O.E.C.D. No.: 523
Printed: August 1976

Report on test in accordance with
O.E.C.D. STANDARD Code for the Official Testing
of Agricultural Tractors



Agricultural Tractor JOHN DEERE 930

Manufactured by: JOHN DEERE WERKE MANNHEIM
D-6800 Mannheim

Date of Tests: December 1975 till February 1976

DLG-Testing Station for Agricultural Machinery
D-6114 Groß-Umstadt

DEUTSCHE LANDWIRTSCHAFTS-GESELLSCHAFT e.V.
Prüfungsabteilung für Landmaschinen
D-6000 Frankfurt/Main 1, Zimmerweg 16

This bulletin is based on engineering tests in accordance with the O.E.C.D. STANDARD CODE for the Official Testing of Agricultural Tractors. It does not contain an evaluation of the performance of the tractor on practical work.

This report has been approved by the O.E.C.D. Coordinating Center (C.N.E.E.M.A., France) as being in accordance with the O.E.C.D. STANDARD CODE.

Date of Approval: 29th July 1976

Serial No.: 523

In this report all performance characteristics are given according to the International System of Units.

The relation with the former used Technical System of Units is given by the following formulas:

Forces:	1 N = 0,102 kp	or 1 kp	= 9,81 N
Powers:	1 kW = 1,36 PS	or 1 PS	= 0,736 kW
Pressures:	1 bar = 1,02 kp/cm²	or 1 kp/cm²	= 0,981 bar
	1000 mbar = 750,1 mm Hg		

All rights including th right of translation, reprint and photomechanical copying - also of excerpts - reserved by DEUTSCHE LANDWIRTSCHAFTS-GESELLSCHAFT e.V., D-6000 Ffm. 1

Printed in Germany

TABLE OF CONTENTS

	Page
Specification of tractor	4 to 13
Fuel and lubricants used in tests	14
COMPULSORY TESTS	
(1) Main power take-off performance (540 rev/min)	15 to 17
(2) Drawbar performance on a concrete track	18 and 19
(3) Turning space and turning circle	20
(4) Location of centre of gravity	20
(5) Braking performance	21
(6) Ambient noise, emitted by the tractor	22
(7) Noise at the driver's ear level	22
(8) Power lift and hydraulic pump performance	23 to 26
OPTIONAL TESTS	
(9) Engine performance	27 to 30
ADDITIONAL TESTS out of the O.E.C.D. Code under the responsibility of the DLG-Testing Station	
(10) Main power take-off performance at engine speed corresponding to standard p.t.o.-speed (540 rev/min)	31

PRÜFUNGS-ABTEILUNG
JOHN DEERE 930 Test No. 75-254

Tractor manufacturer:	JOHN DEERE WERKE MANNHEIM D-6800 Mannheim
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with agreement by DLG
Place of running-in:	Mannheim and Groß-Umstadt
Duration of running-in:	Engine and tractor appr. 100 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	JOHN DEERE WERKE MANNHEIM
Model:	930
Type:	Wheeled agricultural tractor, rear wheel driven, unit construction
Serial No.:	182 562

Engine

Make:	COMPAGNIE FRANCAISE JOHN DEERE
Model:	3164 DL 15
Type:	4-stroke DIESEL engine, direct injection, watercooled
Serial No.:	228 965
Cylinders:	3, in-line, bore 102 mm, stroke 110 mm; displacement 2695 cm^3, compression ratio 16,7:1
Valves:	overhead
Fuel system:	ROTO DIESEL fuel feed pump 2 Fs; ROTO DIESEL distributor injection pump: R 343 2 310; manufacturer's production setting 43 mm^3/stroke at rated engine speed and full load; injection timing 15° before T.D.C.; ROOSA MASTER multihole injection nozzles 20631; injection pressure 215 bar; ROOSA MASTER fuel filter with replaceable cartridge model: Box type master filter; capacity of fuel tank 62,5 l
Governor:	Mechanically acting variable speed governor incorporated in injection pump; governed range of engine speed 660 to 2575 rev/min; rated engine speed 2400 rev/min

PRÜFUNGS-ABTEILUNG

JOHN DEERE 930 Test No. 75-254

Air cleaner:	DONALDSON; dry paper element filter with replaceable cartridge and service indicator; precleaner optionally
Exhaust silencer:	EBERSPÄCHER; multichamber silencer; 213 x 118 mm oval, 483 mm long; at the left hand side of tractor above the bonnet; mouth showing upwards; mouth 2421 mm above ground; optional at the left hand side beside the gear box with mouth showing rearwards
Lubrication system:	Forced feed from gear type pump; strainer in sump; oil filter in full flow with by-pass valve and replaceable cartridge; oil capacity 5,7 l oil changing interval 100 hours; recommended oil viscosities: below -23°C SAE 5W or SAE 5W/20 below 0°C SAE 10W or SAE 10W/20, SAE 10W/30 above 0°C SAE 30
Cooling system:	Pressurized water cooling system with pump; overpressure set at 0,4 to 0,5 bar; thermostat with by-pass; fan with 6 blades, 413 mm diameter; cooling water capacity 10,4 l
Starting system:	Electrical, BOSCH screw-push starter motor 2,9 kW; CAV flame plug in intake pipe; or ether starting aid
Electrical equipment:	12 Volt, negative ground; Bosch 3 phase alternator; GL 14V-28 A; 2 batteries 55 Ah at 20 hours rating

Transmission

Clutch:	FICHTEL UND SACHS, dry dual disc clutch, semi independent; tractor drive disc 280 mm diameter, p.t.o. drive disc 270 mm diameter, both discs are operated with the same pedal with pressure point, tractor drive disc releases first
Gear box:	Own make, speed change gear box with 4 speeds; collar shifted; group gear with 2 forward and 1 reverse group, collar shifted; totally 8 forward and 4 reverse speeds
Rear axle and final drive:	Bevel gear drive with crown wheel and pinion; bevel gear differential with lock, operated by hand lever and pedal, selfdisengaging; planetary final drive
Lubrication:	Oil capacity 30 l, in common with power lift; recommended oil quality: JOHN DEERE Hy-GARD transmission and hydraulic oil or other comparable oils oil changing interval 1000 hours
Power take-off	Semi independent live p.t.o.; at rear of tractor; driven through the 270 mm disc of the dual disc clutch; 541 mm above ground, 25,4 mm left from tractor's median plane; 29 x 34,9 x 8,7 mm = 1 3/8 in.; 6 splines; DIN 9611 Form 1; BS. 1495; ASAE S. 203.7; 625 rev/min at rated engine speed; standard p.t.o. speed 540 rev/min at 2075 rev/min engine speed; p.t.o. speeds can be set by aid of tractormeter; direction of rotation clockwise, viewed from tractor rear

PRÜFUNGS-ABTEILUNG
JOHN DEERE 930

Test No. 75-254

Total ratios and speeds

Group	Gear	Total ratio engine: driving wheel	Nominal driving speed *) at rated engine speed km/h	Nominal driving speed *) at standard p.t.o. speed (540 rev/min) km/h
Forward speeds				
slow	1	267,8	2,06	1,78
	2	187,5	2,94	2,54
	3	126,4	4,37	3,77
	4	90,4	6,10	5,28
fast	1	68,3	8,08	6,99
	2	47,8	11,55	9,98
	3	32,2	17,13	14,81
	4	23,0	23,95	20,70
Reverse speeds				
reverse	1	230,5	2,39	2,07
	2	161,3	3,42	2,96
	3	108,7	5,07	4,39
	4	77,8	7,09	6,13

*) calculated with the INDEX RADIUS 610 mm as per WdK 154

The transmission is optionally available for a maximum speed of 30 km/h in the 8 th gear

