Datasheet

MC/AD1 Series

THERMOLAST® M

The MC/AD1 Series is your material solution for applications requiring basic medical approvals such as ISO 10993-5. The series is characterized by excellent adhesion properties to polar thermoplastics such as PC, ABS, PC/ABS. The compounds are produced exclusively by a special medical unit.

Typical applications

- Flexible Connections
- Membranes
- Seals
- Soft touch
- Valves

Material advantages

- DMF listed
- Excellent mechanical properties
- For injection molding
- Free of animal basedingredients
- KRAIBURG TPE Medical service package (description below)
- Sterilizable (autoclave134 °C, gammaradiation 2x35 kGy, EtO)
- Tested according to ISO 10993-5

Processing Method: Injection Molding

	Color / RAL DESIGN	Hardness DIN ISO 7619 ShoreA	Density DIN EN ISO 1183-1 g/cm3	Tensile Strength [1] DIN 53504/ISO 37 MPa	Elongation at Break [1] DIN 53504/ISO 37 %	Tear Resistance ISO 34-1 Methode B (b)(Graves) N/mm	CS 72 h/23 °C DIN ISO 815-1 Method A %	CS 24 h/70 °C DIN ISO 815-1 Method A %	Adhesion to ABS VDI 2019 N/mm	Adhesion to PC VDI 2019 N/mm	Adhesion to PETG VDI 2019 N/mm
TM3ADT	natural	34	0.930	3.0	550	8.0	13	34	0.5 (A)	0.5 (A)	0.5 (A)
TM4ADT	natural	40	0.940	3.5	500	7.5	14	38	0.5 (A)	0.5 (A)	0.5 (A)
TM5ADT	natural	50	0.950	5.5	600	9.5	17	38	3.0 (D)	1.5 (A)	1.0 (A)
TM6ADT	natural	59	0.960	6.5	600	11.5	18	41	4.5 (D)	4.5 (D)	4.5 (D)
TM7ADT	natural	73	1.000	8.0	650	18.0	22	45	5.0 (A)	8.0 (D)	7.5 (D)

[1] Deviating from ISO 37 standard test piece S2 is tested with a traverse speed of 200 mm/min.

All values published in this data sheet are rounded average values.
Specification limits are based on three-fold standard deviation from the average value.

This datasheet is an extract of the KRAIBURG TPE program. Please contact KRAIBURG TPE to select the compound suitable for the requirements.

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THERMOLAST® M Medical-Service-Package

All medical compounds are tested according to ISO 10993-5 (Cytotoxicity) and listed under a Drug Master File.
Selected medical compounds are tested according to described medical basic approvals: USP Class VI (chapter 88), USP 661 (in vitro), ISO 10993-4 (Haemolysis, indirect in human blood), ISO 10993-10 (Intracutaneous Irritation) and ISO 10993-11 (Acute Systemic Toxicity). No changes in formulation or process (except of necessary adjustments e.g. due to new regulations).
If any changes are necessary, KRAIBURG TPE will inform the customers at least 24 months in advance.
THERMOLAST® M Compounds are produced on a dedicated medical compounding line.

Compression Set

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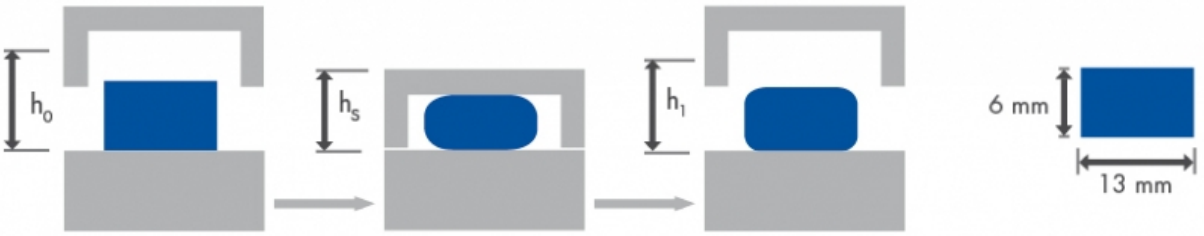
Compression Set (acc. DIN ISO 815)

For the compression set testing the following specimen is used:
The specimen is a cylindrical disk shaped 6 mm thick and 13 mm in diameter.



h_0 = initial thickness of the test piece (in mm)
h_1 = thickness after recovery (in mm)
h_S = height of the specimen (in mm)

$$\text{Compression Set} = \frac{h_0 - h_1}{h_0 - h_s} \times 100$$

The specimen is compressed by 25%. The compressed specimen is heated to the test temperature. DIN ISO 815 discribes two methods.

