January 1955

Test 567: John Deere 80 Diesel

Tractor Test Museum
University of Nebraska

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BELT HORSEPOWER TESTS

<table>
<thead>
<tr>
<th>Hp</th>
<th>Crankshaft speed rpm</th>
<th>Fuel Consumption</th>
<th>Temp Deg F</th>
<th>Barometer inches of mercury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests B &amp; C—100% Maximum Load—Two Hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65.33</td>
<td>1125</td>
<td>3.717</td>
<td>17.58</td>
<td>0.399</td>
</tr>
<tr>
<td>TEST D—Rated Load—One Hour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57.52</td>
<td>1126</td>
<td>3.225</td>
<td>17.84</td>
<td>0.394</td>
</tr>
<tr>
<td>Test E—Varying Load—Two Hours (20 minute runs; last line average)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57.60</td>
<td>1126</td>
<td>3.231</td>
<td>17.88</td>
<td>0.394</td>
</tr>
<tr>
<td>3.05</td>
<td>1172</td>
<td>2.013</td>
<td>14.98</td>
<td>0.469</td>
</tr>
<tr>
<td>56.38</td>
<td>1075</td>
<td>3.761</td>
<td>17.38</td>
<td>0.404</td>
</tr>
<tr>
<td>15.44</td>
<td>1200</td>
<td>1.457</td>
<td>10.60</td>
<td>0.663</td>
</tr>
<tr>
<td>44.56</td>
<td>1158</td>
<td>2.611</td>
<td>12.07</td>
<td>0.411</td>
</tr>
<tr>
<td>35.93</td>
<td>1157</td>
<td>2.347</td>
<td>15.21</td>
<td>0.459</td>
</tr>
</tbody>
</table>

TORQUE (At Dynamometer)

<table>
<thead>
<tr>
<th>Hp</th>
<th>Draw bar pull lb</th>
<th>Draw bar pull mph</th>
<th>Crankshaft speed rpm</th>
<th>Fuel Consumption</th>
<th>Water used gal per hr</th>
<th>Temp Deg F</th>
<th>Barometer inches of mercury</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEST H—Rated Load—Ten Hours—3rd Gear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46.83</td>
<td>9779</td>
<td>4.41</td>
<td>1125</td>
<td>6.19</td>
<td>2.934</td>
<td>15.96</td>
<td>0.440</td>
</tr>
<tr>
<td>TEST F &amp; G—100% Maximum Load</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40.58</td>
<td>7394</td>
<td>2.06</td>
<td>1126</td>
<td>14.17</td>
<td>1st gear (part throttle)</td>
<td>135</td>
<td>55</td>
</tr>
<tr>
<td>57.25</td>
<td>6587</td>
<td>3.26</td>
<td>1124</td>
<td>12.28</td>
<td>2nd gear</td>
<td>150</td>
<td>50</td>
</tr>
<tr>
<td>60.04</td>
<td>5161</td>
<td>4.36</td>
<td>1129</td>
<td>7.60</td>
<td>3rd gear</td>
<td>154</td>
<td>48</td>
</tr>
<tr>
<td>60.26</td>
<td>4412</td>
<td>5.12</td>
<td>1124</td>
<td>7.05</td>
<td>4th gear</td>
<td>149</td>
<td>52</td>
</tr>
<tr>
<td>56.36</td>
<td>3416</td>
<td>6.63</td>
<td>1123</td>
<td>5.36</td>
<td>5th gear</td>
<td>148</td>
<td>56</td>
</tr>
<tr>
<td>56.38</td>
<td>1708</td>
<td>12.38</td>
<td>1133</td>
<td>2.85</td>
<td>6th gear</td>
<td>152</td>
<td>55</td>
</tr>
<tr>
<td>TEST J—Operating Maximum Load</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57.38</td>
<td>5414</td>
<td>4.19</td>
<td>1128</td>
<td>12.80</td>
<td>3rd gear</td>
<td>148</td>
<td>47</td>
</tr>
<tr>
<td>TEST K—Operating Maximum Load</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50.07</td>
<td>4899</td>
<td>3.83</td>
<td>1130</td>
<td>15.49</td>
<td>3rd gear (part throttle)</td>
<td>144</td>
<td>45</td>
</tr>
</tbody>
</table>