P.t.o. between the axles:	Optional, fitted but not tested; drive and direction of rotation same as main p.t.o., independent from main p.t.o. engageable and disengageable by sleeve-coupling when tractor is stationary; 541 mm above ground, 25,4 mm left from tractor's median plane; 1 3/8 in involute profile, 21 splines; DIN 9611, Form 2; ASAE S 204,6; 1162 rev/min at rated engine speed; p.t.o. standard speed 1000 rev/min at 2067 rev/min engine speed
Belt pulley	Optional, not fitted; pulley drive attached on p.t.o. shaft, operated by p.t.o. hand lever; 305 mm diameter,216 mm width; 1109 rev/min at rated engine speed; 17,7 m/s linear belt speed; direction of rotation clockwise viewed from the left hand side of tractor; oil capacity 1,2 l transmission oil SAE 90
Power lift	Own make; hydraulic power lift, unit construction; open centre system; draft control, position control and mixing load and depth control, floating position; BOSCH hydraulic gear pump HY/ZFR 1/11 with 11 cm^3/rev oil supply at rated engine speed and rated oil pressure; with hydraulic assisted steering BOSCH tandem pump HY 055/681/A fitted; directly driven by engine; JOHN DEERE control valve; maximum oil pressure 145 bar; 1 single-acting ram, bore 76,5 mm, stroke 130 mm, overpressure relief valve set at 240 to 310 bar;

Power lift	oil reservoir and oil changing intervals common with gear box, 30 l up to 14 l may be taken off through oil tappings for short time; 1 oil tapping with single-acting selective control valve fitted in the rear; up to 2 single-acting selective control valves with 1 tapping each in the rear as well as in the front or in the middle of the tractor or 1 dual-acting selective control valve with 2 tappings in the rear or in the middle of the tractor optionally available;
Implement linkage	Three point linkage category I DIN 9674; lift rods length adjustable from 608 to 726 mm; lifting range above ground with short lift rods from 367 to 940 mm long lift rods from 85 to 747 mm
Implement crossbar	Short crossbar (long crossbar optionally); fitted on clevis of lower links; length between the ball joints 683 mm; thickness of the bar 25 mm; centre hole and 3 holes at either side with 80 mm distance each; all holes 33 mm diameter; height above ground adjustable by power lift from 98 to 953 mm depending on lift rods length, measured at the surface of the bar; within the lifting range steplessly hydraulically fixable with lower links in horizontal position distance of centre hole from rear axle centre 945 mm p.t.o. shaft end 523 mm
Steering	Own make; mechanically acting on front wheels; (optional : hydraulically assisted steering, fed from the BOSCH tandem hydraulic pump)

Pull attachments

Swinging drawbar:	Height above ground 357 mm hole diameter 31 mm; distance of hole from: p.t.o. shaft end 356 or 397 mm rear axle centre 778 or 819 mm adjustable by shifting drawbar about 41 mm; 235 mm swingable to either side; distance of pivot point to rear axle centre 51 mm
Trailer hitch:	Own make; not automatical; swingable aside when top link is used; height above ground 765 mm; diameter of hole 33 mm; distance of hole to rear axle centre 451 mm; permissible vertical load 1200 kg
Towing hitch:	803 mm above ground

Brakes

Parking brake:	Mechanically operated wet wedge band brake; acting on a disc with 238 mm diameter on the differential; operated by hand lever with ratchet
Service brake:	Hydraulically operated wet disc brakes, acting on discs on final drive shafts; pedal operated, self adjusting
Steering brake:	Divided pedal of service brake; for normal use locked together

Wheels

Steering wheels: Two pneumatics at front 6,00-16 AS 6 ply;
maximum permissible load per tyre 645 kg
at 3,0 bar inflation pressure and 25 km/h;
track width adjustable from 1260 to 1880 mm
in 7 steps of appr. 103 mm distance each by
extending telescopic half axles;
rims 4,00 E x 16

Driving wheels: Two pneumatics at rear 13,6-28 AS 6 ply;
maximum permissible load per tyre 1530 kg
at 1,4 bar inflation pressure and 25 km/h;
track width adjustable from 1360 to 1860 mm
in 6 steps of 100 mm distance each by
turning wheels and offset lug type rims;
rims W 12-28

Wheel base: 1890 mm

Safety frame FRITZMEIER
M 901
O.E.C.D. tested; CS 1139c or
CS 1140f or
CS 1142b

Weights Ready for use, as tested
with safety frame

		without driver	with driver
Without ballast:	front	775 kg	780 kg
	rear	1410 kg	1480 kg
	total	2185 kg	2260 kg
Front ballast:	1 basic weight		80 kg
	4 front weights	40 kg each	160 kg
Rear ballast:	3 weights per wheel	35 kg each	210 kg
	water in the tyres		330 kg
With ballast:	front	1115 kg	1120 kg
	rear	1850 kg	1920 kg
	total	2965 kg	3040 kg

PRÜFUNGS-ABTEILUNG
JOHN DEERE 930 Test No. 75-254

Driver's seat: GRAMMER;
DS 20 L 2 H;
upholstered mould seat with back rest;
adjustable spring with shock absorber;
height of seat platform above ground 600 mm;
height of seat above platform 600 mm;
seat not compressed in downmost position;
101 mm adjustable fore and aft;
101 mm adjustable up and down;
adjustabilities are independent

Dimensions:

Total length: 3460 mm with 3 point linkage without ballast
3710 mm with 3 point linkage with ballast

Total width: 1690 mm at smallest track width
2190 mm at largest track width

Total height: 2260 mm to top of safety frame
2421 mm to top of exhaust pipe

Ground clearance: 325 mm below swinging drawbar

Number of grease points 8

Lighting equipment: 12 Volt
in accordance with the regulations of the several countries

	Dimensions mm	Height above ground of centre mm	Distance from outside edge of tractor to centre * mm
Head lights	125 Ø	868	578
Additional head lights	130 Ø	1205	395
Side lights	70 x 70	1245	110
Rear lights	66 x 163	1168	192
Reflectors	78 Ø	924	74

* at smallest track width

PRÜFUNGS-ABTEILUNG
JOHN DEERE 930

Test No. 75-254

All available tyres (track widths, permissible axle loads)

Dimensions	Track width adjustabilities from mm	in steps of mm	to mm	Permissible axle load kg
Front wheels				
5,50-16 4 PR	1260	103	1880	850
6,00-16 6 PR	1260	103	1880	1120
7,50-16 6 PR	1260	103	1880	1490
Driving wheels				
9,5-36 6 PR	1260	100	1860	2260
11,2-28 4 PR *)	1360	100	1860	2230
12,4-28 6 PR	1360	100	1860	2550
12,4-32 6 PR	1360	100	1860	2710
13,6-28 6 PR	1360	100	1860	2860

Front wheels 5,50-16 can be put together with driving wheels 12,4-28 only
Front wheels 7,50-16 can be put together with driving wheels 12,4-32 only
Front wheels 6,00-16 can be put together with all driving wheels

*) Released from the German TÜV but not factory installed

PRÜFUNGS-ABTEILUNG
JOHN DEERE 930

Test No. 75-254

FUELS AND LUBRICANTS USED IN TESTS

Fuel:	ARAL DIESEL fuel DIN 51601	
	specific gravity at 15°C	
	at engine tests	0,834 kg/l
	at p.t.o. tests	0,834 kg/l
	at drawbar tests	0,838 kg/l
Engine oil:	SHELL ROTELLA TX 30	
Transmission oil:	JOHN DEERE Hy-GARD	
Hydraulic oil:	JOHN DEERE Hy-GARD	

PRÜFUNGS-ABTEILUNG
JOHN DEERE 930

Test No. 75-254

COMPULSORY TESTS

(1) MAIN POWER TAKE-OFF PERFORMANCE

Date of tests: 13th January 1976
Type of dynamometer: SCHENCK hydraulic dynamometer U1-40

