

January 1999

Test 1766: Case IH MX 220 Diesel

Follow this and additional works at: <http://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Applied Mechanics Commons](#)

"Test 1766: Case IH MX 220 Diesel" (1999). *Nebraska Tractor Tests*. 218.
<http://digitalcommons.unl.edu/tractormuseumlit/218>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

NEBRASKA OECD TRACTOR TEST 1766—SUMMARY 293

CASE IH MX 220 DIESEL

18 SPEED

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

Dates of Test: October 8 - 26, 1999

Manufacturer: Case Corporation, 700 State St. Racine WI, USA

FUEL, OIL and TIME: Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8512 Fuel weight 7.087 lbs/gal (0.849 kg/l) Oil SAE 15W-40 API service classification SF/CD/CE Transmission and hydraulic lubricant Case IH Hy-Tran Plus fluid Front axle lubricant SAE 85W-140 API GL-5 Total time engine was operated: 29.5 hours

ENGINE: Make Consolidated Diesel Corporation Diesel Type six cylinder vertical with turbocharger and air to air intercooler Serial No. *45840371* Crankshaft lengthwise Rated engine speed 2000 Bore and stroke 4.488" x 5.315" (114.0 mm x 135.0 mm) Compression ratio 16.5 to 1 Displacement 505 cu in (8268 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements and aspirator Oil filter one full flow cartridge Oil cooler engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil Fuel filter two paper elements Fuel cooler radiator for pump return fuel Muffler vertical Cooling medium temperature control 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 71.4 - 83.3 lb/h (32.4 - 37.8 kg/h) High idle: 2195 - 2285 rpm Turbo boost: nominal 19.7 - 22.6 psi (136 - 156 kPa) as measured 19.9 psi (137 kPa)

CHASSIS: Type front wheel assist Serial No. *X2204C4JJA0101691* Treadwidth rear 64.0" (1626 mm) to 130.9" (3325 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) Wheelbase 118.3" (3006 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with full range operator controlled power shift Nominal travel speeds mph (km/h) first 1.94 (3.12) second 2.22 (3.57) third 2.56 (4.12) fourth 2.94 (4.73) fifth 3.37 (5.42) sixth 3.87 (6.22) seventh 4.51 (7.26) eighth 5.17 (8.32) ninth 5.97 (9.60) tenth 6.84 (11.01) eleventh 7.85 (12.63) twelfth 9.00 (14.48) thirteenth 11.22 (18.05) fourteenth 12.86 (20.70) fifteenth 14.84 (23.88) sixteenth 17.02 (27.39) seventeenth 19.52 (31.41) eighteenth 22.39 (36.04) reverse 2.79 (4.49), 3.19 (5.14), 6.49 (10.44), 7.44 (11.98) Clutch multiple wet disc electrohydraulically actuated by foot pedal Brakes wet disc hydraulically operated by two foot pedals that can be locked together Steering hydrostatic Power take-off 540 rpm at 1982 engine rpm and 1000 rpm at 1974 engine rpm Unladen tractor mass 20010 lb (9076 kg)

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
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1013 rpm)					
186.63 (139.17)	2000	10.34 (39.13)	0.392 (0.239)	18.06 (3.56)	
Standard Power Take-off Speed (1000 rpm)					
190.30 (141.90)	1974	10.44 (39.51)	0.389 (0.236)	18.23 (3.59)	
Maximum Power (2 hours)					
209.25 (156.04)	1700	10.66 (40.35)	0.361 (0.220)	19.63 (3.87)	

VARYING POWER AND FUEL CONSUMPTION

186.63 (139.17)	2000	10.34 (39.13)	0.392 (0.239)	18.06 (3.56)	Air temperature
165.53 (123.44)	2087	9.65 (36.33)	0.413 (0.251)	17.15 (3.38)	76°F (24°C)
126.15 (94.07)	2118	7.96 (30.13)	0.447 (0.272)	15.85 (3.12)	Relative humidity
85.92 (64.07)	2160	6.22 (23.36)	0.513 (0.312)	13.81 (2.72)	66%
43.44 (32.40)	2198	4.49 (16.99)	0.732 (0.445)	9.68 (1.91)	Barometer
1.62 (1.21)	2234	2.92 (11.06)	12.806 (7.789)	0.55 (0.11)	29.08" Hg (98.48 kPa)

