Report on test in accordance with
**OECD STANDARD CODE I** for the Official
Testing of Agricultural Tractor Performance

OECD Approval No.: **1/1803/1 FULL CODE**
Date of approval: 15th May, 2000
Test No.: OECD-H11-T005



# Agricultural Tractor
# KUBOTA M6800SDT (4WD)

*Manufactured by:*
**KUBOTA Corporation, TSUKUBA Plant**
**Aza, Sakanoshinden, Yawaramura, Tsukubagun, IBARAKI, JAPAN**

**INSTITUTE OF AGRICULTURAL MACHINERY**
**BIO-ORIENTED TECHNOLOGY RESEARCH ADVANCEMENT INSTITUTION**
**( I A M – B R A I N )**
**OMIYA, JAPAN**

This bulletin is based on engineering tests in accordance with the OECD STANDARD CODE for the Official Testing of Agricultural Tractor Performance "Yellow Code", January 1998, Code 1. It does not contain the evaluation of the tractor performance on practical work. This report has been approved by the OECD Coordinating Center (CEMAGREF, France) as being in accordance with the OECD STANDARD CODE.

The tractor KUBOTA M6800DT has been tested with No.: OECD-H10-T001 in accordance with code 1, approved the 20th January 1999 with the No.1/1803 Full Code.

The differences between tested tractor and the tractor KUBOTA M6800SDT are in:
- Tractor model name
- Fuel filter
- Exhaust pipe
- Transmission
- PTO
- Swinging drawbar
- Seat
- Lighting

If there are differences in the specifications between tested tractor and tractor for which extension has been required, the specifications of tested tractor are written between brackets [ ].

IAM-BRAIN considers that results of reference test are valid for the tractor for which extension is asked.

| | |
|---|---|
| Test No.: | OECD-H11-T005 |
| Duration of Test: | from February to March, 2000 |
| Date of Approval: | 15th May, 2000 |
| | |
| Make: | KUBOTA |
| Model: | M6800SDT |
| Type: | 4WD |
| Serial number: | M680-60150 |
| 1st serial number: | M680-60001 |

In this report all performance characteristics are given corresponding to the international system of units.
The reference to the former used technical systems of units is given by the following relations:

| | | | |
|---|---|---|---|
| Forces | 1 kgf | = | 9.80665 N |
| Powers | 1 PS | = | 0.7355 kW |
| Pressures | 1 kgf/cm$^2$ | = | 98.0665 kPa |

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# GENERALITIES

| | |
|---|---|
| Tractor manufacturer's name and address: | KUBOTA Corporation, Tsukuba Plant<br>Aza, Sakanoshinden, Yawaramura, Tsukubagun, IBARAKI, JAPAN |
| Location of tractor assembly: | Ditto |
| Submitted for test by: | The manufacturer |
| Selected for test by: | The manufacturer with agreement by BRAIN |
| Place of running-in: | KUBOTA Corporation, Tsukuba Plant |
| Duration of running-in: | Engine and tractor 25 hours |
| Location of test: | BRAIN |

# 1. SPECIFICATIONS OF TRACTOR

## 1.1 IDENTIFICATION

| | |
|---|---|
| Make: | KUBOTA |
| Model: | M6800SDT [M6800DT] |
| Type: | Four-wheel drive, unit construction Agricultural tractor |
| Number of driving wheels: | 4 |
| Serial Number: | M680-60150 |
| 1st Serial Number: | M680-60001 [M680-50001] |

## 1.2 ENGINE

| | |
|---|---|
| Make: | Own make |
| Model: | V3300-E |
| Type: | 4-cycle diesel engine with indirect injection, water cooled, naturally aspirated |
| Serial Number: | YA3636 [WN5147] |

### 1.2.1 Cylinders

| | |
|---|---|
| Number: | 4 |
| Disposition: | Vertical, in-line |
| Bore/Stroke: | 98.0 / 110 mm |
| Capacity: | 3.318 $dm^3$ |
| Compression ratio: | 22.6:1 |
| Arrangement of valves: | Over head |
| Cylinder liners: | None |

1.2.2 Supercharging: Not fitted

### 1.2.3 Fuel System

| | |
|---|---|
| Fuel feed system: | Forced feed type (diaphragm pump) |
| Filters | |
| Make: | TENNEX Corporation [TAIYO GIKEN KOGYO Co., LTD] |
| Model: | F1008-101 [16541-43352] |
| Type: | Replaceable metal element, cartridge type |
| Number: | 1 |

| | |
|---|---|
| Capacity of fuel tank: | 65 $dm^3$ |
| Injection pump | |
| Make: | DENSO Corporation |
| Model: | ND-PFR4M75A1ND706 |
| Type: | Bosch type M |
| Serial Number: | - |
| Manufacturer's production setting of injection pump | |
| Flow rate: | 16.1 $dm^3/h$ ± 5 % at rated engine speed and full load |
| Timing: | 15 ~ 17 degrees before T.D.C. |
| Injectors | |
| Make: | DENSO Corporation |
| Model: | DNOPD 31 |
| Type: | Throttle type |
| Injection pressure: | 13.7 ~ 14.7 MPa |

1.2.4 Governor

| | |
|---|---|
| Make: | Own make |
| Model: | - |
| Type: | Mechanical (all speed governor) |
| Governed range of engine speed: | from 750 to 2800 $min^{-1}$ |
| Rated engine speed: | 2600 $min^{-1}$ |

1.2.5 Air cleaner

| | |
|---|---|
| Pre-cleaner: | Not fitted |
| Main cleaner: | |
| Make: | NIPPON DONALDSON Co., LTD. |
| Model: | FP G078188(fitted on tested tractor)<br>FP G078159(as option) |
| Type: | Dry dual paper element |
| Location of air intake: | Under the bonnet, in front of the radiator |
| Maintenance indicator: | Mechanical type |

1.2.6 Lubrication system

| | |
|---|---|
| Type of feed pump: | Forced lubrication (trochoidal pump) |
| Type of filter: | Replaceable paper element |
| Number: | 1 |

1.2.7 Cooling system

| | |
|---|---|
| Type of coolant: | 50 % solution of permanent antifreeze and clean water |
| Type of pump: | Centrifugal |
| Specification of fan | |
| Type: | Axial type |
| Number of fan blades: | 7 |
| Fan diameter: | 430 mm |
| Coolant capacity: | 8.5 $dm^3$ |
| Type of temperature control: | Wax type thermostat and bypass circuit |
| System pressure: | 88.3 kPa |

