ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

CODE 1

OECD STANDARD CODE FOR THE OFFICIAL TESTING OF AGRICULTURAL AND FORESTRY TRACTOR PERFORMANCE



DEUTZ-FAHR AGRARTECHNIK D10S603AVT

trade name: **DEUTZ-FAHR AGROPLUS 60**

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
OECD approval No.:	**1/1766**
Date of approval:	22 June 1998
Period of test:	April - June 1998

ISMA Via Milano 43 24047 Treviglio BG Italy
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All stated dimensions and tests refer to tyre size 360/70R20 at front and 420/70R30 at rear, as well as to track widths 1450 mm at front and 1500 mm at rear.

- Tractor manufacturer's name and address:	DEUTZ-FAHR AGRARTECHNIK GmbH; 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:	SAME DEUTZ-FAHR Group 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.

1. SPECIFICATION OF TRACTOR

1.1 Identification

- Make:	DEUTZ-FAHR;
- Model:	D10S603AVT with 45 forward and 45 reverse speeds 40 km/h version;
- Trade name:	AGROPLUS 60;
- Type:	four-wheel drive, unit construction;
- Number of driving wheels:	4;
- Serial number:	0529;
- First serial number:	0001.

1.2 Engine

- Make:	K.H.D.;
- Model:	F3L 913 code 44/11;
- Type:	air cooled 4-stroke diesel, direct injection naturally aspirated;
- Serial number:	8510427.

1.2.1 *Cylinders*

- Number and disposition:	3 vertical in line;
- Bore x stroke:	102 x 125 mm;
- Capacity:	3064 cm^3;
- Compression ratio:	18:1;
- Arrangement of valves:	overhead;
- Cylinder liners:	without liners.

1.2.3 *Fuel system*

- Fuel feed system:	electrical fuel feed pump, 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 3A 95 D410/3RS2905;
- Serial number:	76430236;
- Manufacturer's production setting of injection pump:	
. Flow rate:	63.5 ± 2 mm^3/stroke at rated speed and full load corresponding 13.72 dm^3/h;
. Timing:	14° before TDC;
- Make, model and type of injectors:	BOSCH DLLA 147 PV 3182741 multihole injecton nozzles;
- Injection pressure:	25 + 0.8 MPa.

1.2.4 *Governor*

- Make:	BOSCH ;
- Model:	RSV 325 - 1250 A5C 860 L;
- Type:	mechanical;
- Governed range of engine speed:	from 650 to 2500 rev/min;
- Rated engine speed:	2400 rev/min.

1.2.5 *Air cleaner*

- Pre-cleaner	
. Make:	DONALDSON;
. Model:	P01-6330;
. 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 of air intake :	front of engine, above bonnet;
- Maintenance indicator	with warning lamp on the dashboard.

1.2.6 *Lubrication system*

- Type of feed pump:	forced feed from gear pump;
- Type of filter:	FIAMM FT 4803;
- Number of filters:	1.

1.2.7 *Cooling system*

- Type of coolant:	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:	electrical control.

1.2.8 *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;

1.2.9 *Electrical equipment*

- Voltage:	14 V;
- Generator	
. Make:	ISKRA;
. Model:	AAK 3563 14 V 65 A;
. Type:	alternator;
. Power:	65 A;
- Battery:	1 lead acid;
. capacity:	100 Ah at 20 hours rating.

1.2.10 *Exhaust system*

- Make:	SAME DEUTZ-FAHR Group;
- Model:	DGM SA 4127;
- Type:	one reflection absorption chamber;
- Location:	on the left hand side of engine, horizontal position under side bonnet;
- Height of outlet above ground:	425 mm.

1.3 Transmission

1.3.1 *Clutch (utilized only for travelling of tractor)*

- Make:	SAME DEUTZ-FAHR Group;
- Model:	683.23;
- Type:	single disk dry clutch;
- Number of plates:	1;
- Plates diameter:	280 mm;
- Control system:	hydraulic operated by pedal.

1.3.2 *Gear box*

- Make:	SAME DEUTZ-FAHR Group;
- Model:	683.31;
- 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.

1.3.3 *Rear axle and final drives*

- Make:	SAME DEUTZ FAHR Group;
- Model:	683.44;
- Type:	bevel gear differential and epyciclic final drive.
- Differential lock	
. Make:	SAME DEUTZ FAHR Group;
. Model:	683.47;
. Type:	electrohydraulic;
. Control system:	engaged or disengaged by button.

1.3.4 *Front axle and final drives*

- Make:	SAME DEUTZ FAHR Group;
- Model:	683.43;
- Type:	original SAME DEUTZ-FAHR system with central shaft bevel gear drive, differential and epicyclic final drives.
- Differential lock	
. Make:	SAME DEUTZ FAHR Group;
. Model:	683.46;
. Type:	electrohydraulic;
. Control system:	engaged or disengaged by button.

1.3.5 *Total ratios and travelling speeds*

Gear	Group	Number of engine revolutions for one revolution of the driving wheels			Nominal travelling speed at rated engine speed of 2400 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	0.40	0.49	0.59
4	Slow	1064.51	887.29	731.86	0.57	0.68	0.82
5	Slow	765.28	637.81	525.94	0.79	0.94	1.14
1	Normal	482.13	401.70	331.41	1.25	1.50	1.82
2	Normal	337.59	281.41	231.91	1.78	2.14	2.59
3	Normal	235.62	196.27	161.87	2.55	3.07	3.72
4	Normal	168.55	140.58	115.83	3.57	4.28	5.19
5	Normal	121.28	100.98	83.41	4.96	5.96	7.21
1	Fast	87.62	73.01	60.14	6.87	8.24	10.00
2	Fast	61.38	50.99	42.32	9.80	11.80	14.22
3	Fast	42.82	35.64	29.45	14.05	16.88	20.43
4	Fast	30.69	25.49	21.04	19.61	23.60	28.60
5	Fast	22.03	18.32	15.10	27.31	32.85	39.85
REVERSE							
1	Slow	3210.92	2674.33	2206.61	0.19	0.22	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	054	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	1.18	1.42	1.72
2	Normal	355.81	296.60	244.43	1.69	2.03	2.46
3	Normal	248.34	206.86	170.60	2.42	2.91	3.53
4	Normal	177.65	148.17	122.08	3.39	4.06	4.93
5	Normal	127.82	106.43	87.91	4.71	5.65	6.84
1	Fast	92.34	76.95	63.39	6.52	7.82	9.49
2	Fast	64.69	53.74	44.61	9.30	11.20	13.49
3	Fast	45.13	37.56	31.04	13.33	16.02	19.38
4	Fast	32.35	26.87	22.17	18.60	22.39	27.14
5	Fast	23.22	19.30	15.91	25.92	31.17	37.81

