GEPRÜFT

PROT. Nr.

O.E.C.D. Report No.: 1445 Full Code

Bundesanstalt für Landtechnik

A-3250 Wieselburg, Austria

Dieseltractor STEYR 9020.20

40 km/h version

Trade name:

STEYR 964 (2WD)



Date of approval: 17.5.1993

This report has been approved by the O.E.C.D. Coordinating Centre (CEMAGREF, France) as being in accordance with the O.E.C.D. Test Code

TABLE OF CONTENTS

	Page
SPECIFICATIONS OF TRACTOR	2
Tractor	2
Engine	2
Transmission to wheels	6
Power take-off	8
Power lift	10
Trailer hitch	14
Holed drawbar	14
Steering	15
Brakes	15
Wheels	16
Protective structure	16
Driver's seat	16
Miscellaneous	17
Lighting	17
TEST CONDITIONS	18
TEST RESULTS	21
Compulsory test	21
Main power take-off performance - 1000 rev/min	21
Hydraulic power and lifting force	25
Drawbar performance	29
Turning area and turning circle	31
Location of centre of gravity	31
Braking	31
Measurement of external noise level	33
OPTIONAL TESTS	34
Main power take-off performance - 540 rev/min	34
Engine performance	38
Repairs	42
Remarks	42

Tractor manufacturer's name and address:	Steyr Landmaschinentechnik GmbH. A-4300 St. Valentin, Austria
Location of tractor assembly:	St. Valentin
Submitted for test by:	Manufacturer
Selected for test by:	Manufacturer by agreement with BLT Wieselburg
Place of running-in:	St. Valentin
Duration of running-in:	100 hours
Location of test:	Wieselburg, Austria

SPECIFICATIONS OF TRACTOR

TRACTOR:

Make:	STEYR
Trade name:	STEYR 964
Type:	9020.20
Model:	40 km/h version
Number of driving wheels:	2
Serial no.:	9020.20 - 01194
1st serial no.:	9020.20 - 01015

ENGINE:

Make:	Steyr
Model:	WD 301.82
Type:	4 stroke diesel engine with direct injection and exhaust turbo supercharger
Serial no.:	301.83-00.0061

Cylinder:

Number/disposition:	3, vertical in line
Bore/stroke:	105/120 mm

Capacity:	3117 cm^3
Compression ratio:	16,0 : 1
Arrangement of valves:	Overhead valves
Cylinder liners:	Wet liners

Supercharging:

Make:	SCHWITZER or KKK
Model:	S1B-007 resp. K141134AC
Type:	Exhaust turbo supercharger
Pressure:	max. 114 kPa

Fuel system:

Fuel feed system:	Fuel feed pump integrated in injection pump
Make, model and type of fuel filter:	KNECHT filter 7394471 with water trap
Capacity of fuel tank:	63 l
Make, model and type of injection pump:	BOSCH in line injection pump BOSCH PES 3 A90D320/3RS 2658 or BOSCH PES 3 A90D320/3RS 2826
Serial no.:	0410 893 007
Manufacturer's production setting of injection pump, flow rate and timing:	$69^{\pm 2}$ mm^3/stroke at pump speed of pump, 1050 rev/min and full load $19^{+0,5}_{-1}$° before TDC at 1 mm pump stroke
Make, model and type of injectors:	BOSCH DLLA 151 S 972 or BOSCH DLLA 151 SV 3141474
Injection pressure:	$22,0^{+0,8}$ MPa (220^{+8} bar)

Governor:

Make:	BOSCH
Type:	Variable speed governor, mechanically acting, incorporated in injection pump
Governed range of engine speed:	From 700 to 2470^{-40} rev/min engine speed
Rated engine speed:	2300 rev/min

Air cleaner:

Location of air intake:	Inside the bonnet, above and in front of the radiator
Pre-cleaner:	Incorporated in main-cleaner
Main-cleaner:	
Make:	MANN & HUMMEL or KNECHT
Model:	MANN & HUMMEL 45 165 92 824 or KNECHT LVPO 6060 S/1
Type:	Piclon combined filter, dry type with integrated cyclonic pre-cleaner with automatic dust-drain valve and changeable paper filter insert and additional safety cartridge
Location:	Above the engine, inside the bonnet
Service intervals:	
Pre-cleaner:	Visual control, each 250 hours
Main-cleaner paper insert:	Cleaning interval: when control lamp indication is shown Changing interval: 1 year
Maintenance indication:	Electric lamp indication, -65 mbar for indication

Lubrication system:

Type of feed pump:	Forced oil circulation, by gear type pump
Type of filter:	STEYR 409 07 0036
Type of oil cooler:	BEHR or MODINE

Cooling system:

Type of coolant:	Water-frost protection mixture down to -20°C
Type of pump:	Centrifugal pump belt driven
Specification of fan:	Puller, 1 driving belt
Number of fan blades:	4
Fan diameter:	460 mm
Coolant capacity:	13,5 l

Type of temperature control:	Thermostat control and electrical coolant thermometer
Superpressure system:	0,7 bar

Starting system:

Make:	BOSCH
Model:	JF-12 V 2,7 kW
Type:	Solenoid engaged screw push starter motor
Starter motor power rating:	2,7 kW
Cold starting aid:	Electrically, glow plug in inlet manifold
Safety device:	Electrically starting block system by engaged clutch

Electrical system:

Voltage:	12 V, negative earth
Generator:	Make: Type: three phase type Power: 910 W/65 A - 14 V
Battery:	1 with 12 V/100 Ah lead acid type Rating: 100 Ah at 20 hours rating

Exhaust system:

Make:	EBERSPÄCHER
Model:	16.47.190.01.0.00
Type:	Absorption-reflexion type
Location:	364 mm left of the median plane of engine, 1716 mm above centre of crankshaft end of bended exhaust tube
Optional:	Absorption reflexion type with incorporated catalyst
Type:	16.47.790.30.0.00

TRANSMISSION TO WHEELS:

Clutch:

Make:	FICHTEL & SACHS
Model:	DUT 295-295/280
Type:	Dry double clutch with 2 plates
Number of plates:	2
Diameter of plates:	295/280 mm
Method of operation:	2 plates incorporated in the same clutch housing are operated independent for p.t.o. and gear box

Gear box:

Make:	STEYR
Model:	TW 337
Type:	Mechanically acting gear box
Model:	as tested (40 km/h) 2 forward and 1 reverse group (FORWARD FAST, FORWARD NORMAL, REVERSE) combined with 4 speed change gear and reduction gear (ROAD - FIELD) Total: 16 forward and 8 reverse speeds
Arrangement:	1 lever for group gear (S, L, R) 1 lever for the 4 speed gear (1 - 4) 1 lever for the reduction gear (ROAD, NEUTRAL, FIELD)
Available options:	Synchronised 4 speed change gear top speed 30 km/h Total: 16 forward and 8 reverse speeds Synchronised 4 speed change gear type speed 30 km/h with crawler group Total: 16 forward and 16 reverse speeds

Rear axle and final drives:

Make:	STEYR
Model:	337
Type:	Central axle, pinion and bevel gear, reduction by planetary gear in final drives

Differential lock: Type: mechanically acting from half axle to differential housing
Method of engagement: foot lever operated
Method of disengagement: lockable and preselectable, selfdisengaging when not locked

Front axle and final drives:

Make: Own make

Model: 7040.S

Type: Steering axle with hydraulic steering cylinder

Total ratios and travelling speeds:

Gear no.	Group	Number of engine revolutions for one revolution of driving wheels		Nominal travelling speed at rated engine speed to 2300 rev/min *)	
-	-	field L	road S	field L	road S
1	forward	317,69	95,06	1,90	6,34
2	normal	181,86	54,42	3,31	11,07
3	L	111,24	33,29	5,42	18,10
4		71,63	21,43	8,41	28,11
1	forward	233,99	70,02	2,58	8,61
2	fast	133,95	40,08	4,50	15,04
3	S	81,94	24,52	7,35	24,58
4		52,76	15,79	11,42	38,17
1		317,69	95,06	1,90	6,34
2	reverse	181,86	54,42	3,31	11,07
3	R	111,24	33,29	5,42	18,10
4		71,63	21,43	8,41	28,11

*) Calculated with rear tyre dynamic radius index of 695 mm (ISO 4251/1 - 1984)
test tyre equipment: rear 16,9 R 30
front 7,50 - 18 AS

POWER TAKE-OFF:

Main power take-off:

Type:	Independent and (optional) proportional to ground speed p.t.o.
Method of engagement:	Hand lever operated, mechanically engaged dry disc clutch
Number of shafts:	1, optional 2 (540E/1000E)
Method of changing power take-off shaft speeds:	Speed selection by hand lever and spur gears, no changing of shaft ends

Power take-off proportional to engine speed:

540 and 1000 rev/min

Location:	At rear of tractor
Diameter of power take-off shaft end:	34,9 mm
Number of splines:	6, in conformity with ISO R 500 - 1979, type I
Height above ground:	585 mm with type dynamic radius index of 695 mm
Distance from the median plane of the tractor:	0 mm
Distance behind rear wheel axis:	306 mm
P.t.o. speed at rated engine speed:	607 rev/min resp. 1080 rev/min
Engine speed at standard power take-off speeds:	2045 rev/min resp. 2130 rev/min
Ratio of rotation speeds (engine speed/ p.t.o.speed):	3,79 resp. 2,13
Power restriction and max. torque:	None
Direction of rotation (viewed from behind tractor):	Clockwise

