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

OECD Approval No.: 1/2 079
Date of Approval: 27th August 2003

Report No. 2764/T/2003

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

Make: **CASE IH**

Trade Name: **JX 90 U**

Type: **2 WD, 30 km/h, 24+12 speeds with Hi-Lo transmission**



Manufactured by: CNH International S.A.
13, Rue Aldringen
L-1118 Luxembourg
Luxembourg

Date and location of the tests: 2003 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.

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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:	CASE IH
C	Trade name or model:	JX 90 U
C	Type:	2WD

1.1.1 Numbers

D	1st Serial N°:	001227409
C	Serial N°:	001280293

1.1.2 Other specification

D	Model for other countries:	Not applicable
C	Transmission type or gears x ranges:	24+12 speeds with Hi-Lo transmission
C	Speed version:	30 km/h
D	Manufacturer identification:	JXU3C2AB

1.2 ENGINE

C	Make, model and type:	IVECO, 8045.25 model, Diesel direct injection type, 4 cycles
C	Serial N°:	509-864309

1.2.1 Cylinders

C	Number and disposition:	4, vertical, in line
D	Bore x stroke:	104x115 mm
D	Capacity:	3908 cm^3
D	Compression ratio:	16.5:1
D	Arrangement of valves:	Overhead
D	Cylinder liners:	Wet

1.2.2 Supercharging

C	Make, Model and Type:	Garrett, TA 3118
D	Pressure:	62 kP

1.2.3 Fuel system

C	Fuel feed system:	Rotary injection pump with centrifugal speed governor, operating at all speed and incorporating automatic advance
C	Make, model and type of fuel filter(s):	N° 2 CNH make, with replaceable cartridge and n°1 mesh filter inside the fuel feed pump
D	Capacity of fuel tank:	115 dm^3, placed under the tractor platform, on the left side
C	Make/Model/Type of injection pump:	BOSCH make, L793 type, rotary injection pump.
C	Serial N°:	Not applicable
	Manufacturer's production setting of injection pump:	
C	- flow rate:	60.20 mm^3/stroke at rated speed and full load corresponding 18.06 dm^3/h
D	- timing:	7±0.5° before TDC
D	Make/Model/Type of injectors:	BOSCH make, DLLA 132S type, multihole injection nozzles.
D	Injection pressure:	26±1 MPa
C	Make/Model/Type of carburettor:	Nota applicable

1.2.4 Governor

C	Make, model and type:	BOSCH make, mechanical, mechanical type, incorporated in the fuel pump
C	Governed range of engine speed:	750-2708 rev/min
C	Rated engine speed:	2500 rev/min

1.2.5 Air cleaner

	Pre-cleaner:	
C	- Make:	CNH
C	- Model:	1930589
C	- Type:	dry air filter
C	Location of air intake:	on front of the radiator under the bonnet cowling
	Main cleaner	
C	- Make:	CNH
C	- Model:	1930590
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 feed by means of gear pump. Engine oil cooling is provided by a heat exchanger using engine coolant
C	Type of filter(s):	replaceable cartridge type, installed on the pressure line of the engine and wire mesh type, installed on the pump suction line.
C	Number of filters:	2

1.2.7 Cooling System

C	Type of coolant:	water
D	Type of pump:	centrifugal blade pump
	Specification of fan or blower	visco-fan driven by engine shaft
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, model and type:	BOSCH make, 4807375 type, electromagnetic engagement.
D	Starter motor power rating:	3,5 kW
C	Cold starting aid:	LUCAS make, thermostart type
C	Safety device:	clutch engagement

1.2.9 Electrical system

C	Voltage:	12 V, negative earth
	Generator:	
C	- Make:	MARELLI
C	- Model:	456 CW27
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, model and type:	CNH made, 5182593, interference type with internal perforated pipe
C	Location:	on the left 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, model and type:	LUK make, own drawing model, dry single disc for travel and wet multiple disks for PTO
D	Number of plates:	1 for clutch used for travelling and 5 for clutch used for PTO engagement
D	Diameter of plates:	305 mm for travelling and 127 mm for PTO
C	Method of operation:	mechanically operated by pedal for travel, hydraulically operated by pull/push button for PTO engagement/disengagement

1.3.2 Gearbox

D	Make, model and type:	CNH make, own drawing model, HI-LO type
	Description:	synchronized constant mesh gears directly engaged by hand levers

		Forward	Reverse
C	Number of ranges	3 (slow, medium and fast)	3 (slow medium and fast)
C	Number of gears	4	4
C	Number of groups	2 (HI-LO)	None
C	Total of arrangements	24	12

D	- Available options:	Not applicable

1.3.3 Rear axle and final drives

D	Make, model and type	CNH, own drawing, bevel gear differential and epyciclic final drivers
	Differential lock:	
D	- Type:	Mechanical
C	- Method of engagement/disengagement	locking device operated by pedal

1.3.4 Front axle and final drives

D	Make, model and type:	CNH, own drawing, centrally pivoted, 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

