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



SAME SILVER 80 VDT

OECD No. **1645** Full Code

40 km/h four-wheel
drive agricultural tractor

Manufactured by:	SAME DEUTZ-FAHR Group S.p.A. V.le F. Cassani 15 24047 Treviglio BG Italy
Date of OECD approval:	13 February 1997
Period of test:	November - December 1996

ISMA Via Milano 43 24047 Treviglio BG Italy
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All stated dimensions and tests refer to tyre size 16.9R24 at front and 18.4R34 at rear, as well as to track widths 1700 mm at front and 1600 mm at rear.

Tractor manufacturer

- Name:	SAME DEUTZ-FAHR Group S.p.A.;
- Address:	V.le F. Cassani 15, 24047 Treviglio BG, Italy;
- Location of tractor assembly:	Treviglio BG, Italy;
- Submitted for test by:	the manufacturer;
- 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:	SAME;
- Model:	SILVER 80 VDT, 40 km/h version;
- Type:	four-wheel drive, unit construction;
- Number of driving wheels:	4;
- Serial number:	1649;
- First serial number:	1001.

ENGINE

- Make:	SAME DEUTZ-FAHR Group;
- Model:	1000.4 A4;
- Type:	air cooled 4-stroke diesel, direct injection, naturally aspirated;
- Serial number:	1624.

Cylinders

- Number and disposition:	4, vertical, in-line;
- Bore x stroke:	105 x 115.5 mm;
- Capacity:	4000 cm^3;
- Compression ratio:	17:1;
- Arrangement of valves:	overhead;
- Cylinder liners:	without liners.

Fuel system

- Fuel feed system:	AC corone fuel feed pump;
- Make, model and type of fuel filter:	FIAMM FNA 166/20;
- Capacity of fuel tank:	150 dm^3;
- Make, model and type of injection pump:	BOSCH PFR 1K 90 A 517, immersed, one per cylinder in line;
. serial number:	without serial number;
- Manufacturer's production setting of injection pump:	
. flow rate:	59 ± 2 mm^3/stroke at rated speed and full load corresponding 17.89 dm^3/h;
. timing:	16° before TDC;
- Make, model and type of injectors:	BOSCH DLLA 150 S 925 multihole injection nozzles;
- Injection pressure:	18 ± 1 MPa.

Governor

- Make:	SAME DEUTZ-FAHR Group;
- Model:	007.0992.4;
- Type:	electronic;
- Governor range of engine speed:	from 650 to 2710 rev/min;
- Rated engine speed:	2500 rev/min.

Air cleaner

- Pre-cleaner	
. make:	DONALDSON;
. model:	P 01-6330;
. type:	cyclone;
. location:	above the bonnet.
- Main filter	
. make:	DONALDSON;
. model:	FLG 08-0524;
. 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 23.

Cooling system

- Type and detail:	air cooling with axial blower;
- Specification of fan:	propeller fan driven by engine shaft;
- Number of fan blades:	13;
- Fan diameter:	320 mm;
- Type of temperature control:	none.

Starting system

- Make:	ISKRA;
- Model:	AZ 1349 12 V;
- Type:	electromagnetic engagement;
- Starter motor power rating:	3.0 kW;
- Safety device:	electrical lockout on clutch and PTO controls;
- Starting system for low temperatures:	none.

Electrical equipment

- Voltage:	12 V;
- Generator	
. make:	ISKRA;
. model:	AAK 5115 14 V 85 A;
. type:	alternator;
. power:	85 A;
- Battery:	1lead acid;
. capacity:	180 Ah at 20 hours rating.

Exhaust system

- Make:	SAME DEUTZ-FAHR Group;
- Model:	DGM SA 1559;
- Type:	one reflection absorption chamber;
- Location:	on the left hand side of engine, vertical position, under side bonnet;
- Height of outlet above ground:	2715 mm.

TRANSMISSION

Clutch (utilized only for travelling of tractor)

- Make:	SAME DEUTZ-FAHR Group;
- Model:	614.23;
- Type:	single disk dry clutch;
- Number of plates:	1;
- Plates diameter:	330 mm;
- Control system:	hydraulic, operated by pedal.

Gear box

The tractor can be fitted alternatively with a "normal" or a "heavy duty" gear box, slightly differing in their dimensions (see report No. CSD 1385 OECD).
The test tractor was fitted with the "heavy duty" version.

. make:	SAME DEUTZ-FAHR Group;
. model:	614.31;
. type:	heavy duty gear box, mechanical synchromesh speed change gear; 5 speed with 4 ranges of speeds (C/S/N/F), one electrohydraulic reduction gear (low/medium/high), and one reverse group;
. number of gears:	60 forward and 60 reverse.
- Available options:	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.

Rear axle and final drives

- Make:	own make;
- Model:	614.44;
- Type:	bevel gear differential and epicyclic final drive.

Rear differential lock

- Make:	own make;
- Model:	614.47;
- Type:	electrohydraulic;
- Control system:	engaged or disengaged by button.

Front axle and final drives

- Make: own make;
- Model: 614.43;
- Type: original SAME DEUTZ-FAHR system with central shaft, bevel gear drive, differential and epicyclic final drives.

Front differential lock

- Make: own make;
- Model: 614.46;
- Type: electrohydraulic;
- Control system: engaged or disengaged by button.

Total rations and speed

Gear	Group	Number of engine revolution for one revolution of the driving wheels			Nominal travelling speed at rated engine speed of 2500 rev/min (*) km/h		
		Low	Medium	High	Low	Medium	High
FORWARD							
1	Creep	2466.0	2061.3	1691.3	0.29	0.35	0.43
2	Creep	1664.9	1391.4	1141.6	0.44	0.52	0.64
3	Creep	1251.3	1045.8	858.0	0.58	0.69	0.85
4	Creep	948.6	792.8	650.3	0.77	0.92	1.12
5	Creep	714.7	597.3	490.1	1.02	1.21	1.48
1	Slow	725.5	606.3	497.5	1.00	1.20	1.46
2	Slow	489.7	409.3	335.8	1.48	1.77	2.16
3	Slow	368.1	307.6	252.4	1.97	2.36	2.88
4	Slow	279.0	233.2	191.3	2.60	3.11	3.79
5	Slow	210.2	175.7	144.1	3.45	4.13	5.04
1	Normal	280.1	234.1	192.1	2.59	3.10	3.78
2	Normal	189.1	158.0	129.6	3.84	4.59	5.60
3	Normal	142.0	118.7	97.4	5.11	6.11	7.45
4	Normal	107.7	90.0	73.8	6.74	8.06	9.83
5	Normal	81.1	67.8	55.6	8.95	10.70	13.05
1	Fast	94.1	78.6	64.5	7.71	9.23	11.25
2	Fast	63.5	53.1	43.5	11.43	13.67	16.68
3	Fast	47.7	39.9	32.7	15.21	18.19	22.19
4	Fast	36.2	30.2	24.8	20.05	24.03	29.26
5	Fast	27.3	22.8	18.7	26.58	31.83	38.81

(*) Calculated with a tyre dynamic radius index of 770 mm (ISO 4251/1-1992).

