Report on test in accordance with OECD STANDARD CODE

OECD No. **1185**

Agricultural Tractor MERCEDES-BENZ MB-TRAC 700 (4WD)

Type denomination MB-TRAC 440, variant 171

Manufacturer
Daimler-Benz AG
D-7560 Gaggenau

Deutsche Landwirtschafts-Gesellschaft e.V.
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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 I).

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

Duration of tests: December 1987 till July 1988

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: 20th April 1989 OECD No. 1185

This is an OECD-report on a retest of the agricultural tractor MB-TRAC 700 (see OECD-report no. 960).

Retesting has been necessary as the engine model has been changed.

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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PRÜFUNGS-ABTEILUNG
MB-TRAC 700

Test No. 87-249

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*) All stated dimensions refer to tyre size 14.9 R 24 and track width 1606 mm each at front and rear

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Tractor manufacturer:	DAIMLER-BENZ AG D-7560 Gaggenau
Location of tractor assembly:	D-7560 Gaggenau
Submitted for test by:	Manufacturer
Selected for test by:	Manufacturer with agreement by DLG
Place of running-in:	Gaggenau and Groß-Umstadt
Duration of running-in:	Engine 70 hours, tractor 50 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	MERCEDES-BENZ
Trade Name:	MB-TRAC 700
Type denomination:	MB-TRAC 440, variant 171
Type:	Four wheel drive tractor, chassis construction with implement mounting area above rear axle, spring suspended front axle
Serial No.:	WDB 440 171 0W 140 540
1st serial No.:	WDB 440 171 0W 000 001

Engine

Make:	MERCEDES-BENZ
Model:	OM 364.V
Type:	Watercooled 4-stroke DIESEL-engine, direct injection, naturally-aspirated
Serial No.:	364908-10-024475
Cylinders:	4, in-line, bore 97,5 mm, stroke 133 mm, displacement 3972 cm³, no separate cylinder liners; compression ratio 17,25±0,5 : 1
Valves:	Overhead
Fuel system:	BOSCH fuel supply pump, BOSCH 2-stage fuel filter with replaceable filter elements, capacity of fuel tank 120 dm³; BOSCH in-line injection pump EP 3851 PES 4A 90D 410 RS 2666-2 with timing device, serial no.744 04105, manufacturer's production setting 50±1,5 mm³/stroke at rated engine speed and full load, injection timing 18°±8° before TDC; BOSCH multihole injection nozzles DLLA 142 S 791, injection pressure 20±0,8 MPa

Governor:	BOSCH, RSV 350-1200 A2C 1139-2L, RS 3800, centrifugal variable speed governor, governed range of engine speed from 700 to 2590 rev/min, rated engine speed 2400 rev/min
Air cleaner:	Main cleaner MANN optional KNECHT, FP 9007; dry paper element filter with safety cartridge, filter elements replaceable, maintenance pilot lamp, cyclone pre-cleaner incorporated; air intake above bonnet;
Lubrication system:	Forced feed with gear pump, MANN oil filter in full flow (with by-pass valve), replaceable
Cooling system:	Water cooling with centrifugal pump; V-belt driven fan with 7 blades, 470 mm dia; water capacity 15 dm³, temperature control by thermostat; close-circuit cooling, overpressure relief valve set to 70 kPa
Starting system:	Electrical, BOSCH solenoid pre-engaged-drive starting motor JF 12V 3 kW; cold starting aid STARTPILOT, safety device: disengaged travel clutch, p.t.o. selection lever in position 0
Electrical system:	**12 V**, BOSCH 3-phase alternator K1-14 V 23/55 A 770 W; 1 lead acid battery, 120 Ah (optional 165 Ah) at 20 hours rating
Exhaust system:	GILLET, SH 9030 multi-chamber reflexion type silencer, 228x118 mm oval, 425 mm long; on the left of tractor's median plane, below bonnet, vertical pipe, mouth 2780 mm above ground showing upwards-forward

Transmission to wheels

Clutch:	LUK, dry dual disc clutch DT 295/280 G; travel clutch hydraulically operated by pedal, disc 295 mm dia; p.t.o. clutch pneumatically operated by control lever, disc 280 mm dia
Gear box:	MERCEDES BENZ, model UG 2/30-7/13,42 GA; synchromesh gear box with 4 speeds; synchromesh range gear with 2 forward ranges (I and II) and 1 reverse range (R); close stepped range gear with pre-selecting of ranges H and L, by clutch operating pneumatically shifted, synchronized; 4th gear locked in range II; totally 14 forward and 8 reverse speeds; 2 levers, 1 preselector on speed change lever; optionally available creeper or super creeper gearbox
Rear axle and final drives:	MERCEDES BENZ, portal axle; rigidly fitted to tractor's chassis, driven by universally-jointed propeller shaft; bevel gear drive, bevel gear differential lockable, spur gear final drives
Front axle and final drives:	MERCEDES BENZ, portal axle; linked to chassis by coil springs, shock absorbers and Panhard rod; driven by universally-jointed propeller shaft, pneumatically engageable and disengageable under laod by rotary knob; bevel gear drive, bevel gear differential with lock, spur gear final drives
Both axles:	Dog-clutch differential locks, pneumatically shifted under load by rotary knob

Number of revolutions of front wheels for one revolution of rear wheels: 1,0000

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Total ratios and speeds

Range		Gear	Total ratio engine : driving wheels	Nominal travelling speed at rated engine speed *) km/h
I	L	1	121,90	4,38
		2	72,23	7,39
		3	44,58	11,97
		4	27,07	19,72
	H	1	95,62	5,58
		2	56,66	9,42
		3	34,97	15,27
		4	21,23	25,14
II	L	1	44,88	13,06
		2	24,23	22,03
		3	14,95	35,70 2) 3)
		4	-	-
	H	1	32,07	16,65
		2	19,00	28,09
		3	11,73	(45,51) 1) 2) 3)
		4	-	-
R	L	1	94,03	5,68
		2	55,72	9,58
		3	34,39	15,52
		4	20,88	25,57
	H	1	73,76	7,24
		2	43,71	12,21
		3	26,98	19,79
		4	16,38	32,59

*) calculated with the radius index 590 mm

1) tested version, automatic engine speed limitation for max. speed 40 km/h

2) optional, automatic engine speed limitation for max. speed 30 resp. 32 km/h

3) optional, locked 3rd gear in range II for max. speed 30 km/h

Gear lubrication: Oil-sump lubrication

Power take-off

Main p.t.o.: Independent, driven by second disc of dual clutch;
1 p.t.o. shaft at rear of tractor;
35 mm dia, 6 splines, in conformity with ISO 500/1979, type 1 (standard)
optionally available:
35 mm dia, 21 splines, ISO 500/1979 type 2
45 mm dia, 20 splines, ISO 500/1979 type 3
45 mm dia, 6 splines
height above ground 558 mm
distance from tractor's median plane, to the left 25 mm
distance behind rear wheel centre 395 mm

direction of rotation clockwise (viewed facing tractor's rear)
2 speeds are preselectable by hand lever

p.t.o.	p.t.o. speed rev/min	engine speed rev/min	ratio of rotation speeds (engine speed/p.t.o.speed)	power restriction kW
540	540	2165	4,0093	type 1 33 type 2 50
	599	2400		
1000	1000	2196	2,1962	-
	1093	2400		

