Prüfstelle für Landmaschinen



REPORT on test in accordance with OECD STANDARD CODE 2 for the Official Testing of Agricultural Tractor Performance

OECD No. 2/1893
21st March 2000

Agricultural Tractor

CASE IH CX 50 (4WD) 30 km/h version

Manufacturer

CASE United Kingdom Limited
Doncaster, DN2 4PG, England

This is a report on a tractor test in accordance with OECD STANDARD CODE for the Official Testing of Agricultural Tractor Performance "Yellow Code", January 1998, Code 2 (Restricted Code).

It does not contain an evaluation of the tractor on practical work.

Duration of tests: April till June 1999

DLG-Testing Station for Agricultural Machinery, Max-Eyth-Weg 1,
D-64823 Groß-Umstadt

This report has been approved by the OECD Co-Ordinating Centre (CEMAGREF, France) as being in accordance with the OECD STANDARD CODE.

Date of approval: 21st March 2000

OECD No. 2/1893
Restricted Code

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 kN	=	1000 N	=	102 kp
Powers			1 kW	=	1,36 PS
Pressures	1 MPa	=	10 bar	=	10,2 kp/cm^2
	100 kPa	=	1000 mbar	=	750,10 mm Hg

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DLG-No. 321

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CASE IH CX 50 (4WD) **DLG-Test No 99-091**

Tractor manufacturer:	CASE United Kingdom Limited Doncaster, DN2 4PG, England
Location of tractor assembly:	Doncaster, DN2 4PG, England
Submitted for test by:	CASE United Kingdom Limited
Selected by:	Manufacturer with agreement by DLG
Place of running-in:	Doncaster and Groß-Umstadt
Duration of running-in:	Engine and tractor approximate 59 h
Location of test:	DLG-Testing Station, D-64823 Groß-Umstadt

1 SPECIFICATION OF TRACTOR

1.1 Identification

- Make/Model/Type:	CASE IH / CX 50 / wheel tractor, unit construction, four wheel driven
- Trade name:	CX 50 A, 30 km/h version
- Number of driving- wheels:	4
- Serial No.:	JJE 100 1694
- 1st serial No.:	JJE 100 001

1.2 Engine

Make/Model:	PERKINS / 1962/2250 (Case - model 903.27)
Type:	Water-cooled 4-stroke Diesel-engine, direct injection, naturally aspirated
Serial no.:	AQU 324 265 D

1.2.1 Cylinders

Number/disposition:	3 / in line
Bore/stroke:	95 / 127 mm
Capacity:	2700 cm^3
Compression ratio:	17.25 ± 1 :1
Arrangement of valves:	Overhead valves
Cylinder liners:	Dry

1.2.2 Supercharging

None

1.2.3 Fuel system

- Fuel feed system:	Diaphragm fuel supply pump
- Fuel filter	
Make/Model:	PERKINS / - /
Type :	1 replaceable filter
- Capacity of fuel tank:	155 dm³
- Injection pump	
Make/Model:	LUCAS/8922 A 231 T
Type :	DP 202, distributor pump
Serial no.:	48858 ARG
Manufacturer's production setting:	53 ± 1 mm³/stroke at full load and rated speed;
Flow rate:	10.7 ± 0.2 dm³/h at 2250 min⁻¹ and full load
Timing:	Commencement of delivery: 1° BTDC ± 2°
- Injectors	
Make/Model:	LUCAS / KL L 058 PBA
Type :	multi hole
Injection pressure:	29.4 ± 0.5 MPa

1.2.4 Governor

- Make/Model/Type:	LUCAS / - / mechanical, centrifugal variable speed governor, integral with injection pump
- Governed range of engine speed:	800 ± 50 to 2407 ± 50 min⁻¹
- Rated engine speed:	2250 min⁻¹

1.2.5 Air cleaner

- Pre-cleaner	
- Make/Model/Type:	DONALDSON / - / Cyclone type, integrated in main cleaner housing
Location of air intake:	In front of engine, below bonnet
- Main cleaner	
Make/Model:	DONALDSON / 133 720 A1
Type:	Dry paper element filter with additional safety cartridge
- Maintenance indicator:	Warning light on dashboard

