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Report on test in accordance with
O.E.C.D. STANDARD CODE for the Official Testing
of Agricultural Tractors



DEUTZ-AGRICULTURAL TRACTOR INTRAC 2002 A

(All-wheel drive)

Manufactured by: KLÖCKNER-HUMBOLDT-DEUTZ AG
D-5000 Köln

Date of Tests: March till May 1973

DLG-Testing Station for Agricultural Machinery
D-6114 Groß-Umstadt

DEUTSCHE LANDWIRTSCHAFTS-GESELLSCHAFT e.V.
Prüfungsabteilung für Landmaschinen
D-6000 Frankfurt/Main 1, Zimmerweg 16

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

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

Date of Approval: 14th September 1973

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Test No. 73-40

Tractor manufacturer:	KLÖCKNER-HUMBOLDT-DEUTZ AG D-5000 Köln
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with agreement by DLG
Place of running-in:	Köln and Groß-Umstadt
Duration of running-in:	Engine and tractor appr. 50 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	KLÖCKNER-HUMBOLDT-DEUTZ AG
Model:	INTRAC 2002A
Type:	four wheel agricultural tractor, all wheel driven, half-frame construction
Serial No.:	7556/99

Engine

Make:	KLÖCKNER-HUMBOLDT-DEUTZ AG
Model:	F3L 912 H
Type:	4-stroke Diesel engine with direct injection air cooled
Serial No.:	5160213
Cylinders:	3 in line oblique; bore 100 mm, stroke 120 mm; displacement 2826 cm^3; compression ratio 17 : 1; replaceable ribbed single cylinders; overhead valves
Fuel system:	PIERBURG-fuel feed pump PE 15252; BOSCH in line injection pump: PES 3 A 80 D 410/3 RS 1183; manufacturer's production setting 52 mm^3 per stroke at rated engine speed and full load; injection timing 28° before TDC; BOSCH multihole injection nozzles DLLA 149 S 394; injection pressure 175 kp/cm^2; MANN fuel filter with replaceable cartridge; capacity of fuel tank appr. 85 l
Governor:	BOSCH centrifugal variable speed governor: EP/RSV 325-1150 A 8 B 657 DL; governed range of engine speed: 700 to 2425 rev/min; rated engine speed 2300 rev/min

Air cleaner:	Own make; DEUTZ-SICCOPUR; dry paper element filter with precleaner; replaceable cartridge
Exhaust silencer:	Own make; 3-chamber expansion and absorption type; 125 mm diameter, 460 mm long; on the left hand side of tractor; mouth showing rearward before the left hand driving wheel
Lubrication system:	Forced feed from gear type pump; strainer in sump; MANN oil filter in full flow with by-pass valve; replaceable cartridge; oil capacity 9 l; oil changing period 100 till 120 hours or 200 till 240 hours according to oil quality; recommended oil viscosity: winter SAE 10W summer SAE 20W/20 tropics SAE 30
Cooling system:	Air cooling; V-belt driven axial blower
Starting system:	Electrical; BOSCH starter motor DD (R) 12V 3 PS; BOSCH flame type plug in intake pipe: B 12 V H 7632
Electrical equipment:	12 Volt, negative earth; BOSCH threephase alternator G1 R2 14V 26A 22; 1 lead acid battery 110 Ah 20 hours rating

Transmission

Clutch:	LAMELLEN UND KUPPLUNGSBAU GMBH dry dual disc type clutch DT 280/280 G; driving-part operated by pedal; rear p.t.o.-part operated by hand lever
Gear box:	Own make; TW 50.1; synchronized speed change gear with 4 forward speeds

Gear box: (Continuation)	Group gear; 3 forward groups, sliding gear shifted; slow-, fast- and optional creep group; (creep group fitted on tractor tested); 1 reverse group; collar shifted; total 12 forward and 4 reverse speeds
Rear axle and final drive:	Crown wheel and pinion; bevel gear type differential; differential lock fitted; pedal operated, self disengaging; spur gear final drive
Front axle:	S.I.G.E. Mailand (Italy) front-wheel drive at the left hand side of the gear box with universal joint shaft engageable and disengageable by hand lever when tractor is stopping; overload protection fitted; bevel gear type differential without locking
Oil capacity:	Speed change gear, group gear and rear axle with final drive total 19,5 l front-axle differential 1,6 l front-wheel drive 1,3 l
Oil changing period:	1200 hours

Power take off

Main p.t.o.:	At rear of tractor in median plane; driven through the hand lever operated clutch disc; 580 mm above ground; 29 x 34,9 x 8,7 mm = 1 3/8" 6 splines; (DIN 9611 Form A; BS 1495; ASAE S. 203.7); 2 speeds are preselectable: 540 rev/min 598 rev/min at rated engine speed; standard p.t.o. speed 540 rev/min at 2077 rev/min engine speed 1000 rev/min 993 rev/min at rated engine speed; the deviation from the exact standard speed 1000 rev/min is within the tolerance acc. DIN 9611

Total ratios and speeds

Group	Gear No.	Number of engine revolutions for one revolution of the driving wheel	Nominal travelling speed at rated engine speed *)	
			km/h	m/s
creep-group	1	1294,1	0,43	0,12
	2	814,3	0,68	0,19
	3	557,5	0,99	0,28
	4	330,9	1,68	0,47
slow-group	1	263,0	2,11	0,59
	2	165,5	3,35	0,93
	3	113,3	4,90	1,36
	4	67,25	8,25	2,29
fast-group	1	88,43	6,27	1,74
	2	55,64	9,97	2,77
	3	38,09	14,56	4,04
	4	22,60	24,54	6,82
reverse-group	1	232,4	2,39	0,66
	2	146,3	3,79	1,05
	3	100,1	5,54	1,54
	4	59,44	9,33	2,59

*) calculated with the standard active tyre radius acc. DIN 7807

Power take off (Continuation)

Secondary p.t.o.: At front of tractor in median plane;
driven by the front end of crankshaft through a hand lever operated multi-disc type clutch of own make;
under load engageable and disengageable;
670 mm above ground;
dimensions as main p.t.o.;
1060 rev/min at rated engine speed;
standard p.t.o.-speed 540 rev/min at 2180 rev/min engine speed

Direction of rotation of main p.t.o. and secondary p.t.o. clockwise, viewed from tractor rear;
p.t.o.-speeds may be set by tractormeter