Method A: The specimen is allowed to recover immediately after its aging in the oven and then cooled down to room temperature. After 30 minutes the thickness of the specimen is measured and the compression set calculated.

Method B: The specimen is cooled down to room temperature after its aging in the oven and then allowed to recover.

Test results gained from method B are in general higher than from method A.

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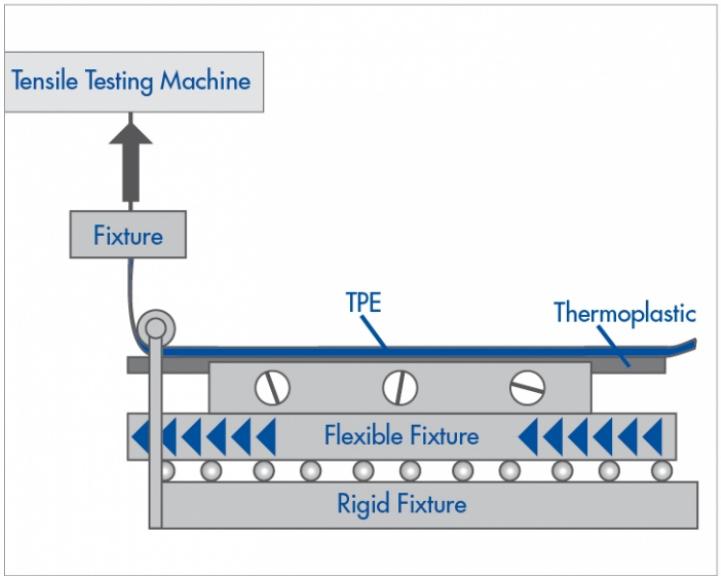
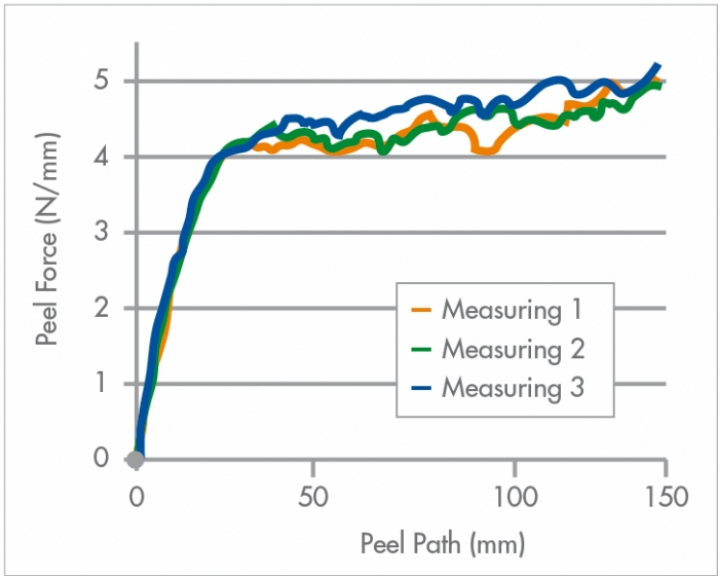
Description peel test

