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

Restricted Code **OECD No.** **1287**

Agricultural Tractor CASE-IH 5140-MAXXUM (4WD)

Model denomination 5140 A

Manufacturer
JI CASE GmbH
D-4040 Neuss

Deutsche Landwirtschafts-Gesellschaft e.V. · Zimmerweg 16
D-6000 Frankfurt a. M. 1 · Telefon: (069) 7 16 80
Telex: 4 13 185 dlg-d · Btx * 20063 # · Telefax (069) 7 24 15 54

This is a report on a tractor test in accordance with OECD STANDARD CODE for the Official Testing of Agricultural Tractor Performance (C(87)53(Final), Code II).

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

Duration of tests: October 1989 till January 1990

DLG-Testing Station for Agricultural Machinery, Max-Eyth-Weg 1,
D-6114 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: 27th September 1990

OECD No. 1287
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/cm²
	100 kPa	=	1000 mbar	=	750,10	mm Hg

Printed in the Federal Republic of Germany
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PRELIMINARY REMARK

The agricultural tractor CASE-IH 5140 A is offered in 2 variants:
1 - Model typical for North-America, so-called NAO-version
2 - Model typical for Europe, so-called EUR-version

Both versions are identical with the exception of following modifications:
transmission ratio in creeper range
transmission ratio 540 rev/min p.t.o.
lighting and mudguards.

The tested model is the NAO-version, fitted with
tyres set 1 front 14.9-24 6 ply FIRESTONE
rear 16.9-38 8 ply GOODYEAR

The drawbar power and fuel consumption tests pages 29 to 35 were completed by measurements with a further tyres combination
tyres set 2 front 14.9 R 24 126 A8 KLEBER
rear 18.4 R 38 146 A8 CONTINENTAL

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Tractor manufacturer:	JI CASE GmbH D-4040 Neuss
Location of tractor assembly:	D-4040 Neuss
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with agreement by DLG
Place of running in:	Neuss and Groß-Umstadt
Duration of running in:	appr. 50 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	CASE INTERNATIONAL
Trade name:	5140 - MAXXUM
Model denomination:	5140 A
Type:	Wheel tractor, unit construction, four wheel driven
Serial no.:	JJF 1000057
1st Serial no.:	JJF 1000001

Engine

Make:	CASE
Model:	6T-590
Type:	Watercooled 4 stroke Diesel-engine direct injection, turbo charged
Serial no.:	52100630
Cylinders:	6, in line, bore 102 mm, stroke 120 mm, displacement 5883 cm^3 compression ratio 17,5±1,5:1
Valves:	Overhead

Supercharging

Make:	HOLSET
Part no.:	J 907 029 (CUMMINS-no.: 3 907 029, HOLSET-no.: 3522778)
Pressure:	50 kPa

Fuel system:	AC SPARK fuel supply pump, BOSCH distributor injection pump CASE no.: J 917 935, (CUMMINS no.: 3 917 935), serial no.: 950 77326; manufacturer's production setting 54,0±2,5 mm³/stroke at full load and rated speed; automatic injection timing device, static injection timing: 1,50±0,15 mm piston stroke of injection pump at TDC, 14 degrees dynamic adjustment; BOSCH multihole injection nozzles DLLA 155 P 74; capacity of fuel tank 135 dm³, optional (fitted to tested tractor) 170 dm³
Governor:	BOSCH centrifugal variable speed governor, governed range of engine speed 800 to 2370 rev/min rated engine speed 2200 rev/min
Air cleaner:	MANN 4433592144, dry paper element filter with precleaner, replaceable cartridge; electric warning indicator lamp; air intake below bonnet
Exhaust silencer:	NELSON-BURGESS multi-chamber expansion reflection type oval 266 x 139 mm, 517 mm long, below bonnet, vertical pipe; mouth showing forward-upwards, 2740 mm above ground
Lubrication system:	Forced feed by internal gear pump, oil filter in full flow with replaceable cartridge, engine oil/cooling-water heat exchanger in crankcase
Cooling system:	Water cooling with impeller pump, overpressure relief valve set to 103,0 kPa; thermostat and by-pass circuit; fan with 6 blades with 450 mm dia; water capacity 22,0 dm³
Starting system:	Electrical BOSCH solenoid pre engaged-drive starter motor 3,1 kW; cold starting aid: Optional starting fluid (ether), fitted to tested tractor or CAV flame plug in air intake channel

Safety device:
Range gear in neutral position, forward/reverse control in forward position, p.t.o. lever off

Electrical system: 12 Volt, negative earth;
BOSCH 3-phase alternator K1-14 V/ 65 A 910 W; optional 95 A, 1330 W, fitted to tested tractor; 1 lead acid battery, 105 Ah at 20 hours rating (standard),
optional 2 batteries, fitted to tested tractor, 105 Ah, total 210 Ah

Transmission

Clutch:
CASE POCLAIN
wet multi-plate clutch, 127 mm dia
pedal operated or hydraulically controlled by forward-reverse lever

Gear box:
CASE POCLAIN 30 km/h version (40 km/h version optional);
power shift speed change gear with 4 speeds;
range gear with 4 synchronized ranges (I, II, III, IV);
power shift reversing gear (F,R);
in position reverse 3 ranges can be used;
total 16 forward, 12 reverse speeds;
optional 1 collar shifted creeper range(CR), acting on 2 range gears (I, II), fitted to tested tractor; total 24 forward and 20 reverse speeds;
creeper range must not be used for heavy drawbar pull;
4 levers (3 without creeper gear);
optionally available synchromesh speed change gear instead of power shift gearbox

Rear axle and final drives:
CASE POCLAIN, bevel gear drive;
bevel gear differential with multiplate differential lock, electro-hydraulically engaged/disengaged by switch or disengaged at service brake operation or engine cutoff;
planetary final drives

Front axle and final drives:
CARRARO 709/S4P,
driven by wet multi-plate clutch, central shaft and bevel gear; clutch operated by electro-hydraulic switch;
limited slip differential; planetary final drives

