KARG Industrietechnik

TECHNICAL INFORMATION

Notching Machines

Manual and Motorized Notching Machines

Precise and easy to use!

These linear notching machines (manual and motorized version) are developed for preparing, rapidly and accurately, V- or U- notched specimens for impact resilience determinations according to Charpy, Izod and Tensile Impact (ASTM, ISO, DIN or others). Therefore these machines are used in conjunction with impact pendulums. Interchangeable notching knives are designed with a constant profile for notching the specimens with the correct angle and radius as prescribed by the standards. The machines are fitted with two separate motion systems: one to move the specimens and the other to move the knife; the motorized machine has a frequency controller for an adjustable speed.

Features:

- Robust and stable instrument
- Ergonomic and modern design
- Precise and stable knife guiding
- Knife tolerances better than 0,01 mm
- Maximum clamping height: 30 mm
- Frictionless and clearance free bearings at loader guiding guarantee a very precise and reproducible notch

Manual Notching Machine Type MAK

Features:

- Robust and stable instrument
- Motorized knife movement
- Knife velocity adjustable by means of a frequency controller
- Plexiglas protection cover with integrated safety switch
- Maximum clamping height: 30 mm
- Jig and notching device for fracture mechanics studies

Motorized Notching Machine Type MOK

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Notching Machines

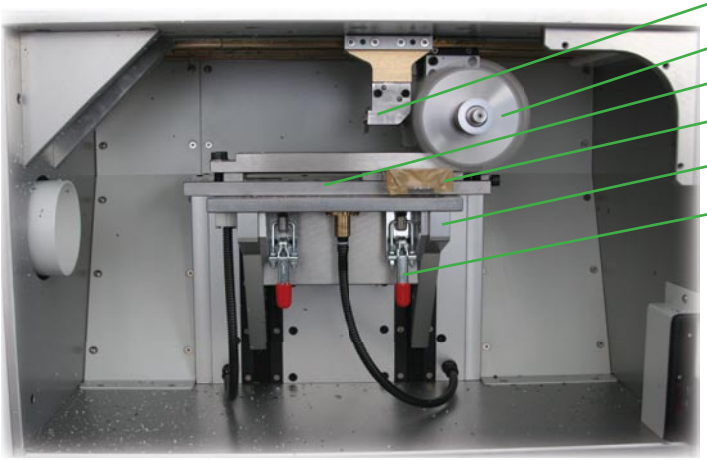
Automatic Notching Machine

This linear automatic notching machine is developed for preparing, rapidly and accurately, V-notched specimens for impact resilience determinations according to Charpy, Izod and Tensile Impact (ASTM, ISO, DIN or others). As an option, the machine can be equipped with a saw, which permits to separate the shoulders of the multipurpose test specimen. Interchangeable notching knives are designed with a constant profile for notching the specimen with the correct angle and radius as prescribed by the standards. The machines are fitted with two separate motion systems: one to move the specimens (z-Axis) and the other to move the knife and the saw (x-Axis). To ensure the maximum possible flexibility, the cutting and notching feed speed as well as the sawing rotating speed are adjustable in a wide range. A special cooling system ensures that even sensitive materials can be processed with the required precision. A new sealing system ensures that even abrasive or glass fiber-reinforced materials can be processed.
The user interface, a 7 “touch screen, allows the programming of the notching or sawing cycles a simple and fast way. Repetitive processing cycles can be stored and are available when needed immediately.

Features AKM:

- Robust and stable instrument
- Precise guided movement
- Adjustable knife speed
- Adjustable saw rotating speed
- ESG safety glas protection cover with integrated safety switch
- Dual knife and saw cooling
- 7”, Touch screen, color
- Clear and easy to use user interface
- Programmable notching and sawing cycles

Automatic Notching Machine Type AKM



Notching knife
Double saw
Specimen loader
Specimen
Specimen loader table (z-axis)
Quick clamping vice for specimen loader

