ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

Report on test in accordance with the OECD Standard Code I (Full Code) for the Official Testing of Agricultural and Forestry Tractor



DEUTZ-FAHR AGRARTECHNIK D10S704AVT

OECD No 1686 Full Code

Trade name: **DEUTZ-FAHR AGROPLUS 70**

with 45 forward and 45 reverse speeds
40 km/h four-wheel drive agricultural tractor

Manufactured by:

DEUTZ-FAHR AGRARTECHNIK GmbH
Deutz-Fahr Strasse 1
89415 Lauingen/Donau
Germany

Date of OECD approval: 20 October 1997
Period of test: April - May 1997

ISMA Via Milano 43 24047 Treviglio BG Italy
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ERRATUM

Pages 24 to 34 shall bear the same heading as the preceding pages of the report, i.e.:

DEUTZ-FAHR AGRARTECHNIK D10S704AVT
TEST No. 092

ISTITUTO SPERIMENTALE PER LA MECCANIZZAZIONE AGRICOLA
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All stated dimensions and tests refer to tyre size 11.2R24 at front and 16.9R30 at rear, as well as to track widths 1700 mm at front and 1600 mm at rear.

Tractor manufacturer

- Name:	DEUTZ-FAHR AGRARTECHNIK GmbH;
- Address:	Deutz-Fahr Strasse 1, 89415 Lauingen/Donau, Germany;
- Location of tractor assembly:	SAME DEUTZ-FAHR GROUP S.p.A. V.le F. Cassani 15, 24047 Treviglio BG, Italy;
- Submitted for test by:	the manufacturer by SAME DEUTZ-FAHR GROUP S.p.A.
- Selected by:	the manufacturer with the agreement of ISMA;
- Place of running in:	Treviglio BG, Italy;
- Duration of running in:	50 hours,
- Location of test:	ISMA, Via Milano 43, Treviglio BG, Italy.

SPECIFICATION OF TRACTOR

TRACTOR

- Make:	DEUTZ-FAHR;
- Model:	D10S704AVT, with 45 forward and 45 reverse speeds 40 km/h version;
- Trade name:	AGROPLUS 70;
- Type:	four-wheel drive, unit construction;
- Number of driving wheels:	4;
- Serial number:	0262;
- First serial number:	0001.

ENGINE

- Make:	KHD DEUTZ;
- Model:	F4L 913 Code 51.5/10;
- Type:	air cooled 4-stroke diesel, direct injection, naturally aspirated;
- Serial number:	8483453.

Cylinders

- Number and disposition:	4, vertical, in-line;
- Bore x stroke:	102 x 125 mm;
- Capacity:	4086 cm^3;
- Compression ratio:	18:1;
- Arrangement of valves:	overhead;
- Cylinder liners:	without liners.

Fuel system

- Fuel feed system:	electrical, BOSCH 0 580 463 018, 12 V;
- Make, model and type of fuel filter:	FIAMM FNA 166/20;
- Capacity of fuel tank:	90 dm^3;
- Make, model and type of injection pump:	BOSCH PES 4A 95 D410/3RS2789;
. serial number:	68826 04032;
- Manufacturer's production setting of injection pump:	
. flow rate:	57 ± 2 mm^3/stroke at rated speed and full load corresponding 15.79 dm^3/h;
. timing:	14° before TDC;
- Make, model and type of injectors:	BOSCH DLLA 147 PV 3182741 multihole injection nozzles;
- Injection pressure:	25 + 0.8 MPa.

Governor

- Make:	BOSCH;
- Model:	RSV 325-1250 A5C V-B 420 700 310;
- Type:	mechanical;
- Governor range of engine speed:	from 650 to 2500 rev/min;
- Rated engine speed:	2300 rev/min.

Air cleaner

- Pre-cleaner	
. make:	DONALDSON;
. model:	P 01-6330;
. type:	cyclone;
. location:	above the bonnet.
- Main filter	
. make:	DONALDSON;
. model:	FLG 08-0553 or FLG 08-0524;
. type:	dry paper element filter with replaceable cartridge;
. location:	front of engine;
. air intake location:	above bonnet;
- Maintenance indicator:	with the warning lamp on the dashboard.

Lubrication system

- Type of feed pump:	forced feed from gear pump;
- Type of filter:	FIAMM FT 4803;
- Oil specifications:	see page 22.

Cooling system

- Type and detail:	air cooling with axial blower;
- Specification of fan:	propeller fan driven by engine shaft;
- Number of fan blades:	11;
- Fan diameter:	230 mm;
- Type of temperature control:	none.

Starting system

- Make:	BOSCH;
- Model:	0331 402607 12 V;
- Type:	electromagnetic engagement;
- Starter motor power rating:	3.0 kW;
- Cold starting aid:	thermostarter;
- Safety device:	electrical lockout on clutch and PTO controls;

Electrical equipment

- Voltage:	14 V;
- Generator	
. make:	ISKRA;
. model:	AAK 3563 14 V 65 A;
. type:	alternator;
. power:	65 A;
- Battery:	1lead acid;
. capacity:	100 Ah at 20 hours rating.

Exhaust system

- Make:	SAME DEUTZ-FAHR Group;
- Model:	0.010.5633.4;
- Type:	one reflection absorption chamber;
- Location:	on the left hand side of engine, horizontal position, under side bonnet;
- Height of outlet above ground:	540 mm.

TRANSMISSION

Clutch (utilized only for travelling of tractor)

- Make:	SAME DEUTZ-FAHR Group;
- Model:	648.23;
- Type:	single disk dry clutch;
- Number of plates:	1;
- Plates diameter:	305 mm;
- Control system:	hydraulic, operated by pedal.

Gear box

. make:	SAME DEUTZ-FAHR Group;
. model:	648.31;
. type:	mechanical synchromesh speed change gear; 5 speed with 3 ranges of speeds (S/N/F), one electrohydraulic reduction gear (low/medium/high), and one reverse group;
. number of gears:	45 forward and 45 reverse.
- Available options:	5 speed with 3 ranges of speeds (S/N/F), one electrohydraulic reduction gear (low/high), and one reverse group;
. number of gears:	30 forward and 15 reverse.

Rear axle and final drives

- Make:	SAME DEUTZ-FAHR Group;
- Model:	648.44;
- Type:	bevel gear differential and epicyclic final drive.

Rear differential lock

- Make:	SAME DEUTZ-FAHR Group;
- Model:	648.47;
- Type:	electrohydraulic;
- Control system:	engaged or disengaged by button.

Front axle and final drives

- Make: SAME DEUTZ-FAHR Group;
- Model: 648.43;
- Type: original SAME DEUTZ-FAHR system with central shaft, bevel gear drive, differential and epicyclic final drives.

