ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

SAME ANTARES 110 VDT
TEST No. 062

O.E.C.D. No. 1328 full code

Test in accordance with the O.E.C.D. Full Code for the official testing of agricultural tractors.



Test report of: **SAME ANTARES 110 VDT "4WD"**

Submitted for test by: S+L+H S.p.A
V.le Cassani 15
24047 Treviglio (BG) (Italy)

Date of O.E.C.D. approval: 16.09.1991
Period of test: June - July 1991

ISMA - SOP Treviglio - Via Milano 43 - TREVIGLIO (BG) - ITALY

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O.E.C.D. No. **1328** full code

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ISMA - SOP Treviglio - Via Milano 43 - TREVIGLIO (BG) - ITALY

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All stated dimensions and tests refer to tyre size 14.9R30 (129A8) at front and 18.4R38 (146A8) at rear, as well as to track widths 1800 mm at front and 1840 mm at rear.

- Tractor manufacturer

. Name: S+L+H S.p.A.;
. Address: V. 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: I.S.M.A. - Via Milano 43 - Treviglio (BG) - ITALY

I - SPECIFICATION OF TRACTOR

TRACTOR

- Make: SAME;
- Model: ANTARES 110 VDT "4WD";
- Type: Wheeled tractor, unit construction, all wheels drive tractor;
- Number of driving wheels: 4;
- Serial number: 1310;
- First serial number: 1001.

ENGINE

- Make: S+L+H;
- Model: 1000.6 A;
- Type: air cooled 4-stroke diesel engine, direct injection, naturally aspirated;
- Serial number: 1318.

Cylinders

- Number/disposition: 6, vertical, in-line;
- Bore/stroke: 105 x 115.5 mm;
- Capacity: 6000 cm^3;
- Compression ratio: 17/1;
- Arrangement of valves: overhead;
- Cylinder liners: without liners.

Supercharging : none:

Fuel system

- Fuel feed system: AC corone fuel feed pump;
- Make, model and type of fuel filter: FIAMM FNA 225/00;
- Capacity of fuel tank: 210 dm^3;
- Make, model and type of injection pump: BOSCH PFR 1K 90A 503, immersed pump, one per cylinder, without serial number, in line injection pump;
- Manufacturer's production setting of injection pump:
  .flow rate: 50 +/-2 mm /stroke at rated speed and full load corresponding 22.85 dm^3/h;
  .timing: 16 0.5 before TDC;
- Make, model and type of injectors: BOSCH DLLA 150 S 925 multihole injecton nozzles;
- Injection pressure: 18 +/- 1 MPa.

Governor

- Make: S+L+H;
- Model: 523.16;
- Type: electronic;
- Governor range of engine speed: from 650 to 2720 rev/min.;
- Rated engine speed: 2500 rev/min.

Air cleaner

- Main filter
  . make: DONALDSON;
  . model: FLG 08-0337;
  . type: dry paper element filter;
  . location: front of engine ;
- Maintenance indicator: with the warning lamp on the dashboard.

Lubrication system

- Type of feed pump: forced feed from gear pump;
- Total oil capacity including filter: 15.0 dm^3;
- Oil change period: 150 hrs;
- Type of filter: FIAMM FT 48 03 IN;
- Number: 2;
- Filter change period: 300 hrs;
- Oil specifications: see page 20.

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: BOSCH;
- Model: JF 12 V;
- Type: electromagnetic engagement;
- Starter motor power rating: 3.0 kW;
- Safety device: preventig engine start in gear;
- Starting system for low temperatures: none.

Electrical equipment

- Voltage: 12 V;
- Generator:
.make: BOSCH ;
.model: K1 14 V 65 A;
.type: alternator:
.power: 780 W;
- Battery: 1 lead acid;
.capacity: 143 Ah at 20 hours rating.

Exhaust system

- Make: S+L+H;
- Model: 83912.3;
- Type: one reflection absorption chamber;
- Location: on the left hand side of engine, under the bonnet cowling, with vertical exhaust;
- Height of outlet above ground: 2870 mm.

TRANSMISSION

Clutch: utilized only for travelling of tractor

- Make: own make;
- Model: 523.23;
- Type: single disk dry clutch;
- Number of plates: 1;
- Plates diameter: 330 mm;
- Control system: hydraulically operated by pedal.

Gear box

- Make: own make;
- Model: 523.22;
- Type: mechanical synchromesh speed change gear ;
- Arrangement: six speeds forward, with four ranges of speeds, and one reverse group;
- Number of speeds : 24 forward and 24 reverse;
- Available options: six speeds forward,with three ranges of speeds, one electro-hydraulically shifted reduction gear (hi/lo) and one reverse group;
  number of speeds: 36 forward and 36 reverse;
  or:
  six speeds forward,with four ranges of speeds, one electro-hydraulically shifted reduction gear (hi/lo) and one reverse group;
  number of speeds: 48 forward and 48 reverse.

Rear axle and final drives

- Make: own make;
- Model: 523.44;
- Type: bevel gear differential and epicyclic final drive;

Differential lock

- Make: own make;
- Model: 523.35;
- Type: electrohydraulic;
- Control system: by push button.

Differential lock (optional, fitted on test tractor)

- Make: own make;
- Model: SBA original SAME system;
. Type: electrohydraulic;
- Control system: engaged by push button, disengaged by push button or automatically when steering angle exceeds 17 degrees, or when forward speed exceeds 15 km/h.

Front axle and final drives

- Make: own make;
- Model: 523.43;
- Type: S+L+H system with central shaft, bevel gear drive, differential and epicyclic final drives;

Differential lock

- Make: own make;
- Model: 523.46;
- Type: electrohydraulic;
- Control system: by push button.

Differential lock (optional, fitted on test tractor)

- Make: own make;
- Model: SBA original SAME system;
- Type: electrohydraulic;
- Control system: engaged by push button, disengaged by push button or automatically when steering angle exceeds 17 degrees, or when forward speed exceeds 15 km/h.

Transmission lubrication

- Gear box, rear axle, final drives, power lift and hydraulic system (in common).
. total capacity including filter: 97 dm^3;
. change period: 1200 hrs;
. filter change period: 2400 hrs or when the filter clogging warning lamp is lighted;
- Front axle and final drives
. total capacity: 18 dm^3;
. change period: 1200 hrs;

- Recommended oil: see page 20.

