Consiglio Nazionale delle Ricerche
ISTITUTO PER LE MACCHINE AGRICOLE E MOVIMENTO TERRA
Strada delle Cacce, 73 - 10135 TORINO (Italy)

OECD Approval No. 1/2 273
Date of Approval: 28th September 2005

Report No. 2889/T/2005

TEST IN ACCORDANCE WITH THE OECD CODE 1 FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS

Make:	**NEW HOLLAND**
Trade Name:	**TL 80 A**
Type:	**2 WD, S2C2T1, 12 speeds, 30 km/h**



Manufactured by:	CNH International S.A. 13, Rue Aldringen L-1118 Luxembourg Luxembourg
Date and location of the tests:	2004 TORINO (Italy)

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

0 FOREWORDS

C	Tractor manufacturer's name and address:	CNH International S.A. 13, Rue Aldringen L-1118 Luxembourg Luxembourg
D	Location of tractor assembly:	Jesi (AN) - ITALY St. Valentin - AUSTRIA
D	Submitted for test by:	The Manufacturer
C	Selected for test by:	Manufacturer with the agreement of IMAMOTER
D	Place of running-in:	MODENA (MO) - ITALY
D	Duration of running-in:	Appr. 50 hours
C	Location of tests :	IMAMOTER - Torino - Italy

1 SPECIFICATIONS OF TRACTOR

1.1 IDENTIFICATION

C	Make:	NEW HOLLAND
C	Trade name or model:	TL 80 A
C	Type:	2WD

1.1.1 Numbers

D	1st serial N°:	Not announced
C	Serial N°:	HJS006208

1.1.2 Other specification

D	Model for other countries:	Not applicable
C	Transmission type or gears x ranges:	12+12 speeds
C	Speed version:	30 km/h
D	Manufacturer identification:	S2C2T1

1.2 ENGINE

C	Make:	CNH UK Ltd.
C	Model:	F4CE0404C*D681
C	Type	Diesel direct injection type, 4 cycles
C	Serial N°:	127847

1.2.1 Cylinders

C	Number and disposition:	4, vertical, in line
D	Bore x stroke:	104x132 mm
D	Capacity:	4485 cm^3
D	Compression ratio:	17.5±0.5:1
D	Arrangement of valves:	Overhead
D	Cylinder liners:	Wet

1.2.2 Supercharging

C	Make:	Not applicable
C	Model:	Not applicable
C	Type:	Not applicable
D	Pressure:	Not applicable

1.2.3 Fuel system

C	Fuel feed system:	Rotary injection pump with centrifugal speed governor, operating at all speed and incorporating automatic advance
	Fuel filter(s):	
C	- Make:	CNH,
C	- Model:	Not applicable
C	- Type:	1 replaceable cartridge filter on the injection pump feed line with water separator, and 1 mesh filter inside the fuel pump
D	Capacity of fuel tank:	127 dm^3, placed under the tractor platform, on the left side
	Injection pump:	
C	- Make:	BOSCH
C	- Model:	VE4/12 F1250 L1018-1
C	- Type:	rotary injection pump type
C	- Serial N°:	Not applicable
	Manufacturer's production setting of injection pump:	
C	- flow rate:	61.50 mm^3/stroke at rated speed and full load corresponding 18.45 dm^3/h
D	- timing:	0°static injection timing
	Injectors:	
D	- Make:	BOSCH
D	- Model:	DLLA 145P 1338
C	- Type:	7 holes injection nozzles.
D	Injection pressure:	24.5±0.14 MPa
C	Make/Model/Type of carburettor:	Not applicable

1.2.4 Governor

C	Make:	BOSCH
	Model:	Not applicable
	Type:	Mechanical, incorporated in the fuel pump
C	Governed range of engine speed:	750– 2686 rev/min
C	Rated engine speed:	2500 rev/min

1.2.5 Air cleaner

	Pre-cleaner:	
C	- Make:	DONALDSON
C	- Model:	P828889
C	- Type:	dry air filter
C	Location of air intake:	on front of the radiator under the bonnet cowling
	Main cleaner	
C	- Make:	DONALDSON
C	- Model:	P829333
C	- Type:	dry air filter
C	Location of air intake:	Inside the pre-cleaner, on front of the radiator under the bonnet cowling
C	Maintenance indicator:	with the warning lamp on the dashboard

1.2.6 Lubrication system

D	Type of feed pump:	Forced, by gear pump. Engine oil cooled by a heat exchanger using engine coolant
C	Type of filter(s):	Pump intake mesh and replaceable cartridge filter on engine intake.
C	Number of filters:	1

1.2.7 Cooling System

C	Type of coolant:	water
D	Type of pump:	centrifugal blade pump with visco-fan driven by engine shaft
	Specification of fan or blower	
C	- Number of fan blades:	11
C	- Fan diameter:	450 mm
D	Coolant capacity:	16 l
C	Type of temperature control:	a temperature gauge, with display on the dashboard
D	Superpressure system:	71 kPa

1.2.8 Starting system

C	Make:	ISKRA
C	Model:	11131325
C	Type:	Electromagnet operated
D	Starter motor power rating:	4.2 kW, 12 V
C	Cold starting aid:	PHILLIPS&TEMRO make, thermostart type
C	Safety device:	clutch engagement

1.2.9 Electrical system

C	Voltage:	14 V, 70-120 A, negative earth
	Generator:	
C	- Make:	BOSH
C	- Model:	BR14-MO (484 120 47129299)
C	- Type:	Alternator
D	- Power:	0.5 kW
	Battery of accumulators	
C	- Number:	1, lead acid type
D	- Rating:	12 V, Capacity 132 Ah, Cranking 960 A

1.2.10 Exhaust system

C	Make:	CNH
C	Model:	1.15.102.AA
C	Type:	interference type with internal perforated pipe
C	Location:	on the right hand side of engine, under the bonnet cowling, with the vertical exhaust pipe above the bonnet cowling

1.3 TRANSMISSION

1.3.1 Clutch (utilized only for travelling of tractor)

D	Make:	LUK
D	Model:	own drawing
D	Type:	dry 12" double-plate with separate controls
D	Number of plates:	1 for clutch used for travelling and 1 for clutch used for PTO engagement
D	Diameter of plates:	12" for travelling and 12" mm for PTO
C	Method of operation:	pedal operation for gearbox and hand lever on the left side on the seat for PTO engagement/disengagement

1.3.2 Gearbox

D	Make:	CNH
D	Model:	own drawing
D	Type:	mechanical type
	Description:	Permanently engaged helical mesh and fully synchromesh for all gears, directly engaged by hand levers

