

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

3-5-1957

Test 607: Unimog 30 Diesel

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

Nebraska Tractor Test Lab, "Test 607: Unimog 30 Diesel" (1957). *Nebraska Tractor Tests*. 32.
<https://digitalcommons.unl.edu/tractormuseumlit/32>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

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

Department of Agricultural Engineering
Dates of test: March 5, 1957 to March 13, 1957
Manufacturer: DAIMLER-BENZ A. G.; STUTTGART-
UNTERTUERKHEIM, GERMANY
Manufacturer's rating: Not rated

NEBRASKA TRACTOR TEST NO. 607

UNIMOG 30 DIESEL

BELT HORSEPOWER TESTS

BEST TORQUE OVER 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 & C—100% MAXIMUM LOAD—TWO HOURS											
28.43	2550	2.278	12.48	0.561	179	43	59	29.173			
TEST D—RATED LOAD—ONE HOUR											
24.71	2550	1.957	12.63	0.555	179	46	62	29.165			
TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)											
24.70	2551	1.940	12.73	0.550	180	46	63			
0.57	2723	0.844	0.68	1.037	161	39	49			
12.82	2627	1.306	9.82	0.714	172	40	53			
27.23	2459	2.176	12.51	0.560	179	45	60			
6.52	2666	1.041	6.26	1.118	168	42	54			
18.96	2595	1.619	11.72	0.598	175	42	55			
15.13	2603	1.488	10.17	0.689	172	42	55	29.145			
TEST L—OPERATING MAXIMUM TORQUE											
% of rated rpm (engine)		100	95	91	84	79	74	69	64	60	55
% of rated-speed torque		100	101	102	102	103	101	100	98	97	96

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 med	Air wet bulb	Air dry bulb	
TEST H—RATED LOAD—TEN HOURS—2nd Gear											
20.57	2000	3.86	2549	4.23	1.802	11.42	0.614	168	42	52	28.522
TESTS F & G—100% MAXIMUM LOAD											
7.84	4806	0.61	2552	15.01	1st Creeper (prt-thrtl)*			168	37	46	28.780
14.12	4768	1.11	2552	14.89	2nd Creeper (prt-thrtl)*			174	38	47	28.760
24.01	4705	1.91	2554	13.99	1st Gear			178	38	47	28.760
25.84	2533	3.83	2552	5.02	2nd Gear			182	39	48	28.760
25.04	1305	7.20	2551	2.89	3rd Gear			180	36	45	28.790
21.80	618	13.23	2547	2.19	4th Gear			171	46	60	28.660
13.65	237	21.60	2559	0.61	5th Gear			168	50	66	28.660
TEST J—OPERATING MAXIMUM LOAD											
25.02	2450	3.83	2553	5.50	2nd Gear			187	55	71	28.600

* Part Throttle.

TIRES, WHEELS AND WEIGHT

	Tests F, G, & H	Test J
Rear wheels		
Type	Pressed steel	Pressed steel
Liquid ballast	None	None
Added cast iron	523 lb each	None
Rear tires		
No. and size	Two 7.50-18	Two 7.50-18
Ply	6	6
Air pressure	36 lb	36 lb
Front wheels		
Type	Pressed steel	Pressed steel
Liquid ballast	None	None
Added cast iron	343 lb each	None
Front tires		
No. and size	Two 7.50-18	Two 7.50-18
Ply	6	6
Air pressure	36 lb	36 lb
Height of drawbar	15 inches	15½ inches
Static weight		
Rear end	3354 lb	2298 lb
Front end	3200 lb	2514 lb
Total weight as tested with operator	6729 lb	4987 lb

FUEL, OIL, WATER and TIME Fuel Diesel Cetane No. 50 (rating taken from oil company's typical inspection data) Weight per gallon 7.005 lb Oil SAE 20-20W To motor 1.755 gal Drained from motor 0.935 gal Water used 0.011 gal Total time motor was operated 41 hours.

CHASSIS TYPE Standard 4 wheel drive Serial No. 6500126 Tread width rear 50.7" and 59.0" front 50.7" and 59.0" Wheel base 67.7" Pneumatic control system direct engine drive Advertised speeds mph first creeper 0.72 second creeper 1.3 first 2.15 second 4.0 third 7.4 fourth 13.4 fifth 21.8 sixth 33.0 Reverse first 1.64 second 3.0 Belt pulley diam. 12.4" face 6.1" rpm 1080 Belt speed 3500 fpm Belt flat Length 50' Width 6" Thickness 0.228" Maximum slip 0.81% Clutch single plate dry disc operated by foot pedal Seat upholstered automotive type seat Brakes hydraulic with internal expanding shoes for all four wheels. Emergency brake can be locked Equalized yes, on four wheels Power take-off conventional type at both front and rear.

ENGINE Make Mercedes-Benz Type 4 cylinder vertical Diesel Serial No. 6503289 Crankshaft mounted lengthwise Head I Lubrication pressure Bore and stroke 2.950" x 3.937" Rated rpm 2550 Compression ratio 19 to 1 Displacement 107.8 cu. in. Port diameter valves Inlet 1.221" Exhaust 1.142" Governor pneumatic type Starting system 12 volt battery Air cleaner oil washed wire mesh Muffler was used Oil filter washable steel element Fuel filter one prefilter with washable metal screen and two filters with washable and replaceable felt element Cooling medium temperature control thermostat.

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data and without allowances, additions or deductions. Tests B and F were made with a fuel pump setting, selected by the manufacturer to develop approximately 29 corrected maximum belt horsepower and data from these tests were used in determining the horsepower to be developed in tests D and H, respectively. Tests C, D, E, G, H, J & L were made with the same setting.

HORSEPOWER SUMMARY

	Drawbar	Belt
1. Sea level (calculated) maximum horsepower (based on 60° F and 29.92" Hg)	26.57	29.13
2. Observed maximum horsepower (tests F and B)	25.84	28.43
3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (ASAE and SAE ratings)	19.93	24.76

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 607.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT (Chairman)
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 instru-

ment 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.

