Prüfstelle für Landmaschinen



REPORT on test in accordance with OECD STANDARD CODE 2 for the Official Testing of Agricultural Tractor Performance

OECD No. 2/1945
8th February 2001

Agricultural Tractor

STEYR 9145 a M2 (4WD)

Manufacturer

CASE STEYR Landmaschinentechnik GmnH
A – 4300 St. Valentin

This is a report on a tractor test in accordance with OECD STANDARD CODE for the Official Testing of Agricultural Tractor Performance (C(2000)59(FINAL), Code 2).

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

Duration of tests: October till December 2000

DLG-Testing Station for Agricultural Machinery, Max-Eyth-Weg 1,
D-64823 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: 8th February 2001 OECD No. 2/1945

This is a report on a retest on the tractor STEYR 9145 a (4WD), OECD approved under no. 1/1771 Full Code. The originally tested tractor differs from the retested tractor in following details:

	New	Former
Engine model	620.93, TIER I	620.83
Hydraulic pump model	REXROTH 998345 A10 CO 45 (CC hydraulic system)	BOSCH 32/16 cm A 510 345 220 (OC hydraulic system)

Notice

The tractor model **CASE IH CS 150 M2**
offered by the manufacturer CASE GERMANY GmbH, Heidelberg
is technically identical with
the tractor model **STEYR 9145 M2**
in all respects except in colour and design of radiator shell.

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/cm^2
	100 kPa	=	1000 mbar	=	750.10	mm Hg

All rights including the right of translation, reprint and photo-mechanical copying - also of excerpts - reserved by the editor.
Printed in Germany, March 2001
DLG-No. 327

TABLE OF CONTENTS

		Page
1	SPECIFICATIONS OF TRACTOR	4 to 20
2	TEST CONDITIONS	21 to 23
3	COMPULSORY TESTS	
3.1	Main power take-off	24 to 27
3.2	Hydraulic power and lifting force	28 and 29
3.3	Drawbar power and fuel consumption of unballasted tractor	30 and 31
4	OPTIONAL TESTS	32
5	REPAIRS	32
6	REMARKS	32

Tractor manufacturer's name and address:	CASE STEYR Landmaschinentechnik GmbH A–4300 St. Valentin
Location of tractor assembly:	A-4300 St. Valentin
Submitted for test by:	Manufacturer
Selected for test by:	Manufacturer with agreement by DLG
Place of running-in:	A-4300 St. Valentin
Duration of running-in:	Engine and tractor approximate 118 h
Location of test:	DLG-Testing Station, D-64823 Groß-Umstadt

1 SPECIFICATIONS OF TRACTOR

1.1 Identification

- Make:	STEYR
- Model:	9145 a M2
- Type:	9080.75 40 kmh version, four wheel driven, semi frame construction, front axle with independent wheel suspension
- Number of driving-wheels:	4
- Serial No.:	DBD 0075289
- 1st serial No.:	DBD 0075001

1.2 Engine

Make/Model/Type:	STEYR / 620.93, TIER I / water-cooled 4-stroke Diesel-engine,direct injection, supercharged
Serial no.:	620.93 J 15140

1.2.1 Cylinders

Number/disposition:	6 / vertical in line
Bore/stroke:	108 mm / 120 mm
Capacity:	6596 cm^3
Compression ratio:	16.5 ±0.5 : 1
Arrangement of valves:	Overhead valves
Cylinder liners:	Wet

1.2.2	Supercharging	
	- Make / Model / Type:	SCHWITZER / S 2 B / exhaust driven supercharger
	- Pressure	Max. 100.4 kPa
1.2.3	Fuel system	
	- Fuel feed system:	1 diaphragm fuel supply purnp, 1 fuel feed pump integrated in injection pump
	- Fuel filter	
	Make/Model:	CAV / 2 FASL
	Type :	1 double-filter with water trap, replaceable
	- Capacity of fuel tank:	220 dm^3 standard, optional additional tank with 72 dm^3 fitted
	- Injection pump	
	Make/Model:	STANADYNE / DB 4629-5679
	Type :	Distributor pump with timing device
	Serial no.:	8368 54877
	Manufacturer's production setting:	75 ± 2 mm^3/stroke at full load and rated speed;
	Flow rate:	31.05 ± 0.83 dm^3/h at 2300 min^{-1} and full load
	Timing:	Commencement of delivery: Static 14 ± 1° before TDC
	- Injectors	
	Make/Model:	STANADYNE / DB 4629-5679
	Type :	multi hole
	Injection pressure:	27 + 2 MPa
1.2.4	Governor	
	- Make/Model/Type:	STANADYNE / - / mechanical, centrifugal variable speed governor, integral with injection pump
	- Governed range of engine speed:	850 ± 50 to 2500 ± 50 min^{-1}
	- Rated engine speed:	2300 min^{-1}

1.2.5	Air cleaner	
	- Pre-cleaner	
	Make/Model:	KNECHT / -
	Type:	Cyclone type, aspirated, integrated in main cleaner housing
	Location of air intake:	In front of engine, below bonnet
	- Main cleaner	
	Make/Model:	KNECHT / LVPO 6120 S -16
	Type:	Dry paper element filter with additional safety cartridge, dust-drain valve
	- Maintenance indicator:	Warning light on dashboard
1.2.6	Lubrication system	Pressure lubrication with engine oil / cooling water heat exchanger in filter socket
	- Type of feed pump:	Gear pump
	- Type of filter:	Full flow, replaceable cartridge
	- Number of filters:	1
1.2.7	Cooling system	
	- Type of coolant:	Water-anti-freeze mixture
	- Type of pump:	Impeller pump
	- Specification of fan	
	Number of fan blades:	10
	Fan diameter:	510 mm
	- Coolant capacity:	24 dm^3
	- Type of temperature control:	Thermostat and by-pass circuit, viscous drive fan, belt driven; variable fan speed controlled by air flow temperature
	- Superpressure system:	70 kPa