1.2.8 Starting System

| | |
|---|---|
| Make: | MITSUBISHI ELECTRIC Corporation |
| Model: | M008T70971 |
| Type: | Solenoid engaged type |
| Starter motor power rating: | 12 V, 2.5 kW |
| Cold starting aid: | Electrical glow plug |
| Safety device: | Operable only with range gear shift lever in neutral and PTO clutch disengaged |

1.2.9 Electrical system

| | |
|---|---|
| Voltage: | 12 V |
| Generator | |
| Make: | MITSUBISHI ELECTRIC Corporation |
| Model: | A7TA1677 |
| Type: | Three phase generator |
| Power: | 45 Amps |
| Battery | |
| Number: | 1 |
| Rating: | 92 Ah at 5 hours |

1.2.10 Exhaust system

| | |
|---|---|
| Make: | Calsonic Corporation |
| Model: | 1B804-20000 |
| Type: | Multi chamber absorption-expansion |
| Location: | Inside of the bonnet |
| Exhaust pipe: | Vertically left side of the engine [On the bonnet]<br>Mouth showing downward / sideward |

## 1.3 TRANSMISSION

1.3.1 Clutch (travel alone)

| | |
|---|---|
| Make: | EXEDY Corporation |
| Model: | D714 W00F |
| Type: | Dry single plate-single stage |
| Number of plates: | 1 |
| Diameter of plates: | 275 mm |
| Method of disengagement: | By foot pedal |

1.3.2 Gear box

| | |
|---|---|
| Make: | Own make |
| Model: | - |
| Type: | Mechanical |
| Description: | Synchromesh 4 speed (1st～4th) gears with main shift lever, constant mesh 2 speed gears, low (L) / high (H) with range shift lever, synchromesh 2 speed gears, forward (F) / reverse (R) with shuttle lever.<br>Totally 8 forward / 8 reverse speeds. |

| | Forward | Reverse |
|---|---|---|
| Number of gears | 4 | 4 |
| Number of ranges | 2 | 2 |
| Total of arrangements | 8 | 8 |

Available options: Additional one constant mesh creeper gear
Totally 12 forward / 12 reverse speeds

(fitted on tested tractor)

1.3.3 Rear axle and final drives

Make: Own make
Type: Bevel gear type differential, planetary gear type final drives
Model: -
Differential lock
Type: Mechanical, dog clutch
Model: -
Method of engagement: By foot pedal
Method of disengagement: Self disengagement

1.3.4 Front axle and final drives

Make: Own make
Type: Bevel gear type differential, planetary gear type final drives
Differential lock
Type: Mechanical, dog clutch
Model: -
Method of engagement: By foot pedal
Method of disengagement: Self disengagement

1.3.5 Total ratios and travelling speeds

| Gear Number | Range | Number of engine revolutions for one revolution of the driving wheels | Nominal travelling speed(*) at rated engine speed of 2600 $min^{-1}$ (km/h) |
|---|---|---|---|
| | | Forward | Forward |
| 1 | 1-L | 251.55 | 2.70 |
| 2 | 2-L | 187.43 | 3.62 |
| 3 | 3-L | 122.14 | 5.55 |
| 4 | 4-L | 81.99 | 8.27 |
| 5 | 1-H | 69.79 | 9.72 |
| 6 | 2-H | 51.99 | 13.04 |
| 7 | 3-H | 33.89 | 20.02 |
| 8 | 4-H | 22.75 | 29.82 |
| | | Reverse | Reverse |
| 1 | 1-L | 240.82 | 2.82 |
| 2 | 2-L | 179.44 | 3.78 |
| 3 | 3-L | 116.93 | 5.80 |
| 4 | 4-L | 78.50 | 8.64 |
| 5 | 1-H | 66.81 | 10.15 |
| 6 | 2-H | 49.78 | 13.62 |
| 7 | 3-H | 32.44 | 20.90 |
| 8 | 4-H | 21.78 | 31.13 |

(*) Calculated with a tyre dynamic radius index (ISO 4251-1:1992): 692 mm (tyre: 16.9-30)

Number of revolutions of front wheels for one revolution of rear wheels: 1.4617

1.3.6 Total ratios and travelling speeds (with creep range; tested tractor)

| Gear Number | Range | Number of engine revolutions for one Revolution of the driving wheels | Nominal travelling speed(*) at rated engine speed of 2600 $min^{-1}$ (km/h) |
|---|---|---|---|
| | | Forward | Forward |
| (1) | 1-C | 1783.79 | 0.38 |
| (2) | 2-C | 1329.09 | 0.51 |
| (3) | 3-C | 866.13 | 0.78 |
| (4) | 4-C | 581.48 | 1.17 |
| 1 | 1-L | 251.55 | 2.70 |
| 2 | 2-L | 187.43 | 3.62 |
| 3 | 3-L | 122.14 | 5.55 |
| 4 | 4-L | 81.99 | 8.27 |
| 5 | 1-H | 69.79 | 9.72 |
| 6 | 2-H | 51.99 | 13.04 |
| 7 | 3-H | 33.89 | 20.02 |
| 8 | 4-H | 22.75 | 29.82 |
| | | Reverse | Reverse |
| (1) | 1-C | 1707.79 | 0.40 |
| (2) | 2-C | 1272.42 | 0.53 |
| (3) | 3-C | 829.19 | 0.82 |
| (4) | 4-C | 556.68 | 1.22 |
| 1 | 1-L | 240.82 | 2.82 |
| 2 | 2-L | 179.44 | 3.78 |
| 3 | 3-L | 116.93 | 5.80 |
| 4 | 4-L | 78.50 | 8.64 |
| 5 | 1-H | 66.81 | 10.15 |
| 6 | 2-H | 49.78 | 13.62 |
| 7 | 3-H | 32.44 | 20.90 |
| 8 | 4-H | 21.78 | 31.13 |
| (*) Calculated with a tyre dynamic radius index (ISO 4251-1:1992): 692 mm (tyre: 16.9-30) | | | |

Number of revolutions of front wheels for one revolution of rear wheels: 1.4617

## 1.4 POWER TAKE-OFF

### 1.4.1 Main power take-off

| | |
|---|---|
| Type: | Independent PTO |
| Method of engagement: | Hydraulic clutch by hand lever |
| Number of shafts: | 1 |
| Method of changing power take-off shafts ends speeds: | Fixed speed |