Optional additional - 540E and 1000E rev/min:	
P.t.o. speed at rated engine speed:	776 rev/min resp. 1380 rev/min
Engine speed at economic standard p.t.o. speeds:	1600 rev/min resp. 1667 rev/min
Ratio of rotation speeds (engine speed/p.t.o. speed):	2,96 resp. 1,67
Middle p.t.o.:	Optional, not on tested tractor
Location:	On the left side of the gear box, 590 mm above ground, 651 mm before rear axle, 186,5 mm left of median plane of tractor
Dimension of p.t.o. shaft end:	ISO R 500 - 1979, type I (35 mm, 6 splines)
P.t.o. speed at rated engine speed:	1133 rev/min Optional additional: 1512 rev/min
Engine speed at standard p.t.o. speed:	2030 rev/min Optional: 1521 rev/min
Power restriction and max. torque:	None
Direction of rotation (viewed from behind tractor):	Clockwise
Power take-off proportional to ground speed:	Optional
Speed of shaft:	
Travelling distance for one revolution of p.t.o. shaft:	0,112 m (with tyre dynamic radius index of 695 mm)
Location:	At rear of tractor, same shaft end as p.t.o. proportional to engine speed
Number of p.t.o. shaft revolutions for one revolution of rear wheels:	38,95 rev/min

Direction of rotation with forward gear engaged (viewed from behind tractor): Clockwise

Stationary mode (reduction gear in 0 position, tractor not driving): Number of p.t.o. shaft revolutions at 2300 rev/min rated engine speed

Normal model, 40 km/h:

Group gear	L	S	R
Gear no.: 1	282	383	282
2	493	669	493
3	805	1094	805
4	1251	1698	1251
Direction of rotation	clockwise	clockwise	anticlockwise
	viewed from behind tractor		

POWER LIFT:

In the rear:

Make: Own make

Type: Draught control with two-stage pull, adjustment and upper link sensing, position control, floating position

Type of hydraulic system: Open center type

Type and number of cylinder: One single acting type
152 mm stroke, 85 mm diameter
Optional: 1 additional single acting cylinder, 45 mm bore, 146 mm stroke

Type of linkage lock for transport: Hydraulically by throttle valve

Relief valve pressure setting: 17,5 MPa (175 bar)

Opening pressure of cylinder safety valve: 24,0 MPa (240 bar)

Lift pump type: Gear type pump

Transmission between pump and engine: Pump directly driven by engine by gear transmission

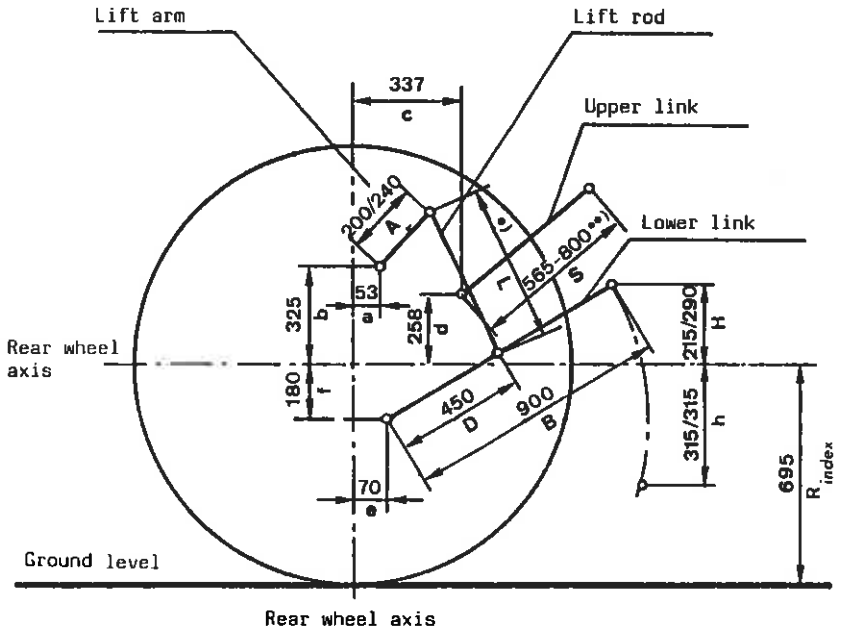
Type and number of filter:	One filter cartridge in suction line, connected at the hydraulic housing
Site of oil reservoir:	Hydraulic housing
Type, number and location of tapping points:	Up to 8 tapping points (4 oil circuits for single or double acting cylinders), 285 mm behind rear axle, 515 - 687 mm above rear axle, max. 128 mm left ot 122 mm right of median plane In accordance to ISO/DIS 5675 - 1979
Maximum volume of oil available to external cylinders:	6 l (optional 15 l)

In the front:

Make:	Own make
Type:	GR I
Type of hydraulic system:	Open center type, independent lower links with quick coupling ends cat. II, fastened to a lifting frame
Type and number of cylinder:	Two single acting cylinder, 152 mm stroke, 60/30 mm bore
Type of linkage lock for transport:	Hydraulically by throttle valve

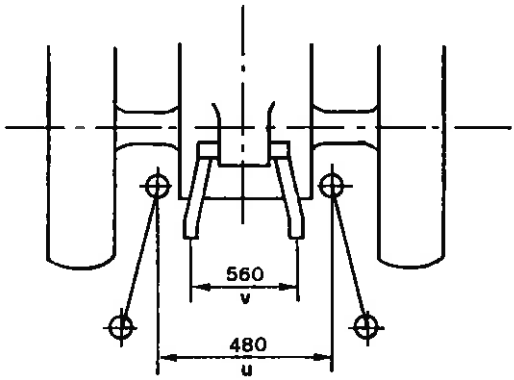
Three-point-linkage:

Category adapter: I/II; in conformity with ISO 730/1-1977



*) Left lift rod adjustable from 535 mm to 655 mm length by thread; right lift rod adjustable from 535 mm to 655 mm by thread.

**) Upper link length adjustable from 565 mm to 800 mm.



Dimensions of linkage geometry:

			Dimension of range mm	Settings used in test mm
Length of lift arms:		(A)	200/240	200/240
Length of lower links:		(B)	900	900
Distance of lift arm pivot points from rear wheel axis:	horizontally	(a)	53	53
	vertically	(b)	325	325
Horizontal distance between the lower link points:		(u)	480	480
Horizontal distance between the 2 lift arm end points:		(v)	560	560
Length of upper link:		(S)	565 - 800	660, 685
Distance of upper link pivot point from rear wheel axis:	horizontally	(c)	337	337
	vertically	(d)	258	258
Distance of lower link pivot point from rear wheel axis:	horizontally	(e)	70	70
	vertically	(f)	180	180

Height of lower link hitch points relative to the rear wheel axis (515 mm above ground)*):

		Min. lift rod length		During test		Max. lift rod length	
Length of lift arms	(A) mm	200	240	200	240	200	240
Linkage distance of lift rod	(D) mm	450					
Length of lift rods	(L) mm	535		655	615	655	
Lowest position	(h) mm	190	295	495	495	495	600
Highest position	(H) mm	275	275	35	110	35	35

Height above ground of lower hitch points when locked in transport position*): Any height within lift range

*) With dynamic radius index 695 mm (ISO 4251/1 - 1984)

TRAILER HITCH:

Type:	295.93.0003	
Hole diameter:	32,0 mm	
Height above ground:	941/881 mm (916/856 mm)	
Distance of hitch point from rear wheel axis, horizontally:	367 mm	
Distance of hitch point from power take-off shaft end,		
vertically:	356/296 mm (331/271 m)m	
horizontally:	72 mm	
Maximum vertical permissible load:	11,90 kN	
or		
	on tested tractor	
	German	Italian
Type:	1	23
Hole diameter:	30,5 mm	28,5 mm
Height above ground:	856/808/760/712/664/616/563/490/442 mm	
Distance of hitch point from rear wheel axis horizontally:	515 mm	484 mm
Distance of hitch point from power take-off shaft end,		
vertically:	271/223/175/127/79/31/-22/-95/-143 mm	
horizontally:	220 mm	189 mm
Maximum vertical permissible load:	11,90 kN	11,90 kN

HOLED DRAWBAR:	Category I
Length:	683 mm
Number of holes (with central hole):	5
Distance between holes:	130 mm
Hole diameter:	33 mm

Thickness/width of the drawbar:	30/80 mm
Height above gound min.:	179 mm
max.:	1047 mm
Horizontal distance to power take-off shaft end (rear):	675 mm

STEERING:

Make:	Zahnradfabrik Friedrichshafen (ZF) or DANFOSS, Nordborg
Model:	ZF 8492 or DANFOSS OSPC 125 OR
Type:	Hydrostatic steering
Method of operation:	Steering wheel acting on front wheels
Pump:	35 l/min at nominal revolutions of engine
Rams:	One double acting cylinder, acting on the middle lever arm of the tie rod, dia 60 mm, cylinder rod 25 mm, stroke 175 mm
Working pressure:	12,0 MPa (120 bar)

BRAKES:

Service brake:

Make:	Rear axle: SIRMAC
Model:	Rear axle: 6 1/2" x 4 1/2"
Type:	Rear axle: Multi disc brake in oil bath, 8 acting faces with 141,2 mm effective diameter each
Method of operation:	Pedal operated, mechanically transmission
Trailer braking take-off:	Optional, hydraulic trailer brake or pressure air system Storage pressure: 0,74 MPa (7,4 bar) Storage volume: 20 l Working pressure: 0,74 MPa (7,4 bar) two line system 0,56 MPa (5,6 bar) one line system

Parking brake:

Type:	Mechanically acting on the same discs as service brake
Method of operation:	Hand lever with ratchet, mechanically transmission acting on separate linkage with service brake

Steering assistance brake: Operated by divided pedal of service brake, pedals disconnectable by a flap

