ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

O.E.C.D. n. 1091
restricted code

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

Report on test of: SAME EXPLORER 80 DT "4WD"



Submitted for test by: SAME TRATTORI S.p.A.
V.le Cassani 15
24047 TREVIGLIO (BG)

Date of approval O.E.C.D.: 21-09-87

Period of test: JAN - JULY 1987

I.S.M.A. - TREVIGLIO
Via Milano, 43

TEST n.031

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TABLE OF CONTENTS

- Specification of tractor 2
- Power take-off performance 16
- Power lift and hydraulic power test 20
- Drawbar performance 21

All stated dimension and tests referred to tyre size 14.9/24 (6plr) at front and 16.9/34 (6plr) at rear, as well as to track whiths 1620 mm at front and 1600 mm at rear.

- Tractor manufacturer's: SAME TRATTORI S.p.A. TREVIGLIO (BG);
- Submitted for test by: the manufacturer;
- Selected by: the manufacturer with the agreement of ISMA;
- Place of running in: TREVIGLIO;
- Duration of running in: 50 hours.

I - SPECIFICATIONS OF TRACTOR

TRACTOR

- Make: SAME;
- Model : 80 DT "4WD";
- Type: Wheeled tractor, unit constr.,all wheels drive tractor;
- Serial no: 10013;
- First serial no.:10001.

ENGINE

- Make: SAME;
- Model: 1000.4 A1;
- Type : Air cooled 4 stroke Diesel engine direct injection;
- Serial n.: 2826.

Cylinders

- Number/disposition: 4 vertical in line;
- Bore/stroke: 105/115.5 mm;
- Capacity: 4000 cc;
- Compression ratio: 17.1/1;
- Arrangement of valves: Overhead;
- Cylinder liners: without liners.

Fuel system

- Fuel feed system: AC corone fuel feed pump;
- Make, type and model of fuel filter: FIAMM FNA 160;
- Capacity of fuel tank: 100 l;

- Make, type and model of injection pump: BOSCH PFR 1K 90 A 472, immersed pump one for cylinder, whitout serial number, in line injection pump.
- Manufacturer's production setting of injection pump:
  . flow rate 55 ± 2 mm3/stroke at rated speed and full load;
  . timing 18 ± 0.5 before TDC;
- Make, type and model of injectors: BOSCH DLLA 150 S 925 multihole injection nozzles;
- Injection pressure: 180 ± 15 bar.

Governor

- Make: SAME;
- Type: mechanical variable speed;
- Model: 086.1652.4;
- Governor range of engine speed from 700 to 2712 rev/min;
- Rated engine speed : 2500 rev/min.

Air Cleaner

- Main filter
  . Make: DONALDSON;
  . Type: Dry paper element filter;
  . Model: 08-11242;
  . Location : front of engine;
- Maintenance indicator : with the warning lamp on the dashboard.

Lubrication system

- Type : forced feed from gear pump;
- Total oil capacity including filter: 9.2 l;
- Oil change period : 125 hrs;
- Type of filter : FIAMM FT 4803 IN;
- Number: 1;
- Filter change period: 300 hrs;
- Oil specifications (see pag.15)

Cooling system

- Type and detail: air cooling with axial blower;
- No. of fan blade : 13 driven from engine shaft;
- Diameter : 280;
- Type of temperature control: none.

Starting system

- Safety device: Preventing engine start in gear;
- Make: BOSCH;
- Model: JF 12 V;
- Type: electromagnetic engagement;
- Power: 3 kW for start motor rating;
- Starting system for low temperatures: thermostarter(opt.).

Electrical equipement

- Voltage: 12 V;
- Generator
  . Make: BOSCH;
  . Type: alternator K1 14V 55 A 20;
  . Power: 770 W - 45 A;
- Battery : 1 lead acid;
  . Capacity: 110 Ah at 20 hours.

Exhaust system

- Make: SAME;
- Type: 4 chambers reflection absorption;
- Model: 255.6610.3;
- Location: on the left hand side of engine cowling, vertical position;
- Height of outlet above ground: 2630 mm.

