OECD APPROVAL NO. 2/1 892
CODE 2
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NEBRASKA TRACTOR TEST LABORATORY
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LINCOLN, NEBRASKA 68583-0832, USA

REPORT ON TEST IN ACCORDANCE WITH OECD STANDARD CODE 2 FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS





CASE IH	STEYR
MX 220	MX 220
4 WD	4 WD

40 km/h version
with 18-Speed Transmission

MANUFACTURED BY:	Case Corporation 700 State Street Racine, WI 53403
NEBRASKA TEST NO.	1766
TEST DATES:	October 12 - 27, 1999

This test report provides the results of the tests conducted in accordance with the OECD Standard Test Code for the Official Testing of Agricultural Tractor Performance - C(87)53 Final, Code 2.

This report has been approved by the OECD Coordinating Centre in Paris on 13 March 2000 for the Case IH MX 220, 40 km/h version, 18-speed transmission with OECD Number 2/1 892.

No reproduction of this report or any part of it can be made without prior approval by the Nebraska Tractor Test Laboratory, Lincoln, Nebraska USA.

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The Case IH MX 220 (4WD) and Steyr MX 220 (4WD) tractors are technically identical in all main respects except with regard to model, designation and color.

All tests were carried out on the Case IH MX 220 (4WD).

- Manufacturer's Name/Address	Case Corporation, 700 State St., Racine, WI 53404
- Location of Tractor Assembly	Case Corporation, 24th & Mead St., Racine, WI 53403
- Submitted for Test by	The Manufacturer
- Selected for Test by	The Manufacturer
- Place of Running-in	Case Corporation, 24th & Mead St., Racine, WI 53403
- Duration of Running-in	137 hours
- Location of Test	Nebraska Tractor Test Laboratory, Lincoln, Nebraska, USA

1. SPECIFICATIONS OF TRACTOR

1.1 IDENTIFICATION

- Make	Case IH / Steyr
- Model	MX 220
- Type	4 wheel drive
- Serial No.	JJA0101691
- 1st Serial No.	JJA0089679

1.2 ENGINE

- Make	Consolidated Diesel Company
- Model	6TAA-830
- Type	Diesel, direct injection, turbo-charged with air to air intercooling
- Serial No.	45840371

1.2.1 Cylinders

- Number/Disposition	6 in-line, vertical
- Bore/Stroke	114 mm / 135 mm
- Capacity	8268 cm^3
- Compression Ratio	16.5:1
- Arrangement of Valves	2V Overhead
- Cylinder Liners (Wet/Dry)	Wet, replaceable

1.2.2 Supercharging

- Make	Holset
- Model	HX40W
- Type	Exhaust gas driven with wastegate control
- Pressure	151/146 +/- 10 kPa

1.2.3 Fuel System

- Fuel Feed System	Engine driven transfer pump
- Fuel Filter(s) Make	Fleetguard
- Model	FF5038, FF5052
- Type	Spin-on cartridge.
- Capacity of Fuel Tank	500 l (132 U.S. gal)
- Make of Injection Pump	Robert Bosch
- Model of Injection Pump	P3000
- Type of Injection Pump	Inline
- Serial No.	8720349830
- Manufacturer's Production Setting of Injection Pump:	
• Flow Rate	32.4 - 37.8 kg/hr
- Timing	16.5 +/- 2° before TDC
- Make of Injectors	Robert Bosch
- Model of Injectors	Part No. 3926787
- Type of Injectors	Inline
- Injection Pressure	30.0 MPa
- Make/Model/Type of Carburetor	N/A
- Fuel Cooler	Air to fuel heat exchanger

1.2.4 Governor

- Make	Robert Bosch
- Model	RSV
- Type	Variable speed mechanical
- Governed Range of Engine Speed	900 +/- 50 rev/min to 2240 +/- 45 rev/min, gears 1-16 2240 +/- 20 rev/min, gears 17-18
- Rated Engine Speed	2000 rev/min

1.2.5 Air Cleaner

- Pre-cleaner Make	Nelson
- Pre-cleaner Model	294291A1
- Pre-cleaner Type	Aspirated
- Location of Air Intake	Rear left side of hood
- Main Cleaner Make	Nelson
- Main Cleaner Model	293031A* Assembly, 294292A* Primary, 294293A* Secondary
- Main Cleaner Type	Dry, dual element pleated
- Maintenance Indicator	Service indicator on digital instrument cluster

1.2.6 Lubrication System

- Type of Feed Pump	Full pressure positive displacement
- Type of Filter(s)	Full flow, turn on type dual filter
- Number of Filters	One
- Oil Cooler	Water to oil heat exchanger

1.2.7 Cooling System

- Type of Coolant	Liquid
- Type of Pump	Centrifugal, belt-driven
- Specification of Fan or Blower	Viscous-drive fan
- Number of Fan Blades	8
- Fan Diameter	700 mm
- Coolant Capacity	20.0 l
- Type of Temperature Control	2 thermostats
- Superpressure System	89.6 kPa

1.2.8 Starting System

- Make	Nippondenso
- Model	R4.0
- Type	Electric motor, gear reduction, solenoid engaged
- Starter Motor Power Rating	4.0 kW
- Cold Starting Aid	Ether spray in intake manifold
- Safety Device	Electrical lockout on transmission controls

1.2.9 Electrical System

- Voltage	12 V
- Generator Make	Bosch
- Generator Model	N1
- Generator Type	Alternator, belt-driven
- Power	110 A/14.2 V at 25° C air inlet temp, optional 135 A
- Battery (Number of Accumulators)	Two 12-volt batteries in parallel
- Rating	1000 cold crank amp/battery, 200 min. reserve capacity

1.2.10 Exhaust System

- Make	Nelson (muffler)
- Model	27080A (Case IH 255270A3)
- Type	Vertical
- Location	External muffler, integrated with vertical exhaust pipe near right front corner of cab

1.3 TRANSMISSION

1.3.1 Clutch (Travel Alone)

- Make/Model/Type	Case IH / N/A / Multi-plate, oil-cooled
- Number of Plates	9 friction
- Diameter of Plates	228 mm
- Method of Operation	Electronic/Hydraulic, by foot pedal or transmission control lever

1.3.2 Gear Box

- Make/Model/Type: Case IH / N/A / Full powershift

	Forward	Reverse
Number of gears	18	4
Number of ranges/groups	1	1
Total of arrangements	18	4

- Available Options: Creeper speed option with additional 6 forward and 2 reverse speeds
- Oil Cooler: Air to oil in front of main radiator

1.3.3 Rear Axle and Final Drives

- Make/Model/Type: Case IH / N/A / Crown wheel and pinion, differential and planetary reduction
- Differential Lock
  - Type: Electro/Hydraulic
  - Method of Engagement: Electrical switch on control console
  - Method of Disengagement: Electrical switch on control console or actuation of either brake pedal

1.3.4 Front Axle and Final Drives

MFD

- Make/Model/Type: Dana / 070BP221 / Crown wheel and pinion, differential and planetary reduction
- Differential Lock
  - Type: Limited slip
  - Method of Engagement: Spring pressure clutch
  - Method of Disengagement: Self-locking hydraulically

2WD

- Make: Case IH
- Availability: Yes

1.3.5 Total Ratios and Traveling Speed (20.8R42 Tire)

Standard transmission, Version fitted on the tested tractor.

