SILSOE RESEARCH INSTITUTE

Wrest Park, Silsoe,
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Report on test in accordance with the OECD STANDARD CODE 2 (RESTRICTED CODE) for the Official Testing of Agricultural and Forestry Tractors

New Holland M1C7BE (TM115) Four-Wheel Drive Tractor with 18-speed Semi Power Shift transmission (40km/h)



Manufactured by:	New Holland UK Limited Basildon Essex SS14 3AD United Kingdom
Submitted for test by:	The Manufacturer
Report No:	813
Date:	May 2000

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OECD/7947/0199

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Tractor manufacturer's name and address:	New Holland UK Limited Basildon, Essex, SS14 3AD 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:	120 hours
Location of test:	Silsoe Research Institute Wrest Park, Silsoe, MK45 4HS United Kingdom

1. SPECIFICATIONS OF TRACTOR

1.1 Identification

Make:	New Holland
Model:	M1C7BE (TM115) with 18-speed Semi-Power Shift Transmission
Type:	Four-wheel drive, unit construction
Serial No:	122089B
1st Serial No:	133189B
Tractor type code:	M Series

1.2 Engine

Make:	New Holland
Model:	675/TH
Type:	4 stroke naturally aspirated direct injection diesel
Serial No:	TH833015

1.2.1 Cylinders

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

1.2.2 Supercharging

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

1.2.3 Fuel system

Fuel feed system:	Wabco series 6000 or Purolator 'Facet' electric lift pump
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:	325 litres
Make, type and model of injection pump:	Bosch, VE Rotary, 0 460 426 314
Serial No:	961 863904
Manufacturer's production setting of injection pump:	
Flow rate (rated engine speed and full load):	62 mm^3 per stroke at 1100 min^{-1} (rev/min) pump speed and full load
Timing:	Delivery starts 3° before T.D.C
Make, type and model of injectors:	Bosch, differential needle, DLLA 143 P471
Injection pressure:	27.0-27.8 MPa

1.2.4 Governor

Make:	Bosch
Model:	None
Type:	Mechanical incorporated in fuel injection pump
Governed range of engine speed:	750 to 2400 min^{-1} (rev/min)
Rated engine speed:	2200 min^{-1} (rev/min)

1.2.5 Air cleaner

Pre-cleaner:	Optional spin tube fitted
Location:	Air cleaner canister inlet
Main cleaner	
Make:	Locker Air maze or Donaldson
Type:	3 stage dry paper element with replaceable cartridge Exhaust Aspirated
Model:	None
Location of air intake:	Under engine bonnet on front and above radiator.
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 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:	510 mm
Coolant capacity:	25.5 litres
Type of temperature control:	Thermostat with full flow bypass
System pressure:	100 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 – Type 357-33
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:	100/120 amps at 6000 min^{-1} (rev/min)
Batteries:	1 CEAC lead acid, mounted on front support
Rating:	140 Ah at 20 hours

1.2.10 Exhaust system

Make:	Alcom
Model:	None
Type:	Under bonnet horizontal silencer with vertical stack pipe
Location:	Left hand side of engine, under bonnet
Height of outlet above ground:	2982 mm

1.3 Transmission

1.3.1 Clutch (Travel alone)

Make:	New Holland
Model:	None
Type:	Wet multiplate in gearbox, for travel only
Number of plates:	7
Diameter of plates:	160 mm
Method of operation:	Electro-hydraulic with pedal override

1.3.2 Gear box

Make:	New Holland
Model:	Range command (semi power shift)
Description:	Electro/Hydraulic, syncromesh (range) operation. 6 powershift speeds with 3 ranges selected by 3 buttons on an adjustable lever mounted on the right-hand console. Forward/reverse is actuated by a steering column mounted shuttle lever.

	Forward	Reverse
Number of gears	6	6
Number of ranges/groups	3	1
Total of arrangements	18	6

Available options:	31 x 12 with creep (40 km/h) 17 x 6 (30 km/h) 30 x 12 with creep (30 km/h)

1.3.3 Rear axle final drivers

Make:	New Holland
Model:	None
Type:	Crown wheel 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 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 right-hand 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 signal from brakes on application, or steering movement, or axle lift

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:* 2200 rev/min km/h
Forward			
1	A	276.23	2.46
2	A	229.71	2.96
3	A	191.23	3.56
4	A	159.03	4.28
5	A	132.21	5.14
6	A	109.95	6.17
1	B	118.93	5.72
2	B	98.90	6.88
3	B	82.33	8.26
4	B	68.47	9.93
5	B	56.92	11.95
6	B	47.34	14.37
1	C	41.93	16.22
2	C	34.87	19.51
3	C	29.03	23.43
4	C	24.14	28.18
5	C	20.07	33.89
6	C	16.69	40.75
Reverse			
1	R	141.58	4.80
2	R	117.74	5.78
3	R	98.02	6.94
4	R	81.51	8.34
5	R	67.77	10.04
6	R	56.35	12.07

Range selection: A = Low range B = Medium range C = High range

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1-1992)

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 – hydraulic 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 splines to ISO 500/1991
Method of changing power take-off speeds:	
Two speed	Shiftable, 540 or 1000 min^{-1} (rev/min) by lever on right-hand console

Clutch

Make:	New Holland
Model:	None
Type:	Multiplate, wet
Number of plates:	6
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)

