OECD APPROVAL NO. 2/1 890
CODE 2
DATE OF APPROVAL: 13 March 2000

NEBRASKA TRACTOR TEST LABORATORY
DEPARTMENT OF BIOLOGICAL SYSTEMS ENGINEERING
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
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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 180	MX 180
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. 1764

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 180, 40 km/h version, 18-speed transmission with OECD Number 2/1 890.

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 180 (4WD) and Steyr MX 180 (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 180 (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	127 hours
- Location of Test	Nebraska Tractor Test Laboratory, Lincoln, Nebraska, USA

1. SPECIFICATIONS OF TRACTOR

1.1 IDENTIFICATION

- Make	Case IH / Steyr
- Model	MX 180
- Type	4 wheel drive
- Serial No.	JJA0101711
- 1st Serial No.	JJA0089679

1.2 ENGINE

- Make	Consolidated Diesel Company
- Model	6T-830
- Type	Diesel, direct injection, turbo-charged
- Serial No.	45837752

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	134 +/- 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
- Make of Injection Pump	Robert Bosch
- Model of Injection Pump	MW
- Type of Injection Pump	Inline
- Serial No.	0403466181
- Manufacturer's Production Setting of Injection Pump:	
• Flow Rate	29.9 - 33.1 kg/hr
- Timing	15 +/- 2° before TDC
- Make of Injectors	Robert Bosch
- Model of Injectors	Part No. 3928228
- Type of Injectors	Inline
- Injection Pressure	26.0 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

<u>MFD</u>

- Make/Model/Type	Dana / 070BP220 / 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

<u>2WD</u>

- Make	Case IH
- Availability	Yes

1.3.5 Total Ratios and Traveling Speed (18.4R42 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	220.19	2.98
2nd	191.96	3.42
3rd	166.47	3.94
4th	145.13	4.52
5th	126.52	5.18
6th	110.30	5.95
7th	94.56	6.94
8th	82.43	7.96
9th	71.49	9.17
10th	62.32	10.52
11th	54.33	12.07
12th	47.37	13.85
13th	38.01	17.25
14th	33.14	19.79
15th	28.74	22.82
16th	25.05	26.18
17th	21.84	30.03
18th	19.04	34.45
R1	152.97	4.29
R2	133.36	4.92
R3	65.69	9.98
R4	57.27	11.45

(*) Calculated with a tyre dynamic radius index of 870 mm (ISO 4251-1:1992)
Number of revolutions of front wheels for one revolution of rear wheels equals 1.3304

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	756.56	0.87
2nd	571.97	1.15
3rd	434.71	1.51
4th	324.89	2.02
5th	245.62	2.67
6th	186.68	3.51
R1	525.59	1.25
R2	225.71	2.91
(*) Calculated with a tyre dynamic radius index of 870 mm (ISO 4251-1:1992) Number of revolutions of front wheels for one revolution of rear wheels equals 1.3304		

	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	745 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	1019 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	745 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	745 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