Total ratios and speeds: See tables below and on page -8-; there are two travelling speed columns stated for two different tyres combinations (according to the remark on page -3-)
+) items for tyres set 1
++) items for tyres set 2

number of revolutions of front wheels for one revolution of rear wheels:
At tested tractor **1.4066**
optional **1.2894**

Creeper Speeds

Range	Gear	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at rated engine speed of 2200 rev/min +) km/h	++)
Forward speeds				
I	1	2334,28	0,28	0,29
	2	1925,96	0,34	0,35
	3	1559,16	0,42	0,44
	4	1257,93	0,52	0,54
II	1	1024,20	0,64	0,66
	2	845,04	0,78	0,80
	3	684,10	0,96	0,99
	4	551,94	1,19	1,23
Reverse speeds				
I	1	1912,42	0,34	0,36
	2	1577,90	0,42	0,43
	3	1277,38	0,52	0,53
	4	1030,59	0,64	0,66
II	1	839,11	0,79	0,81
	2	692,33	0,95	0,98
	3	560,47	1,18	1,21
	4	452,19	1,46	1,50

+) calculated with the radius index (ISO 4251/1-1984) 795 mm
++) calculated with the radius index (ISO 4251/1-1984) 820 mm

PRÜFUNGS-ABTEILUNG
CASE IH 5140

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Normal speeds: Creeper range out of work

Range	Gear	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at rated engine speed of 2200 rev/min km/h	
			+)	++)
Forward speeds				
I	1	342,09	1,93	1,99
	2	282,25	2,34	2,41
	3	228,50	2,89	2,98
	4	184,35	3,58	3,69
II	1	150,10	4,39	4,53
	2	123,84	5,32	5,49
	3	100,26	6,58	6,78
	4	80,89	8,15	8,41
III	1	91,30	7,22	7,45
	2	75,33	8,75	9,03
	3	60,98	10,81	11,15
	4	49,20	13,40	13,82
IV	1	41,77	15,79	16,28
	2	34,46	19,13	19,73
	3	27,90	23,63	24,38
	4	22,51	29,29	30,21
Reverse speeds				
I	1	280,27	2,35	2,43
	2	231,24	2,85	2,94
	3	187,20	3,52	3,63
	4	151,04	4,37	4,50
II	1	122,97	5,36	5,53
	2	101,46	6,50	6,70
	3	82,14	8,03	8,28
	4	66,27	9,95	10,26
III	1	74,80	8,82	9,09
	2	61,71	10,68	11,02
	3	49,96	13,20	13,61
	4	40,31	16,36	16,87

+) calculated with the radius index (ISO 4251/1-1984) 795 mm
++) calculated with the radius index (ISO 4251/1-1984) 820 mm

Main p.t.o.

Independent; driven by multi-plate clutch, operated by electro-hydraulic switch;
NAO-version: (fitted to tested tractor)
1 shaft, standard p.t.o. speed change by reversing shaft, 35 mm dia, 6 splines resp. 35 mm dia 21 splines, ISO 500-1979 type 1 resp.2;
699 mm above ground, 545 mm behind rear wheel centre; sense of rotation clockwise, viewed facing tractor's rear
EUR-version: 1 shaft, 2 speeds preselectable by hand lever;

p.t.o.	p.t.o. speed rev/min	engine speed rev/min	p.t.o. transmission ratio	Power restriction kW
540	540 549	2163 2200	4,0062*)	-
1000	1000 996	2209 2200	2,2095**)*)	-
540	540 634	1875 2200	3,4720**)	-

*) NAO-version
**) EUR-version

Front p.t.o.

optionally available, not fitted

Power lift

CASE POCLAIN
servohydraulic power lift, unit construction, draft, position and intermixable control, floating position, fast raising, lowering throttle, lower links' sensing
Hydraulic system:
Closed centre system;
REXROTH adjustable axial-piston pump gear driven by gearbox,
max. delivery 75 l/min at rated engine speed;
oil cooler in front of engine water cooler,
oil filter in feed line;
REXROTH control valve, (lever in transport position lockable),
relief valve pressure setting 19,0±0,4 MPa;
single acting cylinder with 105 mm bore and 227 mm stroke, safety valve set to 22,0 MPa;

3 double acting additional CASE control valves, 6 oil couplings at rear of tractor;
maximum volume of oil available to external cylinders:
13 l during level operation
25 l during level operation with increased oil level
18 l during operation with increased oil level
hydraulic oil reservoir in common with gearbox with 70 l capacity

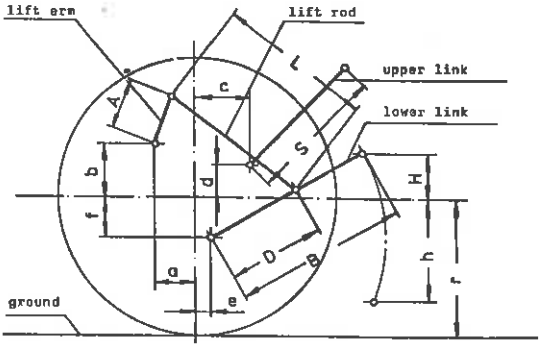
the hydraulic oil pump further provides hydraulic pressure for actuating of steering, p.t.o. clutch, power-shift gear and shifting the front axle drive clutch and the rear axle differential lock

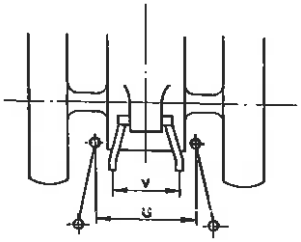
Three point-linkage:

Category 2 acc. to ISO 730/1-1977
lower links avaiable in 2 versions:

1. NAO-version with extendable lower links (fitted to tested tractor)

2. EUR-Version, with WALTERSCHEID quick couplers





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Dimensions of rear implement linkage (projected lengths in mm, underlined dimensions are valid for power lift measurements p.26)

