LABORATORIO DI MECCANICA AGRARIA

DIPARTIMENTO DI ECONOMIA E INGEGNERIA AGRARIE

MINISTERO DELLE POLITICHE AGRICOLE E COMUNITARIE

Report DEIAGRA - sez. I.A. n° 4493 **O.E.C.D. approval number: 1/2 158**

Report on test in accordance with the O.E.C.D. Standard Code for the Official Testing of Agricultural and Forestry Tractor Performance
O.E.C.D. Code 1



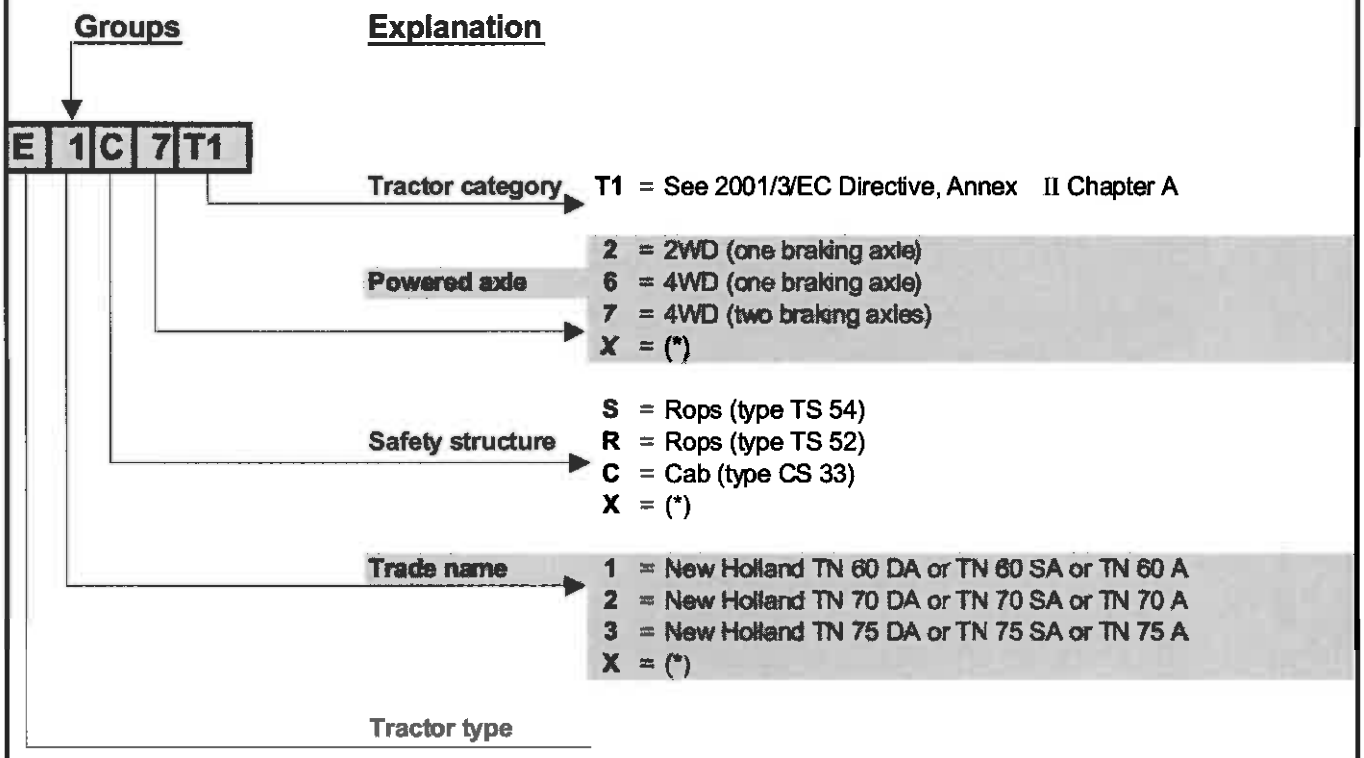
Agricultural tractor
Make: **NEW HOLLAND;** Model: **TN 60 A**
(Four wheel drive tractor 40 km/h version)

Tractor manufacturer: CNH INTERNATIONAL, S.A., 13 Rue Aldrigen 1118, LUXEMBOURG
Date of test: March 2004 - July 2004
Date of approval: 05 August 2004

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. Tractors Test Code

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Codification System New Holland Tractors



(*) Symbol X is inserted when the meaning is not relevant in the homologation procedure.

Example: E1C7T1 means an E tractor type, New Holland TN 60 DA trade name, with cab, 4WD, and T1 tractor category (see 2001/3/EC Directive, Annex II Chapter A)

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4.1 Test procedure for measuring hydraulic lift capacity on agricultural tractors equipped with three-point hitch - SAE J 283, Nov. 1999 36

C	- Tractor manufacturer's name and address:	CNH International SA - 13 rue Aldringen L - 1118 Luxembourg
D	- Location of tractor assembly:	CNH Italia SpA, via Leone XIII - Jesi (AN) - Italy
D	- Submitted for test by:	CNH Italia SpA, viale delle Nazioni 55, Modena - Italy
C	- Selected for test by:	The manufacturer with the agreement of the testing station
D	- Place of running-in:	Modena (MO) - Italy
D	- Duration of running-in:	55 hours
C	- Location of test:	Department of Agricultural Economics and Engineering - University of Bologna - Section of Agricultural Engineering - Laboratory of Cadriano (BO - Italy)

1. SPECIFICATIONS OF TRACTOR

1.1 Identification

C	**1.1.1 Make of the tractor:**	NEW HOLLAND
C	- Model (trade name):	TN60A
C	- Type:	4WD

1.1.2 Numbers

D	- 1St Serial N° or prototype	HJE160347
C	- Serial N°:	HJE160347

1.1.3 Other specification

D	- Model for other countries:	none
C	- Transmission type:	16+16, mechanical
C	- Speed version:	40 km/h
D	- Manufacturer identification or Technical type number:	E1S6

1.2 Engine

C	- Make/Model/Type:	CNH Italia/IVECO 8035.05C/ water-cooled 4 stroke Diesel engine, direct injection
C	- Serial N°:	866640

1.2.1 Cylinders

C	- Number/disposition:	3, vertical, in line
D	- Bore/stroke:	104 mm / 115 mm
D	- Capacity:	2930 cm^3
D	- Compression ratio:	18±0.5 :1
D	- Arrangement of valves:	overhead valves, 2 per cylinder
D	- Cylinder liners:	dry liners
		The engine fitted on the tested tractor is approved according to Directive 2000/25/EC, EURO II (approval number e3*2000/25B*00/000/*6001*00).
		The engine is also in accordance with the requirements of the Environmental Protection Agency (EPA), step II, in terms of emission of gaseous and particulate pollutants

1.2.2 Supercharging

none

1.2.3 Fuel system

C	- Fuel feed system:	membrane pump
C	- Make/Model/Type of fuel filter:	CNH/not announced/ with replaceable cartridge and filter inside the fuel feed pump
D	- Capacity of fuel tank:	53 dm^3 in plastic material, on the left side, under the tractor footrest. Behind the driver's seat is placed a second fuel tank with a capacity of 37 dm^3. As option there is a 65.5 dm^3 fuel tank, in plastic material, on the left side, under the tractor footrest
C	- Make/Model/Type of injection pump:	BOSCH/L959/rotary injection pump
C	- Serial N°:	399160
	- Manufacturer's production, setting of injection pump	
C	. Flow rate (rated engine speed and full load):	68 mm^3 per stroke (corresponding to 14.1 dm^3/h)
D	. Timing:	0 ± 0.5°
D	- Make/Model/Type of injectors:	BOSCH/DLLA 132S/multihole injection nozzle
D	- Injection pressure:	26 ± 0.12 MPa

1.2.4 Governor

C	- Make/Model/Type:	BOSCH/ integrated in the injection pump/

		mechanical type
C	- Governed range of engine speed:	650±30 ÷ 2500±50 min^{-1}(rev/min)
C	- Rated engine speed:	2300 ± 30 min^{-1}(rev/min)