Front differential lock

- Make: SAME DEUTZ-FAHR Group;
- Model: 648.46;
- Type: electrohydraulic;
- Control system: engaged or disengaged by button.

Total ratios and speed

Gear	Group	Number of engine revolutions for one revolution of the driving wheels			Nominal travelling speed at rated engine speed of 2300 rev/min (*) km/h		
		Low	Medium	High	Low	Medium	High
FORWARD							
1	Slow	3046.50	2537.39	2093.62	0.20	0.24	0.29
2	Slow	2131.73	1776.32	1464.72	0.28	0.34	0.41
3	Slow	1487.73	1239.74	1022.68	0.41	0.49	0.59
4	Slow	1064.51	887.29	731.86	0.57	0.68	0.82
5	Slow	765.28	637.31	525.94	0.79	0.94	1.15
1	Normal	482.13	401.70	331.41	1.25	1.50	1.82
2	Normal	337.59	281.41	231.91	1.79	2.14	2.60
3	Normal	235.62	196.27	161.87	2.56	3.07	3.72
4	Normal	168.55	140.58	115.83	3.58	4.29	5.20
5	Normal	121.28	100.98	83.41	4.97	5.97	7.23
1	Fast	87.62	73.01	60.14	6.88	8.25	10.02
2	Fast	61.38	50.99	42.32	9.82	11.82	14.24
3	Fast	42.82	35.64	29.45	14.07	16.91	20.46
4	Fast	30.69	25.49	21.04	19.64	23.64	28.65
5	Fast	22.03	18.32	15.10	27.36	32.90	39.92

(*) Calculated with a tyre dynamic radius index of 695 mm (ISO 4251/1-1992).

Number of revolutions of front wheels for one revolution of rear wheels: 1.383.

Total ratios and speed (continued)

Gear	Group	Number of engine revolutions for one revolution of the driving wheels			Nominal travelling speed at rated engine speed of 2300 rev/min (*) km/h		
		Low	Medium	High	Low	Medium	High
REVERSE							
1	Slow	3210.92	2674.33	2206.61	0.19	0.23	0.27
2	Slow	2246.78	1872.19	1543.76	0.27	0.32	0.39
3	Slow	1568.02	1306.64	1077.87	0.38	0.46	0.56
4	Slow	1121.96	935.18	771.36	0.54	0.64	0.78
5	Slow	806.58	672.23	554.33	0.75	0.90	1.09
1	Normal	508.15	423.37	349.29	1.19	1.42	1.73
2	Normal	355.81	296.60	244.43	1.69	2.03	2.47
3	Normal	248.34	206.86	170.60	2.43	2.91	3.53
4	Normal	177.65	148.17	122.08	3.39	4.07	4.94
5	Normal	127.82	106.43	87.91	4.71	5.66	6.86
1	Fast	92.34	76.95	63.39	6.53	7.83	9.51
2	Fast	64.69	53.74	44.61	9.32	11.21	13.51
3	Fast	45.13	37.56	31.04	13.35	16.04	19.41
4	Fast	32.35	26.87	22.17	18.63	22.43	27.18
5	Fast	23.22	19.30	15.91	25.96	31.22	37.87

(*) Calculated with a tyre dynamic radius index of 695 mm (ISO 4251/1-1992).

Number of revolutions of front wheels for one revolution of rear wheels: 1.383.

POWER TAKE-OFF

Main power take-off proportional to engine speed

- Type: independent, at rear of tractor, in tractor's median plane, engaged or disengaged by push botton, driven by multiplate wet clutch independent of travel clutch;
- Number of shafts: 1;
- Method of changing and dimensions of power take-off shaft ends: not changeable, 35 mm diameter, 6 splines, ISO 500-1991, type 1;
- Method of changing speed: combination of internal and external hand lever;
- Height above ground: 785 mm;
- Distance from the median plane of the tractor: 0 mm;
- Distance behind rear axle: 480 mm;
- Direction of rotation (viewed facing driving end): clockwise.

PTO type	PTO speed rev/min	Engine speed rev/min	Engine/PTO transmission ratio	Power restriction kW
540	540 611	2077 2350	3.846	-
750	750 766	2300 2350	3.066	-
1000	1000 1022	2300 2350	2.300	-

Secondary power take-off proportional to engine speed
(optional, fitted on tested tractor)

- Type:	independent, at front of tractor, in tractor's median plane, engaged or disengaged by push botton, driven by multiplate wet clutch independent of travel clutch;
- Number and type of shafts:	1, ISO 500-1991, type 1 (35 mm dia, 6 splines)
- Height above ground:	570 mm;
- Distance from the median plane of the tractor:	0 mm;
- Distance forward front axle:	647 mm;
- Ratio of rotation speeds (engine speed/PTO speed):	2.4;
- Direction of rotation (viewed facing driving end):	anticlockwise.

Power take-off proportional to ground speed
(optional, not fitted on tested tractor)

- Type:	independent, not adjustable to 540-1000 rev/min, location at rear of tractor, in tractor's median plane, below the mean PTO, engaged or disengaged by hand lever at the left hand side of the seat;
- Number and type of shafts:	1, ISO 500-1991, type 1 (35 mm dia, 6 splines);
- Method of changing power take-off shaft ends:	none;
- Direction of rotation with forward gear engaged:	clockwise;
- Travelling distance for one revolution of power take-off shaft:	0.24 m;
- Number of power take-off shaft revolutions for one revolution of rear driving wheels:	14.74.

REAR POWER LIFT

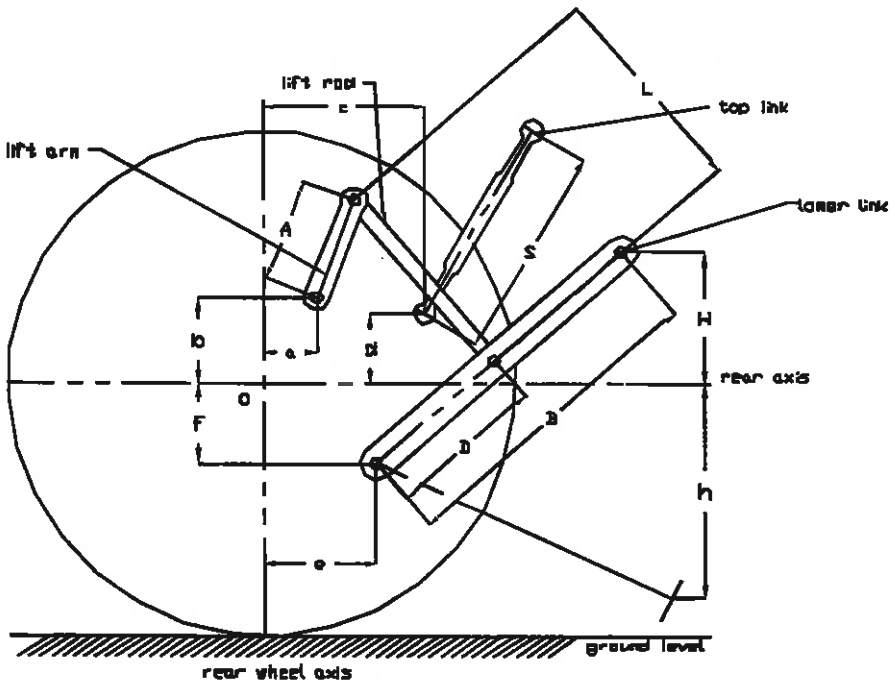
- Make:	SAME DEUTZ-FAHR Group;
- Model:	648.39;
- Type:	load sensing;
- Type of hydraulic system:	open centre system;
- Number and type of cylinders:	1 internal single-acting;
- Type of lock for transport:	hydraulic;
- Relief valves pressure setting:	18.0 ± 0.5 MPa;
- Opening pressure of anti-shock valve:	21.0 ± 0.5 MPa;