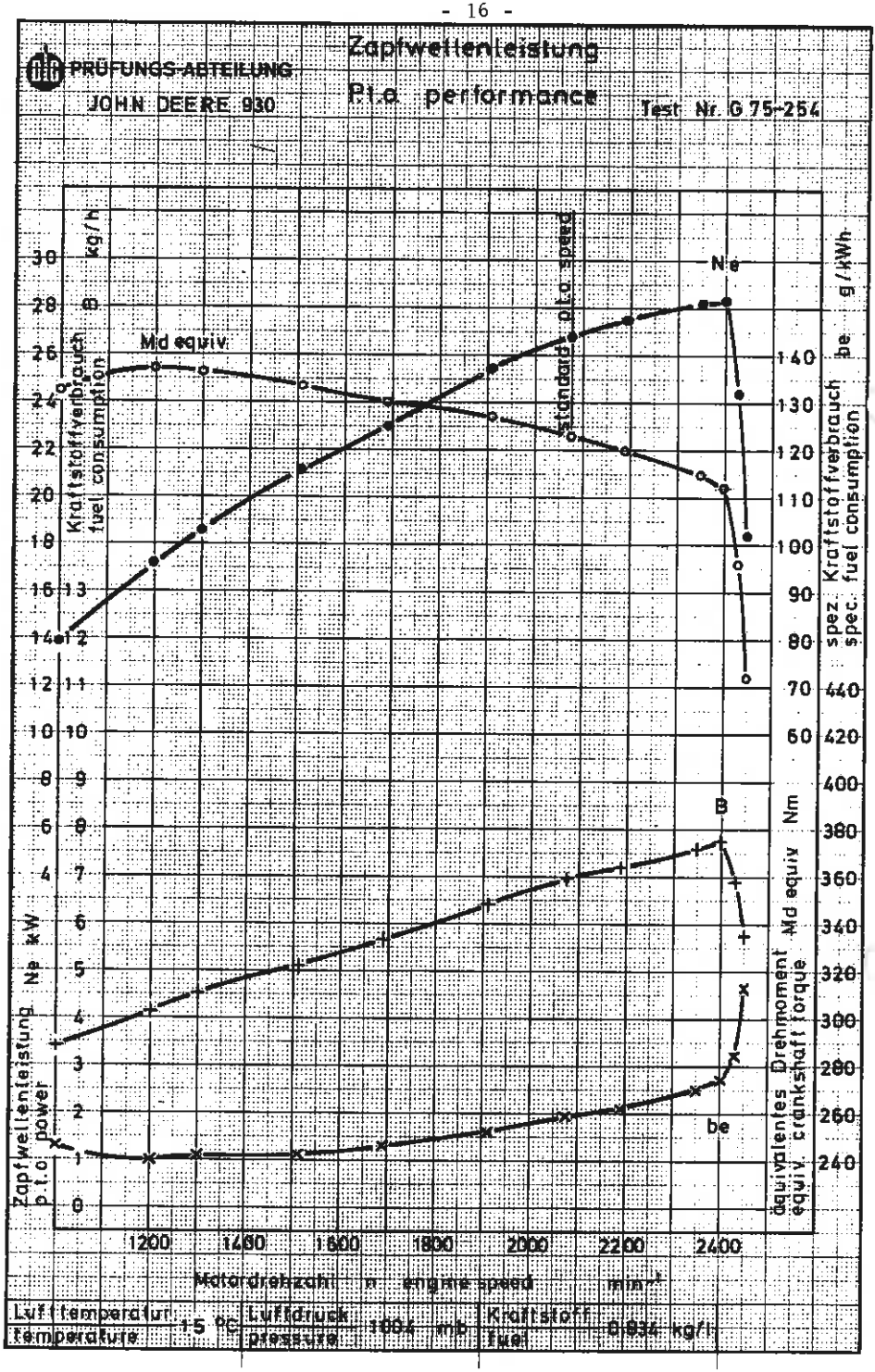
Maximum power

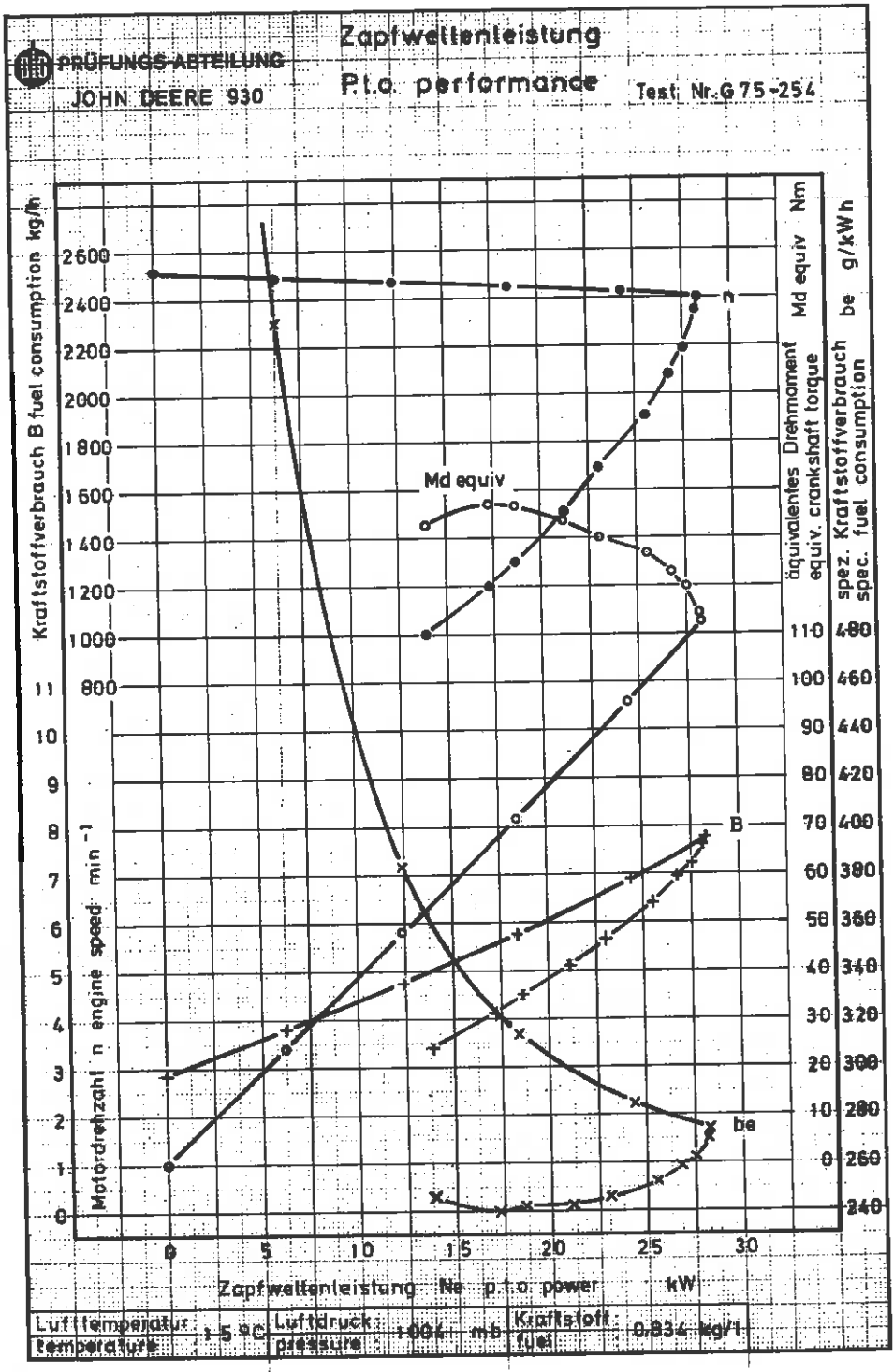
Power kW	Speed engine rev/min	Speed p.t.o. rev/min	Fuel consumption total l/h	Fuel consumption total kg/h	Fuel consumption specific g/kWh	Specific energy kWh/l
At maximum power 2-hour test						
28,3	2400	625	9,30	7,76	274	3,04
At standard p.t.o. speed (540 rev/min)						
26,8	2075	540	8,31	6,93	259	3,23
At the speed recommended for drawbar work						
28,3	2400	625	9,30	7,76	274	3,04
Part loads						
(i) 85% of the torque at maximum power						
24,4	2430	633	8,30	6,92	284	2,94
(ii) unloaded						
-	2515	655	3,42	2,85	-	-
(iii) 50% of the load defined in (i)						
12,4	2468	642	5,70	4,75	383	2,18
(iv) maximum power						
28,3	2400	625	9,30	7,76	274	3,04
(v) 25% of the load defined in (i)						
6,2	2489	648	4,53	3,78	610	1,37
(vi) 75% of the load defined in (i)						
18,4	2450	638	6,89	5,75	313	2,67

