Prüfstelle für Landmaschinen



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

OECD No. 2/2193
1st December 2004

Agricultural Tractor

Massey Ferguson 7465 (HA130)

Manufacturer

AGCO S.A., B.P. 60307, 60026 Beauvais, FRANCE

This is a report on a tractor test in accordance with OECD STANDARD CODE for the Official Testing of Agricultural Tractor Performance (C(2002)17(FINAL) "Red Code", Code 2).

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

Duration of tests: January till May 2004

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: 1st December 2004 OECD No. 2/2193

Remark: The test of the Massey Ferguson 7465 (HA130) tractor was performed with the Massey Ferguson 7480 tractor (DLG-test no.: 2004-056).
Details see section "6. Remarks", page 33.

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[C]	Tractor manufacturer's name and address:	AGCO S.A. ZA n°2 BP 60307, Avenue Blaise Pascal 60026 Beauvais Cedex, FRANCE
[C]	Location of tractor assembly:	60026 Beauvais Cedex, FRANCE
[D]	Submitted for test by:	Manufacturer
[C]	Selected for test by:	Manufacturer with agreement by DLG
[D]	Place of running-in:	Beauvais and Gross-Umstadt
[D]	Duration of running-in:	62 h
[C]	Location of test:	DLG-Testing Station, D-64823 Gross-Umstadt

1 SPECIFICATIONS OF TRACTOR

1.1 Identification

1.1.1

[C]	- Make:	Massey Ferguson
[C]	- Model:	7465 (HA130)
[C]	- Type:	4WD, wheel tractor, unit construction

1.1.2 Numbers

[D]	- 1st serial No.:	M008039
[C]	- Serial No.:	M309065

1.1.3 Other specifications:

[C]	- Transmission version:	DynaVT, 40 km/h
[D]	- Engine version:	exhaust emission according to TIER2, EPA and guideline 2000/25/EG
[D]	- Technical type number:	F35

1.2 Engine

[C]	- Make/Model/Type:	PERKINS / 1106C-E60TA / 2366/2200 water-cooled 4-stroke Diesel-engine, direct injection, supercharged and intercooler (air to air),
[C]	- Serial No.:	U092650K

1.2.1	Cylinders	
[C]	- Number/disposition:	6 / vertical in line
[D]	- Bore/stroke:	100 mm / 127 mm
[D]	- Capacity:	5985 cm^3
[D]	- Compression ratio:	17.5 ± 1 : 1
[D]	- Arrangement of valves:	Overhead valves, 2 per cylinder
[D]	- Cylinder liners:	Wet
1.2.2	Supercharging	
[D]	- Make / Model / Type:	GARRETT / PN 2674A349 / exhaust driven supercharger with air to air intercooler
[D]	- Pressure	Max. 140 kPa
1.2.3	Fuel system	
[D]	- Fuel feed system:	1 diaphragm fuel supply pump
	- Fuel filter	
[D]	Make/Model:	STANADYNE / fuel manager
[C]	Type :	2 replaceable paper element filter
[D]	- Capacity of fuel tank:	270 dm^3
	- Injection pump	
[D]	Make/Model:	BOSCH / VP 30 - 00470006002
[D]	Type:	Rotary
[D]	Serial no.:	760454957
[C]	Manufacturer's production setting:	Standard: 65 ± 3 (boosted: 69 ± 3) mm^3/stroke at full load and rated speed;
[C]	Flow rate:	Standard: 25 ± 0.8 (boosted: 26 ± 0.8) dm^3/h at 2200 min^{-1} and full load
[D]	Timing:	electronically controlled
	- Injectors	
[D]	Make/Model:	BOSCH / 2645 F027
[D]	Type :	Multi hole
[D]	Injection pressure:	25 ± 0.5 MPa
1.2.4	Governor	
[D]	- Make/Model/Type:	PERKINS / - / electronically driven all speed governor
[C]	- Governed range of engine speed:	800 to 2300 min^{-1}
[C]	- Rated engine speed:	2200 min^{-1}

1.2.5	Air cleaner		
	- Pre-cleaner		
[C]	Make/Model:	DONALDSON / -
[C]	Type:	Cyclone, aspirated, pre-cleaner integrated in housing of main cleaner
[C]	Location of air intake:	on the superior hood
	- Main cleaner		
[C]	Make/Model:	DONALDSON / -
[C]	Type:	Dry paper element filter with additional safety cartridge
[C]	- Maintenance indicator:	Warning light on dashboard
1.2.6			
	Lubrication system		
[D]	- Type of feed pump:	Gear pump
[D]	- Type of filter:	Full flow, replaceable cartridge
[D]	- Number of filters:	1
1.2.7			
	Cooling system		
[C]	- Type of coolant:	Water-anti-freeze mixture
[C]	- Type of pump:	Centrifugal pump
[C]	- Specification of fan	BWCS viscous drive fan, ring fan, belt driven, variable fan speed controlled by air flow temperature
[C]	Number of fan blades:	7
[C]	Fan diameter:	560 mm
[D]	- Coolant capacity:	28.5 dm^3
[D]	- Type of temperature control:	Calorstat
	- Superpressure system:	100 kPa