Rear tyres 16.9-38	radius index +)	(r)	795
Front tyres 14.9-24	radius indes +)	(r')	590
Length of lift arms		(A)	230
Length of lower links		(B)	877
Distance of lift arm pivot points from rear wheel centre	horizontal	(a)	-243
	vertical	(b)	181
Horizontal distance between lower link pivot points		(u)	543
Horizontal distance between lift arm end points		(v)	692
Length of upper link		(S)	610 to 880, <u>755</u>
Distance of upper link pivot point from rear wheel centre	horizontal	(c)	359
	vertical	(d)	<u>160</u> or 230
Distance of lower link pivot point from rear wheel centre	horizontal	(e)	231
	vertical	(f)	246
Distance of lower link pivot points from lift rod pivot points on lower links		(D)	555
Length of lift rods		(L)	507 to 650, <u>645</u>

Height of lower link hitch points relative to rear wheels' centre line (situated 795 mm above ground), these data are valid for unloaded power lift:

Length of lift rods	(L)	<u>645</u>	507	650
Linkage distance of lift rods	(D)	555		
Lowest position	(h)	595	320	615
Highest position	(H)	128	310	115
Transport position	(H')	128	310	115

+) Assuming r resp. r' = tyre dynamic radius index of ISO 4251/1-1984

Pull attachment

Swinging drawbar:	Shiftable and turnable	
	height above ground	368 or 478 mm
	pivot point before rear wheel centre line	73 mm
	distance of hitch point from rear wheel centre line	
	vertical	317 or 427 mm
	horizontal	900, 950, 1050 or 1150 mm
	from p.t.o. shaft end	
	vertical	221 or 331 mm
	horizontal	355, 405, 505 or 605 mm
	with drawbar fully retracted centre of clevis swivelling to either side	179 mm
	maximum vertical permissible load	18 kN
	diameter of drawbar pin hole	33 mm
Trailer hitch:	Optionally available, not fitted	
Holed drawbar:	Short bar,	
	length between joint balls	825 mm
	9 holes, 33 mm dia with 80 mm distance each,	
	thickness/width of the drawbar	30/80 mm
	height above ground: minimum	180 mm
	maximum	1105 mm
	horizontal distance to p.t.o. shaft end (lower links in horizontal position)	563 mm
Towing hitch:	At front, height above ground	730 mm

Steering

DANFOSS, OSPC 160 LSR
(EATON, at 40 km/h version);
hydrostatic steering,
connected by sequence valve to the hydraulic system of the tractor (see on page 10);
1 integrated WEBER ram (symmetrical design), 236 mm stroke, 75 mm bore and 42 mm dia of piston rod, directly acting on steering levers;
working pressure 17,2 MPa

Brakes

Service brake:	CASE POCLAIN pedal operated muscle power brake with hydraulic transmission, using oil of gearbox, acting on rear wheels; oil-immersed disc brake with 1 ring-piston on each differential half shaft; disc diameter 300 mm; trailer braking take-off optional, on request hydraulical or pneumatical (not fitted to tested tractor)
Parking brake:	Mechanical wet disc brake, operated by lever with ratchet; 2 lining discs with 141 mm dia each, situated on drive shaft of rear axle (in front of bevel-gear pair)
Steering brake:	Divided pedal of service brake, for normal use locked together

Wheels

Front:	Driving and steering, 2 pneumatics
Rear:	Driving, 2 pneumatics
Wheelbase:	2585 mm
Track width:	At front and at rear 1530 mm up to 2230 mm adjustable in steps of 100 mm each by adjustable gauge bowl wheels and by turning the wheels

Possible combinations of tyres sizes (front/rear)

Typical for NAO-version
with inter axle ratio 1.2894 (not fitted to tested tractor)

Tyres sizes	
at front	at rear
13.6-24 14.9-24	15.5-38
12.4-24 13.6-24	16.9-30
13.6-24 14.9-24	16.9-34
13.6-24 14.9-24	18.4-30

With inter axle ratio 1.4066
(fitted to tested tractor)

Tyres sizes	
at front	at rear
12.4 - 24 13.6 - 24	13.6 - 38
11.2 - 24 12.4 - 24	15.5 - 38
11.2 - 24	16.9 - 30
11.2 - 24 12.4 - 24	16.9 - 34
13.6 - 24 14.9 - 24	16.9 - 38
11.2 - 24 12.4 - 24	18.4 - 30
12.4 - 24 13.6 - 24 14.9 - 24	18.4 - 34
14.9 - 24	18.4 - 38
13.6 - 24	23.1 - 30
14.9 - 24	23.1 - 34
12.4 - 24	12.4 - 42
13.6 - 28 13.6 R 28	14.9 R 46

Typical for EUR-version

with inter axle ratio 1.2894

Tyres sizes	
at front	at rear
13.6 R 24 14.9 R 24 380/70 R 24 11.2 R 28 12.4 R 28	18.4 R 30
14.9 R 24 420/70 R 24 11.2 R 28 12.4 R 28	16.9 R 34
16.9 R 24 **14.9 R 26** **12.4 R 28** **13.6 R 28** **380/70 R 28**	**18.4 R 34**
13.6 R 24 11.2 R 28 12.4 R 28	13.6 R 38
13.6 R 24 14.9 R 24 11.2 R 28 12.4 R 28	15.5 R 38
16.9 R 24 14.9 R 26 13.6 R 28	23.1 R 30
16.9 R 24 14.9 R 26 13.6 R 28 380/70 R 28	16.9 R 38
14.9 R 24 420/70 R 24 12.4 R 28	480/70 R 34
16.9 R 24 14.9 R 26 13.6 R 28 380/70 R 28	520/70 R 34
16.9 R 24 14.9 R 26 13.6 R 28	480/70 R 38

with inter axle ratio 1.4066

Tyres sizes at front	at rear
11.2 R 24 12.4 R 24	18.4 R 30
11.2 R 24 12.4 R 24 360/70 R 24	16.9 R 34
12.4 R 24 13.6 R 24 380/70 R 24 11.2 R 28	18.4 R 34
11.2 R 24 12.4 R 24	13.6 R 38
11.2 R 24 12.4 R 24	15.5 R 38
13.6 R 24 14.9 R 24 11.2 R 28 12.4 R 28	23.1 R 30
13.6 R 24 14.9 R 24 380/70 R 24 420/70 R 24 11.2 R 28 12.4 R 28	16.9 R 38
13.6 R 24 380/70 R 24	520/70 R 34
13.6 R 24 14.9 R 24 420/70 R 24 12.4 R 28	480/70 R 38
14.9 R 24 420/70 R 24 16.9 R 24 14.9 R 26 12.4 R 28 13.6 R 28 380/70 R 28	18.4 R 38
14.9 R 24 420/70 R 24 12.4 R 28	520/70 R 38

