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11-27-1957

## Test 635: Allis-Chalmers D-17 Gasoline

Nebraska Tractor Test Lab

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

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The Experiment Station  
University of Nebraska College of Agriculture  
W. V. Lambert, Director, Lincoln, Nebraska

Department of Agricultural Engineering  
Dates of test: November 14, 1957 to November 25, 1957  
Manufacturer: ALLIS-CHALMERS MANUFACTURING COMPANY, MILWAUKEE, WISCONSIN  
Manufacturer's rating: Not rated

NEBRASKA TRACTOR TEST NO. 635

ALLIS-CHALMERS D17

**BELT HORSEPOWER TESTS**

Hp	Crank shaft speed rpm	Fuel Consumption			Temp. Deg. F.			Barometer inches of mercury			
		Gal per hr	Hp-hr per gal	Lb per hp-hr	Cooling medium	Air wet bulb	Air dry bulb				
TEST B—100% MAXIMUM LOAD—TWO HOURS											
52.70	1650	4.535	11.62	0.524	154	49	62	29.025			
TEST C—OPERATING MAXIMUM LOAD—ONE HOUR											
50.34	1651	4.134	12.18	0.500	152	50	62	29.040			
TEST D—RATED LOAD—ONE HOUR											
46.48	1651	4.011	11.59	0.526	148	50	62	29.080			
TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)											
46.49	1650	4.008	11.60	0.525	146	50	62	.....			
2.27	1949	1.827	1.24	4.903	134	49	60	.....			
25.99	1846	2.910	8.93	0.682	143	49	60	.....			
49.51	1609	4.032	12.28	0.496	151	50	62	.....			
13.40	1899	2.349	5.70	1.068	139	49	60	.....			
37.36	1770	3.427	10.90	0.559	146	49	60	.....			
29.17	1787	3.092	9.43	0.646	143	49	60	29.100			
TEST L—OPERATING MAXIMUM TORQUE											
% of rated rpm (engine)	100	95	90	85	80	75	70	65	60	54	50
% of rated-speed torque	100	102	104	106	107	108	110	112	115	114	110

**DRAWBAR HORSEPOWER TESTS**

Hp	Draw bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of drive wheels %	Fuel Consumption			Temp. Deg. F.			Barometer inches of mercury
					Gal per hr	Hp hr per gal	Lb per hp-hr	Cool- ing me	Air wet bulb	Air dry bulb	
TEST H—RATED LOAD—TEN HOURS—3rd Gear High Range											
36.77	2587	5.33	1649	4.60	3.720	9.88	0.616	118	28	29	29.260
TEST F—100% MAXIMUM LOAD											
48.64	3457	5.28	1651	5.78	3rd Gear High Range			139	25	27	29.260
TEST G—OPERATING MAXIMUM LOAD											
43.34	7059	2.30	1650	13.84	1st Gear HR (prt-thrtl)			136	28	30	29.235
46.03	4421	3.90	1654	6.88	2nd Gear High Range			139	23	24	29.260
45.37	3210	5.30	1650	5.40	3rd Gear High Range			131	23	24	29.260
39.97	1249	12.00	1647	2.57	4th Gear High Range			143	25	27	29.260
30.17	7061	1.60	1648	14.86	1st Gear LR (prt-thrtl)			134	28	30	29.235
43.68	6227	2.63	1649	10.83	2nd Gear Low Range			134	24	26	29.260
45.19	4652	3.64	1652	7.60	3rd Gear Low Range			135	24	26	29.260
43.43	1949	8.36	1651	3.75	4th Gear Low Range			136	25	28	29.260
TEST J—OPERATING MAXIMUM LOAD											
45.09	3297	5.13	1652	10.15	3rd Gear High Range			133	32	34	29.075
TEST K—OPERATING MAXIMUM LOAD											
40.16	3210	4.69	1650	13.61	3rd Gear HR (prt-thrtl)			135	32	34	29.090

**TIRES, WHEELS AND WEIGHT**

	Tests F, G, & H	Test J	Test K
<b>Rear wheels</b>			
Type	Pressed steel	Pressed steel	Pressed steel
Liquid ballast	663 lb each	None	None
Added cast iron	1560 lb each	None	None
<b>Rear tires</b>			
No. and size	Two 14-28	Two 14-28	Two 13-28
Ply	6	6	6
Air pressure	16 lb	16 lb	14 lb
<b>Front wheels</b>			
Type	Pressed steel	Pressed steel	Pressed steel
Liquid ballast	55 lb each	None	None
Added cast iron	90 lb each	None	None
<b>Front tires</b>			
No. and size	Two 6.00-16	Two 6.00-16	Two 6.00-16
Ply	4	4	4
Air pressure	28 lb	28 lb	28 lb
<b>Height of drawbar</b>	23 inches	24 inches	23 inches
<b>Static weight</b>			
Rear end	7450 lb	3004 lb	2910 lb
Front end	1770 lb	1480 lb	1470 lb
<b>Total weight as tested with operator</b>	9395 lb	4659 lb	4555 lb

**HORSEPOWER SUMMARY**

	Drawbar	Belt
1. Sea level (calculated) maximum horsepower (based on 60°F and 29.92" Hg)	48.14	54.43
2. Observed maximum horsepower (tests F and B)	48.64	52.70
3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (ASAE and SAE ratings)	36.11	46.27

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 635.

