COMITATO PER L'OMOLOGAZIONE
DELLE MACCHINE AGRICOLE

REPORT No. 977

REPORT ON TEST IN ACCORDANCE WITH O.E.C.D. TEST
CODE FOR AGRICULTURAL TRACTORS OF:

FIAT 180-90 DT/I (4 WD)



Manufactured by: FIAT TRATTORI S.p.A.
Via Pico della Mirandola, 72 - MODENA (Italy)

Date of tests: Torino, May 1984 - February 1985

This report has been approved by the O.E.C.D. Coordinating Center
(CEMAGREF, France) as being in accordance with the O.E.C.D. Tractor Test Code.

Date of approval: 17th December 1985

CONSIGLIO NAZIONALE DELLE RICERCHE
ISTITUTO PER LA MECCANIZZAZIONE AGRICOLA
TORINO - ITALY

This bulletin is based on engineering tests in accordance with O.E.C.D. Tractor Code. It does not contain an evaluation of performance of the tractor on practical farm work.

The FIAT 180-90 DT tractor is manufactured in following variants:

1. 180-90 DT/12 model with 12 forward and 4 reverse speeds (4x4 gear units)
2. 180-90 DT/24 model with 24 forward and 8 reverse speeds (4x4x2 gear units)
3. 180-90 DT/I model with 16 forward and 16 reverse speeds (4x4x2 gear units)
4. 180-90 DT/IS model with gear units and groups similar to those of the 180-90 DT/I model, but with different ratios.

The tests have been made on FIAT 180-90 DT/I

In this report all performance characteristics are given corresponding to the International System of Units.

The rèference to the former used Technical System of Units is given by the following relations:

Forces:	1 N = 0.10197 kg	or 1 kg	= 9.80665 N
Powers:	1 kW = 1.35962 metric hp	or 1 metric hp	= 0.73550 kW
Pressures:	1 bar = 1.01972 kg/cm^2	or 1 kg/cm^2	= 0.980665 bar
Torques:	1 mN = 0.10196 mkg	or 1 mkg	= 9.80665 mN

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PERFORMANCE CURVES

a) Power take-off test	Fig. No.
Curves of power, torque, hourly and specific fuel consumption/ crankshaft speed	1
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Tractor manufacturer:	FIAT TRATTORI S.p.A. Via Pico della Mirandola, 72 MODENA - Italy
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with agreement by Istituto per la Meccanizzazione Agricola - Torino (Italy)
Place of running-in:	Istituto per la Meccanizzazione Agricola - Torino
Duration of running-in:	Engine and tractor appr. 70 hours

SPECIFICATION OF TRACTOR

Tractor:

Make:	FIAT
Model:	180-90 DT/I
Type:	Four-wheel-drive tractor, unit construction
Serial No.:	263005
Ist serial No.:	263000

Engine:

Make:	FIAT
Model:	8365.25.502
Type:	4-stroke Diesel engine, direct injection, water cooled, turbo supercharged
Serial No.:	753542
Cylinders:	6 cylinders, vertical, in-line, 115 mm bore x 130 mm stroke, capacity 8102 cm^3, compression ratio 15,5:1, overhead in-line valves, replaceable cast-iron dry cylinder liners.
Supercharger:	GARRET, model TO 4B/05-1.14P or HOLSET, model 3 FT-530 V/2.85S4; maximum supercharge pressure 0.60 $\pm$ 0.07 bar.
Fuel system:	Fuel-supply pump, type FP/K22 HW10, fixed to injection pump, one wire-mesh filter on pump suction side and two filters make CAV type 2 FAS 5845310 with replaceable cartridge and sediment bowls on pressure side of injection pump; one standard fuel tank capacity 180 l and two optional tanks capacity 50 l each; BOSCH PES 6 MW 100 in line injection pump; manufacturer's production setting 89.8 - 92.0 mm^3/stroke at rated engine speed and full load injection timing 15° $\pm$ 30' before TDC; FIAT multihole injectors EPPZ1OFV4 or BOSCH multihole iniectors EPPZ5OFV6; injection pressure 204 $\pm$ 4 bar. — Serial No of injection pump: 9359472
Governor:	Fiat, mechanical type, RQV 300, incorporated in injection pump; governed range of engine speed from 650 to 2400 rev/min; rated engine speed 2200 rev/min.
Air cleaner:	Donaldson main cleaner, ELB 10-0060 dry paper element filter, with two replaceable cartridges under bonnet; Donaldson precleaner, PBHOO-O823 centrifugal above bonnet; electrical maintenance indicator.
Lubrication system:	Forced-feed lubrification with gear pump; two filters: one wire mesh type filter on pump suction, and one replaceable cartridges type on pressure side pump of oil to the engine; cartridges change every 400 operating hours; oil capacity including filters 18.3 l; recommended oil FIAT AMBRA SUPER, SAE classification 15W/40, satisfied MIL-L-2104 C specifications; oil change period every 200 operating hours.

Cooling system:	Pressurized water cooling system with centrifugal pump (0.69 bar) and thermostatic control; 520 mm dia, 6 blades, belt driven fan; coolant capacity 28.5 l. Temperature check with thermometer.
Starting system:	Electrical Marelli MT 68 LB (12 V - 3,5 kW) or BOSCH JF (12 V - 3 kW), starting motor pinion coupling solenoid operated: starting motor operable only with engine clutch disengaged: cold starting aid: thermostat or start-pilote.
Electrical system:	12 V, negative earth. Alternator MARELLI type AA 125-14V-65A (780 W) or BOSCH type K1-14V-65A 21 (780 W). Battery: one lead acid type; MARELLI 6A TP 33; capacity 176 Ah at 20 hours rating.
Exhaust system:	Own make, DGM-SA 1025, interferance type with internal perforated pipe; ovoidal shape 213 x 118 mm, 1250 mm length; vertical on left side of engine; maximum height above ground 3030 mm.

