

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

---

6-25-1965

## Test 905: Nuffield 10 / 42 (Diesel)

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto: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 905: Nuffield 10 / 42 (Diesel)" (1965). *Nebraska Tractor Tests*. 1287.  
<https://digitalcommons.unl.edu/tractormuseumlit/1287>

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.

# NEBRASKA TRACTOR TEST 905 - NUFFIELD 10 / 42 DIESEL

## 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								
39.06	2000	2.630	0.468	14.85	175	70	75	29.060
Standard Power Take-off Speed (540 rpm)—One Hour								
31.17	1429	1.972	0.440	15.81	174	70	75	29.085
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
35.10	2116	2.341	0.463	14.99	170	69	75	.....
0.00	2203	0.782	.....	.....	167	68	75	.....
17.71	2134	1.451	0.569	12.21	170	68	75	.....
39.27	2000	2.617	0.463	15.01	173	69	76	.....
8.95	2155	1.084	0.841	8.26	170	69	76	.....
26.36	2117	1.835	0.484	14.37	172	69	76	.....
Av 21.23	2120	1.685	0.551	12.60	170	69	75	29.107

## DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crankshaft speed rpm	Slip of drivers %	Fuel Consumption		Hp-hr per gal	Temp Degrees F			Barometer inches of Mercury
					Gal per hr	Lb per hp-hr		Cooling med	Air wet bulb	Air dry bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—5th Gear (3rd Lo)											
32.69	3912	3.13	1999	7.12	2.601	0.553	12.57	182	80	90	28.775
75% of Pull at Maximum Power—Ten Hours—5th Gear (3rd Lo)											
27.33	3011	3.40	2126	5.19	2.093	0.532	13.06	178	67	76	28.864
50% of Pull at Maximum Power—Two Hours—5th Gear (3rd Lo)											
18.83	2041	3.46	2138	4.21	1.645	0.607	11.45	179	74	78	28.735
MAXIMUM POWER WITH BALLAST											
27.43	6765	1.52	2109	14.99	2nd Gear (1st Hi)		175	67	79	29.000	
31.70	6567	1.81	1998	14.26	3rd Gear (2nd Lo)		175	67	79	29.000	
32.08	4945	2.43	2001	9.27	4th Gear (2nd Hi)		182	77	86	28.930	
33.59	4020	3.13	2000	7.21	5th Gear (3rd Lo)		185	75	83	28.930	
33.44	3093	4.05	2005	5.35	6th Gear (3rd Hi)		184	75	82	28.930	
33.71	2161	5.85	2001	3.84	7th Gear (4th Lo)		183	75	82	28.930	
32.54	1632	7.48	1998	2.91	8th Gear (4th Hi)		182	71	75	28.920	
30.74	909	12.68	2004	1.71	9th Gear (5th Lo)		181	71	75	28.920	

## MAXIMUM POWER WITHOUT BALLAST

32.05	4088	2.94	2001	13.80	5th Gear (3rd Lo)		186	68	83		28.920
-------	------	------	------	-------	-------------------	--	-----	----	----	--	--------

## VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear (3rd Lo)

Pounds pull	4020	4120	4240	4405	4475	4524	4422
Horsepower	33.59	30.88	28.18	25.70	22.09	18.63	14.62
Crankshaft speed, rpm	2000	1796	1599	1407	1193	998	801
Miles per hour	3.13	2.81	2.49	2.19	1.85	1.54	1.24
Slip of drivers, %	7.21	7.32	7.77	7.89	8.33	8.33	8.33

## TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 14.9-28; 6; 18	Two 14.9-28; 6; 14
Ballast	—Liquid	649 lb each	None
	—Cast iron	936 lb each	None
Front tires	—No, size, ply & psi	Two 6.00-16; 6; 44	Two 6.00-16; 6; 32
Ballast	—Liquid	53 lb each	None
	—Cast iron	217 lb each	None
Height of drawbar		19½ inches	20 inches
Static weight	—Rear	6465 lb	3295 lb
	—Front	2400 lb	1860 lb
Total weight with operator		9040 lb	5330 lb

