Prüfstelle für Landmaschinen



OECD No. 2/2197/1
Date of Approval: 1st December 2004
Date of Approval -Extension-: 09th May 2005

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

Agricultural Tractor

Massey Ferguson 7490

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: December 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. 2/2197

For the extension report:

Date of Approval: 09th May 2005
No. of Approval: 2/2 198/1

The manufacturer requested an extension report because:

The manufacturer offers the MF 7490 as a stepless version and for special markets also as a stepshift version. In case of a stepshift version the continuously variable transmission of the tractor MF 7490 has been modified into a gear box with stepshifts by a special electronic control unit. The driver can change the transmission ratio from step to step by the hand lever in the armrest or by power shuttle (located to the left of steering wheel).

The specifications of the tractors are the same. Only the software of the gear box is different. All the test results of OECD test report 2/2197 are valid for the extended model.

Remark: The test of the Massey Ferguson 7490 tractor was performed with the Massey Ferguson 7495 tractor (DLG test no.: 2004-008).
Details see section "6. Remarks", page37.

Statement

The information opposite each item has been validated by the Testing Station. An item marked [C] indicates to the test report user that the information declared by the manufacturer has been checked; an item marked [D] indicates that the manufacturer's declaration has been endorsed.

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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 28
3.2	Hydraulic power and lifting force	29 and 30
3.3	Drawbar power and fuel consumption of unballasted tractor	31 and 32
4	ADDITIONAL TESTS	33
4.1	Drawbar power and fuel consumption of unballasted tractor with dual wheels	33 to 35
4.2	Power Lift Test with short lift rods (maximum lift capacity)	36
5	REPAIRS	37
6	REMARKS	37

[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:	68 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:	7490
[C]	- Type:	4WD, wheel tractor, unit construction

1.1.2 Numbers

[D]	- 1st serial No.:	M153001
[C]	- Serial No.:	M153001

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:	Y35

1.2 Engine

[C]	- Make/Model/Type:	SISU DIESEL / 66.253 ETA / water-cooled 4-stroke Diesel-engine, direct injection, supercharged and intercooler (air to air),
[C]	- Serial No.:	M20369

1.2.1	Cylinders	
[C]	- Number/disposition:	6 / vertical in line
[D]	- Bore/stroke:	108 mm / 120 mm
[D]	- Capacity:	6596 cm^3
[D]	- Compression ratio:	18.5 ± 1 : 1
[D]	- Arrangement of valves:	Overhead valves, 2 per cylinder
[D]	- Cylinder liners:	Wet
1.2.2	Supercharging	
[D]	- Make / Model / Type:	BORG WARNER / S200 / exhaust driven supercharger with air to air intercooler
[D]	- Pressure	Max. 160 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:	380 dm^3
	- Injection pump	
[D]	Make/Model:	BOSCH / VP 30 – VE60470 006 004
[D]	Type:	Rotary
[D]	Serial no.:	33.760.454.957
[C]	Manufacturer's production setting:	Standard: 91 ± 3 (boosted: 95 ± 3) mm^3/stroke at full load and rated speed;
[C]	Flow rate:	Standard: 36 ± 0.8 (boosted: 37 ± 0.8) dm^3/h at 2200 min^{-1} and full load
[D]	Timing:	electronically controlled
	- Injectors	
[D]	Make/Model:	STANADYNE / M35 927/8367 64613
[D]	Type :	Multi hole
[D]	Injection pressure:	27 ± 0.8 MPa
1.2.4	Governor	
[D]	- Make/Model/Type:	SISU DIESEL / EEM2 / 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 / FRG 130193
[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 paper 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, belt driven, variable fan speed controlled by air flow temperature
[C]	Number of fan blades:	9
[C]	Fan diameter:	550 mm
[D]	- Coolant capacity:	28.5 dm^3
[D]	- Type of temperature control:	Calorstat
	- Superpressure system:	50 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:	Grid heater
[C]	- Safety device:	Starter only operating when clutch pedal depressed
1.2.9	Electrical system	
[C]	- Voltage:	12 V, negative earth
	- Generator:	
[C]	Make/Model/Type:	ISKRA / AAN 5123 / 3-phase alternator
[D]	Power:	1120 VA
[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
[C]	- Location:	Vertical stack at right A-post of cab, mouth showing upward / forward to the right
1.2.11		
[D]	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

Massey Ferguson 7490 **DLG-Test No. 2004-007**

1.3.2 Gear box

[D] - Make: FENDT

[D] - Model: ML 160

[D] - Type: Continue variation transmission with stepshifts and variable power branching in a hydrostatic and a mechanic branch; special electronic control unit modifies the cvt into a gear box with stepshifts; ratios electronically selected by lever

[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 - change of transmission ratio step by step - forward and reverse Hand lever in the right armrest which controls following functions: - change of transmission ratio step by step - 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, air-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 / HA160 / 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 / 20.43 / 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;