WHEELS:

Number:	Front: 2, steering function Rear: 2, driving function
Wheelbase:	2029 mm

Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	-	1338	wheels turned around
Rear	-	1600	

PROTECTIVE STRUCTURE:

Make:	Own make
Model:	STEYR 125.02
Type:	Cab
Manufacturer's name and address:	Steyr Landmaschinen GmbH., A-4300 St. Valentin
Protective device:	Welded and screwed profile steel tube construction
OECD-approval no.:	CSD 1354/3

DRIVER'S SEAT:

Make:	KLEPP	KLEPP
Model:	Elastomat	Profi
Type:	1050 E	Star 3

Type of suspension:	2 parallel levers with a column-guiding and 2 tension springs	2 parallel levers with a column-guiding and air spring suspension with a battery driven air compressor
Type of damping:	Hydraulically damping	Hydraulically damping
Range of adjustment, longitudinal:	170 mm	200 mm
vertical:	60 mm	60 mm

MISCELLANEOUS:

Additional seat:	Own make
Location:	On left side of driver's seat
Number of places:	1

LIGHTING:

	*) Height above ground of centre mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Head lights	1120	140 x 75	220
Side lights	1460	90 x 40	675
Rear lights	1495	90 x 40	850
Brake lights			
Direction indicators front	1420	90 x 40	675
Direction indicators rear	1530	90 x 40	850
Reflectors	1440 695	92 x 48 80 Ø	850 445

*) Measured with tyre dynamic radius index at rear 695 mm and 403 mm at front (ISO 4251/1 - 1984)

TEST CONDITIONS

Overall dimensions:

	Length	Width *)	Height at top of	
			exhaust silencer	protective structure
	mm	mm	mm	
Ballasted	4045	2060	2435	2425
Unballasted	3710	2060	2435	2425

*) Measured on the outside edges of the rear wheels

Ground clearance:
(unballasted tractor)

Clearance limiting part: 445 mm under the front axle
340 mm under the trailer hitch mounting console (can be dismantled)

Tractor mass: With tanks full and cab

		Without driver	With driver
		kg	kg
Unballasted	Front	1000	1015
	Rear	1840	1900
	Total	2840	2915
Ballasted	Front	1445	1460
	Rear	2550	2610
	Total	3995	4070

Ballast:

	Number of weights	Mass total kg	Water kg
Front	9	340	-
Rear	2 x (2 + 1)	335	480
Optional	-	-	-

Tyres and track width specifications:

Tyres:

	Front	Rear
Dimensions	7,50-18 AS Front	16,9 R 30 AS
Ply rating	6 PR	137 A8
Type	diagonal carcass	radial carcass
Max. load (tyre manufacturer's)	810 kp resp. 1215 kp with 10 km/h speed limit	2300 kp resp. 3450 kp with 10 km/h speed limit
Max. load (tractor manufacturer's)	-	-
Inflation pressure (tyre manufacturer's)	2,75 bar	1,6 bar
Dynamic radius index	403 mm	695 mm
Chosen track width	1330 (1470) mm	1600 mm

Oil and lubrication:

Capacity and change interval:

	Capacity (dm^3)	Oil change (h)	Filter change (h)
Engine	7,0	250	250
Gear box and rear axle	29,0	1000	-
Front axle	-	-	-
Rear axle	-	-	-
Final drive front	-	-	-
Final drive rear	-	-	-
Hydraulic system	15,0 (23,0)	1000	500
Steering	2,6	-	1000

Specifications:

	Recommended:	Used during test:
Engine oil:		
Type:	One range viscosity oil	
Viscosity:	SAE 30 summer SAE 20 W-20 winter	
Classification:	API CD/MIL-L-2104 CD	As recommended
Transmission oils:		
Type:	Transmission oil	
Viscosity:	SAE 80 W	
Classification:	API GL 4, MIL-L-2105	As recommended
Hydraulic fluid:	Hydraulic oil ISO VG 46/ ISO VG 68	
Steering oil:		
Type:	Hydraulic oil or automatic transmission oil	
Classification:	ATF Dexron II D	As recommended
Brake fluid:		
Type:	-	
Classification:	SAE J 170 3e FMVSS 116 DOT 3	
Grease:		
Type:	Lithium soap basis	
Classification:	NLGI 2 (multigrade grease)	
Number of lubrication points:	18	
Fuel:		
Type:	ELAN diesel fuel In conformity with national standard according to DIN 51601	
Density at 15°C:	0,840 g/cm³	

TEST RESULTS

COMPULSORY TEST:

Main power take-off performance:
Date and location of tests: 22.9.1992, Wieselburg, Austria
Type of dynamometer: SCHENCK eddy-current brake W 780

Main test on: ISO R 500 - 1979, type I (DIN 9611) - 1000 rev/min

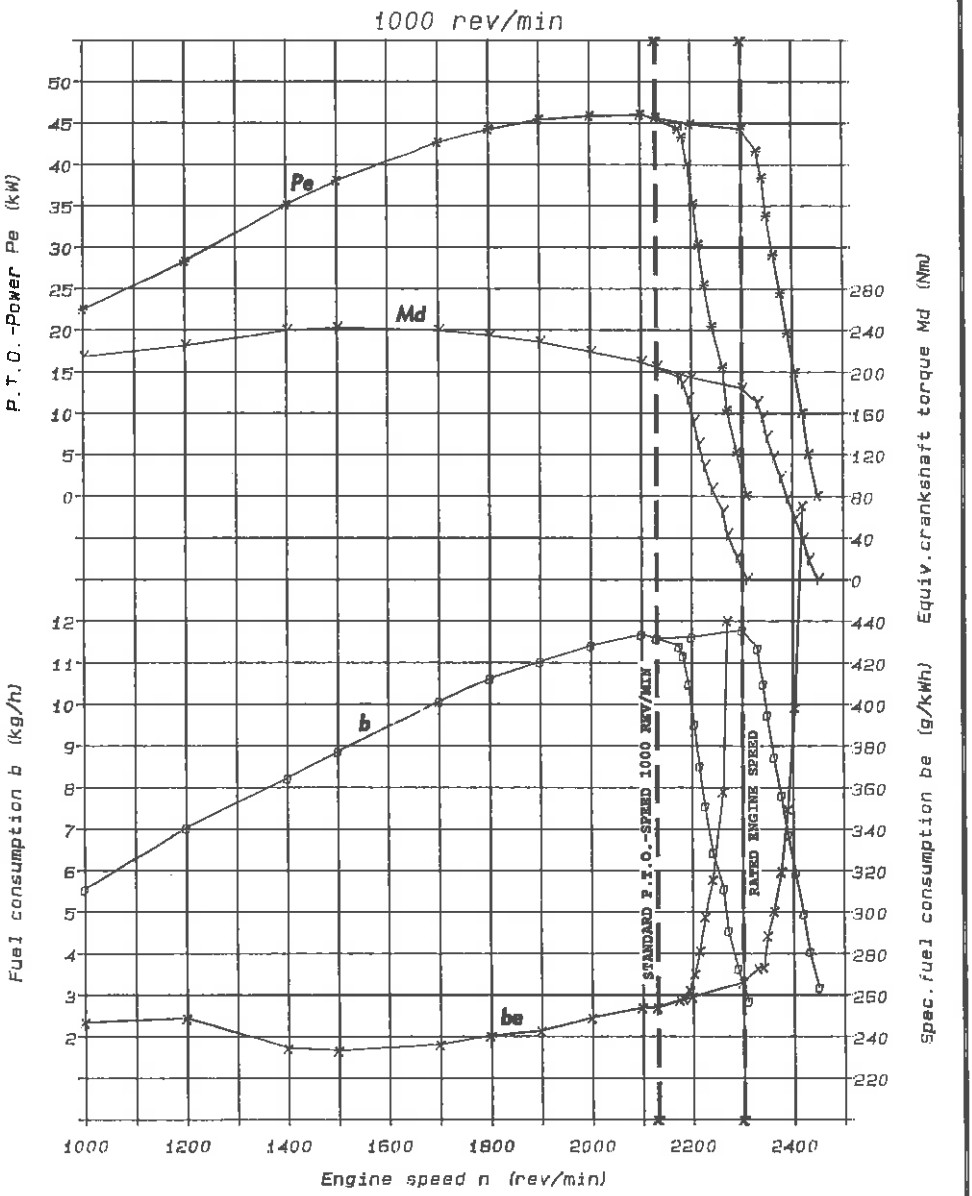
Power	Speed		Fuel consumption		Specific energy
	engine	p.t.o.	hourly	specific	
kW	rev/min	rev/min	kg/h l/h	g/kWh	kWh/l
MAXIMUM POWER					
Maximum power - 2 hours test					
46,00	2100	986	11,68 13,90	254,0	3,31
Power at rated engine speed					
44,28	2300	1080	11,79 14,04	266,5	3,15
Standard power take-off speed					
45,60	2130	1000	11,41 13,58	249,0	3,36
PART LOADS					
(i) The torque corresponding to maximum power at rated engine speed					
44,28	2300	1080	11,79 14,04	266,5	3,15
(ii) 85 % of torque obtained in (i)					
38,36	2341	1099	10,49 12,49	273,5	3,07
(iii) 75 % of torque defined in (ii)					
29,06	2362	1109	8,73 10,39	300,5	2,80
(iv) 50 % of torque defined in (ii)					
19,64	2390	1122	6,87 8,18	349,5	2,40
(v) 25 % of torque defined in (ii)					
9,91	2420	1126	4,96 5,90	495,0	1,68
(vi) unloaded					
0	2450	1150	3,19 3,80	-	-