- **DIN EN ISO 179, 18o and 8256**
- **ASTM D 256, 611o and 638**

and other equivalent standards

Standards

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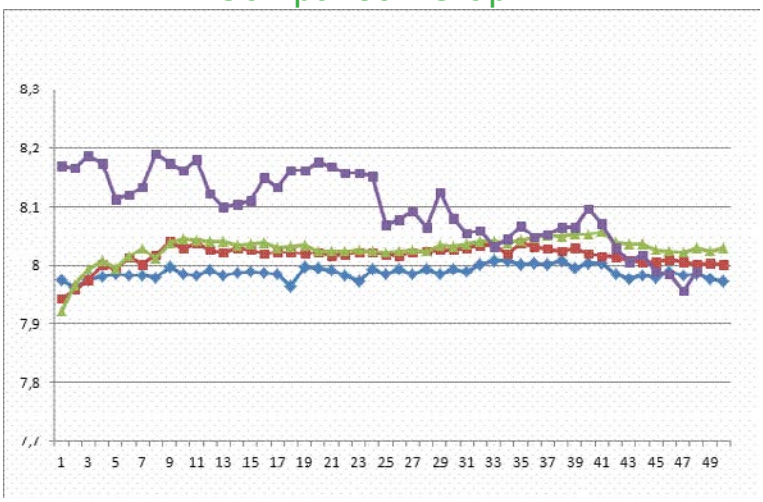
Advantages AKM:

With the new automatic notching machine, E. Karg Industrietechnik offers a sample preparation device, which is able to prepare standardized notched specimens with the highest possible accuracy. As a result of this, the determination of the impact resilience can be done similarly with the same accuracy.

Since, unfortunately so far there is no standardized method for the production of notched specimens, there are a variety of machines with different drive, editing tools and concepts. Due to this matter, the variation of the impact resilience can be very large. In addition to this, the influence of the operator also have to be considered.

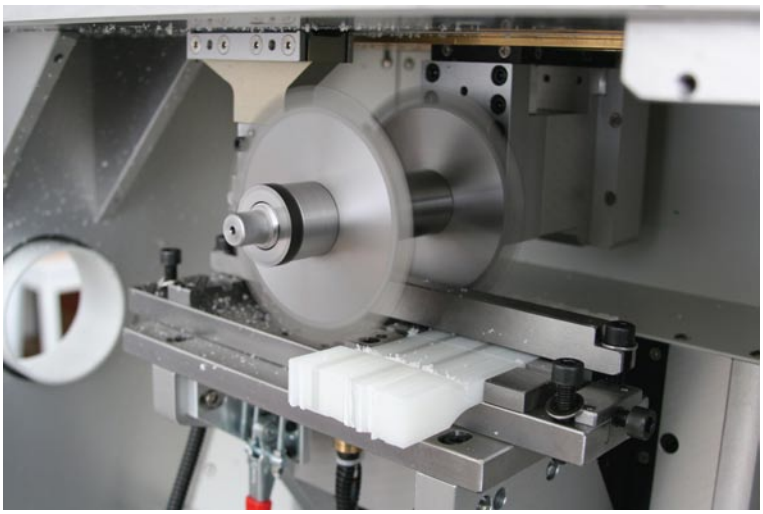
Comparison Graph



series 2,3,4 (green, red and blue graph): Notching depth of 3 notched specimen series (50 pcs.) done by the KARG automatic notching machine

series 1 (fuchsia graph): Notching depth of 1 notched specimen series (50 pcs.) done by a competition automatic notching machine

From the practice is known that it can also occur with semi-automatic machines, despite apparently careful processing, notch geometry variations within the processing length will happen. Since the operator usually do not measure every individual sample from the complete series (apart fully automatic notch measuring devices), the geometry for determining the impact resilience will be taken from a reference sample, the variation of notched impact resilience can be extraordinarily large. Other parameters, such as the used processing method (sawing, milling, planing), the type of notching tool (blade, cutter, chisel, etc.) as well as the influence of the material in terms of the given machine (such as limited flexibility), ultimately influence the reproducibility of the measurement results of the subsequent impact resilience measurement.