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

Power take-off at 540 $min^{-1}$

| | |
|---|---|
| Location: | At rear of tractor |
| Diameter of power take-off shaft end: | 35 mm |
| Number of splines: | 6, in conformity with ISO 500:1991/SAE J1170 |
| Height above ground: | 679 mm |
| Distance from the median plane of the tractor: | 0 mm |
| Distance behind rear axle center: | 335 mm |
| Direction of rotation (viewed from shaft end): | Clockwise |

| PTO type | PTO speed ($min^{-1}$) | Engine speed ($min^{-1}$) | Engine/PTO transmission ratio | Power restriction (kW) |
|---|---|---|---|---|
| 540 | 540<br>612 | 2295<br>2600 | 4.250 | 46.3 |

#### 1.4.1.2 Power take-off proportional to ground speed

Not fitted

### 1.4.2 Optional power take-off (fitted on tested tractor)

| | |
|---|---|
| Type: | Independent PTO |
| Method of engagement: | Hydraulic clutch by hand lever |
| Number of shafts: | 1 |
| Method of changing power take-off shafts ends speeds: | By shift lever change constant mesh 2 speeds |

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

Power take-off at 540/540E $min^{-1}$ 2 speed (fitted on tested tractor)

| | |
|---|---|
| Location: | At rear of tractor |
| Diameter of power take-off shaft end: | 35 mm |
| Number of splines: | 6, in conformity with ISO 500:1991/ SAE J1170 |
| Height above ground: | 679 mm |
| Distance from the median plane of the tractor: | 0 mm |
| Distance behind rear axle center: | 376.5 mm |
| Direction of rotation (viewed from shaft end): | Clockwise |

| PTO type | PTO speed ($min^{-1}$) | Engine speed ($min^{-1}$) | Engine/PTO transmission ratio | Power restriction (kW) |
|---|---|---|---|---|
| 540 | 540<br>609 | 2307<br>2600 | 4.273 | None |
| 540E | 750<br>768 | 2538<br>2600 | 3.385 | None |

#### 1.4.2.2 Power take-off proportional to ground speed

Not fitted

## 1.5 HYDRAULIC POWER LIFT

| | |
|---|---|
| Make: | Own make |
| Type: | Hydraulic, 3-point hitch position, draft and mix control |
| Model: | - |
| Type of hydraulic system: | Open center system |
| Type and number of cylinders: | Single acting, 1 |
| Type of linkage lock for transport: | Hydraulically closed by throttle valve |
| Relief valve pressure setting (tolerance): | 18.6 ~ 19.1 MPa |
| Opening pressure of cylinder safety valve: | 21.1 ~ 22.6 MPa |
| Lift pump type: | Gear type |
| Transmission between pump and engine: | Gear drive (gear: injection pump cam shaft drive) |
| Type and number of filters: | Replaceable paper element canister, 2 |
| Site of oil reservoir: | In rear transmission case |
| Type, number and location of tapping points | |
| Type: | ISO-5675, SAE-J1036, ASAE R366, hydraulic female coupler |
| Number: | 1 to 2 sets |
| Location: | At rear of tractor |
| Maximum volume of oil available to external cylinders: | Hydraulic oil should be added for external hydraulic circuit |

