SILSOE RESEARCH INSTITUTE

Wrest Park, Silsoe,
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Report No: OECD/7951/0199
OECD Approval No: 2/1909
Approval Date: 30 June 2000

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

New Holland M5C7BE (TM165) 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:	809
Date:	April 2000

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OECD/7951/0199

TABLE OF CONTENTS

1.	SPECIFICATIONS OF TRACTOR		1
2.	TEST CONDITIONS		16
3.	COMPULSORY TEST RESULTS		19
	Compulsory tests		
	1	Main power take-off (1000 rev/min)	19
	2	Hydraulic power and lifting force	20
	3	Drawbar power and fuel consumption test (unballasted tractor, four-wheel drive) Drawbar power and fuel consumption test (unballasted tractor, four-wheel drive with front axle disengaged)	23
4.	Optional tests		27
5.	Repairs and adjustments during tests		27
6.	Remarks		27
7.	Annex 1 Main power take-off curves (1000 rev/min)		28

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:	126 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:	M5C7BE (TM165) with 18-speed Semi-Power Shift Transmission
Type:	Four-wheel drive, unit construction
Serial No:	122138B
1st Serial No:	133701B
Tractor type code:	M Series

1.2 Engine

Make:	New Holland
Model:	675T/WW
Type:	4 stroke turbocharged direct injection diesel
Serial No:	WW837801

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:	Garrett
Model:	GT35
Type:	Exhaust driven
Pressure:	0.120 MPa at rated speed/load

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, 0 460 426 313
Serial No:	871 741144
Manufacturer's production setting of injection pump:	
Flow rate (rated engine speed and full load):	86 mm^3 per stroke at 1150 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 2510 min^{-1} (rev/min)
Rated engine speed:	2300 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:	6
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:	3017 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:* 2300 rev/min km/h
Forward			
1	A	335.42	2.21
2	A	278.93	2.66
3	A	232.21	3.19
4	A	193.11	3.84
5	A	160.54	4.62
6	A	133.51	5.55
1	B	144.41	5.13
2	B	120.09	6.17
3	B	99.98	7.42
4	B	83.14	8.92
5	B	69.12	10.73
6	B	57.48	12.90
1	C	50.91	14.56
2	C	42.34	17.51
3	C	35.25	21.03
4	C	29.31	25.29
5	C	24.37	30.42
6	C	20.26	36.59
Reverse			
1	R	171.92	4.31
2	R	142.97	5.19
3	R	119.02	6.23
4	R	98.98	7.49
5	R	82.29	9.01
6	R	68.43	10.83

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

(*) Calculated with a tyre dynamic radius index of 855 mm (ISO 4251/1-1992)

Number of revolutions of front wheels for one revolution of rear wheels: 1.324

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:	838 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)