TRANSMISSION

Clutch: utilized only for travelling of tractor
- Make: SAME;
- Type : single disc dry clutch;
- Model: 445.23;
- Disc diameter: 280 mm;
- Control system: hydraulically operated by pedal self readjusting.

Gear box

- Make: SAME;
- Type: mechanical syncromesh speed change gear with 4 speeds forward, with 3 ranges speed and 1 1 reverse group;
- Model: 445.31;
- No. speeds: 12 forward and 12 reverse;
- Available options: 24 forward and 12 reverse or 16 forward and 16 reverse or 20 forward and 20 reverse.

Rear axle and final drives

- Make: SAME;
- Type: bevel gear differential and epicyclic final drive;
- Model: 445.44;
- Differential lock: yes;
- Type: SAME;
- Model: mechanical;
- Control system: engaged or disengaged with pedal.

Front axle and final drive

- Make: SAME;
- Type: 445.43;
- Model: original SAME system with central shaft bevel gear drive, differential and epicyclic final drive;
- Differential lock: yes;
  - Type: SAME;
  - Model: mechanical;
  - Method of engagement: with pedal;
  - Metod of disengagement: with pedal.

Transmission lubrication

- Oil capacity
  - Gear box, rear axle, final drive,power lift and hydraulic system: in common, total capacity filter including 45 l;
  - Change period: 1200 hrs;
  - Filter change period: when the filter clogging warning lamp is lighted;
  - Front axle and final drive: total capacity 6 l;
  - Changing: 1200 hrs;
- Recommended oil: see pag.15.

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

Total ratios and speeds

Group		Number of engine revolutions for one revolution of the driving wheels	Nominal traveling speed at a rated engine speed of 2500 rev/min
FORWARD			
1		551.75	1.27
2	SLOW	414.71	1.69
3		314.38	2.23
4		236.86	2.96
1		173.24	4.05
2	NORMAL	130.21	5.39
3		98.71	7.11
4		74.37	9.44
1		57.22	12.27
2	FAST	43.01	16.32
3		32.60	21.53
4		24.56	28.58
REVERSE			
1		529.79	1.32
2	SLOW	398.21	1.76
3		301.87	2.32
4		227.47	3.08
1		166.34	4.22
2	NORMAL	125.03	5.61
3		94.78	7.40
4		71.41	9.83
1		54.94	12.78
2	FAST	41.29	17.00
3		31.30	22.42
4		23.58	29.77

- Tyre size 16.9/34 inflaction pressure: 1.3 bar
- Tyre radius index: 745 mm (E.T.R.T.O. norm).

POWER TAKE-OFF

Main power take-off

- Type: independent at rear of tractor, in tractor's median plane, engaged or disengaged through hand lever. Driven by multiplate wet clutch independent of trav clutch; ISO standard 500-1979.

Power take-off proportional to engine speed

540 rev/min

It is possible,through 6 screws, to mount: one take-off shaft end at 6 or at 21 splines. Changing speeds through external hand lever;
- Location:at rear of tractor;
- Diameter of power take-off shaft end: 34.9 mm;
- Number of splines: 6 in conformity with "ISO Standard 500 - 1979";
- Height above ground with tyre size 16.9/34: 745 mm;
- Distance from the median plane of the tractor 0 mm;
- Distance behind rear axle: 380 mm;
- PTO speed: 614 rev/min at rated engine speed;
- Engine speed: 2198 rev/min at standard power take-off speed 540 rpm;
- Ratio of rotation speeds (engine speed/p.t.o. speed): 4.071;
- Max power and torque trasmissible: 95 kW and 144.5 daN;
- Direction of rotation (viewed facing driving end): clockwise.

1000 rev/min

- Location: at rear of tractor;
- Diameter of power take-off shaft end: 34.9 mm;
- Number of splines: 21 in conformity with "ISO Standard 500 - 1979";
- Height above ground with tyre size 16.9/34: 745 mm;
- Distance from the median plane of the tractor 0 mm;
- Distance behind rear axle: 380 mm;
- PTO speed at rated engine speed: 1020 rev/min
- Engine speed 2450 rev/min at standard power take-off speed: 1000 rpm;
- Ratio of rotation speeds (engine speed/p.t.o. speed): 2.450;
- Direction of rotation (viewed facing driving end): clockwise.

