SILSOE RESEARCH INSTITUTE

OECD Report

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CODE 2

OECD RESTRICTED STANDARD CODE FOR THE OFFICIAL TESTING OF AGRICULTURAL AND FORESTRY TRACTOR PERFORMANCE

Case IH PCC7BB 2 (MXU115) Four-Wheel Drive Tractor with 24-speed Hi-Lo Transmission (40 km/h)



Manufactured by: CNH UK Limited
Basildon
Essex SS14 3AD
United Kingdom

Reference No: 850

Date: November 2004

File: 6668/2003

Rev: 25 February 2005

ENGINEERING for Life

OECD/6668/2003

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Statement

The information opposite each item has been validated by the Testing Station. An item marked [C] indicates to the test report user that the information declared by the manufacturer has been checked; an item marked [D] indicates that the manufacturer's declaration has been endorsed.

[C]	Tractor manufacturer's name and address:	CNH UK Limited Basildon, Essex, SS14 3AD United Kingdom
[C]	Location of tractor assembly:	Basildon, Essex / St Valentin, Austria
[D]	Submitted for test by:	The manufacturer
[C]	Selected for test by:	The manufacturer with the agreement of the testing station
[D]	Place of running in:	Basildon. Essex
[D]	Duration of running in:	68 hours
[C]	Location of test:	Silsoe Research Institute Wrest Park, Silsoe, MK45 4HS United Kingdom

1. SPECIFICATIONS OF TRACTOR

1.1 Identification

1.1.1

[C]	Make of tractor:	Case IH
[C]	Model (trade name):	MXU 115
[C]	Type:	Four- wheel drive, unit construction

1.1.2 *Numbers*

[D]	1st Serial No or prototype:	ACP207661/EKP001001
[C]	Serial No:	221208

1.1.3 *Other specifications (if applicable)*

[D]	Model(s) for other countries:	None
[C]	Transmission type or gears x ranges:	24-Speed Hi-Lo
[C]	Speed version:	40 km/h
[C]	Manufacturer identification or Technical type number:	PCC7BB2

1.2 Engine

[C]	Make:	CNH
[C]	Model:	F4CE0684C*D
[C]	Type:	4 stroke turbocharged direct injection and after cooled diesel
[C]	Serial No:	00093411

1.2.1 *Cylinders*

[C]	Number/disposition:.	6 vertical in-line
[D]	Bore/stroke:	104.0mm/132.0mm
[D]	Capacity:	6728 cm^3
[D]	Compression ratio:	17.0 : 1
[D]	Arrangement of valves:	Overhead
[D]	Cylinder liners:	None, monobloc construction

1.2.2	*Supercharging*	
[D]	Make/Model:	Holset/HX35W, HX35
[C]	Type:	Exhaust driven
[D]	Pressure:	0.085 MPa at rated speed/load
1.2.3	*Fuel system*	
[D]	Fuel feed system:	Mechanical Diaphragm pump
[C]	Make, type and model of fuel filter:	None, one disposable canister filter incorporating sediment and water separation plus plastic strainer in tank
[D]	Capacity of fuel tank:	254 dm^3
[D]	Make, type and model of injection pump:	Bosch, VE Rotary 0460426357
[D]	Serial No:	486290
	Manufacturer's production setting of injection pump	
[C]	Flow rate (rated engine speed and full load):	62.8 mm^3 ±5% per stroke at 2200 min^{-1} (rev/min) 23.62 – 26.11 dm^3/h
[D]	Timing:	TDC
[D]	Make, type and model of injectors:	Bosch, Differential Needle DSLA145 P1304
[D]	Injection pressure:	26 MPa
1.2.4	*Governor*	
[C]	Make:	Bosch
[D]	Model:	None
[C]	Type:	Mechanical incorporated in fuel Injection pump
[C]	Governed range of engine speed:	700 to 2450 min^{-1} (rev/min)
[C]	Rated engine speed:	2200 min^{-1} (rev/min)
1.2.5	*Air cleaner*	
[C]	Pre-cleaner	Optional
[C]	Type:	Spin tube
[C]	Location:	Air cleaner canister inlet
	Main cleaner Make:	Donaldson
[C]	Type:	3 stage dry paper element with replaceable cartridge
[D]	Model:	None
[C]	Location of air intake:	Under engine bonnet at front and above radiator.
[C]	Maintenance indicator:	Warning light on instrument panel

1.2.6 *Lubrication system*

[D]	Type of feed pump:	Forced feed from concentric rotor pump
[D]	Type of filter:	Mesh strainer in sump on suction line and full flow disposable canister on pressure line to engine
[C]	Number:	1

1.2.7 *Cooling system*

[C]	Type of coolant:	Water and antifreeze (50% solution)
[D]	Type of pump:	Belt driven centrifugal impeller
	Specification of fan	
[C]	Number of fan blades:	5
[C]	Fan diameter:	510 mm
[D]	Coolant capacity:	25 dm^3
[D]	Type of temperature control:	Thermostat with full flow bypass
[D]	System pressure:	100 kPa

1.2.8 *Starting system*

[D]	Make:	Bosch
[D]	Model:	EV3
[C]	Type:	Electrical, positive engagement, solenoid operated
[D]	Starter motor power rating:	3.1/3.6 kW 3.0 kW (Reduction geared)
[D]	Cold starting aid:	Phillips and Temro, injection management thermostarter
[C]	Safety device:	Starting inoperable unless shuttle lever in neutral, clutch pedal depressed and operator seat presence switch is activated

1.2.9 *Electrical system*

[C]	Voltage:	12 V
	Generator:	Alternator
[C]	Make:	Denso
[C]	Model:	A 127
[C]	Type:	Belt driven
[C]	Power:	120 amps at 6000 min^{-1} (rev/min)
	Batteries	
[C]	Number:	1 Exide lead acid, mounted behind right hand steps
[D]	Rating:	176 Ah at 20 hours

1.2.10 *Exhaust system*

[C]	Make:	COR.TUBI
[D]	Model:	None
[C]	Type:	Vertical stack pipe with intergral silencer
[C]	Location:	Engine rear on right hand side
[C]	Height of outlet above ground:	2930 mm

1.3 Transmission

1.3.1 *Clutch (Travel alone)*

[D]	Make:	CNH
[D]	Model:	None
[D]	Type:	Wet multiplate in gearbox, for travel only
[D]	Number of plates:	9
[D]	Diameter of plates:	160 mm
[C]	Method of operation:	Electro-hydraulic with pedal override

1.3.2 *Gear box*

[D]	Make:	CNH
[C]	Model:	Hi-Lo
[C]	Description:	Mechanical, synchromesh operation, (except for low range selection). 2 powershift speeds, button selected for each of the 4 gear positions on the main lever and the 3 positions on the range lever. Levers mounted on the right-hand console. Forward/reverse is actuated by a steering column mounted shuttle lever.