Location:	Rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	6 (available option:21)
Height above ground:	803 mm
Distance from the median plane of the tractor:	Central
Distance behind rear wheel axis:	602 mm
Pto speed at rated engine speed:	603 min^{-1} (rev/min)
Engine speed at standard power take-off speed:	1971 min^{-1} (rev/min)
Ratio of rotation speeds:	3.65
Power restriction and maximum torque:	None
Direction of rotation (viewed from behind tractor):	Clockwise

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

Location:	Rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	6 (available option:21)
Height above ground:	803 mm
Distance from the median plane of the tractor:	Central
Distance behind rear wheel axis:	602 mm
Pto speed at rated engine speed:	1038 min^{-1} (rev/min)
Engine speed at standard power take-off speed:	2121 min^{-1} (rev/min)
Ratio of rotation speeds:	2.12
Power restriction and maximum torque:	None
Direction of rotation (viewed from behind tractor):	Clockwise

1.4.1.2 Power take-off proportional to ground speed

Indicate 540 or 1000 min^{-1} (rev/min):	540 min^{-1} (rev/min)
Travelling distance for one revolution of PTO shaft	0.371 m
Number of PTO shaft revolutions for one revolution of rear driving wheels	13.9

Power take-off proportional to ground speed

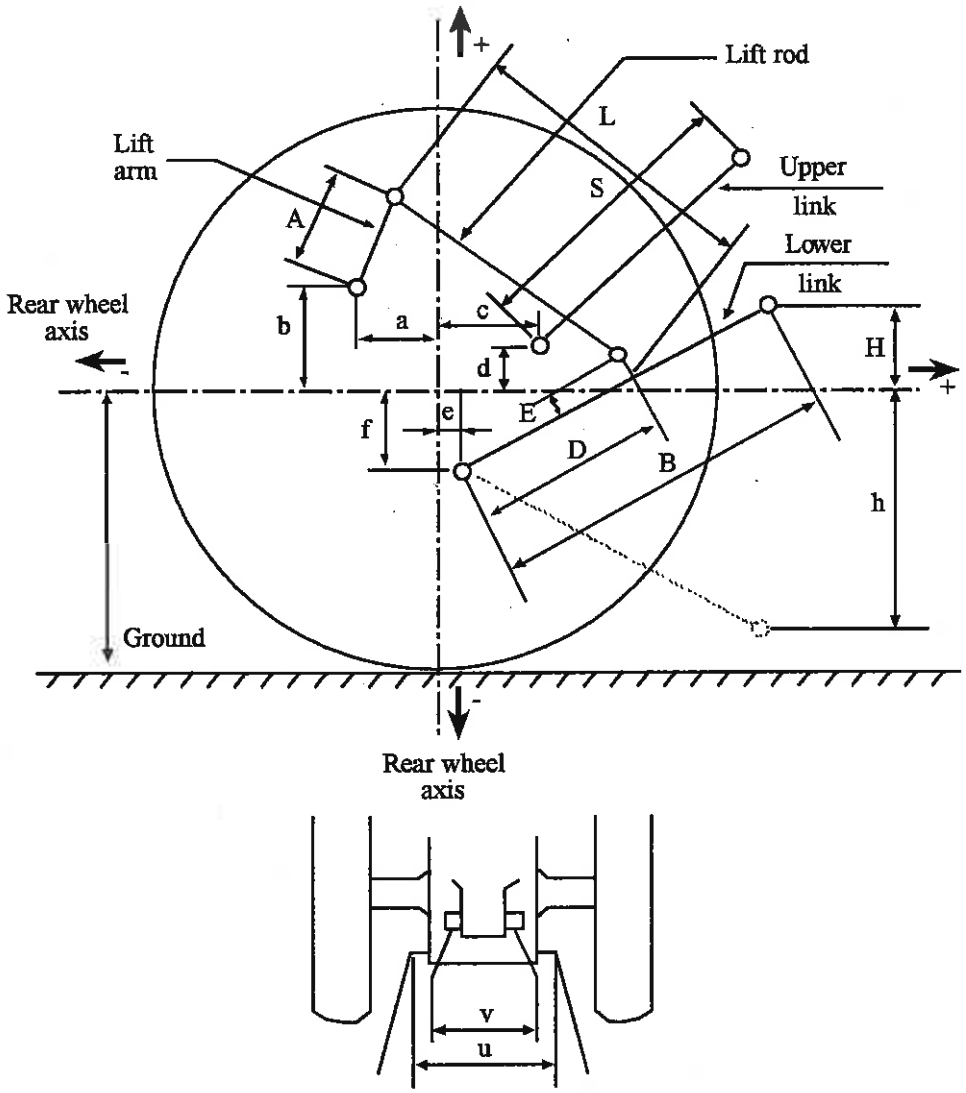
Indicate 540 or 1000 min^{-1} (rev/min):	1000 min^{-1} (rev/min)
Travelling distance for one revolution of PTO shaft	0.217 m
Number of PTO shaft revolutions for one revolution of rear driving wheels	23.8

1.5 Hydraulic power lift (as fitted to the test tractor)

Make:	New Holland
Model:	None
Type:	Electro-hydraulic closed centre load sensing
Type and number of cylinders:	1 single acting inside transmission housing plus the option of single acting, externally mounted assistor ram. (Option not fitted for test)
Type of linkage lock for transport:	Hydraulic
Relief valve pressure setting:	18.7 – 19.3 MPa
Opening pressure of cylinder safety valve:	19.3 MPa
Lift pump type:	Gear
Transmission between pump and engine:	Gear driven from PTO shaft, independent of main and PTO clutches
Type and number filters:	2 disposable canister filters
Site of oil reservoir:	Rear axle housing
Type, number and location of tapping points:	2 or 4 remote couplers at rear of tractor (4 Remote valves fitted on test tractor)
Maximum volume of oil available to external cylinders:	20 –24 litres under normal conditions (flat fields) 35-39 litres when operating stationary on level ground