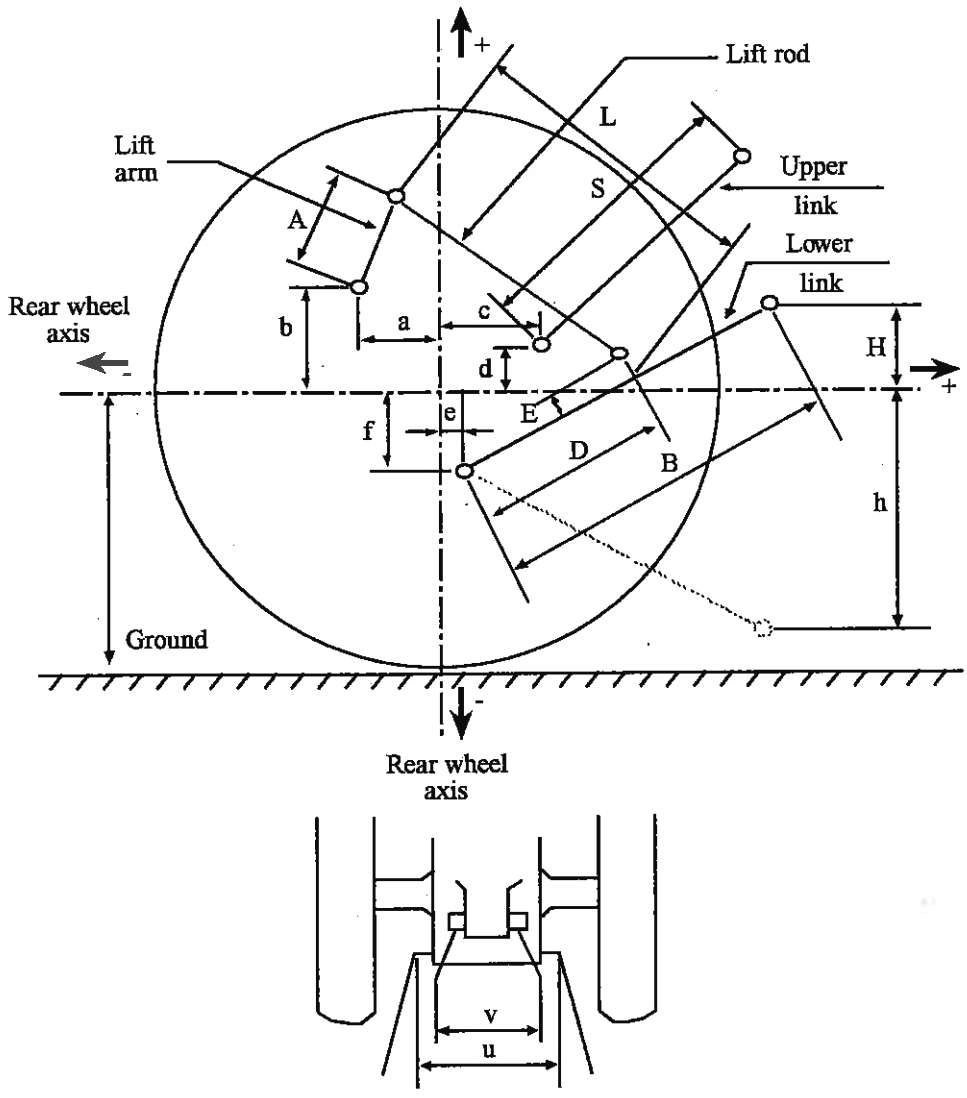
Location:	Rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	6 (available option:21)
Height above ground:	838 mm
Distance from the median plane of the tractor:	Central
Distance behind rear wheel axis:	602 mm
Pto speed at rated engine speed:	1038 min^{-1} (rev/min)
Engine speed 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

1.5 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. (Two 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	435 on centre line
Length of lift rods:		(L)	635-780	740	780	775/730
Height of lower hitch points (*) relative to the rear wheel centre line, situated 855 mm above the ground level:						
- in low position		(h)	265-765	657	632	652/590
- in high position		(H)	-20-275	70	10	15/82
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 855 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:	522 mm			510 mm
Minimum:	470 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 *	1532	2238	Reversing wheels and offset lug rims
Rear	1530	2232	Power adjust and reversing wheels

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

1.13 Protective structure

Make: New Holland

Model: New Holland SLTV7

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: 4/0605

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	1413	150 x 90	200
Sidelights	2005	105 x 30	870
Rear lights	1885	50 x 50	843
Axle reflectors	810	100 x 35	445
Rear fender reflectors	1885	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	4705	2184	2784	2963	3017

2.2 Ground clearance (unballasted tractor) 390 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	2375	2393	---	---
Rear	4182	4239	---	---
Total	6557	6632	---	---

2.4 Track specifications Not applicable

2.5 Tyres and track width specification

	Front	Rear
Tyres dimensions ply rating type	 16.9 R28 136A8 Radial	 20.8 R 38 153A8 Radial
Maximum load (tyre manufacturer's), kg 30 Km/h (40 Km/h)	2395 (2240)	3905 (3650)
Maximum load (tractor manufacturer's), kg	2395 (2240)	3905 (3650)
Inflation pressure (tyre manufacturer's), kPa	160	160
Dynamic radius index, mm	670	855
Chosen track width (manufacturer's nominal), mm	1660	1730