1.2.8	Starting system	
	- Make/Model/Type:	ISKRA / - / electrical, solenoid pre-engaged drive starter motor
	- Starter motor power rating:	3.0 kW
	- Cold starting aid:	Flame glow plug in air intake manifold
	- Safety device:	Gear-change lever and p.t.o.-speed selector in neutral position
1.2.9	Electrical system	
	- Voltage:	12 V
	- Generator:	
	Make/Model/Type:	BOSCH / 120 A – 14 V / 3-phase alternator
	Power:	1.68 kW
	- Battery:	1 lead acid battery, 100 Ah at 20 hours rating
1.2.10	Exhaust system	
	- Make/Model/Type:	ROTH / 44 . 05 . 9920 . 0 . 00 / absorption reflexion, 145 mm dia, 1450 mm long
	- Location:	On the right, beside the engine, in front of the steps, vertical stack, mouth showing upwards 20° to the right
1.2.11	Operating hours meter:	Electronic, counts real hours when engine is running

1.3 Transmission

1.3.1 Clutch (travel alone)

- Make/Model/Type: ZF / T 7200 / wet multi-plate
- Number of plates: 8
- Diameter of plates: 213 mm
- Method of operation: Hydraulically operated by pedal, additionally assisted by low pressure hydraulic circuit

1.3.2 Gear box

- Make/Model/Type: STEYR - ZF / T 7200 / mechanical acting, with 4 step power shift; 40 km/h version
- Description: Main transmission with 6 gears (synchronized)

power shifted range gear with 4 ranges (L , M , H , S)
power shifted reversing gear (F/R)

	forward	reverse
no. of gears	6	6
no. of ranges	4	4
total	24	24

- Available options (not fitted):
  a) synchronized creeper range provides 40 forward and reverse speeds
  b) 50 km/h version provides 24 forward and reverse speeds
  c) 50 km/h version with creeper range provides 40 forward and reverse speeds

1.3.3 Rear axle and final drives

- Make/Model/Type: STEYR / HA 150 / bevel gear drive with bevel gear differential and planetary final drives
- Differential lock:
  - Type: Multi-plate, wet
  - Engagement: By toggle switch or on option by automatic lock management (fitted to tractor tested), electro-hydraulically operated; acting in common with front axle differential lock
  - Disengagement: Self disengaging (if not locked) or by automatic lock management

STEYR 9145 a M2 **DLG-Test No. 2000-293**

1.3.4 Front axle and final drives

- Make/Model/Type: CARRARO / 20.25 S / swing axle; additional independent suspension with transverse control arms; hydropneumatic suspension, blockable; electronic height control; axle driven by wet multi plate clutch, central shaft and bevel gear; clutch electro-hydraulically operated by toggle switch or engaged by service brake operation; planetary final drives

- Differential lock:
  - Type: Multi- plate, wet
  - Engagement: As rear axle differential
  - Disengagement: As rear axle differential

1.3.5 Total ratios and travelling speeds

Gear no	Range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed*) at rated engine speed of 2300 min^{-1} km/h
Forward Speeds			
1	L	266.32	2.78
1	M	222.13	3.34
1	H	185.27	4.00
1	S	154.56	4.80
2	L	147.90	5.01
2	M	123.36	6.01
2	H	102.89	7.21
2	S	85.84	8.64
3	L	92.24	8.04
3	M	76.93	9.64
3	H	64.17	11.55
3	S	53.53	13.85
4	L	61.20	12.11
4	M	51.04	14.52
4	H	42.57	17.41
4	S	35.52	20.87
5	L	44.46	16.67
5	M	37.09	19.99
5	H	30.93	23.97
5	S	25.81	28.73
6	L	32.52	22.80
6	M	27.13	27.33
6	H	22.62	32.77
6	S	18.87	39.28

*) calculated with a dynamic radius index of 855 mm
(not in conformity with ISO 4251-1:1992)
- Number of revolutions of front wheels for one revolution of rear wheels: 1.318

Gear no	Range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed*) at rated engine speed of 2300 min^{-1} km/h
Reverse speeds			
1	L	248.88	2.98
	M	207.66	3.57
	H	181.11	4.09
	S	151.19	4.90
2	L	138.22	5.36
	M	115.33	6.43
	H	100.58	7.37
	S	83.96	8.83
3	L	86.20	8.60
	M	71.92	10.31
	H	62.73	11.82
	S	52.36	14.16
4	L	57.19	12.96
	M	47.72	15.54
	H	41.62	17.81
	S	34.74	21.34
5	L	41.55	17.84
	M	34.67	21.38
	H	30.24	24.52
	S	25.24	29.37
6	L	30.39	24.39
	M	25.36	29.23
	H	22.12	33.52
	S	18.46	40.15

*) calculated with a dynamic radius index of 855 mm
(not in conformity with ISO 4251-1:1992)