(*) *Calculated with a tyre dynamic radius index of 665 mm. (ISO 4251/1-1992)*

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

1.4 Power take-off

1.4.1 *Main power take-off proportional to engine speed*

- Type: independent, at rear of tractor, engaged or disengaged by push button, 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: by internal or external hand lever;
- Height above ground: 700 mm;
- Distance from the median plane of the tractor: 0 mm;
- Distance behind rear axle: 400 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	540 620	2044 2350	3.7857	none
750	750 752	2344 2350	3.1250	none
1000	1000 1021	2300 2350	2.3000	none

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

- Type: independent, at front of tractor, engaged or disengaged by push button, 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: 605 mm;
- Distance from the median plane of the tractor: 0 mm;
- Distance forward front axle: 645 mm;
- Direction of rotation (viewed facing driving end): anticlockwise.

PTO type	PTO speed rev/min	Engine speed rev/min	Engine/PTO transmission ratio	Power restriction kW
1000	1000 979	2400 2350	2.40	none

1.4.3 *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 main 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: 0.28 m;
- Number of power take-off shaft revolutions for one revolution of rear driving wheels: 14.74.

1.5 Hydraulic power lift

1.5.1 *Rear power lift*

- Make:	SAME DEUTZ-FAHR Group;
- Model:	683.39;
- 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 pump, 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 ;

1.5.2 *Front power lift* (optional, fitted on tested tractor)

- Make:	SAME DEUTZ-FAHR Group;
- Model:	ORIGINAL SAME SYSTEM 683-59 FRONT;
- Type of hydraulic system:	open centre system;
- Type and number of cilinders:	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;
- Number and type of filters:	1, repeceable paper cartridge;
- Oil capacity:	41 dm^3 ;
- Site of oil reservoir:	gear box;
- Number, type and location of tapping points:	none;
- Maximum volume of oil available to external cylinders:	none.

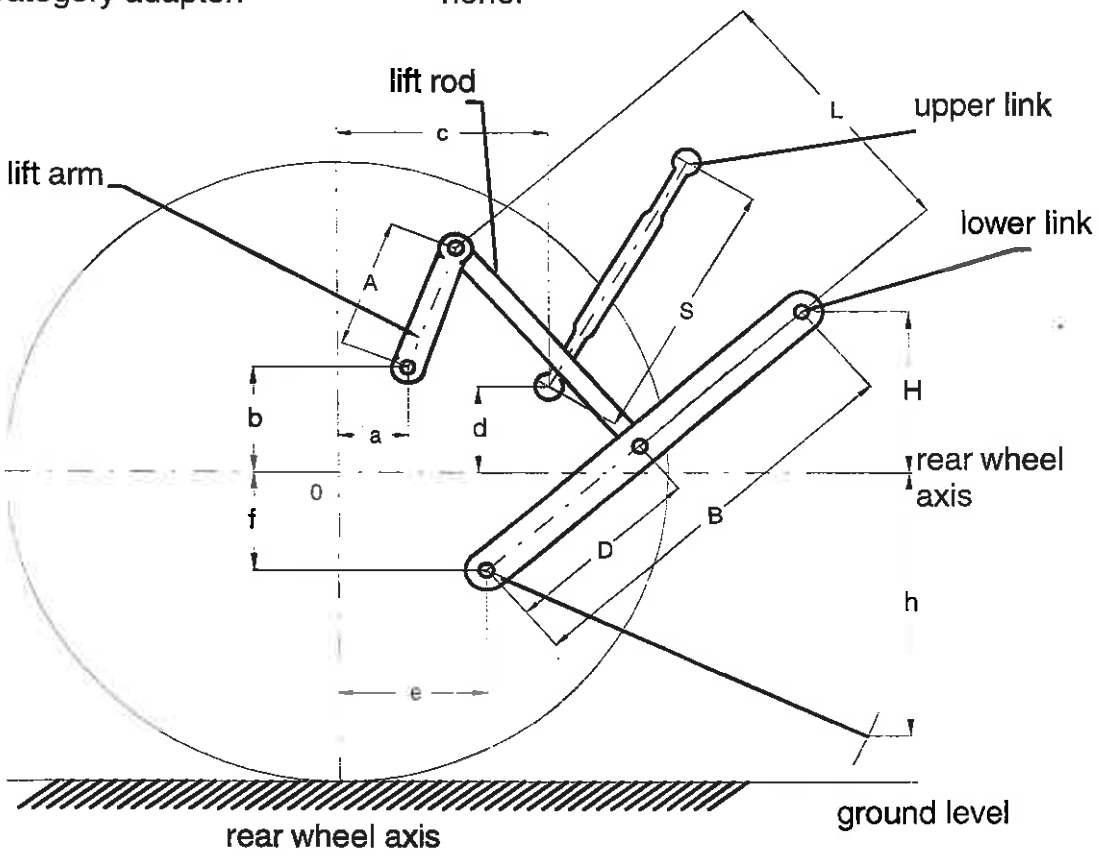
1.6 Three-point linkage

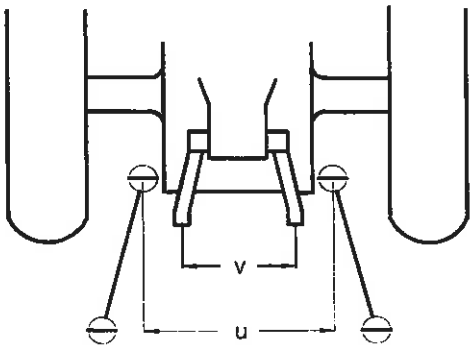
1.6.1 *Rear three point linkage*

- Category (ISO 730/1-1994): 2, lower links with WALTERSCHEID quick couplers;
- Category adapter: none.

1.6.2 *Front three point linkage*

- Category (ISO 730/1-1994): 2;
- Category adapter: none.



