ISTITUTO SPERIMENTALE PER
LA MECCANIZZAZIONE AGRICOLA
SEZIONE DI TREVIGLIO

Report on test in accordance with the OECD Standard Code II (Restricted Code) for the Official Testing of Agricultural and Forestry Tractor





GOLDONI STAR 75
Type denomination **TZA 44**
OECD No. **1667/1** Restricted Code

JOHN DEERE 2446 F
Type denomination **FH 2446 AF**
OECD No. **1667/3** Restricted Code

GOLDONI STAR 75
Type denomination **TZB 44**
OECD No. **1667/2** Restricted Code

JOHN DEERE 2446 F
Type denomination **FH 2446 BF**
OECD No. **1667/4** Restricted Code

40 km/h four-wheel drive agricultural tractors

Manufactured by:	GOLDONI S.p.A. Via Canale, 3 Migliarina di Carpi MO Italy
Date of OECD approval:	21 May 1997
Period of test:	July - September 1996

ISMA Via Milano 43 24047 Treviglio BG Italy
Tel: (0363) 49603 Fax: (0363) 302007

The GOLDONI STAR 75 models whose test results are presented in this report are technically identical to the JOHN DEERE 2446 F models in all main respects except with regard to model designation and colour.

The GOLDONI STAR 75 TZA 44 and the JOHN DEERE 2446 F FH 2446 AF

differ, respectively, from the

GOLDONI STAR 75 TZB 44 and the JOHN DEERE 2446 F FH 2446 BF

with regard to the rear wheel axis position relative to the rear differential axis, as shown in the following table:

Make	Model	Type denomination	Distance of rear wheel axis from differential axis	
			vertically mm	horizontally mm
GOLDONI	STAR 75	*TZA 44*	*21 lower*	*153 behind*
		TZB 44	39 higher	150 behind
JOHN DEERE	2446 F	*FH 2446 AF*	*21 lower*	*153 behind*
		FH 2446 BF	39 higher	150 behind

All the above differences have no influence on the test results.

All tests were carried out on the GOLDONI STAR 75 TZA 44.

Table of contents

SPECIFICATION OF TRACTOR 7

TEST CONDITIONS 20

TEST RESULTS

1. Main power take-off performance 23
2. Hydraulic power and lifting force 27
3. Drawbar performance 28
4. Repairs and Remarks 29

All stated dimensions and tests refer to tyre size 10.0/75-15.3 at front and 380/70R24 at rear, as well as to track widths 1250 mm at front and 1180 mm at rear.

Tractor manufacturer

- Name:	GOLDONI S.p.A.;
- Address:	Via Canale 3, Migliarina di Carpi MO, Italy;
- Location of tractor assembly:	Migliarina di Carpi MO, Italy;
- Submitted for test by:	the manufacturer;
- Selected by:	the manufacturer with the agreement of ISMA;
- Place of running in:	Migliarina di Carpi MO, Italy;
- Duration of running in:	50 hours,
- Location of test:	ISMA, Via Milano 43, Treviglio BG, Italy.

SPECIFICATION OF TRACTOR

TRACTOR

- Make:	GOLDONI respectively JOHN DEERE;
- Model:	STAR 75 respectively 2446 F, with 16 forward and 8 reverse / 8 forward and 8 reverse speeds 40 km/h;
- Type denomination:	TZA 44 and TZB 44 respectively FH 2446 AF and FH 2446 BF;
- Type:	four-wheel drive, unit construction;
- Number of driving wheels:	4;
- Serial number:	457348;
- First serial number:	457000.

ENGINE

- Make:	JOHN DEERE;
- Model:	3029 TFG 21;
- Type:	water cooled 4-stroke diesel, direct injection, turbo charged;
- Serial number:	CD3029T223247.

Cylinders

- Number and disposition:	3, vertical, in-line;
- Bore x stroke:	106.5 x 110 mm;
- Capacity:	2940 cm^3;
- Compression ratio:	17.8:1;
- Arrangement of valves:	overhead;
- Cylinder liners:	wet liners.

Supercharging

	Fitted on test tractor	Optional	
Make	GARRETT	SCHWITZER	SCHWITZER
Model	RE 53845	RE 67501	RE 67706
Type	exhaust driven superchager		
Pressure	55.8 kPa		

Fuel system

- Fuel feed system: mechanical SOFABEX;
- Make, model and type of fuel filter: STANADYNE final fuel filter (FFF);
- Capacity of fuel tank: 40 dm^3;
- Make, model and type of injection pump: LUCAS 1213, RE 66496, rotative;
  . serial number: 37927AOG;
- Manufacturer's production setting of injection pump:
  . flow rate: 64 ± 2 mm^3/stroke at rated speed and full load corresponding 13.24 dm^3/h;
  . timing: 15° before TDC;
- Make, model and type of injectors: STANADYNE, 28485 or 28484, multihole injection nozzles;
- Injection pressure: 24.5 ± 0.5 MPa.

Governor

- Make: LUCAS;
- Type: centrifugal variable speed governor;
- Governor range of engine speed: from 850 to 2530 rev/min;
- Rated engine speed: 2300 rev/min.

Air cleaner

- Pre-cleaner none.
- Main filter
  . make, model: VIRGIS, FC 08 or GOLDONI, 26245 or SOFILTRA, 5708;
  . 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:	paper full flow;
- Oil specifications:	see page 22.