## 1.6 THREE POINT LINKAGE

Category: 1 and 2 in conformity with ISO 730-1:1994+Cor.1: 1995

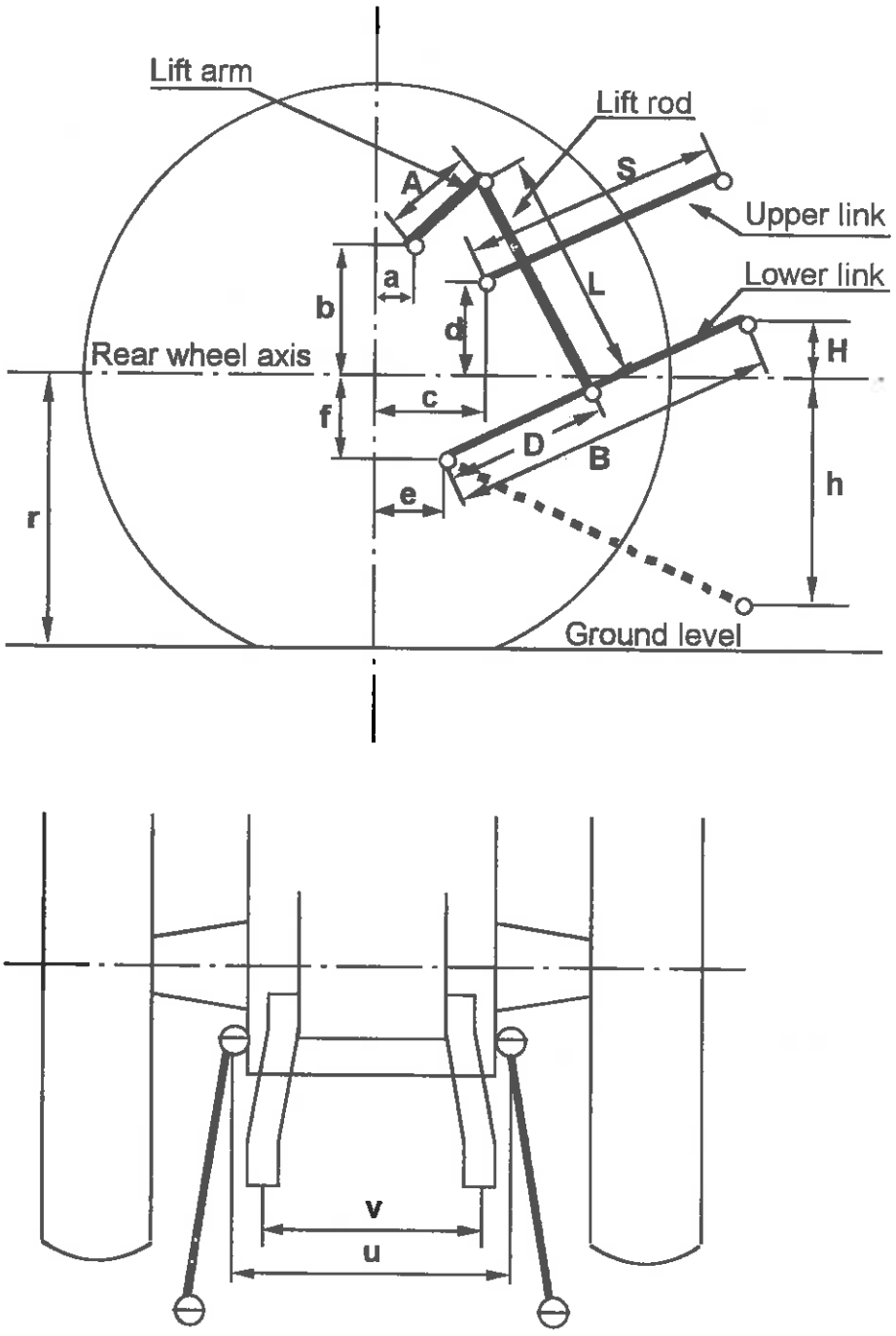



Figure
Lift test - Linkage geometry

| | | Dimension of range (mm) | Settings Used in test (mm) |
|---|---|---|---|
| Length of lift arms | (A) | 240 | 240 |
| Length of lower links | (B) | 790 | 790 |
| Distance of lift arm pivot point from rear-wheel axis: | | | |
| - horizontally | (a) | 95 | 95 |
| - vertically | (b) | 278 | 278 |
| Horizontal distance between the two lower link points | (u) | 357 | 357 |
| Horizontal distance between the two lift arm end points | (v) | 463 | 463 |
| Length of upper link | (S) | from 506 to 712 | 600 |
| Distance of upper link pivot point from rear wheel axis: | | | |
| - horizontally | (c) | 301 301 301 305 | 305 |
| - vertically | (d) | 270 240 210 180 | 180 |
| Distance of lower link pivot point from rear wheel axis: | | | |
| - horizontally | (e) | 104 | 104 |
| - vertically | (f) | 197 | 197 |
| Distance of lower link pivot points to lift rod pivot points on lower links: | (D) | 395 | 395 |
| Length of lift rods (actual length): | (L) | from 475 to 590 | 550 |
| Height of lower hitch points relative to the rear wheel axis: | | | |
| - in low position | (h) | from 361 to 598 | 509 |
| - in high position | (H) | from 34 to 216 | 102 |
| Height above ground of lower hitch points when locked in transport position(*) | | from 726 to 908 | 794 |
| (*) Assuming r = rear tyre dynamic radius index (ISO 4251-1:1992): 692 mm (tyre: 16.9-30) | | | |

Table
Dimensions of linkage geometry when connected to the standard frame

## 1.7 SWINGING DRAWBAR

| | |
|---|---|
| Type: | Bar type (fitted on tested tractor)<br>clevis type (as option) |
| Height above ground | 501 mm at top surface of bar<br>(tyre size 16.9-30, r = 692 mm) |
| Type of adjustment: | |
| Distance of hitch point from rear-wheel axis, horizontally: | 737.5 mm, 787.5mm [692.5 mm] |
| Distance of hitch point from power take-off shaft end vertically: | 178 mm at top surface of bar |
| horizontally: | 540 $min^{-1}$ one speed power take-off:<br>402.5mm, 452.5mm [357.5 mm]<br>(540/540E $min^{-1}$ 2 speeds power take-off:<br>361mm, 411mm [316 mm]) |

| | |
|---|---|
| Lateral adjustment (center of clevis) | |
| right hand: | 122 mm (13 °) [111mm(13°)], 131mm(13 °) |
| left hand: | 122 mm (13 °) [111mm(13°)], 131mm(13 °) |
| Distance of pivot point from rear-wheel axis, | |
| horizontally: | 197.5 mm |
| Diameter of drawbar pin hole: | 33.5 mm |
| Maximum vertical permissible load: | 9.8 kN |

## 1.8 TRAILER HITCH

Not fitted

## 1.9 HOLED DRAWBAR

Not fitted

## 1.10 STEERING

| | |
|---|---|
| Make: | SUMITOMO EATON HYDRAULICS Co., Ltd. |
| Model: | WVQ150Z23AUD |
| Type: | Hydrostatic power steering |
| Method of operation: | Steering wheel operated and full hydraulic power |
| Pump: | Independent hydraulic pump |
| Ram: | Balanced type cylinder |
| Working pressure: | 17.5 MPa |

## 1.11 BRAKES

1.11.1 Service brake

| | |
|---|---|
| Make: | Own make |
| Model: | - |
| Type: | Multiple wet disks operated by two foot pedals which can be locked together |
| Method of operation: | By independent or combined pedal |
| Trailer breaking take-off: | Not fitted |

1.11.2 Parking brake

| | |
|---|---|
| Type: | Mechanical acting type |
| Method of operation: | Brake lever type (combined foot pedal) |
| | By hand lever with ratchet |

## 1.12 WHEELS

| | |
|---|---|
| Number: | 4 |
| Front: | 2, steering and driving |
| Rear: | 2, driving |
| Wheelbase: | 2050 mm |
| Track width adjustment: | |

| | Minimum (mm) | Maximum (mm) | Adjustment method |
|---|---|---|---|
| Front | 1420 | 1520 | Changing offset of rims |
| Rear | 1420 | 1720 | Changing by turning wheels and offset of rims |

## 1.13 PROTECTIVE STRUCTURE

Safety frame

| | |
|---|---|
| Make: | KUBOTA |
| Model: | SFM-F68 |
| Type: | 2-post foldable safety frame |
| Protective device: | Rear roll bar not tiltable |
| OECD approval | |
| Approval number: | 4/0 564/2 |
| Date of approval: | 26th April, 2000 |

Cab

| | |
|---|---|
| Make: | KUBOTA |
| Model: | IC68 |
| Type: | Integral cab |
| Protective device: | Cab, not tilted |
| OECD approval | |
| Approval number: | 4/0 634 |
| Date of approval: | 26th April, 2000 |

## 1.14 SEAT

1.14.1 Driver's seat

| | |
|---|---|
| Make: | Seats Incorporated |
| Model: | 176710-1 [163246-6,176710] |
| Type: | |
| Seat and steering wheel reversible: | No |
| Type of suspension: | Coil spring |
| Type of damping: | Oil damping |
| Range of adjustment | |
| Longitudinal: | 152.4 mm |
| Vertical: | 0 mm [33.5mm] |

Safety belt: Not fitted

1.14.2 Optional driver's seat Not fitted

1.14.3 Passenger seat Not fitted

## 1.15 LIGHTING

| | Height above ground of center (mm) | Size (mm) | Distance from outside edge of Lights to median plane of tractor (mm) |
|---|---|---|---|
| Headlights | 955 [975] | 147 x 90 [147 x 90.3] | 217 [215] |
| Sidelights | — | — | — |
| Rear lights | 1600 [1463] | 101.5 x 89.5 [190 x 75.3] | 731 [690] |
| Reflectors | 1463 | 195 x 75 [41.7 x 41.7] | 690 [609] |
| Flashers | 1600 [1607] | 101.5 x 89.5 [$\phi$ 119.7 x 70] | 731 |