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: 2 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
3.1.1 MAXIMUM POWER – TWO-HOUR TEST						
110.6	2164	1021	28.99	34.64	262	3.19
3.1.2 POWER AT RATED ENGINE SPEED						
107.0	2300	1085	29.32	35.03	274	3.05
3.1.3 STANDARD POWER TAKE-OFF SPEED [1000±25 min^{-1} (rev/min)]						
110.2	2121	1000	28.47	34.01	258	3.24
3.1.4 PART LOADS 3.1.4.1 the torque corresponding to maximum power at rated engine speed						
107.0	2300	1085	29.32	35.03	274	3.05
3.1.4.2 85% of torque obtained in 3.1.4.1						
95.3	2415	1139	27.42	32.76	288	2.91
3.1.4.3 75% of torque defined in 3.1.4.2						
71.7	2420	1142	22.12	26.42	308	2.71
3.1.4.4 50% of torque defined in 3.1.4.2						
48.2	2437	1150	17.38	20.77	360	2.32
3.1.4.5 25% of torque defined in 3.1.4.2						
24.4	2451	1156	12.84	15.33	526	1.59
3.1.4.6 unloaded						
0	2470	1165	8.18	9.77	-	-
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						
110.2	2121	1000	28.47	34.01	258	3.24
3.1.5.2 85% of torque obtained in 3.1.5.1						
97.6	2213	1044	25.70	30.70	263	3.18
3.1.5.3 75% of torque obtained in 3.1.5.2						
73.9	2236	1055	20.64	24.66	279	3.00
3.1.5.4 50% of torque obtained in 3.1.5.2						
49.7	2256	1064	16.01	19.13	322	2.60
3.1.5.5 25% of torque obtained in 3.1.5.2						
25.1	2278	1074	11.56	13.81	460	1.82
3.1.5.6 unloaded						
0	2299	1084	7.36	8.79	-	-

No load maximum engine speed: 2470 min^{-1} (rev/min)

Torque (equivalent crankshaft) at maximum power: 488.0 Nm

At rated engine speed: 444.1 Nm

Maximum torque (equivalent crankshaft): 660.4 Nm
(engine speed: 1298 min^{-1} (rev/min)

Mean atmospheric conditions:	
Temperature	26 °C
Pressure	101.7 kPa
Relative humidity	27 %
Maximum temperatures:	
Coolant	87 °C
Engine oil	112 °C
Fuel	54 °C
Engine air intake	33 °C

3.2 Hydraulic power and lifting force

Date of tests: 14 April 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 stand by)

Pump delivery rate at minimum pressure 124.6 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	85.4	18.5	26.33
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	110.3	17.0	31.25

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	198 mm	198 mm
Vertical movement	727 mm	855 mm
Maximum corrected force exerted through full range	41.6 kN	37.6 kN
Corresponding pressure of hydraulic fluid	18.5 MPa	18.5 MPa
Moment about rear-wheel axis	49.7 kNm	67.8 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	-407	-300	-200	-100	0	100	200	250	320	390
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	--	41.6	51.7	58.3	63.6	67.6	70.7	74.2	75.6	75.9	--
Corresponding pressure: 18.5 MPa											
at the frame kN	37.6	41.8	47.6	51.5	53.6	55.1	55.0	54.8	54.7	54.6	53.0
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	223 mm	223 mm
Vertical movement	642 mm	692 mm
Maximum corrected force exerted through full range	49.8 kN	50.6 kN
Corresponding pressure of hydraulic fluid	18.5 MPa	18.5 MPa
Moment about rear-wheel axis	59.5 kNm	91.3 kNm
Maximum tilt angle of mast from vertical	--	5 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-405	-382	-300	-200	-100	0	100	150	200	260	287
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	--	49.8	59.7	66.7	71.6	75.8	78.7	80.0	81.3	83.8	--
Corresponding pressure: 18.5 MPa											
at the frame kN	50.6	55.0	59.4	64.0	66.7	67.6	67.4	67.3	67.2	66.3	64.4
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	-402	-340	-300	-200	-100	0	100	200	265	--	--
*mm	--	-340	-300	-200	-100	0	100	200	265	300	332
ASAE S349.2											
kN	74.6	71.9	70.9	71.2	71.5	71.9	72.2	72.3	69.9	--	--
*kN	--	63.0	64.3	67.6	69.9	71.6	71.9	71.6	71.0	70.9	69.7
Corresponding pressure: 18.7 MPa											

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-402	-340	-300	-200	-100	0	100	200	265	--	--
*mm	--	-340	-300	-200	-100	0	100	200	265	300	332
ASAE S349.2											
kN	67.0	64.6	63.7	64.0	64.2	64.6	64.9	64.9	62.8	--	--
*kN	--	56.6	57.8	60.7	62.8	64.3	64.6	64.3	63.8	63.7	62.6
Corresponding pressure: 16.8 MPa											

