



ERICHSEN Cupping Test



Deep Drawing Cup Test

Sheet Metal Testing Machine Model 134



Square Deep Drawing Cup Test



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
Deep Drawing Cup Test
Special Tests

Electro-hydraulic Drive
Programme Logic Control
Fully automatic Test Sequence

Product

Sheet Metal Testing Machine, Model 134, with electro-hydraulic drive, max. drawing force 120 kN and adjustment for pre-setting the blank holder pressure max. 45 kN, blanking head (max. blanking force of 200 kN), automatic test sequence and facility for automatic stop at specimen failure. Drawing force and blankholder force as well as the drawing punch stroke are displayed digitally.

Purpose and Application

This Sheet Metal Testing Machine is not only ideal for the effortless, quick and accurately all important and known-deep drawing tests for ferrous and non-ferrous metals, it is also designed for a large number of additional technological investigations:

ERICHSEN Cupping Test in accordance with

DIN EN ISO 20482	JIS Z-2247
ASTM 643-09	JIS Z-7729
NF A 03-602	
NF A 03-652	GOST 10 510
GB 4156-07	

Deep Drawing Cup Test in accordance with

DIN EN 1669
ISO 11 531
JIS Z 2249
GB/T 15825

In addition, the Olsen Test as used in the USA can be performed, if appropriate tools are set up.

There are important reasons for using **Sheet Metal Testing Machine, Model 134**, for quality assurance and research:

- ♦ 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 preparations 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 workpiece to optimise the ratio of price to suitability for the manufacturing process.

Description

The machine consists of a sturdy steel plate housing into which the test head including test cylinder with 3 working pistons for blanking/sheet holding, drawing and ejecting, is fitted. The operator's controls are arranged conveniently on a control panel.

Within the machine housing following parts are accommodated: Drive motor, hydraulic pump, oil tank, the necessary electro-hydraulic control gear and associate internal installation as well as electronic measuring transducers for exact detection of the test parameters.

Further technical advantages:

Cylinder head with bayonet lock permitting direct access to drawing dies, blanking rings, blank holders etc. and quick and convenient changing of the drawing and blanking tools

- ♦ *Infinitely variable drawing speed* once set it remains constant throughout the drawing movement, independent of any change of load
- ♦ *Cardanic drawing die retention* ensures the consistent, parallel clamping of the specimen, independent of variations in thickness.
- ♦ *Crack-Detector* ensures the facility for automatic stop at specimen failure by ERICHSEN Cupping Test.

Accessories (optional)

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 (to be supplied by the user). The software included in the scope of supply runs under WIN 2000/XP. The system consisting of measuring transducer for drawing force and analogue output for the stroke as well as the corresponding interfaces, A/D converter module.

Analogue Outputs below are used for Data Acquisition with own Evaluation Systems for producing force/displacement diagrams of drawing force, sheet holder force and drawing punch stroke.
(When using our data evaluation system, these items are not necessary.)

Test Tools for ERICHSEN Cupping Test

Test Tools for Deep Drawing Cup Tests

Test Tools for Second Draw

Test Tools for producing Square Cups

Test Tools for Ear Forming Tendency Assessment on Non-Ferrous Metals in accordance with DIN 50 155

Additional Devices

- Ear Measuring Instrument, Model 126 PLUS
- Bead Test Instrument, Model 227

Test Tools for Special Requirements
on request

Technical Data

Drawing force	max. 120 kN
Drawing speed	max. 770 mm/min
Blank holder force	max. 45 kN
Drawing punch stroke	approx. 60 mm
Blankholder stroke	approx. 35 mm
Blanking force	max. 200 kN
Sheet metal insert	max. width 110 mm
Mains supply	230/400 V AC 50/60 Hz 2.2 kW
Dimensions	Width approx. 900 mm Height approx. 1100 mm Depth approx. 800 mm
Weight, net	approx. 470 kg

Order Informations	
Ord.-No.	Product-Description
0178.01.31	Sheet Metal Testing Machine, Model 134 , including Test Tool No. 27
<i>Supplied with:</i> ◆ Operating Manual	

Accessories (optional)	
Ord.-No.	Product-Description
0793.01.32	Data logger for recording the measurements

For further details and accessories please see our Price List No. 134.