1.2.6	Lubrication system:	Pressure lubrication
	- Type of feed pump:	Internal gear pump
	- Type of filter:	Full flow, replaceable (metallic cartridge)
	- Number of filter:	1
1.2.7	Cooling system	
	- Type of coolant:	Water cooling
	- Type of pump:	Impeller pump
	- Specification of fan	
	Number of fan blades:	7
	Fan diameter:	475 mm
	- Coolant capacity:	13.4 dm³
	- Type of temperature control:	Thermostat and by-pass circuit, viscous drive fan EATON, model 610, belt driven, variable fan speed controlled by air flow temperature
	- Superpressure system:	110 kPa
1.2.8	Starting system	
	- Make/Model/Type:	MAGNETI MARELLI / - / electrical, solenoid pre-engaged drive starter motor 2.8 kW;
	- Cold starting aid:	Flame glow plug in air intake manifold
	- Safety device:	Forward/reverse lever in neutral position p.t.o. clutch disengaged
1.2.9	Electrical system	
	- Voltage:	12 V
	- Generator	
	Make/Model/Type:	MAGNETI MARELLI/ A 127-65 / 3-phase alternator
	Power:	1 kW
	- Battery:	1 lead acid battery, 95 Ah at 20 hours rating
1.2.10	Exhaust system	
	- Make/Model/Type:	DONALDSON / M050125 / multi-chamber absorption type silencer, 118 mm dia, 1156 mm long
	- Location:	On the right, beside the engine, in front of the steps, vertical stack, mouth showing upwards/45°
	Optionally	
	- Make/Model/Type:	DONALDSON / M050126 / multi-chamber absorption type silencer, 152x103 mm oval, 597 mm long
	- Location:	Through tractor hood
1.2.11	Operating hours meter	Electronic, counts real hours when engine is running

1.3 Transmission

1.3.1 Clutch (travel alone)

- Make/Model/Type: LUK / 223 808 A / dry multi-plate
- Diameter of discs: 305 mm
- Method of operation: By pedal, hydraulical

1.3.2 Gear box

- Make/Model/Type: CASE / NT / mechanical, power shift, 30 km/h version
- Description:
  1. Synchro-mesh gearbox with 4 speeds
  2. synchro-mesh range gear with 2 ranges (Hi/Lo)
  3. power shifted range gear with 2 ranges (TA/DD)
  4. synchro-mesh reversing gear (F/R) reversing operation only for range TA

	forward	reverse
no. of gears	4	4
no. of ranges	2x2	2
total of arrangements	16	8

3 levers, 1 toggle switch

- Available options: CASE / QT / mechanical, 30 km/h version, 8 forward / 8 reverse
- Lubrication: Forced-feed lubrication, oil cooler in front of engine's water cooler

1.3.3 Rear axle and final drives

- Make/Model/Type: CASE / - / bevel gear drive with bevel gear differential and planetary final drives
- Differential lock
  - Type: Dog clutch
  - Engagement: By toggle switch, electro-hydraulical (through low pressure hydraulic circuit)
  - Disengagement: By service brake operation or engine cut off or by toggle switch

1.3.4 Front axle and final drives

- Make/Model/Type: CARRARO / 707S4 164 / bevel gear drive with bevel gear differential and planetary final drives, driven by wet multi plate clutch and central shaft, clutch electro-hydraulically operated by toggle switch (through low pressure hydraulic circuit)

- Differential lock

Type:	Limited slip multi-disc type
Engagement:	Automatic
Disengagement:	Automatic

1.3.5 Total ratios and travelling speeds

Range	Gear	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed*) at rated engine speed 2250 min^{-1} km/h
Forward Speeds			
Lo - TA	1	328.95	1.92
Lo - DD		272.73	2.32
Lo - TA	2	186.76	3.38
Lo - DD		154.84	4.08
Lo - TA	3	115.43	5.47
Lo - DD		95.73	6.60
Lo - TA	4	89.76	7.04
Lo - DD		74.42	8.49
Hi - TA	1	87.72	7.20
Hi - DD		72.73	8.69
Hi - TA	2	49.80	12.69
Hi - DD		41.29	15.30
Hi - TA	3	30.79	20.52
Hi - DD		25.53	24.76
Hi - TA	4	23.94	26.40
Hi - DD		19.85	31.84
Reverse Speeds			
Lo - TA	1	298.67	2.12
Hi - TA		79.65	7.93
Lo - TA	2	169.57	3.73
Hi - TA		45.22	13.98
Lo - TA	3	104.83	6.03
Hi - TA		27.96	22.61
Lo - TA	4	81.50	7.75
Hi - TA		21.73	29.08

*) calculated with the radius index (ISO 4251-1:1992) 745 mm

Number of revolutions of front wheels for one revolution of rear wheels: 1.4074

1.4 Power take-off

1.4.1 Main power take-off

- Type: Independent
- Method of engagement: Driven by wet multi-plate clutch with 125 mm dia; by lever hydraulically operated
- Number of shafts: 1
- Method of changing power take-off shaft ends and speeds: One shaft, not changeable, 2 different standard speeds shiftable by separate lever

