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Test 810: Allis-Chalmers D-19 (Gasoline)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 810 - ALLIS-CHALMERS D19 GASOLINE

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption		Hp-hr per gal	Temperature Degrees F			Barometer inches of Mercury
		Gal per hr	Lb per hp-hr		Cooling medium	Air wet bulb	Air dry bulb	
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
71.54	2000	6.233	0.530	11.48	174	56	75	29.073
Standard Power Take-off Speed (540 rpm)—One Hour								
65.19	1759	5.557	0.519	11.73	169	56	75	29.078
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
63.88	2101	5.833	0.556	10.95	168	57	75	.....
0.00	2272	2.574	.....	.....	160	55	73	.....
32.91	2165	3.812	0.705	8.63	168	55	73	.....
72.63	2000	6.647	0.557	10.93	172	56	74	.....
16.85	2218	3.215	1.161	5.24	161	55	73	.....
48.53	2129	4.758	0.597	10.20	168	55	73	.....
Av 39.13	2147	4.473	0.696	8.75	166	55	73	29.082

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											
63.91	5371	4.46	2000	6.45	6.774	0.645	9.43	174	45	51	29.053
75% of Pull at Maximum Power—Ten Hours—5th Gear											
51.47	4028	4.79	2102	4.48	5.708	0.675	9.02	169	47	55	28.882
50% of Pull at Maximum Power—Two Hours—5th Gear											
35.08	2647	4.97	2151	3.16	4.312	0.748	8.14	169	45	50	29.000
MAXIMUM POWER WITH BALLAST											
41.45	8587	1.81	2122	13.44	1st Gear			166	48	58	28.900
59.32	8391	2.65	2000	12.67	2nd Gear			170	48	58	28.900
59.22	8150	2.73	2001	12.06	3rd Gear ..			168	48	58	28.900
61.42	6054	3.80	2003	8.04	4th Gear ..			169	48	58	28.900
63.05	5323	4.44	2000	6.90	5th Gear			170	48	58	28.900
63.67	3948	6.05	2000	4.87	6th Gear			168	48	58	28.900
63.78	2717	8.80	2000	3.42	7th Gear			168	48	58	28.900
60.68	1650	13.79	2000	1.85	8th Gear ..			168	47	61	28.925
MAXIMUM POWER WITHOUT BALLAST											
54.35	4685	4.35	2070	14.67	5th Gear			172	56	74	29.095
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear											
Pounds pull			5323	5410	5545	5627	5686	5638			
Horsepower			63.05	57.94	52.41	46.48	40.34	32.87			
Miles per hour			4.44	4.02	3.54	3.10	2.66	2.19			
Slip of drivers, %			6.90	7.17	7.17	7.30	7.58	7.44			

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 18.4-34; 6; 16	Two 18.4-34; 6; 16
Ballast	—Liquid	1125 lb each	None
	—Cast iron	1080 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-16; 6; 36	Two 7.50-16; 6; 28
Ballast	—Liquid	None	None
	—Cast iron	None	None
Height of drawbar		19 1/2 inches	21 1/2 inches
Static weight	—Rear	8770 lb	4360 lb
	—Front	2100 lb	2110 lb
Total weight with operator		11,045 lb	6645 lb

Department of Agricultural Engineering

Dates of Test: April 3 to April 19, 1962

Manufacturer: ALLIS-CHALMERS MANUFACTURING COMPANY, MILWAUKEE, WISCONSIN

Manufacturer's Power Rating: Not Rated

FUEL, OIL and TIME Fuel regular gasoline Octane No Motor 84.6 Research 92.2 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7309 Weight per gallon 6.084 lb Oil SAE 10W-30 API service classification MS, DM To motor 1.513 gal Drained from motor 1.285 gal Transmission and final-drive lubricant SAE 80 Type EP lubricant Total time engine was operated 40 1/2 hours.

ENGINE Make Allis-Chalmers Type 6 cylinder vertical Serial No 399189 Crankshaft mounted lengthwise Rated rpm 2000 Bore and stroke 3 9/16" x 4 3/8" Compression ratio 8.00 to 1 Displacement 262 cu in Carburetor size 1 1/4" Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with built-in pre-cleaner and automatic dust unloader using a replaceable pleated paper element Oil filter replaceable pleated paper element Fuel filter sediment bowl with screen Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No D-191199 Tread width rear 60" to 80" front 60" to 88 1/2" Wheel base 102 3/8" 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 33 3/4" Vertical distance above roadway 37 1/2" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system constant running only when power director clutch is used Transmission selective gear fixed ratio plus operator controlled partial range power shifting Advertised speeds mph first 1.9 second 2.9 third 3.1 fourth 4.1 fifth 4.7 sixth 6.3 seventh 9.0 eighth 13.9 reverse 2.6 and 4.0 Clutch single plate dry disc operated by foot pedal Power director clutch two multi-disc wet clutches operated by hand lever Brakes contracting band and disc operated by two foot pedals Steering power assisted Turning radius (on concrete surface with brake applied) right 130" left 130" (on concrete surface without brake) right 140" left 140" Turning space diameter (on concrete surface with brake applied) right 275" left 275" (on concrete surface without brake) right 295" left 295" Belt pulley 1678 rpm at 2000 engine rpm diam 9" face 6 9/16" Belt speed 3956 Power take-off 540 rpm at 1760 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 810.

L. F. LARSEN
Engineer-in-Charge

G. W. STEINBRUEGGE
Acting Chairman
J. J. SULEK
F. D. YUNG
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. 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, $\frac{1}{2}$ 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 trans-

missions, 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 Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

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 D19 Gasoline