Report on test in accordance with
O.E.C.D. STANDARD CODE I for the Official
Testing of Agricultural Tractor Performance

O.E.C.D. Approval No. **1469/2 FULL CODE**



Agricultural Tractor

KUBOTA M9580DT (4WD)

Manufactured by:
KUBOTA Corporation, SAKAI Plant
64 Ishizukitamachi, Sakai-city, OSAKA, Japan

BIO-ORIENTED TECHNOLOGY RESEARCH ADVANCEMENT INSTITUTION
(B R A I N)
OMIYA, Japan

This bulletin is based on engineering tests in accordance with the O.E.C.D. STANDARD CODE for the Official Testing of Agricultural Tractor Performance(C(87)53(Final),Code I). It does not contain the evaluation of the tractor performance on practical work. This report has been approved by the O.E.C.D. Coordinating Center (C.E.M.A.G.R.E.F., France) as being in accordance with the O.E.C.D. STANDARD CODE.

Test No.: 92002/O.E.C.D.
Duration of Test: November till December, 1992
Date of Approval: 9th July, 1993

Make :	KUBOTA	KUBOTA
Model:	M 9580 DT	M1-100S-DT
Type :	4WD	4WD
Serial number :	M958-50099	M92-60001
1st Serial number :	M958-50001	M92-60001

The "KUBOTA M 9580 DT" and the "KUBOTA M1-100S-DT" tractors being mechanically similar except respects as shown below :

- the model denomination,
- the battery rating,
- the clutch model,
- the method of p.t.o. selection and the distance behind rear wheel axle(540 and 1000 rev/min),
- the pump delivery rate and sustained pressure with relief valve open,
- the distance of hitch point from p.t.o. shaft end : Horizontally,
- the driver's seat : Model,
- the lighting : Flashers,

The tests have not been repeated, except for the "HYDRAULIC POWER TEST" and the approval number is valid for the both models of tractor.

In this report all performance characteristics are given corresponding to the International System of Units.
The reference to the former used Technical System of Units is given by the following relations:

Forces	1 kgf	=	9.80665 N
Powers	1 PS	=	0.7355 kW
	1 HP	=	0.7453 kW
Pressures	1 kgf/cm^2	=	98.0665 kPa

All rights including the right of translation, reprint and photomechanical copying – also of excerpts – reserved by
BIO-ORIENTED TECHNOLOGY RESEARCH ADVANCEMENT INSTITUTION

Printed in JAPAN

TABLE OF CONTENTS

	Page
GENERALITIES	4
SPECIFICATIONS OF TRACTOR	4 to 14
TEST CONDITIONS	15 to 16
COMPULSORY TESTS RESULTS	
Main power take-off performance	17 to 20
Hydraulic power and lifting force	21 and 23
Drawbar performance	24 to 25
Turning area and turning circle	26
Location of center of gravity	26
Braking	27
External noise level	28
REPAIRS AND ADJUSTMENTS DURING TESTS	28
REMARKS	28

GENERALITIES

Tractor manufacturer's name and address:	KUBOTA Corporation 2-47, Shikitsuhigashi 1-chome, Naniwa-ku OSAKA, 556 JAPAN
Location of tractor assembly:	64 Ishizukitamachi, Sakai City
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer with agreement by BRAIN
Place of running-in:	KUBOTA Corporation, Sakai Plant
Duration of running-in:	Engine and tractor 56 h
Location of test:	BRAIN

SPECIFICATIONS OF TRACTOR

TRACTOR

Make:	KUBOTA
Model:	M9580DT
Type:	Agricultural Tractor
Number of driving wheels:	Four
Serial Number:	M958-50099
1st Serial Number:	M958-50001

ENGINE

Identification

Make:	Own make
Model:	V4702-T
Type:	4-cycle diesel engine with direct injection, water cooled,supercharged
Serial Number:	V4702-92048

Cylinders

Number:	Four
Disposition:	Vertical, in-line
Bore/stroke:	109 / 125mm
Capacity:	4665 cm^3
Compression ratio:	17.0 : 1
Arrangement of valves:	Overhead
Cylinder liners	Replaceable, dry

Supercharging

Make:	MITSUBISHI HEAVY INDUSTRIES Co.,LTD.
Model:	TD05H-12G
Type:	Radial flow, exhaust driven
Max.Pressure:	567 hPa

Fuel system

Fuel feed system:	Forced feed type(Diaphragm pump)

Filters	
Make:	TSUCHIYA Manufacturing Co.,LTD.
Model:	1663143011
Type:	Replaceable paper element cartridge type
Number:	One
Capacity of fuel tank:	120 liters
Injection pump	
Make:	MIKUNI Precision Co.,LTD.
Model:	DPK J3942F980N
Type:	Distributor type
Serial Number:	0465CK
Manufacturer's production setting of injection pump	
Flow rate	21.9±0.9 dm^3/h at rated engine speed and full load
Timing:	18 degrees before T.D.C.
Injectors	
Make:	MIKUNI Precision Co.,LTD.
Model:	BDLL140S6655
Type:	Hole type
Injection pressure:	22.6 MPa

Governor

Make:	MIKUNI Precision Co.,LTD.
Type:	All speed mechanical governor
Governed range of engine speed:	From 600 to 2590 rev/min
Rated engine speed:	2400 rev/min

Air cleaner

Pre-cleaner:	Optional, not fitted in tested tractor
Make:	TSUCHIYA Manufacturing Co.,LTD.
Model:	98317-011
Type:	Cyclone type
Location of air intake:	Above the bonnet
Main cleaner	
Make:	TSUCHIYA Manufacturing Co.,LTD.
Model:	91502-011
Type:	Dry paper double element
Location of air intake:	Under the bonnet, in front of the radiator
Maintenance indicator:	Electrical vacuum sensor at easy checker

Lubrication system

Type of feed pump:	Forced feed (Gear pump)
Type of filter:	Full flow replaceable cartridge paper element type
Number:	One