Belt pulley	(Optional; not fitted on tractor tested); at rear of tractor; driving device attached to p.t.o.; engaged by p.t.o.-hand lever; to be operated only with 540 rev/min p.t.o.; 1256 rev/min at rated engine speed; linear belt speed 20,9 m/s; standard belt speed at 2281 rev/min engine speed; direction of rotation anticlockwise, viewed from the right hand side of tractor
Power lift	
in the rear:	Own make; K 45; DEUTZ-TRANSFERMATIC-System; hydraulic power lift, unit construction; draught control, position control, floating position; single acting ram, bore 80 mm, stroke 152 mm; overpressure relief valve for ram adjusted at 210 kp/cm² + 30 kp/cm²; BOSCH gear pump HY/ZFS 1/16L (112/1); directly driven by engine; DEUTZ control valve; maximum oil pressure 175 kp/cm²
at front:	Own make; disintegrated construction; fed to the hydraulic system of the rear power lift; 2 single acting rams; bore 45 mm; stroke 210 mm; DEUTZ control valve, single acting
container lifting up device:	Own make; disintegrated construction; in the middle of the tractor; below the platform; fed to the hydraulic system of the rear power lift; 1 double acting ram; bore 55 mm; piston-rod 32 mm diameter, stroke 128 mm; DEUTZ control valve double acting

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Power lift (Continuation)

oil tappings:	a) At front: Up to 3 single acting DEUTZ control valves with 1 oil tapping each or up to 3 double acting DEUTZ control valves with 2 oil tappings each b) In the rear: Up to 3 single acting DEUTZ control valves with 1 oil tapping each or 1 single acting DEUTZ control valve with 1 oil tapping and up to 2 double acting DEUTZ control valves with 2 oil tappings each c) Between the limiting cases a) and b) all combination are available Hydraulic oil tank incorporated in the lift unit with 15 l capacity; additional tank with 12 l capacity too optional available (not fitted on tractor tested); total 27 l hydraulic oil capacity; oil changing period 600 hours

Implement linkage

in the rear:	Three point linkage DIN 9674 category I or II; operated by power lift; lifting rods length adjustable from 540 to 640 mm; lifting range above ground from 75 to 860 mm according to lifting rods length
at front:	Three point linkage of own construction; only the ball joints are according to DIN 9674 category I; rams of front power lift acting through a lifting appliance on lower links; lifting rods length adjustable from 385 to 500 mm; lifting range above ground from 75 to 940 mm according to lifting rods length (DEUTZ-HITCH may be fitted at front and in the rear optionally, not fitted on tractor tested)

Holed drawbar	Fitted on clevis of lower links; length between universal ball joints 830 mm; thickness 30 mm; centre hole and 4 holes on either side 80 mm distance each; all holes 33 mm diameter; height above ground adjustable by power lift in the range between 90 and 875 mm measured at the surface of the drawbar depending on lift rods length; with lifting rods 600 mm long in standard height 450 mm above ground mechanically- hydraulically lockable; with lower links in horizontal position distance of centre hole: from rear axle centre 895 mm from the end of p.t.o.-shaft 495 mm
Pull attachment	
Trailer hitch:	ROCKINGER 227/G 110 D in connection with a support of own construction; height above ground 760 mm; distance of hitch hole from rear axle centre 605 mm; hitch hole 33 mm diameter; permissible supporting force 1000 kp
Towing hitch:	At front of tractor; height above ground 760 mm
Steering	ZAHNRADFABRIK FRIEDRICHSHAFEN AG column hydrosteering gear 09/74; acting on front wheels; steering wheel operated; oil capacity in the steering circuit 3 l
Brakes	
Parking brake:	DEUTSCHE PERROT GMBH simplex shoe type brake; mechanically acting on one external brake drum fitted on a gear shaft; brake drum 180 mm diameter; operated by hand lever with ratchet

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Brakes (Continuation)

Foot brake at front:	GIANOTTI, San Marzanotto, Italy duplex shoe type brakes; model LEONZIONE S 180 x 3 Z; hydraulically acting on 2 drums in the front wheels
in the rear:	GIRLING BREMSEN GMBH encased dry disc type brakes; model GMPD 9" x 6"; hydraulically acting on 2 drums fitted on the rear axle half shafts; active disc diameter 193 mm
	Foot brake at front and in the rear operated in common by foot pedal
Steering brake:	Operated by single parts of the divided foot brake pedal; for normal use both parts of brake pedal are locked together by safety bolt

Wheels

Steering wheels:	At front; two pneumatics 7,50 - 18 6 ply extra special; maximum permissible load on each tyre 1325 kp at 3,5 kp/cm² inflation pressure; track width 1510 mm; rims 5,50 F x 18
Driving wheels:	At front and in the rear; at front see steering wheels; in the rear two pneumatics 14,9-28 10 ply; maximum permissible load on each tyre 2270 kp at 2,25 kp/cm² inflation pressure; track width with centre disc type wheels; 1500 and 1648 mm; changeable by turning wheels; track width with track adjustment wheels: 1513, 1635, 1735, 1828 and 1928 mm; changeable by reversing wheels and offset lug type rims; rims W 12 x 28
Wheel base:	2200 mm

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Cab	Own make; all-steel construction consisting of molded pieces welded and bolted together; antivibration suspended on the chassis frame; entry at the left hand side with sliding door; two mounting steps at the left hand front mudguard 480 and 820 mm above ground; sliding door open and closed lockable; sliding windows in the rear and at the right hand side open and closed lockable; round about glazed with safety glass; the roof may be opened too; the inside of the roof is covered with plastic materials for noise damping; hot air heating; BOSCH windshield wiper; two rear-view mirrors
Seat	GRAMMER DS 44/4H; upholstered mould seat with back and hinged arm rests; adjustable spring and shock absorber; height above ground 1450 mm in median position; 150 mm displaceable to and fro; 75 mm at the right hand side of tractor's median plane
Passenger's seat	At the left hand side of driver's seat; upholstered with back rest; turn up seat; not spring suspended, damped or otherwise adjustable
Auxiliary platform	Behind the cab; between the rear mudguards; length 1250 mm; width 855 mm
Number of grease points	20 (whole tractor)