Standard Transmission Gear No.	Number of Engine Revolutions for One Revolution of the Driving Wheels	Nominal Traveling Speed (*) at Rated Engine Speed of 2000 rev/min km/h
1st	218.93	3.12
2nd	190.87	3.57
3rd	165.52	4.12
4th	144.30	4.73
5th	125.80	5.42
6th	109.67	6.22
7th	94.02	7.26
8th	81.96	8.32
9th	71.08	9.60
10th	61.97	11.01
11th	54.02	12.63
12th	47.10	14.48
13th	37.79	18.05
14th	32.95	20.70
15th	28.57	23.88
16th	24.91	27.39
17th	21.72	31.41
18th	18.93	36.04
R1	152.10	4.49
R2	132.60	5.14
R3	65.32	10.44
R4	56.94	11.98
(*) Calculated with a tyre dynamic radius index of 905 mm (ISO 4251-1:1992) Number of revolutions of front wheels for one revolution of rear wheels equals 1.3228		

Standard transmission with Creeper option, Version not fitted on the tested tractor.

Standard Transmission with Creeper Option Gear No.	Number of Engine Revolutions for One Revolution of the Driving Wheels	Nominal Traveling Speed (*) at Rated Engine Speed of 2000 rev/min km/h
1st	752.23	0.91
2nd	568.70	1.20
3rd	432.23	1.58
4th	323.03	2.11
5th	244.22	2.79
6th	185.61	3.68
R1	522.59	1.31
R2	224.42	3.04
(*) Calculated with a tyre dynamic radius index of 905 mm (ISO 4251-1:1992) Number of revolutions of front wheels for one revolution of rear wheels equals 1.3228		

	Forward	Reverse
Number of gears	6	2
Number of ranges/groups	1	1
Total of arrangements	6	2

1.4 POWER TAKE-OFF

1.4.1 Main Power Take-Off

- Type	Independent
- Method of engagement	Hydraulic clutch operated by electrical switch and electrohydraulic valve independent of main clutch
- Number of shafts	One
- Method of changing power take-off shaft ends and speeds	Manually replace shafts. Power take-off proportional to engine speed
Options	Dual speed (540, 1000 1 3/8 & 1 3/4); or single speed 1000 1 3/4

1.4.1.1 540 rev/min

- Location	Rear of tractor, vertical center plane
- Diameter of power take-off shaft end	35 mm
- Number of splines	6 (ISO 500:1991)
- Height above ground	780 mm
- Distance from the median plane of the tractor	0 mm
- Distance behind rear wheel axle	710 mm
- PTO speed at rated engine speed (2000 rev/min)	545 rev/min
- Engine speed at standard power take-off speed	1982 rev/min
- Ratio of rotation speeds (engine speed/p.t.o. speed)	3.67 to 1
- Power restriction and maximum torque	1159 Nm
- Direction of rotation (viewed facing driving end)	Clockwise

1.4.1.2 1000 rev/min (1 3/8 shaft)

- Location	Rear of tractor, vertical center plane
- Diameter of power take-off shaft end	44.5 mm
- Number of splines	20 (ISO 500:1991)
- Height above ground	780 mm
- Distance from the median plane of the tractor	0 mm
- Distance behind rear wheel axle	796 mm
- PTO speed at rated engine speed (2000 rev/min)	1013 rev/min
- Engine speed at standard power take-off speed	1974 rev/min
- Ratio of rotation speeds (engine speed/p.t.o. speed)	1.974 to 1
- Power restriction and maximum torque	1019 Nm
- Direction of rotation (viewed facing driving end)	Clockwise

1.4.1.3 1000 rev/min (1 3/4 shaft)

- Location	Rear of tractor, vertical center plane
- Diameter of power take-off shaft end	45 mm
- Number of splines	20 (ISO 500:1991)
- Height above ground	780 mm
- Distance from the median plane of the tractor	0 mm
- Distance behind rear wheel axle	659 mm
- PTO speed at rated engine speed (2000 rev/min)	1013 rev/min
- Engine speed at standard power take-off speed	1974 rev/min
- Ratio of rotation speeds (engine speed/p.t.o. speed)	1.974 to 1
- Power restriction and maximum torque	1019 Nm
- Direction of rotation (viewed facing driving end)	Clockwise

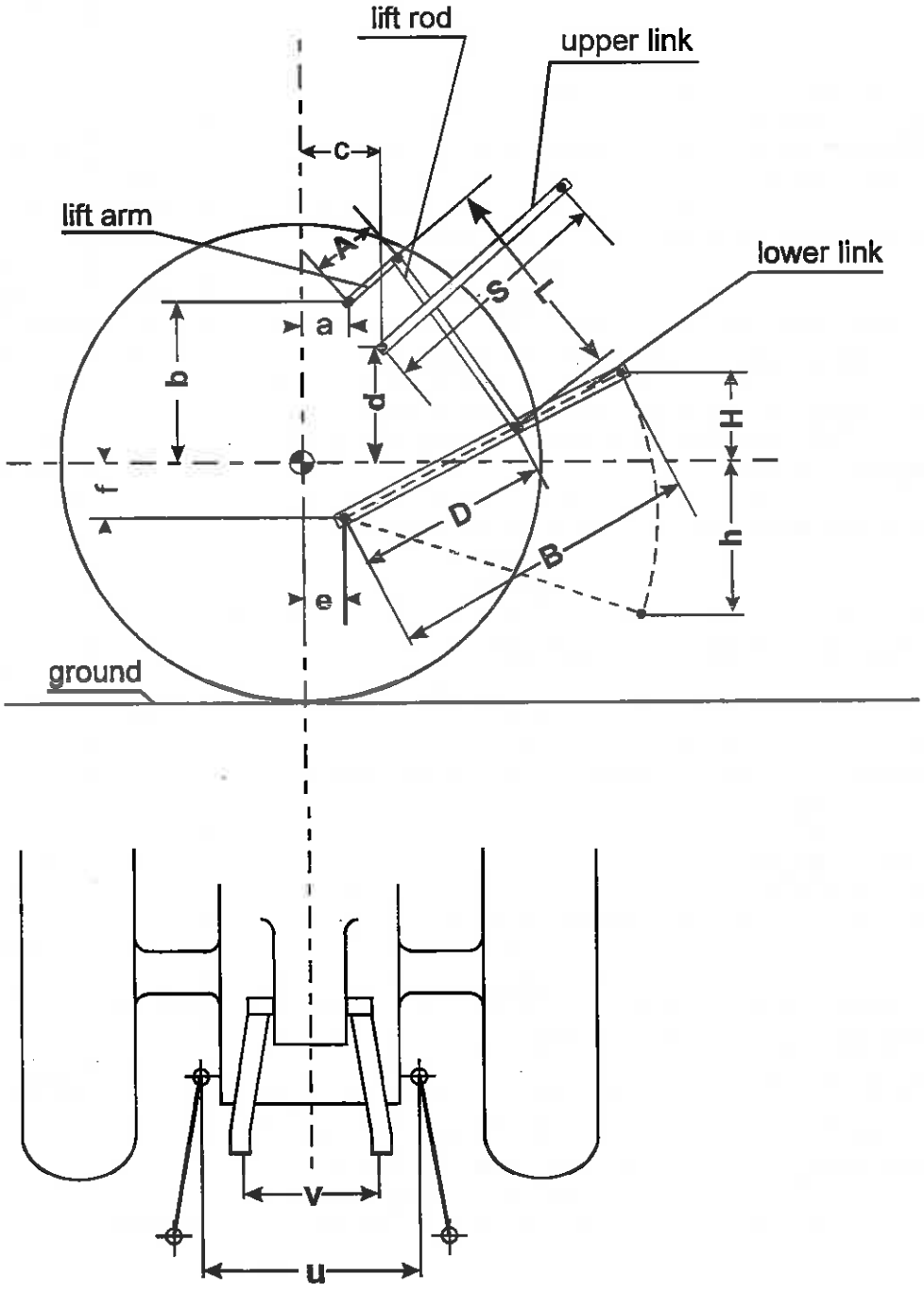
1.4.1.4 Power Take-off proportional to ground speed: None

