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Report on test in accordance with the OECD STANDARD CODE II (RESTRICTED CODE) for the Official Testing of Agricultural and Forestry Tractors

New Holland 618345(TS115)Four-Wheel Drive Tractor with 16-speed Power-Shift Transmission (40 km/h)



Manufactured by: New Holland UK Ltd
Basildon
Essex
United Kingdom

Submitted for test by: The manufacturer

Report No: 805

Date: April 1999

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Tractor manufacturer's name and address:	New Holland UK Ltd Basildon, Essex, United Kingdom
Location of tractor assembly:	Basildon, Essex
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer
Place of running in:	Basildon, Essex
Duration of running in:	43 hours
Location of test:	Silsoe Research Institute Wrest Park, Silsoe, United Kingdom

1. SPECIFICATIONS OF TRACTOR

1. 1 Identification

Make:	New Holland
Model:	618345 (TS 115) with 16 -speed power-shift transmission
Type:	Four wheel drive unit construction
Serial No:	101605B
1st Serial No:	112581B

1.2 Engine

Make:	New Holland
Model:	450T/TJ
Type:	4 stroke natural aspirated direct injection diesel
Serial No:	TJ775033

1.2.1 Cylinders

Number/disposition:	6 vertical In-line
Bore/stroke:	111.8 mm/127.0 mm
Capacity:	7480 cm^3
Compression ratio:	17.5 :1
Arrangement of valves:	Overhead
Cylinder liners:	None, monobloc construction

1.2.2 Supercharging

Make:	None
Model:	----
Type:	----
Pressure:	----

1.2.3 Fuel system

Fuel feed system:	Stanadyne electric
Make, type and model of fuel filter:	Plastic strainer in tank and one disposable canister filter with sediment bowl and water separator plus secondary disposable canister filter between tank and injection pump
Capacity of fuel tank:	198 litres
Make, type and model of injection pump:	Lucas/CAV Rotary, DPS, DSA 998
Serial No:	04340 BRG
Manufacturer's production setting of injection pump:	
Flow rate:	59.0+/-1.8 mm^3 per stroke at 2070 rev/min speed and full load
Timing:	Delivery starts 10° before T.D.C (dynamic)
Make, type and model of injectors:	Lucas/CAV, multihole, JB6801135
Injection pressure:	292-300 bar

1.2.4 Governor

Make:	Lucas
Model:	None
Type:	Mechanical incorporated in fuel injection pump
Governed range of engine speed:	700 rev/min to 2245 rev/min
Rated engine speed:	2070 rev/min

1.2.5 Air cleaner

Pre-cleaner	Optional
Main cleaner	
Make:	Locker Air Maze or Donaldson
Type:	3 stage dry paper element with replaceable cartridge
Model:	None
Location:	Under engine bonnet above engine
Location of air intake:	By roof on RH A- pillar of cab
Maintenance indicator:	Warning light on instrument panel

1.2.6 Lubrication system

Type of feed pump:	Forced feed from eccentric rotor pump
Type of filter:	Metal mesh strainer in sump on suction line and full flow disposable canister on pressure line to engine
Number:	1

1.2.7 Cooling system

Type of coolant:	Water or water and antifreeze (50% solution)
Type of pump:	Belt driven centrifugal impeller
Specification of fan:	Thermal controlled with viscous clutch
Number of fan blades:	5
Fan diameter:	480 mm
Coolant capacity:	16.0 litres
Type of temperature control:	Thermostat with full flow bypass
System pressure:	90 kPa

1.2.8 Starting system

Make:	Bosch JF
Model:	JF
Type:	Electrical, positive engagement, solenoid operated
Starter motor power rating:	3.1/3.6 kW
Cold starting aid:	CAV Thermostart - Lucas 357-33 or Iskra 11-720-375
Safety device:	Starting operable when all gear levers are in neutral

1.2.9 Electrical system

Voltage:	12 V
Generator:	Alternator
Make:	Magneti Marrelli
Model:	MME A 127
Type:	Belt driven
Power:	55/100 amps at 6000 rev/min
Batteries:	1 x 800 cca lead acid, mounted on right-hand side under cab (2 x 800 option)
Rating:	107 AH at 20 hours rating

1.2.10 Exhaust system

Make:	Nelson Burgess
Model:	None
Type:	Underhood horizontal silencer with vertical stack pipe
Location:	Left-hand side of engine, under bonnet
Height of outlet above ground:	2900 mm

1.3 Transmission

1.3.1 Main clutch (Travel alone)

Make:	New Holland
Model:	None
Type:	Wet multiplate - located within gearbox, for travel only
Number of plates:	7
Diameter of plates:	159 mm
Method of operation:	Mechanical/Electro-hydraulic, pedal operated

1.3.2 Gear box

Make:	New Holland (Electroshift™)
Model:	16 x 16 Synchromesh
Operation:	Mechanical/electrical manual synchromesh operation, 4-powershift speeds and 4 ranges selected with two side mounted levers. A third side mounted lever selects forward or reverse for each combination.
Number of gears:	16 forward, 16 reverse (40 km/h)
Available options:	12 x 12 with 24 x 24 Synchroshift™

1.3.3 Rear axle final drives

Make:	New Holland
Model:	None
Type:	Crown wheel and pinion with differential and inboard epicyclic reduction gear final drive
Differential lock:	
Type:	Mechanical
Method of engagement:	Electro-hydraulic actuation in response to signal from switch on right-hand control panel
Method of disengagement:	Via panel switch or in response to electrical signal from brakes on application

1.3.4 Front axle and final drives

Make:	New Holland
Model:	None
Type:	Crown wheel and pinion with differential and outboard epicyclic reduction gear final drives
Drive engagement:	
Type:	Multiplate clutch - located within the gearbox
Method of operation:	Electro-hydraulic actuation in response to signal from switch on the RH control panel
Differential lock:	
Type:	Mechanical
Method of engagement:	Electro-hydraulic actuation in response to signal from switch on right-hand control panel
Method of disengagement:	Via panel switch or in response to electrical signal from brakes on application

1.3.5 Total ratios and travelling speeds

Gear	Group No	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at rated engine speed:* 2070 rev/min km/h
Forward			
1	1L	288.67	2.22
2	2L	235.08	2.72
3	3L	193.16	3.31
4	4L	157.29	4.07
5	5L	122.26	5.23
6	6L	99.56	6.43
7	7L	81.81	7.82
8	1H	70.20	9.12
9	8L	66.62	9.61
10	2H	57.17	11.19
11	3H	46.97	13.62
12	4H	38.25	16.73
13	5H	29.73	21.52
14	6H	24.21	26.43
15	7H	19.89	32.17
16	8H	16.20	39.50
Reverse			
1	1L	291.30	2.20
2	2L	237.22	2.70
3	3L	194.91	3.28
4	4L	158.72	4.03
5	5L	123.37	5.19
6	6L	100.47	6.37
7	7L	82.55	7.75
8	1H	70.84	9.03
9	8L	67.22	9.52
10	2H	57.69	11.09
11	3H	47.40	13.50
12	4H	38.60	16.58
13	5H	30.00	21.33
14	6H	24.43	26.19
15	7H	20.08	31.88
16	8H	16.35	39.14

L = Low range H = High range

(*) Calculated with a tyre dynamic radius index of 820mm (ISO 421/1-1992)

Number of revolutions of front wheels for one revolution of rear wheels: 1.341

1.4 Power take-off

1.4.1 Main power take-off

Type:	Independent
Method of engagement:	Electro - hydraulically operated multi-plate clutch in response to a signal from switch on the right-hand control panel
Number of shafts:	1 interchangeable shaft, 6 or 21 spline to ISO 500/1991
Method of changing power take-off speeds:	Manually by hand lever in cab