No load maximum engine speed: 2515 rev/min
Equivalent crankshaft torque at maximum power: 113 Nm
Maximum equivalent crankshaft torque: 137 Nm at 1200 rev/min of the engine

Mean atmospheric conditions:
- temperature 15°C
- pressure 1004 mbar
- relative humidity 88%

Maximum temperatures:
- coolant 78°C
- engine oil 116°C
- fuel 21°C


Zapfwellenleistung
PRÜFUNGS-ABTEILUNG
JOHN DEERE 930
P.t.o. performance
Test Nr. G 75-254
Kraftstoffverbrauch fuel consumption kg/h
Md equiv.
Ne
Standard p.t.o. speed
spez. Kraftstoffverbrauch spec. fuel consumption be g/kWh
Zapfwellenleistung p.t.o. power Ne kW
B
be
äquivalentes Drehmoment equiv. crankshaft torque Md equiv. Nm
1200
1400
1600
1800
2000
2200
2400
Motordrehzahl n engine speed min⁻¹
Lufttemperatur temperature 15 °C
Luftdruck pressure 1004 mb
Kraftstoff fuel 0,834 kg/l


PRÜFUNGS-ABTEILUNG
JOHN DEERE 930
Zapfwellenleistung
P.t.o. performance
Test Nr. G 75-254
Kraftstoffverbrauch B fuel consumption kg/h
Motordrehzahl n engine speed min⁻¹
äquivalentes Drehmoment Md equiv Nm
equiv. crankshaft torque
spez. Kraftstoffverbrauch be g/kWh
spec. fuel consumption
n
Md equiv
B
be
Zapfwellenleistung Ne p.t.o. power kW
Lufttemperatur temperature +15 °C
Luftdruck pressure 1004 mb
Kraftstoff fuel 0,834 kg/l

PRÜFUNGS-ABTEILUNG
JOHN DEERE 930

(2) DRAWBAR PERFORMANCE

Date of tests: 9th till 17th February 1976
Type of track: Concrete

Gear No. and Group	Driving speed km/h	Power kW	Drawbar pull N	Engine speed rev/min	Slip of wheels %	Specific energy kWh/l
(i) MAXIMUM POWER with ballast, height of drawbar above ground 580 mm						
1 slow	1,83	14,3	28180	2455	15,0	2,08
2 slow	2,57	20,0	28050	2436	15,0	2,38
3 slow	3,95	23,8	21650	2400	10,5	2,57
4 slow	5,72	24,3	15280	2400	7,0	2,61
1 fast	7,74	24,3	11320	2400	5,1	2,61
2 fast	11,17	23,9	7690	2400	3,4	2,57
(ii) FIVE-HOUR-TEST at 75% of pull at maximum power in 4th gear of slow group						
4 slow	5,94	18,9	11470	2444	5,2	2,43
(iii) FIVE-HOUR-TEST at pull corresponding to 15% wheel slip in test (i)						
2 slow	-	-	28180	2430	-	-
(v) MAXIMUM POWER without ballast, height of drawbar above ground 520 mm						
1 slow	1,82	11,2	22050	2462	15,0	1,84
2 slow	2,57	15,8	22170	2446	14,8	2,17
3 slow	3,75	22,4	21560	2400	14,3	2,40
4 slow	5,61	24,1	15450	2400	8,5	2,58
1 fast	7,57	24,5	11670	2400	6,3	2,53
2 fast	11,06	23,9	7750	2398	4,1	2,55

Total oil consumption during ten hours duration of tests (ii) and (iii): 57 g/h

PRÜFUNGS-ABTEILUNG

Test No. 75-154

Tyres make and size: front: VEITH-PIRELLI 6.00-16 AS 6 ply
rear VEITH-PIRELLI 13,6-28 AS 6 ply
Height of treadbars at the beginning of drawbar tests:
86% of the value when new

Specific fuel consumpt g/kWh	Temperatures Fuel °C	Coolant °C	Engine-oil °C	Atmospheric conditions Tempe-rature °C	Relative humidity %	Pressure mbar
tyre inflation pressure 1,6 bar rolling radius of tyres under static load 616 mm						
402	10	80	100	2	92	1016
353	7	80	100	1	98	1016
327	8	80	102	0	97	1016
321	12	80	102	1	97	1016
319	15	80	102	8	90	1016
326	10	80	102	0	98	1016
345	10	80	100	2	97	1016
-	10	80	102	3	95	1016
tyre inflation pressure 1,1 bar rolling radius of tyres under static load 616 mm						
454	14	80	102	5	98	1017
386	12	80	103	5	98	1017
348	12	80	103	5	98	1017
324	13	80	103	5	98	1017
314	14	80	102	5	98	1017
326	13	80	102	5	98	1017

Test (iii) was carried out with additional ballast,
the figures not quoted are therefore irrelevant

(3) TURNING SPACE AND TURNING CIRCLE

Wheel equipment front: 6,00-16 AS Front 6 ply

rear: 13,6-28 AS 6 ply

Track of wheels front: 1360 mm

rear: 1360 mm

	With brakes		Without brakes	
	left-hand	right-hand	left-hand	right-hand
Radius of turning space	2,92	2,85	3,27	3,17
Radius of turning circle	2,80	2,78	3,15	3,06

(4) LOCATION OF CENTRE OF GRAVITY

Height above ground	786 mm
Distance forward from the vertical plane containing the axis of the rear wheels	652 mm
Distance of the median plane on the tractor's right hand side	3 mm

PRÜFUNG

JOHANNUNG

(5) BRAKING

A) SERVICE BRAKE

Date of test: 10th February

Type of tractor: Concrete

Type of dynamometer: MOTO METER Bi

Weight of tested tractor: 3040 kg with ballast

Pedal force: Stsch

Cold brake test

		with ballast	without ballast
Travelling speed	km/h	25,0	
Deceleration	m/s2	4,4	
Stopping distance	m	6,2	
Force on pedal	daN	340	
Force on pedal to achieve a deceleration of 2,5 m/s2	daN	175	2
			145

Deceleration fade characteristics (hot tests)

Deceleration	hot/cold %	100	100
Stopping distance	cold/hot %	100	100
Force on pedal	cold/hot %	95	103

B) PARKING BRAKE

Tractor on up slope:
Pull ake 50 N, tractor does not roll

Tractor on own slope:
Pull e 50 N, tractor does not roll

level

(A)

7

7,5

98

98

7,5

98

7,5

96

26

eed

e t



Agricultural Tractor JOHN DEERE 930

Manufactured by: JOHN DEERE WERKE MANNHEIM
D-6800 Mannheim

Date of Tests: December 1975 till February 1976

DLG-Testing Station for Agricultural Machinery
D-6114 Groß-Umstadt

DEUTSCHE LANDWIRTSCHAFTS-GESELLSCHAFT e.V.
Prüfungsabteilung für Landmaschinen
D-6000 Frankfurt/Main 1, Zimmerweg 16

Serial No.: 523

In this report all performance characteristics are given according to the International System of Units.