	Gear No.	Range and group	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed of 2500 min^{-1} (rev/min) km/h
			Forward	
C	1	Slow LO	444.533	1.579
C	1	Slow HI	390.322	1.798
C	2	Slow LO	305.854	2.295
C	2	Slow HI	268.555	2.613
C	3	Slow LO	212.164	3.308
C	1	Medium LO	190.326	3.687
C	3	Slow HI	186.290	3.767
C	1	Medium HI	167.116	4.199
C	4	Slow LO	148.107	4.738
C	2	Medium LO	130.951	5.359
C	4	Slow HI	130.045	5.397
C	2	Medium HI	114.981	6.104
C	3	Medium LO	90.838	7.726
C	1	Fast LO	80.843	8.681
C	3	Medium HI	79.760	8.799
C	1	Fast HI	70.984	9.887
C	4	Medium LO	63.412	11.067
C	4	Medium HI	55.678	12.604
C	2	Fast LO	55.623	12.617
C	2	Fast HI	48.840	14.369
C	3	Fast LO	38.584	18.189
C	3	Fast HI	33.879	20.715
C	4	Fast LO	26.935	26.055
C	4	Fast HI	23.650	29.674
			Reverse	
C	1	Slow LO	396.994	1.768
C	2	Slow LO	273.146	2.569
C	3	Slow LO	189.474	3.704
C	1	Medium LO	169.972	4.129
C	4	Slow LO	132.268	5.306
C	2	Medium LO	116.947	6.001
C	3	Medium LO	81.123	8.651
C	1	Fast LO	72.198	9.720
C	4	Medium LO	56.630	12.393
C	2	Fast LO	49.674	14.128
C	3	Fast LO	34.458	20.367
C	4	Fast LO	24.054	29.176

(*) Calculated with a tyre 480/70 R 34 with dynamic radius index 745 mm (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:	Independent electro-hydraulic
C	Method of engagement:	Engaged and disengaged by pulling/pushing a button, driven by multiplate wet clutch independent of travel clutch
C	Number of shafts:	1
C	Method of changing power take-off shaft ends and speeds:	Optional, not fitted on tested tractor: removing circlip, swapping shaft and replace circlip

1.4.1.1 Power take-off proportional to engine speed

<u>Power take-off at 540 rev/min</u>

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:	730 mm
C	Distance from the median plane of the tractor:	0 mm
C	Distance behind rear-wheel axis:	550 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):	4.0716
D	Power restriction:	None
D	Maximum torque transmissible:	engine torque
C	Direction of rotation (viewed from behind tractor):	clockwise

<u>Power take-off at 750 rev/min</u> (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:	730 mm
C	Distance from the median plane of the tractor:	0 mm
C	Distance behind rear-wheel axis:	550 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
D	Direction of rotation (viewed from behind tractor):	clockwise

Power take-off at 1000 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:	21, in conformity with ISO 500-1991 Type 2
C	Height above ground:	730 mm
C	Distance from the median plane of the tractor:	0 mm
C	Distance behind rear-wheel axis:	550 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
D	Direction of rotation (viewed from behind tractor):	clockwise

1.4.1.2 **Power take-off proportional to ground speed** (as option, not fitted on tested tractor)

540 rev/min

C	Travelling distance for one revolution of power take-off shaft:	0.53 m
C	Number of PTO shaft revolution for 1 revolution of rear wheels:	8.9
C	Direction of rotation (viewed from behind tractor):	clockwise

750 rev/min

C	Travelling distance for one revolution of power take-off shaft:	0.41 m
C	Number of PTO shaft revolution for 1 revolution of rear wheels:	11.4
C	Direction of rotation (viewed from behind tractor):	clockwise

1000 rev/min

C	Travelling distance for one revolution of power take-off shaft:	0.31 m
C	Number of PTO shaft revolution for 1 revolution of rear wheels:	15.2
C	Direction of rotation (viewed from behind tractor):	clockwise