- 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: Ranges specified in 1.3.2

	Range	Gear	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed*) at rated engine speed of 2200 min^{-1} km/h
	Forward Speed			
[D]	Turtle	1	423.91	1.8
[D]	Turtle	2	346.83	2.2
[D]	Turtle	3	293.47	2.6
[D]	Turtle	4	254.34	3.0
[D]	Turtle	5	224.42	3.4
[D]	Turtle	6	200.80	3.8
[D]	Turtle	7	181.67	4.2
[D]	Turtle	8	158.96	4.8
[D]	Turtle	9	141.30	5.4
[D]	Turtle	10	127.17	6.0
[D]	Turtle	11	112.21	6.8
[D]	Turtle	12	97.82	7.8
[D]	Turtle	13	84.78	9.0
[D]	Turtle	14	73.37	10.4
[D]	Turtle	15	64.66	11.8
[D]	Turtle	16	56.94	13.4
[D]	Turtle	17	49.55	15.4
[D]	Turtle	18	42.87	17.8
[D]	Turtle	19	37.04	20.6
[D]	Turtle	20	32.06	23.8
[D]	Turtle	21	27.85	27.4

[D]	Rabbit	1	200.80	3.8
[D]	Rabbit	2	181.67	4.2
[D]	Rabbit	3	158.96	4.8
[D]	Rabbit	4	141.30	5.4
[D]	Rabbit	5	127.17	6.0
[D]	Rabbit	6	112.21	6.8
[D]	Rabbit	7	100.40	7.6
[D]	Rabbit	8	88.72	8.6
[D]	Rabbit	9	79.48	9.6
[D]	Rabbit	10	71.98	10.6
[D]	Rabbit	11	64.66	11.8
[D]	Rabbit	12	57.81	13.2
[D]	Rabbit	13	51.56	14.8
[D]	Rabbit	14	45.97	16.6
[D]	Rabbit	15	40.59	18.8
[D]	Rabbit	16	35.66	21.4
[D]	Rabbit	17	31.53	24.2
[D]	Rabbit	18	27.85	27.4
[D]	Rabbit	19	24.46	31.2
[D]	Rabbit	20	21.55	35.4
[D]	Rabbit	21	18.98	40.2
	Reverse Speed			
[D]	Turtle	1	423.91	1.8
[D]	Turtle	2	346.83	2.2
[D]	Turtle	3	293.47	2.6
[D]	Turtle	4	254.34	3.0
[D]	Turtle	5	224.42	3.4
[D]	Turtle	6	200.80	3.8
[D]	Turtle	7	181.67	4.2
[D]	Turtle	8	158.96	4.8
[D]	Turtle	9	141.30	5.4
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[D]	Turtle	12	97.82	7.8
[D]	Turtle	13	84.78	9.0
[D]	Turtle	14	73.37	10.4
[D]	Turtle	15	64.66	11.8
[D]	Turtle	16	56.94	13.4
[D]	Turtle	17	49.55	15.4
[D]	Turtle	18	42.87	17.8

[D]	Rabbit	1	200.80	3.8
[D]	Rabbit	2	181.67	4.2
[D]	Rabbit	3	158.96	4.8
[D]	Rabbit	4	141.30	5.4
[D]	Rabbit	5	127.17	6.0
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[D]	Rabbit	9	79.48	9.6
[D]	Rabbit	10	71.98	10.6
[D]	Rabbit	11	64.66	11.8
[D]	Rabbit	12	57.81	13.2
[D]	Rabbit	13	51.56	14.8
[D]	Rabbit	14	45.97	16.6
[D]	Rabbit	15	40.59	18.8

*) Calculated with a dynamic radius index of 920 mm

[D] Number of revolutions of front wheels for one revolution of rear wheels: 1.345

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:	875 mm
[C]	- Distance from the median plane of the tractor:	0 mm
[C]	- Distance behind rear wheel axis:	510 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