Protective structure	CASE POCLAIN, cab model CX-94; OECD-tested driver's platform with integrated safety frame, OECD approval no. CSS 088/1; not tiltable, antivibration mounted by silent-blocks on tractor; 2 doors with 2 steps each, steps 585 and 870 mm, driver's platform 1155 mm above ground; rear window and rear side windows tiltable; air conditioner (optional, fitted to tested tractor) and combined heating/ventilation system with 3-step blower and cooling-water heat exchanger incorporated in roof; air intake above rear window, dry air filter; air outlet jets in the roof at front and at rear, defroster nozzles;

Noise reduction materials:

Roof:	Fabric, PUR-foam	3,5 mm
	resin impregnated felt (molded part)	7 mm
	PUR-foam	50 mm
Roof, front part:	ABS-panel part	3 mm
Doors, below:	PVC foil + fabric, PUR-foam	1 to 15 mm
	ABS-carrier	1,5 mm
Floor:	Compound mat, consisting of: Synthetic heavy foil + PVC coated (molded)	5 mm
	PE-foam	25 mm
	or partially PE-chip foam with waterproof sealing	22,5 mm
Seat support, on the surface and the front side:	Compound mat, consisting of: Synthetic heavy foil + PVC coated (molded)	5 mm
	PE-foam + waterproof sealing	25 mm

Console panel:	Compound mat, consisting of: Synthetic heavy foil + PVC coated (molded)	5 mm
	PE-foam	7 mm
Front panel	-	
Rear panel:	ABS-panel part	3 mm
Mudguards:	PVC-foil	3 mm
	PUR-foam	22 mm
B-posts:	ABS-panel part	3 mm
Bulk head:	PUR-heavy-foil	6 mm
	PE-foam	up to 6 mm
Draught proofing:	Rubber seals and Silicon	

Driver's seat: SEARS, 2000
upholstered seat with back rest, adjustable spring, hydraulic shock absorber (optional pneumatic suspension); height of unloaded seat above platform steplessly adjustable from 380 to 520 mm, longitudinal adjustment 150 mm

Running-time meter: Electronic, counts real operating hours when engine is running

Lighting

Electrical, 12 Volt,
acc. to US legislation

	Height above ground of centre mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Headlights	1387	160x80	293
Side lights +)	2565	110x65	463
(warning lights) ++)	2560	110x65	455
Rearlights	1735	135x30	876
Reflectors	1770	70x25	843

+) facing forward
++) facing rearward

additional SMV sign

TEST CONDITIONS

Overall dimensions

Length mm	Width mm	Height at top of	
		protective structure mm	exhaust silencer mm
4416	2275	2720	2740

Ground clearance: 390 mm below bracket
of swinging drawbar
hours when engine is running

Oils and lubrication

Capacity and change interval

	Capacity dm³	Oil change h	Filter change h
Engine	14,3	250	250
Gearbox, hydraulic system, rear axle and final drives	70,0	1000	1000
Front axle	6,5		-
Final drives (front)	2x1,0		

Specifications

	Recommended	Used during test
Engine oil used in: Engine Type Viscosity Winter Summer Tropics Classification	Engine oil SAE 10W/30 SAE 15W/40 or 10W/30 SAE 15W/40 API SF-CD or MIL-L 2104 C	FINA SAE 10W/30 API-CD
Transmission oil used in: Gearbox with rear axle incl. final drives, hydraulic-, steering-and braking system Type Viscosity Classification *) Front axle incl. final drives Type Viscosity Classification *)	 HY-TRAN PLUS ISO-VG 95-115 MS 1207 Gear oil SAE 85W/140 MS 1316	 FINA HYTRAN-PLUS ISO-VG 95-115 MS 1207 FINA SAE 85W/140 MS 1316

*) MS = CASE material specification

Grease: Multi purpose grease
number of lubrication points 10

Fuel

Type: ARAL Diesel-fuel in conformity with DIN 51601
Density at 15°C: At p.t.o. test 0,833 g/cm³
at drawbar power tests with tyres
set 1 0,831 g/cm³
set 2 0,830 g/cm³

Tractor mass

With tyres combination set 1

	Without driver kg	With driver kg
Front	2000	2015
Rear	3015	3075
Total	5015	5090

Tyres and track widths specifications

With tyres combination set 1

	Front	Rear
Tyres:	FIRESTONE	GOODYEAR
dimensions	14.9 - 24	16.9 - 38
type	cross-ply	cross-ply
ply rating/load index	6/-	8/-
speed index	-	-
maximum load	1510 kg (30 km/h)	2520 kg (30 km/h)
inflation pressure	140 kPa	170 kPa
radius index	590 mm	795 mm
Chosen track width	1830 mm	1830 mm
Rims	W12x24	DW15x38
Technically permissible axle load	3020 kg	4260 kg
Technically permissible total weight	7280 kg	

Tractor mass

With tyres combination set 2

	Without driver kg	With driver kg
Front	2030	2040
Rear	3070	3135
Total	5100	5175

Tyres and track widths specifications

With tyres combination set 2

	Front	Rear
Tyres:	KLEBER	CONTINENTAL
dimensions	14.9 R 24	18.4 R 38
type	radial	radial
ply rating/load index	-/126	-/146
speed index	A8	A8
maximum load	1700 kg	3000 kg
inflation pressure	160 kPa	160 kPa
radius index	590 mm	820 mm
Chosen track width	1830 mm	1830 mm
Rims	W12x24	DW15x38
Technically permissible axle load	3100 kg	5200 kg
Technically permissible total weight	8300 kg	

