OECD Approval No. : 2/2 221
Date of approval : 23rd February, 2005

Report on test in accordance with
OECD STANDARD CODE 2
for the Official Testing of Agricultural and Forestry Tractors



Agricultural Tractor

RENAULT CERES 326 (4 WD) TRACTOR

M 1332 – 40 km/h

Manufactured by : **M/s International Tractors Ltd.**
Village - Chak Gujran
P.O. - Piplanwala, Jalandhar Road,
Distt. **HOSHIARPUR** (Punjab) 146 022, **INDIA**

Submitted for test by : The manufacturer

Report No. : T- 515/1001/09/OECD

Date : March, 2005

GOVERNMENT OF INDIA
Ministry of Agriculture, (Deptt. of Agriculture and Co-opn.)
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This is a report on a tractor test in accordance with **OECD STANDARD CODE 2** for the Official Testing of Agricultural and Forestry Tractors.

It does not contain an evaluation of the tractor on practical work.

Date of approval	23rd February, 2005	OECD No.	2/2 221

In this report all performance characteristics are given corresponding to the International system of units.

The relationship to the Technical System of Units is given by the following conversions:

Forces	1 kN	=	1000 N	=	102	kgf
Powers	1 kW	=	1000 W	=	1,36	Ps
Pressures	1 MPa	=	10 bar	=	10,2	kgf/cm^2
	100 kPa	=	1000 mbar	=	750,1	mm of Hg

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TABLE OF CONTENTS

		PAGE No.
1.	SPECIFICATIONS OF TRACTOR	01
2.	TEST CONDITIONS	13
3.	COMPULSORY TEST RESULTS	15
3.1	Main power take-off performance	15
3.2	Hydraulic power and lifting force	17
3.3	Drawbar power test (unballasted tractor)	21
4.	REPAIRS AND ADJUSTMENTS DURING TESTS	23
5.	REMARKS	23

Statement

The information opposite each item in the specification portion of this report has been validated by the Testing Station. An item marked [C] indicates to the test report user that the information declared by the manufacturer has been checked whereas an item marked [D] indicates that the manufacturer's declaration has been endorsed.

[C]	Tractor manufacturer's name and address	:	**M/s International Tractors Limited,** Village - Chak Gujran, P.O. - Piplanwala, Jalandhar Road, Distt. **HOSHIARPUR** (PUNJAB) 146 022, INDIA
[D]	Location of tractor assembly	:	Village - Chak Gujran, P.O. - Piplanwala, Jalandhar Road, Distt. **HOSHIARPUR** (PUNJAB) 146 022, INDIA
[D]	Submitted for test by	:	The manufacturer
[C]	Selected for test by	:	The manufacturer with agreement of the testing station.
[D]	Place of running-in	:	Village - Chak Gujran, P.O. - Piplanwala, Jalandhar Road, Distt. **HOSHIARPUR** (PUNJAB) 146 022, INDIA
[D]	Duration of running-in	:	25 hours
[C]	Location of test	:	Government of India, Central Farm Machinery Training and Testing Institute, P.O.- Tractor Nagar, BUDNI – 466445 (M.P.), INDIA

1. SPECIFICATIONS OF TRACTOR

1.1 Identification:

1.1.1

[C]	Make of tractor	:	RENAULT
[C]	Model (trade name)	:	CERES 326
[C]	Type	:	4 WD , Agricultural Tractor

1.1.2 Numbers:

[D]	1st Serial No. or prototype	:	M 1332 WA 13300001 G02
[C]	Serial No.	:	M 1332 WA 13300027 A03

1.1.3 Other specification (if applicable):

[D]	Model(s) for other countries	:	None
[C]	Transmission type or gear ranges	:	20 - Speed, mechanical, syncromesh
[C]	Speed version	:	40 km/h
[D]	Manufacturer identification or Technical type no.	:	M1332