		Forward	Reverse
C	Number of ranges	3 (low, medium and high)	3 (low medium and high)
C	Number of gears	4	4
C	Number of groups	Not applicable	Not applicable
C	Total of arrangements	12	12

D	Available options:	Not applicable

1.3.3 Rear axle and final drives

D	Make:	CNH
D	Model:	own drawing
D	Type:	9/43 bevel gear pair ratio with epyciclic final drives
	Differential lock:	
D	- Type:	electro-hydraulic controlled locking device
C	- Method of engagement/disengagement	switch placed on the dashboard

1.3.4 Front axle and final drives

D	Make:	CNH
D	Model:	own drawing
D	Type:	central pivoting, telescopic, inverted U structure
	Differential lock	
D	- Type:	not applicable
C	- Method of engagement/disengagement:	not applicable

1.3.5 Total ratios and travelling speeds[1]

	Gear No.	Range and group	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed[(2)] at rated engine speed of 2500 min^{-1} (rev/min) km/h
			Forward	
C	1	Low	390.322	1.798
C	2	Low	268.555	2.613
C	3	Low	186.290	3.767
C	1	Medium	167.116	4.199
C	4	Low	130.045	5.397
C	2	Medium	114.981	6.104
C	3	Medium	79.760	8.799
C	1	High	70.984	9.887
C	4	Medium	55.878	12.559
C	2	High	48.840	14.369
C	3	High	33.879	20.715
C	4	High	23.650	29.674
			Reverse	
C	1	Low	390.322	1.798
C	2	Low	268.555	2.613
C	3	Low	186.290	3.767
C	1	Medium	167.116	4.199
C	4	Low	130.045	5.397
C	2	Medium	114.981	6.104
C	3	Medium	79.760	8.799
C	1	High	70.984	9.887
C	4	Medium	55.878	12.559
C	2	High	48.840	14.369
C	3	High	33.879	20.715
C	4	High	23.650	29.674

[1] Checked on type approval files given by manufacturer
[2] Calculated with a tyre 540/65 R 34 with dynamic radius index 745 mm on rear axle (ETRTO 1999)

C Number of revolution of front wheels for one revolution of rear-wheels: Not applicable

1.4 Power take-off

1.4.1 Main power take-off

C	Type:	fully independent
C	Method of engagement:	engaged/disengaged by clutch manual control lever
C	Number of shafts:	1
C	Method of changing power take-off shaft ends and speeds:	removing circlip, swapping shaft and replace circlip

1.4.1.1 Power take-off proportional to engine speed

Power take-off at 540 rev/min

C	Location:	at the rear of the tractor, in the median plane
C	Diameter of power take-off shaft end:	35 mm
C	Number of splines:	6, in conformity with ISO 500-1991 Type 1
C	Height above ground:	754 mm
C	Distance from the median plane of the tractor:	0 mm
C	Distance behind rear-wheel axis:	522 mm
C	PTO speed at rated engine speed (2500 rev/min):	614 rev/min
C	Engine speed at standard power take-off speed:	2199 rev/min
C	Ratio of rotation speeds (engine speed/p.t.o. speed):	4.0714
D	Power restriction:	none
D	Maximum torque transmissible:	engine torque
C	Direction of rotation (viewed from behind tractor):	clockwise

Power take-off at 750 rev/min (as option, not fitted on tested tractor)

C	Location:	at the rear of the tractor, in the median plane
C	Diameter of power take-off shaft end:	35 mm
C	Number of splines:	6 or 21, not in conformity with ISO 500-1991
C	Height above ground:	754 mm
C	Distance from the median plane of the tractor:	0 mm
C	Distance behind rear-wheel axis:	522 mm
C	PTO speed at rated engine speed (2500 rev/min):	787 rev/min
C	Engine speed at standard power take-off speed:	2382 rev/min
C	Ratio of rotation speeds (engine speed/p.t.o. speed):	3.176
D	Power restriction:	none
D	Maximum torque transmissible:	engine torque
C	Direction of rotation (viewed from behind tractor):	clockwise

Power take-off at 1000 rev/min

C	Location:	at the rear of the tractor, in the median plane
C	Diameter of power take-off shaft end:	35 mm
C	Number of splines:	21, in conformity with ISO 500-1991 Type 2
C	Height above ground:	754 mm
C	Distance from the median plane of the tractor:	0 mm
C	Distance behind rear-wheel axis:	522 mm
C	PTO speed at rated engine speed (2500 rev/min):	1050 rev/min
C	Engine speed at standard power take-off speed:	2381 rev/min
C	Ratio of rotation speeds (engine speed/p.t.o. speed):	2.381
D	Power restriction:	none
D	Maximum torque transmissible:	engine torque
C	Direction of rotation (viewed from behind tractor):	clockwise