Maximum Torque - 712 lb.-ft. (966 Nm) at 1399 rpm

Maximum Torque Rise - 45.4%

Torque rise at 1600 engine rpm - 38%

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)	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—7th Gear									
161.21 (120.21)	13534 (60.20)	4.47 (7.19)	2000	2.92	0.456 (0.278)	15.53 (3.06)	185 (85)	66 (19)	29.12 (98.61)
75% of Pull at Maximum Power—7th Gear									
128.20 (95.60)	10149 (45.14)	4.74 (7.62)	2100	2.11	0.496 (0.301)	14.30 (2.82)	185 (85)	64 (18)	28.86 (97.73)
50% of Pull at Maximum Power—7th Gear									
87.41 (65.18)	6752 (30.03)	4.85 (7.81)	2137	1.28	0.572 (0.348)	12.39 (2.44)	180 (82)	68 (20)	28.83 (97.63)
75% of Pull at Reduced Engine Speed—9th Gear									
128.14 (95.55)	10152 (45.16)	4.73 (7.62)	1586	2.11	0.435 (0.265)	16.29 (3.21)	185 (85)	67 (19)	28.84 (97.66)
50% of Pull at Reduced Engine Speed—9th Gear									
87.57 (65.30)	6768 (30.11)	4.85 (7.81)	1615	1.28	0.483 (0.294)	14.68 (2.89)	174 (79)	69 (21)	28.81 (97.56)

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)
4th Gear									
141.09 (105.21)	20650 (91.85)	2.56 (4.12)	1987	14.02	0.525 (0.319)	13.51 (2.66)	184 (84)	67 (19)	28.84 (97.66)
5th Gear									
157.90 (117.75)	19722 (87.73)	3.00 (4.83)	1892	7.61	0.478 (0.291)	14.83 (2.92)	187 (86)	71 (22)	28.83 (97.62)
6th Gear									
168.21 (125.43)	19246 (85.61)	3.28 (5.27)	1779	6.70	0.451 (0.274)	15.73 (3.10)	186 (86)	63 (17)	29.12 (98.61)
7th Gear									
178.01 (132.74)	18000 (80.07)	3.71 (5.97)	1699	5.11	0.427 (0.260)	16.60 (3.27)	187 (86)	64 (18)	29.12 (98.61)
8th Gear									
180.72 (134.76)	15726 (69.95)	4.31 (6.94)	1695	3.72	0.422 (0.257)	16.80 (3.31)	188 (86)	68 (20)	29.12 (98.61)
9th Gear									
180.30 (134.45)	13436 (59.77)	5.03 (8.10)	1702	2.83	0.421 (0.256)	16.82 (3.31)	188 (87)	63 (17)	29.16 (98.75)
10th Gear									
179.55 (133.89)	11607 (51.63)	5.80 (9.34)	1702	2.38	0.423 (0.257)	16.75 (3.30)	190 (88)	65 (18)	29.15 (98.71)
11th Gear									
178.57 (133.16)	10051 (44.71)	6.66 (10.72)	1698	2.11	0.424 (0.258)	16.73 (3.30)	189 (87)	62 (17)	29.12 (98.61)
12th Gear									
176.30 (131.47)	8598 (38.24)	7.69 (12.38)	1703	1.65	0.428 (0.261)	16.54 (3.26)	190 (88)	62 (17)	29.12 (98.61)
13th Gear									
170.33 (127.01)	6637 (29.52)	9.62 (15.49)	1702	1.28	0.445 (0.270)	15.94 (3.14)	190 (88)	61 (16)	29.12 (98.61)

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. For the maximum power tests the fuel temperature at the injection pump return was maintained at 141°F(60°C). This tractor did not meet the manufacturers cab sound level claim of 72.0 dB(A), 44.0 GPM(166 lpm) hydraulic flow(high flow option) nor estimate of 46% PTO torque rise. The pull in 2nd gear (ballasted tractor) was limited to avoid excessive tractor bouncing. The performance figures on this summary were taken from a test conducted under the OECD Code II test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1766**, Nebraska Summary 293, December 13, 1999.

Brent T. Sampson
 Test Engineer

L.L. Bashford
 M.F. Kocher
 R.D. Grisso Jr.
 Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB **dB(A)**

At 75% load in 9th gear	72.6
Bystander	--

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires - No., size, ply & psi(kPa)	Four 20.8R42;**,11(75)	Two 20.8R42;**,16(110)
Ballast - Duals (total)	1890 lb (857 kg)	None
- Cast Iron (total)	1545 lb (701 kg)	None
Front Tires - No., size, ply & psi(kPa)	Two 16.9R30;**,21(145)	Two 16.9R30;**,16(110)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	830 lb (376 kg)	None
Height of Drawbar	15.5 in (395 mm)	16.0 in (405 mm)
Static Weight with operator - Rear	15620 lb (7085 kg)	12550 lb(5693 kg)
- Front	8835 lb (4007 kg)	7640 lb(3465 kg)
- Total	24455 lb(11092 kg)	20190 lb(9158 kg)