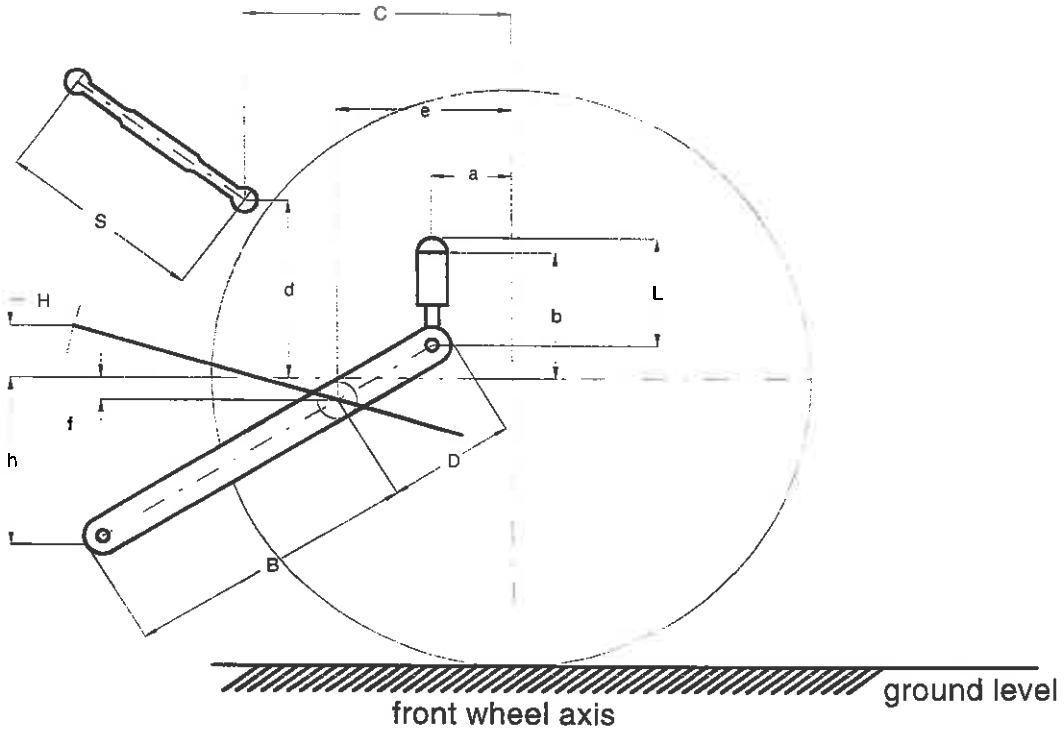


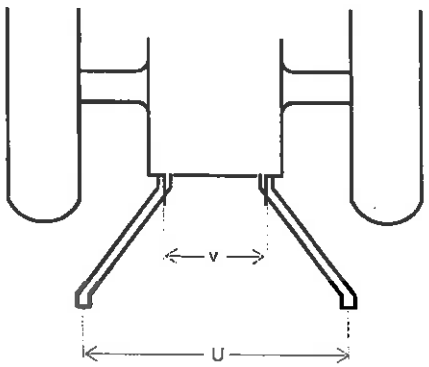
REAR LINKAGE GEOMETRY

Dimensions of rear 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	646
Distance of upper link pivot point from rear wheel axis				
- horizontally		(c)	397	397
- vertically		(d)	260-295-335	335
Distance of lower link pivot point from rear wheel axis				
- horizontally		(e)	183	183
- vertically		(f)	154	154
Distance of lower link pivot points to lift rod pivot points on lower links		(D)	400	400
Length of lift rods		(L)	from 535 to 689	590
Height of lower hitch points relative to the rear wheel axis:				
Length of lift rods	(L)	535	689	590
Linkage distance of lift rods	(D)	400	400	400
Lowest position	(h)	332	585	465
Highest position	(H)	331	26	212
Height above ground of lower hitch points when locked in transport position (*)				877

(*) *Assuming the dynamic radius index = 665 mm (ISO 4251/1-1992)*





FRONT LINKAGE GEOMETRY

Dimensions of front 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 cilinders 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 points 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)		317
- in high position	(H)		295
Height above ground of lower hitch points (*)			785

(*) Assuming the dynamic radius index = 490 mm (ISO 4251/1-1992)

1.7 Swinging drawbar (optional, not fitted on tested tractor)

1.8 Trailer hitch

- Type:	CRAMER;
- Hole diameter:	28 mm;
- Height above ground	
. Min.:	490 mm;
. Max.:	860 mm;
- Distance of hitch point from rear wheel axis	
. Horizontally:	570 mm;
- Distance of hitch point from power take-off shaft end	
. Vertically:	50 mm below, 230 mm above;
. Horizontally:	170 mm;
- Maximum vertical permissible load:	14.7 kN.

1.9 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.:	80 mm;
. Max.:	985 mm;
- Horizontal distance behind power take-off shaft end:	555 mm;
- Diameter of the pinhole:	28 mm.

1.10 Steering

- Specification:	hydrostatic steering with BOSCH hydraulic gear pump, 2 simple acting ram directly on front axle.
- Make:	DANFOSS;
- Model:	ORBITROLL OSPC 80 OR;
- Type:	hydrostatic;
- Working pressure:	15 Mpa;

1.11 Brakes

1.11.1 *Service brake*

- Make: SAME DEUTZ-FAHR Group;
- Model: 683.54;
- 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.

1.11.2 *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.

1.11.3 *Steering brake*

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

1.12 Wheels

- Number
  - Front: 2, steering and driving;
  - Rear: 2, driving;
- Wheelbase: 2112 mm.

-Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	1440	1640	changing the position of the rims with respect to the disc
Rear	1400	1700	

1.13 Protective strutture

1.13.1 *Specifications*

- 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.
- OECD approval number:	CSS 0299/82 with seat SABLE DS 83 H/7 L CSS 0299/83 with seat KAB P2/XH 2 CSS 0299/84 with seat KAB U6/XH 2
- Date of approval:	15 October 1996;
- Modification certificate . Certificate for minor modification numbered:	CSS 0299/1 to 48/mod 1/I.M.A. (I - MILANO) dated 8 April 1997 established by and under the responsability of the National Authority: I.I.A. ISTITUTO di INGEGNERIA AGRARIA Via Celoria, 2 - MILANO - ITALY

1.13.2 *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.

1.14 Seat

1.14.1 *Driver's seat*

- Make: SABLE;
- Model: DS 83 H/7L;
- Type: upholstered seat with back rest;
- Type of suspension: adjustable spring;
- Type of damping: shock absorber;
- Range of adjustment: 150 mm longitudinally and 60 mm vertically;
- Safety belt: no.

1.14.2 *Optional driver's seats*

- Make: KAB
- Models: P2/XH 2 (*) or U6/XH 2;
- Type: upholstered seat with back rest
- Type of suspension: adjustable spring;
- Type of damping: shock absorber;
- Range of adjustment: 150 mm longitudinally and 60 mm vertically;
- Safety belt: no.