Total rations and speed (continued)

Gear	Group	Number of engine revolution for one revolution of the driving wheels			Nominal travelling speed at rated engine speed of 2500 rev/min (*) km/h		
		Low	Medium	High	Low	Medium	High
REVERSE							
1	Creep	2368.0	1979.4	1624.1	0.31	0.37	0.45
2	Creep	1598.8	1336.1	1096.3	0.45	0.54	0.66
3	Creep	1201.6	1004.3	823.9	0.60	0.72	0.88
4	Creep	910.9	761.3	624.5	0.80	0.95	1.16
5	Creep	686.3	573.6	470.6	1.06	1.27	1.54
1	Slow	696.7	582.2	477.7	1.04	1.25	1.52
2	Slow	470.2	393.0	322.5	1.54	1.85	2.25
3	Slow	353.5	295.4	242.4	2.05	2.46	2.99
4	Slow	267.9	223.9	183.7	2.71	3.24	3.95
5	Slow	201.9	168.7	138.4	3.60	4.30	5.24
1	Normal	269.0	224.8	184.5	2.70	3.23	3.93
2	Normal	181.6	151.7	124.5	4.00	4.78	5.83
3	Normal	136.4	114.0	93.5	5.32	6.37	7.76
4	Normal	103.4	86.4	70.9	7.02	8.40	10.24
5	Normal	77.9	65.1	53.4	9.32	11.15	13.59
1	Fast	90.4	75.5	61.9	8.03	9.61	11.72
2	Fast	61.0	51.0	41.8	11.90	14.23	17.37
3	Fast	45.8	38.3	31.4	15.84	18.94	23.11
4	Fast	34.8	29.0	23.8	20.88	25.02	30.47
5	Fast	26.2	21.9	18.0	27.68	33.15	40.41

(*) Calculated with a tyre dynamic radius index of 770 mm (ISO 4251/1-1992).

Number of revolutions of front wheels for one revolution of rear wheels: 1.3072.

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 power take-off shaft ends: it is possible, through 6 screws, to mount one PTO shaft end, 35 mm diameter, 6 splines, ISO 500-1991, type 1or 35 mm diameter, 21 splines, ISO 500-1991, type 2;
- 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	540 614	2199 2500	4.0714	-
775	775 786	2463 2500	3.1791	-
1000	1000 1020	2450 2500	2.4500	-
1300	1300 1307	2487 2500	1.9130	-

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:	750 mm;
- Distance from the median plane of the tractor:	0 mm;
- Distance forward front axle:	700 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:	0.18 m;
- Number of power take-off shaft revolutions for one revolution of rear driving wheels:	25.666.

REAR POWER LIFT

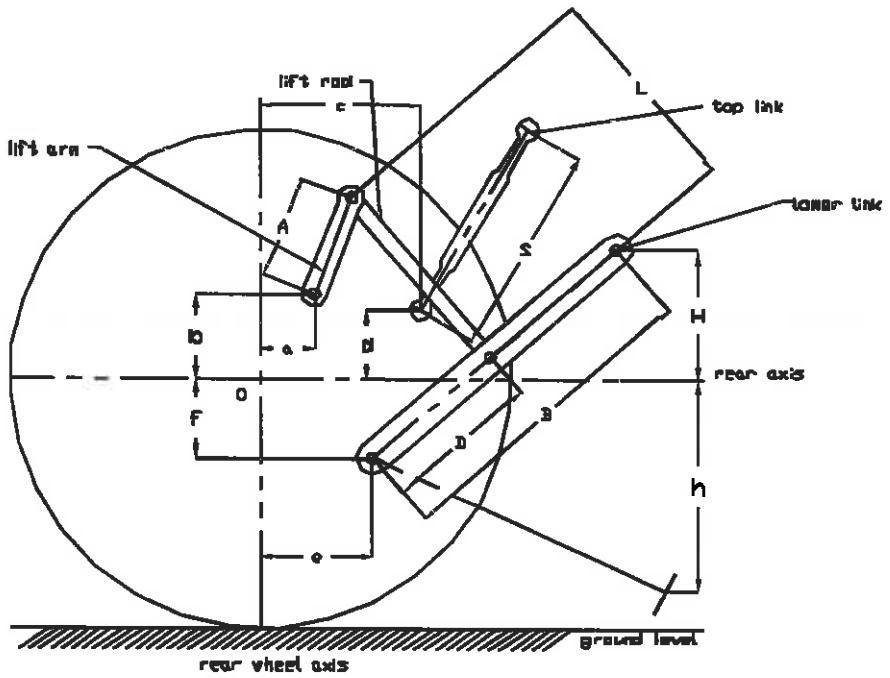
- Make:	SAME DEUTZ-FAHR Group;
- Model:	614.39 electronic-hydraulic power lift, optional fitted on tested tractor;
- Type:	load sensing;
- Type of hydraulic system:	open centre system;
- Number and type of cylinders:	1 internal single-acting;
- Type of lock for transport:	electro-hydraulic;
- Relief valves pressure setting:	18.0 ± 0.5 MPa;
- Opening pressure of anti-shock valve:	21.0 ± 0.5 MPa;

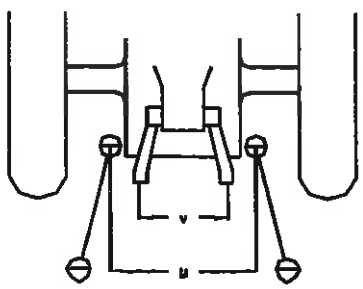
- Lift pump
  . make: BOSCH;
  . type: hydraulic rotary pumps, driven by engine shaft;
- Transmission between pump and engine: mechanical;
- Number and type of filters: 1, replaceable paper cartridge;
- Oil capacity: 71 dm^3;
- Site of oil reservoir: gear box;
- Number, type and location of tapping points: 4 ways distributor at rear of tractor;
- Maximum volume of oil available to external cylinders: 15 dm^3.