PRÜFUNGS-ABTEILUNG
CASE-IH 5140

Test No. 89-193

COMPULSORY TESTS

1. MAIN POWER TAKE OFF PERFORMANCE (1000 rev/min)

Date of tests: 3rd November 1989
Location of tests: DLG-Testing Station Groß-Umstadt
Type of dynamometer: SCHENCK hydraulic dynamometer U1-40

Power kW	Speed Engine rev/min	Speed P.t.o. rev/min	Fuel consumption hourly l/h	Fuel consumption hourly kg/h	Fuel consumption specific g/kWh	Specific energy kWh/l
Maximum power						
1.1 At 2-hour test						
72,8	2150	973	21,85	18,20	250	3,33
1.2 At rated speed						
72,3	2200	996	21,97	18,30	253	3,29
1.3 At standard p.t.o. speed						
72,3	2200	996	21,97	18,30	253	3,29
1.4 Part loads, the governor hand lever in the position corresponding to maximum power at full load (curve a)						
1.4.1 the torque corresponding to maximum power at rated speed						
72,3	2200	996	21,97	18,30	253	3,29
1.4.2 85% of the torque obtained in 1.4.1						
63,1	2259	1022	20,08	16,73	265	3,14
1.4.3 75% of the torque defined in 1.4.2						
47,9	2285	1034	16,86	14,04	293	2,84
1.4.4 50% of the torque defined in 1.4.2						
32,2	2307	1044	13,61	11,34	352	2,37
1.4.5 25% of the torque defined in 1.4.2						
16,4	2341	1060	10,57	8,81	539	1,55
1.4.6 unloaded						
-	2372	1073	7,51	6,25	-	-

PRÜFUNGS-ABTEILUNG
CASE-IH 5140

Test No. 89-193

Power kW	Speed Engine rev/min	Speed P.t.o. rev/min	Fuel consumption hourly l/h	Fuel consumption hourly kg/h	Fuel consumption specific g/kWh	Specific energy kWh/l
1.5 Part loads, the governor hand lever in the position corresponding to the standard p.t.o. speed at full load (curve b)						
1.5.1 the torque corresponding to maximum power						
72,3	2200	996	21,97	18,30	253	3,29
1.5.2 85% of the torque obtained in 1.5.1						
63,1	2259	1022	20,08	16,73	265	3,14
1.5.3 75% of the torque defined in 1.5.2						
47,9	2285	1034	16,86	14,04	293	2,84
1.5.4 50% of the torque defined in 1.5.2						
32,2	2307	1044	13,61	11,34	352	2,37
1.5.5 25% of the torque defined in 1.5.2						
16,4	2341	1060	10,57	8,81	539	1,55
1.5.6 unloaded						
-	2372	1073	7,51	6,25	-	-

No load maximum engine speed: 2372 rev/min
Equivalent flywheel torque at rated engine speed: 314 Nm
Equivalent flywheel torque at 2 hour test: 323 Nm
Maximum equivalent flywheel torque: 415 Nm at 1210 rev/min of the engine

