5-13-1968

Test 974: Minneapolis-Moline G1000 Vista (Diesel)

Tractor Museum

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### NEBRASKA TRACTOR TEST 974 – MINNEAPOLIS-MOLINE G1000 VISTA DIESEL

#### POWER TAKE-OFF PERFORMANCE

<table>
<thead>
<tr>
<th>Hp</th>
<th>Crankshaft speed rpm</th>
<th>Fuel Consumption</th>
<th>Temperature Degrees F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Gal per hr</td>
<td>Lb per hp-hr</td>
</tr>
<tr>
<td>----</td>
<td>----------------------</td>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>111.00</td>
<td>1800</td>
<td>8.000</td>
<td>0.502</td>
</tr>
</tbody>
</table>

#### VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

<table>
<thead>
<tr>
<th>Slips of drivers</th>
<th>Crankshaft rpm</th>
<th>Horsepower</th>
<th>Pounds pull</th>
<th>Miles</th>
<th>Temp. degrees F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.50</td>
<td>1902</td>
<td>7.089</td>
<td>0.496</td>
<td>14.04</td>
<td>175</td>
</tr>
<tr>
<td>0.60</td>
<td>1958</td>
<td>2.062</td>
<td>7.71</td>
<td>2.22</td>
<td>148.7</td>
</tr>
<tr>
<td>0.60</td>
<td>1953</td>
<td>4.399</td>
<td>0.606</td>
<td>11.50</td>
<td>172</td>
</tr>
<tr>
<td>0.75</td>
<td>1926</td>
<td>5.647</td>
<td>0.320</td>
<td>13.99</td>
<td>174</td>
</tr>
<tr>
<td>0.80</td>
<td>1929</td>
<td>3.207</td>
<td>0.880</td>
<td>7.92</td>
<td>168</td>
</tr>
</tbody>
</table>

#### MAXIMUM POWER AND FUEL CONSUMPTION

<table>
<thead>
<tr>
<th>TIRES, BALLAST and WEIGHT</th>
</tr>
</thead>
</table>

- **Height of drawbar**:
  - 17 inches

- **Static weight with operator—Rear**:
  - Rear: 14910 lb
  - Front: 3455 lb

- **Total**: 18595 lb

**DRAWDOWN PERFORMANCE**

| Hp | Drawbar pull miles per hr | Speed  
 per hr | Crankshaft rpm | Slip of drivers | Fuel Consumption | Temp. degrees F |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gal per hr</td>
<td>Lb per hp-hr</td>
</tr>
<tr>
<td>88.48</td>
<td>14443</td>
<td>2.22</td>
<td>1894</td>
<td>14.87</td>
<td>1st Gear (1st AT)</td>
<td>162</td>
</tr>
<tr>
<td>99.94</td>
<td>11267</td>
<td>3.33</td>
<td>1795</td>
<td>7.71</td>
<td>2nd Gear (2nd DD)</td>
<td>165</td>
</tr>
<tr>
<td>98.94</td>
<td>10563</td>
<td>3.51</td>
<td>1799</td>
<td>7.42</td>
<td>3rd Gear (2nd DD)</td>
<td>167</td>
</tr>
<tr>
<td>99.97</td>
<td>7816</td>
<td>4.80</td>
<td>1801</td>
<td>5.02</td>
<td>4th Gear (3rd AT)</td>
<td>169</td>
</tr>
<tr>
<td>100.97</td>
<td>7182</td>
<td>5.27</td>
<td>1798</td>
<td>4.64</td>
<td>5th Gear (2nd DD)</td>
<td>168</td>
</tr>
<tr>
<td>100.19</td>
<td>6351</td>
<td>5.92</td>
<td>1801</td>
<td>3.93</td>
<td>6th Gear (4th AT)</td>
<td>167</td>
</tr>
<tr>
<td>98.88</td>
<td>5204</td>
<td>7.13</td>
<td>1799</td>
<td>3.38</td>
<td>7th Gear (3rd DD)</td>
<td>166</td>
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<tr>
<td>97.57</td>
<td>4176</td>
<td>8.76</td>
<td>1801</td>
<td>2.50</td>
<td>8th Gear (4th DD)</td>
<td>168</td>
</tr>
<tr>
<td>90.69</td>
<td>2511</td>
<td>13.54</td>
<td>1801</td>
<td>1.68</td>
<td>9th Gear (5th AT)</td>
<td>170</td>
</tr>
</tbody>
</table>