1.2	**Engine:**		
[C]	Make	:	IVECO
[C]	Model	:	8045.05B.241
[C]	Type	:	Four stroke, water cooled, direct injection, diesel engine
[C]	Serial No.	:	728454
1.2.1	**Cylinders:**		
[C]	Number and disposition	:	Four,Verticle, In-line
[D]	Bore/Stroke	:	104mm / 115mm
[D]	Capacity	:	3908 cm^3
[D]	Compression ratio	:	18:1
[D]	Arrangement of valves	:	Over head
[D]	Cylinder liners	:	Dry, replaceable
1.2.2	**Supercharging:**		Not Provided
1.2.3	**Fuel system:**		
[C]	Fuel feed system	:	Diaphragm pump
	Filter(s):		
[C]	Make	:	BOSCH
[D]	Model	:	1 457 453 105
[C]	Type	:	Replaceable, paper elements
[C]	Number	:	Two
[D]	**Capacity of fuel tank**	:	143 dm^3
	Injection pump:		
[D]	Make	:	BOSCH
[C]	Model	:	0 460 411 149 L 704
[C]	Type	:	Rotary distributor
[C]	Serial Number	:	21140
	Manufacturer's production setting of injection pump:		
[C]	Flow rate (rated engine speed & full load)	:	13.50 to 14.50 dm^3/h
[D]	Timing	:	9° before TDC
	Injectors:		
[D]	Make	:	BOSCH
[D]	Model	:	DLLA 132 S
[D]	Type	:	Multihole
[D]	Injection pressure	:	26.0 ± 0.5 MPa
1.2.4	**Governor:**		
[D]	Make	:	BOSCH
[C]	Model	:	None
[C]	Type	:	Mechanical, variable speed
[C]	Governed range of engine speed	:	600 – 2650 rev/min
[C]	Rated engine speed	:	2350 ± 50 rev/min

1.2.5	**Air cleaner:**		
	Pre-cleaner:	:	Not Provided
	Main cleaner:		
[C]	Make	:	Donaldson
[C]	Model	:	None
[C]	Type	:	Dry
[C]	Location of air intake	:	Forward of radiator inside the bonnet
[C]	Maintenance indicator	:	Warning light on dash board
1.2.6	**Lubricating System:**		
[D]	Type of feed pump	:	Gear type
[C]	Type of filter(s)	:	Spin on type with paper element
[C]	Number of filter(s)	:	One
1.2.7	**Cooling System:**		
[C]	Type of coolant	:	Water
[D]	Type of pump	:	Centrifugal, belt driven
	Specification of fan:		
[C]	Number of fan blades	:	6
[D]	Fan diameter	:	415 mm
[D]	Coolant capacity	:	13.0 dm^3
[C]	Type of temperature control	:	Thermostat
[D]	Superpressure system	:	49 kPa
1.2.8	**Starting system:**		
[C]	Make	:	BOSCH
[C]	Model	:	None
[C]	Type	:	Electrical, solenoid operated
[D]	Starter motor power rating	:	3.0 kW
[C]	Cold starting aid	:	None
[C]	Safety device	:	Starting inoperable unless the main gear shifting lever is in neutral position
1.2.9	**Electrical System:**		
[C]	Voltage	:	12 V
	Generator:		
[C]	Make	:	PMP
[C]	Model	:	7018
[C]	Type	:	Alternator
[D]	Power	:	0.54 kW
	Battery:		
[C]	Number	:	One
[D]	Rating	:	120 Ah at 20 hours discharge rate

1.2.10 Exhaust System:

[D] Make : Sonalika
[C] Model : None
[C] Type : Vertical (updraft)
[C] Location : On left hand side of engine

1.3 Transmission:

1.3.1 Clutch (Travel and power take-off):

[D] Make : LUK- INDIA
[D] Model : None
[D] Type : Dual dry for travelling and PTO
[D] Number of plates : Two
[D] Diameter of plates : 280mm (For both travel and PTO)

[C] Method of operation:
- Travel : By a pedal on LHS
- PTO : By a hand lever on LHS

1.3.2 Gear Box:

[D] Make : RENAULT
[D] Model : B41-20
[D] Type : Mechanical, Synchromesh

[C] **Description**

		Forward	Reverse
[C]	Number of gears	5	5
[C]	Number of groups	2 ('T' & 'Ra')	2 ('T' & 'Ra')
[C]	Number of ranges	2 ('I' & 'II')	2 ('I' & 'II')
[C]	Total of arrangements	20	20

'T' = Tortoise 'Ra' = Rabbit 'I ' = Low 'II' = High

[D] Available options : B 41 - 10
B 41 - 15
B 41 - 25
B 41 - 26

1.3.3 Rear axle and final drives:

[D] Make : RENAULT
[D] Model : P 11
[D] Type : Crown wheel and pinion with spur gear reduction

Differential lock:

[D] Type : Dog clutch
[C] Method of engagement : By a hand lever
[C] Method of disengagement : By depressing the service brake pedal

1.3.4 Front axle and final drives:

[D] - Make : Carraro
[D] - Model None
[D] - Type : Crown wheel and outboard epicycle gear reduction

