

SOME
GAS ENGINE
TESTS.

Of Interest to
Power Users

COLONIAL ENGINEERING
COMPANY, LIMITED
222 ST. JAMES STREET
MONTREAL

Some Gas Engine Tests.



ACTUAL RESULTS obtained with the famous Hornsby-Stockport Suction Gas Engines in the cost of producing Light and Power have established their standing beyond all question.

A 200 horse power municipal lighting plant installed in Chatham, Ont., was tested by K. L. Aitken, City Electrical expert for Toronto, and showed the following remarkable results.

Each engine was guaranteed to develop 96 maximum brake horse power when using anthracite pea coal for fuel. On this guarantee the engines developed 100 H.P. and could have delivered 5 to 10 per cent. more power.

Each engine was guaranteed to develop 105 maximum brake horse power when running on natural gas (the plant being arranged to run either on anthracite coal or natural gas) and on this guarantee the engines developed 125 H.P. each — or 19 per cent. more than guaranteed.

The engines were guaranteed to produce a brake horse power on one pound of anthracite pea coal. This guarantee was met with 92 one-hundredths of a pound — or 8 per cent. better than guaranteed.

Mr. Aitken said in his report "The engines show every evidence of proper design, good material and good workmanship," and

concludes his report with "I believe, and will most unhesitatingly say, that a better and more suitable equipment has been furnished than contemplated in the agreement. The guarantees have all been exceeded." This plant was accepted and paid for, by unanimous vote of Chatham City Council.

A 200 horse power equipment was installed in the new factory of Ames-Holden Limited (Montreal) and careful readings taken from their switchboard for a period of one week showed the following results:

The engines were guaranteed to produce power at \$19.25 per year (3,000 hours) per horse power, at full load, or, if measured electrically at the switchboard, at one cent per Kilowatt hour, including all operating costs, half time of engineer and seven per cent. on capital outlay to cover interest and maintenance.

The engines met these guarantees with a horse power cost of only \$16.50, or 14 per cent. better than the guarantee, and a Kilowatt cost of 94 one-hundredths of a cent or 6 per cent. better than the guarantee.

A 100 horse power Hornsby-Stockport suction gas engine equipment was installed for the Empire Manufacturing Co., London, Ont., and has reduced their total cost of power from \$50.00 per annum per horse power to less than \$20.00.

The same results have been obtained with similar installations for Frame & Hay Fence Co., Stratford, Ont.; Queen City Printing Ink Co., Toronto, Ont.; Dominion Brewery,

Toronto, Ont.; Vegreville Electric Light Co., Vegreville, Alberta; Essex Roller Mills, Essex, Ont., and Megantic Electric Light Co., Lake Megantic, Que.

Recently a 12 days test was run on a Hornsby-Stockport gas engine of 190 H.P. at the Itchell Pumping Station, Crondall, England. During this test the average coal consumption per brake horse power was only 79 one-hundredths of a pound.

On January 12th last, Wm. Robinson, Professor of Engineering at University College (Engineering Department), Nottingham England, reported test on a 100 H.P. Hornsby-Stockport suction gas engine with the result of only 72 one-hundredths of a pound of coal per brake horse power hour, and closes his report with "This is remarkably low and one of the best results obtained for suction gas plants, as far as I am aware. The cost of fuel in this plant was only 5 to 7 one-hundredths of a penny (equal to 1 tenth to 14 one-hundredths of a cent, or a fuel cost of only \$3.00 per year per brake horse power.)

"The results obtained on a small engine of 22 horse power were extremely good; the thermal efficiency being remarkably high for so small an engine. These suction plants (Hornsby-Stockport) are simple and easy to work, requiring little labor and attention, and are most economical in fuel consumption."

Professor Robinson, at the same time,

made a test on a Hornsby-Stockport single cylinder horizontal oil engine of 32 B.H.P., showing the remarkable economy of only 59 one-hundredths of a pint of fuel oil, consumed per brake horse power hour. Oil used was of specific gravity .825 and a heat value of 14,850 B.T.U. per pound and costs approximately 6 cents per gallon. In other words the total fuel cost of operating this little engine at say 30 H.P. for ten hours would be only \$1.32.

For a gasoline engine developing 30 H.P. for ten hours, the cost for fuel would be not less than \$7.00 or over five times as much.

His report on this test closes by saying "The low working pressure, together with simplicity and substantial design, admirable smoothness and steadiness of running observed in this engine are all-important factors for ensuring durability and little wear of working parts. The performance of the engine during the trial was entirely satisfactory."

The tests made by Prof. Robinson in England were made with Welsh anthracite pea coal which will run about 14,800 heat units per pound. The Pennsylvania anthracite pea obtainable in the Canadian market will run about 13,500 heat units per pound. It will be seen, however, that inasmuch as the English tests on this equipment, made with Welsh coal, showed an economy of 79 one-hundredths of a pound, it leaves an ample margin (21 per cent) with which to

allow for the difference in heat value of the two coals. For example, the test at Chatham was made on coal which ran only 12,750 heat units per pound and showed a net result without making any allowance for the difference in fuels of 1 and 18 one-hundredths of a pound per brake horse power hour. After making the corrections, however, the actual showing in Chatham was 92 one-hundredths of a pound of coal per brake horse power hour.

The average steam engine coal consumption will run from 3 1-2 to 7 pounds of coal per H.P. hour, or 3 1-2 to 7 times as much coal in order to produce a corresponding horse power output.

It, therefore, resolves itself to fuel cost, as compared with steam engines, and total cost of power as compared with current purchased from the outside. As against steam engines it is safe to say that the Hornsby-Stockport suction gas engine in units from 10 to 500 H.P. each, or of pressure producer type up to 2,000 H.P. each, can produce power, including all operating costs and fixed charges, for 50 per cent. less than the best steam engine practice and from 25 to 50 per cent. less than for current purchased from the outside.