Power	Speed		Fuel consumption		Specific energy
	engine	p.t.o.	hourly	specific	
kW	rev/min	rev/min	kg/h 1/h	g/kWh	kWh/l
PART LOADS AT STANDARD POWER TAKE-OFF SPEED					
(i) The torque corresponding to maximum power available					
45,60	2130	1000	11,41 13,58	249,0	3,36
(ii) 85 % of torque obtained at maximum power					
39,96	2194	1030	10,49 12,49	262,5	3,20
(iii) 75 % of torque defined in (ii)					
30,26	2215	1040	8,52 10,14	281,5	2,98
(iv) 25 % of torque defined in (ii)					
20,41	2241	1052	6,45 7,68	316,0	2,66
(v) 25 % of torque defined in (ii)					
10,34	2271	1066	4,56 5,43	441,0	1,90
(vi) unloaded					
0	2309	1084	2,58 3,39	-	-

No load maximum engine speed: 2450 rev/min
Equivalent crankshaft torque
at maximum power: 183,8 Nm at rated engine speed
Maximum equivalent crankshaft torque: 242,1 Nm at 1500 rev/min of engine

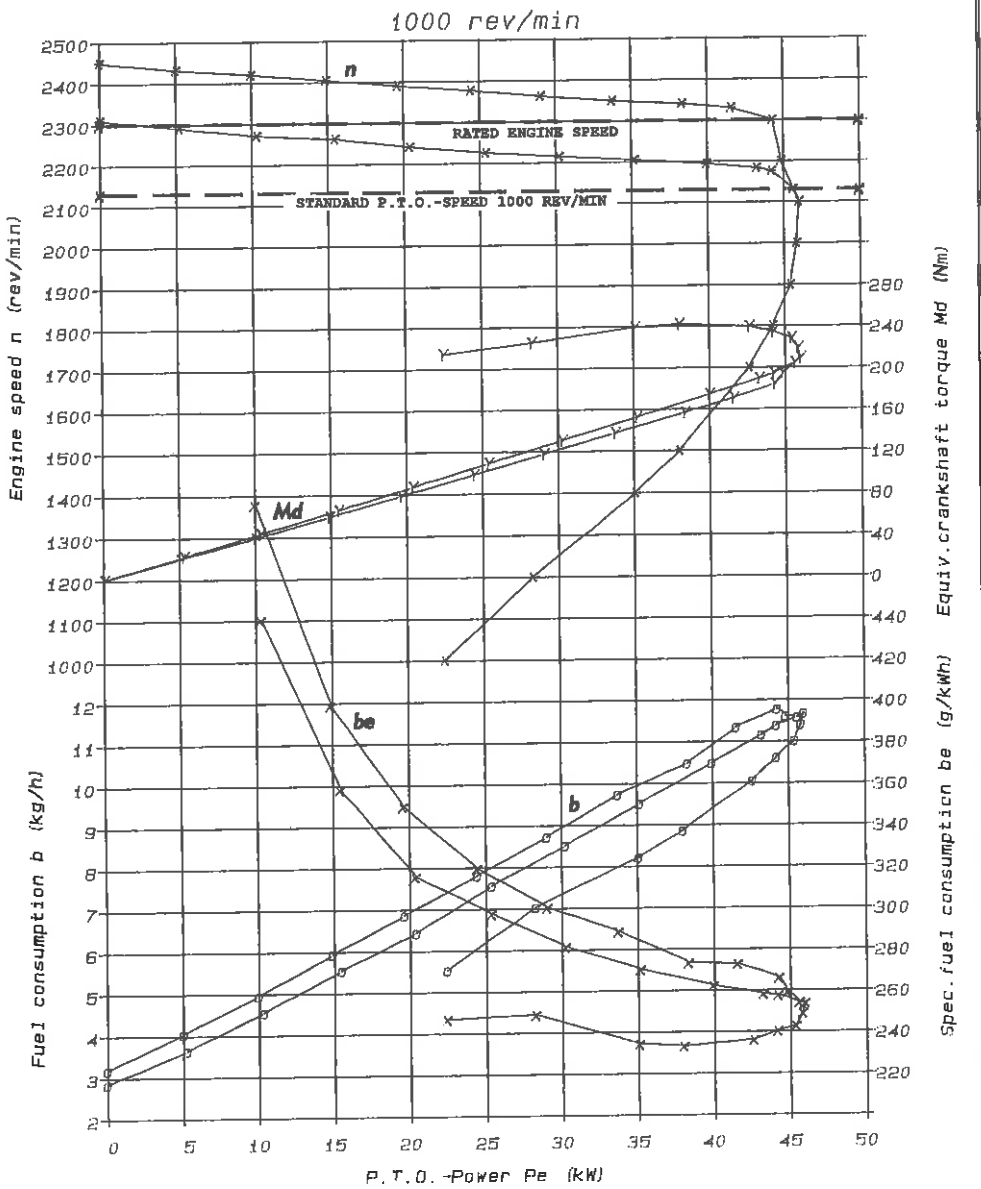
Mean atmospheric conditions	temperature:	17°C
	pressure:	993 mbar
	rel. humidity:	60 %
Maximum temperatures	coolant:	90°C
	engine oil:	110°C
	fuel:	31°C
	engine air intake:	35°C

Bundesanstalt für Landtechnik Wieselburg/Erlauf, Austria Prot.Nr.:	P.T.O.-test	Steyr Dieseltractor Typ 9020.20 (964) (2WD) Mot.Typ Steyr WD 301.83



engine ser.nr. 301.83-000061	atm. pressure. 993 mbar	fuel temp. 31 C	signature	
tractor ser.nr. 9020.25-01194	air temper. 17 C	d.of tests . 1992-09-22		
fuel . 0.84/15 C	coolant temp. 90 C	test no. 780-691-92		
engine oil . 10W/40	oil temp. 110 C	curves no. 1	Haider/Schaufler	

Bundesanstalt für Landtechnik Wieselburg/Erlauf, Austria Prot.Nr.:	P.T.O.-test	Steyr Dieseltractor Typ 9020.20 (964) (2ND) Mot.Typ Steyr WD 301.83



engine ser.nr. 301.83-000061	atm. pressure. 993 mbar	fuel temp. 31 C		signature
tractor ser.nr. 9020.25-01194	air temper. 17 C	d.of tests . 1992-09-22		
fuel . 0.84/15 C	coolant temp. 90 C	test no. 780-691-92		
engine oil . 10W/40	oil temp. 110 C	curves no. 2		Haider/Schaufler

HYDRAULIC POWER AND LIFTING FORCE:

Date of tests: 3.11.1992

Hydraulic power test:

Sustained pressure with relief valve open: 18,0 MPa (180 bar)

Pump delivery rate at minimum pressure (at rated engine speed): 42,3 l/min

	Flow rate	Pressure	Power
	l/min	MPa	kW
Flow rate corresponding to a hydraulic pressure equivalent to 90 % of the actual relief valve pressure setting and corresponding hydraulic power	37,5	16,7	10,44
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	38,1	16,5	10,48

Tapping point used for test: At rear of tractor

Temperature of hydraulic fluid, if different from 65° + 5°C: -

Opening pressure of the unloading valve: 18,5 MPa (185 bar)

Closing pressure of the unloading valve: 18,0 MPa (180 bar)

Remarks:

Flow rate corresponding to a hydraulic pressure equivalent up to 80 % (14,8 MPa) of the actual relief valve pressure setting is equal to pump delivery rate at minimum pressure (at rated engine speed).

By reasons of the characteristic of the hydraulic spool valves about 20 % control flow above 14,8 MPa are normal.

Power lift test:

	at the hitch point	on the frame	
		460 mm mast height	610 mm mast height
Height of lower hitch points above ground in down position *)	200/200 mm	200/200 mm	200/200 mm
Vertical movement *)	605/530 mm	605/530 mm	605/530 mm
Maximum corrected force exerted through full range *)	23,0/26,9 kN	19,5/22,4 kN	16,5/19,6 kN
Corresponding pressure of hydraulic fluid	16,7 MPa (167 bar)	16,7 MPa (167 bar)	16,7 MPa (167 bar)
Moment about rear wheel axis *)	22,3 / 26,1 kNm	30,8 / 35,4 kNm	26,1 / 30,97 kNm
Maximum tilt angle of mast from vertical	-	from -3 to 0° and to +5°	from -7° to 0° and to +7°