- Recommended oil: see page 23.

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)	280	280
Length of lower links	(B)	840	840
Distance of lift arm pivot point from rear wheel axis (behind)			
- horizontally	(a)	95	95
- vertically	(b)	402	402
Horizontal distance between the 2 lower link points	(u)	460	460
Horizontal distance between the 2 lift arm end points	(v)	580	580
Length of upper link	(S)	from 640 to 860	
Distance of upper link pivot point from rear wheel axis			
- horizontally	(c)	350	350
- vertically	(d)	220-285-350	285
Distance of lower link pivot point from rear wheel axis			
- horizontally	(e)	150	150
- vertically	(f)	220	220
Distance of lower link pivot point to lift rod pivot points on lower links	(D)	420	420
Length of lift rods	(L)	from 697 to 823	750
Height of lower hitch points relative to the rear wheel axis:			
Length of lift rods	(L)	697 823	750
Linkage distance of lift rods	(D)	420 420	420
Lowest position	(h)	353 634	470
Highest position	(H)	319 106	235
Height above ground of lower hitch points when locked in transport position (*)			1005

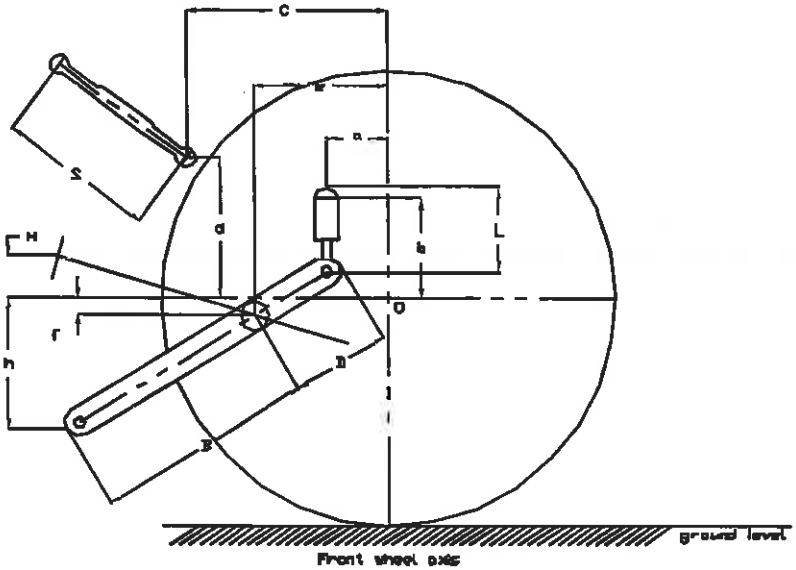
(*) *Assuming the dynamic radius index = 770 mm (ISO 4251/1-1992)*

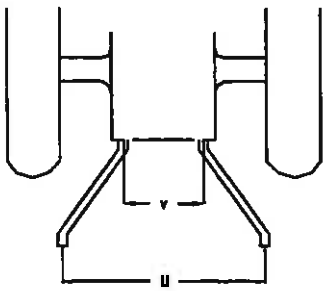
FRONT POWER LIFT (optional, fitted on tested tractor)

- Make:	SAME DEUTZ-FAHR Group;
- Model:	ORIGINAL SAME SYSTEM 614.59 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:	71 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)	750	750
Distance of cylinders pivot point from front wheel axis (forward)			
- horizontally	(a)	300	300
- vertically	(b)	334	334
Horizontal distance between the 2 lower link points	(u)	860	860
Horizontal distance between the 2 lift arm end points	(v)	300	300
Length of upper link	(S)	from 500 to 770	578
Distance of upper link pivot point from front wheel axis			
- horizontally	(c)	662 - 677	677
- vertically	(d)	177 - 437	437
Distance of upper link pivot point from front wheel axis			
- horizontally	(e)	507	507
- vertically	(f)	60	60
Distance of lower link pivot point to cylinders pivot points on lower links	(D)	214	214
Length of cylinders			
- in low position	(L)	325	325
- in high position	(L)	500	500
Height of lower hitch points relative to the front wheel axis			
- in low position	(h)	459	459
- in high position	(H)	166	166
Height above ground of lower hitch points (*)			786

(*) *Assuming the dynamic radius index = 620 mm (ISO 4251/1-1992)*

SWINGING DRAWBAR: optional, not fitted on tested tractor

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:	136 mm;
. max:	1089 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:	420 mm;
. max:	1105 mm;
- Distance of hitch point from rear wheel axis	
. horizontally:	625 mm;
- Distance of hitch point from power take-off shaft end	
. vertically:	375 mm below, 255 mm above;
. horizontally:	200 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 23.

BRAKES

Service brake

- Make:	SAME DEUTZ-FAHR Group;
- Model:	614.54;
- 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:	224 mm,
. rear disc diameter:	280 mm,
. material:	FRENDO HDT 303 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, 3 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:	1600 mm:
. max:	1900 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:	1600 mm;
. max:	1900 mm;
- Adjustment:	changing the position of the rims with respect to the disc.

WHEELBASE: 2373 mm.

