CONSIGLIO NAZIONALE DELLE RICERCHE
ISTITUTO PER LA MECCANIZZAZIONE AGRICOLA
Strada delle Cacce, 73 - 10135 TORINO (Italia)

Report No. 1652/T/1993

TEST IN ACCORDANCE WITH THE OECD FULL
CODE FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS

TRACTOR: Make: FIAT
Model: F 110/16
Type: 2 WD



Manufactured by: FIATGEOTECH S.p.A. - MODENA (Italy)

Date and location of tests: September 1991 - October 1992 - TORINO (Italy)

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

Number and date of approval: 1475 FULL CODE - 3rd August 1993

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 pratical farm work.

The FIAT F 110 DT tractor is manufactured in following variants:

1. F 110/16 model with 16 forward and 16 reverse speeds (4x4 gear units plus inverter)

2. F 110/32 model with 32 forward and 32 reverse speeds (2x4x4 gear units plus inverter)

3. F 110/32/HL model with 32 forward and 16 reverse speeds (8x4 gear units plus inverter; when inverter is engaged, the position HI is automatically excluded reducing to 16 the number of reverse speeds)

4. F 110/64/HL model with 64 forward and 32 reverse speeds (2x8x4 gear units plusinverter; when inverter is engaged, the position HI is automatically excluded reducing to 16 the number of reverse speeds)

Tests have been carried out on FIAT F 110/16

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

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Tractor manufacturer's name and address:	FIATGEOTECH S.p.a. Viale delle Nazioni, 55 MODENA - Italy
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with agreement by Istituto per la Mecca-nizzazione Agricola - TORINO (Italy)
Place of running-in:	FIATGEOTECH - San Matteo - MODENA (Italy)
Duration of running-in:	Engine and tractor appr. 50 hours
Location of test:	Istituto per la Meccanizzazione Agricola - TORINO (Italy)

SPECIFICATION OF TRACTOR

TRACTOR

Make:	FIAT
Model:	F 110/16
Type:	Wheel tractor unit construction, four wheel driven
Serial No.:	789780
1st serial No.:	789000

ENGINE

Make:	FIAT
Model:	8065.05A
Type:	4-stroke Diesel engine, direct injection, water cooled, naturally aspirated.
Serial No.:	562575
Cylinders:	6 cylinders, vertical, in-line, 104 mm bore x 115 mm stroke, capacity 5861 cm^3 compression ratio 17 : 1, overhead in-line valves, replaceable cast-iron dry cylinder liners.
Fuel system:	Forced feed; FP/KS22 AD6/2 type fuel pump; 1 wire-mesh filter on pump suction side and 2 filters, BOSCH make, 0.450.136.005 type, with replaceable cartridge element and sediment bowls on pressure side of iniection pump; changing interval: 400 working houres; capacity of fuel tanks:140 l for the one positioned on the left side of the gear box and 80 l for the one positioned under bonnet above engine; LUCAS CAV model DPS 8521A 760A DSA 965 injection pump, 08118KHG serial number. Manufacturer's production setting 21.19 l/h at rated engine speed and full load. Injection timing: 0° $\pm$ 1° before TDC. CAV multihole injectors, BDLL 134S model or BOSCH multihole injectors, DLLA 134S model or WEBER

	ALTECNA multihole injectors, DLL 134S model; 4725452 serial number; injector pressure 26.4 ± 0.4 MPa.
Governor:	CAV centrifugal variable speed governor, mechanical type, incorporated in fuel injection pump, governed range engine speed 650 to 2525 rev/min; rated engine speed 2300 rev/min.
Air cleaner:	FIAT main cleaner, drawing n.5150017, dry paper element filter with two replaceable cartridges FIAT make,drawing n.1930589 for the external one and n.1930590 for the inside one. Air inlet under bonnet in front of engine. Maintenance indicator:electrical.
Lubrication system:	Forced feed by means of gear type pump; two replaceable cartridge type filters, installed on the pressure line to the engine and 1 wire-mesh filter on the pump suction line. Engine oil cooling is provided by a heat exchanger using the engine coolant.
Cooling system:	Water cooled with centrifugal pump, overpressure relief valve set to 69 KPa, thermostat with by-pass; 470 mm dia, 4 blades, belt driven fan; cooling water capacity 23.5 litres. Temperature visual control with thermometer. Superpressure system: radiator cap.
Starting system:	Electrical, MARELLI or BOSCH make, 12 V 3.5 kW; starting motor pinion coupling solenoid operated. Cold starting aid: CAV make, thermostart model with variable resistance or "start-pilot" as option. Safety device: operable only when the gear box is in the neutral position.
ELECTRICAL SYSTEM	
Voltage:	12 V, negative earth.
Generator:	Alternator MARELLI make, AA 125R type, three phase, 14 V, 780 W power or as option BOSCH make,K1 type,three phase, 14 V, 780 W.
Battery:	One, MARELLI make, 6ATM25-A or 6ATP33 type; respectively capacity: 132 Ah or 176 Ah at 20 hours rating.
EXHAUST SILENCER:	FIAT make, DGM-SA 833 model, rectangular shape 102 x 105 mm dia, interference type with internal perforated pipe; length 820 mm. Vertical position on engine left side, maximum height above ground 2900 mm. As option: FIAT make, DGM-SA 1419 model, rectangular shape 107 x 127 mm, interference type with internal perforated pipe, 820 mm length; vertical position on engine left side; height above ground 2900 mm.

TRANSMISSION TO WHEELS

Clutch:

LUK or VALEO make, independent dry one disc clutch; 330.2 mm dia plate; travelling part: pedal operated; travel alone.

Gearbox:

Own make, on the tractor model tested: mechanical type syncronized constant mesh gear with total 16 forward and 16 reverse speeds.The transmission consists of the three mechanical in series gear units:the first with four positions to select the gear ratios (slow, normal, medium and high), the second with four speeds, the third with two positions in order to select the way of driving (forward or reverse); each unit is operated by the own lever.
The FIAT F 110/16 is available in other three variants:

- F 110/32 model with 32 forward and 32 reverse speeds; The transmission consists of three mechanical in series gear units: the first with four positions to select the gear ratios (slow, normal, medium and high); the second with 8 forward speeds fully synchronized placed in this way: 4 in position LO (1,3,5,7) and four in position HI (2,4,6,8); the third with two positions in order to select the way of driving (forward or reverse); when this one is positioned in the reverse way, the positon, HI of the second unit is automatically excluded reducing to 16 the number of reverse speeds; each unit is operated by the own lever.
- F 110/32/HL model with 16 forward and 16 reverse speeds; the transmission consists of the three mechanical in series gear units:the first with four positions to select the gear ratios (slow, normal, medium and high), the second with four speeds, the third with two positions in order to select the way of driving (forward or reverse); each unit is operated by the own lever.
- F 110/64/HL model with 64 forward and 32 reverse speeds; the transmission consists of four mechanical in series gear units: the first with four positions to select the gear ratios (slow, normal, medium and high); the second with 8 forward speeds fully synchronized placed in this way: 4 in position LO (1,3,5,7) and four in position HI (2,4,6,8); the third with two positions in order to select the way of driving (forward or reverse); when this one is positioned in the reverse way, the positon, HI of the second unit is automatically excluded reducing to 16 the number of reverse speeds; the fourth with two positions to select direct or crawling speeds; each unit is operated by the own lever.

Rear axle and final drive:

Own make, costant mesh gear type; bevel gear type with electro-hydraulical locking device to engage the mechanical differential, operated by means of a button with three positions (left,middle,right) on the dashboard; the differential may be released manually, bringing the button back to the left position, automatically, using the brakes while the

button is in the middle position, and automatically, pressing the lift-o-matic control when the button is in the right position; epyciclic final drive.

Front axle: Inverted U type, telescoping centre pivoting.