1.2.5 Air cleaner

	- Pre-cleaner	none
	- Main cleaner	
C	. Make/Model/Type:	CNH/document n.1.19.100 AC/ dry air filter, with double cartridge
C	. Location of air intake	in front of the radiator, under the bonnet
C	Maintenance indicator:	warning light on dashboard

1.2.6 Lubrication system

D	- Type of feed pump:	forced feed by means of gear pump. Engine oil cooled by a heat exchanger with engine coolant
C	- Type of filter:	replaceable cartridge
C	- Number of filters:	1

1.2.7 Cooling system

C	- Type of coolant:	water-anti freeze mixture
D	- Type of pump:	centrifugal pump
	- Specification of fan or blower	propeller fan driven by engine shaft
C	. Number of fan blades:	6
C	. Fan diameter:	420 mm
D	- Coolant capacity:	12 dm^3
C	- Type of temperature control:	thermostat and by-pass circuit, viscous drive fan, belt driven; variable fan speed controlled by air flow temperature. As option a propeller fan driven by engine shaft
D	- Superpressure system:	71 kPa

1.2.8 Starting system

C	- Make/Model/Type:	BOSCH/1.74.400.AB /Starter motor
D	- Starter motor power rating:	2.6 kW
C	- Cold starting aid:	CAV, 357/10, as option BERU, 0101
C	- Safety device:	forward and reverse lever in neutral position and pto disenganged

1.2.9 Electrical system

C - Voltage: 12 V, negative earth

- Generator

C . Make/Model/Type: Denso/ 1.74.000 AC /Alternator

as option Denso/1.74.000 AD / Alternator

D . Power: 910 W

- Battery of accumulators: lead acid type

C . Number: 1

D . Rating: 88 Ah at 20 hours

1.2.10 Exhaust system

C - Make/Model/Type: CNH/document n. 1.15.001AA/ interference type with internal perforated pipe

C - Location: on the left hand side of engine, under the bonnet, with the vertical exhaust pipe (fitted on the tested tractor) or the horizontal exhaust pipe on the left side; as option exhaust pipe with ejector

1.3 Transmission

1.3.1 Clutch

D - Make/Model/Type: LUK/ 11/11 / double clutch with two dry plates included in the same clutch pressure plate, one for the pto and the other for gear box, but independently operated

(Only for travelling)

D - Number of plates: 1

D - Diameter of plates: 280 mm

C - Method of operation: mechanically operated by pedal

1.3.2 Gear box

D - Make/Model/Type: CNH/ not announced/mechanical synchronised constant mesh gears, direct engagement by hand levers

- Description:

	Forward	Reverse
C Number of ranges/groups	4/1	4/1
C Number of gears	4	4
C Total of arrangements	16	16

D - Available options: 44x16 HI-LO

32x16 HI-LO

(when the reverse is engaged the position HI is automatically excluded)

28x16 mechanical

44x16 mechanical

1.3.3 Rear axle and final drives

D - Make/Model/Type: CNH/not announced/bevel gear differential and epicyclical final drivers

- Differential lock

D . Type: mechanical or, as option, electro-hydraulic

C . Method of engagement: pushing the device control pedal on the right side of the floor or, as option, pushing a button

C . Method of disengagement: pushing one of the two brake pedals

1.3.4 Front axle and final drives

D - Make/Model/Type: CNH/not announced/ bevel gear differential and epicyclical final drivers

- Differential lock

D . Type: automatic and electro-hydraulic

C . Method of engagement: automatic

C . Method of disengagement: automatic

1.3.5 Total ratios and traveling speeds

TN60A with 16 forward speeds and 16 reverse speeds (fitted on the tested tractor)				
	Gear No	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed(*)at rated engine speed of 2300 min^{-1}(rev/min) km/h
C	1	low	769.412	0.783
C	2	low	516.148	1.168
C	3	low	351.121	1.716
C	4	low	237.007	2.543
C	1	medium low	183.062	3.292
C	2	medium low	122.804	4.907
C	3	medium low	83.540	7.213
C	4	medium low	56.390	10.686

C	1	medium high	149.538	4.030
C	2	medium high	100.315	6.007
C	3	medium high	68.242	8.830
C	4	medium high	46.063	13.082
C	1	high	51.795	11.635
C	2	high	34.746	17.343
C	3	high	23.636	25.495
C	4	high	15.955	37.770
	Reverse			
C	1	low	794.232	0.759
C	2	low	532.797	1.131
C	3	low	362.447	1.663
C	4	low	244.652	2.463
C	1	medium low	188.968	3.189
C	2	medium low	126.766	4.754
C	3	medium low	86.235	6.988
C	4	medium low	58.209	10.353
C	1	medium high	154.362	3.904
C	2	medium high	103.551	5.819
C	3	medium high	70.443	8.555
C	4	medium high	47.549	12.673
C	1	high	53.465	11.271
C	2	high	35.866	16.802
C	3	high	24.399	24.698
C	4	high	16.469	36.590

TN60A with 28 forward speeds, with creeper unit (C), and 16 reverse speeds			
Gear No	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed(*)at rated engine speed of 2300 min^{-1}(rev/min) km/h
C 1	C low	2969.660	0.203
C 2	C low	1992.150	0.302
C 3	C low	1355.200	0.445
C 4	C low	914.762	0.659

C	1	C medium low	706.556	0.853
C	2	C medium low	473.982	1.271
C	3	C medium low	322.436	1.869
C	4	C medium low	217.645	2.769
C	1	C medium high	577.164	1.044
C	2	C medium high	387.181	1.556
C	3	C medium high	263.388	2.288
C	4	C medium high	177.787	3.389
C	1	low	769.412	0.783
C	2	low	516.148	1.168
C	3	low	351.121	1.716
C	4	low	237.007	2.543
C	1	medium low	183.062	3.292
C	2	medium low	122.804	4.907
C	3	medium low	83.540	7.213
C	4	medium low	56.390	10.686
C	1	medium high	149.538	4.030
C	2	medium high	100.315	6.007
C	3	medium high	68.242	8.830
C	4	medium high	46.063	13.082
C	1	high	51.795	11.635
C	2	high	34.746	17.343
C	3	high	23.636	25.495
C	4	high	15.955	37.770
	Reverse			
C	1	low	794.232	0.759
C	2	low	532.797	1.131
C	3	low	362.447	1.663
C	4	low	244.652	2.463
C	1	medium low	188.968	3.189
C	2	medium low	126.766	4.754
C	3	medium low	86.235	6.988

4	medium low	58.209	10.353
1	medium high	154.362	3.904
2	medium high	103.551	5.819
3	medium high	70.443	8.555
4	medium high	47.549	12.673
1	high	53.465	11.271
2	high	35.866	16.802
3	high	24.399	24.698
4	high	16.469	36.590

TN60A with 44 forward speeds, with creeper unit (C) , and 16 reverse speeds			
Gear No	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed(*)at rated engine speed of 2300 min^{-1}(rev/min) km/h
1	C low	2969.660	0.203
2	C low	1992.150	0.302
3	C low	1355.200	0.445
4	C low	914.762	0.659
1	C medium low	706.556	0.853
2	C medium low	473.982	1.271
3	C medium low	322.436	1.869
4	C medium low	217.645	2.769
1	C medium high	577.164	1.044
2	C medium high	387.181	1.556
3	C medium high	263.388	2.288
4	C medium high	177.787	3.389
1	low	923.295	0.653
2	low	769.412	0.783
3	low	619.377	0.973
4	low	516.148	1.168
5	low	421.345	1.430
6	low	351.121	1.716

C	7	low	284.408	2.119
C	8	low	237.000	2.543
C	1	medium low	219.675	2.743
C	2	medium low	183.062	3.292
C	3	medium low	147.365	4.089
C	4	medium low	122.804	4.907
C	5	medium low	100.248	6.011
C	6	medium low	83.540	7.213
C	7	medium low	67.668	8.905
C	8	medium low	56.390	10.686
C	1	medium high	179.446	3.358
C	2	medium high	149.538	4.030
C	3	medium high	120.378	5.006
C	4	medium high	100.315	6.007
C	5	medium high	81.890	7.359
C	6	medium high	68.242	8.830
C	7	medium high	55.276	10.902
C	8	medium high	46.063	13.082
C	1	high	62.153	9.695
C	2	high	51.795	11.635
C	3	high	41.695	14.453
C	4	high	34.746	17.343
C	5	high	28.364	21.246
C	6	high	23.636	25.495
C	7	high	19.146	31.475
C	8	high	15.955	37.770
	Reverse			
C	1	low	794.232	0.759
C	2	low	532.797	1.131
C	3	low	362.447	1.663
C	4	low	244.652	2.463
C	1	medium low	188.968	3.189
C	2	medium low	126.766	4.754
C	3	medium low	86.235	6.988
C	4	medium low	58.209	10.353