		Forward	Reverse
[C]	Number of gears	4	4
[C]	Number of ranges/groups	3/2	3/2
[C]	Total of arrangements	24	24

Available options:

12 x12 with or without creep (30/40 km/h)
16 x 16 with or without creep (30/40 km/h)
24 x 24 with or without creep (30/40 km/h)
17 x 16 less creep only (50km/h)

1.3.3 *Rear axle and final drives*

[D]	Make:	CNH
[D]	Model:	None
[D]	Type:	Crown wheel pinion with differential and inboard epicyclic reduction gear final drive
	Differential lock:	
[D]	Type:	Mechanical or multiplate
[C]	Method of engagement:	Electro-hydraulic actuation in response to signal from switch on right-hand control panel or auto diff lock actuation
[C]	Method of disengagement:	Via panel switch or in response to signal from brakes on application, or auto diff lock disengagement

1.3.4 *Front axle and final drives*

[D]	Make:	CNH
[D]	Model:	None
[D]	Type:	Crown wheel and pinion with differential and outboard epicyclic reduction gear final drives
	Drive engagement:	
[D]	Type:	Mechanical or multiplate clutch – located within the gearbox
[C]	Method of operation:	Electro-hydraulic actuation in response to signal from switch on right-hand control panel or auto 4wd engagement
	Differential lock:	
[D]	Type:	Mechanical or multiplate clutch
[C]	Method of engagement:	Electro-hydraulic actuation in response to signal from switch on right-hand control panel or auto diff lock actuation
[C]	Method of disengagement:	Via panel switch or in response to signal from brakes on application, or auto diff lock disengagement

1.3.5 *Total ratios and travelling speeds*

	Gear	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at rated engine speed:* 2200 rev/min km/h
	Forward			
[C]	1	I lo	414.48	1.64
[C]	1	I hi	338.89	2.01
[C]	2	I lo	282.92	2.40
[C]	2	I hi	231.31	2.94
[C]	3	I lo	198.12	3.43
[C]	3	I hi	161.98	4.20
[C]	4	I lo	136.15	5.00
[C]	4	I hi	111.32	6.11
[C]	1	II lo	165.00	4.12
[C]	1	II hi	134.90	5.04
[C]	2	II lo	112.63	6.04
[C]	2	II hi	92.08	7.39
[C]	3	II lo	78.87	8.62
[C]	3	II hi	64.48	10.55
[C]	4	II lo	54.20	12.55
[C]	4	II hi	44.31	15.35
[C]	1	III lo	68.15	9.98
[C]	1	III hi	55.72	12.21
[C]	2	III lo	46.52	14.62
[C]	2	III hi	38.03	17.88
[C]	3	III lo	32.58	20.88
[C]	3	III hi	26.63	25.54
[C]	4	III lo	22.39	30.38
[C]	4	III hi	18.30	37.16
	Reverse			
[C]	1	I lo	400.81	1.70
[C]	1	I hi	327.70	2.08
[C]	2	I lo	273.59	2.49
[C]	2	I hi	223.69	3.04
[C]	3	I lo	191.59	3.55
[C]	3	I hi	156.64	4.34
[C]	4	I lo	131.68	5.17
[C]	4	I hi	107.64	6.32
[C]	1	II lo	159.59	4.26
[C]	1	II hi	130.45	5.21
[C]	2	II lo	108.92	6.24
[C]	2	II hi	89.05	7.64
[C]	3	II lo	76.27	8.92
[C]	3	II hi	62.36	10.91
[C]	4	II lo	52.42	12.98
[C]	4	II hi	42.85	15.87
[C]	1	III lo	65.90	10.32
[C]	1	III hi	53.88	12.62
[C]	2	III lo	44.99	15.12
[C]	2	III hi	36.78	18.49
[C]	3	III lo	31.50	21.59
[C]	3	III hi	25.76	26.41
[C]	4	III lo	21.65	31.41
[C]	4	III hi	17.70	38.42

I = Low range II = Medium range III = High range
lo = Under drive hi = Direct drive

(*) Calculated with a tyre dynamic radius index of 820 mm

[C] Number of revolutions of front wheels for one revolution of rear wheels: 1.353

1.4 Power take-off

1.4.1 *Main power take-off*

[C]	Type:	Independent
[C]	Method of engagement:	Electro-hydraulic operated multi-plate clutch in response to a signal from switch on the right-hand control panel
[C]	Number of shafts:	1 interchangeable shaft, 6 or 21 splines to ISO 500/1991
[C]	Method of changing power take-off speeds:	Two speed shiftable, 540 or 1000 min^{-1} (rev/min) by lever on right-hand console or by changing shafts

Clutch

[D]	Make:	CNH
[D]	Model:	None
[D]	Type:	Multiplate, wet
[D]	Number of plates:	6
[D]	Diameter of plates:	140.0 mm

1.4.1.1 Power take-off proportional to engine speed

Power take-off at 540 min^{-1} (rev/min)

[C]	Location:	Rear of tractor
[C]	Diameter of power take-off shaft:	34.9 mm
[C]	Number of splines:	6 in conformity with ISO 500/1991 (available option 21)
[C]	Height above ground:	792 mm
[C]	Distance from the median plane of the tractor:	Central
[C]	Distance behind rear wheel axis:	555 mm
[C]	PTO speed at rated engine speed:	603 min^{-1} (rev/min)
[C]	Engine speed at standard power take-off speed:	1969 min^{-1} (rev/min)
[C]	Ratio of rotation speeds:	3.65
[D]	Power restriction:	None
[D]	Maximum torque transmissible:	None
[C]	Direction of rotation (viewed from behind tractor):	Clockwise

Power take-off at 1000 min^{-1} (rev/min)

[C]	Location:	Rear of tractor
[C]	Diameter of power take-off shaft:	34.9 mm
[C]	Number of splines:	21 in conformity with ISO 500/1991 (available option 6)
[C]	Height above ground:	792 mm
[C]	Distance from the median plane of the tractor:	Central
[C]	Distance behind rear wheel axis:	555 mm
[C]	PTO speed at rated engine speed:	1038 min^{-1} (rev/min)
[C]	Engine speed at standard power take-off speed:	2120 min^{-1} (rev/min)
[C]	Ratio of rotation speeds:	2.12
[D]	Power restriction	None
[D]	Maximum torque transmissible:	None
[C]	Direction of rotation (viewed from behind tractor):	Clockwise

