2.

# SILSOE RESEARCH INSTITUTE
## Wrest Park, Silsoe,
## Bedford MK45 4HS

**Report No:** OECD/7592/0198
**OECD Approval No:** 2/1801
**Approval Date:** 16 December 1998

**Report on Test in accordance with the OECD Standard Code II (RESTRICTED CODE) for the Official Testing of Agricultural and Forestry Tractors**

New Holland 618325 (TS100) Four-Wheel Drive Tractor with 16-speed Power-Shift Transmission (40km/h)



**Manufactured by:** New Holland UK Ltd
Basildon
Essex
United Kingdom

**Submitted for test by:** The Manufacturer

**Report No:** 794

**Date:** September 1998

OECD/7592/0198

## TABLE OF CONTENTS


1. SPECIFICATIONS OF TRACTOR 1

2. TEST CONDITIONS 16

3. TEST RESULTS 19

Compulsory tests

1 Main power take-off (1000 rev/min) 19

2 Hydraulic power and lifting force 21

3 Drawbar power and fuel consumption test (unballasted tractor, four-wheel drive) 23

Supplementary tests

2 Hydraulic power and lifting force 24

I. Power lift test (To manufacturers lift rod setting) 24

II. Power lift test (To manufacturers lift rod setting) 25

3 Drawbar power and fuel consumption test (unballasted tractor, two-wheel drive) 26

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 Ltd<br>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:** | 94 hours |
| **Location of test:** | Silsoe Research Institute<br>Wrest Park, Silsoe, United Kingdom |

## 1. SPECIFICATION OF TRACTOR

### 1.1 Identification

| | |
|---|---|
| Make: | New Holland |
| Model: | 618325 (TS 100) with 16-speed Power Shift Transmission |
| Type: | Four wheel drive unit construction |
| Serial No: | 086476B |
| 1st Serial No: | 082823B |

### 1.2 Engine

| | |
|---|---|
| Make: | New Holland |
| Model: | 450T/PF |
| Type: | 4 stroke direct injection turbo charged diesel |
| Serial No: | PF736350 |

#### 1.2.1 Cylinders

| | |
|---|---|
| Number/disposition: | 4 vertical In-line |
| Bore/stroke: | 111.8 mm/127.0 mm |
| Capacity: | 4987 $cm^3$ |
| Compression ratio: | 17.5 :1 |
| Arrangement of valves: | Overhead |
| Cylinder liners: | None, monobloc construction |

#### 1.2.2 Supercharging

| | |
|---|---|
| Make: | Garrett |
| Model: | T250 |
| Type: | Exhaust driven |
| Pressure: | 92 kPa at 2170 rpm and 100% load |

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 seperator plus secondary disposable canister filter between tank and injection pump |
| Capacity of fuel tank: | 160 litres |
| Make, type and model of injection pump: | Lucas/CAV Rotary, DP203, DSA 1260 |
| Serial No: | 34646 FPG |
| Manufacturer's production setting of injection pump: | |
| Flow rate: | 76.0+/-2.7 $mm^3$ per stroke at 2170 rev/min speed and full load |
| Timing: | Delivery starts 3° before T.D.C (dynamic) |
| Make, type and model of injectors: | Lucas/CAV, multihole, L067PBA |
| 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: | 2170 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: | 2 x 800 cca lead acid, mounted on right-hand side under cab (1 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: | 2876 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: | 8 |
| Diameter of plates: | 159 mm |
| Method of operation: | Electro-hydraulic, pedal button operation |

1.3.2 Gear box

| | |
|---|---|
| Make: | New Holland (Electroshift™) |
| Model: | 16 x 16 Synchromesh |
| Type: | Mechanical /electrical manual synchromesh operation, 4-powershift speeds and 4 ranges selected by 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:* 2170 rev/min km/h |
|---|---|---|---|
| Forward | | | |
| 1 | 1L | 288.67 | 2.25 |
| 2 | 2L | 235.08 | 2.77 |
| 3 | 3L | 193.16 | 3.37 |
| 4 | 4L | 157.29 | 4.13 |
| 5 | 5L | 122.26 | 5.32 |
| 6 | 6L | 99.56 | 6.53 |
| 7 | 7L | 81.81 | 7.95 |
| 8 | 1H | 70.20 | 9.26 |
| 9 | 8L | 66.62 | 9.76 |
| 10 | 2H | 57.17 | 11.38 |
| 11 | 3H | 46.97 | 13.85 |
| 12 | 4H | 38.25 | 17.00 |
| 13 | 5H | 29.73 | 21.87 |
| 14 | 6H | 24.21 | 26.86 |
| 15 | 7H | 19.89 | 32.69 |
| 16 | 8H | 16.20 | 40.14 |
| Reverse | | | |
| 1 | 1L | 291.30 | 2.23 |
| 2 | 2L | 237.22 | 2.74 |
| 3 | 3L | 194.91 | 3.34 |
| 4 | 4L | 158.72 | 4.10 |
| 5 | 5L | 123.37 | 5.27 |
| 6 | 6L | 100.47 | 6.47 |
| 7 | 7L | 82.55 | 7.88 |
| 8 | 1H | 70.84 | 9.18 |
| 9 | 8L | 67.22 | 9.67 |
| 10 | 2H | 57.69 | 11.27 |
| 11 | 3H | 47.40 | 13.72 |
| 12 | 4H | 38.60 | 16.85 |
| 13 | 5H | 30.00 | 21.68 |
| 14 | 6H | 24.43 | 26.62 |
| 15 | 7H | 20.08 | 32.40 |
| 16 | 8H | 16.35 | 39.78 |

