Report on test in accordance
with O.E.C.D. STANDARD CODE

O.E.C.D. No. 837



Agricultural Tractor HOLDER C 500 (4 WD)

type denomination 412

Manufacturer
Gebr. Holder GmbH & Co.
D-7430 Metzingen

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

Duration of Tests: November 1981 till March 1982
DLG-Testing-Station for Agricultural Machinery, Max-Eyth-Weg 1,
D-6114 Groß Umstadt

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

Date of Approval: 23rd June 1982 O.E.C.D. No. 837

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 daN = 10 N	= 1,02 kp	or 1 kp	= 0,981 daN
Powers	1 kW	= 1,36 PS	or 1 PS	= 0,736 kW
Pressures	1 bar	= 1,02 kp/cm²	or 1 kp/cm²	= 0,981 bar
	1000 mbar = 750,1 mm Hg			

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PRÜFUNGS-ABTEILUNG
HOLDER 412

Test No. 81-200

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PRÜFUNGS-ABTEILUNG
HOLDER 412 Test No. 81-200

Tractor manufacturer:	GEBR. HOLDER GMBH & CO D-7430 Metzingen
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with agreement by DLG
Place of running-in:	Metzingen and Groß-Umstadt
Duration of running-in:	Engine and tractor appr. 60 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	GEBR. HOLDER GMBH & CO
Trade name:	C 500
Type denomination:	412
Type:	Wheel tractor, articulated steering, all-wheel driven
Serial No.:	412 50 101

Engine

Make:	GEBR. HOLDER GMBH & CO
Model:	6001-14
Type:	Supercharged 4-stroke Diesel-engine with direct injection
Serial No.:	6450 136
Cylinder:	3,vertical in-line, bore 100 mm, stroke 100 mm; displacement 2356 cm^3; compression ratio 16,6
Valves:	Overhead
Fuel system:	Fuel feeding by gravity; BOSCH in-line injection pump PES 3A 80D 410/3 RS 1336, manufacturer's production setting 51,4 mm^3/stroke at rated engine speed and full load; injection timing 24° before TDC; BOSCH multihole injection nozzles DLLA 156 S 911, injection pressure 185+8 bar; MANN fuel filter with replaceable cartridge, capacity of fuel tank 40 l
Governor:	BOSCH centrifugal variable speed governor EP/RSV 400-1250 A0B 1123 L; governed range of engine speed 800 to 2670 rev/min,rated engine speed 2500 rev/min

Supercharger:	KÜHNLE, KOPP UND KAUSCH K 24; exhaust driven supercharger, max. supercharge pressure 530 mbar, without air intercooler
Air cleaner:	MANN dry paper element filter with pre-cleaner, replaceable cartridge and acoustically operating maintenance indicator
Exhaust silencer:	HOLDER reflexion-absorption type silencer; double silencer consisting of 2 silencers of 115 mm dia and 407 mm length each; mouth showing backwards, 545 mm above ground
Lubrication system:	Forced feed from gear pump, strainer in sump; MANN oil filter in full flow with by-pass valve and replaceable cartridge; oil capacity 6 l; oil and oil filter change interval 150 operating hours; recommended oil qualities: API-CC, for hard working conditions API-CD; recommended oil viscosities: winter SAE 10W summer SAE 20W/20 tropics SAE 30
Cooling system:	Water cooling with centrifugal pump and overpressure relief valve, set to 1 + 0,2 bar; by-pass thermostat; fan with 4 blades, 300 mm dia; water capacity 9 l
Starting system:	Electrical BOSCH solenoid pre-engaged-drive starting motor JF 12V 2,4 kW; BERU heating spiral in intake manifold
Electrical equipment:	12 Volt, negative earth; BOSCH three-phase AC generator G1 14V 33A,462 W; 1 lead acid battery 88Ah at 20 hours rating

Transmission

Travel drive clutch:	FICHTEL UND SACHS AG single-plate dry clutch MF 240 K; disc 240 mm dia, hydraulically operated by pedal
P.t.o. drive clutch:	HOLDER wet multi-plate clutch, by handlever operated
Gear box:	HOLDER consisting of 2 gear boxes, connected with each other by universally-jointed propeller shafts; speed change gear with 4 speeds, synchronized; group gear with 2 synchronized forward groups and 1 collar shifted reverse group; totally 8 forward and 4 reverse speeds
Axle drives and final drives:	HOLDER all-wheel drive not disengageable; at front and at rear in each case: bevel-gear pair, bevel gear differential with hydraulically by hand valve engageable lock; differential lock self-disengaging; planetary final drives; differential locks are engageable in common according to the manufacturer's specification the drawbar pull during continuous work is to be limited to 2500 daN
Lubrication:	Specified oil: gear oil SAE 80 API-GL4 oil capacities: gear box part at rear inclusive of rear axle 10,3 l gear box part at front inclusive of front axle 6,3 l final drives, each 0,3 l without oil filter oil change interval 1500 operating hours

Total ratios and speeds (tyres 10.5/80-18 Impl.)