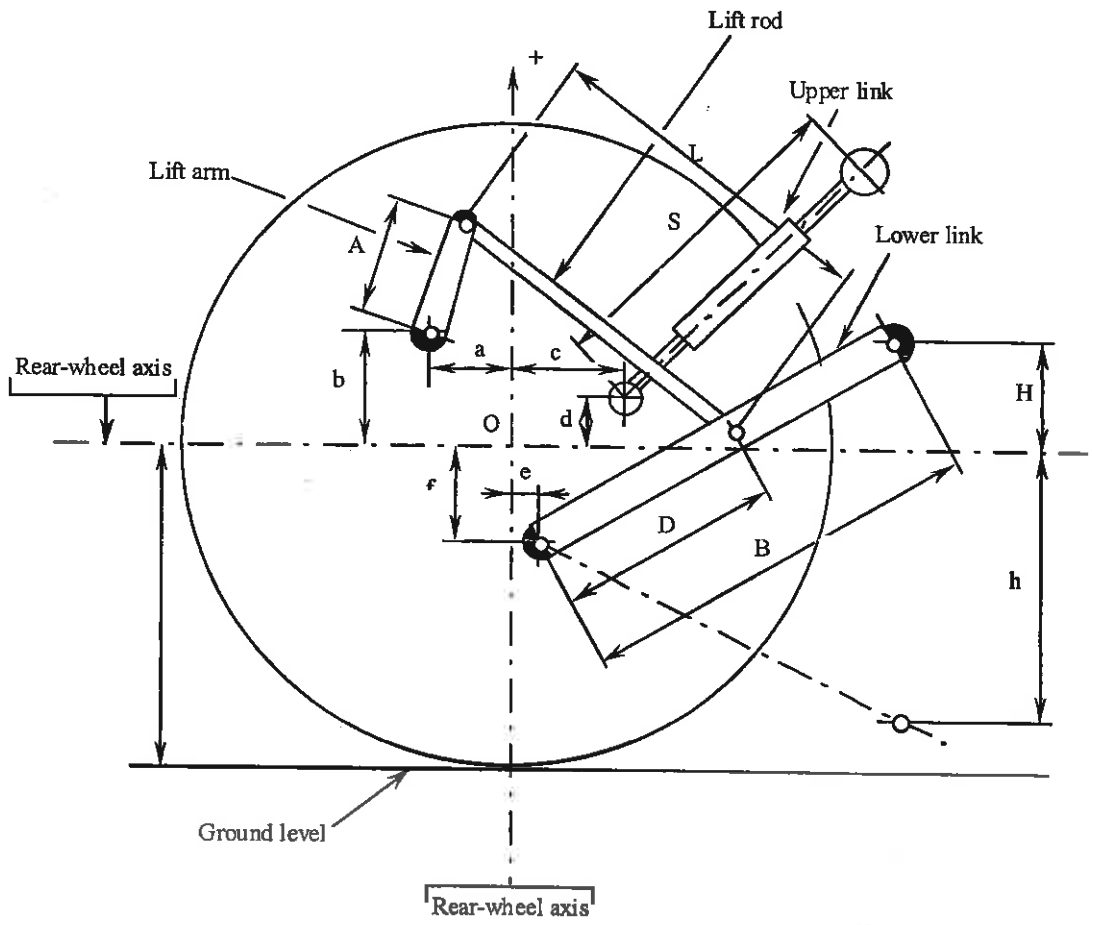
1.4.2 **Optional power take-off**

None

1.5 HYDRAULIC POWER LIFT

C	Make, model and type:	own make, draft and position control and float function; electronically controlled
C	Type of hydraulic system:	open centre system
C	Type and number of cylinders:	1, single acting internal + 1 single acting external
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 and type:	BOSCH make, 0 510 725 085 model, rotative type driven by the engine shaft.
D	Transmission between pump and engine:	mechanical
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



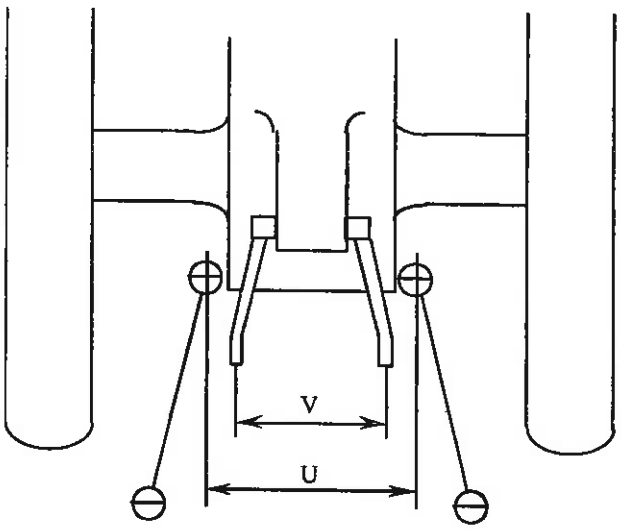


Figure 1. Lift test- Rear linkage geometry

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

			Dimension or range	Settings used in test
			mm	mm
C	Length of lift arms:	(A)	255	255
C	Length of lower links:	(B)	965	965
	Distance of lift arm pivot point from rear wheel axis:			
C	- horizontally (rearward)	(a)	135 rearward	135 rearward
C	- vertically	(b)	300	300
C	Horizontal distance between the 2 lower link points:	(u)	450-475	450
C	Horizontal distance between the 2 lift arm end points:	(v)	510	510
C	Length of upper link:	(S)	from 585 to 875	680
	Distance of upper link pivot point from rear wheel axis:			
C	- horizontally (rearward)	(c)	400	400
C	- vertically	(d)	255 or 335	255
	Distance of lower link pivot point from rear wheel axis:			
C	- horizontally	(e)	135	135
C	- vertically	(f)	205	205
C	Distance of lower link pivot points to lift rod pivot points on lower links:	(D)	465 or 540	465
C	Length of lift rods:	(L)	from 510 to 700	605
	Height of lower hitch points relative to the rear wheel axis:			
C	- in low position	(h)	from 745 to 400	545
C	- in high position	(H)	from 60 to 305	175
C	Height above ground of lower hitch points when locked in transport position		from 805 to 1050	920

Assuming r=745 mm tyre dynamic radius index of 480/70R34 tyres (ETRTO 1999 Ed.)

1.7 SWINGING DRAWBAR

C	Type:	CNH make, DGM-GA 1086 A 6t V0 type.
	Height above ground	
C	- minimum:	455
C	- maximum:	590
C	Type of adjustment:	overturning the drawbar to position the fork uppermost or downmost
C	Distance of hitch point from rear-wheel axis, horizontally:	860 to 930 mm
	Distance of hitch point from PTO shaft end:	
C	- vertically:	220 to 330 mm
C	- horizontally:	260 - 330 – 400 mm
	Lateral adjustment (centre of clevis):	
C	- right hand:	210 mm
C	- left hand:	145 mm
C	Distance of pivot point from rear-wheel axis, horizontally:	210 mm
C	Diameter drawbar pin hole:	29 mm
D	Maximum vertical permissible load:	from 8.9 to 15.99 kN depending on longitudinal adjustment

1.8 TRAILER HITCH

C	Type:	CNH make, DGM-GA 1087 C 6tV1.5 type
C	Hole diameter:	28 mm
C	Height above ground:	
C	- minimum:	455 mm
C	- maximum:	940 mm
C	Distance of hitch point from rear wheel axis horizontally:	700 mm
	Distance of hitch point from power take-off shaft end:	
C	- vertically:	275 mm below, 210 mm above
C	- horizontally:	170 mm
D	Maximum vertical permissible load:	14.7 kN

1.9 HOLED DRAWBAR

C Optional, not fitted on tested tractor

1.10 STEERING

D	Make, model and type:	DANFOSS make, ORBITROL OSPC 125 OR model, hydrostatic type with independent circuit
	Method of operation	
D	- pump:	CASE A31 XRP hydraulic gear pump
D	- rams:	one single acting ram acting directly on front axle
D	Working pressure:	14.5 MPa

