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Test 974: Minneapolis-Moline G1000 Vista (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 974 – MINNEAPOLIS-MOLINE G1000 VISTA 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									
111.00	1800	8.000	0.502	13.88	183	57	75	28.803	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
99.55	1902	7.089	0.496	14.04	175	57	75	.....
0.00	1938	2.062	.....	.....	168	55	72	.....
50.60	1933	4.399	0.606	11.50	172	56	73	.....
111.46	1800	8.001	0.500	13.93	185	57	76	.....
25.39	1929	3.207	0.880	7.92	168	57	75	.....
75.64	1923	5.647	0.520	13.39	174	57	75	.....
Av 60.44	1904	5.067	0.584	11.93	174	56	74	28.825	

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption		Temp Degrees F				Barom- eter inches of Mercury
					Gal per hr	Lb per hp-hr	Hp-hr per gal	Cool- ing med	Air wet bulb	Air dry bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—5th Gear (2nd DD)											
96.38	6840	5.28	1798	4.33	8.154	0.590	11.82	163	53	65	28.680
75% of Pull at Maximum Power—Ten Hours—5th Gear (2nd DD)											
81.60	5429	5.64	1907	3.76	6.829	0.583	11.95	162	50	52	28.690
50% of Pull at Maximum Power—Two Hours—5th Gear (2nd DD)											
54.79	3543	5.80	1932	2.38	5.446	0.693	10.06	170	51	53	28.755
MAXIMUM POWER WITH BALLAST											
85.48	14443	2.22	1894	14.87	1st Gear (1st AT)			162	46	53	29.130
99.94	11267	3.33	1795	7.71	2nd Gear (1st DD)			165	48	57	29.080
98.94	10563	3.51	1799	7.42	3rd Gear (2nd AT)			167	50	61	28.780
99.97	7816	4.80	1801	5.02	4th Gear (3rd AT)			169	50	61	28.780
100.97	7187	5.27	1798	4.64	5th Gear (2nd DD)			168	53	65	28.700
100.19	6351	5.92	1801	3.93	6th Gear (4th AT)			167	53	65	28.700
98.88	5204	7.13	1799	3.38	7th Gear (3rd DD)			166	53	65	28.700
97.57	4176	8.76	1801	2.50	8th Gear (4th DD)			168	53	65	28.700
90.69	2511	13.54	1809	1.68	9th Gear (5th AT)			170	53	65	28.700
MAXIMUM PULL WITHOUT BALLAST											
87.21	9555	3.42	1878	14.74	3rd Gear (2nd AT)			165	50	60	28.995
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 5th Gear (2nd DD)											
Pounds pull				7187	7614	7837	8018	8302	8176	7715	
Horsepower				100.97	95.73	87.30	77.73	60.11	56.61	42.99	
Crankshaft speed rpm				1798	1614	1433	1248	1074	892	715	
Miles per hour				5.27	4.71	4.18	3.64	3.12	2.60	2.09	
Slip of drivers, %				4.64	4.87	5.18	5.18	5.48	5.18	4.87	

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 23.1-34; 8; 16	Two 23.1-34; 8; 16
	—Liquid	1570 lb each	None
	Cast iron	1500 lb each	None
Front tires	—No, size, ply & psi	Two 10.00-16; 6; 28	Two 10.00-16; 6; 28
	—Liquid	None	None
	Cast iron	None	None
Height of drawbar		17 inches	18½ inches
Static weight with operator—	Rear	14910 lb	8770 lb
	Front	3455 lb	3460 lb
	Total	18365 lb	12230 lb

Department of Agricultural Engineering

Dates of Test: May 13 to May 24, 1968

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

FUEL, OIL and TIME Fuel No 2 Diesel Cetane No 52.4 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8371 Weight per gallon 6.970 lb Oil SAE 30 API service classification DS To motor 3.334 gal Drained from motor 1.465 gal Transmission and final-drive lubricant EP 80 Gear oil Mil-L-2105A Total time engine was operated 45 hours.

ENGINE Make Minneapolis-Moline Type 6 cylinder vertical Serial No 29703179 Crankshaft mounted lengthwise Rated rpm 1800 Bore and stroke 4.625" x 5.00" 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 Oil cooler radiator for transmission Fuel filter parallel flow replaceable paper cartridges Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 34600453 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 28" Vertical distance above roadway 35" 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 2.25 second 3.25 third 3.40 fourth 4.55 fifth 5.00 sixth 5.55 seventh 6.65 eighth 8.10 ninth 12.40 tenth 18.05 reverse 3.40 and 5.00 Clutch single plate dry disc operated by foot pedal Brakes dry dual disc hydraulically power actuated 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" Power take-off 536 and 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 974.

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. W. Ottoson, 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

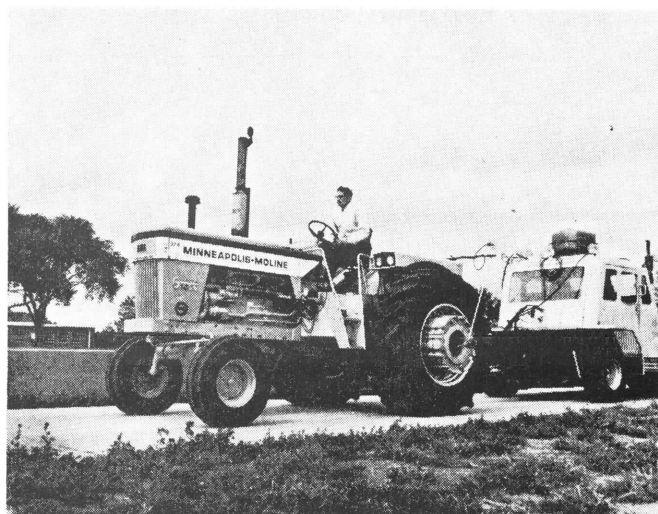
speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to 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 Pull without Ballast. All added ballast is removed from the tractor. The drawbar pull is determined at slip limits of 15% for pneumatic tires or 7% for steel tracks or lugs. The tractor is operated at the fastest possible travel speed.

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 VISTA DIESEL