Massey Ferguson 7490 **DLG-Test No. 2004-007**

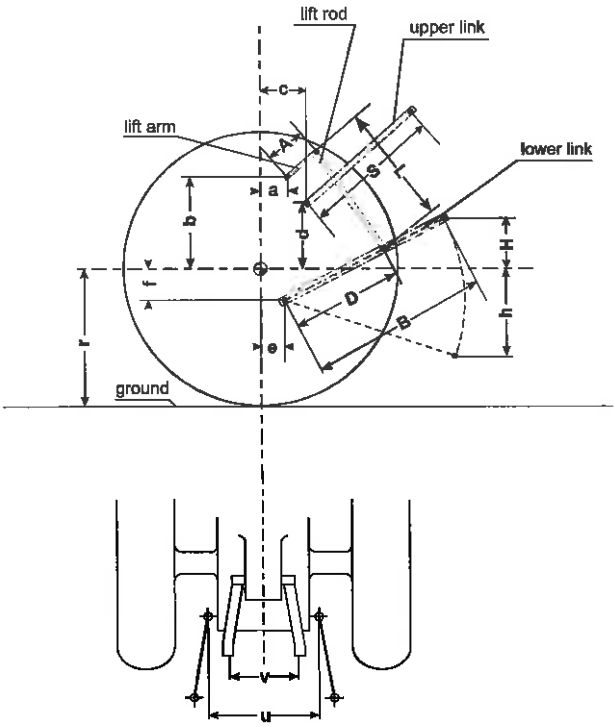
[C]	- Hydraulic system:	Closed, load sensing, pressure and flow compensated system; supplies rear and front power lift including additional control valves and steering system
[C]	- Rear power lift:	external push buttons left and right on rear mudguards; draft, position and intermixable control; floating 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
[D/C]	- Type and number of cylinders:	2 external cylinders, double acting, piston 100 mm bore, tige 36 mm bore, 247 mm stroke
[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 right hand side below cab floor
[C]	- Type, number and location of tapping points:	Double acting, quick-action; 4 coupler-pairs with adjustable flow control and 1 coupler for low pressure return line at rear of tractor Optional: 1 pair of couplers at front of tractor
[D]	- Maximum volume of oil available to external cylinders:	60 dm³

Massey Ferguson 7490 **DLG-Test No. 2004-007**

1.6 Three-point linkage:

1.6.1 Three-point linkage at rear:

[C]	- Category:	3, in conformity with ISO 730-1/1994 + Cor. 1:1995
[C]	- Category adapter:	None



	Dimensions of rear implement linkage			Projected lengths in mm		
				Dimensions	Settings used in test on page 30	36
[C]	Rear tyres 520/85 R 42 Front tyres 540/65 R 30		(r) *) (r') *)	920 695		
[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	805	830
[C]	Distance of upper link pivot point from rear wheel axis	horizontal vertical	(c) (d)	400 / 370 / 350 215 / 275 / 325	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	600	665
[C]	Length of lift rods		(L)	from 665 to 790	740	665

Heights (h, H, H') of lower link hitch points relative to rear wheel axis (situated 920 mm above ground), at different adjustments of L

These data are valid for unloaded power lift

[C]	Length of lift rods	(L)	665	790	740	665
[C]	Linkage distance of lift rods	(D)	600 / 665		600	665
[C]	Lowest position	(h)	545 / 465	855/ 710	690	495
[C]	Highest position	(H)	210 / 215	15 / 25	150	240
[C]	Transport position	(H')	210 /215	15 / 25	150	240

*) 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 three steps	
[C]	- Height above ground		575 mm
[C]	- Type of adjustment:	-	
[C]	- Distance of hitch point from rear wheel axis	Horizontal:	890 / 940 / 1040 mm
[C]	- Distance of hitch point from p.t.o. shaft end	Vertical:	300 mm
		Horizontal:	380 / 430 / 530 mm
[C]	- Lateral adjustment (centre of clevis)	Right/left hand side:	160 / 210 / 260 mm
[C]	- Distance of pivot point from rear-wheel axis, horizontally:		300 mm
[C]	- Diameter of drawbar pin hole:		30 mm
[D]	- Maximum permissible vertical load:		18 kN

1.8 Trailer hitch

[C]	- Make/Model/Type:	ROCKINGER / 810 U 140 / non-automatic	
[C]	- Pin diameter:		30 mm
[C]	- Height above ground:	Centre of clevis adjustable in 5 steps to	910, 950, 990, 1030, 1070 mm
[C]	- Distance of hitch point from rear wheel axis, horizontally:		700 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:		2000 kg

1.9 Holed drawbar Optionally available, not fitted

1.10	**Steering**	
[D]	- Make/Model/Type:	DANFOSS/ OSPD 80/205 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 45.0 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,75 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 4 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: 3007 mm

[D] - Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	1702	1915	adjustable gauge-bowl rims
Rear	1604	1798	adjustable gauge-bowl rims

1.13 Protective structure

[C] - Make/Model/Type: MASSEY FERGUSON / 6033 J2 / 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: 4/0 809

[D] Date of approval: 06th January 2004

[D] Nos. minor modification certificates, if any: none

1.14 Seat

1.14.1	Driver's seat	Fitted to tractor
[C]	- Make/Model:	Grammer / MSG 95 A / 731
[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:	220 mm
[C]	Vertical:	430 to 600 mm
[C]	- Safety belt:	Yes
1.14.2	Optional driver's seats	
[D]	- Make/Model/Type:	Grammer / MSG 85/731; MSG 95AL/741; MSG 95G/731 / mechanical suspension or pneumatic suspension
1.14.3	Passenger seat:	
[C]		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	1440	Ø 120	190
[C]	Side Lights	2170	110 x 30	1000
[C]	Rearlights	2030	Ø 120	1010
[C]	Reflectors, 1st pair	2020	Ø 55	887
	2nd pair	1000	50 x 100	550