Clutch

Make:	New Holland
Model:	None
Type:	Multiplate, wet
Number of plates:	5
Diameter of plates:	148.6 mm

1.4.2 Power take-off proportional to engine speed

Two speed shiftable power take-off

(Fitted for test)	*540 rev/min*	*1000 rev/min*
Location:	Rear of tractor	Rear of tractor
Diameter of power take-off shaft:	34.9 mm	34.9 mm
Number of splines:	6 or 21	6 or 21
Height above ground:	773 mm	773 mm
Distance from the median plane of the tractor:	Central	Central
Distance behind rear wheel axis:	457 mm	457 mm
Pto speed at rated engine speed:	591 rev/min at 2070	985 rev/min at 2070
Engine speed at standard power take-off speed:	1890 rev/min	2103 rev/min
Ratio of rotation speeds:	3.50:1	2.103:1
Power restriction and maximum torque:	None	None
Direction of rotation (viewed from behind tractor):	Clockwise	Clockwise

1.4.2 Optional PTO system available (not fitted for test)

Two speed power take-off selected by exchanging shafts

540 rev/min

Location:	Rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	6
Height above ground:	773 mm
Distance from the median plane of the tractor:	Central
Distance behind rear wheel axis:	457 mm
PTO speed at rated engine speed:	591 rev/min at 2070
Engine speed at standard power take-off speed:	1890 rev/min
Ratio of rotation speeds:	3.50:1
Power restriction and maximum torque:	None
Direction of rotation (viewed from behind tractor):	Clockwise

1000 rev/min

Location:	Rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	21
Height above ground:	773 mm
Distance from the median place of the tractor:	Central
Distance behind rear wheel axis:	457 mm
PTO speed at rated engine speed:	1010 rev/min at 2070
Engine speed at standard power take-off speed:	2049 rev/min
Ratio of rotation speeds:	2.049:1
Power restriction and maximum torque:	None
Direction of rotation (viewed from behind tractor):	Clockwise

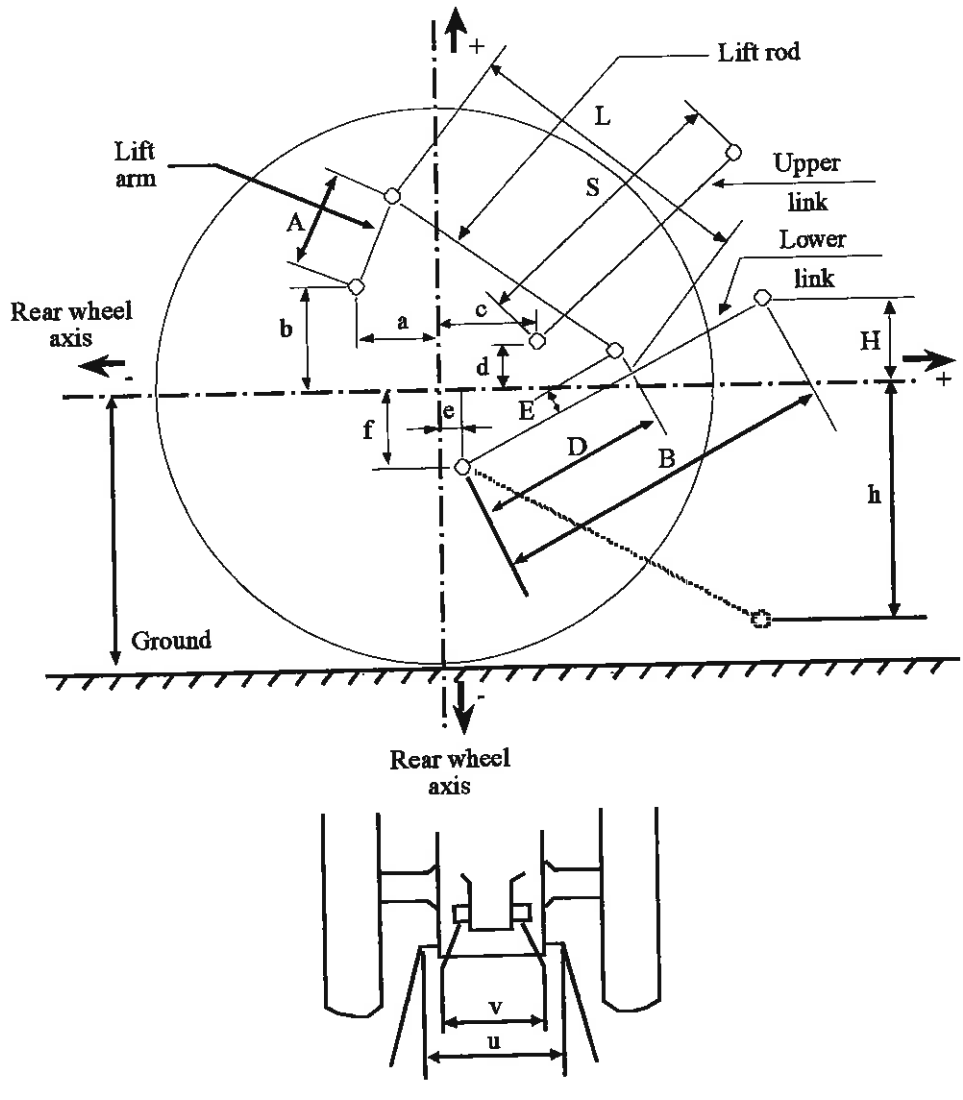
1.5 Hydraulic power lift - standard

Pump - standard

Make:	Sauer Sundstrand
Model:	None
Type:	Piston type, variable displacement closed centre load sensing system
Type and number of cylinders:	1 located inside transmission housing plus the option of 1 or 2 single acting, externally mounted assistor rams (None, 1 or 2 fitted for tests)
Type of linkage lock for transport:	Hydraulic
Relief valve pressure setting:	17.6 - 18.3 MPa
Opening pressure of cylinder safety valve:	19.7 MPa
Lift pump type:	Gear
Transmission between pump and engine:	Gear driven from pto shaft, independent of main and pto clutches
Type and number of filters:	3 replaceable paper element filter canisters
Site of oil reservoir:	Rear axle housing
Type, number and position of tapping points:	1, on front face of hydraulic top cover if no remote valves are fitted. (2 remote valves fitted to test tractor)
Maximum volume of oil available to external cylinders:	18.2 litres

1.6 Three point linkage

Category:	2 to ISO standard 730-1:1994
Category adaptor:	None
Controls:	Electronic draught/position control link. (Optional - draught or position control) Lower link sensing



LIFT TEST
Linkage geometry

Fig 2.1

Table 2.1
Dimensions of linkage when attached to the standard frame (ISO 730-1:1994 CAT 2)
(B2.3 ISO mast height from 730/3-1982 CAT 2)