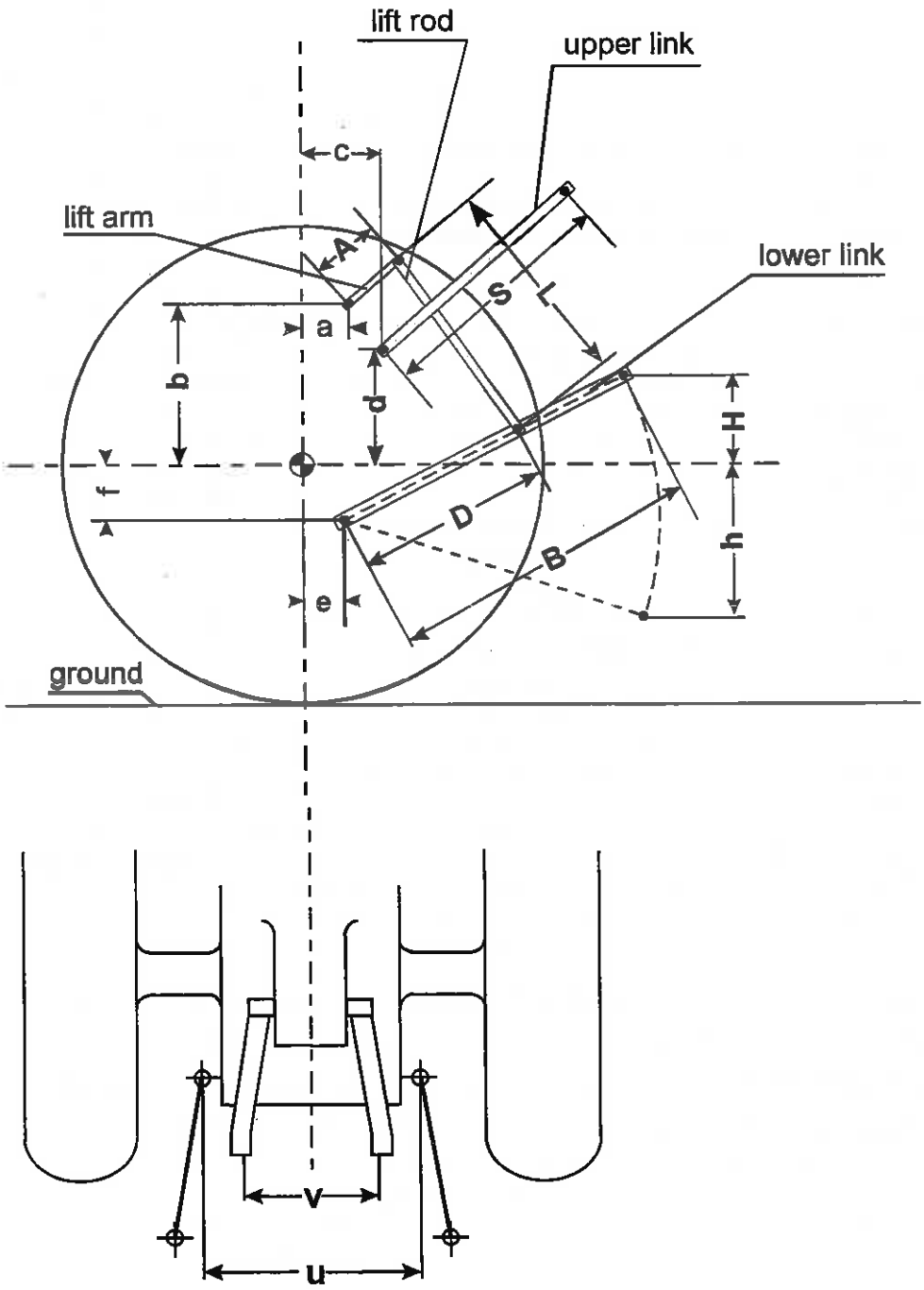
1.4.1.4 Power Take-off Proportional to Ground Speed: None

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 - 2 x 89 mm diameter Optional - 2 x 95 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)**	743 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
- 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)	1076	1087
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)	627 to 745	720
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	1010
Height of lower hitch points relative to the rear-wheel axis:			
- in low position	(h)	621 to 797	750
- in high position	(H)	-53 to 125	87
Height above ground of lower hitch points when locked in transport position (*)		902 to 1080	1042
(*)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)	
- 18.4R-42 / 14.9R-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	35 Diameter - PTO - 243 / 313 45 Diameter - PTO - 243 / 313
- Horizontally	35 Diameter - PTO - 407 (#4) 45 Diameter - PTO - 510 (#3)
- Lateral adjustment (centre of clevis)	
- Right hand	35 Diameter - PTO - 224 45 Diameter - PTO - 234
- 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	1524	2235	Reversing wheel and off-set lug rims
Rear	1549	3150	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

- 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	1372	115 x 220	320
Sidelights	1864	80 x 120	1101
Rear Lights	2007	85 x 150	977
Reflectors (rear) (Euro Only)			
Lower Pair	805	80	325
Upper Pair	2042	50	947
(SMV)	1928		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	3214	3134
Ballasted	5952	3365	3875	3214	3134

2.2 Ground Clearance

- Clearance — 343 mm
- Limiting part — Drawbar

2.3 Tractor Mass

Mass (with cab, full fuel tank)

	Without Driver [kg]	With Driver [kg]
Unballasted		
Front	3364	3379
Rear	5361	5421
Total	8725	8800
Ballasted		
Front	3364	3379
Rear	6082	6142
Total	9446	9521

Ballast Added	Number of Weights	Total Mass [kg]	Liquid [kg]
Rear (duals)	2	701	----
Additional Test Equipment		20	

2.4 Track Specifications N/A

2.5 Tyres and Track Width Specifications

	Front	Rear
Make	Goodyear	Goodyear
Size	14.9R30	18.4R42
Number/Ply rating	3 star (134A8)	2 star (148A8)
Type	Radial	Radial
Maximum load	2120 kg/tire	3150 kg/tire
Inflation pressure	210 kPa	165 kPa
Dynamic Radius Index	665 mm	870 mm
Chosen track width: singles duals	1830 mm	1875 mm 3190 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: 12 & 13 Oct 99 Nebraska Tractor Test Laboratory, Lincoln, NE, USA
- Type of dynamometer bench: Eaton

