ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

O.E.C.D. n. 1080
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 90 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.: 28 - JULY - 87

Period of test: February-May 1987

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

Test n° 028

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TABLE OF CONTENTS

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

All stated dimension and texts referred to tyre size 13.6/28 (8ply) at front and 18.4/34 (8ply) at rear, as well as to track whiths 1620 mm at front and 1700 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 : EXPLORER 90 DT "4WD";
- Type: Wheeled tractor, unit constr.,all wheels drive tractor;
- Serial no.: 10023;
- First serial no.: 10001.

ENGINE

- Make: SAME;
- Model: 1000.4 AT;
- Type : air cooled 4 stroke Diesel engine direct injection turbo surcharged;
- Serial n.: 1034.

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.

Supercharging

- Make: KKK;
- Model: K 26-2664 GA/10/11;
- Type: Turbocharger;
- Supercharging pressure: 0.75 bar.

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 503, immersed pump, one per cylinder whitout serial number, in line injection pump;
- Manufacturer's production setting of injection pump:
  . flow rate 59 ±2 mm 3/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 2695 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;
- Diameter : 280 mm;
- 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: none.

Electrical equipement

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

Exhaust system

- Make: SAME;
- Type: 4 chambers reflection absorption;
- Model: 446.5630.3;
- 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: 446.23;
- 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 reverse group;
- Model: 446.31;
- 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: 446.44;
- Differential lock: yes
- Type: mechanical;
- Model: SAME;
- Control system: engaged or disengaged with pedal.

Front axle and final drive

- Make: SAME;
- Model: original SAME system with central shaft bevel gear drive, differential and epicyclic final drive;
- Type: 446.43;
- Differential lock: yes;
  . Model: SAME;
  . Type: 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

SAME EXPLORER 90 DT "4WD" TEST N.028

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		551.750	1.315
2	SLOW	414.710	1.750
3		314.380	2.308
4		236.860	3.070
1		173.240	4.189
2	NORMAL	130.210	5.573
3		98.710	7.352
4		74.370	9.759
1		57.220	12.683
2	FAST	43.010	16.875
3		32.600	22.260
4		24.560	29.547
	REVERSE		
1		529.790	1.369
2	SLOW	398.210	1.822
3		301.870	2.404
4		227.470	3.190
1		166.790	4.362
2	NORMAL	125.030	5.804
3		94.780	7.656
4		71.410	10.162
1		54.940	13.208
2	FAST	41.290	17.573
3		31.300	23.181
4		23.580	30.768

- Tyre size 18.4/34 inflation pressure: 1.4 bar
- Tyre radius index: 770 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 travel 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 18.4/34: 770 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: 100 kW and 164 daNm;
- 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 18.4/34: 770 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.