1.6 Three-point linkage

Category:	2 in conformity with ISO 730-1:1994 + Cor.1:1995
Category adapter:	None
Controls:	Electronic draught/ position link. (Optional draught/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)

			Dimensions or range mm	Setting used in Test 3.2.2	Test 3.2.2.1	Test 3.2.2.2
Length of lift arms:		(A)	230	230	230	230
Length of lower links:		(B)	974	974	974	974
Distance of lift arm pivot point from rear wheel centre line:	horizontally: vertically:	(a) (b)	156 362.5	156 362.5	156 362.5	156 362.5
Horizontal distance between the two Lower link points:		(u)	544	544	544	544
Horizontal distance between the two lift arm end points:		(v)	560	560	560	560
Length of upper link:		(S)	652-942	754	768	768
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
Distance of lower link pivot point from rear wheel centre line:	horizontally: vertically:	(e) (f)	220 250	220 250	220 250	220 250
Distance of lower link points to lift rod pivot points on lower link centre line:	horizontally: vertically:	(D) (E)	435-504 on centre line	435 on centre line	504 on centre line	504 on centre line
Length of lift rods:		(L)	635-780	740	780	780/730
Height of lower hitch points (*) Relative to the rear wheel centre line, situated 820 mm above the ground level:						
- in low position		(h)	265-765	624	620	620/510
- in high position		(H)	30-275	90	30	30/105
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 ISO 4251/1-1992

1.7 Swinging drawbar

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

Type:	Clevis	Hook
Height above ground:		
Unballasted Maximum:	487 mm	475 mm
Minimum:	435 mm	----
Type of adjustment:	Inverting drawbar	None
Distance of hitch point from rear-wheel axis, horizontally:	850 mm 950 mm 1000 mm	602 mm
Distance of hitch point from power take-off shaft ends:		
Vertically:	316 mm 368 mm	328 mm
Horizontally:	248 mm 348 mm 398 mm	0 mm
Lateral adjustment (centre of clevis):		
Right-hand:	225 mm 240 mm	None
Left-hand:	225 mm 240 mm	None
Distance of pivot point from rear axles horizontally:	345 mm 400 mm	----
Width of clevis:	70 mm	
Diameter of drawbar pin hole:	33 mm	
Maximum vertical permissible load:		
Clevis uppermost:	2400 kg	3000 kg
Clevis underneath:	2180 kg	3000 kg

1.8 Trailer hitch

Type: None fitted

1.9 Holed drawbar

Type: None fitted

1.10 Steering

Make:	New Holland
Model:	None
Type:	Hydrostatic
Method of operation:	
Pump:	New Holland
Motor:	Danfoss OSPC-160-OR
Ram:	2, a balanced single acting cylinder operating each steering arm
Filter:	Integral with hydraulic power lift system
Working pressure:	17 MPa

1.11 Brakes

1.11.1 Service brake

Make:	New Holland
Model:	None
Type:	Oil-immersed single plate disc
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)
Trailer braking take-off:	Hydraulic connector fitted to ISO 5676-1983

1.11.2 Parking brake

Type:	Fully independent three plate disc operating on bevel pinion shaft
Method of operation:	Hand lever with ratchet

1.12 Wheels

Number: 4

Front: 2 driving/steering

Rear: 2 driving

Wheelbase: 2723 mm

Track width adjustment:

	Minimum, mm	Maximum, mm	Adjustment method
Front*	1555	2261	Reversing wheels and offset lug rims
Rear	1530	2232	Reversing wheels and offset lug rims

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

1.13 Protective structure

Make: New Holland

Model: New Holland SLTV6

Type: Cab safety frame - suspended

Manufacturer's name and address: New Holland UK Ltd
Cranes Farm Road
Basildon
Essex
SS14 3AD

Protective device: Safety cab

Tiltable/Not tiltable: None

OECD approval

Approval number: 4/0603

Date of approval: 17 December 1999

Nos. minor modification certificates, if any:

The certificates for minor modifications established by and under the responsibility of the national Authority of Silsoe Research Institute UK

1.14 Seat

1.14.1 Driver's seat

Make/model/Type:	Sears SA15801/02/03/04 EEC approved to 78/764/EEC – e11-1294
Seat and steering wheel reversible:	No
Type of suspension:	Low frequency, parallelogram suspension air spring
Type of damping:	Double acting, hydraulic
Range of adjustment:	
Longitudinal:	± 100 mm
Vertical:	± 68 mm
Safety belt:	No

1.14.2 Passenger seat

Make:	New Holland
Type:	Soft plastic moulding, folding, on left hand side of inner fender. EEC approved to 76/763/EEC – e11 1383

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 of lights to median plane of tractor** mm
Headlights	1398	150 x 90	200
Sidelights	1970	105 x 30	870
Rear lights	1844	50 x 50	843
Axle reflectors	784	100 x 35	665
Rear fender reflectors	1844	50 x 50	843