1.4 Power take-off

1.4.1 Main power take-off

- Type: Independent
- Method of engagement: By wet multi-plate clutch, controlled by push-button; electro-hydraulically operated; additional remote control at rear mudguards
- Number of shafts: 1
- Method of changing power take-off shaft ends and speeds: Flanged shafts, exchangeable; 4 different standard speeds shiftable by 2 separate levers

1.4.1.1 Power take-off proportional to engine speed,
for normal operation: 540 or 1000 p.t.o.
for economic operation: 540E or 1000E p.t.o.
- Location: At rear of tractor
- Diameter of p.t.o. shaft end: 35 mm
- Number of splines: 6 in conformity with ISO 500:1991, type 1
21 in conformity with ISO 500:1991, type 2
- Height above ground: 757 mm
- Distance from the median plane of the tractor: 0 mm
- Distance behind rear-wheel axis: 530 mm

p.t.o. type	p.t.o. transmission ratio	p.t.o. speed min^{-1}	Engine Speed min^{-1}	power restriction +) kW	max. torque transmissible +) Nm
540	4.089	540 562	2208 2300	-	-
1000	2.197	1000 1047	2197 2300	-	-
540E	2.977	540 773	1608 2300	-	-
1000E	1.600	1000 1437	1600 2300	-	-

+) not specified by the manufacturer

- Direction of rotation (viewed from behind tractor): Clockwise

1.4.1.2 Power take-off proportional to ground speed: None

1.4.2 Optional power take-off: Front p.t.o., independent, not fitted to tractor

1.5 Hydraulic power lift

- Make/Model/Type: CASE STEYR/ - / detached system, electro-hydraulic power lift

- Type of hydraulic system: Closed, load sensing, pressure and flow compensated (PFC hydraulic) supplies rear and front power lift including additional control valves, steering system and height-control of front axle suspensi.

- Rear power lift: BOSCH, EHR D
electronic power lift adjustment,
lower link sensing;
external push-buttons on the left and right at rear mudguards;
draft, position and intermixable control,
floating position, fast raising, raise limit,
lowering throttle, vibration damping

- Front power lift: STEYR GR I
on request, fitted to tractor tested
actuated by additional control valve of power lift

	rear power lift	front power lift
- Number of cylinders:	2	2
- Type of cylinders: Single or double acting	single	double
- Bore / stroke: [mm]	100 / 222	80 / 195
- Piston rod diameter: [mm]	-	35
- Type of linkage lock for transport:	hydraulic, lowering throttle	hydraulic, lowering throttle
- Opening pressure of cylinder safety valve:	23 + 1.9 MPa	no safety valve

- Relief valve pressure setting:	20.5 +1.2 MPa
- Lift pump type:	REXROTH, variable displacement axial-piston pump, max. delivery 115 dm^3/min at rated engine speed
- Transmission between pump and engine:	Pump driven by gearbox
- Type and number of filters:	1 filter in suction line of hydraulic pump 1 filter in pressure line
- Site of oil reservoir:	Transmission housing
- Type number and location of tapping points:	3 pairs, double acting, at rear of tractor 1 pair, double acting, at front of tractor
Maximum volume of oil available to external cylinders:	30 dm^3

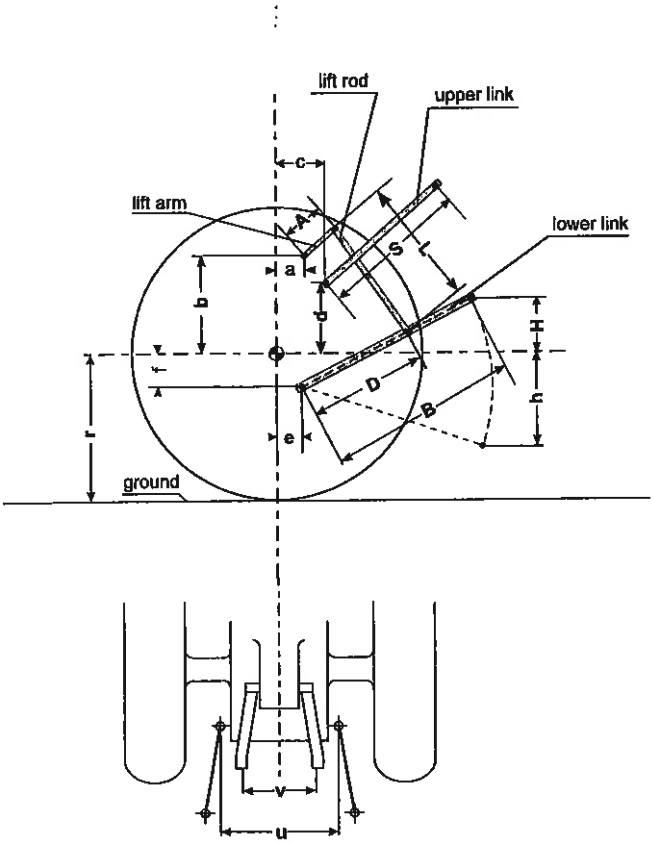
The hydraulic pump further provides hydraulic pressure for actuating of steering, p.t.o. clutch, power-shift gear, rear and front axle differential lock and for shifting the front axle drive clutch

STEYR 9145 a M2 **DLG-Test No. 2000-293**

1.6 Three-point linkage:

1.6.1 Three-point linkage at rear:

- Category: 3, acc. to ISO 730-1/1994 + Cor. 1:1995, with WALTERSCHEID quick couplers
- Category adapter: Adjustment of Cat. 2 possible