# 2. TEST CONDITIONS

## 2.1 OVERALL DIMENSIONS

| | Length | Width | | Height | |
|---|---|---|---|---|---|
| | | Minimum | Maximum | Protective structure | Mirror |
| | (mm) | (mm) | (mm) | (mm) | (mm) |
| Unballasted | 3525 | 1890 | 2190 | 2445 | 1835 |
| Ballasted | 3852 | 2035 | 2335 | 2435 | 1830 |

## 2.2 GROUND CLEARANCE

Ground clearance: 427 mm
Clearance-limiting part: Tank stay

## 2.3 TRACTOR MASS

| | Ballasted | | Unballasted | |
|---|---|---|---|---|
| | Without driver (kg) | With driver (kg) | Without driver (kg) | With driver (kg) |
| Front | 1470 [1454] | 1485 [1465] | 882 [866] | 897 [876] |
| Rear | 2385 [2362] | 2445 [2426] | 1594 [1571] | 1654 [1636] |
| Total | 3855 [3816] | 3930 [3891] | 2476 [2437] | 2551 [2512] |

## 2.4 BALLAST

| | | |
|---|---|---|
| Front: | 1 bracket | 90 kg |
| | 8 weights, total | 360 kg |
| Rear: | 4 weights, total | 272 kg |
| | Water in the tyres | 657 kg |

## 2.5 TYRES AND TRACK WIDTH SPECIFICATIONS

| | | Front | Rear |
|---|---|---|---|
| Tyres: | | | |
| - dimension | | 9.5-24 | 16.9-30 |
| - ply rating | | 6 | 6 |
| - type | | cross-ply | cross-ply |
| - maximum load (tyre manufacture's) | (kN) | 8.4 | 18.8 |
| - inflation pressure | (kPa) | 176 | 118 |
| - dynamic radius index | (mm) | 497 | 692 |
| Chosen track width | (mm) | 1420 | 1420 |

## 2.6 FUEL

Type: Diesel fuel No. 2 in conformity with JIS

Density at 15 °C: 0.839 g/cm$^3$

## 2.7 OILS AND LUBRICATION

### 2.7.1 Capacity and change interval

| | Capacity (dm$^3$) | Oil change (h) | Filter change (h) |
|---|---|---|---|
| Engine | 10.7 | 200 | 400 |
| Gear box<br>Rear axle<br>Final drive (rear)<br>Hydraulic system<br>Power steering | 40.0 | 600 | 300 |
| Front differential case | 5.0 | 600 | — |
| Front axle gear case<br>Final drive (front) | 3.5 | 600 | — |
| Service brake | — | — | — |

### 2.7.2 Specifications

| | Recommended | | Used during test |
|---|---|---|---|
| Engine oil | API grade CD | | |
| Type: | Below 0 °C: | SAE 10W, 10W-30, 10W-40 | SAE 10W-30 |
| Viscosity: | From 0 °C to 25 °C: | SAE 20, 10W-30, 10W-40 | |
| Classification: | Above 25 °C: | SAE 30,10W-30, 10W-40 | |
| Transmission oils<br>Hydraulic fluid<br>Steering oil<br>Type:<br>Viscosity:<br>Classification: | API grade GL-3<br>SAE 75W/80<br>(ISO VG46) | | API grade GL-3<br>SAE 75W/80<br>(ISO VG46) |

### 2.7.3 Grease

Number of lubrication points: 9

# 3. COMPULSORY TESTS RESULTS

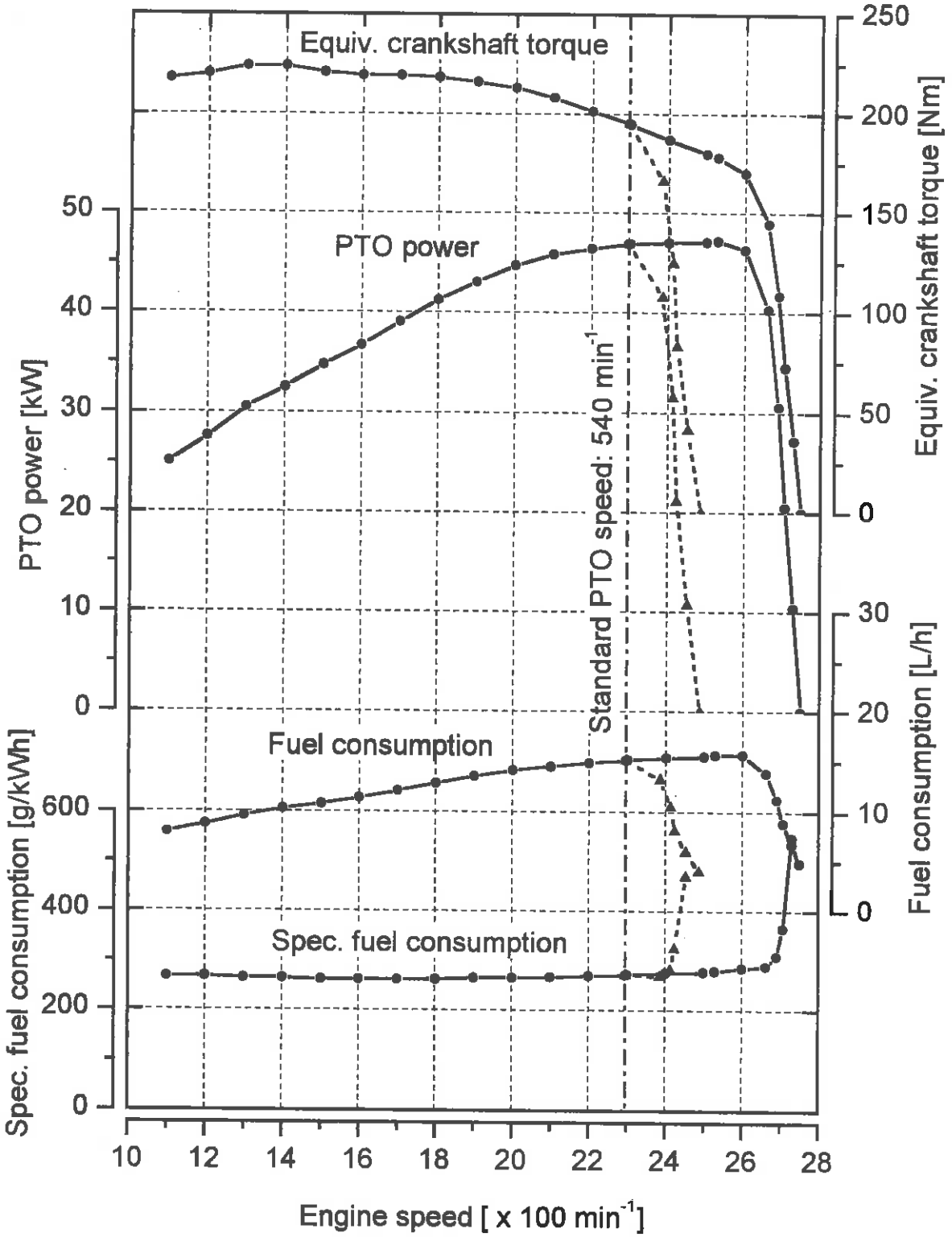
## 3.1 MAIN POWER TAKE-OFF

Date and location of tests: 20 th, October, 1998, BRAIN, Omiya
Type of dynamometer: Eddy current, SCHENCK W400