2. TEST CONDITIONS

2.1 Overall dimensions

	Length	Width		Height at top of	
	mm	Minimum mm	Maximum mm	Protective Structure mm	Exhaust pipe mm
Unballasted	4675	2150	2752	2926	2982

2.2 Ground clearance (unballasted tractor) 365 mm

Clearance-limiting part: Drawbar clevis in lowest position

2.3 Tractor mass (safety cab)

	Unballasted		Ballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	2133	2143	---	---
Rear	3201	3266	---	---
Total	5334	5409	---	---

2.4 Track specifications Not applicable

2.5 Tyres and track width specification

	Front	Rear
Tyres dimensions ply rating type	 14.9 R28 128A8 Radial	 18.4 R 38 146A8 Radial
Maximum load (tyre manufacturer's), kg 30 Km/h (40 Km/h)	1925 (1900)	3210 (3000)
Maximum load (tractor manufacturer's), kg	1925 (1900)	3210 (3000)
Inflation pressure (tyre manufacturer's), kPa	160	160
Dynamic radius index, mm	640	820
Chosen track width (manufacturer's nominal), mm	1775	1735

2.6 Fuel

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

Density at 15° C: 0.8370 g/cm^3

2.7 Oils and lubrication

2.7.1 Capacity and change interval

	Capacity l	Oil change h	Filter change h
Engine	19.0	300	300
Front axle differential	9.0	1200	None
Front axle hub (each)	1.7	1200	None
Gearbox	90	1200	600
Rear axle Hydraulic system Final drives (rear) Steering	Integral with gearbox		
Brakes	0.5	Top-up	None

2.7.2 Specifications

Oils	NH spec	Recommended	Used during test
Engine oil Type: Viscosity Classification:	NH 324B	SAE 10W/30 11.5 cSt at 100° C API CF - 4	As recommended
Transmission oils Type: Viscosity Classification:	NH 410B	SAE 10W/30 9 cSt at 100° C API GL - 4	As recommended
Rear final drives Type: Viscosity: Classification:	NH 410B	SAE 10W/30 9 cSt at 100° C API GL - 4	As recommended
Front differential and final drives Type: Viscosity: Classification:	NH 410B	SAE 10W/30 9 cSt at 100° C API GL - 4	As recommended
Hydraulic brakes Type: Viscosity: Classification:	NH 610B	No equivalent 6 cSt at 100° C No equivalent	As recommended
Hydraulic fluid Type: Viscosity: Classification:	NH 410B	SAE 10W/30 9 cSt at 100° C API GL - 4	As recommended
Steering oil Type: Viscosity: Classification:	NH 410B	SAE 10W/30 9 cSt at 100° C API GL - 4	As recommended

2.7.3 Grease

Grease Points Type	NH 720A	Lithium Based	As recommended

Number of lubrication points: 14

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

Date and location of tests: 29 February 2000
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.	Hourly		specific	
kW	min^{-1} (rev/min)		kg/h	l/h	g/kWh	kWh/l
1.1 MAXIMUM POWER – TWO-HOUR TEST						
73.1	1900	897	18.38	21.96	252	3.33
1.2 POWER AT RATED ENGINE SPEED						
70.1	2200	1038	19.15	22.88	273	3.06
1.3 STANDARD POWER TAKE-OFF SPEED [1000±25 min^{-1} (rev/min)]						
70.7	2119	999	18.84	22.50	266	3.14
1.4 PART LOADS						
1.4.1 the torque corresponding to maximum power at rated engine speed						
70.1	2200	1038	19.15	22.88	273	3.06
1.4.2 85% of torque obtained in 3.1.4.1						
60.6	2238	1055	17.20	20.54	284	2.95
1.4.3 75% of torque defined in 3.1.4.2						
46.6	2295	1082	14.61	17.46	314	2.67
1.4.4 50% of torque defined in 3.1.4.2						
31.5	2318	1093	11.76	14.05	374	2.24
1.4.5 25% of torque defined in 3.1.4.2						
15.9	2343	1105	9.11	10.88	573	1.46
1.4.6 unloaded						
0	2357	1112	6.46	7.72	-	-
1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED [1000±25 min^{-1} (rev/min)]						
1.5.1 the torque corresponding to maximum power						
70.7	2119	999	18.84	22.50	266	3.14
1.5.2 85% of torque obtained in 3.1.5.1						
61.0	2155	1017	16.73	19.99	274	3.05
1.5.3 75% of torque obtained in 3.1.5.2						
47.0	2219	1047	14.08	16.82	300	2.79
1.5.4 50% of torque obtained in 3.1.5.2						
32.0	2250	1062	11.29	13.49	353	2.37
1.5.5 25% of torque obtained in 3.1.5.2						
16.1	2276	1074	8.66	10.34	537	1.56
1.5.6 unloaded						
0	2290	1080	6.23	7.44	-	-

No load maximum engine speed: 2357 min^{-1} (rev/min)

Torque (equivalent crankshaft) at maximum power: 367.1 Nm

At rated engine speed: 304.2 Nm

Maximum torque (equivalent crankshaft): 421.5 Nm
(engine speed: 1400 min^{-1} (rev/min)

Mean atmospheric conditions:	
Temperature	24 °C
Pressure	98.9 kPa
Relative humidity	37 %
Maximum temperatures:	
Coolant	87 °C
Engine oil	106 °C
Fuel	53 °C
Engine air intake	°C

3.2 Hydraulic power and lifting force

Date of tests: 3 May 2000

3.2.1 *Hydraulic power test*

Sustained pressure with relief valve open: 20.6 MPa

Pump stalled: Not applicable (Pump zero flow at high pressure standby)

Pump delivery rate at minimum pressure 118.3 l/min

	Flow rate	Pressure	Power
	l/min	MPa	kW
Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power	83.9	18.5	25.87
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	104.1	17.5	30.36

Tapping point used for test: Auxiliary service connection

Temperature of hydraulic fluid, if different from 65±5°C Not applicable

Opening pressure of the unloading valve: Not applicable

Closing pressure of the unloading valve: Not applicable

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

Linkage settings for test – see Table 2.1 and Figures 2.1 and 2.2.