The relation with the former used Technical System of Units is given by the following formulas:

Forces:	1 N = 0,102 kp	or	1 kp = 9,81 N
Powers:	1 kW = 1,36 PS	or	1 PS = 0,736 kW
Pressures:	1 bar = 1,02 kp/cm²	or	1 kp/cm² = 0,981 bar
	1000 mbar = 750,1 mm Hg		

All rights including th right of translation, reprint and photomechanical copying - also of excerpts - reserved by DEUTSCHE LANDWIRTSCHAFTS-GESELLSCHAFT e.V., D-6000 Ffm. 1

Printed in Germany

(1) Main power take-off performance (540 rev/min) 15 to 17
(2) Drawbar performance on a concrete track 18 and 19
(3) Turning space and turning circle 20
(4) Location of centre of gravity 20
(5) Braking performance 21
(6) Ambient noise, emitted by the tractor 22
(7) Noise at the driver's ear level 22
(8) Power lift and hydraulic pump performance 23 to 26

OPTIONAL TESTS

(9) Engine performance 27 to 30

ADDITIONAL TESTS out of the O.E.C.D. Code under the responsibility of the DLG-Testing Station

(10) Main power take-off performance at engine speed corresponding to standard p.t.o.-speed (540 rev/min) 31

Tractor

Make:	JOHN DEERE WERKE MANNHEIM
Model:	930
Type:	Wheeled agricultural tractor, rear wheel driven, unit construction
Serial No.:	182 562

Engine

Make:	COMPAGNIE FRANCAISE JOHN DEERE
Model:	3164 DL 15
Type:	4-stroke DIESEL engine, direct injection, watercooled
Serial No.:	228 965
Cylinders:	3, in-line, bore 102 mm, stroke 110 mm; displacement 2695 cm^3, compression ratio 16,7:1
Valves:	overhead
Fuel system:	ROTO DIESEL fuel feed pump 2 Fs; ROTO DIESEL distributor injection pump: R 343 2 310; manufacturer's production setting 43 mm^3/stroke at rated engine speed and full load; injection timing 15° before T.D.C.; ROOSA MASTER multihole injection nozzles 20631; injection pressure 215 bar; ROOSA MASTER fuel filter with replaceable cartridge model: Box type master filter; capacity of fuel tank 62,5 l
Governor:	Mechanically acting variable speed governor incorporated in injection pump; governed range of engine speed 660 to 2575 rev/min; rated engine speed 2400 rev/min

	the bonnet; mouth showing upwards; mouth 2421 mm above ground; optional at the left hand side beside the gear box with mouth showing rearwards
Lubrication system:	Forced feed from gear type pump; strainer in sump; oil filter in full flow with by-pass valve and replaceable cartridge; oil capacity 5,7 l oil changing interval 100 hours; recommended oil viscosities: below -23°C SAE 5W or SAE 5W/20 below 0°C SAE 10W or SAE 10W/20, SAE 10W/30 above 0°C SAE 30
Cooling system:	Pressurized water cooling system with pump; overpressure set at 0,4 to 0,5 bar; thermostat with by-pass; fan with 6 blades, 413 mm diameter; cooling water capacity 10,4 l
Starting system:	Electrical, BOSCH screw-push starter motor 2,9 kW; CAV flame plug in intake pipe; or ether starting aid
Electrical equipment:	12 Volt, negative ground; Bosch 3 phase alternator; GL 14V-28 A; 2 batteries 55 Ah at 20 hours rating

	speed change gear box with 4 speeds; collar shifted; group gear with 2 forward and 1 reverse group, collar shifted; totally 8 forward and 4 reverse speeds
Rear axle and final drive:	Bevel gear drive with crown wheel and pinion; bevel gear differential with lock, operated by hand lever and pedal, selfdisengaging; planetary final drive
Lubrication:	Oil capacity 30 l, in common with power lift; recommended oil quality: JOHN DEERE Hy-GARD transmission and hydraulic oil or other comparable oils oil changing interval 1000 hours
Power take-off	Semi independent live p.t.o.; at rear of tractor; driven through the 270 mm disc of the dual disc clutch; 541 mm above ground, 25,4 mm left from tractor's median plane; 29 x 34,9 x 8,7 mm = 1 3/8 in.; 6 splines; DIN 9611 Form 1; BS. 1495; ASAE S. 203.7; 625 rev/min at rated engine speed; standard p.t.o. speed 540 rev/min at 2075 rev/min engine speed; p.t.o. speeds can be set by aid of tractormeter; direction of rotation clockwise, viewed from tractor rear

Forward speeds

slow	1	267,8	2,06	1,78
	2	187,5	2,94	2,54
	3	126,4	4,37	3,77
	4	90,4	6,10	5,28
fast	1	68,3	8,08	6,99
	2	47,8	11,55	9,98
	3	32,2	17,13	14,81
	4	23,0	23,95	20,70

Reverse speeds

reverse	1	230,5	2,39	2,07
	2	161,3	3,42	2,96
	3	108,7	5,07	4,39
	4	77,8	7,09	6,13

*) calculated with the INDEX RADIUS 610 mm
as per WdK 154

The transmission is optionally available for a maximum speed of 30 km/h in the 8 th gear

	p.t.o. standard speed 1000 rev/min at 2067 rev/min engine speed
Belt pulley	Optional, not fitted; pulley drive attached on p.t.o. shaft, operated by p.t.o. hand lever; 305 mm diameter,216 mm width; 1109 rev/min at rated engine speed; 17,7 m/s linear belt speed; direction of rotation clockwise viewed from the left hand side of tractor; oil capacity 1,2 l transmission oil SAE 90
Power lift	Own make; hydraulic power lift, unit construction; open centre system; draft control, position control and mixing load and depth control, floating position; BOSCH hydraulic gear pump HY/ZFR 1/11 with 11 cm^3/rev oil supply at rated engine speed and rated oil pressure; with hydraulic assisted steering BOSCH tandem pump HY 055/681/A fitted; directly driven by engine; JOHN DEERE control valve; maximum oil pressure 145 bar; 1 single-acting ram, bore 76,5 mm, stroke 130 mm, overpressure relief valve set at 240 to 310 bar;

2 tappings in the rear of [illegible]
tractor optionally available;

Implement linkage	Three point linkage category I DIN 9674; lift rods length adjustable from 608 to 726 mm; lifting range above ground with short lift rods from 367 to 940 mm long lift rods from 85 to 747 mm
Implement crossbar	Short crossbar (long crossbar optionally); fitted on clevis of lower links; length between the ball joints 683 mm; thickness of the bar 25 mm; centre hole and 3 holes at either side with 80 mm distance each; all holes 33 mm diameter; height above ground adjustable by power lift from 98 to 953 mm depending on lift rods length, measured at the surface of the bar; within the lifting range steplessly hydraulically fixable with lower links in horizontal position distance of centre hole from rear axle centre 945 mm p.t.o. shaft end 523 mm
Steering	Own make; mechanically acting on front wheels; (optional : hydraulically assisted steering, fed from the BOSCH tandem hydraulic pump)

Trailer hitch:	Own make; not automatical; swingable aside when top link is used; height above ground 765 mm; diameter of hole 33 mm; distance of hole to rear axle centre 451 mm; permissible vertical load 1200 kg
Towing hitch:	803 mm above ground