Mean atmospheric conditions

temperature	20 °C
pressure	99 kPa
rel. humidity	60 %

Maximum temperatures

coolant	84 °C
oil	104 ° C
fuel	20 °C
air intake	20 °C

PRÜFUNGS-ABTEILUNG

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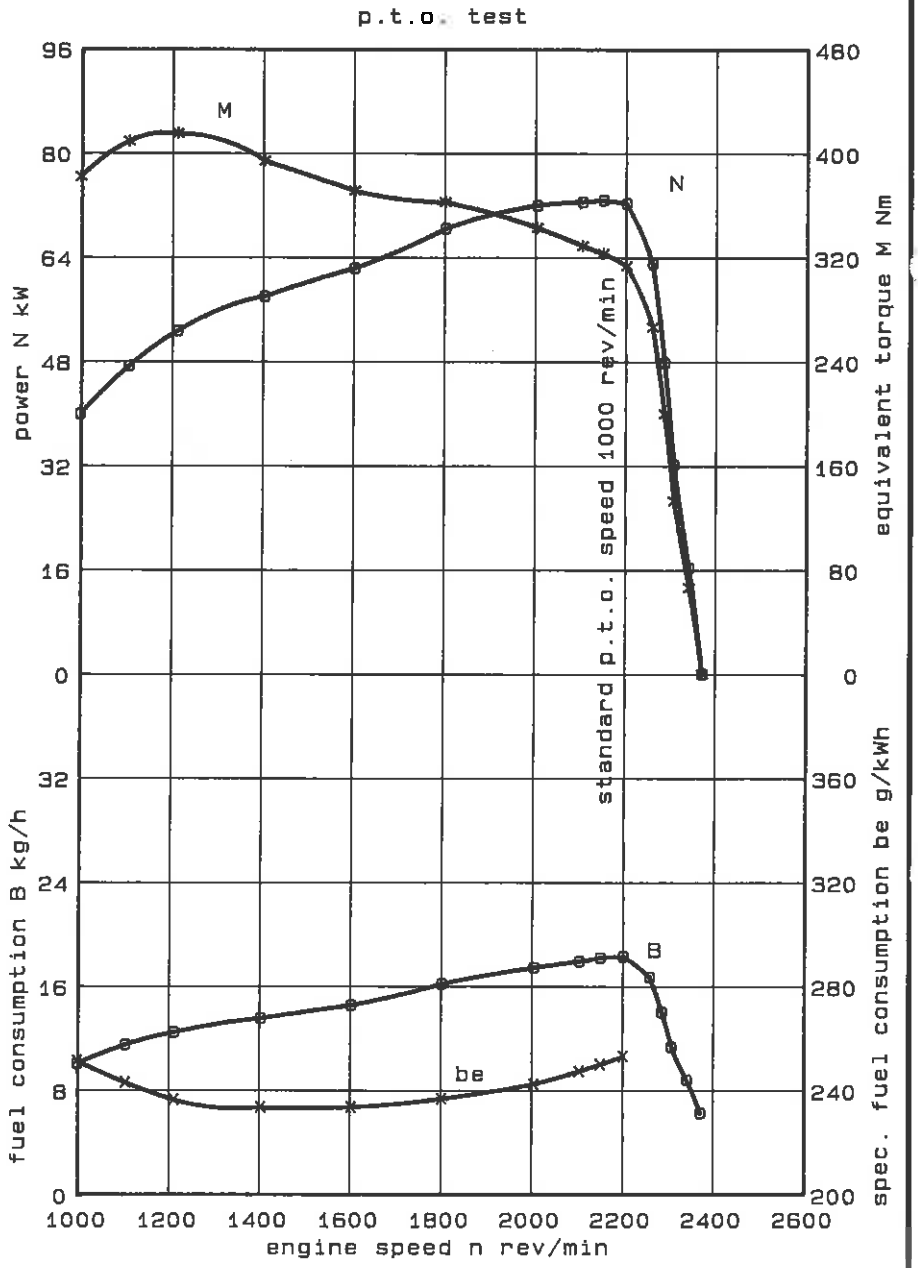
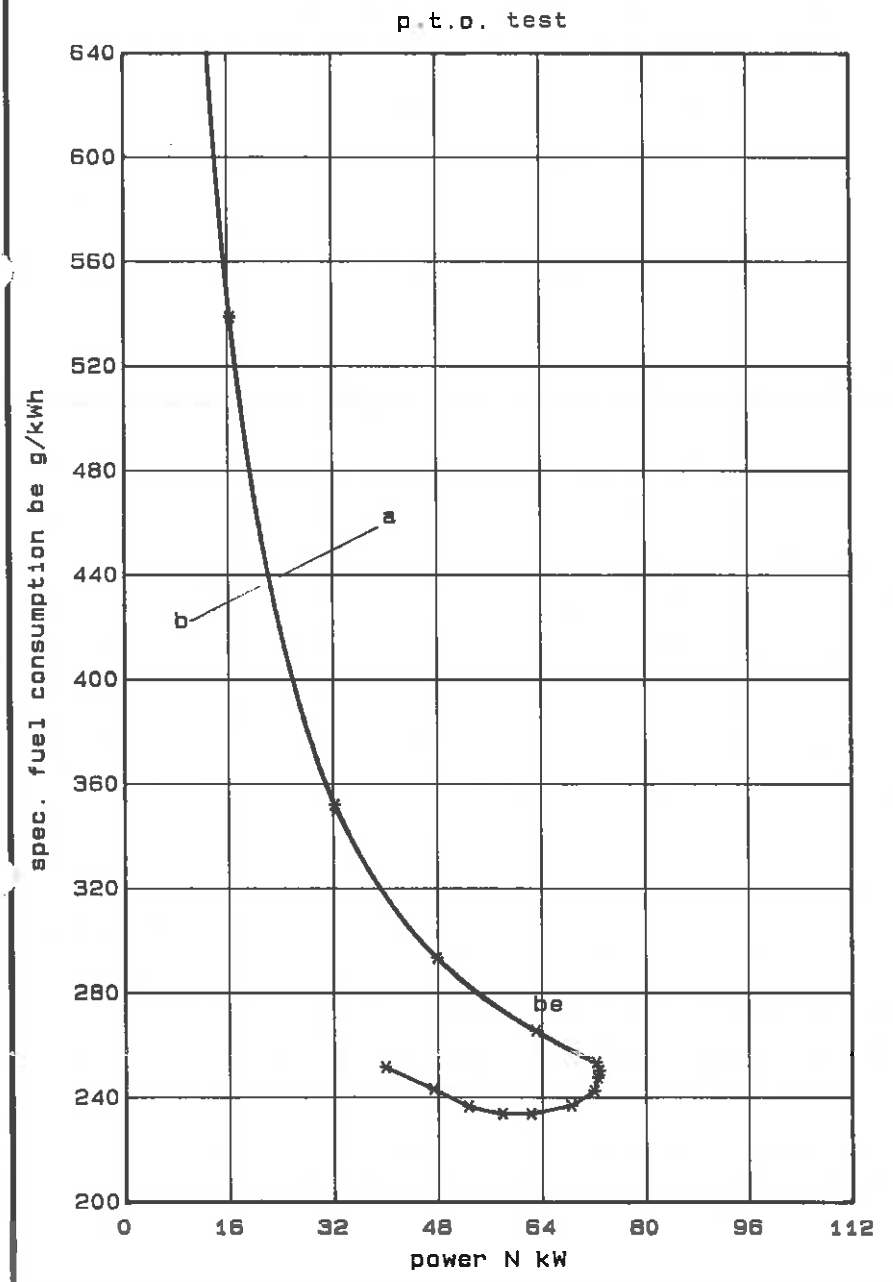
Test-No.89-193




p.t.o. test
spec. fuel consumption be g/kWh
640
600
560
520
480
440
400
360
320
280
240
200
a
b
be
0
16
32
48
64
80
96
112
power N kW

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Test No. 89-193

2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 18th and 19th December 1989

2.1 Hydraulic power test

Sustained pressure with relief valve open 18,9 MPa
Pump delivery rate at minimum pressure 73,3 l/min

	Hydraulic power kW	Flow rate l/min	Pressure MPa	*) Oil temperature °C
At 90% of the actual relief valve setting	13,4	47.3	17,0	40
At max. power	16,6	64,4	15,5	40

Tapping point used for test: At rear of tractor
*) 40°C in the hydraulic fluid tank (no higher value available due to oil cooler)

2.2 Power lift test

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	200 mm	
Vertical movement without lifting forces	723 mm	835 mm
with lifting forces	690 mm	805 mm
Max. corrected force exerted through full range	36,9 kN	29,9 kN
Corresponding pressure	15,5 MPa	
Moment about rear axle	-	51,4 kNm
Max. tilt angle of mast from vertical	-	10 °