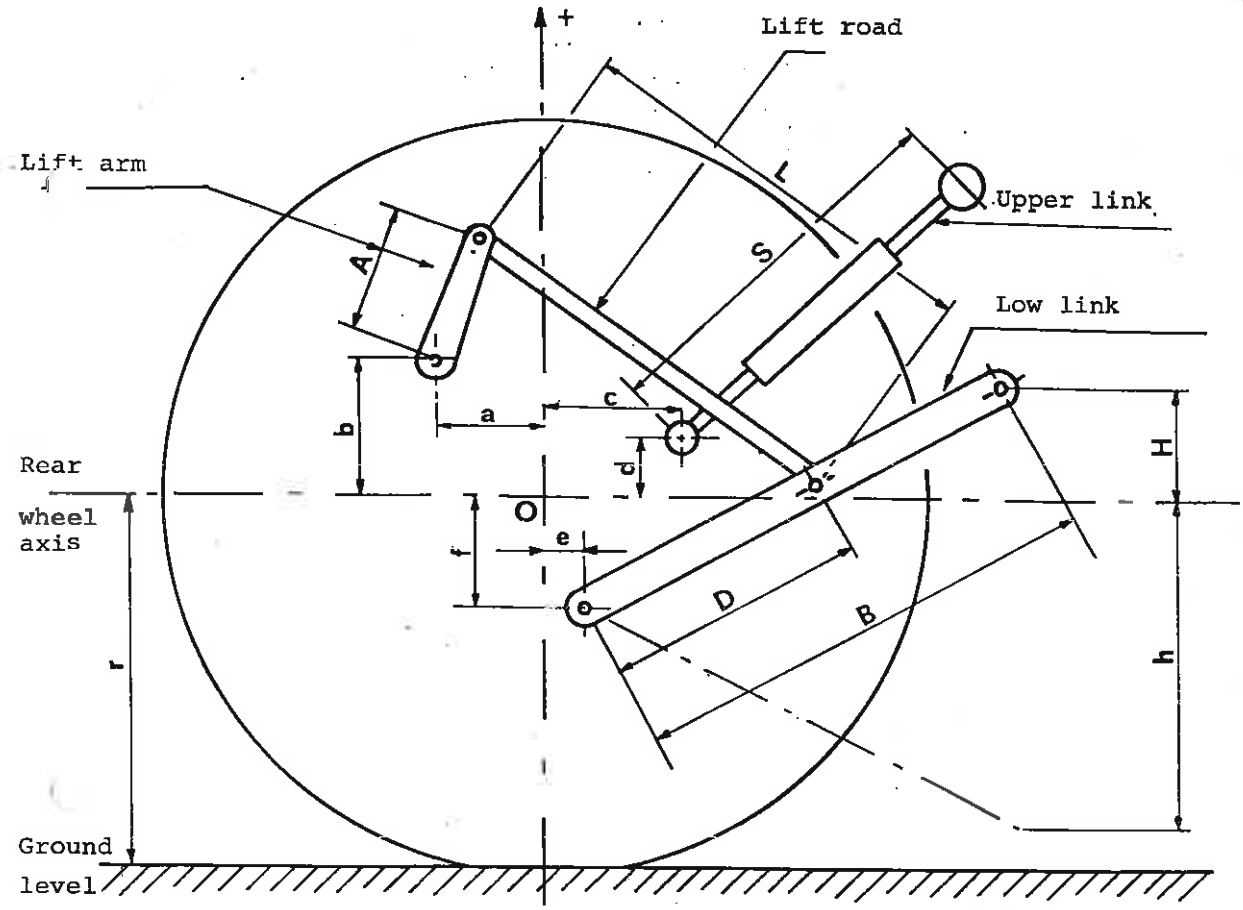
POWER LIFT

- 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 whit 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).

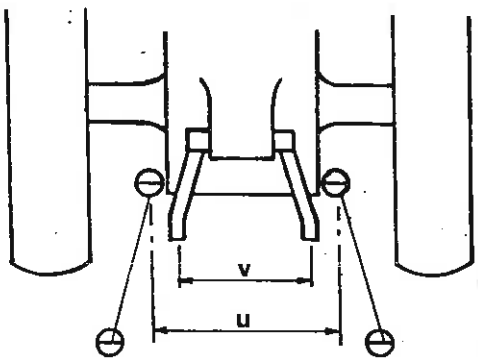
Three-point linkage

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

SAME EXPLORER 90 DT "4WD" TEST N.028 9



Rear weel axis



Specify the settings for the lifting test

Rear tyres (size 18.4/34)	(r)	770 mm
Front tyre (size 13.6/28)	(r')	610 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 relative to the rear wheel centre line, situated 770 mm above the ground level	(H)	195 mm

SWINGING DRAWBAR

- Type: SAME 97320;
- Height above ground (tyre size:18.4/34) max 525 mm
  min 450 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;
- Lateral 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: 525-655-785 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.

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 , minimum 295 mm;
  maximum 985 mm;
- Horizontal distance to power take-off shaft end (rear) 560 mm.
- Diameter of the pinhole: 28 mm;

STEERING

- Specifications: hydrostatic steering whit BOSCH hydraulic gear pump HY/ZFS 11/11 L 201;
- Two rams at double effect acting directly on front axle.

- Make: DANFOSS;
- Model: ORBITROLL;
- Type: OSPC 80 OR;
- Working pressure: 120 bar;
- Oil capacity: 45 l in common whit 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: 446.54;
- 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: hydaulically acting with 2 pedals.
- Trailer braking take-off: none;

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.

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

STEERING WHEELS

- Number: 2;
- Location: at front;
- Tyres: radial;
  - Size: 13.6/28;
  - Ply rating: 8;
  - Maximum permissible load on each tyre: 1613 daN;
  - Corresponding inflation pressure: 2.0 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: 18.4/34;
  . Ply rating: 8;
  . Type of casing: ;
  . Maximum permissible load on each tyre: 2516 daN;
  . Corresponding inflation pressure: 1.4 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: CDS 0912/17;
- Trade name: SAME C 30;
- Manifacturer's name: SAME;
- Protective device: cab.

