Testing Equipment for Construction Materials

HUMBOLDT

H-3031CL
Continuous-Load Beam Breaker

H-3031CL

The Humboldt H-3031CL Portable, Continuous-Load, Concrete Beam Breaker is a great quality control tool for contractors, DOTs and consultants for quickly and accurately determining flexural strengths of concrete using 4" x 4" x 14" test beams.

The H-3031CL incorporates a continuous, screw jack to provide a continuous application of force against the test beam. By providing a continuous force, these beam breakers comply can be used as an accurate quality control tool to determine whether curing concrete has met a specified flexural strength. In this type of application, a known flexural strength value is determined and is used as a go/no-go test parameter.

The H-3031CL beam breaker is constructed of lightweight aluminum, making it extremely portable for use at even the most remote of job sites.

Self-contained, portable concrete beam tester, which accurately and easily determines flexural strengths of 4" x 4" x 14" test beams, which are placed on rollers that are 12" apart. The hydraulically driven unit uses a center-point loading method that provides continuous readings to the break point and retains the maximum reading to eliminate losing the break-point data. The gauge will then reset to zero for repeat tests. The lightweight aluminum unit features a 8,000 lbf. x 100 lbf. The unit is calibrated by measuring the load applied on a calibrated load cell.

The factory calibration is supplied at gauge readings of 10% FS, FS and 3 readings in between. Three load cell readings are averaged at each point to establish the correction for each point.

Continuous-Load Beam Breakers

Also Available:

Humboldt also offers continuous-load beam breakers for determining flexural strengths of 6" x 6" cross-section test beams. These hydraulically driven units use a center-point loading method, which supply continuous readings up to the break and capture the maximum reading for recording. The gauge also resets to zero for repeated tests.

Lightweight aluminum unit has dual registration of modulus of rupture between 10,000 lbf. and 0–4,500 kgf. Calibration is accomplished by measuring the load applied on a calibrated load cell.
The factory calibration is supplied at gauge readings of 10% FS, FS and 3 readings in between. Three load cell readings are averaged at each point to establish the correction for each point.

These beam breakers are constructed of lightweight aluminum, making them extremely portable for use on even the most remote of job sites.

The 16" H-3030CL and the 18" H-3032CL use a single, center point loading configuration, while the 18" H-3033CL uses a three-point configuration. All models can quickly provide a pre-load pressure using the manual hand pump on the hydraulic cylinder. From there a continuous pressure can be applied using the rotating handle.

H-3030CL

Concrete Beam Molds, Heavy-Duty
Concrete Beam Molds, heavyweight, machined .375" steel. The sides of the one-piece mold hinge to the base and the ends hinge to the sides. Fastened with wing nuts. Reusable. Fast and easy to assemble and use. Easy to strip, clean, knock-down and store. Molds give accurate specimens for center or third-point loading tests.

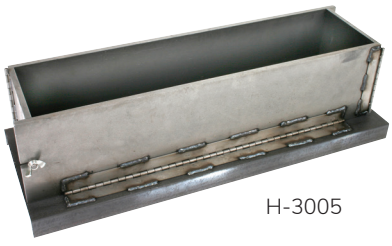
Description	Ship wt.	Part No.
6" x 6" x 21" (152 x 152 x 533mm)	54lbs (24.4kg)	H-3005
6" x 6" x 24" (152 x 152 x 610mm)	67lbs (31kg)	H-3010
6" x 6" x 30" (152 x 152 x 762mm)	70lbs (31.7kg)	H-3015
6" x 6" x 36" (152 x 152 x 914mm)	80lbs (36kg)	H-3020

Concrete Beam Mold, Plastic
Durable, lightweight copolymer plastic beam mold utilizes simple thumb screws for ease of stripping, cleaning and assembly. The lightweight design requires no tools and weighs less than one quarter of the weight of a conventional mold. Will not rust, reusable, inexpensive.