Lifting heights relative to horizontal lower links

mm	-384	-349	-300	-200	-100	0	+100	+200	+300	+341	+400	+421

Lifting forces at hitch points, corrected to 15,5 MPa

kN		36,9	38,5	41,6	42,4	42,0	41,0	39,8	39,8	39,0		

Lifting forces at standard frame, corrected to 15,5 MPa

kN	33,2		36,5	37,3	36,9	36,1	34,4	33,2	31,6		30,3	29,9

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Test No. 89-193

3 DRAWBAR POWER AND FUEL CONSUMPTION
(UNBALLASTED TRACTOR)

The tests were carried out with 2 different tyres combinations, see remark on page 3

	Set 1 (items 3.1,3.2 and 4.1)		Set 2 (items 3.3,3.4 and 4.2)	
	front	rear	front	rear
tyre size	14.9-24	16.9-38	14.9R24	18.4R38
tyre inflation pressure kPa	80	100	100	100
tyre make	FIRESTONE	GOODYEAR	KLEBER	CONTINENTAL
height of drawbar above ground mm	470		500	

Type of track: Concrete

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Date of tests: 11th and 12th December 1989

Tyres combination: Set 1

Gear and range	Speed km/h	Drawbar pull kN	Power kW	Engine speed rev/min	Slip of wheels %	Specific fuel consumption g/kWh
3.1	MAXIMUM POWER IN TESTED GEARS					
1 N II	3,83	45,00	47,9	2260	15,0	340
2 N II	4,55	45,09	57,0	2221	14,9	320
3 N II	5,62	38,14	59,5	2148	11,5	308
1 N III	6,32	34,56	60,7	2150	9,7	303
4 N II	7,25	30,03	60,5	2150	8,3	303
2 N III	7,86	27,70	60,5	2150	7,5	303
3 N III	9,89	22,11	60,7	2150	5,6	303
4 N III	12,46	17,12	59,3	2152	4,2	310
3.2	FUEL CONSUMPTION					
3.2.1	in selected gear nearest to 7,5 km/h, at rated speed					
1 N III	6,48	33,56	60,4	2196	9,4	306
3.2.1.1	75% of pull at maximum power at rated speed					
1 N III	6,88	25,08	47,9	2265	6,7	332
3.2.1.2	50% of pull at maximum power at rated speed					
1 N III	7,15	16,70	33,2	2291	4,2	387
3.2.1.3	next higher gear at reduced engine speed; same pull and					
4 N II	6,86	25,13	47,9	1997	6,7	309
3.2.1.4	next higher gear at reduced engine speed; same pull and					
4 N II	7,17	16,81	33,5	2035	4,2	359
3.2.2	in selected gear, at max. power, at rated speed					
3 N III	10,13	21,46	60,4	2196	5,3	306
3.2.2.1	75% of pull at maximum power at rated speed					
3 N III	10,62	16,17	47,7	2265	3,8	336
3.2.2.2	50% of pull at maximum power at rated speed					
3 N III	10,89	10,77	32,6	2291	2,5	397
3.2.2.3	next higher gear at reduced engine speed; same pull and					
4 N III	10,65	16,09	47,6	1834	3,9	311
3.2.2.4	next higher gear at reduced engine speed; same pull and					
4 N III	10,91	10,71	32,5	1854	2,6	354

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Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/l	°C	°C	°C	°C	%	kPa
2,44	30	76	92	-3	64	99,7
2,60	31	77	91	-3	74	99,7
2,69	31	79	92	-3	74	99,7
2,74	30	80	91	-2	80	99,7
2,74	30	80	92	-2	78	99,7
2,74	30	80	92	-2	81	99,7
2,75	31	79	92	-2	82	99,7
2,68	32	80	92	-2	84	99,7
2,72	32	80	89	1	79	99,1
2,50	32	80	89	1	79	99,1
2,15	32	80	89	1	79	99,1
travelling speed as in 3.2.1.1						
2.69	34	79	87	2	89	99,1
travelling speed as in 3.2.1.2						
2,31	34	79	87	2	89	99,1
2,71	34	79	89	4	91	99,0
2,47	34	79	89	4	91	99,0
2,10	34	79	89	4	91	99,0
travelling speed as in 3.2.2.1						
2,67	33	79	89	4	90	98,9
travelling speed as in 3.2.2.2						
2,35	33	79	89	4	90	98.9

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Date of tests: 17th January 1990

Tyres combination: Set 2

Gear and range	Speed km/h	Drawbar pull kN	Power kW	Engine speed rev/min	Slip of wheels %	Specific fuel consumption g/kWh
3.3 MAXIMUM POWER IN TESTED GEARS						
3 N I	2,58	53,96	38,7	2274	15,0	383
4 N I	3,18	53,93	47,6	2256	15,0	350
1 N II	3,73	53,32	55,2	2150	14,6	328
2 N II	4,84	45,09	60,6	2150	8,4	303
3 N II	6,14	36,36	62,0	2150	5,7	296
1 N III	6,80	33,09	62,5	2150	5,0	294
4 N II	7,72	29,09	62,4	2150	4,1	295
2 N III	8,32	27,08	62,6	2148	3,8	293
3 N III	10,39	21,34	61,6	2152	2,9	298
3.4 FUEL CONSUMPTION						
3.4.1 in selected gear nearest to 7,5 km/h at rated speed						
1 N III	6,97	31,91	61,8	2196	4,7	299
3.4.1.1 75% of pull at maximum power at rated speed						
1 N III	7,28	23,92	48,4	2260	3,2	331
3.4.1.2 50% of pull at maximum power at rated speed						
1 N III	7,47	16,00	33,2	2291	2,1	390
3.4.1.3 next higher gear at reduced engine speed; same pull and						
4 N II	7,24	24,02	48,3	1997	3,2	308
3.4.1.4 next higher gear at reduced engine speed; same pull and						
4 N II	7,50	15,95	33,2	2046	2,1	360
3.4.2 in selected gear, at max. power at rated speed						
2 N III	8,54	26,04	61,8	2198	3,5	299
3.4.2.1 75% of pull at maximum power at rated speed						
2 N III	8,86	19,53	48,1	2260	2,6	334
3.4.2.2 50% of pull at maximum power at rated speed						
2 N III	9,07	13,03	32,8	2291	1,7	397
3.4.2.3 next higher gear at reduced engine speed; same pull and						
3 N III	8,84	19,61	48,2	1825	2,5	299
3.4.2.4 next higher gear at reduced engine speed; same pull and						
3 N III	9,04	13,08	32,8	1849	1,6	346