Peel test according to VDI guide line 2019

Test Setup



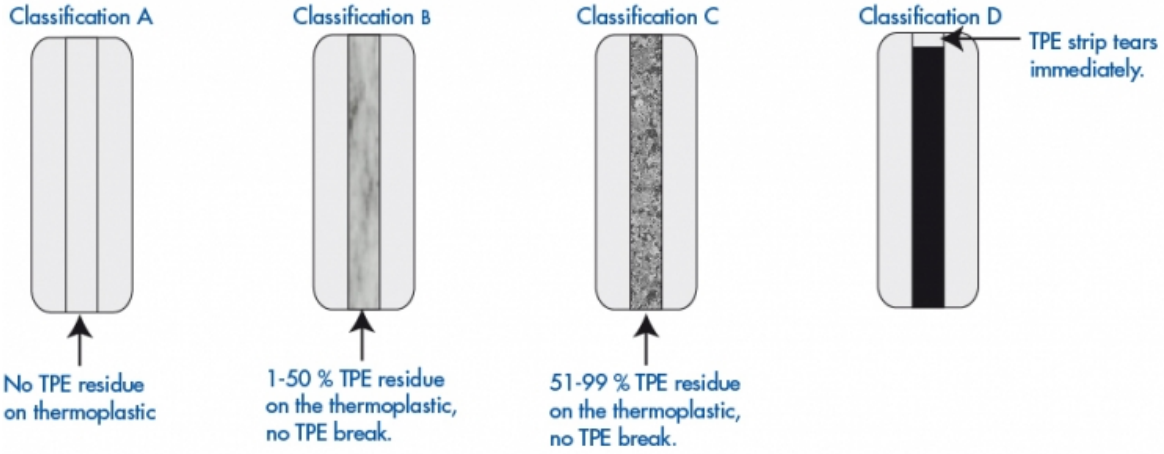
Example diagram for results of a peel test



Classification

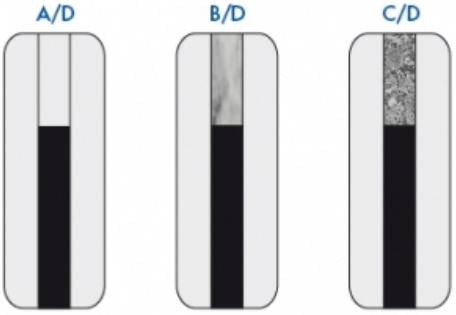
Peel test according to VDI Guideline 2019

For the VDI peel test we add two characters to the peelforce value.
The first character describes the TPE residue on the hard component.



A	No TPE residue on hard component
B	Up to 50 % TPE residue on hard component
C	50 to 99 % TPE residue on hard component
D	TPE strip tears immediately

The second character describes if the TPE strip will tear during the measurement at any position on the peel path.



A/D	No TPE residue on hard component, TPE strip will tear
B/D	Up to 50 % TPE residue on hard component, TPE strip will tear
C/D	50 to 99 % TPE residues on hard component, TPE strip will tear

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Processing Guideline Injection Molding	
Cylinder temperature	180 - 210 - 240 °C, max. 250 °C (360 - 410 - 460 °F, max. 480 °F)
Hotrunner	Hot runner temperatures: 200 -250 °C (390 - 480 °F). The runner should be empty after a maximum of 2 - 3 shots.
Injection pressure	200 - 1000 bar (2900 - 14504 psi) (depending on the size and weight of the part).
Injection rate	In general, the fill time should not be more than 1–2 seconds.
Hold pressure	We recommend to derive the optimum hold pressure from determining the solidification point, starting with 40 % - 60 % of the required injection pressure.
Back pressure	20 - 100 bar; if colour batches are used, higher back pressure is necessary.
Screw retraction	If an open nozzle is used processing with screw retraction is advisable.
Mold temperature	The mold temperature depends on the hard component. A temperature exceeding 80 °C (175 °F) should be avoided. The common temperature is 40 - 60 °C (105 - 140° F).
Pre drying	To achieve optimum mechanical values, drying the material for 2 - 4 hours at 60 - 80 °C (140 - 175 °F) is recommended.
Needle valve	With materials < 50 Shore A the use of a needle valve is advisable.
Screw geometry	Standard 3-zone polyolefine screw.
Residence time	The residence time is to be set as short as possible with a maximum of 10 minutes.
Cleaning recommendation	For cleaning and purging of the machine it is appropriate to use polypropylene or polyethylene. Machine must be PVC-free.