Weights Ready for use with full tanks, as tested

		without driver	with driver
Weight of tractor without ballast:	Basic model without front power lift, container lift up device, DEUTZ-HITCH, and front p.t.o.		
	front:	1323 kp	1372 kp
	rear:	1672 kp	1698 kp
	total:	2995 kp	3070 kp
Additional equipment:	front power lift		163 kp
	container lift up device		113 kp
	DEUTZ-HITCH at front and in the rear: 38 kp each		76 kp
	front p.t.o. with gearing		32 kp
	4 oil tappings with control valves		26 kp
Front ballast:	1 supporting frame		95 kp
	11 front weights on the frame 30 kp each		330 kp
Rear ballast:	2 weights per wheel 60 kp each		240 kp
	1 weight per wheel 40 kp each		80 kp
	water in the tyres		275 kp
Weight of tractor with ballast:	front:	2225 kp	2275 kp
	rear:	2200 kp	2225 kp
	total:	4425 kp	4500 kp

Dimensions

Overall length: 4180 mm with implement linkage at front and in the rear;
3520 mm with implement linkage only in the rear;

Overall width: 1805 mm at smallest track width 1513 mm;
2345 mm at largest track width 1928 mm

Total height: 2513 mm to the top of the roof;

Maximum ground clearence: 280 mm below the front differential;
350 mm in the median plane of tractor

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Lighting equipment: Electrical;
12 Volt;
acc. to German governmental regulations;
additional with main head light beam

	Dimensions of area mm	Height above ground to centre mm	Distance from outside edge of tractor to centre mm
Top head lights	70 x 150	2397	525
Down head lights	130 Ø	1377	462
Side lights	70 Ø	1435	285
Rear lights	150 x 55	1207	340
Reflectors	75 Ø	982	155

FUELS AND LUBRICANTS USED IN TESTS

Fuel: ARAL Diesel fuel (DIN 51601)
specific gravity at 15°C: 0,830 kg/l

Engine oil: SHELL-ROTELLA HD 20

Gear box, transmission, rear axle and final drive, front axle and front differential: SAE 90

Power lift: Engine oil SAE 20W/20

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COMPULSORY TESTS

(1) MAIN POWER TAKE-OFF PERFORMANCE (540 rev/min)

Date of tests: 2nd April 1973
Type of dynamometer: Schenck hydraulic dynamometer U1-40

Maximum power

Power PS	Speed engine rev/min	Speed p.t.o. rev/min	Fuel consumption total l/h	Fuel consumption total kg/h	Fuel consumption specific g/PSh	Specific energy PSh/l
At maximum power 2-hour test						
47,3	2300	598	10,52	8,74	185	4,49
At standard p.t.o. speed (540 rev/min)						
45,1	2077	540	9,83	8,16	181	4,59
At the speed recommended for drawbar work						
47,3	2300	598	10,52	8,74	185	4,49

