Prüfstelle für Landmaschinen



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

OECD No. 2/1898
12th April 2000

Agricultural Tractor

CASE IH 90 (4WD), 40 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: October and November 1998

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: 12th April 2000 OECD No. 2/1898

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. 317

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CASE IH CX 90 (4WD) **DLG-Test No 98-297**

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 50 h
Location of test:	DLG-Testing Station, D-64823 Groß-Umstadt

1 SPECIFICATION OF TRACTOR

1.1 Identification

- Make/Model/Type:	CASE IH / CX 90/ wheel tractor, unit construction, four wheel driven
- Trade name:	CX 90 A, 40 km/h version
- Number of driving- wheels:	4
- Serial No.:	JJE 100 2103
- 1st serial No.:	JJE 100 0001

1.2 Engine

Make/Model:	PERKINS / 1004-4T HR (Case - model 5632)
Type:	Water-cooled 4-stroke Diesel-engine, direct injection, supercharged
Serial no.:	AQ U873802 D

1.2.1 Cylinders

Number/disposition:	4 / in line
Bore/stroke:	100 / 127 mm
Capacity:	3990 cm^3
Compression ratio:	17.25 : 1
Arrangement of valves:	Overhead valves
Cylinder liners:	Dry

1.2.2 Supercharging

- Make/Model/Type:	GARRETT / GT 2052 / exhaust driven supercharger, wastegate
- Pressure:	max. 110 kPa

1.2.3	Fuel system	
	- Fuel feed system:	Diaphragm fuel supply pump, fuel cooler in front of engine's water cooler
	- Fuel filter	
	Make/Model:	PERKINS / - /
	Type :	1 replaceable filter
	- Capacity of fuel tank:	155 dm³
	- Injection pump	
	Make/Model:	LUCAS/8920 A 690 T
	Type :	DP 200, distributor pump
	Serial no.:	35697 MPG
	Manufacturer's production setting:	71 ± 2.4 mm³/stroke at full load and rated speed;
	Flow rate:	18.8 ± 0.7 dm³/h at 2200 min⁻¹ and full load
	Timing:	Commencement of delivery: Static 1° BTDC ± 2°
	- Injectors	
	Make/Model:	LUCAS / KN L 063 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 2360 - 50 min⁻¹
	- Rated engine speed:	2200 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 / 222 421 A1
	Type:	Dry paper element filter with additional safety cartridge
	- Maintenance indicator:	Warning light on dashboard
1.2.6	Lubrication system:	Pressure lubrication with engine oil/cooling water heat exchanger in filter socket
	- Type of feed pump:	Internal gear pump
	- Type of filter:	Full flow, replaceable (metallic cartridge)
	- Number of filter:	1

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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:	17.5 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 alternato
	Power:	1 kW
	- Battery:	1 lead acid battery, 90 Ah at 20 hours rating
1.2.10	Exhaust system	
	- Make/Model/Type:	DONALDSON / M050128 / multi-chamber absorp... 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 / M050129 / multi-chamber absorpti 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 runnin

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 / KT / mechanical, power shift, 40 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	16	8

3 levers, 1 toggle switch

- Available options:
  1. CASE / NT / mechanical, power shift, 30 km/h version, 16 forward / 8 reverse
  2. 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: Multi-plate, wet
  - Engagement: By toggle switch, electro-hydraulical (through low pressure hydraulic circuit)
  - Disengagement: By service brake operation or engine cut off