L = Low range H = High range

(*) Calculated with a tyre dynamic radius index of 795mm (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 exchanging shafts via circlip |
| Clutch | |
| Make: | New Holland |
| Model: | None |
| Type: | Multiplate, wet |
| Number of plates: | 5 |
| Diameter of plates: | 148.6 mm |

#### 1.4.1.1 Power take-off proportional to engine speed

Two speed power take-off via exchanging shafts

| (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: | 749 mm | 749 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: | 620 rev/min at 2170 | 1059 rev/min at 2170 |
| Engine speed at standard power take-off speed: | 1890 rev/min | 2049 rev/min |
| Ratio of rotation speeds: | 3.50:1 | 2.049:1 |
| 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 shiftable power take-off selected by hand lever in cab

*540 rev/min*

| | |
|---|---|
| Location: | Rear of tractor |
| Diameter of power take-off shaft: | 34.9 mm |
| Number of splines: | 6 |
| Height above ground: | 749 mm |
| Distance from the median plane of the tractor: | Central |
| Distance behind rear wheel axis: | 457 mm |
| PTO speed at rated engine speed: | 620 rev/min at 2170 |
| 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: | 749 mm |
| Distance from the median place of the tractor: | Central |
| Distance behind rear wheel axis: | 457 mm |
| PTO speed at rated engine speed: | 1032 rev/min at 2170 |
| Engine speed at standard power take-off speed: | 2103 rev/min |
| Ratio of rotation speeds: | 2.103:1 |
| Power restriction and maximum torque: | None |
| Direction of rotation (viewed from behind tractor): | Clockwise |

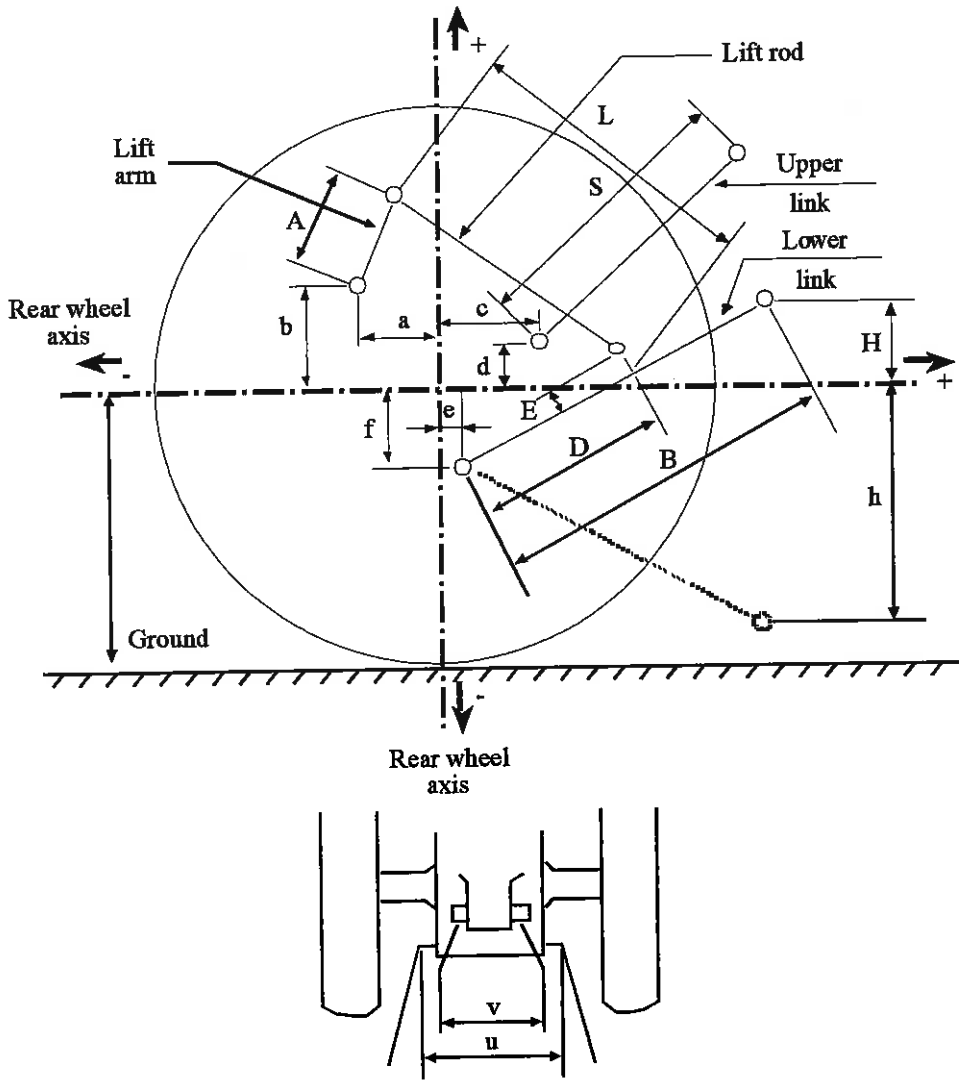
## 1.5 Hydraulic power lift - standard

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 (1 fitted for test) |
| 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 front face of hydraulic top cover |
| 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.<br>(Optional - draught or position control)<br>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 | 720 | 720 | 678 |
| 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 | 810 | 785 | 743 |
| ISO mast height | | | - | 610 | 610 | 510 |
| Height of lower hitch points (*) relative to the rear wheel centre line, situated 795 mm above the ground level: | | | | | | |
| - in low position | | (h) | 308 to 794 | 601 | 543 | 310 |
| - in high position | | (H) | -77 to 224 | 65 | 95 | 210 |
| 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 795 mm ISO 4251/1-1984
+ or 740 mm for supplementary test (B2.2)