2. TEST CONDITIONS

2.1 Overall dimensions

	Length	Width (track width as in 2.5)	Height at top of	
			protective structure	exhaust silencer pipe
	mm	mm	mm	mm
Unballasted	5040	2530	3100	3095

2.2 Ground clearance

480 mm

- Clearance-limiting part: Bracket of swinging drawbar

2.3 Tractor mass

- Unballasted (with cab)

	Without driver kg	With driver kg
Front	2550	2575
Rear	4320	4370
Total	6870	6945

2.4 Track specifications

Not applicable

2.5 Tyres and track widths specifications

	Front	Rear
Tyres:	MICHELIN XM108	MICHELIN Agribib
- Dimensions	540/65 R 30	520/85 R 42
- Load index speed index	143 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	695 mm	920 mm
Chosen track width:	1730 mm	1685 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 0.8322 g/cm³
  at drawbar power tests 0.8313 g/cm³

2.7 Oils and lubrication

2.7.1 Capacity and change interval

	Capacity dm³	Oil change h	Filter-change h
Engine	20	400	400
Gear box and rear axle	58	1200	400
Front axle	6	800	-
Rear axle	in common with gearbox		
Final drives (front each)	1.5	800	-
Final drives rear (each)	13	1200	-
Hydraulic system	100	1200	1200

2.7.2 Specifications:

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

2.7.3 Grease Multi purpose grease TERRAC CHARGE

- Number of lubrication points: 15

3 COMPULSORY TESTS

3.1 Main power take off performance

Date of tests: 2003-12-18
Location of tests: DLG-Testing Station Groß-Umstadt
Type of dynamometer: SCHENCK hydraulic dynamometer U1-40

Power	Speed Engine	Speed P.t.o.	Speed Fan	Fuel consumption hourly	Fuel consumption hourly	Fuel consumption specific	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							
115.1	1900	934	2291	27.65	33.23	240	3.46
3.1.2 At rated speed							
106.8	2201	1082	2545	29.49	35.44	276	3.01
3.1.3 At standard p.t.o. speed							
114.2	2034	1000	2392	28.55	34.31	250	3.33
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							
106.8	2201	1082	2545	29.49	35.44	276	3.01
3.1.4.2 85% of the torque obtained in 3.1.4.1							
91.9	2237	1100	2468	26.90	32.32	293	2.84
3.1.4.3 75% of the torque defined in 3.1.4.2							
70.1	2264	1113	2331	21.16	25.43	302	2.76
3.1.4.4 50% of the torque defined in 3.1.4.2							
47.1	2286	1124	2169	16.98	20.40	361	2.31
3.1.4.5 25% of the torque defined in 3.1.4.2							
23.9	2315	1138	1747	12.03	14.46	503	1.65
3.1.4.6 unloaded							
-	2335	1148	1676	7.83	9.41	-	-

Power	Speed		Fan	Fuel consumption			Specific
	Engine	P.t.o.		hourly		specific	energy
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

114.2	2034	1000	2392	28.55	34.31	250	3.33

3.1.5.2 85% of the torque obtained in 3.1.5.1

98.4	2062	1014	1757	24.72	29.70	251	3.31

3.1.5.3 75% of the torque defined in 3.1.5.2

74.8	2085	1025	2162	20.22	24.30	270	3.08

3.1.5.4 50% of the torque defined in 3.1.5.2

50.2	2103	1034	2165	15.84	19.03	316	2.64

3.1.5.5 25% of the torque defined in 3.1.5.2

25.2	2130	1047	1581	10.86	13.05	431	1.93

3.1.5.6 unloaded

-	2148	1056	1582	7.07	8.49	-	-

OPTIONAL RESULTS

Power kW	Speed Engine min^{-1}	Speed P.t.o. min^{-1}	Fan min^{-1}	Fuel consumption hourly kg/h	Fuel consumption hourly dm^3/h	Fuel consumption specific g/kWh	Specific energy kWh/dm^3
3.1.6 Part loads at different engine speeds							
3.1.6.1 maximum power at rated engine speed							
106.8	2201	1082	2545	29.49	35.44	276	3.01
3.1.6.2 80% of power obtained in 3.1.6.1 at max. speed setting							
85.3	2246	1104	2379	24.70	29.68	290	2.87
3.1.6.3 80% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed							
85.3	1981	974	2353	21.99	26.42	258	3.23
3.1.6.4 40% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed							
42.4	1979	973	1547	12.68	15.24	299	2.78
3.1.6.5 60% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed							
-	-	-	-	-	-	-	-
3.1.6.6 40% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed							
42.8	1320	649	1651	10.48	12.59	245	3.40