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 2200 min^{-1} km/h
Forward Speeds			
Lo - TA	1	301.24	2.12
Lo - DD		249.82	2.56
Lo - TA	2	171.03	3.73
Lo - DD		141.83	4.50
Lo - TA	3	115.43	5.53
Lo - DD		95.73	6.67
Lo - TA	4	73.64	8.67
Lo - DD		61.07	10.46
Hi - TA	1	80.33	7.95
Hi - DD		66.62	9.59
Hi - TA	2	45.61	14.00
Hi - DD		37.82	16.88
Hi - TA	3	30.78	20.75
Hi - DD		25.53	25.02
Hi - TA	4	19.64	32.52
Hi - DD		16.29	39.22
Reverse Speeds			
Lo - TA	1	276.14	2.31
Hi - TA		73.64	8.67
Lo - TA	2	156.77	4.07
Hi - TA		41.81	15.28
Lo - TA	3	105.81	6.04
Hi - TA		28.22	22.63
Lo - TA	4	67.50	9.46
Hi - TA		18.00	35.48

*) calculated with the radius index (ISO 4251-1:1992) 770 mm

Number of revolutions of front wheels for one revolution of rear wheels: 1.407

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 1000 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: 648 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	3.6919	540 596	1994 2200	-
1000	2.0000	1000 1100	2000 2200	-

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

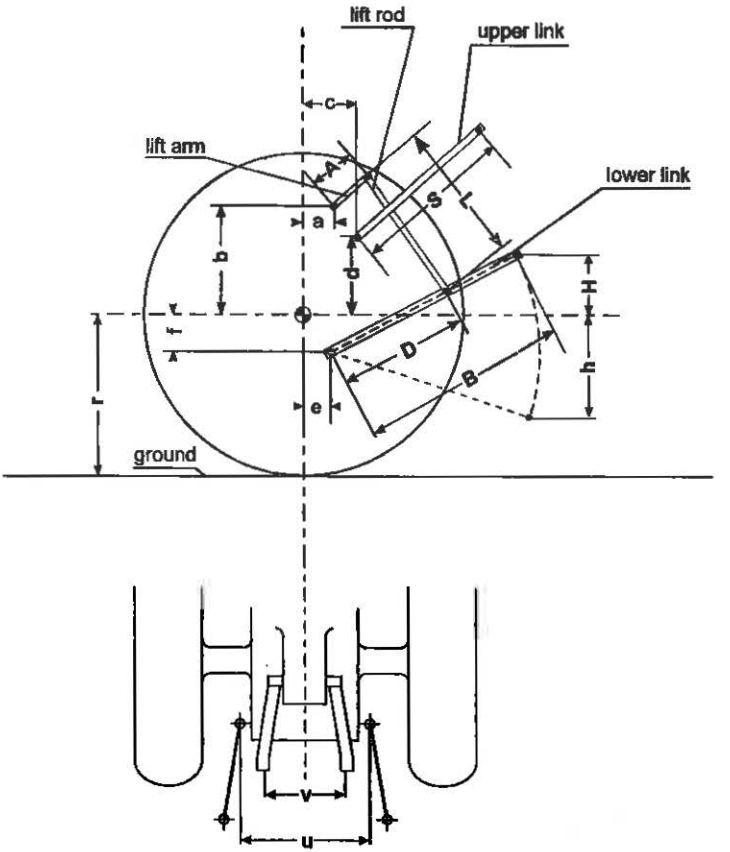
1.4.1.2 Power take-off proportional to ground speed: None

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, 1 external cylinder, single acting, 50 mm bore, 204 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
- Type, number and location of tapping points:	2 pairs, double acting, at rear of tractor
- Maximum volume of oil available to external cylinders:	13.6 dm^3 40.9 dm^3 with overfill

1.6 Three-point linkage:

- Category: 2, in conformity with ISO 730-1:1994, with WALTERSCHEID quick couplers
- Category adaptér: None



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Dimensions of rear implement linkage			projected lengths in mm dimensions and range	settings used in test-page 25
Rear tyres 18.4 R 34 Front tyres 13.6 R 24		(r) *) (r') *)	770 560	
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	716
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	750

Heights (h, H, H') of lower link hitch points relative to rear wheel axis (situated 770 mm above ground), at different adjustments of L