DRAWBAR PERFORMANCE
BALLASTED - 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		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	
2nd Gear									
146.08 (108.93)	26160 (116.37)	2.09 (3.37)	2024	8.49	0.496 (0.302)	14.30 (2.82)	181 (83)	70 (21)	28.60 (96.85)
3rd Gear									
157.39 (117.37)	24697 (109.86)	2.39 (3.85)	1946	5.96	0.474 (0.288)	14.96 (2.95)	184 (84)	71 (22)	28.60 (96.85)
4th Gear									
164.84 (122.92)	23301 (103.65)	2.65 (4.27)	1862	4.78	0.458 (0.279)	15.47 (3.05)	184 (84)	70 (21)	28.61 (96.88)
5th Gear									
171.38 (127.80)	22354 (99.43)	2.88 (4.63)	1750	4.26	0.444 (0.270)	15.97 (3.15)	185 (85)	68 (20)	28.62 (96.92)
6th Gear									
175.38 (130.78)	20338 (90.47)	3.23 (5.20)	1699	3.38	0.432 (0.263)	16.39 (3.23)	186 (85)	68 (20)	28.62 (96.92)
7th Gear									
180.63 (134.70)	17816 (79.25)	3.80 (6.12)	1700	2.67	0.421 (0.256)	16.83 (3.31)	190 (88)	68 (20)	28.63 (96.95)
8th Gear									
180.22 (134.39)	15422 (68.60)	4.38 (7.05)	1699	2.13	0.424 (0.258)	16.73 (3.30)	189 (87)	69 (21)	28.63 (96.95)
9th Gear									
179.29 (133.70)	13240 (58.89)	5.08 (8.17)	1701	1.58	0.423 (0.257)	16.74 (3.30)	189 (87)	70 (21)	28.63 (96.95)
10th Gear									
178.63 (133.21)	11491 (51.11)	5.83 (9.38)	1698	1.49	0.424 (0.258)	16.72 (3.29)	190 (88)	71 (22)	28.62 (96.92)
11th Gear									
176.08 (131.30)	9841 (43.77)	6.71 (10.80)	1699	1.35	0.433 (0.263)	16.38 (3.23)	191 (88)	71 (22)	28.62 (96.92)
12th Gear									
172.96 (128.98)	8392 (37.33)	7.73 (12.44)	1703	1.21	0.439 (0.267)	16.15 (3.18)	189 (87)	71 (22)	28.62 (96.92)
13th Gear									
167.66 (125.02)	6528 (29.04)	9.63 (15.50)	1699	0.84	0.452 (0.275)	15.68 (3.09)	190 (88)	71 (22)	28.62 (96.92)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: Yes

Maximum Force Exerted Through Whole Range: 11394 lbs (50.7 kN) High lift option
 14712 lbs (65.4 kN)

i) Opening pressure of relief valve: NA NA

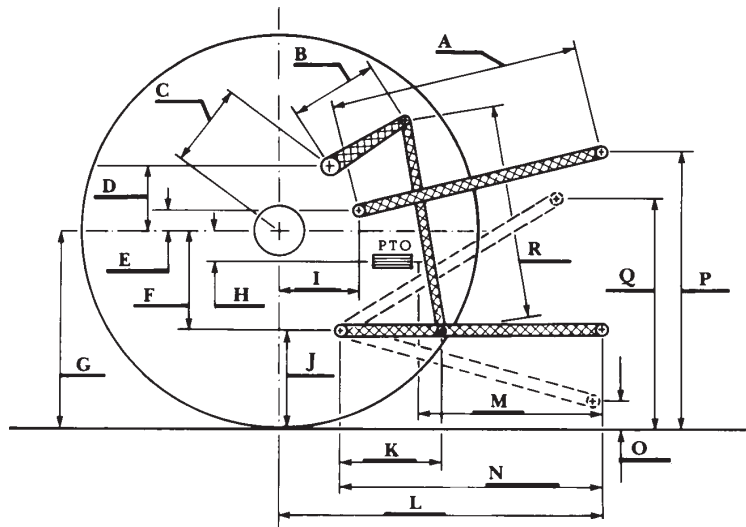
High flow option

Sustained pressure at compensator cutoff: 2990 psi (206 bar) 2970 psi (205 bar)

ii) Pump delivery rate at minimum pressure and rated engine speed: 31.1 GPM (117.7 l/min) 43.3 GPM (163.9 l/min)

iii) Pump delivery rate at maximum hydraulic power: 29.5 GPM (111.7 l/min) 40.3 GPM (152.6 l/min)
 Delivery pressure: 2680 psi (185 bar) 2700 psi (186 bar)
 Power: 46.1 HP (34.4 kW) 63.5 HP (47.3 kW)

HITCH DIMENSIONS AS TESTED — NO LOAD



	inch	mm
A	25.2	640
B	20.5	520
C	22.9	581
D	20.7	525
E	8.7	220
F	15.7	400
G	37.6	955
H	3.5	90
I	20.9	531
J	21.9	555
K	30.3	770
L	46.1	1170
*L'	50.7	1287
M	20.0	507
N	38.2	970
O	8.0	203
P	48.8	1240
Q	37.6	955
R	41.3	1050

*L' to Quick Attack ends



CASE IH MX 220 DIESEL

Agricultural Research Division
 Institute of Agriculture and Natural Resources
 University of Nebraska-Lincoln
 Darrell Nelson, Dean and Director