SILSOE RESEARCH INSTITUTE

OECD Report

Report No: OECD/6642/2003
OECD Approval No: 2/2 241
Approval Date: 13 May 2005

CODE 2

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

New Holland PAC7BA1 (TS 100A) Four-Wheel Drive Tractor with 12-speed Mechanical Transmission (40 km/h)



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

Reference No: 837

Date: January 2005

File: 6642/2003

Rev: 16 May 2005

ENGINEERING for Life

TABLE OF CONTENTS

1.	SPECIFICATIONS OF TRACTOR		1
2.	TEST CONDITIONS		16
3.	TEST RESULTS		18
	Compulsory tests		
	1	Main power take-off (1000 rev/min)	18
		Power take-off curves (1000 rev/min)	20
	2	Hydraulic power and lifting force	22
	3	Drawbar power and fuel consumption test (unballasted tractor, four-wheel drive)	24
		Optional Drawbar power and fuel consumption test (unballasted tractor, four-wheel drive with front axle disengaged)	27
5.	Repairs and adjustments during tests		29
6.	Remarks		29
7.	Appendix 1 Additional tests (not covered by approval)		30

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:	134 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:	New Holland
[C]	Model (trade name):	TS100A
[C]	Type:	Four- wheel drive, unit construction

1.1.2 *Numbers*

[D]	1st Serial No or prototype:	ACP207661/EKP001001
[C]	Serial No:	221337

1.1.3 *Other specifications (if applicable)*

[D]	Model(s) for other countries:	None
[C]	Transmission type or gears x ranges:	12-Speed Mechanical
[C]	Speed version:	40 km/h
[C]	Manufacturer identification or Technical type number:	PAC7BA1

1.2 Engine

[C]	Make:	CNH
[C]	Model:	F4CE0484B*D
[C]	Type:	4 stroke turbocharged direct injection and after cooled diesel
[C]	Serial No:	00087961

1.2.1 *Cylinders*

[C]	Number/disposition:	4 vertical in-line
[D]	Bore/stroke:	104.0mm/132.0mm
[D]	Capacity:	4485 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
[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:	180 dm^3
[D]	Make, type and model of injection pump:	Bosch, VE Rotary 0460424304
[D]	Serial No:	520187
	Manufacturer's production setting of injection pump	
[C]	Flow rate (rated engine speed and full load):	76.1 mm^3 ±5% per stroke at 2200 min^{-1} (rev/min) 19.09 – 21.09 dm^3/h
[D]	Timing:	TDC
[D]	Make, type and model of injectors:	Bosch, Differential Needle DSLA145 P1253
[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	Not fitted
[C]	Type:	----
[C]	Location:	----
	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:	23 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:	Luk
[D]	Model:	None
[D]	Type:	Single dry plate
[D]	Number of plates:	1
[D]	Diameter of plates:	330 mm
[C]	Method of operation:	Hydraulic with pedal override

1.3.2 *Gear box*

[D]	Make:	CNH
[C]	Model:	Mechanical
[C]	Description:	Mechanical, synchromesh operation, (except for low range selection). 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	3
[C]	Total of arrangements	12	12

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	338.89	2.01
[C]	2	I	231.31	2.94
[C]	3	I	161.98	4.20
[C]	4	I	111.32	6.11
[C]	1	II	134.90	5.04
[C]	2	II	92.08	7.39
[C]	3	II	64.48	10.55
[C]	4	II	44.31	15.35
[C]	1	III	55.72	12.21
[C]	2	III	38.03	17.88
[C]	3	III	26.64	25.53
[C]	4	III	18.30	37.16
	Reverse			
[C]	1	I	330.40	2.06
[C]	2	I	225.53	3.02
[C]	3	I	157.93	4.31
[C]	4	I	108.52	6.27
[C]	1	II	130.53	5.21
[C]	2	II	89.78	7.57
[C]	3	II	62.87	10.82
[C]	4	II	43.21	15.74
[C]	1	III	54.33	12.52
[C]	2	III	37.08	18.34
[C]	3	III	25.97	26.19
[C]	4	III	17.85	38.11