	At the hitch point	on the frame
Height of lower hitch points above ground in down position	196 mm	196 mm
Vertical movement	714 mm	861 mm
Maximum corrected force exerted through full range	28.6 kN	26.0 kN
Corresponding pressure of hydraulic fluid	18.5 MPa	18.5 MPa
Moment about rear-wheel axis	31.4 kNm	46.9 kNm
Maximum tilt angle of mast from vertical	---	10 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-433	-374	-300	-200	-100	0	100	200	300	340	428
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	--	28.6	31.7	34.7	36.6	37.8	38.4	39.1	39.4	39.8	--
Corresponding pressure: 18.5 MPa											
at the frame kN	26.0	29.0	29.6	30.6	31.2	30.9	30.5	29.7	28.9	28.6	27.7
Corresponding pressure: 18.5 MPa											

3.2.2.1 Additional Power lift test – (To manufacturers lift rod setting of 780 mm)

Linkage settings for test – see Table 2.1 and Figures 2.1 and 2.2.

	At the hitch point	on the frame
Height of lower hitch points above ground in down position	200 mm	200 mm
Vertical movement	650 mm	707 mm
Maximum corrected force exerted through full range	34.0 kN	33.1 kN
Corresponding pressure of hydraulic fluid	18.5 MPa	18.5 MPa
Moment about rear-wheel axis	40.6 kNm	59.7 kNm
Maximum tilt angle of mast from vertical	--	5 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-397	-370	-300	-200	-100	0	100	150	200	280	310
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	--	34.0	36.7	40.0	41.3	41.9	42.0	42.0	42.1	42.4	--
Corresponding pressure: 18.5 MPa											
at the frame kN	33.1	33.8	36.5	37.6	37.8	37.1	36.1	35.7	35.2	34.5	33.4
Corresponding pressure: 18.5 MPa											

3.2.2.2 Additional Power lift test – (ASAE S349.2/SAE J283)

* Lift rods readjusted to 730 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	-370	-300	-260	-200	-100	0	100	200	280	--	--
*mm	--	--	-260	-200	-100	0	100	200	280	300	355
ASAE S349.2											
kN	49.1	48.8	48.4	47.9	46.0	44.7	42.7	41.1	39.5	--	--
*kN	--	--	46.0	47.3	47.5	46.5	44.9	42.6	40.8	40.1	38.8
Corresponding pressure: 18.7 MPa											

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-370	-300	-260	-200	-100	0	100	200	280	--	--
*mm	--	--	-260	-200	-100	0	100	200	280	300	355
ASAE S349.2											
kN	44.1	43.8	43.4	43.0	41.4	40.1	38.3	37.0	35.4	--	--
*kN	--	--	41.3	42.5	42.7	41.8	40.4	38.3	36.7	36.1	34.9
Corresponding pressure: 16.8 MPa											

3.3 Drawbar power test (unballasted tractor)

New Holland TM115 (4WD)

Date and Location of tests: 30 May 2000
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	380 mm	83	83

Gear and Range	Power	Drawbar Pull	Speed	Engine Speed	Slip of wheels or track	Specific fuel cons	Specific energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Engine oil	Temp	Relative humidity	Pressure
	kW	kN	km/h	min^{-1}	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS													
1A	31.2	52.0	2.16	2292	15.0	444	1.89	55	84	100	18	41	100.6
2A	36.9	50.5	2.63	2268	13.1	414	2.02	56	84	103	19	34	100.7
3A	43.0	49.3	3.14	2232	12.3	395	2.12	57	84	104	20	33	100.7
4A	50.9	48.1	3.81	2210	10.7	373	2.24	56	84	103	19	36	100.7
5A	55.5	46.3	4.32	2054	9.4	334	2.50	55	86	103	19	36	100.7
1B	57.2	43.4	4.75	1995	7.8	320	2.62	54	85	104	19	35	100.6
6A	56.5	41.0	4.95	1906	6.8	322	2.60	54	85	103	19	36	100.6
2B	60.3	38.7	5.60	1906	6.0	306	2.74	52	85	103	18	51	100.7
3B	60.1	31.8	6.81	1901	3.9	305	2.75	54	85	103	17	47	100.7
4B	58.9	25.6	8.27	1903	3.0	312	2.68	53	85	103	18	43	100.7
5B	59.0	21.1	10.07	1902	2.5	310	2.70	51	85	103	17	52	100.7
6B	57.6	17.1	12.16	1901	2.1	317	2.64	51	85	104	17	52	100.7
1C	60.0	15.7	13.72	1897	2.0	308	2.71	51	85	104	17	47	100.7
2C	58.7	12.8	16.48	1898	1.7	311	2.69	51	85	104	18	51	100.7
3.3.2 FUEL CONSUMPTION													
3.3.2.1 In selected gear, at maximum power at rated speed													
2B	56.8	31.1	6.57	2202	3.8	330	2.53	52	85	104	17	46	100.7
3.3.2.1.1 75% of pull at maximum power at rated speed													
2B	44.1	23.3	6.83	2261	2.7	359	2.33	52	84	102	18	37	100.7
3.3.2.1.2 50% of pull at maximum power at rated speed													
2B	30.5	15.6	7.01	2300	1.9	445	1.88	52	84	102	19	38	100.7
3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1													
3B	44.2	23.3	6.83	1887	2.9	324	2.58	55	85	102	19	38	100.6
3.3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2													
3B	30.4	15.6	7.00	1917	2.0	367	2.28	53	83	101	19	38	100.6
3.3.2.2 In selected gear nearest to 7.5 km/h, at maximum power at rated engine speed													
2B	56.8	31.1	6.57	2202	3.8	330	2.53	52	85	104	17	46	100.7
3.3.2.2.1 75% of pull at maximum power at rated speed													
2B	44.1	23.3	6.83	2261	2.7	359	2.33	52	84	102	18	37	100.7
3.3.2.2.2 50% of pull at maximum power at rated speed													
2B	30.5	15.6	7.01	2300	1.9	445	1.88	52	84	102	19	38	100.7
3.3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1													
3B	44.2	23.3	6.83	1887	2.9	324	2.58	55	85	102	19	38	100.6
3.3.2.2.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2													
3B	30.4	15.6	7.00	1917	2.0	367	2.28	53	83	101	19	38	100.6