Secondary p.t.o.: Front p.t.o., 1 shaft at front of tractor;
drive, available profiles, speeds and sense of rotation as main p.t.o.
height above ground 1050 mm
distance from tractor's median plane, to the left 205 mm
distance to front wheel centre 740 mm

Both p.t.o. shafts may be shifted to simultaneous or separate operation by selection lever

Power lift	MERCEDES BENZ/BOSCH hydraulic power lift, disintegrated construction
Hydraulic system:	Open centre system, relief valve pressure setting 18+1,0 MPa; ECKERLE internal gear pump IPF-3-13144 directly V-belt driven by engine, delivery 51 l/min at rated engine speed; oil filter in return line; separate oil tank under front end of chassis, 30 dm³ capacity
Power lift at rear:	Hydraulic power lift with mechanical control MHR; BOSCH control unit SR6D, draft and position control, both infinitely mixable, floating position, lower link sensing, lowering throttle; remote control of power lift at tractor's rear on request (fitted); 2 single acting WEBER cylinders, 150 mm stroke and 80 mm dia, no cylinder safety valves; transport lock: lowering throttle, control lever fixable
Power lift at front:	Optional, installed to tested tractor only for power lift measurements and ballasting; connected with double acting additional control valve by hydraulic couplings; 2 double acting WEBER cylinders, 140 mm stroke and 63 mm dia, piston rod 25 mm dia, directly acting on laterally stabilized lower links; transport lock: stop cock in pressure line; no cylinder safety valves
Remote circuit:	3 double acting additional BOSCH control valves SRZ 60, with 3 pairs of tapping points each at front and at rear; 1 additional return line coupling each at front and at rear; up to 15 dm³ oil may be taken off if tractor is working stationary as well as travelling, 20 dm³ if tractor is standing horizontally

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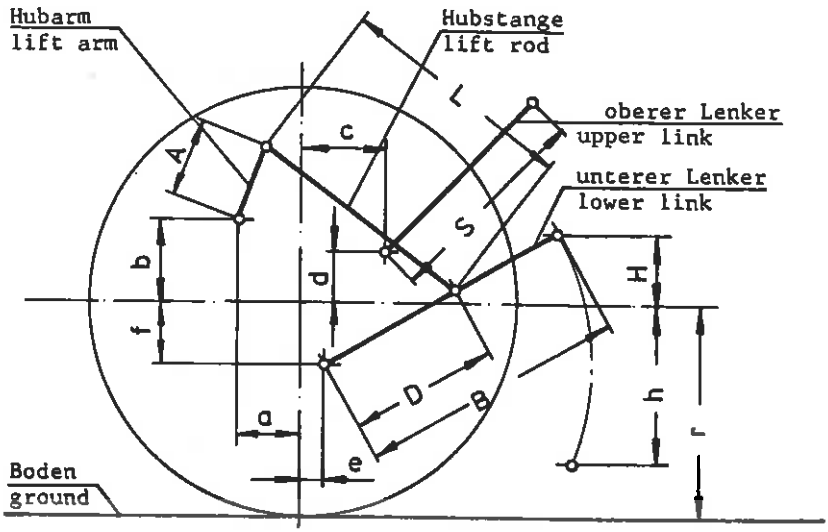
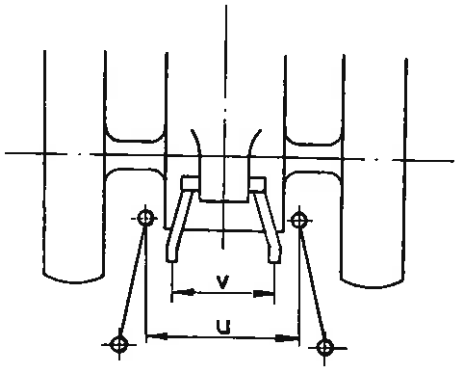
Implement linkage at rear:

Three-point linkage with WALTERSCHEID quick-couplers;
coupler points category 2 acc. to ISO 730/I-1977 resp. DIN 9674





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Dimensions of rear linkage geometry when connected to the standard frame (projected lengths in mm, underlined values are valid for power lift measurements p.25)

Rear and front tyres	redius index	(r)	590
Length of lift arms		(A)	378
Length of lower links		(B)	890
Distance of lift arm pivot points from rear wheel centre	horizontal	(a)	-208
	vertical	(b)	222
Horizontal distance between the 2 lower link pivot points		(u)	490
Horizontal distance between the 2 lift arm end points		(v)	765
Length of upper link		(S)	645 to 865, 704
Distance of upper link pivot point from rear wheel centre	horizontal	(c)	393
	vertical	(d)	342, 400
Distance of lower link pivot point from rear wheel centre	horizontal	(e)	180
	vertical	(f)	94
Distance of lower link pivot points to lift rod pivot points on lower links		(D)	605 and 701
Length of lift rods		(L)	455 to 630, 572

Height of lower link hitch points relative to rear wheel centre line (situated 590 mm above ground), these data are valid for unloaded power lift:

Length of lift rods	(L)	572	455		630	
Linkage distance of lift rod	(D)	605	605	701	605	701
Lowest position	(h)	390	168	74	490	395
Highest position	(H)	230	395	407	135	165
Transport position	(H')	230	395	407	135	165

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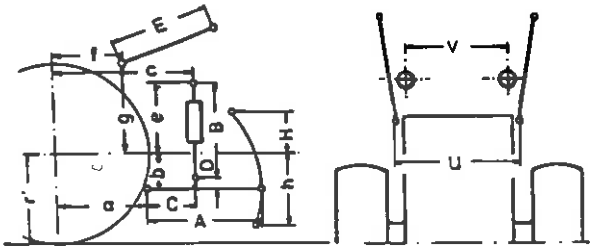
Implement linkage
at front: Three-point linkage, coupler points category 2 acc. to ISO 730/I-1977 resp. DIN 9674

Dimensions of front linkage geometry (projected lengths in mm, underlined values are valid for power lift measurements p. 24)



Rear and front tyres	radius index	(r)	590
Length of lower links		(A)	880, 1010
Length of cylinders		(B)	370 to 500
Distance of lower link pivot point to fixing point of cylinder		(C)	215
Distance of cylinder's fixing point to lower link		(D)	95
Length of upper link		(E)	645 to 865,655