I = Low range II = Medium range III = High range

(*) 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

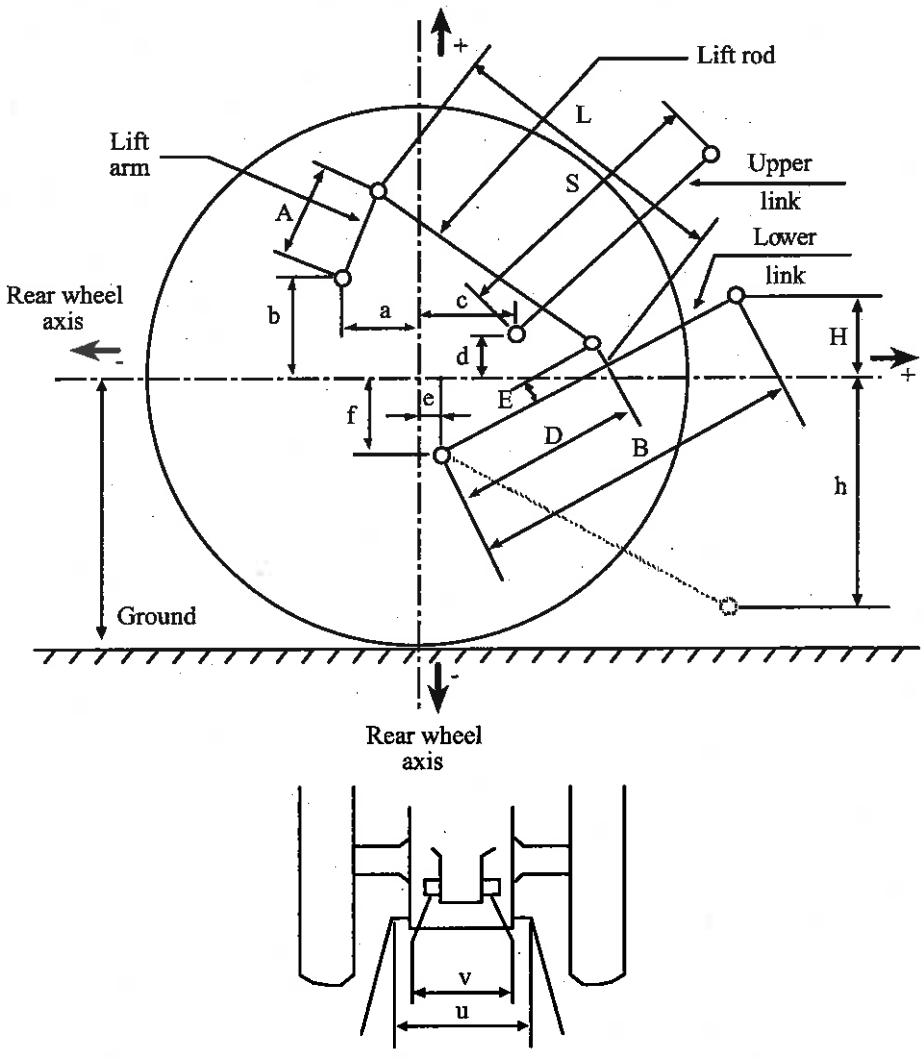
1.4.1.2 Power take-off proportional to ground speed — Not applicable

1.5 Hydraulic power lift

[C]	Make:	CNH
[D]	Model:	None
[D]	Type:	Mechanical closed centre
[C]	Type and number of cylinders:	1 internal plus 1 single acting externally mounted ram
[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:	Mechanical 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)	585 – 780	700	723	710
[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)	505,585,665	505	665	585
[C]	Length of lift rods:		(L)	680 – 815	764	815	815/705
	Height of lower hitch points (*) Relative to the rear wheel centre line, situated 820 mm above the ground level:						
[C]	- in low position		(h)	80 – 740	592	488	520/405
[C]	- in high position		(H)	0 – 225	0	0	0/65
[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, clevis drawbar and separate hook attachment)

[C]	Type:			Clevis	Hook
[C]	Height above ground:	Unballasted	Maximum:	540 mm	545 mm
			Minimum:	495 mm	
[C]	Type of adjustment:			Inverting drawbar	
[C]	Distance of hitch point from rear-wheel axis, horizontally:			915 mm 965 mm	585 mm
[C]	Distance of hitch point from power take-off shaft end:				
			Vertically:	252 mm 297mm	247 mm
			Horizontally:	360 mm 410 mm	30 mm
[C]	Lateral adjustment (centre of clevis):		Right-hand:	160 mm 225 mm	None
			Left-hand:	160 mm 225 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 Trailer 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: 2412 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
[C]	Headlights	1360	145 x 145	280
[C]	Sidelights	1805	75 x 70	1008
[C]	Rear lights	1800	265 x 53	893
[C]	Rear fender reflectors	1800	265 x 53	893
[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	4265	2420	2420	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	1991	2011
Rear	3089	3144
Total	5080	5155