Total ratios and speeds **FORWARD**

Gear	Group	Number of engine revolutions for one revolution of the driving wheells	Nominal travelling speed at rated engine speed of 2500 rev/min (*) km/h
1	R	3394.6	0.228
2	R	2632.6	0.294
3	R	2025.1	0.382
4	R	1579.6	0.489
5	R	1200.2	0.644
1	S	1131.5	0.683
6	R	935.2	0.826
2	S	877.5	0.881
3	S	675.0	1.145
4	S	526.5	1.468
5	S	400.1	1.932
1	N	326.9	2.364
6	S	311.7	2.479
2	N	253.5	3.049
3	N	195.0	3.963
4	N	152.1	5.081
5	N	115.6	6.687
6	N	90.1	8.581
1	F	71.2	10.861
2	F	55.2	14.004
3	F	42.5	18.205
4	F	33.1	23.340
5	F	25.2	30.718
6	F	19.6	39.421

(*) Calculated with a tyre dynamic radius index of 820 mm. (ISO 4251/1 -1984)- Number of rev. of front wheels for one rev. of rear wheels: 1.2741.

Total ratios and speeds **REVERSE**

Gear Group	Number of engine revolutions for one revolution of the driving wheells	Nominal travelling speed at rated engine speed of 2500 rev/min (*) km/h
1 R	3213.2	0.241
2 R	2491.9	0.310
3 R	1916.9	0.403
4 R	1495.1	0.517
5 R	1136.1	0.680
1 S	1071.1	0.722
6 R	885.2	0.873
2 S	830.6	0.930
3 S	639.0	1.210
4 S	498.4	1.551
5 S	378.7	2.041
1 N	309.4	2.498
6 S	295.1	2.619
2 N	240.0	3.221
3 N	184.6	4.187
4 N	144.0	5.368
5 N	109.4	7.064
6 N	85.2	9.066
1 F	67.4	11.474
2 F	52.2	14.795
3 F	40.2	19.233
4 F	31.3	24.658
5 F	23.8	32.452
6 F	18.6	41.647

(*) Calculated with a tyre dynamic radius index of 820 mm. (ISO 4251/1 -1984)- Number of rev. of front wheels for one rev. of rear wheels: 1.2741.

POWER TAKE-OFF

Power take-off proportional to engine speed

- Type: independent, at rear of tractor, in tractor's median plane, engaged or disengaged by push button. Driven by multiplate wet clutch independent of travel clutch; ISO Standard 500-1979.
- Number of shafts: 1;
- Method of changing power take-off shaft ends and speeds: it is possible, through 6 screws, to mount one PTO shaft end at 6 or 21 splines. Speed selection by external hand lever combined with a lever at the left hand side of the seat.

1) 540 rev/min
- Dimension ISO Standard 500-1979 type 1 (35 mm - 6 splines);
- PTO speed at rated engine speed: 605 rev/min;
- Engine speed at standard power take-off speed: 2229 rev/min;
- Ratio of rotation speeds (engine speed/pto speed): 4.1278;
- Power restriction and maximum torque: 143 kw, 252.4 daNm.

2) 1000 rev/min
- Dimension ISO Standard 500-1979 type 2 (35 mm - 21 splines);
- PTO speed at rated engine speed: 1033 rev/min;
- Engine speed at standard power take-off speed: 2421 rev/min;
- Ratio of rotation speeds (engine speed/pto speed): 2.4211.
- Power restriction and maximum torque: 143 kw, 136.3 daNm.

3) 775 rev/min (optional fitted on test tractor)
- Dimension ISO Standard 500-1979 type 2 (35 mm - 21 splines);
- PTO speed at rated engine speed: 784 rev/min;
- Engine speed at standard power take-off speed: 2470 rev/min;
- Ratio of rotation speeds (engine speed/pto speed): 3.188.
- Power restriction and maximum torque: 143 kw, 176.2 daNm.

4) 1300 rev/min (optional fitted on test tractor)
- Dimension ISO Standard 500-1979 type 2 (35 mm - 21 splines);
- PTO speed at rated engine speed: 1337 rev/min;
- Engine speed at standard power take-off speed: 2431 rev/min;
- Ratio of rotation speeds (engine speed/pto speed): 1.869.
- Power restriction and maximum torque: 143 kw, 105.0 daNm.

	P.T.O.	
- Height above ground	830	mm
- Distance from the median plane of the tractor	0	mm
- Distance behind rear axle or forward from frontaxle	475	mm
- Direction of rotation (viewed facing driving end).....	clockwise	

Power take-off proportional to ground speed (not adjustable to 540-1000 rev/min)

- location at rear of tractor, in tractor's median plane, engaged or disengaged by hand level at the left hand side of the seat.
- Number of shafts: 1;
- Travelling distance for one revolution of power take-off shaft: 205 mm;
- Number of power take-off shaft revolutions for one revolution of rear driving wheels: 25.08;
- Direction of rotation with forward gear engaged (viewed facing driving end): clockwise.