Dimensions of rear implement linkage			projected lengths in mm: dimensions and range	settings used in test-page 28
Rear tyres 650/65 R 38		(r) *)	855	
Front tyres 540/65 R 28		(r') *)	670	
Length of lift arms		(A)	328	
Length of lower links		(B)	980	
Distance of lift arm pivot points from rear wheel axis	horizontal	(a)	195	
	vertical	(b)	455	
Horizontal distance between the 2 lower link pivot points		(u)	480	
Horizontal distance between the 2 lift arm end points		(v)	610	
Length of upper link		(S)	from 665 to 900	800
Distance of upper link pivot point from rear wheel axis	horizontal	(c)	390	390
	vertical	(d)	280 / 360	280
Distance of lower link pivot points from rear wheel axis	horizontal	(e)	200	
	vertical	(f)	215	
Distance of lower link pivot points from lift rod pivot points on lower links		(D)	490	
Length of lift rod		(L) *)	from 725 to 925	830

*) With L = 890 mm lower link hitch points touch the ground

Heights (h, H, H') of lower link hitch points relative to rear wheel axis (situated 855 mm above ground), at different adjustments of L

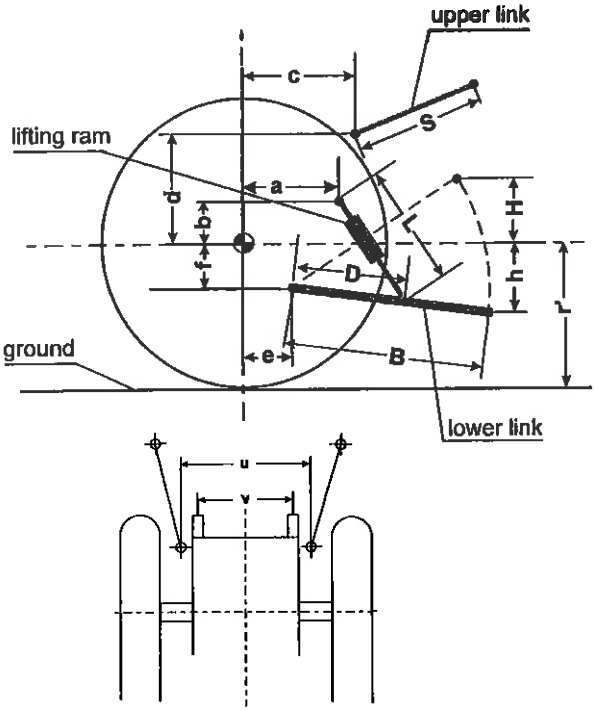
These data are valid for unloaded power lift (front axle suspension switched off)

Length of lift rods	(L)	725	830	890
Linkage distance of lift rods	(D)	490		
Lowest position	(h)	390	625	755
Highest position	(H)	310	125	10
Transport position	(H')	310	125	10

*) Assuming r resp. r' = tyre dynamic radius index (not in conformity with ISO 4251-1:1992)

1.6.2 Three-point linkage at front:

- Category: 2, acc. to ISO 730 -1/1994 + Cor. 1:1995, with WALTERSCHEID quick couplers
- Category adapter: None



STEYR 9145 a M2 **DLG-Test No. 2000-293**

Dimensions of front implement linkage			projected lengths in mm	
			dimensions and range	settings used in test-page 29
Rear tyres 650/65 R 38 Front tyres 540/65 R 28		r*) (r') *)	855 670	
Length of lower links		(B)	840	
Distance of lift cylinder pivot points from front wheel centre	horizontal vertical	(a) (b)	660 340	
Horizontal distance between the 2 lower link pivot points		(u)	380	
Horizontal distance between the 2 lift cylinder pivot points		(v)	370	
Length of upper link		(S)	from 465 to 660	570
Distance of upper link pivot point from front wheel centre	horizontal vertical	(c) (d)	785 / 755 360 / 408	755 408
Distance of lower link pivot points from front wheel centre	horizontal vertical	(e) (f)	485 120	
Distance of lower link pivot points from fixing points of lift cylinders on lower links		(D)	190	
Length of lift cylinders		(L)	from 375 to 565	

Heights (h, H, H') of lower link hitch points relative to front wheel centre (situated 670 mm above ground)

These data are valid for unloaded power lift (front axle suspension switched off)

Lowest position	(h)	550
Highest position	(H)	290
Transport position	(H')	290

*)Assuming r resp. r' = tyre dynamic radius index (not in conformity with ISO 4251-1/1992)

1.7	**Swinging drawbar**	Available,not fitted
1.8	**Trailer hitch**	
	- Make/Model/Type:	SCHARMÜLLER / 2146-1 / automatic
	- Hitch pin diameter:	32 mm
	- Height above ground:	Mouth of coupling adjustable to 520/570/620/720/815/865/915 and 965 mm
	- Distance of hitch point from rear-wheel axis:	horizontal 690 mm
	- Distance of hitch point from power take-off shaft end vertical:	above 58/108/158 and 208 mm below 37/137/187 and 237 mm
	horizontal:	160 mm
	- Maximum vertically permissible load:	25 kN
1.9	**Holed drawbar**	Available, not fitted
1.10	**Steering**	
	- Make/Model/Type:	ZF NORD / LAUCSDR160/50-5-9 / hydrostatic steering, acting on front wheels
	- Method of operation Pump:	BOSCH delivery 80 dm^3/min at rated engine speed
	Ram:	Integrated cylinder of symmetrical design, 238 mm stroke, 65 mm bore, 32 mm dia of piston rod
	- Working pressure:	15.0 MPa
1.11	**Brakes**	
1.11.1	Service brake	
	- Make/Model/ Type:	SIRMAC / 9.5"x7" / OPTISTOP, muscle power brake with hydraulic transmission oil-immersed disc brake with 10 acting faces on each differential half shaft, disc 211mm dia
	- Method of operation:	Pedal operated, acting on rear wheels, front axle drive is automatically engaged when braking
	-Trailer braking take-off:	Optional,not fitted to tested tractor combined 1 / 2 -line air braking system

