

**FIRE ENGINE TESTS
AND FIRE
STREAM TABLES**

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Fire Engine Tests and Fire Stream Tables by Various

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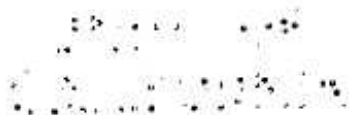
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VARIOUS

**FIRE ENGINE TESTS
AND FIRE
STREAM TABLES**

FIRE ENGINE TESTS
AND
FIRE STREAM TABLES



NATIONAL BOARD OF FIRE UNDERWRITERS
**
New York

PREFACE.

This pamphlet has been prepared for the purpose of assisting fire department officials and others who may wish to determine the condition of fire engines. It may also be of service in testing the capacity of new engines with a view to their acceptance by a city.

Tests similar to those outlined herein have been adopted by several fire departments and are being made by our engineers in their investigation of cities throughout the country, so that by corresponding with this Board, the location of the nearest field party may be ascertained and if desired, an opportunity afforded to observe such tests.

The appended fire stream tables, on pages 26 to 47, are based on tests of rubber-lined fire hose made in October, 1909, by our engineers, with the assistance of the New York Fire Department and the co-operation of the Department of Water Supply of New York City. These tables may also be used to find the approximate amount of water used at a fire, if engineers will observe from time to time the water pressure carried and the length of time at work. With an approximate average of the water pressure at each engine, the amount of water delivered per minute can be found for each line if the size of nozzle and length of hose is also known. Copies of this pamphlet will be sent to such captains of companies and engineers of steamers as would use them in keeping accurate records of the performance of their engine at fires.

NATIONAL BOARD OF FIRE UNDERWRITERS
COMMITTEE ON FIRE PREVENTION,
135 William Street,
New York.

March, 1910.

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PRACTICAL TESTS FOR FIRE ENGINES.

It is the purpose of this manual to set forth convenient and practical methods of making fire engine tests which will show the physical condition of engines, their capacity for delivering water at a reasonable pressure and the ability of the operating crews. The method described has been in use for a number of years and has been found practical, exact and of great value. Although methods similar to that described below are in use in some departments, the character of tests made in many cities, and especially those for acceptance, are usually more spectacular than exact. The throwing of a stream over a church spire, city hall or court house does not necessarily show that the engine is capable of delivering its full rated capacity at a proper working pressure.

Investigation has shown that where regular and systematic tests of engines are not made, even in well managed fire departments, defects often exist which may continue unsuspected for considerable periods and become manifest under the stress of a large fire, where the engine is called upon to deliver its full capacity under suitable working pressures. Such tests will bring to light numerous defects, as, for example, improper setting of steam valves, broken or worn pump valves, broken, weak or displaced valve springs, loose or tight bearings, worn or broken pump plungers, poor or defective condition of the boiler and poor quality of the coal supplied for engine fuel. Furthermore, regular tests are a most valuable drill for engine crews, for in only a few departments do they receive sufficient training in operating engines to capacity. The breakdown of an engine at a fire or the inability of the crew to operate it to capacity may be the direct cause of confusion and the needless loss of property and perhaps of life, to the discredit of the department.

Contracts for new fire engines usually contain guarantees that the engine will deliver a certain quantity of water, but often do not specify the pressure at which it is to be delivered, nor provide for any definite tests which will

accurately determine whether the engine has fulfilled the guarantee; or, in other words, if the department is getting what it is paying for. In several cities, engines are required to fill large measured tanks in a specified time, but this is a cumbersome method at best, and such tanks are frequently unavailable; this usually gives no definite results as to pressure obtained and power developed.

A practical test should show, with fair accuracy, the condition of both water and steam ends of pumps and the condition of the boiler; determine the amount of water which the engine will pump at a reasonable working pressure, such as would be required when operating at a large fire; demonstrate the ability of the engine to draft water, whether the pumps and waterways are tight under high pressures and steam valves are properly set, and whether the coal used is quick steaming and free from objectionable impurities. In addition, the test should be of such a character as to approach the working condition at a serious fire where the full capacity of the engine would be required, and at the same time be easily understood. The following tests bring out all of these points.

The displacement test indicates very closely the actual condition of the pumps as a whole and, in conjunction with the high pressure and valve tests, the condition of the plungers, pump valves, packing, etc. The high pressure test, in connection with the results obtained from the capacity test, indicates the setting of steam valves and condition of steam cylinders. The capacity test shows the steaming quality of the boiler under heavy draft and the ability of the engine to make sufficient speed to develop its capacity when working against a reasonable water pressure. If the test is made from a cistern or reservoir, it will show the ability of the engine to draft. If made from a hydrant, the percentage of slip obtained will indicate this feature as well, as an engine showing less than 7 per cent. slip may be depended upon to take suction satisfactorily. Incidentally, the test also shows the ability of the engine crew in operating and stoking the engine.

Any machine, when new, should be capable of greater work than after several years of service; for this reason, a new engine should be given an acceptance test at least as

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PLATE I.
APPARATUS FOR TESTING
FIBRE ENGINE.