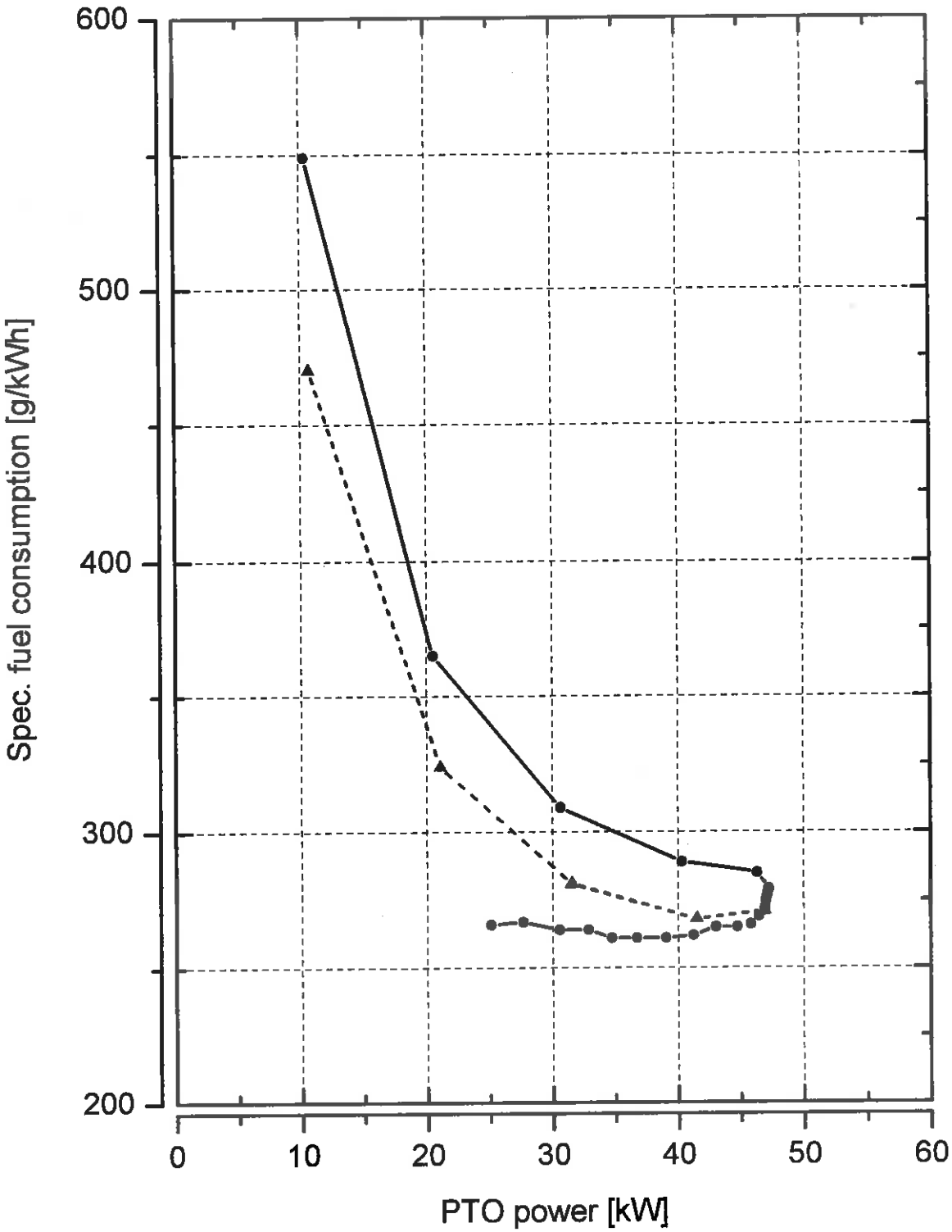
| Power | Speed | | Fuel consumption | | | Specific |
|---|---|---|---|---|---|---|
| | Engine | PTO | Hourly | | Specific | Energy |
| (kW) | ($min^{-1}$) | | (kg/h) | (L/h) | (g/kWh) | (kWh/L) |
| 3.1.1 | MAXIMUM POWER - TWO-HOUR TEST | | | | | |
| 47.2 | 2529 | 595 | 13.16 | 15.69 | 279 | 3.008 |
| 3.1.2 | POWER AT RATED ENGINE SPEED | | | | | |
| 46.3 | 2600 | 612 | 13.20 | 15.73 | 285 | 2.943 |
| 3.1.3 | STANDARD POWER TAKE-OFF SPEED (540 $min^{-1}$) | | | | | |
| 46.9 | 2295 | 540 | 12.72 | 15.16 | 271 | 3.094 |
| 3.1.4 | PART LOADS AT RATED ENGINE SPEED | | | | | |
| 3.1.4.1 | The torque corresponding to maximum power at rated engine speed | | | | | |
| 46.3 | 2600 | 612 | 13.20 | 15.73 | 285 | 2.943 |
| 3.1.4.2 | 85% of torque obtained in 3.1.4.1 | | | | | |
| 40.3 | 2661 | 626 | 11.66 | 13.90 | 289 | 2.899 |
| 3.1.4.3 | 75% of torque defined in 3.1.4.2 | | | | | |
| 30.6 | 2689 | 633 | 9.46 | 11.28 | 309 | 2.713 |
| 3.1.4.4 | 50% of torque defined in 3.1.4.2 | | | | | |
| 20.5 | 2707 | 637 | 7.49 | 8.93 | 365 | 2.296 |
| 3.1.4.5 | 25% of torque defined in 3.1.4.2 | | | | | |
| 10.4 | 2729 | 642 | 5.71 | 6.81 | 549 | 1.527 |
| 3.1.4.6 | Unloaded | | | | | |
| 0 | 2750 | 647 | 4.08 | 4.86 | — | — |
| 3.1.5 | PART LOADS AT STANDARD POWER TAKE-OFF SPEED (540 $min^{-1}$) | | | | | |
| 3.1.5.1 | The torque corresponding to maximum power at standard power take-off speed | | | | | |
| 46.9 | 2295 | 540 | 12.72 | 15.16 | 271 | 3.094 |
| 3.1.5.2 | 85% of torque obtained in 3.1.5.1 | | | | | |
| 41.5 | 2385 | 561 | 11.13 | 13.27 | 268 | 3.127 |
| 3.1.5.3 | 75% of torque defined in 3.1.5.2 | | | | | |
| 31.5 | 2412 | 567 | 8.84 | 10.54 | 281 | 2.989 |
| 3.1.5.4 | 50% of torque defined in 3.1.5.2 | | | | | |
| 21.1 | 2423 | 570 | 6.84 | 8.15 | 324 | 2.589 |
| 3.1.5.5 | 25% of torque defined in 3.1.5.2 | | | | | |
| 10.7 | 2452 | 577 | 5.03 | 6.00 | 470 | 1.783 |
| 3.1.5.6 | Unloaded | | | | | |
| 0 | 2486 | 585 | 3.37 | 4.02 | — | — |

