Prüfstelle für Landmaschinen



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

OECD No. 2/2233
23rd March 2005

Agricultural Tractor

Massey Ferguson 7475 (HA110)

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: Juli till September 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: 23rd March 2005 OECD No. 2/2233

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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[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:	573 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:	7475 (HA110)
[C]	- Type:	4WD, wheel tractor, unit construction

1.1.2 Numbers

[D]	- 1st serial No.:	n.a., prototype
[C]	- Serial No.:	n.a., prototype The test station has checked that the series production conforms to the tested tractor.

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:	F36

1.2 Engine

[C]	- Make/Model/Type:	PERKINS / 1106C-ETA 60/ 2408/2200 water-cooled 4-stroke Diesel-engine, direct injection, supercharged and intercooler (air to air),
[C]	- Serial No.:	U090172J

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:	Perkins / 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: 70 ± 3 (boosted: 74 ± 3) mm^3/stroke at full load and rated speed;
[C]	Flow rate:	Standard: 28 ± 0.8 (boosted: 29 ± 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, belt driven, variable fan speed controlled by air flow temperature
[C]	Number of fan blades:	9
[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
[C]	- 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

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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	heavy use	0-28	0-18
II	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 I/II - 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 / HA110 / 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 / 20.19S / 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: respectively automatic	In common with rear axle differential lock,
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

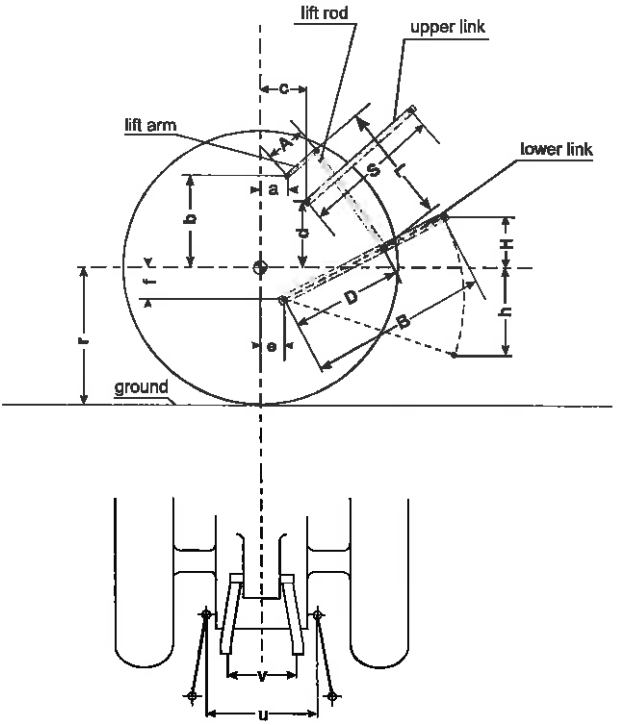
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[C]	- Hydraulic system:	Closed, load sensing, pressure and flow compensated system; supplies rear and front power lift including additional control valves, steering system and height-control of front axle suspension
[C]	- Rear power lift:	external 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 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 dm^3 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 dm^3

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:	None



	Dimensions of rear implement linkage			Projected lengths in mm		
				Dimensions	Settings used in test on page 28	32
[C]	Rear tyres 20.8 R 38 Front tyres 16.9 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	765	780
[C]	Distance of upper link pivot point from rear wheel axis	horizontal vertical	(c) (d)	390 / 350 220 / 315	390 220	350 315
[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	760	670

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	670
[C]	Linkage distance of lift rods	(D)	600 / 665		600	665
[C]	Lowest position	(h)	545 / 465	855/ 710	655	480
[C]	Highest position	(H)	210 / 215	15 / 25	60	180
[C]	Transport position	(H')	210 /215	15 / 25	60	180

*) Assuming r resp. r' = tyre dynamic radius index (in conformity with ISO 4251-1:1998)