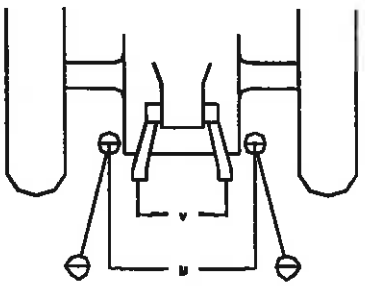
- Lift pump
  . make: BOSCH;
  . type: hydraulic rotary pumps, driven by engine shaft;
- Transmission between pump and engine: mechanical;
- Number and type of filters: 1, replaceable paper cartridge;
- Oil capacity: 41 dm^3;
- Site of oil reservoir: gear box;
- Number, type and location of tapping points: 4 ways distributor at rear of tractor;
- Maximum volume of oil available to external cylinders: 15 dm^3.

- Recommended oil: see page 22.

Rear three-point linkage

- Category (ISO 730/1-1990): 2;
- Category adapter: none.





REAR LINKAGE GEOMETRY

REAR POWER LIFT (continued)

Dimensions of linkage geometry (when connected to the standard frame)

		Dimension or range mm	Settings used in test mm
Length of lift arms	(A)	250	250
Length of lower links	(B)	870	870
Distance of lift arm pivot point from rear wheel axis (behind)			
- horizontally	(a)	177	177
- vertically	(b)	315	315
Horizontal distance between the 2 lower link points	(u)	360	360
Horizontal distance between the 2 lift arm end points	(v)	450	450
Length of upper link	(S)	from 530 to 760	659
Distance of upper link pivot point from rear wheel axis			
- horizontally	(c)	397	397
- vertically	(d)	260-295-335	295
Distance of lower link pivot point from rear wheel axis			
- horizontally	(e)	183	183
- vertically	(f)	154	154
Distance of lower link pivot point to lift rod pivot points on lower links	(D)	400	400
Length of lift rods	(L)	from 535 to 689	628

Height of lower hitch points relative to the rear wheel axis:

Length of lift rods	(L)	535 689	628
Linkage distance of lift rods	(D)	400 400	400
Lowest position	(h)	290 662	495
Highest position	(H)	395 99	240
Height above ground of lower hitch points when locked in transport position (*)			935

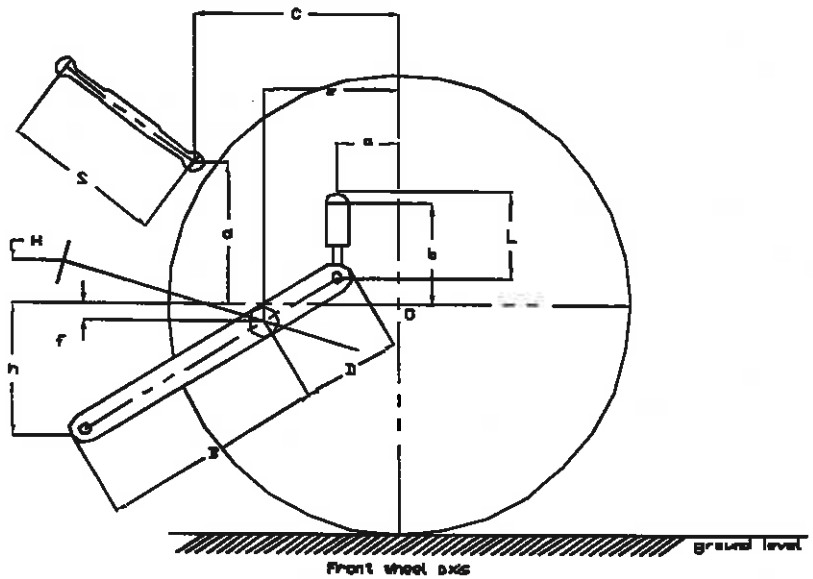
(*) *Assuming the dynamic radius index = 695 mm (ISO 4251/1-1992)*

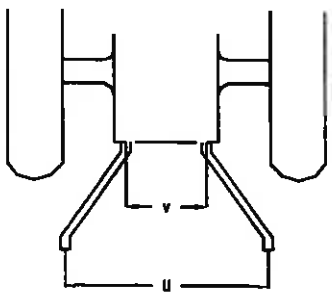
FRONT POWER LIFT (optional, fitted on tested tractor)

- Make:	SAME DEUTZ-FAHR Group;
- Model:	ORIGINAL SAME SYSTEM 648.59 FRONT;
- Type and number of cylinders:	2 at single acting;
- Type of lock for transport:	none;
- Relief valve pressure setting:	18.0 ± 0.5 MPa;
- Opening pressure of anti-shock valve:	21.0 MPa;
- Lift pump type:	hydraulic rotary pump, driven by engine shaft, pump make BOSCH;
- Trasmission between pump and engine:	mechanical;
- Type and number of filters:	1, repeceable paper cartridge;
- Change interval:	2400 hrs or when the filter clogging warning lamp is lighted;
- Oil capacity:	41 dm^3;

Front three-point linkage

- Category (ISO 730/1-1990):	2;
- Category adapter:	none.





FRONT LINKAGE GEOMETRY

FRONT POWER LIFT

Dimensions of linkage geometry (when connected to the standard frame)

		Dimension or range mm	Settings used in test mm
Length of lower links	(B)	647	647
Distance of cylinders pivot point from front wheel axis (forward)			
- horizontally	(a)	245	245
- vertically	(b)	474	474
Horizontal distance between the 2 lower link points	(u)	855	855
Horizontal distance between the 2 lift arm end points	(v)	340	340
Length of upper link	(S)	from 450 to 680	451
Distance of upper link pivot point from front wheel axis			
- horizontally	(c)	592-617-634	634
- vertically	(d)	319-373-431	431
Distance of upper link pivot point from front wheel axis			
- horizontally	(e)	435	435
- vertically	(f)	25	25
Distance of lower link pivot point to cylinders pivot points on lower links	(D)	215	215
Length of cylinders			
- in low position	(L)	303	303
- in high position	(L)	503	503
Height of lower hitch points relative to the front wheel axis			
- in low position	(h)	320	320
- in high position	(H)	282	282
Height above ground of lower hitch points (*)			787

(*) *Assuming the dynamic radius index = 515 mm (ISO 4251/1-1992)*

SWINGING DRAWBAR: none.