(*) fitted on tested tractor

1.14.3 *Passenger's seat*

- Location: at the left side of the driver seat;
- Number of places: 1.

1.15 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	1105	⌀ 140	180
Front parking lights	1410	110 x 40	750
Front direction indicator	1450	110 x 40	750
Rear parking lights	1470	50 x 60	705
Rear direction indicator	1470	50 x 60	755
Brake lights	1470	50 x 60	655
Reflectors 1st pair	1115	⌀ 80	702
2nd pair	640	⌀ 80	285

2. TEST CONDITIONS

2.1 Overall dimensions

	Length		Width		Height at top of protective structure
	with front power lift	without front power lift	minimum	maximum	
	mm	mm	mm	mm	mm
Unballasted	4372	3832	1800	2100	2600
Ballasted	4442	4112	1800	2100	2600

2.2 Ground clearance:

390 mm below front axle (unballasted tractor).

2.3 Tractor mass (with full fuel tank, cab and front power lift)

	Unballasted		Ballasted	
	Without driver	With driver	Without driver	With driver
	kg	kg	kg	kg
Front	1410	1425	1735	1750
Rear	1620	1680	1700	1760
Total	3030	3105	3435	3510

2.4 Ballast

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

2.5 Tyres and track width specifications

	Front	Rear
Tyres		
make	GOOD YEAR	TAURUS
model	DT 810 RADIAL	POINT 7
dimensions	360/70R20	420/70R30
ply rating	-	-
load index/speed index	120 A8	134 A8
type	radial	radial
maximum load (tyre manufacturer's)	1372 daN	2077 daN
inflation pressure (tyre manufact.'s)	160 kPa	160 kPa
dinamic radius index	490 mm	665 mm
Chosen track width	1450 mm	1500 mm
Technically permissible axle load	2254 daN	3136 daN
Other tyres available	320/70R20	420/70R28
	12.4R20	14.9R28
	11.2R20	14.9R30

2.6 Fuel

- Type: AGIP DIESEL, DIN 51601; (in accordance with the national standard)
- Density at 15 °C: 0.838 g/m^3 .

2.7 Oils and lubricants

2.7.1 *Capacity and change interval*

	Capacity dm^3	Oil change h	Filter change h
Engine	8	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

2.7.2 *Specifications*

	Recommended	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

2.7.3 *Grease*

- Type: AKROS GREASE T2;
- Number of lubrication points: 15.

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

- Date and location of test: 22 April 1998, ISMA, Treviglio BG, Italy;
- Type of dynamometer: eddy-current, ZÖLLNER 350 AC.

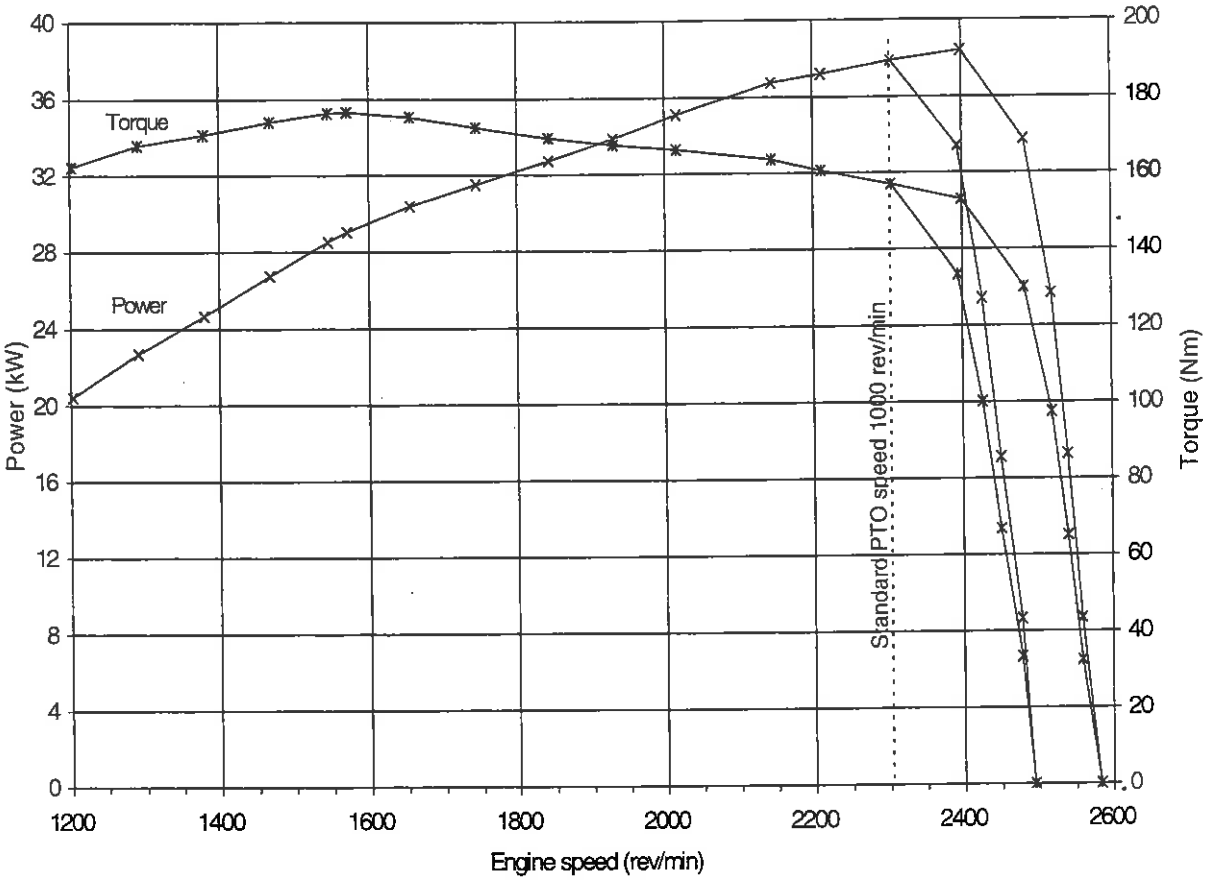
Power	Speed		Fuel consumption			Specific energy
	Engine	PTO	Hourly		Specific	
kW	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
3.1.1 MAXIMUM POWER - TWO-HOUR TEST						
38.42	2399	1043	13.72	11.50	299	2.80
3.1.2 POWER AT RATED ENGINE SPEED						
38.42	2399	1043	13.72	11.50	299	2.80
3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 rev/min)						
37.86	2304	1000	13.27	11.12	294	2.85
3.1.4 PART LOADS 3.1.4.1 The torque corresponding to maximum power at rated engine speed						
38.42	2399	1043	13.72	11.50	299	2.80
3.1.4.2 85% of torque obtained in 1.4.1						
33.77	2482	1079	11.96	10.02	297	2.82
3.1.4.3 75% of torque defined in 1.4.2						
25.69	2519	1095	9.69	8.12	316	2.65
3.1.4.4 50% of torque defined in 1.4.2						
17.29	2540	1104	7.74	6.49	375	2.23
3.1.4.5 25% of torque defined in 1.4.2						
8.70	2559	1113	6.41	5.37	617	1.36
3.1.4.6 unloaded						
0	2583	1123	4.62	3.87	-	-