1.5 Hydraulic Power Lift

- Make/Model/Type	Case IH
- Type of hydraulic system	Closed center, load sensing
- Type and number of cylinders (single or double-acting)	2 external, both double-acting Standard - 1 x 95 mm, 1 x 105 mm diameter Optional - 2 x 105 mm diameter
- Type of linkage lock for transport	Hydraulic, with locking notch for hand lever in control console
- Relief valve pressure setting (tolerance)	(High pressure standby) 19.7 - 20.7 Mpa
- Opening pressure of cylinder safety valve (if fitted)	N/A
- Lift pump type	Axial piston, pressure and flow compensated
- Transmission between pump and engine	Geared drive on transmission
- Type and number of filters	One turn-on replaceable cartridge, cleanable suction screen inside reservoir
- Site of oil reservoir	Transmission housing
- Type, number and location of tapping points	3 pairs of ISO standard couplings at rear of tractor (additional 2 pairs optionally available)
- Maximum volume of oil available to external cylinders	8.5 l

1.6 Three-point linkage:

- Category: 3 in conformity with ISO 730-1/1994, European claw lower links
- Category adapter: None



1.6.1 Three-Point Linkage - Euro Claw

Table 2.1 Dimensions of linkage geometry when connected to the standard frame.

		Dimension or Range	Settings Used in Test
		mm	mm
Length of lift arms	**(A)**	520	520
Length of lower links	**(B)**	1134	1134
Distance of lift arm pivot point from rear wheel axis:			
- horizontally	**(a)**	250	250
- vertically	**(b)**	525	525
Horizontal distance between the 2 lower link points	**(u)**	580	580
Horizontal distance between the 2 lift arm end points	**(v)**	580	580
Length of upper link	**(S)**	745 to 960	790
Distance of upper link pivot point from rear wheel axis:			
- horizontally	**(c)**	525	525
- vertically	**(d)**	140	140
Distance of lower link pivot point from rear wheel axis:			
- horizontally	**(e)**	200	200
- vertically	**(f)**	400	400
Distance of lower link pivot points to lift rod pivot points on lower links	**(D)**	770	770
Length of lift rods	**(L)**	965 to 1100	1028
Height of lower hitch points relative to the rear-wheel axis:			
- in low position	**(h)**	638 to 825	750
- in high position	**(H)**	-25 to 157	84
Height above ground of lower hitch points when locked in transport position (*)		903 to 1112	1039
(*)Assuming r = 955 mm tyre dynamic radius index of ISO 4251-1:1992 Hitch settings used based on: front tires 480/70R34 rear tires 520/85R46			

1.6.2 Three-Point Linkage - North American

- Category (in conformity with ISO 730/1-1990)	3/3N With unique MX-Magnum Quick Coupler (qc)
- Category adapter	N/A

Table 2.1 Dimensions of linkage geometry when connected to the standard frame.

		Dimension or Range	Settings Used in Test
		mm	mm
Length of lift arms	(A)	520	520
Length of lower links	(B)	970 +117 qc	1087
Distance of lift arm pivot point from rear wheel axis: - horizontally - vertically	 (a) (b)	 250 525	 250 525
Horizontal distance between the 2 lower link points	(u)	580	580
Horizontal distance between the 2 lift arm end points	(v)	580	580
Length of upper link	(S)	627 to 745	640
Distance of upper link pivot point from rear wheel axis: - horizontally - vertically	 (c) (d)	 525 140	 525 140
Distance of lower link pivot point from rear wheel axis: - horizontally - vertically	 (e) (f)	 200 400	 200 400
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	770	770
Length of lift rods	(L)	965 to 1100	1050
Height of lower hitch points relative to the rear-wheel axis: - in low position - in high position	 (h) (H)	 621 to 797 -53 to 125	 752 0
Height above ground of lower hitch points when locked in transport position (*)		803 to 1105	955
(*)Assuming r = 955 mm tyre dynamic radius index of ISO 4251-1:1992 Hitch settings used based on: front tires 480/70R34 rear tires 520/85R46			

1.7 SWINGING DRAWBAR

- Type	Swinging
- Height above ground (to center of clevis)	
- 20.8R-42 / 16.9R-30 tires	442 mm
- Type of adjustment	Adjustable Laterally and 3 position Fore-Aft
- Distance of hitch point from rear wheel axis, horizontally	35 Diameter - PTO - 1117 mm 45 Diameter - PTO - 1169 mm
- Distance of hitch point from power take-off shaft end	
- Vertically	0
- Horizontally	35 Diameter - PTO - 407 (#4) 45 Diameter - PTO - 510 (#3)
- Lateral adjustment (centre of clevis)	
- Right hand	0
- Left hand	35 Diameter - PTO - 224 45 Diameter - PTO - 234
- Distance of pivot point from rear wheel axis, horizontally	50 mm forward
- Diameter drawbar pin hole	42 mm
- Maximum vertical permissible load (Static load)	
Standard Drawbar (45 mm)	
Five forward positions	14.1 kN
Rear-most position	13.2 kN
High Capacity Drawbar (50 mm)	
Five forward positions	18.4 kN
Rear-most position	17.3 kN

Hi-Capacity with Assist Casting (455 mm position) - 48.9 kN

1.8 TRAILER HITCH

N/A

1.9 HOLED DRAWBAR

N/A

1.10 STEERING

- Make	Eaton
- Model	266-4070-002
- Type	Hydrostatic steering control unit
- Method of operation	
- Pump/s	Main axial piston pump thru steering priority valve
- Ram/s	2 double-acting cylinders
- Working pressure	16.2-16.9 Mpa