			Dimensions or range	Settings used test		
				Main test	B2.2	B2.3
Length of lift arms		(A)	254	254	254	254
Length of lower links		(B)	915	915	915	915
Distance of lift arm pivot point from rear wheel centre line:	horizontally:	(a)	102	102	102	102
	vertically:	(b)	341	341	341	341
Horizontal distance between the two lower link points:		(u)	527	527	527	527
Horizontal distance between the two lift arm end points:		(v)	610	610	610	610
Length of upper link:		(S)	610 - 830	710	700	675
Distance of upper link pivot point from rear wheel centre line:	horizontally:	(c)	325	325	325	325
	vertically:	(d)	149 - 205	149	149	205
Distance of lower link pivot point from rear wheel centre line:	horizontally:	(e)	102	102	102	102
	vertically:	(f)	229	229	229	229
Distance of lower link points to lift rod pivot points on lower link centre line:	horizontally:	(D)	412 - 520	466	466	520
	vertically:	(E)	on centre line	on centre line	on centre line	on centre line
Length of lift rods:		(L)	743 - 879	820	785	743
ISO mast height				610	610	510
Height of lower hitch points (*) relative to the rear wheel centre line, situated 820 mm above the ground level:						
- in low position		(h)	308 to 794	623	544	305
- in high position		(H)	-77 to 224	50	120	230
Height of lower hitch points when locked in transport position (*)		Any height within lift range (hydraulic transport lock)				

ssuming r = tyre dynamic radius index of820 mm ISO 4251/1-1984
r 740 mm for supplementary test (B2.2)

1.7 Swinging drawbar

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

	Clevis	Hook
Type:		
Height above ground, unballasted maximum:	538 mm	525 mm
minimum:	484mm	
Type of adjustment:	Inverting drawbar	None
Distance of hitch point from rear-wheel axis, horizontally:	713 mm, 822 mm, 867 mm	482 mm
Distance of hitch point from power take-off shaft end:		
Vertically:	235 mm 289 mm	248 mm
Horizontally:	256 mm 365 mm 410 mm	25 mm
Lateral adjustment from the (centre of clevis):		
Right-hand	140 mm 220 mm 240 mm	----
Left-hand	140 mm 220 mm 240 mm	----
Distance of pivot point from rear axles horizontally:	165 mm behind rear axle	N/A
Width of clevis:	66 mm	----
Diameter of pin hole:	29/33 mm	29/33 mm
Maximum vertical permissible load - Clevis uppermost:	2400 kg 1650 kg 1500 kg	2995 kg
Clevis underneath:	2180 kg 1650 kg 1500 kg	----

1.8 Trailer Hitch

Type:	None fitted

1.9 Linkage Drawbar

Type:	None fitted

Front Towing Hitch

Type	None fitted

1.10 Steering

Make:	New Holland
Model:	None
Type:	Hydrostatic
Method of operation:	
Pump:	Sauer Sundstrand
Motor:	Danfoss OSPC-150-OR/160-OR
Ram:	2 double acting balanced cylinders, one operating on each steering arm
Filter:	Integral with hydraulic power lift system
Working pressure:	170 - 175 bar

1.11 Brakes

1.11.1 Service brake

Make:	New Holland
Model:	None
Type:	Oil-immersed multi plate discs
Method of operation:	Hydraulic, independent on rear wheels. On 40 km/h (4WD) models when the service brakes are actuated the front wheel drive is automatically engaged providing 4-wheel braking
Trailer braking take-off:	Hydraulic connector fitted to ISO 5676-1983

1.11.2 Parking brake

Make:	New Holland
Type:	Mechanical linkage coupled to service brakes via cables
Method of operation:	Hand lever with ratchet

1.12 Wheels

Number: 4

Front: 2 steering and driving

Rear: 2 driving

Wheelbase: 2623 mm

Track settings

	Minimum mm	Maximum mm	Adjustment method
Front	1404	2115	Reversing wheels and offset lug rims
Rear	1528	2028	Reversing wheels and offset lug rims

1.13 Protective structure

Make:	New Holland
Model:	New Holland 582 MK SK 90
Type:	Safety cab
Manufacturer's name and address:	Airflow - Streamlines PLC, Northampton
Protective device:	
Rollguard:	Safety cab
Tiltable/Not tiltable:	Non tiltable
OECD approval	
Approval number:	CSD-3/1329/1
Date of approval:	26 March 1998

Nos. of minor modification certificates, if any:
The Certificates for minor modifications established by and under the responsibility of the National Authority of DENMARK

1.14 Seat

1.14.1 Drivers seat

Make/Model/Type:	Grammer MSG 95A/31
Seat and steering wheel reversible:	No
Type of suspension:	Low frequency, parallelogram suspension spring
Type of damping:	Double acting, hydraulic
Range of adjustment:	
Longitudinal:	± 75 mm
Vertical:	± 30 mm
Safety belt:	No

1.15 Lighting

In accordance with EEC Directive 78/933/EEC

Unrestricted beam angle of headlight in plan view: 140°

	Height above ground to centre mm	Size mm	Distance from outside edge to median plane of tractor mm
Headlight	1378	150 x 90	210
Sidelights	1814	105 x 30	770
Rear lights	1770	60 x 60	850
Rear axle reflectors	815	125 x 45	580
Rear fender reflectors	1770	60 x 60	850

2 TEST CONDITIONS

2.1 Overall dimensions

Length mm	Width		Height at top of	
	Minimum mm	Maximum mm	Protective structure mm	Exhaust pipe mm
4397	2180	2495	2788	2900

2.2 Ground clearance (unballasted tractor) 418 mm

Clearance-limiting part: Drawbar clevis in lowest position

2.3 Tractor mass (with safety cab)

	Unballasted		Ballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	1809	1814	--	--
Rear	2993	3063	--	--
Total	4802	4877	--	--

2.5 Tyres and track width specification

	Front	Rear
Tyres dimensions ply rating type	14.9 R 28 128AB Radial	18.4 R 38 146A8 Radial
Maximum load (tyre manufacturer's), kg 30 km/h (40 km/h)	1925 (1800)	3210 (3000)
Maximum load (tractor manufacturer's), kg	1925 (1800)	3210 (3000)
Inflation pressure (tyre manufacturer's), Bar	1.6	1.6
Dynamic radius index, mm	640	820
Chosen track width (manufacturer's nominal), mm	1710	1620

2.6 Fuel

Type: Diesel oil to Class D, 1.5 to 5.5 cSt
Density at at 15°C: 0.8370 g/cm^3

2.7 Oils and lubrication

2.7.1 Capacity and change interval

	Capacity litre	Oil change hours	Filter change hours
Engine	20.7	300	300
Front axle differential	6.2	1200	None
Final drive (front) - per side	3.0	1200	None
Rear axle Range command + CCLS	60.6	1200	300
Gearbox } Hydraulic system } Final drives (rear) } Steering }	Integral with rear axle		
Brakes	0.5	Top-up	None

2.7.2 Specifications

	NH spec	Recommended	Used during test
Engine oil Type: Viscosity: Classification:	82922933	SAE 10W/30 11.5 cSt at 100°C API CE/SF	As recommended
Transmission oils Type: Viscosity: Classification:	85700812	Not specified 9 cSt at 100°C API GL-4	As recommended
Rear final drives Type: Viscosity: Classification:	85700812	Not specified 9 cSt at 100°C API GL-4	As recommended
Hydraulic fluid Type: Viscosity: Classification:	85700812	Not specified 9 cSt at 100°C API GL-4	As recommended
Steering oil Type: Viscosity: Classification:	85700812	Not specified 9 cSt at 100°C API GL-4	As recommended
Front differential and final drives Type: Viscosity: Classification:	85700812	Not specified 9 cSt at 100°C API GL-4	As recommended
Hydraulic brakes Type: Viscosity: Classification:	82865344	Not specified 6 cSt at 100°C No equivalent	As recommended
2.7.3 Grease points Type: Classification:	82948889	Lithium based NLG1 2	As recommended
Number of lubrication points:	12		

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off (1000)

Date and location of tests: 18 March 1999
Silsoe Research Institute,
Wrest Park, Silsoe, Bedford