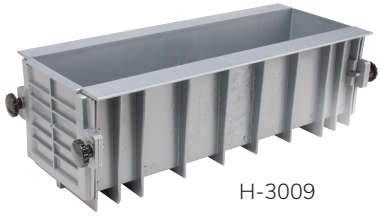
Description	Ship wt.	Part No.
6" x 6" x 21" (152 x 152 x 533mm)	9lbs (4kg)	H-3009

Concrete Beam Mold, Lightweight
Lightweight, stamped-steel, hinge-free beam mold is collapsible. Can be disassembled in to individual, interchangeable parts. Fastened with wing nuts.

Description	Ship wt.	Part No.
6" x 6" x 22" (152 x 152 x 559mm)	29.2lbs (13kg)	H-3007
4" x 4" x 14" (102 x 102 x 356mm)	20lbs (9.1kg)	H-3004


H-3005


H-3004


H-3009

Testing Equipment for Construction Materials
HUMBOLDT

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email: hmc@humboldtmfg.com

H-3030CL, H-3032CL, H-3033CL

Continuous Load Concrete Beam Testers

Introduction

These self-contained portable concrete beam testers accurately and easily determine flexural strengths of 6 x 6" cross-section test beams. By adding a micro-pump to these Beam Testers allows the user to put a continuous load pressure to the beam. Then, by using the micro-pump, the rest of the load can be applied continuously until failure. The range of the micro-pump allows it to add up to 10,000 lbf pressure. Hydraulically-driven, these Beam Breakers use a center-point loading method with continuous readings to the break. The gauge resets to zero (0) for repeat tests. These lightweight aluminum units have dual registration of modulus of rupture between 10,000 lbf. and 0–4,500 kgf. Shipping weight of each is 65 lbs. (29kg)

Product Description— H-3030CL

The Humboldt Manufacturing Co Model H-3030CL, Concrete Beam Tester, is a lightweight portable unit designed to easily determine the flexural strength of up to 6 x 6 x 30" test beams. Hydraulically driven and assisted by a micro-pump to provide a continuous and accurate load, it uses the center-point loading method. Support rollers for this model are set to a 16" distance, center-to-center.

Physical Specifications:

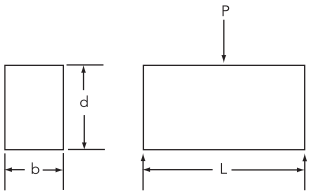
Function	Modulus of rupture of concrete beams using center point loading
Range	0 - 1,666 lbf/in^2 0 - 15,000 lbf
Shipping weight:	lb
Overall height:	"
Base dimension:	"

Theory Of Operation

The modulus of rupture[1] is defined as:

(1)

$$R = \frac{3PL}{2bd^2}$$



where:

R = modulus of rupture in lbf/in^2
b = average specimen width in inches
P = maximum applied load in lbf d = average specimen depth in inches
L = span length in inches

[1] R is actually the stress in lbf/in^2 of the outer fibers of the beam (in compression at the top, in tension at the bottom).

$$S = \frac{Mc}{I}$$

Where: S = stress at top or bottom of the beam in lbf/in^2
M = bending moment (P/2 x L/2)
c = distance from centroid to top of beam (d/2)
I = Inertia about the centroid (bd^3/12)

The most common usage of this unit will be to test 6x6" beams over a 16" span. For this geometry:

$$R = \frac{3 \times P \times 16}{2 \times 6 \times 6^2} = \frac{P}{9} \quad \text{or} \quad P = 9R \qquad (2)$$

The gauge measures in pounds force. It must be corrected for calibration error and beam dimensions.

When beam and span dimensions vary from those in equation (2), the calibration correction may be obtained from:

$$R = \frac{3PL}{2bd^2} \times (1.00 + \text{error}) \qquad (3)$$ Where P is the gauge reading

Operation[2]

1. Center the test beam on the rollers.
2. Close the Flow Control Valve on the top of the cylinder.
3. Actuate the pump in a manner to achieve a smooth rate of applied load.
4. Record the gauge reading at break.
5. Measure the beam dimensions at the section of failure.
6. Calculate the modulus of rupture using equations (2) and (1) or (3).