1.4.1.2 Power take-off proportional to ground speed

Option, not fitted on tested tractor

1.4.2 Optional power take-off

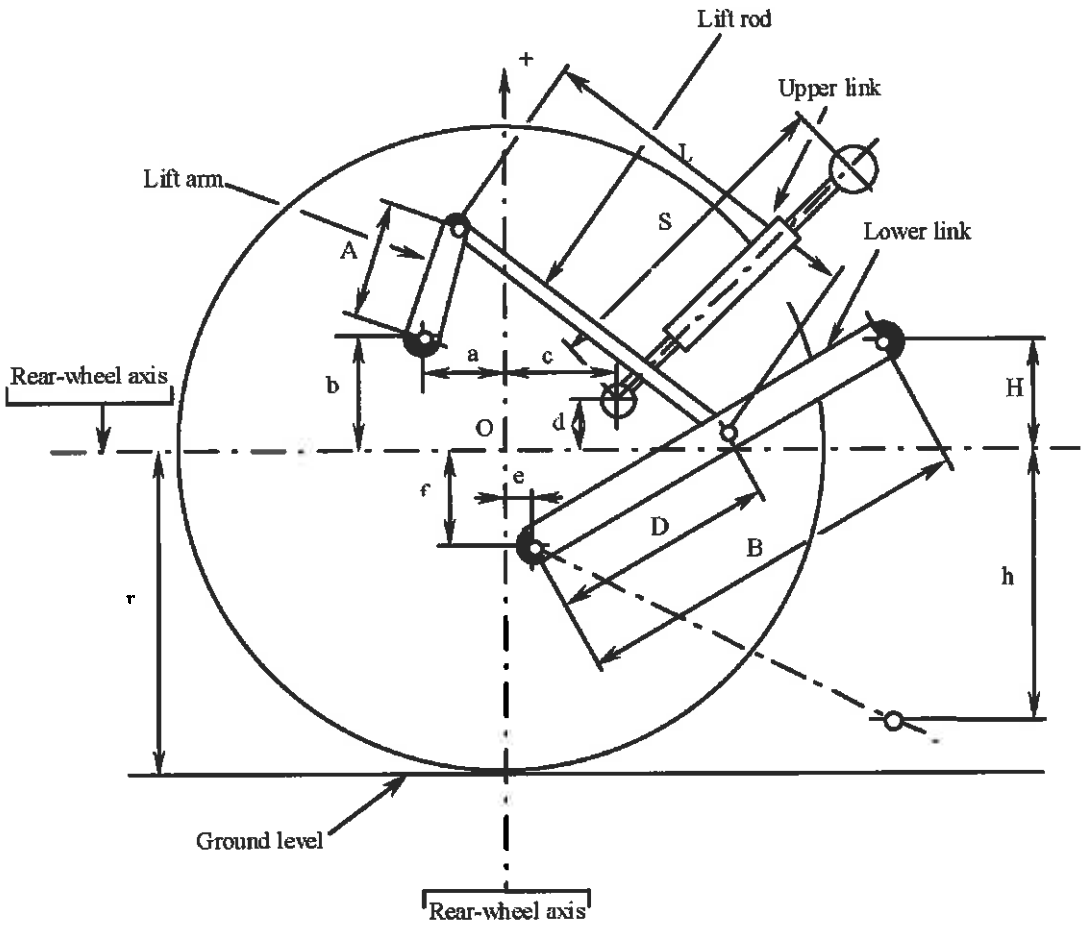
Not applicable

1.5 HYDRAULIC POWER LIFT

C	Make:	CNH
C	Model:	own drawing
C	Type:	draft and position control and float function
C	Type of hydraulic system:	open centre system
C	Type and number of cylinders:	1, single acting internal + 1 single acting external (optional, fitted on tested tractor)
C	Type of linkage lock for transport:	lift-o-matic device
D	Relief valve pressure setting:	19±1 MPa
D	Opening pressure of anti-shock valve:	21±0.5 MPa
D	Lift pump:	
	- Make:	BOSCH-REXROTH
	- Model:	Not announced
	- Type:	gear
D	Transmission between pump and engine:	By means of engine gears
C	Number and type of filters:	1, replaceable paper cartridge
C	Site of oil reservoir:	in common with transmission and rear axle
C	Number, type and location of tapping points:	2 control valves, double acting, 2 couple of couplers at rear of tractor
D	Maximum volume of oil available to external cylinders:	10 dm^3

1.6 THREE POINT LINKAGE

C	Category:	2nd, implement attachment with three point linkage and lower links in conformity with I.S.O. 730-1:1994+Cor.1:1995
C	Category adapter:	1st



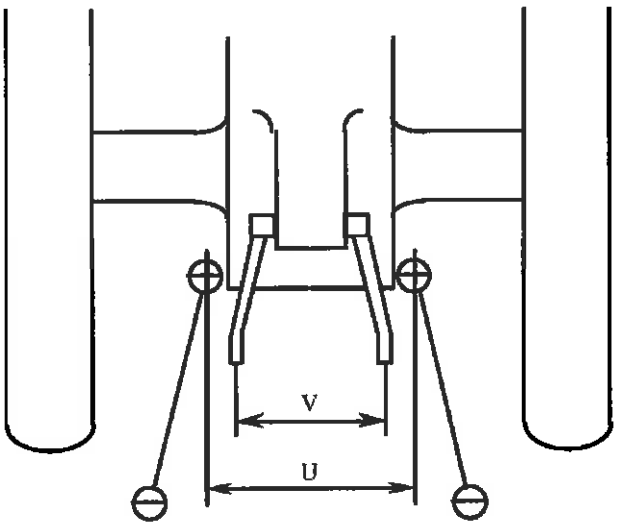


Figure 1. Lift test- Rear linkage geometry

Table 1. Dimension of rear linkage geometry (when connected to the standard frame)

			Dimension or range	Settings used in test[1]	
				Main	Additional
			mm	mm	mm
C	Length of lift arms:	(A)	255	255	255
C	Length of lower links:	(B)	940	940	940
	Distance of lift arm pivot point from rear wheel axis:				
C	- horizontally (rearward)	(a)	191	191	191
C	- vertically	(b)	296	296	296
C	Horizontal distance between the 2 lower link points:	(u)	475 or 505	475	475
C	Horizontal distance between the 2 lift arm end points:	(v)	495	495	495
C	Length of upper link:	(S)	580→870	705	715
	Distance of upper link pivot point from rear wheel axis:	(c)			
C	- horizontally (rearward)		400	400	400
C	- vertically	(d)	257 or 337	257	337
	Distance of lower link pivot point from rear wheel axis:				
C	- horizontally	(e)	130	130	130
C	- vertically	(f)	205	205	205
C	Distance of lower link pivot points to lift rod pivot points on lower links:	(D)	450 or 526	450	526
C	Length of lift rods:	(L)	510→640	640	615
	Height of lower hitch points (corresponding to travel of the lift without power) relative to the rear wheel axis:				
C	- in low position	(h)	250→605	570	495
C	- in high position	(H)	115→345	115	140
C	Height above ground of lower hitch points when locked in transport position[2,3]		1075→1090	1090	1075

[1] *Main setting in accordance with OECD Code specifications and additional setting requested by the manufacturer*

[2] *Assuming r=745 mm tyre dynamic radius index of 540/65 R 34 tyres on rear axle (ETRTO 1999 Ed.)*

[3] *Using the full extent of manual adjustment of lift rod as stated in paragraph 3.2.19 of ISO 730-1*

1.7 SWINGING DRAWBAR

C	Type:	SAUERMANN make, HS 1000 D-FT-S model, clevis type
	Height above ground	
C	- minimum:	362 mm
C	- maximum:	460 mm
C	Type of adjustment:	overturning the drawbar to position the fork uppermost or downmost
C	Distance of hitch point from rear-wheel axis, horizontally:	913-863-773 mm
	Distance of hitch point from PTO shaft end:	
C	- vertically:	271 mm
C	- horizontally:	391-341-251 mm
	Lateral adjustment (centre of clevis, in rearmost position):	
C	- right hand:	237 mm
C	- left hand:	237 mm
C	Distance of pivot point from rear-wheel axis, horizontally:	205 mm
C	Diameter drawbar pin hole:	27 mm
D	Maximum vertical permissible load:	14.7 kN (unballasted tractor) 13.8 kN (ballasted tractor)