ISTITUTO SPERIMENTALE PER
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PROTECTIVE STRUCTURE

Specifications

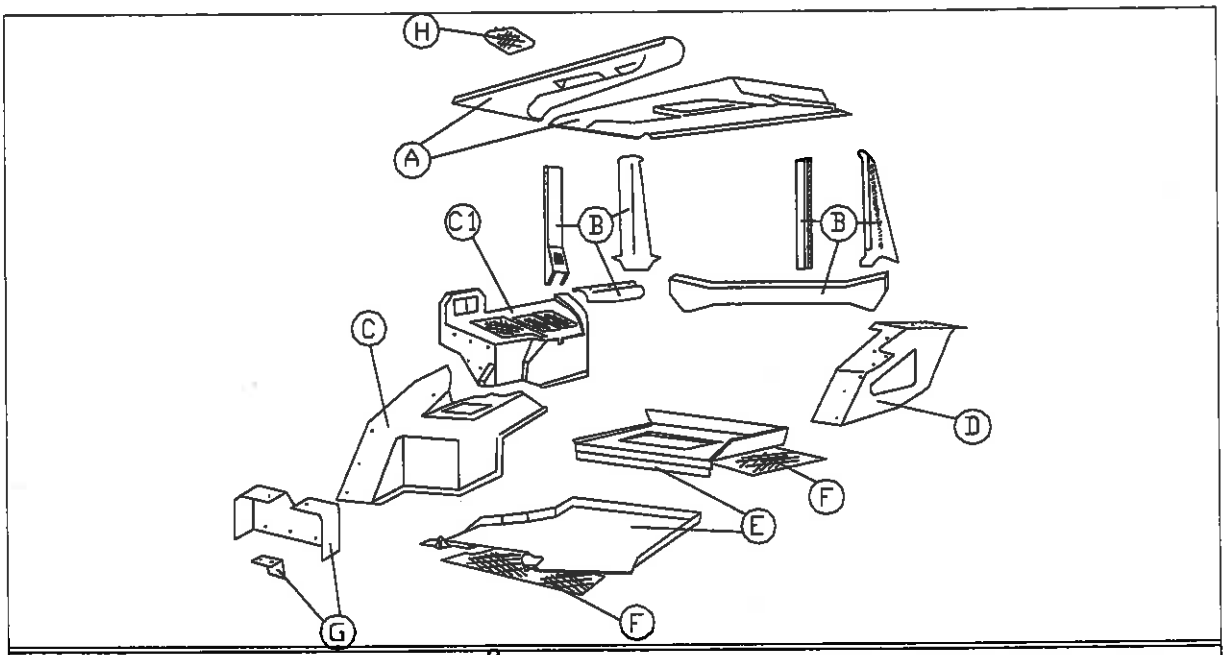
Seat	Gear box	OECD approval number
GRAMMER LS 95 H 1 / 90 AR	"heavy duty"	CSD 1385/251
	"normal"	CSD 1385/247
GRAMMER DS 83 H / 90 A	"heavy duty"	CSD 1385/249
	"normal"	CSD 1385/245
GRAMMER DS 85 H / 90 A	"heavy duty"	CSD 1385/250
	"normal"	CSD 1385/246
KAB XH 2 / U	"heavy duty"	CSD 1385/252
	"normal"	CSD 1385/248

- Date of approval: 21 December 1993;
- 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: 4500 kg;
- Wheelbase used for calculating impact energy at the rear: 2633 mm;
- Make: S+L+H;
- Model: C 37;
- Type: cab, not tiltable;
- Manufacturer's name and address: S+L+H S.p.A., Viale F. Cassani 15, 24047 Treviglio BG, Italy.

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Details of materials used for sound proofing the protective structure

- Glass:
  . type: security glass, thickness 5 and 6 mm;
  . model: 43 R - 000589 (doors, windscreen, windows);
- Windscreen wipers: OSLV, parallelogram type;
- Direction indicators: COBO E3;
- Heating and ventilation system: BORLETTI;
- Draught proofing: rubber GMTA 20 - 70 P, SP 550 and PEC 75.
- Interior padding: see below;



A) Porous material, 50-60 g/m^3, thickness 15-20 mm + Tassel AD, 1200-1400 g/m^3, thickness 6 mm + textile fiber + TNT.

B) PUR, low density, 250-300 g/m^3, coated with expanded laminated PVC.

C) Polypropylene, thickness 3 mm, internally covered with polyurethan foam, thickness 30 mm, and bitumen sheet.

C1) Polypropylene, thickness 3 mm, internally covered with polyurethan foam, thickness 30 mm.

D) Tassel AD, 1400-1600 g/m^3 + PVC, thickness 12 + 22 mm.

E) Rubber, 2-3 kg/m^3, thickness 5 mm + polyurethan foam, thickness 20 mm + thermoplastic film.

F) Bitumen, thickness 6 mm.

G) Rubber + Tassel AB x AD, 800-1000 g/m^3 + Tassel AB x BD, 1400 g/m^3, thickness 23 mm.

H) Polyurethan foam, thickness 30 mm.

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DRIVER'S SEAT: four seats available;

Make	Model	Type of suspension	Type of damping	Range of adjustment	
				vertical	longitudinal
GRAMMER	LS95 H 1 / 90 AR	pneumatic	hydraulic	60 mm	150 mm
GRAMMER	DS 83 H / 90 A	mechanical	hydraulic	60 mm	150 mm
GRAMMER	DS 85 H / 90 A	mechanical	hydraulic	60 mm	150 mm
KAB	XH 2 / U	mechanical	hydraulic	60 mm	150 mm

PASSENGER'S SEAT : none.

LIGHTING
Lighting system in accordance with EEC 78/933

	Height above ground of centre mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Headligths	1210	160 x 100	210
Front parking lights	1703	110 x 35	850
Front direction indicator	1738	110 x 35	850
Rear parking lights	1713	120 x 65	860
Rear direction indicator	1690	75 x 110	935
Brake lights	1690	75 x 110	740
Reflectors 1st pair	1658	120 x 45	860
2nd pair	720	∅ 80	460

TEST CONDITIONS

OVERALL DIMENSIONS

	Length		Width		Height at top of	
	with front power lift mm	without front power lift mm	minimum mm	maximum mm	protective structure mm	exhaust silencer mm
Unballasted	4813	4123	2240	2500	2680	2715
Ballasted	4883	4553	2240	2500	2680	2715

- Ground clearance: 415 mm below front axle;

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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	1985	2005	2520	2540
Rear	2200	2255	2295	2350
Total	4185	4260	4815	4890

BALLAST

	Weights		Water
	Number	Total mass kg	kg
Front	1	375	-
Rear wheels	6	255	-

TYRES AND TRACK WIDTH SPECIFICATIONS

	Front	Rear
Tyres		
make	PIRELLI	PIRELLI
model	TM 700	TM 700
dimensions	16.9R24	18.4R34
ply rating	-	-
load index/speed index	134 A8	144 A8
type	radial	radial
maximum load (tyre manufacturer's)	1373 daN	2206 daN
inflation pressure (tyre manufact.'s)	160 kPa	160 kPa
dinamic radius index	620 mm	770 mm
Chosen track width	1700 mm	1600 mm
Technically permissible axle load	2747 daN	4415 daN
Other tyres available	14.9R24 16.9R24 16.9R24	16.9R24 520/70R34 18.4R34

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

OILS AND LUBRICATION

Capacity and change interval

	Capacity dm^3	Oil change h	Filter change h
Engine	9	150	300
Gear box with rear axle and final drives, hydraulic system, steering	71	1200	2400(*)
Front PTO transmission	2.5	1200	-
Front axle / final drives	10.5 / 5	1200	-
Brakes	2.5	-	-

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

Specifications

	Recomended	Using during test
Engine oil		
Type	AKROS MOTOR OIL	AKROS MOTOR OIL
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

ISTITUTO SPERIMENTALE PER
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SEZIONE DI TREVIGLIO

Grease

- Type:	AKROS GREASE T2;
- Number of lubrication points:	10.