Brakes

Parking brake:	Mechanically operated wet wedge band brake; acting on a disc with 238 mm diameter on the differential; operated by hand lever with ratchet
Service brake:	Hydraulically operated wet disc brakes, acting on discs on final drive shafts; pedal operated, self adjusting
Steering brake:	Divided pedal of service brake; for normal use locked together

Driving wheels:	Two pneumatics at rear 13,6-28 AS 6 ply; maximum permissible load per tyre 1530 kg at 1,4 bar inflation pressure and 25 km/h; track width adjustable from 1360 to 1860 mm in 6 steps of 100 mm distance each by turning wheels and offset lug type rims; rims W 12-28
Wheel base:	1890 mm
Safety frame	FRITZMEIER M 901 O.E.C.D. tested; CS 1139c or CS 1140f or CS 1142b

Weights — Ready for use, as tested with safety frame

		without driver	with driver
Without ballast:	front	775 kg	780 kg
	rear	1410 kg	1480 kg
	total	2185 kg	2260 kg
Front ballast:	1 basic weight		80 kg
	4 front weights	40 kg each	160 kg
Rear ballast:	3 weights per wheel	35 kg each	210 kg
	water in the tyres		330 kg
With ballast:	front	1115 kg	1120 kg
	rear	1850 kg	1920 kg
	total	2965 kg	3040 kg

adjustabilities are independent

Dimensions:

Total length:	3460 mm with 3 point linkage without ballast 3710 mm with 3 point linkage with ballast
Total width:	1690 mm at smallest track width 2190 mm at largest track width
Total height:	2260 mm to top of safety frame 2421 mm to top of exhaust pipe
Ground clearance:	325 mm below swinging drawbar

Number of grease points 8

Lighting equipment 12 Volt
in accordance with the regulations of the several countries

	Dimensions mm	Height above ground of centre mm	Distance from outside edge of tractor to centre * mm
Head lights	125 Ø	868	578
Additional head lights	130 Ø	1205	395
Side lights	70 x 70	1245	110
Rear lights	66 x 163	1168	192
Reflectors	78 Ø	924	74

* at smallest track width

Front wheels

5,50-16 4 PR	1260	103	1880	850
6,00-16 6 PR	1260	103	1880	1120
7,50-16 6 PR	1260	103	1880	1490

Driving wheels

9,5-36 6 PR	1260	100	1860	2260
11,2-28 4 PR *)	1360	100	1860	2230
12,4-28 6 PR	1360	100	1860	2550
12,4-32 6 PR	1360	100	1860	2710
13,6-28 6 PR	1360	100	1860	2860

Front wheels 5,50-16 can be put together with driving wheels 12,4-28 only
Front wheels 7,50-16 can be put together with driving wheels 12,4-32 only
Front wheels 6,00-16 can be put together with all driving wheels

*) Released from the German TÜV but not factory installed

	at drawbar tests	0,838 kg/l
Engine oil:	SHELL ROTELLA TX 30	
Transmission oil:	JOHN DEERE Hy-GARD	
Hydraulic oil:	JOHN DEERE Hy-GARD	

kW	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
At maximum power 2-hour test						
28,3	2400	625	9,30	7,76	274	3,04
At standard p.t.o. speed (540 rev/min)						
26,8	2075	540	8,31	6,93	259	3,23
At the speed recommended for drawbar work						
28,3	2400	625	9,30	7,76	274	3,04
Part loads						
(i) 85% of the torque at maximum power						
24,4	2430	633	8,30	6,92	284	2,94
(ii) unloaded						
-	2515	655	3,42	2,85	-	-
(iii) 50% of the load defined in (i)						
12,4	2468	642	5,70	4,75	383	2,18
(iv) maximum power						
28,3	2400	625	9,30	7,76	274	3,04
(v) 25% of the load defined in (i)						
6,2	2489	648	4,53	3,78	610	1,37
(vi) 75% of the load defined in (i)						
18,4	2450	638	6,89	5,75	313	2,67

No load maximum engine speed: 2515 rev/min
Equivalent crankshaft torque at maximum power: 113 Nm
Maximum equivalent crankshaft torque: 137 Nm at 1200 rev/min of the engine

Mean atmospheric conditions:	temperature	15°C
	pressure	1004 mbar
	relative humidity	88%
Maximum temperatures:	coolant	78°C
	engine oil	116°C
	fuel	21°C

Zapfwellenleistung
p.t.o. power
Ne kW
äquivalentes Drehmoment
equiv. crankshaft torque
Md equiv Nm
spez. Kraftstoffverbrauch
spec. fuel consumption
Kraftstoffverbrauch
fuel consumption
Motordrehzahl n engine speed min⁻¹
1200
1400
1600
1800
2000
2200
2400
be
B
Lufttemperatur 15 °C Luftdruck 1000 mb Kraftstoff 0,834 kg/l
temperature pressure fuel

Motordrehzahl n engine speed min⁻¹
Kraftstoffverbrauch B fu
Md equiv.
be
B
äquivalentes Drehm
equiv. crankshaft to
spez. Kraftstoffverb
spec. fuel consump
Zapfwellenleistung Ne p.t.o. power kW
Lufttemperatur t S.o.C
Luftdruck
Kraftstoff
Temperature
Pressure
fuel

(i) MAXIMUM POWER with ballast
height of drawbar above ground 580 mm

1 slow	1,83	14,3	28180	2455	15,0	2,08
2 slow	2,57	20,0	28050	2436	15,0	2,38
3 slow	3,95	23,8	21650	2400	10,5	2,57
4 slow	5,72	24,3	15280	2400	7,0	2,61
1 fast	7,74	24,3	11320	2400	5,1	2,61
2 fast	11,17	23,9	7690	2400	3,4	2,57

(ii) FIVE-HOUR-TEST
at 75% of pull at maximum power in 4th gear of slow group

4 slow	5,94	18,9	11470	2444	5,2	2,43

(iii) FIVE-HOUR-TEST
at pull corresponding to 15% wheel slip in test (i)

2 slow	-	-	28180	2430	-	-

(v) MAXIMUM POWER without ballast
height of drawbar above ground 520 mm

1 slow	1,82	11,2	22050	2462	15,0	1,84
2 slow	2,57	15,8	22170	2446	14,8	2,17
3 slow	3,75	22,4	21560	2400	14,3	2,40
4 slow	5,61	24,1	15450	2400	8,5	2,58
1 fast	7,57	24,5	11670	2400	6,3	2,53
2 fast	11,06	23,9	7750	2398	4,1	2,55

Total oil consumption during ten hours duration of tests (ii) and (iii): 57 g/h

tyre inflation pressure 1,6 bar
rolling radius of tyres under static load 616 mm

402	10	80	100	2	92	1016
353	7	80	100	1	98	1016
327	8	80	102	0	97	1016
321	12	80	102	1	97	1016
319	15	80	102	8	90	1016
326	10	80	102	0	98	1016
345	10	80	100	2	97	1016
-	10	80	102	3	95	1016

tyre inflation pressure 1,1 bar
rolling radius of tyres under static load 616 mm

454	14	80	102	5	98	1017
386	12	80	103	5	98	1017
348	12	80	103	5	98	1017
324	13	80	103	5	98	1017
314	14	80	102	5	98	1017
326	13	80	102	5	98	1017

Test (iii) was carried out with additional ballast,
the figures not quoted are therefore irrelevant

	With brakes		Without brakes	
	left-hand	right-hand	left-hand	right-hand
Radius of turning space	2,92	2,85	3,27	3,17
Radius of turning circle	2,80	2,78	3,15	3,06

(4) LOCATION OF CENTRE OF GRAVITY

Height above ground	786 mm
Distance forward from the vertical plane containing the axis of the rear wheels	652 mm
Distance of the median plane on the tractor's right hand side	3 mm