1.8 TRAILER HITCH

C Optional, not fitted on tested tractor

1.9 HOLED DRAWBAR

C Optional, not fitted on tested tractor

1.10 STEERING

D	Make:	DANFOSS,
D	Model:	OSPC 100 OR
D	Type:	hydrostatic control with independent circuit
	Method of operation	
D	- pump:	BOSCH-REXROTH gear pump with oil suction from transmission case
D	- rams:	1 double acting ram acting directly on front axle
D	Working pressure:	14.0 MPa

1.11 BRAKES

1.11.1 Service brake

D	Make:	CNH
D	Model:	own drawing
D	Type:	oil immersed disk brakes, 2 disks fitted on rear right and left-hand differential axle shafts.
C	Method of operation:	hydrostatically operated with 2 independent hydraulic circuits for right and left-hand brakes, operated by separate pedals. Pedals are connected by means of a pin for simultaneous braking when driving on roads
C	Trailer braking take-off:	hydraulic brake system

1.11.2 Parking brake

C*	Type:	fully independent of service brake, with 5 oil bath sector disks double face and 2 single face, mounted on the pinion shaft in the gearbox
C	Method of operation:	mechanical operated by hand lever linked by means of a cable

*Checked on technical documents

1.12 WHEELS

	Number:	
C	- front:	2 steering
C	- rear:	2 driving
C	Wheelbase:	2342 mm
	Track width adjustment:	

		Minimum	Maximum	Adjustment method
		mm	mm	
D	Front	1407	2175	By extending the telescopic axle
D	Rear	1632	2132	Changing the position of the rims in respect to the disc

1.13 PROTECTIVE STRUCTURE

C	Make:	CNH
C	Model:	SLTV8
C	Type:	cab
C	Manufacture's name and address:	CNH International S.A. Modena, Italy
	Protective device	
C	- Cab/frame/rollguard/other):	cab
C	- Tiltable/not tiltable:	not tiltable
	OECD Approval	
C[1]	- Approval No:	3/1 425
C[1]	- Date of approval	20th February 2003
C[1]	- Number of minor modifications	from 1 to 2
D	EEC Approval:	Not announced

[1] Checked on ROPS Testing Station's documents

1.14 SEAT

1.14.1 Driver's seat

C	Make:	GRAMMER
C	Model:	MSG 85/721
C	Type:	mechanical suspension
C	Seat and steering wheel reversible:	No
C	Type of suspension:	parallelogram linkage
C	Type of damping:	hydraulic
	Range of adjustment:	
C	- longitudinal:	210 mm
C	- vertical:	60 mm
C	Safety belt:	Yes
	- Type:	pelvic

1.14.2 Optional driver's seat

Make	Model	Type of suspension	Type of dumping	Range of adjustment	
				Longitudinally	Vertically
				mm	mm
GRAMMER	MSG 95A/721	Pneumatic	Hydraulic	170	80
SEARS EUROPE	CNH Drawing 47125336	Mechanical	Hydraulic	152	60
SEARS EUROPE	CNH Drawing 47131666	Pneumatic	Hydraulic	200	76

1.14.3 Passenger seat

C	Location:	on the left side and to rear of the driver's seat
C	Capacity (number of places):	1

1.15 LIGHTING

		Height above ground of centre[1]	Size	Distance from outside edge of lights to median plane of tractor
		mm	mm	mm
C	Headlights[2]	1060	180x150	280
C	Front direction lights	1675	110x70	860
C	Side front work lights[2]	1255	130x240	280
C	Position/Stop lights	1600	80x65	958
C	Rear lower direction lights	1600	80x65	798
C	Rear upper direction lights	2475	115x70	820
C	Lower reflectors	1600	80x65	878
C	Upper reflectors	1740	235x55	1050

[1] *Assuming r=745 mm tyre dynamic radius index of 540/65R34 tyres on the rear axle (ETRTO 1999 Ed.*
[2] *With round shape*

2 TEST CONDITIONS

2.1 OVERALL DIMENSIONS

	Length	Width		Height at top of*	
		minimum	maximum	protective structure	exhaust pipe
	mm	mm	mm	mm	mm
Ballasted	4345	2012	2682	2535	2510
Unballasted	3900	2012	2682	2530	2505

**Assuming r=745 mm tyre dynamic radius index of 540/65R34 tyres on the rear axle (ETRTO 1999 Ed.)*

2.2 GROUND CLEARANCE

Unballasted tractor: 385 mm
Clearance-limiting part: swinging drawbar

2.3 TRACTOR MASS

	Ballasted		Unballasted	
	without driver	with driver	without driver	with driver
	kg	kg	kg	kg
Front	1920	1930	1265	1275
Rear	2750	2815	2575	2640
Total	4670	4745	3840	3915

2.4 BALLAST

	Masses		Water
	Number	Total mass	
		kg	kg
Front mass	10	440	None
Rear wheels	6	300	None
Front support	1	90	None

2.5 TRACK SPECIFICATIONS

None

2.6 TYRES AND TRACK WIDTH SPECIFICATIONS

	Front	Rear
Tyres:		
- make	PIRELLI	PIRELLI
- model	TD 500	TM 800
- dimensions	10.00-16	540/65R34
- ply rating	8 PR	------
- load index*/speed	115/not applicable	145 A8
- type	cross-ply	radial
- maximum load*	11.57 kN	28.45 kN
- inflation pressure*	280 kPa	160 kPa
- dynamic radius index*	not applicable	745 mm
- maximum overall diameter in service*	925 mm	------
Chosen track width:	1650 mm	1632 mm
**ETRTO Standard Manual, 1999 Edition*		

2.7 FUEL

Type: ERG DIESEL oil, in conformity with national standard.
Density at 15 °C: 0.840 g/cm^3

2.8 OILS AND LUBRICANT

2.8.1 Capacity and change interval

	Capacity	Oil change	Filter change
	dm^3	h	h
Engine with filter	10	600	600
Gearbox with rear axle, final drive, brakes, hydraulic lift, power take-off and hydrostatic steering	60.5	1200	300
Brake control circuit	0.4	Max. level	None

2.8.2 Specifications (SAE, API, CCMC, ACEA, Mil.L, ISO)

	Recommended	Used during test
Engine oil - Type: - Viscosity: - Classification:	AMBRA MASTERGOLD 12.50 cSt HSP 15W-40 API CH-4 ACEA E5	As recommended
Transmission oils - Type: - Viscosity: - Classification	AMBRA MULTI G 11.50 cSt API GL4 ISO 32/46 SAE 10W-30	As recommended
Hydraulic fluid - Type: - Viscosity: - Classification	AMBRA MULTI G 11.50 cSt API GL4 ISO 32/46 SAE 10W-30	As recommended
Steering oil - Type: - Viscosity: - Classification:	AMBRA MULTI G 11.50 cSt API GL4 ISO 32/46 SAE 10W-30	As recommended
Brake oil - Type: - Viscosity: - Classification:	AMBRA BRAKE LHM Not announced ISO 7308	As recommended