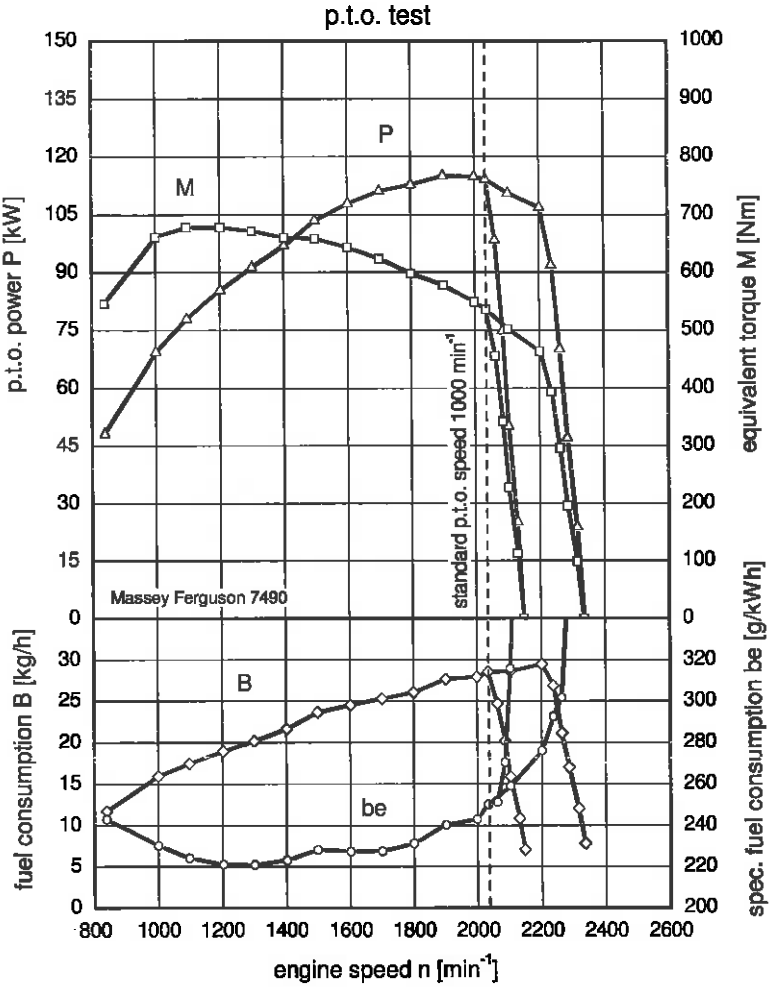
No load maximum engine speed:	2335	min^{-1}
Equivalent flywheel torque at rated engine speed:	463	Nm
Equivalent flywheel torque at 2-hour test:	578	Nm
at engine speed:	1900	min^{-1}
Maximum equivalent flywheel torque:	679	Nm
at engine speed:	1096	min^{-1}

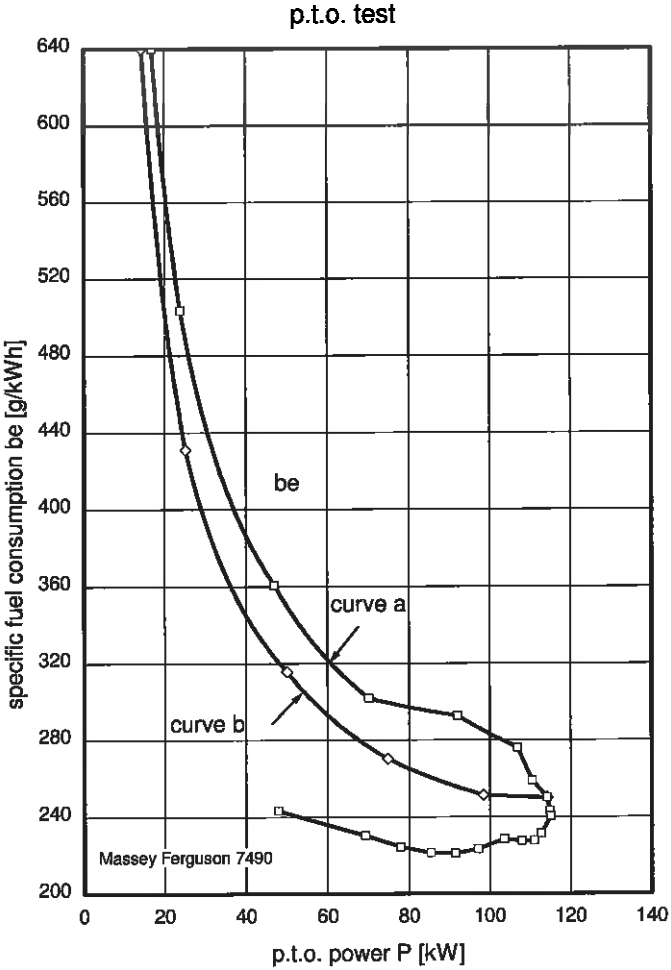
Mean atmospheric conditions

temperature:	19	°C
pressure:	100.6	kPa
relative humidity:	27	%

Maximum temperatures

coolant:	59	°C
oil:	106	°C
fuel:	48	°C
air intake:	20	°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]
P
M
B
be
standard p.t.o. speed 1000 min-1
Massey Ferguson 7490
150
135
120
105
90
75
60
45
30
15
0
1000
900
800
700
600
500
400
300
200
100
0
320
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
120
140
p.t.o. power P [kW]
be
curve a
curve b
Massey Ferguson 7490