FIAT F 110/16

Total ratios and travelling speeds (tyres 18.4 R 38 and pressure 160 KPa)

Gear	Group	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed (2300 rev/min) km/h
I	Slow	478.017	1.49
II		331.372	2.15
III		230.321	3.09
IV		160.713	4.42
I	Medium slow	200.566	3.54
II		139.073	5.11
III		96.638	7.36
IV		67.432	10.54
I	Medium high	166.332	4.27
II		115.305	6.17
III		80.143	8.87
IV		55.922	12.71
I	High	68.018	10.45
II		47.152	15.08
III		32.773	21.69
IV		22.868	31.09
I	Reverse slow	489.133	1.45
II		339.078	2.10
III		235.678	3.02
IV		164.450	4.32
I	Reverse medium slow	205.231	3.46
II		142.271	5.00
III		98.886	7.19
IV		69.000	10.30
I	Reverse medium high	170.200	4.18
II		117.986	6.03
III		82.007	8.67
IV		57.222	12.43
I	Reverse high	69.600	10.22
II		48.248	14.74
III		33.535	21.20
IV		23.400	30.38

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1-1984)

FIAT F 110/32

Total ratios and travelling speeds (tyres 18.4 R 38 and pressure 160 KPa)

Gear	Group	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed (2300 rev/min) km/h
I	Slow (crawling speed)	2868.101	0.25
II		1988.231	0.36
III		1318.927	0.51
IV		964.275	0.74
I	Slow	478.017	1.49
II		331.372	2.15
III		230.321	3.09
IV		160.713	4.42
I	Medium slow (crawling speed)	1203.399	0.59
II		834.223	0.85
III		579.830	1.23
IV		404.591	1.76
I	Medium slow	200.566	3.54
II		139.037	5.11
III		96.638	7.36
IV		67.432	10.54
I	Medium high (crawling speed)	997.991	0.71
II		691.830	1.03
III		480.859	1.48
IV		335.531	2.12
I	Medium high	166.332	4.27
II		115.305	6.17
III		80.143	8.87
IV		55.922	12.71
I	High (crawlig speeed)	408.109	1.74
II		282.910	2.51
III		196.638	3.62
IV		137.209	5.18
I	High	68.018	10.45
II		47.152	15.08
III		32.773	21.69
IV		22.868	31.09
I	Reverse slow (crawling speed)	2934.802	0.24
II		2034.469	0.35
III		1414.065	0.50
IV		986.700	0.72
I	Reverse slow	489.133	1.45
II		339.078	2.10
III		235.678	3.02
IV		164.450	4.32
I	Reverse medium slow (crawling speed)	1231.386	0.58
II		853.624	0.83
III		593.314	1.20
IV		414.000	1.72
I	Reverse medium slow	205.231	3.46
II		142.271	5.00
III		98.886	7.19
IV		69.000	10.30

I	Reverse	1021.200	0.70
II	medium high	707.919	1.00
III	(crawling	492.041	1.45
IV	speed)	343.335	2.07
I	Reverse	170.200	4.18
II	medium	117.986	6.03
III	high	82.007	8.67
IV		57.222	12.43
I	Reverse	417.600	1.70
II	high	289.490	2.46
III	(crawling	201.211	3.53
IV	speed)	140.400	5.06
I		69.600	10.22
II	Reverse	48.248	14.74
III	high	33.535	21.20
IV		23.400	30.38

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1-1984)

FIAT F 110/32/HL

Total ratios and speeds (tyres 18.4 R 38 and pressure 160 kPa)

Gear	Group	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed (2300 rev/min) km/h
I LO	Slow	575.254	1.24
I HI		478.017	1.49
II LO		398.779	1.78
II HI		331.372	2.15
III LO		277.173	2.57
III HI		230.321	3.09
IV LO		193.404	3.68
IV HI		160.713	4.42
I LO	Medium slow	241.365	2.95
I HI		200.566	3.54
II LO		167.320	4.25
II HI		139.037	5.11
III LO		116.296	6.11
III HI		96.638	7.36
IV LO		81.149	8.76
IV HI		67.432	10.54
I LO	Medium high	200.167	3.55
I HI		166.332	4.27
II LO		138.760	5.12
II HI		115.305	6.17
III LO		96.446	7.37
III HI		80.143	8.87
IV LO		67.297	10.57
IV HI		55.922	12.71
I LO	High	81.854	8.69
I HI		68.018	10.45
II LO		56.743	12.53
II HI		47.152	15.08
III LO		39.440	18.03
III HI		32.773	21.69
IV LO		27.520	25.84
IV HI		22.868	31.09
I	Reverse slow	489.133	1.45
II		339.078	2.10
III		235.678	3.02
IV		164.450	4.32
I	Reverse medium slow	205.231	3.46
II		142.271	5.00
III		98.886	7.19
IV		69.000	10.30
I	Reverse medium high	170.200	4.18
II		117.986	6.03
III		82.007	8.67
IV		57.222	12.43
I	Reverse high	69.600	10.22
II		48.248	14.74
III		33.535	21.20
IV		23.400	30.38

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1-1984)

FIAT 110/64/HL

Total ratios and travelling speeds (tyres 18.4 R 38 and pressure 160 KPa)

Gear	Group	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed (2300 rev/min) km/h
I LO	Slow (crawling speed)	3451.527	0.21
I HI		2868.101	0.25
II LO		2392.675	0.30
II HI		1988.231	0.36
III LO		1663.037	0.43
III HI		1381.927	0.51
IV LO		1160.427	0.61
IV HI		964.275	0.74
I LO	Slow	575.254	1.24
II HI		478.017	1.49
II LO		398.779	1.78
II HI		331.372	2.15
III LO		277.173	2.57
III HI		230.321	3.09
IV LO		193.404	3.68
IV HI		160.713	4.42
I LO	Medium slow (crawling speed)	1448.193	0.49
I HI		1203.399	0.59
II LO		1003.920	0.71
II HI		834.223	0.85
III LO		697.778	1.02
III HI		579.830	1.23
IV LO		486.982	1.46
IV HI		404.591	1.76
I LO	Medium slow	241.365	2.95
I HI		200.566	3.54
II LO		167.320	4.25
II HI		139.037	5.11
III LO		116.296	6.11
III HI		96.638	7.36
IV LO		81.149	8.76
IV HI		67.432	10.54
I LO	Medium high (crawling speed)	1201.001	0.59
I HI		997.991	0.71
II LO		832.561	0.85
II HI		691.830	1.03
III LO		578.674	1.23
III HI		480.859	1.48
IV LO		403.785	1.76
IV HI		335.531	2.12
I LO	Medium high	200.167	3.55
I HI		166.332	4.27
II LO		138.760	5.12
II HI		115.305	6.17
III LO		96.446	7.37
III HI		80.143	8.87
IV LO		67.297	10.57
IV HI		55.922	12.71

I LO	High (crawling speed)	491.126	1.45
I HI		408.109	1.74
II LO		340.460	2.09
II HI		282.910	2.51
III LO		236.638	3.00
III HI		196.638	3.62
IV LO		165.120	4.31
IV HI		137.207	5.18
I LO	High	81.854	8.69
I HI		68.018	10.45
II LO		56.743	12.53
II HI		47.152	15.08
III LO		39.440	18.03
III HI		32.773	21.69
IV LO		27.520	25.84
IV HI		22.868	31.09
I	Reverse slow (crawling speed)	2934.802	0.24
II		2034.496	0.35
III		1414.065	0.50
IV		986.700	0.72
I	Reverse slow	489.133	1.45
II		339.078	2.10
III		235.678	3.02
IV		164.450	4.32
I	Reverse medium slow (crawling speed)	1231.386	0.58
II		853.624	0.83
III		593.314	1.20
IV		414.000	1.72
I	Reverse medium slow	205.231	3.46
II		142.271	5.00
III		98.886	7.19
IV		69.000	10.30
I	Reverse medium high (crawling speed)	1021.200	0.70
II		707.919	1.00
III		492.041	1.45
IV		343.335	2.07
I	Reverse medium high	170.200	4.18
II		117.986	6.03
III		82.007	8.67
IV		57.222	12.43
I	Reverse high (crawling speed)	417.600	1.70
II		289.490	2.46
III		201.211	3.53
IV		140.400	5.06
I	Reverse high	69.600	10.22
II		48.248	14.74
III		33.532	21.20
IV		23.400	30.38

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1-1984)

POWER TAKE OFF

Main:

Type: independent; hand lever used to select the two standard speeds; two interchangeable shafts.
Method of engagement: by means of oil bath multidisc clutch with an electrohydraulic device having two position (pto engaged or disengaged).
Position: rear of tractor, in median plane; height above ground 800 mm (with tyre 18.4 R 38).