Group	Gear	Total ratio engine : driving wheel	Nominal travelling speed *) at rated engine speed km/h
Forward speeds			
L	1	265,86	1,51
	2	146,51	2,73
	3	88,09	4,55
	4	56,92	7,04
S	1	74,43	5,38
	2	41,02	9,76
	3	24,66	16,24
	4	15,94	25,13
Reverse speeds			
R	1	225,40	1,78
	2	124,22	3,22
	3	74,68	5,36
	4	48,26	8,30

*) calculated with a tyre dynamic radius of 425 mm

Power take-off

Main p.t.o.:	Independent p.t.o. at front of tractor, in tractor's median plane, 470 mm above ground; p.t.o. shaft end 617 mm before front axle centre line, 35 mm dia, 6 splines ISO 500/DIN 9611 type 1
	1047 rev/min at rated engine speed, standard p.t.o. speed 1000 rev/min at engine speed 2389 rev/min; direction of rotation anticlockwise, viewed from rear of tractor
	main p.t.o. optionally available as 540 rev/min p.t.o.
Secondary p.t.o.:	Drive and shaft like main p.t.o., at rear of tractor, in tractor's median plane, 320 mm above ground; p.t.o. shaft end 770 mm behind rear axle centre line; 1060 rev/min at rated engine speed, standard p.t.o. speed 1000 rev/min at engine speed 2358 rev/min; direction of rotation clockwise, viewed from rear of tractor
Power lift	HOLDER hydraulic power lift, desintegrated construction
Hydraulic system:	Open centre system BOSCH gear pump HY/ZFS, directly driven by engine; delivery 35 l/min at rated engine speed; hydraulic oil filter in high-pressure delivery line behind pump, filter change all 300 operating hours;
	maximum working pressure 180 + 10 bar; seperate hydraulic oil tank with 14 l capacity

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Main power lift (at front):	BUCHER control valve for raising, lowering (pushing) and floating position; 2 double acting rams with 50 mm bore and 137 mm stroke, directly acting on laterally stabilized lower links; without overpressure relief valves in rams, without lowering throttle
Power lift at rear:	BUCHER control valve for raising, lowering and floating position; 1 single acting ram with 45 mm bore and 140 mm stroke, without overpressure relief valve; without lowering throttle
Remote circuit:	2 double acting BUCHER-auxiliary control valves with 2 oil tappings each at front, 1 single acting BUCHER-auxiliary control valve with 1 oil tapping at rear of tractor by oil tappings may be taken off up to 3,5 l if tractor is travelling and 11 l if tractor is standing
Hydraulic oil:	Recommended engine oil SAE 20W/20 API-CC oil change yearly
Implement linkage at front:	Three point linkage, joint balls according to ISO 730/I category 1, lifting range above ground from 85 to 570 mm
Implement linkage at rear:	Linkage of own construction with 2 laterally stabilized arms joint balls according to ISO 730/I category 1; lifting range above ground from 110 to 560 mm

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Pull attachment

Trailer hitch: ROCKINGER
248 U 130, automatical
height above ground adjustable by shifting to 690, 735 or 780 mm;
hitch hole 30 mm dia;
distance of hitch hole centre
from rear axle centre line 1200 mm,
from rear p.t.o. shaft end 430 mm;

permissible vertical load 290 kg

Drawbar: Short bar, fitted on clevis of lower links of rear power lift
length between the joint balls 680 mm,
width 70 mm, thickness 30 mm;
centre hole and 3 holes in 80 mm distance each on either side, all holes 33 mm dia;
height above ground adjustable by power lift in the range from 125 to 575 mm, measured at surface of bar;
distance of holes'centre line with lower links in horizontal position:

from rear axle centre line	1150 mm
from p.t.o. shaft end (at rear)	380 mm

Towing hitch: The upper link pivot point of implement linkage at front may be used for towing,
height above ground 793 mm

Steering HOLDER in cooperation with DANFOSS and WEBER hydrostatic articulated steering;
oil-circuit in common with power lift,
BUCHER flow dividing valve;

2 double acting rams with 55 mm bore and 111 mm stroke each between front and rear parts of tractor

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Brakes

Parking brake: Operated by hand lever with ratchet, acting on the drums of service brake

Service brake: HOLDER in cooperation with KNOTT, pedal operated muscle power brake with mechanical transmission, acting on front axle and simultaneously by undisengageable all-wheel drive on rear axle; internal-expanding-shoe brake, 1 brake drum with 150 mm dia and 35 mm width each on front differential half shafts