**MAXIMUM PULL WITHOUT BALLAST**

<table>
<thead>
<tr>
<th>Points pull 1</th>
<th>2.64</th>
<th>678</th>
</tr>
</thead>
</table>

**MAXIMUM PULL WITH BALLAST**

<table>
<thead>
<tr>
<th>Points pull 2</th>
<th>3.42</th>
<th>678</th>
</tr>
</thead>
</table>

**VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST**

<table>
<thead>
<tr>
<th>Maximum Available Power—Two Hours—5th Gear (2nd DD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>96.38</td>
</tr>
</tbody>
</table>

**ENGINE Make**

- Minneapolis-Moline Type 6
- Cylinder vertical
- Serial No 29703179
- Crankshaft mounted lengthwise

**Fuel, Oil and Time**

- Fuel No 2 Diesel
- Cetane No 52.4 (rating taken from oil company's typical inspection data)
- Specific gravity converted to 60°/60° 0.8371
- Weight per gallon 6.970 lb
- Oil SAE 30
- API service classification D
- To motor 3.534 gal
- Drained from motor 1.465 gal
- Transmission and final-drive lubricant EP 80 Gear oil Mill-L-2105A
- Total time engine was operated 45 hours.

**CHASSIS**

- Type Standard Serial No 4400453
- Tread width rear 64" to 96" front 56" to 80"
- Wheel base 103"/4" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from centerline of rear wheels 28" Vertical distance above roadway horizontal distance from center of rear wheel tread 90° to the right/left
- Hydraulic control system direct engine drive
- Transmission selective gear fixed ratio with partial range operator controlled power shifting Advertised speeds mph first 2.25 second 3.25 third 3.40 fourth 4.55 fifth 5.00 sixth 5.55 seventh 6.65 eighth 8.10 ninth 12.40 tenth 18.05 reverse 3.40 and 5.00 Clutch single plate dry disc operated by foot pedal Brakes dry dual disc hydraulically power actuated by two foot pedals Steering hydraulic with power assist Turning radius (on concrete surface with brake applied) right 129° left 129° (on concrete surface without brake) right 147° left 147° Turning space diameter (on concrete surface with brake applied) right 266" left 266" (on concrete surface without brake) right 302" left 302"

**TIRE and WEIGHT**

- No. size, ply & psi
- Ballast
- Liquid
- Cast iron
- No. size, ply & psi
- Ballast
- Liquid
- Cast iron
- Height of drawbar
- Static weight with operator—Rear

**REPAIRS and ADJUSTMENTS**

No repairs or adjustments.

**REMARKS**

All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

Tenth gear was not run as it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 974.

L. F. LARSEN

Engineer in Charge

G. W. STEINBRUEGGE, Chairman

J. J. SULEK

D. E. LANE

Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean; H. W. Ottoson, Director, Lincoln, Nebraska

Department of Agricultural Engineering

Dates of Test: May 15 to May 24, 1968

Manufacturer: MINNEAPOLIS-MOLINE, INC., HOPKINS, MINNESOTA
Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

**PREPARATION FOR PERFORMANCE RUNS**

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer’s published recommendations. The manufacturer’s representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

**BELT OR POWER TAKE-OFF PERFORMANCE**

**Maximum Power and Fuel Consumption.** The manufacturer’s representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

**Varying Power and Fuel Consumption.** Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, 1/2 of the 85% torque; maximum power, 1/4 and 3/4 of the 85% torque.

Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

**DRAWBAR PERFORMANCE**

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

**Varying Power and Fuel Consumption With Ballast.** The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

**Maximum Power with Ballast.** Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

**Maximum Pull without Ballast.** All added ballast is removed from the tractor. The drawbar pull is determined at slip limits of 15% for pneumatic tires or 7% for steel tracks or lugs. The tractor is operated at the fastest possible travel speed.

**Varying Power and Travel Speed with Ballast.** Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the “lugging ability” of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.