**1.7 Swinging drawbar**
(Stand alone type)

| | | | |
|---|---|---|---|
| Type: | Clevis | | |
| Height above ground, unballasted maximum: | 557 mm | | |
| minimum: | 448 mm | | |
| Type of adjustment: | Inverting drawbar | | |
| Distance of hitch point from rear-wheel axis, horizontally: | 685 mm | 800 mm | 850 mm |
| Distance of hitch point from power take-off shaft ends: | | | |
| Vertically: | 192 mm | 301 mm | |
| Horizontally: | 228 mm | 343 mm | 393 mm |
| Lateral adjustment from the (centre of clevis): | | | |
| Right-hand | 210 mm | 250 mm | 260 mm |
| Left-hand | 210 mm | 250 mm | 260 mm |
| Distance of pivot point from rear axles horizontally: | 13 mm behind rear axle | | |
| Width of clevis: | 70 mm | | |
| Diameter of pin hole: | 29/33 mm | | |
| Maximum vertical permissible load - Clevis uppermost: | 1630 kg | 1065 kg | 910 kg |
| Clevis underneath: | 1135 kg | 1065 kg | 910 kg |

**1.8 Trailer Hitch**

Type: None fitted

**1.9 Holed drawbar**

Type: None fitted

**Front Towing Hitch**

Type None fitted

## 1.10 Steering

| | |
|---|---|
| Make: | New Holland |
| Model: | None |
| Type: | Hydrostatic |
| Method of operation: | |
| Pump: | New Holland |
| 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: 2362 mm

Track width adjustment:

| | Minimum mm | Maximum mm | Adjustment method |
|---|---|---|---|
| Front | 1403 | 2113 | 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 MKSK90 |
| 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-1329/121 |
| Date of approval: | 1 September 1997 |

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

## 1.14 Seat

### 1.14.1 Drivers seat

| | |
|---|---|
| Make/Model/Type: | Grammar MSG93/20 |
| 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: | Yes |

### 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 | 1350 | 150 x 90 | 210 |
| Sidelights | – | – | – |
| Rear lights | 1733 | 60 x 60 | 840 |
| Axle reflectors | – | – | – |
| Cab reflectors | 1733 | 60 x 60 | 840 |

## 2. TEST CONDITIONS

### 2.1 Overall dimensions

| Length mm | Width | | Height at top of | |
|---|---|---|---|---|
| | Minimum mm | Maximum mm | Protective structure mm | Exhaust pipe mm |
| 4065 | 2180 | 2495 | 2762 | 2876 |

### 2.2 Ground clearance (unballasted tractor) 388 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 | 1682 | 1692 | – | – |
| Rear | 2617 | 2682 | – | – |
| Total | 4299 | 4374 | – | – |

## 2.5 Tyres and track width specification

| | Front | Rear |
|---|---|---|
| Tyres<br>dimensions<br>ply rating<br>type | <br>13.6 R 28<br>123A8<br>Radial | <br>16.9 R 38<br>141A8<br>Radial |
| Maximum load (tyre manufacturer's), kg 30 km/h (40 km/h) | 1660 (1550) | 2760 (2575) |
| Maximum load (tractor manufacturer's), kg | 1660 (1550) | 2760 (2575) |
| Inflation pressure (tyre manufacturer's), Bar | 1.6 | 1.6 |
| Dynamic radius index, mm | 610 | 795 |
| Chosen track width (manufacturer's nominal), mm | 1706 | 1630 |

## 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 lubricants

### 2.7.1 Capacity and change interval

| | Capacity litre | Oil change hours | Filter change hours |
|---|---|---|---|
| Engine | 11.4 | 300 | 300 |
| Front axle differential | 6.2 | 1200 | None |
| Final drive (front) - per side | 3.0 | 1200 | None |
| Rear axle<br>Range command + CCLS | 60.6 | 1200 | 300 |
| Gearbox }<br>Hydraulic system }<br>Final drives (rear) }<br>Steering } | Integral with rear axle | | |
| Brakes | 0.5 | Top-up | None |

2.7.2 Specifications

| | NH spec | Recommended | Used during test |
|---|---|---|---|
| Engine oil<br>Type:<br>Viscosity:<br>Classification: | 82922933 | SAE 10W/30<br>11.5 cSt at 100°C<br>API CE/SF | As recommended |
| Transmission oils<br>Type:<br>Viscosity:<br>Classification: | 85700812 | Not specified<br>9 cSt at 100°C<br>API GL-4 | As recommended |
| Rear final drives<br>Type:<br>Viscosity:<br>Classification: | 85700812 | Not specified<br>9 cSt at 100°C<br>API GL-4 | As recommended |
| Hydraulic fluid<br>Type:<br>Viscosity:<br>Classification: | 85700812 | Not specified<br>9 cSt at 100°C<br>API GL-4 | As recommended |
| Steering oil<br>Type:<br>Viscosity:<br>Classification: | 85700812 | Not specified<br>9 cSt at 100°C<br>API GL-4 | As recommended |
| Front differential and final drives<br>Type:<br>Viscosity:<br>Classification: | 85700812 | Not specified<br>9 cSt at 100°C<br>API GL-4 | As recommended |
| Hydraulic brakes<br>Type:<br>Viscosity:<br>Classification: | 82865344 | Not specified<br>6 cSt at 100°C<br>No equivalent | As recommended |