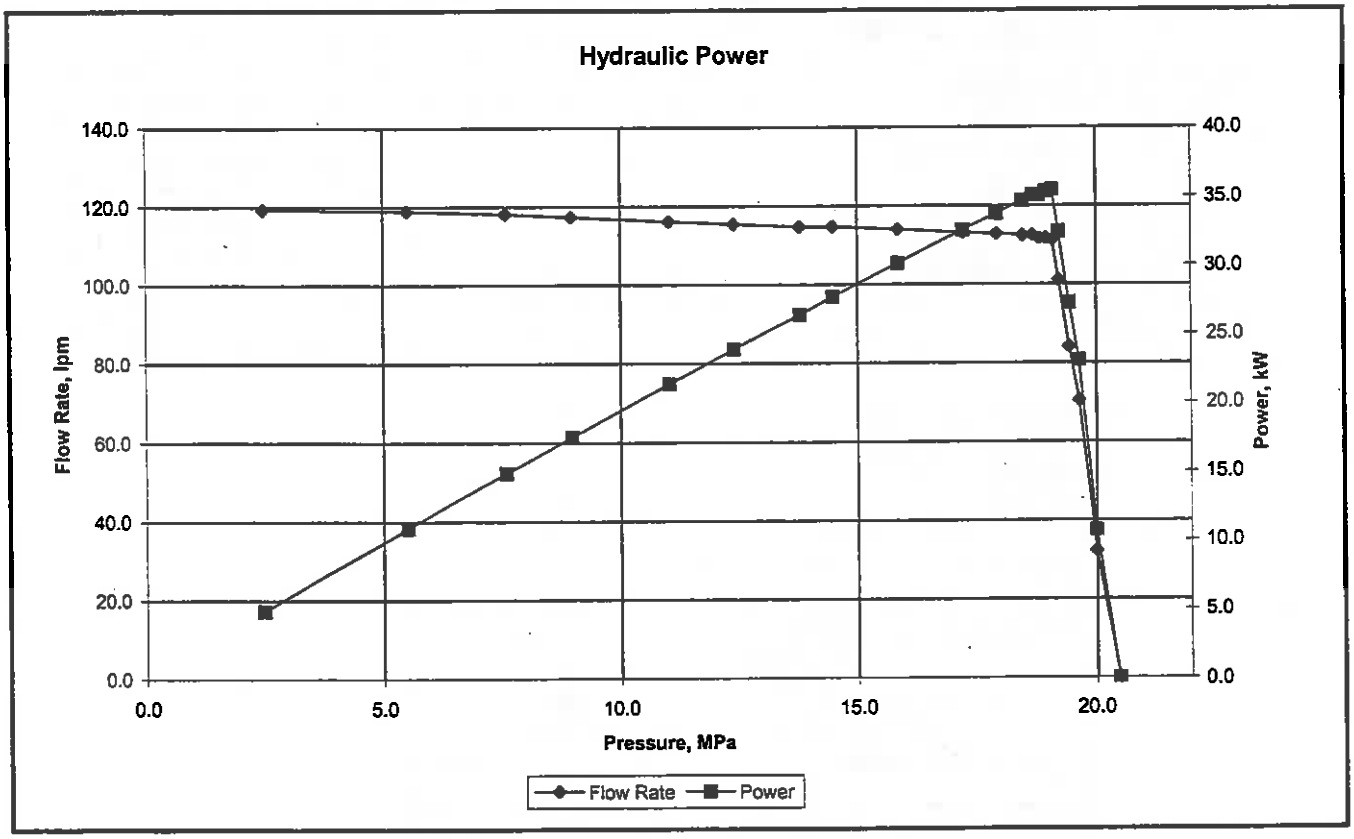
	Speed		Fuel consumption			Specific
Power	Engine	PTO	Hourly		Specific	energy
kW	rev/min		kg/h	l/h	g/kWh	kW-h/l
3.1 MAXIMUM POWER - TWO HOUR TEST						
131.00	1750	886	33.98	40.01	259	3.27
3.1.2 POWER AT RATED ENGINE SPEED						
109.28	2000	1013	30.84	36.31	282	3.01
3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 +/- 25 rev/min)						
112.59	1973	1000	31.32	36.88	278	3.05
3.1.4 PART LOADS						
3.1.4.1 the torque corresponding to maxiimum power at rated engine speed						
109.28	2000	1013	30.84	36.31	282	3.01
3.1.4.2 85% of torque obtained in 3.1.4.1						
96.41	2077	1052	28.58	33.65	296	2.87
3.1.4.3 75% of torque defined in 3.1.4.2						
73.51	2108	1068	23.81	28.04	324	2.62
3.1.4.4 50% of torque defined in 3.1.4.2						
49.90	2150	1089	19.32	22.75	387	2.19
3.1.4.5 25% of torque defined in 3.1.4.2						
25.56	2186	1108	14.83	17.47	580	1.46
1.4.6 unloaded						
0.88	2220	1125	10.48	12.34	11927	0.07
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						
112.59	1973	1000	31.32	36.88	278	3.05
3.1.5.2 85% of torque obtained in 3.1.5.1						
99.63	2052	1040	29.12	34.29	292	2.91
3.1.5.3 75% of torque defined in 3.1.5.2						
75.57	2080	1054	23.81	28.04	315	2.69
3.1.5.4 50% of torque defined in 3.1.5.2						
51.47	2122	1075	19.19	22.59	373	2.28
3.1.5.5 25% of torque defined in 3.1.5.2						
26.04	2161	1095	14.56	17.15	559	1.52
3.1.5.6 unloaded						
0.99	2193	1112	10.21	12.02	10343	0.08

