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Test 897: Massey-Ferguson MF 175 (Diesel)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 897 - MASSEY-FERGUSON MF 175 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								
	63.34	2000	3.797	0.415	16.68	182	68	76	28.897
	Standard Power Take-off Speed (540 rpm)—One Hour								
	55.46	1684	3.275	0.409	16.93	185	69	76	28.875
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
	55.17	2047	3.264	0.409	16.90	172	70	79	.....
	0.00	2114	0.949	.....	.....	162	70	79	.....
	28.10	2084	2.029	0.500	13.85	172	70	80	.....
	63.41	2000	3.785	0.413	16.75	188	71	82	.....
	14.11	2096	1.452	0.712	9.72	162	70	82	.....
	41.50	2055	2.579	0.430	16.09	173	71	83	.....
Av	33.72	2066	2.343	0.481	14.39	172	70	81	28.857

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)												
53.51	3894	5.15	1996	6.13	3.724	0.482	14.37	178	58	66	28.580	
75% of Pull at Maximum Power—Ten Hours—7th Gear (1st Hi-Lo MP)												
43.55	3053	5.35	2041	4.67	3.062	0.487	14.22	177	71	81	28.616	
50% of Pull at Maximum Power—Two Hours—7th Gear (1st Hi-Lo MP)												
30.58	2060	5.57	2091	3.22	2.428	0.550	12.59	171	58	64	28.550	
MAXIMUM POWER WITH BALLAST												
44.05	7109	2.32	2024	14.92	4th Gear (2nd Lo-Hi MP)		184	70	81	28.640		
52.82	5768	3.43	2004	9.41	5th Gear (3rd Lo-Lo MP)		183	69	73	28.720		
54.03	4367	4.64	2002	6.22	6th Gear (3rd Lo-Hi MP)		184	69	73	28.720		
55.69	4030	5.18	2001	5.74	7th Gear (1st Hi-Lo MP)		183	69	73	28.720		
54.79	2983	6.89	2001	4.32	8th Gear (1st Hi-Hi MP)		185	71	81	28.660		
55.33	2613	7.94	2001	3.70	9th Gear (2nd Hi-Lo MP)		184	71	81	28.660		
51.09	1826	10.49	2002	2.74	10th Gear (2nd Hi-Hi MP)		186	71	81	28.660		
48.15	1217	14.84	2000	1.56	11th Gear (3rd Hi-Lo MP)		179	71	81	28.660		
MAXIMUM POWER WITHOUT BALLAST												
55.06	4099	5.04	1999	8.83	7th Gear (1st Hi-Lo MP)		176	56	65	28.870		
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—7th Gear (1st Hi-Lo MP)												
Pounds pull				4030	4139	4310	4265	4177	4016			
Horsepower				55.69	51.15	47.32	41.06	34.25	27.48			
Crankshaft speed, rpm				2001	1793	1598	1400	1191	992			
Miles per hour				5.18	4.63	4.12	3.61	3.08	2.57			
Slip of drivers, %				5.74	5.98	6.34	6.22	6.10	5.86			

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 16.9-28; 6; 16	Two 16.9-28; 6; 16
	Ballast	570 lb each	None
	Cast iron	970 lb each	None
Front tires	—No, size, ply & psi	Two 6.50-16; 6; 32	Two 6.50-16; 6; 28
	Ballast	None	None
	Cast iron	175 lb each	None
Height of drawbar		17½ inches	18½ inches
Static weight	—Rear	7150 lb	4070 lb
	Front	2230 lb	1880 lb
Total weight with operator		9555 lb	6125 lb

Department of Agricultural Engineering

Dates of Test: MAY 17 TO MAY 29, 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 DS To motor 2.194 gal Drained from motor 1.658 gal Transmission and final-drive lubricant Massey-Ferguson Oil M-1101 Total time engine was operated 42½ hours.

ENGINE Make Perkins Diesel Type 4 cylinder vertical Serial No 4803269 Crankshaft mounted lengthwise Rated rpm 2000 Bore and stroke 3.875" x 5" Compression ratio 16 to 1 Displacement 236 cu in Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with replaceable pleated paper element Oil filter full flow replaceable pleated 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 SDW-644000084 Tread width rear 56" to 90" front 48.5" to 80.5" 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 26" Vertical distance above roadway 30.8" 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 1.32 second 1.74 third 1.98 fourth 2.60 fifth 3.65 sixth 4.77 seventh 5.29 eighth 6.94 ninth 7.88 tenth 10.40 eleventh 14.58 twelfth 19.08 reverse 1.81, 2.36, 7.21, and 9.45 Clutch single plate dry disc in combination with pto clutch operated by single foot pedal Brakes double disc operated by two foot pedals which can be locked Steering mechanical with power assist Turning radius (on concrete surface with brake applied) right 126" left 126" (on concrete surface without brake) right 140" left 144" Turning space diameter (on concrete surface with brake applied) right 264" left 264" (on concrete surface without brake) right 290" left 300" Belt pulley 1176 rpm at 1975 engine rpm diam 10¼" face 6½" Belt speed 3117 fpm Power take-off 540 rpm at 1684 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 because it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 897.

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 175 Diesel