Other results

| | | |
|---|---|---|
| No load maximum engine speed: | 2750 | $min^{-1}$ |
| Torque (equivalent crankshaft) at maximum power | | |
| At rated engine speed: | 170.1 | Nm |
| At 2-hour test: | 178.1 | Nm |
| Maximum torque (equivalent crankshaft): | 223.8 | Nm |
| (engine speed: 1400 $min^{-1}$) | | |
| Mean atmospheric conditions | | |
| Temperature: | 19 | °C |
| Pressure: | 101.5 | kPa |
| Relative humidity: | 87 | % |
| Maximum temperatures | | |
| Coolant: | 90 | °C |
| Engine oil: | 106 | °C |
| Fuel: | 22 | °C |
| Engine air intake: | 24 | °C |




**POWER TAKE-OFF PERFORMANCE**




**POWER TAKE-OFF PERFORMANCE**

## 3.2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 21st, October, 1998

### 3.2.1 HYDRAULIC POWER TEST

Tapping point used for test: Auxiliary service connection
(can be measured by transferring circuit)

Sustained pressure with relief valve open: 19.0 MPa
Pump delivery rate at minimum pressure: 44.4 L/min
Temperature of hydraulic fluid: 66 °C

| | Flow rate (L/min) | Pressure (MPa) | Power (kW) |
|---|---|---|---|
| Flow rate corresponding to a hydraulic pressure equivalent to 90 percent of the actual relief valve pressure setting and corresponding hydraulic power | 29.7 | 17.2 | 8.51 |
| Flow rate and hydraulic pressure corresponding to maximum hydraulic power | 39.8 | 16.1 | 10.68 |

### 3.2.2 POWER LIFT TEST

| | At hitch point | On the frame |
|---|---|---|
| Height of lower hitch points above ground in down position (mm) | 186 | 153 |
| Vertical movement without lifting forces (mm) | 611 | 711 |
| with lifting forces (mm) | 578 | 680 |
| Maximum corrected force exerted through Full range (*) (kN) | 14.02 | 12.27 |
| Corresponding pressure of hydraulic fluid (MPa) | 17.2 | 17.2 |
| Moment about rear wheel axle (kNm) | 12.53 | 18.45 |
| Maximum tilt angle mast from vertical (Degrees) | — | 9 |

| Lifting heights(**)(mm) | | -345 | -312 | -300 | -200 | -100 | 0 | +100 | +200 | +266 | +300 | +335 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lifting force (*) | at the hitch point (kN) | — | 14.02 | 14.33 | 16.46 | 17.46 | 17.78 | 17.87 | 17.82 | 17.94 | — | — |
| | at the frame (kN) | 13.78 | — | 14.81 | 15.19 | 15.14 | 14.78 | 13.95 | 13.28 | — | 12.57 | 12.27 |

(*) The values of force measured are corrected to correspond to a hydraulic pressure equivalent to 90 % of the actual relief valve pressure setting.

(**) Lifting heights relative to the horizontal plane including the lower link pivot points.

## 3.3 DRAWBAR POWER TEST

Date of test: 22nd, 25th, 26th and 27th October, 1998

Type of track: Concrete

Tyre size: front: 9.5-24 Tyre inflation pressure: unballasted: front 176 kPa rear 118 kPa Height of drawbar above ground: unballasted: 500 mm

rear: 16.9-30 ballasted: front 176 kPa rear 118 kPa ballasted: 490 mm

| Gear number and range | Power (kW) | Drawbar pull (kN) | Speed (km/h) | Engine speed ($min^{-1}$) | Slip of wheels (%) | Specific fuel consumption (g/kWh) | Specific energy (kWh/L) | Temperature | | | Atmospheric conditions | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Fuel (°C) | Coolant (°C) | Engine oil (°C) | Temperature (°C) | Relative humidity (%) | Pressure (kPa) |
| 3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor) | | | | | | | | | | | | | |
| 1 - L | 15.7 | 23.48 | 2.41 | 2682 | 15.0 | 469 | 1.788 | 26 | 82 | 98 | 24 | 50 | 102.1 |
| 2 - L | 20.7 | 23.04 | 3.24 | 2676 | 15.0 | 412 | 2.035 | 30 | 83 | 99 | 24 | 46 | 102.1 |
| 3 - L | 31.9 | 23.27 | 4.93 | 2644 | 15.0 | 361 | 2.327 | 29 | 83 | 100 | 24 | 46 | 102.1 |
| 4 - L | 41.2 | 19.80 | 7.49 | 2538 | 9.5 | 335 | 2.502 | 21 | 83 | 92 | 21 | 55 | 102.1 |
| 1 - H | 41.4 | 16.54 | 9.00 | 2527 | 7.2 | 329 | 2.553 | 21 | 83 | 98 | 22 | 54 | 102.1 |
| 2 - H | 41.1 | 11.88 | 12.46 | 2527 | 4.1 | 332 | 2.527 | 23 | 83 | 101 | 23 | 52 | 102.1 |
| 3 - H | 38.6 | 7.13 | 19.48 | 2520 | 2.2 | 350 | 2.394 | 25 | 83 | 102 | 23 | 51 | 102.1 |
| 3.3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor) | | | | | | | | | | | | | |
| 1 - L | 21.7 | 32.41 | 2.41 | 2676 | 15.0 | 400 | 2.096 | 29 | 82 | 98 | 22 | 56 | 101.7 |
| 2 - L | 28.6 | 32.18 | 3.20 | 2653 | 15.1 | 370 | 2.270 | 32 | 82 | 101 | 23 | 52 | 101.7 |
| 3 - L | 40.2 | 29.59 | 4.90 | 2533 | 11.4 | 335 | 2.507 | 34 | 83 | 101 | 24 | 46 | 101.8 |
| 4 - L | 42.5 | 19.78 | 7.74 | 2534 | 5.9 | 324 | 2.593 | 18 | 84 | 90 | 18 | 62 | 101.7 |
| 1 - H | 41.0 | 16.60 | 8.89 | 2437 | 4.3 | 323 | 2.601 | 24 | 84 | 98 | 20 | 58 | 101.7 |
| 2 - H | 40.7 | 11.63 | 12.60 | 2534 | 2.9 | 332 | 2.525 | 28 | 81 | 100 | 21 | 57 | 101.7 |
| 3.3.3 FIVE HOUR TEST<br>3.3.3.1 FIVE HOUR TEST at 75 % of the pull corresponding to maximum power | | | | | | | | | | | | | |
| 4 - L | 34.1 | 14.84 | 8.28 | 2636 | 3.4 | 329 | 2.550 | 42 | 82 | 104 | 27 | 33 | 101.8 |
| 3.3.3.2 FIVE HOUR TEST at pull corresponding to 15 % wheel slip | | | | | | | | | | | | | |
| 2 - L | 28.6 | 32.18 | 3.20 | 2653 | 15.1 | 370 | 2.270 | 42 | 82 | 102 | 21 | 34 | 102.5 |