Distance of front wheel centre to:	horizontal		vertical	
pivot point of lower link	(a)	710	(b)	55
pivot point of cylinders	(c)	910	(e)	450
pivot point of upper link	(f)	925	(g)	438

Horizontal distance between the 2 lower link pivot points	(u)	770
Horizontal distance between the 2 cylinder pivot points	(v)	790

Height of lower link hitch points relative to front wheel centre line (situated 590 mm above ground), these data are valid for unloaded power lift)

lowest position	(h)	225
highest position	(H)	325
transport position	(H')	325

Pull attachment

Swinging drawbar:	Optional, not fitted on tractor tested; in accordance with manufacturer:	
	hitch point	
	above ground	393 mm
	behind rear wheel centre	787 mm
	distance to p.t.o. shaft end	
	vertical	165 mm
	horizontal	392 mm
	lateral adjustment to both sides	110 mm
	pivot point behind rear wheel centre	57 mm
	diameter of drawbar pin hole	31 mm
	maximum vertical permissible load not specified	
Trailer hitch:	ROCKINGER, model 248 B type B, optional, fitted on tested tractor; remote control, automatical, height adjustable;	
	hitch point	
	above ground 730, 788, 846 and	904 mm
	behind rear wheel centre	527 mm
	distance to p.t.o. shaft end	
	vertical 172, 230, 288 and	346 mm
	horizontal	135 mm
	diameter of hitch pin	30 mm
	maximum permissible vertical load	1500 kg
	optionally available	
	ROCKINGER 279 B, automatical or ROCKINGER 278 B, non-automatical, as series,	
	ROCKINGER 248 BA, automatical, without remote control	
Holed drawbar:	Short bar, length between joint balls	830 mm
	number of holes	9
	distance between holes	80 mm
	hole diameter	33 mm
	thickness/width of the drawbar	25/80 mm
	height above ground (determined without load) minimum	100 mm
	maximum	997 mm
	horizontal distance to p.t.o. shaft end (with horizontal lower links)	675 mm
Towing hitch:	At front of tractor, height above ground	780 mm

Steering	ZF, hydrostatic, model SERVOSTAT 8493; ZF-vane pump, delivery 19 l/min, V-belt driven by engine, separate oil circuit with 3,2 dm³ capacity, replaceable filter 2 double acting WEBER differential rams, 240 mm stroke, 45 mm dia, piston rod 20 mm dia, directly operating on steering levers, working pressure 10 MPa
Brakes	
Service brake:	MERCEDES-BENZ; pedal operated, single circuit, power assisted brake (assisted by compressed air), hydraulic transmission; internal-expanding-shoe brake at each wheel, brake drums with 390 mm dia and 70 mm width;
Trailer brake:	Optional, fitted on tested tractor; combined single/dual line type, compressed air controlled; MERCEDES-BENZ single-cylinder air compressor, directly driven by engine (standard), optionally additional WABCO air compressor, V-belt driven by engine; 2 air reservoirs with 26 dm³ and 9,5 dm³ volume, working pressure 810±20 kPa; for certain countries hydraulic brake, oil pressure supplied by hydraulic system
Parking brake:	Spring-loaded brake, pneumatically operated by hand valve, acting on rear brake drums of service brake
Steering brake:	None
Wheels	
Steering wheels:	At front, 2 pneumatics
Driving wheels:	At front and at rear
Wheelbase:	2400 mm
Track width adjustment:	By reversing rims, 1606 and 1734 mm

Rims: At front and at rear W12x24

Available tyres:

Tyre sizes at front and at rear			
9.5-32	10 ply *)	14.9R24	126 A8
12.4-28	8 ply *)	14.9/80-24	10 ply
12.4R28	121 A8	14.9/80-24	12 ply
13.6-28	8 ply *)	17.5LR24	139 A8
13.6R28	123 A8	450/70R24	149 G
14.9-24	8 ply *)		

*) as radial ply tyres available, too

Protective structure

MERCEDES-BENZ, model 441.82;
safety cab, OECD-tested
approval-no. CSD 0568/11-a(C),
welded sheet steel construction,
antivibration mounted by 3 silent
blocks on chassis, tiltable to the rear;

1 door and 2 (optional 3) steps on each
side, roof hatch;
steps 530 and 880 mm, driver's platform
1200 mm above ground; windscreen and
roof hatch tiltable, rear window divided,
both parts shiftable, drop windows in
the doors, optional tiltable rear window;
combined heating/ventilation system with
2 step-blower and cooling water heat
exchanger incorporated below instrument
panel, air intake in front of windscreen,
paper element filter below engine bonnet;
on request:
Additional ventilation system with 3-step-
blower, incorporated in roof, 6 outlet
jets above windscreen;
air intake by 1 paper element filter each
on the left and right side along the roof;
air conditioner
(incorporated in roof)

noise reduction materials:

floor inside	laminated floor mat (plastic foil, rubber, foam and film foil)	18,5 mm
bottom side	PVC-damping material (density 9,8 kg/dm³)	4,0 mm
doors, rear wall and side walls	foil coated cardboard	2,5 mm
roof front part	adhesive damping foil	3,5 mm
other part and roof hatch	foam on cardboard with fabric coating (density 30 kg/m³)	30,0 mm
bulk head side facing to engine	PVC-damping material (density 9,8 kg/dm³)	4,0 mm
instrument panel	synthetics PPO (NORYL)	

Driver's seat

ISRINGHAUSEN, model ISRI 6500/516 (on request, fitted on tested tractor), upholstered seat with back rest and arm rests, pneumatic suspension with hydraulic shock absorber, additional horizontal suspension, lockable; automatically acting weight adjustment
range of adjustment
longitudinal 180 mm
vertical front and rear end in 6 steps each from 424 to 489 mm
standard type: ISRI 6000/516 with mechanical suspension;

Passenger's seat

On the left of driver's seat; upholstered with back rest, folding seat, not suspended, not adjustable

Implement mounting area

Behind cab, above rear axle;

width between mudguards	900 mm
length of bottom plate	975 mm

Lighting

Electrical, 12 Volt,
as per German legislation

	Height above ground of centre mm	Size mm	Distance from outside edge to median plane of tractor mm
Headlights	855	135x120	598
Auxiliary lights	2635	135x120	590
Side lights	1445	58x30	930
Rear lights	1260	65x60	795
Reflectors 1st pair 2nd pair	 890 645	 75 dia 75 dia	 795 568

Speed-hour meter

Digital travelling speed and distance display, analog engine and p.t.o. speed display;
electronic running-time meter, reference engine speed for 1 really counted hour 1600 rev/min

TEST CONDITIONS

Overall dimensions

Length:	4550 mm	without ballast,	5300 mm	with ballast
Width:	2010 mm		2010 mm	
Height:	2800 mm	to top of cab roof,	2780 mm	to upper edge of exhaust pipe mouth