1.2.8	Starting system	
[D]	- Make/Model/Type:	ISKRA / AZF / electrical, solenoid pre-engaged drive starter motor
[D]	- Starter motor power rating:	3 kW
[C]	- Cold starting aid:	Flame glow plug in air intake manifold (Thermostart)
[C]	- Safety device:	Starter only operating when clutch pedal depressed
1.2.9	Electrical system	
[C]	- Voltage:	14 V, negative earth
	- Generator:	
[C]	Make/Model/Type:	ISKRA / AAK 5193 / 3-phase alternator
[D]	Power:	1.6 kW
[C]	- Battery:	2 lead acid battery, 12 V / 420 Ah rating at 20 hours
1.2.10	Exhaust system	
[C]	- Make/Model/Type:	AGCO S.A. / 0040 / absorption-reflection type silencer, round 168 mm dia, 1340 mm long
	- Location:	Vertical stack at right A-post of cab, mouth showing upward / forward to the right
1.2.11	Operating hours meter:	Electronic, counts real hours when engine is running

1.3 Transmission

1.3.1		
[D]	Clutch	No clutch in usual sense, pedal fitted, controls the oil flow in hydrostatic drive by valve

1.3.2 Gear box

[D]	- Make:	FENDT
[D]	- Model:	ML 130
[D]	- Type:	Continue variation transmission with variable power branching in a hydrostatic and a mechanic branch
[D]	- Power flow:	From crankshaft via torsional-vibration damper and primary shaft to the planetary-gear carrier of via the internal gear to the hydrostatic part, and via the sun gear to the mechanical part; both power branches are rejoint on a summation shaft and transmitted by a 2 step range gear to the rear axle
[D]	- Hydrostatic branch:	Acts as travel clutch, as infinitely variable gearbox and as reversing gear; is composed of a variable displacement axial-piston pump and an adjustable axial-piston motor; the axial-piston pump, driven by internal gear of planetary gear train, is hydrostatically coupled to the axial-piston motor; both are adjusted in common according to the following scheme

Travel speed	Displacement angle [°]	
	pump	motor
Min	0	45
Max	45	0

[D]	- Mechanical branch:	Consists of planetary gear train and of 2-step range gear (primary shaft of range gear simultaneously serves as summation shaft); the sun gear of planetary gear train propels the summation shaft; electromechanical change of travelling ranges at travelling speed below 2 km/h by push button

range		travel speed [km/h]	
		forward	reverse
I "turtle"	heavy use	0-28	0-18
II "rabbit"	fast transport	0-40	0-19

[D]	- Operation:	Power shuttle (located to the left of steering wheel) which controls following functions: - declutching gearbox in position "neutral" - quick reversing (change of driving direction) - the operating speed of gear ratio change may be varied in 4 steps - continuous change of transmission ratio - forward and reverse Hand lever in the right armrest which controls following functions: - continuous change of transmission ratio - forward and reverse Buttons and switches in the right armrest and the right panel which control following functions - automatic control of travelling speed (cruise control) - change of range turtle-rabbit - engine under-speed supervisor - Various control modes
[D]	- Available options (not fitted):	Transmission version DynaVT, 50 km/h
[C]	- Lubrication:	Oil circuit in common with rear axle drive, ar-oil cooler in front of engine water cooler; 1 oil filter in suction line 1 oil filter in pressure line

1.3.3 Rear axle and final drives

[D]	- Make/Model/Type:	FENDT / HA130 / bevel gear drive with bevel gear differential and planetary final drives
	- Differential lock:	
[D]	Type:	Multi-plate lock
[C]	Method of engagement/ disengagement:	Electro-hydraulically operated by switch, disengaged when brakes are actuated; indicator light

1.3.4	Front axle and final drives	
[C]	- Make/Model/Type:	CARRARO / 20.29S / 4WD axle, transmission via wet multi-plate clutch, shaft in median plane of tractor, bevel gear drive, differential with lock, planetary final drives ; clutch electro-hydraulically operated by non locking push button; suspended axle with hydro-pneumatic suspension, levelling control (suspension stroke ± 45 mm); suspension switchable to on-off by push buttons electro-hydraulically;
	- Differential lock:	
[D]	Type:	Wet multi plate lock and additional limited slip multi plate lock
[D]	Method of engagement/ disengagement:	In common with rear axle differential lock, respectively automatic
1.3.5	Total ratios and travelling speeds:	Not applicable, ranges specified in 1.3.2
[D]	Number of revolutions of front wheels for one revolution of rear wheels:	1.327

1.4 Power take-off

1.4.1	Main power take-off	
[C]	- Type:	Independent
[C]	- Method of engagement:	Driven by wet multi-plate clutch with 178 mm dia, electro-hydraulically operated by push buttons; engagement speed controlled by actuation time of push button; additional remote control of p.t.o. clutch on rear mudguards
[C]	- Number of shafts:	1
[C]	- Method of changing power take-off shaft ends and speeds:	Flanged stub shaft, changeable; 3 speeds may be selected by push-button electro-hydraulically

1.4.1.1 Power take-off proportional to engine speed, 540 , 540E*) or 1000 min^{-1} p.t.o.
*) 540E: Economic type p.t.o. for reduced engine speed

[C] - Location: At rear of tractor

[C] - Diameter of p.t.o. shaft end: 35 mm

[C] - Number of splines: 6 (540, 540E min^{-1}) in conformity with ISO 500:1991, type 1
21(1000 min^{-1}) in conformity with ISO 500:1991, type 2