FUEL

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

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

TEST RESULTS

COMPULSORY TESTS RESULTS

1. MAIN POWER TAKE-OFF PERFORMANCE

- Date and location of test: 21 November 1996, 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						
55.7	2501	1021	17.89	14.99	269	3.11
1.2 POWER AT RATED ENGINE SPEED						
55.7	2501	1021	17.89	14.99	269	3.11
1.3 STANDARD POWER TAKE-OFF SPEED (1000 rev/min)						
54.8	2449	1000	17.11	14.34	261	3.20
1.4 PART LOADS 1.4.1 The torque corresponding to maximum power at rated engine speed						
55.7	2501	1021	17.89	14.99	269	3.11
1.4.2 85% of torque obtained in 1.4.1						
48.7	2570	1049	15.67	13.13	270	3.11
1.4.3 75% of torque defined in 1.4.2						
37.1	2614	1067	12.54	10.51	283	2.96
1.4.4 50% of torque defined in 1.4.2						
25.1	2647	1080	10.64	8.92	356	2.35
1.4.5 25% of torque defined in 1.4.2						
12.6	2673	1091	7.79	6.53	517	1.62
1.4.6 unloaded						
0	2709	1106	5.75	4.82	-	-

ISTITUTO SPERIMENTALE PER
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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						
54.8	2449	1000	17.11	14.34	261	3.20
1.5.2 85% of torque obtained in 1.5.1						
48.2	2530	1033	15.30	12.82	266	3.15
1.5.3 75% of torque defined in 1.5.2						
36.7	2568	1048	12.63	10.58	289	2.90
1.5.4 50% of torque defined in 1.5.2						
24.8	2599	1061	9.92	8.31	335	2.50
1.5.5 25% of torque defined in 1.5.2						
12.5	2627	1072	7.57	6.34	507	1.65
1.5.6 unloaded						
0	2663	1087	5.53	4.63	-	-

- No load maximum engine speed: 2709 rev/min;
- Equivalent flywheel torque at rated engine speed: 212.73 Nm;
- Equivalent flywheel torque at 2-hour test: 212.73 Nm
- Maximum equivalent flywheel torque: 243.77 Nm at 1591rev/min of the engine.

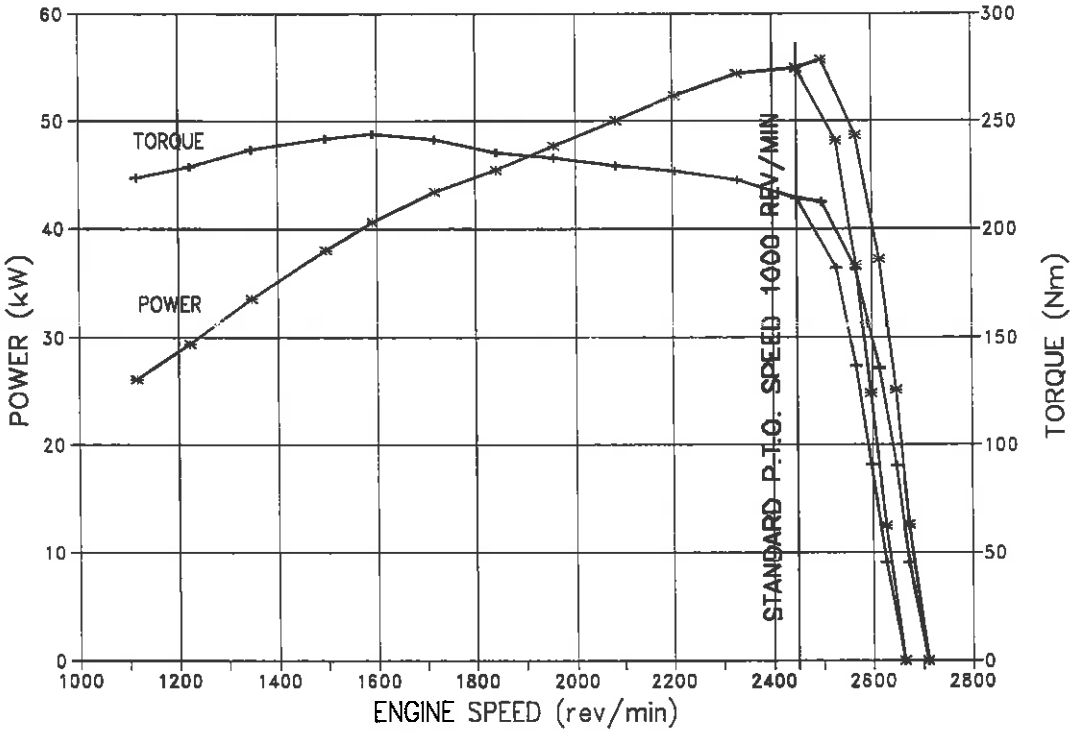
- Mean atmospheric conditions

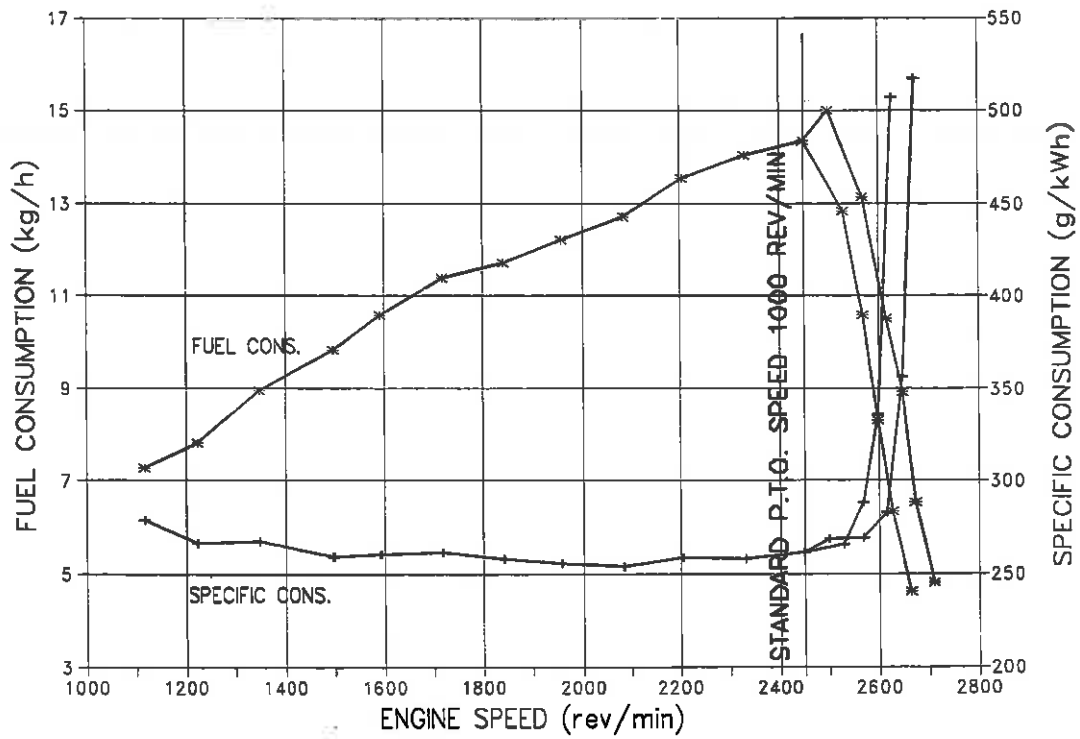
. temperature: 18 °C
. pressure: 99.9 kPa
. relative humidity: 59 %

