10-16-1967

Test 966: Allis-Chalmers 170 (Gasoline)

Tractor Museum
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NEBRASKA TRACTOR TEST 966 - ALLIS-CHALMERS 170 GASOLINE

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/hr per Lb/hr</td>
<td>Hp/hr per gal</td>
</tr>
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</tr>
</tbody>
</table>

MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—Two Hours

54.12 1800 4.383 0.497 12.45 184 58 75 29.140

Standard Power Take-off Speed (540 rpm)—One Hour

51.46 1624 3.986 0.479 12.91 184 58 75 29.130

VARYING POWER AND FUEL CONSUMPTION—TWO HOURS

<table>
<thead>
<tr>
<th>Horsepower</th>
<th>Drawbar Pull</th>
<th>Speed</th>
<th>Slip of Drivers</th>
<th>Fuel Consumption</th>
<th>Hp-hr</th>
<th>Cooling</th>
<th>Air</th>
<th>Air</th>
<th>Barometer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lbs per mile</td>
<td>miles</td>
<td>%</td>
<td>Gal/hr per Lb/hr</td>
<td>per hr</td>
<td>medium</td>
<td>wet</td>
<td>dry</td>
<td>inches of</td>
</tr>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mercury</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mercury</td>
</tr>
</tbody>
</table>

DRAWBAR PERFORMANCE

<table>
<thead>
<tr>
<th>Horsepower</th>
<th>Drawbar Pull</th>
<th>Speed</th>
<th>Crankshaft Speed</th>
<th>Slip of Drivers</th>
<th>Fuel Consumption</th>
<th>Temp Degrees F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lbs per mile</td>
<td>miles</td>
<td>rpm</td>
<td>%</td>
<td>Gal/hr per Lb/hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

Maximum Available Power—Two Hours—5th Gear

46.93 3973 4.43 4.373 0.570 10.73 163 39 47 28.970

75% of Pull at Maximum Power—Ten Hours—5th Gear

38.81 3083 4.72 4.93 3.894 0.621 9.97 159 38 41 28.873

50% of Pull at Maximum Power—Two Hours—5th Gear

27.10 2056 4.94 4.193 3.51 3.253 0.749 8.33 167 41 50 28.940

MAXIMUM POWER WITH BALLAST

34.52 6851 1.80 1879 14.93 1st Gear 174 59 66 28.550

45.50 6164 2.94 1800 12.68 2nd Gear 150 31 34 29.010

55.57 5712 2.90 1798 10.49 3rd Gear 150 31 34 29.010

66.80 4164 4.21 1800 7.13 4th Gear 158 33 37 29.020

48.11 4074 4.43 1800 6.09 5th Gear 160 36 41 29.020

48.35 2963 6.12 1799 4.90 6th Gear 159 36 42 29.010

46.34 1826 9.32 1800 3.51 7th Gear 161 38 45 29.000

45.49 1197 13.63 1799 2.35 8th Gear 165 38 45 29.000

MAXIMUM PULL WITHOUT BALLAST

35.36 4378 3.63 1877 14.68 3rd Gear 155 35 37 29.060

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear

Pounds pull 4074 4335 4527 4.567 4725 4741 4490

Horsepower 48.11 45.99 42.33 37.32 32.92 27.60 20.99

Crankshaft speed rpm 1800 1626 1439 1255 1076 901 729

Miles per hour 4.45 3.98 3.51 3.06 2.61 2.18 1.75

Slip of drivers % 6.69 7.31 7.68 7.81 8.17 8.17 8.17

TIRES, BALLAST AND WEIGHT

<table>
<thead>
<tr>
<th>Ballast</th>
<th>With Ballast</th>
<th>Without Ballast</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Two 18.4-28; 6; 16</td>
<td>Two 18.4-28; 6; 16</td>
</tr>
<tr>
<td></td>
<td>780 lb each</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>800 lb each</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Two 7.5-10; 6; 28</td>
<td>Two 7.5-10; 6; 28</td>
</tr>
<tr>
<td></td>
<td>65 lb each</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Height of drawbar</td>
<td>19.5 inches</td>
<td>21 inches</td>
</tr>
<tr>
<td>Static weight with operator</td>
<td>Rear 7130 lb</td>
<td>3970 lb</td>
</tr>
<tr>
<td></td>
<td>Front 1880 lb</td>
<td>1750 lb</td>
</tr>
<tr>
<td></td>
<td>Total 9010 lb</td>
<td>5720 lb</td>
</tr>
</tbody>
</table>

Department of Agricultural Engineering

Dates of Test: October 16 to October 27, 1967

Manufacturer: ALLIS-CHALMERS MANUFACTURING COMPANY, MILWAUKEE, WISCONSIN

FUEL, OIL and TIME Fuel regular gasoline

Octane No Motor 84.2 Research 93.3 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7432 Weight per gallon 6.187 lb OIL SAE 10W-30 API service classification MS, DG, DM To motor 1,466 gal Drained from motor 1,371 gal Transmission and final-drive lubricant Allis-Chalmers special oil Total engine was operated 45½ hours.

ENGINE Make Allis-Chalmers Type 4 cylinder vertical Serial No 7-1017Z Crankshaft mounted lengthwise Rated rpm 1800 Bore and stroke 4" x 4.75" Compression ratio 8 to 1 Displacement 226 cu in in Carburetor size 1/4" Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with replaceable pleated paper element Oil filter full flow replaceable pleated paper cartridge Fuel filter sediment bowl and screen Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 170-1134 Tread width rear 58" to 82" front 53" to 73" Wheel base 93.5" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center of rear wheels 32.9" Vertical distance above roadway 28.9" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraul ic control system constant running Transmission selective gear fixed ratio plus operator controlled partial range power shifting Advertised speeds mph first 2.0 second 2.9 third 3.2 fourth 4.3 fifth 4.5 sixth 6.1 seventh 9.4 eighth 13.3 reverse 2.7 and 5.8 Clutch single plate dry disc operated by foot pedal Brakes contracting band and disc operated by two foot pedals Steering hydraulic with power assist Turning radius (on concrete surface with brake applied) right 122" left 122" (on concrete surface without brake) right 138" left 138" Turning space diameter (on concrete surface with brake applied) right 253" left 253" (on concrete surface without brake) right 286" left 286" Power take-off 540 rpm at 1024 engine rpm.

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.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 966.

L. F. LARSEN
Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman
J. J. SULK
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
GENERAL CONDITIONS

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 provide the high-idle speed specified by the manufacturer in the operating instructions.

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 as 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.