TIREs, WHEELS AND WEIGHT

<table>
<thead>
<tr>
<th>Tests F, G &amp; H</th>
<th>Test J</th>
<th>Test K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear wheels Type</td>
<td>Liquid ballast</td>
<td>Cast iron</td>
</tr>
<tr>
<td>Cast iron</td>
<td>360 lb each</td>
<td>Cast iron</td>
</tr>
<tr>
<td>Added cast iron</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>No. and size</td>
<td>Ply</td>
<td>Air pressure</td>
</tr>
<tr>
<td>Two 15-34</td>
<td>6</td>
<td>16 lb</td>
</tr>
<tr>
<td>Air pressure</td>
<td>None</td>
<td>Pressed steel</td>
</tr>
<tr>
<td>Type</td>
<td>Liquid ballast</td>
<td>Pressed steel</td>
</tr>
<tr>
<td>Pressed steel</td>
<td>None</td>
<td>Pressed steel</td>
</tr>
<tr>
<td>Added cast iron</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Front tires Type</td>
<td>Liquid ballast</td>
<td>None</td>
</tr>
<tr>
<td>Two 7.50-18</td>
<td>4</td>
<td>28 lb</td>
</tr>
<tr>
<td>Ply</td>
<td>4</td>
<td>28 lb</td>
</tr>
<tr>
<td>Air pressure</td>
<td>28 lb</td>
<td>28 lb</td>
</tr>
<tr>
<td>Height of drawbar</td>
<td>19 1/2 inches</td>
<td>21 inches</td>
</tr>
<tr>
<td>Static weight</td>
<td>Rear end</td>
<td>Front end</td>
</tr>
<tr>
<td>8540 lb</td>
<td>8540 lb</td>
<td>2770 lb</td>
</tr>
<tr>
<td>Total weight as tested with operator</td>
<td>11485 lb</td>
<td>8511 lb</td>
</tr>
</tbody>
</table>

HORSEPOWER SUMMARY

<table>
<thead>
<tr>
<th>Drawbar Belt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sea level (calculated) maximum horsepower (based on 60° F. and 29.92&quot; Hg)</td>
</tr>
<tr>
<td>2. Observed maximum horsepower (tests F and B)</td>
</tr>
<tr>
<td>3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (formerly ASAE and SAE ratings)</td>
</tr>
</tbody>
</table>

We, the undersigned, certify that this is a true and correct report of official tractor test No. 567.

L. F. Larson
Engineer-In-Charge

L. W. Hurlbut
G. W. Steinbruegge
J. J. Sulek

Department of Agricultural Engineering
University of Nebraska College of Agriculture
W. V. Lambert, Director, Lincoln, Nebraska

The Experiment Station
University of Nebraska College of Agriculture
W. V. Lambert, Director, Lincoln, Nebraska

NEBRASKA TRACTOR TEST NO. 567

JOHN DEERE 80 DIESEL

FUEL, OIL and TIME Diesel Fuel Cetane No. 50 (F90, 30% Oil, 10% Water)

CHASSIS Type Standard Serial No. 8000002 Tread width rear 64" or 68" front 56 1/2" Wheel base 85 1/2" Hydraulic control system direct engine drive with automatic lever Advertised speeds mph first 2 1/2 second 3 1/2 third 4 fourth 5 3/4 sixth 6 with 12½ reverse 1 2 3 4 Belt pulley diam. 127/32" face 9" rpm 116.32 Belt speed 3599 rpm 0.399 0.00 158 53

ENGINE Make John Deere Type 4 cylinder horizontal Serial No. 8000002 Cylinders mounted crosswise Head 1 Lubrication pressure Belt rpm 127/32" face 9" rpm 0.399 0.00 158 53

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data and without allowances, additions or deductions. Tests B and F were made with fuel pump set to develop approximately 65 observed maximum belt horsepower and data from these tests were used in determining the horsepower to be developed in tests D and H, respectively. Tests C, D, G, H, J, and K were made with the same setting.