1.11 BRAKES

1.11.1 Service Brake

- Make	Case IH
- Model	N/A
- Type	Oil immersed disc
- Method of operation	Hydraulically actuated from main system operated by two pedals, independently or combined, front axle drive is automatically engaged when braking
- Trailer braking take-off (hydraulic or air brake)	None

1.11.2 Parking Brake

- Type	Electro - Hydraulically actuated oil immersed disc
- Method of Operation	Transmission control lever

1.12 WHEELS

Number	
- Front	2 driving / 2 steering
Optional	2 non-driving / 2 steering
- Rear	2 driving / None steering
Optional	4 driving / None steering
Wheelbase	
- 2 WD	3027 mm
- MFD	3006 mm

	Minimum	Maximum	Adjustment Method
	mm	mm	
Front			
2WD	1580	2197	
MFD	1524	2235	Reversing wheel and off-set lug rims
Rear	1626	3355	Adjustable clamping wedges on bar axle and off-set lug rims

1.13 PROTECTIVE STRUCTURE

- Make /Model/Type	Case IH / MU7 / Cab
- Manufacturer's name and address	Case Corporation, 700 State Street, Racine, WI 53404
- Protective device	
- Cab/frame/rollguard/other	Cab
- Tiltable/not tiltable	Not tiltable
- OECD Approval	
. Approval Number	4/0 548
. Date of Approval	02 September 1998
- Nos. of minor modification certificates	
. Mod 1	08 January 1999
. Mod 2	11 August 1999

1.14 SEAT

1.14.1 Driver's Seat

- Make/Model/Type	Sears / NEXGEN AIR-2000 SA12478 / Air suspension
- Seat and Steering Wheel Reversible	No
- Type of Suspension	Air ride, fore-aft isolator, side/side isolator, weight adjustment
- Type of damping	Air/Oil damping
- Range of adjustment	
.Longitudinally	200 mm
.Vertically	155 mm
- Safety Belt	Yes

1.14.2 OPTIONAL DRIVER'S SEAT

- Make/Model/Type	Sears / NEXGEN AIR-2000 SA16336 / Air suspension
- Seat and Steering Wheel Reversible	No
- Type of suspension	Air ride, fore-aft isolator, side/side isolator, weight adjustment
- Type of damping	Air/Oil damping
- Range of adjustment	
.Longitudinally	200 mm
.Vertically	155 mm
- Safety Belt	Yes

1.14.3 PASSENGER SEAT

- Location	Optional Training Seat located left of drivers seat
- Number of places	One

1.15 LIGHTING

	Height above Ground of Centre	Size	Distance from Outside Edge of Lights to Median Plane of Tractor
	mm	mm	mm
Headlights	1401	115 x 220	320
Sidelights	1896	80 x 120	1101
Rear Lights	1864	85 x 150	977
Reflectors (rear) (Euro Only)			
Lower Pair	805	80	325
Upper Pair	2042	50	947
(SMV)	1963		Centered

2.0 TEST CONDITIONS

2.1 Overall Dimensions, mm

	Length	Width		Height at Top of	
		Minimum	Maximum	Protective Structure	Exhaust Pipe
	mm	mm	mm	mm	mm
Unballasted	5640	3048	3845	3249	3169
Ballasted	5952	3365	3875	3249	3169

2.2 Ground Clearance

- Clearance 378 mm
- Limiting part Drawbar

2.3 Tractor Mass

Mass (with cab, full fuel tank)

	Without Driver [kg]	With Driver [kg]
Unballasted		
Front	3450	3465
Rear	5633	5693
Total	9083	9158
Ballasted		
Front	3992	4007
Rear	7025	7085
Total	11017	11092

Ballast Added	Number of Weights	Total Mass [kg]	Liquid [kg]
Front	5	227	----
Front weight bracket	1	150	----
Rear (duals)	2	857	----
Rear (weights)	4	700	----

2.4 Track Specifications N/A

2.5 Tyres and Track Width Specifications

	Front	Rear
Make	Goodyear	Goodyear
Size	16.9R30	20.8R42
Number/Ply rating	3 star (141A8)	2 star (155A8)
Type	Radial	Radial
Maximum load	2575 kg/tire	3875 kg/tire
Inflation pressure	210 kPa	165 kPa
Dynamic Radius Index	695 mm	905 mm
Chosen track width: singles duals	1626 mm	1875 mm 3275 mm

2.6 Fuel

- Type — No. 2 diesel, in conformity with national standard
- Density at 15°C — 0.849 g/cm^3

2.7 Oils and Lubricants

2.7.1 Capacity and Change Interval

	Capacity	Oil Change	Filter Change
	dm^3	h	h
Engine	21	300	300
Gear Box	172	1500	1500
Front Axle	14.2	1200	N/A
Rear Axle	(*)	(*)	(*)
Final Drive (Front)	1.7 (3.5 pt)	1200	1200
Final Drive (Rear)	(*)	(*)	(*)
Hydraulic System	(*)	(*)	(*)
Steering	(*)	(*)	(*)
(*) Common with Gear Box			

2.7.2 Specifications (SAE, API, Mil-L, ISO)

	Recommended	Used During Test
Engine Oil . Type . Viscosity . Classification	 Case IH No. 1 SAE 15W-40 14.9 cSt at 100° C API SF/CD/CE	Same
Transmission Oils . Type . Viscosity . Classification	 Case IH Hy-Tran Plus 6.3 cSt at 100° C None	Same
Hydraulic Fluid . Type . Viscosity . Classification	 (Same as Transmission)	Same
Front Axle Differential and Final Drive Oil . Type . Viscosity . Classification	 Case IH 135 HEP Gear Lube, SAE 85W140 27 cSt at 100° C API GL-5 of Mil-L-2105D	Same
Grease . Number of Lubrication Points	 6 (with 2WD); 9 (with MFD)	

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

- Date and location of tests: 08-Oct-99 Nebraska Tractor Test Laboratory, Lincoln, NE, USA
- Type of dynamometer bench: Eaton