1.11 BRAKES

1.11.1 Service brake

D	Make, model and type:	CNH make, oil bath disc, total 2 discs, 1 for axle at rear, independently acting on the rear axle. Pedals can be locked together to assure combined acting on the rear axle.
C	Method of operation:	hydraulically actuated with 2 pedals
C	Trailer braking take-off:	hydraulic brake system

1.11.2 Parking brake

C*	Type:	fully independent of service brake, 3 oil bath disc acting on the secondary shaft of the gearbox
C	Method of operation:	mechanical cable linked by means of hand lever

*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	1400	2170	Changing the position of the rims with respect to the disc
D	Rear	1330	2205	Changing the position of the rims in respect to the disc

1.13 PROTECTIVE STRUCTURE

C	Make, model and type:	New Holland, SLTV 3
C	Manufacture's name and address:	New Holland UK Ldt Basildon, UK
	Protective device	
C	- Cab/frame/rollguard/other):	cab
C	- Tiltable/not tiltable:	not tiltable
	OECD Approval	
C*	- Approval No:	CSD 1404/1-8
C*	- Date of approval	31st October 1994
C*	- Number of minor modifications	From 1 to 7
D	EEC Approval:	E18 D 937

*Checked on ROPS Testing Station's documents

1.14 SEAT

1.14.1 Driver's seat

C Make, model and type: SEARS EUROPE make, CNH 47125336 model (Equivalent to SEARS make, SA 19274 model), mechanical suspension type

C Seat and steering wheel reversible: No

C Type of suspension: parallelogram linkage

C Type of damping: hydraulic

Range of adjustment:

C - longitudinal: 170 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	LS 95H1/9 AR	Pneumatic	Hydraulic	200	80
Grammer	DS 85H3/A	Mechanical	Hydraulic	210	60
Grammer	MSG 95A/20	Pneumatic	Hydraulic	170	80
Grammer	MSG 85/721	Mechanical	Hydraulic	210	60
Grammer	MSG 95 A/721	Pneumatic	Hydraulic	170	80
Sears	19278	Pneumatic	Hydraulic	200	76
Sears	19311	Pneumatic	Hydraulic	200	76

1.14.3 Passenger seat (not fitted on tested tractor)

C Location: on the left side of the driver's seat

C Capacity (number of places): 1

1.15 LIGHTING

		Height above ground of centre*	Size	Distance from outside edge of lights to median plane of tractor
		mm	mm	mm
C	Headlights	1085	170x100	187
C	Front direction lights	2530	160x90	670
C	Side front work lights	1085	100x100	270
C	Front upper work lights	2530	130x90	505
C	Position/Stop lights	1615	115x90	857
C	Rear lower direction lights	1615	125x90	1000
C	Rear upper direction lights	2530	140x90	855
C	Reflectors	1785	235x60	1055

**Assuming r=745 mm tyre dynamic radius index of 480/70R34 tyres (ETRTO 1999 Ed.)*

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	4430	1990	2684	2750	2540
Unballasted	3880	1990	2684	2755	2545

**Assuming r=745 mm tyre dynamic radius index of 480/70R34 tyres (ETRTO 1999 Ed.)*

2.2 GROUND CLEARANCE

Unballasted tractor: 390 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	1945	1370	1395
Rear	2490	2540	2290	2340
Total	4410	4485	3660	3735

2.4 BALLAST

	Masses		Water
	Number	Total mass	
		kg	kg
Front mass	10	470	None
Rear wheels	4	200	None
Front support	1	80	None

2.5 TRACK SPECIFICATIONS

None

2.6 TYRES AND TRACK WIDTH SPECIFICATIONS

	Front	Rear
Tyres:		
- make	TAURUS	PIRELLI
- model	FARM FRONT	TM 700
- dimensions	7.50-20	480/70R34
- ply rating	8	------
- load index/speed	108	143A8
- type	bias-ply	radial
- maximum load*	10.30 kN	56.03 kN
- inflation pressure*	340 kPa	160 kPa
- maximum overall diameter in service*	935 mm	------
- dynamic radius index*	-------	745 mm
Chosen track width:	1420 mm	1625 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	9.5	300	300
Gearbox with rear axle, final drive, hydraulic system and steering	54.5	1200	300
Hydrostatic circuit .	1.5	1200 h	None
Brakes	0.5	Max. level	None

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

	Recommended	Used during test
Engine oil - Type: - Viscosity: - Classification:	CASE No. 1 15W-40 12.50 cSt API CF-4/SG	As recommended
Transmission oils - Type: - Viscosity: - Classification	AKCELA Nexplorer 130 ASTM D2270	As recommended
Hydraulic fluid - Type: - Viscosity: - Classification	AKCELA Nexplorer 130 ASTM D2270	Akcela Nexplorer 130 ASTM D2270
Steering oil - Type: - Viscosity: - Classification:	AKCELA Nexplorer 130 ASTM D2270	As recommended

2.8.3 Grease

Type: CASE 251 HEP
Number of lubrication points: 15

3 COMPULSORY TESTS

3.1 MAIN POWER TAKE-OFF

Date and location of tests: 14th –18th October 2002, I.M.A.MO.TER, TORINO, ITALY
Type of dynamometer: Parasitic currents, BORGHI&SAVERI FA300-30SP