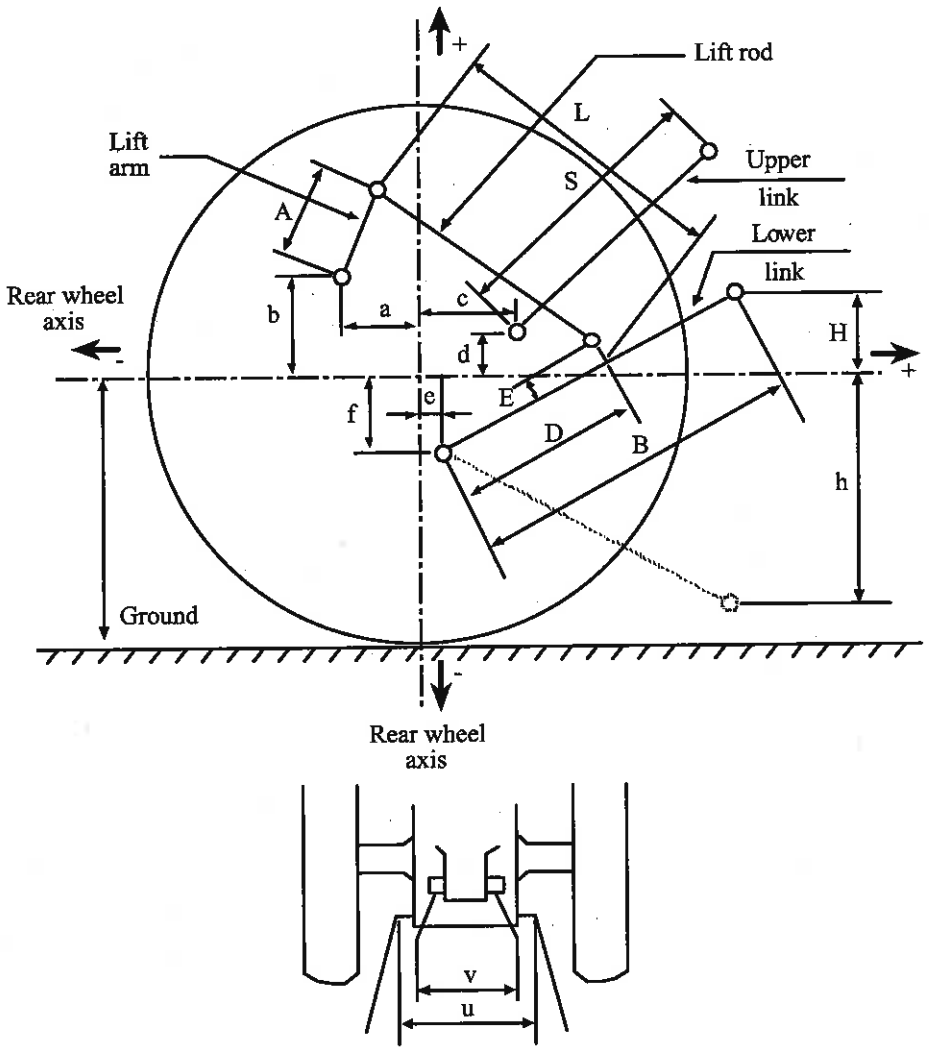
1.4.1.2 Power take-off proportional to ground speed — Not applicable

1.5 Hydraulic power lift

[C]	Make:	CNH
[D]	Model:	None
[D]	Type:	Electro-hydraulic closed centre load sensing
[C]	Type and number of cylinders:	2 single acting externally mounted rams.
[C]	Type of linkage lock for transport:	Hydraulic
[D]	Pump maximum pressure / Relief valve pressure setting:	19.5 – 20.5 MPa
[D]	Opening pressure of cylinder safety valve:	22.0 – 23.0 MPa
[D]	Lift pump type:	Fixed displacement gear pump
[D]	Transmission between pump and engine:	Gear driven from PTO shaft, independent of main and PTO clutches
[C]	Type and number filters:	2 disposable canister filters
[C]	Site of oil reservoir:	Rear axle housing
[C]	Type, number and location of tapping points:	2 remote couplers at rear of tractor
[D]	Maximum volume of oil available to external cylinders:	19 litres under normal conditions (flat fields) 27 litres when operating stationary on level ground

1.6 Three-point linkage

[C]	Category:	2 in conformity with ISO 730-1:1994 + Cor.1:1995
[C]	Category adapter:	None
[C]	Controls:	Electronic draught/ position control with lower link sensing



LIFT TEST
Linkage geometry

Fig 1.1 and Fig 1.2

Table 1.1
Dimensions of linkage when attached to the standard frame (ISO 730-1-1994 CAT 2)

				Dimensions or ranges	Settings used in tests		
					3.2.2	7.1	7.2
				mm	mm	mm	mm
[C]	Length of lift arms:		(A)	310	310	310	310
[C]	Length of lower links:		(B)	950	950	950	950
[C]	Distance of lift arm pivot point from rear wheel centre line:	horizontally: vertically:	(a) (b)	138 370	138 370	138 370	138 370
[C]	Horizontal distance between the two lower link points:		(u)	460	460	460	460
[C]	Horizontal distance between the two lift arm end points:		(v)	550	550	550	550
[C]	Length of upper link:		(S)	650 – 913	700	720	708
[C]	Distance of upper link pivot point from rear wheel centre line:	horizontally: vertically:	(c) (d)	430 – 455 208 – 275	455 208	430 275	430 275
[C]	Distance of lower link pivot point from rear wheel centre line:	horizontally: vertically:	(e) (f)	168 235	168 235	168 235	168 235
[C]	Distance of lower link points to lift rod pivot points on lower link centre line:		(D)	505 – 585	505	585	585
[C]	Length of lift rods:		(L)	700 – 888	830	878	878/810
	Height of lower hitch points (*) Relative to the rear wheel centre line, situated 820 mm above the ground level:						
[C]	- in low position		(h)	290 – 750	622	612	597/500
[C]	- in high position		(H)	0 – 260	43	0	0/80
[C]	Height of lower hitch points when locked in transport position (*)			Any height within lift range (hydraulic transport lock)			

*Assuming r = tyre dynamic radius index of 820 mm

1.7 Swinging drawbar
(Incorporated in automatic pick-up with hook and clevis on drawbar and selected by reversing)

[C]	Type:		Clevis		Hook
[C]	Height above ground:	Unballasted Maximum:	505 mm		490 mm
		Minimum:	462 mm		
[C]	Type of adjustment:		Inverting drawbar		
[C]	Distance of hitch point from rear-wheel axis, horizontally:		805 mm	905 mm 955 mm	585 mm
[C]	Distance of hitch point from power take-off shaft end:				
		Vertically:	287 mm	330 mm	302 mm
		Horizontally:	250 mm	350 mm 400 mm	30 mm
[C]	Lateral adjustment (centre of clevis):	Right-hand:	145 mm	220 mm 250 mm	None
		Left-hand:	145 mm	220 mm 250 mm	None
[C]	Distance of pivot point from rear axles	horizontally:	Not applicable		
[C]	Width of clevis:		70 mm		
[C]	Diameter of drawbar pin hole:		33 mm		
[D]	Maximum vertical permissible load:	Clevis uppermost:	2400 kg		3000 kg
		Clevis underneath:	2180 kg		

1.8 Traller hitch None fitted

1.9 Holed drawbar

Type: None fitted

1.10 Steering

[D]	Make:	CNH
[D]	Model:	None
[D]	Type:	Hydrostatic
	Method of operation	
[C]	Pump:	Bosch
[C]	Motor:	Sauer Danfoss OSPC-160-OR
[C]	Ram:	2, balanced system with double acting cylinders one operating each steering arm
[D]	Filter:	Integral with hydraulic power lift system
[D]	Working pressure:	17 MPa

1.11 Brakes

1.11.1 *Service brake*

[D]	Make:	CNH
[D]	Model:	None
[D]	Type:	Oil-immersed single plate disc
[C]	Method of operation:	Hydraulic, independent on rear wheels (On 4 WD models. When the service brakes are activated the front wheel drive is automatically engaged providing 4-wheel braking)
[C]	Trailer braking take-off:	Hydraulic connector fitted to ISO 5676-1983

1.11.2 *Parking brake*

[D]	Type:	Fully independent four plate disc operating on bevel pinion shaft
[C]	Method of operation:	Hand lever with ratchet

1.12 Wheels

Number

[C] Front: 2 driving/steering

[C] Rear: 2 driving

[C] Wheelbase: 2652 mm

Track width adjustment:

		Minimum mm	Maximum mm	Adjustment method
[C]	Front*	1630	2080	Reversing wheels and offset lug rims
[C]	Rear	1730	2130	Reversing wheels and offset lug rims

