



**ERICHSEN Cupping Test**

## Sheet Metal Testing Machine Model 102



**Bore Expanding Test**



testing equipment for quality management

**ERICHSEN**  
since 1910

### Technical Description

Data logger for recording the measurements such as drawing and blank holder force and stroke

**ERICHSEN Cupping Test  
Bore Expanding Test**

With electro-hydraulic drive and fully automatic test sequence

## Product

**Sheet Metal Testing Machines, Model 102-60 (with max. drawing force of 60 kN) and Model 102-80 (with max. drawing force of 80 kN);** with electro-hydraulic drive, automatic switch off at specimen failure and automatic menu navigation via touch panel.



## Application

This Sheet Metal Testing Machine is intended for testing materials in the medium thickness range (0.1 to approx. 3.0 mm). It provides rapid a reliable quality monitoring for sheet metal producers and users.

Model 102 is suitable for

- the **ERICHSEN Cupping Test** on all ferrous and non-ferrous metals in accordance with

DIN EN ISO 20482	JIS Z-2247
ASTM 643-84	
NF A 03-602	UNE 7080
NF A 03-652	GOST 10 510
GB 4156-84	

In addition, the Olsen Test as used in the USA can be performed on the testing machine when appropriate tools are set up.

- the **Bore Expanding Test**

in accordance with Siebel and Pomp (KWI)

Depending of the testing method the following sheet metal thicknesses can be tested:

Erichsen Cupping Test (102-60)	0.1 - 2.5 mm
Erichsen Cupping Test (102-80)	0.1 - 3.0 mm
Bore Expanding Test	0.2 - 2.0 mm

The above mentioned maximum sheet thicknesses are based on material with a tensile strength of 400 N/mm<sup>2</sup>.

There are important reasons for using the **Sheet Metal Testing Machine, Model 102**, for quality assurance:

- ♦ Lowering of manufacturing costs by making spot checks on the drawing quality of cold rolled sheet during production or in the process department.

- ♦ Sorting out of material of lower quality arriving at the Goods Inwards Department. Without special test preparation it is immediately possible to establish if the material supplied has the prescribed drawing quality.
- ♦ Determining the most appropriate sheet thickness for a particular drawn work piece to optimise the ratio of price to suitability for the manufacturing process.

Quantitative measurement of sheet quality by means of the ERICHSEN Cupping Test provides a basis of communication between sheet metal producers and users.

The form of the crack and the surface roughness (= grain size) also provide information on the quality of the sheet metal and is suitability for drawing, giving valuable information especially to the sheet metal producer.

The good functional layout of Model 102 makes this machine particularly user friendly. All relevant test tools can be set up in the test cylinder quickly and without difficulty.

The sturdy design and the hydraulic system employed ensure that minimum wear is experienced so that accurate test results are assured over a long period of time.

## Description

The machine consists of a sturdy sheet metal housing into which the test aggregate (test cylinder with work piston, sheet holder piston) and the test tools as well as the hydraulic system are integrated. The emergency-stop switch is located on the control panel next to the touch panel, which starts the automatic menu navigation. The two control valves for the drawing and sheet holding force adjustment are user-friendly mounted in front of the housing.

When carrying out the **ERICHSEN Cupping Test**, the sheet metal specimen in the form of strip is inserted into the test cylinder and centralised by locating diagonally. The sheet holder force of e.g. 10 kN in accordance with DIN EN ISO 20482 is adjusted using a special regulating valve, and the actual cupping process is initiated by selecting the from the test specification required drawing speed on the speed regulator.

Since the testing machine is equipped with the function "automatic stop at specimen failure" the forward speed is automatically stopped when the crack occurs, so that in any case an objective test result is achieved. The ERICHSEN cupping value is displayed with an accuracy of 0.01 mm on the touch panel.

When carrying out the **Bore Expanding Test (KWI)** the initial bore (in accordance with the dimensions of the tools, i. e. normally 7.5 mm or 12 mm) is applied to the sheet metal specimen by drilling and reaming. Afterwards this initial bore is expanded until a crack appears.

## Accessories

The various accessories make this sheet metal testing machine particularly versatile. For further detailed specifications please see our Price List No. 102.

**ErMES-Data logger** for recording the measurements such as drawing and blank holder force and stroke by time; the connection is made by a USB connection to an external PC (including in the scope of supply: PC (WIN 10), software, VDU, printer, interfaces, A/D converter module).

### Test Tools for the ERICHSEN Cupping Test

- ◆ Test tool set No. 5 for strip more than 13 mm wide and 0.1 – 0.75 mm thick

### Test Tools for the ERICHSEN Cupping Test in accordance with DIN EN ISO 20482

- ◆ Test tool set No. 11 for strip 30 - 55 mm wide and 0.1 – 1.0 mm thick
- ◆ Test tool set No. 21 for strip 55 - 90 mm wide and 0.2 – 2.0 mm thick
- ◆ Test tool set No. 27 for strip more than 90 mm wide and 0.1 – 2.0 mm thick
- ◆ Test tool set No. 40 for strip more than 90 mm wide and 2.0 – 3.0 mm thick

### Test Tools for the Deep Draw Bore Expanding Test acc. to Siebel and Pomp (KWI)

- ◆ Bore expanding test tool D (initial bore 12 mm)
- ◆ Bore expanding test tool E (initial bore 7.5 mm)
- ◆ Boring jig for drilling the initial bores
- ◆ Drills, drilling bushes and reamers