1.11.2 Parking brake

- Type: Mechanically acting on service brake
- Method of operation: Hand lever with ratchet

1.12 Wheels

- Number

  Front: 2, driving and steering
  Rear. 2, driving

- Wheel base: 2806 mm

- Track width adjustment:

	Minimum	Maximum	Adjustment method
Front	1838	1920	reversing the wheels
Rear	1880	1880	-

1.13 Protective structure

- Make/Model/Type: STEYR / 130.02 / Cab
- Manufacturer's name and address: CASE STEYR Landmaschinentechnik AG, A-4300 St. Valentin
- Protective device

  Cab: Welded and screwed profile steel tube construction, not tiltable

- OECD approval

  Approval number: 4 / 0 520
  Date of approval: 2nd April 1998

- Nos. of minor modification certificates: -

1.14 Seat

1.14.1	Driver's seat	Fitted to tractor
	- Make/Model:	Grammer / MSG95A/20
	- Type:	Air suspended upholstered seat with back rest and arm rests
	- Seat and steering wheel reversible:	No
	- Type of suspension:	Pneumatic
	- Type of damping:	Hydraulic
	- Range of adjustment	
	Longitudinal:	150 mm
	Vertical:	160 mm
	- Safety belt:	No
1.14.2	Optional driver's seats	
	- Make/Model/Type:	GRAMMER / DS85H1/90 / mechanic.suspension GRAMMER / MSG 95G/20 / pneumat. suspension
1.14.3	Passenger seat:	Optional, fitted to tractor tested
	- Location:	On the left mudguard, beside the driver
	- Capacity:	1

1.15 Lighting

Electrical, 12 Volt

	Height above ground of centre mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Headlights	1230	160 x 100	215
Sidelights	1765	110 x 40	855
Rearlights	1810	140 x 45	875
Reflectors, 1st pair 2nd pair	1775 710	125 x 32 80 dia	865 520

2. TEST CONDITIONS

2.1 Overall dimensions

	length		width	height at top of	
	with front power lift	without front power lift	track width as in 2.5	protective structure	exhaust silencer pipe
	mm		mm	mm	mm
unballasted	5440	4782	2500	2910	2893

2.2 Ground clearance 455 mm

- Clearance-limiting part: Bracket of trailer hitch

2.3 Tractor mass Unballasted (with cab)

	Without driver kg	With driver kg
Front	2635	2645
Rear	3745	3810
Total	6380	6455

2.4 Track specifications Not applicable

2.5 Tyres and track widths specifications

	Front	Rear
Tyres:	Michelin XM 108	
-dimensions	540/65 R 28	650/65 R 38
- load index speed index	142 A8	157 A8
- type	radial ply	radial ply
- maximum load (tyre manufacturer's)	26.00 kN	40.51 kN
at travelling speed	40 km/h	40 km/h
at tyre inflation pressure	160 kPa	160 kPa
dynamic radius index	670 mm	855 mm
- maximum load (tractor manufacturer's wheel load)	21.6 kN	35.3 kN
Chosen track width:	1920 mm	1880 mm

2.6 Fuel

- Type:	ARAL-Diesel-fuel, in conformity with DIN 51601	
- Density at 15°C:	At p.t.o. tests	0.843 g/cm³
	at drawbar power tests	0.836 g/cm³

2.7 Oils and lubrication

2.7.1 Capacity and change interval

	Capacity dm³	Oil change h	Filter-change h
Engine	20	250	250
Gear box and rear axle	72	1000	1000
Front axle	2.2	1000	-
Rear axle	in common with gearbox		
Final drives (front each)	1.5	500	-
Final drives rear (each)	10	1000	-
Hydraulic system	in common with gearbox		
Steering			

2.7.2 Specifications:

	Recommended	Used during test
Engine oil:		
Used in engine		
Type	Super-Tractor-Oil-Universal STOU	SHELL Engine Oil
Viscosity	SAE 10W30, SAE 15W30	SAE 10W30
Classification	MIL-L 2104 C/D MIL-L 2105	MIL-L 2105
Transmission oil:		
Used in gearbox, rear axle, hydraulic- and steering system		
Type	Super-Tractor-Oil-Universal STOU	SHELL HARVELLA TX
Viscosity	SAE 10W40, SAE 15W30	SAE 10W40
Classification	MIL-L 2104 C/D MIL-L 2105	MIL-L 2105
Used in rear axle final drives		
Type	Transmission-oil	SHELL SPIRAX MB 90
Viscosity	SAE 90, SAE 85W90 SAE 85W-140	SAE 85W-140/90
Classification	MIL-L 2105 C/D	MIL-L-2105 D MIL-TRF-2105 E
Used in front axle and front final drives		
Type	Transmission Oil	AGIP Rotra MP-DB
Viscosity	SAE 80W90, SAE 85W90	SAE 80W90
Classification	MIL-L 2105 C/D	MIL-L 2105 C/D