- Differential lock : None

1.3.5. Total ratios and travelling speeds:

	Movement	GEAR	GROUP	RANGE	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed of 2350 rev/min, (km/h)
	1	2	3	4	5	6
[C]	Forward	1	T	I	355.73	1.73
[C]		2			248.79	2.47
[C]		3			176.47	3.49
[C]		4			125.47	4.91
[C]		5			89.16	6.91
[C]		1	Ra		294.14	2.09
[C]		2			205.74	2.99
[C]		3			145.94	4.22
[C]		4			103.74	5.94
[C]		5			73.63	8.36
[C]		1	T	II	82.32	7.48
[C]		2			57.55	10.70
[C]		3			40.88	15.06
[C]		4			29.05	21.19
[C]		5			20.61	29.88
[C]		1	Ra		68.14	9.04
[C]		2			47.56	12.95
[C]		3			33.76	18.24
[C]		4			23.98	25.68
[C]		5			17.03	36.15

	1	2	3	4	5	6
[C]	Reverse	1	T	I	361.21	1.70
[C]		2			252.36	2.44
[C]		3			179.01	3.44
[C]		4			127.13	**4.84**
[C]		5			90.37	6.81
[C]		1	Ra		298.91	2.06
[C]		2			208.79	2.95
[C]		3			148.05	4.16
[C]		4			105.25	5.85
[C]		5			74.65	8.25
[C]		1	T	II	83.58	7.37
[C]		2			58.38	10.55
[C]		3			41.45	**14.85**
[C]		4			29.39	20.95
[C]		5			20.91	29.45
[C]		1	Ra		69.09	8.91
[C]		2			48.33	12.74
[C]		3			34.25	17.98
[C]		4			24.34	25.30
[C]		5			17.28	35.63

*Calculated with a tyre dynamic radius index of 695mm(ISO 4251-1-1998)

'T' = Tortoise 'Ra' = Rabbit 'I' = Low 'II' = High

[C] Number of revolutions of front wheels for one revolution of rear wheels : 1.388

1.4 Power take-off:

1.4.1. Main Power Take-Off:

[C]	Type	:	Independent
[C]	Method of engagement	:	Mechanically, by a hand lever
[C]	Number of shafts	:	One
[C]	Method of changing power take-off shaft ends and speeds	:	By hand lever and physically replacing the PTO shaft end

1.4.1.1 Power take-off proportional to engine speed:

Power take-off at 540 (rev/min):

[C]	- Location	:	At rear of tractor
[C]	- Diameter of power take-off shaft end	:	34.97 mm
[C]	- Number of splines		6 (in conformity with ISO 500 :1991)
[C]	- Height above ground	:	690 mm
[C]	- Distance from the median plane of the tractor	:	0 mm
[C]	- Distance behind rear wheel axis	:	465 mm
[C]	- PTO speed at rated engine speed	:	601 rev/min.
[C]	- Engine speed at standard power take-off speed	:	2111 rev/min.
[C]	Ratio of rotation speeds (Engine speed/ PTO speed	:	3.909:1
[D]	Power restriction	:	None
[D]	Maximum torque transmissible	:	1500 Nm
[C]	Direction of rotation (viewed from Behind tractor)	:	Clockwise

Power take-off at 1000 (rev/min):

[C]	- Location	:	At rear of tractor
[C]	- Diameter of power take-off shaft end	:	34.2 mm
[C]	- Number of splines	:	21 (in conformity with ISO 500 :1991)
[C]	- Height above ground	:	690 mm
[C]	- Distance from the median plane of the tractor	:	0 mm
[C]	- Distance behind rear wheel axis	:	465 mm
[C]	- PTO speed at rated engine speed	:	1110 rev/min
[C]	- Engine speed at standard power take off speed	:	2118 rev/min
[C]	- Ratio of rotation speeds (Engine Speed/PTO speed)	:	2.118 : 1
[D]	- Power restriction	:	None
[D]	- Maximum torque transmissible	:	1500 Nm
[C]	- Direction of rotation (viewed from behind tractor)	:	Clockwise

1.4.1.2 Power take-off proportional to ground speed : None

1.4.2 Optional power take-off : None

1.5	**Hydraulic power-lift:**		
[C]	Make	:	Renault
[C]	Model	:	R-21
[C]	Type of hydraulic system	:	Open centre
[C]	Type and number of cylinders	:	Single acting, two
[C]	Type of linkage lock for transport	:	None
[D]	Relief valve pressure setting (tolerance)	:	18 ± 1MPa
[D]	Opening pressure of cylinder safety valve	:	Not applicable
[D]	Lift pump type	:	Gear pump
[D]	Transmission between pump and engine	:	Gear drive
[C]	Number and Type of filters	:	Two, first hydraulic circuit oil 'suction strainer' and second hydraulic circuit oil 'High Pressure filter'
[C]	Site of oil reservoir	:	Transmission housing
	Type, number and location of tapping points:		
[C]	- Type	:	Quick coupling
[C]	- Number	:	06
[C]	- Location	:	Behind the operator's seat
[D]	- Maximum volume of oil available to external cylinders	:	10 dm^3