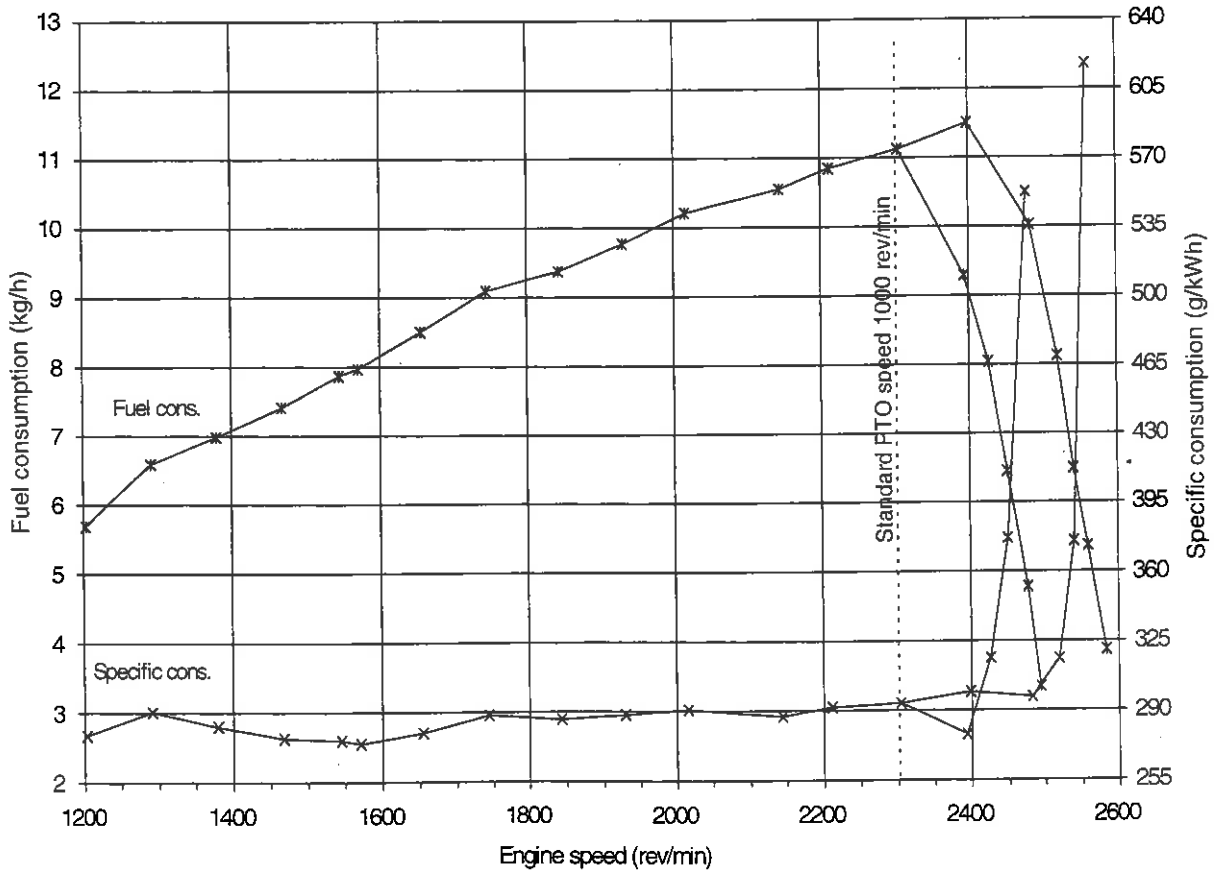
Power	Speed		Fuel consumption			Specific
	Engine	PTO	Hourly		Specific	energy
kW	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED (1000 rev/min)						
3.1.5.1 The torque corresponding to maximum power available						
37.86	2304	1000	13.27	11.12	294	2.85
3.1.5.2 85% of torque obtained in 1.5.1						
33.42	2394	1041	11.09	9.29	278	3.01
3.1.5.3 75% of torque defined in 1.5.2						
25.41	2426	1055	9.59	8.04	316	2.65
3.1.5.4 50% of torque defined in 1.5.2						
17.12	2450	1065	7.70	6.45	377	2.22
3.1.5.5 25% of torque defined in 1.5.2						
8.65	2477	1077	5.70	4.78	552	1.52
3.1.5.6 unloaded						
0	2494	1084	3.99	3.34	-	-