Cooling system

- Type and detail:	water cooling with impeller pump;
- Specification of fan:	propeller fan driven by engine shaft;
- Number of fan blades:	8;
- Fan diameter:	360 mm;
- Type of temperature control:	thermostat.

Starting system

- Make:	ISKRA;
- Model:	12 V;
- Type:	electromagnetic engagement;
- Starter motor power rating:	3.1 kW;
- Safety device:	electrical lockout on clutch;
- Starting system for low temperatures:	none.

Electrical equipment

- Voltage:	12 V;
- Generator	
. make:	MAGNETON;
. model:	55 A;
. type:	alternator;
. power:	55 A;
- Battery:	1lead acid;
. capacity:	100 Ah at 20 hours rating.

Exhaust system

- Make:	GOLDONI;
- Model:	G 18105, DGM-SA 1378;
- Type:	reflection absorption chamber;
- Location:	on the left hand side of engine, horizontal position;
- Height of outlet above ground:	365 mm.

TRANSMISSION

Clutch (utilized only for travelling of tractor)

- Make:	LUK;
- Model:	11";
- Type:	double disk dry clutch;
- Number of plates:	1;
- Plates diameter:	250 mm;
- Control system:	mechanical, operated by pedal.

Gear box

- Gear box	
. make:	GOLDONI;
. model:	STAR;
. type:	mechanical synchronized speed change gear; hand lever selects two speed/range combinations;
. arrangement and number of gears:	4 speeds combined with 2 forward (Normal/Fast) and 1 reverse group and with 1 reduction gear (High/Low); total of 16 forward and 8 reverse, combination selected during the test or 4 speeds combined with 2 forward (Normal/Fast) and 1 reverse group; total of 8 forward and 8 reverse.
- Available options:	4 speeds combined with 2 forward (Super creep/Fast) and 1 reverse group and with 1 reduction gear (High/Low);
. number of gears:	16 forward and 8 reverse or 4 speeds combined with 2 forward (Normal/Fast) and 1 reverse group;
. number of gears:	8 forward and 8 reverse.

Rear axle and final drives

- Make:	GOLDONI;
- Model:	STAR;
- Type:	bevel gear differential and epicyclic final drive.

Rear differential lock

- Make:	GOLDONI;
- Model:	STAR;
- Type:	mechanical;
- Control system:	engaged or disengaged by foot pedal.

Front axle and final drives

- Make: GOLDONI;
- Model: STAR;
- Type: central shaft, bevel gear type, differential and final drive

Front differential lock: none.

Total ratios and speeds

16 forward and 8 reverse (combination selected during the test)

Gear	Group	Number of engine revolution for one revolution of the driving wheels		Nominal travelling speed at rated engine speed of 2300 rev/min (*) km/h	
		Low	High	Low	High
FORWARD					
1	Normal	400.19	316.86	1.21	1.53
2	Normal	243.09	192.47	2.00	2.52
3	Normal	140.83	111.51	3.45	4.35
4	Normal	97.34	77.07	4.99	6.30
1	Fast	70.12	55.52	6.92	8.74
2	Fast	42.60	33.73	11.39	14.39
3	Fast	24.68	19.54	19.67	24.84
4	Fast	17.06	13.51	28.45	35.93
REVERSE					
1	Reverse	167.52	132.64	2.90	3.66
2	Reverse	101.76	80.57	4.77	6.02
3	Reverse	58.95	46.68	8.23	10.40
4	Reverse	40.75	32.26	11.91	15.04

(*) Calculated with a tyre dynamic radius index of 560 mm (ISO 4251/1-1992).

Number of revolutions of front wheels for one revolution of rear wheels: 1.5.

Total ratios and speeds (continued)

8 forward and 8 reverse

Gear	Group	Number of engine revolution for one revolution of the driving wheels	Nominal travelling speed at rated engine speed of 2300 rev/min (*) km/h
FORWARD			
1	Normal	316.86	1.53
2	Normal	192.47	2.52
3	Normal	111.51	4.35
4	Normal	77.07	6.30
1	Fast	55.52	8.74
2	Fast	33.73	14.39
3	Fast	19.54	24.84
4	Fast	13.51	35.93
REVERSE			
1	Normal	401.25	1.21
2	Normal	243.73	1.99
3	Normal	141.20	3.44
4	Normal	97.60	4.97
1	Fast	70.31	6.90
2	Fast	42.71	11.36
3	Fast	24.74	19.61
4	Fast	17.10	28.38

(*) Calculated with a tyre dynamic radius index of 560 mm (ISO 4251/1-1992).

Number of revolutions of front wheels for one revolution of rear wheels: 1.5.

