	2000x800x200	2000x1000x200	
Type 80	white	M8	80	Please ask for the technical data and dimensions for this product separately!				120°C																								styling models, milling program control, moulds for the ceramic industry	
Type 210	light grey	MD	200	3	4	43x10 ⁻⁶ ·K ⁻¹	21-30	80°C																								visualizing-, styling-, conception-, architectural-, proving- and laminating models; thermoplastic deep drawing tools	
Type 302	pink	MG	300	6	8	41x10 ⁻⁶ ·K ⁻¹	35-50	80°C			●	●							●	●	X		●	●	●	X	X	●	●	X	●		
Type 400	orange	MI	400	10	12	53x10 ⁻⁶ ·K ⁻¹	38-61	80°C	X	●	●		X	●	●		X	●	●	X		X	●	X				X					
Type 500	magma	ML	500	18	20	47x10 ⁻⁶ ·K ⁻¹	55-66	80°C	X	●	●		X	●	●		X	●	●					●								original-, master- and flow patterns; windtunnel-, working-, data control- and laminating models; thermoplastic deep drawing tools, foundry patterns, checking fixtures	
Type 652	mokka	MQ	650	32	33	58x10 ⁻⁶ ·K ⁻¹	64-75	80°C	X	●	●		X	●	●		X	●	●				●										
Type 652 HT	terracotta	MP	650	28	27	depending on temperature	60-70	120°C			●			●				●															
Type 700	terra	MN	720	32	31	50x10 ⁻⁶ ·K ⁻¹	64-70	80°C			●			●				●										●					
Type 750	turquoise	MS	750	39	39	58x10 ⁻⁶ ·K ⁻¹	65-75	80°C	X	●	●		X	●	●		X	●	●				●										
Type 850	grey	MU	850	41	43	60x10 ⁻⁶ ·K ⁻¹	70-81	80°C	●	●	●		●	●	●		●	●	●														pressing tools, checking fixtures, core boxes, foundry patterns, hammer form tools
Type 1000	crème	MR	950	50	55	65x10 ⁻⁶ ·K ⁻¹	74	80°C	X	●	X		X	●	X		X	●	X														
Type 1200	sahara	MW	1200	88	85	70x10 ⁻⁶ ·K ⁻¹	82-87	80°C		●	●	●		●	●	X		●	●	●		X											
Type 1200	green	MY	1200	88	85	70x10 ⁻⁶ ·K ⁻¹	81-87	80°C		●	●	●		●	●	●		●	●	●													
Type 1500	beige	MA	1500	87	55-65	43x10 ⁻⁶ ·K ⁻¹	88-90	85°C	●		●			●				●															
Type 1600	grey	MX	1600	86	65-77	43x10 ⁻⁶ ·K ⁻¹	88	100-120°C	●		●			●				●															

The technical data relating to the material and its processing has been compiled carefully and is correct to the best of our knowledge. The information cannot, however, be taken to be legally binding nor as any commitment that the material has certain properties or is suited for any particular purpose.

Machining

We recommend the use of high speed CNC-machine centres and traditional wood and plastic working machines for the purpose of machining obomodulan®. In principle, traditional metal working machines are also suitable for this purpose.

However, they generally do not achieve such high speeds and feed rates and may therefore be less efficient. Carbide milling cutters should be used for machining purposes. Solid carbide for small milling cutters and reversible carbide

tips for larger cutter diameters. The cutting edge geometry is identical to that used for machining aluminium.

We can send you the detailed machining processing information by fax or e-mail.

Service

We offer you our special cutting service:

- horizontal cuts from 10 mm on, in steps of 5 mm (plus cutting allowance)
- specified cut sizes from our board dimensions

TÜV-Zertifikat für DIN ISO 9001:2000



Thermoforming with obomodulan®

For the thermoforming of Thermoplastics, i. e. ABS, PVC and PS by vacuum- or compressed hot-forming, we recommend obomodulan® which is qualified for pre- and small series production. The grades obomodulan® 652, 652 HT and 1600 are successfully used for this application.

Advantages and properties:

- Easy and quick machining
- Short machining time in comparison to metal materials and therefore, less abrasive and cost effective
- Gentle to tools and long working time
- Good ability of re-machining and therefore, more cost effective
- High edge stability

Tool life:

- 100 - 250 pieces depending on tool geometry and kind and thickness of hot-forming material also higher – up to 1000 pieces possible.

Fields of application:

Various thermoplastic materials being hot-formed on obomodulan®:

- ABS 8 mm thick, approx. 50 pcs. on a tool made of obomodulan® 652
- PVC 1 mm thick, at 150-160°C on a tool made of obomodulan® 1600
- PS 4 mm thick, at 180-190°C auf einem Werkzeug aus obomodulan® 1600



Tool made of obomodulan® 1600 and the part „tube carrier“ of PS material



Tool made of obomodulan® 1600 and part „packing for electronic parts“ of PVC

Sheet metal pressing with obomodulan® 1200

Although our type 1200 excels in many fields of application such as foundry tooling, checking fixtures and hammer form tools, we particularly recommend the sahara version for sheet metal pressing; it is ideally suited for test and pilot series.

Tool life:

- average expectancy from 100 - 300 pieces, depending on tool geometry and pressing material but higher volumes up to 3000 pieces are possible

Advantages and properties:

- short machining and procurement time
- good ability of re-machining and therefore more cost effective
- sheet surface undamaged by tool
- fast machining and gentle to tools, low dust formation
- high edge strength
- homogeneous and smooth surface

Fields of application:

Examples of used metal sheets, which are transformed on obomodulan®:

- type DX 53 with zinc coat, 1,5 mm thickness, ca. 100 pieces*
- type DX 53 with zinc coat, 1,0 mm thickness, ca. 150 pieces*
- type chromium-nickel 1.4301, 0,6 mm thickness, ca. 100 pieces*
- type chromium-steel 1.4016, 0,6 mm thickness, ca. 100 pieces*

* minimum quantities of transformed metal sheets. Higher quantities possible.



Pressing tool with a 2 mm steel sheet of obomodulan® 1200



Pressing tool made of obomodulan® 1200 (by kind permission of Miele & Cie. KG, Germany)