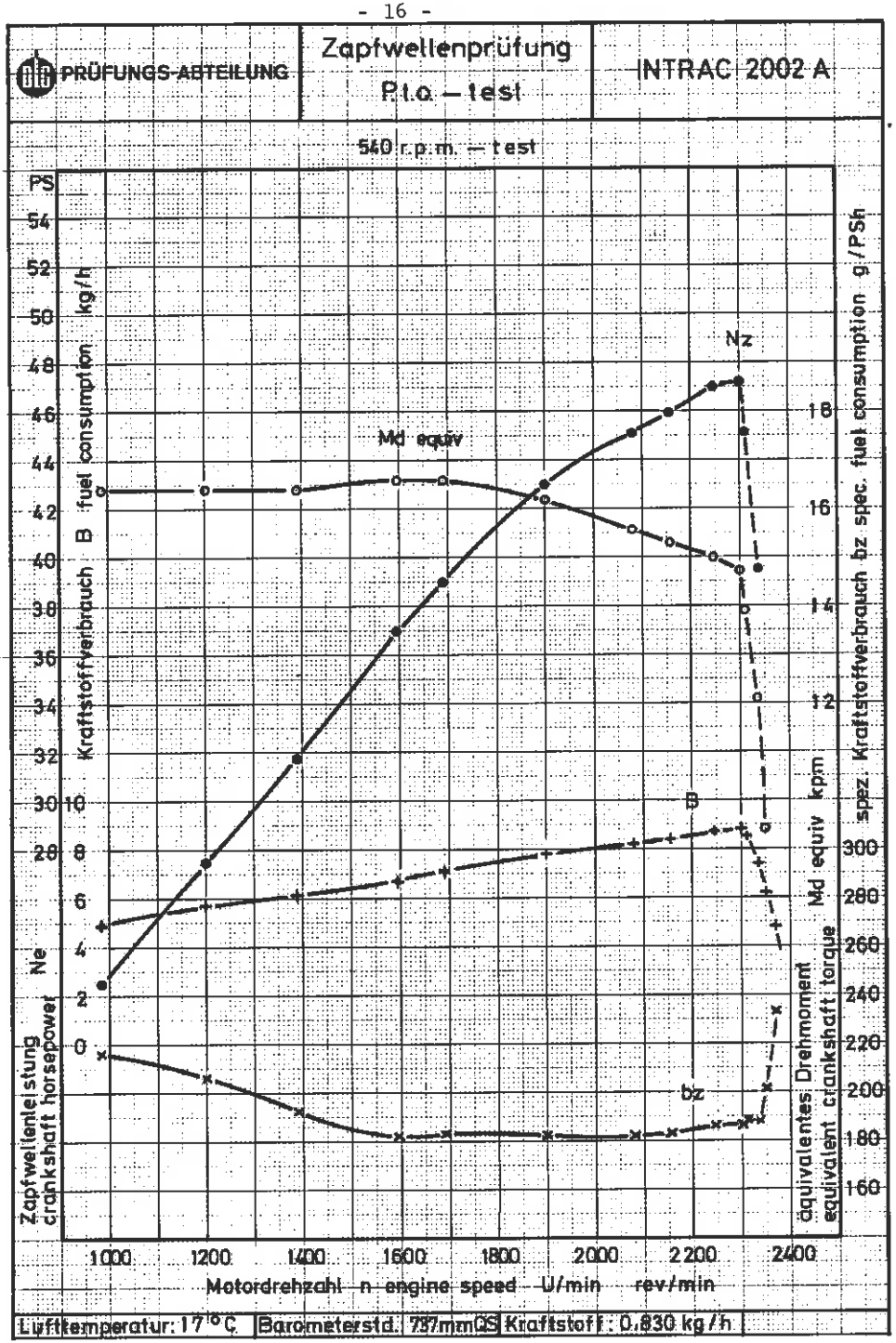
Part loads

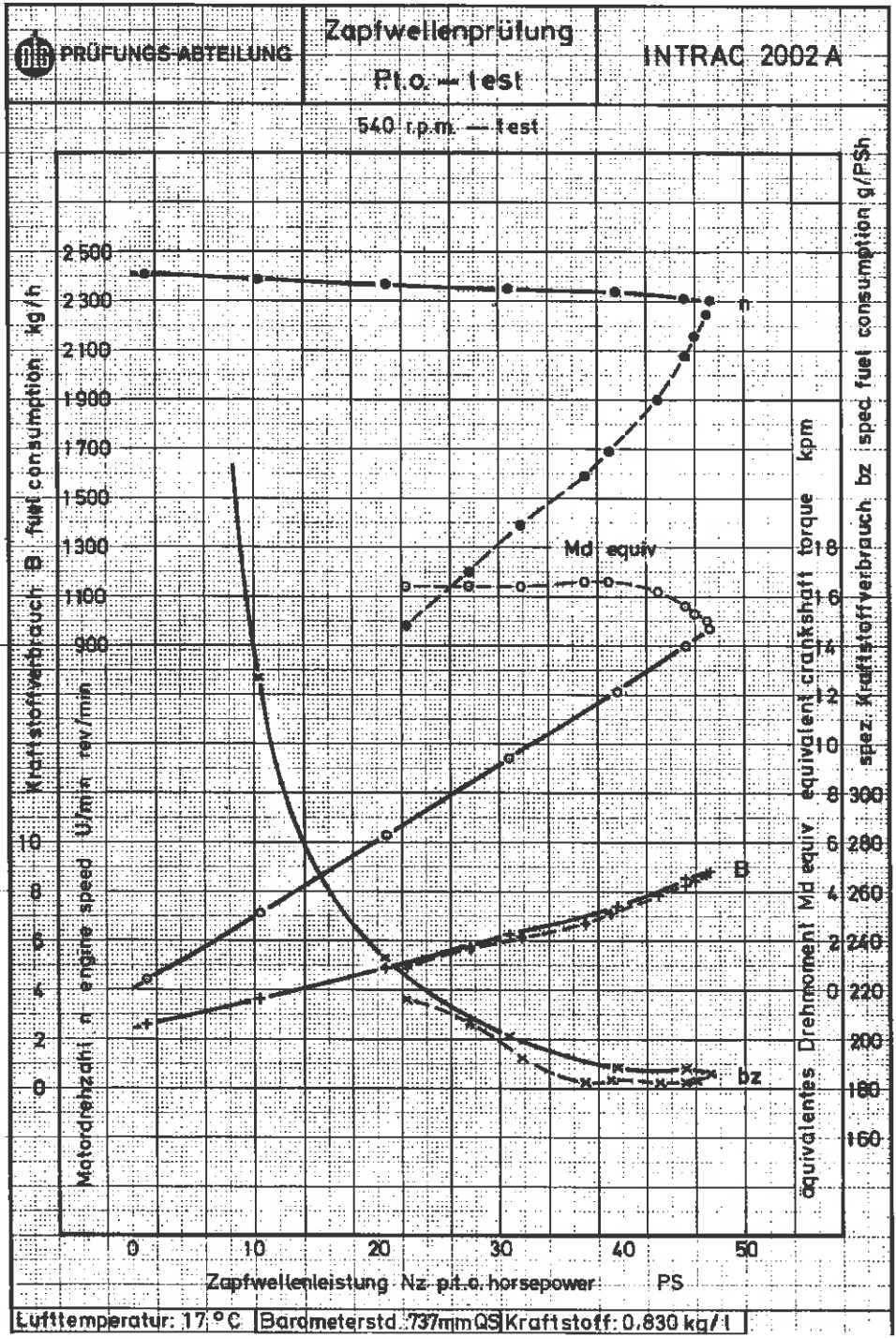
(i) 85% of torque at maximum power						
40,7	2330	606	9,17	7,60	187	4,45
(ii) unloaded						
-	2408	626	2,56	2,12	-	-
(iii) 50% of the load defined in (i)						
20,7	2370	616	5,83	4,83	233	3,55
(iv) maximum power						
47,3	2300	598	10,52	8,74	185	4,49
(v) 25% of the load defined in (i)						
10,4	2387	621	4,36	3,62	347	2,38
(vi) 75% of the load defined in (i)						
30,8	2353	612	7,45	6,19	201	4,13

No load maximum engine speed: 2408 rev/min
Equivalent crankshaft torque at maximum power: 14,7 kpm
Maximum equivalent crankshaft torque: 16,6 kpm at 1600 rev/min of the engine

Mean atmospheric conditions:
- temperature 17°C
- pressure 737 mm Hg
- relative humidity 90%

Maximum temperatures:
- coolant not recorded
- engine oil 101°C
- fuel 20°C


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Zapfwellenprüfung
P.t.o. – test
INTRAC 2002 A
540 r.p.m. – test
PS
Kraftstoffverbrauch B fuel consumption kg/h
Nz
Md equiv
B
bz
Zapfwellenleistung Ne crankshaft horsepower
äquivalentes Drehmoment Md equiv kpm equivalent crankshaft torque
spez. Kraftstoffverbrauch bz spec. fuel consumption g/PSh
Motordrehzahl n engine speed U/min rev/min
Lufttemperatur: 17 °C
Barometerstd. 737 mm QS
Kraftstoff: 0,830 kg/h


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Zapfwellenprüfung
P.t.o. - test
INTRAC 2002 A
540 r.p.m. — test
Kraftstoffverbrauch B fuel consumption kg/h
Motordrehzahl n engine speed U/min rev/min
Md equiv
B
bz
n
Drehmoment Md equiv equivalent crankshaft torque kpm
äquivalentes
spez. Kraftstoffverbrauch bz spec. fuel consumption g/PSh
Zapfwellenleistung Nz p.t.o. horsepower PS
Lufttemperatur: 17 °C
Barometerstd. 737mmQS
Kraftstoff: 0,830 kg/l