2.7.3 Grease

| | | | |
|---|---|---|---|
| Type:<br>Classification: | 82948889 | Lithium based<br>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: 15 July 1998
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 | | | | | | |
| 66.0 | 2050 | 1000 | 16.19 | 19.34 | 245 | 3.41 |
| 3.1.2 POWER AT RATED ENGINE SPEED | | | | | | |
| 63.7 | 2170 | 1059 | 16.32 | 19.50 | 256 | 3.27 |
| 3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 ± 25 rev/min) | | | | | | |
| 66.0 | 2050 | 1000 | 16.19 | 19.34 | 245 | 3.41 |
| 3.1.4 PART LOADS<br>3.1.4.1 The torque corresponding to maximum power at rated engine speed | | | | | | |
| 63.7 | 2170 | 1059 | 16.32 | 19.50 | 256 | 3.27 |
| 3.1.4.2 85% of the torque defined in 3.1.4.1 | | | | | | |
| 56.1 | 2246 | 1096 | 15.17 | 18.12 | 271 | 3.09 |
| 3.1.4.3 75% of the torque defined in 3.1.4.2 | | | | | | |
| 42.5 | 2275 | 1110 | 12.82 | 15.31 | 301 | 2.78 |
| 3.1.4.4 50% of the torque defined in 3.1.4.2 | | | | | | |
| 28.7 | 2296 | 1121 | 10.37 | 12.39 | 362 | 2.31 |
| 3.1.4.5 25% of the torque defined in 3.1.4.2 | | | | | | |
| 14.5 | 2316 | 1130 | 7.83 | 9.35 | 539 | 1.55 |
| 3.1.4.6 Unloaded | | | | | | |
| 0 | 2332 | 1138 | 5.28 | 6.31 | – | – |

| 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 (1000 ± 25 rev/min) | | | | | | |
| 3.1.5.1 The torque corresponding to maximum power | | | | | | |
| 66.0 | 2050 | 1000 | 16.19 | 19.34 | 245 | 3.41 |
| 3.1.5.2 85% of the torque obtained in 3.1.5.1 | | | | | | |
| 58.0 | 2120 | 1035 | 14.95 | 17.86 | 258 | 3.25 |
| 3.1.5.3 75% of the torque obtained in 3.1.5.2 | | | | | | |
| 44.1 | 2155 | 1052 | 12.57 | 15.02 | 285 | 2.94 |
| 3.1.5.4 50% of the torque obtained in 3.1.5.2 | | | | | | |
| 29.8 | 2181 | 1064 | 10.09 | 12.06 | 338 | 2.47 |
| 3.1.5.5 25% of the torque obtained in 3.1.5.2 | | | | | | |
| 15.1 | 2202 | 1075 | 7.37 | 8.81 | 503 | 1.66 |
| 3.1.5.6 Unloaded | | | | | | |
| 0 | 2219 | 1083 | 4.89 | 5.84 | -- | -- |

No load, maximum engine speed: 2332 rev/min

Torque (equivalent crankshaft) at maximum power: 307.5 Nm

Torque (equivalent crankshaft) at rated speed: 280.5 Nm

Maximum torque (equivalent crankshaft): 374.7 Nm
(engine speed 1355 rev/min)

Mean atmospheric conditions:

- Temperature 24°C
- Pressure 100.8 kPa
- Relative humidity 36%

Maximum temperatures:

- Coolant 84°C
- Engine oil 110°C
- Fuel 54°C
- Engine air intake 30°C

## 3.2 Hydraulic power and lifting force

Date of tests: 2 September 1998

### 3.2.1 Hydraulic power test

Sustained pressure with relief valve open: 18.9 MPa

Pump delivery rate at minimum pressure: 86.0 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 | 53.2 | 17.0 | 15.08 |
| Flow rate and hydraulic pressure corresponding to maximum hydraulic power | 74.8 | 15.2 | 18.96 |

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 | 194 mm | 194 mm |
| Vertical movement | 666 mm | 871 mm |
| Maximum corrected force exerted through full range | 30.4 kN | 21.4 kN |
| Corresponding pressure of hydraulic fluid | 17.0 MPa | 17.0 MPa |
| Moment about rear-wheel axis | 30.9 kNm | 34.8 kNm |
| Maximum tilt angle of mast from vertical | – | 13 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 | -469 | -372 | -300 | -200 | -100 | 0 | 100 | 200 | 250 | 294 | 402 |
| 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 | – | 30.4 | 30.9 | 32.0 | 32.9 | 33.5 | 33.8 | 33.8 | 33.9 | 33.9 | – |
| Corresponding pressure: 17.0 MPa | | | | | | | | | | | |
| at the frame kN | 23.9 | 24.3 | 24.4 | 24.8 | 25.0 | 24.8 | 24.2 | 23.5 | 23.2 | 22.5 | 21.4 |
| Corresponding pressure: 17.0 MPa | | | | | | | | | | | |