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)	1820 mm	1830 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 dm^3	Oil change h	Filter change h
Engine	10.0	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:	NH 324H	Ambra Super Gold HSP 11.5 cSt at 100° C API CH – 4	As recommended
Transmission oils Type: Viscosity Classification:	NH 410B	Ambra Multi G 9 cSt at 100° C API GL – 4	As recommended
Rear final drives Type: Viscosity: Classification:	NH 410B	Ambra Multi G 9 cSt at 100° C API GL – 4	As recommended
Front differential and final drives Type: Viscosity: Classification:	NH 410B	Ambra Multi G 9 cSt at 100° C API GL – 4	As recommended
Hydraulic brakes Type: Viscosity: Classification:	NH 610A	Ambra LHM Brake 6 cSt at 100° C ISO 7308	As recommended
Hydraulic fluid Type: Viscosity: Classification:	NH 410B	Ambra Multi G 9 cSt at 100° C API GL – 4	As recommended
Steering oil Type: Viscosity: Classification:	NH 410B	Ambra Multi G 9 cSt at 100° C API GL – 4	As recommended

2.8.3 *Grease*

Type:	NH 710A	Ambra GR 9 NLGI 2 Lithium Based	As recommended

Number of lubrication points: 14

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

Date and location of tests: 25 November 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							
65.4	1937	914	2170	17.63	20.86	270	3.13
3.1.2 POWER AT RATED ENGINE SPEED							
64.8	2200	1038	2339	18.67	22.09	288	2.93
3.1.3 STANDARD POWER TAKE-OFF SPEED [1000 ± 25 min^{-1} (rev/min)]							
65.0	2121	1001	2272	18.25	21.59	281	3.01
3.1.4 PART LOADS 3.1.4.1 the torque corresponding to maximum power at rated engine speed							
64.8	2200	1038	2339	18.67	22.09	288	2.93
3.1.4.2 85% of torque obtained in 3.1.4.1							
59.2	2358	1112	2406	18.43	21.80	311	2.72
3.1.4.3 75% of torque defined in 3.1.4.2							
44.3	2363	1114	2225	15.19	17.97	343	2.47
3.1.4.4 50% of torque defined in 3.1.4.2							
29.8	2369	1118	1895	11.55	13.66	387	2.19
3.1.4.5 25% of torque defined in 3.1.4.2							
14.9	2387	1126	1907	8.42	9.96	567	1.49
3.1.4.6 unloaded							
0	2407	1135	1875	5.76	6.82	-	-
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							
65.0	2121	1001	2272	18.25	21.59	281	3.01
3.1.5.2 85% of torque obtained in 3.1.5.1							
57.4	2195	1035	1932	17.20	20.35	300	2.82
3.1.5.3 75% of torque defined in 3.1.5.2							
43.5	2207	1041	2186	13.83	16.36	318	2.66
3.1.5.4 50% of torque defined in 3.1.5.2							
29.0	2227	1051	2190	10.69	12.65	368	2.29
3.1.5.5 25% of torque defined in 3.1.5.2							
14.9	2257	1065	2200	7.81	9.24	525	1.61
3.1.5.6 unloaded							
0	2282	1076	1911	5.19	6.14	-	-

3.1.6 PART LOADS AT DIFFERENT ENGINE SPEEDS							
3.1.6.1 maximum power at rated engine speed							
64.8	2200	1038	2339	18.67	22.09	288	2.93
3.1.6.2 80% of power obtained in 3.1.6.1 at max speed setting							
51.7	2359	1113	2245	16.63	19.67	321	2.63
3.1.6.3 80% of power obtained in 3.1.6.1 with governor set to 90% of rated engine speed							
51.8	1977	933	2055	14.88	17.60	287	2.94
3.1.6.4 40% of power obtained in 3.1.6.1 with governor set to 90% of rated engine speed							
25.8	1984	936	1553	8.52	10.08	330	2.56
3.1.6.5 60% of power obtained in 3.1.6.1 with governor set to 60% of rated engine speed							
38.9	1320	622	1375	9.56	11.31	246	3.44
3.1.6.6 40% of power obtained in 3.1.6.1 with governor set to 60% of rated engine speed							
25.9	1319	622	1100	6.82	8.06	263	3.21