3.3 Drawbar power test (unballasted tractor)

New Holland 165 (4WD)

Date and Location of tests: 13 March 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	415 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	36.6	65.0	2.03	2435	14.7	482	1.74	48	85	105	16	54	101.9
2A	44.5	64.5	2.48	2432	13.2	443	1.89	45	86	105	15	57	101.9
3A	53.1	64.1	2.98	2426	12.9	414	2.02	44	86	106	16	55	101.9
4A	62.7	63.0	3.59	2415	12.5	396	2.12	52	87	109	16	56	102.0
5A	75.1	61.3	4.41	2410	10.4	369	2.27	46	87	109	16	54	102.0
1B	82.5	60.2	4.94	2394	9.1	350	2.39	51	87	106	15	58	101.9
6A	85.5	59.7	5.16	2299	8.6	340	2.46	47	86	107	15	56	102.0
2B	92.3	58.8	5.66	2250	7.9	311	2.69	47	86	107	15	59	101.9
3B	95.2	50.9	6.73	2166	5.3	305	2.75	47	87	109	14	60	102.0
4B	93.8	41.1	8.22	2170	3.9	311	2.70	44	86	109	15	57	102.0
5B	95.5	34.5	9.96	2171	3.3	308	2.72	45	87	109	14	58	102.0
6B	92.9	27.8	12.01	2168	2.9	319	2.62	44	86	105	15	57	101.9
1C	96.1	25.4	13.62	2169	2.4	308	2.72	46	87	109	13	62	102.0
2C	91.7	20.2	16.38	2160	2.1	326	2.57	45	86	109	14	60	102.0
3.3.2 FUEL CONSUMPTION													
3.3.2.1 In selected gear, at maximum power at rated speed													
1C	92.9	23.0	14.52	2307	2.2	317	2.64	45	87	109	14	62	102.0
3.3.2.1.1 75% of pull at maximum power at rated speed													
1C	73.7	17.4	15.29	2417	1.9	364	2.30	44	87	110	14	61	102.0
3.3.2.1.2 50% of pull at maximum power at rated speed													
1C	49.3	11.5	15.46	2431	1.6	429	1.95	45	86	110	14	60	102.0
3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1													
2C	73.3	17.4	15.20	2003	2.0	312	2.68	45	86	105	15	57	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													
2C	49.2	11.5	15.45	2025	1.6	360	2.32	45	85	104	15	56	101.9
3.3.2.2 In selected gear nearest to 7.5 km/h, at maximum power at rated engine speed													
3B	93.2	46.5	7.22	2308	4.6	320	2.62	46	87	110	14	60	102.0
3.3.2.2.1 75% of pull at maximum power at rated speed													
3B	74.0	34.8	7.67	2418	3.3	345	2.42	46	86	110	15	59	102.0
3.3.2.2.2 50% of pull at maximum power at rated speed													
3B	50.3	23.2	7.79	2431	2.3	406	2.06	46	86	109	15	58	102.0
3.3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1													
4B	74.0	34.8	7.66	2013	3.5	300	2.79	49	86	106	15	58	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													
4B	50.1	23.2	7.77	2019	2.4	340	2.46	48	85	104	15	59	101.9

Drawbar power test (unballasted tractor)

New Holland TM 165 (4WD with front axle disengaged)

Date and Location of tests: 14 March 2000
Silsoe Research Institute
Wrest Park
Silsoe
Bedford MK45 4HS