1.4.1.1 Power take-off proportional to engine speed, 540 and 540 E min^{-1}

- Location: At rear of tractor
- Diameter of p.t.o. shaft end: 35 mm
- Number of splines: 6 in conformity with ISO 500:1991, type 1
- Height above ground: 625 mm
- Distance from the median plane of the tractor: 0 mm
- Distance behind rear-wheel axis: 435 mm

p.t.o. type	p.t.o. transmission ratio	p.t.o. speed min^{-1}	engine speed min^{-1}	power restriction kW
540	3.7159	**540** 606	**2007** 2250	-
540 E	2.6818	540 839	1448 2250	-

- Direction of rotation (viewed from behind tractor): Clockwise

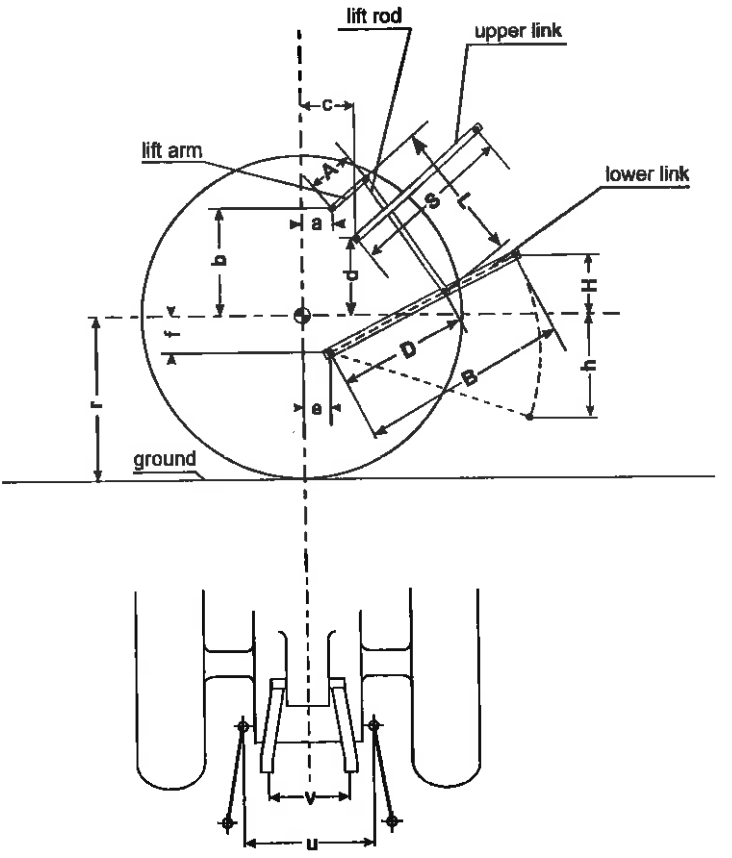
1.4.1.2 Power take-off proportional to ground speed: None

1.5 Hydraulic power lift

- Make/Model/Type:	CASE-IH / - / electronic-hydraulic power lift, top link sensing
- Type of hydraulic system:	Open center
- Type and Number of cylinders:	1 internal cylinder, single acting, 89 mm bore, 145 mm stroke
- Type of linkage lock for transport:	Hydraulic, lowering throttle
- Relief valve pressure setting:	17.2 to 18.0 MPa
- Opening pressure of cylinder safety valve:	18.6 MPa
- Lift pump type:	SAUER SUNDSTRAND fixed delivery gear pump
- Transmission between pump and engine:	Pump gear driven by forward end of p.t.o shaft, independent of p.t.o. clutch
- Type and number of filters:	1 filter in feeding line of hydraulic pump, 1 fine screen in feeding line of transfer pump
- Site of oil reservoir:	Transmission housing, common with transmission oil
- Type, number and location of tapping points:	2 pairs, double acting, at rear of tractor; 1 separate low pressure return line coupler
- Maximum volume of oil available to external cylinders:	13.6 dm³ 40.9 dm³ with overfill

1.6 Three-point linkage:

- Category: 2, in conformity with ISO 730-1:1994
- Category adapter: None



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Dimensions of rear implement linkage			projected lengths in mm: dimensions and range	projected lengths in mm: settings used in test-page 25
Rear tyres 16.9 R 34 Front tyres 12.4 R 24		(r) *) (r') *)	745 540	
Length of lift arms		(A)	298	298
Length of lower links		(B)	814	814
Distance of lift arm pivot points from rear wheel axis	horizontal vertical	(a) (b)	66 288	66 288
Horizontal distance between the 2 lower link pivot points		(u)	455	455
Horizontal distance between the 2 lift arm end points		(v)	540	540
Length of upper link		(S)	from 600 to 800	721
Distance of upper link pivot point from rear wheel axis	horizontal vertical	(c) (d)	300 200	300 200
Distance of lower link pivot points from rear wheel axis	horizontal vertical	(e) (f)	161 170	161 170
Distance of lower link pivot points to lift rod pivot points on lower links		(D)	550	550
Length of lift rods		(L)	from 635 to 750	740