Specimen shoulder slicing

Due to different material properties and behaviors, the processing parameter in the production of notched specimens according different standards will influence the subsequent determination of the impact resilience. For this reason, the software

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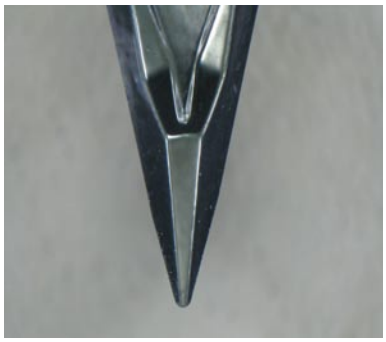
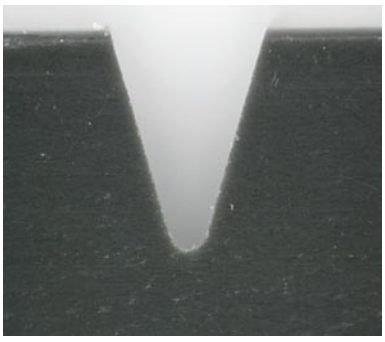
Advantages AKM:

of the automatic notching machine allows the operator to create user-defined set of notching parameter, such as feed rate specimen loader (2 variable), feed rate saw, feed rate notching knife, etc. This feature enables the operator to run a reproducible notch-process at any time.

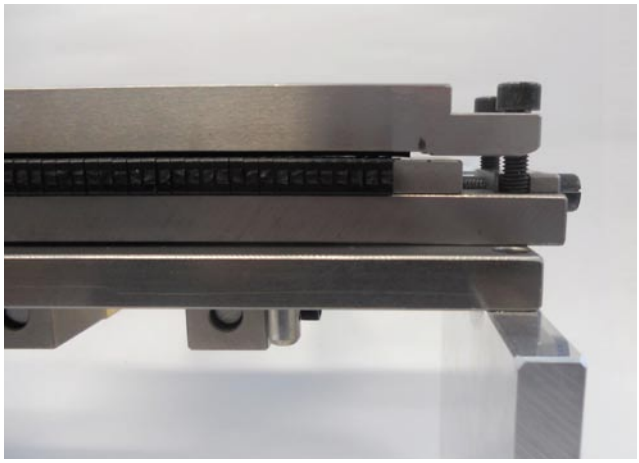


Precise polished notching knife

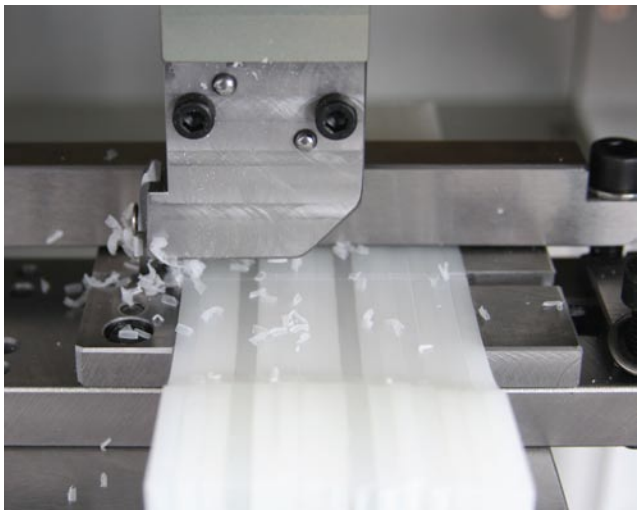


The notch shows a clean sharp edge, no deformed or melted material and no adhering chips.

Furthermore, the new system draws mainly from the rigid construction! This, due to the high quality linear guidings in conjunction with precise servo and stepper motors and a resolution of the linear movement of a few micrometers. The modular system can be extended with additional features such as a circular saw to remove the shoulders of ISO 527 tensile bar.
A wear-and movement-independent cooling system can be integrated as well as an option. A new specimen loader table with integrated loader detection increases safety and convenience.
In order to reduce or even eliminate the known problems in the past with increased wear on the spindles, linear guides and actuators during processing of glass fiber reinforced plastics, a special sealing system was integrated.
The automatic notching machine is controlled by an integrated computer with touch screen. The innovative user interface guarantees a safe and easy operation, even with untrained operators.