Proportional engine speed p.t.o.:

- *540 rev/min:* distance behind rear axle 600 mm; diameter of p.t.o. shaft end 35 mm; 6 splines, in conformity with ISO 500/1990; no power restriction; 630 rev/min at rated engine speed; standard p.t.o. speed 540 rev/min at engine speed 1969 rev/min; p.t.o. shaft rotates clockwisely, viewed from tractor rear.
  Ratio of rotation speed:

  $$\text{Engine/p.t.o. ratio} = \frac{2300}{630} = 3.650$$

- *1000 rev/min:* distance behind rear axle 600 mm; diameter of p.t.o. shaft end: 35 mm; 21 splines, in conformity with ISO 500/1990 and 45 mm; 6 splines, not in conformity with ISO 500/1990; no power restriction; 1085 rev/min at rated engine speed; standard p.t.o. speed 1000 rev/min at engine speed 2120 rev/min; p.t.o. shaft rotates clockwisely, viewed from tractor rear.
  Ratio of rotation speed:

  $$\text{Engine/p.t.o. ratio} = \frac{2300}{1085} = 2.120$$

As option:

- two speeds power take off (540 and 1000 rev/min) with automatic speed selection replacing the pto shaft end;

- three speeds power take off (540,750 and 1000 rev/min) selected by means of an hand lever.

  750 rev/min: distance behind rear axle 600 mm; diameter of p.t.o. shaft end 35 mm; 6 splines, not in conformity with ISO 500/1990; no power restriction; 803 rev/min at rated engine speed; standard p.t.o. speed 750 rev/min at engine speed 2148 rev/min; p.t.o. shaft rotates clockwisely, viewed from tractor rear.
  Ratio of rotation speed:

  $$\text{Engine/p.t.o. ratio} = \frac{2300}{803} = 2.864$$

- syncronized ground speed pto.

P.t.o. proportional to ground speed:

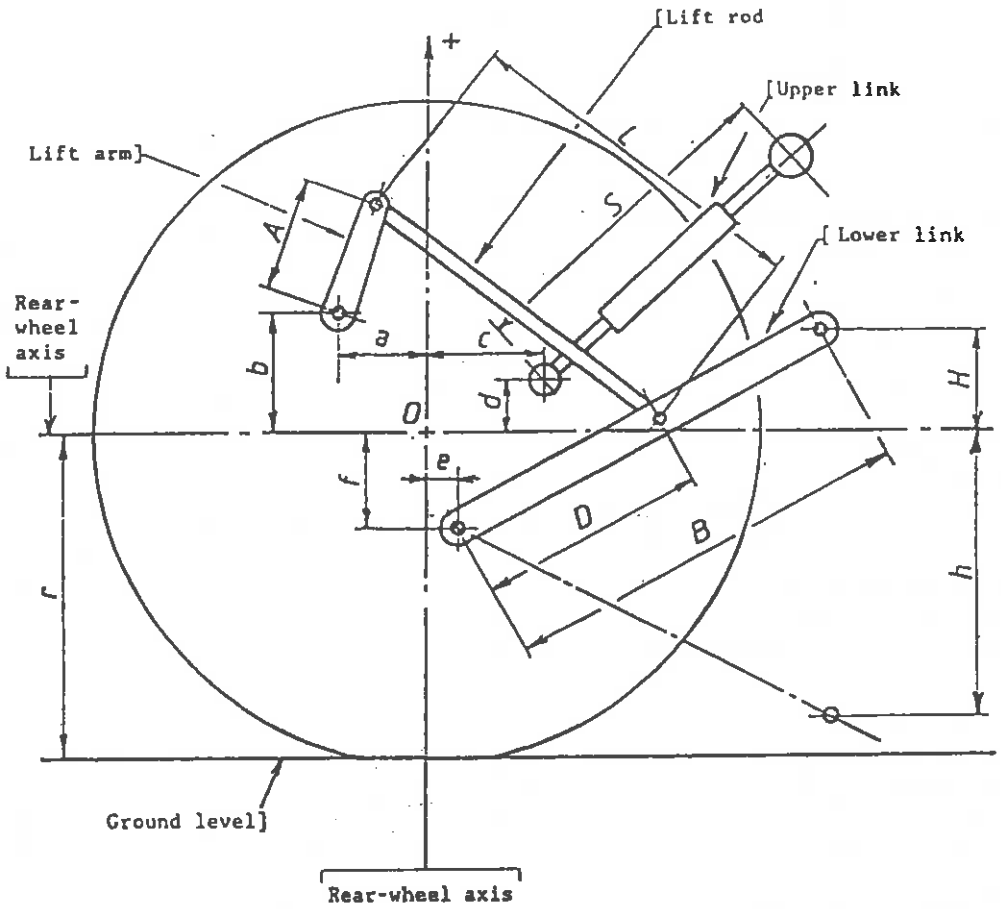
size of tyres: 18.4 R 38, radius index 820 mm; travelling distance for one revolutions of p.t.o. shaft: 0.37 m with 540 rpm PTO, 0.29 m with 750 rpm PTO and 0.22 m with 1000 rpm PTO;
number of p.t.o. shaft revolution for one revolution of the real wheels: 13,9 revolutions with 540 rpm PTO; 17.6 revolutions with 750 rpm PTO and 23.8 revolutions with 1000 rpm PTO.
Direction of rotation with forward gear engaged: clockwise, viewed from tractor rear.

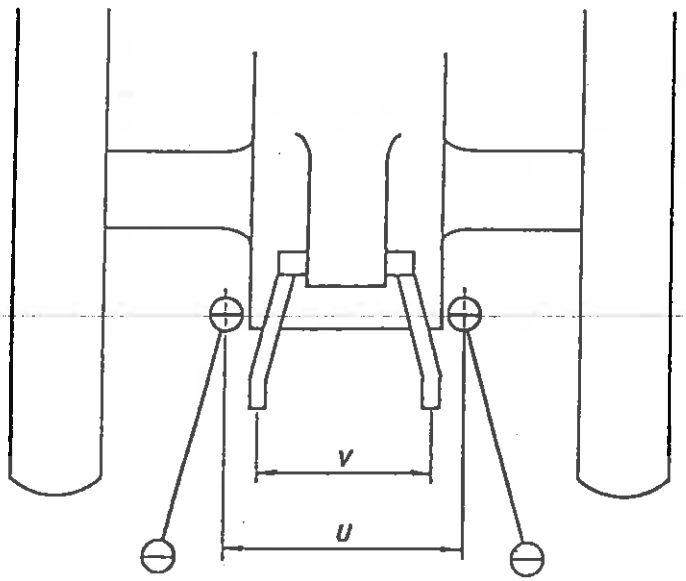
POWER LIFT:

Own make; hydraulic power lift in unit construction, draught, position float and combined draught and position control operated by two independent levers; lift-o-matic device to raise and to low in a fast way the lower links.

- *Hydraulic system:* open centre system with hydraulic oil taken from rear transmission by means of gear pump driven straight by the real transmission drive shaft. One single acting cylinder with 115 mm bore and 159 mm stroke.
  As option, one single acting cylinder with 75 mm bore and 150 mm stroke out of the housing.
  Relief valve pressure setting: 19.0 MPa.
  Antishock valve setting: 21.0 MPa.
  FIAT C42XP lift gear pump, directly driven by engine.
  Delivery 55.0 l/min at rated engine speed.

There are no cylinder safety valves.
Type of linkage lock for transport: hydraulic. Site of oil revervoir: rear transmission cast housing. Number one, or as option, two, three or four tapping points on the rear part of tractor. Maximum volume of oil available to external cylinder 10 litres.
Implement linkage:
2nd category implement attachment with three point linkage and lower links with quick-connection or telescopic ends, according to I.S.O. STANDARD 730/I-1990; dimensions see on pag. 16.