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 hand lever, driven by single dry clutch independent of travel clutch;
- Number of shafts: 1, 35 mm diameter, 6 splines, ISO 500-1991, type 1 ;
- Method of changing power take-off shaft ends: none;

Main power take-off proportional to engine speed (continued)

- Height above ground: 492 mm;
- Distance from the median plane of the tractor: 0 mm;
- Distance behind rear axle: 313 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	540 575	2160 2300	4.00	51.5
750(*)	750 767	2250 2300	3.00	51.5
1000(*)	1000 1041	2210 2300	2.21	51.5

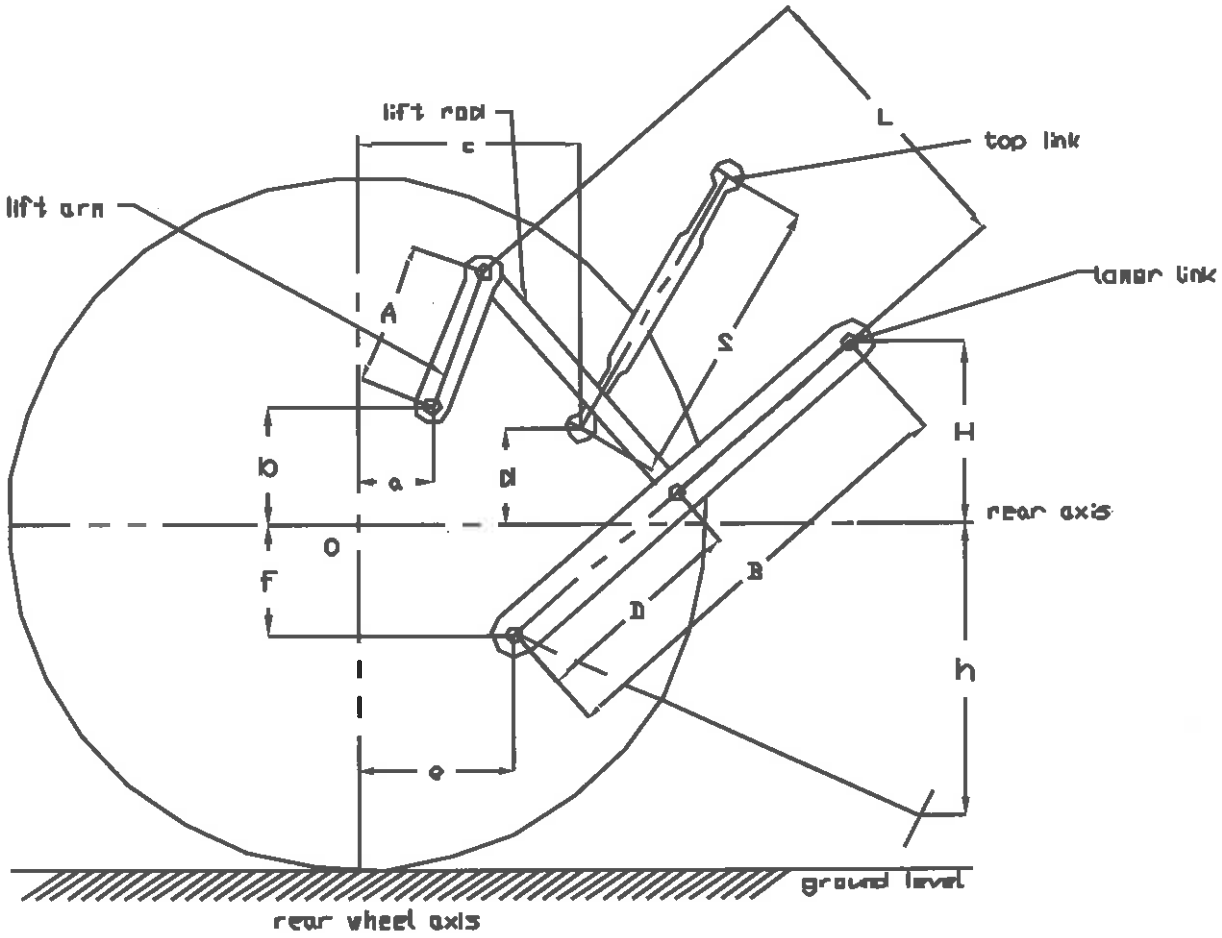
(*) optional

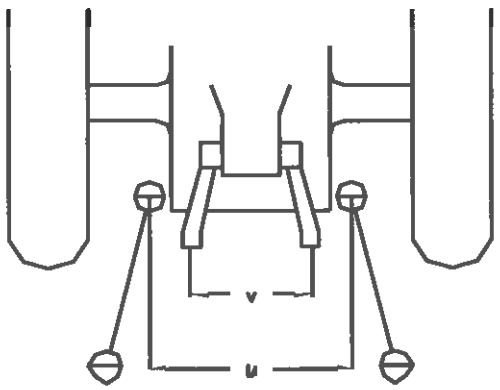
POWER LIFT

- Make: GOLDONI;
- Model: STAR;
- Type: load sensing;
- Type of hydraulic system: open centre system;
- Number and type of cylinders: 1 internal single-acting;
- Type of lock for transport: by lever;
- Relief valves pressure setting: 19.5 ± 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: 32 dm^3;
- Site of oil reservoir: gear box
- Number type an location of tapping points: 1, double acting at rear of tractor;
- Maximum volume of oil available to external cylinders: 7 dm^3.
- Recommended oil: see page 22.

Rear three-point linkage

- Category : 1 (ISO 730/1-1990);
- Category adapter: 2 (ISO 730/1-1990).





