9-11-1969

Test 1020: Massey-Ferguson MF 175 (Gasoline)

Nebraska Tractor Test Lab
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NEBRASKA TRACTOR TEST 1020 – MASSEY-FERGUSON MF 175 GASOLINE

POWER TAKE-OFF PERFORMANCE

Hp	Crankshaft speed rpm	Fuel Consumption: Gal per hr	Fuel Consumption: Lb per hp-hr	Fuel Consumption: Hp-hr per gal	Temperature Degrees F: Cooling medium	Temperature Degrees F: Air wet bulb	Temperature Degrees F: Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
61.89	2000	5.568	0.553	11.12	180	69	75	29.227
Standard Power Take-off Speed (540 rpm)—One Hour								
58.06	1683	5.039	0.533	11.52	181	69	75	29.220
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
55.51	2109	5.545	0.614	10.01	177	69	74	.....
0.00	2261	2.895	.....	.....	170	69	74	.....
28.86	2196	4.276	0.911	6.75	175	71	76	.....
61.57	1999	5.526	0.552	11.14	180	70	76	.....
14.67	2230	3.573	1.497	4.11	171	70	75	.....
42.31	2146	4.911	0.713	8.62	176	70	75	.....
Av 33.82	**2157**	**4.454**	**0.809**	**7.59**	**175**	**70**	**75**	**29.183**

DRAWBAR PERFORMANCE

Hp	Drawbar pull lbs	Speed miles per hr	Crankshaft speed rpm	Slip of drivers %	Fuel Consumption: Gal per hr	Fuel Consumption: Lb per hp-hr	Fuel Consumption: Hp-hr per gal	Temp Degrees F: Cooling med	Temp Degrees F: Air wet bulb	Temp Degrees F: Air dry bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—7th Gear (1st Hi-Lo MP)											
48.30	3484	5.20	1999	6.19	4.931	0.627	9.80	172	61	73	29.055
75% of Pull at Maximum Power—Ten Hours—7th Gear (1st Hi-Lo MP)											
41.75	2783	5.63	2128	4.76	5.013	0.738	8.33	168	60	70	29.037
50% of Pull at Maximum Power—Two Hours—7th Gear (1st Hi-Lo MP)											
28.92	1866	5.81	2174	3.77	4.284	0.910	6.75	164	59	70	28.808
MAXIMUM POWER WITH BALLAST											
44.03	6848	2.41	2049	13.52	4th Gear (2nd Lo-Hi MP)			167	61	65	28.960
49.60	5443	3.42	2001	10.54	5th Gear (3rd Lo-Lo MP)			170	63	78	29.100
50.47	4099	4.62	2000	7.59	6th Gear (3rd Lo-Hi MP)			170	62	76	29.100
51.05	3696	5.18	2002	6.94	7th Gear (1st Hi-Lo MP)			174	62	75	29.100
51.63	2808	6.90	2001	5.12	8th Gear (1st Hi-Hi MP)			175	62	75	29.090
50.82	2393	7.96	2001	4.49	9th Gear (2nd Hi-Lo MP)			178	63	77	29.080
49.33	1750	10.57	2007	3.29	10th Gear (2nd Hi-Hi MP)			177	62	75	29.080
46.57	1168	14.95	2005	2.31	11th Gear (3rd Hi-Lo MP)			178	62	76	29.080
MAXIMUM PULL WITHOUT BALLAST											
41.75	4551	3.44	2078	14.83	5th Gear (3rd Lo-Lo MP)			177	65	82	28.690

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST
7th Gear (1st Hi-Lo MP)

Pounds Pull	3696	4019	4276	4445	4473	4260
Horsepower	51.05	49.67	46.78	42.39	36.42	28.98
Crankshaft speed rpm	2002	1806	1609	1405	1200	998
Miles per hour	5.18	4.63	4.10	3.58	3.05	2.55
Slip of drivers, %	6.94	7.47	8.17	8.40	8.40	7.94

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	—Liquid	650 lb each	None
	Cast iron	800 lb each	None
Front tires	—No, size, ply & psi	Two 6.50-16; 6; 32	Two 6.50-16; 6; 32
Ballast	—Liquid	None	None
	Cast iron	180 lb each	None
Height of drawbar		21 inches	22½"
Static weight with operator—Rear		6985 lb	4085 lb
	Front	2200 lb	1840 lb
	Total	9185 lb	5925 lb

Department of Agricultural Engineering

Dates of Test: September 11 to September 25, 1969

Manufacturer: MASSEY-FERGUSON, INC., DETROIT, MICHIGAN

FUEL, OIL and TIME Fuel regular gasoline **Octane No** Motor 85 Research 93 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.7383 **Weight per gallon** 6.146 lb **Oil** SAE 20-20W **API service classification** MS-DM **To motor** 1.884 gal **Drained from motor** 1.498 gal **Transmission and final-drive lubricant** Massey-Ferguson oil M1129A **Total time engine was operated** 44 hours.

ENGINE Make Perkins gasoline **Type** 4 cylinder vertical **Serial No** 236UA 882A **Crankshaft mounted** lengthwise **Rated rpm** 2000 **Bore and stroke** 3⅞" x 5" **Compression ratio** 7 to 1 **Displacement** 236 cu in **Carburetor size** 1¼" **Ignition system** battery **Cranking system** 12 volt electric **Lubrication** pressure **Air cleaner** dry type with replaceable pleated paper element **Oil filter** full flow replaceable pleated paper element **Oil cooler** radiator for transmission and hydraulic oil **Fuel filter** sediment bowl and screen **Muffler** was used **Cooling medium temperature control** thermostat.

CHASSIS Type standard **Serial No** 9A 55897 **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** direct drive **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 operated by foot pedal **Brakes** double disc operated by two foot pedals which can be locked together **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 1683 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 1020.

L. F. LARSEN
Engineer-In-Charge

G. W. STEINBRUEGGE, Chairman
W. E. SPLINTER
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, ½ of the 85% torque; maximum power, ¼ and ¾ 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.

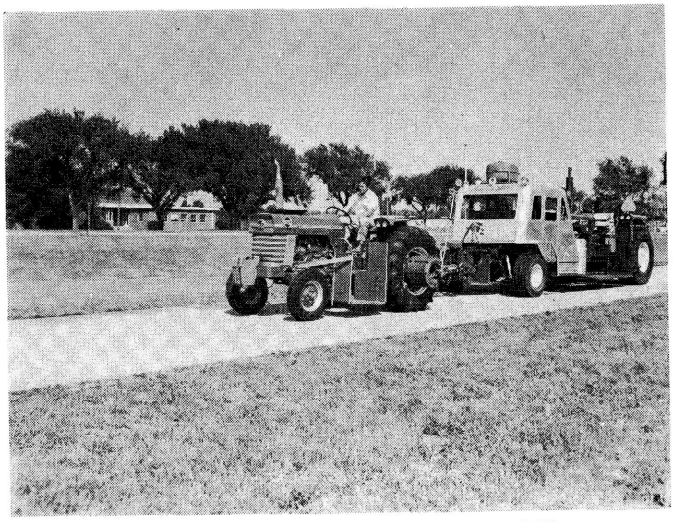
Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with 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.**



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