Ground clearance: 440 mm below lower link pivot points

Tyres and track widths specifications

Tyres:	Front and rear wheels
dimensions	14.9R24
type	KLEBER radial ply tyres
load index	126
speed index	A 8
maximum load	17,0 kN
inflation pressure	160 kPa
radius index	590 mm
Chosen track width:	1606 mm

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Tractor mass

		without driver kg	with driver kg
Without ballast: Mass	front	2240	2270
	rear	1580	1615
	total	3820	3885

Front ballast:
1 weight 500 kg
1 front power lift 80 kg

Rear ballast:
weights on implement mounting area 1560 kg

With ballast: Mass	front	3375	3405
	rear	2585	2620
	total	5960	6025

Technically permissible axle loads: at front 3400 kg
at rear 3400 kg

Technically permissible total weight: 6000 kg

Oils and lubrication

Capacity and change interval:

	Capacity dm³	Oil change h *)	Filter change h *)
Engine	9,0	300	300
Gear box	7,5	1200	-
Front axle	2,0	1200	-
Rear axle	2,0	1200	-
Final drives front	0,3 +)	1200	-
Final drives rear	0,3 +)	1200	-
Hydraulic system	33,0	1800	1800
Steering	3,2	2400	2400

*) operating hours

+) on the left and right each

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Specifications:

	Recommended	Used during test
Engine oil:		
type	engine oil	ARAL MULTI-TURBORAL
viscosity	SAE	
winter	10W, 20W/20, 20W/30 or 15W/40	SAE 15W/40
summer	30 or 15W/40	
tropics	40	
classification	API-CC or MIL-L-46152	API-CC
Transmission oils:		
Gear box and group gears		
type	gear oil	ESSO GP-D80
viscosity	SAE 80 or 80W/85	SAE 80
classification	API-GL-4 or MIL-L-2105	API-GL-4
Front axle and rear axle		
type	gear oil	ESSO HYPOID GX-D90
viscosity	SAE 90 or 85W/90	SAE 90
classification	API-GL-5 or MIL-L-2105 B	API-GL-5
Final drives at front and final drives at rear		
type	gear oil	ESSO HYPOID GX-D90
viscosity	SAE 90 or 85W/90	SAE 90
classification	API-GL-5 or MIL-L-2105 B	API-GL-5
Power lift and steering		SCHLEIFENBAUM
type	engine oil	PENAXOLINE DBU
viscosity	SAE 10W	SAE 10W
classification	API-CC	API-CC

Grease: multi purpose grease
number of lubrication points: 22

Fuel

type: ARAL Diesel-fuel in conformity with DIN 51601
density: At 15°C at engine performance test 0,829 g/cm³
at p.t.o. performance test 0,834 g/cm³
at drawbar power test 0,831 g/cm³

REPAIRS None

REMARKS None

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COMPULSORY TESTS

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

Date of tests: 26th January 1988
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						
46,9	2400	1093	14,64	12,21	260	3,21
1.2 At rated speed						
46,9	2400	1093	14,64	12,21	260	3,21
1.3 At standard p.t.o. speed						
45,9	2196	1000	13,75	11,46	250	3,34
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						
46,9	2400	1093	14,64	12,21	260	3,21
1.4.2 85% of the torque obtained in 1.4.1						
40,9	2460	1120	13,24	11,04	270	3,09
1.4.3 75% of the torque defined in 1.4.2						
31,0	2489	1133	10,90	9,09	293	2,85
1.4.4 50% of the torque defined in 1.4.2						
21,0	2523	1149	8,71	7,26	346	2,41
1.4.5 25% of the torque defined in 1.4.2						
10,6	2555	1163	6,75	5,63	530	1,57
1.4.6 unloaded						
-	2595	1182	4,83	4,03	-	-

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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						
45,9	2196	1000	13,75	11,46	250	3,34
1.5.2 85% of the torque obtained in 1.5.1						
40,2	2262	1030	12,50	10,43	260	3,21
1.5.3 75% of the torque defined in 1.5.2						
30,6	2296	1045	10,20	8,51	278	3,00
1.5.4 50% of the torque defined in 1.5.2						
20,6	2322	1057	8,10	6,76	328	2,54
1.5.5 25% of the torque defined in 1.5.2						
10,5	2359	1074	6,08	5,07	484	1,72
1.5.6 unloaded						
-	2384	1086	4,14	3,45	-	-

No load maximum engine speed: 2595 rev/m
Equivalent flywheel torque at rated engine speed: 187 Nm
Maximum equivalent flywheel torque: 227 Nm at 1602 rev/min of the engine

Mean atmospheric conditions

temperature	20 °C
pressure	98 kPa
rel. humidity	40 %

Maximum temperatures

coolant	80 °C
oil	109 °C
fuel	20 °C
air intake	20 °C

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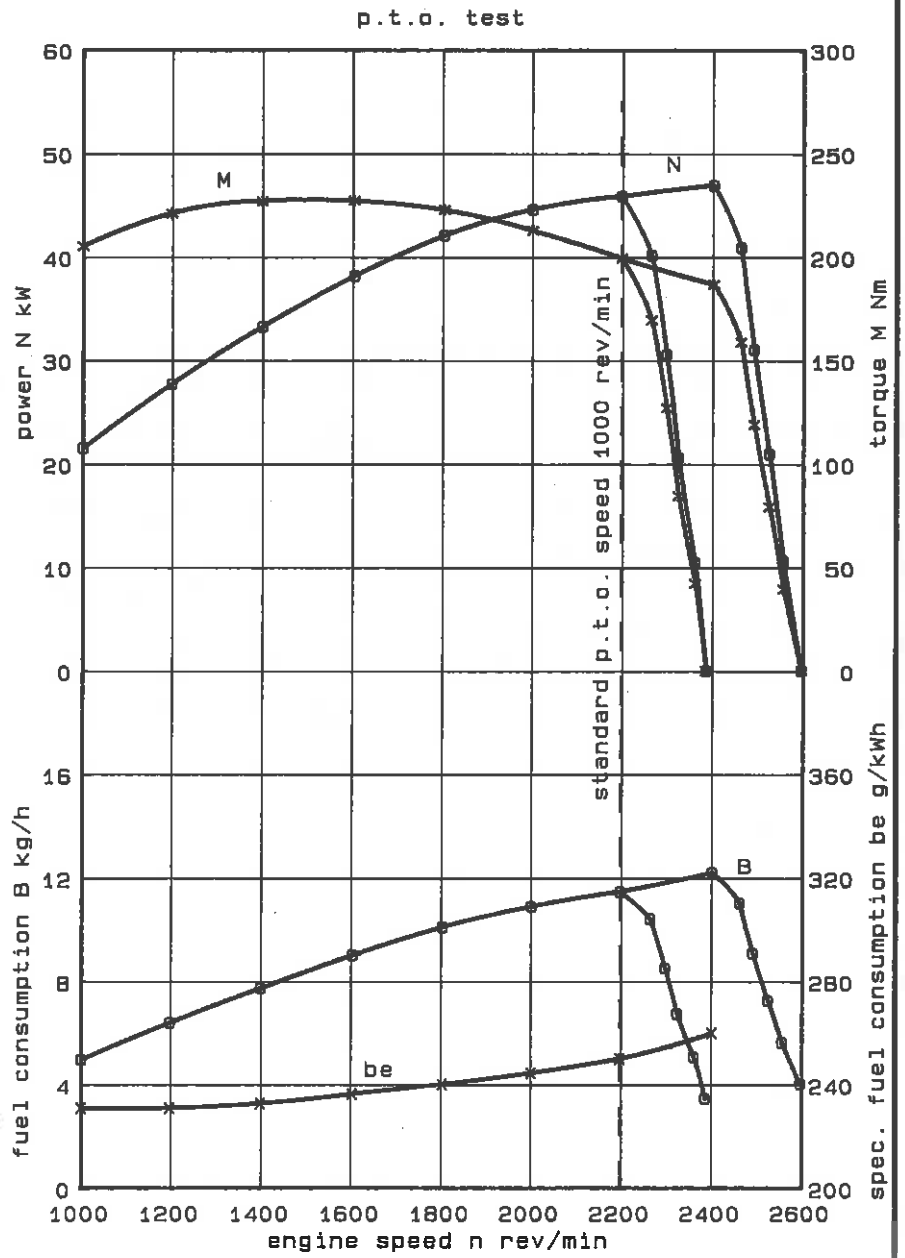