REAR LINKAGE GEOMETRY

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)	230	230
Length of lower links	(B)	805	805
Distance of lift arm pivot point from rear wheel axis (behind)			
- horizontally	(a)	24	24
- vertically	(b)	288	288
Horizontal distance between the 2 lower link points	(u)	480	480
Horizontal distance between the 2 lift arm end points	(v)	325	325
Length of upper link	(S)	from 590 to 720	616
Distance of upper link pivot point from rear wheel axis			
- horizontally	(c)	199-191-183-171	183
- vertically	(d)	233-259-285-323	285
Distance of lower link pivot point from rear wheel axis			
- horizontally	(e)	9	9
- vertically	(f)	121	121
Distance of lower link pivot point to lift rod pivot points on lower links	(D)	360	360
Length of lift rods	(L)	from 385 to 455	430

Height of lower hitch points relative to the rear wheel axis:

Length of lift rods	(L)	385	455	430
Linkage distance of lift rods	(D)	360	360	360
Lowest position	(h)	237	429	360
Highest position	(H)	300	158	210
Height above ground of lower hitch points in transport position (*)				770

(*) *Assuming the dynamic radius index = 560 mm (ISO 4251/1-1992)*

SWINGING DRAWBAR (optional not fitted on test tractor)

- Type:	GOLDONI DGM-GA 1052 Cat A;
- Height above ground:	370 mm
- Type of adjustment:	reversible;
- Distance of hitch point from rear wheel axis	
. horizontally:	593 mm;
- Distance of hitch point from power take-off shaft end	
. vertically:	115 mm below;
. horizontally:	322 mm behind;
- Lateral adjustment (centre of clevis)	
. right hand:	50 mm;
. left hand:	50 mm;
- Distance of pivot point from rear wheel axis	
. horizontally:	597 mm forward;
- Diameter of drawbar pin hole:	28.5 mm;
- Maximum vertical permissible load:	not specified.

HOLED DRAWBAR: none.

TRAILER HITCH

- Type:	GOLDONI DGM-GA 1051 Cat C
- Hole diameter:	28.5 mm;
- Height above ground	
. min:	360 mm;
. max:	665 mm;
- Distance of hitch point from rear wheel axis	
. horizontally:	350 mm;
- Distance of hitch point from power take-off shaft end	
. vertically:	144 mm below, 201 mm above;
. horizontally:	111 mm;
- Maximum vertical permissible load:	1.47 kN.

STEERING

- Specification:	hydrostatic steering with BOSCH hydraulic gear pump, one double acting ram acting directly on front axle.
- Make:	DANFOSS;
- Model:	OSPC 80 LS;
- Type:	hydrostatic;
- Working pressure:	15 MPa;
- Recommended oil:	see page 22.

BRAKES

Service brake

- Make:	GOLDONI;
- Model:	STAR;
- Type:	oil bath disc, total 18 discs, 6 at front (3 per wheel) and 12 at rear (6 per wheel) all mounted before the final drive;
- Available options:	oil bath disc, 12 at rear (6 per wheel) all mounted before the final drive;
- Method of operation:	hydraulically actuated with 2 pedals;
- Trailer braking take-off:	none.

Parking brake

- Type:	in common with service brake;
- 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:	1248 mm:
. max:	1372 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
  . minimum: 1180 mm;
  . maximum: 1488 mm;
- Adjustment: changing the position of the rims with respect to the disc.

WHEELBASE: 1915 mm.

PROTECTIVE STRUCTURE

Specifications

Tractor	Seat model	OECD approval number
GOLDONI STAR 75 TZA 44	GOLDONI COMPACT	NT/ROPS-F/S 017/35
	GOLDONI Y 01	NT/ROPS-F/S 017/36
GOLDONI STAR 75 TZB 44	GOLDONI COMPACT	NT/ROPS-F/S 017/51
	GOLDONI Y 01	NT/ROPS-F/S 017/52
JOHN DEERE 2446 F FH 2446 AF	GOLDONI COMPACT	NT/ROPS-F/S 017/61
	GOLDONI Y 01	NT/ROPS-F/S 017/62
JOHN DEERE 2446 F FH 2446 BF	GOLDONI COMPACT	NT/ROPS-F/S 017/67
	GOLDONI Y 01	NT/ROPS-F/S 017/68

- Date of approval: 10 September 1996;
- Location and country of test of protective structure: D.E.I. AGRA. - Sez. I.A., Bologna, ITALY;
- Mass used for calculating impact energies and crushing forces: 2250 kg;
- Make: GOLDONI;
- Model: K 16;
- Type: roll-bar, tiltable;
- Manufacturer's name and address: GOLDONI S.p.A., Via canale 3, Migliarina di Carpi MO, Italy.

DRIVER'S SEAT

Standard

- Make: GOLDONI;
- Model: COMPACT;
- Type: upholstered seat with back rest;
- Type of suspension: mechanical
- Type of damping: shock absorber;
- Range of adjustment
  . vertical: 80 mm;
  . longitudinal: 80 mm.

Optional

- Make: GOLDONI;
- Model: Y 01 EEC om. e2 034;
- Type: upholstered seat with back rest;
- Type of suspension: mechanical
- Type of damping: shock absorber;
- Range of adjustment
  . vertical: 76 mm;
  . longitudinal: 76 mm.

PASSENGER'S SEAT : none.