Heights (h, H, H') of lower link hitch points relative to rear wheel axis (situated 745 mm above ground), at different adjustments of L

These data are valid for unloaded power lift

Length of lift rods	(L)	635	740	750
Linkage distance of lift rods	(D)	550		
Lowest position	(h)	295	545	550
Highest position	(H)	245	95	90
Transport position	(H')	245	95	90

*) Assuming r resp. r' = tyre dynamic radius index of ISO 4251-1:1992

1.7 Swinging drawbar

- Type:	Longitudinally adjustable
- Height above ground:	380 mm
- Type of height adjustment:	None
- Distance of hitch point from rear-wheel axle	700/785/830 mm
- Distance of hitch point from power take-off shaft end	
Vertical	253 mm
Horizontal	265/350/395 mm
- Lateral adjustment (centre of clevis)	
Right and left hand each:	233/277/300 mm
- Distance of pivot point from rear-wheel axis, horizontal (rearward)	240 mm
- Drawbar pin hole diameter	32 mm
- Maximum vertically permissible load (short position)	8.8 kN

1.8 Trailer hitch None

1.9 Holed drawbar Not fitted

1.10	**Steering**	
	- Make/Model/Type:	DANFOSS / OSPC 100 OR / hydrostatic
	- Method of operation	
	Pump:	Separate SAUER SUNDSTRAND fixed delivery (28 dm^3/min) gear pump, driven by engine
	Ram:	CARRARO, integrated cylinder of symmetrical design; 172 mm stroke, 63 mm bore, 36 mm piston rod dia
	- Working pressure:	15.1 MPa
1.11	**Brakes**	
1.11.1	Service brake:	
	- Make/Model/Type:	CASE / - / muscle power brake with hydraulic transmission, brake fluid provided by hydraulic circuit
	- Method of operation:	Pedal operated, acting on rear wheels, front axle drive is automatically engaged when braking, oil-immersed disc brake with 1 ring-piston on each differential half shaft, disc 259 mm dia
	- Trailer braking take-off:	None Hydraulic trailer braking take-off on request available
1.11.2	Parking brake	
	- Type:	Mechanical, separate brake on front wheel drive shaft
	- Method of operation:	Hand lever with ratchet

1.12 Wheels

- Number

Front:	2, driving and steering
Rear.	2, driving

- Wheelbase: 2214 mm

- Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	1299	1894	adjustable rims
Rear	1420	1922	adjustable rims

1.12.1 - Possible combinations of tyres sizes

Rear	Front
18.4 R 34	12.4 R 24 13.6 R 24 360/70 R 24 380/70 R 24
16.9 R 34	11.2 R 24 12.4 R 24 13.6 R 24 360/70 R 24
13.6 R 38	11.2 R 24 12.4 R 24 360/70 R 24
18.4 R 30	14.9 R 20 375/75 R 20 11.2 R 24 12.4 R 24
16.9 R 30	12.4 R 20 14.9 R 20 335/80 R 20 375/75 R 20 405/70 R 20 9.5 R 24
13.6 R 28	11.2 R 20

This is the list of the most popular tyres combinations, further combinations are available

1.13 Protective structure

- Make/Model:	CASE IH / MX11
- Type:	Four-Post ROPS, may be fitted with optional sun roof (plastics)
- Manufacturer's name and address:	CASE France S.A. BP 109 59964 Croix Cedex France
- Protective device	
Cab/frame/rollguard/other:	Frame, welded to a platform which is mounted by 4 antivibration blocks to the tractor
Tiltable/not tiltable:	not tiltable
- OECD approval	
Approval number:	4/0525
Date of approval:	29th May 1998
- Nos. of minor modification certificates:	Mod 1 (15th September 1998) Mod 2 (08th January 1999)
- Optional protective device:	Not fitted
- Make/Model/Type:	CASE IH / MX11 Standard Cab or MX11 Low Profile Cab
- Manufacturer's name and address:	CASE France S.A. BP 109 59964 Croix Cedex France
- Protective device	
Cab/frame/rollguard/other:	Cab
Tiltable/not tiltable:	not tiltable
- OECD approval	
Approval number:	CSS 0472/11 resp. CSS 0472/12
Date of approval:	21st October 1997
- Nos. of minor modification certificates:	Mod 1 (08th January 1999) Mod 2 (27th August 1999)

1.14 Seat

1.14.1 Driver's seat — Fitted to tractor

- Make/Model: Grammer / DS 85 H/90A
- Type: Upholstered seat with back rest
- Seat and steering wheel reversible: No
- Type of suspension: Mechanical
- Type of damping: Hydraulical
- Range of adjustment
  - Longitudinally: 210 mm
  - Vertically: 60 mm
- Safety belt: On request, not fitted