*55° steering angle available only on 1860 mm and larger track settings

1.13 Protective structure

[C] Make: CNH

[C] Model: SLTV 11

[C] Type: Cab safety frame

[C] Manufacturer's name and address: CNH UK Ltd
Cranes Farm Road
Basildon
Essex
SS14 3AD

Protective device

[C] Cab/frame/rollguard/ other: Cab

[C] Tiltable/Not tiltable: Not tiltable

OECD approval

[C] Approval number: 4/0740

[C] Date of approval: 19 September 2002

Nos. minor modification certificates, if any: 2

The certificates for minor modifications established by Danish testing station

1.14 Seat

1.14.1 *Driver's seat*

[C]	Make/model/Type:	Grammer MSG 93/731, 95A/741 EEC approved to 78/764/EEC – e1*0006*03, e1*100514*07
[C]	Seat and steering wheel reversible:	No
[C]	Type of suspension:	Parallelogram, suspension air spring
[C]	Type of damping:	Double acting, hydraulic
	Range of adjustment -	
[C]	Longitudinal:	+ 90 mm / -120 mm
[C]	Vertical:	± 40 mm
[C]	Safety belt:	Yes

1.14.2 *Optional driver's seat(s)*

1.14.3 *Passenger seat* Not fitted

1.15 Lighting

		Height above ground to centre	Size	Distance from outside edge of lights to medium plane of tractor
		mm	mm	mm
[D]	Headlights	1315	170 x 170	190
[C]	Sidelights	1805	75 x 70	1008
[D]	Rear lights	1865	90 x 90	950
[D]	Rear fender reflectors	1865	35 x 90	950
[C]	Rear axle reflectors	795	100 x 35	581

2 TEST CONDITIONS

2.1 Overall dimensions

	length	Width		Height at top of	
		minimum	maximum	Protective structure	Exhaust pipe
	mm	mm	mm	mm	mm
Unballasted	4505	2340	2340	2860	2930

2.2 Ground clearance (unballasted tractor) 350 mm

Clearance-limiting part: Drawbar clevis in lowest position

2.3 Tractor mass

Mass (with or without frame/roll guard/cab/other): With cab

	Unballasted	
	Without driver	With driver
	kg	kg
Front	2078	2104
Rear	3292	3341
Total	5370	5445

2.4 Ballast Not applicable

2.5 Track specifications Not applicable

2.6 Tyres and track width specification

	Front	Rear
Tyres Dimensions ply rating type	480/65R28 136 A8 Radial	600/65R 38 153 A8 Radial
Maximum load (tyre manufacturer's) 30/40/50 km/h	15.4/14.4/13.1 kN	25.3/23.6/21.4 kN
Maximum load (tractor manufacturer's) 30/40/50	15.4/14.4/13.1 kN	25.3/23.6/21.4 kN
Inflation pressure (tyre manufacturer's)	62 kPa	62 kPa
Dynamic radius index	640 mm	820 mm
Chosen track width (manufacturer's nominal)	1760 mm	1740 mm

2.7 Fuel

Type: Diesel oil to Class D, 1.5 to 5.5 cSt.

Density at 15° C: 0.8453 g/cm^3

2.8 Oils and lubrication

2.8.1 *Capacity and change interval*

	Capacity	Oil change	Filter change
	dm^3	h	h
Engine	15.0	600	600
Front axle differential	9.0	1200	None
Front axle hub (each)	1.7	1200	None
Gearbox	62.0	1200	600/1200
Rear axle Hydraulic system Final drives (rear) Steering	Integral with gearbox		
Brakes	0.5	Top-up	None

2.8.2 *Specifications (SAE, APL, CCMC, ACEA, MILL, ISO)*

	spec	Recommended	Used during test
Engine oil Type: Viscosity Classification:	MS 1121	SAE 10W/30 11.5 cSt at 100° C API CH – 4	As recommended
Transmission oils Type: Viscosity Classification:	MAT 3525	SAE 10W/30 9 cSt at 100° C API GL – 4	As recommended
Rear final drives Type: Viscosity: Classification:	MAT 3525	SAE 10W/30 9 cSt at 100° C API GL – 4	As recommended
Front differential and final drives Type: Viscosity: Classification:	MAT 3525	SAE 10W/30 9 cSt at 100° C API GL – 4	As recommended
Hydraulic brakes Type: Viscosity: Classification:	LHM fluid	No equivalent 6 cSt at 100° C ISO 7308	As recommended
Hydraulic fluid Type: Viscosity: Classification:	MAT 3525	SAE 10W/30 9 cSt at 100° C API GL – 4	As recommended
Steering oil Type: Viscosity: Classification:	MAT 3525	SAE 10W/30 9 cSt at 100° C API GL – 4	As recommended

2.8.3 *Grease*

Type:	251 HEP	Lithium Based	As recommended

Number of lubrication points: 14

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

Date and location of tests: 9 September 2004
Silsoe Research Institute
Wrest Park, Silsoe, Bedford

Type of dynamometer bench: Eddy Current, Borghi and Saveri

Power	Speed			Fuel consumption			Specific Energy
	Engine	P.T.O.	Fan	Hourly		Specific	
kW	min^{-1} (rev/min)			kg/h	l/h	g/kWh	kWh/l
3.1.1 MAXIMUM POWER – TWO - HOUR TEST							
78.1	1964	926	2216	20.63	24.40	264	3.20
3.1.2 POWER AT RATED ENGINE SPEED							
75.3	2200	1038	2471	21.53	25.47	286	2.96
3.1.3 STANDARD POWER TAKE-OFF SPEED [1000 ± 25 min^{-1} (rev/min)]							
77.3	2119	999	2368	21.38	25.29	277	3.06
3.1.4 PART LOADS 3.1.4.1 the torque corresponding to maximum power at rated engine speed							
75.3	2200	1038	2471	21.53	25.47	286	2.96
3.1.4.2 85% of torque obtained in 3.1.4.1							
67.4	2316	1092	2376	20.45	24.20	304	2.79
3.1.4.3 75% of torque defined in 3.1.4.2							
50.8	2330	1099	2480	1766	20.89	348	2.43
3.1.4.4 50% of torque defined in 3.1.4.2							
34.2	2354	1110	2333	1381	16.34	403	2.10
3.1.4.5 25% of torque defined in 3.1.4.2							
17.4	2382	1124	2111	10.42	12.33	598	1.41
3.1.4.6 unloaded							
0	2423	1143	1980	7.26	8.59	-	-
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED [1000± 25 min^{-1} (rev/min)] 3.1.5.1 the torque corresponding to maximum power							
77.3	2119	999	2368	21.38	25.29	277	3.06
3.1.5.2 85% of torque obtained in 3.1.5.1							
68.4	2213	1044	2087	19.67	23.27	288	2.94
3.1.5.3 75% of torque defined in 3.1.5.2							
51.7	2231	1052	2164	17.02	20.14	329	2.57
3.1.5.4 50% of torque defined in 3.1.5.2							
35.1	2267	1070	2162	13.23	15.65	377	2.24
3.1.5.5 25% of torque defined in 3.1.5.2							
17.8	2302	1086	2111	9.95	11.77	558	1.52
3.1.5.6 unloaded							
0	2344	1106	2003	6.78	8.02	-	-