LIGHTING

Lighting system in accordance with EEC 78/933

	Height above ground of centre	Size	Distance from outside edge of lights to median plane of tractor
	mm	mm	mm
Headligths	970	150 x 100	210
Sidelights	930	70 x 100	535
Rearlights	1255	155 x 60	550
Reflectors 1st pair	1175	80 x 50	517
2nd pair	610	50 x 100	320

TEST CONDITIONS

OVERALL DIMENSIONS

	Length	Width		Height at top of	
		minimum	maximum	protective structure	exhaust silencer
	mm	mm	mm	mm	mm
Unballasted	3267	1460	1860	2160	365

- Ground clearance: 340 mm below front axle;

TRACTOR MASS (unballasted with full fuel tank and protective structure)

	Without driver	With driver
	kg	kg
Front	975	990
Rear	1115	1175
Total	2090	2165

TYRES AND TRACK WIDTH SPECIFICATIONS

	Front	Rear
Tyres		
make	PIRELLI	PIRELLI
model	AS AGRAR	TM 700
dimensions	10.0/75-15.3	380/70R24
ply rating	8	-
load index/speed index	-	125 A8
type	diagonal	radial
maximum load (tyre manufacturer's)	824 daN	1618 daN
inflation pressure (tyre manufact.'s)	370 kPa	160 kPa
dinamic radius index	360 mm	560 mm
Chosen track width	1250 mm	1180 mm
Technically permissible axle load	1315 daN	2649 daN

TYRES AND TRACK WIDTH SPECIFICATIONS (continued)

Other tyres available

Tractors	Front	Rear
GOLDONI STAR 75 TZA 44 JOHN DEERE 2446 F FH 2446 AF	280/70R16	380/70R24
	250/80-18	12.4R28
	280/70R18	420/70R24
	250/80-18	14.9R24
	280/70R16	380/70R24
	29x12.50-15	44x18.00-20
	8.25-16	13.6R24
GOLDONI STAR 75 TZB 44 JOHN DEERE 2446 F FH 2446 BF	280/70R16	380/70R24
	260/70R16	360/70R24
	9.0/75-16	360/70R24
	9.0/75-16	12.4R24
	29x12.50-15	44x18.00-20
	280/60-15.5	375/75R20
	200/70R16	320/70R24
	240/70R16	320/70R24
	210/80R16	320/70R24
	10.0/75-15.3	380/70R24

OILS AND LUBRICATION

Capacity and change interval

	Capacity dm^3	Oil change h	Filter change h
Engine	8.5	200	200
Gear box with rear axle and final drives, hydraulic system, steering	32	800	200
Front axle / final drives	4.5	800	-

OILS AND LUBRICATION (continued)

Specifications

	Recomended	Using during test
Engine oil		
Type	AGIP DIESEL SIGMA	AGIP DIESEL SIGMA
Viscosity	12.50 cSt	12.50 cSt
Classification	API SE - CD	API SE - CD
Transmission oil used in		
Gear box		
Front/Rear axle and final drives		
Type	AGIP OSO 68	AGIP OSO 68
Viscosity	8.6 cSt	8.6 cSt
Classification	API GL 4	API GL 4
Steering oil		
Type	AGIP OSO 68	AGIP OSO 68
Viscosity	8.6 cSt	8.6 cSt
Classification	API GL 4	API GL 4

Grease

- Type: ESSO GP GREASE;
- Number of lubrication points: 8.

FUEL

- Type: AGIP DIESEL DIN 51061;
(in accordance with the national standard)
- Density at 15 °C: 0.837 g/cm^3.

TEST RESULTS

COMPULSORY TESTS RESULTS

1. MAIN POWER TAKE-OFF PERFORMANCE

- Date and location of test: 30 July 1996, ISMA, Treviglio BG, Italy;

- Type of dynamometer: ZÖLLNER B 500.

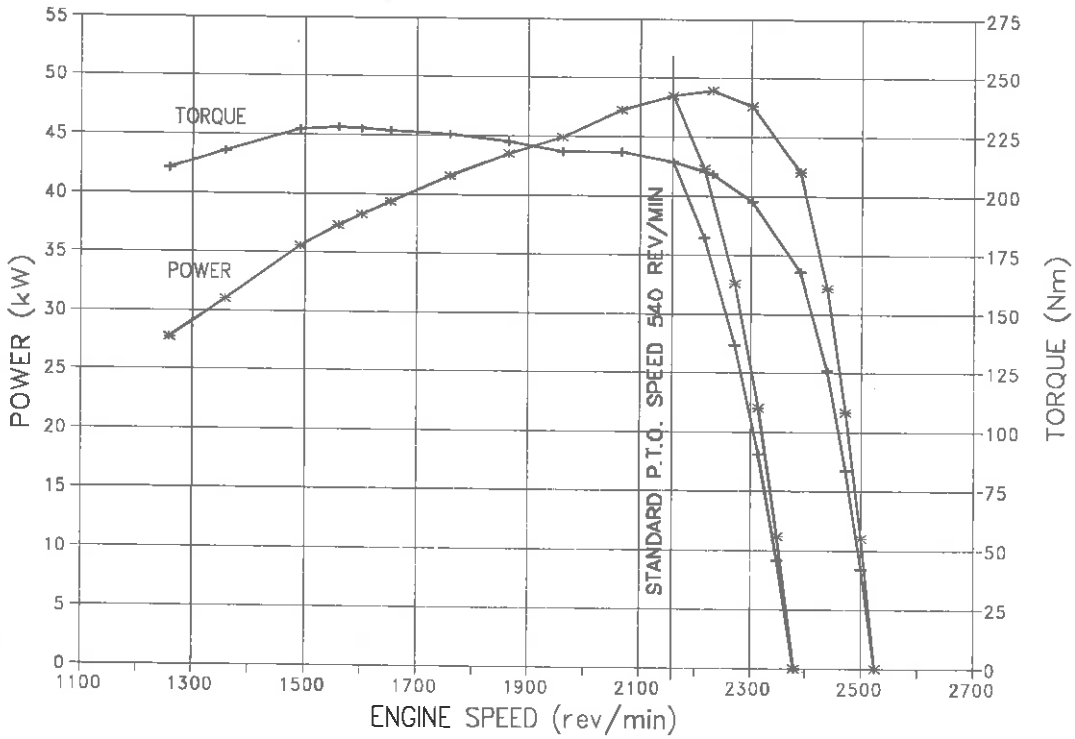
Power	Speed		Fuel consumption			Specific energy
	Engine	PTO	Hourly		Specific	
kW	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
1.1 MAXIMUM POWER - TWO-HOUR TEST						
48.9	2232	558	13.44	11.25	230	3.64
1.2 POWER AT RATED ENGINE SPEED						
47.6	2302	576	13.24	11.08	233	3.60
1.3 STANDARD POWER TAKE-OFF SPEED (540 rev/min)						
48.5	2159	540	13.14	11.00	227	3.69
1.4 PART LOADS 1.4.1 The torque corresponding to maximum power at rated engine speed						
47.6	2302	576	13.24	11.08	233	3.60
1.4.2 85% of torque obtained in 1.4.1						
42.0	2390	598	11.98	10.03	239	3.51
1.4.3 75% of torque defined in 1.4.2						
32.2	2440	610	9.83	8.23	256	3.27
1.4.4 50% of torque defined in 1.4.2						
21.7	2472	618	7.93	6.64	306	2.74
1.4.5 25% of torque defined in 1.4.2						
11.0	2501	625	5.81	4.86	442	1.89
1.4.6 unloaded						
0	2526	632	3.64	3.05	-	-