1	medium high	154.362	3.904
2	medium high	103.551	5.819
3	medium high	70.443	8.555
4	medium high	47.549	12.673
1	high	53.465	11.271
2	high	35.866	16.802
3	high	24.399	24.698
4	high	16.469	36.590

TN60A with 32 forward speeds, with HI-LO, and 16 reverse speeds			
Gear No	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed(*)at rated engine speed of 2300 min^{-1}(rev/min) km/h
1	low	923.295	0.653
2	low	769.412	0.783
3	low	619.377	0.973
4	low	516.148	1.168
5	low	421.345	1.430
6	low	351.121	1.716
7	low	284.408	2.119
8	low	237.000	2.543
1	medium low	219.675	2.743
2	medium low	183.062	3.292
3	medium low	147.365	4.089
4	medium low	122.804	4.907
5	medium low	100.248	6.011
6	medium low	83.540	7.213
7	medium low	67.668	8.905
8	medium low	56.390	10.686
1	medium high	179.446	3.358
2	medium high	149.538	4.030
3	medium high	120.378	5.006
4	medium high	100.315	6.007
5	medium high	81.890	7.359

C	6	medium high	68.242	8.830
C	7	medium high	55.276	10.902
C	8	medium high	46.063	13.082
C	1	high	62.153	9.695
C	2	high	51.795	11.635
C	3	high	41.695	14.453
C	4	high	34.746	17.343
C	5	high	28.364	21.246
C	6	high	23.636	25.495
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	Reverse			
C	1	low	794.232	0.759
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C	3	low	362.447	1.663
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C	4	medium low	58.209	10.353
C	1	medium high	154.362	3.904
C	2	medium high	103.551	5.819
C	3	medium high	70.443	8.555
C	4	medium high	47.549	12.673
C	1	high	53.465	11.271
C	2	high	35.866	16.802
C	3	high	24.399	24.698
C	4	high	16.469	36.590

TN60A with 44 forward speeds, with HI-LO, with creeper unit (C), and 16 reverse speeds			
Gear No	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed(*)at rated engine speed of 2300 min^{-1}(rev/min) km/h
C 1	C low	1972.850	0.305

C	2	C low	1323.460	0.455
C	3	C low	900.310	0.669
C	4	C low	607.709	0.992
C	1	C medium low	469.391	1.284
C	2	C medium low	314.883	1.914
C	3	C medium low	214.206	2.813
C	4	C medium low	144.589	4.168
C	1	C medium high	383.431	1.572
C	2	C medium high	257.218	2.343
C	3	C medium high	174.978	3.444
C	4	C medium high	118.110	5.102
C	1	low	923.295	0.653
C	2	low	769.412	0.783
C	3	low	619.377	0.973
C	4	low	516.148	1.168
C	5	low	421.345	1.430
C	6	low	351.121	1.716
C	7	low	284.408	2.119
C	8	low	237.000	2.543
C	1	medium low	219.675	2.743
C	2	medium low	183.062	3.292
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C	6	medium low	83.540	7.213
C	7	medium low	67.668	8.905
C	8	medium low	56.390	10.686
C	1	medium high	179.446	3.358
C	2	medium high	149.538	4.030
C	3	medium high	120.378	5.006
C	4	medium high	100.315	6.007
C	5	medium high	81.890	7.359

C	6	medium high	68.242	8.830
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C	1	high	62.153	9.695
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C	3	medium high	70.443	8.555
C	4	medium high	47.549	12.673
C	1	high	53.465	11.271
C	2	high	35.866	16.802
C	3	high	24.399	24.698
C	4	high	16.469	36.590

(*) Calculated with a dynamic radius index of 695 mm (in conformity with ISO 4295-1:1998)

C - Number of revolutions of front wheels for one revolution of rear-wheels: 1.303

1.4 Power take-off

1.4.1 Main power take-off

C	- Type:	independent
C	- Method of engagement:	by hand lever acting on a dry clutch
C	- Number of shafts:	1
C	- Method of changing power take-off shaft ends and speeds:	by lever and physically replacing the PTO shaft

1.4.1.1 Power take-off proportional to engine speed

	Type of power take-off	540 min^{-1} (rev/min)	540 min^{-1} economic (rev/min)	1000 min^{-1} (rev/min)
C	- Location:	at the rear of the tractor, in the median plane		
C	- Diameter of power take-off shaft end:	35 mm	35 mm	35 mm
C	- Number of splines (in conformity with ISO 500:1991)	6	6	21
C	- Height above ground:	665 mm	665 mm	665 mm
C	- Distance from the median plane of the tractor:	0 mm	0 mm	0 mm
C	- Distance behind rear-wheel axis:	485 mm	485 mm	485 mm
C	- PTO speed at rated engine speed (2300 rev/min):	565 min^{-1}	809 min^{-1}	1017 min^{-1}
C	- Engine speed at standard power take-off speed:	2196 min^{-1}	2132 min^{-1}	2260 min^{-1}
C	- Ratio of rotation speeds (engine speed/p.t.o. speed):	4.07	2.845	2.26
D	- Power restriction:	none	none	none
D	- Maximum torque transmissible (equivalent crankshaft torque):	320 Nm	320 Nm	330 Nm
C	- Direction of rotation:	clockwise (viewed from behind tractor)		

1.4.1.2 Power take-off proportional to ground speed

	Type of power take-off	540 min^{-1} (rev/min)	540 min^{-1} economic (rev/min)	1000 min^{-1} (rev/min)
C	- Travelling distance for one revolution of take-off shaft	0.355 m	0.244 m	0.194 m

C	- Number of power take-off shaft revolutions for one revolution of (rear) driving wheels:	12.30	17.88	22.48
C	- Direction of rotation with forward gear engaged:	clockwise (viewed from behind tractor)		

1.4.2 Optional power take-off

none

1.5 Hydraulic power lift

C	- Make/Model/Type:	CNH/not announced/load, position and mixed control operated by two independent levers; a lift-o-matic device is fitted for raising and lowering quickly the lower links. As option hydraulic power lift electronically controlled.
C	- Type of hydraulic system:	open centre system
C	- Type and number of cylinders:	1, single action, internal
C	- Type of linkage lock for transport:	lift-o-matic device
D	- Relief valve pressure setting:	20.5 + 0.5 MPa
D	- Opening pressure of cylinder safety valve:	22 + 0.5 MPa
D	- Lift pump type:	rotative pump driven by the engine shaft (delivery rate of 47 l/min with pump at 2484 min^{-1}, as stated by the manufacturer)
D	- Transmission between pump and engine:	mechanical
C	- Type and number of filters:	1, replaceable paper cartridge
C	- Site of oil reservoir:	gear-box
C	- Type, number and location of tapping points:	4 tapping points, single or double acting, at the rear of tractor
D	- Maximum volume of oil available to external cylinders:	21 dm^3

