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Test 1189: Massey-Ferguson MF 255 Diesel

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1189 – MASSEY-FERGUSON MF 255 DIESEL

POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temperature Cooling medium	Degrees F Air wet bulb	Air dry bulb	Barometer inches of Mercury
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MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—Two Hours (PTO Speed—642 rpm)								
50.69	2000	3.222	0.439	15.73	179	68	75	28.920

Standard Power Take-off Speed (540 rpm)—One Hour								
45.55	1683	2.868	0.435	15.88	182	68	75	28.895

VARYING POWER AND FUEL CONSUMPTION—Two Hours

44.04	2046	2.765	0.434	15.93	173	69	76	.....
0.00	2170	0.929	.....	.....	161	69	75	.....
22.72	2110	1.767	0.537	12.86	165	69	75	.....
50.83	2001	3.251	0.442	15.63	180	70	76	.....
11.58	2146	1.302	0.778	8.89	162	71	77	.....
33.64	2083	2.205	0.453	15.26	168	71	77	.....
Av 27.13	2093	2.037	0.519	13.32	168	70	76	28.883

DRAWBAR PERFORMANCE

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

Maximum Available Power—Two Hours 7th (1 H L) Gear											
42.07	2986	5.28	1999	6.63	3.129	0.514	13.44	179	64	69	28.725

75% of Pull at Maximum Power—Ten Hours 7th (1 H L) Gear											
34.45	2328	5.55	2060	4.88	2.579	0.517	13.36	169	56	64	28.771

50% of Pull at Maximum Power—Two Hours 7th (1 H L) Gear											
25.01	1627	5.77	2108	3.42	2.044	0.565	12.24	168	70	75	28.645

50% of Pull at Reduced Engine Speed—Two Hours 9th (2 H L) Gear											
24.26	1590	5.72	1429	3.58	1.754	0.500	13.83	165	48	56	29.020

MAXIMUM POWER WITH BALLAST

33.20	5257	2.37	2050	14.95	4th Gear (2 L H)	172	55	69	29.050
41.47	4614	3.37	1998	11.44	5th Gear (3 L L)	176	61	65	28.720
42.32	3451	4.60	1999	7.69	6th Gear (3 L H)	176	61	65	28.720
43.72	3102	5.29	1999	6.75	7th Gear (1 H L)	175	61	65	28.720
43.19	2303	7.03	1999	5.18	8th Gear (1 H H)	176	62	65	28.730
43.10	2035	7.94	2000	4.31	9th Gear (2 H L)	176	62	66	28.730

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—7th (1 H L) Gear

Pounds Pull	3102	3258	3388	3480	3482	3397
Horsepower	43.72	41.23	38.03	33.80	28.97	23.52
Crankshaft Speed rpm	1999	1803	1607	1396	1195	993
Miles Per Hour	5.29	4.75	4.21	3.64	3.12	2.60
Slip of Drivers %	6.75	7.11	7.58	7.81	8.04	7.81

TRACTOR SOUND LEVEL WITHOUT CAB db(A)

Maximum Available Power 2 Hours	95.5
75% of Pull at Max. Power 10 Hours	95.5
50% of Pull at Max. Power 2 Hours	94.0
50% of Pull at Reduced Engine Speed 2 Hours	90.5
Bystander (in 11th—3 H L—gear)	85.0

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires	Two 16.9-28; 6; 16	Two 16.9-28; 6; 16
Ballast	573 lb each	None
	Cast iron	None
Front Tires	Two 7.5L-15; 6; 32	Two 7.5L-15; 6; 32
Ballast	None	None
	Liquid	None
	Cast iron	None
Height of drawbar	20 inches	20 inches
Static weight with operator—rear	5075 lb	3930 lb
front	2055 lb	2040 lb
total	7130 lb	5970 lb

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska—Lincoln
H. W. Ottoson, Director

Department of Agricultural Engineering

Dates of Test: September 4 to 24, 1975

Manufacturer: MASSEY-FERGUSON INC.,
1901 Bell Avenue, Des Moines, Iowa 50315

FUEL, OIL AND TIME Fuel Diesel No. 2 Cetane No. 51.7 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° .8300 Weight per gallon 6.911 lb Oil SAE 20-20W API service classification SB/SE-CA/CC To motor 2.351 gal Drained from motor 1.618 gal Transmission and final drive lubricant Massey-Ferguson Oil M-1129(A) Total time engine was operated 43.5 hours.

ENGINE Make Perkins Type four cylinder vertical Serial No 123465 DL Crankshaft Mounted lengthwise Rated rpm 2000 Bore and stroke 3.6" x 5.0" Compression ratio 18.5 to 1 Displacement 203 cu in Lubrication pressure Cranking system 12 volt Air cleaner dry dual pleated paper element Oil filter full flow paper cartridge Oil cooler radiator for hydraulic and transmission oil Fuel filter pleated paper element Muffler vertical Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No. 9A 221107 Tread width rear 56" to 90" front 48" to 80" Wheel base 82" 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 27.4" Vertical distance above roadway 32.4" Horizontal distance from center of rear wheel tread 0.3" to the right Hydraulic control system constant running except when PTO clutch is disengaged Transmission selective gear fixed ratio with partial range operator controlled power shift Advertised speeds mph first 1.4 second 1.8 third 2.0 fourth 2.6 fifth 3.6 sixth 4.8 seventh 5.4 eighth 7.1 ninth 7.9 tenth 10.4 eleventh 14.5 twelfth 19.0 reverse 1.8, 2.4, 7.4 and 9.6 Clutch single plate dry disc operated by foot pedal Brakes double dry disc operated by two foot pedals which can be locked together Steering power assist Turning radius (on concrete surface with brake applied) right 116.5" left 118" (on concrete surface without brake) right 128" left 125.5" Turning space diameter (on concrete surface with brake applied) right 241" left 234" (on concrete surface without brake) right 263" left 260" Power take-off 540 rpm at 1683 engine rpm.

REPAIRS AND ADJUSTMENTS: No repairs and adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure. Fuel temperature at injection pump return was 153°F. Six gears were chosen between 15% slip and 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1189.

LOUIS I. LEVITICUS

Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman

W. E. SPLINTER

D. E. LANE

Board of Tractor Test Engineers

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories may be disconnected only when the means for disconnecting can be reached from the operator station. 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. Prior to the maximum power run the tire tread-bar height must be at least 65% of new tread height.

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 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 use.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effects 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 4 different runs 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; (3) 50% of the pull at maximum power; and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 6 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 manufacturer's representative has the option of selecting one gear or speed over eight miles per hour. The maximum safe speed for the Nebraska Test Course has been set at 15 mph. The slip limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Varying Drawbar Pull 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.

SOUND MEASUREMENT

Sound is recorded during each of the Varying Power and Fuel Consumption runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet from the line of travel of the tractor.

An increase of 10 dB(A) will approximately double the loudness to the human ear.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska 68583.



MASSEY-FERGUSON MF 255 DIESEL