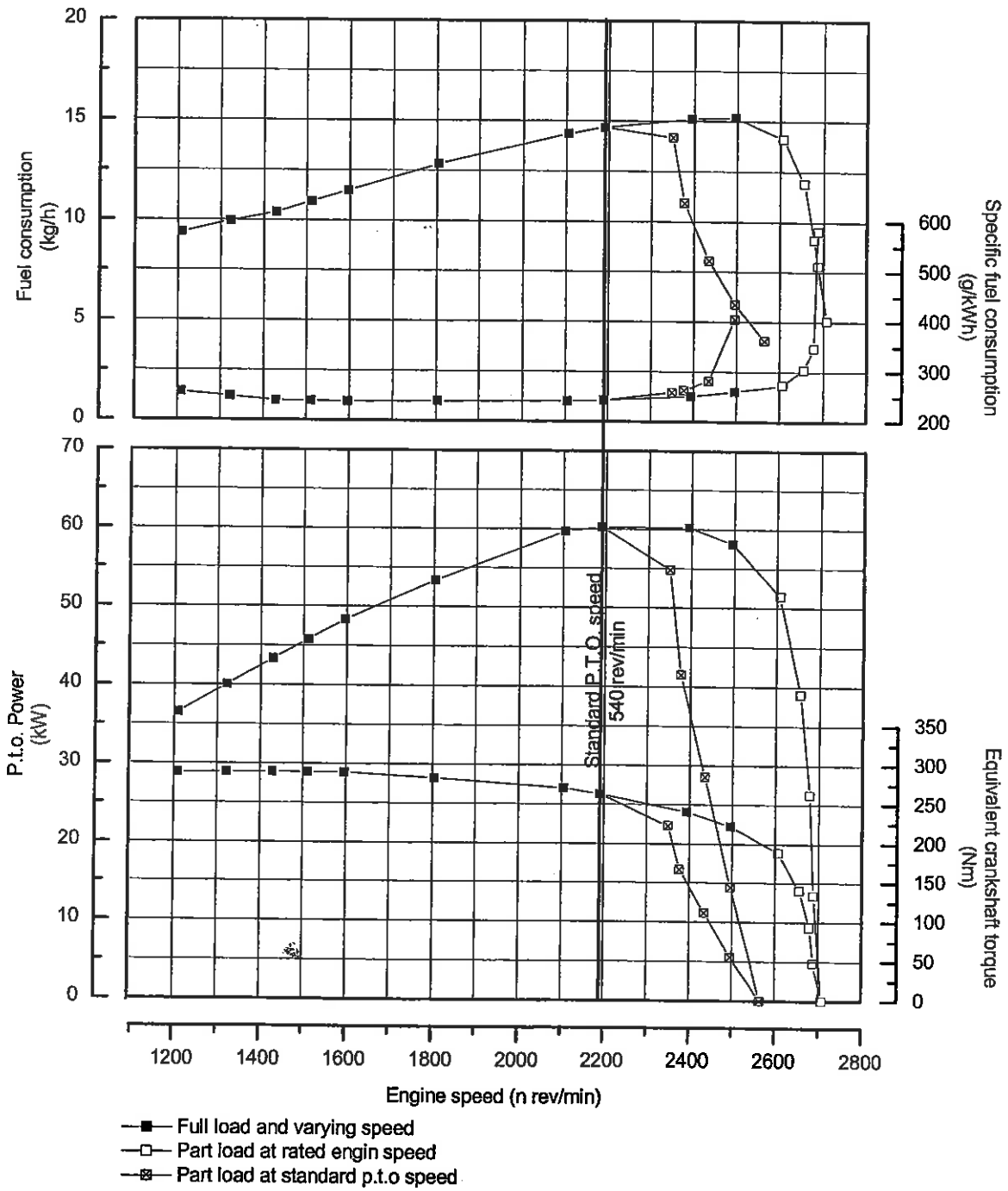
Power	Speed			Fuel consumption			Specific
	Engine	P.t.o.	Fan	Hourly		Specific	energy
kW	rev/min			kg/h	l/h	g/kWh	kWh/l
3.1.1	**MAXIMUM POWER-TWO HOUR TEST**						
60.28	2191	538	532	14.67	17.46	243	3.45
3.1.2	**POWER AT RATED ENGINE SPEED**						
58.16	2496	613	638	15.17	18.06	261	3.22
3.1.3	**STANDARD POWER TAKE OFF SPEED (540±10 rev/min)**						
60.28	2191	538	532	14.67	17.46	243	3.45
3.1.4	**3.1.4 PART LOADS**						
3.1.4.1	**The torque corresponding to maximum power at rated engine speed**						
58.16	2496	613	638	15.17	18.06	261	3.22
3.1.4.2	**85% of torque obtained in 3.1.4.1**						
51.47	2606	640	814	14.12	16.81	274	3.06
3.1.4.3	**75% of torque defined in 3.1.4.2**						
39.05	2655	652	2349	11.91	14.18	305	2.75
3.1.4.4	**50% of torque defined in 3.1.4.2**						
26.25	2679	658	2367	9.13	10.87	348	2.42
3.1.4.5	**25% of torque defined in 3.1.4.2**						
13.41	2688	660	2320	7.81	9.30	582	1.44
3.1.4.6	**unloaded**						
-	2708	665	2354	5.05	6.01	-	-
3.1.5	**PART LOADS AT STANDARD POWER TAKE OFF SPEED (540±10 rev/min)**						
3.1.5.1	**the torque corresponding to maximum power**						
60.28	2191	538	532	14.67	17.46	243	3.45
3.1.5.2	**85% of torque obtained in 3.1.5.1**						
54.80	2350	577	907	14.18	16.88	259	3.25
3.1.5.3	**75% of torque defined in 3.1.5.2**						
41.53	2378	584	1676	10.92	13.00	263	3.19
3.1.5.4	**50% of torque defined in 3.1.5.2**						
28.56	2435	598	1452	8.06	9.69	282	2.98
3.1.5.5	**25% of torque defined in 3.1.5.2**						
14.44	2496	613	1225	5.87	6.99	406	2.07
3.1.5.6	**unladen**						
-	2565	630	1257	4.06	4.83	-	-