Steering brake: None

Wheels

Driving wheels: At front and at rear, 4 pneumatics, 10.5/80-18 Impl. 6 ply, diagonal type tyre casing; maximum permissible load per tyre 1430 kg at 2,25 bar inflation pressure and 30 km/h travelling speed;

track widths adjustable to 924, 940, 1014 or 1030 mm by turning the wheels and attachment of intermediate rings to the wheel hubs

rims 9 x 18

Wheel base: 1450 mm

Cab

HOLDER
type 6055
OECD-tested safety cab, approval no. CSD 0409/1

cab mounted to front part of tractor by 4 silent blocks;
driver's doors on the left and on the right with sliding windows,
door for a passenger behind left-hand driver's door;
roof with tiltable hatch cover;

engine coolant heat exchanger with two-stage blower below passenger's seat,
air outlet jets for the cab floor and for the windscreen;
additional fan assisted fresh air ventilation system and outlet jets in the roof

noise-reduction materials:

floor	rubber-haevy mat	7 mm
seat support	foam with imitation leather	20 mm
front wall	rubber-heavy mat	7 mm
instrument and steering support	foam with imitation leather	8 mm
doors	foam with perforated PVC-foil	20 mm
mudguards	PVC-face grating	2 mm
rear wall	foam with perforated PVC-foil	20 mm
roof	foam with perforated PVC-foil	20 mm

Driver's seat

BOSTROM, Typ TS-1
upholstered seat with back rest,
adjustable spring with shock absorber;
height of driver's platform above ground 700 mm;
height of unloaded seat above platform adjustable to 6 positions from 340 to 430 mm;
longitudinal adjustment range 150 mm, in 6 steps divided

Passenger's seat

Behind driver's seat, upholstered;
at right angles to driving direction

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Auxiliary loading platform: Behind the cab, above engine, detachable

Number of grease points: 18

Dimensions

Total length: 3870 mm without ballast
4400 mm with ballast

Total width: 1280 mm with and without ballast

Total height: 2040 mm to top of cab roof
2275 mm to top of warning lamp

Ground clearance: 220 mm below articulation point

Permissible total weights and axle loads for all available tyre sizes

tyre sizes at front and at rear	permissible axle load at front and at rear kg	permissible total weight kg
10.5/80-18 Impl. 6 ply 400-15.5 6 ply 400/60-15.5 4/6 ply 31 x 15.5-15 4/6 ply 13.0/65-18 Impl. 6 ply	1800	3000

Running-time meter: Mechanical, combined with tachometer, driven by engine's camshaft; reference engine speed for one really counted hour 1670 rev/min

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Lighting equipment — Electrical, 12 V
in accordance with German legislation

	Dimensions mm	Height of centre above ground mm	Distance of outside edge of tractor to centre mm
Headlamps	120 x 130	1050	235
Auxiliary lamps	70 x 140	1950	410
Sidelamps	20 x 70	1940	260
Rearlamps	40 x 90	940	265
Reflectors	45 x 90	880	265

TEST CONDITIONS

Track of wheels — at front and at rear 924 mm

Weights		Without driver	With driver
Without ballast:	front	790 kg	855 kg
	rear	1205 kg	1210 kg
	total	1995 kg	2065 kg
Front ballast:	1 concrete weight in front implement linkage		615 kg
Rear ballast:	1 concret weight in rear implement linkage		230 kg
	1 loading platform		85 kg
With ballast:	front	1735 kg	1800 kg
	rear	1195 kg	1200 kg
	total	2930 kg	3000 kg

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Fuel and lubricants used in tests

Fuel:	ARAL Diesel fuel DIN 5106		
	specific gravity at 15°C		
	at engine tests and at p.t.o. tests		0,832 kg/l
	at drawbar performance test		0,828 kg/l
Engine oil:	MOBIL DELVAC 1220	SAE 20W/20	
Gear oil:	MOBIL	SAE 80	
Hydraulic oil:	MOBIL DELVAC 1220	SAE 20W/20	

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COMPULSORY TESTS

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

Main p.t.o. at front of tractor

Date of tests: 14th December 1891
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						
At 2-hour test						
33.3	2500	1047	11.57	9.62	289	2.87
At standard p.t.o. speed						
32.7	2389	1000	11.15	9.27	283	2.94
At the speed recommended for drawbar work						
33.3	2500	1047	11.57	9.62	289	2.87
Part loads, the governor hand lever in the position corresponding to the maximum power at full load (curve a)						
(i) 85% of the torque at maximum power at 2-hour test						
28.6	2531	1059	9.96	8.29	290	2.87
(ii) unloaded						
-	2637	1104	3.13	2.61	-	-
(iii) 50% of the load defined in (i)						
14.6	2575	1078	6.32	5.26	361	2.30
(iv) maximum power						
33.3	2500	1047	11.57	9.62	289	2.87
(v) 25% of the load defined in (i)						
7.4	2602	1089	4.66	3.88	528	1.58
(vi) 75% of the load defined in (i)						
21.7	2558	1071	8.12	6.76	311	2.67

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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
Part loads, the governor hand lever in the position corresponding to the standard p.t.o. speed at full load (curve b)						
(i) 85% of the torque at maximum power at standard p.t.o. speed						
28.2	2423	1014	9.43	7.84	278	2.99
(ii) unloaded						
-	2539	1063	2.86	2.38	-	-
(iii) 50% of the load defined in (i)						
14.4	2468	1033	5.97	4.97	346	2.41
(iv) maximum power						
32.7	2389	1000	11.15	9.27	283	2.94
(v) 25% of the load defined in (i)						
7.3	2504	1048	4.33	3.60	494	1.68
(vi) 75% of the load defined in (i)						
21.4	2450	1026	7.73	6.43	300	2.77