2.7.3 Grease Multi purpose grease

- number of lubrication points: 23

3 COMPULSORY TESTS RESULTS

3.1 MAIN POWER TAKE OFF PERFORMANCE (1000 min^{-1})

Date of tests: 2000-10-13
Location of tests: DLG-Testing Station Groß-Umstadt
Type of dynamometer: SCHENCK hydraulic dynamometer U1-40

Power kW	Speed Engine min^{-1}	Speed P.t.o. min^{-1}	Fuel consumption hourly dm³/h	Fuel consumption hourly kg/h	Fuel consumption specific g/kWh	Specific energy kWh/dm³
Maximum power						
3.1.1 At 2-hour test						
99.0	2051	934	29.14	24.55	248	3.40
3.1.2 At rated speed						
94.3	2300	1047	30.41	25.62	272	3.10
3.1.3 At standard p.t.o. speed						
98.0	2197	1000	30.12	25.38	259	3.25
3.1.4 Part loads, the governor hand lever in the position corresponding to maximum power at full load (curve a)						
3.1.4.1 the torque corresponding to maximum power at rated speed						
94.3	2300	1047	30.41	25.62	272	3.10
3.1.4.2 85% of the torque obtained in 3.1.4.1						
83.2	2359	1074	28.45	23.97	288	2.92
3.1.4.3 75% of the torque defined in 3.1.4.2						
63.1	2390	1088	24.28	20.46	324	2.60
3.1.4.4 50% of the torque defined in 3.1.4.2						
42.7	2418	1101	20.05	16.89	396	2.13
3.1.4.5 25% of the torque defined in 3.1.4.2						
21.6	2451	1116	14.79	12.46	577	1.46
3.1.4.6 unloaded						
-	2471	1125	10.13	8.54	-	-

Power kW	Speed Engine min^{-1}	Speed P.t.o. min^{-1}	Fuel consumption hourly dm^3/h	Fuel consumption hourly kg/h	Fuel consumption specific g/kWh	Specific energy kWh/dm^3
3.1.5 Part loads, the governor hand lever in the position corresponding to standard p.t.o. speed at full load (curve b)						
3.1.5.1 the torque corresponding to maximum power						
98.0	2197	1000	30.12	25.38	259	3.25
3.1.5.2 85% of the torque obtained in 3.1.5.1						
84.1	2223	1012	27.36	23.05	274	3.07
3.1.5.3 75% of the torque defined in 3.1.5.2						
64.2	2258	1028	23.24	19.58	305	2.76
3.1.5.4 50% of the torque defined in 3.1.5.2						
43.4	2293	1044	18.85	15.88	366	2.30
3.1.5.5 25% of the torque defined in 3.1.5.2						
22.1	2328	1060	13.90	11.71	531	1.59
3.1.5.6 unloaded						
-	2363	1075	8.61	7.25	-	-

No load maximum engine speed:	2471 min^{-1}
Equivalent flywheel torque at rated engine speed:	392 Nm
Equivalent flywheel torque at 2-hour test:	461 Nm
at engine speed:	2051 min^{-1}
Maximum equivalent flywheel torque:	552 Nm
at engine speed:	1199 min^{-1}