Cooling system

Type of coolant:	50/50 solution of permanent antifreeze and clear water
Type of pump:	Centrifugal
Specification of fan:	Axial
Number of fan blades:	Seven

Fan diameter:	460 mm
Coolant capacity:	14.5 dm^3
Type of temperature control:	Wax type thermostat
System pressure:	88.3 kPa

Starting system

Make:	NIPPON DENSO
Model:	ND128000-6861
Type:	Solenoid engaged type
Starter motor power rating:	2.5 kW
Cold starting aid:	Electrical glow plug
Safety device:	Operable only with main clutch pedal operated and P.T.O. clutch disengaged

Electrical system

Voltage:	12 Volts
Generator	
Make:	NIPPON DENSO
Model:	ND100211-7260
Type:	Three phase generator
Power:	0.72 kW
Battery	
Number:	One
Rating:	925 Cold Cranking Amps. (75 Ah at 5 hours)

Exhaust system

Make:	Own make
Type:	Multi chamber absorption-expansion
Location:	Vertical on the left side of tractor

TRANSMISSION TO WHEELS

Clutch(travel)

Make:	DAIKIN SEISAKUSHO
Model:	C297B00
Type:	Dry single
Number of plates:	One
Diameter of plates:	350 mm
Method of disengagement:	Operated by foot pedal

Gear box

Make:	Own make
Type:	Mechanical
Arrangement:	Synchromesh 6 speed gears with main lever, constant mesh 2 speeds (H / L)gears with sub lever, hydraulic clutch type dual speed gears(Hi/Lo) with switch. Hydraulic clutch type forward/reverse shuttle with shuttle switch lever.
Number of gears:	Totally 24 forward and 24 reverse speeds

Available options:	Not fitted on the tested tractor. Additional constant mesh creeper gear "C", adding 12 forward and 12 reverse gears. Totally 36 forward / 36 reverse speeds.

Rear axle and final drives

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

Front axle and final drives

Make:	Own make
Type:	Bevel gear type differential and planetary gear type final drives
Differential lock	
Type:	Mechanical, dog clutch
Method of engagement:	Operated by foot pedal
Method of disengagement:	Self disengagement
Available option:	"Bi-speed turn" system; mechanism of increase speed of front tyre in turning, 1.64 times faster than the standard 4WD front tyre speed.

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 2400 rev/min (km/h)	
		Forward	Reverse	Forward	Reverse
(1)	C-1-Lo	3506.387	3456.295	0.201	0.204
(2)	C-1-Hi	2620.935	2583.493	0.269	0.273
(3)	C-2-Lo	2664.854	2626.785	0.265	0.269
(4)	C-2-Hi	1991.911	1963.455	0.354	0.359
(5)	C-3-Lo	1880.441	1853.578	0.375	0.381
(6)	C-3-Hi	1405.582	1385.502	0.502	0.509
(7)	C-4-Lo	1581.633	1559.038	0.446	0.453
(8)	C-4-Hi	1182.230	1165.341	0.597	0.606
(9)	C-5-Lo	1202.040	1184.868	0.587	0.596
(10)	C-5-Hi	898.495	885.659	0.785	0.797
(11)	C-6-Lo	848.214	836.097	0.832	0.844
(12)	C-6-Hi	634.018	624.961	1.11	1.13
1	L-1-Lo	628.443	619.465	1.12	1.14
2	L-1-Hi	469.745	463.034	1.50	1.52
3	L-2-Lo	477.616	470.793	1.48	1.50
4	L-2-Hi	357.006	351.906	1.98	2.01
5	L-3-Lo	337.028	332.213	2.09	2.12
6	L-3-Hi	251.920	248.321	2.80	2.84
7	L-4-Lo	283.473	279.423	2.49	2.53
8	L-4-Hi	211.889	208.862	3.33	3.36
9	L-5-Lo	215.439	212.362	3.28	3.32
10	L-5-Hi	161.035	158.735	4.38	4.45
11	L-6-Lo	152.024	149.852	4.64	4.71
12	L-6-Hi	113.634	112.010	6.21	6.30
13	H-1-Lo	122.623	120.871	5.76	5.84
14	H-1-Hi	91.658	90.348	7.70	7.81
15	H-2-Lo	93.193	91.862	7.57	7.68
16	H-2-Hi	69.660	68.665	10.13	10.28
17	H-3-Lo	65.761	64.822	10.73	10.89
18	H-3-Hi	49.155	48.453	14.36	14.57
19	H-4-Lo	55.312	54.522	12.76	12.94
20	H-4-Hi	41.344	40.753	17.07	17.32
21	H-5-Lo	42.037	41.436	16.79	17.03
22	H-5-Hi	31.422	30.973	22.46	22.79
23	H-6-Lo	29.663	29.239	23.79	24.14
24	H-6-Hi	22.172	21.856	31.83	32.29

(*)The gears between brackets are not available on the tested tractor.
(**)Calculated with a tyre dynamic radius index of 780 mm (ISO 4251/1-1984)

Number of revolutions of front wheels
for one revolution of rear wheels: 1.39027
2.27499 (in turning with "Bi-speed turn" switch on)

POWER TAKE-OFF

Main power take-off

Type:	Independent P.T.O.
Method of engagement:	By means of hydraulically actuated wet multi-plate clutch with hand lever
Number of shafts:	Two, replaceable
Method of changing power take-off shafts ends and speeds:	Speed change by replacing power take-off shaft

Power take-off proportional to engine speed

540 rev/min

Location:	At rear of tractor
Diameter of power take-off shaft end:	35 mm
Number of splines:	Six, In conformity with ISO 500/1979, SAE J1170
Height above ground:	738 mm
Distance from the median plane of the tractor:	0 mm
Distance behind rear wheel axle:	421 mm
Power take-off speed at rated engine speed (2400 rev/min):	637 rev/min
Engine speed at standard power take-off speed:	2035 rev/min
Ratio of rotation speeds (engine speed / p.t.o. speed):	3.769
Power restriction and maximum torque:	68.6 kW, 1294 N•m
Direction of rotation (viewed facing driving end):	Clockwise