1.6 Three point linkage:

[C] Category : 2 (In conformity of ISO 730-1:1994 + corr.1:1995 and ISO 730-2:1979)

[C] Category adapter : None

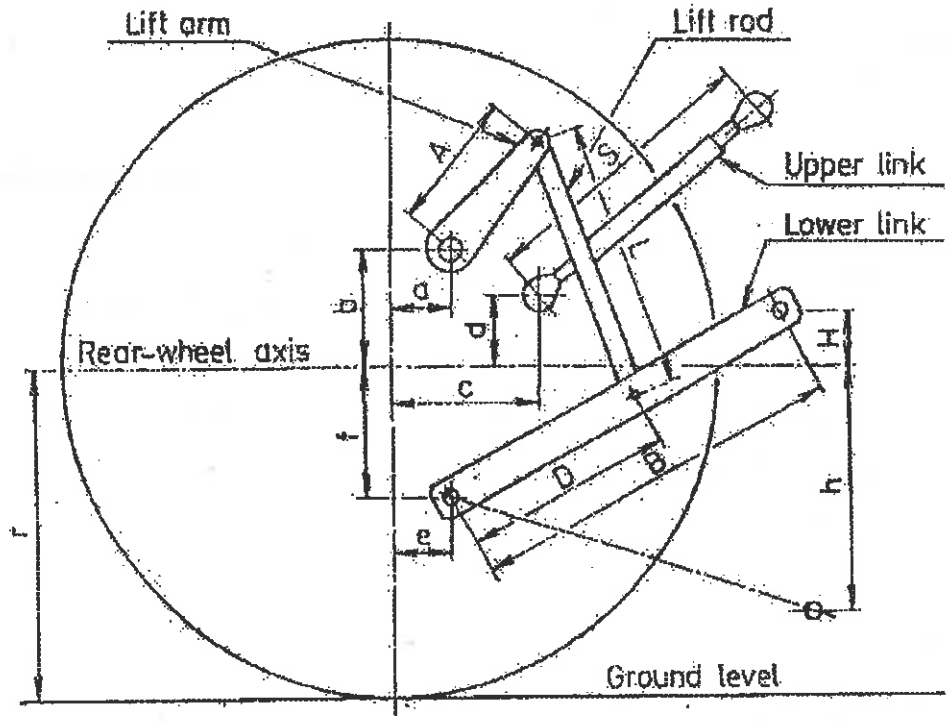


Fig. 1 .1

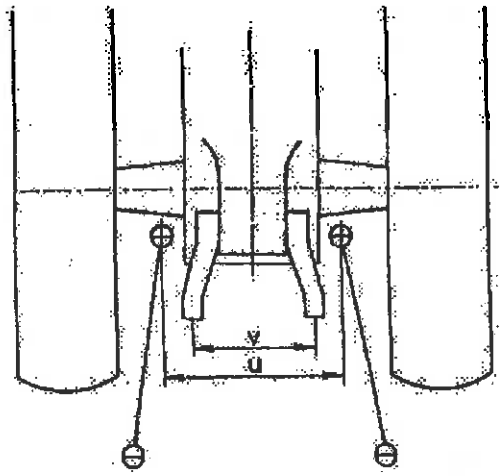


Fig. 1.2

Table: Linkage Geometry dimensions:

			Dimension or range, mm	Settings used during test, mm
[C]	Length of lift arms:	(A)	225	225
[C]	Length of lower links:	(B)	835	835
	Distance of lift arm pivot point from rear-wheel axis:			
[C]	- Horizontally	(a)	115	115
[C]	- Vertically	(b)	325	325
[C]	Horizontal distance between the 2 lower link points:	(u)	450	450
[C]	Horizontal distance between the 2 lift arm end points:	(v)	600	600
[C]	Length of upper link:	(S)	From 560 to 770	690
	Distance of upper link pivot point from rear wheel axis:			
[C]	- Horizontally	(c)	435	435
[C]	- Vertically	(d)	225, 285 and 345	345
	Distance of lower link pivot point from rear wheel axis:			
[C]	- Horizontally	(e)	160	160
[C]	- Vertically	(f)	155	155
[C]	Distance of lower link pivot points to lift rod pivot points on lower links:	(D)	180, 230, 380, 430 and 480	380
[C]	Length of lift rods:	(L)	From 500 to 645	595
	Height of lower hitch points relative to the rear-wheel axis:			
[C]	- in low position	(h)	From 235 to 635	495
[C]	- in high position	(H)	From - 95 to 305	105
[C]	Height above ground of lower hitch points when locked in transport position (*)	-	Any height within lift range	