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

Date and Location of tests: 21 July 1998
Silsoe Research Institute
Wrest Park
Silsoe
Bedford MK45 4HS

Type of track: Concrete

| Height of drawbar above ground | Tyre inflation pressure (kPa) | |
|---|---|---|
| | Front | Rear |
| 405 mm | 90 | 90 |

| 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 | 24.7 | 43.5 | 2.05 | 2286 | 14.9 | 456 | 1.84 | 55 | 83 | 106 | 20 | 47 | 100.2 |
| 2L | 30.3 | 43.5 | 2.51 | 2277 | 15.0 | 408 | 2.05 | 55 | 82 | 106 | 20 | 45 | 100.2 |
| 3L | 36.4 | 42.1 | 3.11 | 2263 | 12.6 | 385 | 2.18 | 53 | 83 | 107 | 21 | 42 | 100.1 |
| 4L | 43.9 | 41.3 | 3.85 | 2237 | 11.4 | 346 | 2.42 | 54 | 83 | 107 | 21 | 45 | 100.1 |
| 5L | 51.8 | 38.9 | 4.79 | 2119 | 8.6 | 311 | 2.69 | 55 | 83 | 105 | 21 | 48 | 100.0 |
| 6L | 54.4 | 33.5 | 5.85 | 2056 | 6.4 | 293 | 2.86 | 54 | 83 | 104 | 22 | 44 | 100.0 |
| 7L | 52.2 | 25.9 | 7.25 | 2057 | 4.5 | 308 | 2.72 | 52 | 84 | 102 | 21 | 46 | 100.0 |
| 1H | 53.8 | 22.7 | 8.55 | 2054 | 4.0 | 301 | 2.78 | 52 | 83 | 105 | 20 | 52 | 99.9 |
| 8L | 51.3 | 20.6 | 8.95 | 2049 | 3.7 | 313 | 2.68 | 51 | 83 | 106 | 20 | 52 | 99.9 |
| 2H | 53.2 | 18.1 | 10.58 | 2055 | 3.4 | 303 | 2.77 | 52 | 83 | 106 | 20 | 52 | 99.9 |
| 3H | 51.5 | 14.4 | 12.87 | 2041 | 2.7 | 313 | 2.67 | 52 | 83 | 107 | 20 | 51 | 99.9 |
| 4H | 50.1 | 11.3 | 15.91 | 2045 | 2.2 | 319 | 2.63 | 53 | 83 | 108 | 20 | 51 | 99.9 |
| 3.3.2 FUEL CONSUMPTION<br>3.3.2.1 In selected gear, at maximum power at rated speed | | | | | | | | | | | | | |
| 6L | 53.4 | 31.0 | 6.21 | 2167 | 5.7 | 302 | 2.77 | 53 | 83 | 104 | 22 | 47 | 100.0 |
| 3.3.2.1.1 75% of pull at maximum power at rated speed | | | | | | | | | | | | | |
| 6L | 42.4 | 23.2 | 6.59 | 2261 | 4.1 | 339 | 2.48 | 53 | 82 | 105 | 20 | 51 | 100.0 |
| 3.3.2.1.2 50% of pull at maximum power at rated speed | | | | | | | | | | | | | |
| 6L | 29.0 | 15.5 | 6.74 | 2284 | 2.7 | 405 | 2.07 | 54 | 83 | 107 | 19 | 52 | 100.0 |
| 3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1 | | | | | | | | | | | | | |
| 7L | 42.4 | 23.2 | 6.58 | 1860 | 4.2 | 304 | 2.75 | 55 | 84 | 106 | 20 | 47 | 100.2 |
| 3.3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2 | | | | | | | | | | | | | |
| 7L | 28.9 | 15.5 | 6.73 | 1875 | 2.9 | 352 | 2.38 | 53 | 83 | 102 | 20 | 47 | 100.2 |
| 3.3.2.2 In selected gear nearest to 7.5 km/h, at maximum power at rated speed | | | | | | | | | | | | | |
| 7L | 50.6 | 23.7 | 7.69 | 2171 | 4.2 | 325 | 2.58 | 51 | 83 | 103 | 21 | 46 | 100.0 |
| 3.3.2.2.1 75% of pull at maximum power at rated speed | | | | | | | | | | | | | |
| 7L | 39.9 | 17.8 | 8.09 | 2261 | 3.2 | 360 | 2.33 | 51 | 83 | 104 | 20 | 48 | 100.0 |
| 3.3.2.2.2 50% of pull at maximum power at rated speed | | | | | | | | | | | | | |
| 7L | 27.4 | 11.9 | 8.26 | 2286 | 2.2 | 441 | 1.90 | 53 | 82 | 106 | 20 | 49 | 100.0 |
| 3.3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1 | | | | | | | | | | | | | |
| 1H | 40.1 | 17.8 | 8.13 | 1940 | 3.3 | 307 | 2.73 | 54 | 83 | 103 | 21 | 44 | 100.2 |
| 3.3.2.2.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2 | | | | | | | | | | | | | |
| 1H | 27.4 | 11.9 | 8.29 | 1960 | 2.4 | 362 | 2.31 | 54 | 82 | 102 | 22 | 41 | 100.2 |