1000 rev/min

Location:	At rear of tractor
Diameter of power take-off shaft end:	35 mm
Number of splines:	21, In conformity with ISO 500/1979, SAE J1170
Height above ground:	738 mm
Distance from the median plane of the tractor:	0 mm
Distance behind rear wheel axle:	421 mm
Power take-off speed at rated engine speed (2400 rev/min):	1005 rev/min
Engine speed at standard power take-off speed:	2389 rev/min
Ratio of rotation speeds (engine speed / p.t.o. speed):	2.389
Power restriction and maximum torque:	68.6 kW, 820 N•m
Direction of rotation (viewed facing driving end):	Clockwise

Power take-off proportional to ground speed — Not fitted

POWER LIFT

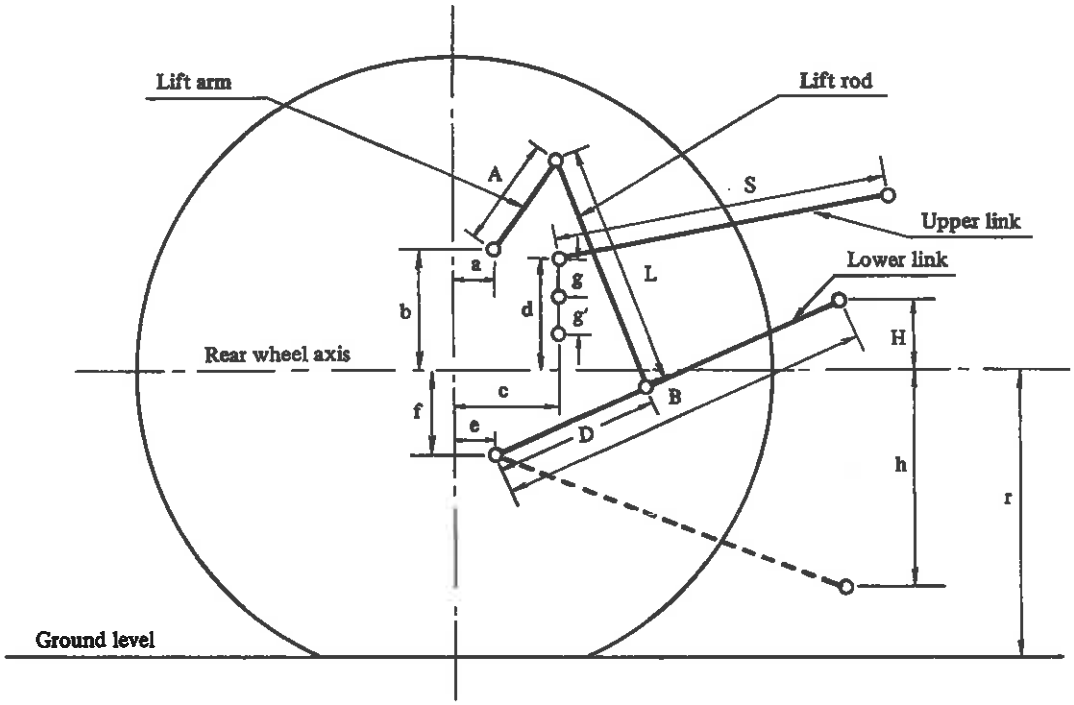
Make:	Own make
Type:	Hydraulic three point hitch (position, draft and mix control)

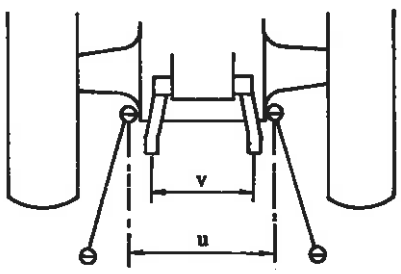
Type of hydraulic system:	Open center system
Type and number of cylinders:	Single acting, One
Type of linkage lock for transport:	Hydraulically closed by throttle valve
Lift pump type:	Gear pump
Relief valve pressure setting for lifting:	From 19.12 to 19.61 MPa
Opening pressure of cylinder safety valve:	From 23.0 to 24.5 MPa
Another pump for auxiliary service:	Gear pump, it is possible to use together with the pump for lift, in this case, twice flow rate is capable to obtain.
Relief valve pressure setting for auxiliary service:	From 17.7 to 18.1 MPa
Transmission between pump and engine:	Drive shaft
Type and number of filters:	Paper cartridge type, Two
Site of oil reservoir:	In rear transmission case
Type, number and location of tapping points:	SAE 1/2" Hydraulic female coupler, two sets, at rear of tractor
Maximum volume of oil available to external cylinders:	Hydraulic oil should be added for external hydraulic circuit
Available options:	Additional one external cylinder Additional two external cylinders(fitted on the tested tractor)

Three-point linkage

Category: II (In accordance with ISO 730/1-1977 / SAE J715)

Linkage geometry





Dimensions of linkage geometry(when connected to the standard frame)

Linkage dimensions (mm)				Settings used in compulsory test (mm)	Settings used in optional test with one cylinder (mm)	Settings used in optional test with two cylinders (mm)
Length of lift arms		(A)	250			
Length of lower links		(B)	900			
Distance of lift arm pivot point from rear wheel axis	horizontally vertically	(a) (b)	70 303			
Horizontal distance between the two lower link points		(u)	512			
Horizontal distance between the two lift arm end points		(v)	535			
Length of upper link		(S)	from 660 to 895	752	752	752
Distance of upper link pivot point from rear wheel axis	horizontally vertically	(c) (d)	[273, [290 [286, [221	290 221	290 221	290 221
Distance of lower link pivot point from rear wheel axis	horizontally vertically	(e) (f)	115 176			
Distance of lower link pivot points to lift rod pivot points on lower links		(D)	402, 457, 512	457	457	457
Length of lift rods		(L)	from 545 to 685	627	627	627
Height of lower hitch points relative to the rear wheel axis – in low position – in high position		 (h) (H)	 from 243 to 799 from –3 to 297	 564 116	 564 116	 564 116
Height above ground of lower hitch points when locked transport position (*)			from 720 to 1055			