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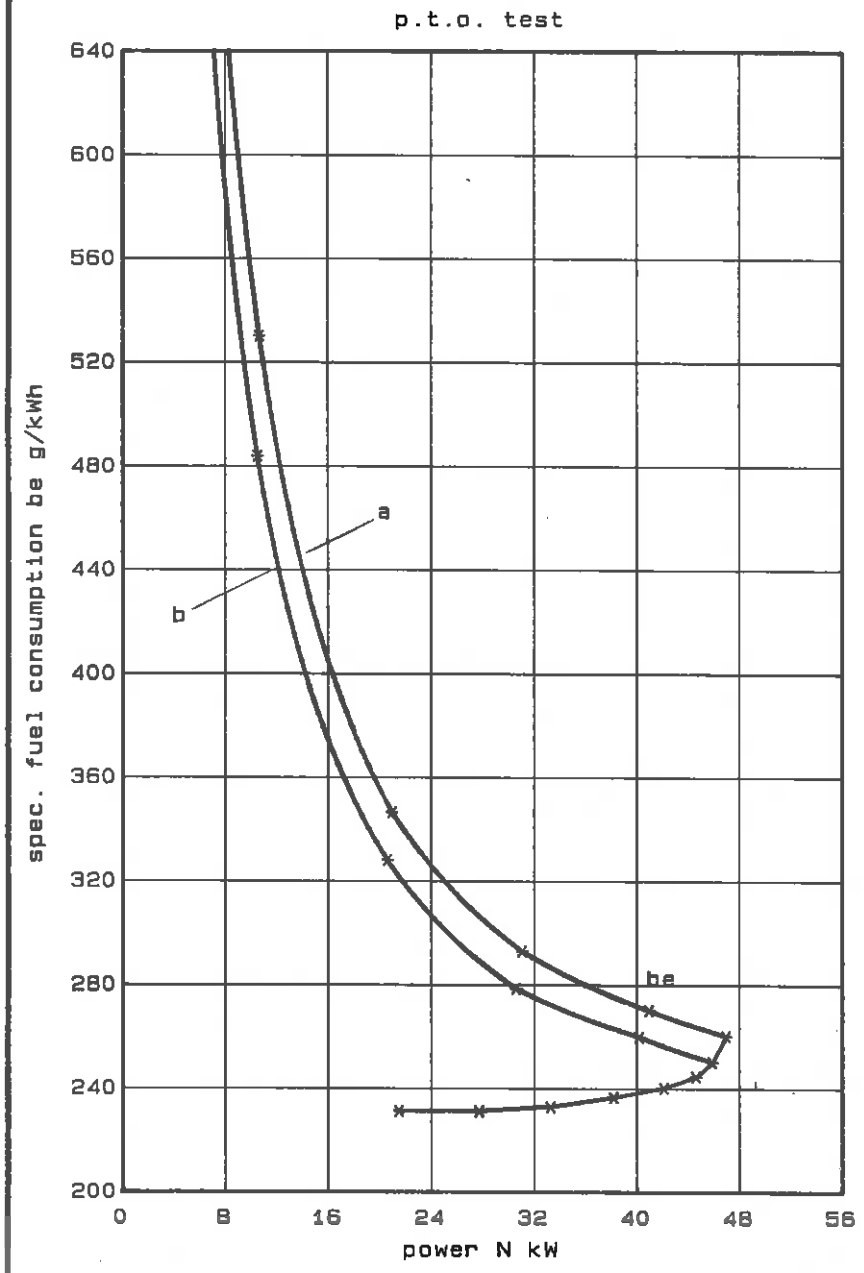

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Test No. 87-249

(2) HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 8th February 1988

(2.1) Hydraulic power test

Sustained pressure with relief valve open 18,3 MPa
Pump delivery rate at minimum pressure 54,3 dm³/min

	Hydraulic power kW	Flow rate l/min	Pressure MPa	Oil temperature °C
at 90% of the actual relief valve setting	11,3	41,1	16,5	65
maximum	12,8	50,2	15,3	65

Tapping point used for test: At rear of tractor

(2.2) Lifting force at front power lift (spring suspension at front axle locked)

linkage dimensions see page 12

	Height of lower hitch points above ground in down position mm	Vertical movement mm	Max.force exerted through full range kN	Corresp. pressure of hydraul. fluid MPa	Moment about front axle kNm	Max.tilt angle of mast from vertical degrees
At hitch points	365	+) 550 *) 525	19,2	15,3	-	-
On the frame	365	+) 590 *) 550	15,0	15,3	33,0	5,0

Temperature of hydraulic fluid at start of test 65°C

Lifting heights relative to horizontal lower links

mm	-175	-170	-100	0	+100	+200	+300	+355	+375
kN		19,8	19,6	19,8	20,0	20,0	19,4	19,2	

Lifting forces at test frame

kN	20,1		19,4	18,7	17,9	17,3	16,0		15,0

+) without lifting forces *) with lifting forces

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(2.3) Lifting force at rear power lift
linkage dimensions see pages 10 and 11

	Height of lower hitch points above ground in down position mm	Vertical movement mm	Max.force exerted through full range kN	Corresp. pressure of hydraul. fluid MPa	Moment about rear axle kNm	Max.tilt angle of mast from vertical degrees
At hitch points	200	+) 620 *) 590	23,9	15,3	-	-
On the frame	200	+) 700 *) 650	22,4	15,3	37,63	6,0