3.1.6 PART LOADS AT DIFFERENT ENGINE SPEEDS							
3.1.6.1 maximum power at rated engine speed							
75.3	2200	1038	2471	21.53	25.47	286	2.96
3.1.6.2 80% of power obtained in 3.1.6.1 at max speed setting							
60.2	2324	1096	2453	19.98	22.81	320	2.64
3.1.6.3 80% of power obtained in 3.1.6.1 with governor set to 90% of rated engine speed							
60.2	1981	934	2030	16.95	20.05	282	3.00
3.1.6.4 40% of power obtained in 3.1.6.1 with governor set to 90% of rated engine speed							
30.1	1979	933	1890	10.42	12.33	346	2.44
3.1.6.5 60% of power obtained in 3.1.6.1 with governor set to 60% of rated engine speed							
45.2	1322	624	1563	10.84	12.82	240	3.52
3.1.6.6 40% of power obtained in 3.1.6.1 with governor set to 60% of rated engine speed							
30.1	1320	623	1335	7.75	9.17	258	3.28

No load maximum engine speed: 2423 min^{-1} (rev/min)

Torque (equivalent crankshaft) at maximum power

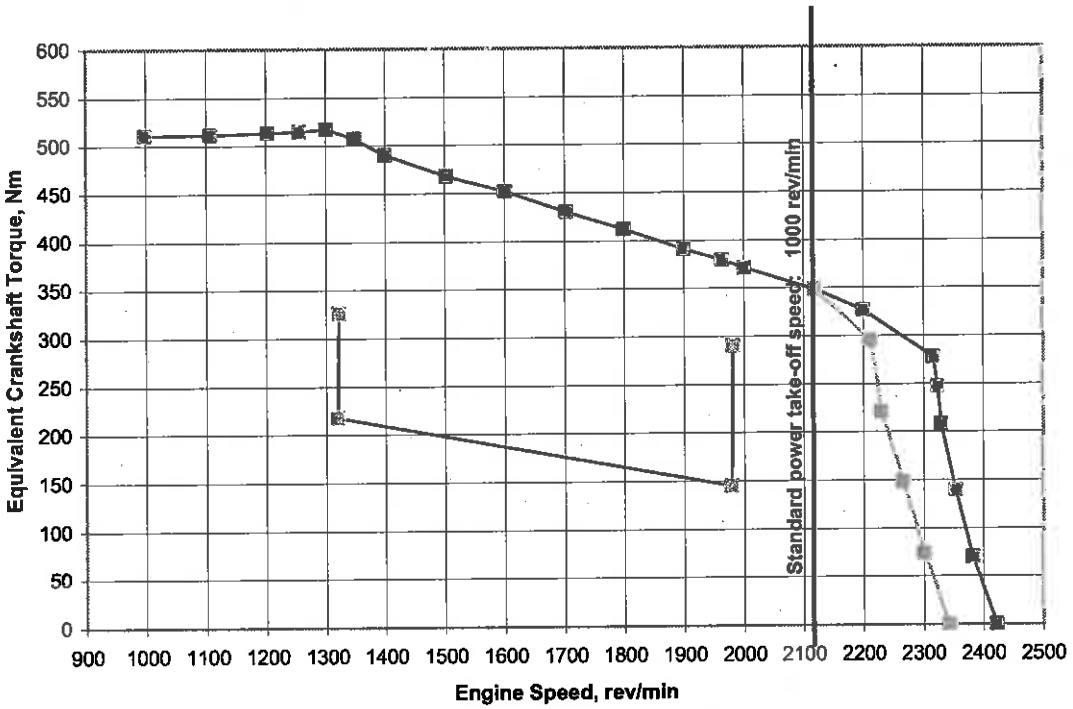
At rated engine speed: 327.0 Nm

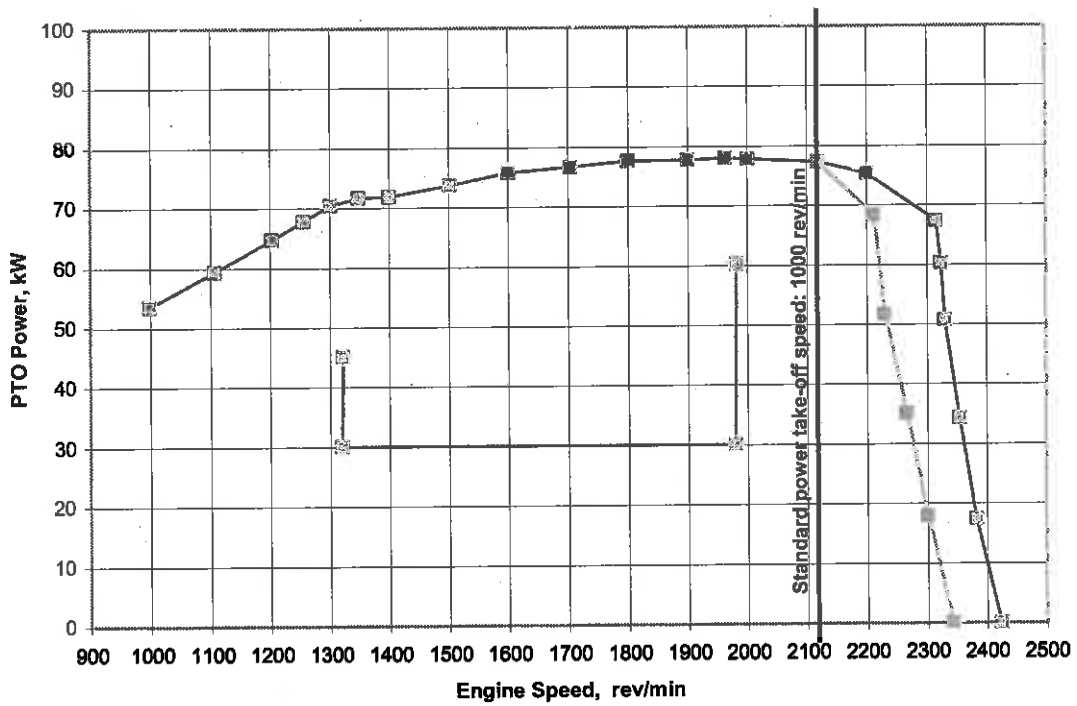
At 2-hour test: 379.6 Nm

Maximum torque (equivalent crankshaft): 517.1 Nm
(engine speed:1301 min^{-1} (rev/min)