HOLED DRAWBAR:

- Number of holes:	7;
- Distance between holes:	100 mm;
- Hole diameter:	28.5 mm;
- Thickness x width of the drawbar:	30 x 80 mm;
- Height above ground,	
. min:	70 mm;
. max:	1051 mm;
- Horizontal distance behind power take-off shaft end:	555 mm;
- Diameter of the pinhole:	28 mm.

TRAILER HITCH

- Type:	DGM-GA 2107 C 6t V1.5;
- Hole diameter:	28 mm;
- Height above ground	
. min:	555 mm;
. max:	950 mm;
- Distance of hitch point from rear wheel axis	
. horizontally:	607 mm;
- Distance of hitch point from power take-off shaft end	
. vertically:	155 mm below, 240 mm above;
. horizontally:	150 mm;
- Maximum vertical permissible load:	14.7 kN.

STEERING

- Specification:	hydrostatic steering with BOSCH hydraulic gear pump, two simple acting ram acting directly on front axle.
- Make:	DANFOSS;
- Model:	ORBITROLL OSPC 80 OR;
- Type:	hydrostatic;
- Working pressure:	15 MPa;
- Recommended oil:	see page 22.

BRAKES

Service brake

- Make:	SAME DEUTZ-FAHR Group;
- Model:	648.54;
- Type:	oil bath disc, total 4 discs, 2 at front (1 per wheel) and 2 at rear (1 per wheel), all mounted before the final drive;
. front disc diameter:	178 mm,
. rear disc diameter:	224 mm,
. material:	FRENDO HDT 303 SINTERIX 2 lining material;
- Method of operation:	hydraulically actuated with 2 pedals;
- Trailer braking take-off:	hydraulic brake system.

Parking brake

- Type:	fully independent of service brake, 2 oil bath disc mounted on the pinion shaft in the gear box;
- Method of operation:	mechanical by hand lever.

Steering brake

- Metod of operation:	divided pedal of service brake, for normal use locked together.

STEERING WHEELS

- Number:	2;
- Location:	at front;
- Track widths	
. min:	1440 mm:
. max:	1740 mm;
- Adjustment:	changing the position of the rims with respect to the disc.

DRIVING WHEELS

- Number:	4;
- Location:	two at front and two at rear;
- Rear track widths	
. min:	1400 mm;
. max:	1700 mm;
- Adjustment:	changing the position of the rims with respect to the disc.

WHEELBASE: 2242 mm.

PROTECTIVE STRUCTURE

Specifications

Seat	OECD approval number
GRAMMER DS 83 H / 7 L	CSS 0299/58
KAB P 2/XH 2	CSS 0299/59
KAB U 6/XH 2	CSS 0299/60

- Date of approval: 15 October 1996;
- Location and country of test of protective structure: Istituto di Ingegneria Agraria, Università degli Studi di Milano, Italy;
- Mass used for calculating impact energies and crushing forces: 3000 kg;
- Make: S+L+H;
- Model: C 36;
- Type: cab, not tiltable;
- Manufacturer's name and address: SAME DEUTZ-FAHR GROUP S.p.A., Viale F. Cassani 15, 24047 Treviglio BG, Italy.

Details of materials used for sound proofing the protective structure

- Interior padding
  - . roof: vinyl + polyurethan, thickness 10 mm;
  - . roof front part: ABS, thickness 4 mm;
  - . floor: PVC, thickness 3 mm + polyurethan foam, 400/500 kg/m^3, thickness 25 mm + polythene film;
  - . seat support: PVC, thickness 3 mm + polyurethan foam, 400/500 kg/m^3, thickness 25 mm + polythene film;
  - . rear panel: PVC, thickness 3 mm + polyurethan foam, 400/500 kg/m^3, thickness 25 mm + polythene film;
  - . console panel: ABS, thickness 4 mm;
  - . mudguards: polystyrene, thickness 3 mm.
- Padding of gear levers box: polyurethan 1470 kg/m^3
- Glass
  - . type: security glass, thickness 5 and 6 mm;
  - . model: 43 R - 002493 (doors), 43 R - 29091 (windscreen), 43 R - 005171 (windows);
- Windscreen wipers: OSLV, parallelogram type;
- Direction indicators: COBO E3;
- Heaters and ventilators: BORLETTI;
- Draught proofing: SAIAG 8546.

DRIVER'S SEAT

Make	Model	Type	Width mm	Depth mm	Back rest height mm
GRAMMER	DS 83 H/7L	upholstered seat with back rest	490	415	390
KAB (*)	P 2/XH 2		520	400	260
KAB	U 6/XH 2		520	400	260

(*) fitted on tested tractor

PASSENGER'S SEAT : 1 place seat at the left side of the driver seat.

LIGHTING
Lighting system in accordance with EEC 78/933

	Height above ground of centre mm	Size mm	Distance from out side edge of lights to median plane of tractor mm
Headlights	1125	∅ 140	180
Front parking lights	1510	110 x 35	650
Front direction indicator	1475	110 x 35	650
Rear parking lights	1500	50 x 60	705
Rear direction indicator	1500	50 x 60	755
Brake lights	1500	50 x 60	655
Reflectors 1st pair	1145	∅ 80	702
2nd pair	680	∅ 80	375

TEST CONDITIONS

OVERALL DIMENSIONS

	Length		Width		Height at top of protective structure mm
	with front power lift mm	without front power lift mm	minimum mm	maximum mm	
Unballasted	4572	4242	1800	2100	2600
Ballasted	4502	3962	1800	2100	2600

- Ground clearance: 396 mm below front axle;

TRACTOR MASS (with full fuel tank, cab and front power lift)

	Unballasted		Ballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	1420	1440	1765	1785
Rear	1690	1745	1750	1805
Total	3110	3185	3515	3590

BALLAST

	Weights		Water
	Number	Total mass kg	kg
Front	1	235	-
Rear wheels	4	170	-

TYRES AND TRACK WIDTH SPECIFICATIONS

	Front	Rear
Tyres		
make	TAURUS	TAURUS
model	ENERGY SAVER	ENERGY SAVER
dimensions	11.2R24	16.9R30
ply rating	-	-
load index/speed index	114 A8	137 A8
type	radial	radial
maximum load (tyre manufacturer's)	1157 daN	2196 daN
inflation pressure (tyre manufact.'s)	160 kPa	160 kPa
dinamic radius index	515 mm	695 mm
Chosen track width	1700 mm	1600 mm
Technically permissible axle load	2196 daN	3055 daN
Other tyres available	360/70R20 11.2R24 370/70R24	420/70R30 12.4R36 480/70R30