(*) Assuming r=695mm, tyre dynamic radius index of ISO:4251-1:1998

1.7	**Swinging drawbar:**		
[C]	- Type	:	Clevis
[C]	- Height above ground	:	435mm
[C]	- Type of adjustment	:	None
[C]	- Distance of hitch point from rear wheel axis, horizontally	:	805mm
	Distance of hitch point from power take-off shaft end:		
[C]	- Vertically	:	280mm
[C]	- Horizontally	:	340mm
	Lateral adjustment (centre of clevis)		
[C]	- Right hand	:	250mm
[C]	- Left hand	:	250mm
[C]	- Distance of pivot point from rear-wheel axis, horizontally	:	195 mm
[C]	- Diameter of drawbar pinhole	:	33mm
[D]	- Maximum vertical permissible load	:	18.39 kN
1.8	**Trailer hitch:**		
[C]	Type	:	Clevis
[C]	Hole diameter	:	33 mm
[C]	Height above ground	:	900mm to 970mm
[C]	Distance of hitch point from rear-wheel axis, horizontally	:	630
	Distance of hitch point from power take-off shaft end:		
[C]	- Vertically	:	190mm to 260mm
[C]	- Horizontally	:	165mm
[D]	Maximum vertical permissible load	:	14.71 kN
1.9	**Holed drawbar:**		
[C]	Number of holes	:	9
[C]	Distance between holes	:	80 mm
[C]	Hole diameter	:	25 mm
[C]	Thickness/Width of drawbar	:	30 mm/75 mm
	Height above ground:		
[C]	- Minimum	:	60mm
[C]	- Maximum	:	1000mm
[C]	Horizontal distance to power take-off shaft end (rear)	:	530mm

1.10 Steering:

[D]	Make	:	DANFOSS
[D]	Model	:	None
[D]	Type	:	Open centre
[D]	Method of operation	:	Hydraulic power assisted
[D]	Pump(s)	:	Gear type
[D]	Ram(s)	:	Double acting cylinder
[D]	Working pressure	:	14 MPa

1.11 Brakes:

1.11.1 Service brake:

[D]	Make	:	Kalyani Brakes Limited
[D]	Model	:	None
[D]	Type	:	Wet disc
[C]	Method of operation	:	Mechanical, independent or coupled pedal operation
[C]	Trailer braking take-off	:	None

1.11.2 Parking brake:

[C]	Type	:	Common with service brake
[C]	Method of operation	:	By a hand lever with rachet on LHS of operator's seat.

1.12 Wheels:

Number

[C]	Front	:	Two, steering as well as driving
[C]	Rear	:	Two, driving
[C]	Wheel base	:	2445 mm

Track width adjustment:

		Minimum [mm]	Maximum [mm]	Adjustment method
[D]	Front	1505	1860	Reversing wheels and offset lug rims.
[D]	Rear	1490	1770	Reversing wheels and offset lug rims.

1.13 Protective structure: : Not Provided

1.14 Seat:

1.14.1 Driver's seat:

[C]	Make	:	SPACK
[C]	Model	:	None
[C]	Type	:	Cushioned
[C]	Seat and steering wheel reversible	:	No
[C]	Type of suspension	:	Coil springs
[C]	Type of damping	:	Hydraulic shock absorber

Range of adjustment:

[C] Longitudinally : ± 65 mm
[C] Vertically : Nil
[C] Safety belt : Not provided

1.14.2 Optional driver's seat(s) : Not provided
1.14.3 Passenger seat : Not provided

1.15 Lighting:

		Height above ground of centre	Size	Distance from outside edge of lights to median plane of tractor
		[mm]	[mm]	[mm]
[C]	Head lights	1092	140x95	200
[C]	Side lights	1460	90x75	873
[C]	Rear lights	1460	90x75	780
[C]	Reflectors	1460	45x55	803

2. TEST CONDITIONS

2.1 Overall dimensions (unballasted tractor)

Length [mm]	Width		Height at top of	
	Minimum [mm]	Maximum [mm]	Exhaust pipe [mm]	Steering wheel [mm]
4405	1945	2210	2385	1895

2.2 Ground clearance (unballasted tractor) : 295 mm
Clearance – limiting part : Swinging Drawbar

2.3 Tractor Mass

	Unballasted	
	Without driver	With driver
	[kg]	[kg]
Front	1370	1385
Rear	1970	2030
Total	3340	3415

2.4 Tyres and track width specifications:

Tyres		Front	Rear
- Dimensions		11.2-24	16.9-30
- Ply rating		8	14
- Type		Pneumatic Diagonal	Pneumatic Diagonal
- Maximum load (tyre manufacturer's)	kN	10.3	33
- Maximum load (tractor manufacturer's)	kN	10.3	33
- Inflation pressure (tyre manufacturer's)	kPa	176	240
- Dynamic radius index	mm	515	695
Chosen track width	mm	1550	1490

