ERICHSEN Cupping Test
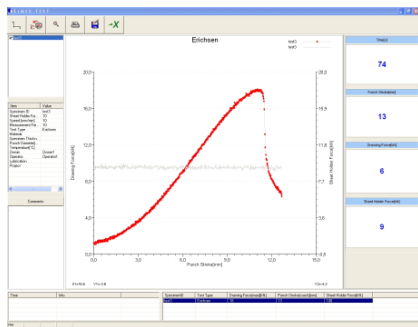

Deep-drawing Cup Test

Cupping and Deep-Drawing Cup Test Machine, Model 212

Square Cup Test

Data Recording

testing equipment for quality management

since 1910

Technical Description

ERICHSEN Cupping Test

Deep-drawing Cup Test

Electro-hydraulic Drive
Programmable Logic Control
Fully Automatic Test Sequence
Data Evaluation System

Product

Fully automatic cupping and deep-drawing cup test machine for testing the ductility of coated, ferrous and non-ferrous metals (e.g. stamping paints, lacquered, plastic coated or electroplated materials). The testing machine is provided with an electro-hydraulic drive and a maximum drawing force of 120 kN. The machine is operated via a resistive touch panel. The operation is simplified by the user-friendly menu navigation. Main and emergency Off switches are located next to the touch panel. The setting of sheet holding force and forming speed is carried out by ergonomically placed control buttons on the front of the housing.

Application

When manufacturing deep-drawn products the ingoing material is deformed in all three coordinating planes. Thereby the surface coating should not become defect to avoid subsequent corrosion. For the standard controls and proofs required for the purposes of quality assurance **Model 212** is particularly suitable to conduct cupping and deep-drawing cup tests within the sheet metal thickness range of 0.1 mm to 3.0 mm.

To intensify the tests by further special investigations, it is possible to carry out without any problem a redraw (a second deep-drawing operation conducted on the standard cup using a smaller drawing die and drawing punch).

Furthermore, the Bead Test Instrument, **Model 227**, can be used to form a bead into the cylindrical wall of a standard cup until a mechanic destruction of the coating is achieved. This is another possibility to intensify the test. The above-mentioned sheet thickness range of 0.1 mm to 3.0 mm is based on material with a tensile strength of 400 N/mm². In case of a higher/lower tensile strength the values mentioned concerning the maximum sheet thickness that can be drawn, are to be reduced/increased.

Purpose

The following reasons are important for using the Cupping and Deep-drawing Cup Test Machine, **Model 212**, for quality assurance, research and development:

• Lowering of the reject rate by concerted monitoring of the coating quality during production or in the process department.

• Immediate sorting out of lower quality arriving at the goods inwards department by means of the ERICHSEN cupping test or the deep-drawing cup test. Without special test preparations it is possible to establish, if the material supplied corresponds to the prescribed properties.

• The sturdy construction and hydraulic operation ensure a wear-resistant functioning of the machine so that high accuracy of the test results at low maintenance and working expenses is guaranteed.

Description

The machine consists of a solid housing made of high-strength steel into which the test aggregate (test cylinder with work piston, sheet holder plate and die) are integrated. All components are easily accessible from outside the machine, and thus the tools for the individual tests can be changed quickly, too. The operator's controls are well arranged on the control panel. The operating sequence of the testing machine has been designed in such a comfortable manner that cutting of the blank as well as drawing and ejecting of the cup are executed in one single operation.

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 supplied software runs under WIN 2000/XP. The system consisting of measuring transducer for drawing force /blank holder 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.)

Bead Test Instrument, Model 227,

Special Microscope with illumination for the evaluation and observation of the test procedure.