**SUPPLEMENTARY TESTS**

## 3.2 Hydraulic power and lifting force

### 3.2.2 Power lift test

I. 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 | 197 mm | 197 mm |
| Vertical movement | 638 mm | 862 mm |
| Maximum corrected force exerted through full range | 31.8 kN | 21.2 kN |
| Corresponding pressure of hydraulic fluid | 17.0 MPa | 17.0 MPa |
| Moment about rear-wheel axis | 32.3 kNm | 34.5 kNm |
| Maximum tilt angle of mast from vertical | -- | 16 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 | -400 | -314 | -250 | -150 | -50 | 0 | 100 | 200 | 300 | 324 | 462 |
| 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 | -- | 31.8 | 32.1 | 33.2 | 34.3 | 34.5 | 34.8 | 34.6 | 34.6 | 34.7 | -- |
| Corresponding pressure: 17.0 MPa | | | | | | | | | | | |
| at the frame kN | 25.0 | 25.3 | 25.5 | 25.7 | 25.7 | 25.5 | 24.9 | 24.1 | 23.2 | 23.0 | 21.2 |
| Corresponding pressure: 17.0 MPa | | | | | | | | | | | |

II. 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 | 485 mm | 485 mm |
| Vertical movement | 520 mm | 649 mm |
| Maximum corrected force exerted through full range | 38.9 kN | 25.7 kN |
| Corresponding pressure of hydraulic fluid | 17.0 MPa | 17.0 MPa |
| Moment about rear-wheel axis | 39.6 kNm | 41.8 kNm |
| Maximum tilt angle of mast from vertical | -- | 13 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 | -91 | -81 | 0 | 100 | 200 | 250 | 300 | 400 | 439 | 500 | 558 |
| 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 | -- | 41.9 | 41.7 | 41.9 | 41.8 | 41.3 | 40.8 | 39.6 | 38.9 | -- | -- |
| Corresponding pressure: | 17.0 MPa | | | | | | | | | | |
| at the frame kN | 37.0 | 36.9 | 36.5 | 36.1 | 34.2 | 33.3 | 32.5 | 30.5 | 29.7 | 27.6 | 25.7 |
| Corresponding pressure: | 17.0 MPa | | | | | | | | | | |

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

Date and Location of tests: 22 July 1998
Silsoe Research Institute
Wrest Park
Silsoe
Bedford MK45 4HS

Type of track: Concrete

| Height of drawbar above ground | Tyre inflation pressure (kPa) Front | Rear |
|---|---|---|
| 505 mm | 90 | 90 |

| 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 | 18.4 | 32.5 | 2.04 | 2300 | 14.9 | 532 | 1.57 | 54 | 82 | 105 | 23 | 39 | 100.7 |
| 2L | 22.5 | 32.4 | 2.50 | 2293 | 15.0 | 475 | 1.77 | 54 | 82 | 105 | 24 | 38 | 100.7 |
| 3L | 28.0 | 31.9 | 3.16 | 2280 | 10.9 | 429 | 1.95 | 54 | 82 | 103 | 22 | 41 | 100.7 |
| 4L | 34.3 | 32.0 | 3.86 | 2269 | 10.8 | 389 | 2.16 | 52 | 83 | 106 | 23 | 37 | 100.7 |
| 5L | 42.8 | 31.4 | 4.90 | 2243 | 10.6 | 349 | 2.40 | 54 | 82 | 105 | 22 | 42 | 100.7 |
| 6L | 51.2 | 31.3 | 5.90 | 2177 | 9.7 | 318 | 2.63 | 55 | 83 | 106 | 23 | 41 | 100.8 |
| 7L | 51.7 | 26.5 | 7.03 | 2052 | 6.2 | 310 | 2.70 | 52 | 83 | 109 | 18 | 60 | 100.8 |
| 1H | 54.8 | 23.8 | 8.30 | 2052 | 5.6 | 297 | 2.82 | 53 | 83 | 104 | 23 | 38 | 100.8 |
| 8L | 52.2 | 21.5 | 8.74 | 2049 | 4.9 | 307 | 2.73 | 54 | 83 | 107 | 21 | 45 | 100.8 |
| 2H | 54.0 | 18.8 | 10.36 | 2058 | 4.3 | 298 | 2.81 | 55 | 83 | 107 | 22 | 43 | 100.8 |
| 3H | 52.3 | 14.9 | 12.64 | 2045 | 3.4 | 304 | 2.76 | 54 | 84 | 109 | 22 | 41 | 100.8 |
| 4H | 51.0 | 11.8 | 15.59 | 2043 | 2.9 | 313 | 2.68 | 56 | 83 | 109 | 22 | 43 | 100.8 |
| 3.3.2 FUEL CONSUMPTION<br>3.3.2.1 In selected gear, at maximum power at rated speed | | | | | | | | | | | | | |
| 1H | 53.2 | 21.7 | 8.81 | 2165 | 5.0 | 307 | 2.73 | 54 | 83 | 108 | 19 | 52 | 100.9 |
| 3.3.2.1.1 75% of pull at maximum power at rated speed | | | | | | | | | | | | | |
| 1H | 42.2 | 16.3 | 9.31 | 2258 | 3.7 | 339 | 2.47 | 54 | 83 | 108 | 19 | 54 | 100.9 |
| 3.3.2.1.2 50% of pull at maximum power at rated speed | | | | | | | | | | | | | |
| 1H | 28.8 | 10.9 | 9.51 | 2283 | 2.7 | 406 | 2.06 | 52 | 82 | 107 | 21 | 42 | 100.8 |
| 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 | 41.8 | 16.3 | 9.25 | 1832 | 4.0 | 293 | 2.86 | 55 | 82 | 103 | 24 | 41 | 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 | | | | | | | | | | | | | |
| 2H | 28.7 | 10.9 | 9.46 | 1853 | 2.9 | 346 | 2.43 | 54 | 82 | 103 | 24 | 40 | 100.6 |
| 3.3.2.2 In selected gear nearest to 7.5 km/h, at maximum power at rated speed | | | | | | | | | | | | | |
| 7L | 50.3 | 24.2 | 7.49 | 2172 | 5.5 | 324 | 2.58 | 52 | 83 | 109 | 19 | 58 | 100.8 |
| 3.3.2.2.1 75% of pull at maximum power at rated speed | | | | | | | | | | | | | |
| 7L | 39.7 | 18.1 | 7.90 | 2258 | 4.1 | 362 | 2.32 | 53 | 83 | 110 | 19 | 57 | 100.8 |
| 3.3.2.2.2 50% of pull at maximum power at rated speed | | | | | | | | | | | | | |
| 7L | 27.3 | 12.1 | 8.09 | 2283 | 2.9 | 437 | 1.92 | 53 | 83 | 109 | 19 | 57 | 100.8 |
| 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 | 39.7 | 18.1 | 7.92 | 1932 | 4.2 | 304 | 2.76 | 52 | 83 | 102 | 23 | 40 | 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 | | | | | | | | | | | | | |
| 1H | 27.2 | 12.1 | 8.10 | 1953 | 3.1 | 365 | 2.30 | 54 | 82 | 102 | 23 | 40 | 100.6 |