Standard specific fuel consumption (g/kWh): 290/361/278/346

No load maximum engine speed: 2637 rev/min
Equivalent crankshaft torque at maximum power (2 hours): 127 Nm
Maximum equivalent crankshaft torque: 137 Nm at 1966 rev/min of the engine

Mean atmospheric conditions:	temperature	16 °C
	pressure	966 mbar
	relative humidity	48 %
Maximum temperatures:	coolant	85 °C
	engine oil	87 °C
	fuel	17 °C
	engine air intake	16 °C

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HOLDER 4-12

Zapfwellenleistung

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P.t.o. performance

Test Nr. 81-200

Zapfwellenleistung Pe kW
p.t.o. power

Kraftstoffverbrauch B kg/h
fuel consumption

Pe

M equiv

B

be

standard p.t.o. speed 1000 min⁻¹

äquivalentes Drehmoment M equiv Nm
equiv. crankshaft torque

spez. Kraftstoffverbrauch be g/kWh
spec. fuel consumption

Motordrehzahl n engine speed U/min rev/min

40 32 24 16 8 0 10 8 6 4 2

1300 1500 1700 1900 2100 2300 2500 2700

160 140 120 100 80 60 40 20 0

420 400 380 360 340 320 300 280 260 240 220 200 180

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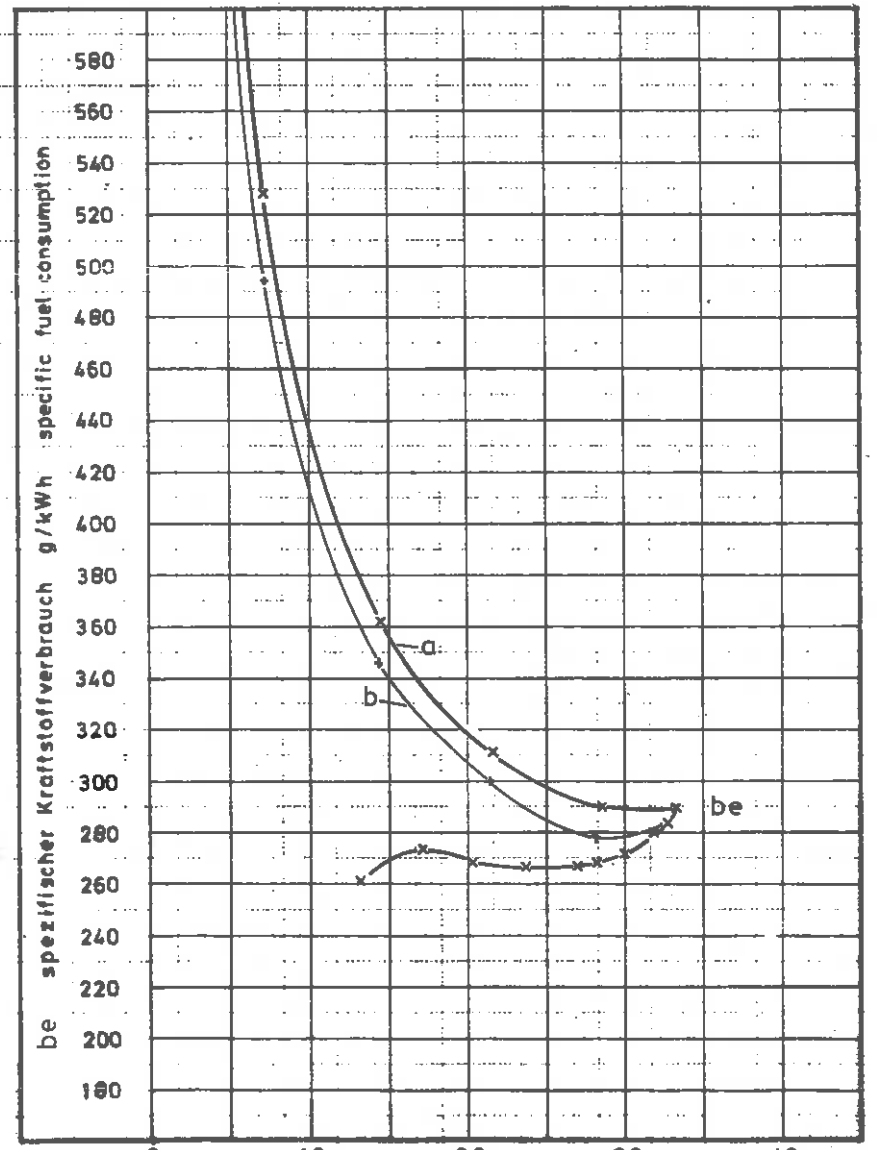
HOLDER 412