1.6 *Three point linkage*

C - Category — in conformity with category 2 of ISO 730-1:1994 + Cor.1:1995

C - Category adapter: — none

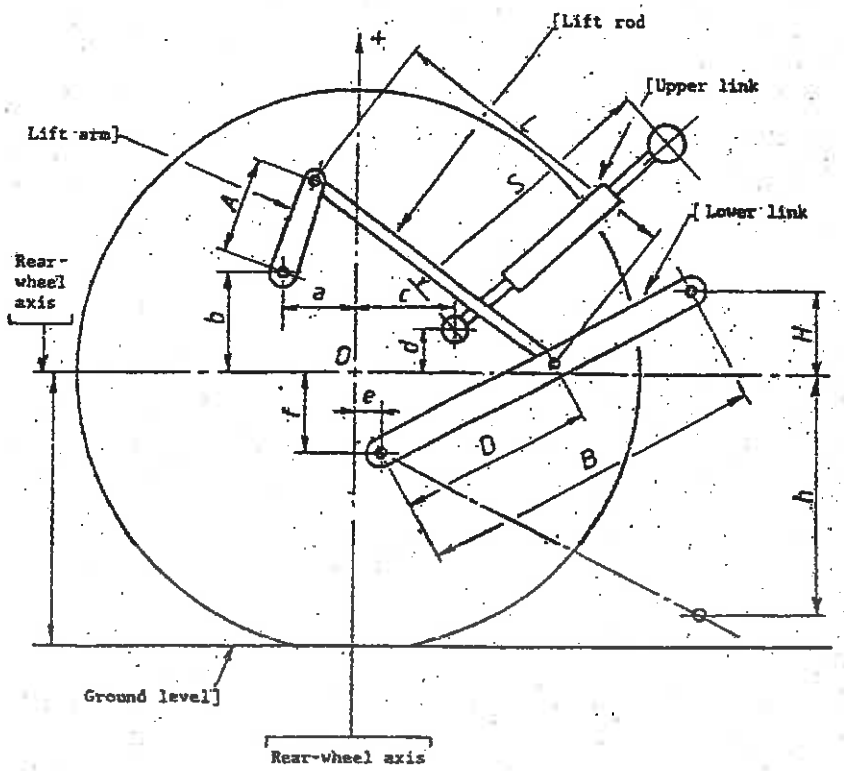


Figure 1.1

Lift test - Linkage geometry

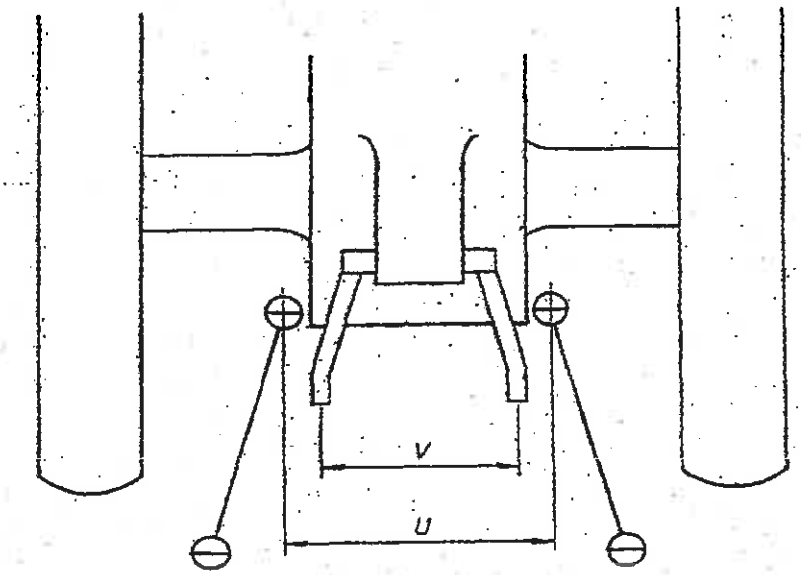


Figure 1.2

Lift test - Linkage geometry

			Dimension or range	Settings used in test
			mm	mm
C	Length of lift arms:	(A)	255	255
C	Length of lower links:	(B)	880	880
	Distance of lift arm pivot point from rear wheel axis			
C	- horizontally (rearward)	(a)	145	145
C	- vertically	(b)	276	276
C	Horizontal distance between the 2 lower link points:	(U)	405	405
C	Horizontal distance between the 2 lift arm end points:	(V)	450	450
C	Length of upper link:	(S)	555⊕770	697
	Distance of upper link pivot point from rear wheel axis			
C	- horizontally (rearward)	(c)	340-345	345
C	- vertically	(d)	308-361	308
	Distance of lower link pivot point from rear wheel axis			
C	- horizontally	(e)	155	155
C	- vertically	(f)	189	189
C	Distance of lower link pivot points to lift rod pivot points on lower links:	(D)	523	523
C	Length of lift rods :	(L)	570⊕690	572
	Height of lower hitch points relative to the rear-wheel axis			
C	- in low position	(h)	305⊕650	323
C	- in high position	(H)	15⊕320	318
	Height above ground of lower hitch points when locked in transport position		710⊕1015	-
*Assuming r=695 mm tyre dynamic radius index of ISO 4251-1:1998				

Table 2.1

Dimensions of linkage geometry when connected to the standard frame

1.7 *Swinging drawbar*

C	- Type:	CNH, Document n. 1.12.136AA, longitudinally adjustable
	- Height above ground	
C	. Maximum:	440 mm
C	. Minimum:	360 mm
C	- Type of adjustment:	by turning the drawbar
C	- Distance of hitch point from rear-wheel axis, horizontally:	691 ÷ 891 mm
	- Distance of hitch point from power take-off shaft end.	
C	. Vertically:	250 ÷ 330 mm
C	. Horizontally:	206 ÷ 406 mm
	- Lateral adjustment	
C	. Right hand:	289 mm
C	. Left hand:	289 mm
C	- Distance of pivot point from rear-wheel axis, horizontally:	310 mm
C	- Diameter of drawbar pinhole:	32 mm
C	- Maximum vertical permissible load:	5.0 kN
D		As option are available the following drawbars: CNH DGM-GA 4036A SAUERMAN HS1000-D-FT-S

1.8 *Trailer hitch*

C	- Type:	CBM / GTF 30015
C	- Hole diameter:	32 mm
C	- Height above ground:	450 ÷ 510 mm
C	- Distance of hitch point from rear-wheel axis, horizontally:	655 mm
	- Distance of hitch point from power take-off shaft end	
C	. Vertically:	440 mm
C	. Horizontally:	170 mm
D	- Maximum vertical permissible load:	8.4 ⊛ 11.2 kN
D		As option are present the following trailer

hitch:

CBM / 30014

CBM / D2

CBM / C

CNH / D2

CNH / C

SAUERMAN / HS 1000-D-FT-S

1.9 Holed drawbar

Not present on the tested tractor, but available as option

1.10 Steering

D - Make/Model/Type: DANFOSS/ORBITROL OSPC 80N/hydrostatic. As option OGNIBENE/STH ON80G170LNV/hydrostatic

- Method of operation

D - Pump: independent gear pump

D - Ram: single acting ram mounted on the middle of the front axle and directly acting on it. As option two acting rams, one on the left and one on the right side, acting on the front axle

D - Working pressure: 17 MPa

1.11 Brakes

1.11.1 Service brake

D - Make/Model/Type: CNH/not announced/ 2 oil bath disc, 1 per rear wheel, mounted on the differential shaft; further there is the automatic engagement of four-wheel drive, providing the four wheel braking.

As option 4 oil bath disc, 1 per rear wheel and 1 per front wheel, mounted on the differential shaft; further there is the automatic engagement of four-wheel drive, providing the four wheel braking

C - Method of operation: foot operated bi-pedal braking device, with hydraulic transmission

C - Trailer braking take-off: hydraulic brake system

1.11.2 Parking brake

C - Type: fully independent from service brake, 4 oil bath sector double face discs and 2 oil bath

		sector single face discs, mounted on the pignon shaft in the gear box
C	- Method of operation:	mechanical hand lever

1.12 Wheels

	- Number	
C	. Front	2 driving and steering
C	. Rear	2 driving
C	- Wheelbase:	2065 mm
	- Track width adjustment:	

		Minimum mm	Maximum mm	Adjustment method
D	Front	1236	1945	changing the position of the rims in respect to the disc
D	Rear	1232	1949	changing the position of the rims in respect to the disc

1.13 Protective structure

C	- Make/Model/Type:	CNH/TS54/ rear roll bar
C	- Manufacturer's name and address:	CNH International SA - 13 rue Aldringen L - 1118 Luxembourg
	- Protective device	
C	. Cab/frame/rollguard/other:	rear roll bar
C	. Tiltable/not tiltable	foldable
	- OECD approval	
C	. Approval number:	4/0 516/3
C	. Date of approval:	5 June 2003
C	. N° of minor modification certificates, if any:	none