Materials used in the construction and dimensions

See OECD Test Report on Protective Stuctures.

DRIVER'S SEAT

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

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 1500 (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	99*45	485
Reflectors	1465	90*60	445

Tyre size: 13.6/28 front - 18.4/34 rear.

TEST CONDITIONS

- Overall dimensions with tyres:
- Front 13.6/28 - Rear 18.4/34

	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.

Track setting

- Front: 1620 mm;
- Rear: 1700 mm.

Tractor mass (without driver but with tanks full with cab) Water in tyres none.

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

Fuel and lubricants recommended and used in tests 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: 18 th Feb 1987 - I.S.M.A. TREVIGLIO (BG) ITALY
- Type of dynamometer: ZOELLNER 350 AC

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
MAXIMUM POWER - 2 - HOUR TEST						
60.29	2500	1020	17.92	15.11	251	3.36
POWER AT RATED ENGINE SPEED						
60.29	2500	1020	17.92	15.11	251	3.36
STANDARD POWER TAKE-OFF SPEED (1000+/-25 Rev/min)						
60.20	2450	1000	17.62	14.80	246	3.41
PART LOADS						
i) torque corresponding to maximum power at rated engine speed						
60.29	2500	1020	17.92	15.11	251	3.36
ii) 85% of torque obtained in i)						
53.50	2609	1065	16.90	14.20	265	3.16
iii) 75% of torque defined in ii)						
40.58	2633	1075	13.84	11.63	286	2.93
iv) 50% of torque defined in ii)						
27.20	2650	1082	10.98	9.23	339	2.47
v) 25% of torque defined in ii)						
13.60	2668	1089	8.09	6.80	500	1.68
vi) unloaded						
-	2695	1100	5.42	4.56	-	-

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

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						
60.20	2450	1000	17.62	14.80	246	3.41
ii) 85% of torque obtained at maximum power						
53.50	2562	1046	16.60	13.95	260	3.22
iii) 75% of torque defined in ii)						
40.60	2589	1057	13.58	11.41	281	2.99
iv) 50% of torque defined in ii)						
27.20	2599	1061	10.76	9.04	332	2.53
v) 25% of torque defined in ii)						
13.60	2614	1067	7.83	6.58	484	1.74
vi) unload						
-	2646	1080	5.20	4.40	-	-