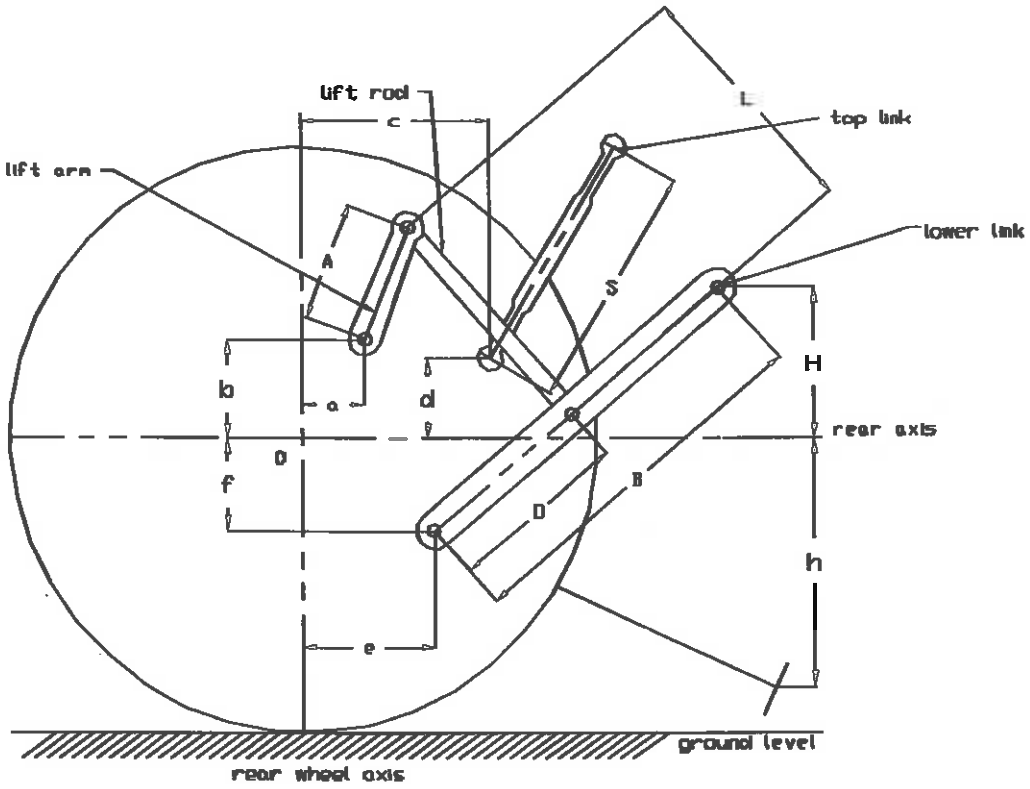
POWER LIFT

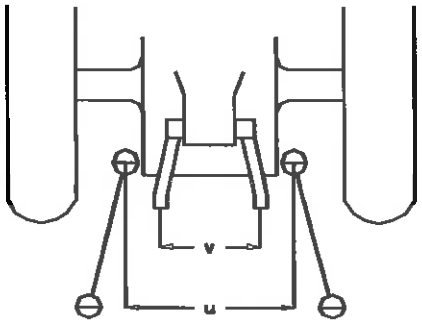
- Make: S+L+H;
- Model: 524.59-electronic control;
- Type: load sensing;
- Type of hydraulic system: open centre system;
- Type and number of cylinders: 1 internal single acting, and 2 external single acting;
- Type of lock for transport: mechanical, with screwed tie rods that lock the lower links;
- 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 HY/ZFS 11/22.5 R206V;
- 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: 97 dm^3;
- Site of oil reservoir: gear box;
- Position, type and No. of additional oil plugs: 6 ways distributor at rear of tractor;
- Maximum volume of oil available to external cylinders: 15 dm^3;

- Recommended oil: see page 20.

Three-point linkage

- Category: 2 in conformity with ISO 730/1 - 1977;
- Category adapter: none .


lift rod
c
L
top link
lift arm
lower link
A
S
H
b
a
d
rear axis
D
f
B
h
e
ground level
rear wheel axis


v
u

POWER LIFT

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 :horizontally	(a) 135	135
pivot point from rear :vertically	(b) 402	402
wheel axis (behind)		
Horizontal distance between the 2 lower link points	(u) 550	550
Horizontal distance between the 2 lift arm end points	(v) 580	580
Length of upper link	(S) from 500 to 770	729
Distance of upper link :horizontally	(c) 335	335
pivot point from rear :vertically	(d) 217-282-347	282
wheel axis		
Distance of lower link :horizontally	(e) 220	220
pivot point from rear :vertically	(f) 230	230
wheel axis		
Distance of lower link pivot point to lift rod pivot points on lower links	(D) 430-470	430
Length of lift rods	(L) from 730 to 870	825
Height of lower hitch points relative to the rear wheel axis		
- in Low position	(h) from 406 to 723	620
- in High position	(H) from 29 to 272	112
- Height above ground of lower hitch points when locked in transport position (*)		932

(*) *Assuming the dynamic radius index = 820 mm (ISO 4251/1- 1984)*

SWINGING DRAWBAR

Optional, not fitted on tractor tested;
- Type: 97313;
- Height above ground (tyre size: 18.4R38): max 530 mm
  min 455 mm;
- Type of adjustment: reversible;
- Distance of hitch point from rear wheel axis;
  .horizontally: 815 mm;
- Distance of hitch point from power take-off shaft end;
  .vertically: 290 - 365 mm below;
  .horizontally: 485 mm behind;
- Lateral adjustment (centre of clevis);
  .right hand: 270 mm;
  .left hand: 270 mm;
- Distance of pivot point from rear wheel axis;
  .horizontally: 485 mm forward;
- Diameter of drawbar pin hole: 33 mm;
- Maximum vertical permissible load: not specified.

HOLED DRAWBAR

- Number of holes: 7;
- Distance between holes: 100 mm;
- Hole diameter: 28.5 mm;
- Thickness/width of the drawbar:30-80 mm;
- Height above ground,(tyre size: 18.4/38) min 260 mm;
  max 1020 mm;
- Horizontal distance behind power take-off shaft end: 590 mm;
- Diameter of the pinhole: 28 mm.

TRAILER HITCH

- Type: SAME DGM-GA 1189/C;
- Hole diameter: 28 mm;
- Height above ground: 520 min. 770 max. mm;
- Distance of hitch point from rear wheel axis, horizontally: 560 mm;
- Distance of hitch point from power take-off shaft end;
  .vertically : 310 mm below, 60 mm above;
  .horizontally : 110 mm;
- Maximum vertical permissible load: 14.7 kN.

STEERING

- Specification: hydrostatic steering with BOSCH hydraulic gear pump HY/ZFS 11/11 L201, two double acting rams acting directly on front axle.
- Make: DANFOSS;
- Model: ORBITROL OSPC 160 OR;
- Type: hydrostatic;
- Working pressure: 15 MPa;
- Oil capacity: 97 dm^3;
- Oil change period: 1200 hrs;
- Filter change period: 2400 hrs or when the warning lamp is lighted;
- Recommended oil: see page 20.

BRAKES

Service brake

- Make: S+L+H;
- Model: 524.54;
- Type: oil bath disc, total 6 discs, 4 at front (2 for wheel) and 2 at rear (1 for wheel), all mounted before the final drive. front disc dia = 224 mm , rear disc dia = 280 mm, FRENDO HDT 303 lining material;
- Method of operation: hydraulically actuated with 2 pedals;
- Trailer braking take-off: none.

Parking brake

- Type: fully independent of service brake, 4 oil bath disc mounted on the pinion shaft in the gear box, ISOBOND SINTERIX lining material;
- Method of operation: mechanical by hand lever.