**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

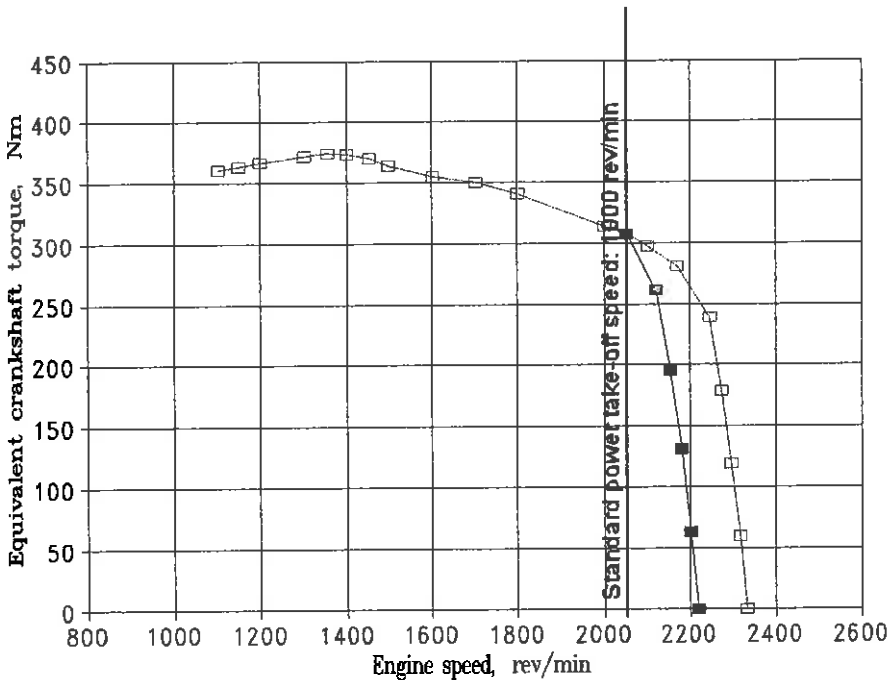
A G Douglass
Interim Manager - Test Engineering Group