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:	280 mm
		Horizontal:	260 / 360 / 520 / 570 / 670 mm
[C]	- Lateral adjustment (centre of clevis)	Right/left hand side:	260 mm
[C]	- Distance of pivot point from rear-wheel axis, horizontally:		400 mm
[C]	- Diameter of drawbar pin hole:		33 mm
[D]	- Maximum permissible vertical load:		18 kN
1.8	**Trailer hitch**		
[C]	- Make/Model/Type:	Rockinger / Europe 810 U 140 / non-automatical	
[C]	- Pin diameter:		30 mm
[C]	- Height above ground:	Centre of clevis adjustable in 5 steps to	840, 880, 920, 960, 1000 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	30, 70, 110, 150, 190 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/ 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	1610	1844	reversing the wheels
Rear	1760	1890	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 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 95G / 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:	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 ; MSG 95AL/741 / 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	1810	Ø 110	1090
[C]	Reflectors, 1st pair	1850	Ø 55	887
	2nd pair	665	50 x 100	770

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	4750	2450	2895	2965

2.2 Ground clearance

410 mm

- Clearance-limiting part: Bracket of swinging drawbar

2.3 Tractor mass

- Unballasted (with cab)

	Without driver kg	With driver kg
Front	2430	2455
Rear	3820	3870
Total	6250	6325

2.4 Track specifications

Not applicable

2.5 Tyres and track widths specifications

	Front	Rear
Tyres:	Michelin Agribib	Michelin XM
- Dimensions	16.9 R 28	20.8 R 38
- Load index speed index	136 A8	153 A8
- Type	radial	radial
- Maximum load (tyre manufacturer's)	22.40 kN*)	36.50 kN*)
- Maximum load (tractor manufacturer's)	22.40 kN	36.50 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:	1700 mm	1890 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 0.8379 g/cm³
  at drawbar power test 0.8379 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: 2004-07-13
Location of tests: DLG-Testing Station Groß-Umstadt
Type of dynamometer: SCHENCK hydraulic dynamometer U1-40

Power kW	Speed Engine min^{-1}	P.t.o. min^{-1}	Fan min^{-1}	Fuel consumption hourly kg/h	hourly dm^3/h	specific g/kWh	Specific energy kWh/dm^3
Maximum power							
3.1.1 At 2-hour test							
88.5	1800	885	1814	23.05	27.51	260	3.22
3.1.2 At rated speed							
79.2	2200	1081	2057	23.61	28.18	298	2.81
3.1.3 At standard p.t.o. speed							
85.9	2034	1000	1996	23.96	28.60	279	3.00
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							
79.2	2200	1081	2057	23.61	28.18	298	2.81
3.1.4.2 85% of the torque obtained in 3.1.4.1							
67.8	2213	1088	2110	21.00	25.06	310	2.71
3.1.4.3 75% of the torque defined in 3.1.4.2							
51.3	2235	1099	2077	17.54	20.93	342	2.45
3.1.4.4 50% of the torque defined in 3.1.4.2							
34.6	2258	1110	1969	14.15	16.89	409	2.05
3.1.4.5 25% of the torque defined in 3.1.4.2							
17.5	2276	1119	1595	10.50	12.53	600	1.40
3.1.4.6 unloaded							
-	2295	1128	1628	6.87	8.20	-	-

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

85.9	2034	1000	1996	23.96	28.60	279	3.00

3.1.5.2 85% of the torque obtained in 3.1.5.1

73.5	2044	1005	1990	20.86	24.90	284	2.95

3.1.5.3 75% of the torque defined in 3.1.5.2

55.8	2071	1018	1993	17.28	20.62	310	2.71

3.1.5.4 50% of the torque defined in 3.1.5.2

37.6	2097	1031	1407	13.08	15.61	348	2.41

3.1.5.5 25% of the torque defined in 3.1.5.2

19.0	2117	1041	1376	9.09	10.85	478	1.75

3.1.5.6 unloaded

-	2138	1051	1383	5.76	6.88	-	-

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							
79.2	2200	1081	2057	23.61	28.18	298	2.81
3.1.6.2 80% of power obtained in 3.1.6.1 at max. speed setting							
63.5	2219	1091	2026	20.02	23.89	315	2.66
3.1.6.3 80% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed							
63.3	1981	974	1890	18.06	21.55	285	2.94
3.1.6.4 40% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed							
31.6	1975	971	1265	10.84	12.94	343	2.44
3.1.6.5 60% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed							
47.6	1318	648	956	11.88	14.18	250	3.36
3.1.6.6 40% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed							
31.6	1320	649	1055	8.51	10.16	269	3.11

