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## Test 814: Allis-Chalmers D19 (LPG)

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA TRACTOR TEST 814 - ALLIS-CHALMERS D19 LPG

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									
65.19	2000	7.381	0.474	8.97	178	56	75	29.117	
Standard Power Take-off Speed (540 rpm)—One Hour									
59.88	1759	6.546	0.465	9.15	170	56	75	29.090	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
60.29	2145	6.932	0.489	8.70	175	57	76	.....	
0.00	2273	2.548	.....	.....	163	56	75	.....	
30.46	2169	4.616	0.644	6.60	173	57	77	.....	
65.69	2001	7.412	0.480	8.86	178	56	75	.....	
15.62	2223	3.558	0.968	4.39	166	57	75	.....	
45.41	2155	5.619	0.526	8.08	174	57	75	.....	
Av	36.25	2161	5.114	0.600	7.09	171	57	75	29.055

## 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	Cool- ing med	Air wet bulb	Air dry bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—5th Gear											
58.29	4826	4.53	2013	5.65	7.471	0.545	7.80	174	45	54	29.000
75% of Pull at Maximum Power—Ten Hours—5th Gear											
48.90	3758	4.88	2125	3.84	6.359	0.553	7.69	173	48	59	29.158
50% of Pull at Maximum Power—Two Hours—5th Gear											
33.20	2474	5.03	2168	2.75	5.029	0.644	6.60	174	49	64	28.960
MAXIMUM POWER WITH BALLAST											
42.27	8674	1.83	2145	13.77	1st Gear .....			172	36	44	29.070
57.13	7955	2.69	2002	11.54	2nd Gear .....			175	36	44	29.070
56.91	7703	2.77	2001	10.73	3rd Gear .....			173	39	48	29.070
59.00	5765	3.84	2001	7.34	4th Gear .....			175	39	48	29.070
59.32	4951	4.49	2002	6.03	5th Gear .....			179	42	53	29.000
59.54	3660	6.10	2000	4.25	6th Gear .....			175	42	53	29.000
59.07	2493	8.89	2008	2.86	7th Gear .....			174	42	53	29.000
55.78	1504	13.91	2012	1.65	8th Gear .....			172	42	53	29.000
MAXIMUM POWER WITHOUT BALLAST											
54.89	4786	4.30	2048	14.29	5th Gear .....			171	44	55	29.140
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear											
Pounds pull			4951	5112	5264	5328	5395	5419	5263		
Horsepower			59.32	55.24	50.23	44.38	38.34	31.92	24.54		
Miles per hour			4.49	4.05	3.58	3.12	2.66	2.21	1.75		
Slip of drivers, %			6.03	6.31	6.45	6.59	6.59	6.86	6.31		

## 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
	—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
	—Liquid	None	None
	—Cast iron	None	None
Height of drawbar		20 inches	22 inches
Static weight	—Rear	8830 lb	4420 lb
	—Front	2155 lb	2190 lb
Total weight with operator		11,160 lb	6785 lb

Department of Agricultural Engineering  
Dates of Test: April 9 to April 19, 1962  
Manufacturer: ALLIS-CHALMERS MANUFACTURING COMPANY, MILWAUKEE, WISCONSIN  
Manufacturer's Power Rating: Not Rated

**FUEL, OIL and TIME** Fuel commercial propane Specific gravity converted to 60°/60° 0.5103 Weight per gallon 4.25 lb Oil SAE 10W-30 API service classification MS, DM To motor 1.718 gal Drained from motor 1.251 gal Transmission and final-drive lubricant SAE 80 Type EP lubricant Total time engine was operated 39½ hours.

**ENGINE** Make Allis-Chalmers Type 6 cylinder vertical Serial No 399162 Crankshaft mounted lengthwise Rated rpm 2000 Bore and stroke 3 9/16" x 4 3/8" Compression ratio 9.65 to 1 Displacement 262 cu in Carburetor size 1¼" Ignition system battery Cranking system 12 volt electric 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 replaceable paper element Muffler was used Cooling medium temperature control thermostat.

**CHASSIS** Type standard Serial No D-191200 Tread width rear 60" to 80" front 60" to 88½" Wheel base 102¾" 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 34¼" Vertical distance above roadway 38½" 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 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 814.

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 LPG