Transmission:

Clutch:	LUK or VALEO make, dry dual disc clutch, only for travel, on the primary shaft of the gear box; two disc 305 mm dia; pedal operated.
Gearbox:	Own make. On the 180-90 DT/I tractor model tested: mechanical syncronized type, constant mesh gear with total 16 forward and 16 reverse speeds; the transmission consists of three mechanical in series gear units: the first with 4 speeds, the second with 4 positions to select the gear groups (low, normal, medium, high) the third with two positions to select the forward and reverse speeds; each unit is operated by own lever. The FIAT 180-90 DT tractor is available in the other three variants: — 180-90 DT/24 model with 24 forward and 8 reverse speeds; three series gear units: the first with four speeds, the second with four positions to select the gear groups (low, medium, high, reverse), the third with two positions to select direct or crawling speeds; — 180-90 DT/12 model with 12 forward and 4 reverse speeds; two series gear units: the first with four speeds, the second with four positions to select the gear (low, medium, high and reverse); — 180-90 DT/IS model with gear units and groups similar to thouse of the 180-90 DT/I model, but with different ratios.
Rear axle and final drive:	Own make, mechanical type with Gleason crown wheel and pinion; bevel gear type differential with mechanical pedal operated and self-disengaging lock; epycicloidal final drives.
Front axle and final drive:	Own make, mechanical type with crown wheel and pinion; NO-SPIN type automatic lock, epycicloidal final drives.
Gear lubrication:	Gear box capacity 21.1 l; rear axle, final rear drives and power lift circuit 59.5 l; front axle and final front drives 12.9 l; change period 1600 operating hours; two filters in full flow with by-pass valve and replaceable cartridge; filters change period 400 operating hours. Recommended oil FIAT TUTELA MULTI F, SAE classification 20W/40 or any oil conforming MIL L 2104 C or API-CD.

FIAT 180-90 DT/I model

– Total ratios and speeds (tyres 20.8-38 and pressure 1.6 bar)

Gear	Group	Number of engine revolutions for one revolution of the driving wheel	Nominal travelling speed(*) for rated engine speed (2200 rev/min) km/h
I	Low	333.835	2.12
II		218.495	3.24
III		178.918	3.96
IV		119.421	5.93
I	Normal	164.921	4.30
II		107.940	6.57
III		88.389	8.02
IV		58.996	12.01
I	Medium	148.637	4.77
II		97.283	7.28
III		79.662	8.90
IV		53.171	13.33
I	High	65.800	10.77
II		43.066	16.46
III		35.265	20.10
Iv		23.538	30.11
I	Reverse low	417.294	1.70
II		273.119	2.59
III		223.648	3.17
IV		149.276	4.75
I	Reverse normal	206.151	3.56
II		134.924	5.25
III		110.486	6.41
IV		73.745	9.61
I	Reverse medium	185.798	3.81
II		121.604	5.83
III		99.578	7.12
IV		66.464	10.66
I	Reverse high	82.250	8.62
II		53.833	13.17
III		44.082	16.08
IV		29.423	24.09

(*) Calculated with the radius index of 855 mm

FIAT 180-90 DT/12 model

– Total ratios and speeds (tyres 20.8-38 and pressure 1.6 bar)

Gear	Group	Number of engine revolutions for one revolution of the driving wheel	Nominal travelling speed(*) for rated engine speed (2200 rev/min) km/h
I	Low	333.841	2.12
II		218.495	3.24
III		178.918	3.96
IV		119.421	5.93
I	Medium	148.637	4.77
II		97.283	7.28
III		79.662	8.90
IV		53.171	13.33
I	High	65.800	10.77
II		43.066	16.46
III		35.265	20.10
IV		23.538	30.11
I	Reverse	178.664	3.97
II		116.916	6.06
III		95.755	7.40
IV		63.910	11.09

(*) Calculated with the radius index of 855 mm

FIAT 180-90 DT/24 model

– Total ratios and speeds (tyres 20.8-38 and pressure 1.6 bar)

Gear	Group	Number of engine revolutions for one revolution of the driving wheel	Nominal travelling speed(*) for rated engine speed (2200 rev/min) km/h
I	Low (crawling speed)	3614.110	0.20
II		2365.450	0.30
III		1936.980	0.36
IV		1292.860	0.55
I	Low	333.841	2.12
II		218.495	3.24
III		178.918	3.96
IV		119.421	5.93
I	Medium (crawling speed)	1609.150	0.44
II		1053.180	0.68
III		862.417	0.82
IV		575.631	1.24
I	Medium	148.637	4.77
II		97.283	7.28
III		79.662	8.90
IV		53.171	13.33
I	High (crawling speed)	712.360	1.00
II		466.235	1.52
III		381.785	1.85
IV		254.828	2.78
I	High	65.800	10.77
II		43.066	16.46
III		35.265	20.10
IV		23.538	30.11
I	Reverse (crawling speed)	1934.212	0.36
II		1265.726	0.56
III		1036.634	0.68
IV		691.903	1.02
I	Reverse	178.664	3.97
II		116.916	6.06
III		95.755	7.40
IV		63.910	11.09

(*) Calculated with the radius index of 855 mm

FIAT 180-90 DT/IS model

– Total ratios and speeds (tyres 20.8-38 and pressure 1.6 bar)