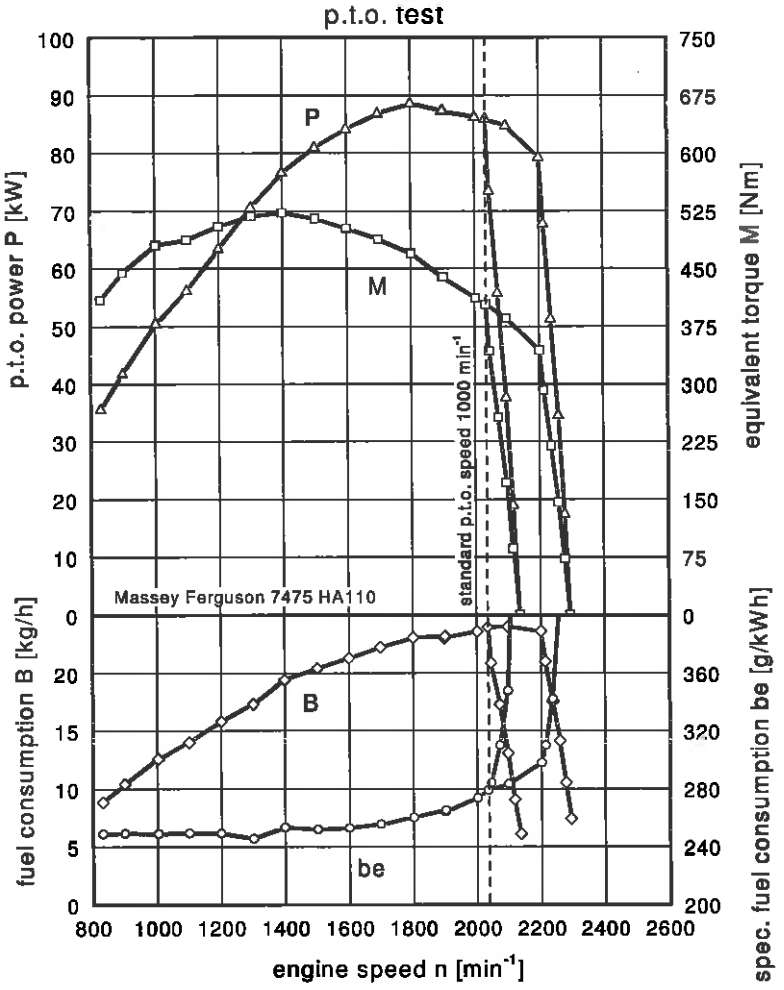
No load maximum engine speed:	2295	min^{-1}
Equivalent flywheel torque at rated engine speed:	344	Nm
Equivalent flywheel torque at 2-hour test:	470	Nm
at engine speed:	1800	min^{-1}
Maximum equivalent flywheel torque:	522	Nm
at engine speed:	1399	min^{-1}