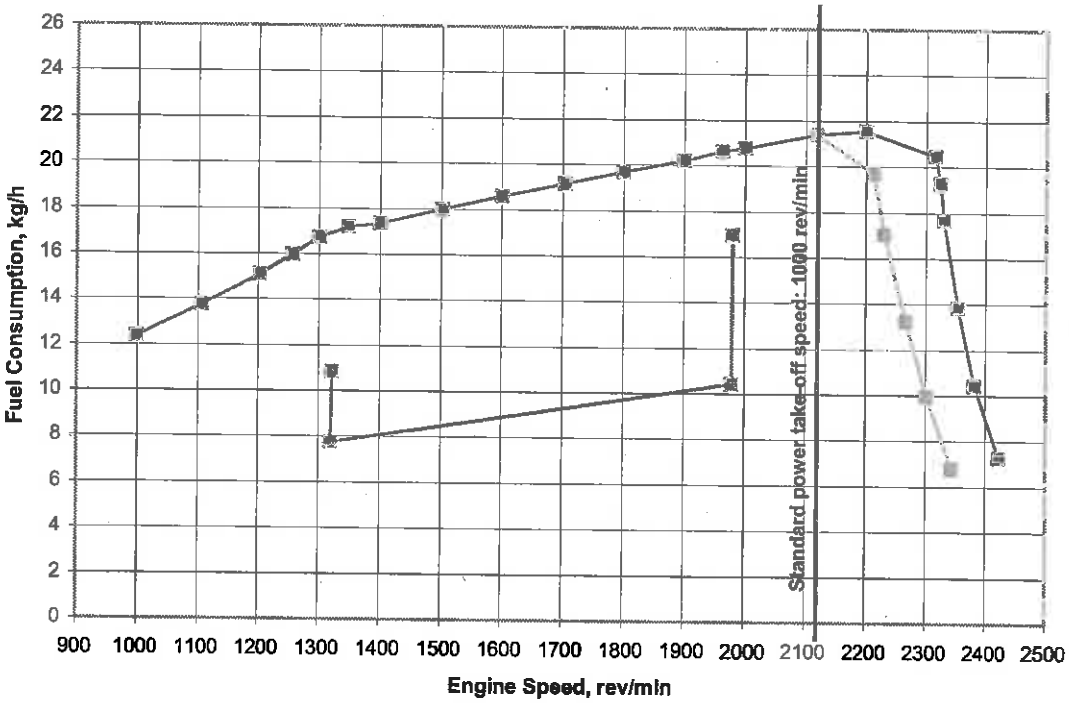
Mean atmospheric conditions:	
Temperature	23 °C
Pressure	102.2 kPa
Relative humidity	54 %
Maximum temperatures:	
Coolant	83 °C
Engine oil	108 °C
Fuel	51 °C
Engine air intake	29 °C

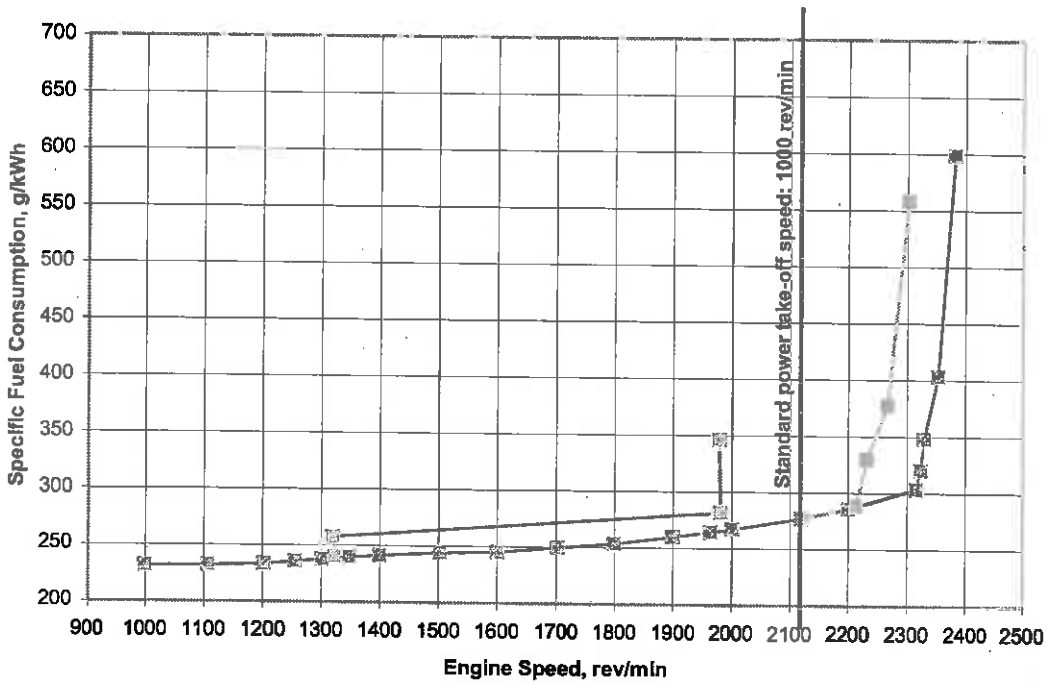
Power take-off curves



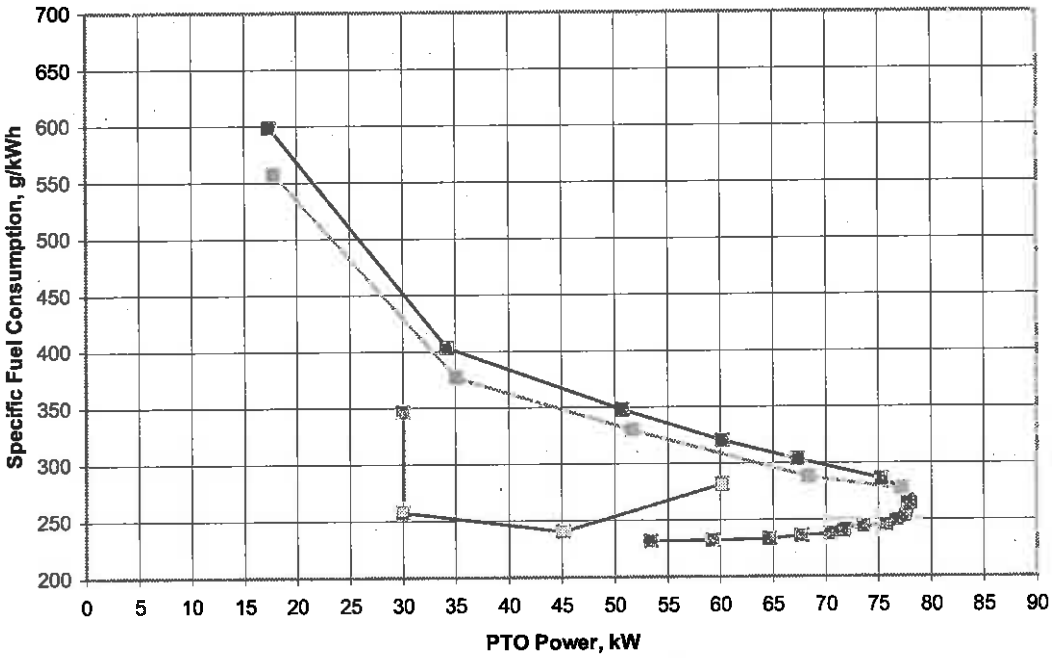


Power take-off curves





Power take-off curves



3.2 Hydraulic power and lifting force

Date of tests: 28 October and 8 November 2004

3.2.1 *Hydraulic power test*

3.2.1.1 Hydraulic fluid data

Hydraulic fluid type: MAT 3525

Viscosity index (ISO 3448+Corr 1:1993): 130

Viscosity at 65° C: 36.5mm^2/s

3.2.1.2 Compulsory Reporting (Test Results):

	Pressure	Reservoir oil Temperature °C (65 °C target)		Engine Speed	Flow rate	Power
	MPa	Min.	Max.	Rev/min	l/min	kW
Rated Engine Speed				2200		
3.2.1.2.1 Maximum (sustained) pressure with relief valve open as measured at the coupler Pump stalled: Yes	20.5	64	66	2423		
3.2.1.2.2 Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power (one coupler pair)	18.5 18.5*	67 66*		2390 2393*	46.9 51.9*	14.46 16.00*
3.2.1.2.3 Maximum available flow and maximum power from one coupler pair:	16.5	65		2378	71.7	19.72
3.2.1.2.4 Maximum available flow and maximum power from coupler pairs operating simultaneously (flow through two or more coupler pairs if required):	17.0	67		2380	71.9	20.37

* From 2 couplers

Maximum flow from 1 pair of couplers: 83.5 l/m

Maximum flow from 2 pairs of couplers: 84.0 l/m

3.2.2 Compulsory Power lift test

Power lift test – (To ISO 730-1:1994)

Linkage settings for test – see Table 1.1 and Figures 1.1 and 1.2.