Type of dynamometer: Eddy Current, Borghi and Saveri

Power kW	Speed		Fuel consumption			Specific energy kWh/l
	Engine rev/min	P.T.O. rev/min	Hourly kg/h	Hourly l/h	Specific g/kWh	
3.1.1 MAXIMUM POWER - TWO HOUR TEST						
70.9	2072	985	18.17	21.71	256	3.26
3.1.2 POWER AT RATED ENGINE SPEED						
70.9	2072	985	18.17	21.71	256	3.26
3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 ± 25 rev/min)						
--	--	--	--	--	--	--
3.1.4 PART LOADS 3.1.4.1 The torque corresponding to maximum power at rated engine speed						
70.9	2072	985	18.17	21.71	256	3.26
3.1.4.2 85% of the torque defined in 3.1.4.1						
62.8	2166	1030	16.92	20.21	269	3.11
3.1.4.3 75% of the torque defined in 3.1.4.2						
47.4	2181	1037	13.92	16.63	294	2.85
3.1.4.4 50% of the torque defined in 3.1.4.2						
31.8	2195	1044	11.15	13.33	350	2.39
3.1.4.5 25% of the torque defined in 3.1.4.2						
16.1	2207	1050	8.52	10.18	530	1.58
3.1.4.6 Unloaded						
0	2220	1055	6.05	7.22	--	--

No load, maximum engine speed:	2220 rev/min
Torque (equivalent crankshaft) at maximum power:	326.7 Nm
Torque (equivalent crankshaft) at rated speed:	326.7 Nm
Maximum torque (equivalent crankshaft): (engine speed 1134 rev/min)	419.9 Nm

Mean atmospheric conditions:

• Temperature	23 °C
• Pressure	102.0 kPa
• Relative humidity	30 %

Maximum temperatures:

• Coolant	87 °C
• Engine oil	107 °C
• Fuel	54 °C
• Engine air intake	37 °C

3.2 Hydraulic power and lifting force

Date of tests: 12 April 1999

3.2.1 Hydraulic power test

Sustained pressure with relief valve open:	19.8 MPa
Pump delivery rate at minimum pressure:	75.8 l/min

	Flow rate l/min	Pressure MPa	Power kW
Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power	57.3	17.8	17.00
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	71.7	16.8	20.08

Tapping point used for test:	Auxiliary service connection
Temperature of hydraulic fluid if different from 65 ± 5°C	-- °C
Opening pressure of the unloading valve:	-- MPa
Closing pressure of the unloading valve:	-- MPa

3.2.2 Power lift test - (To ISO 730-1:1994)

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	196 mm	196 mm
Vertical movement	685 mm	898 mm
Maximum corrected force exerted through full range	(1) 20.1 kN (2) 30.8 kN (3) 41.6 kN (4) 46.2 kN	(1) 15.6 kN (2) 23.6 kN (3) 30.0 kN (4) 33.7 kN
Corresponding pressure of hydraulic fluid	17.8 MPa	17.8 MPa
Moment about rear-wheel axis	(1) 20.4 kNm (2) 31.3 kNm (3) 42.3 kNm (4) 47.0 kNm	(1) 25.4 kNm (2) 38.4 kNm (3) 48.8 kNm (4) 54.8 kNm
Maximum tilt angle of mast from vertical	--	13 degrees

Linkage settings for test - see Table 2.1 and Figure 2.1

(1) No Assistor ram fitted

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-504	-396	-300	-200	-100	0	100	200	250	289	394
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure delivered by the hydraulic system)											
at the hitch points kN	--	20.1	21.2	22.5	23.4	23.9	24.2	24.4	24.5	24.5	--
Corresponding pressure: 17.8 MPa											
at the frame kN	17.5	17.6	17.8	18.1	18.0	17.8	17.3	16.8	16.6	16.2	15.6
Corresponding pressure: 17.8 MPa											

(2) 1 Assistor ram fitted (45mm)

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-504	-396	-300	-200	-100	0	100	200	250	289	394
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure delivered by the hydraulic system)											
at the hitch points kN	--	30.8	31.4	33.0	34.0	34.6	34.7	35.0	35.1	35.1	--
Corresponding pressure: 17.8 MPa											
at the frame kN	27.1	27.1	27.2	26.9	26.9	26.7	26.5	25.6	25.1	24.7	23.6
Corresponding pressure: 17.8 MPa											

(3) 2 Assistor rams fitted (45mm)

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-504	-396	-300	-200	-100	0	100	200	250	289	394
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure delivered by the hydraulic system)											
at the hitch points kN	--	41.6	42.2	43.8	45.3	45.9	46.6	46.5	46.4	46.9	--
Corresponding pressure: 17.8 MPa											
at the frame kN	34.8	34.9	35.1	35.2	35.0	34.3	33.6	32.5	31.9	31.2	30.0
Corresponding pressure: 17.8 MPa											

(4) 2 Assistor rams fitted (50mm)

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-504	-396	-300	-200	-100	0	100	200	250	289	394
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure delivered by the hydraulic system)											
at the hitch points kN	--	46.2	47.5	49.4	50.5	51.8	51.8	52.1	52.0	51.9	--
Corresponding pressure: 17.8 MPa											
at the frame kN	38.7	38.9	39.2	39.4	39.1	38.5	37.6	36.4	35.7	35.0	33.7
Corresponding pressure: 17.8 MPa											

3.3 Drawbar power test (unballasted tractor), 4 wheel drive

Date and Location of tests: 7 April 1999
Silsoe Research Institute
Wrest Park
Silsoe
Bedford MK45 4HS

Type of track: Concrete

Height of drawbar above ground	Tyre inflation pressure (kPa)	
	Front	Rear
455 mm	103	83

Gear and Range	Power	Drawbar Pull	Speed	Engine Speed	Slip of wheels or track	Spec Fuel cons	Spec energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Eng oil	Temp	Rel Humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kwh	kWh/l	Deg C	Deg C	Deg C	Deg C	%	kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS													
1L	27.3	48.1	2.04	2192	14.8	448	1.87	46	84	100	14	41	101.3
2L	33.8	47.2	2.58	2187	12.2	386	2.17	48	85	102	15	40	101.3
3L	40.9	46.3	3.18	2177	10.5	376	2.23	44	85	102	14	42	101.3
4L	50.3	46.1	3.93	2164	9.4	350	2.39	44	85	102	14	40	101.3
5L	58.6	42.5	4.96	2077	7.0	315	2.66	48	85	105	14	40	101.3
6L	60.4	35.0	6.20	2066	4.9	302	2.77	49	86	106	14	43	101.3
7L	57.8	27.2	7.64	2067	3.7	317	2.64	46	86	103	13	46	101.3
1H	60.2	24.0	9.03	2074	3.2	306	2.74	44	86	104	12	47	101.3
8L	57.9	22.0	9.49	2076	3.1	316	2.65	45	86	106	12	46	101.3
2H	59.6	19.2	11.16	2074	2.6	309	2.71	46	86	106	12	46	101.3
3H	55.1	14.6	13.60	2066	2.2	329	2.55	47	85	106	13	43	101.3
4H	53.5	11.5	16.76	2070	2.1	335	2.50	47	86	103	15	40	101.3
3.3.FUEL CONSUMPTION 3.3.2.1 In selected gear , at maximum power at rated speed													
6L	60.4	35.0	6.20	2066	4.9	302	2.77	49	86	106	14	43	101.3
3.3.2.1.1 75% of pull at maximum power at rated speed													
6L	48.4	26.3	6.62	2176	3.5	329	2.54	49	85	106	14	41	101.3
3.3.2.1.2 50% of pull at maximum power at rated speed													
6L	32.8	17.5	6.74	2192	2.5	386	2.17	45	84	105	14	44	101.3
3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1													
7L	48.4	26.3	6.61	1788	3.6	299	2.80	46	85	100	13	43	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													
7L	32.7	17.5	6.73	1800	2.7	344	2.43	47	84	101	14	42	101.3
3.3.2.2 In selected gear nearest to 7.5 km/h, at maximum power at rated speed													
7L	57.8	27.2	7.64	2067	3.7	317	2.64	46	86	103	13	46	101.3
3.3.2.2.1 75% of pull at maximum power at rated speed													
7L	45.9	20.4	8.10	2175	2.9	350	2.39	46	85	105	14	46	101.3
3.3.2.2.2 50% of pull at maximum power at rated speed													
7L	31.0	13.6	8.23	2190	2.2	403	2.08	46	84	104	14	43	101.3
3.3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in3.3.2.2.1													
1H	46.2	20.4	8.15	1886	3.0	314	2.66	44	84	98	13	41	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													
1H	31.2	13.6	8.26	1875	2.2	346	2.42	45	83	98	14	44	101.3