No load maximum engine speed: 2407 min^{-1} (rev/min)

Torque (equivalent crankshaft) at maximum power

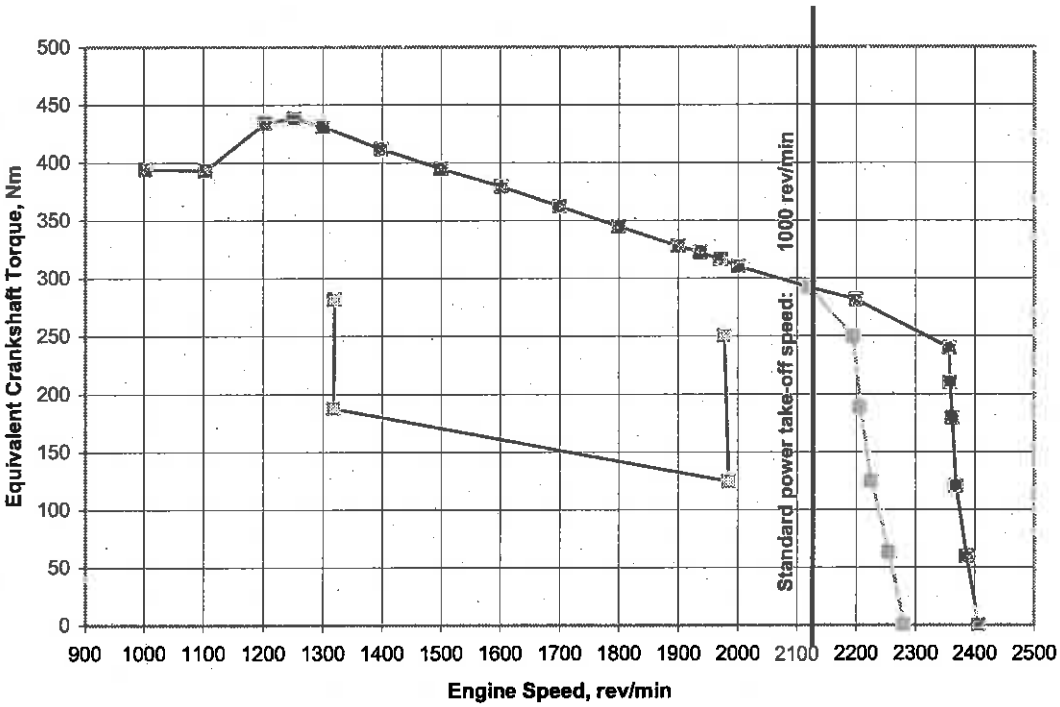
At rated engine speed: 281.4 Nm

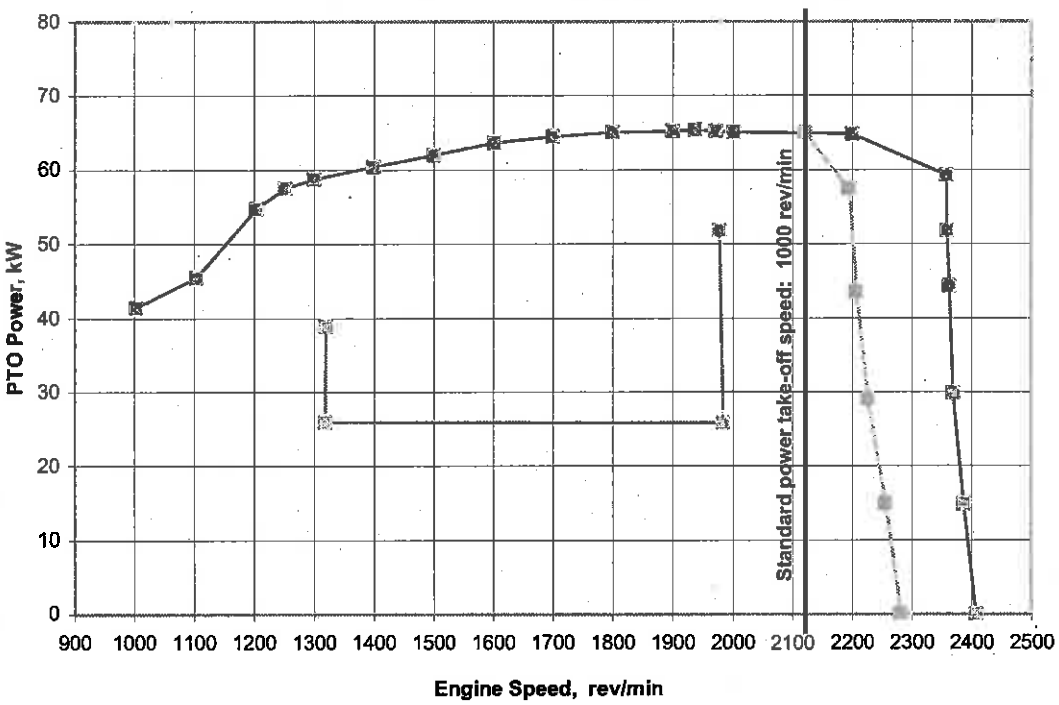
At 2-hour test: 322.3 Nm

Maximum torque (equivalent crankshaft): 438.3 Nm