No load maximum engine speed: 2708 rev/min
Torque (equivalent crankshaft) at maximum power:
- at rated engine speed: 222.5 Nm
- at 2 hour test: 262.8 Nm

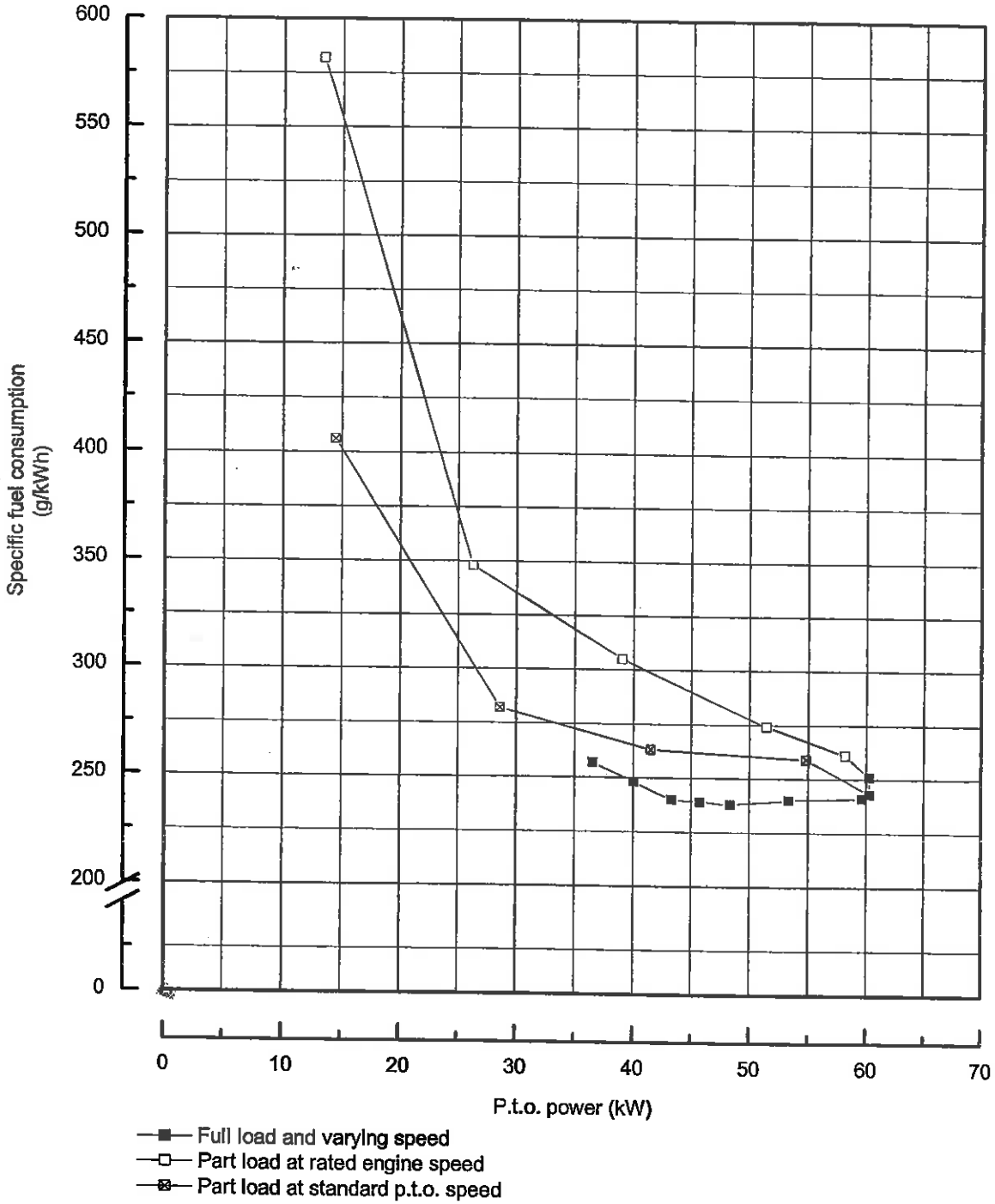
Maximum torque (equivalent crankshaft): 289.5 Nm at 1429 rev/min of the engine

Mean atmospheric conditions	
Temperature	19 °C
Pressure	99.4 kPa
Relative humidity	75 %
Maximum temperature	
Coolant	93.6 °C
Engine oil	110.5 °C
Fuel	30.2 °C
Engine air intake	20.6 °C

Graph 1. Power take-off test



Graph 2. Power take-off test



3.2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 25th-26th March 2003

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	65	2700	61.84	
3.2.1.2.2 Maximum (sustained) pressure with relief valve open as measured at the coupler Pump stalled: No	19.57	60	65	2700		
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	17.66	60	65	2700	39.17	11.53
3.2.1.2.4 Maximum available flow and maximum power from one coupler pair:	16.75	60	65	2700	52.80	14.74
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	65	2500	56.64	
3.2.1.3.2 Maximum available flow and maximum useable (*continuous*) power from one coupler:	16.46	60	65	2500	45.06	12.36
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	10.53	60	65	2500	50.00	
3.2.1.3.6 Peak Pressure	19.85	60	65	2500		
3.2.1.3.7 Maximum sump return pressure with coupler	0.39	60	65	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 test - see Table 1.1 and Figure 1.1 and 1.2