SUPPLEMENTARY TESTS

3.1 Main power take-off (540)

Date and location of tests: 18 March 1999
Silsoe Research Institute
Wrest Park, Silsoe, Bedford

Type of dynamometer: Eddy Current, Borghi and Saveri

Power kW	Speed		Fuel consumption			Specific energy kWh/l
	Engine rev/min	P.T.O. rev/min	Hourly kg/h	Hourly l/h	Specific g/kWh	
3.1.1 MAXIMUM POWER						
70.7	2069	591	18.20	21.75	258	3.25
3.1.2 POWER AT RATED ENGINE SPEED						
70.7	2069	591	18.20	21.75	258	3.25
3.1.3 STANDARD POWER TAKE-OFF SPEED (540 ± 10 rev/min)						
68.6	1892	540	17.06	20.38	249	3.37
3.1.4 PART LOADS 3.1.4.1 The torque corresponding to maximum power at rated engine speed						
70.7	2069	591	18.20	21.75	258	3.25
3.1.4.2 85% of the torque defined in 3.1.4.1						
62.8	2163	618	16.97	20.27	270	3.10
3.1.4.3 75% of the torque defined in 3.1.4.2						
47.4	2179	622	14.06	16.80	297	2.82
3.1.4.4 50% of the torque defined in 3.1.4.2						
31.9	2193	626	11.18	13.35	351	2.39
3.1.4.5 25% of the torque defined in 3.1.4.2						
16.0	2207	631	8.50	10.15	530	1.58
3.1.4.6 Unloaded						
0	2220	634	5.95	7.10	--	--

Power kW	Speed		Fuel consumption			Specific energy kWh/l
	Engine rev/min	P.T.O. rev/min	Hourly kg/h	Hourly l/h	Specific g/kWh	
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED (540 ± 10 rev/min)						
3.1.5.1 The torque corresponding to maximum power						
68.6	1892	540	17.06	20.38	249	3.37
3.1.5.2 85% of the torque defined in 3.1.5.1						
61.1	1979	565	15.69	18.75	257	3.26
3.1.5.3 75% of the torque defined in 3.1.5.2						
46.3	1997	571	12.80	15.30	276	3.03
3.1.5.4 50% of the torque defined in 3.1.5.2						
31.1	2015	576	10.07	12.04	323	2.59
3.1.5.5 25% of the torque defined in 3.1.5.2						
15.7	2031	580	7.47	8.93	477	1.75
3.1.5.6 Unloaded						
0	2049	585	5.02	6.00	--	--

No load, maximum engine speed: 2220 rev/min

Torque (equivalent crankshaft) at maximum power: 326.1 Nm

Torque (equivalent crankshaft) at rated speed: 326.1 Nm

Maximum torque (equivalent crankshaft): *Nm
(engine speed --- rev/min)

Mean atmospheric conditions:

- Temperature 24 °C
- Pressure 102.0 kPa
- Relative humidity 27 %

Maximum temperatures:

- Coolant 86°C
- Engine oil 107°C
- Fuel 54 °C
- Engine air intake 35°C

*Maximum torque not measurable within limits of test equipment

3.2 Hydraulic power and lifting force

I. B 2.2 Power lift test - (To ISO 730-1: 1994, alternative rear tyre size 13.6 R38)

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	196 mm	196 mm
Vertical movement	664 mm	889 mm
Maximum corrected force exerted through full range	46.9 kN	33.4 kN
Corresponding pressure of hydraulic fluid	17.8 MPa	17.8 MPa
Moment about rear-wheel axis	47.7 kNm	54.3 kNm
Maximum tilt angle of mast from vertical	--	14 degrees

Linkage settings for test - see Table 2.1 and Figure 2.1

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-405	-315	250	150	50	0	100	200	300	349	484
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure delivered by the hydraulic system)											
at the hitch points kN	--	46.9	48.3	50.8	51.7	52.3	52.7	53.3	52.9	52.8	--
Corresponding pressure: 17.8 MPa											
at the frame kN	38.8	39.1	39.6	39.8	39.7	39.6	38.6	38.0	36.6	35.9	33.4
Corresponding pressure: 17.8 MPa											

II. B 2.3 Power lift test - (To manufacturers lift rod setting and original tyres)

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	515 mm	515mm
Vertical movement	535 mm	665 mm
Maximum corrected force exerted through full range	60.5 kN	35.4 kN
Corresponding pressure of hydraulic fluid	17.8 MPa	17.8 MPa
Moment about rear-wheel axis	61.5 kNm	57.6 kNm
Maximum tilt angle of mast from vertical	–	14 degrees

Linkage settings for test - see Table 2.1 and Figure 2.1

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-81	-76	0	100	200	250	300	400	459	520	584
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure delivered by the hydraulic system)											
at the hitch points kN	–	63.8	63.8	64.3	64.3	64.2	63.1	61.7	60.5	–	–
Corresponding pressure: 17.8 MPa											
at the frame kN	57.5	57.4	56.4	54.3	51.3	49.8	48.2	45.1	43.0	40.0	35.4
Corresponding pressure: 17.8 MPa											

3.3 Drawbar power test (unballasted tractor), 2 wheel drive

Date and Location of tests: 8 April 1999
Silsoe Research Institute
Wrest Park
Silsoe
Bedford MK45 4HS

Type of track: Concrete

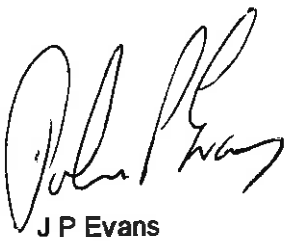
Height of drawbar above ground	Tyre inflation pressure (kPa) Front	Rear
510 mm	103	83