2.8.3 Grease

Type:	AMBRA GR9
Classification.	NLGI 2
Number of lubrication points:	15

3 COMPULSORY TESTS RESULTS

3.1 MAIN POWER TAKE-OFF

Date and location of tests: 12th October 2004, I.M.A.MO.TER, TORINO, ITALY
Type of dynamometer: Parasitic currents, BORGHI&SAVERI FA300-30SP

Power	Speed			Fuel consumption			Specific energy
	Engine	P.t.o.	Fan	Hourly		Specific	
kW	rev/min			kg/h	l/h	g/kWh	kWh/l
3.1.1	**MAXIMUM POWER-TWO HOUR TEST**						
53.9	2398	1007	2907	15.26	18.17	283	2.97
3.1.2	**POWER AT RATED ENGINE SPEED**						
53.3	2507	1053	3022	15.50	18.45	291	2.89
3.1.3	**STANDARD POWER TAKE OFF SPEED (1000±25 rev/min)**						
53.9	2398	1007	2907	15.26	18.17	283	2.97
3.1.4	**PART LOADS**						
3.1.4.1	**The torque corresponding to maximum power at rated engine speed**						
53.3	2507	1053	3022	15.50	18.45	291	2.89
3.1.4.2	**85% of torque obtained in 3.1.4.1[1]**						
48.2	2643	1110	3331	15.17	18.06	314	2.67
3.1.4.3	**75% of torque defined in 3.1.4.2[1]**						
37.5	2657	1116	3325	13.00	15.48	347	2.42
3.1.4.4	**50% of torque defined in 3.1.4.2[1]**						
24.1	2669	1121	3351	10.13	12.06	421	2.00
3.1.4.5	**25% of torque defined in 3.1.4.2[1]**						
14.3	2674	1123	3324	7.70	9.17	537	1.57
3.1.4.6	**unloaded**						
-	2686	1128	3383	5.56	6.62	-	-
3.1.5	**PART LOADS AT STANDARD POWER TAKE OFF SPEED (1000±25 rev/min)**						
3.1.5.1	**the torque corresponding to maximum power**						
53.9	2398	1007	2907	15.26	18.17	283	2.97
3.1.5.2	**85% of torque obtained in 3.1.5.1[1]**						
48.4	2560	1075	3091	14.33	17.06	296	2.84
3.1.5.3	**75% of torque defined in 3.1.5.2[1]**						
38.5	2574	1081	3110	12.51	14.89	325	2.58
3.1.5.4	**50% of torque defined in 3.1.5.2[1]**						
22.0	2591	1088	3120	9.47	11.27	431	1.95
3.1.5.5	**25% of torque defined in 3.1.5.2[1]**						
10.3	2598	1091	3140	7.24	8.62	704	1.19
3.1.5.6	**unloaded**						
-	2600	1092	3145	5.58	6.64	-	-

[1] *Not possible to obtain requested percentage of torque because of the unsteadiness of engine speed caused by visco-fan discontinuous work. Nearer values quoted.*

Power	Speed			Fuel consumption			Specific energy
	Engine	P.t.o.	Fan	Hourly		Specific	
kW	rev/min			kg/h	l/h	g/kWh	kWh/l
3.1.6	**PART LOADS AT DIFFERENT ENGINE SPEEDS**						
3.1.6.1	**maximum power at rated engine speed**						
53.3	2507	1053	3022	15.50	18.45	291	2.89
3.1.6.2	**80% of power obtained in 3.1.6.1 at max speed setting[2]**						
42.5	2657	1116	3293	13.39	15.94	315	2.67
3.1.6.3	**80% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed**						
42.4	2262	950	2745	11.81	14.06	279	3.01
3.1.6.4	**40% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed**						
21.4	2245	943	2810	8.08	9.62	377	2.23
3.1.6.5	**60% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed[3]**						
31.5	1502	631	1180	8.01	9.54	254	3.31
3.1.6.6	**40% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed[3]**						
21.5	1493	627	1862	5.76	6.86	268	3.13

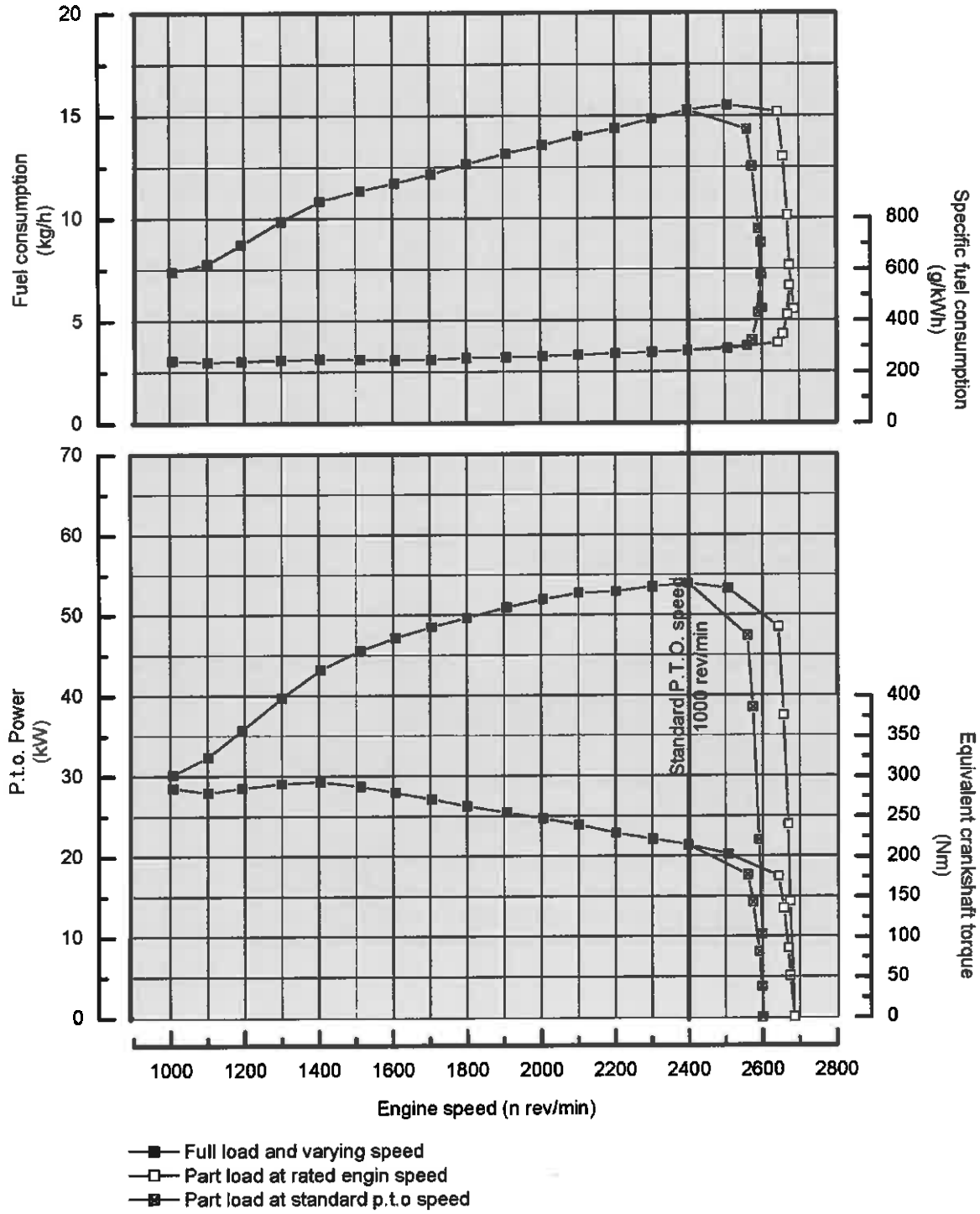
[2] *Different torque at the same engine speed of 3.1.4.3 because of discontinuous work of visco-fan.*
[3] *Not possible to obtain requested engine power or engine speed because of the unsteadiness of engine speed caused by visco-fan discontinuous work. Nearer values quoted.*