(*) Assuming the dynamic radius index = 760 mm (ISO 4251/1–1984)

SWINGING DRAWBAR

Type:	Bar type, clevis type(as option)
Height above ground(tyre size 18.4R34)	Reversible, 450 mm and 600 mm at top surface of bar
Distance of hitch point from rear wheel axis, horizontally:	772 mm and 822 mm
Distance of hitch point from power take-off shaft end	
Vertically:	289 mm and 139 mm at top surface of bar
Horizontally:	350 mm and 400 mm
Lateral adjustment (center of clevis)	
Right hand:	145 mm
Left hand:	145 mm
Distance of pivot point from rear wheel axis, horizontally:	215 mm
Diameter drawbar pin hole:	28 mm
Maximum vertical permissible load:	14.7 kN

TRAILER HITCH Not fitted

HOLED DRAWBAR Not fitted

STEERING

Make:	SUMITOMO EATON HYDRAULICS Co.,LTD
Model:	WDE120Y14KB4B
Type:	Hydrostatic, load reaction type
Method of operation:	Hydraulic steering system
Pump:	Gear type
Ram:	Balanced type cylinder
Working pressure:	From 11.8 to 12.5 MPa

BRAKES

Service brake

Make:	Own make
Type:	Hydraulic (master cylinder) acting, oil-immersed disk type, four disks on each differential half shaft
Method of operation:	Independent or combined pedal
Trailer braking take-off:	Not fitted

Parking brake

Type:	Mechanical acting oil-immersed cam-disk type
Method of operation:	Pull type brake handle

WHEELS

Number
- Front: Two, steering and driving
- Rear: Two, driving

Wheelbase: 2440 mm

Track width adjustment

	Minimum (mm)	Maximum (mm)	Adjustment method
Front	1540	1740	Changing by turning wheels and offset of rims
Rear	1520	2020	Changing by turning wheels and offset of rims(Offset type wheel)
	1500	2100	Changing disc clamp position on rims(P.A.V.T. wheel)

PROTECTIVE STRUCTURE

Manufacturer's name: Own make
Model: IC 95
Protective device: Cab, no tiltable

DRIVER'S SEAT

Make: TACHI-S Co.,LTD
Model: M1-5
Type of suspension: Coil spring
Type of damping: Oil dumping
Range of adjustment
- Longitudinal: 120 mm
- Vertical: 38 mm

LIGHTING

	Height above ground of center (mm)	Size (mm)	Distance from outside edge of lights to median plane of tractor (mm)
Headlights	1155	120×120	258
Taillights	1570	104×79	702
Reflectors	1570	40×40	697
Flashers	2570	¢120×70	733
Auxiliary lights	2562	125×85	521

TEST CONDITIONS

Overall dimensions

	Length (mm)	Width		Height	
		min (mm)	max (mm)	at top of protective structure (mm)	exhaust silencer (mm)
Ballasted	4433	2020	2620	2633	2586
Unballasted	4105	2020	2620	2650	2600

Ground clearance: 470 mm
Clearance-limiting part: Drawbar frame

Tractor mass(with cab)

	Ballasted		Unballasted	
	Without driver (kg)	With driver (kg)	Without driver (kg)	With driver (kg)
Front	2250	2261	1469	1481
Rear	3266	3330	2717	2780
Total	5516	5591	4186	4261

Ballast

Front:	1 bracket	60 kg
	12 weights, total	529 kg
Rear:	water in the tyres	741 kg

Tyres and track width specifications

	Front	Rear
Tyres:		
-dimension	13. 6-24	18. 4R34
-ply rating	8	6 and 8
-type	cross-ply	radial-ply
-maximum load (kN)	15. 12	25. 55
-inflation pressure (kPa)	193	110
-dynamic radius index (mm)	570	780
Chosen track width (mm) :	1640	1700

Oils and lubrication

-Capacity and change interval

	Capacity dm^3	Oil change h	Filter change h
Engine	16. 3	200	400
Gear box including rear axle, final drive (front and rear), hydraulic system and power steering	56	600	200
Front axle	21. 2	600	-
Service brake	0. 3	600	-

-Specifications

	Recommended	Used During test
Engine oil: Viscosity Classification	Below -23℃ : SAE 5W or10W-30 From -23℃ to 0℃ : SAE 10W or10W-30 From 0℃ to 25℃ : SAE 20W or 10W-30 Above 25℃ : SAE 30W or 10W-30 API - CD	SAE 10W-30
Transmission oils, Hydraulic fluid and Steering oil Viscosity Classification	SAE 75W/80 API - GL 3	SAE 75W/80 API - GL 3

Grease:

Number of lubrication points: Twelve
Add one point per one external cylinder

Fuel

Type: Diesel fuel No. 2 in conformity with JIS
Density at 15℃: 0.8347 g/cm^3

COMPULSORY TESTS RESULTS

1. MAIN POWER TAKE-OFF

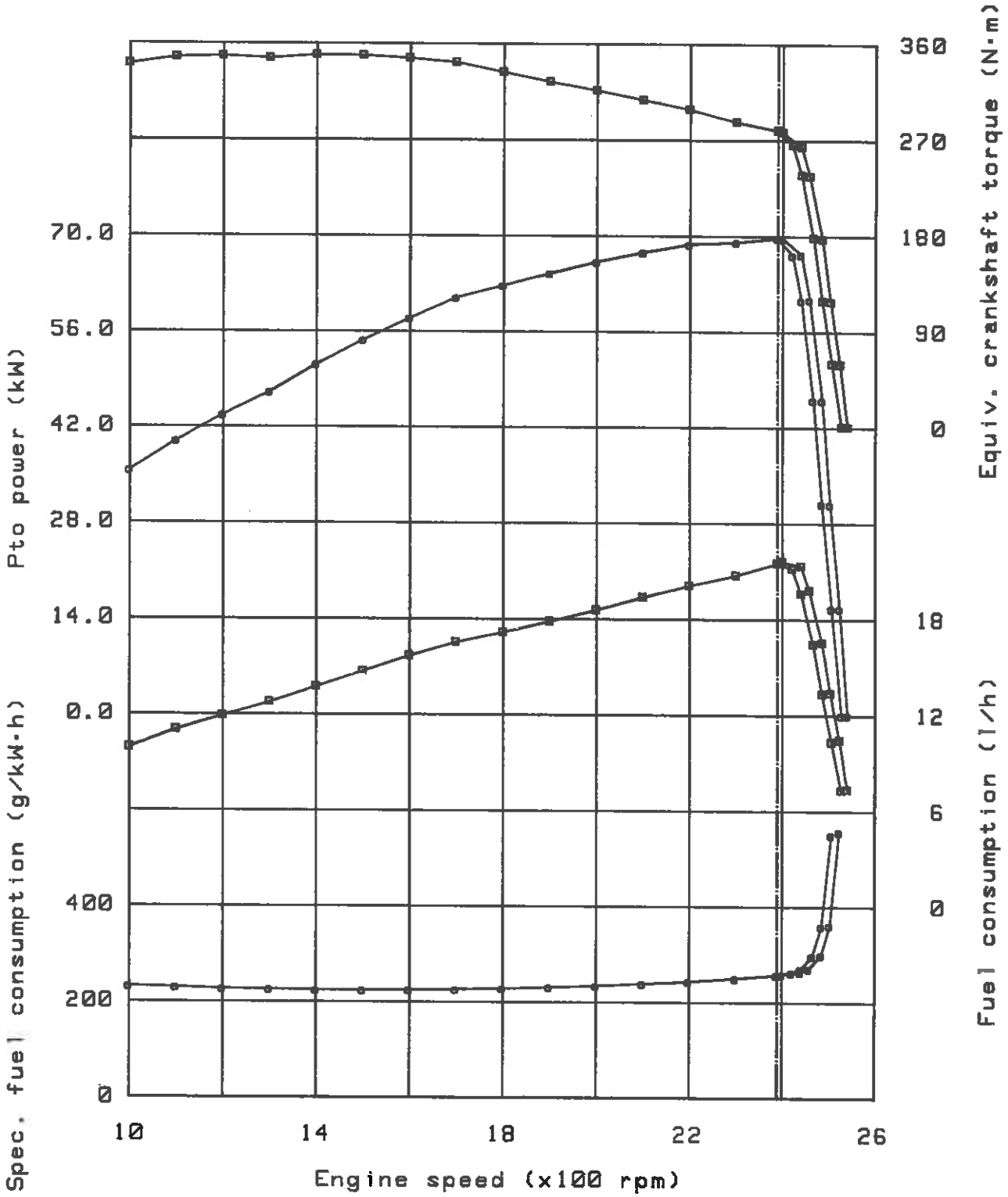
Date and location of tests: 1st December, 1992, BRAIN, Omiya
Type of dynamometer: Eddy current, SCHENCK W400

Power	Speed		Fuel consumption			Specific Energy
	engine	power take-off	hourly		specific	
(kW)	(rev/min)		(kg/h)	(l/h)	(g/kW·h)	(kW·h/l)
1.1 Maximum power – 2-hours test						
69.7	2400	1005	18.05	21.62	259	3.224
1.2 Power at rated engine speed						
69.7	2400	1005	18.05	21.62	259	3.224
1.3 Standard power take-off speed(1000 rev/min)						
69.7	2389	1000	17.96	21.51	258	3.240
1.4 Part loads (governor control being set for maximum power at rated engine speed) 1.4.1 The torque corresponding to maximum power at rated engine speed						
69.7	2400	1005	18.05	21.62	258	3.224
1.4.2 85 % of torque obtained in 1.4.1						
60.7	2459	1029	16.52	19.79	272	3.067
1.4.3 75 % of torque defined in 1.4.2						
46.0	2486	1040	13.78	16.51	300	2.786
1.4.4 50 % of torque defined in 1.4.2						
30.8	2504	1048	11.16	13.36	362	2.305
1.4.5 25 % of torque defined in 1.4.2						
15.6	2524	1056	8.70	10.42	557	1.497
1.4.6 Unloaded						
0	2541	1064	6.12	7.33	–	–
1.5 Part loads (governor control being set for maximum power at standard power take off speed) 1.5.1 The torque corresponding to maximum power at standard power take-off speed						
69.7	2389	1000	17.96	21.51	258	3.224
1.5.2 85 % of torque obtained in 1.5.1						
60.6	2441	1022	16.36	19.60	270	3.092
1.5.3 75 % of torque defined in 1.5.2						
46.0	2467	1033	13.71	16.43	298	2.800
1.5.4 50 % of torque defined in 1.5.2						
30.9	2486	1041	11.11	13.30	360	2.323
1.5.5 25 % of torque defined in 1.5.2						
15.6	2507	1049	8.59	10.29	551	1.516
1.5.6 unloaded						
0	2528	1058	6.08	7.28	–	–