Drawbar power test (unballasted tractor)

New Holland TM115 (4WD with front axle disengaged)

Date and Location of tests: 31 May 2000
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	425 mm	83	83

Gear and Range	Power	Drawbar Pull	Speed	Engine Speed	Slip of wheels or track	Specific fuel cons	Specific energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Engine oil	Temp	Relative humidity	Pressure
	kW	kN	km/h	min^{-1}	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS													
1A	21.2	35.6	2.15	2308	15.0	567	1.48	56	84	103	20	37	101.3
2A	25.8	34.7	2.67	2299	13.3	481	1.74	59	84	103	21	35	101.3
3A	30.5	34.4	3.20	2285	12.9	447	1.87	57	84	103	20	36	101.3
4A	36.1	34.1	3.81	2261	12.8	426	1.97	58	84	103	19	40	101.3
5A	42.3	33.2	4.59	2231	11.6	397	2.11	57	84	103	19	36	101.3
1B	47.0	32.9	5.15	2223	10.4	368	2.27	57	84	104	19	37	101.3
6A	49.0	32.3	5.47	2172	9.9	379	2.21	57	85	103	19	36	101.3
2B	54.3	32.3	6.05	2146	9.5	335	2.50	57	84	104	19	39	101.3
3B	58.6	32.0	6.61	1913	7.5	313	2.67	53	85	102	18	36	101.3
4B	58.4	25.8	8.14	1901	4.6	313	2.68	51	85	103	17	48	101.3
5B	58.4	21.3	9.90	1902	3.7	312	2.68	52	85	105	17	50	101.3
6B	57.8	17.3	12.03	1909	3.0	316	2.65	52	86	105	17	47	101.3
1C	60.1	16.0	13.54	1898	2.7	304	2.75	52	86	105	17	47	101.3
2C	58.1	12.9	16.26	1897	2.4	310	2.70	52	86	105	17	46	101.3
3.3.2 FUEL CONSUMPTION													
3.3.2.1 In selected gear, at maximum power at rated speed													
1C	52.7	12.0	15.86	2209	2.2	359	2.33	52	86	105	17	48	101.3
3.3.2.1.1 75% of pull at maximum power at rated speed													
1C	40.9	9.0	16.38	2256	1.9	397	2.11	52	86	105	17	48	101.3
3.3.2.1.2 50% of pull at maximum power at rated speed													
1C	27.6	6.0	16.66	2301	1.5	492	1.70	52	86	105	17	48	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													
*													
3.3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2													
*													
3.3.2.2 In selected gear nearest to 7.5 km/h, at maximum power at rated engine speed													
2B	52.1	29.4	6.39	2201	6.7	361	2.32	55	85	104	19	39	101.2
3.3.2.2.1 75% of pull at maximum power at rated speed													
2B	42.5	22.9	6.69	2249	4.4	371	2.26	55	84	104	19	42	101.2
3.3.2.2.2 50% of pull at maximum power at rated speed													
2B	29.7	15.3	6.96	2303	2.9	440	1.90	56	84	104	19	42	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													
3B	42.4	22.9	6.68	1870	4.4	323	2.59	53	84	101	18	44	101.2
3.3.2.2.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2													
3B	29.6	15.3	6.95	1915	2.8	368	2.28	54	83	99	19	43	101.2

* Shutdowns were not possible in Gear C2 as speed was too fast to control Test Equipment.