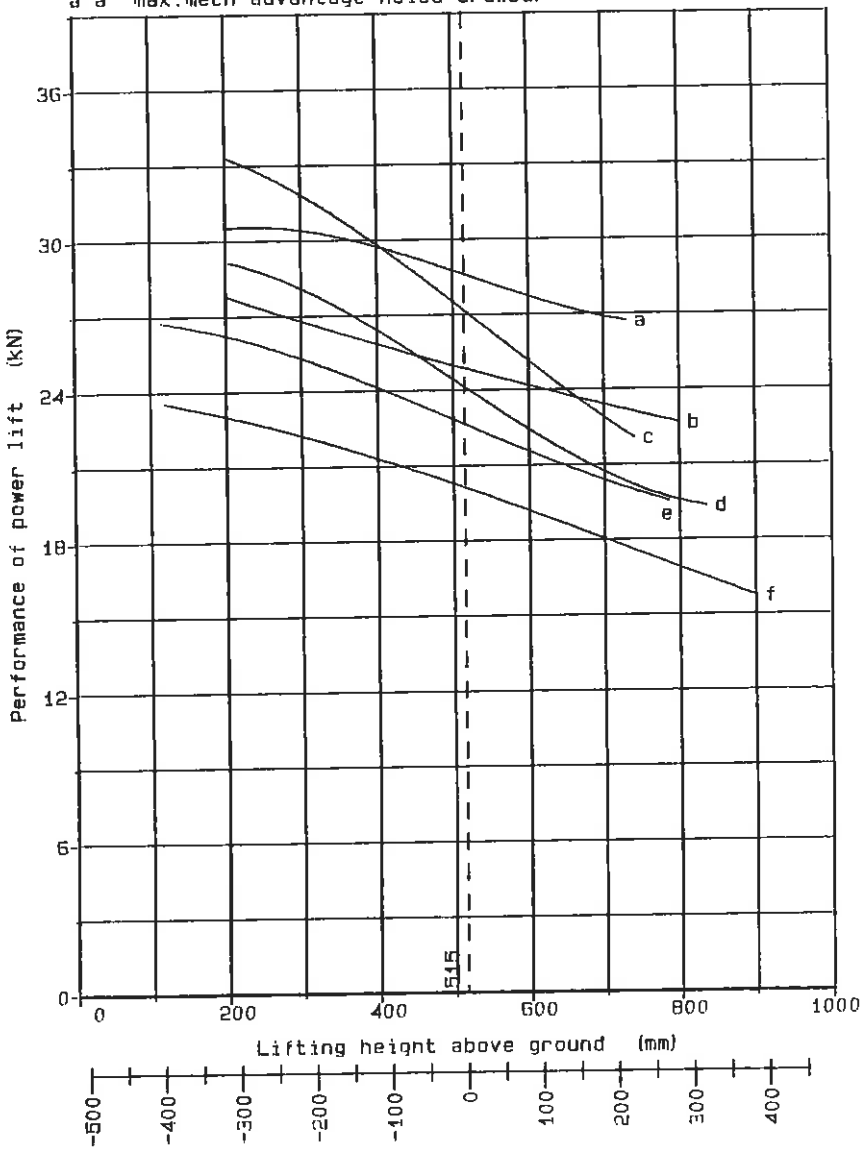
*) Min.mech/max.mech. advantage

Linkage settings for test: See table and figure in specifications

Lifting heights relative to the horizontal plane including the lower link pivot points															
mm		-400	-345	-290	-245	-200	-150	-100	0	100	160	215	265	320	385
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90 % of the actual relief valve pressure setting or to maximum power delivered by the hydraulic system, which is lower)															
Corresponding pressure: 16,7 MPa (167 bar)															
at the hitch point kN	max.mech. advantage			30,6	30,4	30,2	29,9	29,5	28,6	27,7	27,2	26,9			
	min.mech. advantage			27,5	27,0	26,5	26,0	25,6	24,8	23,9	23,5	23,2	23,0		
at the frame kN (460 mm mast height)	max.mech. advantage			33,0	32,7	32,0	31,0	30,0	27,3	24,8	23,5	22,4			
	min.mech. advantage			28,9	28,2	27,5	26,8	26,1	24,5	22,4	21,2	20,5	19,9	19,5	
at the frame kN (610 mm mast height)	max.mech. advantage	26,7	26,5	26,1	25,7	25,2	24,7	24,0	22,7	21,3	20,6	20,0	20,6		
	min.mech. advantage	23,3	23,4	23,1	22,7	22,2	21,6	21,0	19,8	18,6	18,0	17,5	17,2	16,7	16,5

Performance of power lift:

f: f: max.mech advantage frame 610 mm
e. e: max.mech advantage frame 610 mm
d. d: min.mech advantage frame 460 mm
c. c: max.mech advantage frame 460 mm
b. b. min.mech advantage holed drawbar
a a max.mech advantage holed drawbar



Height relative to the horizontal plane including the lower link pivot points (dyn. radius index 695 mm)

Drawbar performance:

Date of test: 1.12. - 2.12.1992

Type of track: Concrete

Height of drawbar above ground: unballasted 610 mm, ballasted 650 mm

Tyre inflation pressure: front: unballasted 150 kPa, ballasted 175 kPa
rear: unballasted 100 kPa, ballasted 110 kPa

Tyre sizes: front: 7.50 - 18 AS, 8 PR, rear: 16.9 R 30

Gear	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption	Specific energy	Temperature			Atmosph. conditions		
								Fuel	Coolant	Engine oil	Temperature	Rel.humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
(i) Maximum power in tested gears (unballasted tractor)													
L 1 L	12,58	26,76	1,69	2395	15,0	-	-	15	78	94	2	100	99,0
L 1 S	16,96	26,92	2,27	2382	15,0	-	-	16	78	96	2	100	99,0
L 2 L	21,82	26,94	2,92	2368	15,0	379,0	2,21	18	79	100	2	100	99,0
L 2 S	29,05	26,90	3,89	2345	15,0	361,0	2,33	12	72	96	3	100	99,0
L 3 L	34,73	26,92	4,64	2329	15,0	330,0	2,57	14	72	97	2	100	99,0
S 1 L	39,20	24,50	5,75	2300	9,4	301,0	2,79	15	72	97	1	100	99,9
L 3 S	37,56	19,81	6,84	2300	7,3	314,0	2,68	15	72	98	2	100	99,0
L 4 L	38,24	17,46	7,88	2300	6,3	308,5	2,72	15	72	98	2	100	99,0
S 1 S	38,63	17,24	8,06	2300	6,1	305,0	2,75	15	72	98	2	100	99,0

Gear	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption	Specific energy	Temperature			Atmosph. conditions		
								Fuel	Coolant	Engine oil	Temperature	Rel.humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
(ii) Maximum power in tested gears (ballasted tractor)													
L 1 L	16,72	36,35	1,66	2382	15,0	-	-	17	78	93	1	90	99,0
L 1 S	22,50	36,31	2,23	2365	15,0	388,0	2,17	18	79	100	1	90	99,0
L 2 L	28,64	36,30	2,84	2346	15,0	366,5	2,29	19	79	102	2	90	99,0
L 2 S	36,46	33,08	3,96	2300	11,5	323,5	2,60	19	78	102	3	90	99,0
L 3 L	38,28	27,52	5,00	2300	7,2	308,0	2,73	19	78	103	3	90	99,0
S 1 L	39,20	23,78	5,94	2300	6,1	301,0	2,79	16	78	104	3	90	99,0
L 3 S	38,40	19,81	6,98	2300	4,8	307,0	2,74	14	72	96	3	90	99,0
L 4 L	38,26	17,23	7,99	2300	4,6	308,0	2,73	14	73	97	3	90	99,0
S 1 S	39,01	17,14	8,21	2300	4,5	302,0	2,78	14	72	96	3	90	99,0
(iii) Five-hour-test at 75 % of pull at maximum power													
S 1 L	30,40	17,81	6,16	2348	4,7	320,5	2,62	22	73	98	7	90	100,0
(iv) Five-hour-test at pull corresponding to 15 % wheelslip in test (ii)													
L 2 L	28,26	36,34	2,80	2345	15,0	371,0	2,26	28	79	105	4	90	99,8

Oil consumption during 10 hours duration of tests (iii) and (iv): 23,6 g/h

TURNING AREA AND TURNING CIRCLE:

Wheel equipment: front: 7,50 - 18 AS
rear: 16,9 R 30

Track of wheel: front: 1470 mm
rear: 1600 mm

Results	With brakes		Without brakes	
	right-hand	left-hand	right-hand	left-hand
	m	m	m	m
Radius of turning area	3,64	3,69	4,09	4,20
Radius of turning circle	3,51	3,56	3,96	4,07

LOCATION OF CENTRE OF GRAVITY:

	mm
Height above ground	703
Distance forward from the vertical plane containing the axis of the rear wheels	707
Distance from the median plane of the tractor, left-side	1

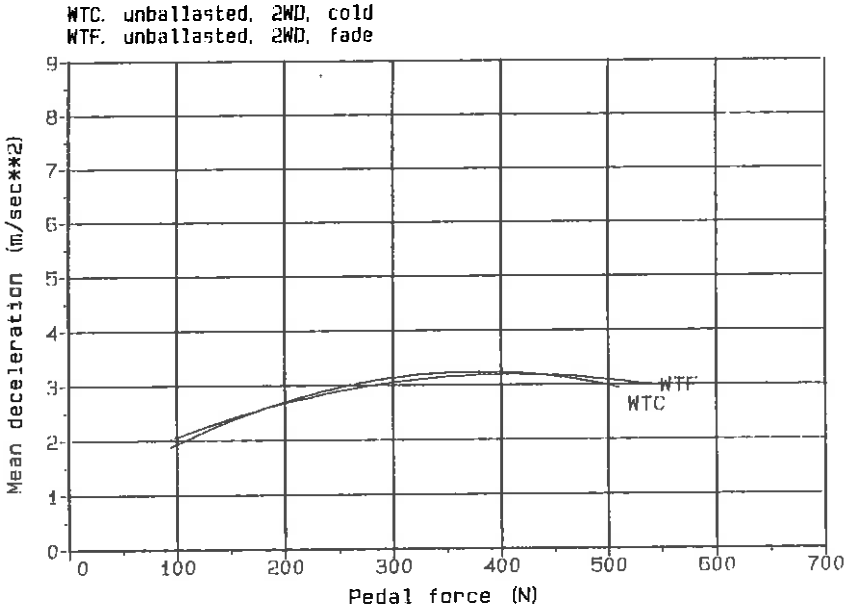
BRAKING:

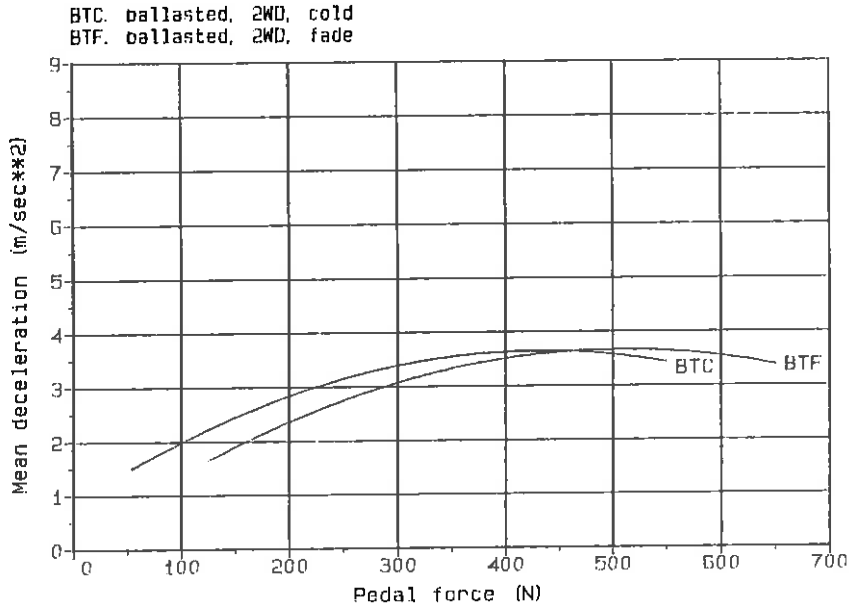
Date of tests: 18. and 19.11.1992
Type of track: Concrete
Type of decelerometer: Moto-Meter Nr. 03382 (Kombi-Schreiber)

Tractor mass during brake tests (with driver):

	Front kg	Rear kg	Total kg
Ballasted	1460	2610	4070
Unballasted	1015	1900	2915

Service brake:





Speed before application of brakes: 39,04 km/h
The tractor brakes were heated by towing of the tractor for 1 km

Maximum deviation of tractor from its original course: None

Abnormale vibration: None

Parking brake device test:

	Ballasted tractor on 18 % slop	
Braking device control force	up	down
	280 N	230 N

MEASUREMENT OF EXTERNAL NOISE LEVEL:

Date of test: 19.1.1993

Type of sound level meter: BRÜEL & KJAER 2209 and 2308

Type of track: Concrete

Gear number: S 4 S

Travelling speed before acceleration: 29,3 km/h

Sound level: 82,0 dB(A)

OPTIONAL TESTS

Main power take-off performance:

Date and location of tests: 23.9.1992, Wieselburg, Austria
Type of dynamometer: SCHENCK eddy-current brake W 780

Main test on: ISO R 500 - 1979, type I (DIN 9611) - 540 rev/min

Power	Speed		Fuel consumption		Specific energy
	engine	p.t.o.	hourly	specific	
kW	rev/min	rev/min	kg/h l/h	g/kWh	kWh/l
MAXIMUM POWER					
Maximum power - 2 hours test					
45,43	2100	554	11,62 13,83	256,0	3,28
Power at rated engine speed					
43,10	2300	607	11,86 14,12	275,0	3,05
Standard power take-off speed					
45,30	2045	540	11,56 13,76	255,0	3,29
PART LOADS					
(i) The torque corresponding to maximum power at rated engine speed					
43,10	2300	607	11,86 14,12	275,0	3,05
(ii) 85 % of torque obtained in (i)					
37,33	2340	618	10,56 12,57	283,5	2,97
(iii) 75 % of torque defined in (ii)					
28,22	2359	623	8,62 10,26	305,5	2,75
(iv) 50 % of torque defined in (ii)					
19,03	2386	630	6,86 8,17	360,5	2,33
(v) 25 % of torque defined in (ii)					
9,65	2420	639	4,87 5,80	504,5	1,66
(vi) unloaded					
0	2454	648	3,22 3,83	-	-

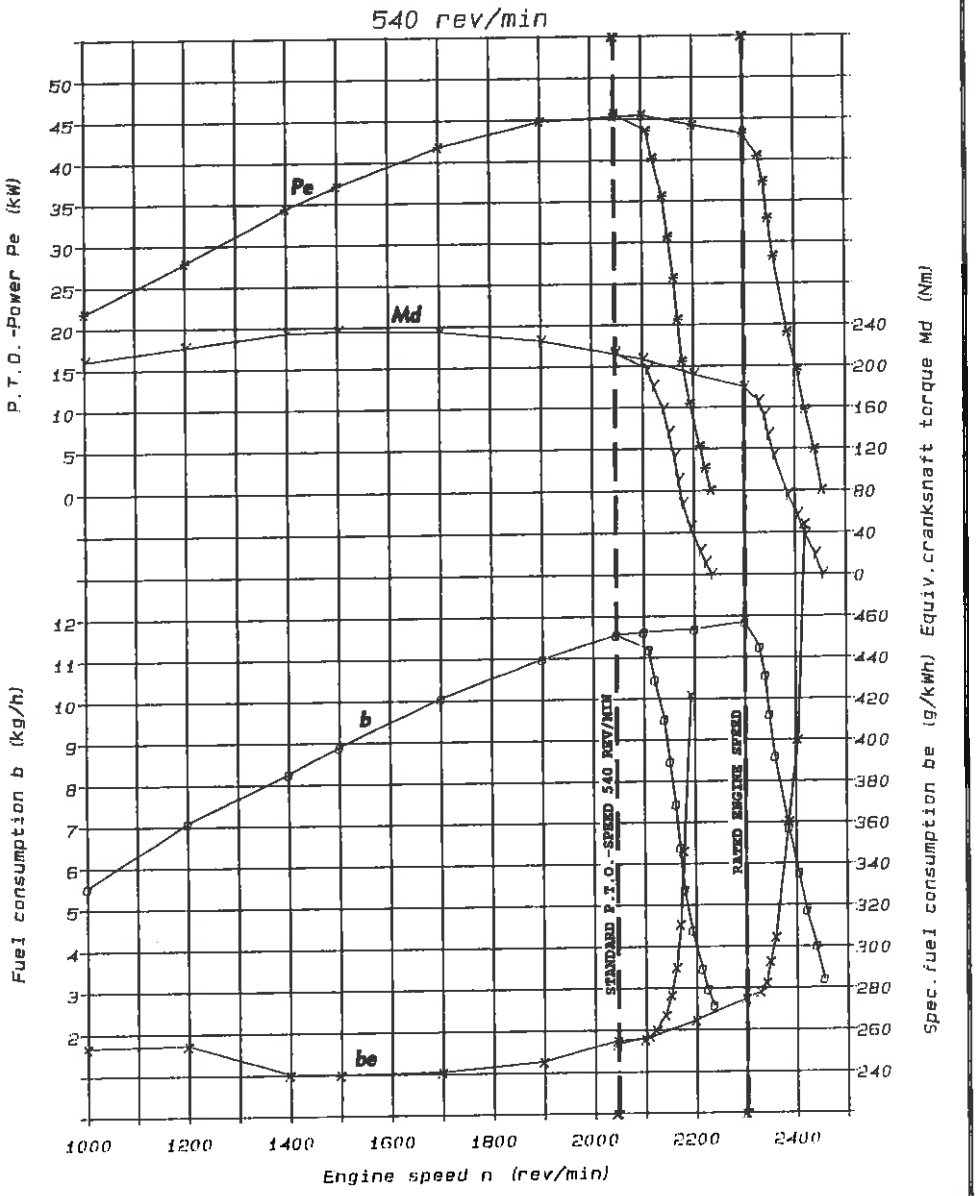
Power	Speed		Fuel consumption		Specific energy
	engine	p.t.o.	hourly	specific	
kW	rev/min	rev/min	kg/h l/h	g/kWh	kWh/l
PART LOADS AT STANDARD POWER TAKE-OFF SPEED					
(i) The torque corresponding to maximum power available					
45,30	2045	540	11,56 13,76	255,0	3,29
(ii) 85 % of torque obtained at maximum power					
40,21	2121	560	10,47 12,46	260,5	3,23
(iii) 75 % of torque defined in (ii)					
30,62	2151	568	8,48 10,10	277,0	3,03
(iv) 25 % of torque defined in (ii)					
20,57	2170	573	6,40 7,62	311,0	2,70
(v) 25 % of torque defined in (ii)					
10,42	2193	579	4,40 5,24	422,0	1,99
(vi) unloaded					
0	2234	590	2,58 3,07	-	-

No load maximum engine speed: 2454 rev/min
Equivalent crankshaft torque
at maximum power: 179 Nm at rated engine speed
Maximum equivalent crankshaft torque: 236,0 Nm at 1500 rev/min of engine

Mean atmospheric conditions
temperature: 18°C
pressure: 993 mbar
rel. humidity: 60 %