Steering brake : divided pedal of service brake, for normal use locked together.

STEERING WHEELS

- Number: 2 ;
- Location : at front ;
- Track widths: 1800 min. - 2000 max. mm;
- Adjustment: changing the position of the rims with respect to the disc.

DRIVING WHEELS

- Number: 4 ;
- Location: 2 at front and 2 at rear;
- Rear track widths: 1750 min. 2250 max. mm;
- Adjustment: changing the position of the rims in respect to the disc.

WHEELBASE: 2750 mm.

PROTECTIVE STRUCTURE

Specifications

- OECD approval number: CSD 1261/12;
- date of approval: 21.02.1990;
- location and country of test of protective structure: I.I.A. Università degli studi di Milano - ITALY;
- the reference mass and wheelbase used for calculating impact energies and crushing forces were: 5250 kg 2750 mm;
- Make: S+L+H;
- Model: C 32;
- Type: cab, not tiltable;
- Manufacturer's name: S+L+H S.p.A.
  . address: V.le F. Cassani 15 - 24047 Treviglio (BG) - ITALY;
- Protective device: cab.

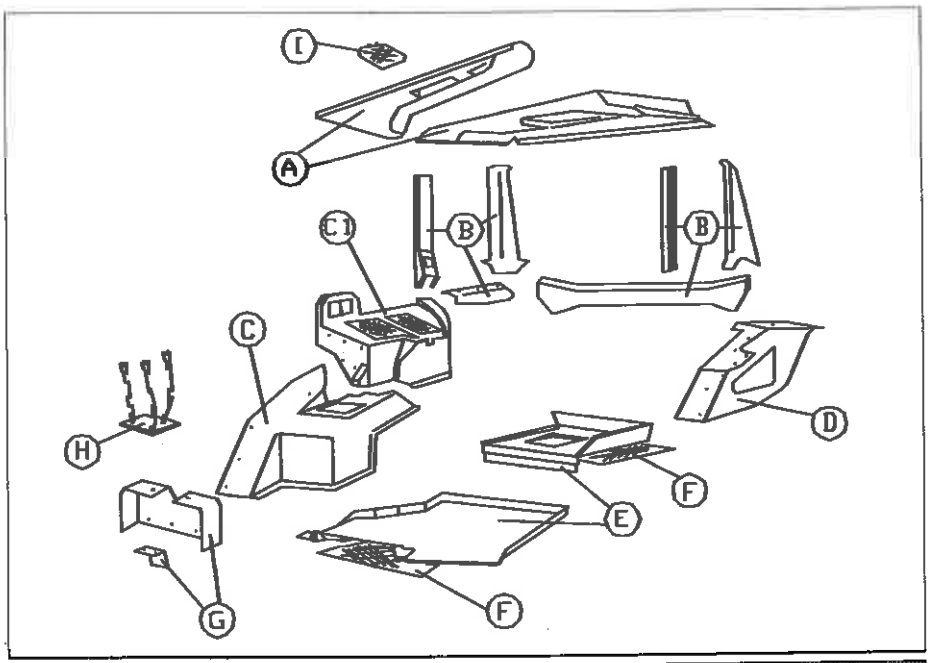
Materials used in the construction and dimensions

- Interior padding: see the next table;
- Glass: security glass, tickness 5 and 6 mm;
  doors: 43 R - 000589;
  windscreen: 43 R - 000589;
  windows: 43 R - 000589;
- Windscreen wipers: OSLV, parallelogram type;
- Direction indicators: COBO E3;
- Heaters and ventilators: BORLETTI;
- Draught proofing: rubber GMTA 20 - 70 P, SP 550 and PEC 75.

DRIVER'S SEAT

- Make: SABLE';
- Model: VF 100 ERG;
- Type: upholstered seat with back rest ;
- Type of suspension: adjustable spring ;
- Type of damping: shock absorber ;
- Range of adjustment, longitudinal 150 mm; vertical ... 60 mm.

PASSENGER'S SEAT : none.



A) Porous 50-60 g/m ,Thickness 15-20 mm. + Tassel AD 1200-1400 g/m. thickness 6 mm. + textil fiber + T.N.T.

B) Pur low density (250300 kg/m .) coated with expanded laminated PVC

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

C1) Polypropylene thickness 3mm - internal covered with polyurethan foam thickness 30 mm.

D) Tassel AD 1400-1600 g/m + PVC thickness 12 + 22

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

F) Bitumen, thickness 5 mm. + polyrethan foam thickness 20 mm. + thermoplastic film

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

H) Polyrethan foam thickness 30 mm + bitumen shet

I) Polyrethan foam thickness 30 mm.

LIGHTING

Lighting system in accordance with E.E.C. 78/933

	Height above ground of centre with tyre (*) (mm)	Size (mm)	Distance from out side edge of tractor to centre at 1840 mm trak width mm
Headligths	1310	170*110	1020
Front park. lights	1810	110*35	350
Front finger post	1845	110*35	350
Rear park. lights	1835	115*70	390
Rear finger post	1810	75*105	290
Stop	1810	75*105	485
Reflectors	1785	110*35	390

(*) Tyre size: 14.9R30 front - 18.4R38 rear.

TEST CONDITIONS

Overall dimensions with tyres 14.9R30 front and 18.4R38 rear

	Length (mm)	Width (mm) min	Width (mm) max	Height (mm) at top of exaust sil.	Height (mm) at top of protec. struc.
Without ballast	4560	2250	2500	2870	2840
With ballast	4925	2250	2500	2870	2840

- Ground clearance (unballasted tractor): 490 mm;
- Clearance-limiting part: front axle.