Lift rod
Upper link
Lift arm
Lower link
Rear-wheel axis
+
A
S
L
a
b
c
d
H
O
e
f
D
B
h
r
Ground level
Rear-wheel axis


v
u

Dimension of linkage geometry (when connected to the standard frame)

		Dimension or range mm	Settings used in compulsory test mm	Settings used in optional test mm
Length of lift arms	(A)	230	230	230
Length of lower links	(B)	960	960	960
Distance of lift arm pivot point from rear wheel axis: - horizontally	(a)	152	152	152
- vertically	(b)	369	369	369
Horizontal distance between the 2 lower link points	(u)	540 - 570	540	540
Horizontal distance between the 2 lift arm end points	(v)	565	565	565
Length of upper link	(S)	from 650 to 950	725	745
Distance of upper link pivot point from rear wheel axis: - horizontally	(c)	425 - 450	450	425
- vertically	(d)	215 - 282	215	282
Distance of lower link pivot point from rear wheel axis: - horizontally	(e)	220	220	220
- vertically	(f)	243	243	243
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	440 - 510	440	510
Length of lift rods	(L)	from 645 to 790	745	790
Heigth of lower hitch points relative to the rear wheel axis: - in low position	(h)	from 250 to 605	605	605
- in high position	(H)	from 60 to 310	155	80
Height above ground of lower hitch points when locked in transport position (*)		from 880 to 1130		

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

SWINGING DRAWBAR:

Own make; clevis type.
Vertical height with tyres 18.4 R 38, to centre of clevis: min 500 mm max 620 mm above ground; adjustments obtained by overturning the drawbar to position the fork uppermost or down; clevis coupling pin diameter 28 mm; distance of hitch point from rear axle horizontally: 1000 mm behind.
Position relative to p.t.o., horizontally and vertically:
- 400 mm behind
- from 180 mm below to 300 mm below

Lateral adjustements: two position (one in the middle and one for each side at 200 mm).
Pivot position relative to rear wheels horizontally 300 mm.
Maximum vertical load: not allowed by italian legislation and by manufacturer.

HITCH:

Own make; clevis type; 10 positions from an height above ground (with tyres 18.4 R 38) of 560 mm to 1055 mm, changeable by sliding on drilled guides; hitch hole 28 mm dia; distance of hitch hole to rear axle horizontally 690 mm; position relative to p.t.o.: vertical from 240 mm below to 245 mm above; 90 mm horizontal behind.
Maximum vertical load 14.7 kN according to italian legislation (with tyres 18.4 R 38 146 A8).
As option:
Own make; clevis type; 10 positions from an height above ground (with tyres 18.4 R 38) of 500 mm to 1090 mm, changeable by sliding on drilled guides; hitch hole 51 mm dia; distance of hitch hole to rear axle horizontally 770 mm; position relative to p.t.o.: vertical from 300 mm below to 290 mm above; 90 mm horizontal behind.
Maximum vertical load 22.8 kN according to italian legislation (with tyres 18.4 R 38 146 A8).

HOLED DRAWBAR:

Available as option.

STEERING:

Own make, hydrostatic control, with semindependent hydraulic circuit. Distributor DANFOSS make, Orbitrol OSPC 160 ON; gear pump delivery 19.1 l/min at rated engine speed, one double acting cylinder directly acting on the front wheel, transversaly mounted, bore 48 mm, stroke 220 mm, piston rod 22 mm dia; working pressure 12.5 $\pm$ 0.2 MPa.
One replaceable paper filter on pump suction line.

BRAKES:

Service brake:
Own make, oil immersed disk brakes on differential half shaft; right-hand and left hand brake independent circuits hydrostatically operated by separate pedals locked together for road drive.
As option:
- it differs from the standard solution for the mixed-automatic braking system in order to brake the possible trailers.

Parking brake:
Own make, hand lever operated; three-disc, fully independent, mounted on bevel pinion shaft.
Steering brake:

Divided pedal of service brake, for normal use locked together.

WHEELS:

Steering wheels:
at front, two tyres with steel plate discs and rims
Tyres available:
9.00-16 8 ply
10.00-16 8 ply
11.00-16 8 ply

Driving wheels:
at rear two tyres with steel plate discs and rims
Tyres available:
18.4 R 34 144 A8
16.9 R 38 141 A8
18.4 R 38 146 A8
480/70 R 38 145 A8

Recommended tyre matching			
At front		At rear	
9.00-16	8 ply	18.4 R 34	144 A8
10.00-16	8 ply	16.9 R 38	141 A8
11.00-16	8 ply	18.4 R 38	146 A8
10.00-16	8 ply	480/70 R 38	145 A8

Wheelbase: 2770 mm

- Track width adjustment in the following two condition:

  - Track width with 34" rims at rear

	Minimum mm	Maximum mm	Adjustement method
Front	1515	2015	continuos by 100 mm steps extending axle
Rear	1550	2150	manual placing disc bulge facing either inward or outward

  - Track width with 38" rims at rear

	Minimum mm	Maximum mm	Adjustement method
Front	1515	2015	continuos by 100 mm steps extending axle
Rear	1450	2155	manual placing disc bulge facing either inward or outward

PROTECTIVE STRUCTURE: FIATGEOTECH safety CAB, CS 24 type, not tiltable, OECD approval number CSS - 0145/25.

SEAT:

Driver's seat:
GRAMMER make, DS 85H1/90A model, upholstered seat with back rest,parallelogram suspension, hydraulic damper and tip-up arms; height of unloaded seat above driver's platform adjustable from 0 mm to 60 mm in a continuos way, longitudinal adjustment 150 mm. As option De-Luxe seat model with adiustable back, swidel cradle and parallelogram or pneumatic suspension.

Passenger seat: none.

LIGHTING: Electrical 12 V, in accordance with Italian legislation.

	Height above ground of centre mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Headlights	1095	170 x 110	250
Sidelights	1853	110 x 35	820
Rearlights	1710	90 x 60	820
Reflectors 1st pair	1490	90 x 55	905

TEST CONDITIONS

OVERALL DIMENSIONS

	Length	Width		Height to top of	
		mini	maxi	exhaust silencer	protective structure
	m	m	m	m	m
With ballast	4.98	2.02	2.70	2.90	2.78
Without ballast	4.66	2.02	2.70	2.90	2.78

Ground clearance: 530 mm below the gear box housing.

Tractor mass
(with protective structure and full fuel tank):

	Without driver		With driver	
	Without ballasts kg	With ballast weights kg	Without ballasts kg	With ballast weights kg
Front	1630	1980	1650	2000
Rear	2760	3110	2815	3165
Total	4390	5090	4465	5165

Ballasts:

	Weights		Water (kg)
	Number	Total mass (kg)	
Front wheels	-	-	
Front weight	10	400	-
Rear wheels	6	300	

Tyres and track width specifications

	Front	Rear
Tyres:	GOODYEAR	GOODYEAR
dimensions	11.0-16	18.4 R 38
ply rating	8 ply	146 A8
type	diagonal	radial
maximum load	1190 kg (35 km/h)	3090 kg (35 km/h)
inflaction pressure (tyre manufacturer's)	250 KPa	160 KPa
dynamic radius index	435 mm	820 mm
Chosen track width:	1515 mm	1650 mm

Oils and lubrication

- Capacity and change interval

	Capacity dm3	Oil change h	Filter change h
Engine	15.7	200	400
Gear box with hydraulic system, rear transmission, P.T.O. and steering system	60.0	400	400

- Specifications (SAE, API, MIL-L, ISO)

	Recommended	Used during test
Engine oil - Type: - Viscosity: - Classification:	AMBRA SUPER SAE 15 W 40 MIL-L-2014 D	As recommended
Trasmission oils - Type: - Viscosity: - Classification	TUTELA MULTI F SAE 20 W 40 MF 1135 and M2 C86 A	As recommended
Hydraulic fluid - Type: - Viscosity: - Classification:	TUTELA MULTI F SAE 20 W 40 MF 1135 and M2 C86 A	As recommended
Steering oil - Type: - Viscosity: - Classification:	TUTELA MULTI F SAE 20 W 40 MF 1135 and M2 C86 A	As recommended

- Grease: FIAT TUTELA G9

Number of lubrication points: 23

Fuel:

- Type: Esso Diesel oil, in conformity with national standard.

