

# **H-3030 CONCRETE BEAM TESTER**



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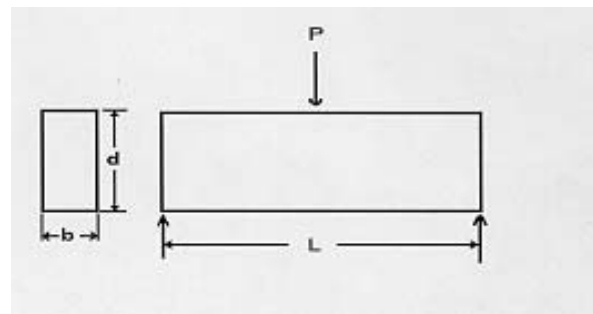


The Humboldt Manufacturing Co Model H-3030, Concrete Beam Tester, is a lightweight portable unit to easily determine the flexural strength of up to 6x6x30" test beams. Hydraulically driven, it uses the center-point loading method defined in ASTM C293 and AASHTO T177 with continuous dial gauge readings to the break and retains the maximum reading to eliminate lost readings.

### SPECIFICATIONS

Function: Modulus of rupture of concrete beams using center point loading  
Max Size: 6x6"  
Range: 0 - 1,666 lbf/in<sup>2</sup>  
0 - 15,000 lbf  
Weight: 75 lb

### THEORY OF OPERATION



The modulus of rupture<sup>1</sup> is defined as:

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

where:

R = modulus of rupture in lbf/in<sup>2</sup>  
P = maximum applied load in lbf  
L = span length in inches

b = average specimen width in inches  
d = average specimen depth in inches

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<sup>1</sup>R is actually the stress in lbf/in<sup>2</sup> 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<sup>2</sup>  
M = bending moment (P/2 x L/2)  
c = distance from centroid to top of beam (d/2)  
I = Inertia about the centroid (bd<sup>3</sup>/12)



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

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

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:

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

## OPERATION<sup>2</sup>

1. Center the test beam on the rollers.
2. Close the Flow Control Valve on the top of the cylinder. This will make the needle stay at the highest pressure achieved during the test.
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  $5,400/9 = 600 \text{ lbf/in}^2$   
 Per the calibration, the meter error at 5400 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:

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

<sup>2</sup>Specific operation should follow the applicable specifications (e.g. ASTM C293). These operation procedures are supplied as a guideline.

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.

The unit is not in full compliance with ASTM C293 since it uses a hand pump, but numerous government agencies including Illinois DOT have found it's results acceptable.

CONCRETE BEAM TESTER CALIBRATION REPORT

CUSTOMER:

INSP. DATE:	TEMP.
TESTER I.D.: B. LEATHERMAN	
MODEL: H-3030 SERIAL NUMBER:	

S  
a  
m  
p  
l  
e

TESTER READING	LOAD CELL READING			AVERAGE READING	ERROR (%+/-)
	1	2	3		
1500					
4500					
7500					
11000					
15000					

CALIBRATION EQUIPMENT USED  
 HUMBOLDT H-4454.200 SER. #708 0-15000 LBF.  
 CALIBRATED BY: HUMBOLDT DATE: 20 FEB. 2005

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

Preventative maintenance is not required.

No exploded view is available for this unit. Parts can be identified by their descriptor. Contact Humboldt Manufacturing for availability and pricing.