Tractor mass (with tanks full, with cab, water in tyres none)

	Units	Front	Rear	Total
Without driver				
Without ballast	kg	2000	2855	4855
With ballast	kg	2360	3115	5475
With driver				
Without ballast	kg	2025	2905	4930
With ballast	kg	2385	3165	5550

Ballast

	no. of weights	total weight (kg)	water (kg)
front	8	320	-
rear	3 + 3	300	-
additional	-	-	-

Tyres and track width specifications

	front	rear
- Tyres		
. dimensions	14.9R30	18.4R38
. ply rating	129A8	146A8
. type	radial	radial
. maximum load (tyre manufacturer's) ..... daN	1815	2943
. maximum load (tractor manufact.) ..... daN	1373	2305
. inflation pressure (tyre manufact.) ..... kPa	160	160
. dynamic radius index ..... mm	665	820
- Chosen track width ..... mm	1800	1840
- Tyres on request	16.9/24	18.4/34
	420.70R24	480.70/34

Oils, lubrication and fuel - Capacity and change interval

	capacity dm^3	oil change h	filter change h
Engine	15	150	300
Gear box	97	1200	2400 (*)
Front axle	13	1200	-
Final drives (front)	5	1200	-
Rear axle and final drives ...	in common with gear box		
Hydraulic system	"		"
Other (steering, etc.)	"		"

(*) Or when the warning lamp is lighted

Fuel and lubricants reccomended and used in tests
all in accordance with API NORM.

Fuel

- Type: AGIP DIESEL, DIN 51601 (in accordance with the national standard)
- Specific gravity at 15 C: 0.832 g/cm^3.

Engine oil

- Type: AGIP DIESEL SIGMA S SAE 30;
- Viscosity: 12.50 cSt;
- Classification: API SE - CD .

Transmission oil

	front axle and final drive	rear axle, final drive and gear box
-Type	AGIP ROTRA THT	AGIP ROTRA THT
-Viscosity	11.50 cSt	11.50 cSt
-Viscosity index	95	95
-Classification	API GL 4	API GL 4

Hydraulic fluid

- Type: AGIP ROTRA THT;
- Viscosity: 11.50 cSt;
- Classification: API GL 4.

Steering oil

- Type: AGIP ROTRA THT;
- Viscosity: 11.50 cSt;
- Classification: API GL 4.

Grease

- Type: GREASE 30;
- Number of lubrication points: 10.

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

II - TEST RESULTS

COMPULSORY TESTS RESULTS

(1) **MAIN POWER TAKE-OFF PERFORMANCE**

- Date and location of test: 11.06.1991 - I.S.M.A. TREVIGLIO (BG) ITALY
- Type of dynamometer: ZOELLNER 350 AC

Power	Speed		Fuel consumption			Specific Energy
	Engine	P.T.O.	Hourly		Specific	
kW	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
MAXIMUM POWER - 2 HOUR TEST						
76.9	2503	1034	22.85	19.01	247	3.36
POWER AT RATED ENGINE SPEED						
76.9	2503	1034	22.85	19.01	247	3.36
STANDARD POWER TAKE-OFF SPEED (1000 +/- 25 rev/min)						
75.8	2422	1000	22.23	18.49	244	3.41
PART LOADS						
i) The torque corresponding to maximum power at rated engine speed						
76.9	2503	1034	22.85	19.01	247	3.36
ii) 86% of torque obtained in i)						
67.0	2571	1062	20.16	16.77	250	3.32
iii) 75% of torque defined in ii)						
51.3	2630	1086	16.44	13.68	266	3.12
iv) 50% of torque defined in ii)						
34.5	2658	1098	12.88	10.72	310	2.68
v) 25% of torque defined in ii)						
17.6	2693	1112	9.75	8.11	462	1.80
vi) unloaded						
0	2722	1124	6.75	5.62	-	-

PART LOADS AT STANDARD POWER TAKE-OFF SPEED (1000 rev/min)

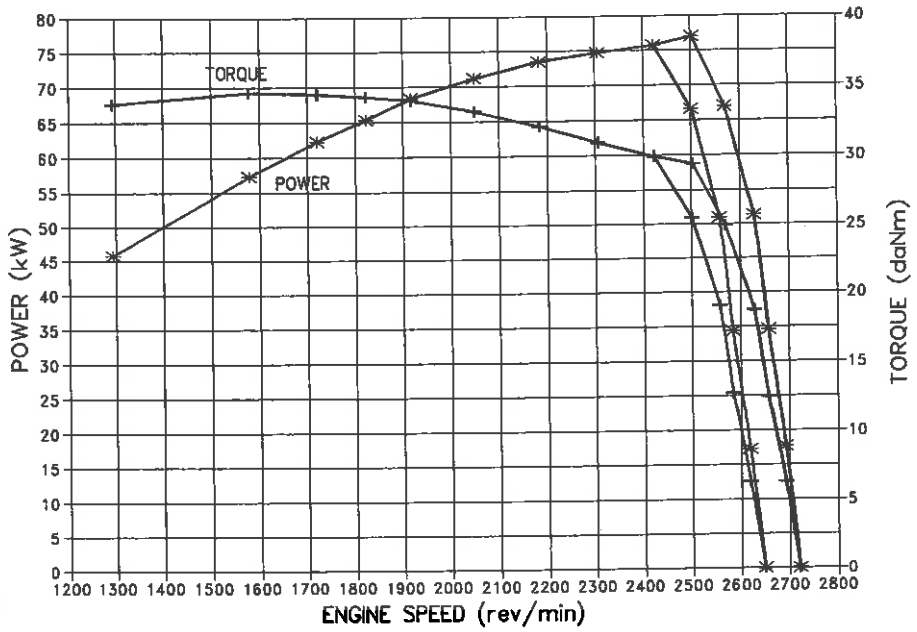
Power	Speed		Fuel consumption			Specific Energy
	Engine	P.T.O.	Hourly		Specific	
kW	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
i) The torque corresponding to maximum power available						
75.8	2422	1000	22.23	18.49	244	3.41
ii) 85% of torque obtained at maximum power						
66.6	2501	1033	19.41	16.15	243	3.43
iii) 75% of torque defined in ii)						
50.9	2557	1056	15.96	13.28	261	3.19
iv) 50% of torque defined in ii)						
34.2	2584	1067	12.46	10.37	303	2.75
v) 25% of torque defined in ii)						
17.2	2620	1082	9.09	7.56	439	1.89
iv) unloaded						
0	2649	1094	5.87	4.88	-	-

