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January 2005

Test 1856: McCormick MTX 120 Diesel

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1856 - SUMMARY 483

McCORMICK MTX 120 DIESEL

16 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
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MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—(PTO speed—996 rpm)					
100.88 (75.23)	2200	6.23 (23.59)	0.436 (0.265)	16.19 (3.19)	
Maximum Power (1 hour)					
106.21 (79.20)	1901	6.01 (22.77)	0.400 (0.243)	17.66 (3.48)	

VARYING POWER AND FUEL CONSUMPTION

100.88 (75.23)	2200	6.23 (23.59)	0.436 (0.265)	16.19 (3.19)	Air temperature
86.18 (64.26)	2216	5.63 (21.30)	0.461 (0.280)	15.31 (3.02)	84°F (29°C)
66.21 (49.37)	2257	4.68 (17.71)	0.498 (0.303)	14.15 (2.79)	Relative humidity
44.47 (33.16)	2294	3.73 (14.11)	0.591 (0.360)	11.93 (2.35)	50%
22.59 (16.85)	2335	2.82 (10.68)	0.881 (0.536)	8.01 (1.58)	Barometer
1.88 (1.41)	2364	2.07 (7.83)	7.747 (4.713)	0.91 (0.18)	28.88" Hg (97.80 kPa)

Maximum Torque - 369 lb.-ft. (501 Nm) at 1299 rpm

Maximum Torque Rise - 53.3%

Torque rise at 1800 engine rpm - 28%

DRAWBAR PERFORMANCE

(Unballasted - Front Drive Engaged)

FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—7th(II-3) Gear									
86.71 (64.66)	6569 (29.22)	4.95 (7.97)	2197	2.97	0.507 (0.308)	13.92 (2.74)	189 (87)	80 (27)	28.81 (97.56)
75% of Pull at Maximum Power—7th(II-3) Gear									
66.93 (49.91)	4949 (22.02)	5.07 (8.16)	2233	2.32	0.552 (0.336)	12.77 (2.52)	188 (87)	84 (29)	28.82 (97.60)
50% of Pull at Maximum Power—7th(II-3) Gear									
46.33 (34.55)	3330 (14.81)	5.22 (8.39)	2277	1.40	0.643 (0.391)	10.98 (2.16)	189 (87)	86 (30)	28.82 (97.60)
75% of Pull at Reduced Engine Speed—9th(III-1) Gear									
66.88 (49.87)	4948 (22.01)	5.07 (8.16)	1661	2.26	0.473 (0.287)	14.93 (2.94)	184 (84)	85 (29)	28.82 (97.60)
50% of Pull at Reduced Engine Speed—9th(III-1) Gear									
46.32 (34.54)	3329 (14.81)	5.22 (8.40)	1694	1.44	0.518 (0.315)	13.63 (2.68)	184 (84)	87 (31)	28.84 (97.66)

Location of tests: Nebraska Tractor Test Laboratory. University of Nebraska, Lincoln Nebraska, USA 68583-0832

Dates of tests: September 8 - 16, 2005

Manufacturer: McCormick Tractors Intr. Ltd., Doncaster, South Yorkshire, DN2 4PG, England

FUEL and OIL: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8473 **Fuel weight** 7.055 lbs/gal (0.846 kg/l) **Oil SAE** 15W40 **API service classification** CG-4 **Transmission and hydraulic lubricant** McCormick HTX fluid **Front axle lubricant** API GL5 SAE 85W140 **Total time engine was operated** 17.0 hours

ENGINE: Make Iveco Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** 00210448 **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** 4.094" x 5.197" (104.0 mm x 132.0 mm) **Compression ratio** 17.5 to 1 **Displacement** 410 cu in (6728 ml) **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** thermostat and variable speed fan

ENGINE OPERATING PARAMETERS: **Fuel rate:** 41.4 - 45.8 lb/h (18.8 - 20.8 kg/h) **High idle:** 2325 - 2375 rpm **Turbo boost:** nominal 9.4 - 12.3 psi (65 - 85 kPa) as measured 10.8 psi (74 kPa)