No load maximum engine speed: 2686 rev/min
Torque (equivalent crankshaft) at maximum power:
- at rated engine speed: 202.9 Nm
- at 2 hour test: 214.6 Nm

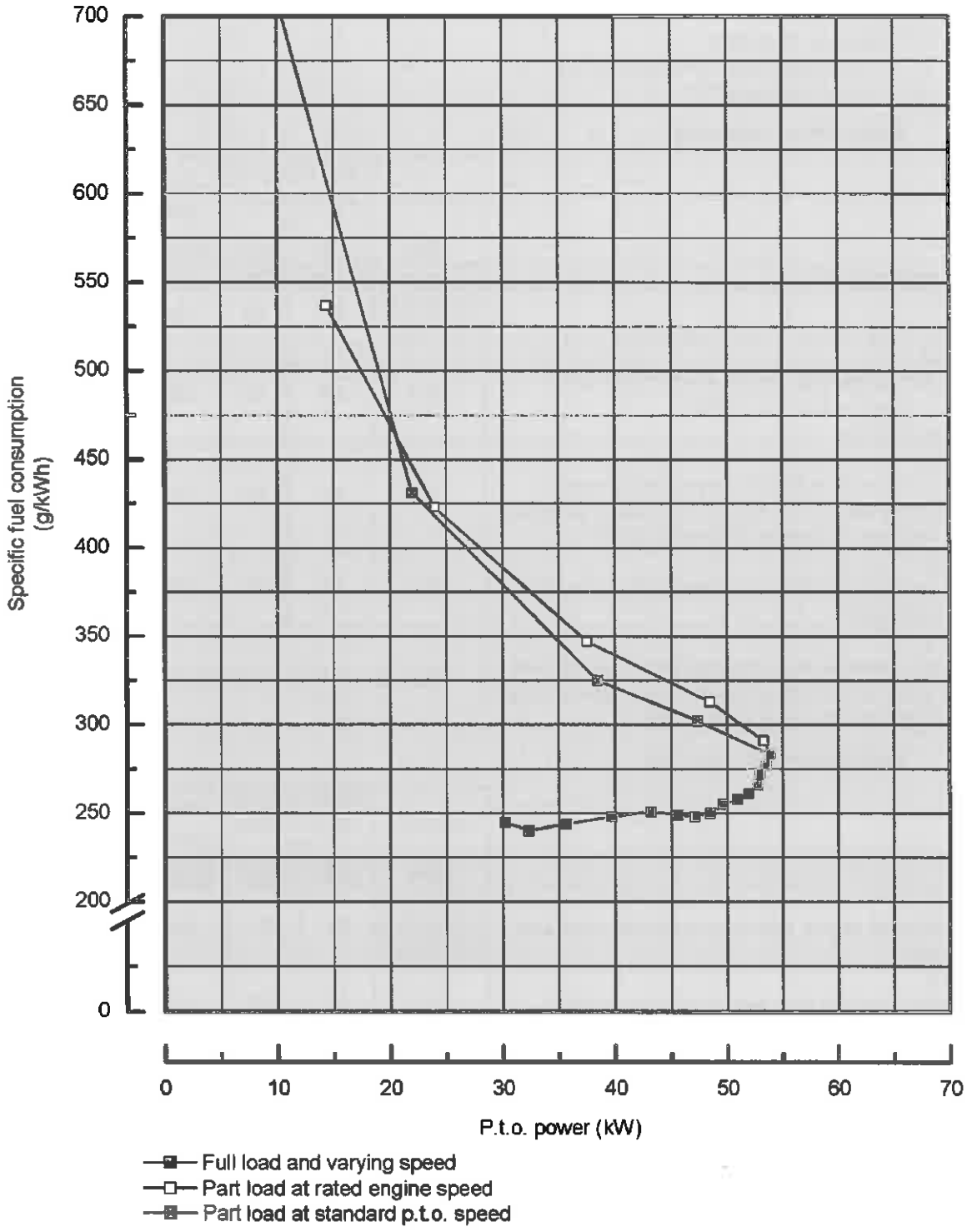
Maximum torque (equivalent crankshaft): 293.6 Nm at 1405 rev/min of the engine

Mean atmospheric conditions	
Temperature	17.5 °C
Pressure	99.4 kPa
Relative humidity	50%
Maximum temperature	
Coolant	85.4 °C
Engine oil	109.5 °C
Fuel	39.6 °C
Engine air intake	21.2°C

Graph 1. Power take-off test



Graph 2. Power take-off test



3.2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 26th October 2004

3.2.1 Hydraulic Power Test

3.2.1.1 Hydraulic fluid data

Hydraulic fluid data:
- **Viscosity index (ASTM D2270):** 130
- Viscosity at 65°C: 25 cST