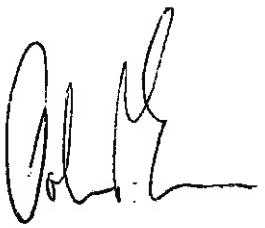
Type of track: Concrete

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
	mm	kPa	kPa
Unballasted	465 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	27.6	50.0	1.99	2442	15.0	550	1.52	44	85	104	11	47	101.7
2A	33.8	49.8	2.44	2440	13.7	487	1.72	49	85	104	11	46	101.7
3A	41.1	49.4	3.00	2437	11.8	429	1.95	41	85	105	11	46	101.7
4A	49.1	49.1	3.60	2432	11.7	415	2.02	41	85	105	11	48	101.6
5A	59.6	49.5	4.33	2417	11.2	374	2.24	43	85	107	11	49	101.6
1B	65.9	48.5	4.89	2418	9.8	356	2.35	47	86	108	12	52	101.6
6A	71.6	48.6	5.30	2417	9.6	347	2.41	42	86	107	11	52	101.6
2B	79.0	48.1	5.91	2412	9.1	367	2.28	46	87	108	11	63	101.6
3B	89.5	48.5	6.64	2261	9.3	330	2.54	40	87	110	11	63	101.6
4B	93.2	41.9	8.01	2170	5.2	311	2.69	44	87	108	12	70	101.4
5B	95.7	35.3	9.75	2167	4.0	302	2.77	45	87	110	12	66	101.5
6B	91.9	28.0	11.81	2162	3.0	315	2.66	46	87	110	13	65	101.5
1C	96.2	25.9	13.37	2167	3.0	299	2.80	43	86	108	11	46	101.7
2C	95.2	21.2	16.14	2164	2.6	303	2.76	42	86	107	11	45	101.7
3.3.2 FUEL CONSUMPTION													
3.3.2.1 In selected gear, at maximum power at rated speed													
1C	92.1	23.4	14.19	2293	2.8	319	2.62	41	86	109	11	44	101.7
3.3.2.1.1 75% of pull at maximum power at rated speed													
1C	73.0	17.5	15.05	2418	2.2	366	2.29	42	87	110	11	46	101.7
3.3.2.1.2 50% of pull at maximum power at rated speed													
1C	49.7	11.7	15.22	2431	1.6	438	1.91	43	86	109	11	46	101.7
3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1													
2C	73.2	17.5	15.06	2010	2.0	308	2.71	40	85	107	11	45	101.7
3.3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2													
2C	49.4	11.7	15.21	2020	1.6	356	2.35	40	85	104	11	45	101.7
3.3.2.2 In selected gear nearest to 7.5 km/h, at maximum power at rated engine speed													
3B	88.7	46.9	6.81	2310	9.0	330	2.53	44	87	106	11	46	101.7
3.3.2.2.1 75% of pull at maximum power at rated speed													
3B	73.3	35.1	7.51	2420	4.1	351	2.38	41	86	107	11	45	101.7
3.3.2.2.2 50% of pull at maximum power at rated speed													
3B	50.0	23.5	7.67	2434	2.7	405	2.07	41	85	108	11	47	101.7
3.3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1													
4B	73.3	35.1	7.51	2012	4.2	311	2.69	42	85	106	11	44	101.7
3.3.2.2.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2													
4B	50.0	23.5	7.67	2021	2.7	334	2.51	43	85	103	11	45	101.7