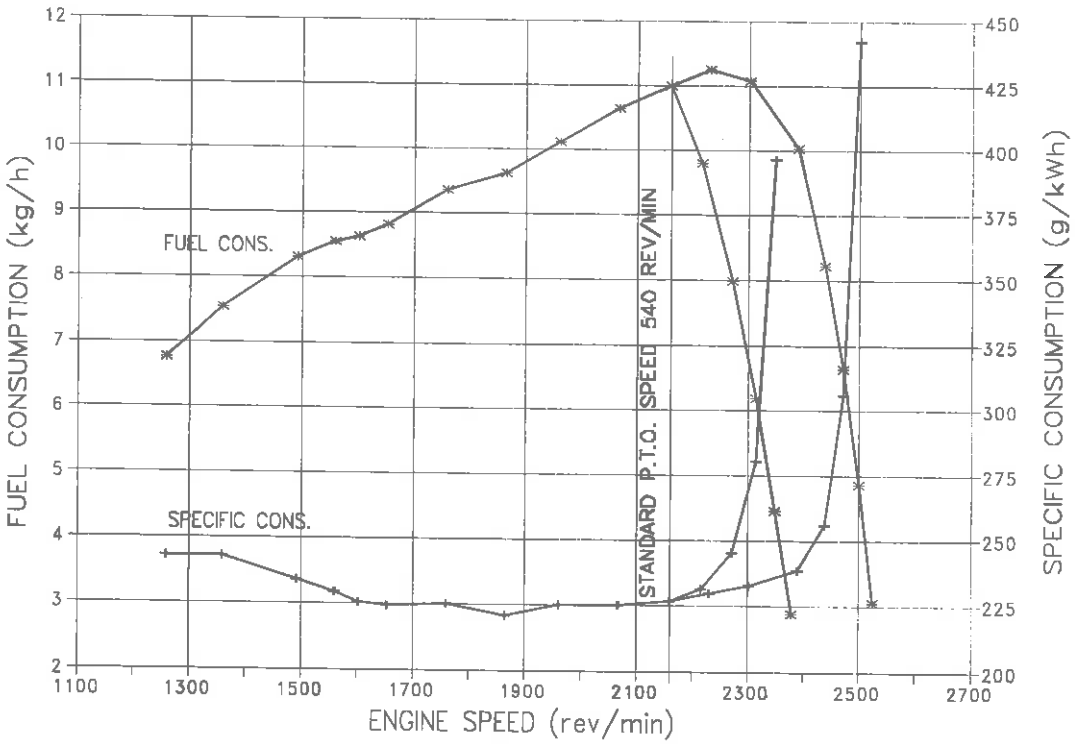
Power	Speed		Fuel consumption			Specific energy
	Engine	PTO	Hourly		Specific	
kW	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED (540 rev/min)						
1.5.1 The torque corresponding to maximum power available						
48.5	2159	540	13.14	11.00	227	3.69
1.5.2 85% of torque obtained in 1.5.1						
42.3	2217	554	11.70	9.79	231	3.62
1.5.3 75% of torque defined in 1.5.2						
32.5	2272	568	9.55	7.99	246	3.41
1.5.4 50% of torque defined in 1.5.2						
22.0	2314	579	7.38	6.18	280	2.99
1.5.5 25% of torque defined in 1.5.2						
11.2	2350	588	5.32	4.45	397	2.11
1.5.6 unloaded						
0	2380	595	3.45	2.89	-	-