CHASSIS: **Type** front wheel assist **Serial No.** ZT20AC4JJJE3335673 **Tread width** rear 60.2" (1530 mm) to 87.8" (2230 mm) front 60.2" (1530 mm) to 87.8" (2230 mm) **Wheelbase** 106.3" (2700 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (4) range operator controlled powershift **Nominal travel speeds mph (km/h)** first 1.78 (2.87) second 2.15 (3.46) third 2.66 (4.28) fourth 3.29 (5.30) fifth 3.34 (5.38) sixth 4.03 (6.48) seventh 4.98 (8.01) eighth 6.16 (9.91) ninth 6.69 (10.77) tenth 8.06 (12.97) eleventh 9.96 (16.03) twelfth 12.33 (19.85) thirteenth 13.01 (20.93) fourteenth 15.67 (25.22) fifteenth 19.37 (31.17) sixteenth 23.99 (38.61) reverse 2.06 (3.32), 2.49 (4.00), 3.08 (4.95), 3.81 (6.13), 3.87 (6.23), 4.66 (7.50), 5.76 (9.27), 7.13 (11.48), 7.74 (12.45), 9.32 (15.00), 11.52 (18.54), 14.27 (22.97)

DRAWBAR PERFORMANCE

(Unballasted - Front Drive Engaged) MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Consumption Hp.hr/gal (kW.h/l)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
2nd(I-2) Gear									
67.16 (50.08)	12892 (57.34)	1.95 (3.14)	2219	11.94	0.591 (0.360)	11.93 (2.35)	189 (87)	75 (24)	28.77 (97.43)
3rd(I-3) Gear									
81.64 (60.88)	12588 (55.99)	2.43 (3.91)	2194	10.28	0.540 (0.328)	13.07 (2.57)	189 (87)	76 (24)	28.78 (97.46)
4th(I-4) Gear									
86.45 (64.47)	12042 (53.56)	2.69 (4.33)	1957	10.13	0.498 (0.303)	14.16 (2.79)	187 (86)	78 (26)	28.75 (97.36)
5th(II-1) Gear									
88.49 (65.98)	11968 (53.24)	2.77 (4.46)	1943	8.21	0.487 (0.296)	14.50 (2.86)	187 (86)	76 (24)	28.77 (97.43)
6th(II-2) Gear									
91.02 (67.87)	10175 (45.26)	3.35 (5.40)	1901	5.83	0.469 (0.285)	15.04 (2.96)	187 (86)	79 (26)	28.75 (97.36)
7th(II-3) Gear									
91.54 (68.26)	8125 (36.14)	4.22 (6.80)	1897	3.78	0.463 (0.282)	15.23 (3.00)	187 (86)	80 (27)	28.75 (97.36)
8th(II-4) Gear									
91.01 (67.86)	6448 (28.68)	5.29 (8.52)	1899	2.75	0.467 (0.284)	15.10 (2.97)	187 (86)	83 (28)	28.73 (97.29)
9th(III-1) Gear									
90.93 (67.81)	5927 (26.36)	5.75 (9.26)	1896	2.42	0.465 (0.283)	15.18 (2.99)	186 (86)	86 (30)	28.72 (97.26)
10th(III-2) Gear									
90.62 (67.58)	4855 (21.60)	7.00 (11.26)	1902	1.83	0.469 (0.285)	15.04 (2.96)	187 (86)	88 (31)	28.71 (97.22)
11th(III-3) Gear									
89.24 (66.54)	3855 (17.15)	8.68 (13.97)	1901	1.36	0.473 (0.288)	14.92 (2.94)	185 (85)	89 (32)	28.70 (97.19)

Clutch multiple wet disc electro-hydraulically operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals that can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 1877 engine rpm or 1000 rpm at 2209 engine rpm **Unladen tractor mass** 12670 lb (5746 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. This tractor did not meet the manufacturer's 3 point lift claims of 11234 lbs (5096 kg) (optionally 13137 lbs (5959 kg)) at the hitch points with either the category II or category IIIN hitch. This tractor also did not meet the manufacturer's 3 point lift claims of 8201 lbs (3720 kg) (optionally 10183 lbs (4619 kg)) at the frame with the category IIIN hitch. The pull in 2nd(I-II) gear was limited to avoid excessive tractor bouncing. For the maximum power tests, the fuel temperature at the injection pump inlet was maintained at 141°F(60°C). The performance figures on this summary were taken from a test conducted under the OECD Code II test procedure.

We, the undersigned, certify that this is a true and correct report of official tractor Test No. **1856**, Nebraska Summary 483, November 21, 2005.