Robust and rigid specimen loader with loader table



Specimen notching

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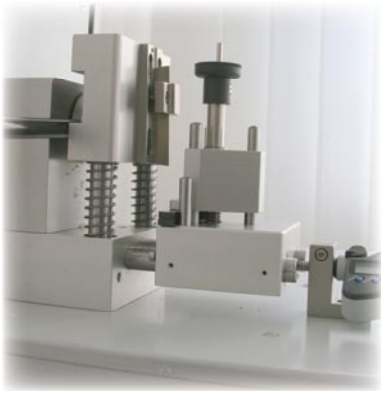
Options for advanced material characterization:

In the international polymer research, the determination of fracture mechanics or material quantities of polymeric materials has been established. Particularly in the application of conventional measurement methods (impact strength tests), there are limits in terms of a differentiation of the toughness behavior. Some plastics can not be distinguished by standard impact resilience tests. For this reason, different fracture mechanical measurement and calculation methods have been developed for polymers, which describe the crack initiation and crack propagation.

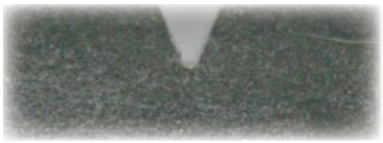
Contrary to the standardized test specimens, which are described in EN ISO 179 or 180 standard, specimens which are used to determine the crack initiation and crack propagation an additional razor blade section will be introduced (see figure). This is necessary, because some tough polymers became a plastically deformation on the notch root (tip). For the determination of the J-values (function of crack growth) a stable crack propagation is required.

For both machines (MAK and MOK) there are several options for the mechanical preparation of specimens used for fracture mechanical measurements available.
Figure 1 shows a standard notched specimen, in which was subsequently introduced a razor cut.



For the determination of K_1 on CT-specimens (compact tension, see figure 2) there is another vice available to introduce the desired cut by a razor blade in previously mechanically processed specimens by means of a C4U specimen milling machine.

Notched Specimen (V-notch 45°, r = 0,25 mm)



Notched Specimen (V-notch 45°, r = 0,25 mm), with razor blade notch

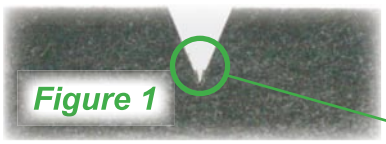


Figure 1

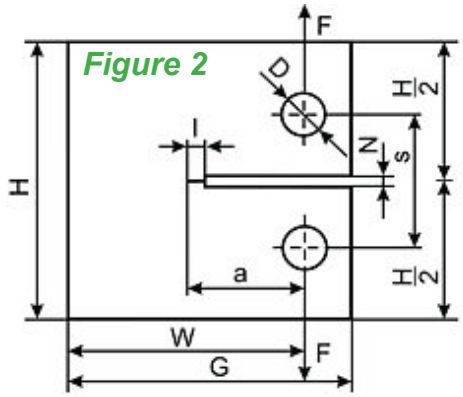
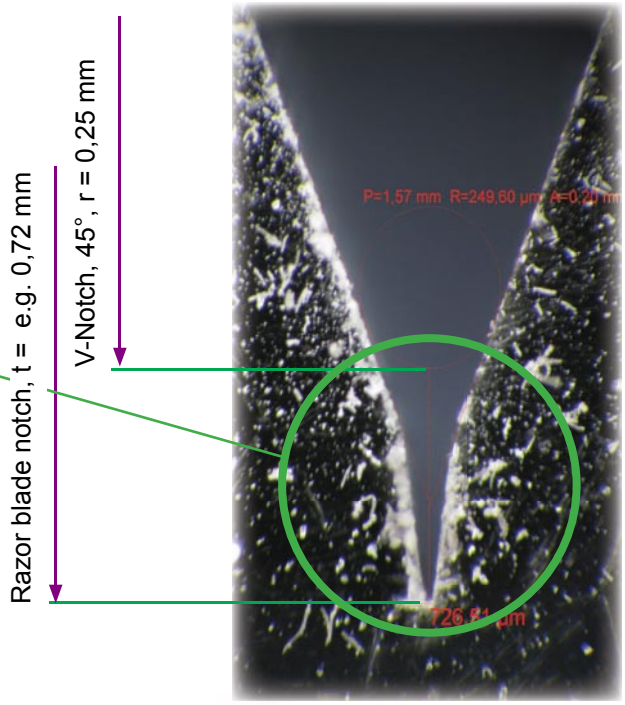