[C] - Height above ground: 810 mm

[C] - Distance from the median plane of the tractor: 0 mm

[C] - Distance behind rear wheel axis: 490 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
[D]	540	3.82	540 576	2062 2200	75 kW	not specified
[D]	540E	2.94	540 748	1588 2200	75 kW	not specified
[D]	1000	2.03	1000 1083	2030 2200	not specified	

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

1.4.1.2

[D] Power take-off proportional to ground speed: None

1.4.2

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

1.5 Hydraulic power lift

[C] - Make/Model: AGCO / -

[C] - Type: electronic-hydraulic power lift at rear, desintegrated construction

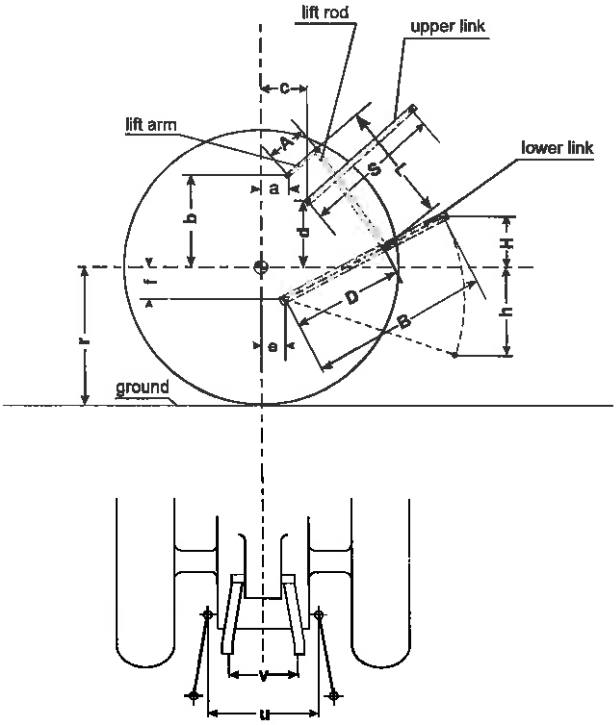
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[C]	- Hydraulic system:	Closed, load sensing, pressure and flow compensated system; supplies rear and front power lift including additional control valves, steering system and height-control of front axle suspension
[C]	- Rear power lift:	external push buttons left and right on rear mudguards; draft, position and intermixable control; floating position, fast raising (switch with transport lock and button for "vibration damping"), raise limit, lowering throttle, lower link sensing
[C]	- Front power lift:	Optional, not fitted to tractor tested
[C]	- Type and number of cylinders:	2 external cylinders, double acting, 100/90 mm bore, 247 mm stroke, 40 mm piston rod diameter
[C]	- Type of linkage lock for transport:	Hydraulic, lowering throttle
[D]	- Relief valve pressure setting:	20.0 + 1.0 MPa
[D]	- Opening pressure of cylinder safety valve:	23.0 + 1.9 MPa
	- Lift pump:	
[D]	- Make:	REXROTH
[D]	- Model:	A10VO45 DFR1/52 R
[D]	- Type:	Variable displacement axial-piston pump
[D]	- Transmission between pump and engine:	Independently driven by gear box
[C]	- Type and number of filters:	1, exchangeable filter in return line
[D]	- Site of oil reservoir:	Separate oil reservoir with 100 dm³ volume on left hand side below cab floor
[C]	- Type, number and location of tapping points:	4 double acting, quick-action coupler-pairs at rear of tractor with adjustable flow control
[D]	- Maximum volume of oil available to external cylinders:	60 dm³

1.6 Three-point linkage:

1.6.1 Three-point linkage at rear:

[C]	- Category:	2, in conformity with ISO 730-1/1994 + Cor. 1:1995
[C]	- Category adapter:	Adjustment of Cat. 3 possible



	Dimensions of rear implement linkage			Projected lengths in mm			
				Dimensions	Settings used in test-page		
					28	31	32
[C]	Rear tyres 650/65 R 38 Front tyres 540/65 R 28		(r) *) (r') *)		855 670		
[C]	Length of lift arms		(A)		355		
[C]	Length of lower links		(B)		1030		
[C]	Distance of lift arm pivot points from rear wheel axis	horizontal vertical	(a) (b)		165 305		
[C]	Horizontal distance between the 2 lower link pivot points		(u)		470		
[C]	Horizontal distance between the 2 lift arm end points		(v)		535		
[C]	Length of upper link		(S)	from 670 to 960	810	790	795
[C]	Distance of upper link pivot point from rear wheel axis	horizontal vertical	(c) (d)	400 / 370 / 350 215 / 275 / 325	400 215	400 215	350 325
[C]	Distance of lower link pivot points from rear wheel axis	horizontal vertical	(e) (f)		145 255		
[C]	Distance of lower link pivot points from lift rod pivot points on lower links		(D)	600 / 665	665	600	665
[C]	Length of lift rods		(L)	from 665 to 790	760	710	665

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

[C]	Length of lift rods	(L)	665	790	760	710	665
[C]	Linkage distance of lift rods	(D)	600 / 665		665	600	665
[C]	Lowest position	(h)	545/465	855/710	655	620	480
[C]	Highest position	(H)	210 / 215	15 / 25	80	155	215
[C]	Transport position	(H')	210 / 215	15 / 25	80	155	215