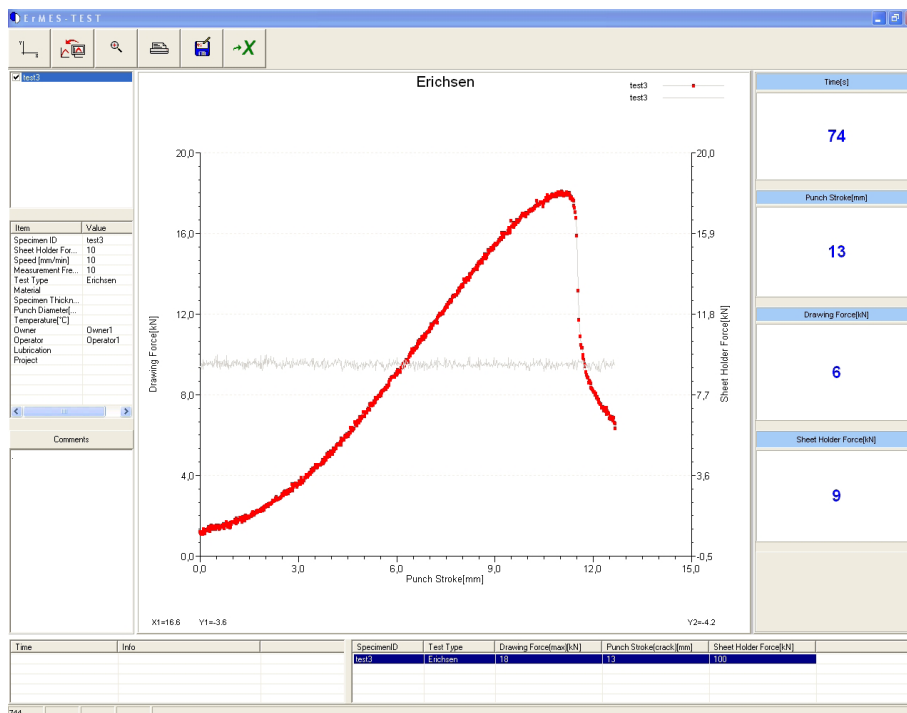
Modified ERICHSEN Cupping Test

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.

The Sheet Metal Testing Machine, Model 134, (as is the case with all the modern electro-hydraulic ERICHSEN Testing Machines) can as an option be equipped with analogue measuring outputs for

- ◆ drawing punch movement,
- ◆ drawing force, and
- ◆ blankholder force.

These analogue measuring signals are transmitted to a PC via an integrated amplifier and an A/D converter.



Data Evaluation System 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 recording will be stopped after the maximum force is achieved in a cupping test or the deep draw test is finished.

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 scope of supply includes PC, VDU and printer.

Selection table for drawing dies B1/C2 (#01370132) valid for ferritic and non-ferritic material (material type necessary for order) Norm: ERICHSEN			
Var.	Thickness s / mm	Var.	Thickness s / mm
1	0,076	28	0,85
2	0,100	29	0,90
3	0,127	30	0,95
4	0,13	31	1,00
5	0,14	32	1,10
6	0,15	33	1,15
7	0,18	34	1,20
8	0,20	35	1,25
9	0,21	36	1,30
10	0,23	37	1,40
11	0,24	38	1,50
12	0,25	39	1,60
13	0,26	40	1,70
14	0,27	41	1,80
15	0,28	42	1,90
16	0,30	43	2,00
17	0,32	44	2,10
18	0,35	45	2,20
19	0,40	46	2,30
20	0,45	47	2,40
21	0,50	48	2,50
22	0,55	49	2,60
23	0,60	50	2,65
24	0,65	51	2,70
25	0,70	52	2,8
26	0,75	53	2,9
27	0,80	54	3,0

Selection table for drawing dies B1/C2 (#01370132) valid for aluminium and aluminium alloy Norm: DIN EN 1669			
valid for Clearance ratio 1,15 bis 1,52		valid for Clearance ratio 1,34 bis 1,76	
Var.	Thickness s / mm	Var.	Thickness s / mm
1	0,095 < s ≤ 0,120	1	0,080 < s ≤ 0,100
2	0,121 < s ≤ 0,150	2	0,101 < s ≤ 0,125
3	0,151 < s ≤ 0,185	3	0,126 < s ≤ 0,157
4	0,186 < s ≤ 0,235	4	0,158 < s ≤ 0,195
5	0,236 < s ≤ 0,280	5	0,196 < s ≤ 0,240
6	0,281 < s ≤ 0,345	6	0,241 < s ≤ 0,290
7	0,346 < s ≤ 0,435	7	0,291 < s ≤ 0,360
8	0,436 < s ≤ 0,535	8	0,361 < s ≤ 0,450
9	0,536 < s ≤ 0,665	9	0,451 < s ≤ 0,555
10	0,666 < s ≤ 0,800	10	0,556 < s ≤ 0,670
11	0,801 < s ≤ 0,940	11	0,671 < s ≤ 0,800
12	0,941 < s ≤ 1,130	12	0,801 < s ≤ 0,965
13	1,131 < s ≤ 1,450	13	0,966 < s ≤ 1,250
14	1,451 < s ≤ 1,900	14	1,251 < s ≤ 1,600
15	1,901 < s ≤ 2,350	15	1,601 < s ≤ 2,000
16	2,351 < s ≤ 2,900	16	2,001 < s ≤ 2,400
17	2,901 < s ≤ 3,500	17	2,401 < s ≤ 3,000