1.14.2 Optional driver's seats

- Make/Model/Type: Grammer / DS 85H/7L / Mechanical suspension or Grammer / MSG 95A/31C / Air suspension

1.14.3 Passenger seat: On request, not fitted

1.15 Lighting

Electrical, 12 Volt

	Height above ground of centre	Size	Distance from outside edge of lights to median plane of tractor
	mm	mm	mm
Headlights	1335	180x103	263
Sidelights	1605	113x36	888
Rearlights	1665	67x62	755
Reflectors 1st pair	1665	50x62	805
2nd pair	850	60 dia	265

2. TEST CONDITIONS

2.1 Overall dimensions

Length	Width	Height at top of	
		protective structure	exhaust silencer pipe
mm	mm	mm	mm
3830	2020	2470	2490

2.2 Ground clearance 315 mm

- Clearance-limiting part: Bracket of swinging drawbar

2.3 Tractor mass Unballasted (with frame)

	Without driver kg	With driver kg
Front	1415	1430
Rear	2030	2090
Total	3445	3520

2.4 Track specifications Not applicable

2.5 Tyres and track widths specifications

	Front	Rear
Tyres:	GOODYEAR	GOODYEAR
dimensions	12.4 R 24	16.9 R 34
load index speed index	119 A8	139 A8
type	radial ply	radial ply
maximum load (tyre manufacturer's)	13.6 kN	24.3 kN
at travelling speed	40 km/h	40 km/h
at tyre inflation pressure	160 kPa	160 kPa
radius index (ISO 4251-1 : 1992)	540 mm	745 mm
Chosen track width:	1550 mm	1520 mm
*) Technically permissible axle load:	29.0 kN	41.0 kN
*) Technically permissible total weight:	60.0 kN	

*) without consideration of load restriction, given by the tyres used

2.6 Fuel

- Type: ARAL-Diesel-fuel, in conformity with DIN 51601
- Density at 15°C: At p.t.o. tests 0.830 g/cm³
  at drawbar power tests . 0.842 g/cm³

2.7 Oils and lubrication

2.7.1 Capacity and change interval

	Capacity	Oil change	Filter change
	dm³	h	h
Engine	7.6	250	250
Gear box	37	1000	500
Front axle	5.5	1000	-
Rear axle	common with gearbox	common with gearbox	common with gearbox
Final drives (front, each)	0.6	1000	-
Final drives (rear)	common with gearbox	common with gearbox	common with gearbox
Hydraulic system	common with gearbox	common with gearbox	common with gearbox
Steering	common with gearbox	common with gearbox	common with gearbox

2.7.2 Specifications:

	Recommended	Used during test
Engine oil:		
Used in engine		
Type	Multi-grade oil	MS1121*) Case No. 1
Viscosity	SAE 15W-40	SAE 15W-40
Classification	API CG-4 or CF-4	API CG-4 or CF-4
Transmission oil:		
Used in gearbox, rear axle, hydraulic- and steering system		
Type	CASE HY-TRAN PLUS	CASE HY-TRAN PLUS
Viscosity	ISO-VG-46	ISO-VG-46
Classification	MS 1223*)	MS 1223*)
Used in front axle and front final drives		
Type	Gear oil	
Viscosity	SAE 84W-140	
Classification	API-GL5 or MS 1316*)	

*) MS 1121, MS 1223 and MS 1316 = CASE specification

2.7.3 Grease: Multi purpose grease

- number of lubrication points: 9

CASE IH CX 50 (4WD) **DLG-Test No 99-091**

3. COMPULSORY TESTS RESULTS

3.1 MAIN POWER TAKE OFF PERFORMANCE (540 min^{-1})

Date of tests: 20th April 1999
Location of tests: DLG-Testing Station Groß-Umstadt
Type of dynamometer: SCHENCK hydraulic dynamometer U1-40

Power kW	Speed Engine min^{-1}	Speed P.t.o. min^{-1}	Fuel consumption hourly dm³/h	Fuel consumption hourly kg/h	Fuel consumption specific g/kWh	Specific energy kWh/dm³
Maximum power						
3.1.1 At 2-hour test						
31.7	2248	605	10.58	8,78	277	2.99
3.1.2 At rated speed						
31.7	2248	605	10.58	8.78	277	2.99
3.1.3 At standard p.t.o. speed						
30.5	2006	540	9.72	8.07	265	3.13
3.1.4 Part loads, the governor hand lever in the position corresponding to maximum power at full load (curve a)						
3.1.4.1 the torque corresponding to maximum power at rated speed						
31.7	2248	605	10.58	8.78	277	2.99
3.1.4.2 85% of the torque obtained in 3.1.4.1						
27.6	2311	622	9.46	7.85	285	2.92
3.1.4.3 75% of the torque defined in 3.1.4.2						
21.0	2348	632	7.86	6.52	310	2.67
3.1.4.4 50% of the torque defined in 3.1.4.2						
14.1	2363	636	6.39	5.30	376	2.20
3.1.4.5 25% of the torque defined in 3.1.4.2						
7.1	2389	643	4.55	3.78	531	1.57
3.1.4.6 unloaded						
-	2403	647	3.23	2.68	-	-