- No load maximum engine speed: 2220 rev/min
- Torque (equivalent crankshaft) at rated speed:
  - At rated engine speed 522 Nm
  - At 2-hour test 715 Nm
- Maximum torque (equivalent crankshaft): 757 Nm
  (engine speed: 1450 rev/min)

Mean atmospheric conditions:		
Dry bulb	28	°C
Pressure	98.7	kPa
Relative Humidity	43	%
Maximum temperatures:		
Coolant	88	°C
Engine oil	99	°C
Fuel	48	°C
Engine air intake	42	°C

3.2 Hydraulic power and lifting forces

Date of Test:	18-Oct-99	Case IH MX 180	
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:		
	119.2 l/min		
	31.5 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	112.4 l/min	18.48 MPa	34.6 kW
	29.7 gpm	*2680 psig*	*46.4 hp*
	Maximum hydraulic power:		
	111.3 l/min	19.10 MPa	35.4 kW
	29.4 gpm	*2770 psig*	*47.5 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	62.8 °C		
	145 °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, 95 mm cylinders
Date of test: 17 March 1999

		Hitch points	Frame
Lower hitch points above ground - down position:	mm	197	195
Vertical movement - without load:	mm	834	945
with load:	mm	834	920
Maximum corrected force exerted through full range:	kN	65.5	56.2
Corresponding pressure:	MPa	18.5	18.5
Moment about rear axle:	kNm	87.5	109.3
Maximum mast tilt angle:	degrees	--	8.0

Lifting height relative to horizontal position of lower links.

mm	-350	-348	-299	-202	-102	2	105	200	300	400	486	570
Corrected lift forces												
At the Hitch point kN	--	65.5	66.8	69.2	71.4	73.1	74.7	75.7	76.8	78.1	78.6	--
at the frame kN	66.4	--	67.2	67.1	67.1	66.7	66.0	63.9	62.4	59.1	58.2	56.2
Corresponding pressure Mpa	18.5											

3.3.1 Drawbar Power Test(unballasted tractor)

OECD Drawbar Data (SI)

Date of tests: 20,21OCT99					Fuel density:	0.849 kg/l							
Type of track: Concrete					Test number:	1764							
3.3.1 Maximum power in tested gears (unballasted, 4wd)					Tire pressure:	138 kPa, rear		152 kPa, front			Drawbar Height:	419 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	73.37	85.67	3.08	2084	15	0.390	2.18	48	82	98	15	45	98.5
3	84.79	86.74	3.52	2008	13	0.364	2.33	48	81	98	12	45	98.5
4	93.69	81.61	4.13	1960	9	0.339	2.50	48	85	99	15	45	98.5
5	101.82	80.78	4.54	1871	8	0.329	2.58	48	85	99	17	44	98.5
6	107.32	78.71	4.91	1753	8	0.318	2.67	48	86	99	18	41	98.4
7	111.67	68.70	5.85	1750	6	0.306	2.78	48	86	99	18	38	98.4
8	112.56	59.19	6.85	1751	4	0.302	2.81	48	86	100	13	51	97.8
9	111.17	50.50	7.93	1752	4	0.307	2.77	48	86	100	19	39	98.4
10	110.87	43.68	9.14	1751	3	0.308	2.76	48	87	100	21	41	98.3
11	110.41	37.75	10.53	1749	2	0.308	2.76	47	87	99	21	42	98.3
12	109.41	32.40	12.16	1754	2	0.311	2.73	48	87	100	22	46	98.3
13	106.07	25.11	15.21	1751	2	0.320	2.65	48	87	101	22	47	98.3
3.3.2 Fuel consumption													
3.3.2.1		In selected gear at maximum power at rated engine speed.											
8	93.11	42.36	7.91	1998	3	0.331	2.56	49	85	100	14	48	97.8
3.3.2.1.1		75% of pull at maximum power at rated engine speed											
8	73.71	31.82	8.34	2092	2	0.364	2.34	48	85	99	16	47	97.8
3.3.2.1.2		50% of pull at maximum power at rated engine speed											
8	50.33	21.22	8.54	2128	1	0.434	1.96	48	81	95	20	44	97.8
3.3.2.1.3		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.1											
9	73.66	31.74	8.36	1818	2	0.333	2.55	48	82	97	18	45	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	50.33	21.18	8.56	1849	1	0.377	2.25	47	81	96	21	42	97.8
3.3.2.1.5		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.1											
10	73.62	31.92	8.30	1574	2	0.312	2.72	47	82	96	19	47	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	50.32	21.25	8.52	1607	1	0.348	2.44	47	79	94	23	38	97.7
3.3.2.2		In selected gear nearest to 7.5 km/h at rated engine speed.											
8	93.11	42.36	7.91	1998	3	0.331	2.56	49	85	100	14	48	97.8
3.3.2.2.1		75% of pull at maximum power at rated engine speed											
8	73.71	31.82	8.34	2092	2	0.364	2.34	48	85	99	16	47	97.8
3.3.2.2.2		50% of pull at maximum power at rated engine speed											
8	50.33	21.22	8.54	2128	1	0.434	1.96	48	81	95	20	44	97.8
3.3.2.2.3		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.1											
9	73.66	31.74	8.36	1818	2	0.333	2.55	48	82	97	18	45	97.8
3.3.2.2.4		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.2											
9	50.33	21.18	8.56	1849	1	0.377	2.25	47	81	96	21	42	97.8
3.3.2.2.5		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.1											
10	73.62	31.92	8.30	1574	2	0.312	2.72	47	82	96	19	47	97.8
3.3.2.2.6		Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.2											
10	50.32	21.25	8.52	1607	1	0.348	2.44	47	79	94	23	38	97.7

