



Los Angeles  
Abrasion Machine



## General

Model H-3860D (Los Angeles Abrasion Machine) is designed to conform to ASTM C131, C535 and AASHTO T96. These methods cover the procedure for testing crushed rock, crushed slag, uncrushed and crushed gravel for resistance to abrasion in the Los Angeles Testing Machine with an abrasive charge. This machine can be used for determining the abrasion limits given in ASTM C33 (see table 1).

The drum is rotated by a single phase 3/4 hp, 115/220V 60/50Hz Electric Motor at 7amps. A heavy-duty speed reducer converts the motor speed to the required drum speed of 30 to 33 revolutions per minute. The machine is equipped with an adjustable digital counter that can be set to stop the machine at the required number of revolutions.

## Packing & Assembly

Each unit is shipped complete with a set of 12 charges and a collector pan. Generally the collector pan and the carton containing the charges is wire strapped to the lower cross members of this machine.

### Electrical Motor and Speed Reducer

Examine the motor carefully to make sure that it has not been damaged during shipment. Be sure that the line voltage and frequency correspond to those stamped on the nameplate. For connections, see diagram attached to the machine.

The ratio-motor gear housing is shipped with oil. Check the oil level and if necessary, be sure to lubricate in accordance with the instructions on the motor plate and included in this manual.

**NOTE:** U.S. Electrical Motors, Div. World Wide Electric Corp., Operating Instructions for the motor and for the gear head are considered part of these instructions.

### Pillow Blocks

The bearings in all Gear Pillow Blocks are pre-greased at the factory. When re-lubrication is necessary use recommended ball bearing grease of medium consistency and apply by means of an ordinary grease gun and the convenient grease fitting provided.

**DO NOT USE OIL FOR RE-LUBRICATION.** Additions of grease every three or four months is suggested unless experience proves otherwise. For normal usage, grease having a temperature operating range from 0°F to 150°F is recommended.

## Counter

The counter assembly is a combination of two parts, which are: the counter and the proximity switch. The power supply for the digital counter is 100-240VAC 50/60Hz.

Safe load of contacts:

Max. contact voltage is 250VAC

Max. contact current is 5amps

### Wiring:

The counter is powered by connecting terminal 4 and 5 on the counter to L1 and L2 in the electrical box. The STOP button of the motor in the electrical box is connected to terminal 2 of the counter. Proximity switch wiring to the counter is done by connecting the BLACK, BROWN and BLUE wires from the proximity switch to terminals 6, 8 and 9 respectively on the back of the counter.

## Settings and Operation

To set the desired rotation count, push the button with left arrows once. You will then see four digits with the last one flashing. Using buttons or select the number of rotation counts desired. If you want to change the decimal place, press the button again to move to the next digit. Push the button again to advance to the next decimal place and continue to use and buttons to select the desired number. When you are done with the rotation count selection, press to set the counter. If no button is pressed for 60 seconds after the rotation count is set, the counter will automatically set the count to the last one selected.

Press the START on the LA abrasion machine's electrical box to start the machine rotation to the set count. When the set count is reached, the LA abrasion machine will stop automatically.

In order to repeat the same set count as the last one, press RST button, located under the counter display or the "big" RESET button next to the display on the front of the counter housing. The press START on the LA abrasion machine's electrical box.

Maintenance: The counters do not require any particular attention. However, for reliable functioning of these precision instruments careful handling is absolutely necessary.

## Operation

### Machine

The Los Angeles Abrasion Testing Machine consists of a hollow steel cylinder, closed at both ends, having an inside diameter of 28" and inside length of 20". The cylinder is mounted on stub shafts attached the ends of the cylinder but not entering it and mounted in such a manner that it may be rotated about its axis in a horizontal position.

An opening in the cylinder is provided for the introduction of the test sample. The opening can be closed dust-tight with the removable cover bolted in place.

The cover is so designed as to maintain the cylindrical contour of the interior surface. The shelf is so located that the charge will not fall in the cover or come in contact with it during the test.

A removable steel shelf projecting a radial 3- ½" into the cylinder and extending its full length is mounted along one element of the interior surface of the cylinder. The shelf is of such thickness and so mounted by bolts or other approved means to be firm & rigid. The position of the shelf is such that the distance from the shelf to the opening measured along the circumference of the cylinder in the direction of rotation is not less than 50".