1.14 Seat

1.14.1 Driver's seat

C	- Make/Model/Type:	MT/SC78-M30i/mechanical
C	- Seat and steering wheel reversible:	no
C	- Type of suspension:	adjustable spring
C	- Type of damping:	shock absorber
	- Range of adjustment	

C	. Longitudinally:	150 mm
C	. Vertically:	60 mm
C	- Safety belt:	yes
C	. Type	2 point seat belt

1.14.2 Optional driver's seat(s)

D	- Make/Model/Type:	GRAMMER/44/520/mechanical
D	- Type of suspension:	adjustable spring
D	- Type of damping:	shock absorber
	- Range of adjustment	
C	. Longitudinally:	150 mm
C	. Vertically:	60 mm

1.14.3 Passenger seat

C	- Location:	on the left of the driving seat
C	- Capacity:	1

1.15 Lighting

	Height above ground of centre	Size	Distance from outside edge of lights to median plane of tractor
	mm	mm	mm
Headlights	1040	160x140	230
Sidelights	1580	110x70	680
Rearlights	1800	170x110	610
Reflectors	1800	170x110	610

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	3859	1867	2428	2476	2290
Unballasted	3601				

2.2 Ground clearance

- Height: 353 mm
- Clearance-limiting part: drawbar bracket

2.3 Tractor mass

- Tractor tested: mass with TS54 rear roll bar

	Ballasted		Unballasted	
	Without driver	With driver	Without driver	With driver
	kg	kg	kg	kg
Front	1400	1425	1025	1050
Rear	1725	1775	1600	1650
Total	3125	3200	2625	2700

2.4 Ballast

	Weights		Water
	Number	Total mass	
		kg	kg
Front	6	290	none
Rear	4	200	none
Optional	none	none	none

2.6 Tyres and track width specifications

	Front	Rear
Tyres		
- make	TAURUS	TAURUS
- type	Point 8	Point 8
- dimensions	11.2 R24	16.9 R30
- ply rating	114 A8	137 A8
- type of casing	Radial	Radial
- maximum load (tyre manufacturer's)	11.6 kN	22.5 kN
- maximum load (tractor manufacturer's)	10.8 kN	17.5 kN
- inflation pressure (tyre manufacturer's)	160 kPa	160 kPa
- dynamic radius index	515	695
Chosen track width	1550	1540

Optional

Dimension	
Front	Rear
300/70R20 A8	13.6R28 123 A8
8.3R24 104 A8	12.4R32 122 A8
300/70R20 110 A8	3.80/70R28 127 A8
36070R20 120 A8	420/70R30 134 A8
11.2R20 111 A8	14.9R28 128 A8
12.4R20 116 A8	14.9R30 129 A8
11.2R24 114 A8	12.4R36 124 A8 16.9R30 137 A8
300/70R24 113 A8	480/70R28 140 A8
300/70 R20 110 A8	380/70R28 127 A8
320/70R20 113 A8	420/70R28 133 A8
380/70R20 122 A8	480/70R30 141 A8
335/80R18 153 A2/143B	480/65R28 129 A8
375/75R20 155 A2/143B	540/65R28 137 A8
340/75R20 117 A8	16.9R28 136 A8
405/70R20 155A2/143B	540/65R30 138 A8
14.9LR20 118A8/116B	16.9R30 137 A8

2.7 Fuel

- type: AGIP diesel oil, in conformity with national standard
- density at 15°C: 0.835 g/cm^3

2.8 Oils and lubricants

2.8.1 Capacity and change interval

	Capacity	Oil change	Filter change
	dm^3	h	h
Engine	7.5	300	300

Gear box , rear axle, rear final drive, brakes, hydraulic system and steering	42	300	1200 hours and 2 years
Front axle	4.5	300	none
Final drive with brakes (front)	none	none	none

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

	Recommended	Used during test
Engine oil Type Viscosity Classification	 AMBRA SUPER GOLD 15W-40 SAE	As recommended
Transmission oils, hydraulic fluid and steering oil Type Viscosity Classification	 AMBRA MULTI G 10W-30 SAE	As recommended
Braking oil Type Viscosity Classification	 AKCELA LHM FLUID 7308 ISO	As recommended

