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Test 1156: Allis-Chalmers 175 Gasoline

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1156 – ALLIS-CHALMERS 175 GASOLINE

POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Temperature Degrees F Air wet bulb	Air dry bulb	Barometer inches of Mercury
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MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—Two Hours (PTO Speed—599 rpm)								
60.88	1800	5.088	0.511	11.97	183	58	75	28.950

Standard Power Take-off Speed (540 rpm)—One Hour								
56.02	1622	4.755	0.519	11.78	183	59	75	28.945

VARYING POWER AND FUEL CONSUMPTION—Two Hours

53.46	1859	4.676	0.535	11.43	178	58	75	.....
0.00	2035	1.722	.....	.....	156	58	74	.....
28.08	1952	3.155	0.687	8.90	165	57	74	.....
61.08	1801	5.074	0.508	12.04	182	57	74	.....
14.44	2008	2.468	1.045	5.85	158	57	73	.....
41.00	1901	3.891	0.580	10.54	169	57	73	.....
Av 33.01	1926	3.498	0.648	9.44	168	57	74	28.960

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool- ing med	Air wet bulb	Air dry bulb	Barometer inches of Mercury
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VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

Maximum Available Power—Two Hours—5th Gear (2-Hi)											
51.80	4450	4.37	1803	8.24	5.070	0.598	10.22	165	44	57	29.130

75% of Pull at Maximum Power—Ten Hours—5th Gear (2-Hi)											
42.52	3412	4.67	1880	5.83	4.412	0.634	9.64	163	40	50	29.140

50% of Pull at Maximum Power—Two Hours—5th Gear (2-Hi)											
30.02	2307	4.88	1923	3.81	3.660	0.745	8.20	162	46	55	28.950

50% of Pull at Reduced Engine Speed—Two Hours—6th Gear (3-Hi)											
29.56	2284	4.85	1546	3.75	3.333	0.689	8.87	164	52	66	28.940

MAXIMUM POWER WITH BALLAST

44.20	6875	2.41	1846	14.71	2nd Gear (1-Hi)	167	53	70	28.820
48.95	6247	2.94	1800	12.06	3rd Gear (2-Lo)	171	52	69	28.820
51.37	5181	3.72	1800	9.70	4th Gear (3-Lo)	165	41	53	29.130
52.78	4548	4.35	1799	8.12	5th Gear (2-Hi)	166	44	56	29.110
53.17	3627	5.50	1799	6.36	6th Gear (3-Hi)	165	43	57	29.110
52.61	2288	8.62	1802	3.88	7th Gear (4-Lo)	165	43	56	29.120

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 5th Gear (2-Hi)

Pounds Pull	4548	4674	4821	4835	4790	4407
Horsepower	52.78	48.74	44.16	39.26	33.15	25.32
Crankshaft Speed rpm	1799	1622	1429	1270	1080	897
Miles Per Hour	4.35	3.91	3.44	3.04	2.60	2.18
Slip of Drivers %	8.12	8.60	8.83	9.30	8.83	8.12

TRACTOR SOUND LEVEL

	dB (A)
Maximum Available Power 2 Hours	91.0
75% of Pull at Max. Power 10 Hours	91.0
50% of Pull at Max. Power 2 Hours	88.0
50% of Pull at Reduced Engine Speed 2 Hours	87.5
Bystander—8th Gear (4-Hi)	80.5

TIRES, BALLAST AND WEIGHT

		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi	Two 18.4-28;6;16	Two 18.4-28;6;16
Ballast	—Liquid	1000 lb each	None
	Cast Iron	125 lb each	None
Front Tires	—No., size, ply & psi	Two 7.50-16;6;28	Two 7.50-16;6;28
Ballast	—Liquid	None	None
	Cast Iron	None	None
Height of drawbar		19 inches	20½ inches
Static weight with operator—rear		6560 lb	4560 lb
front		1840 lb	1830 lb
total		8400 lb	6390 lb

Department of Agricultural Engineering

Dates of Test: April 1 to April 11, 1974

Manufacturer: Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin

FUEL, OIL AND TIME Fuel regular gasoline Octane No Motor 84.5 Research 93.4 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7344 Weight per gallon 6.114 lb Oil SAE 10W-30 API service classification SB/SE-CA/CB To motor 1.460 gal. Drained from motor 1.334 gal Transmission and final drive lubricant Allis-Chalmers special lube oil Total time engine was operated 47 hours

ENGINE Make Allis-Chalmers gasoline Type 4 cylinder vertical Serial No 77100 Crankshaft Mounted lengthwise Rated rpm 1800 Bore and stroke 4" x 4½" Compression ratio 8.2 to 1 Displacement 226 cu in Carburetor size 1¼ Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with replaceable pleated paper element Oil filter replaceable pleated paper cartridge Fuel filter sediment bowl and wire screen Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 175-2151 Tread width rear 58" to 82" front 53" to 73" Wheel base 93" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 26.7" Vertical distance above roadway 30.8" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive Transmission selective gear fixed ratio plus operator controlled partial range power shifting Advertised speeds mph first 2.0 second 2.8 third 3.4 fourth 4.2 fifth 4.9 sixth 6.0 seventh 9.2 eighth 13.1 reverse 2.6 and 3.7 Clutch single plate dry disc operated by foot pedal Brakes contracting band and disc operated by two foot pedals which can be locked together Steering hydrostatic power Turning radius (on concrete surface with brake applied) right 122" left 122" (on concrete surface without brake) right 143" left 143" Turning space diameter (on concrete surface with brake applied) right 254" left 254" (on concrete surface without brake) right 290" left 290" Power take-off 540 rpm at 1622 engine rpm.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure.

First gear was not run as it was necessary to limit the pull in second gear to avoid excessive wheel slippage.

Eighth gear was not run as test procedure requires only six travel speeds.

We the undersigned, certify that this is a true and correct report of official Tractor Test 1156.

L. F. LARSEN

Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman

W. E. SPLINTER

D. E. LANE

Board of Tractor Test Engineers

EXPLANATION OF TEST REPORT

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 make appropriate decisions regarding mechanical adjustments.

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

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 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, $\frac{1}{2}$ of the 85% torque; maximum power, $\frac{1}{4}$ and $\frac{3}{4}$ 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.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effects 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 4 different runs 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; (3) 50% of the pull at maximum power; and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 6 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 manufacturer's representative has the option of selecting one gear or speed over eight miles per hour. 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.

Varying Drawbar Pull 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.

SOUND MEASUREMENT

Sound is recorded during each of the Varying Power and Fuel Consumption runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet from the line of travel of the tractor.

An increase of 10 dB(A) will approximately double the loudness to the human ear.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska 68503.



ALLIS-CHALMERS 175 GASOLINE