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

Test carried out by: S J Devonshire

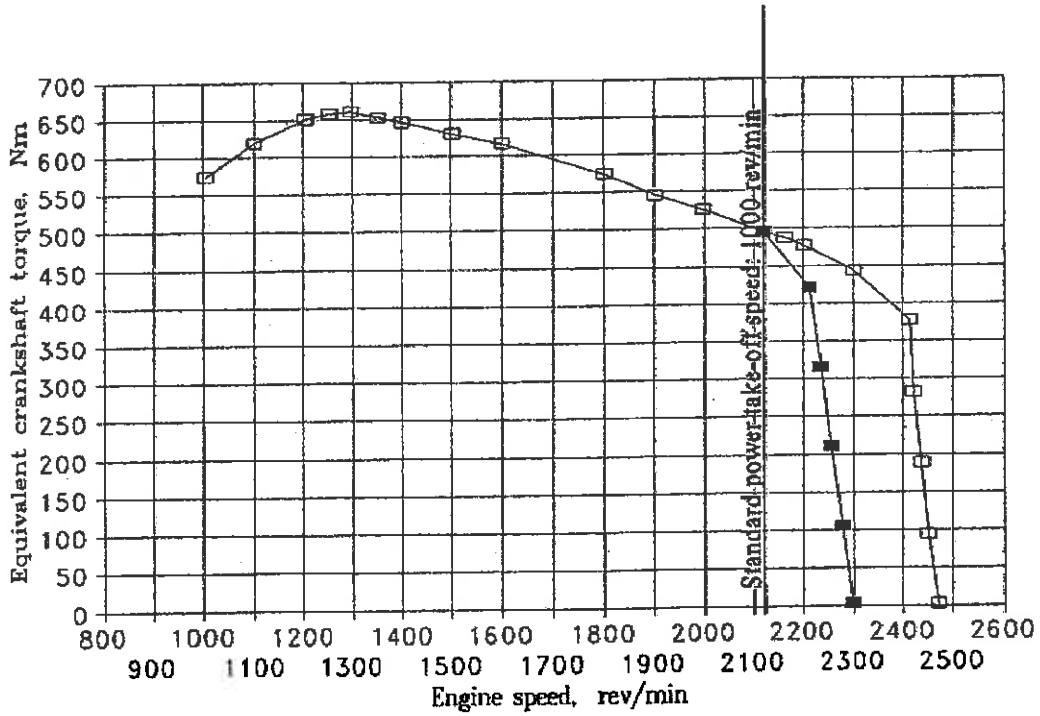
Signed:  Officer in charge

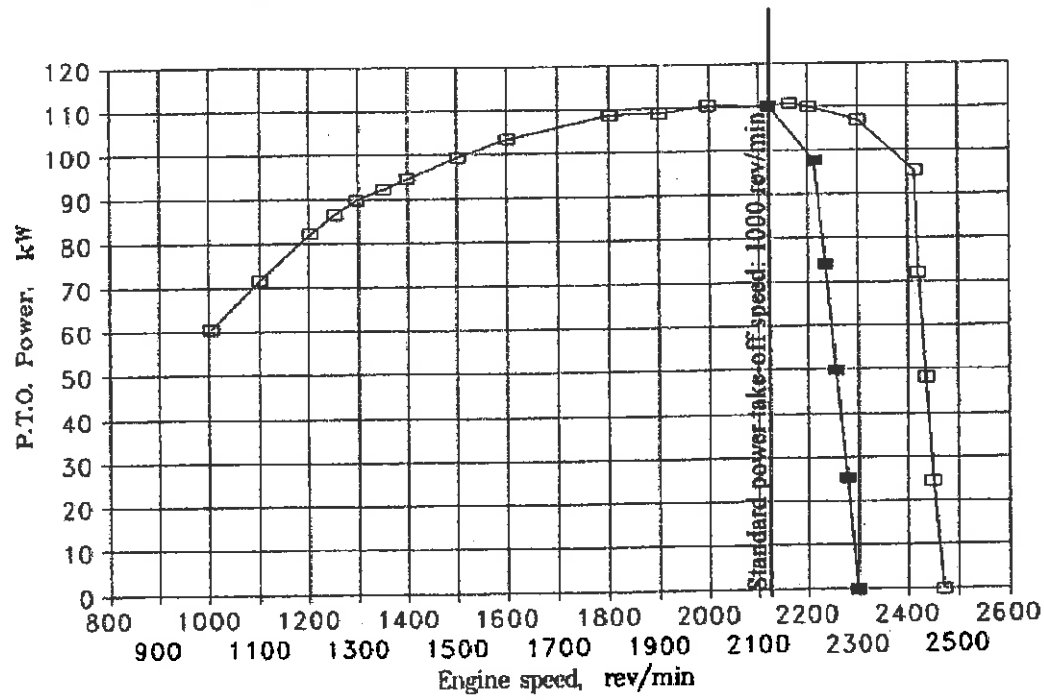
J P Evans
Senior Test Engineer
Test Engineering group