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(2) DRAWBAR PERFORMANCE

Date of test: 12th till 17th April, 10th and 11th May 1973
Type of track: concrete

Gear No. and Group	Speed km/h	Power PS	Drawbar pull kp	Engine speed rev/min	Slip of wheels %	Specific energy PSh/l
(i) MAXIMUM POWER with ballast height of drawbar above ground 755 mm						
1 creep	0,37	5,9	4300	2376	14,9	1,38
2 creep	0,59	9,4	4300	2366	14,9	1,89
3 creep	0,86	13,6	4280	2363	15,0	2,34
4 creep	1,43	22,8	4290	2343	15,0	2,93
1 slow	1,80	28,4	4270	2345	14,9	3,30
2 slow	2,93	38,5	3550	2298	11,3	3,62
3 slow	4,51	40,4	2420	2300	6,8	3,76
1 fast	5,89	41,5	1900	2301	5,1	3,86
4 slow	7,86	40,4	1390	2300	3,4	3,78
2 fast	9,56	40,1	1130	2301	2,8	3,77
(ii) FIVE-HOUR-TEST at 75% of pull at maximum power in 1st gear of fast group						
1 fast	6,01	31,8	1430	2332	3,7	3,64
(iii) FIVE-HOUR-TEST at pull corresponding to 15% wheel slip in test (i)						
1 slow	-	-	4300	2340	-	-
(v) MAXIMUM POWER without ballast height of drawbar above ground 520 mm						
1 slow	1,83	20,6	3030	2351	14,8	2,98
2 slow	2,88	32,6	3060	2330	14,9	3,48
3 slow	4,36	39,6	2450	2299	10,4	3,71
1 fast	5,77	41,7	1950	2300	7,5	3,87
4 slow	7,78	41,0	1420	2300	5,2	3,83
2 fast	9,48	41,2	1170	2301	4,4	3,84
3 fast	14,11	40,3	770	2301	2,4	3,82

Total oil consumption during ten hours duration of tests (ii) and (iii): 40 g/h

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Tyres make and size: Front: Metzeler 7,50-18 extra special
Rear: Goodyear Sure Grip 14,9-28 AS

Specific fuel consumpt. g/PSh	Temperatures Fuel °C	Coolant °C	Engine °C	Atmospheric conditions Temperature °C	Relative humidity %	Pressure mm Hg
Tyres inflation pressure 1,1 kp/cm² active tyre radius 630 mm						
599	12	-	75	10	65	759
436	13	-	75	12	66	759
356	15	-	84	12	67	759
283	15	-	80	12	72	759
250	15	-	80	12	78	759
229	15	-	90	13	90	760
220	13	-	90	7	74	754
215	12	-	88	6	74	754
219	12	-	90	7	88	749
219	12	-	90	6	85	749
228	15	-	90	13	70	760
-	17	-	92	13	70	754
Tyres inflation pressure 1,1 kp/cm² active tyre radius 628 mm						
275	24	-	83	17	74	754
236	24	-	94	14	75	754
221	24	-	94	14	80	754
212	22	-	92	13	86	754
214	23	-	92	16	90	752
214	23	-	92	16	90	753
216	23	-	89	17	91	752

Test (iii) was carried out with additional ballast, the results for power, slip, speed and fuel consumption have no practical significance

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(3) TURNING SPACE AND TURNING CIRCLE

Wheel equipment front: 7,50-18 6 ply extra special
rear: 14,9-28 10 ply

Track width front: 1510 mm
rear: 1513 mm

	With brakes left-hand m	With brakes right-hand m	Without brakes left-hand m	Without brakes right-hand m
All-wheel driven				
Radius of turning space	3,78	4,30	4,83	4,99
Radius of turning circle	3,56	4,14	4,62	4,83
Rear-wheel driven				
Radius of turning space	4,21	5,00	5,22	5,38
Radius of turning circle	4,00	4,84	5,01	5,23

(4) LOCATION OF CENTRE OF GRAVITY

Height above ground	865 mm
Horizontal distance forward from rear axle centre	983 mm
Distance of the median plane of the tractor to the left hand side	7 mm

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(5) BRAKING PERFORMANCE

A) FOOT BRAKE

Date of tests: 18th April and 14th May 1973
Type of track: Concrete
Type of decelerometer: MOTO METER-Bremsverzögerungs- und Pedalkraftschreiber

Weight of ballasted tractor: 4500 kp with driver

Cold brakes

		with ballast	without ballast
Travelling speed	km/h	25,0	25,0
Deceleration	m/s^2	5,3	7,1
Stopping distance	m	6,0	5,0
Force on pedal	kp	80	80
Force on pedal to achieve a deceleration of 2,5 m/s^2	kp	47	35

Brake fade characteristics (hot tests)

Deceleration	hot/cold	%	101	101
Stopping distance	cold/hot	%	96	92
Force on pedal	cold/hot	%	101	102

B) PARK BRAKE

Tractor facing up slope:
pull on hand brake 17 kp, tractor does not roll

Tractor facing down slope:
Pull on hand brake 20 kp, tractor does not roll

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(6) AMBIENT NOISE EMITTED BY THE TRACTOR

Date of test: 16th May 1973
Type of track: Concrete
Type of sound level meter: Brüel and Kjaer type 2203

Results of test

Gear: 4th fast
Travelling speed before acceleration: 19,5 km/h
Sound level: 87 dBA

(7) NOISE AT THE DRIVER'S EAR LEVEL

Date of tests: 14th and 15th May 1973
Type of track: Concrete
Type of sound level meter: Brüel and Kjaer type 2203
Type of frequency analyser: Brüel and Kjaer type 1613
(fitted with octave filter)

The tractor was fitted with a cab

Results of tests

Gear	Drawbar pull at which the tractor develops the maximum sound level kp	Travelling speed nominal km/h	Travelling speed effective km/h	Sound level dBA	Sone
With all-wheel drive; doors and windows of the cab closed					
1 creep	3010	0,43	0,23	95	
2 creep	3070	0,68	0,39	95	
3 creep	3100	0,99	0,72	95	
4 creep	3090	1,68	1,24	94	
1 slow	3080	2,11	1,63	94	
2 slow	3110	3,35	2,69	95	
3 slow	2120	4,90	4,45	95	
1 fast *)	1830	6,27	5,78	95	90
4 slow *)	1330	8,25	7,80	95	92
2 fast	1080	9,97	9,54	95	
3 fast	740	14,56	14,15	95	
4 fast	light load	24,54	25,40	94	