(engine speed:1252 min^{-1} (rev/min)

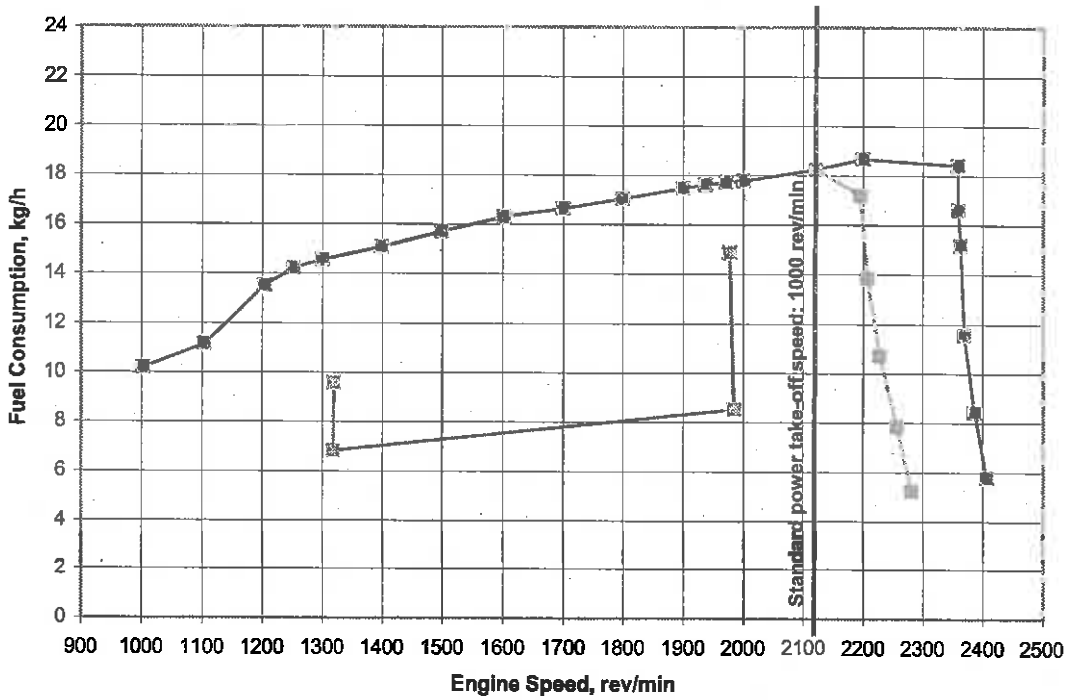
Mean atmospheric conditions:	
Temperature	23 °C
Pressure	102.0 kPa
Relative humidity	40 %
Maximum temperatures:	
Coolant	83 °C
Engine oil	107 °C
Fuel	50 °C
Engine air intake	28 °C