*) Assuming r resp. r' = tyre dynamic radius index

1.6.2 [C]	Three-point linkage at front:	Not fitted	
1.7	**Swinging drawbar**		
[C]	- Type:	Longitudinally adjustable in five steps	
[C]	- Height above ground		530 mm
[C]	- Type of adjustment:		
[C]	- Distance of hitch point from rear wheel axis	Horizontal:	750 / 850 / 1010 / 1060 / 1160 mm
[C]	- Distance of hitch point from p.t.o. shaft end	Vertical: Horizontal:	280 mm 260 / 360 / 520 / 570 / 670 mm
[C]	- Lateral adjustment (centre of clevis)	Right/left hand side:	240 mm
[C]	- Distance of pivot point from rear-wheel axis, horizontally:		30 mm
[C]	- Diameter of drawbar pin hole:		33 mm
[D]	- Maximum permissible vertical load:		18 kN
1.8	**Trailer hitch**		
[C]	- Make/Model/Type:	SCHARMUELLER / 1120/2 / automatic	
[C]	- Pin diameter:		38 mm
[C]	- Height above ground:	Centre of clevis adjustable in 5 steps to	845, 885, 925, 965, 1005 mm
[C]	- Distance of hitch point from rear wheel axis, horizontally:		690 mm
[C]	- Distance of hitch point from power take-off shaft end		
	vertically:	above	35, 75, 115, 155, 195 mm
	horizontally:		200 mm
[D]	- Maximum permissible vertical load:		2500 kg
1.9	**Holed drawbar**	Optionally available, not fitted	

1.10	**Steering**	
[D]	- Make/Model/Type:	DANFOSS/ OSPC 160 ON + OVR / hydrostatic steering, acting on front wheels
[C]	- Method of operation:	By steering wheel and cylinder directly acting on steering levers
[D]	Pump:	Gear pump with 35.4 dm³/min delivery at rated engine speed (only if delivery of axial-piston pump of hydraulic circuit is ordered by control valves)
[D]	Ram:	1 integrated ram (symmetrical design) acting on steering levers; 270 mm stroke,70 mm bore and 38 mm dia of piston rod
[D]	- Working pressure:	15.0 MPa
1.11	**Brakes**	
1.11.1	Service brake	
[D]	- Make/Model/ Type:	FENDT & KNOTT / - / Pedal operated combined muscle / power braking system acting on both axles
	Rear axle brake:	Muscle power brake, 1 wet multi disc brake with 5 discs with 222 mm diameter each on left and right differential half shafts
	Front axle brake:	Power braking system, controlled by relay valve in brake circuit, hydraulically operated; 1 wet multi disc brake on drive shaft to front axle; 5 discs with 222 mm dia
[C]	- Method of operation:	Pedal operated, hydraulic transmission
[C]	-Trailer braking take-off:	None
1.11.2	Parking brake	
[D]	- Type:	Mechanical brake, acting on rear axle
[C]	- Method of operation:	Operated by lever

1.12 Wheels

[C] - Number

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

[C] - Wheelbase: 2780 mm

[D] - Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	1840	1984	reversing the wheels
Rear	1566	1896	reversing the wheels

1.13 Protective structure

[C] - Make/Model/Type: MASSEY FERGUSON / 6003 S3 / Cab

[C] - Manufacturer's name and address: AGCO S.A., ZA N°2 BP 60307
Avenue Blaise Pascal, 60026 Beauvais Cedex
FRANCE

- Protective device

[C] Cab: Safety cab with integrated safety frame; welded and screwed profile steel tube construction, mounted on antivibration silent blocks; 1 door and 3 steps each at the left and right side; rear window, roof hatch and side window to open; water-heating, ventilation system, air conditioner

[C] Tiltable / not tiltable: Not tiltable

- OECD approval

[D] Approval number: 4/0 765

[D] Date of approval: March 11th, 2003

[D] Nos. minor modification certificates, if any: 1

1.14 Seat

1.14.1	Driver's seat	Fitted to tractor
[C]	- Make/Model:	Grammer / MSG 95 AL / 741
[C]	- Type:	Air suspended upholstered seat with backrest and armrests
[C]	- Seat and steering wheel reversible:	No
[C]	- Type of suspension:	Pneumatic
[C]	- Type of damping:	Hydraulic
	- Range of adjustment	
[C]	Longitudinal:	200 mm
[C]	Vertical:	400 to 620 mm
[C]	- Safety belt:	No
1.14.2	Optional driver's seats	
[D]	- Make/Model/Type:	Grammer / MSG 85/731; MSG 95A/731 / mechanical suspension or pneumatic suspension
1.14.3 [C]	Passenger seat:	Optional, fitted to tractor tested

1.15 Lighting

Electrical, 12 Volt, according to EEC legislation

		Height above ground of centre mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
[C]	Headlights	1270	Ø 120	190
[C]	Side Lights	2010	110 x 30	1025
[C]	Rearlights	1880	Ø 110	1090
[C]	Reflectors, 1st pair	1850	Ø 55	887
	2nd pair	625	50 x 100	770

2. TEST CONDITIONS

2.1 Overall dimensions

	Length mm	Width (track width as in 2.5) mm	Height at top of protective structure mm	 exhaust silencer pipe mm
Unballasted	4720	2510	2645	2958