STARTING ENGINE Make John Deere Type 4 cylinder "V" Bore and stroke 2 5/8 x 8" Belt pulley diam. 127/32" face 9" rpm 0.399 0.00 158 53 Ignition battery, 6 volt battery.

STARTING ENGINE Make John Deere Type 4 cylinder "V" Bore and stroke 2 5/8 x 8" Belt pulley diam. 127/32" face 9" rpm 0.399 0.00 158 53 Ignition battery, 6 volt battery.

starting engine

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data and without allowances, additions or deductions. Tests B and F were made with fuel pump set to develop approximately 65 observed maximum belt horsepower and data from these tests were used in determining the horsepower to be developed in tests D and H, respectively. Tests C, D, G, H, J, and K were made with the same setting.

STARTING ENGINE Make John Deere Type 4 cylinder "V" Bore and stroke 2 5/8 x 8" Belt pulley diam. 127/32" face 9" rpm 0.399 0.00 158 53 Ignition battery, 6 volt battery.
TEST A: The manufacturer's representative operates the tractor for a minimum of 12 hours using light to heavy drawbar loads in each gear. This serves as a period for limber up, general observation and adjustments. Adjustments that are permissible include valve tappet clearance, breaker point gap, spark plug gaps, clutch and others of a similar nature. No new parts or accessories can be installed without having mention made of it in the report. No data are recorded during this preliminary run except the time that the engine is operated.

BELT HORSEPOWER TESTS

TEST B: The throttle valve is held wide open and the belt load on the dynamometer is adjusted so that the engine is at the rated speed recommended by the manufacturer. Carburetor, ignition timing and manifold adjustments are all set for maximum engine power. This test is designed to determine maximum belt horsepower of the tractor at rated speed and to measure fuel consumption at the maximum power on the belt.

TEST C: For tractors with carburetors the best fuel economy does not always occur when the engine develops maximum power at rated speed. Test C is intended to allow the manufacturer's representative to select a more economical fuel setting even though there is a slight loss of power. This more practical carburetor setting is used in all later tests except test F. The throttle valve is held wide open and load adjusted to give rated rpm. Tests B and C are the same for diesel tractors, which have an altogether different fuel system.

TEST D: The throttle control lever is set so that the governor will maintain rated engine speed when rated load is applied. Rated load is 85% of 100% maximum, as obtained in test B, corrected to standard conditions. This rating is somewhat less than the maximum belt horsepower in order that the operator may have a certain amount of reserve.

TEST F: A drawbar test, the results of which are used to determine the rated drawbar horsepower in test H. The carburetor is set to develop maximum power as in test B. The rated gear recommended by manufacturer as plow gear is used in this test. The drawbar load is adjusted to give rated engine speed.

TEST G: Maximum drawbar horsepower is determined in each gear when the carburetor is set for fuel economy as in test C. The throttle valve is held wide open and the load is applied so that the engine runs at rated engine speed. When operating in low gear it is not uncommon for the tractor to develop less drawbar horsepower than in rated gear because of excessive wheel slippage. When excessive wheel slippage occurs the load is reduced until slippage approaches 16%. When the load is reduced it is necessary to operate the tractor engine at part throttle and control engine speed by governor action.

TEST H: Intended to test the ability of the tractor to run continuously for 10 hours at rated drawbar horsepower and to determine the fuel consumption during that time. Rated drawbar horsepower is 75% of 100%, maximum drawbar horsepower (Test F), corrected to standard conditions.

TEST J: The tractor is operated in rated gear with all added weight removed. This test shows the effect of the removal of added weight on the performance of the tractor when compared with test G. Removal of wheel weights generally increases wheel slippage and decreases drawbar horsepower.

TEST K: Similar to test J except that the smallest tires and lightest wheels offered by the manufacturer are used.

DRAWBAR HORSEPOWER TESTS

In all drawbar tests the pull exerted by the tractor is transmitted by a hydraulic pressure cylinder to a recording instrument in the test car. All tests are made on the same dirt test course which is maintained by grading, sprinkling and rolling so that it remains very nearly the same throughout the season. The same tires, wheels and weights are used for all tests except J and K.