Temperature of hydraulic fluid at start of test 65 °C
+) without lifting forces
*) with lifting forces

Lifting heights relative to horizontal lower links

mm	-326	-300	-296	-200	-100	0	+100	+200	+294	+300	+324
Lifting forces at hitch points											
kN			23,9	24,9	26,5	27,8	29,0	29,8	29,6		
Lifting forces at test frame											
kN	22,4	22,8		23,5	24,0	24,4	24,4	23,8		22,8	22,6

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(3) DRAWBAR PERFORMANCE

Date of tests: 18th till 25th April 1988
Type of track: Concrete

Gear	Driving speed km/h	Power kW	Drawbar pull kN	Engine speed rev/min	Slip of wheels %
(3.1)	Maximum power in tested gears (unballasted tractor) Height of drawbar above ground 470 mm				
1 I L	4,02	37,3	33,44	2403	7,6
1 I H	5,26	38,7	26,51	2400	5,2
2 I L	7,08	38,6	19,65	2398	3,3
2 I H	9,09	38,5	15,24	2403	2,7
3 I L	11,65	37,6	11,62	2398	1,8
1 II L	12,69	37,2	10,56	2398	1,8
(3.2)	Maximum power in tested gears (ballasted tractor) Height of drawbar above ground 460 mm				
1 I L	4,15	38,2	33,18	2398	5,1 *)
1 I H	5,35	39,0	26,26	2396	3,2
2 I L	7,16	38,3	19,26	2400	2,6
2 I H	9,17	38,5	15,12	2400	2,0
3 I L	11,69	36,9	11,36	2396	1,5
1 II L	12,82	36,4	10,23	2398	1,3
(3.3.1)	Five-hour-test at 75% of pull at maximum power in 2 I L gear				
2 I L	7,37	29,7	14,45	2453	1,9
(3.3.2)	Five-hour-test in the gear giving max. pull in test (3.2) *)				
1 I L	4,12	38,0	33,18	2400	5,6

Total oil consumption during ten hours duration of tests (3.3.1) and (3.3.2) 25 g/h

*) The lowest speed (1 I L) is so fast, that 15 % wheel slip cannot be achieved, even unballasted at max. engine power.

Tyre size front and rear: 14.9 R 24 126 A8

Specific fuel consumpt. g/kWh	Specific energy kWh/l	Temperatures Fuel °C	Coolant °C	Engine-oil °C	Atmospheric conditions Tempe-rature °C	Relative humidity %	Pressure kPa
tyre inflation pressure: 90 kPa at front, 80 kPa at rear							
324	2,56	24	80	89	16	95	99,5
313	2,66	26	79	93	18	92	99,5
313	2,65	28	80	94	18	92	99,5
315	2,64	28	79	93	19	87	99,5
322	2,58	29	80	94	20	84	99,6
325	2,56	29	79	93	20	81	99,6
tyre inflation pressure: 160 kPa at front and 110 kPa at rear							
317	2,62	22	80	92	15	89	100,0
310	2,68	23	79	92	15	86	100,0
316	2,63	23	79	91	17	83	100,0
315	2,64	26	79	91	16	78	100,0
326	2,53	26	80	92	16	78	100,0
333	2,50	27	80	92	17	77	100,0
343	2,42	19	79	100	10	68	99,6
319	2,61	29	80	112	16	74	99,5

(4) TURNING AREA AND TURNING CIRCLE

Wheel equipment front and rear: 14.9 R 24

Track of wheels front and rear: 1606 mm

Front wheel drive disengaged

	left hand	right hand
Radius of turning area	5,79 m	5,81 m
Radius of turning circle	5,31 m	5,31 m

(5) POSITION OF CENTRE OF GRAVITY

Height above ground	983 mm
Distance forward from rear axle centre	1402 mm
Distance from tractor's median plane, to the right	7 mm

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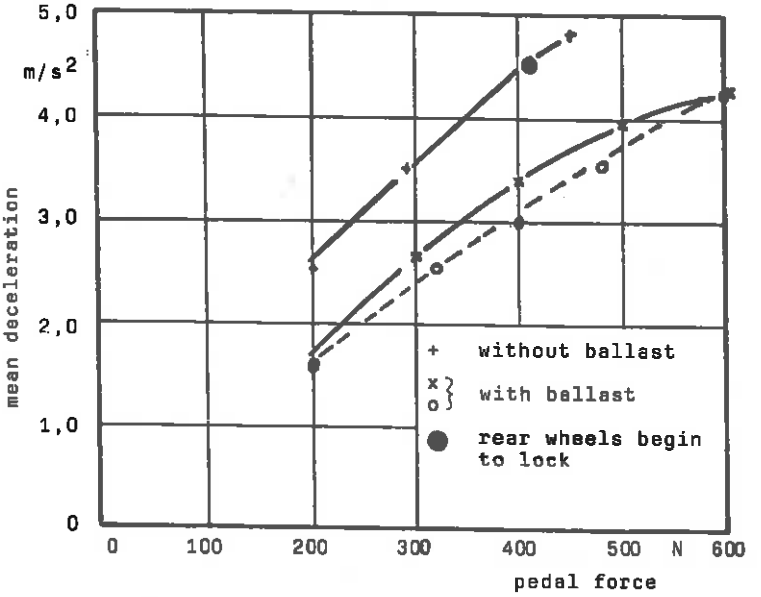
(6) BRAKING (Front wheel drive disengaged)
Date of test: 20th April 1988

	Tractor mass (with driver) front kg	rear kg	total kg	Speed before application of brakes km/h
Without ballast	2270	1615	3885	40,2
With ballast	3405	2620	6025	39,6

(6.1) Cold service braking device test ————

(6.2) Fade test ----------



No significant deviation of tractor from original course and no abnormal vibrations,

Brakes-heating: Actuating of brake for 1 km with pedal force corresponding to 1 m/s²

(6.3) Parking braking device test

		Ballasted tractor on 18% - slope
Braking device control force	kN	Parking brake pneumatically controlled by hand valve, tractor doesn't roll

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(7) MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of test: 10th April 1988
Type of track: Concrete
Type of sound level meter: BRÜEL & KJAER model 2209

Results of test

Gear: 3 II H **)
Travelling speed before acceleration: 30,3 km/h
Sound level: 81,0 dB(A)

APPENDIX

MEASUREMENTS OF NOISE IN THE PROTECTIVE STRUCTURE

Results of OECD-Test No. CSD 0568/11-a(C)

Date of tests: 10th March 1987
Type of track: Concrete
Type of sound level meter: BRÜEL & KJAER model 2209

Gear	Drawbar pull kN	Travelling speed km/h	Sound level dB(A)	Noise rating N
1 I H	26,24	5,19	82,0	77
2 I L *)	19,21	7,09	80,5	77
2 I L *)	light load	8,03	78,0	
3 II H **)	light load	41,38	79,0	