STANDARD SPECIFIC FUEL CONSUMPTION: 265/339/260/332 g/kWh

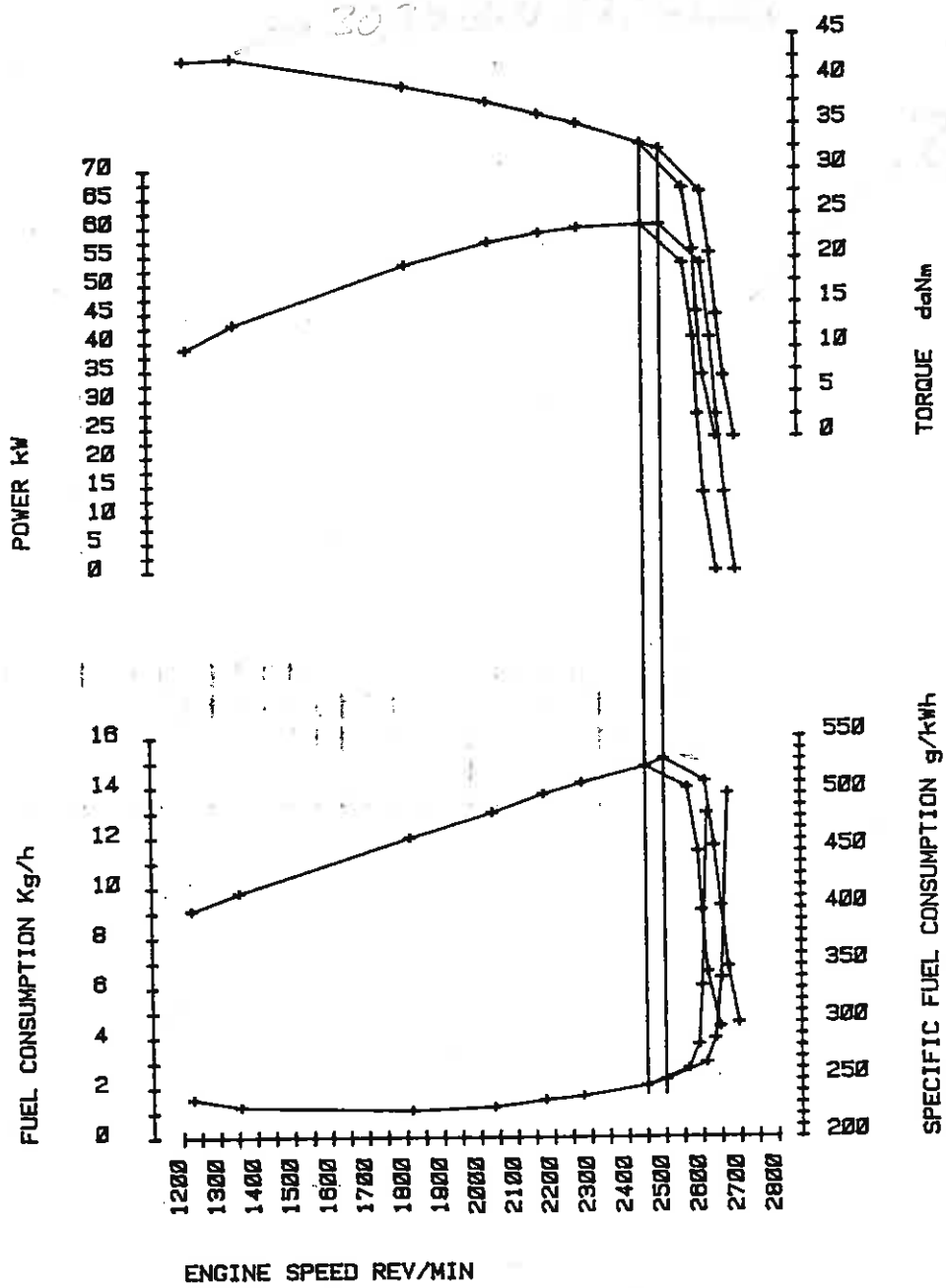
- No load maximum engine speed: 2695 rev/min
- Torque (1) at maximum power: 23.08 daNm
- Maximum torque (1) (engine speed: 1355 rev/min):30.39 daNm
- Mean atmospheric conditions : Temperature 16°C
  Pressure 985 mbar
  Relat.humidity 76 %
- Maximum temperatures : Coolant 105°C
  Engine oil 120°C
  Fuel 22°C
  Engine air intake 18°C.

(1) The torque is the equivalent crankshaft torque.

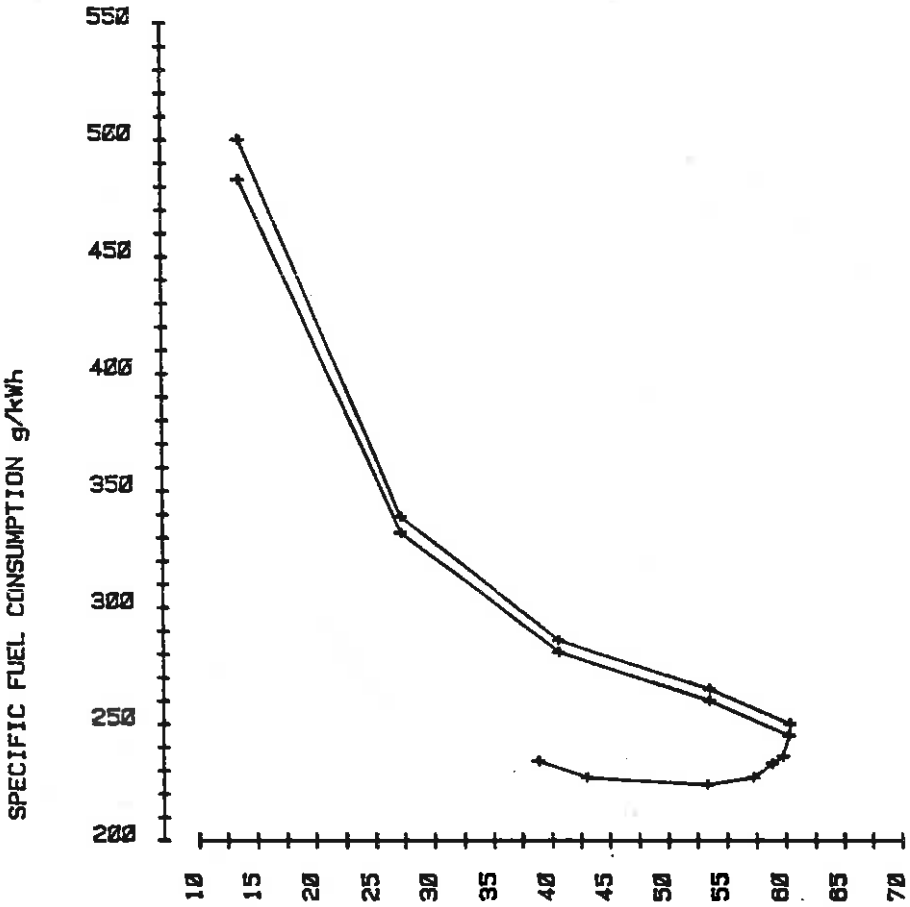
ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