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	200 mm	200 mm
Vertical movement - With lifting force - Without lifting force	 700 mm 720 mm	 700 mm 720 mm
Maximum corrected force exerted through full range	35.93 kN	30.37 kN
Corresponding pressure of hydraulic fluid	17.6 MPa	17.6 MPa
Moment about rear-wheel axis	40.78 kNm	62.47 kNm
Maximum tilt angle of mast from the vertical	none	2.8 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points									
mm	-340	-310	-170	-70	0	130	230	360	390
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	35.93	-	36.36	37.08	37.08	36.55	36.02	36.38	-
Corresponding pressure: 17.6 MPa									
at the frame kN	-	43.26	39.89	37.90	36.53	33.71	31.48	-	30.37
Corresponding pressure: 17.6 MPa									

3.3 DRAWBAR POWER TEST (ballasted and unballasted tractor)

Date of tests: 22nd - 24th April 2003
Type of track: Asphalt

	Height of hitch above ground	Tyre inflation pressure	
		Front	Rear
Unballasted	700	370 kPa	90 kPa
Ballasted	690	370 kPa	90 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)														
4 Slow LO	35.6	30.7	4.17	2648	1836	15.1	384	2.19	31.5	78.4	110.4	17	85	101.1
2 Medium LO	39.2	30.9	4.58	2558	1903	14.9	376	2.23	32.0	75.8	110.5	17	85	101.1
4 Slow HI	39.1	30.2	4.65	2502	1652	11.3	378	2.22	32.4	87.4	109.8	18	75	101.1
2 Medium HI	47.5	29.9	5.72	2498	1578	7.6	326	2.58	31.8	88.0	108.4	17	75	101.1
3 Medium LO	47.2	23.5	7.25	2497	1478	5.4	323	2.60	31.7	85.5	107.7	19	75	101.1
1 Fast LO	48.8	21.7	8.11	2503	1241	4.9	316	2.66	34.5	86.1	104.5	18	75	101.1
3 Medium HI	47.9	20.2	8.52	2501	1103	4.5	321	2.62	35.8	86.2	104.7	18	70	101.1
1 Fast HI	46.6	17.9	9.37	2504	956	4.3	328	2.56	35.4	88.4	103.6	17	70	101.1
3.3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)														
1 Slow LO	12.9	31.8	1.46	2692	2120	14.8	552	1.52	34.2	80.6	108.6	18	80	101.1
1 Slow HI	14.6	32.0	1.65	2686	1924	15.2	545	1.54	35.6	83.6	109.2	18	80	101.1
2 Slow LO	18.6	32.1	2.08	2682	1865	15.3	444	1.89	36.2	85.9	108.8	20	75	101.1
2 Slow HI	21.2	32.2	2.37	2681	1953	15.0	422	1.99	34.5	91.2	109.4	19	75	101.1
3 Slow LO	27.0	32.3	3.01	2678	1751	14.9	378	2.22	35.4	91.9	108.9	18	70	101.1
1 Medium LO	30.2	32.5	3.35	2648	1824	15.2	377	2.23	36.8	90.4	109.6	20	70	101.1
3 Slow HI	30.6	32.4	3.40	2632	1642	15.2	374	2.25	38.2	88.4	108.3	21	70	101.1
1 Medium HI	34.3	32.5	3.80	2626	1750	15.0	369	2.27	40.1	87.6	107.8	19	70	101.1
4 Slow LO	38.6	32.6	4.26	2613	1648	15.2	371	2.27	38.4	92.1	108.3	18	65	101.1
2 Medium LO*	44.3	32.4	4.92	2497	1101	14.8	349	2.41	39.2	86.8	106.5	19	65	101.1
4 Slow HI*	46.6	32.5	5.16	2502	954	12.0	330	2.55	36.2	90.1	104.2	18	60	101.1
2 Medium HI	46.2	29.2	5.71	2498	860	6.9	335	2.51	35.6	88.4	103.8	19	60	101.1
3 Medium LO	48.7	23.9	7.35	2501	765	4.7	315	2.66	36.5	86.4	104.6	18	55	101.1
1 Fast LO	48.4	21.1	8.24	2500	687	4.5	321	2.62	37.6	90.6	104.4	18	55	101.1
3 Medium HI	45.4	19.2	8.51	2503	635	4.4	333	2.52	39.4	83.6	103.9	19	50	101.1
1 Fast HI	47.5	18.0	9.51	2505	854	4.1	327	2.57	38.2	86.2	104.2	19	50	101.1
4 Medium LO	47.3	15.9	10.71	2496	745	3.5	324	2.59	37.8	87.0	104.6	18	50	101.1
* Tractor working unsteadily														
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														
3 Medium LO	39.1	17.8	7.90	2650	1550	4.1	307	2.74	35.5	84.0	106.5	19	60	100.7
3.3.3.2 FIVE-HOUR TEST at pull corresponding to 15% wheelslip, with additional ballast: 270 kg														
2 Medium LO	44.3	32.4	4.92	2513	1120	⌘	⌘	2.57	32.5	82.0	104.5	21	55	100.7
⌘ The test was carried out with additional ballast; the not quoted figures are irrelevant														

⌘ 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, 3.3.3.2 and 3.3.4: 10 g/h

3.4 TURNING AREA AND TURNING CIRCLE

Wheels equipment
- front: 7.50-20
- rear: 480/70R34

Track width:
- front: 1420
- rear: 1625

	Without brakes	
	Right-hand	Left-hand
	m	m
Radius of turning area	3.90	3.80
Radius of turning circle	3.85	3.80

3.5 LOCATION OF CENTRE OF GRAVITY

Height above ground	880 mm
Distance forward from the vertical plane, containing the axis of the rear wheels	883 mm
Distance from the median plane of the tractor: to the left	0 mm

3.6 BRAKING

Date of tests: 14th April 2003

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
32.0	0.13	1.79	22.1
32.0	0.17	2.35	16.8
32.0	0.25	2.74	14.4
32.0	0.37	3.43	11.5
32.0	0.42	4.01	9.9
32.0	0.57	4.24	9.3