Selection table for drawing dies B1/C2 (#01370132) valid for ferritic and non-ferritic material (material type necessary for order) Norm: ISO 11531			
Var.	Thickness s / mm	Var.	Thickness s / mm
1	0,1 < s ≤ 0,2	4	0,8 < s ≤ 1,6
2	0,2 < s ≤ 0,4	5	1,6 < s ≤ 3,0
3	0,4 < s ≤ 0,8		

**Selection table for drawing dies C1
(#01410132)**

valid for **ferritic and non-ferritic** material
(material type necessary for order)

Norm: ERICHSEN

Var.	Thickness s / mm	Var.	Thickness s / mm
1	0,076	28	0,85
2	0,100	29	0,90
3	0,127	30	0,95
4	0,13	31	1,00
5	0,14	32	1,10
6	0,15	33	1,15
7	0,18	34	1,20
8	0,20	35	1,25
9	0,21	36	1,30
10	0,23	37	1,40
11	0,24	38	1,50
12	0,25	39	1,60
13	0,26	40	1,70
14	0,27	41	1,80
15	0,28	42	1,90
16	0,30	43	2,00
17	0,32	44	2,10
18	0,35	45	2,20
19	0,40	46	2,30
20	0,45	47	2,40
21	0,50	48	2,50
22	0,55	49	2,60
23	0,60	50	2,65
24	0,65	51	2,70
25	0,70	52	2,8
26	0,75	53	2,9
27	0,80	54	3,0

**Selection table for drawing dies
square cups 26x26 (#01720132)**

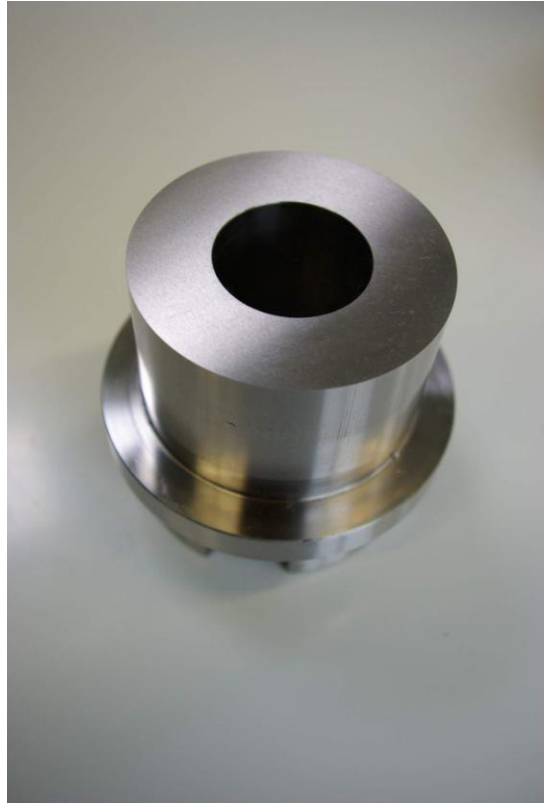
valid for **ferritic and non-ferritic** material
(material type necessary for order)

Norm: ERICHSEN

Var.	Thickness s / mm	Var.	Thickness s / mm
1	0,10	20	0,85
2	0,15	21	0,90
3	0,20	22	0,95
4	0,22	23	1,00
5	0,23	24	1,10
6	0,24	25	1,20
7	0,25	26	1,25
8	0,26	27	1,30
9	0,30	28	1,40
10	0,35	29	1,50
11	0,40	30	1,60
12	0,45	31	1,70
13	0,50	32	1,80
14	0,55	33	1,90
15	0,60	34	2,00
16	0,65	35	2,30
17	0,70	36	2,50
18	0,75	37	2,60
19	0,80	38	3,00

Selection table for blanking tools

- consists of blanking die ring (# 01380132) and blanking punch (01390132):



Blanking tool for deep-drawing cups blank cut with punch dia 33 mm (B1):

for ferritic material:

- 55 – 80 mm
- 64 mm recommended
- ISO 11531 approx. 60 mm
- Square cups 26 x 26 mm approx. 60 mm (# 04210132)

for non-ferritic material:

- DIN EN 1669 / 60 or 64 mm

Punching areas for sheet thicknesses of ferritic materials:

- 0,2 – 1,0 mm
- 1,1 – 2,5 mm

Punching areas for sheet thicknesses of non-ferritic materials:

- 0,1 – 0,59 mm
- 0,6 – 1,69 mm
- 1,7 – 3,0 mm