2.8.3 Grease

- number of lubrication points: 15

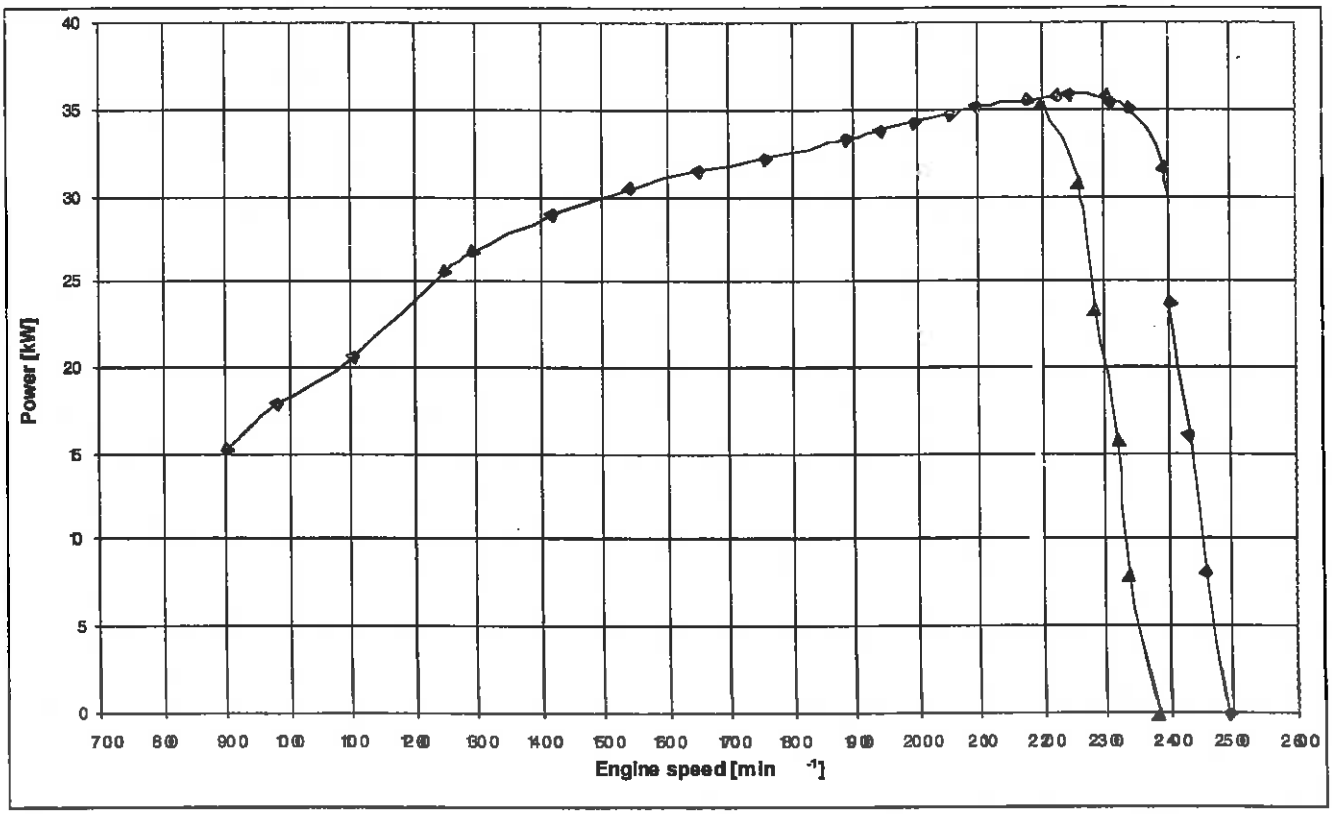
3. COMPULSORY TEST RESULTS

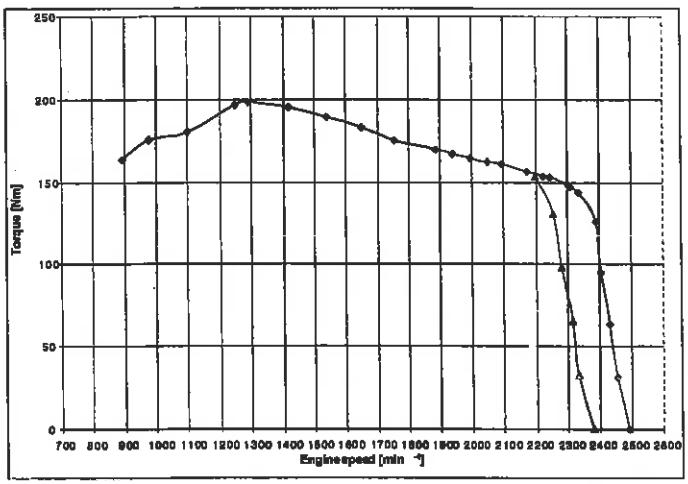
3.1 Main power take-off

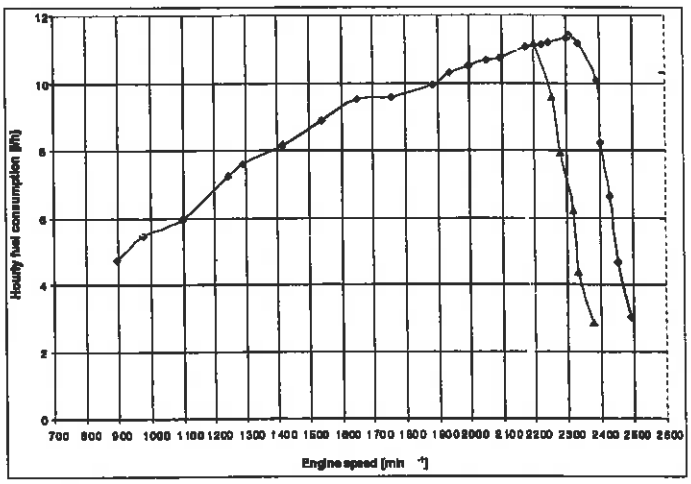
- Date and location of tests: 04.03.2004, Cadriano (BO) - Italy
- Type of dynamometer bench: Schenck U1 - 40

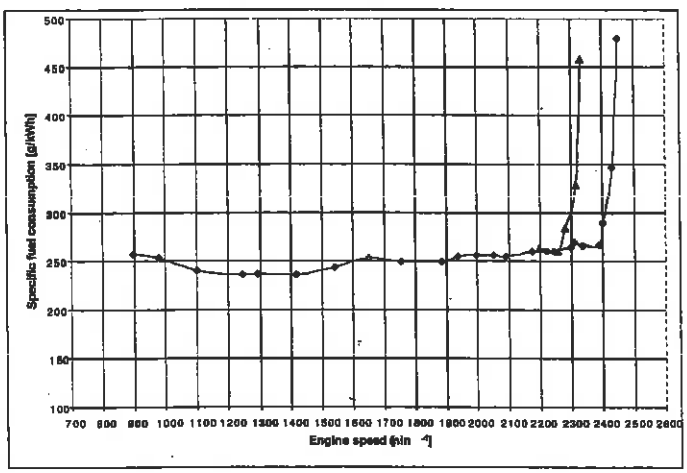
Power	Speed			Fuel consumption			Specific energy
	Engine	P.T.O.	Fan	Hourly		Specific	
kW	min^{-1} (rev/min)			kg/h	l/h	g/kWh	kWh/l
3.1.1	MAXIMUM POWER - TWO-HOUR TEST						
36.0	2243	551	2489	9.39	11.21	261	3.21
3.1.2	POWER AT RATED ENGINE SPEED						
35.8	2300	565	2538	9.51	11.35	265	3.16
3.1.3	STANDARD POWER TAKE-OFF SPEED [540 ± 10 min^{-1} (rev/min)]						
35.5	2198	540	2388	9.36	11.17	264	3.17
3.1.4	PART LOADS						
3.1.4.1	the torque corresponding to maximum power at rated engine speed						
35.8	2300	565	2538	9.51	11.35	265	3.16
3.1.4.2	85% of torque defined in 3.1.4.1						
31.7	2389	587	2640	8.46	10.10	267	3.14
3.1.4.3	75% of torque defined in 3.1.4.2						
23.9	2401	590	2654	6.90	8.23	289	2.90
3.1.4.4	50% of torque defined in 3.1.4.2						
16.1	2430	597	2373	5.58	6.66	347	2.42
3.1.4.5	25% of torque defined in 3.1.4.2						
8.1	2454	603	1635	3.90	4.65	480	1.75
3.1.4.6	unloaded						
/	2491	612	1521	2.52	3.01	/	/
3.1.5	PART LOADS AT STANDARD POWER TAKE-OFF SPEED [540 ± 10 min^{-1} (rev/min)]						
3.1.5.1	the torque corresponding to maximum power						
35.5	2198	540	2388	9.36	11.17	264	3.17
3.1.5.2	85% of torque defined in 3.1.5.1						
30.9	2255	554	2482	8.04	9.59	260	3.22
3.1.5.3	75% of torque defined in 3.1.5.2						
23.4	2279	560	2525	6.66	7.95	284	2.95
3.1.5.4	50% of torque defined in 3.1.5.2						
15.9	2316	569	2568	5.22	6.23	329	2.55
3.1.5.5	25% of torque defined in 3.1.5.2						
8.0	2332	573	1812	3.66	4.37	458	1.83
3.1.5.6	unloaded						
/	2377	584	1557	2.39	2.86	/	/

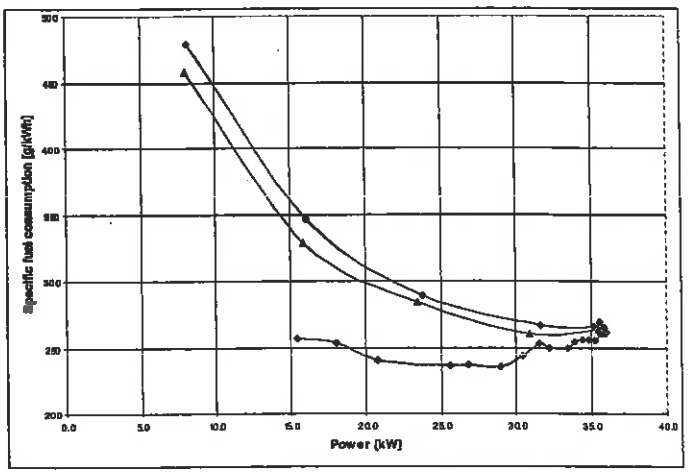
3.1.6 Curves as a function of engine speed











3.1.7 Other results

No load maximum engine speed: 2491 min^{-1}

Torque (equivalent crankshaft) at maximum power

At rated engine speed 148.9 Nm

At two-hour test 153.3 Nm

Maximum torque (equivalent crankshaft) 198.4 Nm

(engine speed) (1290 min^{-1})

Mean atmospheric conditions:	
Temperature	22 °C
Pressure	101.7 kPa
Relative humidity	55 %
Maximum temperature	
Coolant	99 °C
Engine oil	114 °C
Fuel	47 °C
Engine air intake	28 °C