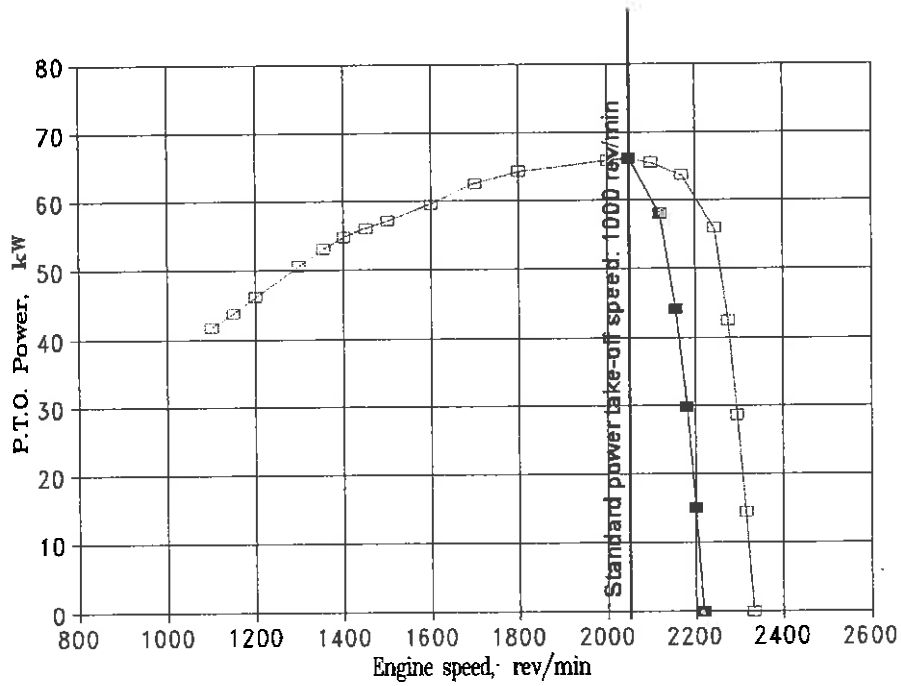
**Date:** 2/3/99

## 7. ANNEX 1 MAIN POWER TAKE-OFF CURVES

**P.T.O. POWER TEST - NEW HOLLAND TS100 FOUR-WHEEL DRIVE (1000 rev/min)**

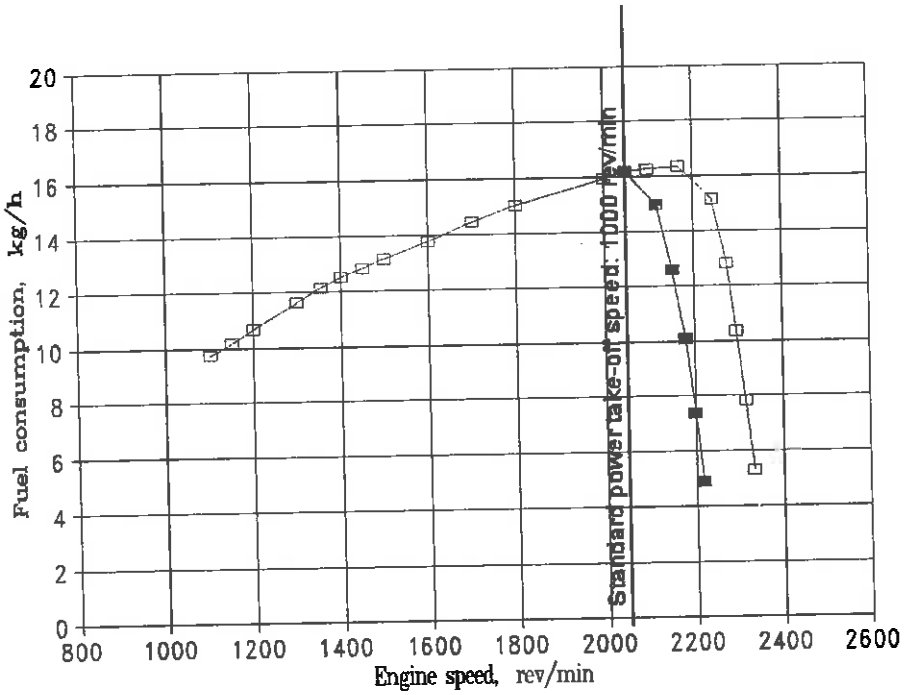
Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■

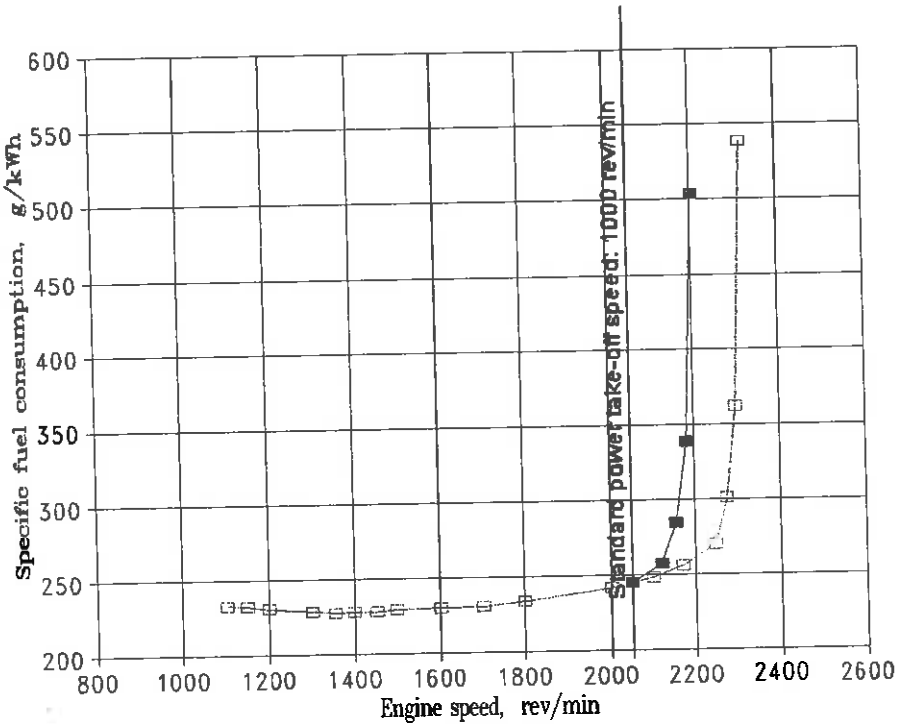


## P.T.O. POWER TEST - NEW HOLLAND TS100 FOUR-WHEEL DRIVE (1000 rev/min)

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



## P.T.O. POWER TEST - NEW HOLLAND TS100 FOUR-WHEEL DRIVE (1000 rev/min)

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

