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Test 966: Allis-Chalmers 170 (Gasoline)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 966 – ALLIS-CHALMERS 170 GASOLINE

POWER TAKE-OFF PERFORMANCE

POWER TAKE-OFF PERFORMANCE								
Hp	Crank-shaft speed rpm	Fuel Consumption		Temperature Degrees F				
		Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
54.12	1800	4.348	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								
47.60	1863	4.083	0.531	11.66	178	59	77	.....
0.00	2039	1.775	.....	.....	158	57	75	.....
24.94	1952	2.943	0.730	8.47	165	58	76	.....
54.15	1801	4.320	0.494	12.53	182	58	76	.....
12.74	1995	2.381	1.156	5.35	160	58	75	.....
36.77	1904	3.467	0.583	10.61	171	58	76	.....
Av 29.37	1926	3.161	0.666	9.29	169	58	76	29.120

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption		Temp Degrees F				Barometer inches of Mercury
					Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling med	Air wet bulb	Air dry bulb	

VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

Maximum Available Power—Two Hours—5th Gear											
46.93	3973	4.43	1798	6.75	4.373	0.576	10.73	163	39	47	28.970
75% of Pull at Maximum Power—Ten Hours—5th Gear											
38.81	3083	4.72	1880	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	1939	3.51	3.253	0.743	8.33	167	41	50	28.940

MAXIMUM POWER WITH BALLAST

34.52	6851	1.89	1879	14.93	1st Gear	.....	174	59	66	28.550
45.50	6464	2.64	1800	12.68	2nd Gear	.....	150	31	34	29.010
45.57	5712	2.99	1798	10.49	3rd Gear	.....	150	31	34	29.010
46.80	4164	4.21	1800	7.13	4th Gear	.....	158	33	37	29.020
48.11	4074	4.43	1800	6.69	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	9.52	1801	3.31	7th Gear	.....	161	38	45	29.000
43.49	1197	13.63	1799	2.35	8th Gear	.....	165	38	45	29.000

MAXIMUM PULL WITHOUT BALLAST

35.36	4378	3.03	1877	14.68	3rd Gear	155	35	37	29.060
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VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear

Pounds pull	4074	4335	4527	4567	4725	4741	4490
Horsepower	48.11	45.99	42.33	37.23	32.92	27.60	20.99
Crankshaft speed rpm	1800	1626	1439	1255	1076	901	720
Miles per hour	4.43	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

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 18.4-28; 6; 16	Two 18.4-28; 6; 16
	—Liquid	780 lb each	None
	—Cast iron	800 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-16; 6; 28	Two 7.50-16; 6; 28
	—Liquid	65 lb each	None
	—Cast iron	None	None
Height of drawbar		19½ inches	21 inches
Static weight with operator—Rear		7130 lb	3970 lb
	Front	1880 lb	1750 lb
	Total	9010 lb	5720 lb

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 lube oil Total time 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 4½" Compression ratio 8 to 1 Displacement 226 cu in Carburetor size 1½" 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 95.5" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 32.8" Vertical distance above roadway 28.9" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic 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 3.8 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 288" left 288" Power take-off 540 rpm at 1624 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. 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

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. 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, $\frac{1}{2}$ 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. 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.



ALLIS-CHALMERS 170 GASOLINE