Gear	Group	Number of engine revolutions for one revolution of the driving wheel	Nominal travelling speed(*) for rated engine speed (2200 rev/min) km/h
I	Low	218.484	3.24
II		178.854	3.96
III		147.883	4.79
IV		119.380	5.94
I	Normal	107.878	6.60
II		88.313	8.03
III		73.005	9.70
IV		58.926	12.03
I	Medium	97.217	7.29
II		79.590	8.90
III		65.795	10.78
IV		53.107	13.36
I	High	43.065	16.46
II		35.253	20.11
III		29.151	24.33
IV		23.530	30.13
I	Reverse low	273.105	2.59
II		223.557	3.17
III		184.840	3.83
IV		149.217	4.75
I	Reverse normal	134.846	5.26
II		110.387	6.42
III		91.256	7.77
IV		73.658	9.62
I	Reverse medium	121.520	5.83
II		99.488	7.13
III		82.230	8.62
IV		66.363	10.68
I	Reverse high	53.831	12.87
II		44.067	16.09
III		36.437	19.46
IV		29.406	24.10

(*) Calculated with the radius index of 855 mm

Power take off: Indipendent p.t.o. driven by indipendent multidisc clutch, hidraulically controlled; two interchangeable shafts, automatic selection of speed changing p.t.o. shafts; hand lever operated. Position: rear of tractor, in median plane; height above ground 795 mm (with tyre 20.8-38).

Proportional engine speed p.t.o.:
— 1000 rev/min p.t.o.: distance behind rear axle 548 mm; diameter of p.t.o. shaft end 34.9 mm; 21 splines or 44,4 mm dia, 20 splines; according to I.S.O. standard, 1061 rev/min at rated engine speed, standard p.t.o. speed 1000 rev/min at engine speed 2074 rev/min; p.t.o. shaft rotates clockwisely viewed from tractor rear.

p.t.o. transmission ratio: $\frac{\text{engine speed}}{\text{p.t.o. speed}} = 2.074$

Power lift: Own make; hydraulic power lift in unit construction. Draft and position control operated by two indipendent levers; lift-o-matic device to raise and to low lower links.

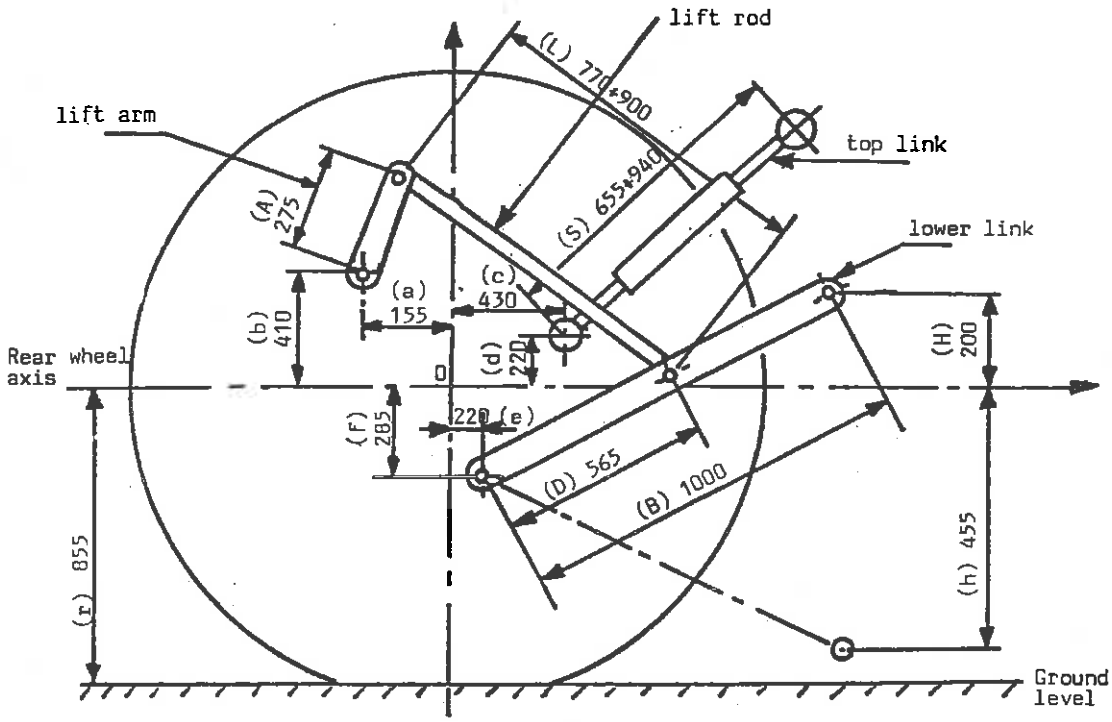
Hydraulic system:
open centre system; own make gear pump A 42, directely driven by engine; delivery 55.7 l/min at rated engine speed; two hydraulic oil filters with paper cartridges; filters change period 400 operating hours.
Own make control valve; maximum working pressure 175-183 bar. Single acting cylinder with 115 mm bore and 159 mm stroke; over pressure relief valve in cylinder set to 215 bar; two single acting rams with 75 bore and 150 mm stroke.