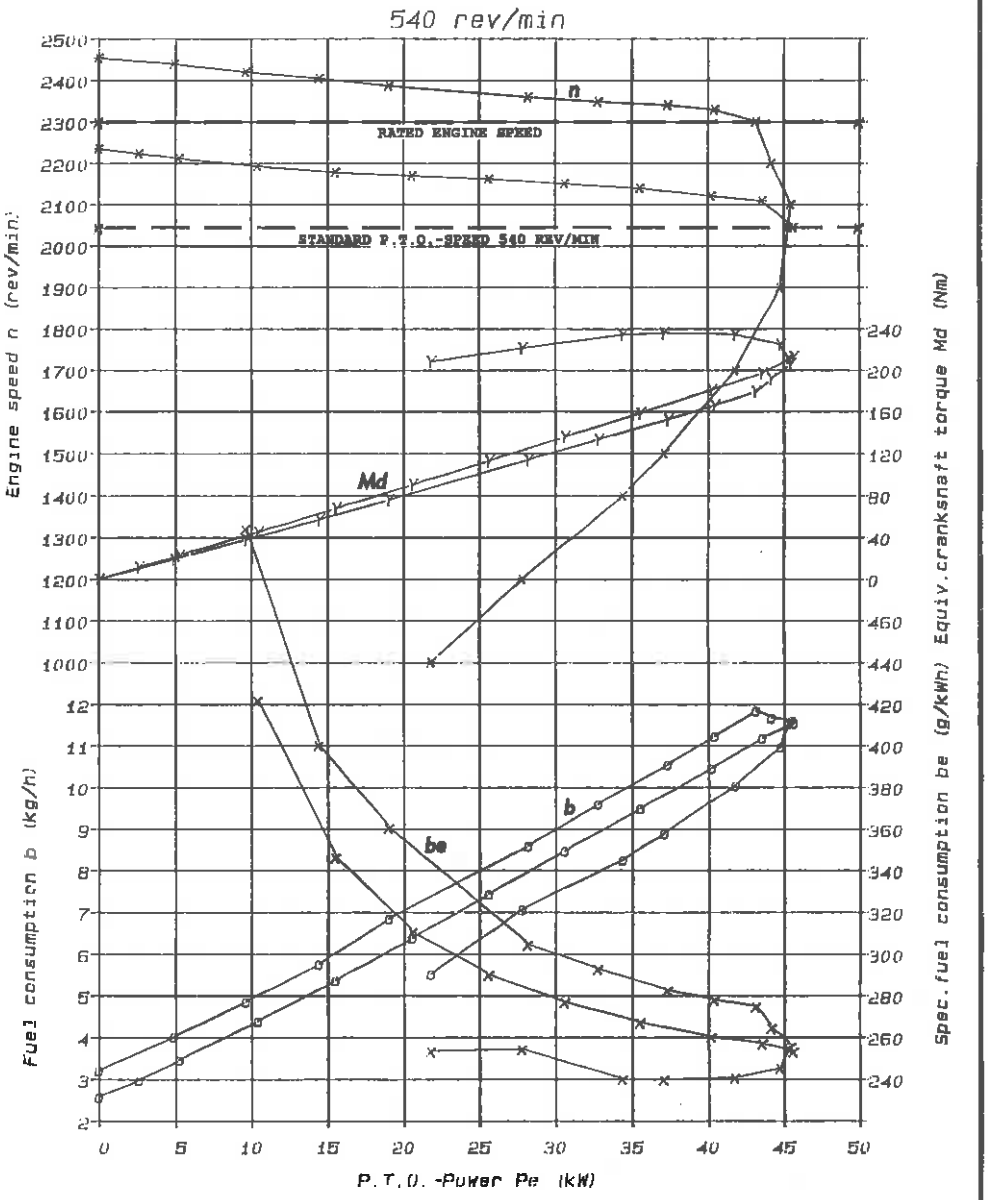
Maximum temperatures
coolant: 91°C
engine oil: 109°C
fuel: 30°C
engine air intake: 35°C

Bundesanstalt für Landtechnik Wieselburg/Erlauf, Austria Prot.Nr.:	P.T.O.-test	Steyr Dieseltractor Typ 9020.20 (964) (2WD) Mot.Typ Steyr WD 301.83



engine ser.nr. 301.83-000061	atm. pressure. 993 mbar	fuel temp. 30 C	signature
tractor ser.nr. 9020.20-01194	air temper. 18 C	d.of tests . 1992-09-23	
fuel . 0.84/15 C	coolant temp.. 91 C	test no. 780-691-92	
engine oil . 10W/40	oil temp. 109 C	curves no. 3	Haider/Schaufler

Bundesanstalt für Landtechnik Wieselburg/Erlauf, Austria Prot.Nr.	P.T.O.-test	Steyr Dieseltractor Typ 9020.20 (964) (2WD) Mot.Typ Steyr WD 301.83



engine ser.nr. 301.83-000061	atm. pressure. 993 mbar	fuel temp. 30 C	signature
tractor ser.nr. 9020.20-01194	air temper. 18 C	d.of tests . 1992-09-23	
fuel . 0.84/15 C	coolant temp. 91 C	test no. 780-691-92	
engine oil . 10W/40	oil temp. 109 C	curves no. 4	Haider/Schaufler

Engine performance:
Date and location of test: 22.9.1992, Wieselburg, Austria
Type of dynamometer: SCHENCK eddy-current brake W 150

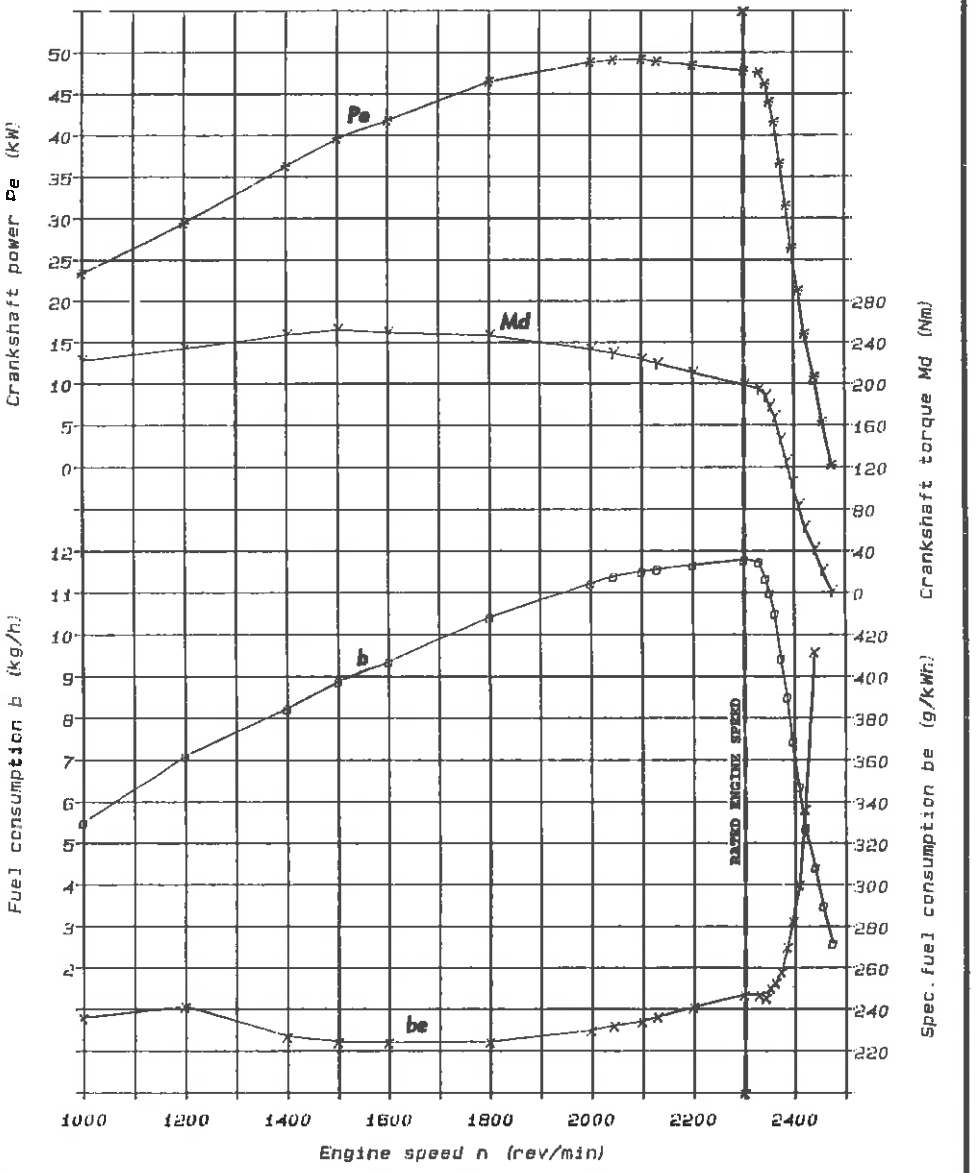
Power	Engine speed	Fuel consumption		Specific energy
		hourly	specific	
kW	rev/min	kg/h 1/h	g/kWh	kWh/l
Maximum power - 2 hours test				
49,14	2100	11,50 13,69	234,0	3,59
Power at rated engine speed				
47,73	2300	11,79 14,04	247,0	3,40
Standard power take-off speed				
48,88	2130	11,56 13,76	233,0	3,55
49,08	2045	11,38 13,55	232,0	3,62
Part loads				
(i) The torque corresponding to maximum power at rated engine speed				
47,73	2300	11,79 14,04	247,0	3,40
(ii) 85 % of torque obtained in (i)				
41,55	2361	10,51 12,51	253,0	3,32
(iii) 75 % of torque defined in (ii)				
31,48	2385	8,51 10,13	270,0	3,11
(iv) 50 % of torque defined in (ii)				
21,20	2409	6,37 7,58	300,0	2,80
(v) 25 % of torque defined in (ii)				
10,74	2440	4,42 5,26	412,0	2,04
(vi) unloaded				
-	2475	2,60 3,10	-	-

No load maximum engine speed: 2475 rev/min
Torque at maximum power: 198,2 Nm at rated engine speed
Maximum torque: 252,1 Nm at 1500 rev/min of engine

Mean atmospheric conditions:
temperatur: 19°C
pressure: 998 mbar
relative humidity: 60 %