If the cover stops at the bottom in a difficult to reach location, jog the barrel by pushing the outer weight-plate forward then reverse and pull to jog the barrel to the desired position.

## Abrasive charges

The abrasive charges consist of cast-iron spheres or steel spheres approximately 1-7/8" in diameter and each weighing between 390g and 445g. The abrasive charge depending upon the grading of the test sample as described on page 4 shall be as follows:

<u>Grading</u>	<u>Number of Spheres</u>	<u>Weight of Charges, g.</u>
A	12	5000 ± 25
B	11	4584 ± 25
C	8	3330 ± 20
D	6	2500 ± 15

## Test Sample

The test sample shall consist of clean aggregate that has been dried in an oven at 105°C to 110°C (221°F to 230°F) substantially to constant weight and shall conform to a grading shown in Table 1. The grading used shall be the most nearly representing the aggregate furnished for the work.

**TABLE 1: Grading of Test Samples**

Sieve Size (Square Openings)		Weight of Indicated Sizes, g			
Passing	Retained On	Grading			
		A	B	C	D
37.5 mm (1 1/2")	25.0 mm (1.0")	1 250 ± 25	...	...	...
25.0 mm (1")	19.0 mm (3/4")	1 250 ± 25	...	...	...
19.0 mm (3/4")	12.5 mm (1/2")	1 250 ± 10	2 500 ± 10	...	...
12.5 mm (1/2")	9.5 mm (3/8")	1 250 ± 10	2 500 ± 10	...	...
9.5 mm (3/8")	6.3 mm (1/4")	...	...	2 500 ± 10	...
6.3 mm (1/4")	4.75 mm (No. 4)	...	...	2 500 ± 10	...
4.75 mm (No. 4)	2.36 mm (No. 8)	...	...	...	5 000 ± 10
Total		5 000 ± 10	5 000 ± 10	5 000 ± 10	5 000 ± 10

## Test Procedure

Place the test sample and the abrasive charge in the Los Angeles Abrasion Testing Machine and rotate the machine at a speed of 30 to 33 rpm for 500 revolutions. The machine shall be so driven and so counter balanced as to maintain a substantially uniform peripheral speed. After the prescribed number of revolutions, discharge the material from the machine and make a preliminary separation of the sample on a sieve coarser than the No. 12 (1.70mm). Sieve the finer portion to a No. 12 sieve in a manner conforming to section 5.2 of ASTM Method C136. Test for sieve or screen analysis of fine and coarse aggregates. Wash the material coarser than the No. 12 sieve, oven dry at 221°F to 230°F (105°C to 110°C) to substantially constant weight and weigh to the nearest 1-G.

## Calculation

The difference between the original weight and the final weight of the test sample shall be expressed as a percentage of the original weight of the test sample. This value shall be reported as the percentage of wear.

## Maintenance

Keep the assembly as clean as possible.

Lubricate necessary parts regularly. Use heavy transmission oil-40 weight, for the speed reducer (AGMA lubricant class 8 COMP). Some examples are as follows:

Oil Recommended for H-3860 Los Angeles Abrasion Machine:

- Gulf Oil      Senate 680
- Shell Oil     Omala 680
- Texaco       Honor 680
- Mobil        Extra Helica Super Cylinder Oil

## Accessories

Sieves	All sieves conform to ASTM E11
H-3940	3", 2.50", 2", 1.50", 3/4", 1/2", 3/8", 1/4"
H-3920	# 4, # 8
H-3865	Replacement set 12 abrasion charges
H-4785	Solution Balance: 20 Kilogram Cap, Sensitivity: 1 gm.
H-4325	Sieve Shaker

## Safety Warning

- Use the emergency-red-stop button in an emergency situation only.
- A safety clutch is installed between the motor and the drum. Any overload will cause it to slip. The clutch is adjusted at the factory and should not operate in a "slipping" condition for any extended period.
- Recommendation: Build a protective guard railing around the unit or a cover over the machine to prevent unauthorized use.

**CAUTION:** Keep hands, clothing and other objects away from moving parts when the machine is in operation.



## 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.

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