Power kW	Speed Engine min⁻¹	Speed P.t.o. min⁻¹	Fuel consumption hourly dm³/h	Fuel consumption hourly kg/h	Fuel consumption specific g/kWh	Specific energy kWh/dm³
3.1.5 Part loads, the governor hand lever in the position corresponding to standard p.t.o. speed at full load (curve b)						
3.1.5.1 the torque corresponding to maximum power						
30.5	2006	540	9.72	8.07	265	3.13
3.1.5.2 85% of the torque obtained in 3.1.5.1						
26.4	2040	549	8.40	6.97	265	3.14
3.1.5.3 75% of the torque defined in 3.1.5.2						
20.2	2077	559	6.99	5.80	287	2.89
3.1.5.4 50% of the torque defined in 3.1.5.2						
13.6	2110	568	5.52	4.58	336	2.47
3.1.5.5 25% of the torque defined in 3.1.5.2						
6.9	2129	573	4.11	3.41	496	1.67
3.1.5.6 unloaded						
-	2156	580	2.53	2.10	-	-

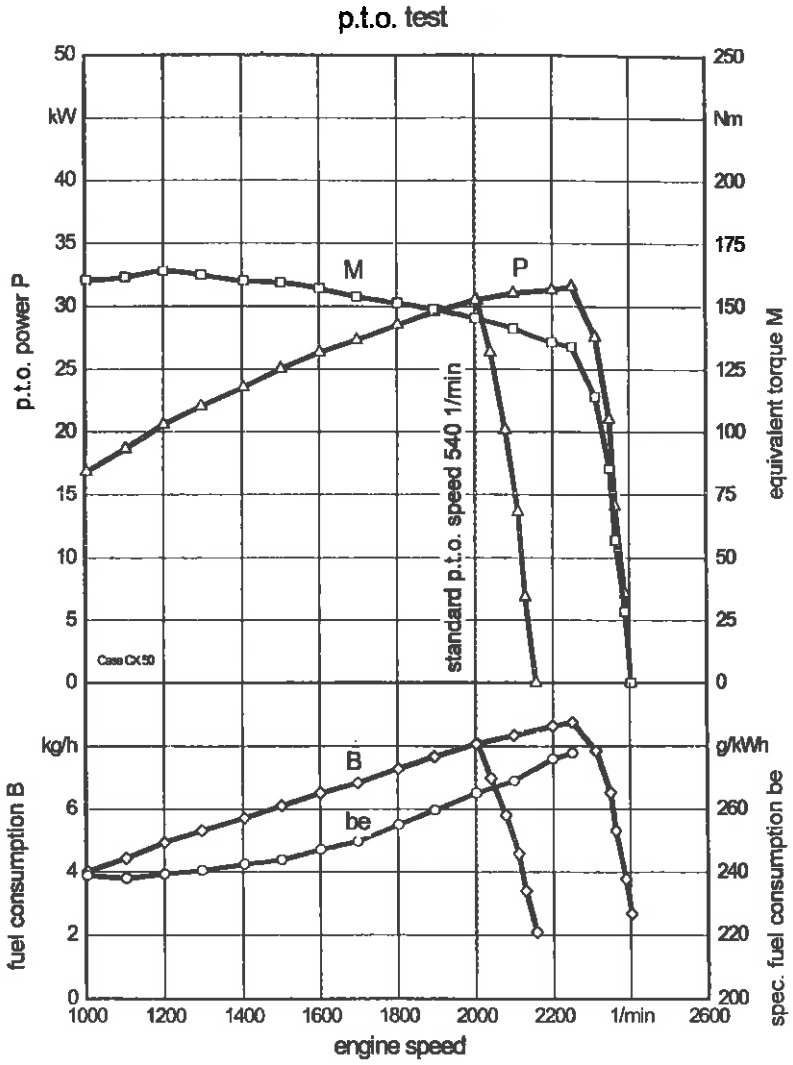
No load maximum engine speed:	2403 min⁻¹
Equivalent flywheel torque at rated engine speed:	135 Nm
Equivalent flywheel torque at 2-hour test:	135 Nm
at engine speed:	2248 min⁻¹
Maximum equivalent flywheel torque:	164 Nm
at engine speed:	1200 min⁻¹