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Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/l	°C	°C	°C	°C	%	kPa
2,17	34	80	90	8	94	100,3
2,37	33	80	90	8	94	100,3
2,53	33	80	92	8	96	100,3
2,73	33	82	94	9	95	100,3
2,80	33	82	94	9	95	100,3
2,82	34	83	93	9	94	100,3
2,82	34	82	94	9	94	100,3
2,83	34	82	94	9	92	100,3
2,78	33	82	94	9	92	100,3
2,77	31	83	94	9	94	100,2
2,5o	31	83	94	9	94	100,2
2,13	31	83	94	9	94	100,2
travelling speed as in 3.4.1.1						
2,69	32	82	92	9	94	100,2
travelling speed as in 3.4.1.2						
2,31	32	82	92	9	94	100,2
2,78	32	81	92	9	95	100,2
2,48	32	81	92	9	95	100,2
2,09	32	81	92	9	95	100,2
travelling speed as in 3.4.2.1						
2,78	32	80	90	9	94	100,2
travelling speed as in 3.4.2.2						
2,40	32	80	90	9	94	100,2

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ADDITIONAL TESTS

under the responsibility of the DLG-Testing Station

4 Drawbar test (unballasted tractor)
according to Code I, front axle drive disengaged

Gear and range	Speed km/h	Drawbar pull kN	Power kW	Engine speed rev/min	Slip of wheels %	Specific fuel consumption g/kWh
4.1 Tyres combination: Set 1						
Date of tests: 11th December 1989						
MAXIMUM POWER IN TESTED GEARS						
3 N II	5,53	33,10	50,8	2251	15,1	344
1 N III	5,97	33,23	55,1	2216	15,0	334
4 N II	6,64	30,75	56,7	2148	13,7	323
2 N III	7,24	28,69	57,7	2150	12,7	318
3 N III	9,26	22,44	57,7	2150	9,4	318
4 N III	11,73	17,57	57,2	2150	7,3	321
4.2 Tyres combination: Set 2						
Date of Tests: 18th January 1990						
MAXIMUM POWER IN TESTED GEARS						
1 N II	3,89	41,18	44,5	2267	14,9	366
2 N II	4,64	41,25	53,2	2238	15,0	341
3 N II	5,85	36,59	59,5	2148	9,7	309
1 N III	6,55	32,98	60,0	2152	8,0	306
4 N II	7,49	29,23	60,8	2148	6,6	302
2 N III	8,10	26,89	60,5	2148	5,7	304
3 N III	10,17	21,32	60,2	2150	4,2	305

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Type of track: Concrete

Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/l	°C	°C	°C	°C	%	kPa
2,42	31	79	89	2	87	99,6
2,49	32	78	89	2	89	99,6
2,57	32	80	91	2	87	99,6
2,61	30	81	90	2	86	99,6
2,61	34	80	93	2	86	99,6
2,59	33	81	92	2	86	99,6
2,26	32	80	89	3	88	100,8
2,42	30	79	90	3	89	100,8
2,68	28	79	90	2	89	100,7
2,70	34	82	92	4	89	100,8
2,74	32	81	92	3	87	100,8
2,72	34	81	92	5	87	100,8
2,71	33	82	91	5	89	100,8

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5 MEASUREMENT OF EXTERNAL NOISE LEVEL (according to OECD Code I and NEBRASKA-Test)

Date of test: 11th January 1990
Type of track: Concrete
Type of sound level meter: BRÜEL & KJAER model 2233

Front axle drive disengaged

Results of test

Gear: 4 N IV

Travelling speed before acceleration:	22,5 km/h
Sound level:	86,0 dB(A)

6 MEASUREMENTS OF NOISE IN THE PROTECTIVE STRUCTURE

Type of track: Concrete
Type of sound level meter: BRÜEL & KJAER model 2209

Date of tests: 6th December 1989

6.1 According to OECD CODE V, results of OECD-report CSS 088/1/NMO276

Gear number	Drawbar pull		Measured travelling speed		Sound level	
	1) kN	2) kN	1) km/h	2) km/h	1) dB(A)	2) dB(A)
Unloaded test in the gear giving the speed nearest to 7,5 km/h						
1 N III	-	-	7,73	7,52	77,0	77,0
Unloaded test in the gear giving the maximum speed						
4 N IV	-	-	-	30,06	-	78,5
Tests with the drawbar pull for which the tractor gives the maximum sound level (combination of gear giving the nearest nominal speed to 7,5 km/h and also in any gear with a sound level increase of at least 1 dB(A))						
1 N III	27,17	31,29	6,82	6,08	79,0	78,5

1) Front axle drive engaged
2) Front axle drive disengaged

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6.2 According to NEBRASKA-Test

6.2.1 Front axle drive engaged

SOUND LEVEL	dB(A)
At maximum available power in 1 N III gear	78,0
At 75% of pull, at max. power in 1 N III gear	79,0
At 50% of pull, at max. power in 1 N III gear	79,0
At 50% of pull, at reduced engine speed in 4 N II gear	78,5

6.2.2 Front axle drive disengaged

SOUND LEVEL	dB(A)
At maximum available power in 4 N II gear	78,0
At 75% of pull, at max. power in 4 N II gear	78,0
At 50% of pull, at max. power in 4 N II gear	79,0
At 50% of pull, at reduced engine speed in 2 N III gear	78,0

7 REPAIRS AND REMARKS None

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Deutsche Landwirtschafts-Gesellschaft e.V. (DLG)
Fachbereich Landtechnik — Prüfungsabteilung —
Zimmerweg 16 (DLG-Haus)
D-6000 Frankfurt am Main 1