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4.1 Drawbar power (ballasted tractor)

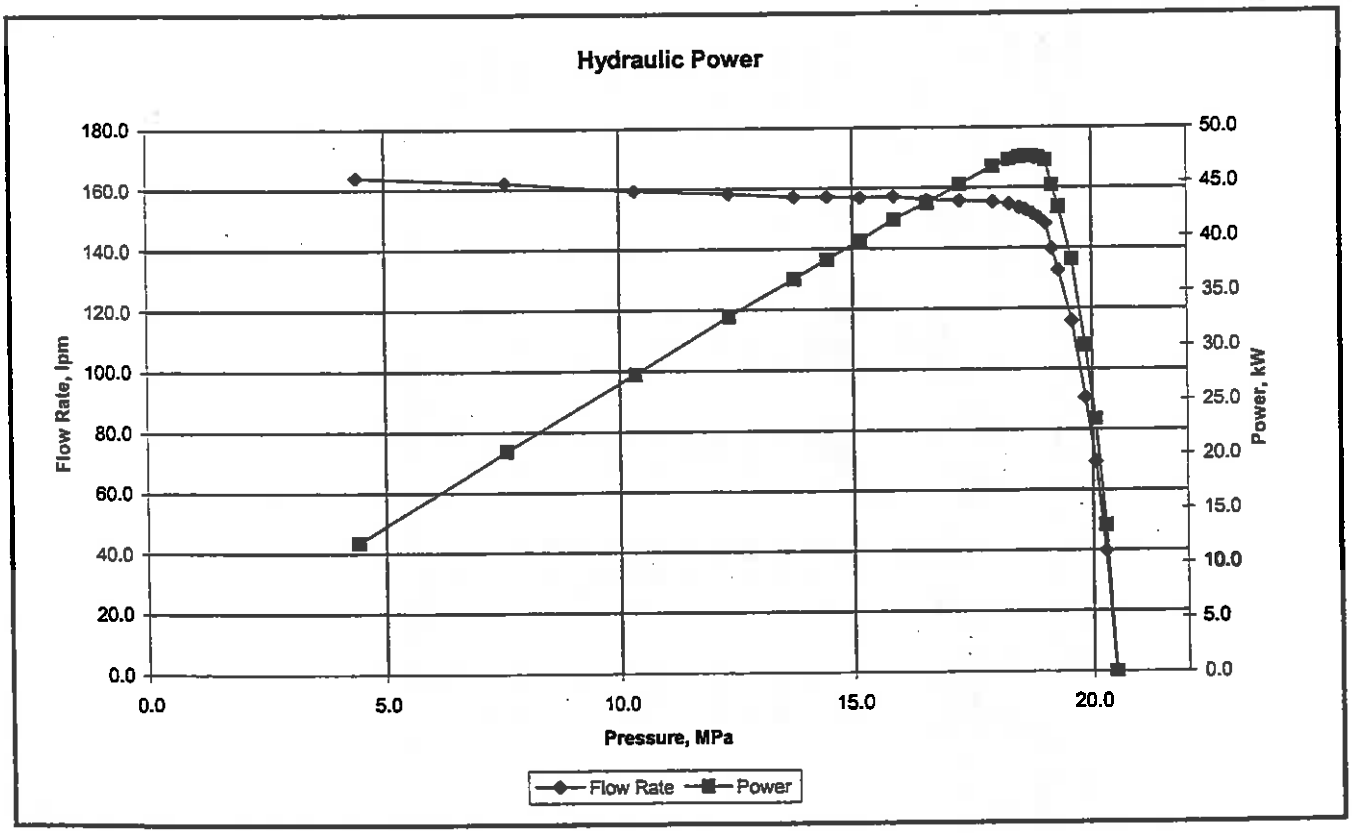
OECD Drawbar Data (SI)