2.5 Fuel:

Type : High speed diesel conforming to IS: 1460-2000

Density at 15 °C : 0.845 g/cm^3

2.6 Oils and lubrication:

2.6.1 Capacity and change interval:

	Capacity	Oil change	Filter change
	(dm^3)	(h)	(h)
Engine oil sump	8.5	300	300
Gear box, Hydraulic, steering, service brake and rear axle	65	900	- Hydraulic circuit high pressure oil filter after 250 hours - Hydraulic circuit strainer after 900 hours
Front axle	5.5	900	--
Final drive (front)	0.6	900	--

2.6.2 Specifications:

	Recommended	Used during test
Engine oil:		
Type	SAE 20 W 40	As recommended
Viscosity	14.0-16.0 cst at 100°C	
Classification	API CD 4	

Transmission, hydraulic fluid, steering oil, service brake & Rear axle:		
Type	ELF SF 31	As recommended
Viscosity	30 cst at 65 °C	
Classification	API GL 4	

Front Drive oil (Differential Casing, final Drive):		
Type	ELF TRANSSELF BLS 90	As recommended
Viscosity	194 cst at 40 °C	
Classification	API GL 4	

2.6.3 Grease:

Number of lubricating points:

Grease nipples : 09

Grease cups : NIL

3 COMPULSORY TESTS RESULTS

3.1 Main power take-off:

Date and location of tests : 14.07.2004 at CFMT&TI,BUDNI, INDIA

Type of dynamometer bench : FUCHINO, ESF 1000

Power	Speed		Fuel consumption			Specific energy
	Engine	PTO	Hourly		Specific	
kW	(rev/min)		kg/h	l/h	g/kWh	kWh/l
3.1.1 Maximum Power – Two-Hour Test:						
41.0	2111	540	11.13	13.17	271	3.11
3.1.2 Power at Rated Engine Speed:						
40.0	2350	601	11.73	13.88	293	2.88
3.1.3 Standard Power Take-Off Speed [540 ± 10 (rev/min)]:						
41.0	2111	540	11.13	13.17	271	3.11
3.1.4 Part Loads:						
3.1.4.1 The torque corresponding to maximum power at rated engine speed:						
40.0	2350	601	11.73	13.88	293	2.88
3.1.4.2 85 % of torque obtained in 3.1.4.1:						
36.4	2517	644	11.25	13.31	309	2.74
3.1.4.3 75 % of torque defined in 3.1.4.2:						
27.5	2533	648	9.03	10.69	328	2.57
3.1.4.4 50 % of torque defined in 3.1.4.2:						
18.6	2564	656	7.54	8.92	405	2.09
3.1.4.5 25 % of torque defined in 3.1.4.2:						
9.3	2572	658	5.96	7.05	641	1.32

1	2	3	4	5	6	7
3.1.4.6	**Unloaded:**					
1.2	2588	662	4.70	5.56	3917	0.22
3.1.5	**Part Loads at Standard Power Take-Off Speed [540± 10 (rev/min)]:**					
3.1.5.1	**The torque corresponding to maximum power:**					
41.0	2111	540	11.13	13.17	271	3.11
3.1.5.2	**85 % of torque obtained in 3.1.5.1:**					
36.1	2189	560	10.00	11.83	277	3.05
3.1.5.3	**75 % of torque defined in 3.1.5.2:**					
27.5	2224	569	8.27	9.79	301	2.81
3.1.5.4	**50 % of torque defined in 3.1.5.2:**					
18.7	2271	581	6.77	8.02	362	2.33
3.1.5.5	**25 % of torque defined in 3.1.5.2:**					
9.5	2302	589	5.19	6.14	546	1.55
3.1.5.6	**Unloaded:**					
1.1	2326	595	3.90	4.62	3545	0.24
3.1.6	**PART LOADS AT DIFFERENT ENGINE SPEEDS**					
3.1.6.1	**maximum power at rated engine speed**					
40.0	2350	601	11.73	13.88	293	2.88
3.1.6.2	**80% of power obtained in 3.1.6.1 at max. speed setting**					
32.0	2525	646	10.06	11.91	314	2.69
3.1.6.3	**80% of power obtained in 3.6.1.1 with governor control set to 90% of rated engine speed**					
32.0	2115	541	8.63	10.21	270	3.13
3.1.6.4	**40% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed**					
16.0	2115	541	5.81	6.88	363	2.33
3.1.6.5	**60% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed**					
24.0	1411	361	5.83	6.90	243	3.48
3.1.6.6	**40% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed**					
16.0	1411	361	4.28	5.07	268	3.16

No load maximum engine speed : 2588 (rev/min)

Torque (equivalent crankshaft) at maximum power:
-At rated engine speed : 162.45 Nm
-At 2 - hour test : 185.47 Nm