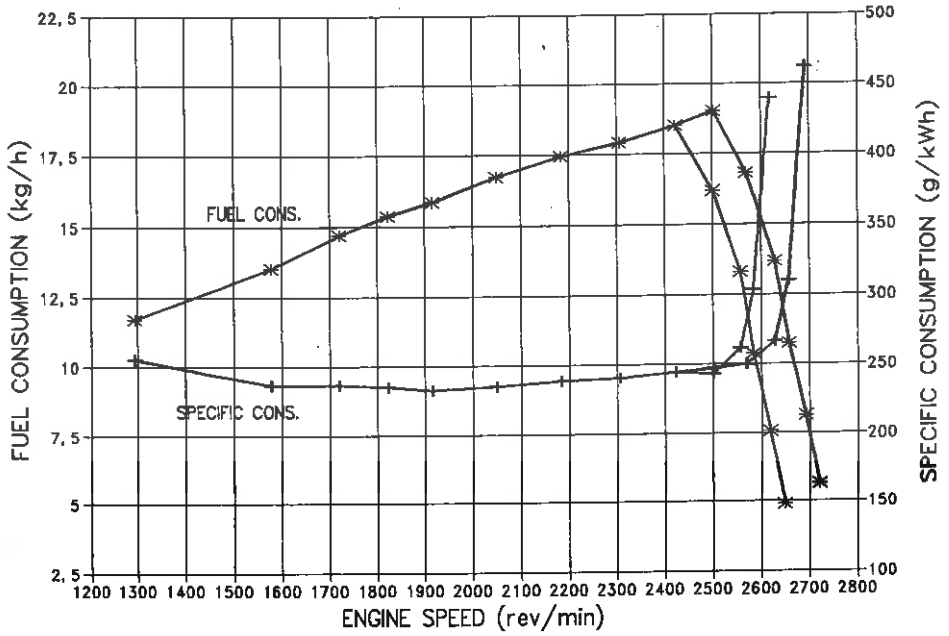
STANDARD SPECIFIC FUEL CONSUMPTION: 250/310/243/303 g/kWh

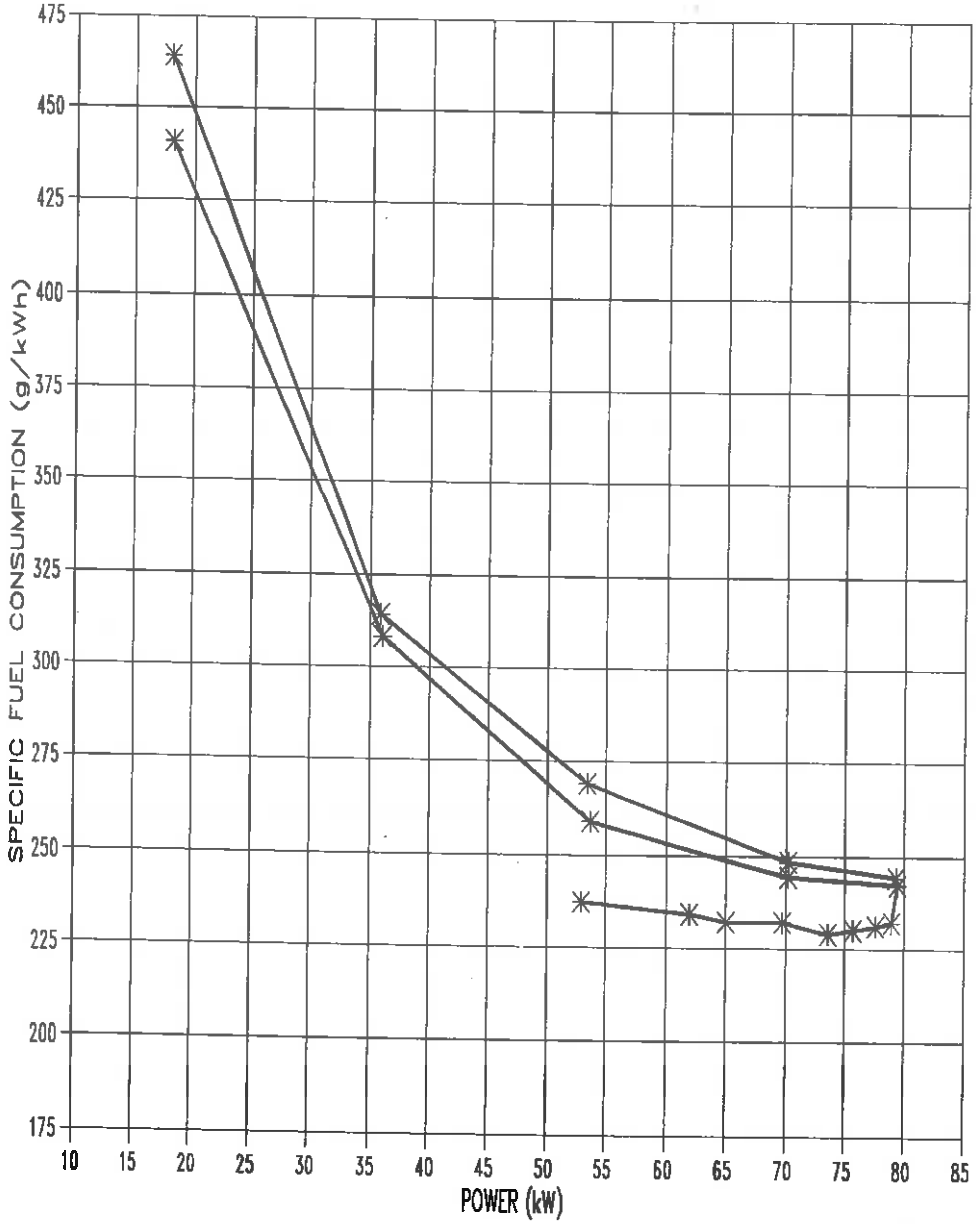
- No load maximum engine speed: 2722 rev/min
- Torque (1) at maximum power at rated engine speed: 29.35 daNm
- Maximum torque (1) (engine speed: 1577 rev/min) 34.66 daNm
- Mean atmospheric conditions:
  - Temperature ..... 28 °C
  - Pressure ..... 99.0 kPa
  - Relat. humidity ..... 68 %
- Maximum temperatures:
  - Coolant ..... 115 °C
  - Engine oil ..... 130 °C
  - Fuel ..... 33 °C
  - Engine air intake ..... 34 °C

(1) *The torque is the equivalent crankshaft torque.*

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SPECIFIC FUEL CONSUMPTION (g/kWh)
475
450
425
400
375
350
325
300
275
250
225
200
175
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
POWER (kW)