	At the hitch point	on the frame
Height of lower hitch points above ground in down position	198 mm	198 mm
Vertical movement	665 mm	827 mm
Maximum corrected force exerted through full range	40.5 kN	27.9 kN
Corresponding pressure of hydraulic fluid	18.5 MPa	18.5 MPa
Moment about rear-wheel axis	45.3 kNm	48.2 kNm
Maximum tilt angle of mast from vertical	—	10 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	- 462	- 387	- 275	- 175	- 65	0	+ 128	+ 190	+ 245	+ 278	+ 365
Lifting forces (the values of force measured shall be corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting of the hydraulic lift system):											
at the hitch points kN	--	40.5	41.3	42.9	44.3	45.2	46.6	46.6	47.3	45.4	--
Corresponding pressure: 18.5 MPa											
at the frame kN	36.0	--	36.0	36.1	36.1	35.8	34.1	33.6	32.7	--	27.9
Corresponding pressure: 18.5 MPa											

3.3 Drawbar power test (unballasted tractor)

Date and Location of tests: 28 and 29 September 2004
Silsoe Research Institute
Wrest Park
Silsoe
Bedford MK45 4HS

Type of track: Concrete

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
	mm	kPa	kPa
Unballasted 4WD	425	70	70
Unballasted 4WD disengaged	470	70	70

Gear number and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels or track	Fan speed	Specific fuel cons	Specific Energy	Temperature			Atmospheric condition		
									Fuel	Coolant	Engine oil	Temp	Relative humidity	Pressure
	kW	kN	Km/h	min^{-1}	%	min^{-1}	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.3.1	MAXIMUM POWER IN TESTED GEARS (unballasted tractor)													
1 I lo	24.0	55.0	1.57	2379	13.0	1935	555	1.52	54	83	107	17	70	101.2
1 I hi	29.2	54.7	1.92	2366	12.6	2235	504	1.68	57	84	107	17	69	101.2
2 I lo	34.8	54.2	2.31	2351	11.6	2335	479	1.76	60	85	108	17	68	101.2
2 I hi	42.3	54.2	2.81	2346	11.9	2656	408	2.07	57	85	110	17	69	101.2
3 I lo	49.3	53.9	3.29	2335	11.2	2212	395	2.14	56	83	109	17	68	101.2
1 II lo	56.9	53.3	3.84	2242	10.1	2563	358	2.36	59	84	109	18	64	101.1
3 I hi	56.4	51.2	3.97	2246	9.0	2042	374	2.26	56	84	110	17	69	101.2
4 I lo	61.9	47.9	4.66	2157	6.6	2003	328	2.58	57	83	109	18	65	101.2
1 II hi	61.6	47.4	4.68	2153	6.8	2003	335	2.52	56	83	109	18	64	101.2
2 II lo	62.0	42.2	5.30	2006	5.4	2282	335	2.52	58	83	107	18	64	101.0
4 I hi	64.4	43.5	5.33	1996	5.5	2196	320	2.64	57	83	109	18	66	101.2
2 II hi	64.7	36.3	6.42	1964	4.3	2000	317	2.67	52	82	105	15	78	101.2
3 II lo	63.4	30.1	7.58	1972	3.6	2177	324	2.61	52	82	105	16	70	101.2
1 III lo	64.4	26.2	8.85	1982	3.2	2135	320	2.64	53	83	108	16	72	101.2
3 II hi	64.1	24.7	9.35	1978	3.0	2020	322	2.62	53	82	106	17	69	101.2
1 III hi	64.5	21.7	10.70	1950	2.4	2054	314	2.69	52	83	107	16	74	101.2
4 II lo	63.5	20.8	10.99	1947	2.6	1980	319	2.65	53	83	107	15	74	101.2
2 III lo	61.6	17.1	12.96	1965	2.1	2157	330	2.56	52	82	107	16	73	101.2
4 II hi	63.3	16.9	13.52	1950	2.2	2087	318	2.66	52	83	107	16	73	101.2

3.3.2 FUEL CONSUMPTION														
3.3.2.1 In selected gear, at maximum power at rated speed														
2 II hi	62.2	30.9	7.24	2201	3.6	2121	344	2.46	52	82	102	15	78	101.2
3.3.2.1.1 75% of pull corresponding to maximum power at rated engine speed														
2 II hi	49.6	23.2	7.70	2323	2.9	2273	387	2.18	53	83	106	19	62	101.0
3.3.2.1.2 50% of pull corresponding to maximum power at rated engine speed														
2 II hi	33.4	15.4	7.83	2345	2.0	2393	474	1.78	53	84	107	19	63	101.0
3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1														
3 II lo	49.7	23.2	7.73	1997	2.9	1967	338	2.50	55	83	106	19	62	101.0
3.3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2														
3 II lo	33.5	15.4	7.86	2014	2.0	1981	404	2.09	54	82	104	19	61	101.0
3.3.2.2 In selected gear nearest to 7.5 km/h at rated engine speed														
2 II hi	62.2	30.9	7.24	2201	3.6	2121	344	2.46	52	82	102	15	78	101.2
3.3.2.2.1 75% of pull corresponding to maximum power at rated engine speed														
2 II hi	49.6	23.2	7.70	2323	2.9	2273	387	2.18	53	83	106	19	62	101.0
3.3.2.2.2 50% of pull corresponding to maximum power at rated engine speed														
2 II hi	33.4	15.4	7.83	2345	2.0	2393	474	1.78	53	84	107	19	63	101.0
3.3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1														
3 II lo	49.7	23.2	7.73	1997	2.9	1967	338	2.50	55	83	106	19	62	101.0
3.3.2.2.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2														
3 II lo	33.5	15.4	7.86	2014	2.0	1981	404	2.09	54	82	104	19	61	101.0

Drawbar power test (unballasted tractor)

Optional Test

(Four-Wheel Drive disengaged)