Example: The gauge reads 5,400 lbf at break.
This corresponds to a modulus of rupture of 5,400/9 = 600 lbf/in^2
Per the calibration, the meter error at 5,400 is +0.5%.
The corrected load is 5,427 lbf.
The beam calipers as 6.1" deep, and 5.95" wide.
The modulus of rupture is:

$$R = \frac{3 \times 5{,}427 \times 16}{2 \times 5.95 \times 6.1 \times 6.1} = 588.3 \text{ lbf/in}^2$$

Calibration

The unit is calibrated by measuring the load applied on a calibrated load cell. The factory calibration is supplied at gauge readings of 10% FS, FS and 3 readings in between. Three load cell readings are averaged at each point to establish the correction for each point.

[2]Specific operation should follow the applicable specifications.
These operation procedures are supplied as a guideline.

Testing Equipment for Construction Materials

HUMBOLDT

www.humboldtmfg.com

CONCRETE BEAM TESTER CALIBRATION REPORT

CUSTOMER:

INSP. DATE5/6/2009 TEMP.68

TESTER I.D.: B. LEATHERMAN

B. Leatherman

MODEL: H-3030 SERIAL NUMBER:376

TESTER READING	LOAD CELL READING 1	2	3	AVERAGE READING	ERROR (%+/-)
1500	1498.3	1498.3	1498.3	1498.3	-.1
4500	4505.1	4513.6	4496.6	4505.1	+.1
7500	7542.5	7559.5	7542.5	7548.2	+.6
11000	11025.5	11017.0	11017.0	11019.8	+.2
15000	14966.0	14957.5	14949.0	14957.5	-.3

CALIBRATION EQUIPMENT USED
HUMBOLDT H-4454.200 SER. #708 0-15000 LBF.
CALIBRATED BY: HUMBOLDT DATE: 2 FEB. 2009

DIRECT READING GAUGE READS POUNDS FORCE
DIVIDE BY 9 TO GET FLEXURAL PSI.

Humboldt Mfg. Co., 875 Tollgate Road, Elgin, IL 60123
P: 1.708.468.6300 F: 1.708.456.0137

Product Description— H-3032CL

The Humboldt Manufacturing Co Model H-3032CL, Concrete Beam Tester, is a lightweight portable unit designed to easily determine the flexural strength of up to 6 x 6 x 30" test beams. Hydraulically driven and assisted by a micro-pump to provide a continuous and accurate load, it uses the center-point loading method. Support rollers for this model are set to a 18" distance, center-to-center.

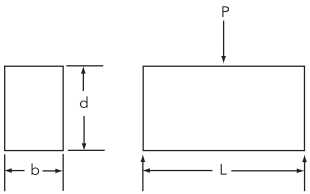
Physical Specifications:

Function	Modulus of rupture of concrete beams using center point loading
Range	0 - 1,875 lbf/in^2 0 - 15,000 lbf
Shipping weight:	lb
Overall height:	"
Base dimension:	"

Theory Of Operation

The modulus of rupture[1] is defined as:

$$R = \frac{3PL}{2bd^2} \quad (1)$$



where:

R = modulus of rupture in lbf/in^2
b = average specimen width in inches
P = maximum applied load in lbf d = average specimen depth in inches
L = span length in inches

[1] R is actually the stress in lbf/in^2 of the outer fibers of the beam (in compression at the top, in tension at the bottom).

$$S = \frac{Mc}{I}$$

Where: S = stress at top or bottom of the beam in lbf/in^2
M = bending moment (P/2 x L/2)
c = distance from centroid to top of beam (d/2)
I = Inertia about the centroid (bd^3/12)

The most common usage of this unit will be to test 6 x 6" beams over a 18" span. For this geometry:

$$R = \frac{3 \times P \times 18}{2 \times 6 \times 6^2} = \frac{P}{8} \quad \text{or} \quad P = 8R \qquad (2)$$

The gauge measures in pounds force. It must be corrected for calibration error and beam dimensions.

