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Test 811: Allis-Chalmers D19 (Diesel)

Nebraska Tractor Test Lab
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NEBRASKA TRACTOR TEST 811 - ALLIS-CHALMERS D19 DIESEL

The University of Nebraska Agricultural Experiment Station

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POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Temperature Degrees F Air wet bulb	Temperature Degrees F Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
66.92	2000	5.211	0.540	12.84	195	58	75	28.870
Standard Power Take-off Speed (540 rpm)—One Hour								
64.83	1760	4.855	0.519	13.35	199	57	75	28.855
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
60.21	2117	4.867	0.561	12.37	189	58	76	.....
0.00	2281	1.687	.....	.....	161	56	72	.....
31.41	2210	3.132	0.691	10.03	184	56	73	.....
67.23	2000	5.226	0.539	12.86	194	57	75	.....
15.96	2246	2.379	1.034	6.71	179	57	75	.....
46.20	2167	3.906	0.586	11.83	187	57	74	.....
Av 36.84	**2170**	**3.533**	**0.665**	**10.43**	**182**	**57**	**74**	**28.847**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Fuel Consumption Hp-hr per gal	Temp Degrees F Cool-ing med	Temp Degrees F Air wet bulb	Temp Degrees F Air dry bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—5th Gear											
62.05	5162	4.51	2001	5.57	5.377	0.601	11.54	194	31	37	29.170
75% of Pull at Maximum Power—Ten Hours—5th Gear											
50.31	3852	4.90	2141	4.08	4.675	0.644	10.76	190	35	41	29.110
50% of Pull at Maximum Power—Two Hours—5th Gear											
35.83	2636	5.10	2196	2.71	3.797	0.735	9.44	188	32	35	29.078
MAXIMUM POWER WITH BALLAST											
41.19	8459	1.83	2162	14.35	1st Gear			174	42	45	29.000
58.47	8317	2.64	2002	13.17	2nd Gear			187	42	45	29.000
58.15	8076	2.70	1998	12.70	3rd Gear			188	42	45	29.000
59.64	5875	3.81	2000	8.01	4th Gear ..			189	43	45	29.000
61.27	5158	4.45	2001	6.58	5th Gear ..			190	43	45	29.000
60.83	3772	6.05	1997	4.83	6th Gear			190	45	48	28.985
60.65	2576	8.83	2002	3.23	7th Gear ..			189	45	48	28.985
57.19	1555	13.79	2005	2.04	8th Gear			188	45	48	28.985
MAXIMUM POWER WITHOUT BALLAST											
54.92	4695	4.39	2090	14.78	5th Gear			187	49	59	29.140

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear						
Pounds pull	5158	5500	5826	5849	5693	5108
Horsepower	61.27	58.73	54.55	47.86	40.25	30.12
Miles per hour	4.45	4.00	3.51	3.07	2.65	2.21
Slip of drivers, %	6.58	7.20	7.60	7.74	7.47	6.79

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	1130 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		20 inches	22 inches
Static weight	—Rear	8820 lb	4400 lb
	—Front	2215 lb	2260 lb
Total weight with operator		11,210 lb	6835 lb

Department of Agricultural Engineering
Dates of Test: April 3 to April 18, 1962
Manufacturer: ALLIS-CHALMERS MANUFACTURING COMPANY, MILWAUKEE, WISCONSIN
Manufacturer's Power Rating: Not Rated

FUEL, OIL and TIME Fuel No 2 Diesel **Cetane No** 52.3 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.8328 **Weight per gallon** 6.935 lb **Oil** SAE 30 **API service classification** DS **To motor** 1.930 gal **Drained from motor** 1.412 gal **Transmission and final-drive lubricant** SAE 80 **Type** EP lubricant **Total time engine was operated** 41½ hours.

ENGINE Make Allis-Chalmers **Type** 6 cylinder vertical with turbo-charger **Serial No** 117957 **Crankshaft mounted** lengthwise **Rated rpm** 2000 **Bore and stroke** 3 9/16″ x 4 3/8″ **Compression ratio** 14 to 1 **Displacement** 262 cu in **Cranking system** 12 volt electric (two 6 volt batteries) **Lubrication** pressure **Air cleaner** dry type with built-in precleaner and automatic dust unloader using a replaceable pleated paper element **Oil filter** replaceable pleated paper element **Fuel filter** primary filter with replaceable cotton waste element and secondary filter with replaceable pleated paper element **Muffler** was not used **Cooling medium temperature control** thermostat.

CHASSIS Type standard **Serial No** D191198D **Tread width** rear 60″ to 80″ front 60″ to 88⅝″ **Wheel base** 102⅜″ **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 35 3/16″ Vertical distance above roadway 37½″ 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 **Advertiesd 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 fpm **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 811.

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, ½ the 85% torque; maximum power, ¼ and ¾ 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 transmisisons, 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 Diesel