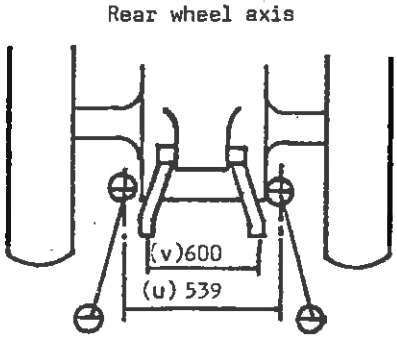
Type of linkage lock for transport: hydraulic:
Maximum 3 double acting additional control valves with oil tappings at rear of tractor available; pump suction inside the rear transmission box.
Oil capacity (common at gear box and rear axle): 59.5 l.
Max oil delivery which may be taken of through oil tappings 32 l.
Recommended oil: see transmission oils. Oil change period 1600 operating hours.

Implement linkage:
Three point linkage, quick couplers optional, not fitted on tested tractor; joint balls category 2 according to I.S.O. standard 730.
Available joint balls category 3; from category 2 to category 3 changing lower link end; dimensions see on pag 9.

POWER LIFT

Dimensions of linkage geometry for the table on page 10





State setting of hydraulic power lift for test

– Rear tyres (size 20.8-38) radius index		(r) :	855 mm
– Front tyres (size 16.9-28) radius index		(r') :	670 mm
– Length of lift arms		(A) :	275 mm
– Lenght of lower links		(B) :	1000 mm
– Distance of lift arm pivot point from rear wheel centre line:	horizontally	(a) :	155 mm
	vertically	(b) :	410 mm
– Horizontal distance between the 2 lower link points		(u) :	539 mm
– Horizontal distance between the 2 lift arm end points		(v) :	600 mm
– Length of upper link		(S) :	from 655 to 940 mm
– Distance of upper link pivot point from rear wheel centre line	horizontally	(c) :	430 mm
	vertically	(d) :	220 mm
– Distance of lower link pivot point from rear wheil centre	horizontally	(e) :	220 mm
	vertically	(f) :	285 mm
– Distance of lower lift pivot points to lift rod pivot points on lower links		(D) :	565 mm
– Length of lift rods		(L) :	from 770 to 900 mm
– Height of lower hitch points: · in low position		(h) :	455 mm
· in high position relative to the rear wheel centre line, situated 855 mm above the ground level		(H) :	200 mm
– Height of lower link hitch points when locked in transport position			Any height within lift range

Pull attachement:

Swinging drawbar and sector guide:
own make. Heights above ground with tyres 20.8-38 max 575 mm, min 460 mm. Two possible positions inverting (180°) the drawbar; distance of hitch points from rear axle 1005 mm behind horizontally; distance of hitch point from p.t.o. shaft end 335 mm max and 220 mm min below vertically and 457 mm behind horizontally; lateral adjustments 280 mm on right and left hands; distance ot pivot point from rear axle 295 mm vertically and 305 mm horizontally; one drawbar pin hole, 31 mm dia.

Trailer hitch:
own make, clevis type; height above ground, with tyres 20.8-38, 1000 mm max and 555 mm min distance of hitch point from rear axle 770 mm horizontally; distance of hitch point from p.t.o. shaft end: vertically from 240 mm below to 205 mm above, horizontally 227 behind; max vertical load 1470 daN according to Italian legislation; on hitch pin hole 28.5 mm dia.

Holed drawbar:
fitted on hitch points of lower links; number 9 holes; distance between holes 80 mm, 33 mm dia holes, 32 mm thickness 80 mm widht, height above ground min 340 mm, max 1025 mm (with tyres 20.8-38); horizontal distance to p.t.o. shaft end 1220 mm.

Steering:

Hydrostatic control with indipendent hydraulic circuit, DANFOSS make, OSPC 160, incorporating hand control for emergency; gear pump FIAT CX 31 RP, 19 l/min delivery, 2 cylinders directly acting on front axle, transversely mounted, bore 50 mm,

stroke 185 mm, piston rod 22 mm; working pressure 125 bar; oil capacity 1 l; oil filter: one paper cartridge; oil change period 1600 operating hours, filter change period 400 operating hours.
Recommended oil FIAT TUTELA MULTI F, SAE classification 20 W/40 or any oil according to MIL L 2104 C or API - CD.

Brakes:

Service brakes:
own make, wet disc brake type, one disc 370 mm dia, 10 mm thickness; hydraulically acting on rear differential half shaft; operated by 2 indipendent pedals locked together for road drive. Hydraulic trailer braking take off available as optional.

Parking brake:
indipendent, mechanic; hand lever operated acting on two discs sets on driving pinion shaft. Discs 107.5 mm dia, 7 mm thickness.

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

Wheels:

Steering wheels:
at front, 2 radial type tyres PIRELLI 16.9-28, 6 ply; maximum permissible load per tyre 1655 kg at 1.3 bar inflation pressure and max 35 km/h speed; track width adjustement continuons from 1800 mm to 2230 mm rotating the wheels on discs (rail system).

Driving wheels:
at front and at rear; rear wheels: two radial type tyres PIRELLI 20.8-38, 10 ply; maximum permissible load per tyre 3130 kg at 1.6 bar inflation pressure and max 35 km/h speed; track width continuons adjustment from 1620 mm to 2220 mm rotating the wheels on discs (rail system).
Possible combinations of tyres:

Tyre size	
at front	at rear
16.9 - 28 6 ply	20.8 - 38 10 ply
18.4 - 70 6 ply	20.8 - 38 10 ply

Wheelbase: 2890 mm.

Cab:

Own make, CS 5 type. O.E.C.D.-tested safety cab, approval numbers: CSD N° 0410/19-a(C)-30-a(C); mounted by 6 silent blocks on tractor; main frame stamped sheet-metal made.