4.	**OPTIONAL TESTS RESULTS**	None
5.	**REPAIRS AND ADJUSTMENTS DURING TESTS:**	None
6.	**REMARKS:**	None

Test carried out by: S J Devonshire

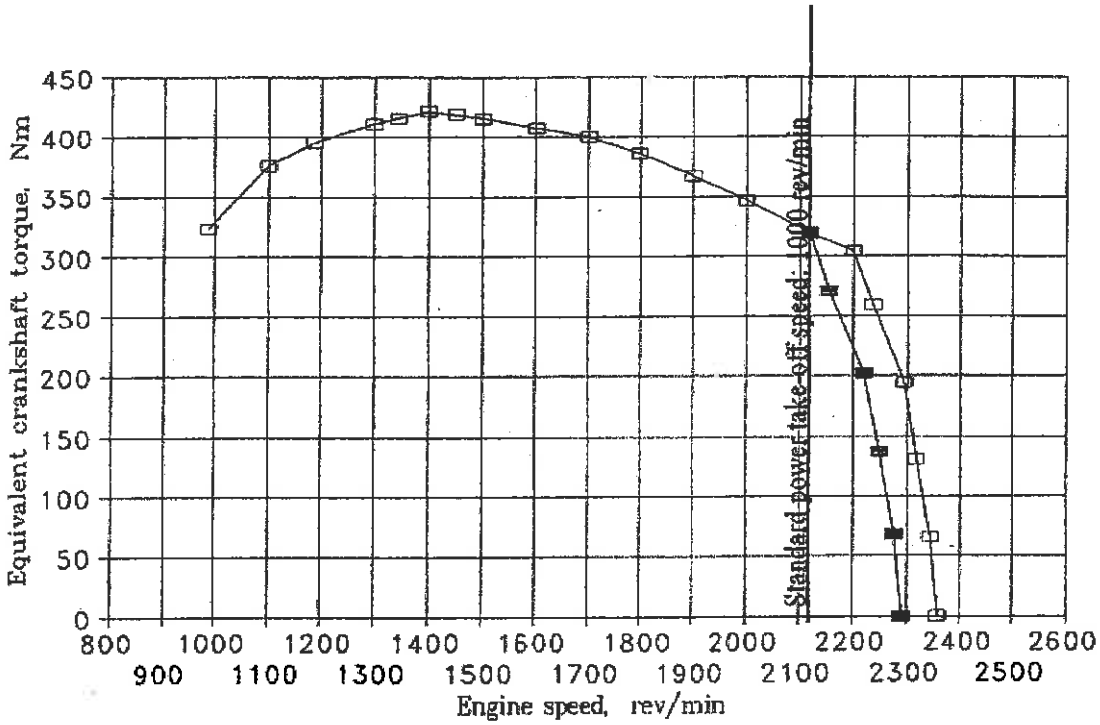
Signed:  Officer in charge

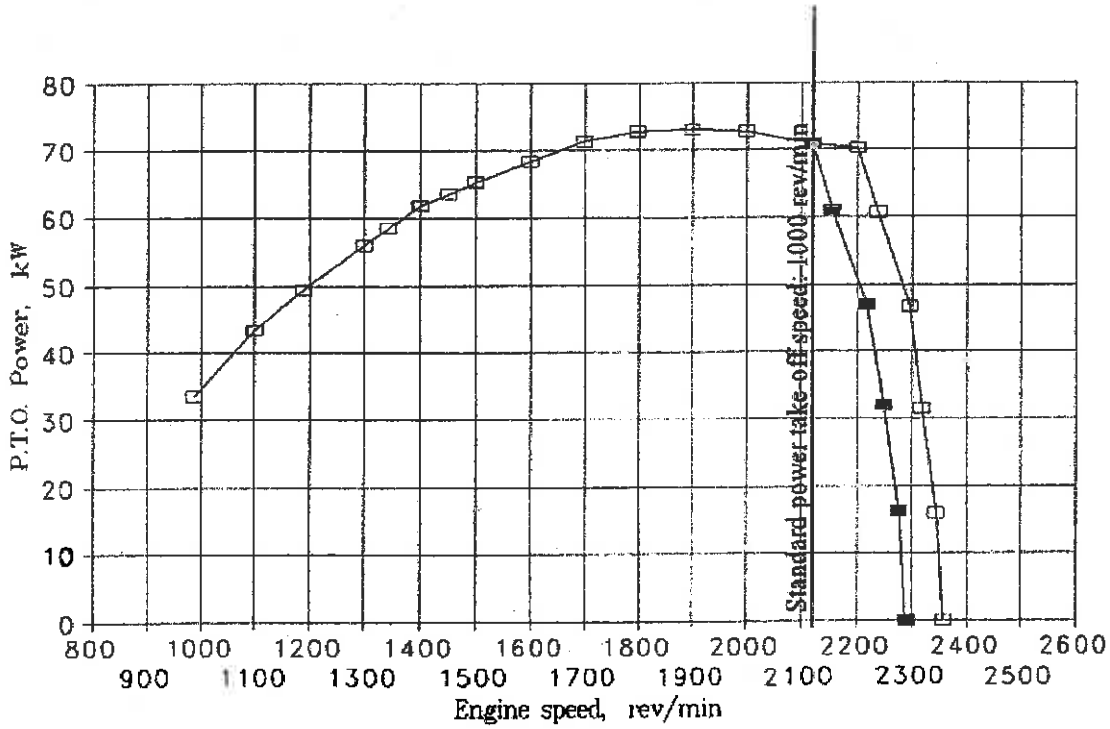
J P Evans
Senior Test Engineer
Test Engineering group