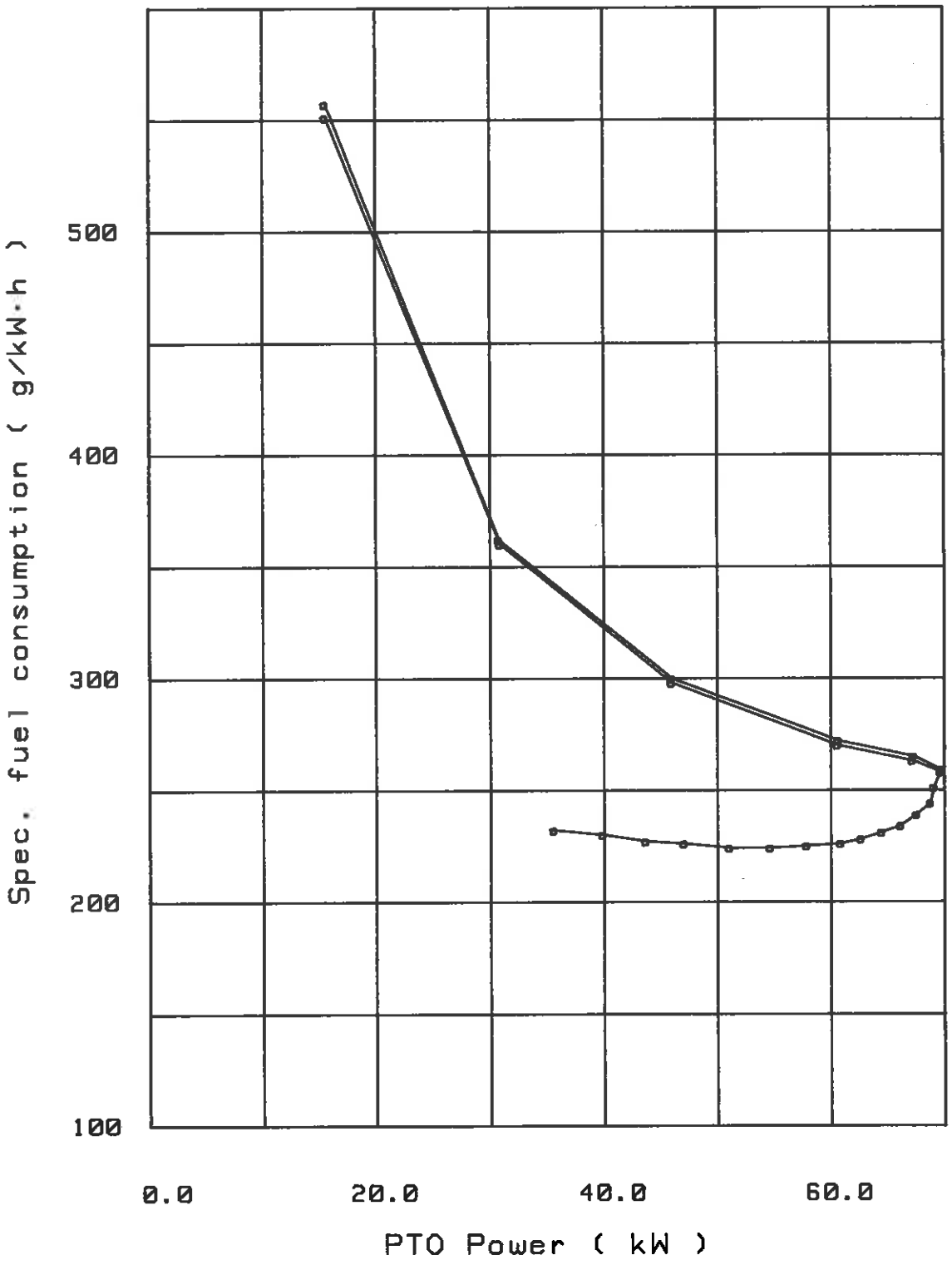
Other results

No load maximum engine speed:	2541 rev/min
Torque (equivalent crankshaft) at maximum power:	277.1 N•m
Torque (equivalent crankshaft) at rated engine speed:	277.1 N•m
Maximum torque (equivalent crankshaft):	348.7 N•m
(engine speed: 1400 rev/min)	

Mean atmospheric conditions	
Temperature:	19 ℃
Pressure:	102.4 kPa
Relative humidity:	47 %
Maximum temperatures	
Coolant:	83 ℃
Engine oil:	112 ℃
Fuel:	54 ℃
Engine air intake:	23 ℃



POWER TAKE-OFF PERFORMANCE



POWER TAKE-OFF PERFORMANCE

2. HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 30th November and 2nd December, 1992

2.1 HYDRAULIC POWER TEST

2.1.1 Auxiliary service coupling (standard flow rate)

Tapping point used for test: Auxiliary service connection
Sustained pressure with relief valve open: 18.04 MPa
Pump delivery rate at minimum pressure: 44.0 l/min

	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	40.8	16.28	11.11
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	40.3	17.06	11.47

2.1.2 Auxiliary service coupling (twice flow rate)

Tapping point used for test: Auxiliary service connection
Sustained pressure with relief valve open: 18.04 MPa
Pump delivery rate at minimum pressure: 82.9 l/min

	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	57.4	16.28	15.59
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	78.7	14.91	19.56

2.1.3 Lift pump

Tapping point used for test: Auxiliary service connection
(can be measured by transferring circuit)
Sustained pressure with relief valve open: 19.61 MPa
Pump delivery rate at minimum pressure: 40.3 l/min

	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	38.3	17.65	11.25
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	37.3	18.63	11.55

2.2 POWER LIFT TEST

2.2.1 Standard setting

			at hitch point	on the frame
Height of lower hitch points above ground in down position		(mm)	193	95
Vertical movement	without lifting forces	(mm)	680	888
	with lifting forces	(mm)	656	855
Maximum corrected force exerted through full range (**)		(kN)	19.32	15.40
Corresponding pressure of hydraulic fluid		(MPa)	17.65	17.65
Moment about rear wheel axle		(kN•m)	-	25.03
Maximum tilt angle of mast from vertical		(Degrees)	-	10