- Density at 15° C: 0.835 g/cm^3

COMPULSORY TEST RESULTS

1. **MAIN POWER TAKE OFF**
   - Date and location of tests: 05/09/1991, I.M.A., TORINO, ITALY
   - Type of dynamometer: PARASITIC CURRENTS, BORGHI & SAVERI FA 300-30 SP

Power	Speed		Fuel consumption			Specific energy
	Engine	P.t.o.	Hourly		Specific	
kW	rev/min		kg/h	l/h	g/kWh	kWh/l
1.1 **MAXIMUM POWER** - TWO HOUR TEST						
71.48	2300	1085	17.60	21.08	246	3.39
1.2 POWER AT RATED ENGINE SPEED						
71.59	2300	1085	17.60	21.08	246	3.40
1.3 STANDARD POWER TAKE OFF SPEED (1000 ± 25 rev/min)						
71.08	2120	1000	17.60	21.08	248	3.37
1.4 **PART LOADS**						
1.4.1 the torque corresponding to maximum power at rated engine speed						
71.59	2300	1085	17.60	21.08	246	3.40
1.4.2 85% of torque obtained in 1.4.1						
63.55	2402	1133	16.10	19.28	253	3.30
1.4.3 75% of torque defined in 1.4.2						
48.12	2425	1144	13.10	15.69	272	3.07
1.4.4 50% of torque defined in 1.4.2						
32.47	2455	1158	10.50	12.57	323	2.58
1.4.5 25% of torque defined in 1.4.2						
16.46	2489	1174	7.70	9.22	468	1.78
1.4.6 unloaded						
----	2504	1181	5.40	6.47	----	----
1.5 **PART LOADS AT STANDARD POWER TAKE OFF SPEED (1000 ± 25 rev/min)**						
1.5.1 the torque corresponding to maximum power						
71.19	2120	1000	17.57	21.04	247	3.38
1.5.2 85% of torque obtained in 1.5.1						
62.32	2184	1030	15.32	18.35	246	3.40
1.5.3 75% of torque defined in 1.5.2						
47.34	2211	1043	12.50	14.97	264	3.16
1.5.4 50% of torque defined in 1.5.2						
32.01	2243	1058	9.65	11.56	301	2.77
1.5.5 25% of torque defined in 1.5.2						
16.31	2285	1078	6.60	7.90	405	2.06
1.5.6 unloaded						
----	2317	1093	4.60	5.51	----	----

No load maximum engine speed : 2504 rev/min
Torque at maximum power: 297.3 Nm
Maximum torque: 362.0 Nm at 1300 rev/min of the engine
Mean atmospheric conditions: Temperature 24 °C
Pressure 1000 mbar
Relative Humidity 66%
Maximum Temperature: Coolant 94 °C
Engine oil 130 °C
Fuel 36 °C
Engine air intake 24 °C

2. HYDRAULIC POWER AND LIFTING FORCE (*)

(Tests have been carried out with the same setting condition of FIAT F 120 DT tractor. The differences between the two tests are not significant; therefore results of power lift test made on FIAT F 110 tractor are equivalent of these found for FIAT F 120 DT tractor)

- Date of tests: 16th September 1991

2.1 HYDRAULIC POWER TEST

- Sustained pressure with relief valve open: 17 MPa
- Pump delivery rate at minimum pressure: 53.4 l/min

	Flow rate l/min	Pressure MPa	Power kW
Flow rate corresponding to a hydraulic pressure equivalent to 90 per cent of the actual relief valve pressure setting and corresponding hydraulic power	51.80	16.7	14.13
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	51.80	17.0	14.39

- Tapping point used for test: at rear of tractor
- Temperature of hydraulic fluid: 65 °C

2.2 POWER LIFT TEST

	at the hitch point		on the frame	
Height of lower hitch points above ground in down position	200	mm	200	mm
Vertical movement	760	mm	760	mm
Maximum corrected force exerted through full range	26.4	kN	26.1	kN
Corresponding pressure of hydraulic fluid	16.7	MPa	16.7	MPa
Moment about rear-wheel axis	-	kNm	46.72	kNm
Maximum tilt angle of mast from vertical	- degress		6.2 degress	

Lifting heights relative to the horizontal plane including the lower pivot points								
mm	- 362	- 300	- 150	0	+ 100	+ 200	+ 300	+ 398
Lifting forces								
at the hitch points kN	26.40	28.60	32.20	33.10	33.80	34.00	34.10	35.00
Corresponding presure: 16.7 MPa								
at the frame kN	27.00	28.90	30.70	30.60	29.80	28.40	27.50	26.10
Corresponding pressure: 16.7 MPa								

(*) Performances are obtained with dimension's values set in condition of minimum mechanical advantage.

PERFORMANCES OBTAINED WITH THE SUPPLEMENTARY CYLINDER MOUNTED

	at the hitch point		on the frame	
Height of lower hitch points above ground in down position	200	mm	200	mm
Vertical movement	760	mm	760	mm
Maximum corrected force exerted through full range	30.4	kN	33.3	kN
Corresponding pressure of hydraulic fluid	16.7	MPa	16.7	MPa
Moment about rear-wheel axis	-	kNm	59.61	kNm
Maximum tilt angle of mast from vertical	- degress		6.2 degress	

Lifting heights relative to the horizontal plane including the lower pivot points								
mm	- 362	- 300	- 150	0	+ 100	+ 200	+ 300	+ 398
Lifting forces								
at the hitch points kN	30.40	34.50	42.10	46.20	48.00	49.30	50.70	52.90
Corresponding presure: 16.7 MPa								
at the frame kN	33.30	36.50	41.00	42.30	42.30	41.90	41.00	40.10
Corresponding pressure: 16.7 MPa								

3. DRAWBAR PERFORMANCE

Date of tests: 13th - 16th October 1992
Type of track: concrete
Tyre size - front: 11.00-16 8 ply
- rear: 18.4 R 38 146 A8

	Height of hitch above ground	Tyre inflaction pressure	
		Front	Rear
Unballasted	750 mm	250 kPa	160 kPa
Ballasted	745 mm	250 kPa	160 kPa

Gear no. and group	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	Temperature			Atmospheric conditions		
								Fuel °C	Coolant °C	Engine oil °C	Temperature °C	Relative humidity %	Pressure mbar
3.1 - MAXIMUM POWER IN TESTED GEARS (unballasted tractor)													
IV Slow	4.01	42.09	3776	2423	14.8	349	2.39	33	88	106	17.5	52	990.6
II Medium slow	4.64	48.62	3776	2410	14.4	325	2.57	32	88	113	17.5	53	990.6
II Medium high	5.67	56.25	3570	2306	9.2	291	2.87	29	90	113	18.0	54	990.6
III Medium slow	7.03	58.17	2981	2300	5.6	280	2.98	27	91	112	18.0	58	990.6
III Medium high	8.57	57.88	2432	2306	4.7	282	2.96	29	92	109	18.0	60	990.6
I High	10.17	58.72	2079	2302	3.9	277	3.02	28	93	108	18.0	61	990.6
IV Medium slow	10.26	57.29	2010	2301	3.8	284	2.94	30	94	106	18.0	61	990.6
IV Medium high	12.46	56.31	1628	2307	3.4	288	2.90	33	94	112	18.0	63	990.6
3.2 - MAXIMUM POWER IN TESTED GEARS (tractor with ballast weights)													
I Slow	1.37	14.74	3864	2471	15.0	-	-	28	88	95	22.0	53	986.6
II Slow	1.98	21.24	3864	2462	14.8	-	-	30	90	101	22.0	53	986.6
III Slow	2.83	30.44	3874	2450	14.9	380	2.20	29	90	104	22.0	55	986.6
I Medium slow	3.24	34.89	3874	2449	15.0	354	2.36	30	90	106	22.5	56	986.6
I Medium high	3.89	41.83	3874	2433	15.0	335	2.49	34	92	107	22.5	58	986.6
IV Slow	4.02	43.23	3874	2426	14.8	336	2.49	30	94	110	22.5	57	986.6
II Medium slow	4.60	48.86	3825	2411	15.1	325	2.57	27	94	108	22.5	59	988.0
II Medium high	5.69	56.06	3550	2298	8.7	293	2.85	28	94	113	22.5	60	989.3
III Medium slow	7.00	57.73	2971	2297	5.8	283	2.95	30	95	114	23.0	60	989.3
III Medium high	8.58	57.45	2412	2298	4.3	284	2.94	24	95	113	23.0	61	990.6
I High	10.18	58.21	2059	2302	3.8	281	2.97	25	94	112	23.5	62	990.6
IV Medium slow	10.29	56.90	1991	2303	3.6	288	2.90	21	95	111	23.5	61	990.6
IV Medium high	12.36	55.89	1628	2294	3.6	291	2.87	23	94	111	23.5	64	990.6
3.3.1 - FIVE HOUR TEST at 75% of pull at maximum power													
III Medium slow	7.51	46.45	2228	2435	4.7	315	2.65	32	94	120	24.5	58	987.9
3.3.2 - FIVE HOUR TEST at pull corresponding to 15% wheelslip - with 350 kg as additional ballast													
II Medium slow	4.43	47.06	3825	2400	-	-	-	33	95	115	25.0	62	986.6

Oil consumption during ten hours tests 3.3.1 and 3.3.2: 62 g/h

Tests 3.3.2 was carried out with additional ballast; so, the not quoted figures are irrelevant

