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Test 699: Porche Junior L108 (Diesel)

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

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NEBRASKA TRACTOR TEST 699 – PORSCHE DIESEL JUNIOR L108

University of Nebraska Agricultural Experiment Station

W. V. Lambert, Director, Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temperature Cooling medium	Degrees F Air wet bulb	Air dry bulb	Barometer inches of Mercury	
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
11.29	2250	0.889	0.552	12.70	Air cooled	62	75	29.150	
Standard Power Take-off Speed (540 rpm)—One Hour									
10.46	2032	0.800	0.536	13.08	Air cooled	62	74	29.145	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
9.97	2332	0.788	0.554	12.65	Air cooled	61	74	
0.32	2464	0.312	6.884	1.03	Air cooled	62	76	
5.24	2432	0.535	0.716	9.79	Air cooled	62	75	
11.24	2250	0.886	0.552	12.69	Air cooled	62	74	
2.67	2478	0.424	1.112	6.30	Air cooled	61	74	
7.63	2381	0.646	0.594	11.81	Air cooled	62	75	
Av	6.18	2389	0.599	0.679	10.32	Air cooled	61	75	29.145

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank shaft speed rpm	% Slip of drive wheels	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temp Cool- ing med	Degrees F Air wet bulb	Air dry bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER & FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear											
9.28	772	4.51	2258	3.38	0.805	0.608	11.53	Air	79	84	28.955
Cooled											
75% of Pull at Maximum Power—Ten Hours—4th Gear											
7.76	604	4.82	2386	2.59	0.723	0.653	10.73	Air	72	78	28.935
Cooled											
50% of Pull at Maximum Power—Two Hours—4th Gear											
5.93	442	5.03	2457	1.51	0.636	0.751	9.32	Air	82	85	28.855
Cooled											
MAXIMUM POWER WITH BALLAST											
7.02	2482	1.06	2387	14.12	1st Gear			Air Cooled	81	86	28.870
9.26	2047	1.70	2259	9.88	2nd Gear			Air Cooled	65	77	29.030
9.57	1221	2.94	2249	5.56	3rd Gear			Air Cooled	68	79	29.000
9.58	804	4.47	2249	3.68	4th Gear			Air Cooled	68	79	29.000
8.88	451	7.38	2251	1.78	5th Gear			Air Cooled	74	80	29.000
6.80	205	12.45	2263	0.65	6th Gear			Air Cooled	74	80	29.000
MAXIMUM POWER WITHOUT BALLAST											
9.40	785	4.49	2247	4.63	4th Gear			Air Cooled	73	83	28.870

VARYING DRAWBAR PULL & TRAVEL SPEED WITH BALLAST—4th Gear

Pounds pull	800	800	800	850	800	800
Horsepower	9.6	8.5	7.7	7.0	5.5	4.7
Miles per hour	4.5	4.0	3.6	3.1	2.6	2.2

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 9-24;4;14	Two 9-24;4;12
Ballast	—Liquid	142 lb each	None
	—Cast iron	260 lb each	None
Front tires	—No, size, ply & psi	Two 4.50-16;4;28	Two 4.50-16;4;28
Ballast	—Liquid	None	None
	—Cast iron	None	None
Height of drawbar		21.5 inches	22 inches
Static weight	—Rear	2256 lb	1452 lb
	—Front	950 lb	948 lb
Total weight with operator		3381 lb	2575 lb

Department of Agricultural Engineering

Dates of Test: May 21 to June 9, 1959

Manufacturer: PORSCHE-DIESEL,
FRIEDRICHSHAFEN, GERMANY

Manufacturer's Power Rating: Not Rated

FUEL, OIL and TIME Fuel No 2 Diesel Cetane No 51 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8418 Weight per gallon 7.009 lb Oil SAE 20-20W API service classification DG and MS To motor 1.447 gal Drained from motor 1.149 gal Transmission and final-drive lubricant SAE No 90 Type straight mineral transmission oil Total time motor was operated 70 hours.

ENGINE Make Porsche-Diesel Type 1 cylinder vertical air cooled Serial No 12851H Crankshaft mounted lengthwise Rated rpm 2250 Lubrication pressure Bore and stroke 3.74" x 4.56" Compression ratio 19 to 1 Displacement 50.2 cu in Cranking system 12 volt battery Air cleaner oil washed wire mesh Muffler was used Oil filter oil pump screen mounted on drain plug and a rotary disc filter Fuel filter one replaceable paper element Cooling medium temperature control air cooled with thermostat.

CHASSIS Type standard Serial No L546H Tread width rear 49.2" to 68.9" front 49.2" to 64.9" Wheel base 72.4" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 32.7" Vertical distance above roadway 27.2" Horizontal distance from center of rear wheel tread 0" to the right or left Hydraulic control system direct engine drive Advertised speeds mph first 1.2 second 1.9 third 3.3 fourth 4.7 fifth 8.1 sixth 12.9 reverse 0.8 and 3.3 Belt pulley diam 7.08" face 3.94" rpm 1833 Belt speed 3400 fpm Clutch single plate dry disc operated by foot pedal Brakes internal expanding shoe operated by two independent foot pedals and a hand lever Power take-off 540 rpm at 2032 engine rpm Steering no power assistance Turning radius (on concrete surface with brake applied) right 102.5" left 102.5" (on concrete surface without brake) right 118" left 118" Turning space diameter (on concrete surface with brake applied) right 205" left 205" (on concrete surface without brake) right 236" left 236".

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with SAE and ASAE test code.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No 699.

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

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 useage.

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 transmissions, 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.



Porsche Diesel Junior L108 Test 699