*) The 1st fast and 4th slow speed correspond to the travelling speed nearest to 7,25 km/h

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(7) NOISE AT THE DRIVER'S EAR LEVEL (continuation)

Gear	Drawbar pull at which the tractor develops the maximum sound level kp	Travelling speed nominal km/h	Travelling speed effectiv km/h	Sound level dBA	Sone
With all-wheel drive; doors and windows of the cab opened, roof lifted					
1 creep	3120	0,43	0,27	91	
2 creep	3120	0,68	0,53	92	
3 creep	3040	0,99	0,81	92	
4 creep	3090	1,68	1,33	93	
1 slow	3060	2,11	1,67	93	
2 slow	3110	3,35	2,62	93	
3 slow	2250	4,90	4,36	93	
1 fast *)	1780	6,27	5,81	93	80
4 slow *)	1370	8,25	7,74	93	79
2 fast	1060	9,97	9,55	93	
3 fast	720	14,56	14,04	93	
4 fast	light load	24,54	25,40	93	
With rear-wheel drive; doors and windows of the cab closed					
1 slow	2070	2,11	1,73	95	
2 slow	2080	3,35	2,73	95	
3 slow	2050	4,90	3,93	95	
1 fast *)	1890	6,27	5,23	95	96
4 slow *)	1350	8,25	7,28	95	99
2 fast	1130	9,97	9,15	95	
3 fast	720	14,56	13,79	95	
4 fast	light load	24,54	25,40	95	
With rear-wheel drive; doors and windows of the cab opened, roof lifted					
1 slow	2160	2,11	1,71	94	
2 slow	2140	3,35	2,70	94	
3 slow	2120	4,90	3,92	95	
1 fast *)	1970	6,27	5,20	95	91
4 slow *)	1440	8,25	7,42	95	91
2 fast	1190	9,97	9,10	95	
3 fast	790	14,56	13,56	95	
4 fast	light load	24,54	25,40	94	

*) the 1st fast and 4th slow speed correspond to the travelling speed nearest 7,25 km/h

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(8) POWER LIFT AND HYDRAULIC PUMP PERFORMANCE

Date of tests: 3rd May 1973

Height above ground in down position: hitch points mm	Height above ground in down position: test frame mm	Vertical movement mm	Maximum force excerted throughout the full lift range kp	Oil pressure kp/cm²	Lifting force when front of tractor lifts kp
A) POWER LIFT AT REAR OF TRACTOR					
Linkage giving maximum mechanical advantage					
At hitch points					
290	-	570	2035	175	3380
On the frame					
75	118	622	1690	175	2010
Linkage giving minimum mechanical advantage					
At the hitch points					
75	-	660	1855	175	3380
On the frame					
290	290	630	1665	175	2010
B) POWER LIFT AT FRONT OF TRACTOR					
Linkage giving maximum mechanical advantage					
At hitch points					
75	-	655	1605	175	4000
On the frame					
310	310	635	1510	175	2420
Linkage giving minimum mechanical advantage					
At hitch points					
310	-	630	1525	175	4000
On the frame					
75	65	673	1430	175	2420

(8) POWER LIFT AND HYDRAULIC PUMP PERFORMANCE (continuation)

C) HYDRAULIC PUMP

(1)	Opening pressure of relief valve in the remote circuit	180 kp/cm²
	Sustained pressure by the open relief valve	175 kp/cm²
(2)	pump delivery rate at minimum pressure and rated engine speed	35,0 l/min
(3)	pump delivery rate	31,0 l/min
	delivery pressure	170 kp/cm²
	hydraulic power	11,7 PS

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OPTIONAL TESTS

(9) ENGINE PERFORMANCE

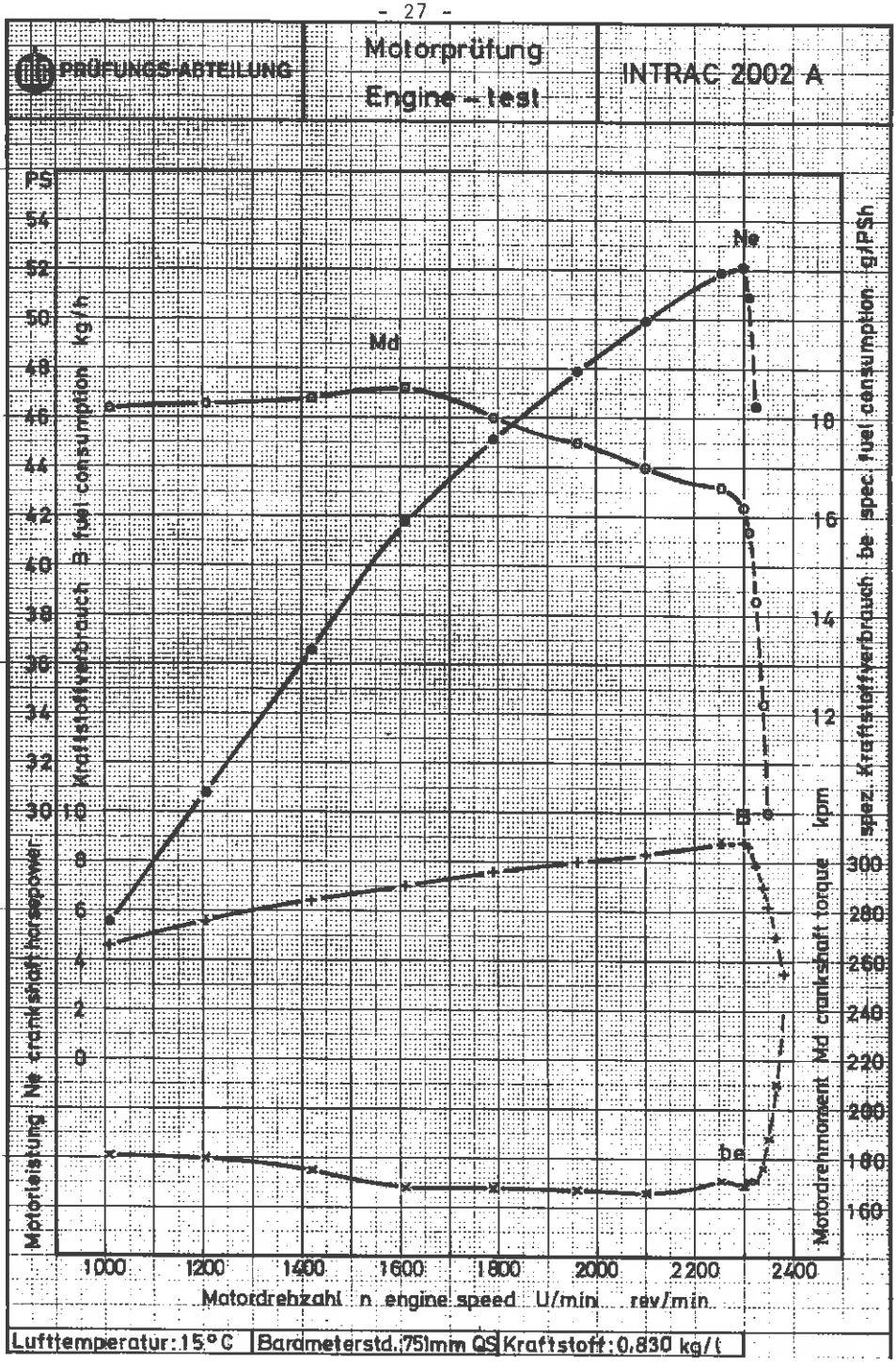
Date of tests: 16th till 20th March 1973
Type of dynamometer: Schenck eddy current dynamometer W 150