4. TURNING AREA AND TURNIG CIRCLE

Wheel equipment front: 11.00-16 8 ply
rear: 18.4 R 38 146 A8

Track width front: 1515
rear: 1650

	With brakes		Without brakes	
	Right-hand m	Left-hand m	Right-hand m	Left-hand m
Radius of turning area	3.91	3.96	4.66	4.71
Radius of turning circle	3.75	3.80	4.50	4.55

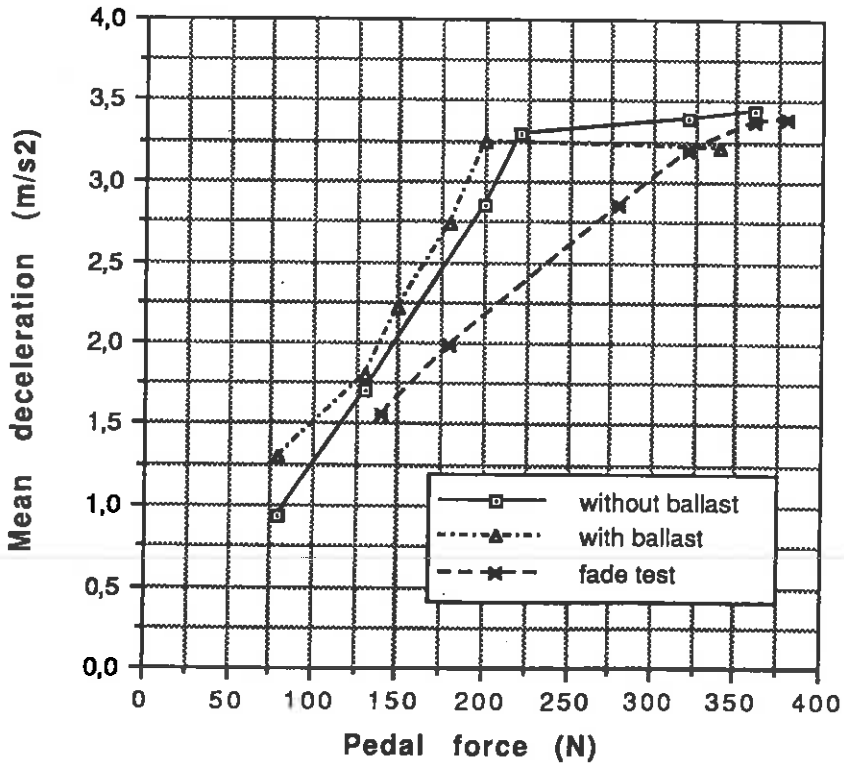
5. LOCATION OF CENTRE OF GRAVITY

Height above ground	950 mm
Distance forward from the vertical plane containing the axis of the rear wheels	1024 mm
Distance from the median plane of the tractor, to the left	3 mm

6. BRAKING

- Date of tests: 21st September 1992

6.1 *COLD SERVICE BRAKING DEVICE TEST* - 6.2 *FADE TEST*



Cold service braking device test

	Ballasted tractor	Unballasted tractor
Speed before application of brakes (km/h)	33.05	32.95

Fade test

- Maximum deviation of the tractor from its original course: none
- Abnormal vibration: none
- Brake heating method: by means of towing the tractor for 1 km at 26.3 km/h with a towing force of 5.16 kN

6.3 *PARKING BRAKING DEVICE TEST*

	Uphill	Downhill
Braking device control force	30.1 kN	30.1 kN

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

- Date of tests: 24th September 1992
- Type of sound level meter: impulse precision BRUEL & KJAER 2209 model
- Type of track: concrete

7.1 *Results of test with DGM-SA 833 model*

- Gear number: IV HI High
- Travelling speed before acceleration: 24.50 km/h
- Sound level: 85.5 dB(A)

8. REPAIRS AND ADJUSTEMENT DURING TEST = none

9. REMARKS = none

OPTIONAL TESTS ON REQUEST OF THE MANUFACTURER

10. MAIN POWER TAKE OFF

- Date and location of tests: 06/09/1991, I.M.A., TORINO, ITALY
- Type of dynamometer: PARASITIC CURRENTS, BORGHI & SAVERI FA 300-30 SP

Power	Speed		Fuel consumption			Specific
	Engine	P.t.o.	Hourly		Specific	energy
kW	rev/min		kg/h	l/h	g/kWh	kWh/l
1.1 **MAXIMUM POWER** - TWO HOUR TEST						
71.75	2300	803	17.67	21.16	246	3.39
1.2 POWER AT RATED ENGINE SPEED						
71.75	2300	803	17.67	21.16	246	3.39
1.3 POWER TAKE OFF SPEED (750 ± 25 rev/min)						
71.46	2148	750	17.67	21.16	247	3.38
1.4 **PART LOADS** 1.4.1 the torque corresponding to maximum power at rated engine speed						
71.75	2300	803	17.69	21.19	247	3.39
1.4.2 85% of torque obtained in 1.4.1						
63.79	2406	840	15.95	19.10	250	3.34
1.4.3 75% of torque defined in 1.4.2						
48.30	2429	848	12.96	15.52	268	3.11
1.4.4 50% of torque defined in 1.4.2						
32.58	2457	858	10.40	12.46	319	2.62
1.4.5 25% of torque defined in 1.4.2						
16.52	2492	870	7.74	9.27	469	1.78
1.4.6 unloaded						
----	2506	875	5.35	6.41	----	----
1.5 **PART LOADS AT POWER TAKE OFF SPEED (750 ± 25 rev/min)** 1.5.1 the torque corresponding to maximum power						
71.88	2148	750	17.70	21.20	246	3.39
1.5.2 85% of torque obtained in 1.5.1						
64.27	2260	789	16.00	19.16	249	3.35
1.5.3 75% of torque defined in 1.5.2						
48.75	2285	798	12.30	14.73	252	3.31
1.5.4 50% of torque defined in 1.5.2						
32.96	2317	809	9.85	11.80	299	2.79
1.5.5 25% of torque defined in 1.5.2						
16.82	2366	826	7.40	8.86	440	1.90
1.5.6 unloaded						
----	2383	832	4.70	5.63	----	----

No load maximum engine speed: **2506 rev/min**
Torque at maximum power: **297.9 Nm**
Maximum torque: **354.4 Nm at 1300 rev/min of the engine**
Mean atmospheric conditions: **Temperature 27.0 °C**
Pressure 998.6 mbar
Relative Humidity 70%

Maximum Temperature:
Coolant 95.0°C
Engine oil 130.0 °C
Fuel 40.0 °C
Engine air intake 26.0 °C

11. HYDRAULIC POWER AND LIFTING FORCE (*)

(Tests have been carried out with the same setting condition of FIAT F 120 DT tractor. The differences between the two tests are not significant; therefore results of power lift test made on FIAT F 110 tractor are equivalent of these found for FIAT F 120 DT tractor)

- Date of tests: 16th September 1991

11.1 HYDRAULIC POWER TEST

- Sustained pressure with relief valve open: 17 MPa
- Pump delivery rate at minimum pressure: 53.4 l/min

	Flow rate l/min	Pressure MPa	Power kW
Flow rate corresponding to a hydraulic pressure equivalent to 90 per cent of the actual relief valve pressure setting and corresponding hydraulic power	51.80	16.7	14.13
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	51.80	17.0	14.39

- Tapping point used for test: at rear of tractor
- Temperature of hydraulic fluid: 65 °C

11.2 POWER LIFT TEST

	at the hitch point		on the frame	
Height of lower hitch points above ground in down position	200	mm	200	mm
Vertical movement	685	mm	685	mm
Maximum corrected force exerted through full range	30.0	kN	33.8	kN
Corresponding pressure of hydraulic fluid	16.7	MPa	16.7	MPa
Moment about rear-wheel axis	-	kNm	60.50	kNm
Maximum tilt angle of mast from vertical	- degress		0.3 degress	

Lifting heights relative to the horizontal plane including the lower pivot points								
mm	- 362	- 300	- 150	0	+ 100	+ 200	+ 300	+ 323
Lifting forces								
at the hitch points kN	30.00	32.20	35.80	37.20	37.20	36.70	36.70	37.60
Corresponding presure: 16.7 MPa								
at the frame kN	40.05	39.70	39.20	37.50	36.50	35.20	33.80	33.80
Corresponding pressure: 16.7 MPa								

(*) Performances obtained with dimension's values set in condition of maximum mechanical advantage.