These data are valid for unloaded power lift

Length of lift rods	(L)	635	750
Linkage distance of lift rods	(D)	550	
Lowest position	(h)	330	570
Highest position	(H)	255	95
Transport position	(H')	255	95

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

1.7 Swinging drawbar

- Type:	Longitudinally adjustable
- Height above ground:	395 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

- Make/Model/Type:	CRAMER / KU 5410/309 / non-automatical
- Hole diameter:	32 mm
- Height above ground:	Centre of clevis adjustable in 5 steps to 575/675/775/825/875 mm
- Distance of hitch point from rear-wheel axis, horizontal:	594 mm
- Distance of hitch point from power take-off shaft end	
Vertical	below 73 mm, above 27/127/177/227 mm
Horizontal	159 mm
- Maximum vertically permissible load:	15.0 kN

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 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
	- 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: 2356 mm

- Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	1364	1930	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 LR 20 375/75 R 20 11.2 R 24 12.4 R 24 360/70 R 24
16.9 R 30	12.4 R 20 14.9 LR 20 335/80 R 20 375/75 R 20 405/70 R 20 9.5 R 24 11.2 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/Type:	CASE IH / MX11 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 0472/3 resp. CSS 0472/4
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	1360	180x103	263
Sidelights	1625	113x36	888
Rearlights	1600	67x62	840
Reflectors 1st pair	1600	50x62	890
2nd pair	880	60 dia	300

2. TEST CONDITIONS

2.1 Overall dimensions

Length	Width	Height at top of	
		protective structure	exhaust silencer pipe
mm	mm	mm	mm
4000	2150	2520	2520

2.2 Ground clearance 330 mm

- Clearance-limiting part: Bracket of swinging drawbar

2.3 Tractor mass Unballasted (with frame)

	Without driver kg	With driver kg
Front	1520	1535
Rear	2185	2245
Total	3705	3780

2.4 Track specifications Not applicable

2.5 Tyres and track widths specifications

	Front	Rear
Tyres:	GOODYEAR	GOODYEAR
dimensions	13.6 R 24	18.4 R 34
load index speed index	121 A8	144 A8
type	radial ply	radial ply
maximum load (tyre manufacturer's)	14.2 kN	27.5 kN
at travelling speed	40 km/h	40 km/h
at tyre inflation pressure	160 kPa	160 kPa
radius index (ISO 4251-1 : 1992)	560 mm	770 mm
Chosen track width:	1530 mm	1620 mm
Technically permissible axle load:	30.4 kN	54.9 kN
Technically permissible total weight:	58.9 kN	

2.6 Fuel

- Type: ARAL-Diesel-fuel, in conformity with DIN 51601
- Density at 15°C: At p.t.o. tests and at drawbar power tests 0.843 g/cm³

2.7 Oils and lubrication

2.7.1 Capacity and change interval

	Capacity	Oil change	Filter change
	dm³	h	h
Engine	8.8	250	250
Gear box	37	1000	500
Front axle	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.
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 PLU
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

3. COMPULSORY TESTS RESULTS

3.1 MAIN POWER TAKE OFF PERFORMANCE (1000 min⁻¹)

Date of tests: 1st October 1998
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						
60.5	2000	1000	18.00	15.17	251	3.36
3.1.2 At rated speed						
59.4	2200	1100	18.81	15.86	267	3.16
3.1.3 At standard p.t.o. speed						
60.5	1998	999	18.01	15.18	251	3.36
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						
59.4	2200	1100	18.81	15.86	267	3.16
3.1.4.2 85% of the torque obtained in 3.1.4.1						
52.0	2272	1136	17.47	14.73	283	2.97
3.1.4.3 75% of the torque defined in 3.1.4.2						
39.4	2294	1147	14.78	12.46	317	2.66
3.1.4.4 50% of the torque defined in 3.1.4.2						
26.4	2314	1157	12.14	10.23	387	2.18
3.1.4.5 25% of the torque defined in 3.1.4.2						
13.3	2336	1168	9.49	8.00	600	1.41
3.1.4.6 unloaded						
-	2361	1181	5.96	5.02	-	-