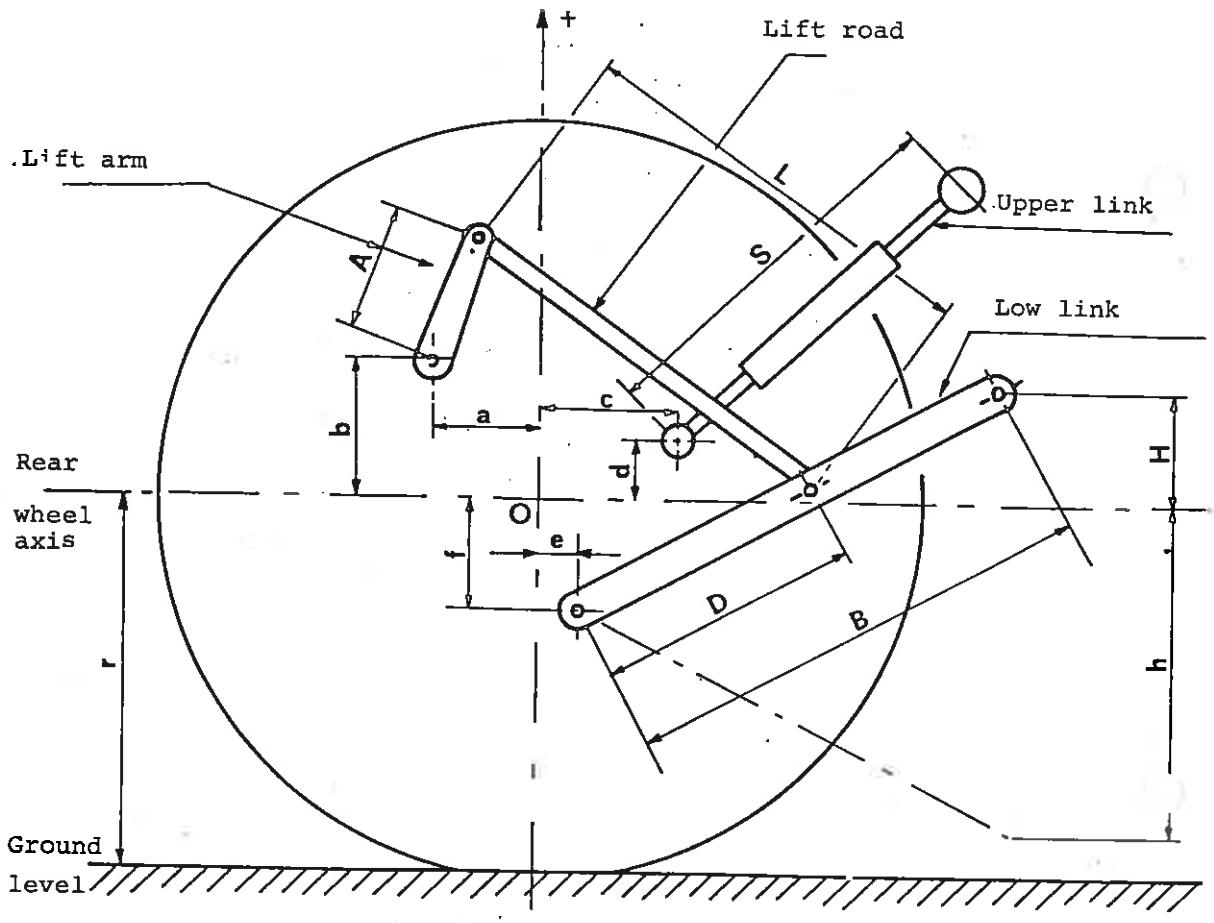
POWER LIFT

- Make: SAME;
- Type: LOAD SENSING open centre system;
- Type and number of cylinders: 1 at simple effect;
- Type of locking for the transport: mechanical, with screwed tie rods that lock the lower links;
- Exercise valve pressure: 153 bar;
- Opening pressure anti-shock valve: 183 bar;
- Lift pump type: hydraulic rotary pump, driven from engine shaft;
- Transmission between pump and engine: mechanical
- Type and number of filters: 1, replaceable paper cartridge;
- Changing: when the filter clogging warning lamp is lighted;
- Oil capacity: 45 l in common with gear box;
- Site of oil reservoir: gear box;
- Position and No.of additional oil plugs: 3 ways distributor at rear of tractor;
- Maximum volume of oil available to external cylinders: 15 l;
- Recommended oil (see pag.15).