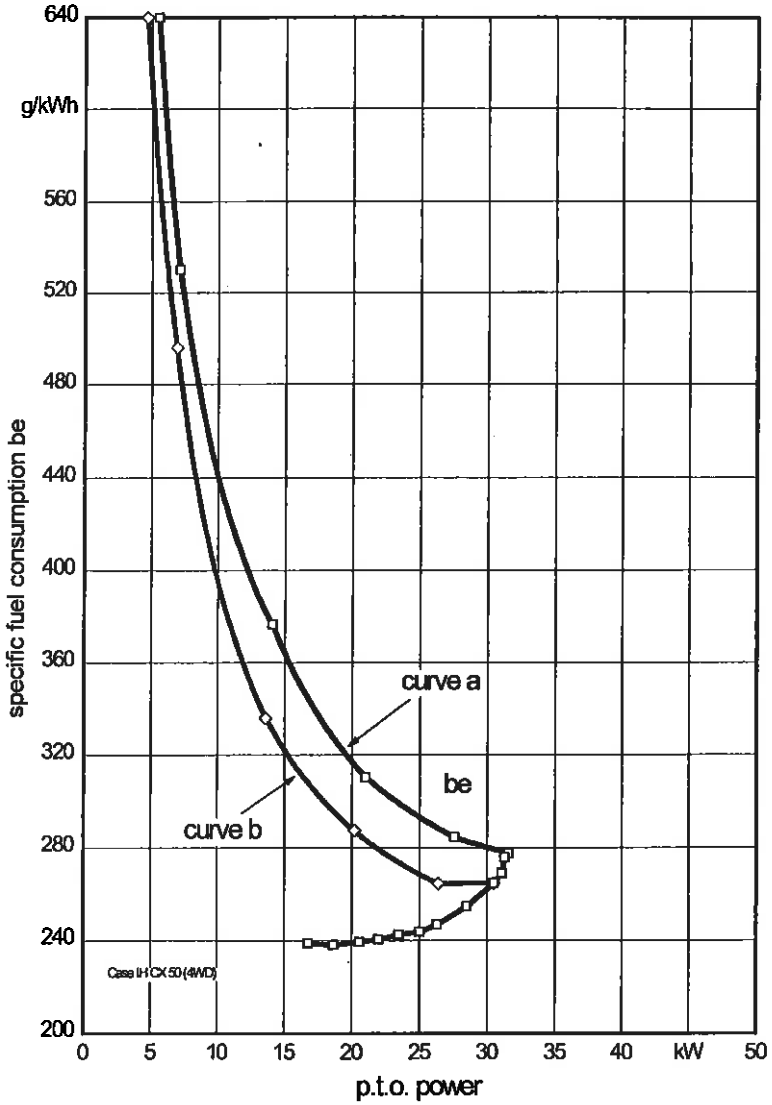
Mean atmospheric conditions

temperature:	21 °C
pressure:	997 hPa
relative humidity:	40 %

Maximum temperatures

coolant:	67 °C
oil:	107 °C
fuel:	65 °C
air intake:	21 °C


p.t.o. test
p.t.o. power P
kW
Nm
equivalent torque M
M
P
standard p.t.o. speed 540 1/min
Case CX50
fuel consumption B
kg/h
g/kWh
spec. fuel consumption be
B
be
engine speed
1/min
50
40
35
30
25
20
15
10
5
0
250
200
175
150
125
100
75
50
25
0
6
4
2
0
260
240
220
200
1000
1200
1400
1600
1800
2000
2200
2600


640
g/kWh
560
520
480
440
400
360
320
280
240
200
specific fuel consumption be
curve a
be
curve b
Case IH CX 50 (4WD)
0
5
10
15
20
25
30
35
40
kW
50
p.t.o. power

3.2 HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 18th and 27th May 1999

3.2.1 Hydraulic power test

- Sustained pressure with relief valve open 16.7 MPa
- Pump delivery rate at minimum pressure 52.1 dm³/min

	Hydraulic power kW	Flow rate dm³/min	Pressure MPa	Oil Temperature °C
At 90% of the actual relief valve setting	12.0	47.8	15.1	65
Maximum	12.0	47.8	15.1	65

- Tapping point used for test: At rear of tractor, connected with additional control valve no 2

3.2.2 Power lift test

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	200 mm	
Vertical movement without lifting forces	640 mm	840 mm
with lifting forces	625 mm	830 mm
Max. corrected force exerted through full range	15.8 kN	11.9 kN
Corresponding pressure	15.1 MPa	
Moment about rear axle	-	18.85 kNm
Max. tilt angle of mast from vertical		9°