- Maximum temperatures

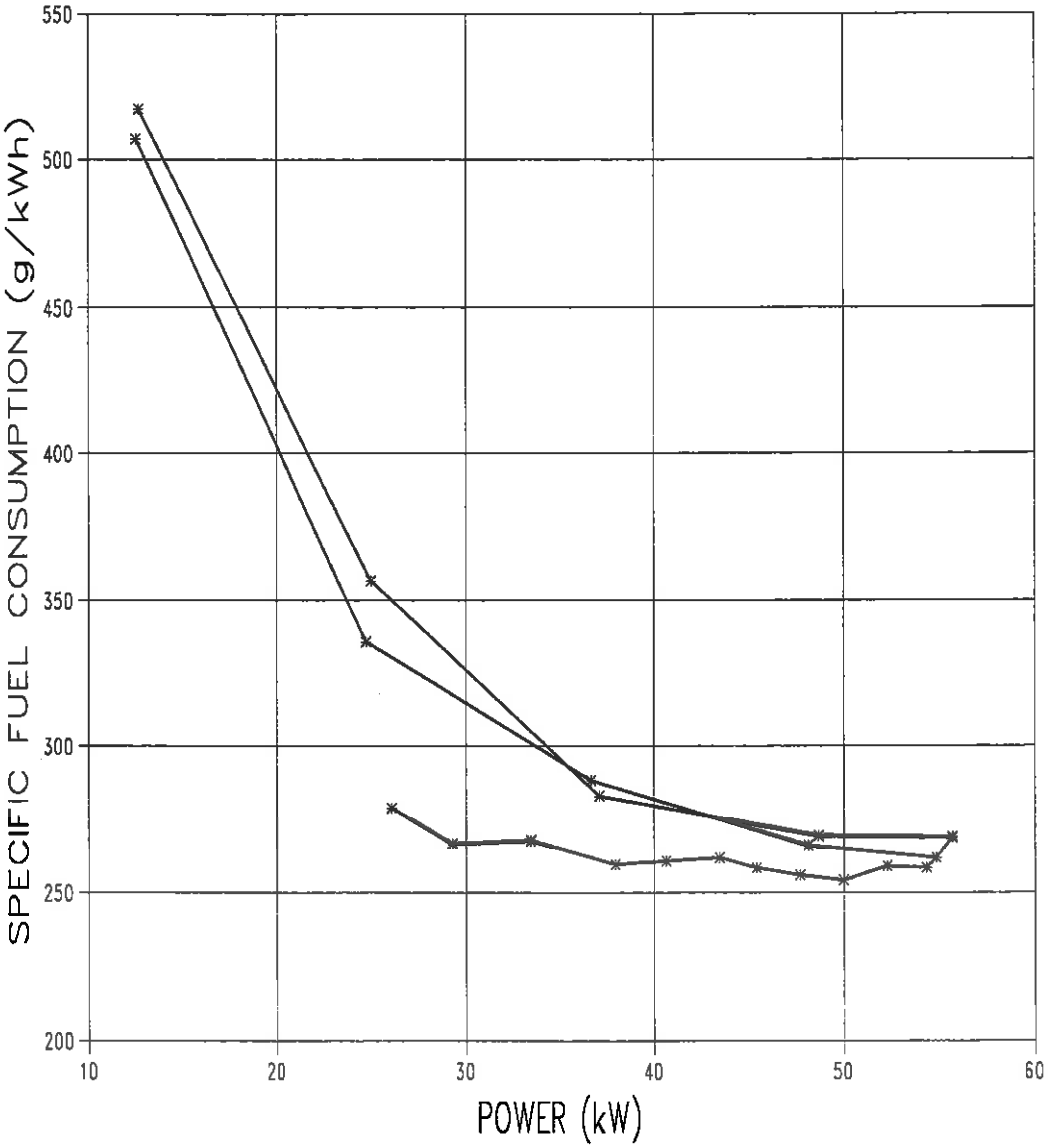
. coolant: 90 °C
. engine oil: 124 °C
. fuel: 32 °C
. engine air intake: 22 °C

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO





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SEZIONE DI TREVIGLIO

2. HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 12 December 1996.

2.1 HYDRAULIC POWER TEST

- Sustained pressure with relief valve open: 18.5 MPa;
- Pump delivery rate at minimum pressure: 39.8 l/min;

	Power kW	Flow rate l/min	Pressure MPa	Oil temp. °C
At 90% of the actual relief valve setting	7.64	27.6	16.6	65
Maximum	8.89	34.4	15.5	62

- 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	300	300
Vertical movement			
without lifting forces	mm	705	764
with lifting forces	mm	688	740
Maximum corrected force exerted through full range	kN	16.90	22.84
Corresponding pressure of hydraulic fluid	MPa	16.6	16.6
Moment about rear axle	kNm	20.78	38.14
Maximum tilt angle of mast over range of lift	degrees	-	6

Lifting heights relative to the horizontal lower links											
mm	-250	-239	-200	-100	0	+100	+200	+300	+400	+438	+501
Lifting forces at hitch points, corrected to 16.6 MPa											
kN	19.60	-	20.84	22.90	24.48	25.75	26.70	28.16	31.06	31.30	-
Lifting forces at test frame, corrected to 16.6 MPa											
kN	-	22.84	22.96	23.93	24.23	24.28	24.06	23.91	23.91	-	23.86

