

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

---

11-4-1966

## Test 953: Minneapolis-Moline G1000 Diesel (Also G1050 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 953: Minneapolis-Moline G1000 Diesel (Also G1050 Diesel)" (1966). *Nebraska Tractor Tests*. 1317.

<https://digitalcommons.unl.edu/tractormuseumlit/1317>

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 953 - MINNEAPOLIS-MOLINE G1000 DIESEL

(ALSO MINNEAPOLIS-MOLINE G1050 DIESEL)

## POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption		Temperature Degrees F					Barometer inches of Mercury
		Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
*	110.78	1800	8.072	0.504	13.72	185	53	75	29.040
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
	98.17	1875	7.134	0.503	13.76	171	52	73	.....
	0.00	1966	2.190	.....	.....	156	51	71	.....
	50.27	1920	4.618	0.636	10.89	170	51	71	.....
	110.04	1801	7.931	0.499	13.87	181	52	74	.....
	25.28	1941	3.322	0.909	7.61	156	50	70	.....
	74.57	1902	5.776	0.536	12.91	164	51	72	.....
Av	59.72	1901	5.162	0.598	11.57	166	51	72	29.070

## DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption		Temp Degrees F				
					Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling med	Air wet bulb	Air dry bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											

### VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

<b>Maximum Available Power—Two Hours—6th Gear (2nd DD)</b>												
100.99	7161	5.29	1804	5.15	8.252	0.565	12.24	170	35	41	29.090	
<b>75% of Pull at Maximum Power—Ten Hours—6th Gear (2nd DD)</b>												
81.99	5475	5.62	1887	3.70	6.846	0.578	11.98	168	37	43	29.291	
<b>50% of Pull at Maximum Power—Two Hours—6th Gear (2nd DD)</b>												
56.97	3692	5.79	1915	2.34	5.521	0.670	10.32	162	47	52	29.175	

### MAXIMUM POWER WITH BALLAST

64.67	14218	1.71	1888	14.93	1st Gear (1st AT)			168	33	35	29.230	
92.40	13711	2.53	1791	13.04	2nd Gear (2nd AT)			165	33	35	29.180	
100.13	11312	3.32	1801	8.85	3rd Gear (1st DD)			163	34	40	29.160	
94.54	9811	3.61	1802	7.37	4th Gear (3rd AT)			167	34	40	29.160	
97.58	8196	4.46	1800	5.90	5th Gear (4th AT)			169	34	40	29.160	
102.32	7293	5.26	1798	5.33	6th Gear (2nd DD)			170	36	42	29.100	
99.93	5256	7.13	1798	3.80	7th Gear (3rd DD)			169	36	42	29.100	
99.71	4261	8.78	1801	2.98	8th Gear (4th DD)			171	36	42	29.100	
90.91	3291	10.36	1809	2.37	9th Gear (5th AT)			171	36	42	29.100	

### MAXIMUM POWER WITHOUT BALLAST

98.51	7070	5.23	1800	7.97	6th Gear (2nd DD)			177	54	66	28.890	
-------	------	------	------	------	-------------------	--	--	-----	----	----	--------	--

### VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—6th Gear (2nd DD)

Pounds pull	7293	7715	7941	8266	8449	8354
Horsepower	102.32	96.69	88.53	80.18	69.41	57.47
Crankshaft speed, rpm	1798	1610	1436	1252	1063	889
Miles per hour	5.26	4.70	4.18	3.64	3.08	2.58
Slip of drivers, %	5.33	5.90	5.76	5.90	6.19	6.19

### TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 23.1-30; 8; 16	Two 23.1-30; 8; 16
Ballast	—Liquid	1405 lb each	None
	Cast iron	1920 lb each	None
Front tires	—No, size, ply & psi	Two 10.00-16; 6; 28	Two 10.00-16; 6; 28
Ballast	—Liquid	None	None
	Cast iron	None	None
Height of drawbar		14 inches	16 inches
Static weight with operator—Rear		14010 lb	7360 lb
	Front	3340 lb	3315 lb
	Total	17350 lb	10675 lb

Department of Agricultural Engineering

Dates of Test: NOVEMBER 4 TO NOVEMBER 15, 1966

Manufacturer: MINNEAPOLIS-MOLINE, INC., HOPKINS, MINNESOTA

**FUEL, OIL and TIME** Fuel No 2 diesel Cetane No 54.7 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8309 Weight per gallon 6.918 lb Oil SAE 30 API service classification MS, DG, DM To motor 2.235 gal Drained from motor 1.536 gal Transmission and final-drive lubricant EP80 Gear oil Mil-L-2105A Total time engine was operated 45½ hours.

**ENGINE** Make Minneapolis-Moline diesel Type 6 cylinder vertical Serial No 29700931 Crankshaft mounted lengthwise Rated rpm 1800 Bore and stroke 4½" x 5" Compression ratio 14.3 to 1 Displacement 504 cu in Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with replaceable paper element Oil filter replaceable pleated paper element Fuel filter parallel flow replaceable pleated paper cartridges Muffler was used Cooling medium temperature control thermostat.

**CHASSIS** Type standard Serial No 30601039 Tread width rear 64" to 96" front 56" to 80" Wheel base 103¼" 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 29.4" Vertical distance above roadway 35.2" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial range operator controlled power shifting Advertised speeds mph first 1.84 second 2.81 third 3.50 fourth 3.74 fifth 4.57 sixth 5.35 seventh 7.13 eighth 8.70 ninth 10.16 tenth 19.35 reverse 2.81 and 5.35 Clutch single plate dry disc operated by foot pedal Brakes wet type multi-disc operated by two foot pedals Steering hydraulic with power assist Turning radius (on concrete surface with brake applied) right 129" left 129" (on concrete surface without brake) right 147" left 147" Turning space diameter (on concrete surface with brake applied) right 266" left 266" (on concrete surface without brake) right 302" left 302" Belt pulley none Power take-off 536 or 995 rpm at 1800 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.

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 953.

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.



Minneapolis-Moline G1000 Diesel