Noise reduction materials:
- roof: 6 mm sound deadening panel, Keller make, AutoKell-MB type;
- platform: 26 mm sound deadening panel, Keller make, Auto-Kell-T type;
- fenders: 8 or 12 mm sound deadening panel, Keller make, AutoKell-MB type;
- other parts: 3 mm sound deadening panel, UNIROYAL make, ABS type.

Engine-water heat exchanger heating-system, 3-step blower for fresh and warm air.
Assembly and mounting bolts: see Report CSD N° 0410/19-a(C)-78-a(C).

Glasses: windscreen and rear window tempered security glasses SAINT-GOBAIN make, Security-L type, IGM 0594 VT approval.
Doors and lateral glasses: tempered security glasses DETAG make, DGM 336008 VT approval.

Option: FIAT TS 18 frame O.E.C.D. - tested safety frame, approval numbers: CSD N° 0246/19 - 30

Seat:

Driver's seat:
GRAMMER make, DS 85 H/90 AR model, upholstered seat with back rest and arm rests, adjustable spring with shock absorber; height of unloaded seat above driver's platform adjustable from 580 mm to 640 mm in three position, longitudinal adjustment 150 mm; seat revolving around vertical axis to the left and right each about 25°.

Passenger seat:
own make, mounted on front part of mudguard, left side; available as optional.

Number of grease points: 24.

Overall dimensions (tyres size 16.9-28 front and 20.8-38 rear)

	Lenght	Width		Height to top of	
		mini	maxi	exhaust silencer	safety cab or frame
	m	m	m	m	m
With ballast	5.09	2.23	2.75	3.03	2.97
Without ballast	4.82	2.23	2.75	3.03	2.97

Ground clearance: 450 mm below swinging drawbar frame.

Lighting equipment: Electrical 12 V, in accordance with Italian legislation.

	Height above ground of centre with tyres: 16.9 - 28 front 20.8 - 38 rear	Size	Distance from outside edge of tractor to centre (°)
	mm	mm	mm
Headlights	1280	180 x 120	934
Side lights	1950	75 x 55	217
Rear lights	1940	100 x 60	349
Reflectors: 1st pair	1650	90 x 55	144
2nd pair	660	90 x 55	689

(°) Track setting: 1800 mm at front
1720 mm at rear

TEST CONDITIONS

Track setting: 1900 mm at front
1720 mm at rear

Weights: Tractor (with safety cab, standard and optional tanks fuel, without driver)

	Front kg	Rear kg	Total kg
Without ballast	2350	4320	6670
With ballast	3510	5490	9000

Ballasts:

	Weights		Water (kg)
	Number	Total mass (kg)	
Front wheels Front weight	- 10 + support	- 540	390 -
Rear wheels	6	390	810
Additional	4	200	-

Fuel and lubricants used in tests

Fuel:	Esso Diesel oil; specific gravity: 0.831 Kg/l at 15 °C, which is in conformity with our National Standard;
Engine oil:	FIAT AMBRA SUPER SAE 15W/40
Transmission oil, hydraulic oil, steering oil:	FIAT TUTELA MULTI F SAE 20 W 40
Grease:	FIAT TUTELA G9

COMPULSORY TESTS

(1) MAIN POWER TAKE-OFF PERFORMANCE (1000 rev/min)

Date of tests: 24th May 1984

Location of tests: Istituto per la Meccanizzazione Agricola - Torino (Italy)

Type of dynamometer: Electrical, swinging frame

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 At 2-hour test						
121.49	2200	1061	36.64	30.45	251	3.32
At standard p.t.o. speed						
115.52	2074	1000	34.32	28.52	247	3.37
At the speed recommended by Manufacturer for drawbar work						
121.49	2200	1061	36.64	30.45	251	3.32
Part loads, the governor hand lever in the position corresponding to the maximum power at full load (curve a) (i) 85% of the torque at maximum power at 2-hour test						
106.59	2271	1095	33.61	27.93	262	3.17
(ii) unloaded						
-	2437	1175	10.14	8.43	-	-
(iii) 50% of the load defined in (i)						
55.57	2369	1142	21.88	18.18	327	2.54
(iv) maximum power						
121.49	2200	1061	36.64	30.45	251	3.32
(v) 25% of the load defined in (i)						
28.18	2402	1158	16.10	13.38	475	1.75
(vi) 75% of the load defined in (i)						
81.83	2325	1121	27.62	22.95	280	2.96

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
Part loads, the governor hand level in the position corresponding to the standard p.t.o. speed at full load (curve b) (i) 85% of the torque at maximum power at standard p.t.o. speed						
101.74	2149	1036	31.48	26.16	257	3.23
(ii) unloaded						
-	2331	1124	9.55	7.94	-	-
(iii) 50% of the load defined in (i)						
53.39	2255	1087	20.51	17.04	319	2.60
(iv) maximum power						
115.52	2074	1000	34.32	28.52	247	3.37
(v) 25% of the load defined in (i)						
27.14	2292	1105	14.90	12.38	456	1.82
(vi) 75% of the load defined in (i)						
78.36	2207	1064	26.21	21.78	278	2.99

Standard specific fuel consumption (g/kWh): 262/327/257/319

No load maximum engine speed: 2437 rev/min

Equivalent crankshaft torque at maximum power (2 hours): 527 Nm

Maximum equivalent crankshaft torque: 622 Nm at 1400 rev/min of the engine

Mean atmospheric conditions:
- temperature 23.0 °C
- pressure 978.6 mbar
- relative humidity 47%

Maximum temperature:
- coolant 87 °C
- engine oil 111 °C
- fuel 28 °C
- engine air intake 33 °C