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

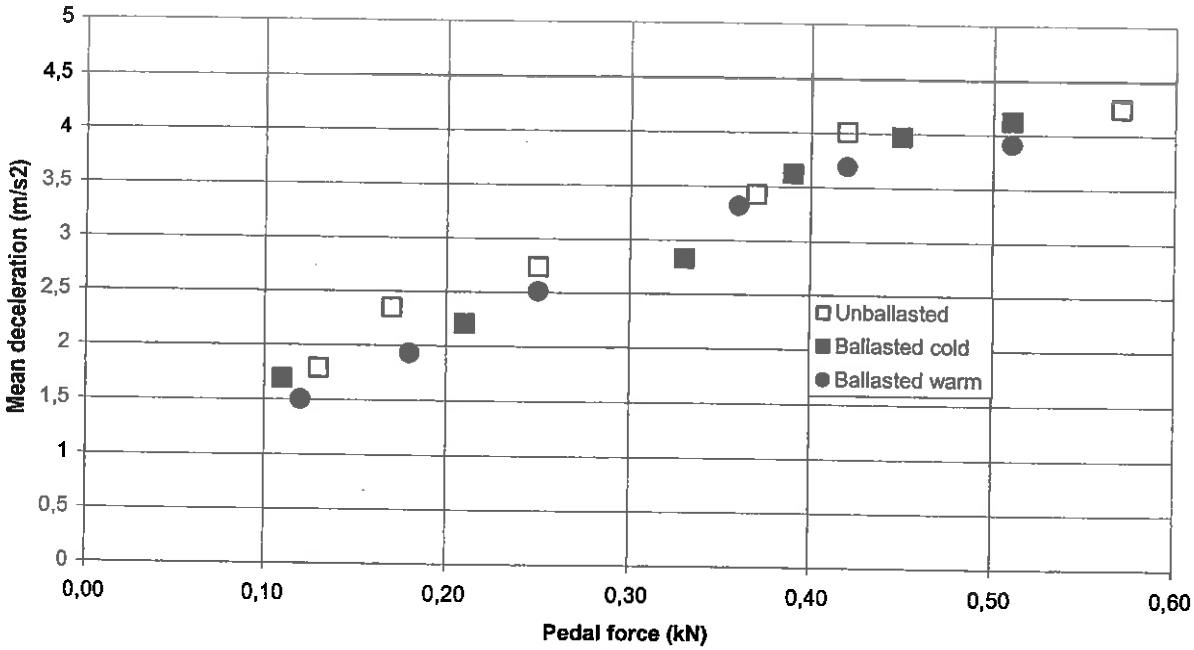
Ballasted tractor			
Speed before application of brake	Braking device control force	Mean deceleration	Minimum stopping distance without locking the wheels
km/h	kN	m/s^2	m
32.0	0.11	1.69	23.4
32.0	0.21	2.21	17.9
32.0	0.33	2.83	14.0
32.0	0.39	3.62	10.9
32.0	0.45	3.97	10.0
32.0	0.51	4.12	9.6

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
32.0	0.12	1.50	26.3
32.0	0.18	1.93	20.5
32.0	0.25	2.51	15.7
32.0	0.36	3.32	11.9
32.0	0.42	3.69	10.7
32.0	0.51	3.91	10.1

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: 14th April 2003
Sound level meter make, model and type: RION make, NA 29 E model, impulse precision type
Type of track: Asphalt
Gear number: 4 Fast HI
Travelling speed before acceleration: 24 km/h
Sound level: Side left 85.6 dB(A)
Side right 84.1 dB(A)

4 OPTIONAL TESTS RESULTS

Not covered by OECD approval

4.1 Test procedure for measuring hydraulic lift capacity on agricultural tractors equipped with three-point hitch - SAE J 283, Nov. 1999

4.1.1 Tractor description

See:

Section 1- Specification of tractor

Section 2- Test conditions

4.1.2 Test conditions

Three-point hitch hydraulic system pressure setting: 198 bar (at rear couplers)

Three-point hitch hydraulic system oil temperature: 65±5C°

Rated engine speed: 2500 rpm

Tests have been performed in accordance with Section 4- Static lift force test of SAE J283 Settings of the three-point hitch specified in the table below. See figure 1.1 and 1.2 for more details on linkage geometry.

		Dimension or range	Settings used in tests
		mm	mm
Length of lift arms:	(A)	255	255
Length of lower links:	(B)	965	965
Distance of lift arm pivot point from rear wheel axis:			
- horizontally (rearward)	(a)	135	135
- vertically	(b)	300	300
Horizontal distance between the 2 lower link points:	(u)	450 or 475	450
Horizontal distance between the 2 lift arm end points:	(v)	510	510
Length of upper link:	(S)	585→875	685
Distance of upper link pivot point from rear wheel axis:			
- horizontally (rearward)	(c)	400	400
- vertically	(d)	255 or 335	335
Distance of lower link pivot point from rear wheel axis:			
- horizontally	(e)	135	135
- vertically	(f)	205	205
Distance of lower link pivot points to lift rod pivot points on lower links:	(D)	465 or 540	540
Length of lift rods:	(L)	510→700	655

4.1.3 Static lift force

Position of the hitch	Vertical lift force*	Vertical distance of lower hitch point above ground
	kN	mm
Lowest	54.9	203
1/5	51.6	345
2/5	46.5	488
3/5	41.2	630
4/5	36.8	773
Highest	35.1	915

**Reported values are 90% of measured*

5 REPAIRS

none

6 REMARKS

none

7 ANNEX

none

The Head of the Section

E. CAVALLO

The Director

G.L. ZAROTTI

Torino, 12th June 2003