3.2 HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 8th March 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	19.8	65	65	2333	-	-
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	17.8	65		2315 [1)] 2306 [2)]	79.0 [1)] 110.7 [2)]	23.4 [1)] 32.8 [2)]
3.2.1.2.3 Maximum available flow and maximum power from one coupler pair	5.0 17.0	65 65		2333 2311	101.7 98.4	- 27.9
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)	3.2 18.0	65 65		2332 2306	122.0 109.7	- 32.9

- 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 3

- Linkage settings for test - see on page 16

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	230 mm	
Vertical movement without lifting forces	840 mm	1010 mm
with lifting forces	810 mm	979 mm
Max. corrected force exerted through full range	57.15 kN	49.95 kN
Corresponding pressure	17.8 MPa	
Moment about rear axle	67.15 kNm	91.55 kNm
Max. tilt angle of mast from vertical	-	11°

Lifting heights relative to horizontal lower links												
mm	-500	-435	-400	-300	-200	-100	0	+100	+200	+300	+375	+480
Lifting forces at hitch points, corrected to 17.8 MPa												
kN		57.15	58.50	61.90	65.70	69.10	73.60	77.40	81.00	82.35	80.10	
Lifting forces at standard frame, corrected to 17.8 MPa												
kN	49.95	51.30	52.20	54.00	56.25	58.05	59.85	61.65	63.00	62.55	61.20	56.25

3.3 DRAWBAR POWER TEST (unballasted tractor)

Remarks:

The MF tractor MF 7490 is fitted with a stepless gear box. But for special markets in the world the gear box is modified to a stepshift version by a special electronic control unit and will be sold as a stepshift tractor. The tractor we tested wasn't fitted with the electronic control unit yet. Because we tested a stepless version of the tractor we weren't able to change the transmission ratio by the hand lever step by step as in usual use.We got a speedchart from the manufacturer wich accords with the speeds and ratios of the stepshift version. We had to adjust the speed by the hand lever. It was not possible to adjust the speed of the speedchart very exactly and that is the reason why we have differences between the calculated speed and the announced speed for each gear.

Measuring the part loads should show, that it is possible to realize the same pull and travelling speed in a higher gear at reduced engine speed with lower fuel consumption at the same time. We decided not to measure the next higher gear but second higher speed to show the effect of saving fuel in a more clearly way.

Massey Ferguson 7490 **DLG-Test No. 2004-007**

Date of tests: 21st and 22nd April 2004
Type of track: Concrete

	Height of drawbar above ground	Tyre inflation pressure Front	Rear
Unballasted	550 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/dm^3	Temperature Fuel °C	Coolant °C	Engine oil °C	Atmospheric conditions Temperature °C	Relative humidity %	Pressure kPa
Turtle 9	82.8	64.46	4.63	2086	15.0	2140	348	2.39	51	70	107	21	43	99.0
Turtle 10	84.8	64.79	4.71	1908	14.8	2267	323	2.57	50	70	108	19	43	99.0
Turtle 11	90.1	57.94	5.60	1897	8.9	2272	301	2.76	49	71	107	19	43	99.0
Turtle 12	91.8	51.65	6.40	1905	6.8	2283	296	2.81	46	70	107	16	43	99.0
Turtle 13	92.3	42.50	7.82	1903	4.9	2282	295	2.82	48	70	107	18	43	99.0
Turtle 14	92.1	38.02	8.72	1906	4.2	2279	296	2.81	49	71	108	20	43	99.0
Turtle 15	92.0	33.71	9.82	1898	3.6	2275	296	2.81	48	71	108	18	43	99.0
Turtle 16	90.5	28.63	11.38	1897	2.9	2240	301	2.76	49	71	108	18	43	99.0
Turtle 17	89.5	24.78	13.00	1901	2.4	2277	304	2.74	49	71	108	17	43	99.0
Turtle 18	87.3	22.13	14.21	1902	2.1	2151	309	2.69	46	70	102	18	43	99.0
Rabbit 10	90.4	37.50	8.68	1904	4.0	2077	301	2.76	46	70	105	16	43	99.0
Rabbit 11	91.4	32.78	10.03	1903	3.4	2216	298	2.79	47	69	106	18	43	99.0
Rabbit 12	90.9	28.73	11.39	1895	2.8	2272	297	2.79	48	70	106	18	43	99.0
Rabbit 13	90.3	25.96	12.52	1892	2.5	2270	300	2.77	50	71	108	19	43	99.0
Rabbit 14	90.1	22.52	14.40	1896	2.1	2243	302	2.76	49	71	107	18	43	99.0