(3) DRAWBAR PERFORMANCE

			with ballasts	without ballasts
Date of tests:	20th September 1984	Tyre size: - front: 16.9-28; 6 play;	inflation pressure:	1.3 bar	1.3 bar
Type of track:	concrete	- rear: 20.8-38; 10 play:	inflation pressure:	1.6 bar	1.6 bar

Height of drawbar above ground: 560 mm (with ballasts and without ballasts)

Gear	Driving speed Km/h	Power KW	Drawbar pull daN	Engine speed rev/min	Slip of wheels %	Specific fuel consumption g/KWh	Specific energy KWh/l	Temperatures			Atmospheric conditions		
								Fuel °C	Coolant °C	Engine oil °C	Temperature °C	Relative humidity %	Pressure mbar
1 - MAXIMUM POWER (ballasted)													
I Low	2.01	38.03	6816	2400	15.0	-	-	40.0	82	98	14.0	98	973
II Low	3.05	57.32	6767	2367	14.3	354	2.35	40.0	82	101	14.0	88	973
III Low	3.65	69.11	6816	2342	15.0	318	2.61	39.5	82	101	14.0	80	975
I Normal	3.97	74.64	6767	2320	14.0	311	2.67	39.0	83	104	14.0	78	975
I Medium	4.30	81.38	6816	2290	15.0	314	2.64	39.0	83	105	14.5	60	978
IV Low	5.31	100.54	6816	2259	14.5	294	2.82	37.0	83	105	14.5	50	978
II Normal	5.98	105.87	6374	2208	11.0	287	2.89	36.0	83	107	15.0	56	978
II Medium	6.75	106.84	5698	2194	8.8	285	2.91	34.0	85	109	15.0	60	980
III Normal	7.56	108.74	5178	2200	7.6	281	2.96	34.0	85	109	15.0	56	980
III Medium	8.58	109.14	4580	2203	5.4	281	2.96	34.0	87	111	15.5	58	980
I High	10.48	107.33	3687	2205	4.8	285	2.91	33.5	87	111	15.5	56	980
IV Normal	11.82	103.35	3148	2200	3.5	295	2.82	33.5	87	112	15.5	60	980
2 - FIVE HOUR TEST at 75% of pull at maximum power													
II Medium	7.23	85.86	4276	2294	6.4	302	2.76	35.5	84	109	16.0	58	984
3 - FIVE HOUR TEST at pull corresponding to 15% wheelslip in test (1)													
I Medium	4.59	86.90	6816	2275	-	-	-	36.0	84	108	16.0	66	983
4 - MAXIMUM POWER (unballasted)													
IV Low	5.33	82.79	5590	2305	15.0	307	2.71	31.0	81	99	18.0	82	995
II Normal	5.84	90.67	5590	2282	15.0	298	2.79	31.0	81	99	18.0	77	995
II Medium	6.38	99.92	5639	2250	15.0	304	2.73	29.0	81	102	17.0	67	993
III Normal	7.13	106.46	5374	2203	11.9	287	2.90	29.0	82	102	16.0	50	991
III Medium	8.07	108.83	4854	2200	10.0	280	2.97	27.0	84	104	16.0	40	990
I High	10.04	109.94	3942	2206	8.6	278	2.99	26.0	84	106	15.5	38	988
IV Normal	11.24	107.15	3432	2195	6.9	286	2.91	26.0	84	106	15.5	36	988
IV Medium	12.84	105.65	2962	2208	4.8	289	2.87	26.0	84	108	15.5	38	988
II High	15.97	104.42	2354	2[illegible]	3.7	292	2.85	25.5	85	108	15.5	40	988

Oil consumption during ten hours duration of test: 111 g/h

(3) TURNING SPACE AND TURNING CIRCLE:

Wheel equipment: front 16.9-28 (6 ply)
rear 20.8-38 (10 ply)

Track of wheels: front 1900 mm
rear 1720 mm

Front wheel drive disengaged

	With brakes		Without brakes	
	Right-hand	Left-hand	Right-hand	Left-hand
	m	m	m	m
Radius of turning space	5.61	5.48	6.48	6.42
Radius of turning circle	5.35	5.23	6.23	6.17

(4) LOCATION OF CENTRE OF GRAVITY:

Height above ground	mm 1090
Distance forward from the vertical plane containing the axis of the rear wheels	mm 1007
Distance from the median plane of the tractor	mm 8 right

(5) BRAKING (front wheel drive disengaged)

Date of tests: 10th January 1985
Tractor masses during tests with driver:

	Front kg	Rear kg	Total kg
without ballast	2350	4390	6740
with ballast	3510	5560	9070

Speed before application of brakes: 30.11 km/h

Type 0 test (cold brakes)

BALLASTED TRACTOR:

Braking device control force	daN	30.1	32.5	33.4	36.5	39.7	48.1
Mean deceleration	m/s^2	2.2	2.4	2.5	2.7	2.9	2.9

UNBALLASTED TRACTOR:

Braking device control force	daN	21.5	28.8	33.2	35.1	36.2	45.4
Mean deceleration	m/s^2	2.0	2.5	2.8	3.0	3.2	3.2

Type I test (fade)

Braking device control force	daN	14.0	23.6	28.7	34.3	36.3	43.5
Mean deceleration	m/s^2	2.1	2.4	2.7	2.9	3.0	3.0

Maximum deviation of tractor from its original course: none
Abnormal vibration: none
The brakes were heated by towing of the tractor for 1 km

PARKING BRAKING DEVICE TEST

	Ballasted tractor		Unballasted tractor	
	on slope of 18%		on slope of 12% with trailer of 3000 kg	
	Up	Down	Up	Down
Braking device control force: daN	41.5	46.5	37.5	43.0