OILS AND LUBRICATION

Capacity and change interval

	Capacity dm^3	Oil change h	Filter change h
Engine	11	150	300
Gear box with rear axle and final drives, hydraulic system, steering	41	1200	2400(*)
Front PTO transmission	2.5	1200	-
Front axle / final drives	6 / 3	1200	-
Brakes	2.5	-	-

(*) *Or when the warning lamp is lighted*

Specifications

	Recomended	Using during test
Engine oil		
Type	AKROS TURBO	AKROS TURBO
Viscosity	12.5 cSt	12.5 cSt
Classification	API SE - CD	API SE - CD
Transmission oil used in		
Gear box		
Front PTO transmission		
Front axle and final drives		
Rear axle and final drives		
Type	AKROS MULTI	AKROS MULTI
Viscosity	11.5 cSt	11.5 cSt
Classification	API GL 4	API GL 4
Steering oil		
Type	AKROS MULTI	AKROS MULTI
Viscosity	11.5 cSt	11.5 cSt
Classification	API GL 4	API GL 4
Braking oil		
Type	AKROS MATIC	AKROS MATIC
Viscosity	6.7 cSt	6.7 cSt
Classification	API GL 4	API GL 4

Grease

- Type:	AKROS GREASE T2 NLGI2 LITIO/Ca;
- Number of lubrication points:	15.

FUEL

- Type:	AGIP DIESEL, DIN 51601; (in accordance with the national standard)
- Density at 15 °C:	0.837 g/cm^3.

ISTITUTO SPERIMENTALE PER
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TEST RESULTS

COMPULSORY TESTS RESULTS

1. MAIN POWER TAKE-OFF PERFORMANCE

- Date and location of test: 3 April 1997, ISMA, Treviglio BG, Italy;

- Type of dynamometer: ZÖLLNER 350 AC.

Power	Speed		Fuel consumption			Specific energy
	Engine	PTO	Hourly		Specific	
kW	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
1.1 MAXIMUM POWER - TWO-HOUR TEST						
49.6	2300	1000	15.79	13.22	267	3.14
1.2 POWER AT RATED ENGINE SPEED						
49.6	2300	1000	15.79	13.22	267	3.14
1.3 STANDARD POWER TAKE-OFF SPEED (1000 rev/min)						
49.6	2300	1000	15.79	13.22	267	3.14
1.4 PART LOADS 1.4.1 The torque corresponding to maximum power at rated engine speed						
49.6	2300	1000	15.79	13.22	267	3.14
1.4.2 85% of torque obtained in 1.4.1						
43.0	2343	1019	13.80	11.55	269	3.11
1.4.3 75% of torque defined in 1.4.2						
32.7	2375	1033	11.49	9.62	294	2.84
1.4.4 50% of torque defined in 1.4.2						
22.1	2407	1047	8.97	7.51	341	2.46
1.4.5 25% of torque defined in 1.4.2						
11.2	2436	1059	6.69	5.60	502	1.67
1.4.6 unloaded						
0	2452	1066	4.49	3.76	-	-

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Power	Speed		Fuel consumption			Specific energy
	Engine	PTO	Hourly		Specific	
kW	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED (1000 rev/min)						
1.5.1 The torque corresponding to maximum power available						
49.6	2300	1000	15.79	13.22	267	3.14
1.5.2 85% of torque obtained in 1.5.1						
43.0	2343	1019	13.80	11.55	269	3.11
1.5.3 75% of torque defined in 1.5.2						
32.7	2375	1033	11.49	9.62	294	2.84
1.5.4 50% of torque defined in 1.5.2						
22.1	2407	1047	8.97	7.51	341	2.46
1.5.5 25% of torque defined in 1.5.2						
11.2	2436	1059	6.69	5.60	502	1.67
1.5.6 unloaded						
0	2452	1066	4.49	3.76	-	-

- No load maximum engine speed: 2452 rev/min;
- Equivalent flywheel torque at rated engine speed: 205.99 Nm;
- Equivalent flywheel torque at 2-hour test: 205.99 Nm;
- Maximum equivalent flywheel torque: 247.06 Nm at 1498 rev/min of the engine.