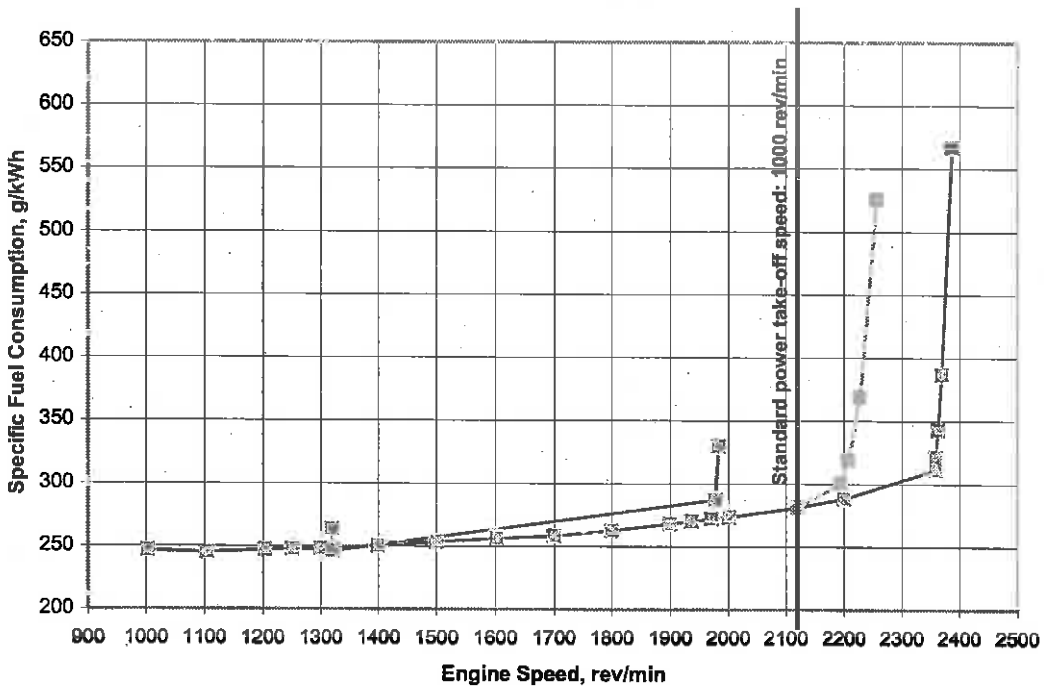
Power take-off curves



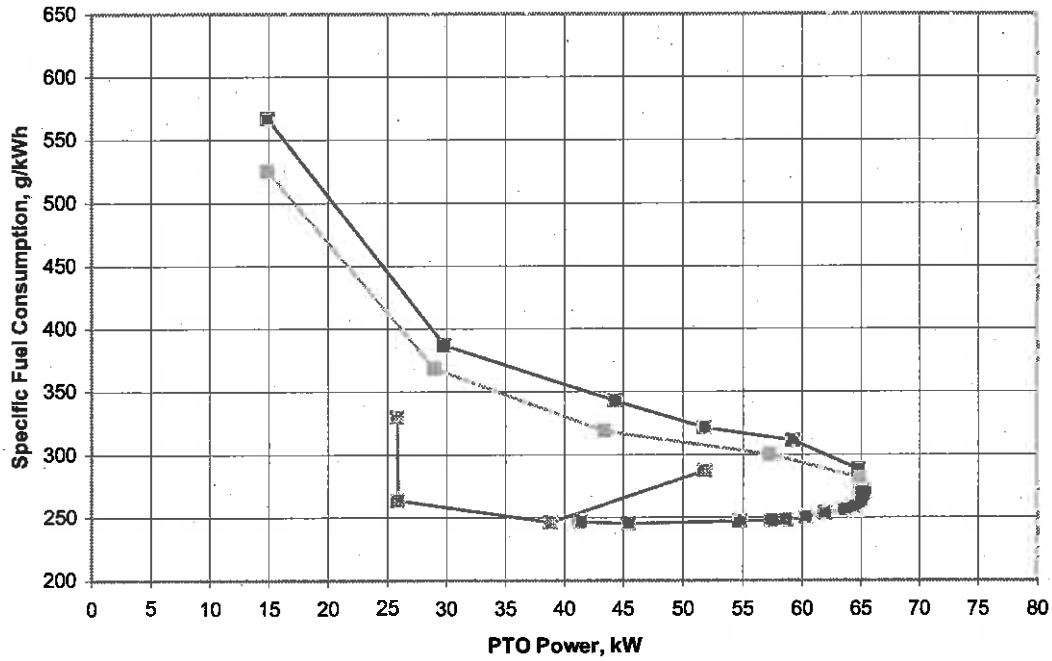


Power take-off curves





Power take-off curves



3.2 Hydraulic power and lifting force

Date of tests:	6 December 2004 19 and 20 January 2005

3.2.1 *Hydraulic power test*

3.2.1.1 Hydraulic fluid data

Hydraulic fluid type:	NH 410B
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	20.1	64	66	2407		
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)	18.1 18.1*	63 63*		2385 2389*	51.2 56.1*	15.44 16.92*
3.2.1.2.3 Maximum available flow and maximum power from one coupler pair:	16.5	65		2388	70.6	19.41
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	72.2	20.46