Date: 23/6/00

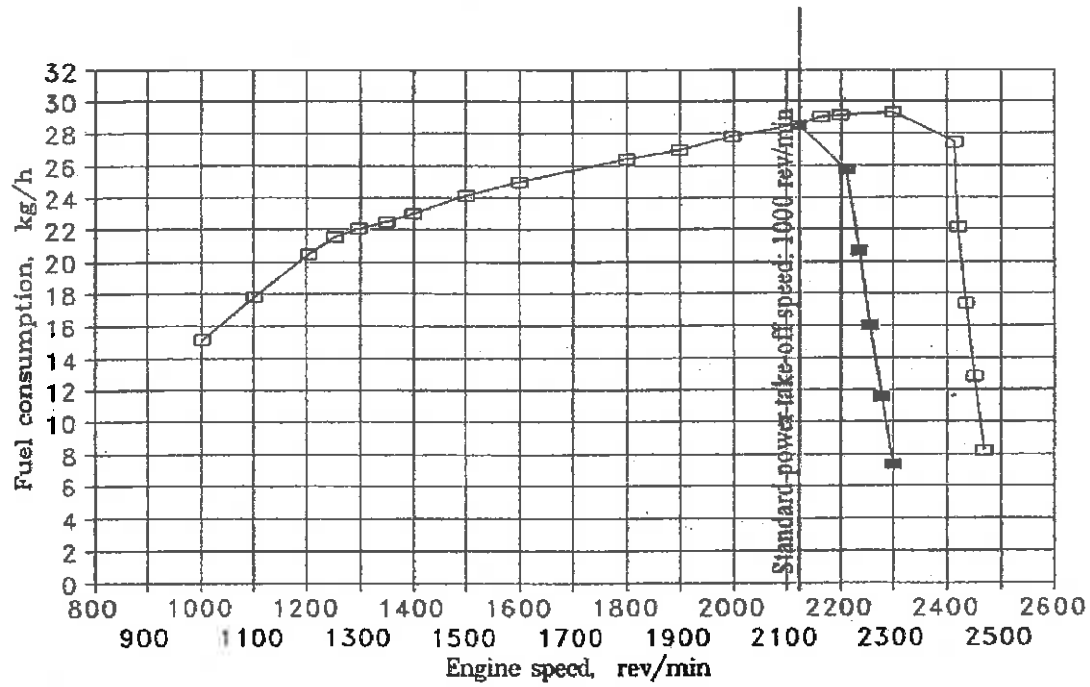
7. ANNEX 1 MAIN POWER TAKE-OFF CURVES

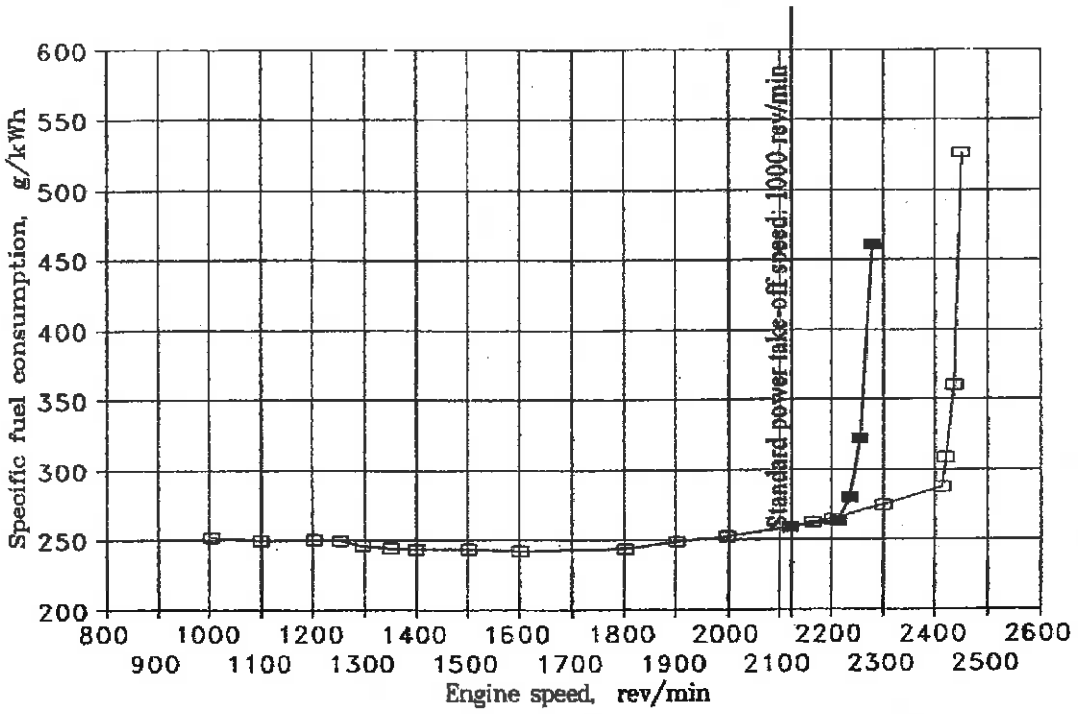
New Holland TM165 Four-Wheel Drive





New Holland TM165 Four-Wheel Drive





New Holland TM165 Four-Wheel Drive