SAME EXPLORER 90 DT "4WD" TEST N.028

p.t.o. PERFORMANCE



p. t. o. PERFORMANCE



SAME EXPLORER 90 DT "4WD" TEST N.028

(2) POWER LIFT AND HYDRAULIC POWER TEST
- Date and location of tests: 19/02/1987 - ISMA Treviglio (BG)

		at hitch point	on the frame
Height of lower hitch point above ground in down position	mm	225	225
Vertical movement	mm	740	780
Maximum corrected force exerted through full range	daN	1760	1750
Corresponding pressure of hydraulic fluid	bar	171.5	171.5
Moment about rear axle	daNm	1777	2835
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

dN	1760	2162	2427	2736	2824	2833	2939	2824	1941	----

Lifting forces at test frame

dN	1544	1941	2162	2295	2250	2286	2330	2206	----	1853

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

Hidraulic power	kW	flow rate l/min	pressure bar	oil temp. °C
At 90% of the actual reliev valve setting	7.14	25	171.5	--
Maximum	7.14	25	171.5	--

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

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

- Date of tests: 05/05/1987
- Type of track: concrete
- Type and size of tyres front: 13.6/28 - 8 ply
  rear : 18.4/34 - 8 ply

Height drawbar above ground : 525 mm
Tyre inflation pressure : front 2.0 bar
rear 1.4 bar

Gear	Power	Draw. pull	Speed	Eng. speed	Slip of wheel	Specific ener.cons.		Temperatures fuel	cool.eng.	temp.	hum.	Atm. cond. pres.
N.	kW	daN	km/h	rev/min	%	kWh/l	g/kWh	°C	°C	°C	°C	%	mbar
1) MAXIMUM DRAWBAR IN TESTED GEARS													
3 S	17.10	3080	2.00	2660	15.0	1.57	555	23	50	90	10	74	985
4 S	22.80	3166	2.60	2651	15.0	1.73	485	23	50	90	10	74	985
1 N	32.00	3118	3.70	2633	14.0	2.14	391	23	50	91	10	74	985
2 N	41.70	3133	4.80	2614	15.0	2.40	349	23	50	92	11	74	985
3 N	51.10	2668	6.90	2521	5.0	2.85	294	23	50	92	11	74	985
4 N	50.90	1954	9.40	2521	2.0	2.84	295	23	50	92	11	74	985

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

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

TRANSMISSION AND FUEL CONSUMPTIOM CHARACTERISTICS

i) - Selected gear													
3 N	51.10	2668	6.90	2521	5.0	2.85	294	23	55	92	11	74	985
ii) - 75% Of pull at maximum power													
3 N	41.70	2002	7.50	2638	2.0	2.53	332	24	56	93	12	74	985
iii) - 50% of pull at maximum power													
3 N	27.80	1317	7.60	2651	1.0	2.04	410	24	56	93	12	74	985
iv) - Highest gear giving the same pull as in ii) ,reduced engine speed													
4 N	41.80	1982	7.60	2033	1.5	3.13	267	24	56	93	12	74	985
v) - Highest gear giving the same pull as in iii), reduced engine speed													
4 N	28.50	1317	7.80	2099	1.0	2.81	298	24	56	93	12	74	985

ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

REMARKS: no remarks

TEST ENGINEER
(ing.Giovanni SANTORO)

THE DIRECTOR OF TESTING STATION
(prof.Giuseppe COLZANI)

HEAD OF ISMA - ROMA
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