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Test 725: International T-340 (Gasoline)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 725 - INTERNATIONAL T-340 GASOLINE

The University of Nebraska Agricultural Experiment Station

W. V. Lambert, Director; Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption		Hp-hr per gal	Temperature Degrees F			Barometer inches of mercury
		Gal per hr	Lb per hp-hr		Cooling medium	Air wet bulb	Air dry bulb	
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
36.49	2000	3.131	0.521	11.65	201	72	75	28.833
Standard Power Take-off Speed (540 rpm)—One Hour								
32.83	1747	2.787	0.515	11.78	207	71	75	28.823
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
32.56	2100	2.916	0.544	11.17	199	73	78
1.15	2213	1.102	5.817	1.04	161	71	75
16.68	2152	2.110	0.768	7.91	172	71	75
36.36	2000	3.138	0.524	11.59	195	72	77
8.47	2185	1.572	1.126	5.39	165	72	76
24.68	2121	2.491	0.613	9.91	180	75	79
Av 19.98	2128	2.222	0.675	8.99	179	72	76	28.800

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	% Slip of drive wheels	Fuel Consumption		Hp-hr per gal	Temp. Degrees F			Barometer inches of mercury
					Gal per hr	Lb per hp-hr		Cool- ing med	Air wet bulb	Air dry bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—2nd Gear											
28.33	4913	2.16	2007	3.07	3.251	0.697	8.71	169	42	46	28.930
75% of Pull at Maximum Power—Ten Hours—2nd Gear											
24.28	4011	2.27	2102	2.99	2.985	0.746	8.13	169	43	51	28.847
50% of Pull at Maximum Power—Two Hours—2nd Gear											
16.58	2689	2.31	2139	2.91	2.584	0.946	6.42	165	45	54	28.800
MAXIMUM POWER WITH BALLAST											
24.93	6458	1.45	2111	5.96	1st Gear.....		165	36	43	29.095	
31.04	5374	2.17	1998	2.94	2nd Gear.....		166	32	34	29.115	
30.58	3862	2.97	2004	1.63	3rd Gear.....		162	34	38	29.105	
29.21	2587	4.23	2001	0.78	4th Gear.....		166	36	43	29.095	
27.38	1768	5.81	1999	0.46	5th Gear.....		171	36	43	29.095	
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—2nd Gear											
Pounds pull			5350	5400	5450	5650	5450	5250			
Horsepower			31.0	27.4	24.7	22.6	18.9	15.4			
Miles per hour			2.2	1.9	1.7	1.5	1.3	1.1			

Department of Agricultural Engineering

Dates of Test: October 21 to October 29, 1959.

Manufacturer: INTERNATIONAL HARVESTER

COMPANY, CHICAGO, ILLINOIS

Manufacturer's Power Rating: 35 belt horsepower and 31 drawbar horsepower (corrected to standard conditions).

FUEL, OIL and TIME Fuel regular gasoline Octane No ASTM 84 Research 92 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7292 Weight per gallon 6.070 lb Oil SAE 10W-30 API service classification MS and DG To motor 1.635 gal Drained from motor 0.774 gal Transmission and final-drive lubricant IH HY-Tran Fluid Total time motor was operated 53 hours.

ENGINE Make International Type 4 cylinder vertical Serial No 16459V Crankshaft mounted lengthwise Rated rpm 2000 Lubrication pressure Bore and stroke 3¼" x 4¼" Compression ratio 7.38 to 1 Displacement 135 cu in Carburetor size ¾" Ignition system battery Cranking system 6 volt battery Air cleaner oil washed wire screen Muffler was used Oil filter replaceable treated paper element Cooling medium temperature control thermostat.

CHASSIS Type tracklayer Serial No T-340-946 Tread width 48" Wheel base 66" Drawbar height 13" Measured length of track 17.5 feet Cleats integral with shoes Cleats per track 35 Size of cleats 14" x 1½" 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 31²⁹/₃₂" Vertical distance above roadway 19³³/₆₄" Horizontal distance from center of rear wheel tread 0" to the right or left Hydraulic control system direct engine drive Advertised speeds mph first 1.5 second 2.2 third 3.0 fourth 4.3 fifth 5.8 reverse 1.8 Belt pulley diam 11" face 7½" rpm 1082 Belt speed 3115 fpm Clutch single plate dry disc operated by foot pedal Brakes double disc operated by steering levers or one foot pedal for both brakes Power take-off 541 rpm at 1800 engine rpm Steering hand-levers controlling brakes and single disc planetary steering Turning space diameter (with brake applied) right 161" left 161".

Total weight with operator 6695 pounds including front bumper 405 lbs, crankcase guards 37 lbs, front transmission guard 36 lbs, independent power take-off 130 lbs, swinging drawbar 68 lbs, track roller shields 130 lbs, 12 gallon hydraulic pump with dual control valves 82 lbs.

REPAIRS AND ADJUSTMENTS Seasonal disconnect shifter lever broke during limber-up run as a result of faulty actuation. This was replaced and test continued.

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 725.

L. F. LARSEN

Engineer-in-Charge

L. W. HURLBUT

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 usage.

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.



International T-340 Gasoline