Zapfwellenleistung

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P.t.o. performance

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(2) DRAWBAR PERFORMANCE

Date of tests: 24th February till 22nd March 1982
Type of track: Concrete

Gear no. and group	Driving speed km/h	Power kW	Drawbar pull daN	Engine speed rev/min	Slip of wheels %
(i) MAXIMUM POWER (unballasted) height of drawbar above ground 410 mm					
3 L	3,84	21,7	2034	2531	15,0
1 S	4,52	25,2	2010	2517	15,0
4 L	6,22	27,9	1613	2501	9,5
2 S	8,92	28,3	1140	2500	6,1
3 S	15,33	27,6	647	2501	3,3
(ii) MAXIMUM POWER (ballasted) height of drawbar above ground 450 mm					
1 L	1,28	10,4	2922	2582	15,1
2 L	2,29	18,4	2891	2548	14,9
3 L	3,91	26,3	2420	2501	10,8
1 S	4,77	27,7	2087	2504	8,3
4 L	6,40	27,6	1550	2496	5,4
2 S	9,06	26,9	1070	2499	3,6
(iii) FIVE-HOUR-TEST at 75% of pull at maximum power in 4th-L gear					
4 L	6,65	21,5	1163	2551	3,8
(iv) FIVE-HOUR-TEST at pull allowed by manufacturer during continuous work					
2 L	2,46	17,1	2500	2559	-

Total oil consumption during ten hours duration of tests (iii) and (iv) 15 g/h

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Tyre size front and rear: 10.5/80-18 Impl. 6 ply

Tread bar height at the beginning of drawbar tests

Specific fuel consumpt. g/kWh	Specific energy kWh/l	Temperatures Fuel °C	Coolant °C	Engine oil °C	Atmospheric conditions Temperature °C	Relative humidity %	Pressure mbar
tyre inflation pressure at front and at rear 1,0 bar							
376	2,20	8	78	78	0	77	990
363	2,28	8	78	80	0	99	990
344	2,41	13	82	84	4	49	993
341	2,43	14	84	86	5	45	993
346	2,39	11	80	82	3	55	993
tyre inflation pressure at front and at rear 1,0 bar							
490	1,69	20	84	86	10	81	995
404	2,05	20	84	86	11	69	995
364	2,28	20	85	87	10	80	995
345	2,40	24	85	87	10	80	995
346	2,39	16	84	86	11	75	995
354	2,34	18	83	86	11	76	995
355	2,33	21	86	88	12	78	1010
(see description of gear box on page 6)							
-	-	21	87	89	15	86	996

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

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(3) TURNING SPACE AND TURNING CIRCLE

Wheel equipment front and rear: 10.5/80-18 Impl. 6 ply

Track of wheels front and rear: 924 mm

	left-hand	right-hand
Radius of turning space	3,09 m	3,07 m
Radius of turning circle	2,77 m	2,75 m

(4) LOCATION OF CENTRE OF GRAVITY

Height above ground	611 mm
Distance forward from rear axle centre	602 mm
Distance from tractor's median plane, to left	1 mm
Distance from the vertical plane containing the mid points of the front and rear axles with maximum articulation 33,5° to left 34,5° to right	 45 mm to left 40 mm to right

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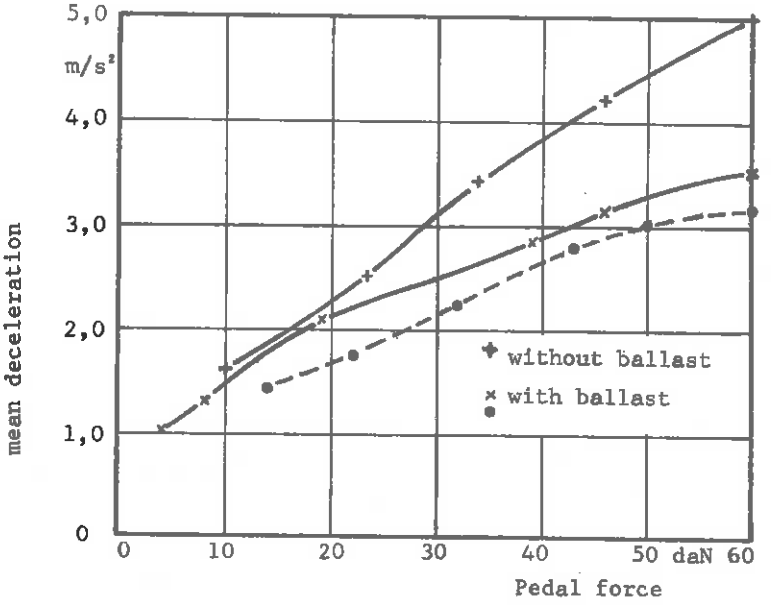
(5) Braking

Date of tests: 25th February 1982

Tractor masses during tests with driver:	front kg	rear kg	total kg
without ballast	855	1210	2065
with ballast	1800	1200	3000