	Speed		Fuel consumption			Specific
Power	Engine	PTO	Hourly		Specific	energy
kW	rev/min		kg/h	l/h	g/kWh	kW-h/l
3.1 MAXIMUM POWER - TWO HOUR TEST						
156.04	1700	861	34.26	40.35	220	3.87
3.1.2 POWER AT RATED ENGINE SPEED						
139.17	2000	1013	33.23	39.13	239	3.56
3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 +/- 25 rev/min)						
141.90	1974	1000	33.55	39.51	236	3.59
3.1.4 PART LOADS						
3.1.4.1 the torque corresponding to maxiimum power at rated engine speed						
139.17	2000	1013	33.23	39.13	239	3.56
3.1.4.2 85% of torque obtained in 3.1.4.1						
123.44	2087	1057	31.03	36.53	251	3.38
3.1.4.3 75% of torque defined in 3.1.4.2						
94.07	2118	1073	25.58	30.13	272	3.12
3.1.4.4 50% of torque defined in 3.1.4.2						
64.07	2160	1094	20.00	23.56	312	2.72
3.1.4.5 25% of torque defined in 3.1.4.2						
32.40	2198	1113	14.42	16.99	445	1.91
1.4.6 unloaded						
1.21	2234	1132	9.39	11.06	7789	0.11
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED (1000 +/- 25 rev/min)						
3.1.5.1 the torque corresponding to maximum power						
141.90	1974	1000	33.55	39.51	236	3.59
3.1.5.2 85% of torque obtained in 3.1.5.1						
125.86	2066	1046	30.89	36.37	245	3.46
3.1.5.3 75% of torque defined in 3.1.5.2						
96.34	2094	1061	25.31	29.80	263	3.23
3.1.5.4 50% of torque defined in 3.1.5.2						
64.85	2134	1081	19.60	23.07	302	2.81
3.1.5.5 25% of torque defined in 3.1.5.2						
33.19	2171	1100	14.29	16.83	431	1.97
3.1.5.6 unloaded						
1.19	2207	1118	9.25	10.90	7773	0.11

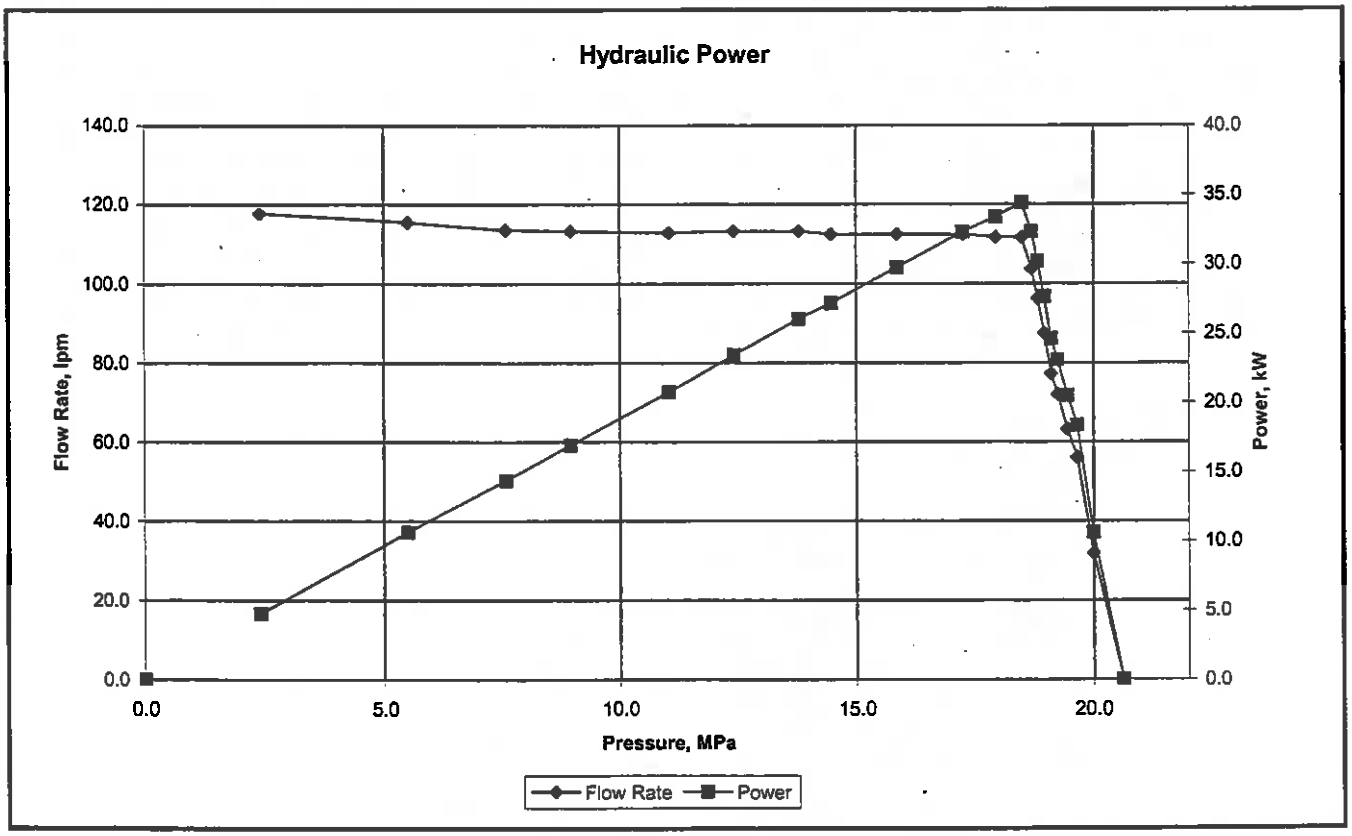
- No load maximum engine speed: 2234 rev/min
- Torque (equivalent crankshaft) at rated speed:
  - At rated engine speed 665 Nm
  - At 2-hour test 876 Nm
- Maximum torque (equivalent crankshaft): 966 Nm
  (engine speed: 1399 rev/min)

Mean atmospheric conditions:		
Dry bulb	24	°C
Pressure	98.5	kPa
Relative Humidity	66	%
Maximum temperatures:		
Coolant	87	°C
Engine oil	99	°C
Fuel	53	°C
Engine air intake	37	°C

3.2 Hydraulic power and lifting forces

Date of Test:	13-Oct-99	Case IH MX 220	
Location of Test-City-State:		Tractor Test Lab, Lincoln, NE, USA	
Tapping point used for test:		Remote hydraulic outlets	
I.	Sustained pressure with pump stalled:		
	20.62 MPa		
	2990 psig		
II.	Pump delivery rate at minimum pressure at full throttle:		
	117.7 l/min		
	31.1 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	111.7 l/min	18.48 MPa	34.4 kW
	29.5 gpm	*2680 psig*	*46.1 hp*
	Maximum hydraulic power:		
	111.7 l/min	18.48 MPa	34.4 kW
	29.5 gpm	*2680 psig*	*46.1 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	60.8 °C		
	141 °F		

This hydraulic system does not use an accumulator.
Opening and closing pressures of the unloading valve could not be measured.



