



# TECHNICAL DATA SHEET

## MM-TM70-RIM

**Master-model for composite tool manufacturing in resin infusion technology**

### ► DESCRIPTION

Master-model is an initial carrier of shape and surface quality of the final product. We offer high quality Master-models produced by the company «KOLLER». They are designed to produce composite tool using resin infusion technology to create high quality shape-generating surface. Master-model is a light, vacuum tight and solid structure fabricated using sandwich-structure technology with application of special modeling compound, applied on the previously created structure. Comparing to modeling board Master-models this technology allows to avoid starved spots, porosity and interstices and also to avoid joints that reduce surface quality of composite tool.

Manufacturing of Master Model includes following steps:

- Analyses of technical files received from the customer like Technical Statement of Work (SOW) and 3D models. Before going to the next step Customer will get mathematical model of final Master-model for check and validation.
- Design and manufacturing of Master-model supporting structure includes:
  - ✓ Creation of wooden structure;
  - ✓ Creation of polystyrene core with following milling with negative offset from the theoretical contour;
  - ✓ Application of expanded foam (density 100kg/m<sup>3</sup>) with negative offset from the theoretical contour to create primary volume;
  - ✓ Laminating: application, impregnation and polymerization of reinforcing layers.
- Modeling of shape-generating structure of Master-model includes applying of epoxy compound SK2TM70. To achieve the best strength characteristics of the applied compound model-master have to be thermo stabilized.





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- Mechanical treatment of Master-models is carried out on one of three available machines HSM milling UGV 5 axis «FOREST LINE» with working area 6800 mm x 3500 mm x 2000 mm and with surface finish Ra 1,6. Application of the contour lines and labels can be done on request on finished models. Final finishing is achieved by polishing grain 320.



- Final check of Master-model includes the vacuum test and geometry test measuring the deviation from the theoretical contour. The vacuum test is carried out in the vacuum bag to prove that the maximum vacuum loss is no more than 0.1 bar for 10 minutes. Geometry test measuring the deviation from specified values is carried out with the help of the POWER INSPECT DELCAM software and special measuring arm for quality control of the tool. Measuring arm and digitalization have useful area of 6000 mm x 3000 mm x 2000 mm.



#### ► TECHNICAL DATA

THERMAL AND MECHANICAL PROPERTIES OF SK2TM70-4 <sup>1</sup>			
Hardness  7 days at 23°C 16 hours at 70°C	ISO 868 : 2003	Shore D1	65 67
Glass transition temperature (Tg)  7 days at 23°C 16 hours at 70°C	ISO 11359 : 1999	°C	50 83
Coefficient of thermal expansion (CTE)  16 hours at 70 °C	ISO 11359 : 1999	10 <sup>-6</sup> .K <sup>-1</sup>	60
Tensile modulus	ISO 527 : 1993	MPa	1,100
Tensile strength	ISO 527 : 1993	MPa	14
Elongation at break	ISO 527 : 1993	%	2.8



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Flexural modulus	ISO 178 : 2001	MPa	1,100
Flexural strength	ISO 178 : 2001	MPa	24

(1) Average values obtained on standard specimens / Hardening 24 hr at 23°C + 16 hr at 70°C

### ► ADVANTAGES OF OUR MASTER- MODELS

- Manufacturing of oversized Master-model within a very short time;
- High surface quality of Master-models;
- High working temperature of Master-model;
- Low coefficient of thermal expansion (CTE): geometrical stability of model;
- Installation of rigidity ribs for redistribution of loads;
- Creating of supporting structure with bearing and rigging elements.

Storage conditions : it is recommended to store at temperature from -20°C until +30°C in the original package.

### ► NOTE

Before applying the release liquids SK2TR399-1 or SK2TR399-2, it is recommended to treat the surface of the Master-model by sealing material SK2TR399-4. Apart from reducing of the surface porosity, it has the ability to enhance the performance of semi-permanent release reagents.