Lifting height (*) (mm)		-493	-400	-388	-300	-200	-100	0	100	200	268	300	362
Lifting force (**)	at the hitch point (kN)	-	-	19.32	20.45	21.28	21.77	22.06	22.51	22.46	22.36	-	-
	at the frame (kN)	15.69	15.98	-	16.57	16.77	16.92	16.77	16.28	15.89	-	15.49	15.40

2.2.2. Setting with one additional external cylinder

			at hitch point	on the frame
Height of lower hitch points above ground in down position		(mm)	193	95
Vertical movement	without lifting forces	(mm)	680	888
	with lifting forces	(mm)	656	850
Maximum corrected force exerted through full range (**)		(kN)	27.16	19.66
Corresponding pressure of hydraulic fluid		(MPa)	17.65	17.65
Moment about rear wheel axle		(kN•m)	-	31.95
Maximum tilt angle of mast from vertical		(Degrees)	-	10

Lifting height (*) (mm)		-493	-400	-388	-300	-200	-100	0	100	200	268	300	357
Lifting force (**)	at the hitch point (kN)	-	-	27.16	27.80	28.68	28.73	28.78	28.68	28.39	28.44	-	-
	at the frame (kN)	21.67	21.97	-	22.51	22.46	22.26	22.02	21.13	20.59	-	19.71	19.66

2.2.3. Setting with two additional external cylinders

		at hitch point	on the frame
Height of lower hitch points above ground in down position	(mm)	193	95
Vertical movement without lifting forces	(mm)	680	888
with lifting forces	(mm)	656	845
Maximum corrected force exerted through full range (**)	(kN)	34.57	23.49
Corresponding pressure of hydraulic fluid	(MPa)	17.65	17.65
Moment about rear wheel axle	(kN•m)	–	38.17
Maximum tilt angle of mast from vertical	(Degrees)	–	10

Lifting height (*) (mm)		-493	-400	-388	-300	-200	-100	0	100	200	268	300	352
Lifting force (**)	at the hitch point (kN)	–	–	34.67	35.40	35.99	35.75	35.75	35.06	34.67	34.57	–	–
	at the frame (kN)	27.95	28.29	–	28.34	28.00	27.61	27.12	26.23	24.96	–	24.08	23.49

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

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

3 DRAWBAR PERFORMANCE

Date of tests: 4th,8th and 9th December, 1992

Type of track: concrete

Tyre size: front: 13.6-24

rear 18.4R30

		Tyre inflation pressure	
	Height of drawbar above ground	Front	Rear
Unballasted	523 mm	193 kPa	110 kPa
Ballasted	520 mm	193 kPa	110 kPa

Gear no. and range	Power (kW)	Drawbar pull (kN)	Travelling speed (km/h)	Engine speed (rev/min)	Slip of wheels (%)	Specific fuel consumption (g/kW·h)	Specific energy (kW·h/l)	Temperature			Atomospheric condition		
								Fuel (℃)	Coolant (℃)	Engine oil (℃)	Temperature (℃)	Relative humidity (%)	Pressure (kPa)
3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)													
L-1-Hi	17.2	43.23	1.44	2506	8.9	589	1.418	19	76	98	13	45	102.5
L-2-Hi	22.8	43.31	1.89	2500	8.5	485	1.720	20	78	94	13	45	102.5
L-3-Lo	24.2	43.05	2.02	2498	7.7	456	1.831	18	76	92	13	45	102.5
L-4-Lo	29.2	42.76	2.46	2491	7.2	408	2.046	19	76	94	13	45	102.5
L-3-Hi	31.8	42.30	2.71	2485	6.6	402	2.075	18	80	98	13	45	102.5
L-5-Lo	37.3	42.11	3.19	2476	6.2	368	2.270	21	78	100	13	45	102.5
L-4-Hi	37.9	41.92	3.25	2474	5.8	368	2.266	22	80	100	13	45	102.5
L-5-Hi	48.7	41.50	4.22	2456	5.5	327	2.553	22	77	100	14	37	102.5
L-6-Lo	51.8	41.34	4.51	2448	5.3	319	2.618	22	78	95	14	37	102.5
H-1-Lo	61.4	39.11	5.65	2426	3.4	299	2.788	20	79	100	14	37	102.5
L-6-Hi	61.0	35.89	6.12	2414	2.6	308	2.711	20	80	98	14	37	102.5
H-2-Lo	62.4	29.80	7.54	2404	1.1	295	2.827	16	80	97	14	37	102.5
H-1-Hi	61.8	29.07	7.66	2405	1.0	302	2.763	16	80	100	14	37	102.5
H-2-Hi	61.9	21.78	10.22	2400	0.2	302	2.768	18	80	98	14	37	102.5
H-3-Lo	62.2	20.84	10.75	2395	0.1	298	2.803	20	78	100	14	37	102.5

(*) The maximum drawbar power in each gear were developed before giving 15 % wheel slip.