Date of tests:	**18-Oct-99**					**Fuel density:**	**0.849 kg/l**						
Type of track:	**Concrete**					**Test number:**	**1764**						
3.3.1 Maximum power in tested gears (ballasted, 4wd)						**Tire pressure:**	**69 kPa, rear**		**152 kPa, front**		**Drawbar Height:**	**419 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	82.84	96.54	3.09	2032	12	0.366	2.32	47	84	98	11	38	98.3
3	94.56	93.46	3.64	1972	8	0.335	2.53	48	84	98	12	40	98.3
4	102.91	91.01	4.07	1896	7	0.320	2.65	48	84	99	13	42	98.3
5	109.84	89.67	4.41	1782	6	0.311	2.73	48	86	99	15	36	98.3
6	110.80	78.61	5.07	1748	4	0.307	2.77	46	86	99	16	42	98.3
7	114.53	69.06	5.97	1750	3	0.298	2.85	47	86	100	16	43	98.3
8	113.92	59.45	6.90	1751	3	0.299	2.84	46	87	100	16	43	98.3
9	113.19	51.03	7.99	1751	2	0.301	2.82	46	86	100	16	43	98.3
10	112.58	44.15	9.18	1751	2	0.303	2.80	46	87	100	16	46	98.3
11	111.25	37.88	10.57	1752	2	0.306	2.78	46	87	100	15	50	98.3
12	108.68	32.27	12.12	1748	1	0.314	2.71	46	87	100	14	49	98.3
13	106.11	25.13	15.20	1753	1	0.322	2.64	45	87	100	14	53	98.3
* Note:	Pull limited to avoid excessive 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.		



4.4 POWER LIFT TEST Category III, Extendable lower links, 2 - 89 mm cylinders
Date of test: 17 March 1999

		Hitch points	Frame
Lower hitch points above ground - down position:	mm	195	195
Vertical movement - without load:	mm	835	950
with load:	mm	825	915
Maximum corrected force exerted through full range:	kN	56.4	47.4
Corresponding pressure:	MPa	18.5	18.5
Moment about rear axle:	kNm	72.0	89.3
Maximum mast tilt angle	degrees	--	8.4

Lifting height relative to horizontal position of lower links.

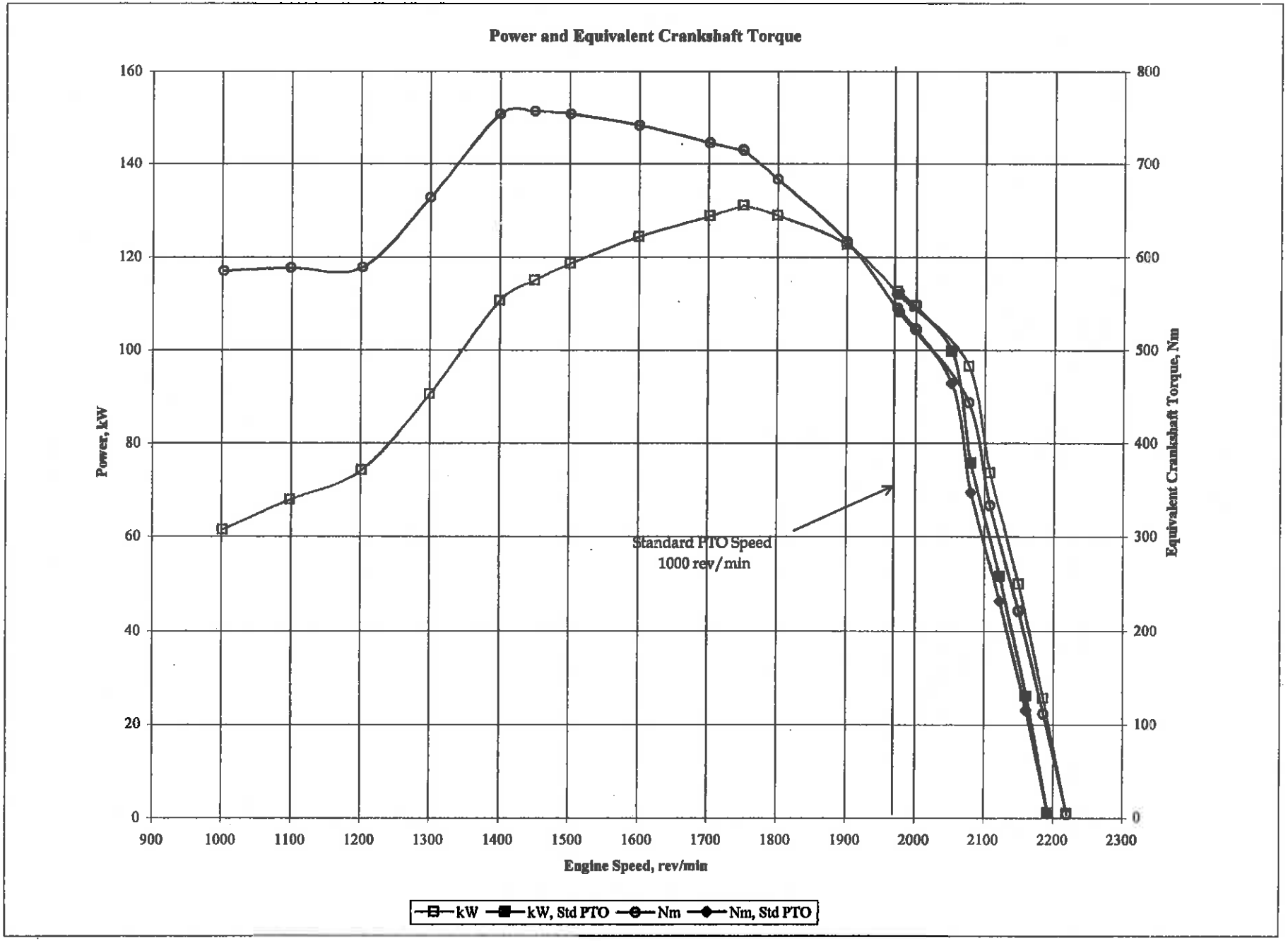
mm	-350	-301	-201	-101	-1	99	202	299	399	475	565
Corrected lift forces											
At the Hitch point kN	56.4	57.3	60.1	62.2	63.9	65.2	66.9	68.3	69.8	70.1	--
at the frame kN	59.0	58.2	58.2	58.2	57.7	56.4	55.3	52.5	51.1	49.7	47.4
Corresponding pressure Mpa 18.5											