(6) MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests: 30th October 1984
Type of sound level meter: BRUEL & KJAER mod. 2209
Type of track: concrete
Position of the exhaust pipe: vertical on the left hand of the engine
Results of tests:
Gear: IV high
Travelling speed before acceleration: 21.90 km/h
Sound level: 85.5 dB (A)

(7) NOISE MEASUREMENT AT THE DRIVER'S EAR LEVEL

Date of tests: 30th October 1984
Type of sound level meter: BRUEL & KJAER mod. 2209
Type of track: concrete
Tractor with FIAT CS 5 safety cab

Results of tests:

Gear	Drawbar pull at which the tractor develops the maximum sound level	Measured travelling speed		Sound level
		Nominal	Effective	
	daN	km/h	km/h	dB(A)
(i) all openings closed				
2. M (*)	5590	7.28	6.43	83.0
2. M (*)	light load	7.28	7.75	81.0
top gear	light load	30.11	32.70	80.5
(ii) cab with open windows and doors (optional)				
2. M (*)	5560	7.28	6.59	92.0
2. M (*)	light load	7.28	7.75	90.0
top gear	light load	30.11	32.62	94.5

(*) the 2. M gear corresponds to the nominal travelling speed nearest to 7.5 km/h

(8) POWER LIFT AND HYDRAULIC PUMP PERFORMANCE:

Date of tests: 13th and 14th June 1984

POWER LIFT

	Height of lower hitch point above ground in down position	Vertical movement	Maximum force exerted through full range	Corresponding pressure of hydraulic fluid	Moment about rear axle	Maximum tilt angle of mast over range of lift
	mm	mm	daN	bar	daNm	degrees
At the hitch points	400	655	5970	167	-	-
On the frame	363	780	5280	167	9662	14°

Temperature of hydraulic fluid at start of test: 65 °C.

Tilting angle of mast from vertical position to uppermost position: 10°

Lifting heights relative to horizontal links

mm	−170	−160	−100	0	+100	+200	+300	+370	+485

Lifting forces at hitch points

daN	5970	6020	6040	6140	6190	6270	6180	6140	6100

Lifting forces at test frame

daN	6310	6270	6250	6180	6085	5940	5670	5510	5280

HYDRAULIC PUMP PERFORMANCE:

– Sustained pressure with relief valve open:	175 bar
– Opening pressure of the pressure regulator:	167 bar
– Hydraulic pressure corresponding to 90% of the minimum setting of the opening pressure of the relief valve:	157.5 bar
– Delivery:	54 l/min
– Power:	14.2 kW
– Pressure specified by the manufacturer for an external hydraulic motor:	
– Pressure:	155 bar
– Delivery:	54 l/min
– Power:	13.9 kW
– Temperature of hydraulic fluid:	65 °C