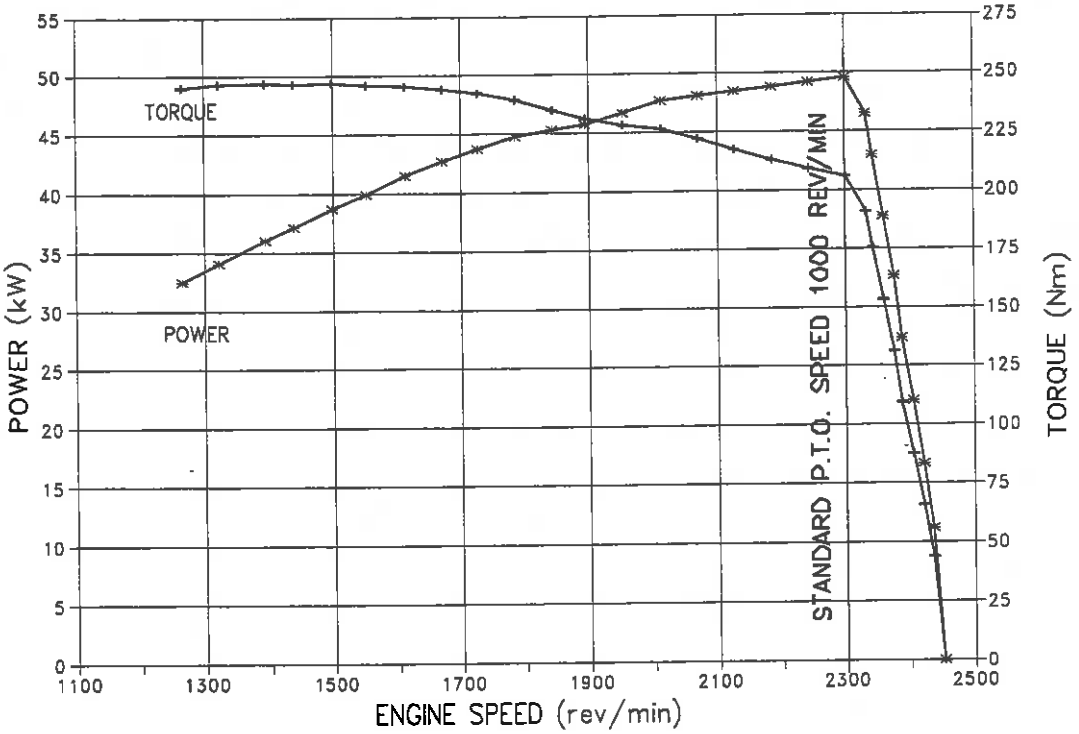
- Mean atmospheric conditions

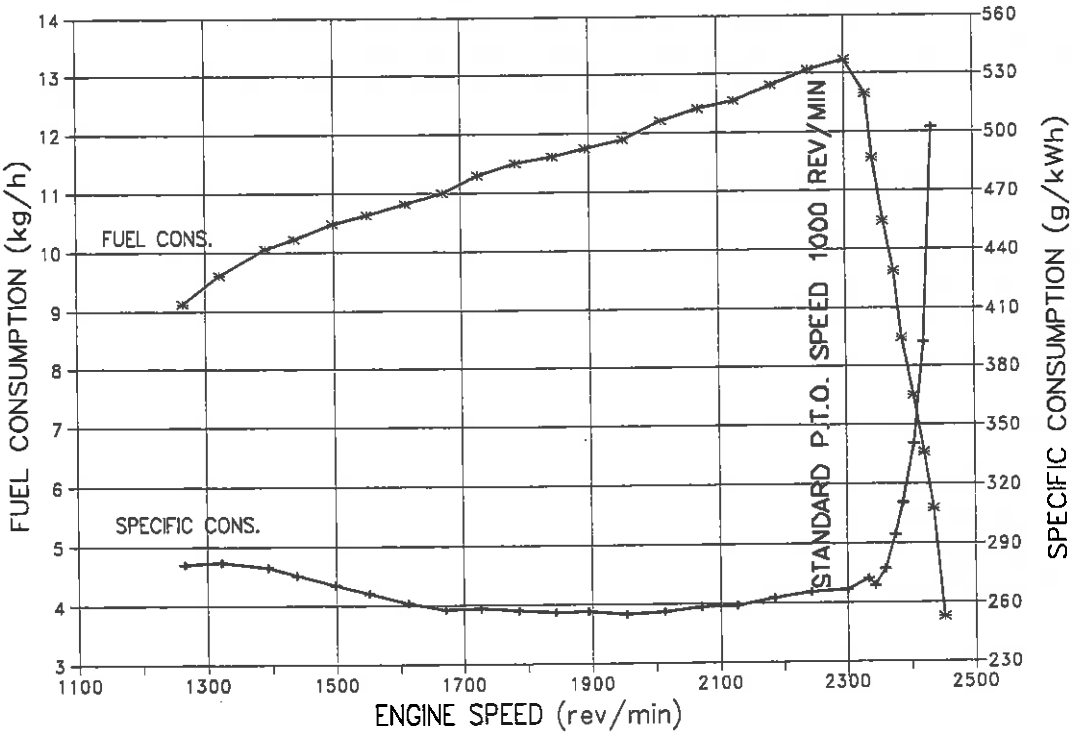
. temperature: 18 °C
. pressure: 99.5 kPa
. relative humidity: 68 %

- Maximum temperatures

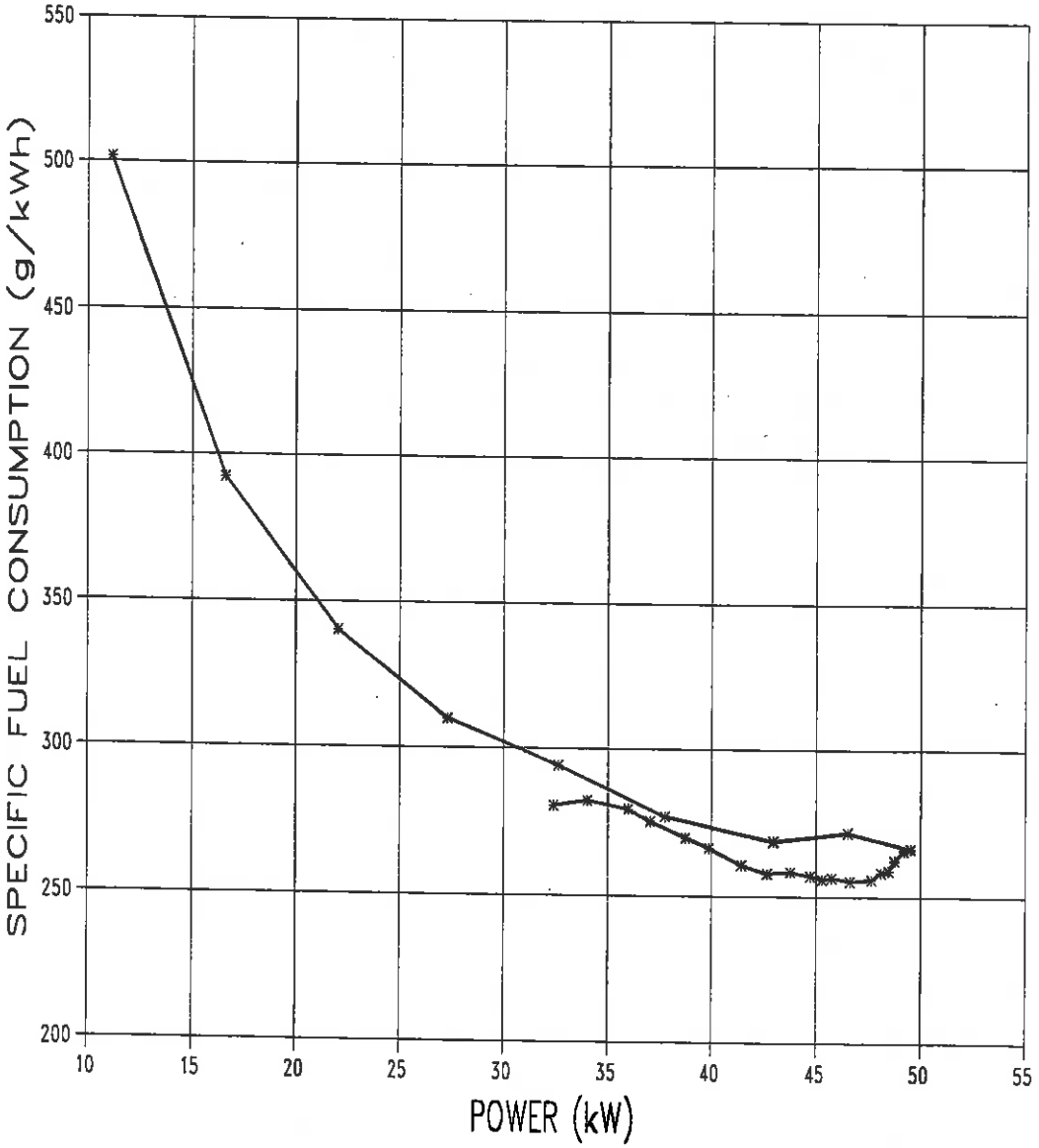
. coolant: 97 °C
. engine oil: 150 °C
. fuel: 31 °C
. engine air intake: 26 °C

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2. HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 10 April 1997.

