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6-19-1957

Test 625: Someca SOM 45 Diesel

Nebraska Tractor Test Lab

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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: June 14, 1957 to June 19, 1957
Manufacturer: SOMECA 47, BD. ORNANO,
SAINT-DENIS—(SEINE) FRANCE
Manufacturer's rating: Not rated

NEBRASKA TRACTOR TEST NO. 625

SOMECA SOM 45

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 & C—100% MAXIMUM LOAD—TWO HOURS											
40.43	1600	2.604	15.53	0.451	184	64	73	28.773			
TEST D—RATED LOAD—ONE HOUR											
36.28	1600	2.354	15.41	0.454	183	68	78	28.750			
TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)											
36.10	1600	2.340	15.43	0.454	181	69	79			
1.13	1657	0.827	1.37	5.124	144	69	79			
18.53	1630	1.513	12.25	0.572	153	68	78			
38.57	1517	2.447	15.76	0.444	184	68	78			
9.40	1648	1.136	8.27	0.846	149	68	76			
27.48	1615	1.903	14.44	0.485	161	68	75			
21.87	1611	1.694	12.91	0.542	162	68	77	28.747			
TEST L—OPERATING MAXIMUM TORQUE											
% of rated rpm (engine)...	100	94	88	81	75	69	63	56	50	44	40
% of rated-speed torque...	100	101	103	104	106	108	109	111	111	111	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 med	Air wet bulb	Air dry bulb	
TEST H—RATED LOAD—TEN HOURS—4th Gear											
29.53	2710	4.09	1601	5.05	2.098	14.08	0.497	156	60	72	29.089
TESTS F & G—100% MAXIMUM LOAD											
17.10	6248	1.03	1600	15.74	1st gear (prt-thrtl) ..	150		150	64	71	28.960
26.02	6200	1.57	1599	15.29	2nd gear (prt-thrtl) ..	152		152	64	71	28.960
36.09	5246	2.58	1599	10.28	3rd gear	166		166	67	73	28.960
37.09	3449	4.03	1600	6.29	4th gear	173		173	67	73	28.960
35.84	2137	6.29	1603	4.32	5th gear	163		163	64	71	28.960
32.62	1242	9.85	1596	2.67	6th gear	160		160	62	70	28.970
32.78	928	13.24	1611	2.26	7th gear	150		150	64	80	29.055
TEST J—OPERATING MAXIMUM LOAD											
35.44	3348	3.97	1597	8.92	4th gear	161		161	61	69	29.025

TIRES, WHEELS AND WEIGHT

	Tests F, G, & H	Test J
Rear wheels		
Type	Cast iron	Cast iron
Liquid ballast	488 lb each	None
Added cast iron	1076 lb each	None
Rear tires		
No. and size	Two 14-30	Two 14-30
Ply	6	6
Air pressure	16 lb	16 lb
Front wheels		
Type	Pressed steel	Pressed steel
Liquid ballast	None	None
Added cast iron	None	None
Front tires		
No. and size	Two 6.00-19	Two 6.00-19
Ply	6	6
Air pressure	28 lb	28 lb
Height of drawbar	22½ inches	23½ inches
Static weight		
Rear end	6410 lb	3282 lb
Front end	2038 lb	2038 lb
Total weight as tested with operator	8623 lb	5495 lb

FUEL, OIL, WATER and TIME Fuel Diesel Cetane No. ASTM 50 (rating taken from oil company's typical inspection data) Weight per gallon 7.000 lb Oil SAE 30 To motor 2.419 gal Drained from motor 2.346 gal Water used 0.257 gal Total time motor was operated 37½ hours.

CHASSIS TYPE Standard Serial No. 30032 Tread width rear 51.2" to 78.7" front 51.2" to 67" Wheel base 80" Hydraulic control system none Advertised speeds mph first 1.19 second 1.82 third 2.81 fourth 4.20 fifth 6.40 sixth 9.92 seventh 13.16 reverse first 1.88 second 6.65 Belt pulley diam. 11.8" face 7.0" rpm 890 Belt speed 2745 fpm Belt flat Length 72' Width 7" Thickness 0.216" Maximum slip 0.79% Clutch dual dry disc operated by single foot pedal Seat pressed steel on leaf spring with shock absorber Brakes disc brakes operated by two foot pedals and a hand lever Equalized by locking pedals together Power take-off continuous running controlled by secondary clutch Steering power steering not available.

ENGINE Make O. M. Milano (Italy) Type 4 cylinder vertical Diesel Serial No. 117091 Crankshaft mounted lengthwise Head I Lubrication pressure Bore and stroke 4.135" x 4.724" Rated rpm 1600 Compression ratio 15.5 to 1 Displacement 253.5 cu. in. Valve port diameter Inlet 1.383" Exhaust 1.224" Governor variable speed centrifugal Starting system 12 volt (two-6 volt batteries) Air cleaner oil washed wire screen Muffler was used Oil filter one auto cleaner and one cotton replaceable element Fuel filter one chamois leather element and one cotton replaceable element Cooling medium temperature control thermostat and curtain.

REPAIRS AND ADJUSTMENTS Prior to Test B the fuel injector was replaced in No. two cylinder.

REMARKS All test results were determined from observed data and without allowances, additions or deductions. Tests B and F were made with fuel pump set to develop approximately 43 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 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)	38.79	42.56
2. Observed maximum horsepower (tests F and B)	37.09	40.43
3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (ASAE and SAE ratings)	29.09	36.18

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 625.

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.