* From 2 couplers

Maximum flow from 1 pair of couplers: 82.6 l/m

Maximum flow from 2 pairs of couplers: 83.3 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	196 mm	196 mm
Vertical movement	592 mm	725 mm
Maximum corrected force exerted through full range	32.1 kN	24.4 kN
Corresponding pressure of hydraulic fluid	18.1 MPa	18.1 MPa
Moment about rear-wheel axis	35.9 kNm	42.2 kNm
Maximum tilt angle of mast from vertical	—	10 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-465	-389	-280	-175	-75	0	+105	+170	+190	+203	+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	--	32.1	35.0	36.9	37.5	37.8	37.2	37.0	36.9	36.9	--
Corresponding pressure: 18.1 MPa											
at the frame kN	29.8	--	30.8	30.9	30.8	29.8	28.1	26.9	26.6	--	24.4
Corresponding pressure: 18.1 MPa											

3.3 Drawbar power test (unballasted tractor)

Date and Location of tests: 12 and 13 January 2005
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	440	70	70
Unballasted 4WD disengaged	495	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	28.5	53.6	1.91	2368	13.0	1862	464	1.82	47	82	106	9	61	101.1
2 I	41.8	53.1	2.83	2368	12.1	1906	405	2.09	47	82	108	10	60	101.1
3 I	53.4	50.8	3.78	2141	9.1	1900	342	2.47	47	81	108	10	58	101.1
1 II	55.7	45.8	4.38	1999	6.1	1862	321	2.64	46	80	104	9	63	101.1
4 I	56.8	40.2	5.10	1898	5.1	1909	305	2.77	48	82	107	10	58	101.1
2 II	56.6	32.3	6.31	1921	3.9	1894	313	2.70	44	80	102	7	72	101.1
3 II	55.2	22.2	8.96	1891	3.1	1966	318	2.66	42	80	101	9	66	101.1
1 III	54.7	19.0	10.38	1887	2.7	1874	320	2.64	44	80	102	9	65	101.1
4 II	53.0	14.3	13.31	1916	2.2	1883	332	2.55	43	80	103	8	70	101.1

3.3.2 FUEL CONSUMPTION														
3.3.2.1 In selected gear, at maximum power at rated speed														
4 I	55.7	33.5	5.98	2207	4.2	1891	333	2.54	47	81	107	10	58	101.1
3.3.2.1.1 75% of pull corresponding to maximum power at rated engine speed														
4 I	45.4	25.2	6.49	2372	3.3	2182	381	2.22	47	83	107	10	60	101.2
3.3.2.1.2 50% of pull corresponding to maximum power at rated engine speed														
4 I	30.4	16.8	6.53	2367	2.7	1842	454	1.86	48	82	108	10	58	101.1
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 II	45.4	25.2	6.47	1958	3.4	1902	331	2.55	46	81	105	10	59	101.1
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 II	30.5	16.8	6.54	1960	2.5	1752	370	2.28	47	81	103	10	58	101.1
3.3.2.2 In selected gear nearest to 7.5 km/h at rated engine speed														
2 II	55.7	27.6	7.27	2203	3.6	1913	332	2.55	43	82	104	7	72	101.0
3.3.2.2.1 75% of pull corresponding to maximum power at rated engine speed														
2 II	45.3	20.7	7.88	2373	3.0	1877	382	2.21	45	82	105	8	71	101.0
3.3.2.2.2 50% of pull corresponding to maximum power at rated engine speed														
2 II	30.4	13.8	7.92	2368	2.2	1845	450	1.88	45	82	106	8	71	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	45.4	20.7	7.89	1665	2.9	1632	322	2.62	46	79	103	10	57	101.1
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	30.2	13.8	7.91	1654	2.1	1705	333	2.54	44	80	102	10	58	101.1

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	21.9	41.9	1.88	2376	13.1	1735	516	1.64	46	83	104	7	71	102.2
2 I	31.7	41.3	2.76	2367	12.8	1946	444	1.90	49	83	106	7	74	102.2
3 I	45.5	40.3	4.07	2370	10.1	1844	397	2.13	49	83	107	8	67	102.2
1 II	52.4	37.8	4.99	2335	6.8	1860	355	2.38	50	82	107	9	64	102.2
4 I	55.9	35.7	5.64	2150	5.5	1822	327	2.58	49	81	107	9	63	102.2
2 II	57.4	33.7	6.13	1912	4.5	1700	307	2.75	44	80	101	7	71	102.2
3 II	56.5	22.9	8.86	1899	2.8	1503	310	2.73	44	80	104	5	78	102.2
1 III	56.5	19.7	10.30	1901	2.4	1552	307	2.75	44	81	105	5	75	102.2
4 II	55.1	15.2	13.07	1911	2.0	1540	319	2.65	44	80	104	5	76	102.2