2.2 Ground clearance

420 mm

- Clearance-limiting part: Bracket of swinging drawbar

2.3 Tractor mass

- Unballasted (with cab)

	Without driver kg	With driver kg
Front	2620	2645
Rear	4110	4160
Total	6730	6805

2.4 Track specifications

Not applicable

2.5 Tyres and track widths specifications

	Front	Rear
Tyres:	Kleber Super11L	
- Dimensions	540/65 R 28	650/65 R 38
- Load index speed index	142 A8	157 A8
- Type	radial	radial
- Maximum load (tyre manufacturer's)	26.50 kN*)	41.25 kN*)
- Maximum load (tractor manufacturer's)	26.50 kN	41.25 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
Chosen track width:	1840 mm	1896 mm

*) With other tyres higher load capacity possible

2.6 Fuel

- Type: ARAL-Diesel-fuel, in conformity with DIN 51601
- Density at 15°C: At p.t.o. tests 0.8269 g/cm³
  at drawbar power tests 0.8259 g/cm³

2.7 Oils and lubrication

2.7.1 Capacity and change interval

	Capacity dm³	Oil change h	Filter-change h
Engine	14.5	400	400
Gear box and rear axle	45	1200	400
Front axle	8.5	800	-
Rear axle	in common with gearbox		
Final drives (front each)	1.5	800	-
Final drives rear (each)	10	1200	-
Hydraulic system	100	1200	1200

2.7.2 Specifications:

	Specified	Used during test
Engine Type	BP Full-Year Engine oil	BP
Viscosity	SAE 10W/30, 10W/40 SAE 15W/30 or 15W/40	10W/40
Classification	API-CH4	API-CH4
Gearbox Rear axle drive Type	BP Super-Tractor-Oil-Universal STOU	BP
Viscosity	SAE 10W/40, 15W/40	10W/40
Classification	API-GL4	API-GL4
Rear axle final drives Type	BP Hypoid-Gear-Oil	BP
Viscosity	SAE 85W/90	85W/90
Classification	API-GL5	API-GL5
Front axle drive Front axle final drives Type	BP Hypoid-Gear-Oil	BP
Viscosity	SAE , 85W/140	85W/140
Classification	API-GL5	API-GL5
Hydraulic system Type	BP STOU	BP
Viscosity	SAE 10W/40	10W/40
Classification	API-CH4	API-CH4

2.7.3 Grease Multi purpose grease TERRAC CHARGE

- Number of lubrication points: 17

3 COMPULSORY TESTS

3.1 Main power take off performance

Date of tests: 2004-01-29
Location of tests: DLG-Testing Station Groß-Umstadt
Type of dynamometer: SCHENCK hydraulic dynamometer U1-40

Power	Speed			Fuel consumption			Specific
	Engine	P.t.o.	Fan	hourly		specific	energy
kW	min^{-1}	min^{-1}	min^{-1}	kg/h	dm^3/h	g/kWh	kWh/dm^3

Maximum power

3.1.1 At 2-hour test

79.4	1800	885	2032	19.82	23.97	250	3.31

3.1.2 At rated speed

72.1	2199	1081	2325	20.79	25.14	288	2.87

3.1.3 At standard p.t.o. speed

76.4	2034	1000	2238	20.42	24.69	267	3.09

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

72.1	2199	1081	2325	20.79	25.14	288	2.87

3.1.4.2 85% of the torque obtained in 3.1.4.1

61.8	2217	1090	2288	18.72	22.64	303	2.73

3.1.4.3 75% of the torque defined in 3.1.4.2

46.8	2239	1101	2281	15.50	18.74	331	2.50

3.1.4.4 50% of the torque defined in 3.1.4.2

31.6	2260	1111	2239	12.88	15.58	408	2.03

3.1.4.5 25% of the torque defined in 3.1.4.2

15.9	2278	1120	2055	9.44	11.42	594	1.39

3.1.4.6 unloaded

-	2297	1129	2028	6.85	8.28	-	-

Power	Speed		Fan	Fuel consumption			Specific energy
	Engine	P.t.o.		hourly		specific	
kW	min^{-1}	min^{-1}	min^{-1}	kg/h	dm^3/h	g/kWh	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

76.4	2034	1000	2238	20.42	24.69	267	3.09

3.1.5.2 85% of the torque obtained in 3.1.5.1

65.1	2040	1003	2093	18.51	22.38	284	2.91

3.1.5.3 75% of the torque defined in 3.1.5.2

49.3	2065	1015	2113	14.85	17.96	301	2.75

3.1.5.4 50% of the torque defined in 3.1.5.2

33.3	2087	1026	2054	11.75	14.21	353	2.34

3.1.5.5 25% of the torque defined in 3.1.5.2

16.8	2107	1036	1982	8.83	10.68	526	1.57

3.1.5.6 unloaded

-	2129	1046	1954	5.35	6.47	-	-

OPTIONAL RESULTS

Power	Speed		Fan	Fuel consumption			Specific energy
	Engine	P.t.o.		hourly		specific	
kW	min^{-1}	min^{-1}	min^{-1}	kg/h	dm^3/h	g/kWh	kWh/dm^3