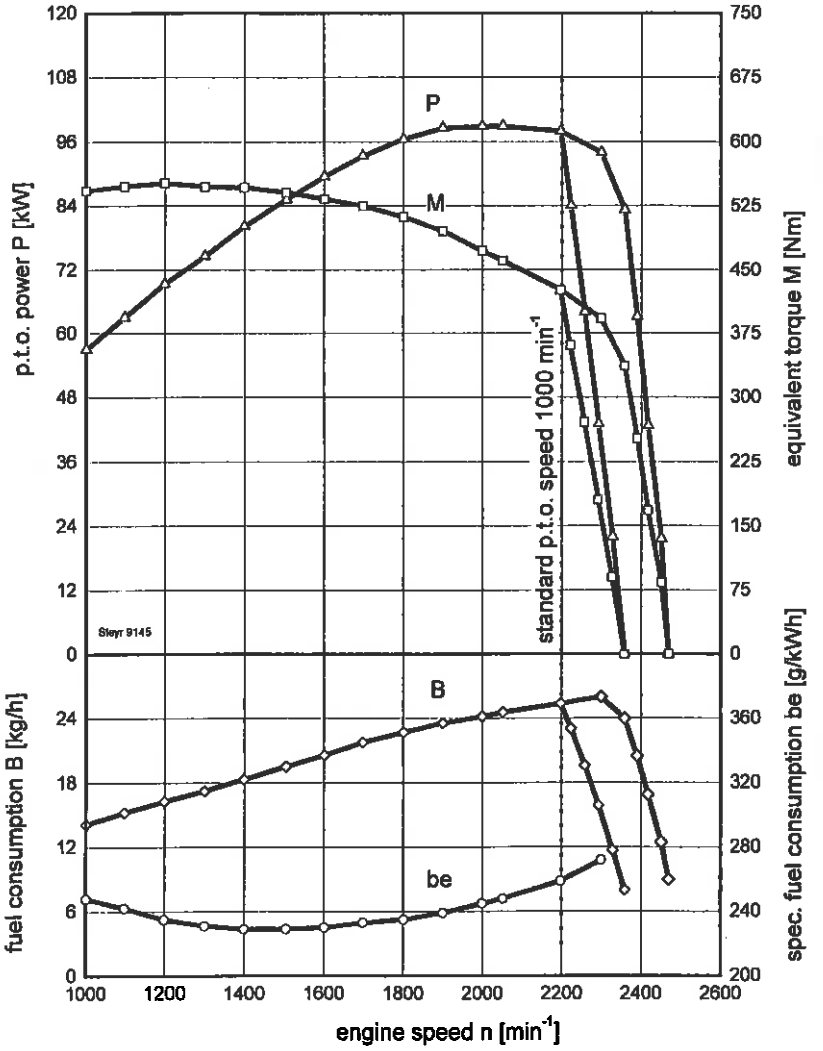
Mean atmospheric conditions

temperature:	20 °C
pressure:	100.5 kPa
relative humidity:	48 %

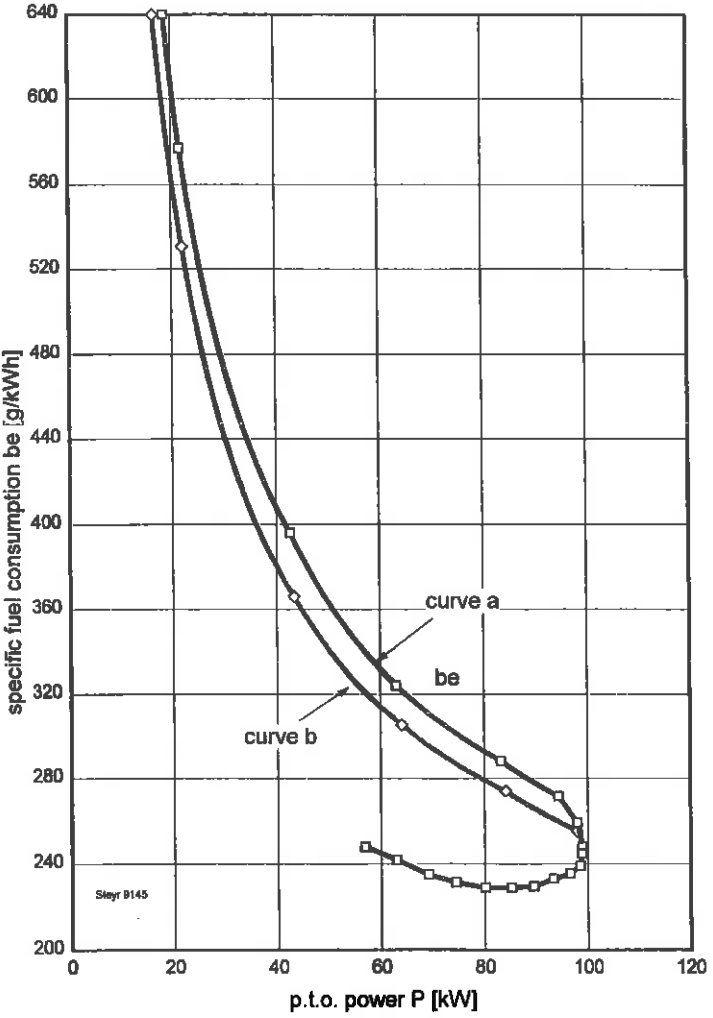
Maximum temperatures

coolant:	90 °C
oil:	118 °C
fuel:	60 °C
air intake:	20 °C

P.T.O. Test


P
M
B
be
Steyr 9145
p.t.o. power P [kW]
equivalent torque M [Nm]
standard p.t.o. speed 1000 min-1
fuel consumption B [kg/h]
spec. fuel consumption be [g/kWh]
engine speed n [min-1]
120
108
96
84
72
60
48
36
24
12
0
750
675
600
525
450
375
300
225
150
75
0
24
18
12
6
0
360
320
280
240
200
1000
1200
1400
1600
1800
2000
2200
2400
2600

P.T.O. Test


specific fuel consumption be [g/kWh]
640
600
560
520
480
440
400
360
320
280
240
200
0
20
40
60
80
100
120
p.t.o. power P [kW]
curve a
be
curve b
Steyr 9145

3.2 HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 31st October till 9th November 2000

3.2.1 Hydraulic power test

- Sustained pressure with relief valve open: 21.7 MPa
- Pump stalled: No
- Pump delivery rate at minimum pressure: 84.9 dm³/min [1)] / 121.5 dm³/min [2)]

	Hydraulic power kW	Flow rate dm³/min	Pressure MPa	Oil Temperature °C
At 90% of the actual relief valve setting [1)]	26.6	81.7	19.5	65
At 90% of the actual relief valve setting [2)]	33.7	103.7		
Maximum [1)]	26.6	81.7		
Maximum [2)]	33.7	103.7		

- Tapping point used for test: At rear of tractor, [1)] double acting control valve; [2)] double acting control valves, parallel connection
- Opening/closing pressure of unloading valve: Not applicable

3.2.2 Power lift test at rear power lift

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	230 mm	
Vertical movement without lifting forces	750 mm	890 mm
Vertical movement with lifting forces	710 mm	850 mm
Max. corrected force exerted through full range	82.4 kN	67.5 kN
Corresponding pressure	19.5 MPa	
Moment about rear axle	-	120.8 kNm
Max. tilt angle of mast from vertical		8°