Various test tools

Technical Data

Drawing force, max.	120 kN
Blank holding force, max.	45 kN
Drawing punch stroke, approx.	60 mm
Blank holder stroke, approx.	35 mm
Blanking force, max.	200 kN
Opening for sheet insert, max. width	110 mm
Power supply	3L/N/PE AC 400 V 50 Hz, 2.2 kW

Dimensions, approx.		
	Height	1100 mm
	Width	900 mm
	Depth	800 mm

Weight net, approx.	470 kg

Order Information	
Order No.	**Product Description**
01780431	Cupping and Deep-drawing Cup Test Machine, **Model 212**

Selection table for drawing dies B1/C2 (#01370132) valid for **ferritic and non-ferritic** material (material type nessary 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 aloy** Norm: DIN EN 1669			
valid for Clearance ratio **1,15 bis 1,52**			ce ratio 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 C1 (#01410132) valid for **ferritic and non-ferritic** material (material type nessary for order) Norm: ERICHSEN				Selection table for drawing dies square cups 26x26 (#01720132) valid for **ferritic and non-ferritic** material (material type nessary for order) Norm: ERICHSEN			
Var.	Thickness s / mm	Var.	Thickness s / mm	Var.	Thickness s / mm	Var.	Thickness s / mm
1	0,076	28	0,85	1	0,10	20	0,85
2	0,100	29	0,90	2	0,15	21	0,90
3	0,127	30	0,95	3	0,20	22	0,95
4	0,13	31	1,00	4	0,22	23	1,00
5	0,14	32	1,10	5	0,23	24	1,10
6	0,15	33	1,15	6	0,24	25	1,20
7	0,18	34	1,20	7	0,25	26	1,25
8	0,20	35	1,25	8	0,26	27	1,30
9	0,21	36	1,30	9	0,30	28	1,40
10	0,23	37	1,40	10	0,35	29	1,50
11	0,24	38	1,50	11	0,40	30	1,60
12	0,25	39	1,60	12	0,45	31	1,70
13	0,26	40	1,70	13	0,50	32	1,80
14	0,27	41	1,80	14	0,55	33	1,90
15	0,28	42	1,90	15	0,60	34	2,00
16	0,30	43	2,00	16	0,65	35	2,30
17	0,32	44	2,10	17	0,70	36	2,50
18	0,35	45	2,20	18	0,75	37	2,60
19	0,40	46	2,30	19	0,80	38	3,00
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 blanking tools

- consists of blanking die ring (# 01380132) and blanking punch (01390132):
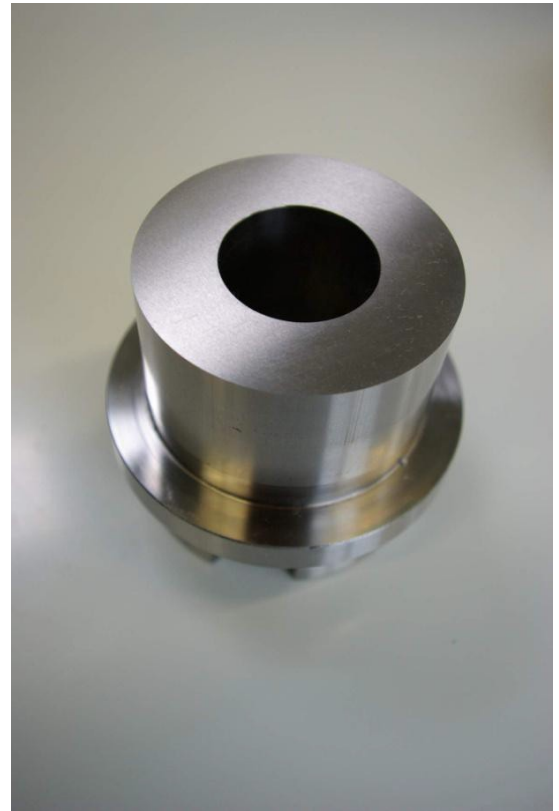
Blanking tool for deep-drawing cups blank cut with punch dia 33 mm (B1):

for ferritic material:
- 55 – 80 mm
- 64 mm recommended
- ISO 11531 approx. 60 mm
- Square cups 26 x 26 mm approx. 60 mm (# 05030132)

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

ISO 9001
BUREAU VERITAS
Certification