PERFORMANCES OBTAINED WITH THE SUPPLEMENTARY CYLINDER MOUNTED

	at the hitch point		on the frame	
Height of lower hitch points above ground in down position	200	mm	200	mm
Vertical movement	685	mm	685	mm
Maximum corrected force exerted through full range	39.0	kN	49.5	kN
Corresponding pressure of hydraulic fluid	16.7	MPa	16.7	MPa
Moment about rear-wheel axis	-	kNm	88.61	kNm
Maximum tilt angle of mast from vertical	- degress		0.3 degress	

Lifting heights relative to the horizontal plane including the lower pivot points								
mm	- 362	- 300	- 150	0	+ 100	+ 200	+ 300	+ 323
Lifting forces								
at the hitch points kN	39.00	41.70	48.40	52.00	53.40	54.00	54.70	55.60
Corresponding presure: 16.7 MPa								
at the frame kN	49.50	50.90	53.20	53.10	53.60	52.30	51.40	50.40
Corresponding pressure: 16.7 MPa								

RESPONSIBLE OF I.M.A. HOMOLOGATION

P.I. R. MARENGO

DIRECTOR OF I.M.A.

Dr. Ing. S. POTECCHI

Turin, 27th May 1993

FIAT F 110/16 (2 WD)

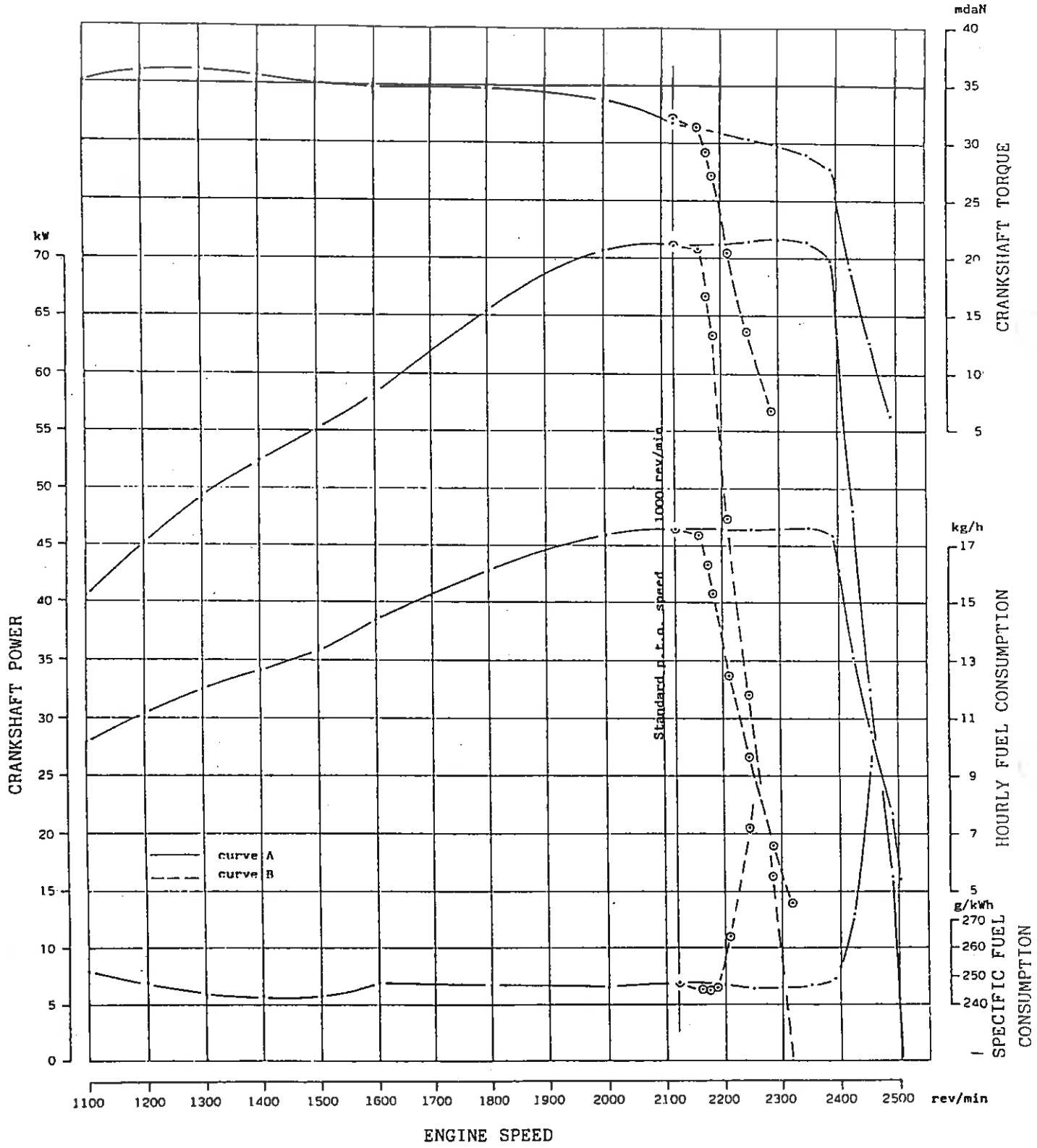


Fig. 1 – POWER TAKE-OFF TEST

FIAT F 110/16 (2 WD)

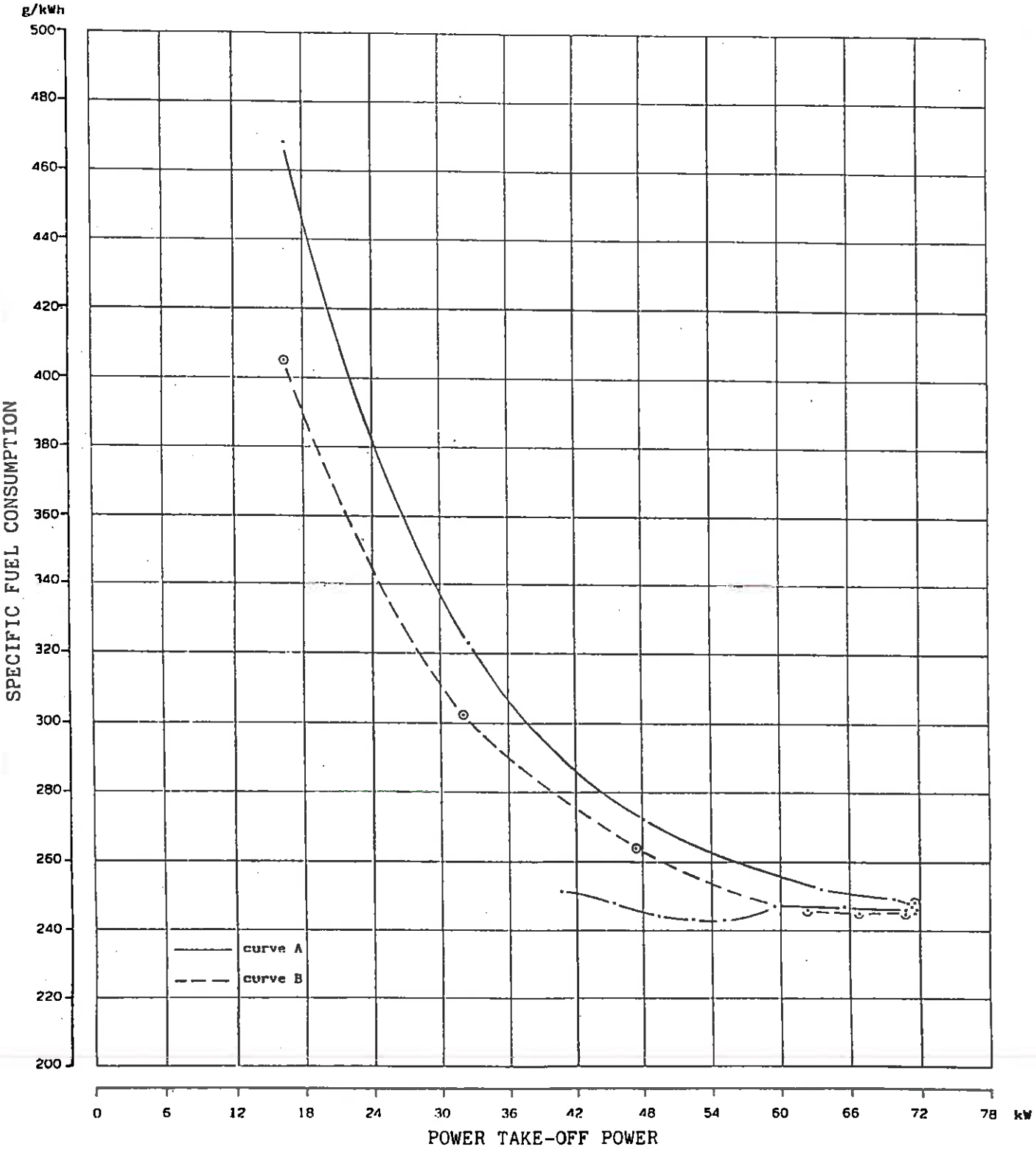


Fig. 2 – POWER TAKE-OFF TEST

FIAT F 110/16 (2 WD)