3.2.1.2 Compulsory reporting:

	Pressure	Reservoir oil Temperature °C		Engine speed	Flow rate	Power
	MPa	min.	max.	rev/min^{-1}	l/min	kW
Rated engine speed				2500		
3.2.1.2.1 Pump delivery rate at minimum pressure		60	70	2675	62.2	
3.2.1.2.2 Maximum (sustained) pressure with relief valve open as measured at the coupler Pump stalled: No	19.5	60	70	2675		
3.2.1.2.3 Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power	17.6	60	70	2675	49.8	14.7
3.2.1.2.4 Maximum available flow and maximum power from one coupler pair:	17.0	60	75	2675	54.4	15.4
3.2.1.2.5 Maximum available flow and maximum power from coupler pairs operating simultaneously (flow through two or more coupler pairs if required):	Maximum power available from one couple pair					

3.2.1.3 Supplementary reporting

	Pressure	Reservoir oil Temperature °C		Engine speed	Flow rate	Power
	MPa	min.	max.	rev/min^{-1}	l/min	kW
3.2.1.3.1 Pump delivery rate at minimum pressure from one couple pair		60	70	2500	57.8	
3.2.1.3.2 Maximum available flow and maximum useable (*continuous*) power from one coupler:	16.5	60	75	2500	48.3	13.3
3.2.1.3.3 Maximum available flow and maximum useable (*continuous*) power from pairs operating simultaneously (flow through two coupler pairs):	Maximum power available from one couple pair					
3.2.1.3.4 Maximum differential pressure Category 1 Tractor						
3.2.1.3.5 Maximum differential pressure Category 2 or 3 Tractor	16.8	60	75	2500	50.00	
3.2.1.3.6 Peak Pressure	19.3	60	75	2500		
3.2.1.3.7 Maximum sump return pressure with coupler	0.8	60	75	2500		
3.2.1.3.8 Maximum return pressure without coupler						

3.2.2 Power lift test

3.2.2.1 Rear power lift

Linkage settings for tests - see Table 1.1 and Figure 1.1 and 1.2

3.2.2.1.1 Main setting

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	175 mm	175 mm
Vertical movement (of the point of application of the force) - with power travel of the lift - without power travel of the lift	 650 mm 685 mm	 685 mm 780 mm
Maximum corrected force exerted through full range	32.0 kN	26.5 kN
Corresponding pressure of hydraulic fluid	17.6 MPa	17.6 MPa
Moment about rear-wheel axis	34.2 kNm	44.5 kNm
Maximum tilt angle of mast from the vertical	Not applicable	3.8 degrees

Lifting heights (of the point of application of the force) relative to the horizontal plane including the lower link pivot points											
mm	-365	-350	-250	-150	-50	0	50	150	250	285	335
Lifting forces (the values of force measured shall be corrected to correspond to a hydraulic pressure equivalent to a 90% of the actual relief valve pressure setting of the hydraulic lift system):											
at the hitch points kN	32.0	32.2	33.8	34.3	34.4	34.3	33.9	33.7	33.5	33.5	-----
Corresponding pressure: 17.6 MPa											
at the frame kN	-----	35.1	33.4	32.3	31.1	30.4	29.5	28.3	27.6	27.2	26.5
Corresponding pressure: 17.6 MPa											

3.2.2.1.2 Additional setting

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	250 mm	250 mm
Vertical movement (of the point of application of the force) - with power travel of the lift - without power travel of the lift	 615 mm 635 mm	 520 mm 580 mm
Maximum corrected force exerted through full range	36.7 kN	33.4 kN
Corresponding pressure of hydraulic fluid	17.6 MPa	17.6 MPa
Moment about rear-wheel axis	39.3 kNm	56.1 kNm
Maximum tilt angle of mast from the vertical	Not applicable	0.5 degrees

Lifting heights (of the point of application of the force) relative to the horizontal plane including the lower link pivot points										
mm	-290	-240	-160	-60	0	50	150	250	280	325
Lifting forces (the values of force measured shall be corrected to correspond to a hydraulic pressure equivalent to a 90% of the actual relief valve pressure setting of the hydraulic lift system):										
at the hitch points kN	37.3	38.4	39.4	39.6	39.2	39.0	38.0	37.0	36.9	36.7
Corresponding pressure: 17.6 Mpa										
at the frame kN	----	45.0	44.0	41.8	40.1	38.8	36.1	34.1	33.4	----
Corresponding pressure: 17.6 MPa										

3.3 DRAWBAR POWER TEST (ballasted and unballasted tractor)

Date of tests: 8th-9th November 2004
Type of track: Asphalt

	Height of hitch above ground	Tyre inflation pressure	
		Front	Rear
Unballasted	465 mm	240 kPa	100 kPa
Ballasted	460 mm	240 kPa	100 kPa

Gear number and range	Power	Drawbar pull	Speed	Engine speed	Fan speed	Slip of wheels	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/l	°C	°C	°C	°C	%	kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)														
1 Medium	27.9	27.9	3.6	2589	2171	15.2	548	1.53	27	92	107	10	41	98.5
4 Low	34.8	27.2	4.6	2552	2373	14.8	443	1.90	27	92	106	11	40	98.5
2 Medium	38.2	27.5	5.0	2402	3080	14.3	401	2.10	26	92	108	11	40	98.5
3 Medium	40.1	18.5	7.8	2399	2076	6.6	382	2.20	26	93	106	12	40	98.5
1 High	40.8	16.7	8.8	2392	2245	5.8	372	2.26	26	93	107	11	42	98.5
4 Medium	40.9	12.8	11.5	2390	3480	4.5	372	2.26	26	93	107	12	40	98.5
2 High	40.3	10.6	13.7	2404	1792	4.0	379	2.21	25	93	106	11	40	98.5
3 High	34.0	6.4	19.1	2386	2386	2.9	448	1.88	26	93	106	10	40	98.5
3.3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)														
1 Low	13.7	30.8	1.6	2601	3082	14.7	1118	0.75	26	88	104	11	41	98.5
2 Low	20.1	30.2	2.4	2596	3099	15.0	760	1.11	25	90	106	12	41	98.5
3 Low	26.4	29.7	3.2	2586	3056	15.6	580	1.45	25	91	105	13	38	98.5
1 Medium	29.6	29.6	3.6	2575	3863	15.0	517	1.63	25	90	105	14	37	98.5
4 Low	37.4	29.9	4.5	2452	3165	14.9	412	2.04	26	91	106	10	38	98.5
2 Medium	40.6	27.6	5.3	2395	3508	8.9	377	2.23	24	90	107	11	37	98.5
3 Medium	41.3	18.8	7.9	2395	3382	5.4	371	2.27	25	90	108	12	37	98.5
1 High	41.5	16.6	9.0	2401	3187	4.7	369	2.28	26	88	107	11	37	98.5
4 Medium	40.3	12.4	11.7	2406	3409	3.7	380	2.21	25	90	108	11	37	98.5
2 High	40.2	10.4	13.9	2408	3394	3.4	381	2.20	24	87	107	11	38	98.5
3 High	32.5	6.1	19.2	2380	3142	2.4	467	1.80	25	86	108	11	37	98.5
3.3.3 FIVE-HOUR TEST														
3.3.3.1 FIVE-HOUR TEST at 75% of the pull corresponding to maximum power at rated speed														
1 High	33.3	12.5	9.6	2554	2670	4.0	462	1.82	24	88	106	9	45	98.4
3.3.3.2 FIVE-HOUR TEST at pull corresponding to 15% wheelslip (with 300 kg additional ballast)														
4 Low	38.5	30.1	4.6	2431	2520	⌘	⌘	2.11	26	85	107	10	41	98.4
⌘ The test was carried out with additional ballast; the not quoted figures are irrelevant														