A) Service brake

Type-0-test (cold brakes) ——, Type-I-(fade)test – – –



Speed before application of brakes, without ballast 25,5 km/h
with ballast 25,1 km/h

The brakes were heated by towing of the tractor for 1 km

B) Parking brake

	Ballasted tractor on 18%-slope		Unballasted tractor on 12%-slope with trailer of 2065 kg	
	up	down	up	down
Braking device control force daN	45	32	52	38

(6) MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of test: 25th February 1982
Type of track: Concrete
Type of sound level meter: BRÜEL AND KJAER model 2203

Results of test

Gear: 4th S
Travelling speed before acceleration: 19,1 km/h
Sound level: 83,5 dB(A)

(7) NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests: 18th March 1982
Type of track: Concrete
Type of sound level meter: BRÜEL AND KJAER model 2207
With HOLDER safety cab model 6055

Results of tests

Gear no. and group	Drawbar pull at which the tractor develops the maximum sound level daN	Travelling speed nominal km/h	Travelling speed effective km/h	Sound level dB(A)
1 L	2012	1,51	1,29	82,5
2 L	2033	2,73	2,33	84,0
3 L	2012	4,55	3,86	83,5
1 S	2007	5,38	4,53	82,0
4 L*)	light load	7,04	7,30	82,0
4 L*)	1601	7,04	6,23	84,0
2 S	1100	9,76	8,93	82,5
3 S	622	16,24	15,39	81,5
4 S	light load	25,13	25,43	81,0

*) The 4th L gear corresponds to the travelling speed nearest to 7,5 km/h

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(8) POWER LIFT AND HYDRAULIC PUMP PERFORMANCE

Date of tests: 14th and 20th January 1982

Power Lift (at front)

	Height of lower hitch point above ground in down pos. mm	Vertical movement mm	Max. force exerted through full range daN	Corresp. pressure of hydraul. fluid bar	Moment about rear axle daNm	Max. tilt angle of mast over range of lift degrees
At hitch points	85	485	1082	162	-	-
On the frame	85	470	509	162	879	2

Temperature of hydraulic fluid at start of test 65 °C

Lifting heights relative to horizontal lower links

mm	-230	-200	-100	-95	0	+100	+200	+255	+300	+375
Lifting forces at hitch points										
daN	1082	1082	1091		1108	1112	1104	1091		
Lifting forces at test frame										
daN				1608	1118	861	715		586	509

Hydraulic Pump Performance

Opening pressure of the relief valve in remote circuit	150 bar
Sustained pressure with relief valve open	185 bar
Pump delivery rate at minimum pressure, the governor control lever being set for max. power	24,5 l/min
Hydraulic power at 90% of relief valve setting	4,6 kW
Corresponding delivery rate	16,6 l/min
Pressure	167 bar
Temperature of hydraulic fluid	65 °C

Tapping point used for test: at front of tractor

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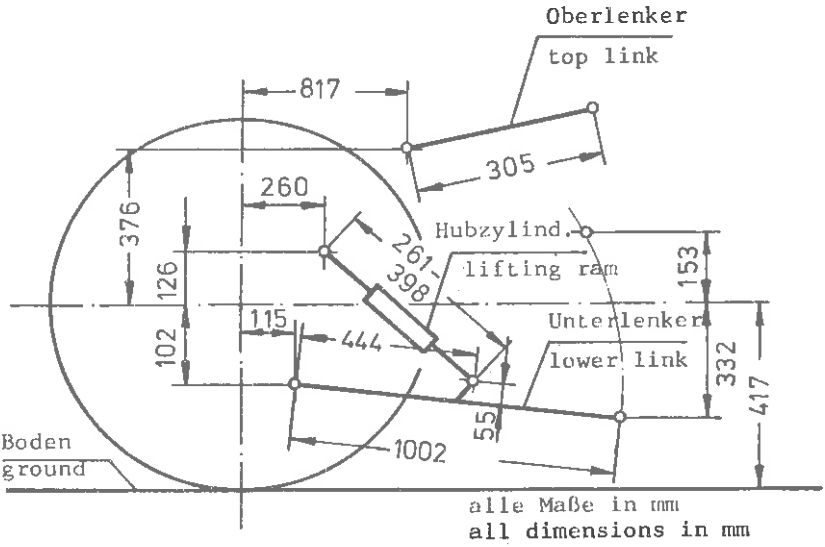
LINKAGE GEOMETRY when connected to the standard frame

Projected length in side view:

Lower links	1002 mm
Lift rams	261 to 398 mm
Top link	305 mm
Distance of lift ram connection point from pivot point lower link	444 mm

The following dimensions are given relative to the front wheel centre line, situated 417 mm above ground:

Lower link pivot point	115 mm forward, 102 mm below
Top link pivot point	817 mm forward, 376 mm above
Lift ram pivot point	260 mm forward, 126 mm above
Maximum and minimum height of lower link hitch points	153 mm above, 332 mm below
Height of lower link hitch points when locked in transport position	153 mm above