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

2.3 FRONT POWER LIFT

		At hitch point	On the frame
Height of lower hitch point above ground in down position	mm	161	161
Vertical movement			
without lifting forces	mm	625	603
with lifting forces	mm	615	593
Maximum corrected force exerted through full range	kN	15.89	13.68
Corresponding pressure of hydraulic fluid	MPa	16.6	16.6
Moment about front axle	kNm	19.97	24.72
Maximum tilt angle of mast over range of lift	degrees	-	4

Lifting heights relative to the horizontal lower links										
mm	-399	-356	-300	-200	-100	0	+100	+200	+216	+237
Lifting forces at hitch points, corrected to 16.6 MPa										
kN	18.28	-	17.66	17.11	16.75	16.48	16.27	15.98	15.89	-
Lifting forces at test frame, corrected to 16.6 MPa										
kN	-	21.41	20.22	17.97	16.67	15.60	14.66	13.68	-	13.24

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

3. DRAWBAR PERFORMANCE

- Date of test: 27 to 29 November 1996;
- Type of track: concrete.

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
	mm	kPa	kPa
Unballasted	540	160	160
Ballasted	545	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)													
4SL	23.9	37.27	2.31	2615	15	438	1.91	27	87	110	5	73	99.8
3SH	22.4	31.84	2.53	2610	15	481	1.74	27	87	111	5	73	99.8
1NM	26.1	34.57	2.72	2606	15	422	1.99	27	87	111	5	73	99.8
4SM	27.4	35.61	2.77	2592	15	431	1.95	27	88	112	5	72	99.8
5SL	27.7	33.19	3.01	2580	15	452	1.86	27	88	112	5	72	99.7
1NH	29.5	31.64	3.36	2579	15	427	1.96	27	88	112	5	72	99.8
4SH	33.2	35.70	3.35	2560	15	403	2.08	28	87	111	5	71	99.8
2NL	33.1	35.30	3.38	2570	15	397	2.11	28	88	111	4	71	99.8
5SM	33.8	33.83	3.60	2570	15	390	2.15	26	88	110	5	69	99.8
2NM	40.3	36.28	4.00	2566	15	328	2.55	27	88	111	5	69	99.7
5SH	36.7	27.62	4.79	2498	5	408	2.06	28	89	110	5	68	99.7
3NL	42.9	33.58	4.60	2497	10	348	2.40	28	88	111	6	68	99.7
2NH	43.0	29.90	5.18	2500	8	349	2.40	28	89	110	5	67	99.7
3NM	46.3	28.06	5.94	2503	4	324	2.59	28	88	110	5	68	99.7
4NL	43.9	24.51	6.45	2498	5	341	2.46	28	88	110	6	67	99.8
3NH	43.1	21.50	7.22	2499	4	349	2.40	29	87	110	6	67	99.8
1FL	47.8	22.83	7.54	2497	3	314	2.67	29	87	111	6	66	99.8
4NM	44.2	20.24	7.86	2500	3	341	2.46	28	87	112	6	66	99.8
5NL	44.1	18.16	8.74	2500	3	343	2.45	28	88	111	6	65	99.8
1FM	46.4	18.53	9.02	2497	3	320	2.60	28	88	111	6	65	99.7

I.S.M.A.
ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
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)													
1CL	2.4	33.73	0.26	2693	15	2295	0.37	29	87	110	11	55	99.7
1CM	3.2	35.79	0.32	2691	15	1808	0.46	29	87	110	11	55	99.8
1CH	3.9	34.92	0.40	2683	15	1585	0.53	29	87	110	11	55	99.9
2CL	4.0	36.41	0.40	2683	15	1515	0.55	28	87	110	11	56	99.8
2CM	5.6	42.55	0.47	2677	15	1133	0.74	28	87	110	12	56	99.8
3CL	5.8	40.41	0.52	2673	15	1130	0.74	28	87	110	12	56	99.8
2CH	6.5	40.95	0.57	2674	15	1019	0.82	28	88	110	11	56	99.8
3CM	6.8	39.74	0.62	2669	15	1009	0.83	29	88	111	12	57	99.9
4CL	7.7	39.70	0.70	2662	15	972	0.86	29	88	111	11	57	99.9
3CH	8.6	39.65	0.78	2655	15	960	0.87	29	88	110	11	57	99.9
4CM	9.3	41.21	0.81	2654	15	892	0.94	29	87	110	11	57	99.9
1SL	10.4	41.75	0.90	2659	15	745	1.12	29	87	110	11	58	99.9
5CL	11.3	43.87	0.93	2648	15	781	1.07	29	87	111	10	58	99.9
4CH	11.7	42.05	1.00	2642	15	789	1.06	30	87	111	11	58	100.0
1SM	12.9	43.99	1.06	2651	15	664	1.26	30	87	112	11	58	100.0
5CM	12.8	42.94	1.07	2642	15	723	1.16	30	88	111	10	59	99.9
1SH	15.6	42.75	1.31	2643	15	590	1.42	29	88	111	10	59	99.9
5CH	15.3	42.65	1.29	2621	15	668	1.26	29	88	110	10	59	99.9
2SL	16.0	42.48	1.36	2643	15	574	1.46	29	87	110	10	60	99.8
2SM	19.0	42.18	1.62	2635	15	501	1.67	29	87	110	10	62	99.8
3SL	20.7	43.08	1.73	2628	15	473	1.77	28	87	110	11	62	99.8
2SH	23.0	42.17	1.96	2617	15	451	1.86	28	87	110	11	62	99.8
3SM	23.9	40.43	2.13	2614	15	440	1.91	28	87	110	10	62	99.8
1NL	26.3	40.52	2.34	2610	15	408	2.05	28	87	110	10	63	99.8
4SL	26.2	40.12	2.35	2604	15	424	1.98	28	87	111	10	63	99.8
3SH	29.9	41.99	2.56	2583	15	412	2.03	28	87	111	10	63	99.9
1NM	31.5	41.05	2.76	2590	15	380	2.20	29	88	112	10	64	99.9
4SM	31.3	40.66	2.77	2582	15	398	2.10	29	88	112	10	63	99.9