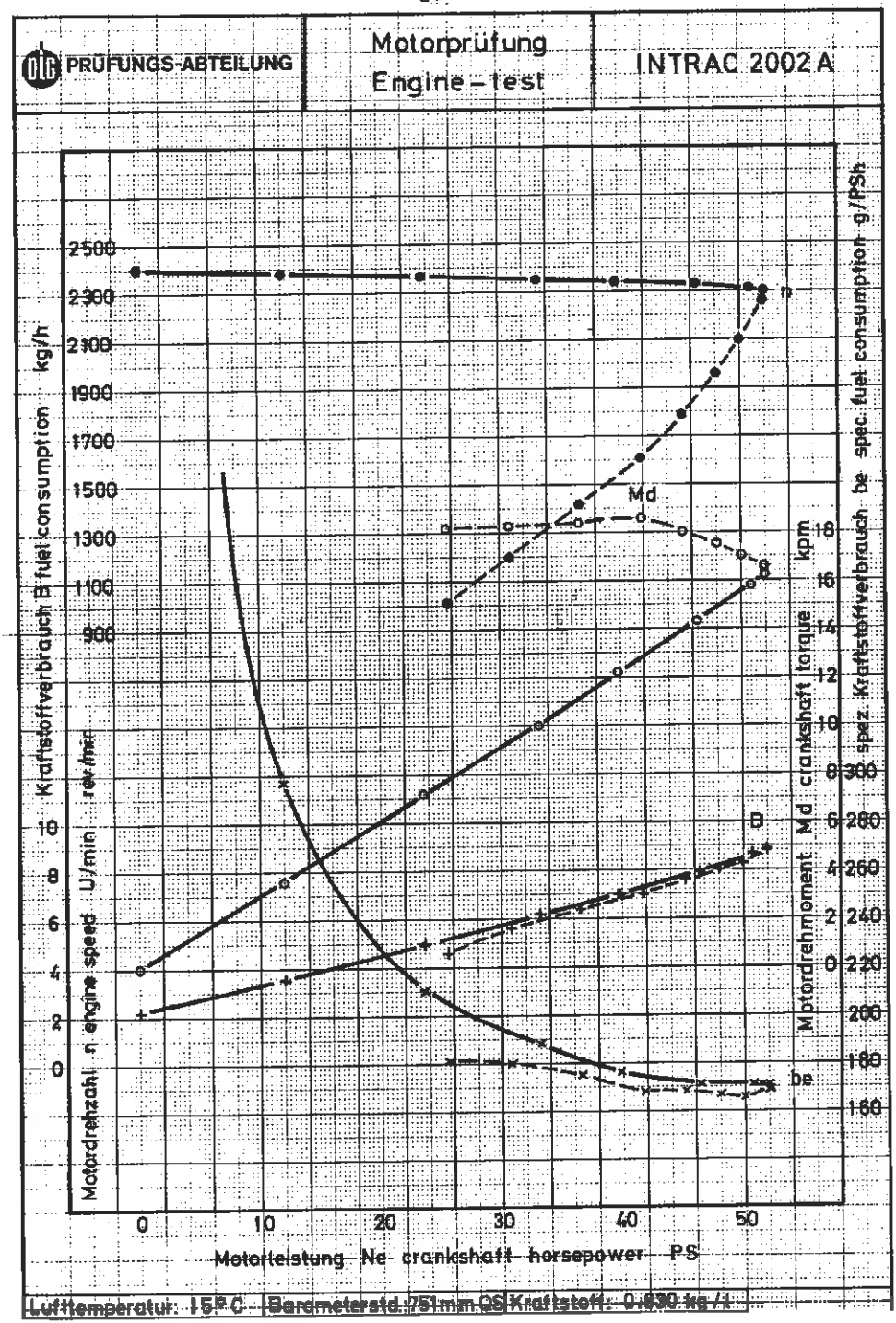
Maximum power

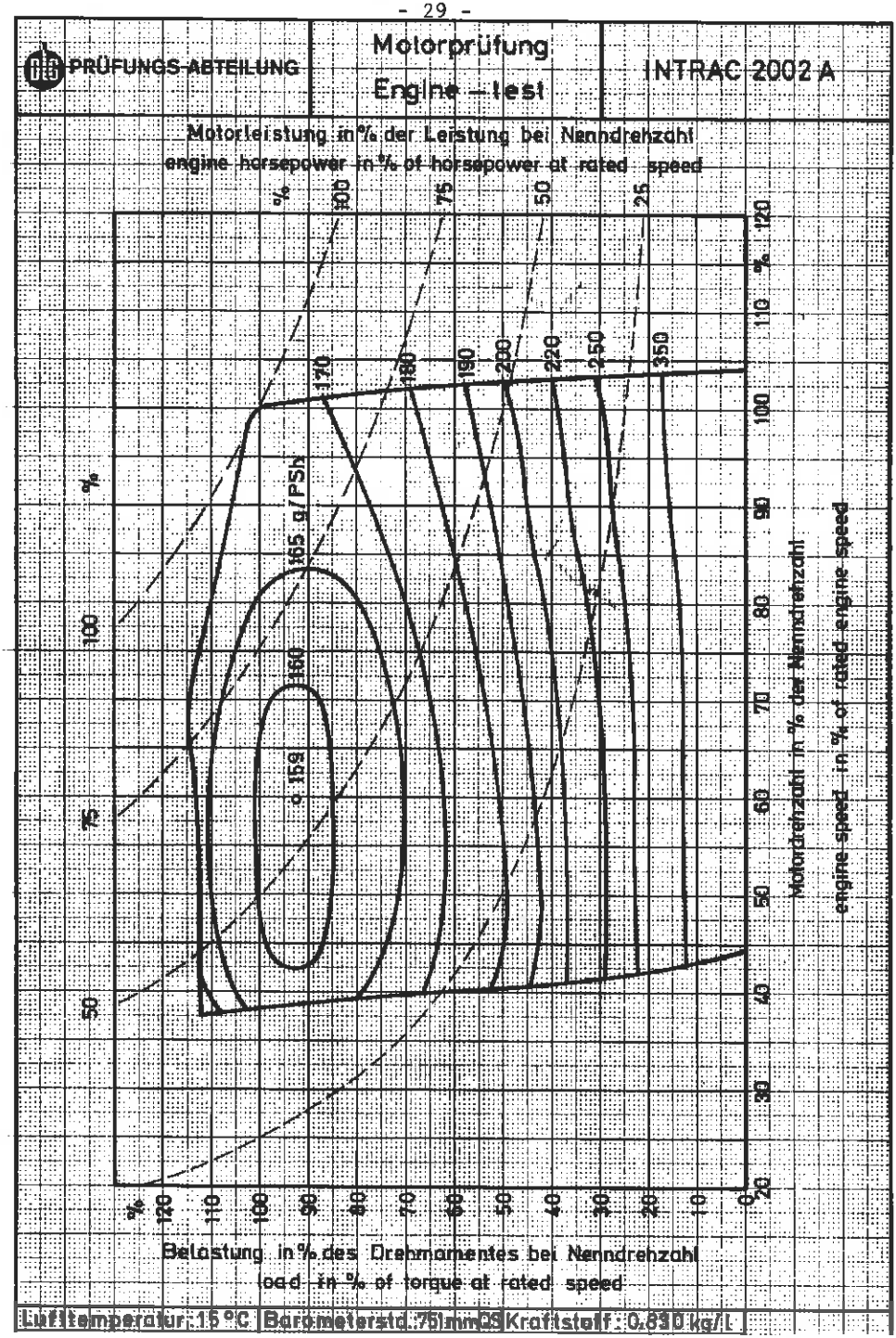
Power PS	Engine speed rev/min	Fuel consumption total 1/h	Fuel consumption total kg/h	Fuel consumption specific g/PSh	Specific energy PSh/l
At maximum power 2-hour test					
52,1	2300	10,68	8,84	169	4,88
At standard p.t.o. speed (540 rev/min)					
49,6	2077	9,98	8,26	166	4,97
At the speed recommended for drawbar work					
52,1	2300	10,68	8,84	169	4,88
Fuel consumption at part loads					
(i) 85% of torque at maximum power					
45,0	2330	9,26	7,67	171	4,86
(ii) unloaded					
-	2410	2,54	2,10	-	-
(iii) 50% of the load defined in (i)					
22,9	2372	5,80	4,80	210	3,95
(iv) maximum power					
52,1	2300	10,68	8,84	169	4,88
(v) 25% of the load defined in (i)					
11,5	2386	4,18	3,46	301	2,75
(vi) 75% of the load defined in (i)					
34,2	2356	7,67	6,35	186	4,46

Optimum fuel consumption: 159 g/PSh at 28,9 PS and 1380 rev/min
Standard fuel consumption 1/2 (DIN 9606): 4,46/9,00 1/h
No load maximum engine speed: 2410 rev/min
Torque at maximum power: 16,2 kpm
Maximum torque: 18,6 kpm at 1610 rev/min of the engine

Mean atmospheric conditions:	temperature	15°C
	pressure	751 mm Hg
	relative humidity	50%
Maximum temperatures:	coolant	not recorded