When beam and span dimensions vary from those in equation (2), the calibration correction may be obtained from:

$$R = \frac{3PL}{2bd^2} \times (1.00 + \text{error}) \qquad (3)$$ Where P is the gauge reading

Operation[2]

1. Center the test beam on the rollers.
2. Close the Flow Control Valve on the top of the cylinder.
3. Actuate the pump in a manner to achieve a smooth rate of applied load.
4. Record the gauge reading at break.
5. Measure the beam dimensions at the section of failure.
6. Calculate the modulus of rupture using equations (2) and (1) or (3).

Example: The gauge reads 5,400 lbf at break.
This corresponds to a modulus of rupture of 5,400/8 = 675 lbf/in^2
Per the calibration, the meter error at 5,400 is +0.5%.
The corrected load is 5,427 lbf.
The beam calipers as 6.1" deep, and 5.95" wide.
The modulus of rupture is:

$$R = \frac{3 \times 5.427 \times 18}{2 \times 5.95 \times 6.1 \times 6.1} = 661.8 \text{ lbf/in}^2$$

Calibration

The unit is calibrated by measuring the load applied on a calibrated load cell. The factory calibration is supplied at gauge readings of 10% FS, FS and 3 readings in between. Three load cell readings are averaged at each point to establish the correction for each point.

[2]Specific operation should follow the applicable specifications.
These operation procedures are supplied as a guideline.

Testing Equipment for Construction Materials

HUMBOLDT

www.humboldtmfg.com

CONCRETE BEAM TESTER CALIBRATION REPORT

CUSTOMER:

INSP. DATE:08/25/2008 TEMP.75

TESTER I.D.: B. LEATHERMAN

B. Leatherman

MODEL: H-3032 SERIAL NUMBER:370

TESTER READING	LOAD CELL READING 1	2	3	AVERAGE READING	ERROR (%+/-)
1500	1501.7	1501.7	1501.7	1501.7	+.1
4500	4494.9	4494.9	4494.9	4494.9	-.1
7500	7496.6	7496.6	7496.6	7496.6	-.05
11000	10979.6	10979.6	10979.6	10979.6	-.2
15000	15018.7	15018.7	15010.2	15015.9	+.1

CALIBRATION EQUIPMENT USED
HUMBOLDT H-4454.200 SER. #708 0-15000 LBF.
CALIBRATED BY: HUMBOLDT DATE: 18 APR. 2008

DIRECT READING GAUGE READS POUNDS FORCE
DIVIDE BY 8 TO GET FLEXURAL PSI.

Humboldt Mfg. Co., 875 Tollgate Road, Elgin, IL 60123
P: 1.708.468.6300 F: 1.708.456.0137

Product Description— H-3033CL

The Humboldt Manufacturing Co Model H-3030CL, Concrete Beam Tester, is a lightweight portable unit designed to easily determine the flexural strength of up to 6 x 6 x 30" test beams. Hydraulically driven and assisted by a micro-pump to provide a continuous and accurate load, it uses the third-point loading method. Support rollers for this model are set to a 18" distance, center-to-center.

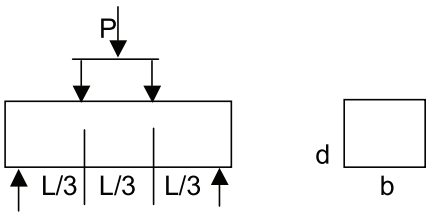
Physical Specifications:

Function	Modulus of rupture of concrete beams using third point loading
Range	0 - 1,250 lbf/in^2 (for 6 x 6”) 0 - 15,000 lbf
Shipping weight:	lb
Overall height:	"
Base dimension:	"

Theory Of Operation

The modulus of rupture[1] is defined as:

$$R = \frac{PL}{bd^2} \qquad (1)$$



where:

R = modulus of rupture in lbf/in^2
b = average specimen width in inches
P = maximum applied load in lbf d = average specimen depth in inches
L = span length in inches

[1] R is actually the stress in lbf/in^2 of the outer fibers of the beam (in compression at the top, in tension at the bottom).