2) POWER LIFT AND HYDRAULIC POWER TEST

- Date and location of tests: 17.06.91 - ISMA Treviglio (BG)

		at hitch point	on the frame
Height of lower hitch point above ground in down position	mm	200	200
vertical movement	mm	732	714
Maximum corrected force exerted through full range	daN	4118	4644
Corresponding pressure of hydraulic fluid	MPa	18.5	18.5
Moment about rear axle	daNm	4365	7755
Maximum tilt angle of mast over range of lift	degrees	–	1°

Lifting heights relative to the horizontal lower links mm	-390	-300	-200	-100	0	100	200	300	342	353
Lifting forces at hitch points daN	4118	4189	4542	4836	5091	5277	5508	5719	5740	–
Lifting forces at test frame daN	4644	4689	4905	5082	5160	5261	5327	5334	–	5258

2.1) HYDRAULIC POWER TEST

Sustained pressure with relief valve open: 18.7 MPa;
Pump delivery rate at min pressure: 61.7 l/min;

Hydraulic power	flow rate kW	l/min	pressure MPa	oil temp. °C
At 90% of the actual relief valve setting	14.14	50.5	16.8	62
Maximum	15.36	49.8	18.5	63

Tapping point used for test : at rear of tractor;
Hydraulic fluid: see page 20.

3) DRAWBAR PERFORMANCE

- Date of test: 19.06 to 20.06.1991
- Type of track: concrete
- Type and size of tyres front: 14.9R30 - 129A8; rear : 18.4R38 -146A8

Height of drawbar above ground: 570 mm (unballasted) - 568 mm (ballasted)
Tyre inflation pressure: unballasted .front: 160 kPa .rear: 160 kPa
ballasted .front: 160 kPa .rear: 160 kPa

3.1) MAXIMUM POWER IN TESTED GEARS (unballasted tractor)

Gear	Power	Draw. pull	Speed	Eng. speed	Slip of wheel	Specific ener. cons.		Temperatures fuel	col.	eng.	Atm. cond. temp.	hum.	press.
	kW	daN	km/h	rev/min	%	kWh/l	g/kWh	°C	°C	°C	°C	%	kPa
1R	2.14	3663	0.21	2702	15	0.270	3084	32	80	96	17	68	100.0
2R	3.10	4013	0.27	2702	15	0.368	2259	32	80	96	17	68	100.0
3R	3.94	4053	0.35	2699	15	0.475	1751	32	81	96	17	68	100.1
4R	5.04	4123	0.44	2695	15	0.591	1409	31	81	96	17	68	100.1
5R	6.30	3909	0.58	2688	15	0.708	1175	32	80	97	17	68	100.1
1S	6.38	3768	0.61	2694	15	0.717	1160	32	80	97	17	67	100.1
6R	7.76	3776	0.74	2685	15	0.817	1018	33	81	97	17	67	100.0
2S	8.78	4003	0.79	2688	15	0.902	923	33	82	97	18	66	100.1
3S	11.15	3936	1.02	2682	15	1.079	771	34	82	98	18	66	100.1
4S	14.62	4049	1.30	2673	15	1.294	643	33	83	98	18	65	100.1
5S	19.13	4052	1.70	2657	15	1.460	570	34	83	98	18	65	100.2
1N	21.14	3677	2.07	2651	15	1.557	535	33	82	99	18	65	100.2
6S	24.12	4021	2.16	2641	15	1.715	485	33	83	99	19	64	100.2
2N	29.65	4044	2.64	2632	15	1.841	452	34	83	100	19	64	100.1
3N	37.66	3977	3.41	2613	15	2.048	406	34	83	100	19	63	100.1
4N	46.88	3917	4.31	2585	15	2.438	341	33	82	100	19	64	100.2
5N	54.67	3579	5.50	2512	15	2.394	348	33	83	102	18	63	100.2
6N	57.49	2844	7.28	2505	12	2.478	336	33	82	102	19	62	100.2
1F	67.21	2430	9.96	2513	5	2.882	289	32	82	103	19	62	100.2
2F	64.63	1805	12.89	2498	4	2.801	297	33	82	103	19	62	100.2

Gear	Power	Draw. pull	Speed	Eng. speed	Slip of wheel	Specific ener.cons.		Temperatures fuel cool.	eng.	Atm. cond. temp.	hum.	pres
	kW	daN	km/h	rev/min	%	kWh/l	g/kWh	°C	°C	°C	%	kPa

3.2) MAXIMUM POWER IN TESTED GEARS (ballasted tractor)

1R	1.82	3275	0.20	2706	15	0.244	3407	33	83	97	19	61	100.1
2R	3.00	4152	0.26	2703	15	0.378	2200	33	83	97	19	61	100.1
3R	3.91	4270	0.33	2700	15	0.486	1714	33	82	98	19	60	100.1
4R	4.36	3648	0.43	2698	15	0.533	1560	33	82	98	20	61	100.0
5R	7.07	4545	0.56	2689	15	0.795	1047	31	83	98	20	61	100.1
1S	7.42	4530	0.59	2688	15	0.753	1105	31	83	99	21	60	100.1
6R	8.98	4490	0.72	2681	15	0.859	969	32	83	99	20	60	100.0
2S	9.32	4418	0.76	2683	15	0.862	966	33	82	100	21	60	99.9
3S	11.97	4354	0.99	2677	15	1.071	777	33	82	101	21	60	99.9
4S	16.10	4601	1.26	2664	15	1.340	621	34	84	101	21	59	99.9
5S	20.63	4531	1.64	2649	15	1.519	548	34	83	102	21	59	99.7
1N	25.14	4527	2.00	2641	15	1.660	501	34	83	102	21	59	99.8
6S	26.60	4583	2.09	2634	15	1.702	489	33	82	103	22	58	99.8
2N	31.79	4454	2.57	2630	15	1.959	425	33	83	103	22	58	99.8
3N	41.53	4532	3.30	2607	15	2.304	361	32	82	102	22	57	99.9
4N	48.20	4142	4.19	2584	15	2.522	330	32	82	102	22	57	100.0
5N	58.42	3677	5.72	2507	9	2.572	324	33	81	103	23	56	99.9
6N	60.75	2864	7.64	2502	5	2.633	316	32	82	104	23	56	99.8
1F	62.05	2315	9.65	2500	5	2.675	311	32	82	104	23	57	99.9
2F	62.13	1760	12.71	2504	3	2.665	312	32	83	103	24	57	99.8
3F	57.61	1251	16.58	2519	3	2.523	330	32	83	103	23	57	99.7