3.3.2 FUEL CONSUMPTION														
3.3.2.1 In selected gear, at maximum power at rated speed														
2 II	56.4	28.5	7.13	2202	3.5	1652	333	2.54	43	81	102	5	74	102.2
3.3.2.1.1 75% of pull corresponding to maximum power at rated engine speed														
2 II	46.3	21.4	7.78	2376	2.6	1595	386	2.19	44	82	103	5	74	102.2
3.3.2.1.2 50% of pull corresponding to maximum power at rated engine speed														
2 II	30.8	14.2	7.82	2372	1.9	1566	438	1.93	44	82	104	5	75	102.2
3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1														
3 II	46.4	21.4	7.79	1667	2.6	1269	310	2.73	47	79	104	8	68	102.2
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	30.8	14.2	7.81	1660	1.9	1213	329	2.57	46	79	103	8	67	102.2
3.3.2.2 In selected gear nearest to 7.5 km/h at rated engine speed														
2 II	56.4	28.5	7.13	2202	3.5	1652	333	2.54	43	81	102	5	74	102.2
3.3.2.2.1 75% of pull corresponding to maximum power at rated engine speed														
2 II	46.3	21.4	7.78	2376	2.6	1595	386	2.19	44	82	103	5	74	102.2
3.3.2.2.2 50% of pull corresponding to maximum power at rated engine speed														
2 II	30.8	14.2	7.82	2372	1.9	1566	438	1.93	44	82	104	5	75	102.2
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	46.4	21.4	7.79	1667	2.6	1269	310	2.73	47	79	104	8	68	102.2
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	30.8	14.2	7.81	1660	1.9	1213	329	2.57	46	79	103	8	67	102.2

5.	**REPAIRS**	None
6.	**REMARKS**	None
Test carried out by:		S J Devonshire
Signed:		Officer in charge



J P Evans
Senior Test Engineer
Field Machinery Centre

Date: 16 May 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	312 mm	312 mm
Vertical movement	488 mm	562 mm
Maximum corrected force exerted through full range	42.2 kN	32.5 kN
Corresponding pressure of hydraulic fluid	18.1 MPa	18.1 MPa
Moment about rear-wheel axis	47.2 kNm	56.2 kNm
Maximum tilt angle of mast from vertical	----	7 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-312	-273	-175	-75	0	+85	+140	+165	+185	+215	+250
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	--	45.2	46.9	47.2	46.4	44.5	43.3	42.8	42.4	42.2	--
Corresponding pressure:18.1 MPa											
at the frame kN	40.5	--	41.3	40.5	39.2	36.5	34.6	34.1	33.5	--	32.5
Corresponding pressure:18.1 MPa											

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

Linkage settings for test – see Table 1.1

* Lift rods readjusted to 705 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	-385	-323	-240	-170	-75	0	+75	+135	---	---	---
*mm	---	---	---	-170	-75	0	+75	+135	+180	+245	+300
SAE J283											
kN	45.2	45.3	43.3	41.3	40.2	38.1	36.5	33.2	---	---	---
*kN	---	---	---	42.8	42.6	42.4	41.0	40.0	38.9	36.0	34.4
Corresponding pressure: 17.6 MPa											

HYDRAULIC LIFT COMBINATION / REPORT REFERENCE TABLE

NEW HOLLAND TS100A / TS110A / TS115A / TS125A / TS135A

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
6642/2003	x							
6643/2003			x					
6644/2003						x		
6645/2003		x						
6646/2003					x			
6647/2003				x				
6648/2003							x	
6649/2003				x				
6650/2003								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: 14 March 2005

Four wheel drive engaged Windows closed

Gear	Test Condition	Measured travelling speed km/h	Sound level dB(A)
2 II	Light Load	8.2	74

Four wheel drive engaged Windows open

Gear	Test Condition	Measured travelling speed km/h	Sound level dB(A)
2 II	Light Load	8.2	79

Four wheel drive dis-engaged Windows closed

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

Four wheel drive dis-engaged Windows open

Gear	Test Condition	Measured travelling speed km/h	Sound level dB(A)
2 II	Light Load	8.1	79