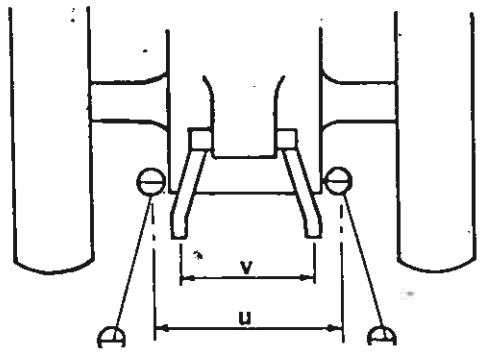
Three-point linkage

- Category: 2 in conformity with ISO 730/I;

SAME EXPLORER 80 DT "4WD" TEST 031 9



Rear weel axis



ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

Specify the settings for the lifting test

Rear tyres (size 16.9/34)	(r)	745 mm
Front tyre (size 14.9/24)	(r')	590 mm
Length of lift arms	(A)	280 mm
Length of lower links	(B)	860 mm
Distance of lift arm :horizontally	(a)	95 mm
pivot point from rear :vertically	(b	400 mm
wheel centre line		
Horizontally distance between the 2 lower link points	(u)	510 mm
Horizontally distance between the 2 lift arm end points	(v)	580 mm
Length of upper link	(S)	from 500 to 770 mm
Distance of upper link horizontally	(c)	355 mm
pivot point from rear vertically	(d)	305 mm
wheel centre line		
Distance of lower link horizontally	(e)	150 mm
pivot point from rear vertically	(f)	220 mm
wheel centre		
Distance of lower link pivot points to lift rod pivot points on lower link	(D)	420 mm
Length of lift rods	(L)	810 mm
Height of lower hitch points:		
- in Low position	(h)	545 mm
- in High position	(H)	195 mm
relative to the rear wheel centre line, situated 745 mm above the ground level		

SWINGING DRAWBAR

- Type: SAME 97320;
- Height above ground (tyre size:16.9/34) max 500 mm
  min 425 mm
- Type of adjustment: reversible;
- Distance of hitch point from rear axle axis, horizontally: 815 mm;
- Distance of hitch point fron power take-off shaft end
  . vertically: 283 - 358 mm below;
  . horizontally: 485 mm behind;
- Laterel adjustement (centre of clevis):
  (right hand) 270 mm;
  (left hand) 270 mm;
- Distance of pivot point from rear axle axis. horizontally: 485 mm forward;
- Diameter drawbar pin hole: 33 mm.

TRAILER HITCH

- Type: SAME;
- Height above ground: 500 - 630 - 760 mm;
- Distance of hitch point from rear axle axis, horizontally: 530 mm;
- Distance of hitch point from power take-off shaft end:
  . vertically: behind 240 - 110 mm above 20 mm;
  . horizontally: 150 mm;
- Maximun vertical permissible load: 1470 daN;M
- Diameter of pinhole: 28.5 mm.

HOLED DRAWBAR

- Number of holes: 7;
- Distance between holes: 100 mm;
- Hole diameter: 28.5 mm;
- Thickeness/width of the drawbar: 30 - 80 mm;
- Height above ground , minimum 270 mm;
  maximum 960 mm;
- Horizontal distance to power take-off shaft end (rear) 560 mm.

STEERING

- Specifications: hydrostatic steering whit BOSCH hydraulic gear pump HY/ZFS 11/11 L 201.
  Two rams at simple effect acting directly on front axle;
- Make: DANFOSS;
- Model: ORBITROLL;
- Type: OSPC 80 OR;
- Working pressure: 120 bar;
- Oil capacity: 45 l in common with gear box;
- Oil change period: 1200 hrs;
- Filter change period: when the filter clogging warning lamp is lighted;
- Recommended oil (see pag.15).