Gear no. and range	Power (kW)	Drawbar pull (kN)	Travelling speed (km/h)	Engine speed (rev/min)	Slip of wheels (%)	Specific fuel consumption (g/kW·h)	Specific energy (kW·h/l)	Temperature			Atomospheric condition		
								Fuel (℃)	Coolant (℃)	Engine oil (℃)	Temperature (℃)	Relative humidity (%)	Pressure (kPa)
3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)													
L–1–Lo	15.9	57.41	1.00	2512	15.0	656	1.272	26	78	98	18	71	102.3
L–2–Lo	21.5	57.33	1.35	2505	12.3	532	1.569	26	78	98	18	71	102.3
L–1–Hi	21.7	56.60	1.38	2500	11.7	497	1.681	26	78	98	18	71	102.3
L–2–Hi	28.4	55.98	1.83	2487	11.0	422	1.976	26	78	98	18	71	102.3
L–3–Lo	30.0	55.87	1.93	2483	10.6	405	2.060	26	78	98	18	71	102.3
L–4–Lo	36.0	54.96	2.36	2484	8.5	364	2.293	26	78	98	18	71	102.3
L–3–Hi	40.3	54.89	2.64	2466	8.1	363	2.299	26	78	98	18	71	102.3
L–5–Lo	46.7	54.57	3.08	2456	7.5	342	2.439	26	79	98	18	71	102.3
L–4–Hi	47.7	53.67	3.20	2452	6.0	338	2.469	26	79	99	18	71	102.3
L–5–Hi	59.0	50.62	4.20	2406	4.6	311	2.681	26	79	102	18	71	102.3
L–6–Lo	60.5	48.55	4.49	2402	3.5	301	2.770	24	78	100	18	71	102.3
H–1–Lo	61.6	39.03	5.68	2401	1.4	299	2.795	24	80	100	18	71	102.3
L–6–Hi	59.6	34.57	6.20	2405	0.6	306	2.725	23	79	102	18	71	102.3
H–2–Lo	60.6	28.58	7.64	2408	0.2	308	2.710	16	80	90	18	71	102.3
H–1–Hi	60.3	28.18	7.70	2400	0.1	305	2.738	20	80	100	18	71	102.3
3.3.1 FIVE HOURS IN TEST at 75 % of pull at maximum power in H–2–Lo gear													
H–2–Lo	46.5	21.44	7.81	2466	0.0	326	2.557	22	79	102	14	57	101.3
3.3.2 FIVE HOURS TEST at pull corresponding to 15 % wheelslip													
L–1–Lo	15.9	57.41	1.00	2520	15.0	656	1.272	28	80	103	13	71	100.6

(*)Oil consumption during ten hours duration of tests 3.3.1 and 3.3.2 : 1.6 g/h

4 TURNING AREA AND TURNING CIRCLE

Front wheel drive disengaged

	With brakes		Without brakes	
	left-hand (m)	right-hand (m)	left-hand (m)	right-hand (m)
Radius of turning area	3.91	3.93	4.49	4.51
Radius of turning circle	3.63	3.65	4.14	4.16

Front wheel drive engaged

	With brakes		Without brakes	
	left-hand (m)	right-hand (m)	left-hand (m)	right-hand (m)
Radius of turning area	4.13	4.17	5.06	5.06
Radius of turning circle	3.79	3.83	4.66	4.66

Front wheel drive engaged("Bi-speed turn" switch on)

	With brakes		Without brakes	
	left-hand (m)	right-hand (m)	left-hand (m)	right-hand (m)
Radius of turning area	4.07	4.11	4.04	4.04
Radius of turning circle	3.76	3.80	3.76	3.76

5 LOCATION OF CENTER OF GRAVITY

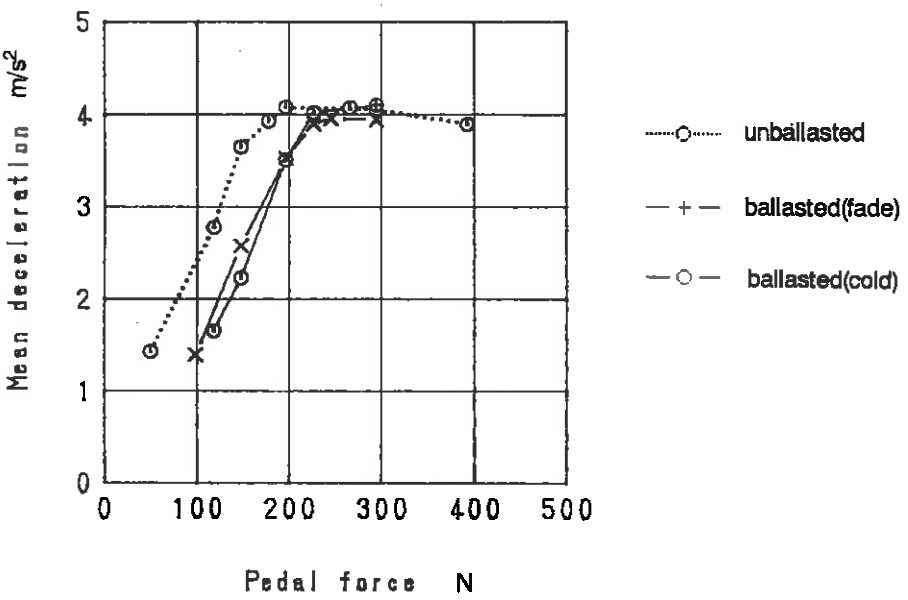
Height above ground: 929 mm
Distance forward from the vertical plane containing the axis of the rear-wheels: 848 mm
Distance from the median plane of the tractor (to the right): 4 mm

6 BRAKING (front wheel drive disengaged)

Date of tests: 4th December, 1992

Tractor mass during brake test(with driver)

	Front (kg)	Rear (kg)	Total (kg)
Ballasted	2238	3386	5624
Unballasted	1483	2884	4367



COLD SERVICE BRAKING DEVICE TEST AND FADE TEST

6.1 COLD SERVICE BRAKING DEVICE TEST

	Ballasted tractor	Unballasted tractor
Speed before application of brakes (km/h)	34.5	33.4

6.2 FADE TEST

Speed before application of brakes: 34.3 km/h

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 km/h with a towing force of 50 kN

6.3 PARKING BRAKING DEVICE TEST

	Ballasted tractor on 18 % slope	
	uphill	downhill
Braking device control force (N)	118	137

7 MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests:	1st December, 1992
Sound level meter	
Make:	RION
Model:	NA-61
Type:	Precision sound level meter
Type of track:	Concrete
Gear number:	H-6-Hi
Travelling speed before acceleration:	24.4 km/h
Sound level:	86 dB(A)

REPAIRS AND ADJUSTMENTS DURING TESTS

None

REMARKS

None