3.2.2 POWER LIFT TEST Category III, Euro lower links, cylinders 1- 95 mm & 1 - 105 mm
Date of test: 18 March 1999

		Hitch points	Frame
Lower hitch points above ground - down position:	mm	197	175
Vertical movement - without load:	mm	834	945
with load:	mm	833	941
Maximum corrected force exerted through full range:	kN	71.2	61.9
Corresponding pressure:	MPa	18.5	18.5
Moment about rear axle:	kNm	95.1	120.5
Maximum mast tilt angle:	degrees	--	8.1

Lifting height relative to horizontal position of lower links.

mm	-370	-348	-299	-198	-99	-1	102	199	299	400	485	571
Corrected lift forces												
At the Hitch point kN	--	71.2	72.5	75.6	77.7	79.7	82.4	83.2	83.7	85.1	85.6	--
at the frame kN	73.5	--	73.8	74.3	74.1	73.5	72.4	70.8	68.7	67.5	64.5	61.9
Corresponding pressure Mpa 18.5												

3.3.1 Drawbar power test(unballasted tractor)

OECD Drawbar Data (SI)

Date of tests:	Oct 12-14 1999					Fuel density:	0.849 kg/l						
Type of track:	Concrete					Test number:	1766						
3.3.1 Maximum power in tested gears (unballasted, 4wd)						Tire pressure:	110 kPa, rear		110 kPa, front		Drawbar Height:	406 mm	
Gear	Power	Drawbar pull	Speed	Engine speed	Slip	Fuel		Temperature			Atmospheric conditions		
						SFC	SFE	Fuel	Coolant	Oil	Temperature	Relative humidity	Pressure
	kW	kN	km/h	rev/min	%	kg/kW.h	kW.h/l	°C	°C	°C	°C	%	kPa
3	94.62	91.41	3.73	2077	15	0.335	2.54	53	83	99	21	81	97.7
4	105.21	91.85	4.12	1987	14	0.319	2.66	52	84	99	19	72	97.7
5	117.75	87.73	4.83	1892	8	0.291	2.92	52	86	101	22	86	97.6
6	125.43	85.61	5.27	1779	7	0.274	3.10	54	86	101	17	44	98.6
7	132.74	80.07	5.97	1699	5	0.260	3.27	53	86	101	18	45	98.6
8	134.76	69.95	6.94	1695	4	0.257	3.31	52	86	101	20	60	98.6
9	134.45	59.77	8.10	1702	3	0.256	3.31	52	87	101	17	49	98.7
10	133.89	51.63	9.34	1702	2	0.257	3.30	52	88	101	18	54	98.7
11	133.16	44.71	10.72	1698	2	0.258	3.30	53	87	101	17	44	98.6
12	131.47	38.24	12.38	1703	2	0.261	3.26	53	88	102	17	44	98.6
13	127.01	29.52	15.49	1702	1	0.270	3.14	53	88	102	16	43	98.6
3.3.2 Fuel consumption													
3.3.2.1		In selected gear at maximum power at rated engine speed.											
8	120.36	52.30	8.28	1998	2	0.277	3.07	53	84	100	19	55	98.7
3.3.2.1.1		75% of pull at maximum power at rated engine speed											
8	95.58	39.25	8.77	2100	2	0.306	2.78	53	85	101	16	52	97.9
3.3.2.1.2		50% of pull at maximum power at rated engine speed											
8	65.46	26.22	8.99	2139	1	0.349	2.43	51	82	99	21	39	97.5
3.3.2.1.3		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.1											
9	95.66	39.20	8.79	1825	2	0.282	3.02	51	84	99	17	48	97.8
3.3.2.1.4		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.2											
9	65.36	26.20	8.98	1854	1	0.317	2.68	50	81	97	22	40	97.5
3.3.2.1.5		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.1											
10	95.41	39.28	8.74	1583	2	0.267	3.18	50	84	98	17	49	97.8
3.3.2.1.6		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.2											
10	65.28	26.19	8.97	1614	1	0.295	2.88	49	80	96	22	40	97.4
3.3.2.2		In selected gear nearest to 7.5 km/h at rated engine speed.											
7	120.21	60.20	7.19	2000	3	0.278	3.06	53	85	100	19	51	98.6
3.3.2.2.1		75% of pull at maximum power at rated engine speed											
7	95.60	45.14	7.62	2100	2	0.301	2.82	53	85	101	18	49	97.7
3.3.2.2.2		50% of pull at maximum power at rated engine speed											
7	65.18	30.03	7.81	2137	1	0.348	2.44	51	82	99	20	45	97.6
3.3.2.2.3		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.1											
8	95.93	45.33	7.62	1830	2	0.278	3.06	52	84	99	18	50	97.7
3.3.2.2.4		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.2											
8	65.23	30.06	7.81	1864	1	0.315	2.69	50	80	98	21	42	97.6
3.3.2.2.5		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.1											
9	95.55	45.16	7.62	1586	2	0.265	3.21	51	85	99	19	48	97.7
3.3.2.2.6		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.2											
9	65.30	30.11	7.81	1615	1	0.294	2.89	49	79	96	21	42	97.6

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4.1 Drawbar Power (ballasted tractor)

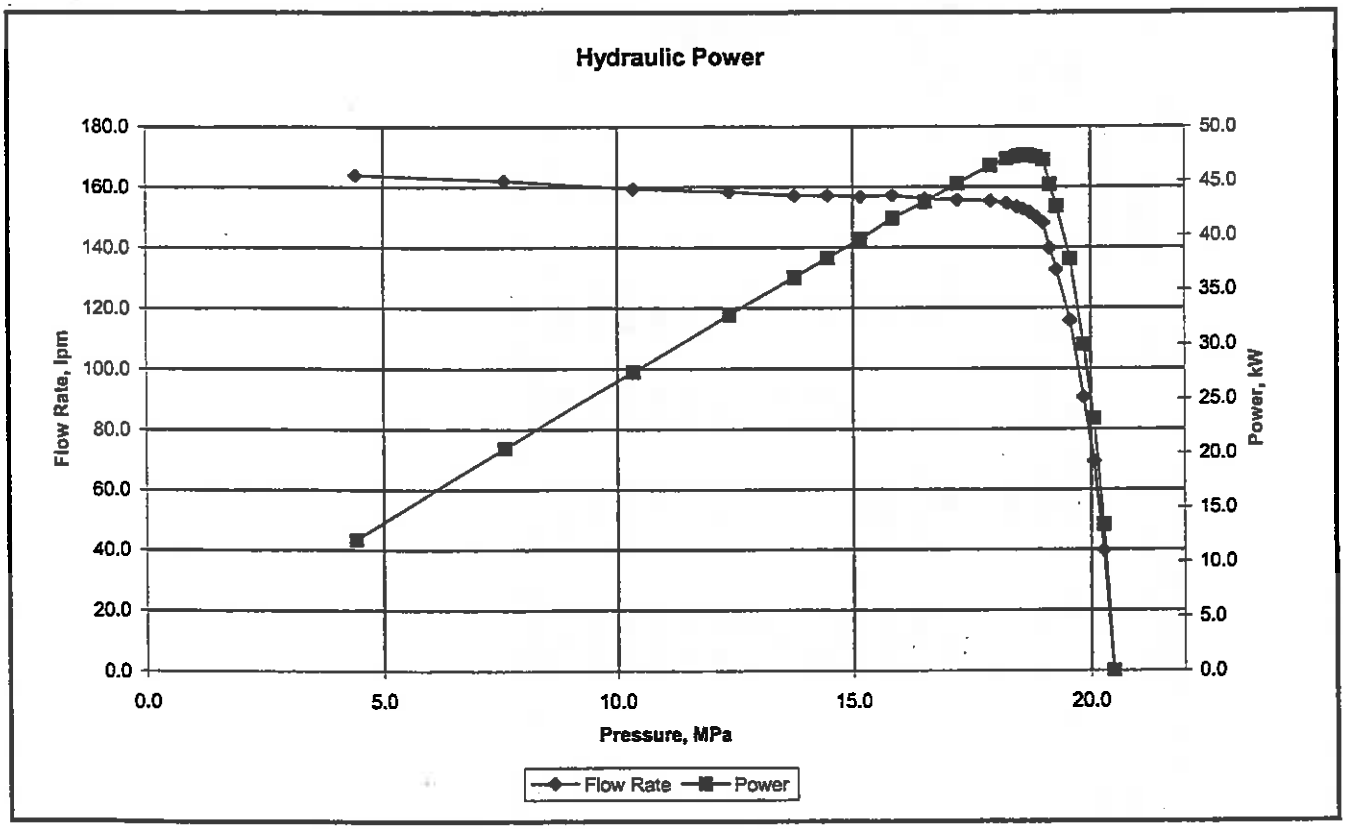
OECD Drawbar Data (SI)