Gear	Power	Draw. pull	Speed	Eng. speed	Slip of wheel	Specific ener.cons.		Temperatures fuel	cool.eng.		Atm. cond temp.	hum.	pres
	kW	daN	km/h	rev/min	%	kWh/l	g/kWh	°C	°C	°C	°C	%	kPa
3.3.1) FIVE HOUR TEST at 75% of pull at maximum power													
5N	45.75	2746	6.00	2593	7	2.424	343	35	86	113	30	63	99.9
3.3.2) FIVE HOUR TEST at pull corresponding to 15% wheelslip with additional ballast 200 kg													
4N	50.56	4119	4.42	2579	(*)	(*)	(*)	32	85	103	27	59	99.7

Oil consumption during ten hours duration of tests 3.3.1 and 3.3.2: 63 g/h.
(*) *Having the test been carried out with additional ballast, these figures are irrelevant.*

4) TURNING AREA AND TURNING CIRCLE

Wheel equipment front: 14.9R30 - 129A8;
rear : 18.4R38 - 146A8.

Track width front: 1800 mm;
rear : 1840 mm.

	With brakes on four wheels right hand (m)	left hand (m)	Without brakes right hand (m)	left hand (m)
radius of turning area	5.12	5.20	5.37	5.30
radius of turning circle	5.00	5.08	5.25	5.18

5) LOCATION OF CENTRE OF GRAVITY

Height above ground ..... 1028 mm
Distance forward from rear wheel axis .... 1130 mm
Distance from tractor's median plane ..... 0 mm

6) BRAKING PERFORMANCE

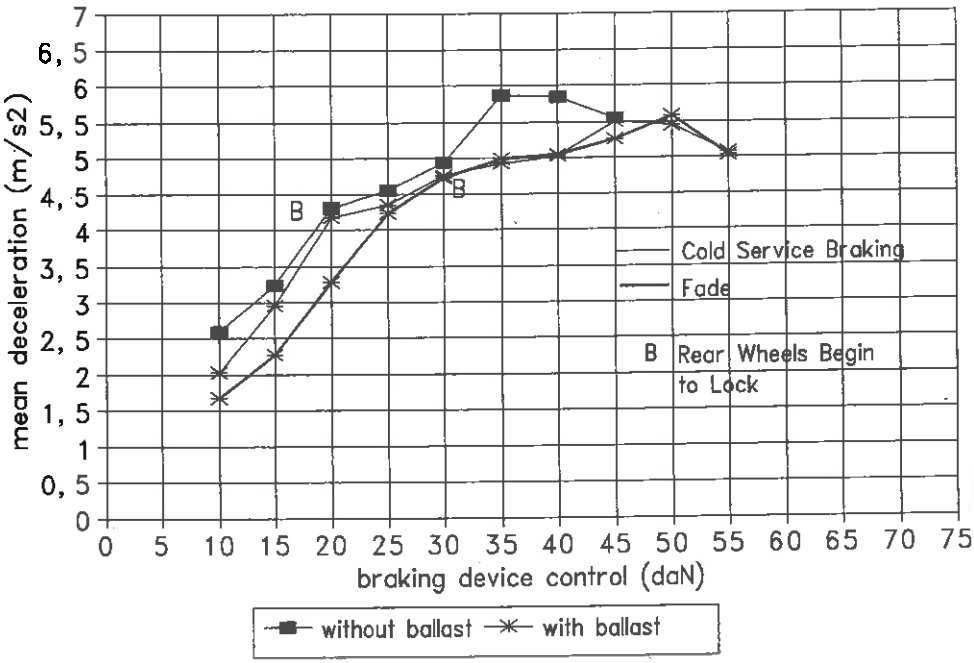
Date of test: 16.07.1991;
Type of track: asphalt;
Type of decelerometer: PEISELER.

Tractor masses during test (*)

	front axle (kg)	rear axle (kg)	total (kg)
without ballast	2025	2915	4940
with ballast	2700	4700	7400

(*) Tractor carrying a driver and the decelerometer (85 kg)

6.1) SERVICE BRAKES (all wheels braked)



Speed before application of brakes (unballasted tractor): 42.1 km/h.
Speed before application of brakes (ballasted tractor): 41.7 km/h.
The tractor brakes were heated by towing of the tractor for 1 km.
Maximum deviation of tractor from its original course: no significant deviation.
Abnormal vibration: none.

6.2) PARKING BRAKING DEVICE TEST

Ballasted tractor on 18% slope

	up	down
Braking device control force daN	10.79	11.30

7) MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of test: 18.07.1991
Type of sound level meter
. make: BRÜEL & KJAER;
. model: 2231;
. type: impulse precision sound level meter;
Type of track: concrete.
Results of test
No. gear used: 6 F ;
Travelling speed before acceleration: 31.8 km/h;
Sound level: 87.4 dB(A).

APPENDIX

MEASUREMENT OF NOISE IN THE PROTECTIVE STRUCTURE

Results of OECD test no. CSD 1261/12/NM 0403
(tractor fitted with 36 forward + 36 reverse speed gear box)

Date of test: 20.06.1990
Location: ISMA - SOP TREVIGLIO (BG) - Via Milano 43 - ITALY
Type of sound level meter
. make: BRÜEL & KJAER;
. model: 2231;
. type: impulse precision sound level meter;
Type of track: concrete.

TABLE FOR NOISE LEVELS AT DRIVER'S EAR POSITION - O.E.C.D. code V

gear	brake-load daN	trav.speed km/h	sound level dB(A) a	b	driving wheels
Unloaded test in the gear giving the speed nearest to 7.5 km/h					
6N lo	0	8.1	77.6	87.7	4
Unloaded test in the gear giving the maximum speed					
6F hi	0	42.4	77.5	88.4	4
Loaded test with nominal travelling speed nearest to 7.5 km/h					
6N lo	2450	7.2	78.0	88.3	4

a - all openings closed;
b - all openings open.

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REPAIRS AND REMARKS: none.

TEST CARRIED OUT BY
(P.a. Giovanni LAMORATTA)

THE DIRECTOR OF TESTING STATION
(Prof. Giuseppe COLZANI)

HEAD OF ISMA - ROMA
(Prof. Alfio CAMMILLI)

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