	engine oil	87°C
	fuel	16°C


PRÜFUNGS-ABTEILUNG
Motorprüfung
Engine - test
INTRAC 2002 A
PS
Ne
Md
be
Motorleistung Ne crankshaft horsepower
Kraftstoffverbrauch B fuel consumption kg/h
spez. Kraftstoffverbrauch be spec. fuel consumption g/PSh
Motordrehmoment Md crankshaft torque kpm
1000
1200
1400
1600
1800
2000
2200
2400
Motordrehzahl n engine speed U/min rev/min
Lufttemperatur: 15° C
Barometerstd.: 751mm QS
Kraftstoff: 0,830 kg/l


PRÜFUNGS-ABTEILUNG
Motorprüfung
Engine – test
INTRAC 2002 A
Kraftstoffverbrauch B fuel consumption kg/h
Motordrehzahl n engine speed U/min rev/min
Md
n
B
be
Motordrehmoment Md crankshaft torque kpm
spez. Kraftstoffverbrauch be spec. fuel consumption g/PSh
Motorleistung Ne crankshaft horsepower PS
Lufttemperatur: 15°C Barometerstd.: 751mm QS Kraftstoff: 0,830 kg/l


PRÜFUNGS-ABTEILUNG
Motorprüfung
Engine – test
INTRAC 2002 A
Motorleistung in % der Leistung bei Nenndrehzahl
engine horsepower in % of horsepower at rated speed
Motordrehzahl in % der Nenndrehzahl
engine speed in % of rated engine speed
Belastung in % des Drehmomentes bei Nenndrehzahl
load in % of torque at rated speed
165 g/PSh
159
Lufttemperatur: 15 °C
Barometerstd.: 751 mmQS
Kraftstoff: 0,830 kg/l