Department of Agricultural Engineering

Dates of Test: JUNE 25 TO JULY 3, 1965

Manufacturer: THE BRITISH MOTOR CORPORATION, LONGBRIDGE, BIRMINGHAM, ENGLAND

**FUEL, OIL and TIME** Fuel No 2 Diesel Cetane No 57.0 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8343 Weight per gallon 6.947 lb Oil SAE 20-20W API service classification MS, DS To motor 1.944 gal Drained from motor 1.579 gal Transmission and final-drive lubricant SAE 90 Type transmission oil Total time engine was operated 47 hours.

**ENGINE** Make B.M.C. Diesel Type 3 cylinder vertical Serial No 28T 1257 D2448 Crankshaft mounted lengthwise Rated rpm 2000 Bore and stroke 3.937" x 4.724" Compression ratio 16.5 to Displacement 172.5" cu in Cranking system 12 volt electric Lubrication pressure Air cleaner oil washed wire mesh Oil filter replaceable micronic paper element Fuel filter replaceable gauze filters in fuel tank and lift pump, sediment bowl, and two replaceable paper elements Muffler was used Cooling medium temperature control thermostat and radiator shutter.

**CHASSIS** Type Standard Serial No 42N 66396 Tread width rear 52" to 80" front 52" to 76" Wheel base 73" 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 27" Vertical distance above roadway 31½" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system constant running except when PTO hand clutch is disengaged or when PTO-hydraulic selector lever is in neutral position Advertised speeds mph first 1.2 second 1.53 third 1.91 fourth 2.42 fifth 3.05 sixth 3.86 seventh 5.48 eighth 6.96 ninth 11.66 tenth 14.78 reverse 3.53 and 4.49 Clutch single plate dry disc operated by foot pedal Brakes dry disc operated by two foot pedals or by hand lever Steering no power assist Turning radius (on concrete surface with brake applied) right 124" left 124" (on concrete surface without brake) right 138" left 138" Turning space diameter (on concrete surface with brake applied) right 254" left 254" (on concrete surface without brake) right 282" left 282" Belt pulley 1325 rpm at 1800 engine rpm diam 9" face 6½" Belt speed 3123 fpm Power take-off 540 rpm at 1430 engine rpm.

**REPAIRS and ADJUSTMENTS** No repairs or adjustments.

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

First gear was not run as it was necessary to limit the pull in second gear to avoid excessive wheel slippage. Tenth gear was not run as it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 905.

L. F. LARSEN

Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman

J. J. SULEK

D. E. LANE

Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station  
E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

# 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,  $\frac{1}{2}$  of 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 trans-

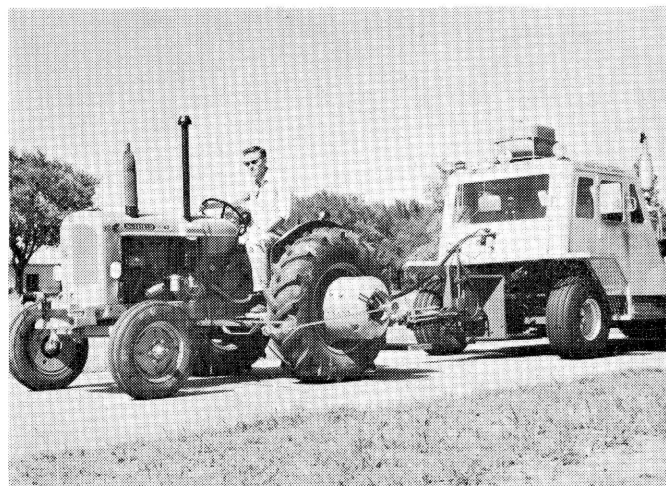
mission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the 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.



Nuffield 10/42 Diesel