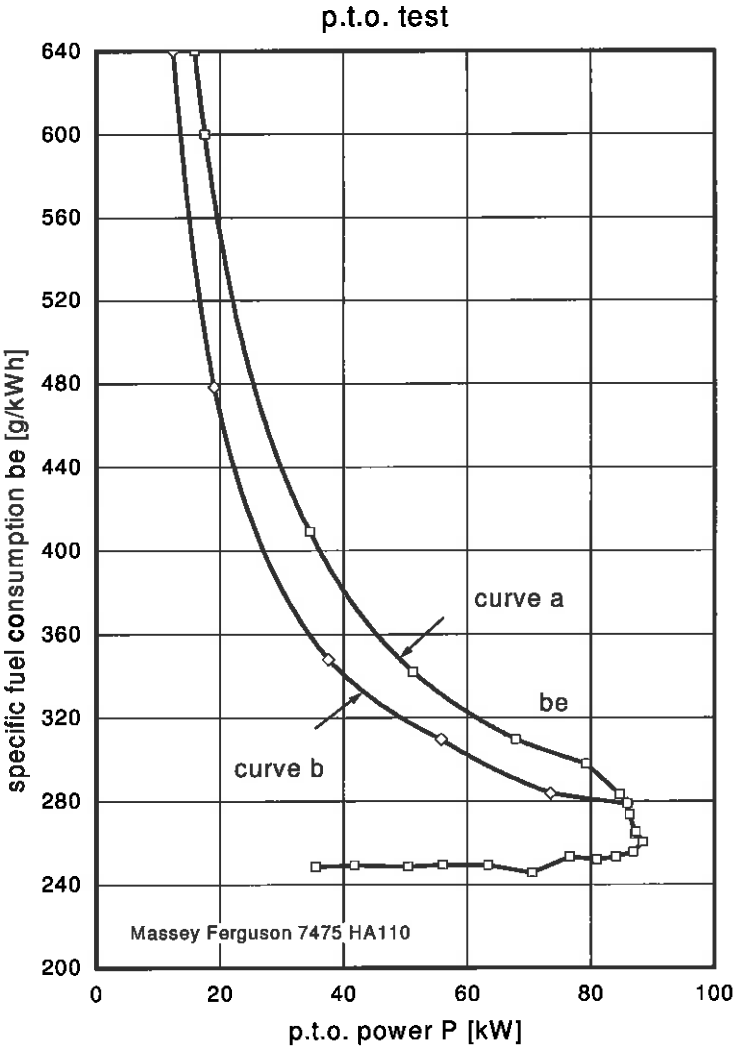
Mean atmospheric conditions

temperature:	19	°C
pressure:	99.5	kPa
relative humidity:	52	%

Maximum temperatures

coolant:	68	°C
oil:	111	°C
fuel:	56	°C
air intake:	20	°C


p.t.o. test
P
M
B
be
Massey Ferguson 7475 HA110
standard p.t.o. speed 1000 min-1
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]
100
90
80
70
60
50
40
30
20
10
0
750
675
600
525
450
375
300
225
150
75
0
20
15
10
5
360
320
280
240
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 7475 HA110

3.2 HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 19th September 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

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	200 mm	
Vertical movement without lifting forces	714 mm	831 mm
with lifting forces	700 mm	792 mm
Max. corrected force exerted through full range	54.00 kN	48.50 kN
Corresponding pressure	18.1 MPa	
Moment about rear axle	63.45 kNm	86.60 kNm
Max. tilt angle of mast from vertical	-	7°

Lifting heights relative to horizontal lower links												
mm	-458	-400	-300	-200	-100	0	+100	+200	+300	+335		
Lifting forces at hitch points, corrected to 18.1 MPa												
kN		54.00	55.55	57.35	59.50	62.40	65.95	67.50	64.40			
Lifting forces at standard frame, corrected to 18.1 MPa												
kN	49.55	49.20	49.20	50.25	51.70	53.10	53.45	52.75	50.25	48.50		

3.3 DRAWBAR POWER TEST (unballasted tractor)

Date of tests: 19th - 21st July 2004
Type of track: Concrete

	Height of drawbar above ground	Tyre inflation pressure Front	Rear
Unballasted	410 mm	80 kPa	80 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

3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)

I	59.9	64.40	3.35	2050	14.9	2268	416	2.01	65	72	115	35	29	99.7
I	61.2	65.14	3.38	1912	14.8	2268	386	2.17	67	74	117	35	32	99.7
I	67.1	63.62	3.80	1806	10.5	2030	338	2.48	64	71	115	32	38	99.7
I	67.6	59.10	4.12	1790	8.7	2159	338	2.48	64	73	116	33	35	99.7
I	70.3	53.53	4.73	1806	6.9	1977	319	2.62	63	72	111	33	36	99.7
I	72.3	48.40	5.38	1800	5.1	1772	315	2.66	54	68	111	25	59	99.8
I	71.6	41.64	6.19	1801	3.9	1924	316	2.65	60	51	115	30	42	99.9
I	72.5	36.05	7.24	1801	2.9	1766	313	2.68	57	72	115	22	67	99.5
I	71.8	31.07	8.32	1801	2.2	1830	316	2.65	59	72	117	24	63	99.5
I	70.8	26.90	9.48	1803	2.8	1846	319	2.63	60	73	117	24	62	99.5
I	68.8	22.95	10.79	1801	2.5	1936	328	2.56	56	70	110	27	57	99.5
I	68.3	20.21	12.16	1804	2.3	1918	335	2.50	58	70	114	26	59	99.5
I	66.3	16.33	14.61	1800	1.9	1947	347	2.42	58	71	115	25	59	99.8

