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5-25-1965

Test 901: Massey-Ferguson MF 150 (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 901 - MASSEY-FERGUSON MF 150 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								
* 37.88	2000	2.124	0.388	17.83	189	57	75	28.880
Standard Power Take-off Speed (540 rpm)—One Hour								
35.38	1705	1.949	0.381	18.15	193	58	75	28.870
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
32.79	2036	1.877	0.396	17.47	175	59	75	.....
0.00	2144	0.616	.....	.....	152	59	75	.....
17.01	2113	1.214	0.494	14.01	172	59	75	.....
38.26	2000	2.137	0.387	17.90	190	59	75	.....
8.57	2130	0.893	0.721	9.60	158	59	75	.....
25.17	2085	1.535	0.422	16.40	175	59	75	.....
Av 20.30	2084	1.379	0.470	14.72	170	59	75	28.873

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—7th Gear (1st Hi-Lo MP)												
33.07	2514	4.93	1999	5.59	2.151	0.450	15.37	192	70	82	28.770	
75% of Pull at Maximum Power—Ten Hours—7th Gear (1st Hi-Lo MP)												
26.31	1931	5.11	2040	4.22	1.752	0.461	15.02	181	67	79	28.813	
50% of Pull at Maximum Power—Two Hours—7th Gear (1st Hi-Lo MP)												
18.38	1297	5.31	2093	2.87	1.378	0.519	13.34	168	69	80	28.775	
MAXIMUM POWER WITH BALLAST												
28.01	4787	2.19	2007	14.37	4th Gear (2nd Lo-Hi MP)		180	64	72	28.780		
31.48	3608	3.27	2002	9.01	5th Gear (3rd Lo-Lo MP)		198	69	79	28.780		
32.39	2773	4.38	1999	6.21	6th Gear (3rd Lo-Hi MP)		189	69	79	28.780		
33.50	2554	4.92	1998	5.88	7th Gear (1st Hi-Lo MP)		192	69	79	28.780		
32.48	1869	6.52	2001	4.17	8th Gear (1st Hi-Hi MP)		191	70	82	28.770		
33.40	1661	7.54	2000	3.83	9th Gear (2nd Hi-Lo MP)		191	70	82	28.770		
32.15	1219	9.89	2000	2.94	10th Gear (2nd Hi-Hi MP)		192	70	82	28.770		
31.09	829	14.06	2000	2.04	11th Gear (3rd Hi-Lo MP)		190	70	82	28.770		
MAXIMUM POWER WITHOUT BALLAST												
33.23	2554	4.88	2001	6.65	7th Gear (1st Hi-Lo MP)		190	68	80	28.690		
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—7th Gear (1st Hi-Lo MP)												
Pounds pull				2554	2714	2809	2830	2793	2697			
Horsepower				33.50	32.05	29.38	25.92	21.73	17.62			
Crankshaft speed, rpm				1998	1805	1604	1405	1193	999			
Miles per hour				4.92	4.43	3.92	3.44	2.92	2.45			
Slip of drivers, %				5.88	6.40	6.53	6.65	6.53	6.27			

TIRES, BALLAST and WEIGHT		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 12.4-38; 4; 14	Two 12.4-38; 4; 12
Ballast	—Liquid	524 lb each	None
	Cast iron	239 lb each	None
Front tires	—No, size, ply & psi	Two 6.00-16; 4; 32	Two 6.00-16; 4; 32
Ballast	—Liquid	None	None
	Cast iron	138 lb each	None
Height of drawbar		21½ inches	22 inches
Static weight	—Rear	4470 lb	2945 lb
	Front	1960 lb	1685 lb
Total weight with operator		6605 lb	4805 lb

Department of Agricultural Engineering

Dates of Test: MAY 25 TO JUNE 9, 1965

Manufacturer: MASSEY-FERGUSON INC.,
DETROIT, MICHIGAN

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° 0.8312 Weight per gallon 6.920 lb Oil SAE 20-20W API service classification MS DG To motor 1.496 gal Drained from motor 1.327 gal Transmission and final-drive lubricant SAE Massey-Ferguson Oil M-1101 Total time engine was operated 39½ hours.

ENGINE Make Perkins Diesel Type 3 cylinder vertical Serial No 2303061 Crankshaft mounted lengthwise Rated rpm 2000 Bore and stroke 3.6" x 5" Compression ratio 17.4 to 1 Displacement 152.7 cu in Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with replaceable pleated paper element Oil filter full flow replaceable paper element Fuel filter primary and secondary filters with replaceable paper elements and sediment bowl with screen Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No CDW 642000915 Tread width rear 52" to 88" front 50" to 82" Wheel base 81.8" 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 30" Vertical distance above roadway 31.4" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system constant running except when PTO foot clutch is disengaged Transmission selective gear fixed ratio with partial range operator controlled power shifting Advertised speeds mph first 1.38 second 1.69 third 1.95 fourth 2.54 fifth 3.58 sixth 4.66 seventh 5.20 eighth 6.76 ninth 7.80 tenth 10.14 eleventh 14.32 twelfth 18.62 reverse 1.77, 2.30, 7.08 and 9.20 Clutch single plate dry disc in combination with PTO clutch operated by single foot pedal Brakes double disc operated by two foot pedals that can be locked together Steering mechanical with power assist Turning radius (on concrete surface with brake applied) right 124" left 124" (on concrete surface without brake) right 137" left 137" Turning space diameter (on concrete surface with brake applied) right 248" left 248" (on concrete surface without brake) right 274" left 274" Belt pulley 1176 rpm at 1975 engine rpm diam 10¼" face 6½" Belt speed 3117 fpm Power take-off 540 rpm at 1700 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, second, and third gears were not run as it was necessary to limit the pull in fourth gear to avoid excessive wheel slippage. Twelfth 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 901.

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-

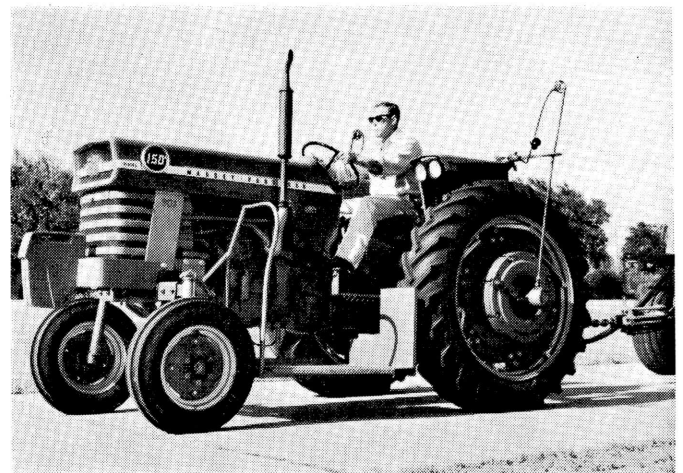
mission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the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



Massey-Ferguson MF 150 Diesel