Gear and Range	Power	Drawbar Pull	Speed	Engine Speed	Slip of wheels or track	Spec Fuel cons	Spec energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Eng oil	Temp	Rel Humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kwh	kWh/l	Deg C	Deg C	Deg C	Deg C	%	kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS													
1L	21.0	37.5	2.02	2202	15.3	514	1.63	47	84	101	16	48	101.9
2L	26.4	37.2	2.55	2192	12.4	411	2.04	42	84	97	16	47	101.9
3L	31.7	36.3	3.14	2183	11.1	416	2.01	44	84	98	16	46	101.9
4L	38.6	36.0	3.86	2174	10.8	362	2.31	48	84	103	17	45	101.9
5L	49.4	35.5	5.01	2164	9.1	341	2.45	49	85	106	16	47	101.9
6L	58.3	34.9	6.01	2076	7.3	313	2.67	47	85	104	16	45	101.9
7L	56.4	27.1	7.50	2065	4.6	321	2.61	48	86	105	15	46	101.9
1H	58.7	23.7	8.90	2074	3.8	311	2.70	46	85	103	15	46	101.9
8L	57.3	22.2	9.31	2066	3.6	320	2.62	47	86	106	13	54	101.9
2H	58.6	19.2	11.00	2071	3.1	311	2.69	48	86	104	16	44	101.9
3H	55.4	14.8	13.47	2073	2.6	328	2.55	49	86	105	15	48	101.9
3.3.2 FUEL CONSUMPTION 3.3.2.1 In selected gear , at maximum power at rated speed													
1H	58.7	23.7	8.90	2074	3.8	311	2.70	46	85	103	15	46	101.9
3.3.2.1.1 75% of pull at maximum power at rated speed													
1H	46.7	17.8	9.41	2174	2.9	339	2.47	47	85	104	15	47	101.9
3.3.2.1.2 50% of pull at maximum power at rated speed													
1H	31.5	11.9	9.56	2189	2.2	399	2.10	49	84	105	16	45	101.9
3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1													
2H	46.7	17.8	9.42	1775	3.2	298	2.81	48	84	101	16	51	101.9
3.3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2													
2H	31.5	11.9	9.55	1785	2.3	343	2.44	48	84	100	16	51	101.9
3.3.2.2 In selected gear nearest to 7.5 km/h, at maximum power at rated speed													
7L	56.4	27.1	7.50	2065	4.6	321	2.61	48	86	105	15	46	101.9
3.3.2.2.1 75% of pull at maximum power at rated speed													
7L	45.2	20.3	7.99	2173	3.3	356	2.35	49	85	106	15	44	101.9
3.3.2.2.2 50% of pull at maximum power at rated speed													
7L	30.4	13.5	8.13	2188	2.4	412	2.03	47	84	104	15	47	101.9
3.3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1													
1H	45.2	20.3	8.02	1864	3.5	306	2.73	48	85	103	16	50	101.9
3.3.2.2.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2													
1H	30.5	13.5	8.15	1874	2.6	349	2.40	47	84	101	16	50	101.9

5. REPAIRS AND ADJUSTMENTS DURING TESTS: None

6. REMARKS: None

Test carried out by: S J Devonshire

Signed:  Officer in charge of tests

J P Evans

Signed:  for the Director

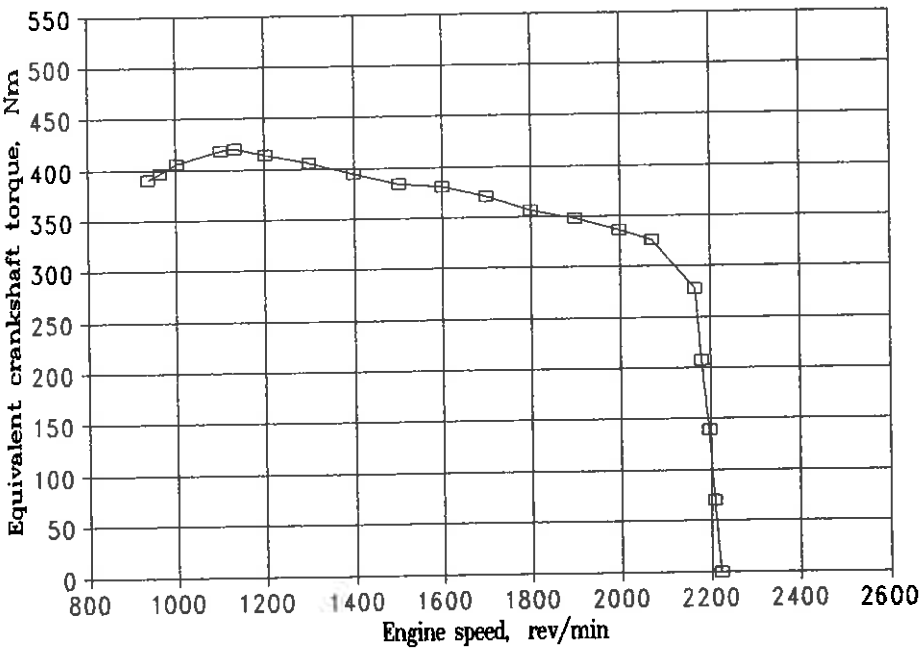
A G Douglass
Interim Manager - Test Engineering Group

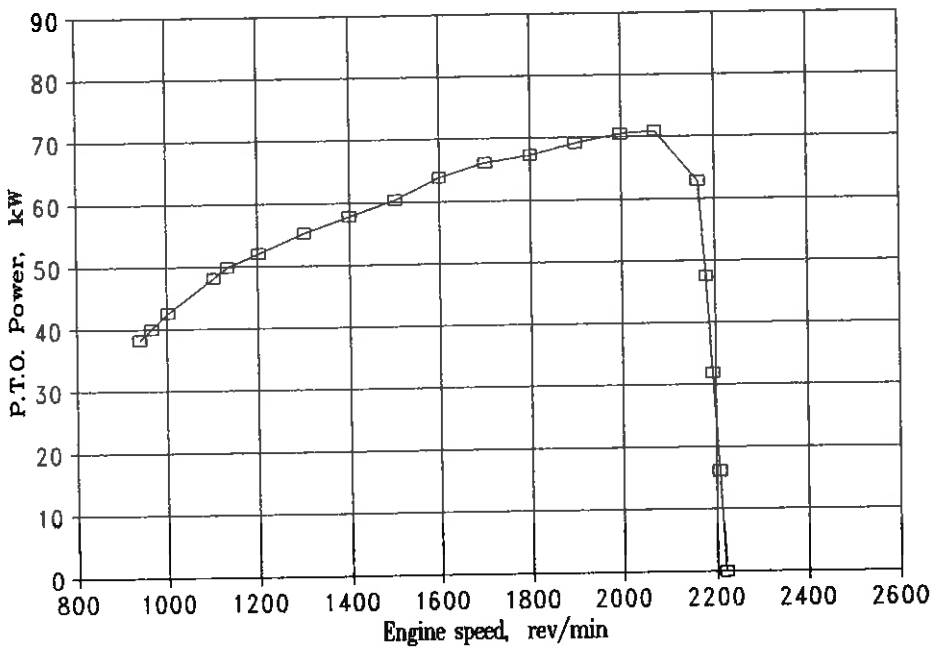
Date: 11/5/99

7. ANNEX 1 MAIN POWER TAKE-OFF CURVES

P.T.O. POWER TEST - NEW HOLLAND TS115 FOUR-WHEEL DRIVE (1000 rev/min)