Massey Ferguson 7490 **DLG-Test No. 2004-007**

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/dm^3	°C	°C	°C	°C	%	kPa
	FUEL CONSUMPTION													
3.3.2.1	In selected gear, at maximum power at rated speed													
Turtle 13	85.3	33.58	9.14	2196	3.3	2550	343	2.42	54	73	108	25	43	99.0
3.3.2.1.1	75 % of pull at maximum power at rated speed													
Turtle 13	66.2	25.13	9.49	2246	2.5	2587	372	2.23	54	71	109	26	43	99.0
3.3.2.1.2	50 % of pull at maximum power at rated speed													
Turtle 13	45.2	16.80	9.68	2273	1.6	2485	436	1.91	54	70	108	26	43	99.0
3.3.2.1.3	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1													
Turtle 15	68.1	25.52	9.61	1874	2.5	2231	305	2.73	53	70	106	25	43	99.0
3.3.2.1.4	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2													
Turtle 15	45.3	16.68	9.77	1877	1.5	2010	346	2.40	53	69	105	25	43	99.0
3.3.2.2	In selected gear nearest to 7.50 km/h at rated speed													
Turtle 12	85.8	40.12	7.70	2201	4.3	2461	341	2.44	50	71	106	22	43	99.0
3.3.2.2.1	75 % of pull at maximum power at rated speed													
Turtle 12	66.9	30.18	7.98	2247	3.0	2487	364	2.29	51	70	108	21	43	99.0
3.3.2.2.2	50 % of pull at maximum power at rated speed													
Turtle 12	45.9	20.23	8.17	2273	1.9	2360	430	1.93	50	69	108	21	43	99.0
3.3.2.2.3	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1													
Turtle 14	67.0	30.14	8.00	1681	3.0	2068	301	2.76	49	68	100	23	43	99.0
3.3.2.2.4	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2													
Turtle 14	45.8	20.30	8.11	1673	2.0	1657	321	2.59	50	69	101	23	43	99.0

4 ADDITIONAL TESTS under the responsibility of the DLG Testing Station

Not covered by the approval.

4.1 DRAWBAR POWER TEST (unballasted tractor with dual wheels)

4.1.1 Tractor mass

Unballasted (with cab); dual wheels (2 front wheels, 4 rear wheels)

	Without driver kg	With driver kg
Front	2485	2510
Rear	5090	5140
Total	7575	7650

4.1.2 Tyres and track width specification

Dual wheels (2 front wheels, 4 rear wheels)

	Front	Rear
Tyres:	Michelin Agribib	
- Dimensions	380/85 R 30	480/80 R42
- Load index speed index	135 A8	151 A8
- Type	radial	radial
- Maximum load (tyre manufacturer's)	21.80 kN*)	34.50 kN*)
- Maximum load (tractor manufacturer's)	21.00 kN	18.25 kN
at travelling speed	40 km/h	40 km/h
at tyre inflation pressure	160 kPa	160 kPa
dynamic radius index	695 mm	920 mm
Chosen track width:	1680 mm	2680 mm

*) With other tyres higher load capacity possible

Massey Ferguson 7490 **DLG-Test No. 2004-007**

4.1.3 Test Results Drawbar Power Test with dual wheels

Date of tests: 10th and 11th May 2004
Type of track: Concrete

	Height of drawbar above ground	Tyre inflation pressure Front	Rear
Unballasted	550 mm	70 kPa	40 kPa

Gear number and range	Power	Drawbar pull	Speed	Engine speed	Slip of Wheels	Fan speed	Specific Fuel consumption	Specific energy	Temperature Fuel	Coolant	Engine Oil	Atmospheric conditions Tempe-rature	Relative humidity	Pressure
	kW	kN	km/h	min^{-1}	%	min^{-1}	g/kWh	kWh/dm³	°C	°C	°C	°C	%	kPa