3.1.6 Part loads at different engine speeds

3.1.6.1 maximum power at rated engine speed

72.1	2199	1081	2325	20.79	25.14	288	2.87

3.1.6.2 80% of power obtained in 3.1.6.1 at max. speed setting

57.6	2223	1093	2263	18.05	21.83	313	2.64

3.1.6.3 80% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed

57.8	1981	974	2120	16.19	19.58	280	2.95

3.1.6.4 40% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed

28.9	1973	970	1893	10.15	12.27	351	2.35

3.1.6.5 60% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed

43.2	1318	648	1509	11.11	13.44	257	3.22

3.1.6.6 40% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed

28.9	1318	648	1512	7.73	9.35	267	3.09

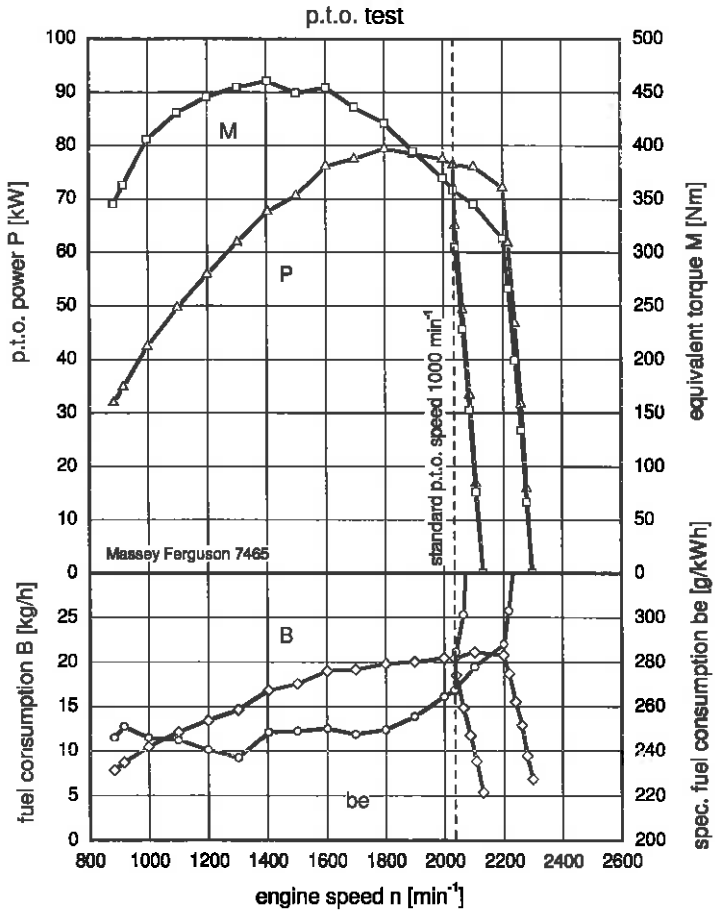
No load maximum engine speed:	2297	min^{-1}
Equivalent flywheel torque at rated engine speed:	313	Nm
Equivalent flywheel torque at 2-hour test:	421	Nm
at engine speed:	1800	min^{-1}
Maximum equivalent flywheel torque:	461	Nm
at engine speed:	1403	min^{-1}

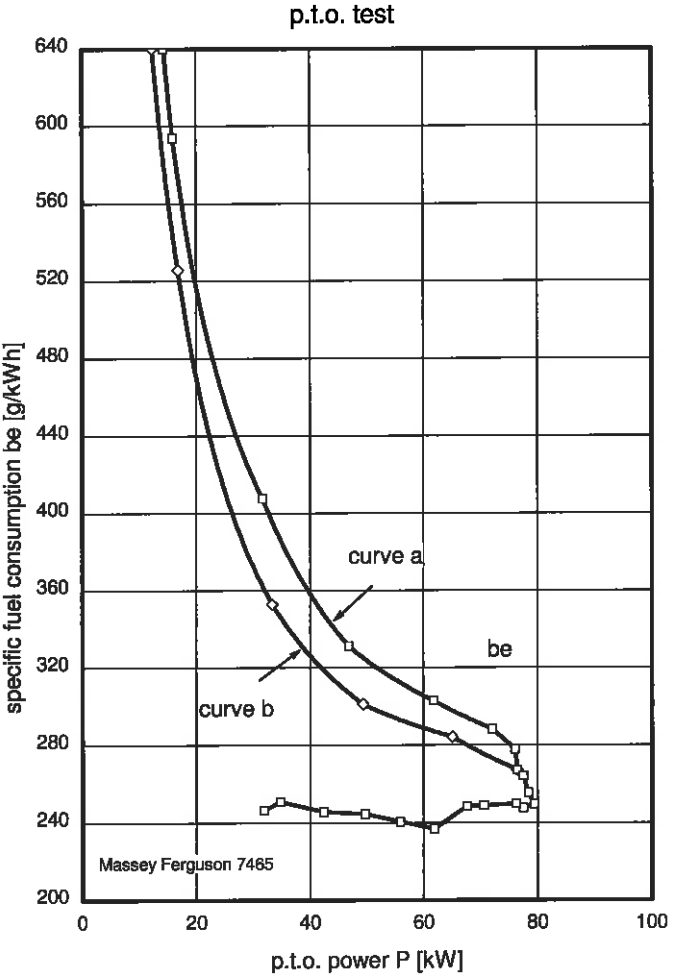
Mean atmospheric conditions

temperature:	19	°C
pressure:	98.0	kPa
relative humidity:	28	%

Maximum temperatures

coolant:	73	°C
oil:	117	°C
fuel:	55	°C
air intake:	19	°C


p.t.o. test
p.t.o. power P [kW]
equivalent torque M [Nm]
fuel consumption B [kg/h]
spec. fuel consumption be [g/kWh]
engine speed n [min-1]
M
P
B
be
standard p.t.o. speed 1000 min-1
Massey Ferguson 7465
100
90
80
70
60
50
40
30
20
10
0
500
450
400
350
300
250
200
150
100
50
0
25
20
15
10
5
0
300
280
260
240
220
200
800
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
p.t.o. power P [kW]
curve a
be
curve b
Massey Ferguson 7465