Figure 2



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Technical data:

	MAK	MOK	AKM
Dimensions			
Width (mm)	470	470	1200
Height (mm)	215	540	700
Depth (mm)	220	470	540
Weight (kg), approx.	16	43	200
Machine data			
Max. number of specimen, approx. (with 4 mm thickness)	7	7	50
Cutting speed saw, adjustable (m/min.), approx.	-	-	0,3 - 1,8
Rotating speed saw, adjustable (rpm), approx.	-	-	1000 - 2000
Cutting speed knife, adjustable (m/min.)	adjustable	adjustable	1 - 30
Single pass depth z-axis (specimen loader) (mm)	min. 0,01	min. 0,01	0,01 - 0,25
Machining length (mm), approx.	30	30	200
Electrical data			
Power (kW), approx.	-	0,4	1
Power supply (V/Hz)	-	230 / 50	230/110 - 50/60
Code No.	2600.000	2700.000	2900.000

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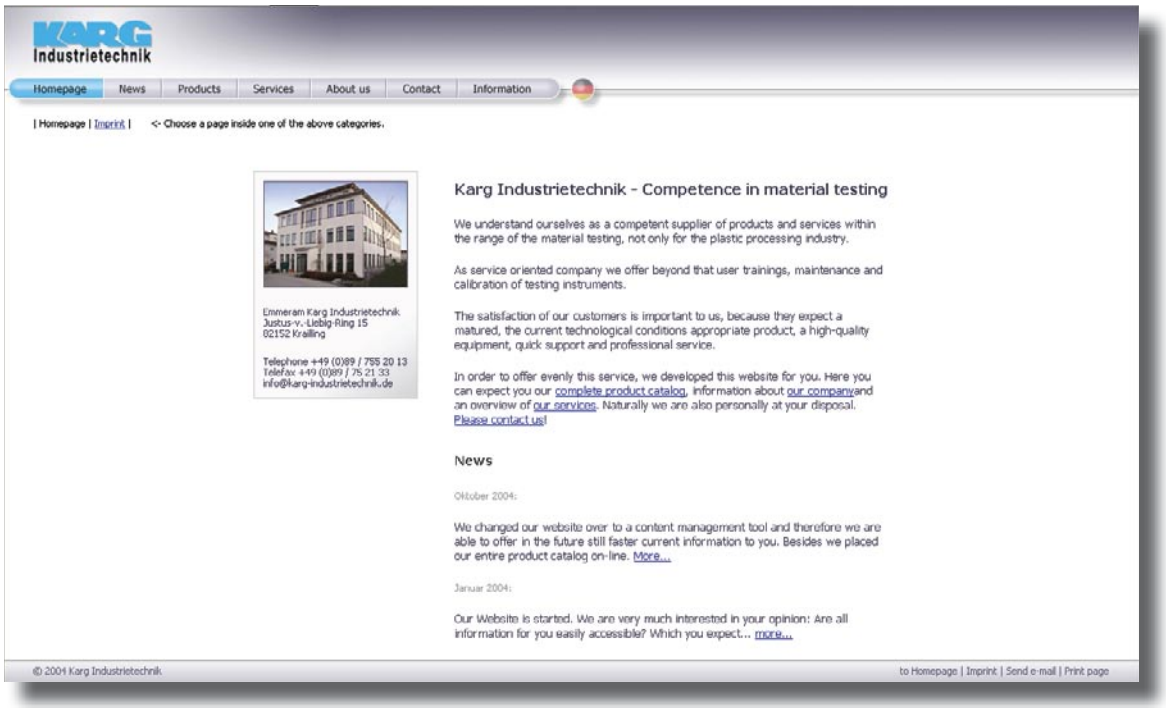
The whole world of Karg Industrietechnik: www.karg-industrietechnik.com



You can find what ever you like to know about us and our products under:

www.karg-industrietechnik.com

Beside any information, news, exhibitions you have also the opportunity to get in touch directly with your responsable sales manager.
We supply quality control instruments for:

- Plastic industry
- Automotive industry
- Laboratories / Universities / Technical high schools
- Electronic industry
- Rubber industry

Due to continuous development policy, changes may be introduced without any notice!

KARG Industrietechnik

Competence in material testing

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