Lifting heights relative to horizontal lower links												
mm	-495	-400	-375	-300	-200	-100	0	+100	+200	+250	+300	+335
Lifting forces at hitch points, corrected to 15.1 MPa												
kN			15.80	16.70	18.00	18.90	19.80	19.80	19.60	18.50		
Lifting forces at standard frame, corrected to 15.1 MPa												
kN	11.90	12.60		13.10	13.60	13.80	14.00	13.80	13.50		12.60	12.20

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3.3 DRAWBAR POWER TEST

- Date of test: 18th till 22nd June 1999
- Type of track: Concrete

Gear number and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption
	kW	kN	km/h	min^{-1}	%	g/kWh
3.3.1	MAXIMUM POWER IN TESTED GEARS (unballasted tractor)					
1 TA - Lo	16.5	35.45	1.68	2325	15.0	416
1 DD - Lo	19.8	35.55	2.00	2290	15.0	408
2 TA - Lo	25.4	28.98	3.15	2252	6.8	347
2 DD - Lo	25.4	23.54	3.88	2251	4.9	345
3 TA - Lo	26.0	17.75	5.28	2251	3.4	339
3 DD - Lo	25.6	14.52	6.35	2235	2.8	344
4 TA - Lo	25.3	13.36	6.82	2240	2.4	348
1 TA - Hi	26.4	13.59	6.99	2248	2.5	332
4 DD - Lo	24.2	10.53	8.28	2246	1.9	362
1 DD - Hi	24.9	10.60	8.46	2247	2.0	353
2 TA - Hi	23.4	6.78	12.43	2241	1.2	373
3.3.2	FUEL CONSUMPTION					
3.3.2.1	in selected gear, at maximum power at rated speed,					
1 TA - Hi	26.4	13.59	6.99	2248	2.5	332
3.3.2.1.1	75 % of pull at maximum power at rated speed					
1 TA - Hi	20.4	10.18	7.22	2310	1.9	362
3.3.2.1.2	50 % of pull at maximum power at rated speed					
1 TA - Hi	14.0	6.82	7.37	2338	1.2	452
3.3.2.1.3	next higher gear at reduced engine speed; same pull and travelling					
4 DD - Lo	20.6	10.17	7.28	1978	1.9	345
3.3.2.1.4	next higher gear at reduced engine speed; same pull and travelling					
4 DD - Lo	14.0	6.83	7.36	1985	1.2	391
3.3.2.2	in selected gear					
1 DD - Hi	24.9	10.60	8.46	2247	2.0	353
3.3.2.2.1	75 % of pull at maximum power at rated speed					
1 DD - Hi	19.3	7.97	8.74	2313	1.5	381
3.3.2.2.2	50 % of pull at maximum power at rated speed					
1 DD - Hi	13.1	5.31	8.87	2336	1.0	471
3.3.2.2.3	next higher gear at reduced engine speed; same pull and travelling					
2 TA - Hi	19.2	7.94	8.70	1555	1.6	319
3.3.2.2.4	next higher gear at reduced engine speed; same pull and travelling					
2 TA - Hi	13.2	5.35	8.89	1598	1.0	358

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	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
unballasted	380 mm	80 kPa	80 kPa

Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/dm³	°C	°C	°C	°C	%	kPa
2.02	62	64	107	18	57	100.5
2.06	65	66	105	17	57	100.5
2.43	71	66	116	18	57	100.5
2.44	69	67	114	20	57	100.5
2.48	68	68	113	19	57	100.5
2.45	69	67	112	20	57	100.5
2.42	73	66	109	18	46	100.0
2.53	66	67	113	19	46	100.0
2.33	68	67	113	19	46	100.0
2.39	68	66	114	19	46	100.0
2.26	68	65	108	19	57	100.5
identical with gear nearest to 7.50 km/h at rated speed						
2.53	66	67	113	19	46	100.0
2.32	67	60	110	20	57	100.5
1.86	57	58	104	15	57	100.5
speed as in 3.3.2.1.1						
2.44	53	59	101	15	57	100.5
speed as in 3.3.2.1.2						
2.15	54	58	101	16	57	100.5
2.39	68	66	114	19	46	100.0
2.21	62	57	104	17	57	100.5
1.79	59	56	107	17	57	100.5
speed as in 3.3.2.2.1						
2.64	55	57	101	16	57	100.5
speed as in 3.3.2.2.2						
2.35	54	55	99	16	57	100.5

4	**OPTIONAL TEST RESULTS**	None
5	**REPAIRS**	None
6	**REMARKS**	None

Head of tractor test section

M. Lober

Dipl.-Ing. Manfred Lober

Date: 19th May 2000

Deutsche Landwirtschafts-Gesellschaft

Test carried out by

B. Huber

Dipl.-Ing. Bodo Huber