BRAKE

Service brake
- Make: SAME;
- Model: 445.54;
- Type: oil bath disc, total 4 discs, mounted before 2 at front and 2 at rear differential half schafts.Front disc dia=224 mm ; rear disc dia=290 mm
  FRENDO HDT 303 lining material;
- Method of operation: hydraulically acting with 2 pedals.

Parking brake
- Type: fully indipendent by service brake, 3 oil bath discs mounted on the pinion shaft in the gear box
  ISOBOND SINTERIX lining material;
- Method of operation: mechanically by hand lever.
- Trailer braking take-off: none

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

STEERING WHEELS

- Number: 2;
- Location: at front;
- Tyres: radial;
  . Size: 14.9/24;
  . Ply rating: 6;
  . Maximum permissible load on each tyre: 1480.8 daN;
  . Corresponding inflation pressure: 1.4 bar;
- Track widths: 1620-1720-1820 mm;
- Regulation: changing the position of the rims in respect of the disc.

DRIVING WHEELS

- Number: 4;
- Location: 2 at front and 2 at rear;
- Tyres:
  . Size: 16.9/34;
  . Ply rating: 6
  . Type of casing: radial;
  . Maximum permissible load on each tyre: 1976 daN;
  . Corresponding inflation pressure: 1.3 bar;
- Track widths: 1500-1600-1700-1800-1900-2000-2100 mm;
- Regulation: changing the position of the rims in respect of the disc.

WHEELBASE: 2320 mm.

PROTECTIVE STRUCTURE

Specifications

- OECD approval number: CSD 0912/20;
- Trade name: SAME C 30;
- Manifacturer's name: SAME TRATTORI S.p.A.;
- Protective device: cab.

Materials used in the construction and dimensions

See OECD Test Report on Protective Stuctures.

DRIVER'S SEAT

- Make: BOSTROM;
- Type of suspension: 84422 upholstered seat with back rest;
- Type of damping: shock absorber;
- Range of adjustment, longitudinal 150 mm;
  vertical 60 mm.

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

LIGHTING

Lighting system in accordance with CEE 78/933

	Height above ground of centre with tyre mm	Size mm	Distance from out side edge of trac tor to centre at 1600 mm track width mm
Headligths	1055	110*110	820
Front park.lights	1852.5	110*35	315
Front finger post	1887.5	110*35	315
Rear park.lights	1657.5	180*35	440
Rear finger post	1697.5	90*45	395
Stop	1697.5	90*45	485
Reflectors	1465	90*60	445

Tyre size: 14.9/24 6 ply front - 16.9/34 6 ply rear.

TEST CONDITIONS

- Overall dimensions with tyres:
- Front 14.9/24 6 ply - Rear 16.9/34 6 ply

	Length (mm)	Width (mm) min	Width (mm) max	Height (mm) at top of exaust sil.	Height (mm) at top of protec.struc.
Without ballast	4050	2020	2620	2630	2600

Ground clearance

-Clearance-limiting part: 470 mm. below front traction gear

Track setting

- Front: 1620 mm;
- Rear: 1600 mm;

Tractor mass (without driver but with thanks full with cab);

	Units	Front	Rear	Total
Without ballast	kg	1375	1950	3325
With ballast	kg	1575	2150	3725

Fuel and lubricants recommended and used in tests all in accordance with API Norm

Fuel
Type: AGIP Diesel, DIN 51601;
Specific gravity at 15 °C: 0.840 kg/l;

Engine oil
- Type: AGIP DIESEL SIGMA S SAE 30;
- Viscosity: 12.5 cSt;

Transmission oils and rear, front axle and final drive oils;
- Type: AGIP ROTRA THT;
- Viscosity: 11.5 cSt;
- Viscosity index: 95;

Power lift oil
- Type: AGIP ROTRA THT;
- Viscosity: 11.5 cSt;

Steering oil
- Type: AGIP ROTRA THT;
- Viscosity: 11.5 cSt.

Recommended grease: AGIP GREASE 30;
- Number of lubrication points: 11.