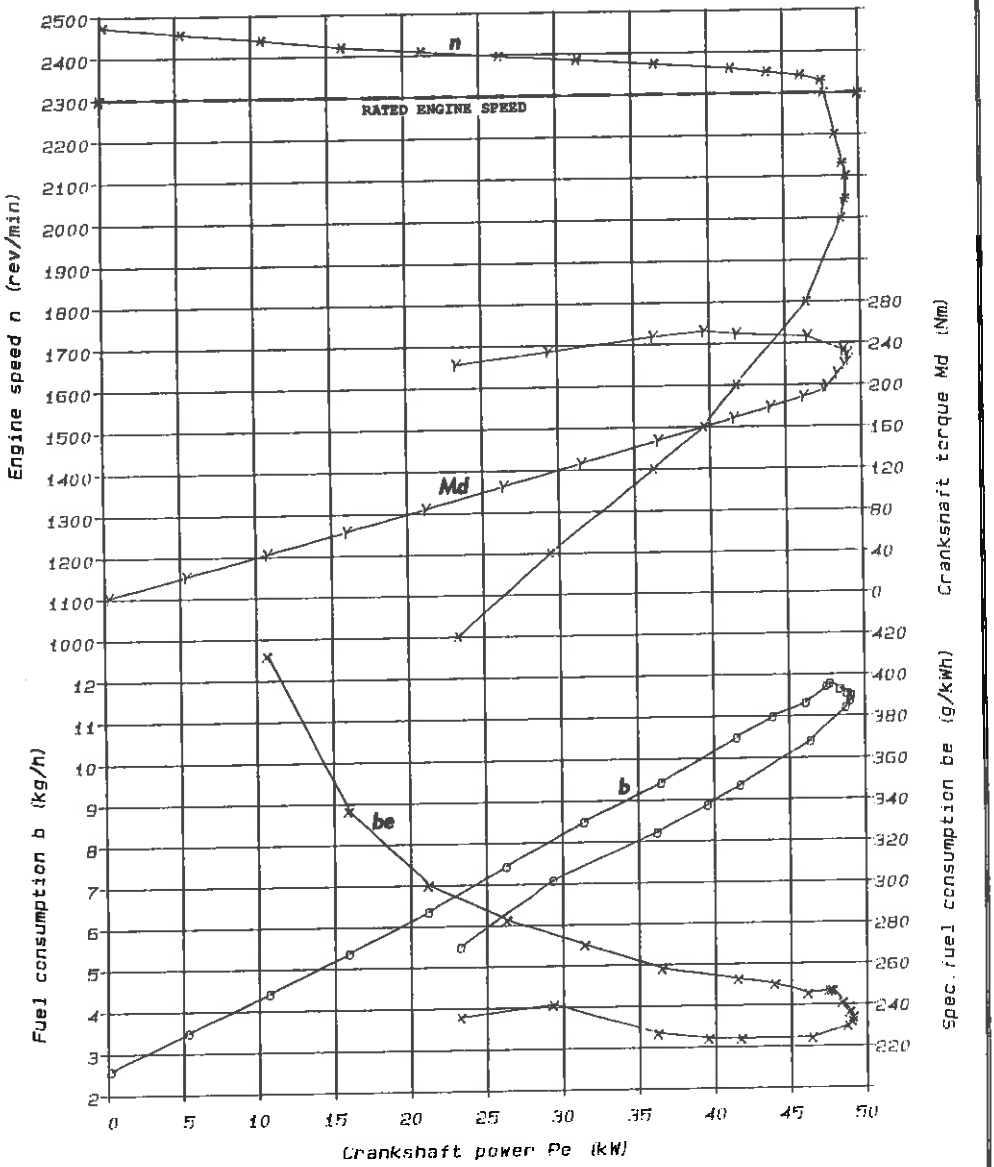
Maximum temperatures:
coolant: 81°C
engine oil: 106°C
fuel: 30°C
engine air intake: 33°C

Bundesanstalt für Landtechnik Ieselburg/Erlauf, Austria Prot.Nr.:	Engine-test	Steyr Dieseltractor Typ 9020.20 (964) (2WD) Mot.Typ Steyr WD 301.83



gine ser.nr.	000061	atm. pressure	998 mbar	fuel temp.	30 C	signature	
ctor ser.nr.	9020.20-01194	air temper.	19 C	d.of tests	1992-08-12		
el	0.84/ 15 C	coolant temp.	81 C	test no.	150-194-92		
gine oil	10W/40	oil temp.	106 C	curves no.	5	Haider/Schaufler	

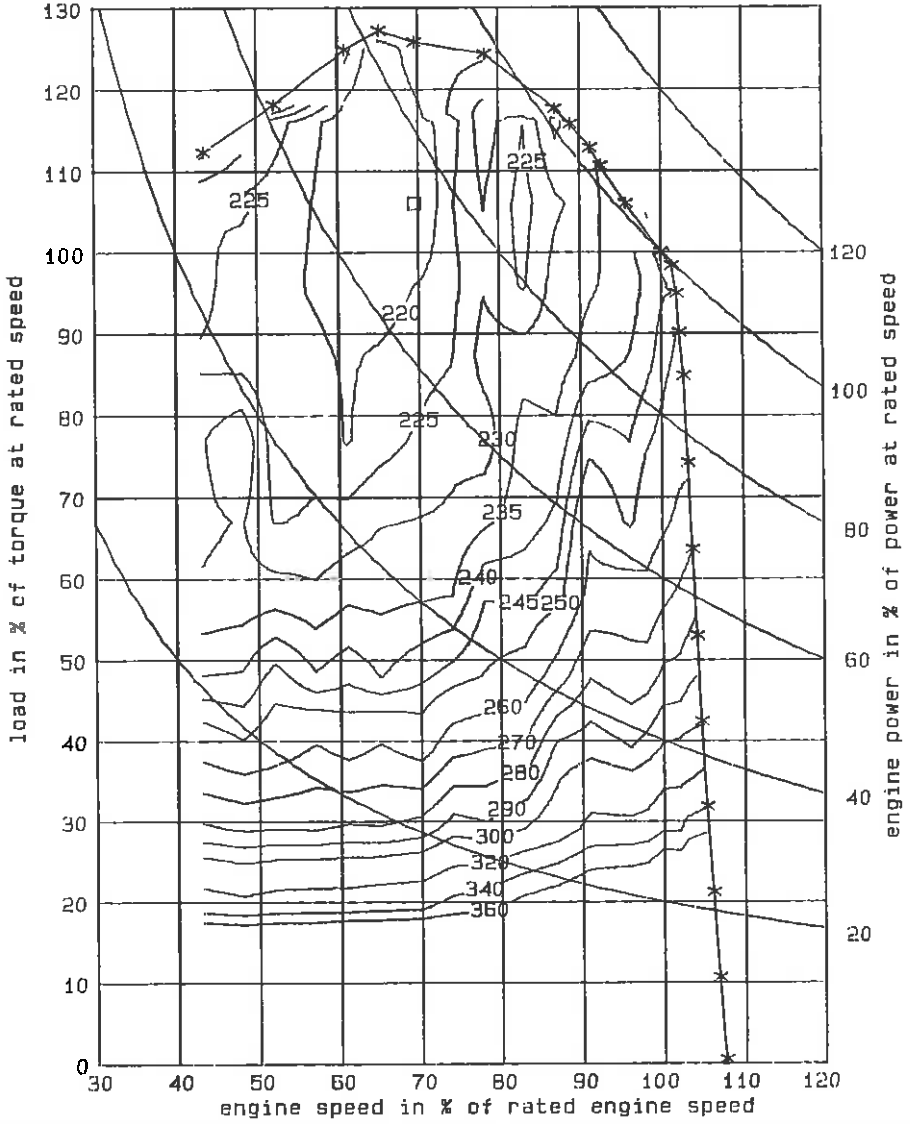
Bundesanstalt für Landtechnik Wieselburg/Erlauf, Austria Prot.Nr.:	Engine-test	Steyr Dieseltractor Typ 9020.20 (964) (2WD) Mot.Typ Steyr WD 301.83



engine ser.nr. 000061	atm. pressure. 998 mbar	fuel temp. 30 C	signature	
tractor ser.nr. 9020.20-01194	air temper. 19 C	d.of tests . 1992-08-12		
fuel . 0.84/ 15 C	coolant temp. 81 C	test no. 150-194-92		
engine oil . 10W/40	oil temp. 106 C	curves no. 6	Haider/Schaufler	

BUNDESANSTALT F_B LANDTECHNIK Wieselburg/Erlauf, Austria Prot.Nr.:	ENGINE PERFORMANCE CHARACTERISTIC	*Steyr Dieseltractor Typ 9020.20 (964) (2WD) Mot.Typ Steyr WD 301.83*

□ .. min. fuel 213.38 g/kWh at n = 1600. rev/min
Md = 210.08 Nm, P = 35.2 kW
✱ . N = 2300. rev/min, Md = 198.1 Nm, P = 47.7 kWh



engine ser.nr.	301.83-000061	atm. pressure.	993 mbar	fuel temp.	30 C	signature	
tractor ser.nr.	9020.20-01194	air temper.	21 C	d.of tests	1992-08-13		
fuel :	0.84/ 15 C	coolant temp.	84	test no.	150-194-92		
engine oil .	10W/40	oil temp.	105 C	curves no.	7	Haider/Schaufler	

EDV-PK05MKL-MKL11-<.dat>mku590.dat

REPAIRS: None

REMARKS: None

The head of department:

(Dipl.Ing. H. Lampel)
Oberrat

Bundesanstalt für Landtechnik Wieselburg a. d. Erlauf

Test and report carried out by:

(Ing. Hermann Schaufler)

The director of testing station:

(Dipl.Ing.Dr. J. Schrottmaier)
Hofrat