Date: 23/6/00

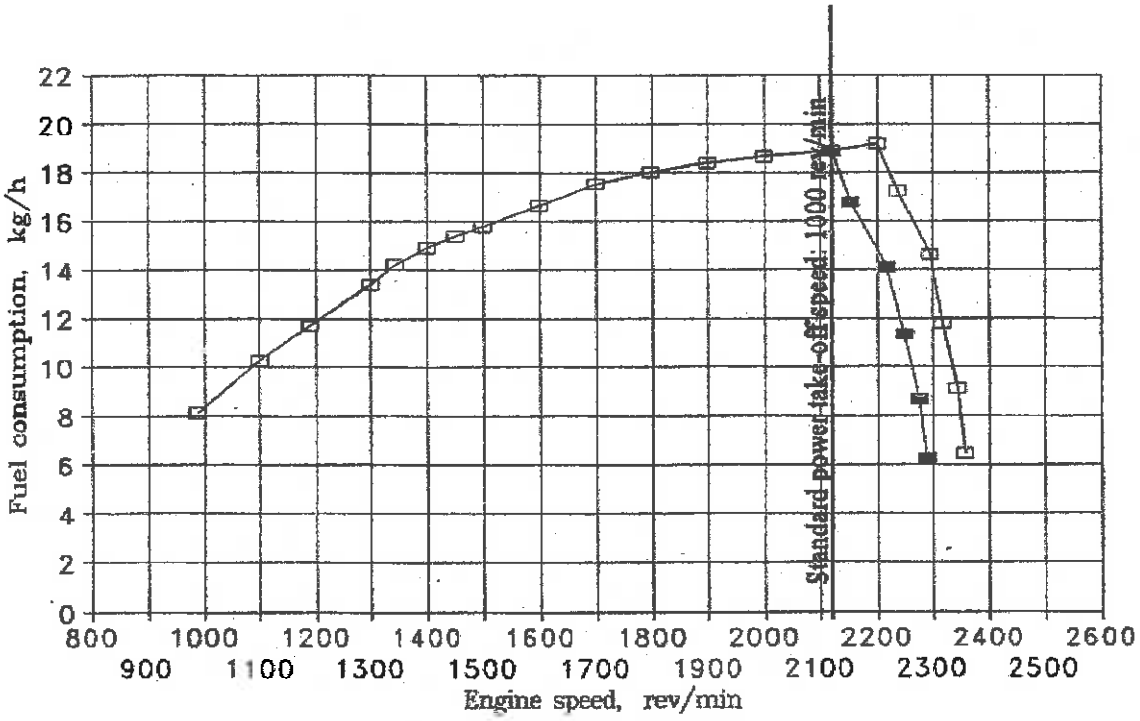
7. ANNEX 1 MAIN POWER TAKE-OFF CURVES

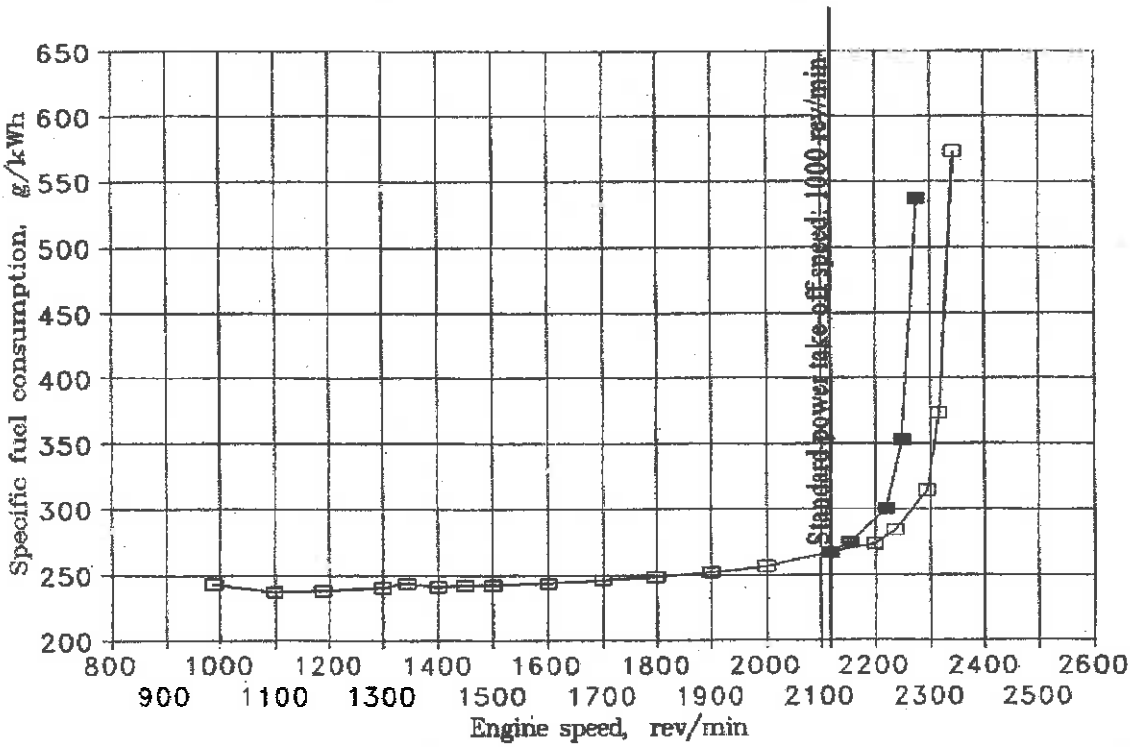
New Holland TM115 Four-Wheel Drive





New Holland TM115 Four-Wheel Drive





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