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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

60.5	1998	999	18.01	15.18	251	3.36

3.1.5.2 85% of the torque obtained in 3.1.5.1

52.5	2042	1021	16.20	13.66	260	3.24

3.1.5.3 75% of the torque defined in 3.1.5.2

40.0	2070	1035	13.50	11.38	285	2.96

3.1.5.4 50% of the torque defined in 3.1.5.2

27.0	2098	1049	10.89	9.18	340	2.48

3.1.5.5 25% of the torque defined in 3.1.5.2

13.7	2130	1065	8.24	6.95	507	1.66

3.1.5.6 unloaded

-	2168	1084	4.83	4.07	-	-

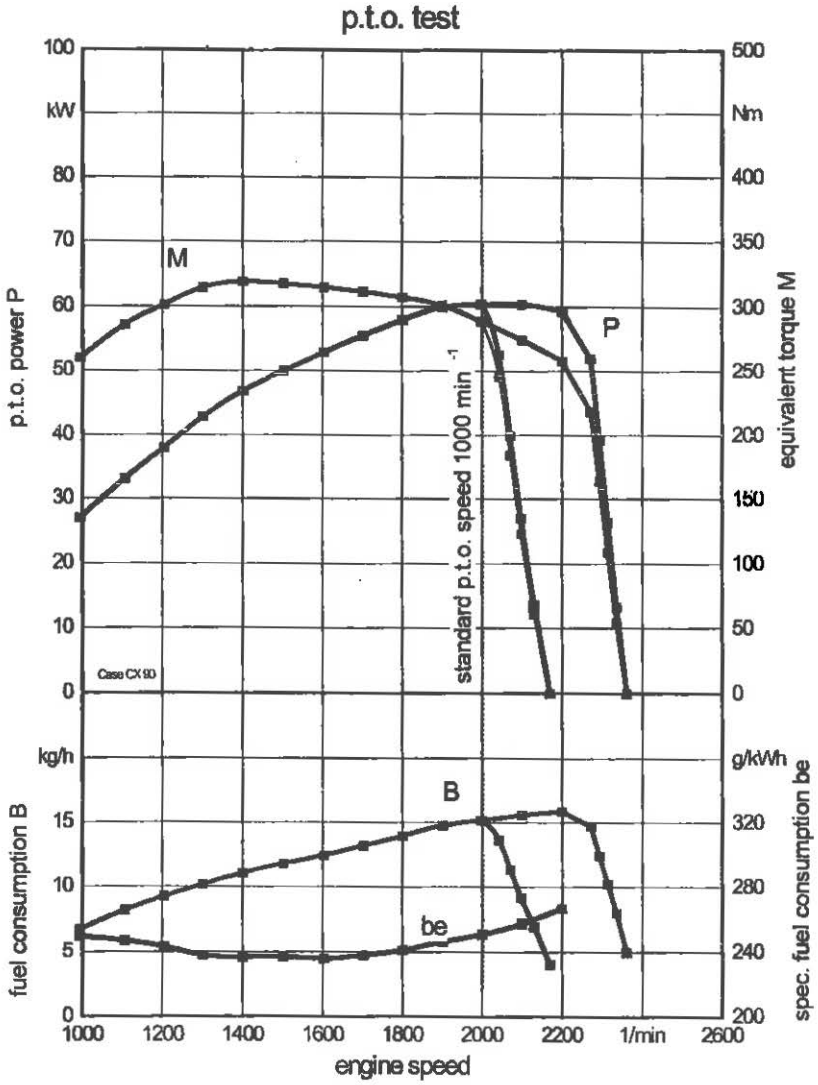
No load maximum engine speed:	2361 min⁻¹
Equivalent flywheel torque at rated engine speed:	258 Nm
Equivalent flywheel torque at 2-hour test:	289 Nm
at engine speed:	2000 min⁻¹
Maximum equivalent flywheel torque:	319 Nm
at engine speed:	1400 min⁻¹