*) The 2 I L gear corresponds to the nominal travelling speed nearest to 7,5 km/h

**) Front wheel drive disengaged

OPTIONAL TEST

8. ENGINE PERFORMANCE

Date of tests: 15th December 1987
Location of tests: DLG-Testing-Station Groß-Umstadt
Type of dynamometer: SCHENCK eddy-current-dynamometer W 150

	Power kW	Engine speed rev/min	Fuel consumption hourly l/h	hourly kg/h	specific g/kWh	Specific energy kWh/l
Maximum power						
8.1 At 2-hour test	52,3	2400	14,74	12,22	234	3,55
8.2 At rated engine speed	52,3	2400	14,74	12,22	234	3,55
8.3 At standard p.t.o. speed (1000 rev/min)	50,1	2196	13,83	11,46	229	3,62
8.4 Part loads						
8.4.1 the torque corresponding to maximum power at rated speed	52,3	2400	14,74	12,22	234	3,55
8.4.2 85% of the torque obtained in 8.4.1	45,4	2451	13,13	10,88	239	3,46
8.4.3 75% of the torque obtained in 8.4.2	34,5	2482	10,63	8,81	255	3,25
8.4.4 50% of the torque obtained in 8.4.2	23,3	2517	8,13	6,74	289	2,87
8.4.5 25% of the torque obtained in 8.4.2	11,8	2554	5,89	4,89	412	2,01
8.4.6 unloaded	-	2584	3,73	3,09	-	-

Optimum fuel consumption: 215 g/kWh at 26.2 kW and 1200 rev/min
No load maximum engine speed: 2584 rev/min
Torque at rated engine speed: 208 Nm
Maximum torque: 247 Nm at 1501 rev/min of the engine

Mean atmospheric conditions

temperature	20 °C
pressure	99 kPa
relative humidity	30 %

Maximum temperatures

coolant	79 °C
oil	97 °C
fuel	22 °C
engine air intake	20 °C

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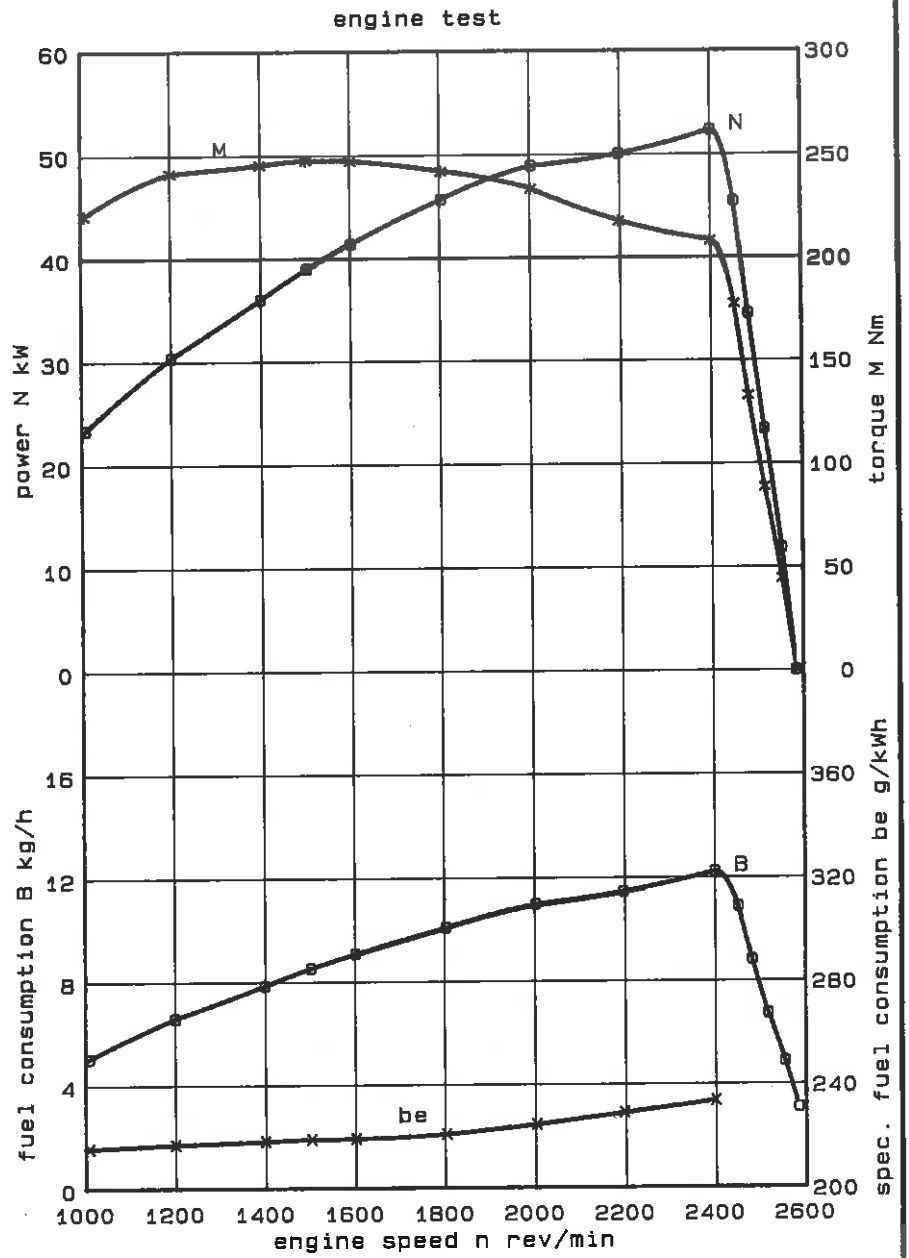