Leonard L. Bashford
Director

M.F. Kocher
V.I. Adamchuk
J.A. Smith
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Disengaged dB(A)	Engaged dB(A)
At no load in 7th (II-3) gear	73.8	73.8
Bystander in 16th (IV-4)	80.4	--

TIRES AND WEIGHT

Rear tires - No., size, ply & psi (kPa)
Front tires - No., size, ply & psi (kPa)

Height of Drawbar

Static Weight with operator- Rear
- Front
- Total

Tested Without Ballast

Two 20.8R38; **; 16 (110)
Two 16.9R28; **; 14 (95)

18.5 in (470 mm)

7645 lb (3468 kg)

5200 lb (2359 kg)

12845 lb (5827 kg)

DRAWBAR PERFORMANCE **UNBALLASTED - FRONT DRIVE DISENGAGED** **FUEL CONSUMPTION CHARACTERISTICS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption		Temp. °F (°C)		Barom. inch Hg (kPa)
					lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	cool- ing med	Air dry bulb	
Maximum Power—7th (II-3) Gear									
86.02 (64.15)	6671 (29.67)	4.84 (7.78)	2197	4.44	0.514 (0.313)	13.73 (2.70)	188 (87)	81 (27)	28.81 (97.56)
75% of Pull at Maximum Power—7th (II-3) Gear									
66.37 (49.49)	4992 (22.21)	4.99 (8.02)	2234	3.08	0.556 (0.338)	12.70 (2.50)	189 (87)	83 (28)	28.82 (97.60)
50% of Pull at Maximum Power—7th (II-3) Gear									
45.95 (34.27)	3347 (14.89)	5.15 (8.29)	2279	1.70	0.651 (0.396)	10.84 (2.14)	189 (87)	86 (30)	28.83 (97.63)
75% of Pull at Reduced Engine Speed—9th (III-1) Gear									
66.22 (49.38)	4989 (22.19)	4.98 (8.01)	1659	2.95	0.469 (0.285)	15.04 (2.96)	184 (84)	86 (30)	28.82 (97.60)
50% of Pull at Reduced Engine Speed—9th (III-1) Gear									
45.87 (34.21)	3344 (14.87)	5.14 (8.28)	1694	1.70	0.522 (0.317)	13.53 (2.66)	183 (84)	86 (30)	28.83 (97.63)
MAXIMUM POWER IN SELECTED GEARS									
5th (II-1) Gear									
73.21 (54.59)	9096 (40.46)	3.02 (4.86)	2216	11.83	0.570 (0.347)	12.37 (2.44)	189 (87)	76 (24)	28.77 (97.43)
6th (II-2) Gear									
84.14 (62.74)	8305 (36.94)	3.80 (6.11)	2199	7.12	0.522 (0.318)	13.51 (2.66)	189 (87)	77 (25)	28.76 (97.39)
7th (II-3) Gear									
86.02 (64.15)	6671 (29.67)	4.84 (7.78)	2197	4.44	0.514 (0.313)	13.73 (2.70)	188 (87)	81 (27)	28.81 (97.56)
8th (II-4) Gear									
85.07 (63.43)	5263 (23.41)	6.06 (9.75)	2200	3.24	0.516 (0.314)	13.68 (2.69)	189 (87)	82 (28)	28.74 (97.33)
9th (III-1) Gear									
84.98 (63.37)	4836 (21.51)	6.59 (10.60)	2196	2.95	0.517 (0.314)	13.65 (2.69)	189 (87)	84 (29)	28.73 (97.29)
10th (III-2) Gear									
84.63 (63.11)	3966 (17.64)	8.00 (12.88)	2196	2.13	0.525 (0.319)	13.44 (2.65)	187 (86)	87 (31)	28.71 (97.22)

CATEGORY: II, IIIN

Quick Attach: None

Maximum force exerted

through whole range:

Cat II

w/ assist cylinder

7398 lbs (32.9 kN) 9000 lbs (40.0 kN) (at the frame)

8919 lbs (39.7 kN) 10881 lbs (48.4 kN) (at the hitch points)

Cat IIIN

7038 lbs (31.3 kN) 8586 lbs (38.2 kN) (at the frame)

9000 lbs (40.0 kN) 11079 lbs (49.3 kN) (at the hitch points)

i) Opening pressure of relief valve:

NA

one outlet set

two outlet sets combined

Sustained pressure of the open relief valve:

2900 psi (200 bar)

2904 psi (200 bar)

ii) Pump delivery rate at minimum pressure

and rated engine speed:

28.6 GPM (108.3 l/min) 29.0 GPM (109.8 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

27.9 GPM (105.6 l/min) 27.5 GPM (104.1 l/min)

Delivery pressure:

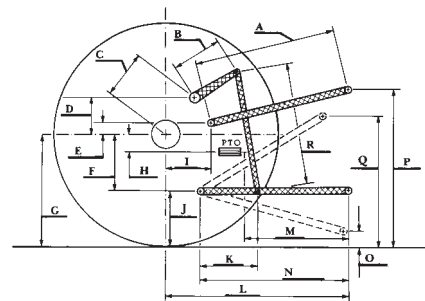
2300 psi (159 bar)

2620 psi (181 bar)

Power:

37.4 hp (27.9 kW)

42.0 HP (31.3 kW)



HITCH DIMENSIONS AS TESTED—NOLOAD

Category II

	SAE Test		OECD Test	
	inch	mm	inch	mm
A	29.4	746	30.0	762
B	9.1	230	9.1	230
C	11.9	303	11.9	303
D	6.8	173	6.8	173
E	11.2	284	11.2	284
F	10.0	253	10.0	253
G	33.7	855	33.7	855
H	4.1	105	4.1	105
I	13.5	342	13.5	342
J	23.7	602	23.7	602
K	21.8	554	21.8	554
L	43.9	1114	43.9	1114
M	24.2	614	24.2	614
N	35.1	891	35.1	891
O	8.0	203	8.0	203
P	42.7	1085	47.7	1212
Q	36.7	932	36.7	932
R	25.7	654	25.7	654

HITCH DIMENSIONS AS TESTED—NOLOAD

Category IIIN

	SAE Test		OECD Test	
	inch	mm	inch	mm
A	28.8	730	29.8	756
B	9.1	230	9.1	230
C	11.9	303	11.9	303
D	6.8	173	6.8	173
E	11.2	284	11.2	284
F	10.0	253	10.0	253
G	33.7	855	33.7	855
H	4.1	105	4.1	105
I	13.5	342	13.5	342
J	23.7	602	23.7	602
K	21.8	554	21.8	554
L	43.9	1114	43.9	1114
M	24.2	614	24.2	614
N	35.1	891	35.1	891
O	8.0	203	9.0	229
P	45.7	1160	50.7	1287
Q	36.7	932	37.5	951
R	25.7	654	25.3	641

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi. (bar)	2980 (205)
Location:	lift cylinder
Hydraulic oil temperature: °F (°C)	158 (70)
Location:	hydraulic sump
Category:	II, IIIN
Quick attach:	none

Cat II

SAE Static Test—System pressure 2565 psi (177 Bar)

Hitch point distance to ground level in. (mm)	8.0 (203)	15.0 (381)	22.0 (559)	29.0 (737)	36.0 (914)
Lift force on frame lb	11250	11165	10530	9432	8901
" " " " " " (kN)	(50.0)	(49.7)	(46.8)	(42.0)	(39.6)

Cat II w/assist cylinder

SAE Static Test—System pressure 2565 psi (177 Bar)

Hitch point distance to ground level in. (mm)	8.0 (203)	15.0 (381)	22.0 (559)	29.0 (737)	36.0 (914)
Lift force on frame lb	13878	13464	12789	11529	10949
" " " " " " (kN)	(61.7)	(59.9)	(56.9)	(51.3)	(48.7)

Cat IIIN

SAE Static Test—System pressure 2565 psi (177 Bar)

Hitch point distance to ground level in. (mm)	8.0 (203)	16.0 (406)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb	9149	10076	9437	8159	8078
" " " " " " (kN)	(40.7)	(44.8)	(42.0)	(36.3)	(35.9)

Cat IIIN w/assist cylinder

SAE Static Test—System pressure 2565 psi (177 Bar)

Hitch point distance to ground level in. (mm)	8.0 (203)	16.0 (406)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb	10197	11556	10967	9630	9072
" " " " " " (kN)	(45.4)	(51.4)	(48.8)	(42.8)	(40.4)



McCormick MTX 120 Diesel

Institute of Agriculture and Natural Resources
University of Nebraska—Lincoln