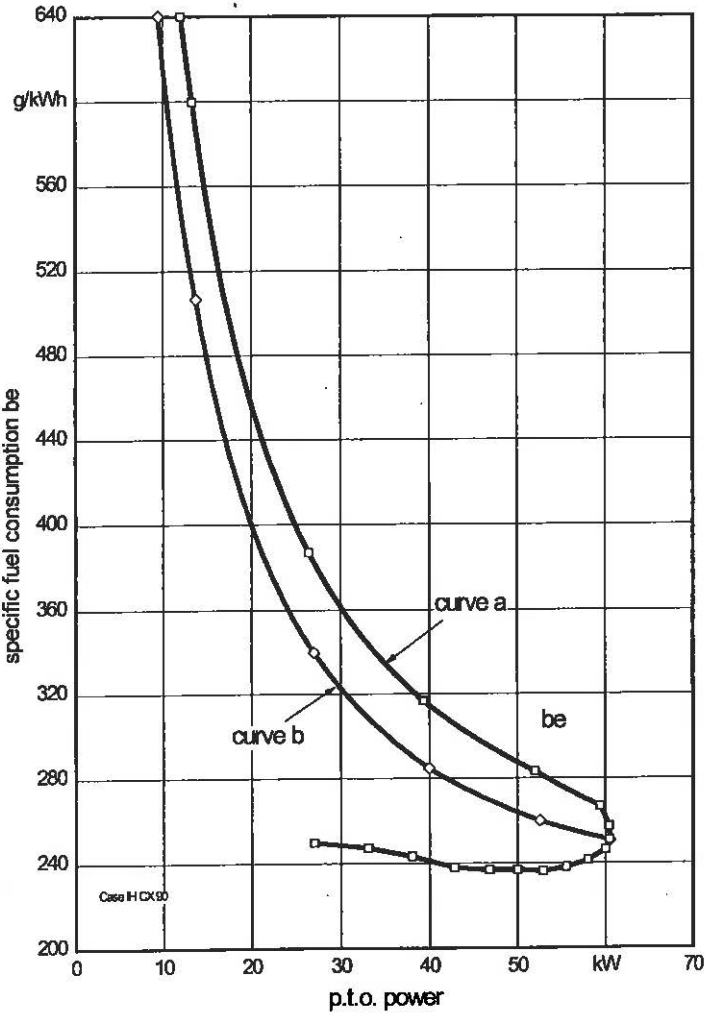
Mean atmospheric conditions

temperature:	21 °C
pressure:	989 hPa
relative humidity:	33 %

Maximum temperatures

coolant:	81 °C
oil:	116 °C
fuel:	46 °C
air intake:	21 °C


p.t.o. test
p.t.o. power P
kW
equivalent torque M
Nm
M
P
standard p.t.o. speed 1000 min -1
Case CX 90
fuel consumption B
kg/h
B
be
spec. fuel consumption be
g/kWh
engine speed
1/min
100
80
70
60
50
40
30
20
10
0
500
400
350
300
250
200
150
100
50
0
15
10
5
320
280
240
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
curve b
be
Case IH CX90
0
10
20
30
40
50
kW
70
p.t.o. power

3.2 HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 27th October and 17th November 1998

3.2.1 Hydraulic power test

- Sustained pressure with relief valve open 17.8 MPa
- Pump delivery rate at minimum pressure 64.3 dm³/min

	Hydraulic power kW	Flow rate dm³/min	Pressure MPa	Oil Temperature °C
At 90% of the actual relief valve setting	14.2	53.2	16.0	65
Maximum	14.2	53.2	16.0	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 with lifting forces	665 mm 650 mm	910 mm 890 mm
Max. corrected force exerted through full range	23.90 kN	17.80 kN
Corresponding pressure	16.0 MPa	
Moment about rear axle	-	28.2 kNm
Max. tilt angle of mast from vertical		11°