– Tapping point used for test: at rear of tractor

(9) REPAIRS AND ADJUSTMENTS DURING TEST: none

(10) REMARKS: none

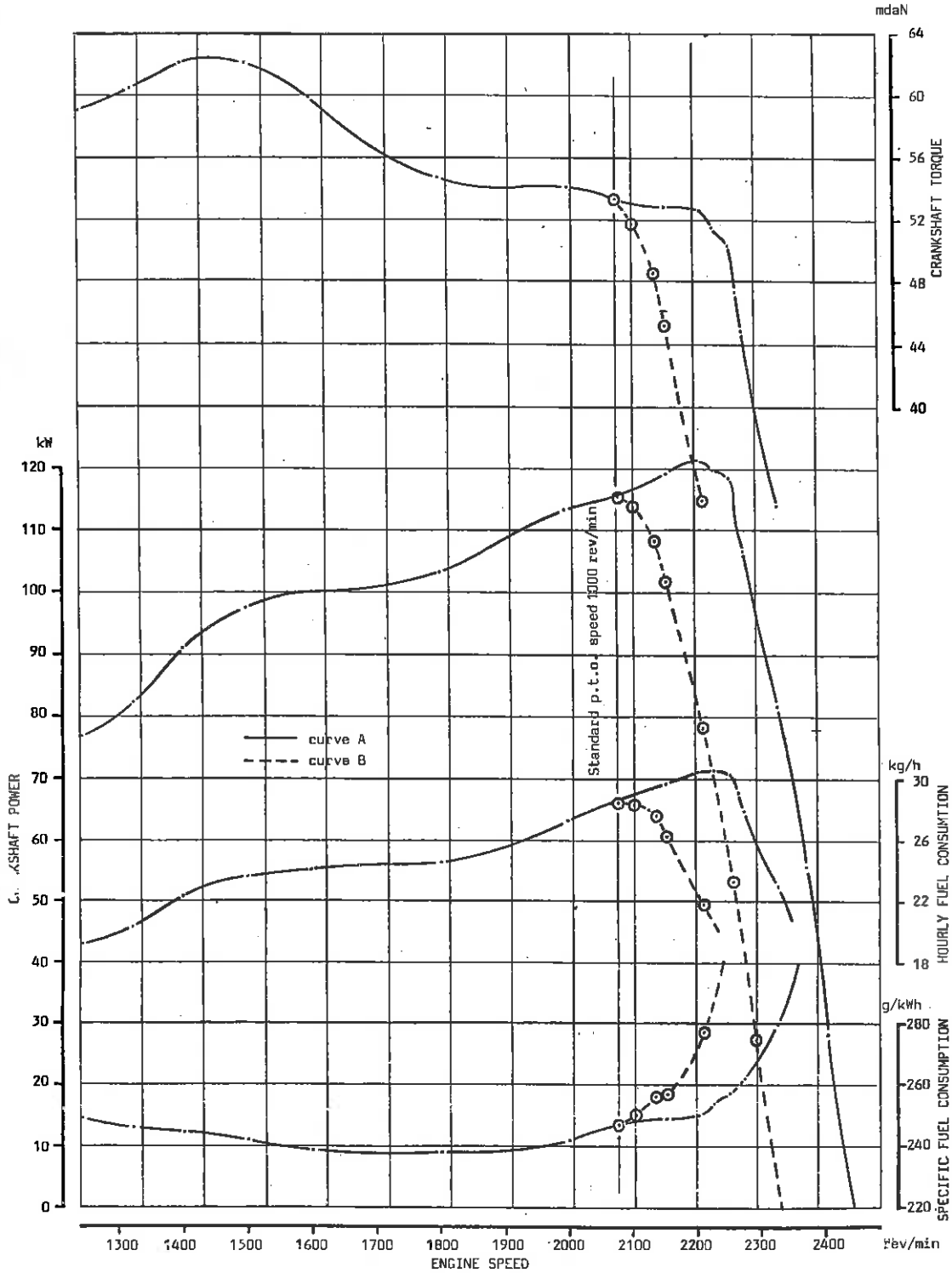


Fig. 1 - POWER TAKE-OFF TEST

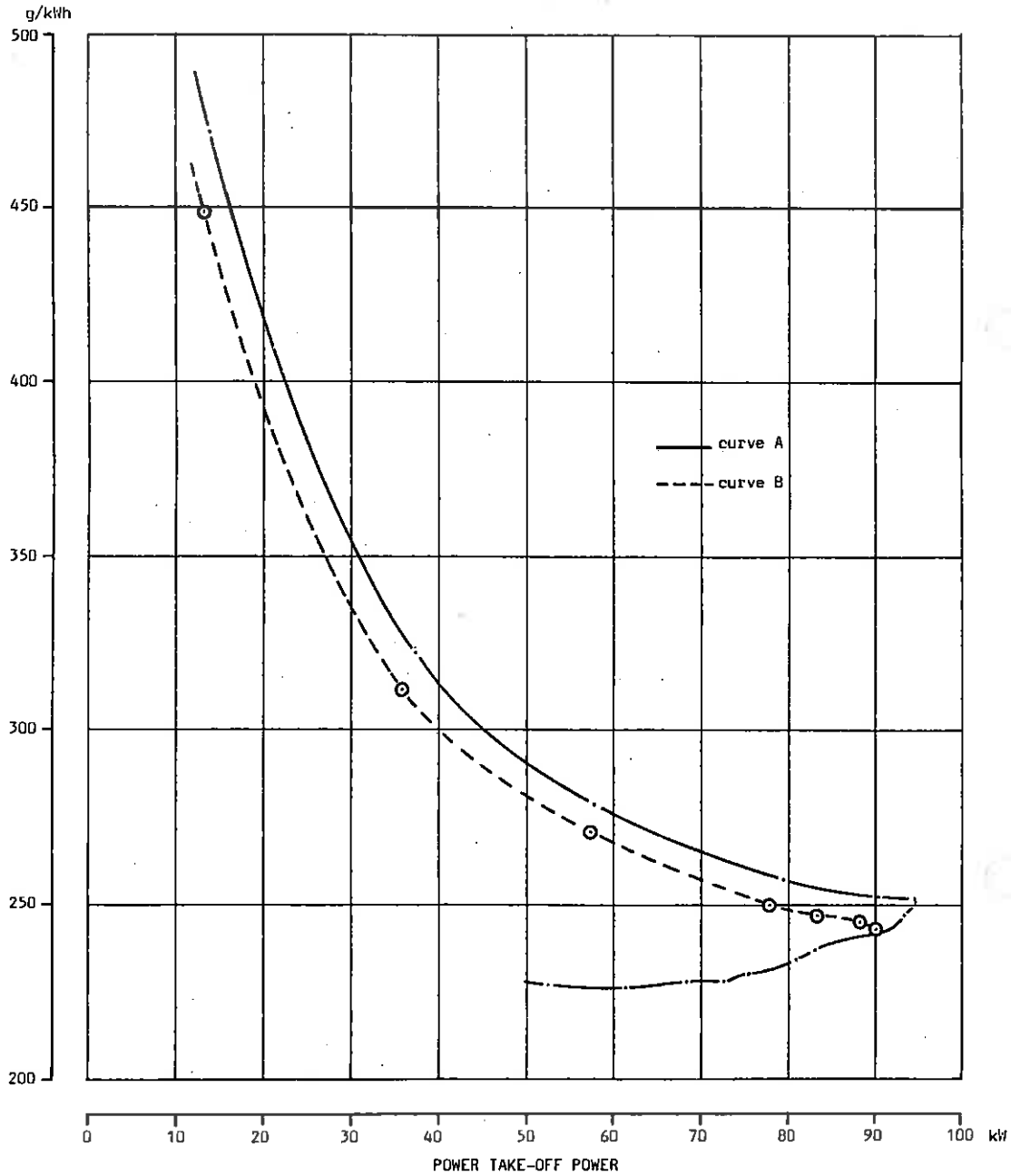
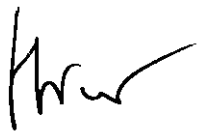


Fig. 2 - POWER TAKE-OFF TEST

HEAD OF I.M.A.
TEST DEPARTMENT



R. Gioia

DIRECTOR OF I.M.A.



L. Lisa

Turin, 19th September 1985