Lifting heights relative to horizontal lower links											
mm	-480	-410	-400	-300	-200	-100	0	+100	+200	+300	+370
Lifting forces at hitch points, corrected to 19.5 Mpa											
kN		82.4	82.8	85.5	87.3	89.6	91.8	93.6	95.0	96.8	
Lifting forces at standard frame. corrected to 19.5 Mpa											
kN	67.5		69.3	72.0	73.8	75.6	77.0	77.4	77.4	76.5	71.1

3.2.3 Power lift test at front power lift (front axle suspension switched off)

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	120 mm	
Vertical movement without lifting forces with lifting forces	840 mm 815 mm	965 mm 935 mm
Max. corrected force exerted through full range	33.8 kN	21.4 kN
Corresponding pressure	19.5 MPa	
Moment about front axle	-	41.4 kNm
Max. tilt angle of mast from vertical	-	12.5°

Lifting heights relative to horizontal lower links													
mm	-440	-430	-400	-300	-200	-100	0	+100	+200	+300	+385	+400	+495
Lifting forces at hitch points, corrected to 19.5 MPa													
kN		38.9	37.8	36.0	35.6	35.3	35.6	35.6	35.3	34.9	33.8		
Lifting forces at standard frame, corrected to 19.5 MPa													
kN	39.8		37.8	34.7	33.1	32.0	31.1	29.7	28.4	26.3		24.1	21.4

3.3 DRAWBAR POWER TEST (unballasted tractor)

Date of test: 18th and 25th October 2000
Type of track: Concrete

Gear number and range	Power kW	Drawbar pull kN	Speed km/h	Engine speed min^{-1}	Slip of wheels %
3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)					
1 S	76.3	65.86	4.17	2308	15.1
2 L	79.9	65.94	4.36	2302	14.9
2 M	86.8	61.89	5.05	2052	7.7
2 H	87.2	50.40	6.23	2050	4.8
3 L	86.8	44.65	7.00	2055	4.3
2 S	89.4	42.46	7.58	2054	3.7
3 M	89.8	38.11	8.48	2048	3.3
3 H	90.6	31.97	10.20	2042	2.6
4 L	90.3	30.20	10.76	2051	2.5
3 S	87.4	25.52	12.33	2047	1.9
4 M	86.3	23.94	12.97	2052	1.9
FUEL CONSUMPTION					
3.3.2.1 in selected gear, at maximum power at rated speed					
3 H	81.2	25.38	11.52	2301	2.0
3.3.2.1.1 75 % of pull at maximum power at rated speed					
3 H	63.0	19.02	11.92	2365	1.4
3.3.2.1.2 50 % of pull at maximum power at rated speed					
3 H	42.9	12.73	12.13	2396	1.0
3.3.2.1.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1					
4 L	62.8	19.04	11.88	2248	1.5
3.3.2.1.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2					
4 L	42.6	12.66	12.11	2278	1.0
3.3.2.2 in selected gear nearest to 7.50 km/h at rated speed					
2 H	82.5	42.09	7.06	2301	3.6
3.3.2.2.1 75 % of pull at maximum power at rated speed					
2 H	64.3	31.52	7.34	2367	2.7
3.3.2.2.2 50 % of pull at maximum power at rated speed					
2 H	44.1	21.06	7.54	2404	1.5
3.3.2.2.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1					
3 L	64.6	31.59	7.36	2125	2.8
3.3.2.2.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2					
3 L	44.4	21.06	7.59	2168	1.6

STEYR 9145 a M2 **DLG-Test No. 2000-293**

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
Unballasted	500 mm	80 kPa	80 kPa

Specific fuel consumption	Specific energy	Temperature			Atmospheric conditions		
		Fuel	Coolant	Engine oil	Tempe-rature	Relative humidity	Pressure
g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
330	2.53	57	81	106	14	75	100.0
320	2.62	56	82	107	13	75	100.0
283	2.95	56	82	109	13	75	100.0
280	2.99	58	83	110	16	95	101.0
280	2.98	61	84	111	18	95	101.0
276	3.03	54	82	109	8	95	101.0
275	3.04	54	82	108	11	95	101.0
272	3.07	55	83	109	13	95	101.0
272	3.07	54	81	108	14	95	101.0
283	2.96	54	81	108	15	95	101.0
285	2.94	55	82	108	16	95	101.0
314	2.66	58	83	110	19	75	100.0
357	2.34	58	83	110	18	75	100.0
436	1.92	57	82	109	17	75	100.0
335	2.49	59	82	108	19	75	100.0
407	2.06	57	81	108	18	75	100.0
309	2.71	59	83	111	16	95	101.0
346	2.41	59	82	110	17	95	101.0
410	2.04	59	83	109	16	95	101.0
310	2.70	58	82	108	17	75	100.0
364	2.30	57	81	106	18	75	100.0

4	**OPTIONAL TESTS RESULTS**	**None**
5	**REPAIRS**	**None**
6	**REMARKS**	**None**

Head of tractor test section

Dipl.-Ing. Manfred Lober

Date: 19th Febr. 2001

Deutsche Landwirtschafts-Gesellschaft

Test carried out by

Dipl.-Ing. Bodo Huber



Deutsche Landwirtschafts-Gesellschaft e.V.
Fachbereich Landtechnik - Prüfstelle für Landmaschinen
Max-Eyth-Weg 1, D-64823 Groß-Umstadt
Tel. 0 60 78/96 35-0, Fax 0 60 78/96 35-90
E-mail: Tech@dlg-frankfurt.de, Internet: www.dlg-frankfurt.de