Lifting heights relative to horizontal lower links												
mm	-530	-500	-400	-300	-200	-100	0	+100	+200	+250	+300	+360
Lifting forces at hitch points, corrected to 16.0 MPa												
kN			23.90	25.90	27.45	28.35	28.95	29.15	28.60	27.70		
Lifting forces at standard frame, corrected to 16.0 MPa												
kN	18.00	18.20	19.20	20.00	20.60	20.80	20.70	20.25	19.80		18.55	17.80

3.3 DRAWBAR PERFORMANCE

- Date of test: 16th till 19th October 1998
- 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 Lo - DD	25.8	41.05	2.26	2271	14.7	541
2 Lo - TA	36.9	41.02	3.24	2232	14.9	428
2 Lo - DD	41.9	40.50	3.72	1990	9.3	366
3 Lo - TA	48.5	37.22	4.69	1991	6.8	315
3 Lo - DD	49.5	30.75	5.80	1993	4.5	308
1 Hi - TA	52.8	27.30	6.96	1999	4.0	290
4 Lo - TA	51.2	24.06	7.66	2002	3.3	299
1 Hi - DD	50.7	21.57	8.47	1995	2.9	302
4 Lo - DD	49.2	19.15	9.25	1992	2.8	311
3.3.2 3.3.2.1	FUEL CONSUMPTION in selected gear, at maximum power at rated speed,					
1 Hi - TA	51.6	24.24	7.67	2190	3.6	310
3.3.2.1.1	75 % of pull at maximum power at rated speed					
1 Hi - TA	40.6	18.27	8.01	2268	2.6	346
3.3.2.1.2	50 % of pull at maximum power at rated speed					
1 Hi - TA	27.4	12.10	8.16	2291	1.9	432
3.3.2.1.3	next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1					
4 Lo - TA	40.1	18.18	7.95	2066	2.6	334
3.3.2.1.4	next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2					
4 Lo - TA	27.3	12.04	8.15	2093	1.5	394
3.3.2.2	in selected gear					
4 Lo - TA	50.0	21.36	8.42	2198	3.1	320
3.3.2.2.1	75 % of pull at maximum power at rated speed					
4 Lo TA	39.1	16.03	8.77	2269	2.2	359
3.3.2.2.2	50 % of pull at maximum power at rated speed					
4 Lo - TA	26.4	10.61	8.95	2295	1.3	445
3.3.2.2.3	next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1					
1 Hi - DD	39.3	16.13	8.77	2046	2.0	333
3.3.2.2.4	next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2					
1 Hi - DD	26.6	10.68	8.97	2080	1.4	393

CASE IH CX 90 (4WD) **DLG-Test No 98-297**

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
unballasted	400 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
1.56	49	83	116	15	74	99.5
1.97	51	83	119	14	74	99.5
2.31	50	84	119	13	76	99.5
2.67	49	84	117	14	76	99.5
2.74	48	83	117	13	76	99.5
2.91	49	83	116	9	80	99.5
2.82	45	82	115	10	80	99.5
2.79	45	82	115	12	80	99.5
2.71	46	83	115	13	78	99.5
Identical with gear nearest to 7.50 km/h at rated speed						
2.72	42	82	116	9	80	99.7
2.43	42	81	115	8	80	99.7
1.95	40	79	112	9	80	99.7
2.52	40	80	111	9	80	99.7
2.14	41	80	112	9	80	99.7
2.64	44	82	115	9	80	99.7
2.35	44	82	116	9	80	99.7
1.90	43	81	115	11	80	99.7
2.53	40	80	111	12	78	99.7
2.15	41	79	111	10	80	99.7

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

Head of tractor test section

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Date: 19th May 2000

Deutsche Landwirtschafts-Gesellschaft

Test carried out by

B. Huber

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