Date of tests:	15-Oct-99				Fuel density:	0.849 kg/l							
Type of track:	Concrete				Test number:	1766							
3.3.1 Maximum power in tested gears (ballasted, 4wd)						Tire pressure:	76 kPa, rear	145 kPa, front			Drawbar Height:	394 mm	
Gear	Power	Drawbar pull	Speed	Engine speed	Slip	Fuel		Temperature			Atmospheric conditions		
						SFC	SFE	Fuel	Coolant	Oil	Temperature	Relative humidity	Pressure
	kW	kN	km/h	rev/min	%	kg/kW.h	kW.h/l	°C	°C	°C	°C	%	kPa
* 2	108.93	116.37	3.37	2024	8	0.302	2.82	54	83	98	21	53	96.9
3	117.37	109.86	3.85	1946	6	0.288	2.95	53	84	100	22	54	96.9
4	122.92	103.65	4.27	1862	5	0.279	3.05	53	84	100	21	57	96.9
5	127.80	99.43	4.63	1750	4	0.270	3.15	52	85	100	20	60	96.9
6	130.78	90.47	5.20	1699	3	0.263	3.23	52	85	100	20	60	96.9
7	134.70	79.25	6.12	1700	3	0.256	3.31	52	88	101	20	56	97.0
8	134.39	68.60	7.05	1699	2	0.258	3.30	53	87	101	21	57	97.0
9	133.70	58.89	8.17	1701	2	0.257	3.30	53	87	101	21	53	97.0
10	133.21	51.11	9.38	1698	1	0.258	3.29	52	88	100	22	50	96.9
11	131.30	43.77	10.80	1699	1	0.263	3.23	53	88	102	22	50	96.9
12	128.98	37.33	12.44	1703	1	0.267	3.18	53	87	101	22	50	96.9
13	125.02	29.04	15.50	1699	1	0.275	3.09	52	88	101	22	50	96.9
* Note:	Pull limited to avoid tractor bouncing												

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4.3 Hydraulic power(high flow pump)

Date of Test:	23-Apr-99		
Location of Test-City-State:		Tractor Test Lab, Lincoln, NE, USA	
Tapping point used for test:		Remote hydraulic outlets	
I.	Sustained pressure with pump stalled:		
	20.48 MPa		
	2970 psig		
II.	Pump delivery rate at minimum pressure at full throttle:		
	163.9 l/min		
	43.3 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	153.3 l/min	18.48 MPa	47.2 kW
	40.5 gpm	*2680 psig*	*63.3 hp*
	Maximum hydraulic power:		
	152.6 l/min	18.62 MPa	47.3 kW
	40.3 gpm	*2700 psig*	*63.5 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	72.9 °C		
	163 °F		
	This hydraulic system does not use an accumulator. Opening and closing pressures of the unloading valve could not be measured.		



4.3.2 POWER LIFT TEST Category III, Quick coupler, cylinders 1 - 95 mm & 1-105 mm
Date of test: 19 March 1999

		Hitch points	Frame
Lower hitch points above ground - down position:	mm	197	205
Vertical movement - without load:	mm	752	868
with load:	mm	727	795
Maximum corrected force exerted through full range:	kN	82.8	65.4
Corresponding pressure:	MPa	18.4	18.4
Moment about rear axle:	kNm	82.8	65.4
Maximum mast tilt angle:	degrees	--	7.1

Lifting height relative to horizontal position of lower links.

mm	-348	-340	-301	-200	-98	-2	99	200	300	379	455
Corrected lift forces											
At the Hitch point kN	82.8	--	84.6	87.9	90.6	92.0	93.1	94.0	94.0	93.2	--
at the frame kN	---	86.8	85.6	84.9	83.5	81.7	78.9	75.7	--	71.1	65.4
Corresponding pressure Mpa 18.4											

4.3.1 POWER LIFT TEST Category III, Quick coupler, 2 - 105 mm cylinders
Date of test: 16 March 1999

		Hitch points	Frame
Lower hitch points above ground - down position:	mm	196	210
Vertical movement - without load:	mm	752	868
with load:	mm	734	800
Maximum corrected force exerted through full range:	kN	91.4	72.2
Corresponding pressure:	MPa	18.5	18.5
Moment about rear axle:	kNm	117.7	136.9
Maximum mast tilt angle:	degrees	--	7.7

Lifting height relative to horizontal position of lower links.

mm	-349	-335	-301	-200	-100	1	99	201	299	385	465
Corrected lift forces											
At the Hitch point kN	91.4	--	93.0	96.4	98.8	100.5	101.8	102.5	102.2	102.2	--
at the frame kN	--	95.3	93.8	92.8	91.4	89.3	85.9	82.5	--	77.7	72.2
Corresponding pressure Mpa 18.5											