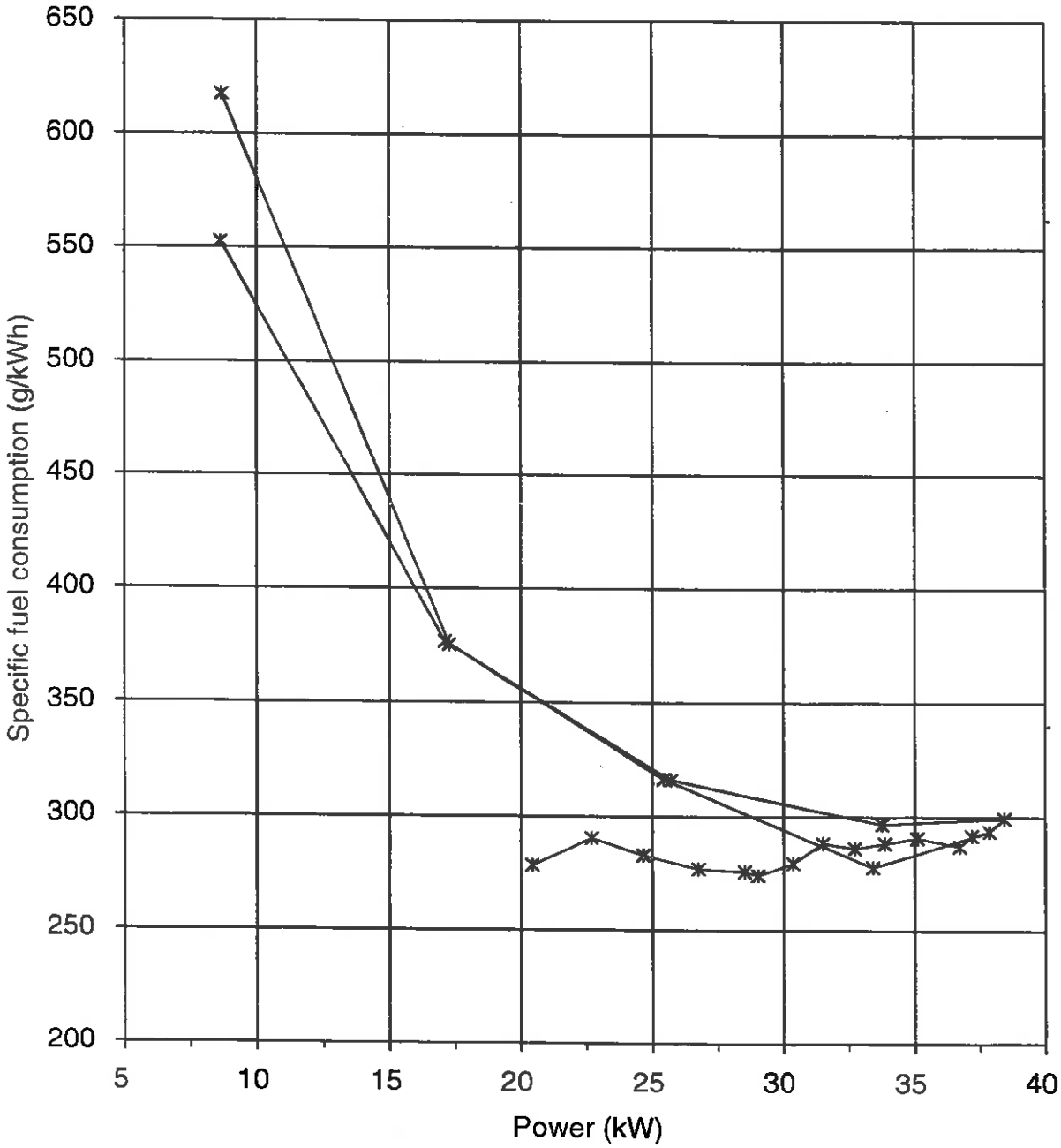
- No load maximum engine speed: 2583 rev/min;
- Equivalent flywheel torque at rated engine speed: 152.99 Nm;
- Equivalent flywheel torque at 2-hour test: 152.99 Nm;
- Maximum equivalent flywheel torque: 176.60 Nm at 1571 rev/min of the engine.

- Mean atmospheric conditions
  . Temperature: 18 °C
  . Pressure: 99.7 kPa
  . Relative humidity: 62 %

- Maximum temperatures
  . Coolant: 120 °C
  . Engine oil: 128 °C
  . Fuel: 28 °C
  . Engine air intake: 21 °C


Torque
Power
Power (kW)
Torque (Nm)
Standard PTO speed 1000 rev/min
Engine speed (rev/min)


Fuel cons.
Specific cons.
Fuel consumption (kg/h)
Specific consumption (g/kWh)
Standard PTO speed 1000 rev/min
Engine speed (rev/min)


650
600
550
500
450
400
350
300
250
200
Specific fuel consumption (g/kWh)
5
10
15
20
25
30
35
40
Power (kW)

3.2 Hydraulic power and lifting force

- Date of tests: 11 May 1998.

3.2.1 *Hydraulic power test*

- Sustained pressure with relief valve open: 18.0 MPa;
- Pump delivery rate at minimum pressure: 47.5 l/min;

	Power kW	Flow rate l/min	Pressure MPa	Oil temp. °C
At 90% of the actual relief valve setting	12.47	46.2	16.2	67
Maximum	12.54	45.6	16.5	67

- 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.

3.2.2 *Rear power lift test*

		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	685	737
with lifting forces	mm	677	719
Maximum corrected force exerted through full range	kN	15.01	15.67
Corresponding pressure of hydraulic fluid	MPa	16.2	16.2
Moment about rear axle	kNm	15.66	25.90
Maximum tilt angle of mast from vertical	degrees	-	5

Lifting heights relative to the horizontal lower links											
mm	-311	-300	-200	-100	0	+100	+200	+300	+366	+400	+419
Lifting forces at hitch points, corrected to 16.2 MPa											
kN	15.01	15.14	15.63	16.60	17.39	18.23	17.89	18.72	19.57	-	-
Lifting forces at test frame, corrected to 16.2 MPa											
kN	-	17.57	17.43	17.19	16.96	16.07	15.72	15.69	-	15.69	15.67

3.2.3 *Front power lift test*

		At hitch point	On the frame
Height of lower hitch point above ground in down position	mm	173	173
Vertical movement			
without lifting forces	mm	612	738
with lifting forces	mm	590	707
Maximum corrected force exerted through full range	kN	12.25	7.95
Corresponding pressure of hydraulic fluid	MPa	16.2	16.2
Moment about rear axle	kNm	13.25	13.45
Maximum tilt angle of mast from vertical	degrees	-	10

Lifting heights relative to the horizontal lower links											
mm	-303	-300	-292	-200	-100	0	+100	+200	+298	+300	+404
Lifting forces at hitch points, corrected to 16.2 MPa											
kN	-	-	12.25	12.36	12.93	13.26	13.49	13.68	13.77	-	-
Lifting forces at test frame, corrected to 16.2 MPa											
kN	13.73	13.74	-	12.95	12.29	11.68	10.92	10.05	-	9.02	7.95

3.3 Drawbar performance

- Date of tests: 13 to 21 May 1998;
- Type of track: concrete.