Gear number and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels or track	Fan speed	Specific fuel cons	Specific Energy	Temperature			Atmospheric condition		
									Fuel	Coolant	Engine oil	Temp	Relative humidity	Pressure
	kW	kN	Km/h	min^{-1}	%	min^{-1}	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)														
1 I lo	18.1	42.0	1.55	2378	13.1	1867	647	1.31	55	84	105	16	69	101.3
1 I hi	22.0	42.0	1.89	2365	13.0	1787	569	1.49	57	84	107	16	70	101.3
2 I lo	26.0	41.6	2.25	2351	13.0	1800	529	1.60	57	84	108	16	69	101.3
2 I hi	31.7	41.3	2.77	2315	11.1	1870	472	1.79	59	84	107	17	66	101.3
3 I lo	36.6	41.0	3.21	2298	10.8	1820	457	1.85	57	84	108	17	68	101.3
1 II lo	43.7	41.3	3.81	2270	10.8	1920	418	2.02	57	83	107	16	68	101.3
3 I hi	45.1	41.4	3.93	2289	10.6	1925	406	2.08	57	84	108	16	67	101.2
4 I lo	53.3	40.9	4.70	2266	9.1	1846	370	2.28	57	83	108	16	67	101.3
1 II hi	53.5	41.0	4.70	2252	9.4	1855	367	2.30	58	83	107	16	66	101.3
2 II lo	59.4	38.9	5.51	2158	7.6	1711	347	2.44	56	83	108	16	68	101.3
4 I hi	60.4	38.9	5.59	2164	7.6	2096	343	2.47	55	83	108	17	68	101.3
2 II hi	64.3	36.0	6.43	2017	5.6	2107	320	2.64	52	82	105	14	65	101.2
3 II lo	63.6	30.6	7.50	1981	4.0	1987	319	2.65	53	82	107	15	75	101.2
1 III lo	64.8	26.8	8.72	1977	3.4	1906	312	2.71	53	82	108	15	73	101.2
3 II hi	65.1	25.6	9.15	1962	3.1	1946	311	2.72	53	82	108	15	73	101.2
1 III hi	65.4	21.8	10.80	1991	2.7	1950	310	2.73	53	83	108	15	71	101.2
4 II lo	64.3	20.9	11.06	1981	2.6	1984	315	2.69	53	82	107	15	72	101.2
2 III lo	63.0	17.7	12.83	1966	2.2	2040	320	2.64	53	83	108	15	71	101.2
4 II hi	64.7	17.2	13.50	1971	2.2	1954	315	2.69	52	82	107	15	72	101.2

3.3.2 FUEL CONSUMPTION														
3.3.2.1 In selected gear, at maximum power at rated speed														
1 III hi	62.8	18.9	11.96	2198	2.4	2052	337	2.51	53	83	109	16	70	101.2
3.3.2.1.1 75% of pull corresponding to maximum power at rated engine speed														
1 III hi	50.6	14.2	12.79	2337	1.8	2144	386	2.19	53	83	109	16	70	101.2
3.3.2.1.2 50% of pull corresponding to maximum power at rated engine speed														
1 III hi	33.7	9.4	12.95	2355	1.2	2100	479	1.76	53	83	109	16	70	101.2
3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1														
2 III lo	50.7	14.3	12.73	1944	1.9	1952	336	2.52	53	82	105	17	63	101.3
3.3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2														
2 III lo	33.5	9.3	12.93	1962	1.3	1900	400	2.11	53	82	104	17	64	101.3
3.3.2.2 In selected gear nearest to 7.5 km/h at rated engine speed														
2 II hi	62.9	31.8	7.13	2202	4.1	2005	341	2.48	50	82	104	14	74	101.2
3.3.2.2.1 75% of pull corresponding to maximum power at rated engine speed														
2 II hi	50.6	23.8	7.67	2340	2.9	2056	384	2.20	52	83	108	14	75	101.2
3.3.2.2.2 50% of pull corresponding to maximum power at rated engine speed														
2 II hi	34.4	15.9	7.80	2361	2.0	1916	459	1.84	53	83	107	14	75	101.2
3.3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1														
3 II lo	50.6	23.8	7.66	2005	3.1	1844	340	2.49	55	80	103	17	64	101.3
3.3.2.2.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2														
3 II lo	34.4	15.8	7.82	2027	1.9	1870	387	2.19	55	82	104	17	65	101.3

5. REPAIRS None

6. REMARKS

The test results for this report were obtained from a test carried out on a New Holland TS115A which is identical to the Case IH MXU 115 in all practical aspects relating to the tests.

Test carried out by: S J Devonshire

Signed: Officer in charge



J P Evans
Senior Test Engineer
Field Machinery Centre

Date: 6 April 2005

APPENDIX 1 ADDITIONAL TESTS

7.1 *Power lift tests – (To Manufacturers lift rod setting)*

"Not covered by the approval"

Linkage settings for test – see Table 1.1 and Figures 1.1 and 1.2.

	At the hitch point	on the frame
Height of lower hitch points above ground in down position	198 mm	198 mm
Vertical movement	612 mm	693 mm
Maximum corrected force exerted through full range	45.0 kN	35.5 kN
Corresponding pressure of hydraulic fluid	18.5 MPa	18.5 MPa
Moment about rear-wheel axis	50.3 kNm	61.3 kNm
Maximum tilt angle of mast from vertical	—	5 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	- 433	- 387	- 275	- 170	- 77	0	+ 63	+ 125	+ 215	+ 225	+ 260
Lifting forces (the values of force measured shall be corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting of the hydraulic lift system):											
at the hitch points kN	--	45.7	46.7	48.3	49.5	50.1	50.2	50.3	50.4	45.0	--
Corresponding pressure: 18.5 MPa											
at the frame kN	42.7	--	42.7	42.6	42.3	41.9	41.1	40.3	39.1	--	35.5
Corresponding pressure: 18.5 MPa											

7.2 *Power lift tests – (To SAE J283)*

Linkage settings for test – see Table 1.1

* Lift rods readjusted to 810 mm to allow for lift force to be measured throughout the total lift range

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	- 387	- 337	- 265	- 185	- 80	0	+113	+ 202	+ 210	---	---
*mm	---	---	- 265	- 185	- 80	0	+ 113	+ 202	+ 210	+ 275	+ 315
SAE J283											
kN	53.6	53.6	50.5	46.2	44.8	43.8	42.6	40.6	39.5	---	---
*kN	---	---	46.1	46.1	45.1	44.4	43.5	42.3	41.5	40.4	39.4
Corresponding pressure: 17.6 MPa											

HYDRAULIC LIFT COMBINATION / REPORT REFERENCE TABLE

CASE IH MXU100 / MXU110 / MXU115/ MXU125 / MXU135

OECD Report Numbers	Hydraulic Lift Force (OECD, SAE and Manufacturers Settings)							
	Mechanical Draft Control with internal lift ram				Electronic Draft Control with external rams			
	Plus 1 x 50mm assist ram		Plus 2 x 50mm assist rams		2 x 80mm rams		2 x 90mm rams	
	Pump Displacement		Pump Displacement		Pump Displacement		Pump Displacement	
	Fixed	Variable	Fixed	Variable	Fixed	Variable	Fixed	Variable
6676/2003	x							
6678/2003			x					
6679/2003						x		
6667/2003		x						
6668/2003					x			
6670/2003				x				
6671/2003							x	
6673/2003				x				
6674/2003								x

X Denotes hydraulic lift combination test report number

TEST RESULTS (OECD Code 5)

"Not covered by the approval"

Make and type of sound level meter: Bruel and Kjaer 2260

Type of test track: Concrete

Date of tests: 18 October 2004

Four wheel drive engaged Windows closed

Gear	Test Condition	Measured travelling speed km/h	Sound level dB(A)
II hi	Light Load	8.2	75

Four wheel drive engaged Windows open

Gear	Test Condition	Measured travelling speed km/h	Sound level dB(A)
II hi	Light Load	8.2	78

Four wheel drive dis-engaged Windows closed

Gear	Test Condition	Measured travelling speed km/h	Sound level dB(A)
II hi	Light Load	8.1	74

Four wheel drive dis-engaged Windows open

Gear	Test Condition	Measured travelling speed km/h	Sound level dB(A)
II hi	Light Load	8.1	77