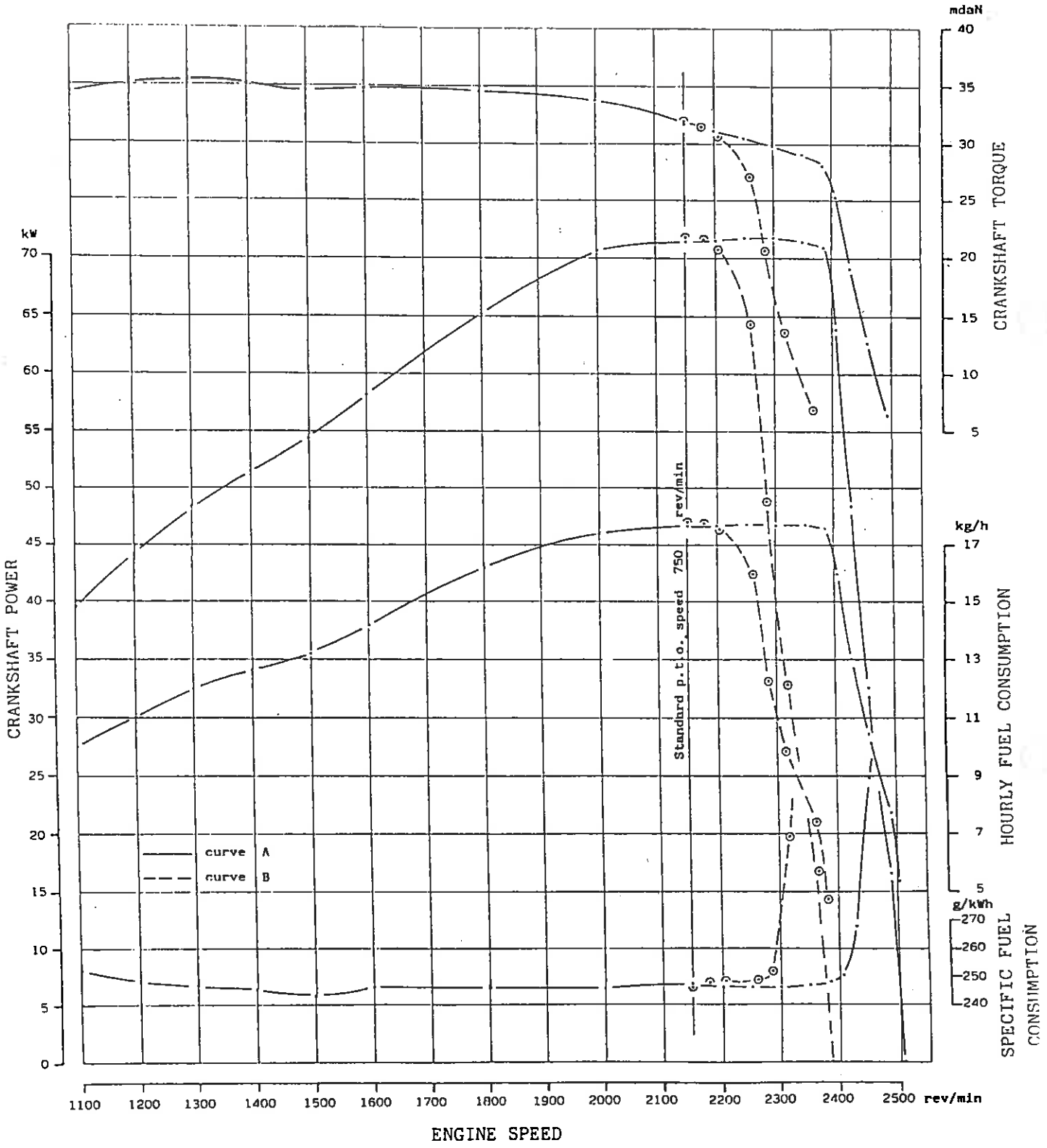


Fig. 3 - POWER TAKE-OFF TEST

FIAT F 110/16 (2 WD)

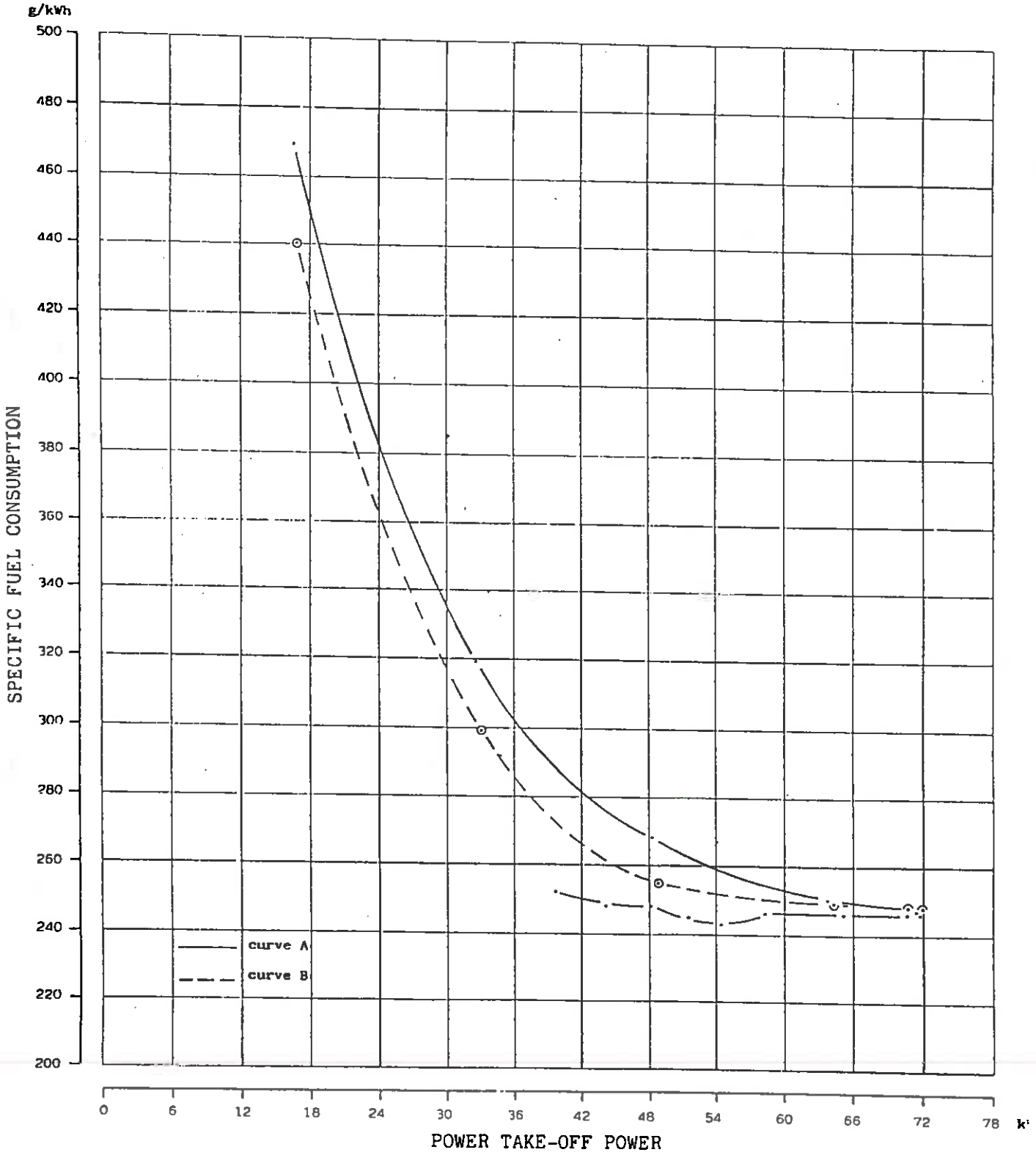


Fig. 4 - POWER TAKE-OFF TEST