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## Test 637: Volvo Model T425

Nebraska Tractor Test Lab

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Department of Agricultural Engineering  
Dates of test: February 26 to March 10, 1958  
Manufacturer: A-B. BOLINDER-MUNKTELL,  
ESKILSTUNA, SWEDEN  
Manufacturer's rating: 22 maximum drawbar horse-  
power and 24 maximum belt horsepower (cor-  
rected to standard conditions)

NEBRASKA TRACTOR TEST NO. 637

VOLVO T425

**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	

**TESTS B & C—100% MAXIMUM POWER—TWO HOURS**

23.99	2000	2.263	10.60	0.569	162	45	60	28.873
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**TEST D—RATED POWER—ONE HOUR**

21.27	2000	1.986	10.71	0.564	161	46	60	28.873
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**TEST E—VARYING POWER—TWO HOURS (20 minute runs; last line average)**

21.27	2000	1.998	10.65	0.567	161	45	60	.....
1.65	2162	0.855	1.93	3.127	162	45	60	.....
11.16	2101	1.337	8.35	0.723	161	46	61	.....
21.72	1805	2.053	10.58	0.570	164	46	61	.....
25.4	2083	1.026	5.40	1.117	164	45	60	.....
16.49	2076	1.630	10.12	0.597	164	46	62	.....
12.97	2038	1.483	8.75	0.690	162	45	60	28.878

**TEST L—OPERATING MAXIMUM TORQUE**

% of rated rpm (engine)	100	95	90	85	80	75	71	66	61	55
% of rated-speed torque	100	101	102	102	103	103	102	100	99	97

**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 POWER—TEN HOURS—2nd Gear**

17.04	1811	3.53	2000	3.84	1.702	10.01	0.603	172	33	35	29.014
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**TESTS F & G—OPERATING MAXIMUM POWER**

17.92	3659	1.84	1995	14.72	1st Gear (part throttle)	170	38	41	28.965
22.01	2367	3.49	2001	5.14	2nd Gear	174	38	42	28.945
21.63	1437	5.65	2000	3.03	3rd Gear	169	38	42	28.950
18.97	504	14.12	2010	0.59	4th Gear	159	38	42	28.945

**TEST J—OPERATING MAXIMUM POWER**

19.26	2293	3.15	2000	14.87	2nd Gear (part throttle)	170	32	36	28.995
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**TIRES, WHEELS AND WEIGHT**

Tests F, G, & H			Test J	
Rear wheels				
Type	Pressed steel		Pressed steel	
Fluid ballast	243 lb each		None	
Added cast iron	550 lb each		None	
Rear tires				
No. and size	Two 10-28		Two 10-28	
Ply	4		4	
Air pressure	16 lb		12 lb	
Front wheels				
Type	Pressed steel		Pressed steel	
Fluid ballast	None		None	
Added cast iron	88 lb each		None	
Front tires				
No. and size	Two 5.50-16		Two 5.50-16	
Ply	4		4	
Air pressure	24 lb		24 lb	
Height of drawbar	17 inches		17½ inches	
Static weight				
Rear end	3550 lb		1964 lb	
Front end	1160 lb		1034 lb	
Total weight as tested with operator	4885 lb		3173 lb	

**FUEL, OIL, WATER and TIME** Fuel Gasoline Octane No. ASTM 83 Research 89.7 (rating taken from oil company's typical inspection data) Weight per gallon 6.036 lb Oil SAE 20-20W To motor 0.707 gal Drained from motor 0.604 gal Water used 0.142 gal Total time motor was operated 46 hours.

**CHASSIS** Type Standard Serial No. 2571 Tread width rear 52.5" to 76.5" front 49" and 57" Wheel base 75" Hydraulic control system driven by belt from crankshaft Advertised speeds mph first 2.12 second 3.65 third 5.88 fourth 14.2 reverse 1.88 Belt pulley diam. 8½" face 6⅝" rpm 1340 Belt speed 3111 fpm Belt flat Length 71' Width 6" Thickness 0.215" Maximum slip 0.52% Clutch single plate dry disc operated by foot pedal Seat pressed steel seat with rubber puck suspension Brakes internal expanding shoe operated by two independent foot pedals Equalized by master foot pedal Power take-off conventional type Steering power steering not available.

**ENGINE** Make Volvo B 16 C Type 4 cylinder vertical Serial No. 995 Crankshaft mounted lengthwise Head I Lubrication pressure Bore and stroke 3.125" x 3.15" Rated rpm 2000 Compression ratio 7.4 to 1 Displacement 97.6 cu. in. Valves port diameter Inlet 1.339" Exhaust 1.22" Governor variable speed centrifugal Carburetor size ¾" Ignition system battery Starting system 6 volt battery Air cleaner oil washed wire screen Muffler was used Oil filter replaceable paper element Cooling medium temperature control thermostat and curtain.

**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 carburetor set for 100% 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 and 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)	22.35	24.86
2. Observed maximum horsepower (tests F and B)	22.01	23.99
3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (ASAE and SAE ratings)	16.76	21.13

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 637.

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.