PRÜFUNGS-ABTEILUNG
HOLDER 412

Test No. 81-200

OPTIONAL TESTS

(9) ENGINE PERFORMANCE

Date of tests: 4th December 1981
Type of dynamometer: SCHENCK eddy-current dynamometer W 150

Power kW	Engine speed rev/min	Fuel consumption hourly l/h	Fuel consumption hourly kg/h	Fuel consumption specific g/kWh	Specific energy kWh/l
Maximum power					
At 2-hour test					
36.9	2500	11.49	9.56	259	3.21
At standard p.t.o. speed (1000 rev/min)					
36.0	2388	10.94	9.10	253	3.29
At the speed recommended for drawbar work					
36.9	2500	11.49	9.56	259	3.21
Part loads					
(i) 85% of the torque at maximum power at 2-hour test					
31.9	2537	9.85	8.20	257	3.24
(ii) unloaded					
-	2667	2.72	2.27	-	-
(iii) 50% of the load defined in (i)					
16.3	2589	6.03	5.02	309	2.70
(iv) maximum power					
36.9	2500	11.49	9.56	259	3.21
(v) 25% of the load defined in (i)					
8.2	2627	4.25	3.53	428	1.94
(vi) 75% of the load defined in (i)					
24.2	2564	7.98	6.64	275	3.03

Optimum fuel consumption: 226 g/kWh at 15.2 kW and 1375 rev/min
No load maximum engine speed: 2667 rev/min
Torque at maximum power (2 hours): 141 Nm
Maximum torque: 151 Nm at 1899 rev/min of the engine

Mean atmospheric conditions:	temperature	15 °C
	pressure	996 mbar
	relative humidity	45 %
Maximum temperatures:	coolant	83 °C
	engine oil	85 °C
	fuel	15 °C
	engine air intake	15 °C