2.1 HYDRAULIC POWER TEST

- Sustained pressure with relief valve open: 18.0 MPa;
- Pump delivery rate at minimum pressure: 44.7 l/min;

	Power kW	Flow rate l/min	Pressure MPa	Oil temp. °C
At 90% of the actual relief valve setting	11.53	42.7	16.2	67
Maximum	11.60	43.5	16.0	65

- Tapping point used for test: at rear of tractor;
- Temperature of hydraulic fluid if different from 65 ± 5 °C: - °C;
- Opening pressure of the unloading valve: - MPa;
- Closing pressure of the unloading valve: - MPa.

2.2 REAR POWER LIFT

		At hitch point	On the frame
Height of lower hitch point above ground in down position	mm	200	200
Vertical movement			
without lifting forces	mm	735	841
with lifting forces	mm	710	795
Maximum corrected force exerted through full range	kN	15.36	15.13
Corresponding pressure of hydraulic fluid	MPa	16.2	16.2
Moment about rear axle	kNm	16.02	25.01
Maximum tilt angle of mast over range of lift	degrees	-	7

Lifting heights relative to the horizontal lower links												
mm	-352	-341	-300	-200	-100	0	+100	+200	+300	+369	+400	+443
Lifting forces at hitch points, corrected to 16.6 MPa												
kN	-	15.36	15.54	16.49	17.04	17.59	18.04	18.91	20.13	21.11	-	-
Lifting forces at test frame, corrected to 16.6 MPa												
kN	16.25	-	16.07	15.81	15.72	15.56	15.34	15.16	15.13	-	15.32	15.19

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2.3 FRONT POWER LIFT

		At hitch point	On the frame
Height of lower hitch point above ground in down position	mm	185	185
Vertical movement			
without lifting forces	mm	602	719
with lifting forces	mm	594	711
Maximum corrected force exerted through full range	kN	11.94	8.54
Corresponding pressure of hydraulic fluid	MPa	16.2	16.2
Moment about rear axle	kNm	12.92	14.45
Maximum tilt angle of mast over range of lift	degrees	-	10

Lifting heights relative to the horizontal lower links											
mm	-306	-300	-295	-200	-100	0	+100	+200	+299	+300	+405
Lifting forces at hitch points, corrected to 16.2 MPa											
kN	-	-	12.83	13.00	13.23	13.39	13.53	13.55	11.94	-	-
Lifting forces at test frame, corrected to 16.2 MPa											
kN	14.13	13.56	-	13.00	12.31	11.73	11.02	10.10	-	9.08	8.54

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
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3. DRAWBAR PERFORMANCE

- Date of test: 11 to 16 April 1997;
- Type of track: concrete.

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
	mm	kPa	kPa
Unballasted	555	160	160
Ballasted	560	160	160

Gear and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption	Specific energy	Temperatures			Atmospheric conditions		
								Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)													
2NL	11.6	26.01	1.61	2448	15	365	2.29	29	89	124	18	61	99.9
1NH	11.5	25.22	1.64	2449	15	366	2.29	29	89	124	18	61	99.8
2NM	12.9	24.12	1.92	2441	15	397	2.11	28	89	125	18	62	99.9
3NL	15.6	24.47	2.30	2430	15	384	2.18	29	90	125	19	61	99.9
2NH	17.2	26.10	2.37	2427	15	361	2.32	29	90	126	18	61	100.0
3NM	19.8	25.73	2.77	2419	15	341	2.45	29	90	126	19	60	100.0
4NL	21.2	23.86	3.20	2414	15	333	2.52	30	90	126	19	60	100.1
3NH	23.1	24.79	3.36	2403	15	335	2.50	30	90	126	19	60	100.1
4NM	26.1	24.52	3.84	2385	15	337	2.49	30	90	127	20	59	100.2
5NL	29.9	24.67	4.37	2363	15	344	2.43	29	90	127	19	59	100.2
4NH	31.5	24.85	4.57	2357	15	338	2.48	29	91	127	20	58	100.1
5NM	34.6	23.93	5.21	2300	13	383	2.19	30	91	127	20	59	100.2
1FL	43.4	24.35	6.42	2300	8	305	2.75	30	90	127	21	59	100.1
5NH	37.8	20.23	6.72	2303	7	348	2.40	30	91	128	20	58	100.1
1FM	42.7	19.40	7.92	2300	5	309	2.71	30	91	128	21	58	100.0
2FL	42.0	15.87	9.52	2300	4	316	2.65	31	91	128	21	57	100.1
1FH	41.2	15.37	9.66	2301	4	321	2.61	30	91	128	22	57	100.1
2FM	40.3	12.64	11.48	2300	3	329	2.55	30	90	127	21	55	100.1
3FL	39.7	10.32	13.85	2300	2	334	2.51	29	90	128	22	55	100.1

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Gear and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption	Specific energy	Temperatures			Atmospheric conditions		
								Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)													
1SL	1.3	25.50	0.18	2458	15	2423	0.35	28	88	125	15	44	99.7
1SM	1.8	29.19	0.22	2458	15	1767	0.47	28	88	125	15	44	99.7
2SL	2.1	28.73	0.26	2457	15	1533	0.55	28	88	125	15	44	99.6
1SH	2.1	28.67	0.26	2457	15	1529	0.55	29	88	125	16	43	99.7
2SM	2.4	27.91	0.31	2458	15	1313	0.64	29	89	127	15	44	99.9
3SL	3.0	28.79	0.37	2457	15	1073	0.78	29	89	127	15	44	99.8
2SH	3.3	32.21	0.37	2455	15	1055	0.79	30	89	127	15	43	99.8
3SM	3.6	29.78	0.44	2456	15	944	0.89	29	89	127	16	43	99.9
4SL	4.3	30.65	0.51	2454	15	819	1.02	29	90	128	16	43	99.8
3SH	4.6	31.63	0.52	2452	15	826	1.01	30	90	128	16	43	99.9
4SM	5.2	30.72	0.61	2453	15	712	1.18	30	90	128	16	43	99.9
5SL	6.2	31.39	0.71	2448	15	685	1.22	30	89	128	17	43	100.0
4SL	6.5	31.93	0.73	2445	15	698	1.20	29	90	128	17	42	99.9
5SM	7.3	31.37	0.84	2443	15	658	1.27	29	90	129	17	42	99.9
5SH	9.1	31.98	1.02	2435	15	615	1.36	29	90	129	18	42	99.9
1NL	9.8	30.90	1.14	2440	15	526	1.59	30	90	129	18	41	100.0
1NM	11.4	30.95	1.33	2435	15	493	1.70	30	90	128	18	41	100.0
2NL	12.8	28.86	1.60	2432	15	461	1.82	29	90	129	19	40	100.0
1NH	13.1	29.11	1.62	2427	15	473	1.77	29	91	129	19	40	100.1
2NM	15.6	29.18	1.93	2422	15	420	1.99	30	90	129	18	40	110.1
3NL	18.2	28.93	2.26	2412	15	398	2.10	29	91	129	19	39	100.0
2NH	18.9	29.26	2.33	2404	15	409	2.05	31	91	129	19	39	100.1
3NM	21.5	28.44	2.72	2408	15	344	2.43	30	91	128	18	38	100.1
4NL	23.7	27.16	3.14	2400	15	331	2.53	30	91	129	18	37	100.0