	Height of drawbar above ground mm	Tyre inflation pressure	
		Front kPa	Rear kPa
Unballasted	492	160	160
Ballasted	495	160	160

Gear and range	Power kW	Drawbar pull kN	Speed km/h	Engine speed rev/min	Slip of wheels %	Specific fuel consumption g/kWh	Specific energy kWh/l	Temperatures Fuel °C	Coolant °C	Engine oil °C	Atmospheric conditions Temperature °C	Relative humidity %	Pressure kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)													
3SL	3.33	33.32	0.36	2574	15.3	1351	0.62	22	98	115	26	52	99.9
2SH	2.94	28.64	0.37	2571	14.8	1599	0.52	22	98	115	26	52	99.9
3SM	3.96	33.13	0.43	2576	15.0	1111	0.75	22	98	115	27	52	99.9
4SL	4.08	30.00	0.49	2544	15.0	1551	0.54	22	98	116	27	51	99.9
3SH	4.48	31.62	0.51	2560	15.1	1210	0.69	23	99	118	27	51	99.9
4SM	5.08	31.57	0.58	2507	15.0	1722	0.49	23	99	118	27	51	99.9
5SL	5.80	29.40	0.71	2558	14.2	952	0.88	23	98	118	27	51	99.9
4SH	6.30	30.66	0.74	2551	15.1	941	0.89	23	99	119	27	51	99.9
5SM	6.88	29.50	0.84	2525	15.0	1122	0.75	23	99	118	27	50	99.9
5SH	8.17	28.83	1.02	2541	14.9	789	1.06	22	98	118	28	50	100.0
1NL	9.04	29.08	1.12	2546	15.0	688	1.22	22	98	118	27	50	100.0
1NM	11.13	29.91	1.34	2452	15.0	521	1.61	22	98	119	28	50	100.0
2NL	13.11	29.69	1.59	2535	15.1	756	1.11	23	98	119	28	50	99.9
1NH	13.40	29.78	1.62	2535	15.1	517	1.62	24	99	119	28	50	99.9
2NM	15.77	29.73	1.91	2518	15.0	523	1.60	24	100	120	28	50	99.9
3NL	18.73	29.59	2.28	2500	15.1	486	1.72	24	100	120	28	50	99.8
2NH	19.96	31.53	2.28	2482	15.0	499	1.68	24	100	119	28	50	99.9
3NM	22.17	29.90	2.67	2493	15.0	426	1.97	23	99	121	28	50	99.9
4NL	27.10	31.27	3.12	2475	15.1	374	2.24	23	100	121	28	50	100.0
3NH	27.86	30.97	3.24	2466	15.0	373	2.25	23	100	122	28	49	100.0
4NM	29.79	28.53	3.76	2401	11.8	385	2.18	23	102	122	28	50	100.0
5NL	30.84	24.19	4.59	2399	7.0	373	2.25	24	102	122	29	49	100.1
4NH	32.41	24.02	4.86	2403	6.1	353	2.37	24	102	122	29	49	100.1

Gear and range	Power kW	Drawbar pull kN	Speed km/h	Engine speed rev/min	Slip of wheels %	Specific fuel consumption g/kWh	Specific energy kWh/l	Temperatures Fuel °C	Coolant °C	Engine oil °C	Atmospheric conditions Temperature °C	Relative humidity %	Pressure kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor) continued													
5NM	30.41	19.42	5.64	2401	4.9	377	2.23	24	102	123	29	49	100.2
1FL	33.91	18.70	6.53	2394	4.3	339	2.47	24	102	123	30	48	100.2
5NH	30.11	15.60	6.95	2397	3.2	382	2.20	24	102	123	30	48	100.2
1FM	33.39	15.14	7.94	2397	3.1	346	2.42	23	101	124	30	49	100.2
2FL	34.15	12.91	9.53	2399	2.5	337	2.48	24	101	124	30	48	100.1
1FH	33.55	12.41	9.74	2406	2.4	341	2.46	24	102	124	30	48	100.1
2FM	32.86	10.23	11.57	2399	1.3	349	2.40	24	102	123	30	48	100.1
3FL	30.88	8.01	13.88	2397	0.8	373	2.24	23	102	124	30	47	100.2
2FH	31.52	8.03	14.13	2403	0.7	364	2.30	23	102	125	30	47	100.1

Gear and range	Power kW	Drawbar pull kN	Speed km/h	Engine speed rev/min	Slip of wheels %	Specific fuel consumption g/kWh	Specific energy kWh/l	Temperatures Fuel °C	Coolant °C	Engine oil °C	Atmospheric conditions Temperature °C	Relative humidity %	Pressure kPa
3.3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)													
1SL	1.74	34.76	0.18	2578	13.1	2489	0.34	23	95	111	28	52	100.2
1SM	2.08	34.04	0.22	2578	15.1	2077	0.40	23	95	111	28	52	100.2
2SL	2.37	32.87	0.26	2578	14.9	1823	0.46	23	95	113	28	52	100.2
1SH	2.46	34.12	0.26	2581	15.0	1626	0.52	23	95	113	28	52	100.2
2SM	2.86	34.37	0.30	2581	15.0	1409	0.59	23	95	113	28	52	100.2
3SL	3.37	33.75	0.36	2578	14.9	1285	0.65	24	97	114	28	52	100.2
2SH	3.42	33.29	0.37	2576	14.9	1272	0.66	24	96	115	28	52	100.2
3SM	4.17	34.90	0.43	2574	15.0	1079	0.78	24	97	115	28	51	100.2
4SL	4.88	35.16	0.50	2562	14.9	1055	0.79	24	97	115	28	51	100.1
3SH	5.27	35.78	0.53	2567	14.9	934	0.90	24	98	115	28	51	100.1
4SM	5.89	35.37	0.60	2564	15.3	866	0.97	24	98	115	29	50	100.1
5SL	7.09	36.47	0.70	2551	15.0	832	1.01	24	98	117	29	50	100.2
4SH	7.41	36.05	0.74	2548	14.8	804	1.04	24	98	117	29	50	100.1
5SM	8.48	36.34	0.84	2544	15.0	741	1.13	24	98	117	29	50	100.2
5SH	9.97	35.20	1.02	2537	14.7	672	1.25	25	99	117	29	50	100.2
1NL	10.98	35.29	1.12	2541	14.9	588	1.42	25	99	118	29	49	100.2
1NM	12.78	34.34	1.34	2535	15.0	541	1.55	25	99	118	29	49	100.1
2NL	15.54	35.19	1.59	2530	14.9	467	1.79	24	98	118	29	49	100.1