PRÜFUNGS-ABTEILUNG

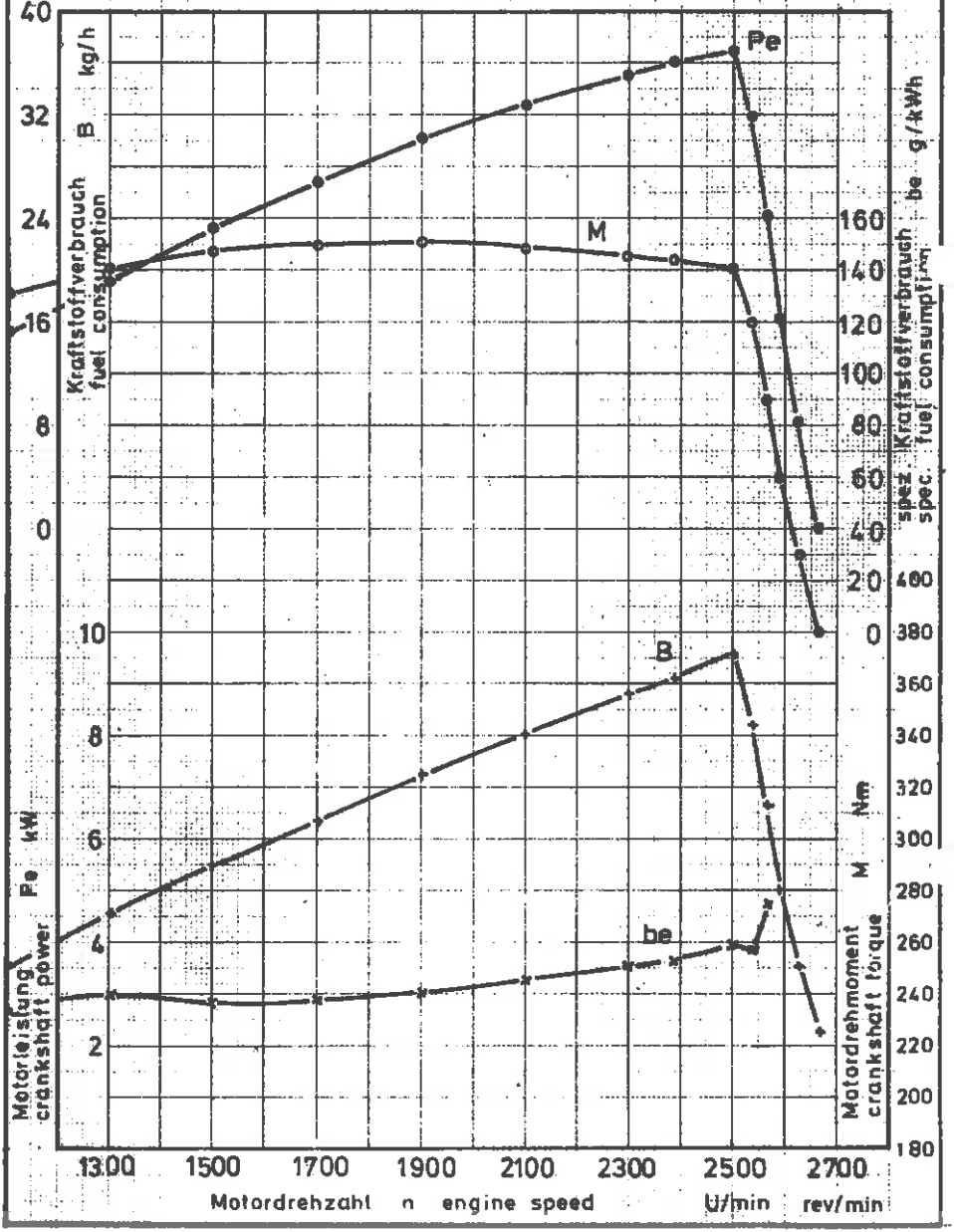
HOLDER 412

Motorleistung

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Engine performance

Test Nr. 81-200



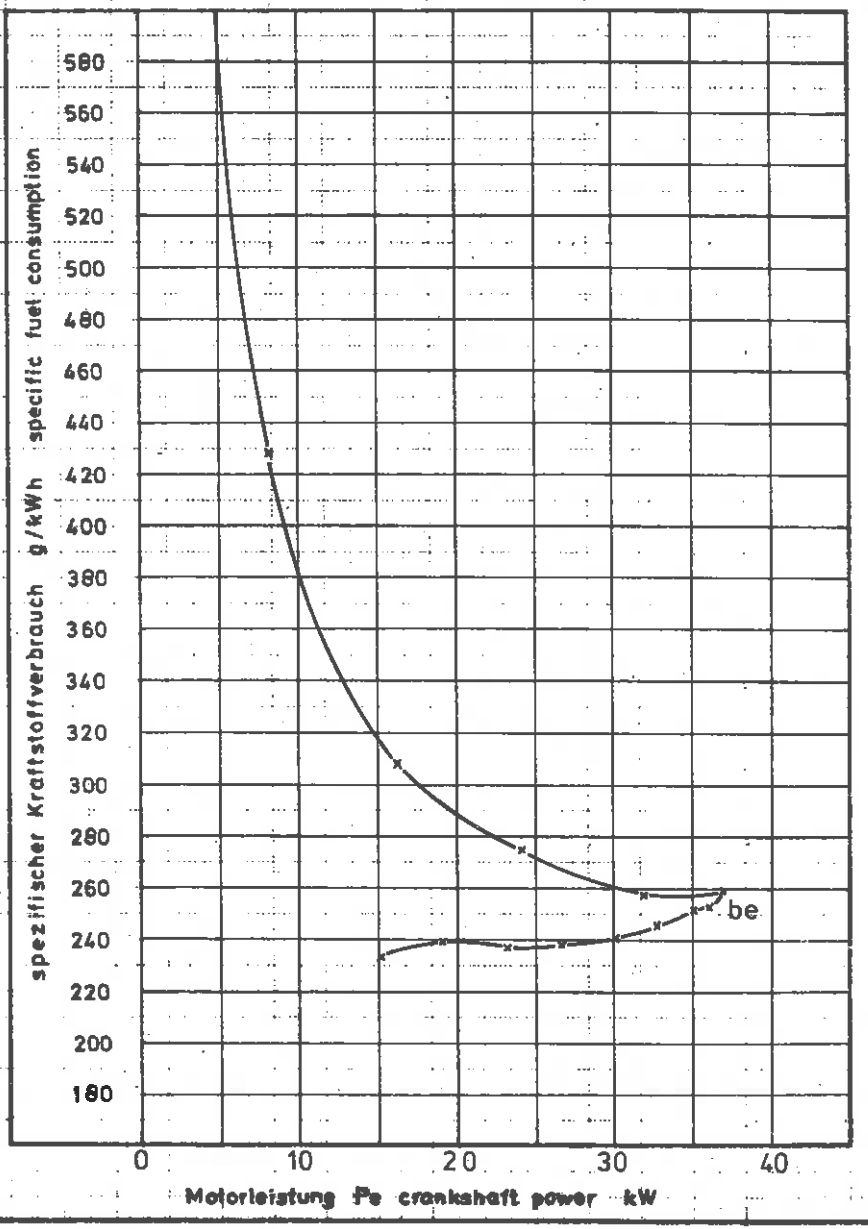
PRÜFUNGS-ABTEILUNG

HOLDER 412

Motorleistung

Engine performance

Test Nr. 81-200



PRÜFUNGS-ABTEILUNG

BOLDER 412

Motorleistung

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Engine performance

Test Nr. 81-200

Motorleistung in % der Leistung bei Nenndrehzahl

engine power in % of power at rated engine speed

%

100 80 60 40 20

110 100 90 80 70 60 50 40

Motordrehzahl in % der Nenndrehzahl engine speed in % of rated engine speed

226 g/kWh

230 235 240 250 275 300 350 450

%

130 120 110 100 90 80 70 60 50 40 30 20 10 0

Belastung in % des Drehmomentes bei Nenndrehzahl

load in % of torque at rated engine speed

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