4.1.3.1 MAXIMUM POWER IN TESTED GEARS

Turtle 8	77.9	75.32	3.73	2126	15.0	2504	368	2.26	49	72	112	22	53	99.6
Turtle 9	80.6	75.44	3.85	2065	15.0	2354	354	2.35	48	71	110	20	53	99.6
Turtle 10	90.7	62.22	5.24	1897	7.3	2230	299	2.78	48	71	109	20	53	99.6
Turtle 11	91.6	57.00	5.79	1899	5.9	2269	296	2.81	47	70	109	20	53	99.6
Turtle 12	91.4	50.23	6.55	1900	5.2	2178	296	2.82	45	71	108	19	53	99.6
Turtle 13	89.9	42.17	7.67	1901	4.5	2232	303	2.75	46	71	110	18	53	99.6
Turtle 14	89.7	36.15	8.94	1903	3.5	2279	302	2.75	46	71	110	19	53	99.6
Turtle 15	88.2	32.21	9.86	1896	3.2	2276	307	2.70	46	70	109	19	53	99.6
Turtle 16	88.1	27.92	11.36	1896	2.9	2276	308	2.70	46	70	109	18	53	99.6
Turtle 17	84.4	23.12	13.15	1896	2.3	2283	318	2.62	46	71	110	19	53	99.6
Turtle 18	83.4	20.64	14.54	1900	2.1	2279	324	2.57	46	70	110	19	53	99.6
Rabbit 10	87.9	35.87	8.83	1895	3.6	2111	307	2.71	41	69	107	16	53	99.6
Rabbit 11	87.5	31.16	10.11	1905	3.3	2223	311	2.68	41	67	107	16	53	99.6
Rabbit 12	87.6	28.05	11.24	1895	3.2	2055	309	2.69	42	68	108	15	53	99.6
Rabbit 13	86.4	24.61	12.63	1897	2.6	2191	313	2.66	42	69	108	17	53	99.6
Rabbit 14	87.2	21.66	14.49	1892	2.6	2266	312	2.67	43	68	108	17	53	99.6

Massey Ferguson 7490 **DLG-Test No. 2004-007**

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	Temperature	Relative humidity	Pressure
	kW	kN	km/h	min^{-1}	%	min^{-1}	g/kWh	kWh/dm^3	°C	°C	°C	°C	%	kPa
	FUEL CONSUMPTION													
4.1.3.2	In selected gear, at maximum power at rated speed													
Turtle 11	83.2	44.08	6.80	2201	4.4	2483	352	2.36	48	72	110	22	53	99.6
4.1.3.2.1	75 % of pull at maximum power at rated speed													
Turtle 11	64.8	33.16	7.04	2246	3.5	2472	379	2.19	49	71	111	23	53	99.6
4.1.3.2.2	50 % of pull at maximum power at rated speed													
Turtle 11	44.3	22.16	7.20	2273	2.5	2339	446	1.87	49	69	109	23	53	99.6
4.1.3.2.3	Next higher gear at reduced engine speed; same pull and travelling speed as in 4.1.3.2.1													
Turtle 12	65.1	33.11	7.07	1953	3.5	2204	323	2.57	49	69	108	22	53	99.6
4.1.3.2.4	Next higher gear at reduced engine speed; same pull and travelling speed as in 4.1.3.2.2													
Turtle 12	45.3	22.49	7.25	1972	2.5	2076	370	2.25	48	68	106	23	53	99.6
4.1.3.3	In selected gear nearest to 7.50 km/h at rated speed													
Turtle 12	85.4	39.2	7.85	2198	3.9	2332	343	2.42	45	70	109	19	53	99.6
4.1.3.3.1	75 % of pull at maximum power at rated speed													
Turtle 12	66.1	29.4	8.11	2244	3.1	2373	376	2.21	46	70	110	19	53	99.6
4.1.3.3.2	50 % of pull at maximum power at rated speed													
Turtle 12	45.3	19.62	8.31	2271	2.3	2247	441	1.89	46	68	108	19	53	99.6
4.1.3.3.3	Next higher gear at reduced engine speed; same pull and travelling speed as in 4.1.3.3.1													
Turtle 13	67.0	29.69	8.13	1960	3.2	2120	319	2.61	45	69	106	21	53	99.6
4.1.3.3.4	Next higher gear at reduced engine speed; same pull and travelling speed as in 4.1.3.3.2													
Turtle 13	45.3	19.55	8.34	1960	2.3	2082	374	2.23	46	67	106	21	53	99.6

4.2 Additional power lift test at rear power lift with different linkage adjustments to obtain maximum lifting force:

- Linkage settings for test - see on page 16

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	425 mm	
Vertical movement without lifting forces	735 mm	815 mm
with lifting forces	710 mm	785 mm
Max. corrected force exerted through full range	69.30 kN	65.70 kN
Corresponding pressure	17.8 MPa	
Moment about rear axle	81.45 kNm	118.90 kNm
Max. tilt angle of mast from vertical	-	7°

Lifting heights relative to horizontal lower links												
mm	-255	-240	-200	-100	0	+100	+200	+300	+400	+470	+500	+530
Lifting forces at hitch points, corrected to 17.8 MPa												
kN		69.30	70.20	73.80	77.85	82.80	87.30	91.35	92.70	90.00		
Lifting forces at standard frame, corrected to 17.8 MPa												
kN	65.70		66.60	67.95	70.65	72.45	75.15	76.05	76.50		72.45	70.65

5	**REPAIRS**	**None**
6	**REMARKS**	The engine of the tractor Massey Ferguson 7490 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 7495 model was replaced by the 7490 module and all relevant measurements were repeated. All other specifications of the models 7495 and 7490 are identical.

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Massey Ferguson 7490 **DLG-Test No. 2004-007**



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