Gear and range	Power kW	Drawbar pull kN	Speed km/h	Engine speed rev/min	Slip of wheels %	Specific fuel consumption g/kWh	Specific energy kWh/l	Temperatures Fuel °C	Coolant °C	Engine oil °C	Atmospheric conditions Temperature °C	Relative humidity %	Pressure kPa
3.3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor) continued													
1NH	15.73	34.96	1.62	2528	15.1	472	1.78	25	100	118	30	49	100.1
2NM	18.35	34.60	1.91	2518	14.6	448	1.87	24	100	120	30	49	100.1
3NL	22.00	35.06	2.26	2500	14.9	415	2.02	24	100	120	30	48	99.9
2NH	21.53	33.86	2.29	2498	15.0	429	1.95	24	100	120	30	48	99.9
3NM	25.33	34.03	2.68	2477	15.1	399	2.10	24	101	121	30	48	99.9
4NL	31.22	36.26	3.10	2447	14.7	341	2.46	24	101	121	30	48	100.0
3NH	30.95	34.62	3.22	2406	13.5	369	2.27	24	102	121	30	48	100.0
4NM	33.44	30.71	3.92	2401	8.4	343	2.44	25	102	123	30	47	100.0
5NL	33.16	25.62	4.66	2401	6.2	347	2.42	24	102	123	31	48	100.1
4NH	33.75	24.75	4.91	2406	5.7	337	2.49	24	103	124	31	48	100.0
5NM	32.87	20.88	5.67	2397	4.7	351	2.38	24	102	124	31	48	100.0
1FL	34.40	18.74	6.61	2406	4.0	331	2.53	24	102	125	31	47	100.0
5NH	31.19	16.04	7.00	2401	3.1	366	2.29	25	102	125	31	47	100.0
1FM	33.36	15.01	8.00	2401	3.1	343	2.44	25	102	125	31	47	100.0
2FL	32.51	12.22	9.58	2403	2.6	350	2.39	25	103	125	32	47	100.1
1FH	33.49	12.36	9.76	2401	2.5	342	2.45	25	103	125	31	47	100.1
2FM	34.40	10.67	11.61	2399	1.5	334	2.51	24	103	126	31	46	100.1
3FL	33.44	8.67	13.89	2400	1.0	344	2.43	24	103	126	32	46	100.0
2FH	33.41	8.50	14.15	2399	1.0	345	2.43	24	103	126	32	46	100.0

Gear and range	Power kW	Drawbar pull kN	Speed km/h	Engine speed rev/min	Slip of wheels %	Specific fuel consumption g/kWh	Specific energy kWh/l	Temperatures Fuel °C	Coolant °C	Engine oil °C	Atmospheric conditions Temperature °C	Relative humidity %	Pressure kPa
3.3.3 FIVE HOUR TESTS													
3.3.3.1 FIVE HOUR TEST at 75% of pull at maximum power													
5NH	24.48	12.16	7.25	2463	1.9	423	1.98	26	115	131	30	47	100.2
3.3.3.2 FIVE HOUR TEST at pull corresponding to 15% wheel slip, additional ballast: 85 kg													
4NL	32.88	35.99	3.29	2451	(*)	(*)	(*)	26	118	133	28	56	100.2

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

Oil consumption during ten hours duration of test 3.3.3.1 and 3.3.3.2: 40 g/h.

3.4 **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	4.36	4.54	5.57	5.42
Radius of turning circle	4.05	4.23	5.25	5.09

3.5 **Location of centre of gravity**

	mm
Height above ground	818
Distance forward from rear axle centre	969
Distance from tractor's median plane to the left	8

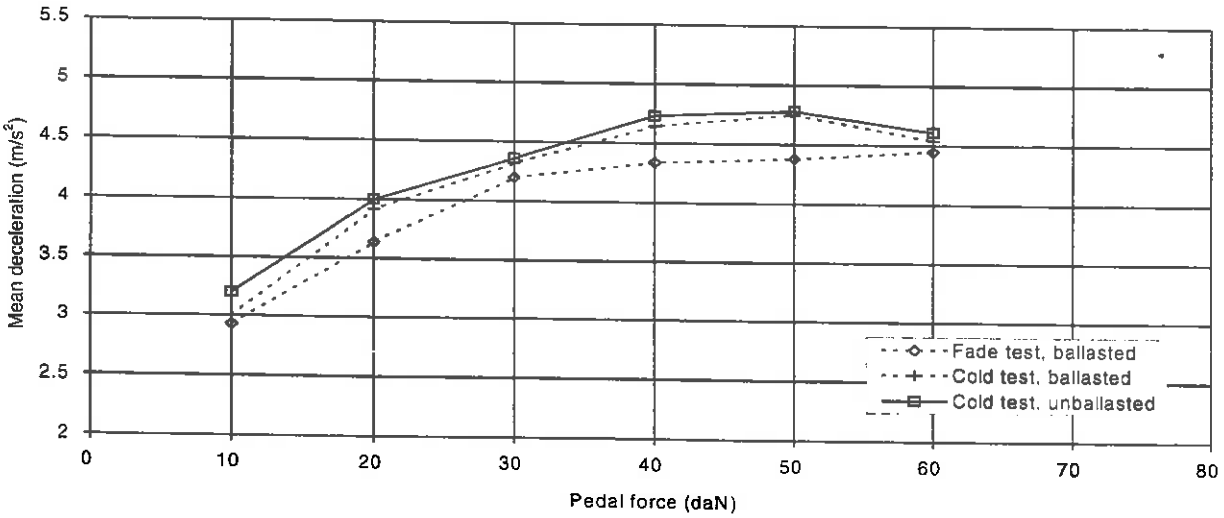
3.6 **Braking** (front wheel drive disengaged)

- Date of tests: 25 May 1998;
- Type of track: concrete.

	Tractor mass (with driver)			Speed before application brakes
	front	rear	total	
	kg	kg	kg	km/h
Unballasted	1425	1680	3105	41.5
Ballasted	1750	1760	3510	41.3

3.6.1 *Cold service braking device test*

3.6.2 *Fade test*



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

3.6.3 *Parking brake*

	Ballasted tractor on 18% slope	
	up daN	down daN
Braking device control force	13.5	11.3

3.7 Measurement of external noise level

- Date of test: 2 June 1998;
- Type of track: concrete;
- Type of sound level meter: BRÜEL & KJÆR model 2231.

Gear	Travelling speed before acceleration km/h	Sound level dB(A)
5FH	31.6	83.9

3.8 Repairs: none.

3.9 Remarks: none.

TEST ENGINEER
(Dr. Carlo BISAGLIA)

DIRECTOR OF TESTING STATION
(Prof. Giuseppe COLZANI)

HEAD OF ISMA
(Ing. Giovanni SANTORO)