Oil consumption during ten hours duration of test 3.3.3.1 and 3.3.3.2: 12 g/h

3.4 TURNING AREA AND TURNING CIRCLE

Wheels equipment
- front: 10.00-16
- rear: 540/65R34

Track width:
- front: 1650 mm
- rear: 1632 mm

	Without brakes	
	Right-hand	Left-hand
	m	m
Radius of turning area	4.10	4.10
Radius of turning circle	3.95	3.95

3.5 LOCATION OF CENTRE OF GRAVITY

Height above ground	945 mm
Distance forward from the vertical plane, containing the axis of the rear wheels	763 mm
Distance from the median plane of the tractor: to the left	3 mm

3.6 BRAKING

Date of tests: 5th November 2004

Laden mass on axels:
- front (maximum technically permissible) 2200 kg
- rear 3500 kg
- total 5700 kg

3.6.1 Cold service braking device test

Unballasted tractor			
Speed before application of brake	Braking device control force	Mean deceleration	Minimum stopping distance without locking the wheels
km/h	kN	m/s^2	m
30.0	0.11	1.54	22.6
29.9	0.17	2.25	15.3
30.1	0.24	2.65	13.2
30.9	0.28	3.10	11.9
30.5	0.32	3.26	11.0
30.1	0.36	3.46	10.1

Maximum deviation of the tractor from its original course: none

Abnormal vibration: none

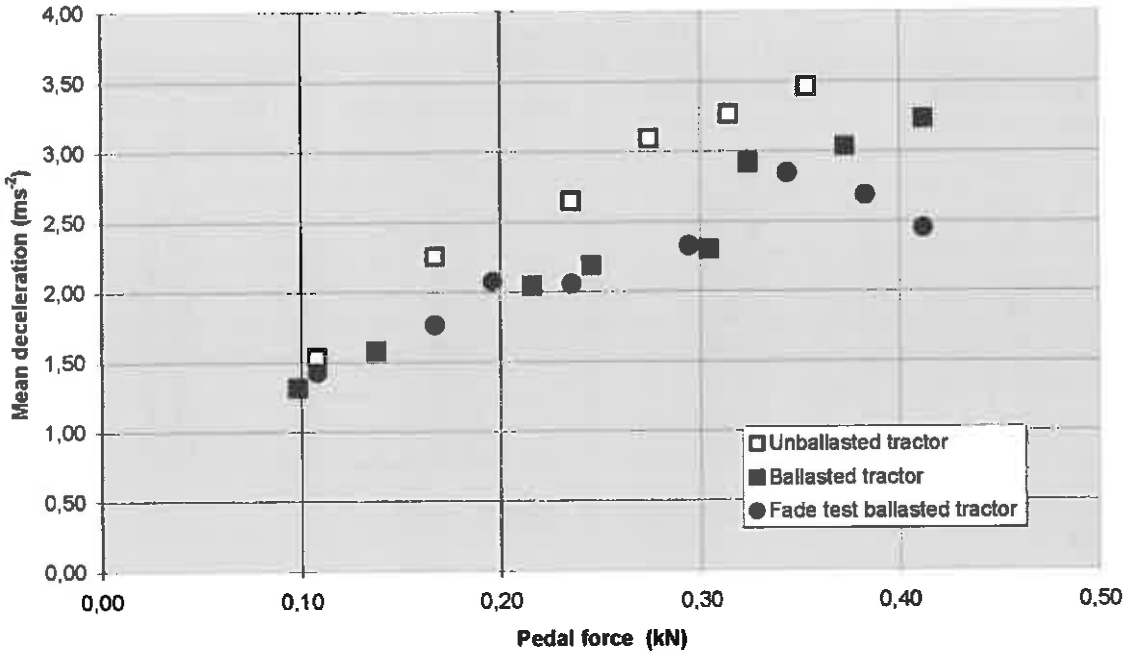
Ballasted tractor			
Speed before application of brake	Braking device control force	Mean deceleration	Minimum stopping distance without locking the wheels
km/h	kN	m/s^2	m
30.4	0.10	1.32	27.1
29.1	0.14	1.58	20.7
31.2	0.22	2.04	18.4
29.1	0.25	2.19	14.9
31.0	0.30	2.30	16.1
31.0	0.32	2.92	12.7
31.1	0.37	3.03	12.3
30.5	0.41	3.23	11.1

Maximum deviation of the tractor from its original course: none
Abnormal vibration: none

3.6.2 Fade test

Ballasted tractor			
Speed before application of brake	Braking device control force	Mean deceleration	Minimum stopping distance without locking the wheels
km/h	kN	m/s^2	m
31.0	0.11	1.43	26.0
30.0	0.17	1.76	19.7
29.5	0.20	2.07	16.2
30.0	0.24	2.05	16.9
30.0	0.29	2.33	14.9
30.0	0.34	2.85	12.2
31.0	0.38	2.69	13.8
29.5	0.41	2.45	13.7

Maximum deviation of the tractor from its original course: none
Abnormal vibration: none
Brake heating method: by means of towing the tractor for 1 km at 80% of maximum speed with a pedal force corresponding to a deceleration of 1 ms^{-2} in cold brakes test



3.6.3 Parking braking device test

	Uphill	Downhill
Braking device control force	0.20 kN	0.20 kN

3.7 MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests:	5th November 2004
Sound level meter make, model and type:	RION make, NA 29 E model, impulse precision type
Type of track:	Asphalt
Gear number:	4 High
Travelling speed before acceleration:	23 km/h
Sound level:	Left side 84.1 dB(A) Right side 84.5 dB(A)

4 OPTIONAL TEST RESULTS

None

5 REPAIRS

None

6 REMARKS

None

7 ANNEX

None

The Head of the Section
E. CAVALLO

The Director
G.L. ZAROTTI

Torino, 10th June 2005