L. F. LARSEN  
Engineer-in-Charge

L. W. HURLBUT  
G. W. STEINBRUEGGE  
J. J. SULEK  
Board of Tractor  
Test Engineers

## EXPLANATION OF TEST REPORT

**TEST A:** The manufacturer's representative operates the tractor for a minimum of 12 hours using light to heavy drawbar loads in each gear.

This serves as a period for limber up, general observation and adjustments. Adjustments that are permissible include valve tappet clearance, breaker point gap, spark plug gaps, clutch and others of a similar nature. No new parts or accessories can be installed without having mention made of it in the report.

No data are recorded during this preliminary run except the time that the engine is operated.

### BELT HORSEPOWER TESTS

**TEST B:** The throttle valve is wide open and the belt load on the dynamometer is adjusted so that the engine is at the rated speed recommended by the manufacturer. Carburetor, ignition timing and manifold adjustments are all set for maximum engine power.

This test is designed to determine maximum belt horsepower of the tractor at rated speed and to measure fuel consumption at the maximum power on the belt.

**TEST C:** For tractors with carburetors the best fuel economy does not always occur when the engine develops maximum power at rated speed. Test C is intended to allow the manufacturer's representative to select a more economical fuel setting even though there is a slight loss of power. *This more practical carburetor setting is used in all later tests except test F.* The throttle valve is wide open and load adjusted to give rated rpm. Tests B and C are the same for diesel tractors which have an altogether different fuel system.

**TEST D:** The throttle control lever is set so that the governor will maintain rated engine speed when rated load is applied. Rated load is 85% of 100% maximum, as obtained in test B, corrected to standard conditions.

This rating is somewhat less than the maximum belt horsepower in order that the operator may have a certain amount of reserve.

### TEST E:

**Varying load** serves to show the range of engine speeds when the engine is controlled by the governor during the following varied loads, of 20 minutes each; rated load, no load,  $\frac{1}{2}$  rated load, maximum load at wide open throttle valve,  $\frac{1}{4}$  and  $\frac{3}{4}$  rated load.

The average result of this test shows the average power and fuel consumption. Since the average tractor is subjected to varying loads, these data serve well in predicting fuel consumption and efficiency of a tractor in general use.

**TEST L:** This torque test is run with wide open throttle. Loads are applied to reduce engine speed in approximately ten 5% increments. Rated speed equals 100%. The corresponding dynamometer torque is recorded as a per cent of torque at rated speed.

### DRAWBAR HORSEPOWER TESTS

In all drawbar tests the pull exerted by the tractor is transmitted by a hydraulic pressure cylinder to a recording instrument in the test car. When rubber tires are used, all tests are

made on the concrete test course. All crawler type tractors are tested on a dirt test course which is maintained by grading, sprinkling and rolling so that it remains very nearly the same throughout the season. The same tires, wheels and weights are used for all tests except J and K.

**TEST F:** A drawbar test, the results of which are used to determine the rated drawbar horsepower in test H. The carburetor is set to develop maximum power as in test B. The rated gear recommended by manufacturer as plow gear is used in this test. The drawbar load is adjusted to give rated engine speed.

**TEST G:** Maximum drawbar horsepower is determined in each gear when the carburetor is set for fuel economy as in test C. The throttle valve is held wide open and the load is applied so that the engine runs at rated engine speed.

When operating in low gear it is not uncommon for the tractor to develop less drawbar horsepower than in rated gear because of excessive wheel slippage. When excessive wheel slippage occurs the load is reduced until slippage approaches 16%. When the load is reduced it is necessary to operate the tractor engine at part throttle and control engine speed by governor action.

**TEST H:** Intended to test the ability of the tractor to run continuously for 10 hours at rated drawbar horsepower and to determine the fuel consumption during that time. Rated drawbar horsepower is 75% of 100% maximum drawbar horsepower (Test F), corrected to standard conditions.

When operating at rated load the throttle control lever is set to maintain rated engine speed. This rating is less than maximum drawbar horsepower in order that the operator may have a certain amount of reserve.

**TEST J:** The tractor is operated in rated gear with all added weight removed. This test shows the effect of the removal of added weight on the performance of the tractor when compared with test G.

Removal of wheel weights generally increases wheel slippage and decreases drawbar horsepower.

**TEST K:** Similar to test J except that the smallest tires and lightest wheels offered by the manufacturer are used.