3.2 HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 25th February 2004

3.2.1 Hydraulic power test

3.2.1.1 Hydraulic fluid data

- Hydraulic fluid type: STOU
- Viscosity index (ISO 3448+Corr 1:1993): SAE 10W/40
- Viscosity at 65 °C: 34 cst

3.2.1.2 Compulsory Reporting (Test Results):

	Pressure	Reservoir oil Temperature °C (65 °C traget)		Engine speed	Flow rate	Power
		Min.	Max.			
	MPa	°C	°C	min^{-1}	l/min	kW
Rated Engine Speed *(Manufacturers Specification)*	-	-	-	2200	-	-
3.2.1.2.1 Maximum (sustained) pressure with relief valve open as measured at the coupler Pump stalled: No	20.1	63	72	2259	-	-
3.2.1.2.2 Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power	18.1	69 [1)] 72 [2)]		2273 [1)] 2260 [2)]	68.9 [1)] 107.0 [2)]	20.8 [1)] 32.3 [2)]
3.2.1.2.3 Maximum available flow and maximum power from one coupler pair	3.7 15.9	63 68		2291 2266	104.3 101.8	- 27.0
3.2.1.2.4 Maximum available flow and maximum power from coupler pairs operating simultaneously (flow through two or more coupler pairs if required)	1.6 18.5	63 68		2292 2260	119.9 106.1	- 32.6

- Tapping point used for test: At rear of tractor, [1)] 1 double acting control valve
  [2)] 2 double acting control valves parallel connection

3.2.2 Power lift test at rear power lift – Category 2

Linkage settings for test - see on page 14

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	200 mm	
Vertical movement without lifting forces	735 mm	912 mm
with lifting forces	728 mm	788 mm
Max. corrected force exerted through full range	57.15 kN	53.55 kN
Corresponding pressure	18.0 MPa	
Moment about rear axle	67.15 kNm	95.59 kNm
Max. tilt angle of mast from vertical	-	7°

Lifting heights relative to horizontal lower links												
mm	-400	-300	-200	-100	0	+100	+200	+300	+328	+388		
Lifting forces at hitch points, corrected to 18.0 MPa												
kN	57.15	60.75	63.90	67.95	71.55	75.60	77.85	76.50	75.15			
Lifting forces at standard frame, corrected to 18.0 MPa												
kN	53.55	55.80	58.05	59.85	62.10	63.00	63.45	61.20		56.25		

3.3 DRAWBAR POWER TEST (unballasted tractor)

Date of tests: 16th March 2004
Type of track: Concrete

	Height of drawbar above ground	Tyre inflation pressure Front	Tyre inflation pressure Rear
Unballasted	560 mm	80 kPa	80 kPa

3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)

Gear number and range	Power kW	Drawbar pull kN	Speed km/h	Engine speed min^{-1}	Slip of wheels %	Fan speed min^{-1}	Specific fuel consumption g/kWh	Specific energy kWh/dm³	Temperature Fuel °C	Temperature Coolant °C	Temperature Engine oil °C	Atmospheric conditions Temperature °C	Atmospheric conditions Relative humidity %	Atmospheric conditions Pressure kPa
I	47.4	62.71	2.72	2218	14.9	2254	408	2.03	45	64	113	18	43	101.4
I	57.4	63.65	3.25	2114	15.3	2204	371	2.22	45	64	112	19	43	101.5
I	64.3	63.53	3.64	1801	9.1	1981	315	2.62	43	63	112	18	44	101.4
I	67.0	49.32	4.89	1801	4.5	2006	301	2.75	43	63	112	18	46	101.4
I	66.7	39.36	6.10	1800	2.7	1942	300	2.75	39	59	108	15	55	101.5
I	66.5	32.26	7.42	1801	2.5	1938	302	2.73	40	59	110	16	54	101.5
I	65.9	26.45	8.97	1800	1.8	1994	305	2.71	41	62	111	17	50	101.4
I	65.2	22.18	10.58	1801	0.9	2002	307	2.69	42	63	113	17	49	101.4
I	64.2	19.68	11.74	1803	0.6	2010	313	2.64	43	64	114	17	49	101.4
I	63.4	16.80	13.58	1802	0.6	2014	318	2.60	44	64	114	16	50	101.4
II	65.6	32.90	7.16	1801	2.2	2024	306	2.70	44	65	114	17	47	101.4
II	66.1	27.88	8.53	1801	1.6	2017	304	2.72	44	64	113	18	45	101.4
II	66.1	22.62	10.52	1802	1.1	2019	304	2.72	45	64	113	18	44	101.4
II	66.0	19.79	12.01	1805	0.8	2019	305	2.70	45	64	114	18	44	101.4
II	65.2	17.37	13.51	1807	0.5	2026	310	2.66	45	65	114	17	45	101.4