$$S = \frac{Mc}{I}$$

Where: S = stress at top or bottom of the beam in lbf/in^2
M = bending moment (P/2 x L/2 – P/2xL/6)
c = distance from centroid to top of beam (d/2)
I = Inertia about the centroid (bd^3/12)

The most common usage of this unit will be to test 6 x 6" beams over a 18" span. For this geometry:

$$R = \frac{P \times 18}{6 \times 6^2} = \frac{P}{12} \quad \text{or} \quad P = 12R \qquad (2)$$

The gauge measures in pounds force. It must be corrected for calibration error and beam dimensions. See the example in the **Operation** section below.

When fracture occurs in the tension surface outside of the middle third of the span length by not more than 5% of the span length, the modulus of rupture becomes:

$$R = \frac{3Pa}{bd^2} \qquad (3)$$

Where 'a' is the average distance between the line of fracture and the nearest support on the tension surface.

Operation[2]

1. Center the test beam on the rollers.
2. Close the Flow Control Valve on the top of the cylinder.
3. Actuate the pump in a manner to achieve a smooth rate of applied load.
4. Record the gauge reading at break.
5. Measure the beam dimensions at the section of failure.
6. Calculate the modulus of rupture using equations (2) and (1) or (3).

Example: The gauge reads 5,400 lbf at break.
This corresponds to a modulus of rupture of 5,400/12 = 450 lbf/in^2
Per the calibration, the meter error at 5,400 is +0.5%.
The corrected load is 5,427 lbf.
The beam calipers as 6.1" deep, and 5.95" wide.
The modulus of rupture is:

$$R = \frac{5{,}427 \times 18}{5.95 \times 6.1 \times 6.1} = 441.2 \text{ lbf/in}^2$$

Calibration

The unit is calibrated by measuring the load applied on a calibrated load cell. The factory calibration is supplied at gauge readings of 10% FS, FS and 3 readings in between. Three load cell readings are averaged at each point to establish the correction for each point.

[2]Specific operation should follow the applicable specifications.
These operation procedures are supplied as a guideline.

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CONCRETE BEAM TESTER CALIBRATION REPORT

CUSTOMER:

INSP. DATE:2/5/2009 TEMP.68

TESTER I.D.: B. LEATHERMAN

B. Leatherman

MODEL: H-3033 SERIAL NUMBER:371

TESTER READING	LOAD CELL READING 1	2	3	AVERAGE READING	ERROR (%+/-)
1500	1498.3	1506.8	1506.8	1504.0	+.3
4500	4496.6	4496.6	4505.1	4499.4	-.01
7500	7500.0	7491.5	7508.5	7500.0	0
11000	10983.0	10983.0	10983.0	10983.0	-.2
15000	14966.0	14966.0	14966.0	14966.0	-.2

CALIBRATION EQUIPMENT USED
HUMBOLDT H-4454.200 SER. #708 0-15000 LBF.
CALIBRATED BY: HUMBOLDT DATE: 2 FEB. 2009

DIRECT READING GAUGE READS POUNDS FORCE
USE FORMULA TO GET FLEXURAL PSI.

Humboldt Mfg. Co., 875 Tollgate Road, Elgin, IL 60123
P: 1.708.468.6300 F: 1.708.456.0137

Warranty

Humboldt Mfg. Co. warrants its products to be free from defects in material or workmanship. The exclusive remedy for this warranty is Humboldt Mfg. Co., factory replacement of any part or parts of such product, for the warranty of this product please refer to Humboldt Mfg. Co. catalog on Terms and Conditions of Sale. The purchaser is responsible for the transportation charges. Humboldt Mfg. Co. shall not be responsible under this warranty if the goods have been improperly maintained, installed, operated or the goods have been altered or modified so as to adversely affect the operation, use performance or durability or so as to change their intended use. The Humboldt Mfg. Co. liability under the warranty contained in this clause is limited to the repair or replacement of defective goods and making good, defective workmanship.

Humboldt Mfg. Co.
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