II - TEST RESULTS

A. COMPULSORY TESTS RESULTS

1) MAIN POWER TAKE-OFF PERFORMANCE

- Date and location of test: 21 th JAN 1987 - I.S.M.A. TREVIGLIO (BG) ITALY
- Type of dynamometer: ZOELLNER B 350

Power	Speed		Fuel consumption			Specific
	Engine	P.T.O.	Hourly	Specific		Energy
KW	rev/min	rev/min	l/h	Kg/h	g/kWh	KWh/l
MAXIMUM POWER - 2 - HOUR TEST						
54.2	2509	1024	16.77	14.09	259	3.23
POWER AT RATED ENGINE SPEED						
54.2	2509	1024	16.77	14.09	259	3.23
STANDARD POWER TAKE-OFF SPEED (540+/-10 REV/MIN)						
54.2	2450	1001	16.62	13.96	257	3.26
PART LOADS						
i) torque corresponding to maximum power at rated engine speed						
54.2	2509	1024	16.77	14.09	259	3.23
ii) 85% of torque obtained in i)						
48.2	2626	1072	15.83	13.29	275	3.04
iii) 75% of torque definited in ii)						
36.6	2655	1084	12.85	10.79	294	2.84
iv) 50% of torque defined in ii)						
24.5	2675	1092	10.07	8.46	344	2.43
v) 25% of torque defined in ii)						
12.3	2690	1098	7.45	6.26	506	1.65
vi) unloaded						
0	2712	1107	5.89	4.95	0	0

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

SAME EXPLORER 80 DT "4WD" TEST 031

PART LOADS AT STANDARD POWER TAKE-OFF SPEED

Power	Speed		Fuel consumption			Specific
	Engine	P.T.O.	Hourly		Specific	Energy
kW	rev/min	rev/min	l/h	kg/h	g/kWh	kW h/l
i) The torque corresponding to maximum power available						
54.26	2453	1000	16.62	13.96	257	3.26
ii) 85% of torque obtained at maximum power						
48.4	2575	1051	15.3	12.85	265	3.16
iii) 75% of torque defined in ii)						
36.6	2600	1061	12.14	10.2	279	3.01
iv) 50% of torque defined in ii)						
24.6	2625	1071	9.51	7.98	324	2.58
v) 25% of torque defined in ii)						
12.4	2638	1077	6.8	5.7	459	1.82
vi) unload						
-	2650	1082	5.3	4.45	-	-

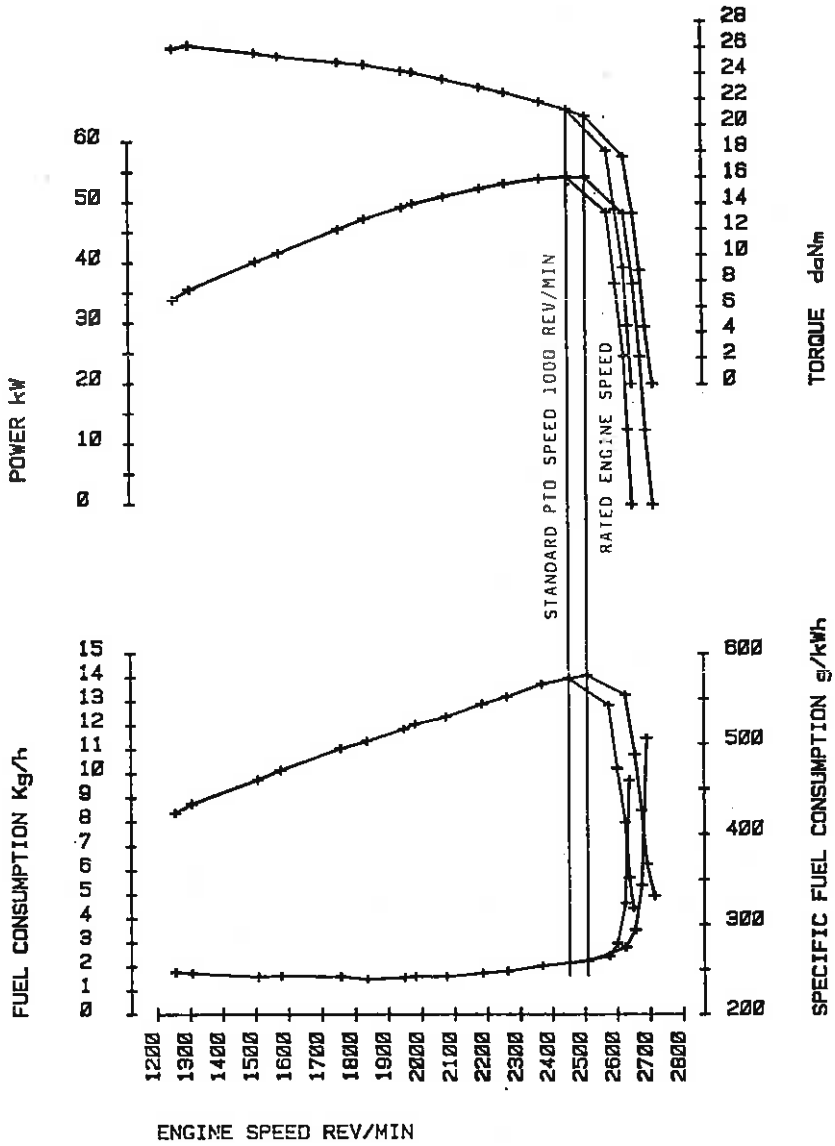
STANDARD SPECIFIC FUEL CONSUMPTION: 275/344/265/324 g/kWh