Cold brakes

		with ballast	without ballast
Travelling speed	km/h	25,0	25,0
Deceleration	m/s^2	4,4	4,5
Stopping distance	m	6,2	6,0
Force on pedal	N	340	275
Force on pedal to achieve a deceleration of 2,5 m/s^2	N	175	145

Brake fade characteristics (hot tests)

Deceleration	hot/cold %	100	100
Stopping distance	cold/hot %	100	100
Force on pedal	cold/hot %	95	103

B) PARKING BRAKE

Tractor facing up slope:
Pull on hand brake 50 N, tractor does not roll

Tractor facing down slope:
Pull on hand brake 50 N, tractor does not roll

acceleration: 19,5 km/h
Sound level: 88,5 dB(A)

(7) NOISE AT THE DRIVER'S EAR LEVEL

Date of tests: 9th February 1976
Type of track: Concrete
Type of sound level meter: BRÜEL AND KJAER model 2607
Type of frequency analyser: BRÜEL AND KJAER model 1614
(fitted with octave filter)

A safety frame was fitted on the tractor
Approval no. CS 1139c or CS 1140f or CS 1142b

Results of tests

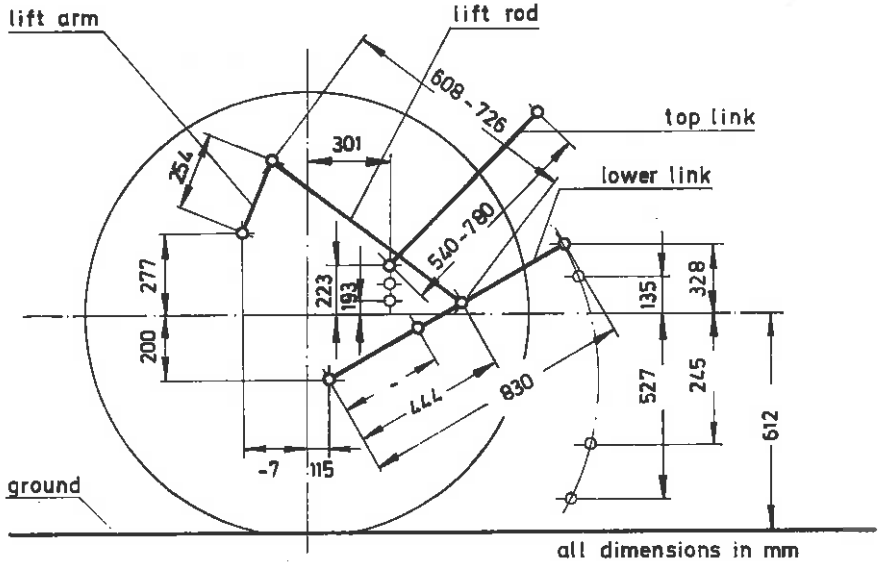
Gear	Drawbar pull at which the tractor develops the maximum sound level N	Travelling speed nominal km/h	Travelling speed effective km/h	Sound level dB(A)
1 slow	21900	2,06	1,84	97
2 slow	22050	2,94	2,59	97,5
3 slow	21050	4,37	3,81	98
4 slow	14980	6,10	5,63	98
1 fast *)	11430	8,08	7,59	97,5
2 fast	7560	11,55	11,16	98
3 fast	4770	17,13	18,03	97,5
4 fast	light load	23,95	26,02	96

*) The 1st fast gear corresponds to the travelling speed nearest to 7,5 km/h

(2)	Pump delivery rate at minimum pressure and maximum engine speed	27,8 l/min
(3)	Pump delivery rate	25,4 l/min
	Delivery pressure	122 bar
	Hydraulic Power	5,16 kW

POWER LIFT

Dimensions of linkage geometry for the table on page 26



at hitch points maximum mechanical advantage

N		6290	6640	7540	8980			9810	10320

minimum mechanical advantage

N							7220	7840	9410

Max. force exerted throughout the whole range 6290 N

Front of tractor does not lift with maximum allowable front ballast

at test frame maximum mechanical advantage

N	6600		7220	7840	8340			8570	8670

minimum mechanical advantage

N						5980		6810	7540

Max. force exerted throughout the whole range 6600 N

Front of tractor does not lift with maximum allowable front ballast

lift rods 726 mm long

10900	11560	11760							

lift rods 608 mm long

10690	11760			12460	13290	13540			

lift rods 726 mm long

8670	8670		8500						

lift rods 608 mm long

7950	8150			8050	7680		7220	6190	6090

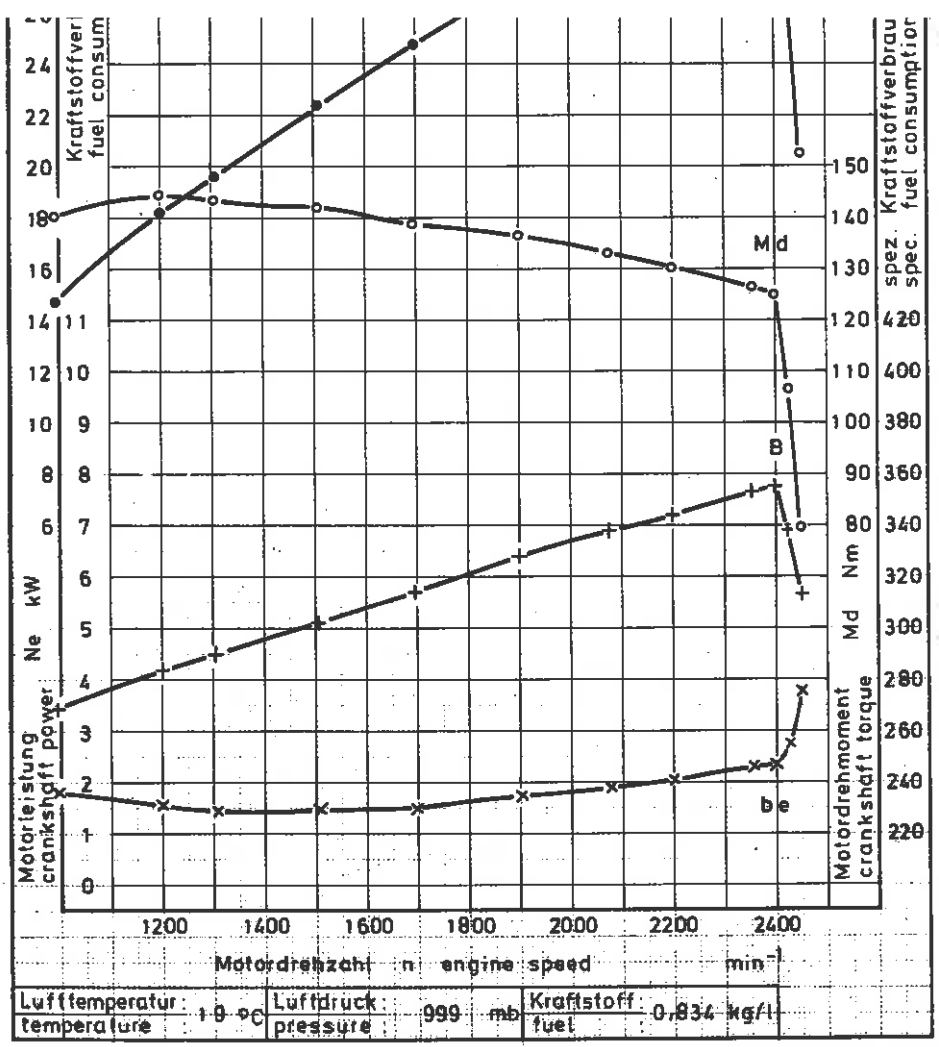
All values of forces for pressure at max. hydraulic power 122 bar, see page 23; calculated from measurements at max. oil pressure 145 bar