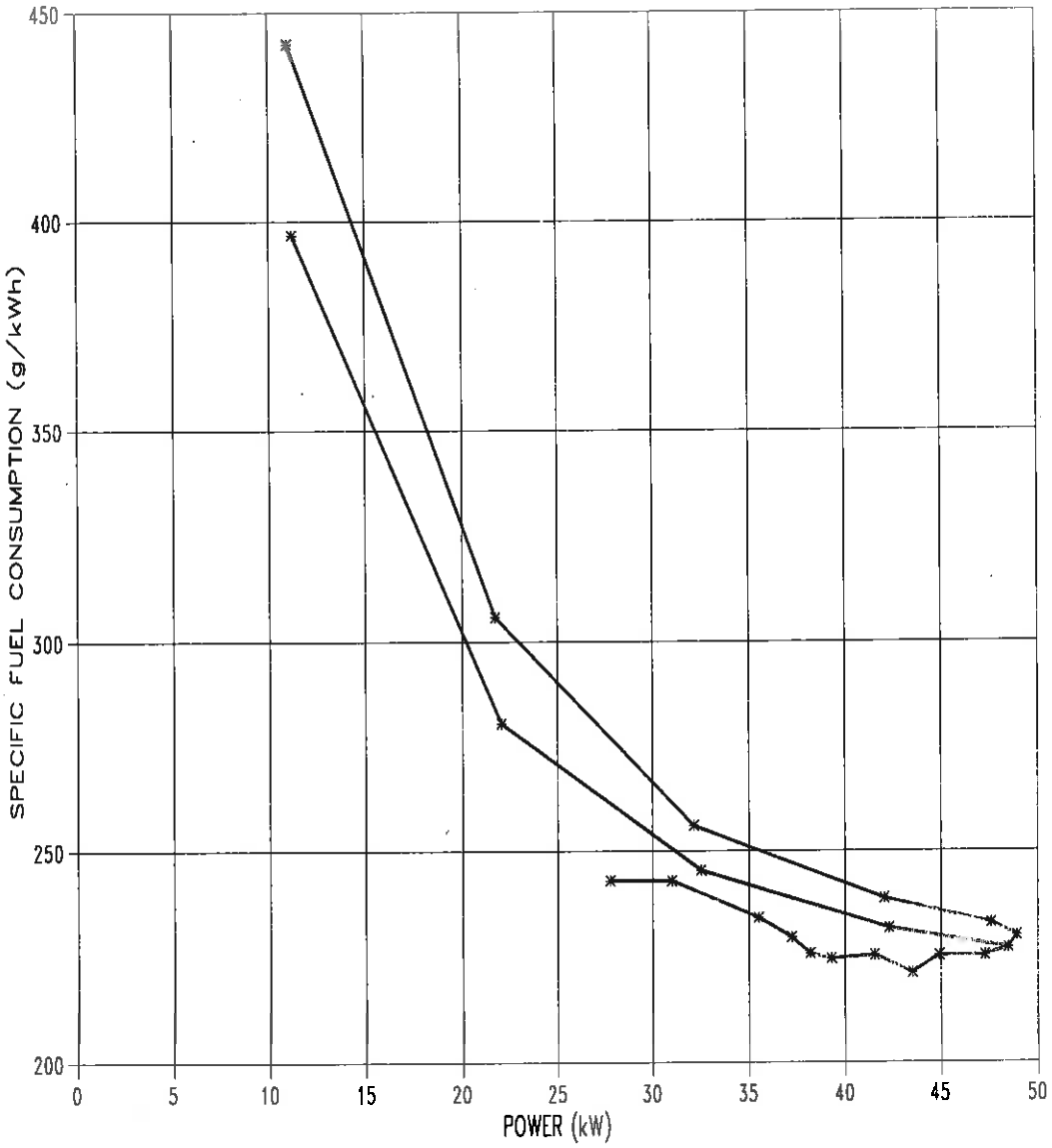
- No load maximum engine speed: 2526 rev/min;
- Equivalent flywheel torque at rated engine speed: 197.51 Nm;
- Equivalent flywheel torque at 2-hour test: 209.38 Nm;
- Maximum equivalent flywheel torque: 228.38 Nm at 1558 rev/min of the engine.

- Mean atmospheric conditions
  - temperature: 23°C
  - pressure: 100.2 kPa
  - relative humidity: 58 %

- Maximum temperatures
  - coolant: 85 °C
  - engine oil: 121 °C
  - fuel: 32 °C
  - engine air intake: 30 °C


TORQUE
POWER
STANDARD P.T.O. SPEED 540 REV/MIN
POWER (kW)
TORQUE (Nm)
ENGINE SPEED (rev/min)
55
50
45
40
35
30
25
20
15
10
5
0
275
250
225
200
175
150
125
100
75
50
25
0
1100
1300
1500
1700
1900
2100
2300
2500
2700


FUEL CONS.
SPECIFIC CONS.
STANDARD P.T.O. SPEED 540 REV/MIN
FUEL CONSUMPTION (kg/h)
SPECIFIC CONSUMPTION (g/kWh)
ENGINE SPEED (rev/min)
12
11
10
9
8
7
6
5
4
3
2
450
425
400
375
350
325
300
275
250
225
200
1100
1300
1500
1700
1900
2100
2300
2500
2700