- No load maximum engine speed: 2712 rev/min
- Torque (1) at maximum power: 20.66 daNm
- Maximum torque (1) (engine speed: 1305 rev/min):26.08 daNm
- Mean atmospheric conditions : Temperature 18°C
  Pressure 975 mbar
  Relat.humidity 80%
- Maximum temperatures : Coolant 90°C
  Engine oil 110°C
  Fuel 40°C
  Engine air intake 20°C

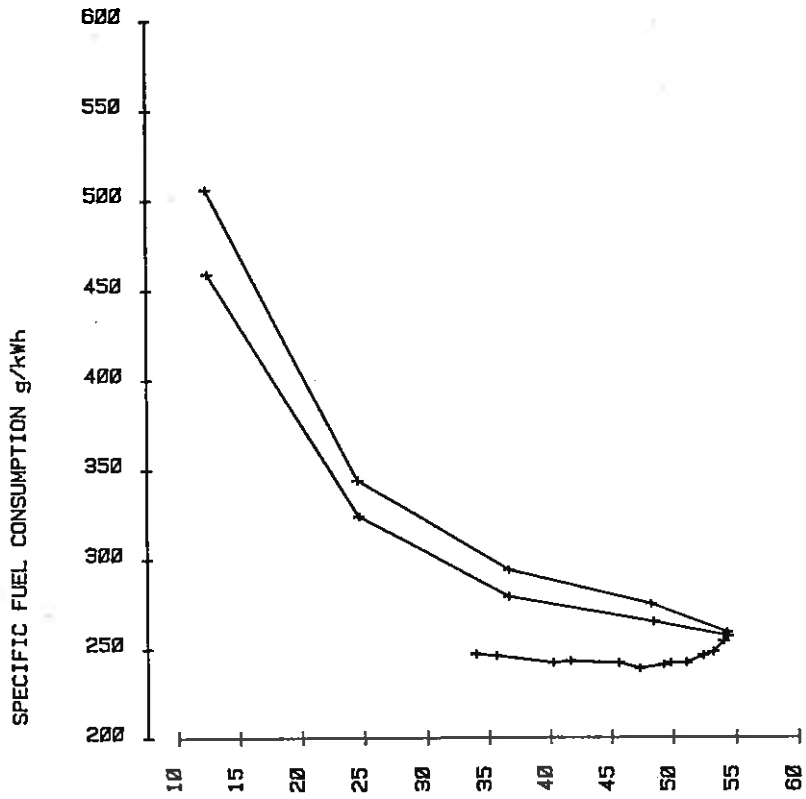
(1) The torque is the equivalent crankshaft torque.