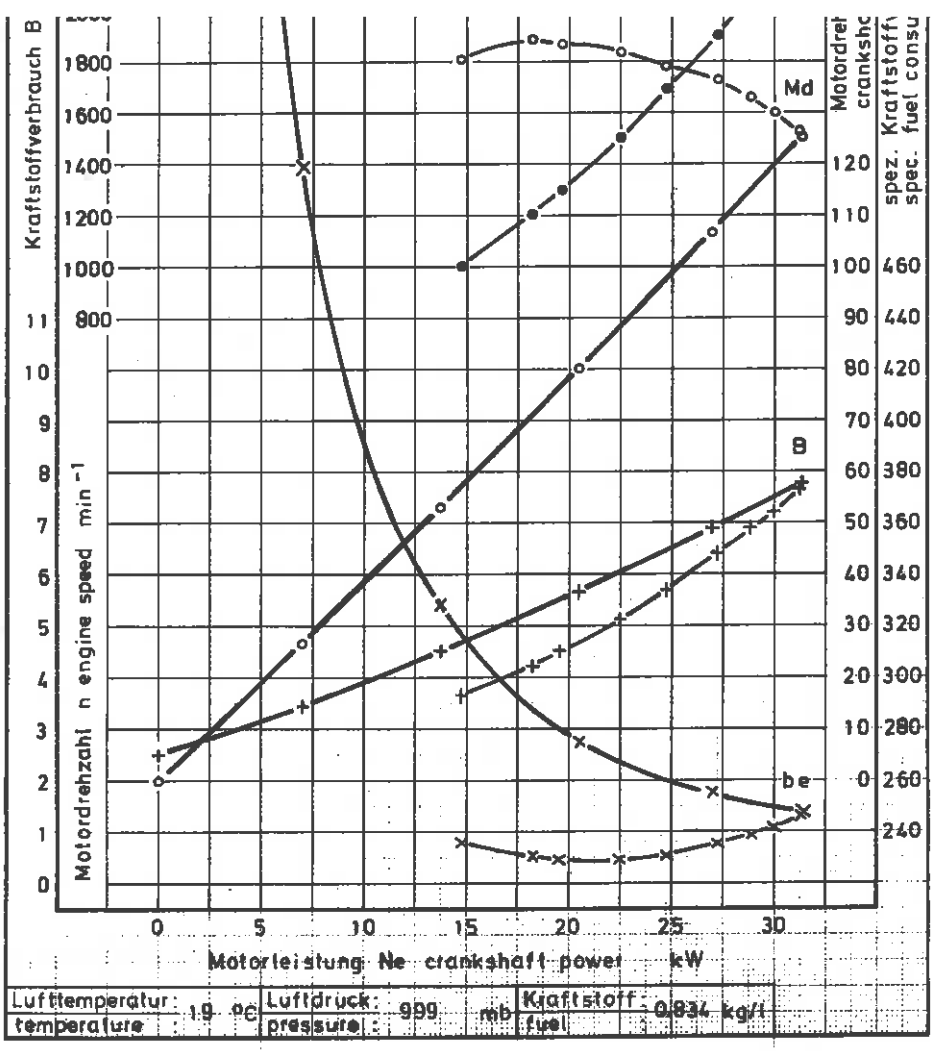
LINKAGE GEOMETRY when connected to the standard frame	Maximum mechanical advantage	Minimum mech
Projected length in side view:		
Lower links	846 mm	8
Lift arms	254 mm	2
Lift rods	726 mm	6
Top link	660 mm	6
Distance of lift rod connection point from pivot point of lower link	453 mm	4
The following dimensions are given relative to rear axle centre line 612		
Lower link pivot point	115 mm behind, 200 mm below	115 mm behi
Top link pivot point	301 mm behind, 223 mm above	301 mm behi
Lift arm pivot point	7 mm behind, 277 mm above	7 mm behi
Maximum and minimum height of lower link hitch points	135 mm above, 527 mm below	328 mm abo
Height of lower link hitch points above ground when lockes in highest transport position	747 mm	940 mm

At maximum power 2-hour test					
31,4	2400	9,32	7,77	247	3,37
At standard p.t.o. speed (540 rev/min)					
28,9	2075	8,25	6,88	238	3,50
At the speed recommended for drawbar work					
31,4	2400	9,32	7,77	247	3,37
Part loads					
(i) 85% of torque at maximum power					
27,0	2425	8,26	6,89	255	3,27
(ii) unloaded					
-	2514	2,97	2,48	-	-
(iii) 50% of the load defined in (i)					
13,7	2465	5,40	4,50	328	2,54
(iv) maximum power					
31,4	2400	9,32	7,77	247	3,37
(v) 25% of the load defined in (i)					
6,9	2487	4,12	3,44	499	1,67
(vi) 75% of the load defined in (i)					
20,5	2449	6,76	5,64	275	3,03

Optimum fuel consumption: 228 g/kWh at 19,6 kW and 1300 rev/min
Standard fuel consumption 1/2 (DIN 9606): 4,14/7,94 l/h
No load maximum engine speed: 2514 rev/min
Torque at maximum power: 125 Nm
Maximum torque: 145 Nm at 1200 rev/min of the engine

Mean atmospheric conditions:	Temperature	19°C
	pressure	999 mbar
	relative humidity	70%
Maximum temperatures:	coolant	77°C
	engine oil	115°C
	fuel	21°C


Kraftstoffverbrauch
fuel consumption
Md
B
be
Motorleistung
crankshaft power
Ne kW
Motordrehmoment
crankshaft torque
Md Nm
spez. Kraftstoffverbrauch
spec. fuel consumption
1200
1400
1600
1800
2000
2200
2400
Motordrehzahl n engine speed min⁻¹
Lufttemperatur: temperature: 10 °C
Luftdruck: pressure: 999 mb
Kraftstoff: fuel: 0,834 kg/l


Kraftstoffverbrauch B
Motordrehzahl n engine speed min⁻¹
Md
B
be
Motordrehmoment crankshaft torque
spez. Kraftstoffverbrauch spec. fuel consumption
Motorleistung Ne crankshaft power kW
Lufttemperatur temperature : 19 °C
Luftdruck pressure : 999 mb
Kraftstoff fuel : 0,834 kg/l

Motordrehzahl in % der Nenndrehzahl
engine speed in % of rated engine sp
Belastung in % des Drehmomentes bei Nenndrehzahl
load in % of torque at rated engine speed
Lufttemperatur: 19 °C
temperature
Luftdruck: 999 mb
pressure
Kraftstoff: 0,834 kg/l
fuel
228 g/kWh
235
240
250
260
275
300
350
450
%
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
100
110
120
30
40
50
60
70
80
90
100

Type of dynamometer: SCHENCK hydraulic dynamometer DI-40

Power kW	Speed engine rev/min	Speed p.t.o. rev/min	Fuel consumption total 1/h	Fuel consumption total kg/h	Fuel consumption specific g/kWh	Specific energy kWh/l
Maximum power at standard p.t.o. speed						
26,8	2075	540	8,31	6,93	259	3,23
Part loads at standard p.t.o. speed						
(i) 85% of the torque at maximum power						
23,2	2113	550	7,49	6,25	269	3,10
(ii) unloaded						
-	2220	578	2,82	2,35	-	-
(iii) 50% of the load defined in (i)						
11,9	2164	563	4,92	4,10	345	2,42
(iv) maximum power						
26,8	2075	540	8,31	6,93	259	3,23
(v) 25% of the load defined in (i)						
6,00	2190	570	3,78	3,15	525	1,59
(vi) 75% of the load defined in (i)						
17,6	2140	557	6,22	5,19	295	2,83

Mean atmospheric conditions:
Temperature 15°C
pressure 1004 mbar
relative humidity 88%

Maximum temperatures:
coolant 78°C
engine oil 116°C
fuel 21°C