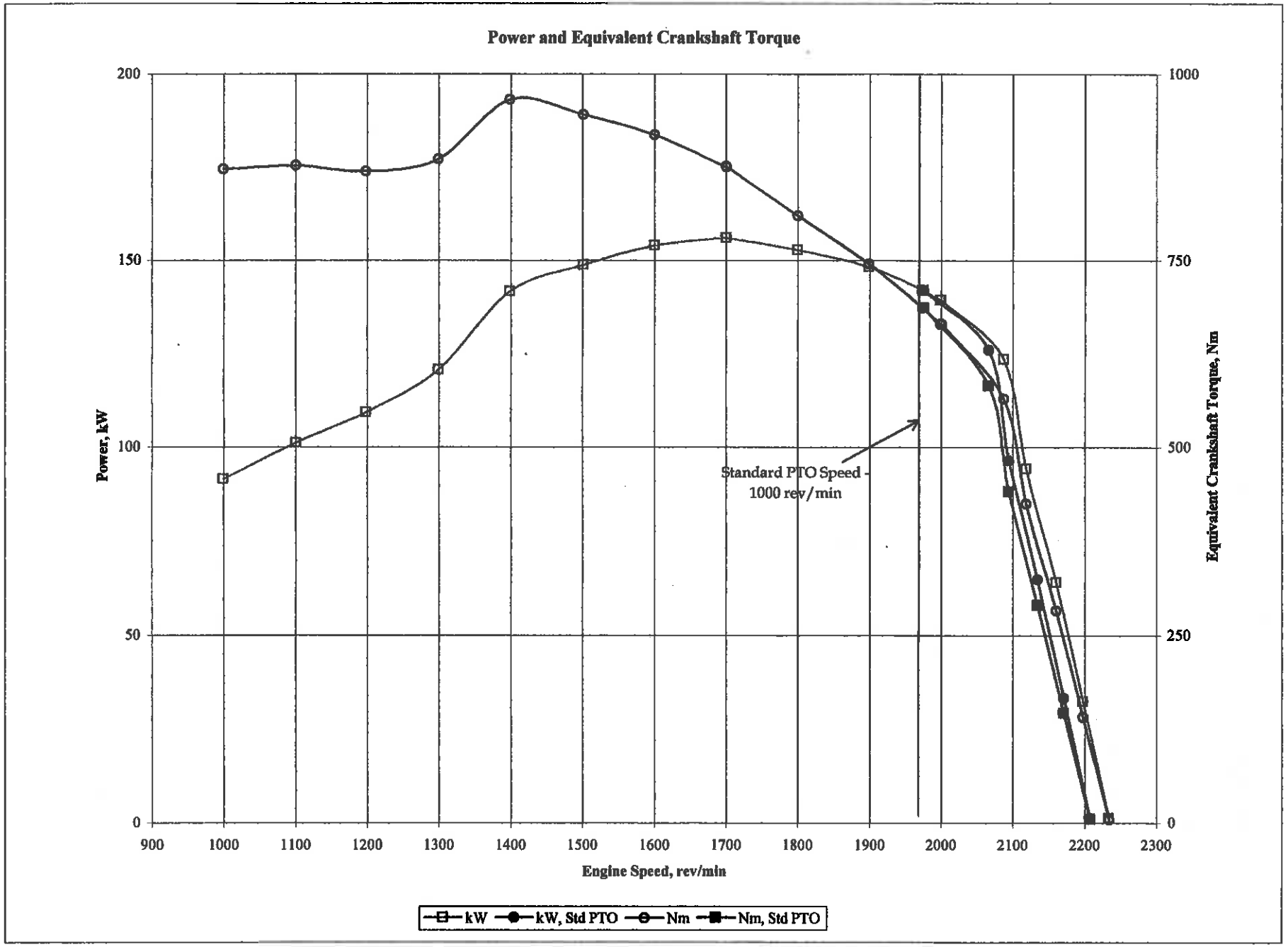
5. REPAIRS

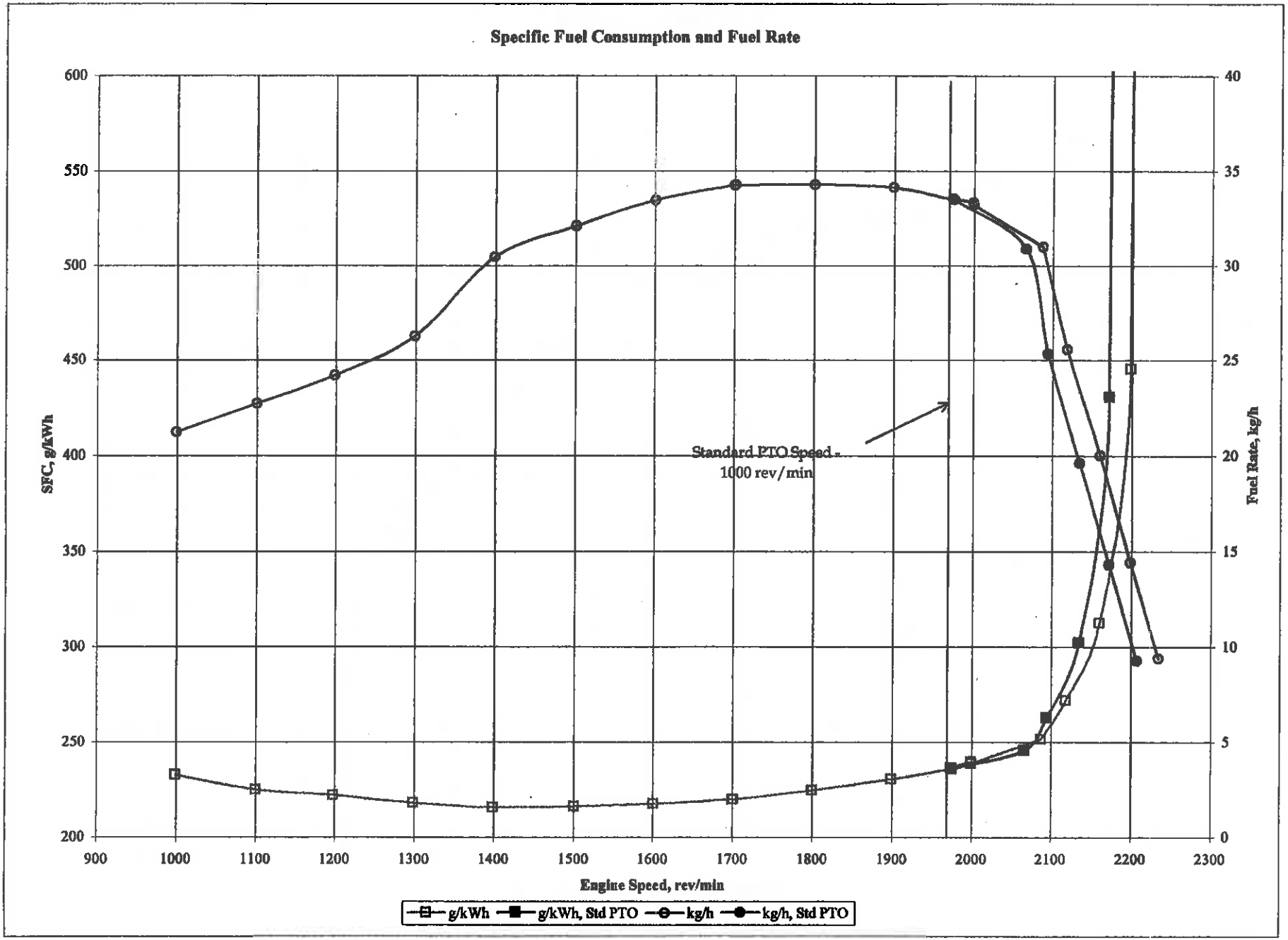
None

6. REMARKS

None

Case IH MX 220




Specific Fuel Consumption and Fuel Rate
SFC, g/kWh
Fuel Rate, kg/h
Engine Speed, rev/min
Standard PTO Speed -
1000 rev/min
g/kWh
g/kWh, Std PTO
kg/h
kg/h, Std PTO
600
550
500
450
400
350
300
250
200
40
35
30
25
20
15
10
5
0
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300

Case IH MX 220

