January 1920

Test 001: Waterloo Boy N

Tractor Museum

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UNIVERSITY OF NEBRASKA
AGRICULTURAL ENGINEERING DEPARTMENT
UNIVERSITY FARM, LINCOLN

Report of Official Tractor Test No. 1

Dates of test: Mar. 31 to April 2, 1920.

Name, model and rating of tractor: Waterloo Boy, Model "N" 12-25 H.P.

Serial No. Engine: 19851

Manufacturer: Waterloo Gasoline Engine Co., Waterloo, Iowa.

Tractor equipment used: Dixie #246 Max. Shoebler Model D Carburetor.

Style and dimensions of wheel lugs: Angle 21/" x 21/" x 5/16 -- 16" long.

Brake Horse Power Tests

<table>
<thead>
<tr>
<th>Horse Power Developed</th>
<th>Crank Shaft Speed R.P.M.</th>
<th>Length of Test Min.</th>
<th>Fuel Consumption</th>
<th>Water Consumption Gallons per Hour</th>
<th>Horse Power Hours per Gallon</th>
<th>Water Consumption Total</th>
<th>Temperature of Cooling Fluid Deg. F.</th>
<th>Temperature of Atmosphere Deg. F.</th>
<th>Humidity %</th>
<th>Barometric Pressure Inches</th>
<th>Mercury</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATED LOAD TEST 1</td>
<td>25.51 771 120</td>
<td></td>
<td>Kero 3.28 7.78 x</td>
<td>x 0.46 177.2 61.9 36</td>
<td>28.5</td>
<td>Belt slippage 1.64%</td>
<td>Radiator partly covered.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VARYING LOAD TEST 2</td>
<td>25.33 744 10</td>
<td></td>
<td>Kero n</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25.99 713 10</td>
<td></td>
<td>Kero n</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.31 374 10</td>
<td></td>
<td>Kero n</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12.31 739 10</td>
<td></td>
<td>Kero n</td>
<td>n</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16.25 732 10</td>
<td></td>
<td>Kero n</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.88 768 60</td>
<td></td>
<td>Kero n</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aver.</td>
<td>25.97 724 60</td>
<td></td>
<td>Kero 3.80 5.83 x</td>
<td>x 0.83 178.4 60.7 50</td>
<td>23.4</td>
<td>Belt slippage 1.38%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAXIMUM LOAD TEST 3</td>
<td>25.97 724 60</td>
<td></td>
<td>Kero 3.80 5.83 x</td>
<td>x 0.83 178.4 60.7 50</td>
<td>23.4</td>
<td>Belt slippage 1.38%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HALF LOAD TEST</td>
<td>15.02 903 60</td>
<td></td>
<td>Kero 2.40 6.25</td>
<td></td>
<td>175.7 64.4 50 23.4</td>
<td>Belt slippage 0.84%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Taken in discharge line from engine.

1. In the rated load test, with load constant, the speed increased from 788 at the beginning of the test to 794 at the end of 1 Hr.

Remarks: 1. A slight change in governor adjustment was made after which the slowest speed was 748 and the fastest speed was 774 r.p.m.

2. It was necessary to shut off water feed to fuel mixture for 0, 1/2 and 1 loads in the varying load test.

3. In the maximum load test the governor was set the same as in the rated load test, which gave nearly, but not quite full opening of the governor valve at rated speed.

x. The water for radiator and fuel mixture could not be measured separately.
# Report of Official Tractor Test No. 1

## Drawbar Horse Power Tests

<table>
<thead>
<tr>
<th>Horse Power Developed</th>
<th>Draw Bar Pull (Pounds)</th>
<th>Speed Miles per Hour</th>
<th>Crank Shaft Speed (R. P. M.)</th>
<th>Slippage of Drive Wheels</th>
<th>Fuel Consumption</th>
<th>Water Used per Hour Gallons</th>
<th>Horse Power Hours per Gallon</th>
<th>Temperature of Cooling Fluid (Deg. F.)</th>
<th>Temperature of Atmosphere (Deg. F.)</th>
<th>Average Humidity %</th>
<th>Barometric Pressure (Inches Mercury)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RATED LOAD TEST. TEN HOURS</strong></td>
<td>10 Hours, 0 minutes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>12.10</td>
<td>1982</td>
<td>2.29</td>
<td>778.5</td>
<td>11.84</td>
<td>kero.</td>
<td>2.858</td>
<td>4.23</td>
<td>0.19</td>
<td>160.6</td>
<td>49</td>
<td>60</td>
</tr>
<tr>
<td>Radiator partly covered 8:20 to 1:30 and again 6:00 to 7:42.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>MAXIMUM LOAD TEST (98.2 ft)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.98</td>
<td>2900</td>
<td>2.07</td>
<td>746</td>
<td>17.0</td>
<td>kero.</td>
<td>No record</td>
<td>No record</td>
<td>154</td>
<td>50</td>
<td>61</td>
<td>28.8</td>
</tr>
</tbody>
</table>

*Taken in discharge line from engine.*

**Remarks**

In computing slippage, the circumference of drive wheels was taken at points of lugs.

Kerosene used for this test weighed 6.71 lbs per gal.

Drawbar tests were made with tractor on low gear.

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**Oil Consumption:**

During the complete test consisting of about 14 hours running the following oil was used:

- For the engine, $3\frac{3}{8}$ gallons of MobilOil #1
- For the transmission, None added during test. None used on final drive gear.
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Miscellaneous Tests:

At the beginning of the limbering up run the oil was drained from the crank case and 4-1/2 qts. of fresh oil put in. At the end of the limbering up run 5 qts. of oil was drained from the crank case, indicating that some fuel was passing the pistons unburned during this test.

Repairs and Adjustments. Endurance:

The valve tappet rods were adjusted on April 2, 1920 at the beginning of the rated load brake test. The tractor was in good condition at the close of this test. There was no evidence of undue wear in any part nor of any weakness which might call for early repairs.


Engine: Twin cylinder, opposed cranks, horizontal, valve-in-head. Bore 6-1/2", stroke 7", rated speed 750 r.p.m.

Chassis: Four wheel. Rated speeds: low gear 2.34 mi. per hr.
high gear 3.02 mi. per hr.

Total weight 6123 lbs.

General Remarks:

The governor on this tractor did not give close regulation of the speed even with the load constant and on varying load the speed regulation was erratic. We do not consider this to be so serious a defect as to disqualify the tractor.

In the advertising literature submitted with the application for test of this tractor we find the following statement regarding the horse power capacity: "It has ample reserve power for prompt utility when needed". We do not approve this statement for the reason that it is indefinite and therefore likely to be misleading.

We also find in this advertising literature some claims and statements which cannot be directly compared with the results of this test as reported above. It is our opinion that none of these statements or claims are unreasonable or excessive except the following:

Page 2. "Drive internal gear, most efficient type." 
"Air taken from high level, insuring no dust."

Page 5. "Air stack brings air to the carburetor from a high level -- no dust."

We, the undersigned, certify that above is a true and correct report of official tractor test No. 1.

Claude K. Shedd
Engineer-in-Charge

Oscar W. Sjoosen
E. B. Hendrick

Board of Tractor Test Engineers.