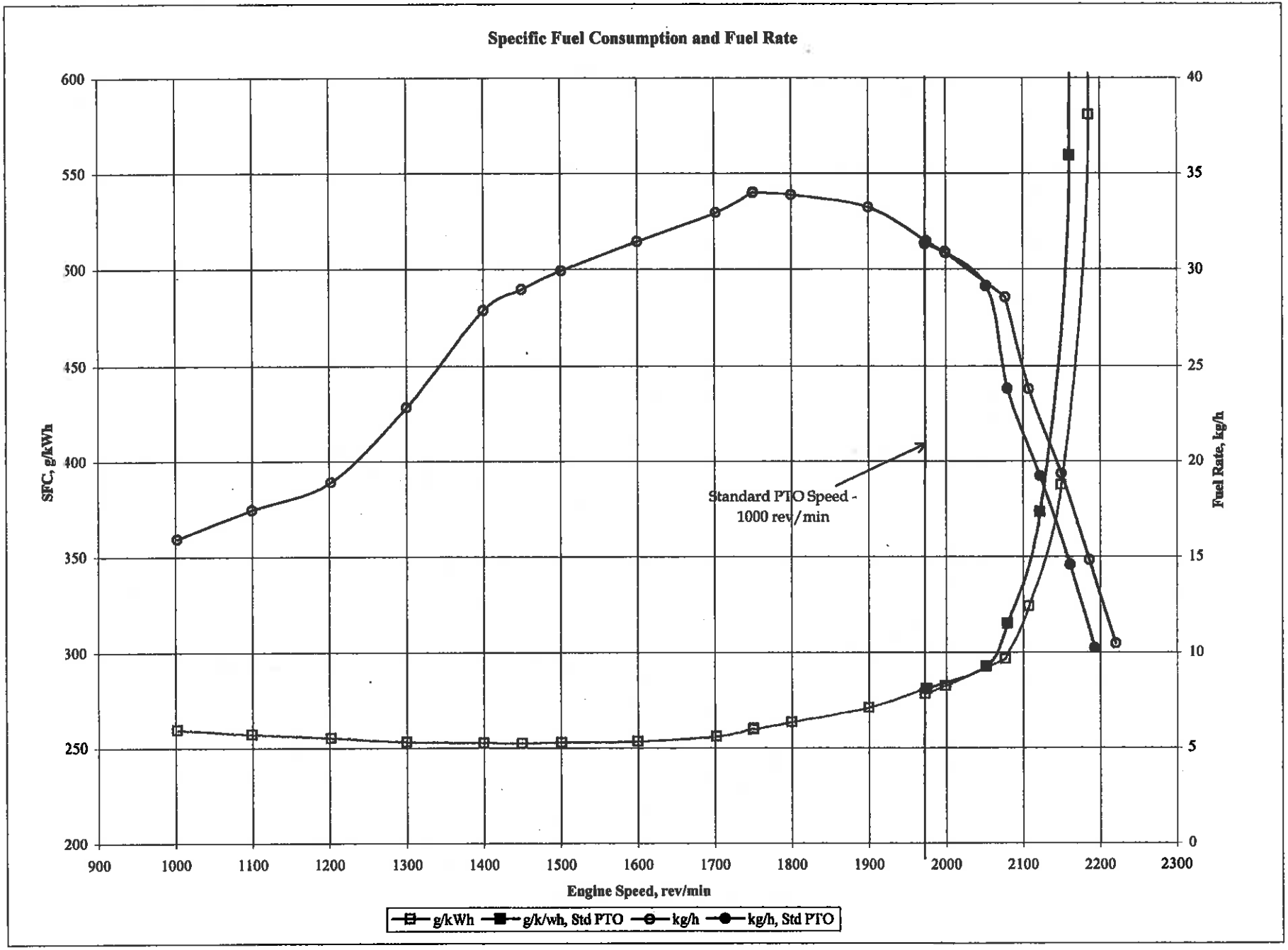
5. REPAIRS

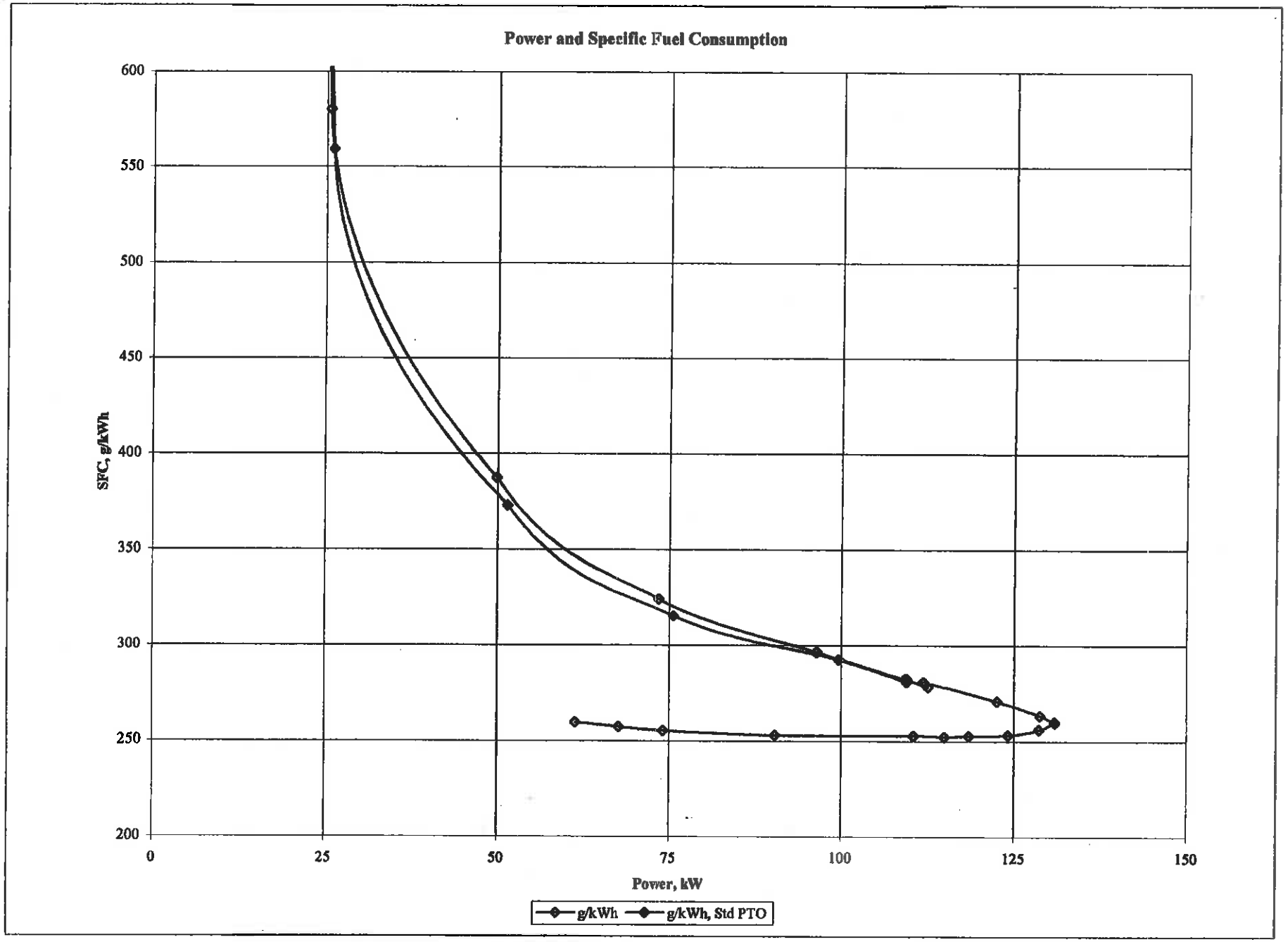
None

6. REMARKS

None


Power and Equivalent Crankshaft Torque
Power, kW
Equivalent Crankshaft Torque, Nm
Engine Speed, rev/min
Standard PTO Speed
1000 rev/min
kW
kW, Std PTO
Nm
Nm, Std PTO


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/k/wh, 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


Power and Specific Fuel Consumption
600
550
500
450
400
350
300
250
200
SFC, g/kWh
0
25
50
75
100
125
150
Power, kW
g/kWh
g/kWh, Std PTO