(*) Oil consumption during ten hours duration of test 3.3.3.1 and 3.3.3.2: 28.9 g/h

## 3.4 TURNING AREA AND TURNING CIRCLE

### 3.4.1 Front wheel drive disengaged

| | With brakes | | Without brakes | |
|---|---|---|---|---|
| | Left-hand (m) | Right-hand (m) | Left-hand (m) | Right-hand (m) |
| Radius of turning area | 3.42 | 3.39 | 3.85 | 3.80 |
| Radius of turning circle | 3.21 | 3.18 | 3.60 | 3.55 |

### 3.4.2 Front wheel drive engaged

| | With brakes | | Without brakes | |
|---|---|---|---|---|
| | Left-hand (m) | Right-hand (m) | Left-hand (m) | Right-hand (m) |
| Radius of turning area | 3.47 | 3.41 | 4.25 | 4.22 |
| Radius of turning circle | 3.21 | 3.15 | 3.97 | 3.94 |

## 3.5 LOCATION OF CENTER OF GRAVITY

Height above ground: 753 mm
Distance forward from the vertical plane containing the axis of the rear-wheels: 722 mm
Distance from the median plane of the tractor (to the left): 1 mm

## 3.6 BRAKING (front wheel drive disengaged)

Date of tests: 22 nd, October, 1998

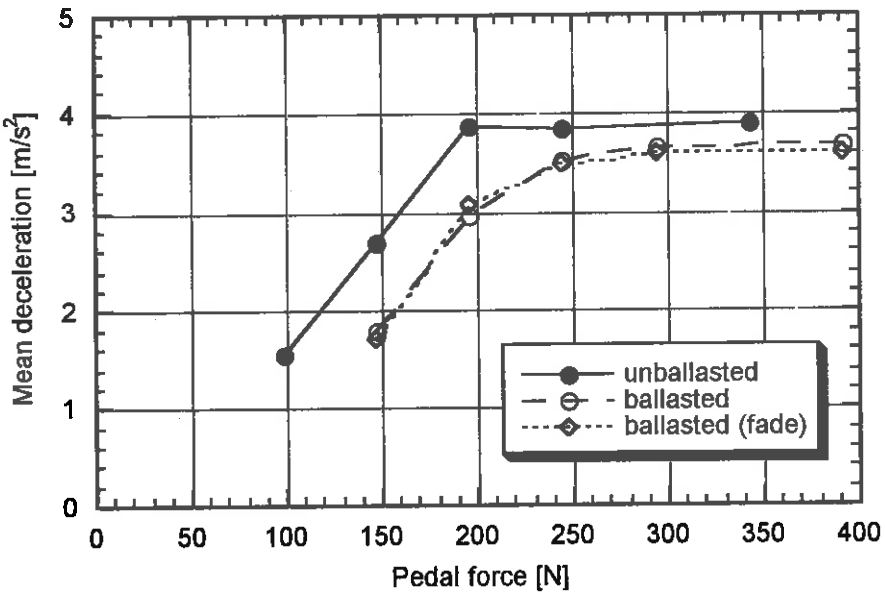



Figure
**COLD SERVICE BRAKING DEVICE TEST AND FADE TEST**

3.6.1 Cold service braking device test

| | Speed before application of brakes (km/h) | Braking device control force (N) | Mean deceleration ($m/s^2$) |
|---|---|---|---|
| Ballasted tractor | 31.5 | 147 | 1.80 |
| | | 196 | 2.96 |
| | | 245 | 3.51 |
| | | 294 | 3.63 |
| | | 392 | 3.66 |
| Unballasted tractor | 32.0 | 98 | 1.55 |
| | | 147 | 2.68 |
| | | 196 | 3.86 |
| | | 245 | 3.84 |
| | | 343 | 3.89 |

Maximum deviation of tractor from its original course: None
Abnormal vibration: None

3.6.2 Fade test

| Speed before application of brakes (km/h) | Braking device control force (N) | Mean deceleration ($m/s^2$) |
|---|---|---|
| 31.5 | 147 | 1.71 |
| | 196 | 3.06 |
| | 245 | 3.48 |
| | 294 | 3.58 |
| | 392 | 3.59 |

Maximum deviation of tractor from its original course: None
Abnormal vibration: None
Brake heating method: By means of towing the tractor for 1 km at 25.2 km/h with the towing force of 3.75 kN

3.6.3 Parking braking device test

| | | Ballasted tractor on 18 % slope | |
|---|---|---|---|
| | | Uphill | Downhill |
| Braking device control force | (N) | 441 | 490 |

## 3.7 EXTERNAL NOISE LEVEL

Date of tests: 1 st, March, 2000
Sound level meter
Make: RION Corporation
Model: NL-14
Type: Precision integrating sound level meter
Type of track: Concrete
Gear number: 4-H
Travelling speed before acceleration: 23.6 km/h
Sound level: 85.5 dB(A)

# REPAIRS AND ADJUSTMENTS DURING TESTS

None

# REMARKS

None