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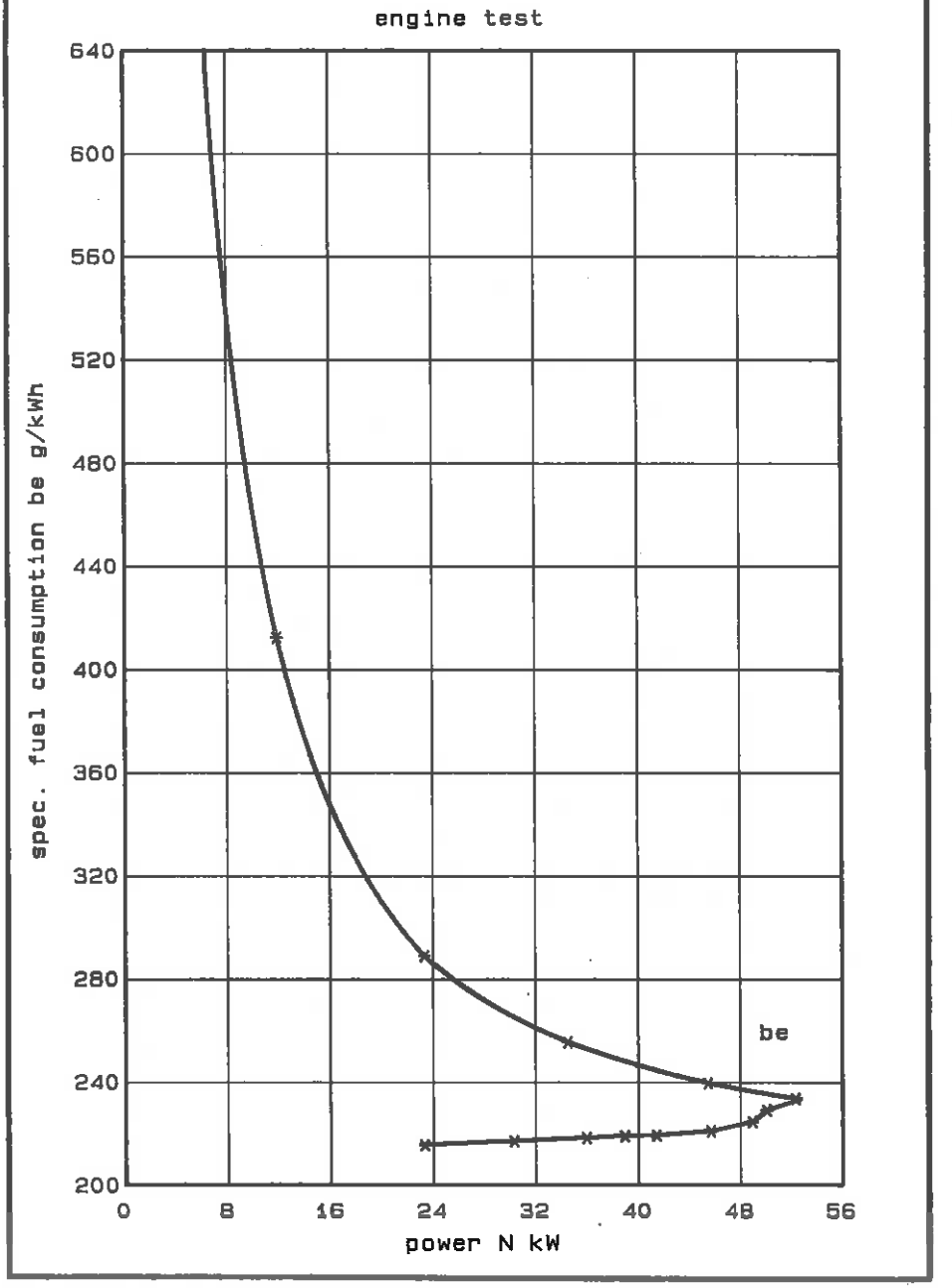

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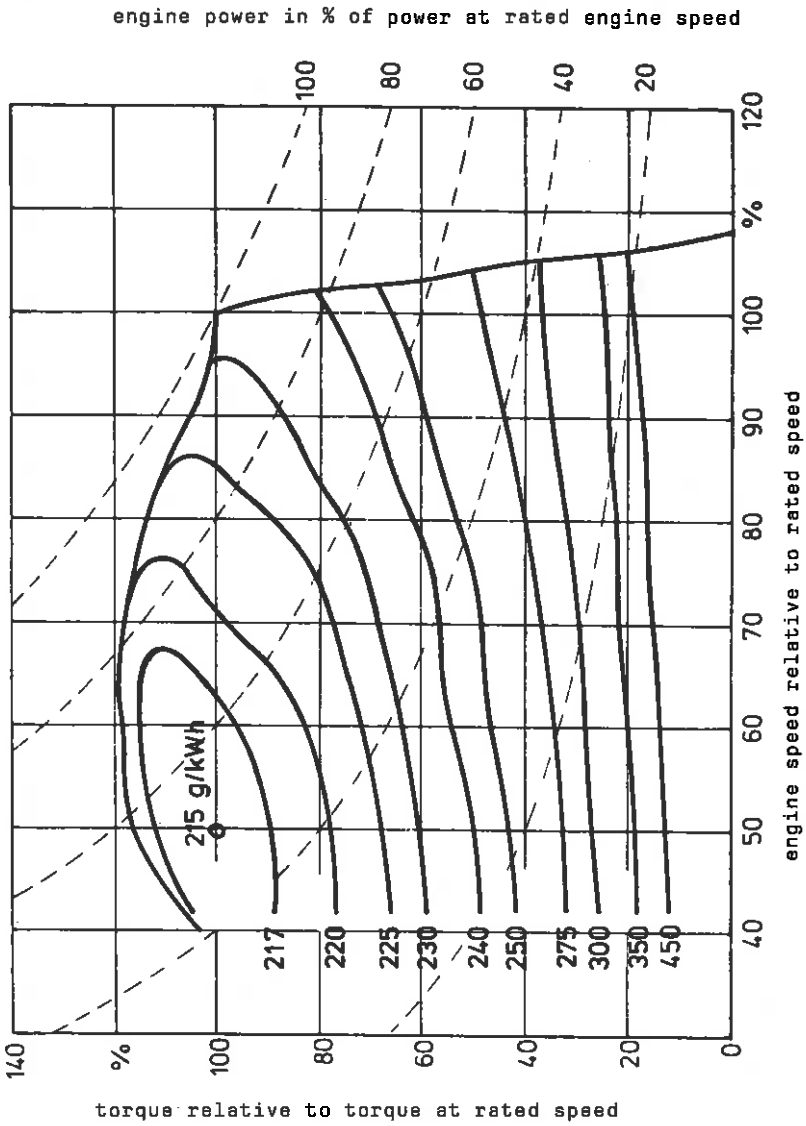

ADDITIONAL TESTS

under the responsibility of the DLG-Testing Station

(9) LIFTING FORCES at rear power lift with modified linkage setting

Date of tests:

Length of lift rods	(L)	455 mm
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	701 mm
Distance of upper link pivot point from rear wheel centre, vertical	(d)	400 mm
Length of upper link	(S)	697 mm

see pages 10 and 11

	Height of lower hitch points above ground in down position mm	Vertical movement mm	Max.force exerted through full range kN	Corresp. pressure of hydraul. fluid MPa	Moment about rear axle kNm	Max.tilt angle of mast from vertical degrees
At hitch points	516	+) 481 *) 455	31,5	15,3	-	-
On the frame	516	+) 549 *) 495	25,7	15,3	43,18	7,5

Temperature of hydraulic fluid at start of test 65°C

Lifting heights relative to horizontal lower links

mm	+20	+100	+200	+300	+400	+475	+500	+515
Lifting forces at hitch points								
kN	31,5	32,6	33,9	35,1	35,6	35,1		
Lifting forces at test frame								
kN	29,9	30,2	30,2	29,8	28,3		25,9	25,7

+) without lifting forces
*) with lifting forces

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