SPECIFIC FUEL CONSUMPTION (g/kWh)
450
400
350
300
250
200
0
5
10
15
20
25
30
35
40
45
50
POWER (kW)

2. HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 6 August 1996.

2.1 HYDRAULIC POWER TEST

- Sustained pressure with relief valve open: 20.0 MPa;
- Pump delivery rate at minimum pressure: 26 l/min;

	Power kW	Flow rate l/min	Pressure MPa	Oil temp. °C
At 90% of the actual relief valve setting	7.08	23.6	18.0	66
Maximum	7.08	23.6	18.0	66

- 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 POWER LIFT

		At hitch point	On the frame
Height of lower hitch point above ground in down position	mm	200	200
Vertical movement			
without lifting forces	mm	570	655
with lifting forces	mm	515	579
Maximum corrected force exerted through full range	kN	14.88	10.70
Corresponding pressure of hydraulic fluid	MPa	18.0	18.0
Moment about rear axle	kNm	12.11	15.24
Maximum tilt angle of mast over range of lift	degrees	-	5

Lifting heights relative to the horizontal lower links										
mm	-250	-239	-200	-100	0	+100	+200	+276	+300	+ 329
Lifting forces at hitch points, corrected to 18.0 MPa										
kN	-	15.19	15.16	15.23	15.27	15.38	14.89	14.88	-	-
Lifting forces at test frame, corrected to 18.0 MPa										
kN	15.48	-	14.87	14.24	13.53	13.01	11.95	-	11.25	10.70

3. DRAWBAR PERFORMANCE

- Date of test: 8 August 1996;
- Type of track: concrete.

Height of drawbar above ground	Tyre inflation pressure	
	Front	Rear
mm	kPa	kPa
425	230	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)													
1NL	5.1	16.10	1.13	2496	15	1030	0.81	28	83	100	24	66	100.1
1NH	6.3	15.89	1.42	2488	15	903	0.93	28	83	100	24	66	100.0
2NL	8.5	16.58	1.85	2480	15	722	1.16	29	83	101	24	66	100.0
2NH	10.8	16.78	2.31	2472	15	623	1.34	28	84	101	24	66	100.0
3NL	14.2	16.13	3.16	2460	15	512	1.63	30	84	102	25	65	100.0
3NH	17.8	16.11	3.97	2448	15	439	1.91	30	84	102	24	65	100.0
4NL	20.3	16.06	4.56	2452	15	379	2.21	30	84	102	25	65	100.1
4NH	25.7	16.27	5.69	2424	15	342	2.45	31	85	103	25	65	100.1
1FL	28.2	16.37	6.21	2408	15	333	2.51	30	85	103	25	65	100.0
1FH	34.1	16.09	7.64	2344	15	310	2.70	30	85	102	26	64	100.1
2FL	37.0	12.75	10.44	2300	9	302	2.77	30	86	103	26	64	100.0
2FH	37.5	10.00	13.50	2301	7	299	2.80	31	85	102	26	64	100.0
3FL	36.3	6.96	18.79	2298	5	307	2.73	30	86	102	26	64	100.0

N= Normal, F= Fast, L= Low, H= High.

Gear and range	Power kW	Drawbar pull kN	Speed km/h	Engine speed rev/min	Slip of wheels %	Specific fuel consumption g/kWh	Specific energy kWh/l	Temperatures Fuel °C	Coolant °C	Engine oil °C	Atmospheric conditions Temperature °C	Relative humidity %	Pressure kPa
3.2 FUEL CONSUMPTION													
3.2.1) Selected gear, at maximum power at rated speed													
2FH	37.5	10.00	13.50	2301	7	299	2.80	31	85	102	26	64	100.0
3.2.1.1) 75% of pull at maximum power at rated speed													
2FH	30.0	7.50	14.40	2404	5	337	2.49	28	83	100	27	62	100.0
3.2.1.2) 50% of pull at maximum power at rated speed													
2FH	20.8	5.00	14.98	2448	3	440	1.90	28	83	100	28	62	100.1
.2.1.3) next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.1.1													
3FL	29.9	7.50	14.37	1752	5	271	3.09	29	83	101	28	62	100.1
3.2.1.4) next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.1.2													
3FL	20.8	5.00	14.94	1792	3	345	2.43	28	83	100	28	62	100.0
3.2.2) Selected gear, nearest to 7.5 km/h at rated speed													
1FL	28.2	16.37	6.21	2408	15	333	2.51	30	85	103	25	65	100.0
3.2.2.1) 75% of pull at maximum power at rated speed													
1FL	23.2	12.26	6.81	2444	8	354	2.37	29	82	99	28	62	100.1
3.2.2.2) 50% of pull at maximum power at rated speed													
1FL	16.1	8.16	7.12	2476	5	386	2.17	28	82	100	28	61	100.0
3.2.2.3) next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.2.1													
1FH	23.2	12.24	6.83	1916	7	280	2.99	29	83	100	28	61	100.1
.2.2.4) next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.2.2													
1FH	16.1	8.14	7.14	1964	5	390	2.14	29	83	100	28	61	100.2

N= Normal, F= Fast, L= Low, H= High.

4. REPAIRS and REMARKS: none.

TEST ENGINEER
(Dr. Carlo BISAGLIA)

DIRECTOR OF TESTING STATION
(Prof. Giuseppe COLZANI)

HEAD OF ISMA
(Ing. Giovanni SANTORO)