3.2 Hydraulic power and lifting force

- Date of tests: 25.03.2004

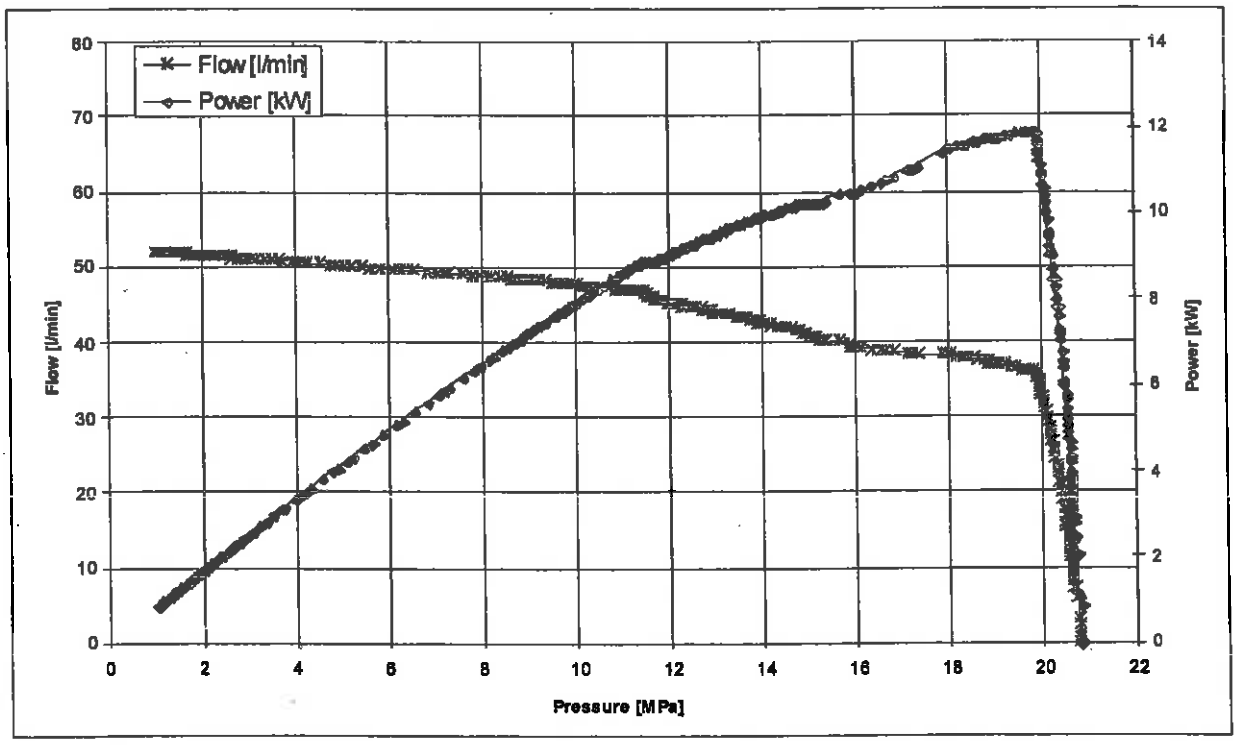
3.2.1 Hydraulic power test

3.2.1.1 Hydraulic fluid data

- Hydraulic fluid type: AKCELA NEXPLORE
- Viscosity index: 120
- 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.	min^{-1}	l/min	kW
Rated Engine Speed						
3.2.1.2.1 Maximum (sustained) pressure with relief valve open as measured at the coupler Pump stalled: No	20.76	61	68	2378		
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:	18.70	66		2421	37.52	11.73
3.2.1.2.3 Maximum avaible flow and maximum power from one coupler pair:	19.81	66		2418	36.08	11.91

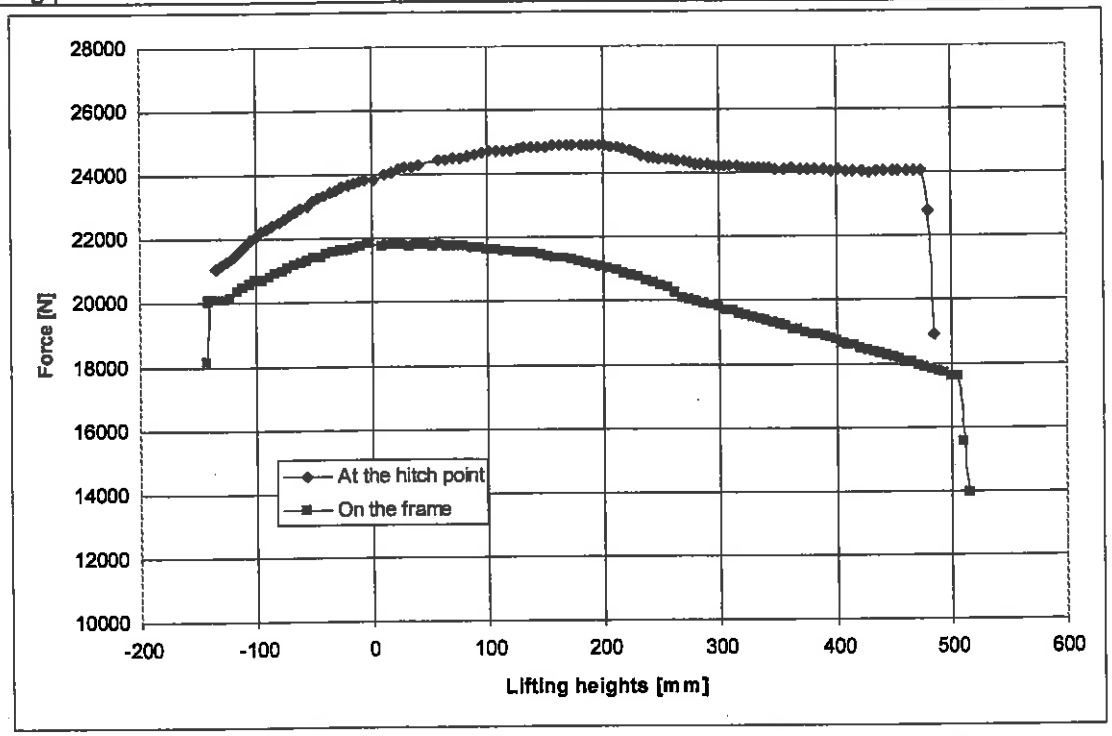


3.2.2 Power lift test:

- Linkage settings for test - see Table 2.1 and Figures 2.1 and 2.2.

	At the hitch point	On the frame
Height of lower hitch points above ground in down position:	372 mm	356 mm
Vertical movement - with lifting force - without lifting force	 609 mm 641 mm	 648 mm 721 mm
Maximum corrected force exerted through full range	21.17 kN	17.58 kN
Corresponding pressure of hydraulic fluid	18.70 MPa	18.70 MPa
Moment about rear-wheel axis	21.91 kNm	25.84 kNm
Maximum tilt angle of mast from vertical	-	10.1 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points								
Lifting forces:								
mm	-135	-100	0	100	200	300	400	474
at the hitch point in kN:	21.17	22.09	23.87	24.68	24.88	24.22	24.09	24.07
Corresponding pressure: 18.70 MPa								
mm	-142	-100	0	100	200	300	400	506
on the frame in kN:	18.11	20.68	21.86	21.65	21.09	19.78	18.74	17.58
Corresponding pressure: 18.70 MPa								



3.3 *Drawbar Power test*

- Date of tests: 26-27.04.2004
- Type of track: concrete

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
	mm	kPa	kPa
Unballasted	510	135	130
Ballasted	510	135	130