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SEZIONE DI TREVIGLIO

Gear and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption	Specific energy	Temperatures			Atmospheric conditions		
								Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor) continued													
3NH	23.6	25.78	3.30	2389	15	360	2.32	29	90	129	18	37	100.
4NM	26.6	25.28	3.79	2382	15	345	2.43	29	90	129	18	36	99.9
5NL	35.4	29.22	4.36	2350	15	314	2.67	29	90	130	18	36	99.9
4NH	35.3	27.95	4.55	2340	15	336	2.49	29	91	130	17	36	100.
5NM	42.1	26.64	5.69	2350	7	266	3.15	30	91	130	17	36	10(
1FL	42.5	23.75	6.45	2300	7	312	2.68	30	91	130	17	36	100.
5NH	39.7	20.76	6.88	2300	5	334	2.51	30	90	130	17	36	99.9
1FM	43.3	19.79	7.87	2300	5	306	2.74	29	90	129	17	35	99.9
2FL	41.9	16.11	9.36	2299	5	316	2.64	29	90	129	16	35	100.
1FH	42.7	15.92	9.66	2298	4	311	2.70	30	90	130	16	35	99.9
2FM	41.8	13.04	11.53	2300	3	317	2.64	30	90	130	16	35	100.
3FL	39.9	10.38	13.85	2300	2	332	2.52	29	91	130	16	33	100.
2FH	41.1	10.45	14.16	2302	1	322	2.60	29	91	129	16	34	100.

Gear and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption	Specific energy	Temperatures			Atmospheric conditions		
								Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kWh	kWh/l	°C	°C	°C	°C	%	kPa
3.3 FIVE HOUR TESTS													
3.3.1 FIVE HOUR TEST at 75% of pull at maximum power													
5NH	30.9	15.41	7.23	2363	3	333	2.51	31	88	129	18	44	100.
3.3.2 FIVE HOUR TEST at pull corresponding to 15% wheel slip with additional ballast: 85 k													
4NH	37.3	27.85	4.82	2322	(*)	(*)	(*)	31	91	132	19	51	100.

(*) *Having the test been carried out with additional ballast, these figures are irrelevant*

Oil consumption during ten hours duration of tests 3.3.1 and 3.3.2: 29 g/h.

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4.TURNING AREA AND TURNING CIRCLE (front wheel drive disengaged)

	With brakes		Without brakes	
	left-hand	right-hand	left-hand	right-hand
	m	m	m	m
Radius of turning area	4.30	4.32	5.02	4.99
Radius of turning circle	4.00	4.02	4.72	4.69

5. LOCATION OF CENTRE OF GRAVITY

	mm
Height above ground	890
Distance forward from rear axle centre	1014
Distance from tractor's median plane to the left	6

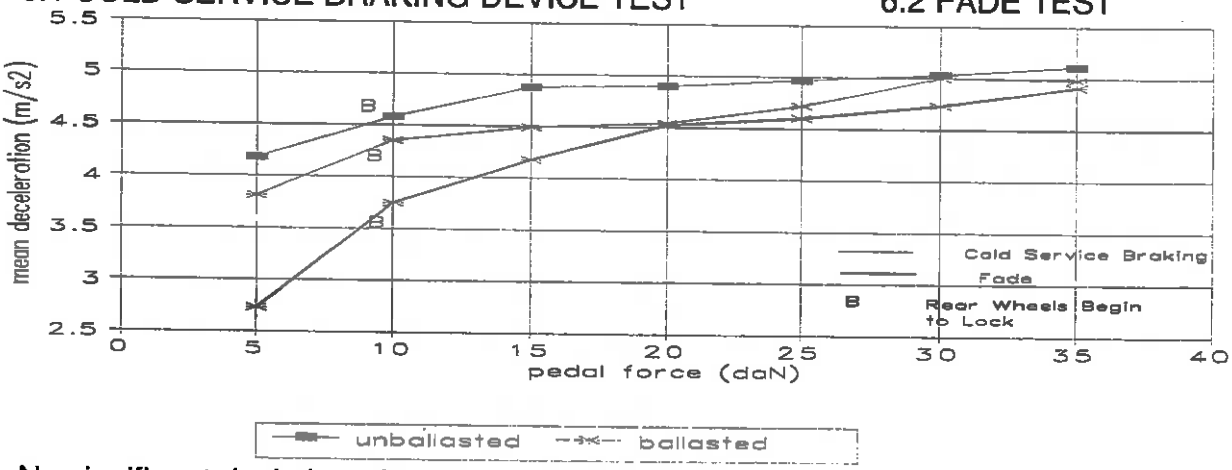
6. BRAKING (front wheel drive disengaged)

- Date of test: 21 April 1997;
- Type of track: concrete.

	Tractor mass (with driver)			Speed before application brakes
	front	rear	total	
	kg	kg	kg	km/h
Unballasted	1440	1745	3185	42.2
Ballasted	1785	1805	3590	42.3

6.1 COLD SERVICE BRAKING DEVICE TEST

6.2 FADE TEST



No significant deviation of tractor from original course and no abnormal vibrations
The tractor brakes were heated by towing of the tractor for 1 km

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6.3 PARKING BRAKE

	Ballasted tractor on 18% slope	
	up	down
	daN	daN
Braking device control force	16.7	15.7

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

- Date of test: 21 April 1997;
- Type of track: concrete;
- Type of sound level meter: BRÜEL & KJÆR model 2231.

Gear	Travelling speed before acceleration	Sound level
	km/h	dB(A)
5 Fast High	32.0	82.5

8. REPAIRS: none.

9. REMARKS: none.

TEST ENGINEER
(Dr. Carlo BISAGLIA)

DIRECTOR OF TESTING STATION
(Prof. Giuseppe COLZANI)

HEAD OF ISMA
(Ing. Giovanni SANTORO)