Massey Ferguson 7475 (HA110) **DLG-Test No. 2004-264**

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
II	67.6	31.84	7.65	1801	3.9	2042	336	2.49	66	73	116	35	31	99.7
II	71.0	29.72	8.60	1801	3.4	1771	316	2.65	55	67	111	24	73	100.1
II	70.9	26.73	9.55	1802	2.6	1828	317	2.64	57	69	114	25	69	100.1
II	71.3	24.04	10.69	1801	2.7	1881	317	2.65	59	70	115	25	68	100.0
II	70.8	21.82	11.69	1802	2.5	1895	323	2.59	59	71	113	26	62	100.1
II	70.2	18.40	13.74	1804	2.2	1912	325	2.58	60	70	115	27	58	100.1
II	69.3	16.56	15.06	1801	2.3	1931	332	2.53	62	73	117	27	59	100.1

Massey Ferguson 7475 (HA110) **DLG-Test No. 2004-264**

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/dm³	°C	°C	°C	°C	%	kPa
	FUEL CONSUMPTION													
3.3.2.1	In selected gear, at maximum power at rated speed													
I	62.2	24.48	9.15	2202	2.4	2183	367	2.28	60	69	108	32	37	100.0
3.3.2.1.1	75 % of pull at maximum power at rated speed													
I	46.6	18.07	9.27	2226	2.5	2234	407	2.06	62	70	112	32	39	100.0
3.3.2.1.2	50 % of pull at maximum power at rated speed													
I	31.1	11.77	9.52	2247	1.6	2220	467	1.79	61	69	111	33	37	100.0
3.3.2.1.3	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1													
I	46.7	18.16	9.26	1926	2.5	1981	363	2.31	61	69	110	32	37	100.0
3.3.2.1.4	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2													
I	31.5	12.00	9.46	1949	1.8	1990	443	1.89	61	69	109	32	37	100.0
3.3.2.2	In selected gear nearest to 7.50 km/h at rated speed													
I	64.3	29.71	7.79	2202	3.4	2141	363	2.31	60	70	114	28	56	100.1
3.3.2.2.1	75 % of pull at maximum power at rated speed													
I	48.9	22.10	7.96	2225	2.9	2206	391	2.14	62	71	116	29	52	100.1
3.3.2.2.2	50 % of pull at maximum power at rated speed													
I	33.1	14.63	8.13	2246	2.4	2189	462	1.82	60	69	113	30	51	100.1
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	49.3	22.02	8.05	1975	2.6	1985	354	2.36	60	68	112	28	54	100.0
3.3.2.2.4	Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2													
I	33.2	14.69	8.13	1969	2.2	1969	433	1.94	58	67	109	28	54	100.1

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 - Maximum Lifting Force (short lift rods)

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	377 mm	
Vertical movement without lifting forces with lifting forces	658 mm 646 mm	729 mm 698 mm
Max. corrected force exerted through full range	56.35 kN	56.15 kN
Corresponding pressure	18.1 MPa	
Moment about rear axle	66.20 kNm	100.25 kNm
Max. tilt angle of mast from vertical	-	4°

Lifting heights relative to horizontal lower links												
mm	-263	-223	-200	-100	0	+100	+200	+300	+400	+423	+435	
Lifting forces at hitch points, corrected to 18.1 MPa												
kN		56.35	57.50	59.85	62.00	64.55	67.50	70.05	68.65	66.90		
Lifting forces at standard frame, corrected to 18.1 MPa												
kN	56.15		56.75	57.15	58.90	60.45	61.85	62.00	59.10		56.35	

5	**REPAIRS**	**None**
6	**REMARKS**	The engine of the tractor Massey Ferguson 7475 (HA110) 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.

Head of Vehicle Technology

Dipl.-Ing. (FH) Ottmar Degrell

Test carried out by

Dipl.-Ing. (FH) Thomas Feuerstein

Date: 30th March 2005



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