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	Teperature	Relative umidity	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)														
L 4	14.43	22.58	2.30	2405	15.0	1521	436	1.92	56	85	108	17	66	101.2
ML 1	18.74	22.81	2.96	2385	14.9	1588	398	2.10	55	84	109	16	66	101.2
MH 1	22.49	22.55	3.59	2370	15.1	1841	370	2.26	57	83	101	17	66	101.2
ML 2	26.08	21.69	4.33	2330	13.8	2276	353	2.38	55	84	108	16	66	101.2
MH 2	27.63	18.12	5.49	2262	9.0	2493	327	2.56	56	85	109	17	66	101.2
ML 3	27.80	14.55	6.88	2278	6.1	2504	330	2.54	56	84	110	16	66	101.2
MH 3	28.83	12.35	8.40	2254	4.9	2474	326	2.57	55	83	109	16	66	101.2
ML 4	28.02	9.79	10.30	2261	4.0	2489	328	2.55	56	84	109	16	66	101.2
H 1	28.08	8.96	11.28	2266	3.8	2481	335	2.50	57	83	110	16	66	101.2
MH 4	26.59	7.52	12.73	2250	3.0	2446	352	2.38	55	84	110	17	66	101.2
H 2	25.12	5.38	16.82	2239	2.5	2422	371	2.26	56	84	111	16	66	101.2
3.3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)														
L 4	17.27	27.16	2.29	2401	14.9	1332	414	2.02	54	85	109	16	66	101.2
ML 1	22.28	27.29	2.94	2378	15.0	1716	364	2.30	56	84	110	16	66	101.2
MH 1	26.34	26.72	3.55	2320	14.2	1983	336	2.50	55	85	109	15	66	101.2
ML 2	27.69	22.60	4.41	2244	9.0	2192	336	2.49	54	84	108	16	66	101.2
MH 2	28.65	18.48	5.58	2244	6.4	2440	315	2.66	55	85	110	15	66	101.2
ML 3	28.71	15.11	6.84	2252	4.8	2478	321	2.61	54	84	109	16	66	101.2
MH 3	28.46	12.00	8.54	2270	4.1	2479	321	2.61	56	84	110	16	66	101.2
ML 4	27.50	9.59	10.32	2254	3.3	2432	334	2.51	53	83	109	15	66	101.2
H 1	27.52	8.77	11.30	2258	3.0	2484	335	2.50	54	83	109	15	66	101.2
MH 4	26.84	7.57	12.77	2263	2.5	2483	345	2.43	54	83	110	15	66	101.2
H 2	24.99	5.31	16.94	2247	1.9	2444	374	2.24	55	84	110	16	66	101.2
3.3.3 FIVE-HOUR TESTS														
3.3.3.1 FIVE-HOUR TESTS at 75% of the pull corresponding to maximum power at rated speeed														
MH 3	22.32	9.02	8.91	2375	3.9	2592	368	2.28	55	87	109	15	68	101.8
3.3.3.2 FIVE-HOUR TESTS at pull corresponding to 15% of wheelslip, with additional ballast: 800 kg														
ML 1	23.54	27.25	3.11	2355	9.0	1568	345	2.43	56	88	110	15	66	101.8
Oil consumption during ten hours duration of tests 3.3.3.1 et 3.3.3.2: 16 g/h														

3.4 Turning area and turning circle

- Wheel equipment if several sets of tyres are tested: not applicable

	Without brakes	
	Right-hand	Left-hand
	m	m
Radius of turning area	3.75	3.75
Radius of turning circle	3.61	3.61

3.5 Location of centre of gravity

- Height above ground 794 mm
- Distance from the vertical plane containing the axis of the rear-wheels 803 mm
- Distance from the median longitudinal plane of the tractor 7 mm (to the left)

3.6 Braking

-date of tests 23-24.04.2004

3.6.1 Cold service braking device test

	Speed before application of brakes	Braking device control Force	Mean deceleration	Minimum stopping distance without locking the wheels
	km/h	kN	m/s^2	m
Ballasted tractor	40.3	0.11	1.21	52.0
Ballasted tractor	40.3	0.20	1.98	31.6
Ballasted tractor	40.3	0.31	3.19	19.5
Ballasted tractor	40.3	0.43	3.83	16.4
Ballasted tractor	40.3	0.55	4.60	13.7
Ballasted tractor	40.3	0.60	4.60	13.6
Unballasted tractor	40.3	0.10	2.24	28.2
Unballasted tractor	40.3	0.20	2.73	23.0
Unballasted tractor	40.3	0.30	3.91	16.2
Unballasted tractor	40.3	0.43	4.86	12.9
Unballasted tractor	40.3	0.48	6.20	10.2
Unballasted tractor	40.3	0.55	5.95	10.5

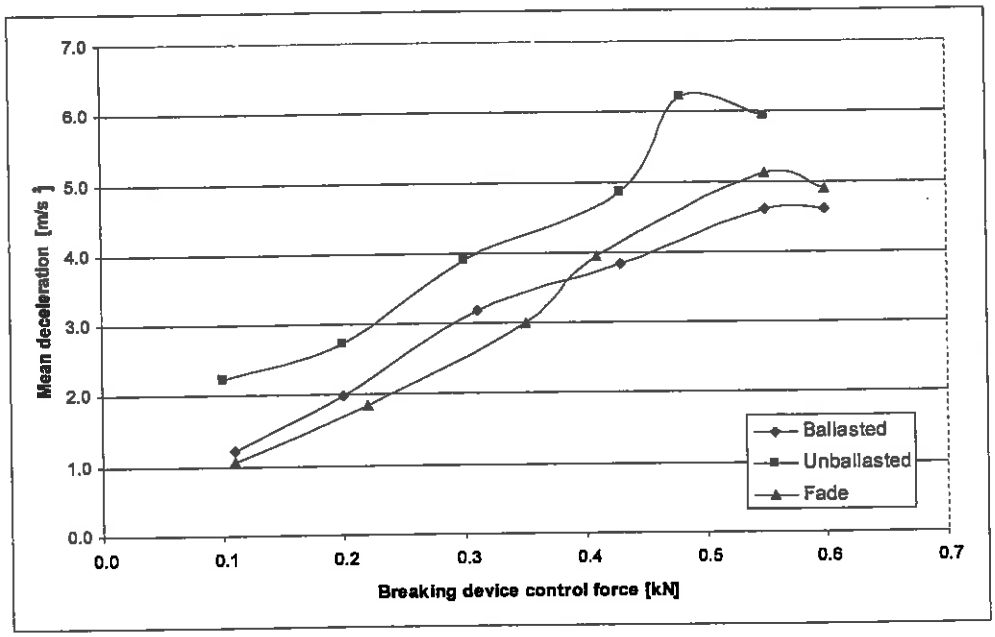
- Maximum deviation of tractor from its original course: none
- Abnormal vibration: none

3.6.2 Fade test

Speed before application of brakes	Braking device control force	Mean deceleration	Minimum stopping distance without locking the wheels
km/h	kN	m/s^2	m
40.5	0.11	1.06	59.2

40.5	0.22	1.86	33.8
40.5	0.35	3.00	20.9
40.5	0.41	3.96	15.8
40.5	0.55	5.13	12.3
40.5	0.60	4.90	12.8

- Maximum deviation of tractor from its original course: none
- Abnormal vibration: none
- Brake heating method: the tractor has been driven for 1 km at a speed of 34.3 km/h and the force for actuating the service brake has been 90 N



3.6.3 Parking braking device test

	Uphill	downhill
Braking device control force	0.32 kN	0.34 kN

3.7 *Measurement of external noise*

- Date of tests: 23.04.2004
- Sound level meter make/model/type: Bruel&Kjaer / 2238
- Type of track: concrete
- Gear number: 4 high
- Travelling speed before acceleration: 30.4 km/h
- Sound level: 83.7 dB (A) (tractor left side)

4. OTHER TEST 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 (excepted tyres)

Tested tractor was fitted with 11.2R24 tyres (with maximum overall diameter in service of 1135 mm) on the front axle and 12.4R36 tyres (with maximum overall diameter in service of 1529 mm) on the rear axle.

4.1.2 Test conditions

Three-point hitch hydraulic system pressure setting: 20.75 MPa
Three-point hitch hydraulic system oil temperature: 45 ± 5 °C
Rated engine speed: 2300 min^{-1}

Tests have been performed in accordance with Section 4 - Static lift force 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 test
		mm	mm
Length of lift arms:	(A)	255	255
Length of lower links:	(B)	880	880
Distance of lift arm pivot point from rear wheel axis			
- horizontally (rearward):	(a)	145	145
- vertically:	(b)	276	276
Horizontal distance between the 2 lower link points:	(U)	405	405
Horizontal distance between the 2 lift arm end points:	(V)	450	450
Length of upper link:	(S)	555⊕770	690
Distance of upper link pivot point from rear wheel axis			
- horizontally (rearward):	(c)	340-345	340
- vertically:	(d)	308-361	361
Distance of lower link pivot point from rear wheel axis			
- horizontally:	(e)	155	155
- vertically:	(f)	189	189
Distance of lower link pivot points to lift rod pivot points on lower links:	(D)	523	523
Length of lift rods :	(L)	570⊕690	570

4.1.3 Static lift force

Position of the hitch	Vertical lift force*	Vertical distance of lower hitch point above ground
	kN	mm
Lowest	21.23	455
1/5	23.32	578
2/5	23.21	698
3/5	22.19	822
4/5	20.88	944
Highest	19.35	1065

* Reported values are 90% of measured

Bologna, 01 July 2004

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