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
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													
5SL	34.9	41.19	3.05	2570	15	377	2.22	29	87	110	10	64	99.9
1NH	37.3	40.82	3.29	2558	15	360	2.33	28	87	110	10	64	99.9
4SH	35.9	39.66	3.26	2520	15	404	2.07	28	88	110	9	65	99.9
2NL	36.9	39.77	3.34	2555	15	366	2.29	28	88	110	9	65	99.9
5SM	39.7	39.74	3.60	2500	13	378	2.22	28	87	110	9	65	99.9
2NM	42.9	36.28	4.26	2502	8	348	2.41	27	87	111	9	65	99.9
5SH	39.5	29.85	4.77	2501	6	379	2.21	28	87	111	9	67	99.9
3NL	42.8	33.09	4.66	2498	9	350	2.39	28	88	111	9	66	99.8
2NH	46.2	31.22	5.33	2499	6	326	2.57	28	88	111	8	67	99.9
3NM	46.6	28.35	5.92	2500	3	321	2.61	28	87	111	9	67	99.9
4NL	43.9	24.18	6.54	2501	4	342	2.45	28	87	112	9	68	99.8
3NH	44.1	21.86	7.26	2501	3	339	2.48	28	87	111	8	68	99.9
1FL	48.2	22.98	7.55	2504	3	311	2.70	28	87	111	8	69	99.8
4NM	47.2	21.75	7.82	2505	3	317	2.65	28	88	111	8	69	99.9
5NL	42.3	17.24	8.84	2503	2	353	2.37	28	87	112	8	70	99.8
1FM	46.7	18.54	9.07	2500	2	321	2.61	28	87	112	8	70	99.8
4NH	39.7	14.80	9.66	2498	2	377	2.22	28	87	110	8	71	99.8
3.3 FIVE HOUR TESTS													
3.3.1 FIVE HOUR TEST at 75% of pull at maximum power													
3NH	34.3	16.38	7.55	2571	2	381	2.20	29	87	112	10	68	99.6
3.3.2 FIVE HOUR TEST at pull corresponding to 15% wheel slip with additional ballast: 85 kg													
2NL	39.7	39.91	3.58	2555	(*)	(*)	(*)	28	88	112	11	66	99.9

(*) *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: 68 g/h.

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

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	4.10	4.05	6.11	6.10
Radius of turning circle	3.86	3.80	5.87	5.85

5. LOCATION OF CENTRE OF GRAVITY

	mm
Height above ground	896
Distance forward from rear axle centre	1117
Distance from tractor's median plane to the left	5

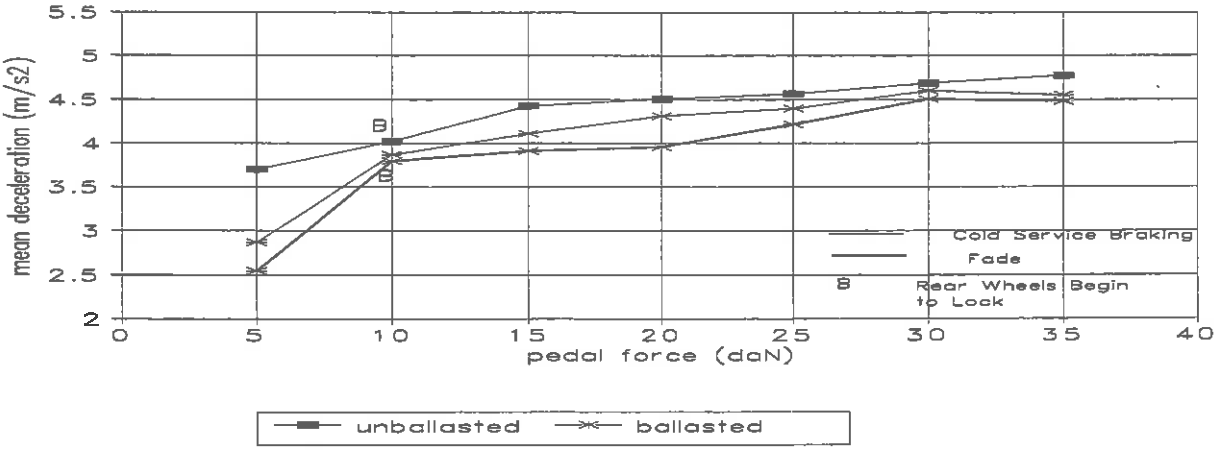
6. BRAKING (front wheel drive disengaged)

- Date of test: 2 December 1996;
- Type of track: concrete.

	Tractor mass (with driver)			Speed before application brakes
	front	rear	total	
	kg	kg	kg	km/h
Unballasted	2005	2255	4260	42.0
Ballasted	2540	2350	4890	42.0

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

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
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6.3 PARKING BRAKE

	Ballasted tractor on 18% slope	
	up	down
	daN	daN
Braking device control force	9.8	9.3

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

- Date of test: 5 December 1996;
- 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	31.5	85.2

8. REPAIRS: none.

9. REMARKS: none.

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

APPENDIX

MEASUREMENT OF NOISE IN THE PROTECTIVE STRUCTURE - OECD code V

- Test report of: SAME SILVER 80 VDT "4WD";
- Protective structure: S+L+H C37;
- Gear box: heavy duty;
- Driver's seat: GRAMMER LS 95 H1/90 AR;
- OECD test No.: CSD 1385/251/NM 1612;
- Date of approval: 1 December 1995;
- Date of test: 21 and 29 September 1995;
- Location: ISMA, Via Milano 43, Treviglio BG, Italy;
- Type of sound level meter: BRÜEL & KJÆR 2231;
- Type of track: concrete.

Gear	Driving axles	Drawbar pull kN	Travelling speed km/h	Sound level a dB(A)	Sound level b dB(A)
Unloaded test in the gear giving the forward speed nearest to 7.5 km/h					
3 N high	1	0	7.7	76.4	86.5
3 N high	2	0	7.9	77.0	86.2
Unloaded test in the gear giving the maximum forward speed					
5 F high	1	0	41.0	77.2	87.3
5 F high	2	0	41.0	77.5	87.5
Test with the drawbar pull for which the tractor gives the maximum sound level in a gear giving the nominal forward speed nearest to 7.5 km/h					
3 N high	1	18.6	6.9	77.4	87.8
3 N high	2	26.5	6.6	77.4	87.5
Test with the drawbar pull for which the tractor gives the maximum sound level in any gear with a sound level increase of at least 1 dB(A) compared to the previous test					
4 N normal	1	15.7	7.5	78.8	88.0
4 N normal	2	19.6	8.6	79.2	87.5

a - *all openings closed*
b - *doors, side and rear windows and roof hatch open*

TEST ENGINEER
(Dr. Carlo BISAGLIA)

DIRECTOR OF TESTING STATION
(Prof. Giuseppe COLZANI)

HEAD OF ISMA
(Ing. Giovanni SANTORO)