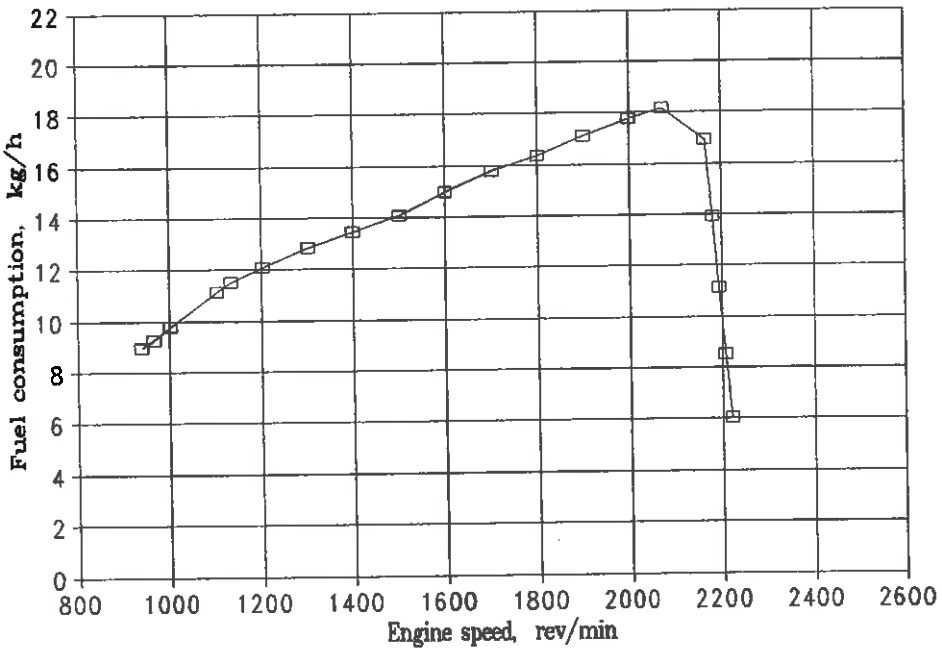
Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■

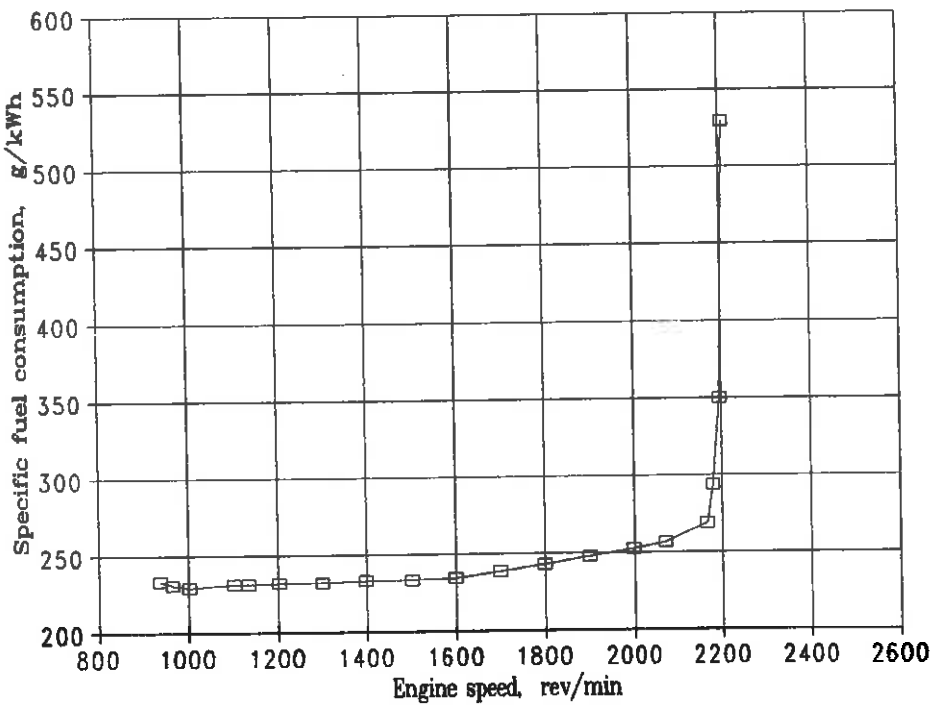




P.T.O. POWER TEST - NEW HOLLAND TS115 FOUR-WHEEL DRIVE (1000 rev/min)

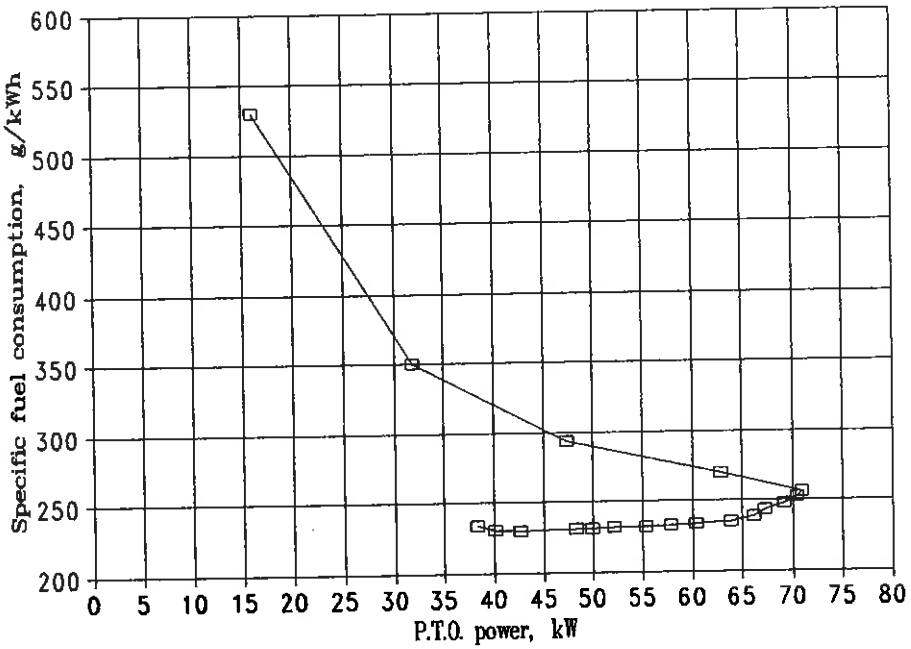
Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■





P.T.O. POWER TEST - NEW HOLLAND TS115 FOUR-WHEEL DRIVE (1000 rev/min)

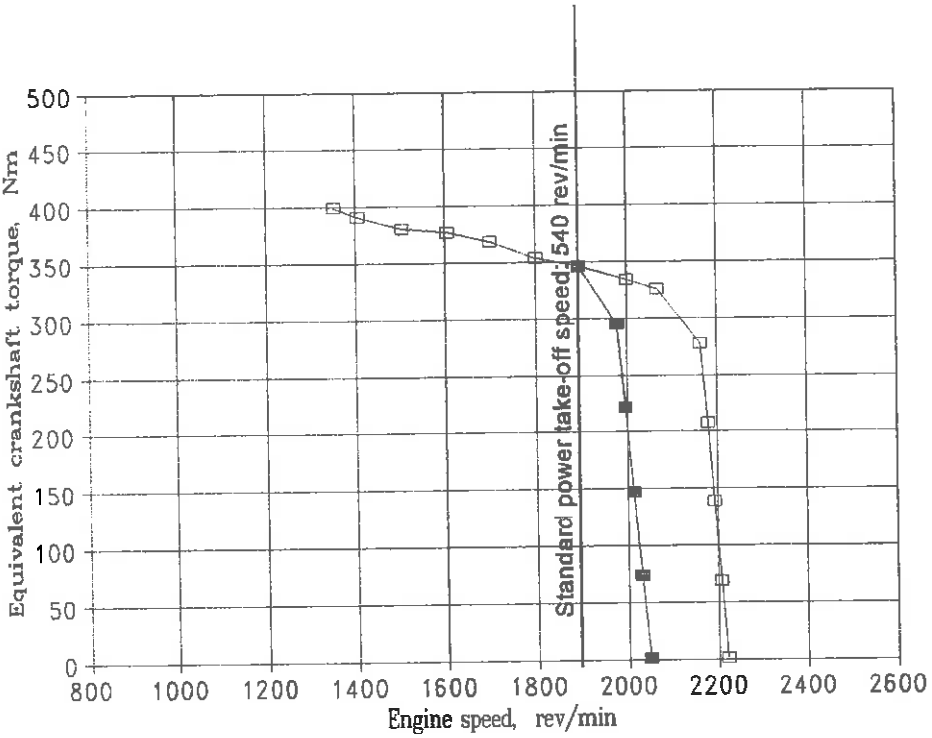
Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■