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

p.t.o. PERFORMANCE



p. t. o. PERFORMANCE



p. t. o. POWER kW

(2) POWER LIFT AND HYDRAULIC POWER TEST

Hydraulic fluid: AGIP ROTRA THT, 11.5 cst, viscosity index 95
temperature at beginning test: 65 C°

- Date and location of tests: 10 th mar 1987 - 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	740	770
Maximum corrected force exerted through full range	daN	2118	1864
Corresponding pressure of hydraulic fluid	bar	171.5	171.5
Moment about rear axle	daNm	2240	3019
Maximum tilt angle of mast over range of lift	Degrees	--	-3

Lifting heights relative to the horizontal lower links

mm	-325	-300	-200	-100	0	100	200	300	415	445
Lifting forces at hitch points										
daN	2118	2256	2354	2570	2658	2737	2815	2894	2168	---
Lifting forces at test frame										
daN	1942	1950	2010	2110	2180	2180	2160	2150	----	1864

HYDRAULIC POWER TEST

Sustained pressure with relief valve open: 188.2 bar;
Pump delivery rate at min pressure: 35.8 l/min;

Hydraulic power	kW	flow rate l/min	pressure bar	oil temp. °C
At 90% of the actual reliev valve setting	11.58	40.5	171.5	65
Maximum	11.58	40.5	171.5	65

Tapping point used for test : at rear of tractor
Hydraulic fluid: see pag.15.

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

(3) MAXIMUM POWER TRANSMISSION AND FUEL CONSUMPTION AT THE DRAWBAR
(UNBALLASTED TRACTOR)

- Date of tests: 7/5/1987
- Type of track: concrete
- Type and size of tyres front: 14.9/24 6 plr
  rear : 16.9/34 6 plr

Height drawbar above ground : 450 mm
Tyre inflation pressure : front 1.4 bar
rear 1.3 bar

1) MAXIMUM DRAWBAR IN TESTED GEARS

Gear	Pow.	Draw. pull	Speed	Engine speed	Slip of wheel	Specific ener.cons.	Temperat. fuel	cool.eng.	temp.	hum.	Atm. condit. pres.
n.	kW	daN	km/h	rev/min	%	kWh/l	g/kWh	°C	°C	°C	°C	%	mbar
1S	9.11	2893	1.13	2680	15.0	1.00	847	15	25	81	13	78	991
2S	12.13	2915	1.50	2668	15.0	1.14	793	15	25	81	13	78	991
3S	15.88	2903	1.97	2655	15.0	1.26	666	16	26	81	13	78	991
4S	20.80	2894	2.59	2635	15.0	1.42	589	16	28	83	14	77	991
1N	27.90	2879	3.50	2605	15.0	1.74	481	16	28	83	14	77	991
2N	36.16	2821	4.60	2570	14.0	2.23	376	16	28	83	14	77	991
3N	46.30	2606	6.40	2500	7.5	2.81	301	16	29	84	14	77	9[illegible]
4N	45.29	1857	8.79	2490	4.0	2.72	307	16	29	84	14	76	9[illegible]

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

Gear	Pow.	Draw. pull	Speed	Engine speed	Slip of wheel	Specific ener.cons.	Temperat. fuel	cool.eng.	Atm.condit. temp.	hum.	pres
.	kW	daN	km/h	rev/min	%	kWh/l g/kWh	°C	°C	°C	°C	%	mbar
TRANSMISSION AND FUEL CONSUMPTIOM CHARACTERISTICS												
i) - Selected gear												
3N	46.3	2606	6.4	2500	7.5	2.81 301	16	28	79	15	76	992
ii) - 75% Of pull at maximum power												
3N	37.5	1972	6.85	2580	4.5	2.33 360	16	28	79	15	76	992
iii) - 50% of pull at maximum power												
3N	25.98	1285	7.12	2611	2	1.65 507	17	28	80	15	76	992
iv) - Highest gear giving the same pull as in ii) ,reduced engine speed												
4N	37.77	1972	6.9	2118	5	2.44 344	17	29	81	15	76	992
v) - Highest gear giving the same pull as in iii), reduced engine speed												
4N	25.72	1285	7.05	2150	3	1.70 494	17	29	82	15	76	992

REMARKS: none

TEST ENGINEER
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THE DIRECTOR OF TESTING STATION
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