### Additional Facilities for Tests on lacquered sheet metal specimens according to DIN ISO 1520

- ◆ Special microscope with holder and illumination for optical observation of the test procedure

## Technical Data

Dimensions	Width 650 mm Depth 620 mm Height 1100mm
Weight, net	approx. 150 kg
Main supply	400 V, 3~, 50 Hz
Motor performance	0.95 kW
Drawing force	max. 60 / 80 kN
Blank holder force	max. 12 kN
Drawing speed	max. 150 mm/min
Punch stroke	max. approx. 40 mm
Indication of punch stroke	digital (accuracy 0.01 mm)

Order Informations	
Ord.-No.	Product-Description
00120131	<b>Sheet Metal Testing Machine, Model 102-60 (with max. drawing force of 60 kN)</b>
00120231	<b>Sheet Metal Testing Machine, Model 102-80 (with max. drawing force of 80 kN)</b>
Supplied with: <ul style="list-style-type: none"><li>◆ Test Tool No. 27</li><li>◆ One Filling of Hydraulic Oil</li><li>◆ Operating Manual</li></ul>	

Further details and accessories please see our Price List No. 102.

## Modified ERICHSEN Cupping Test

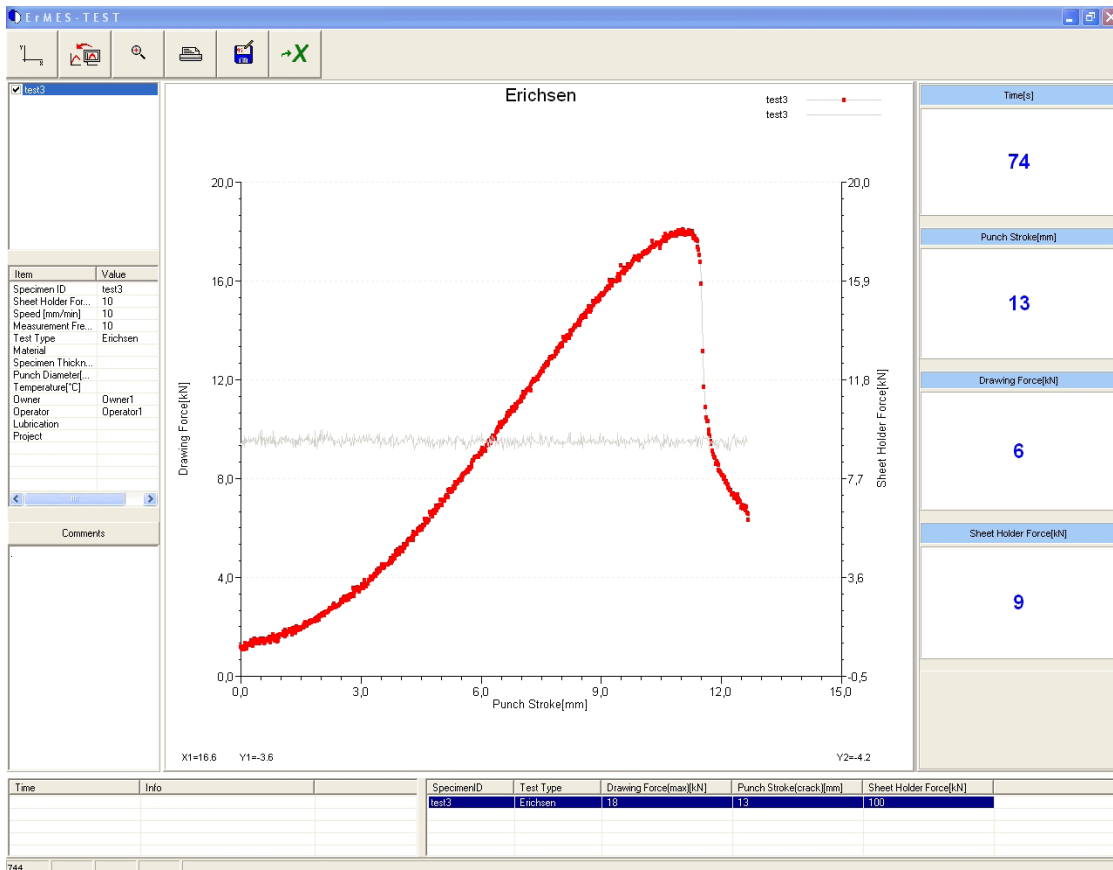
The ERICHSEN Cupping Test (in accordance with DIN EN ISO 20482, and corresponding to national and international standards) is a test providing simple and quick means of assessing the multi-axis ductility of sheet and strip using a procedure that relates closely to practical processes. The depth range reached at failure is, however, only an initial guide to the evaluation of the forming properties of the sheet metal.

## ErMES - Datalogger with User Test Software

The software enables the continuous acquisition of measured values with simultaneous display of the force/displacement diagram throughout the forming process. The data record is terminated by reaching the maximum pulling force.

This data is presented immediately on the VDU on completion of the test alongside the graph of the force against displacement.

Either a printout can then be obtained and the data saved or the data can be easily transferred to other evaluation programmes (e.g. Microsoft Excel).



The right of technical modifications is reserved.  
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