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Gear number and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Fan speed	Specific fuel consumption	Specific energy	Temperature			Atmospheric conditions		
									Fuel	Coolant	Engine oil	Tempe-rature	Relative humidity	Pressure
	kW	kN	km/h	min^{-1}	%	min^{-1}	g/kWh	kWh/dm³	°C	°C	°C	°C	%	kPa
	FUEL CONSUMPTION													
3.3.2.1	In selected gear, at maximum power at rated speed													
I	61.0	35.35	6.21	2201	2.5	2284	348	2.38	48	65	114	21	41	101.3
3.3.2.1.1	75 % of pull at maximum power at rated speed													
I	46.8	26.46	6.37	2229	1.6	2202	380	2.17	47	62	112	21	40	101.3
3.3.2.1.2	50 % of pull at maximum power at rated speed													
I	31.9	17.64	6.51	2250	0.7	2256	454	1.82	48	62	113	22	38	101.3
3.3.2.1.3	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1													
I	47.0	26.46	6.40	1872	1.8	2027	328	2.51	47	62	111	21	40	101.3
3.3.2.1.4	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2													
I	31.9	17.62	6.53	1887	0.7	1996	380	2.17	45	60	107	21	39	101.3
3.3.2.2	In selected gear nearest to 7.50 km/h at rated speed													
I	60.1	28.84	7.50	2202	1.6	2311	353	2.34	46	65	116	20	42	101.4
3.3.2.2.1	75 % of pull at maximum power at rated speed													
I	45.8	21.59	7.64	2228	0.8	2324	390	2.12	47	63	115	20	42	101.4
3.3.2.2.2	50 % of pull at maximum power at rated speed													
I	31.0	14.33	7.79	2249	0.2	2306	470	1.76	46	62	113	20	43	101.4
3.3.2.2.3	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1													
I	45.7	21.55	7.64	1894	0.9	2063	337	2.45	46	61	110	20	42	101.4
3.3.2.2.4	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2													
I	31.1	14.35	7.81	1913	0.1	2020	393	2.10	44	60	108	20	41	101.4

4 ADDITIONAL TESTS under the responsibility of the DLG Testing Station

Not covered by the approval.

4.1 Power lift test at rear power lift - Category 3

Linkage settings for test - see on page 14

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	230 mm	
Vertical movement without lifting forces	780 mm	882 mm
with lifting forces	762 mm	870 mm
Max. corrected force exerted through full range	52.20 kN	45.00 kN
Corresponding pressure	18.0 MPa	
Moment about rear axle	61.34 kNm	84.34 kNm
Max. tilt angle of mast from vertical	-	12°

Lifting heights relative to horizontal lower links												
mm	-452	-370	-300	-200	-100	0	+100	+200	+300	+392	+400	+500
Lifting forces at hitch points, corrected to 18.0 MPa												
kN		52.20	54.45	58.50	62.10	66.15	70.65	74.25	76.50	74.25		
Lifting forces at standard frame, corrected to 18.0 MPa												
kN	45.00	47.25	48.60	50.85	52.65	54.00	55.80	56.70	57.15		54.90	50.40

4.2 Power lift test at rear power lift - Maximum Lifting Force (short lift rods)

Linkage settings for test - see on page 14

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	375 mm	
Vertical movement without lifting forces	689 mm	835 mm
with lifting forces	676 mm	805 mm
Max. corrected force exerted through full range	63.90 kN	56.70 kN
Corresponding pressure	18.0 MPa	
Moment about rear axle	75.08 kNm	101.21 kNm
Max. tilt angle of mast from vertical	-	12°

Lifting heights relative to horizontal lower links												
mm		-224	-200	-100	0	+100	+200	+300	+400	+452		
Lifting forces at hitch points, corrected to 18.0 MPa												
kN		63.90	64.80	68.40	72.00	76.05	80.55	83.70	84.15	81.45		
Lifting forces at standard frame, corrected to 18.0 MPa												
kN	56.70		58.05	59.85	61.20	64.60	63.90	64.60	63.90		60.30	56.70

5 REPAIRS **None**

6 REMARKS

The engine of the tractor Massey Ferguson 7465 (HA130) has two different injection pump characteristics.

- **Standard**, for heavy drawbar work (forward speeds below 15 km/h) and also for PTO-operation with standing tractor or forward speed below 8 km/h

- **Power boosted**, for transport work at forward speeds higher than about 15 km/h and for PTO work at forward speeds higher than about 8 km/h. In this mode the maximum fuel injection at high engine speeds is increased.

The electronic engine control device of the 7480 model was replaced by the 7465 (HA130) module and all relevant measurements were repeated. All other specifications of the models 7480 and 7465 (HA130) are identical, except the number of fan blades of the cooling system. The model MF 7480 is equipped with a nine blade fan. The model MF 7465 (HA130) is equipped with a seven blade fan.

Head of Vehicle Technology

Dipl.-Ing. (FH) Ottmar Degrell

Test carried out by

Dipl.-Ing. (FH) Thomas Feuerstein

Date: 29th March 2005



Wir setzen Maßstäbe

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