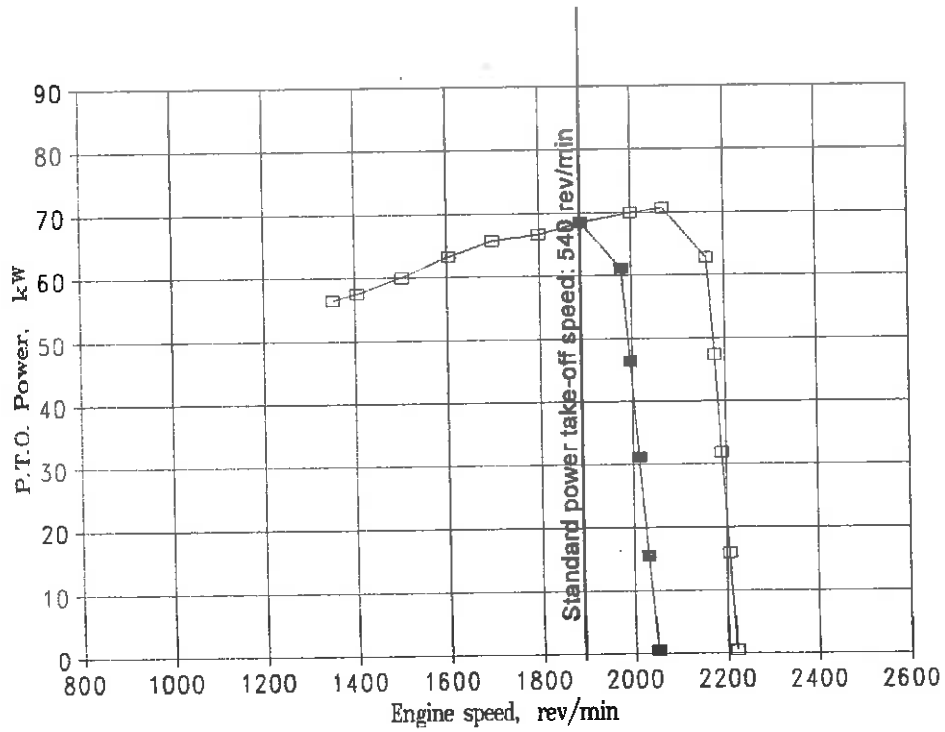


7. ANNEX 2 MAIN POWER TAKE-OFF CURVES

P.T.O. POWER TEST - NEW HOLLAND TS115 FOUR-WHEEL DRIVE (540 rev/min)

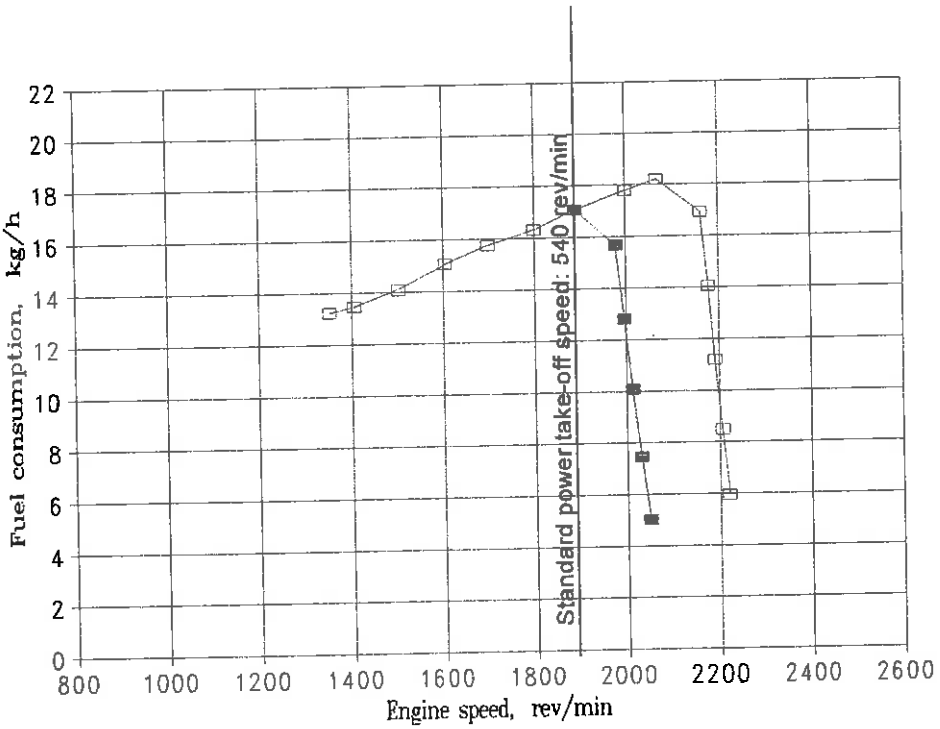
Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■

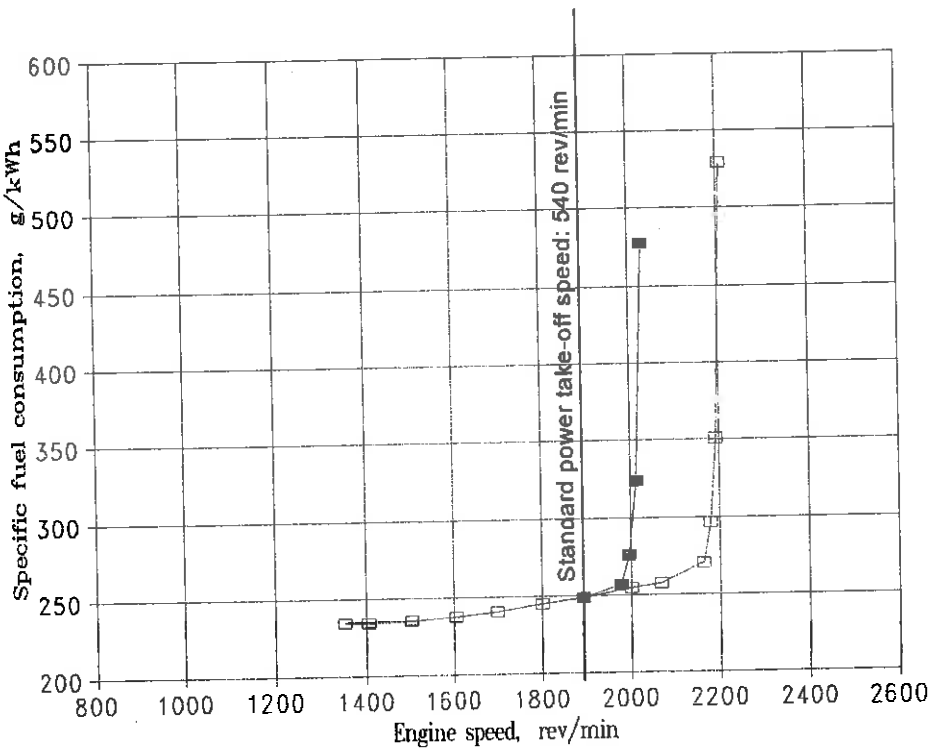




P.T.O. POWER TEST - NEW HOLLAND TS115 FOUR-WHEEL DRIVE (540 rev/min)

Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■





POWER TEST- NEWHOLLAND TS115 FOUR-WHEEL DRIVE (540 rev/min)

Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■