Maximum torque (equivalent crankshaft) : 232.28 Nm
(Engine speed : 1302 (rev/min)

Mean atmospheric conditions:		
-Temperature	:	23 °C
-Pressure	:	97.2 kPa
-Relative humidity	:	57%
Maximum temperatures:		
-Coolant	:	82 °C
-Engine oil	:	109 °C
-Fuel	:	35 °C
-Engine air intake	:	26 °C

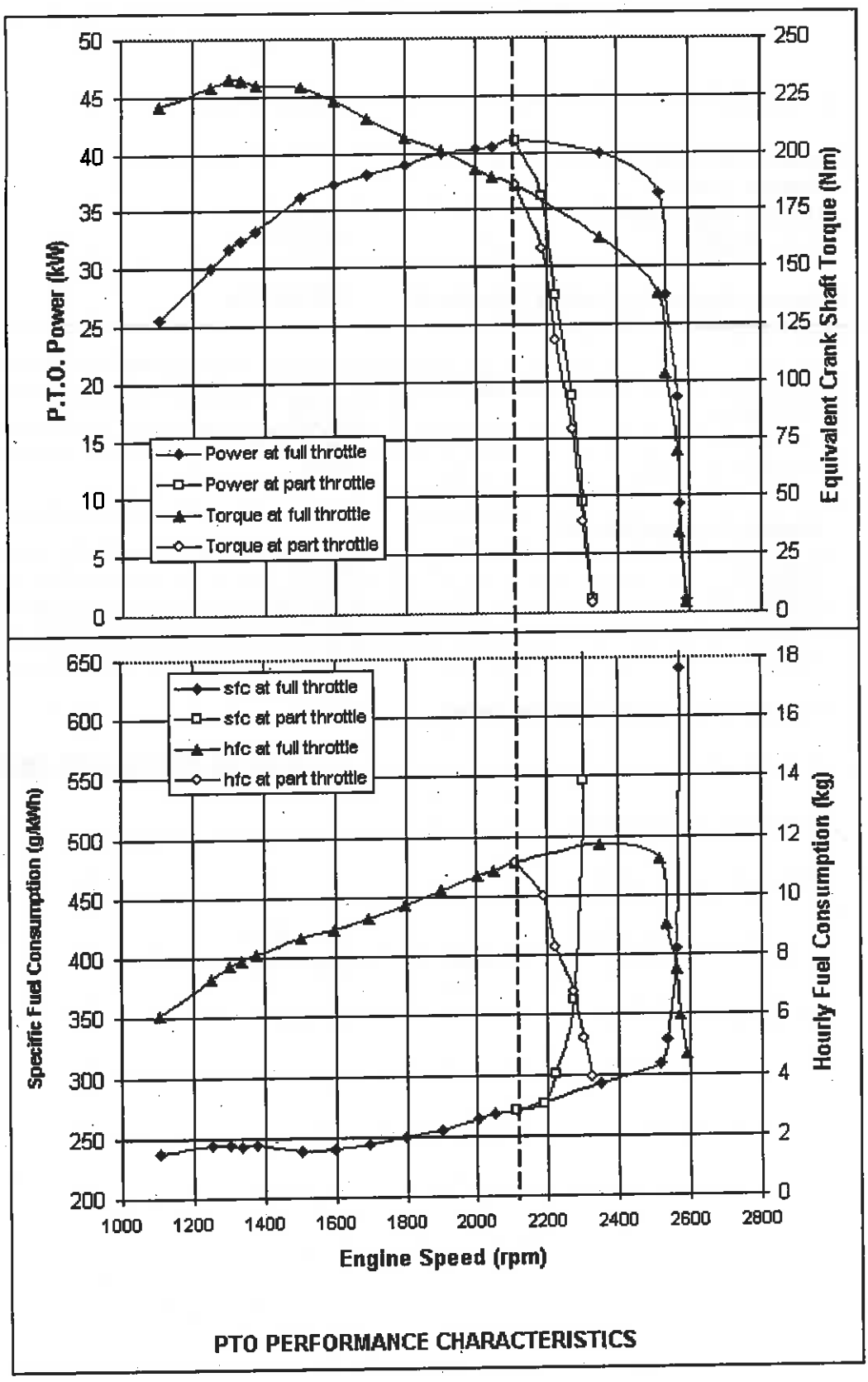
3.2 Hydraulic power and lifting force:

Date of tests : 29.09.04, 04.10.04 and 05.10.04

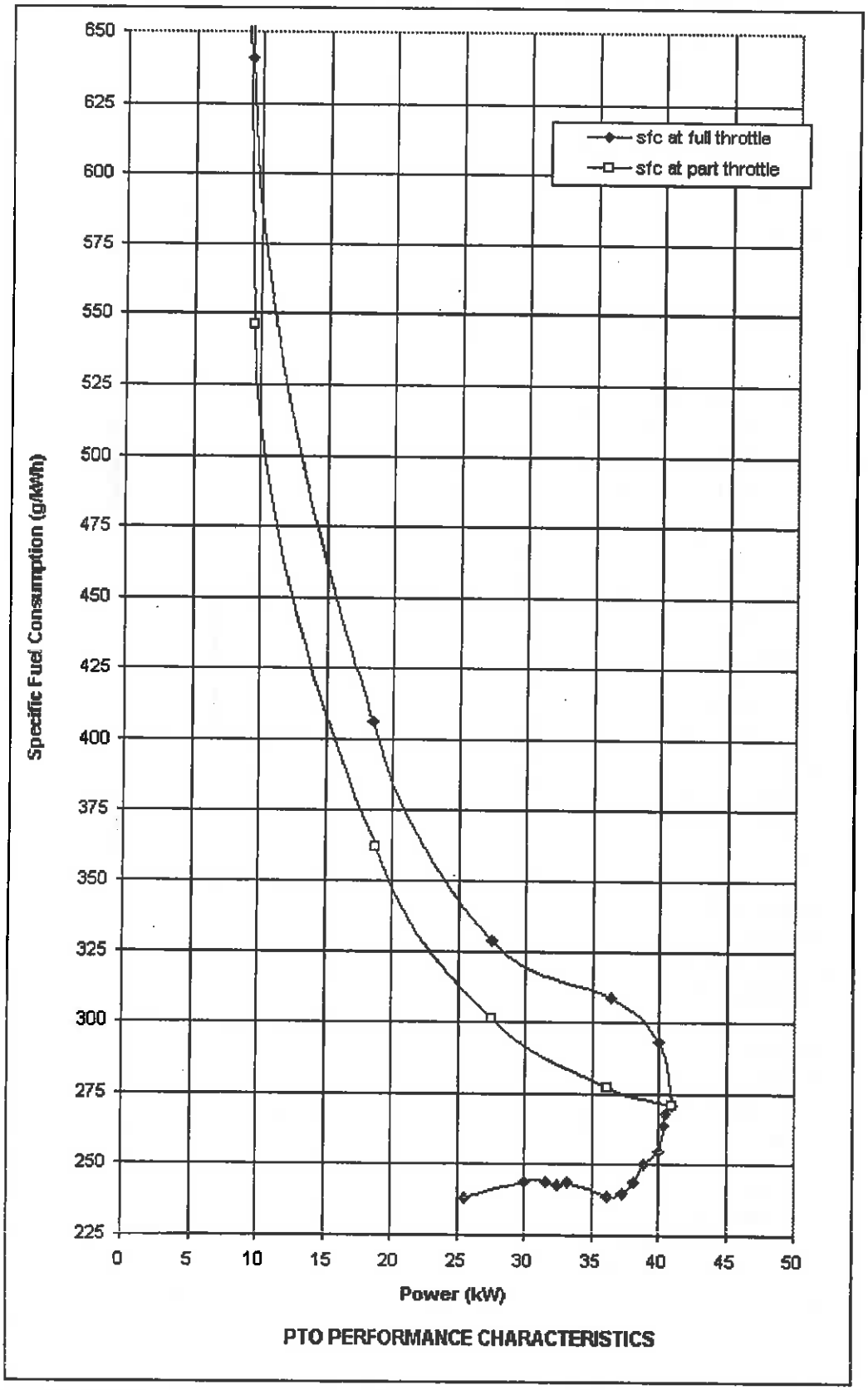
3.2.1 Hydraulic Power Test:

3.2.1.1 Hydraulic Fluid Data:

- Hydraulic fluid type : ELF SF 31
- Viscosity index (ISO 3448 + Corr1:1993) : Max. 100
- Viscosity at 65 °C : 30 cst



PTO PERFORMANCE CHARACTERISTICS



PTO PERFORMANCE CHARACTERISTICS

3.2.1.2 Compulsory Reporting (Test Results):

		Press-ure, MPa	Reservoir oil Temp. °C		Engine speed, rev/min	Flow rate, l/min	Power, kW
			Min	Max.			
1	2	3	4	5	6	7	8
1	Rated Engine speed (Manufacturer's specification)	--	--	--	2350±50	--	--
2.	Maximum (sustained) pressure with relief valve open as measured at the coupler. Pump stalled- No	18.5	60	69	2552	0.0	0.0
3.	Flow rate corres-ponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power.	16.7	66		2556	48.38	13.5
4.	Maximum available flow and maximum power from one coupler pair	17.00	67		2556	48.08	13.6
5.	Maximum available flow and maximum power from coupler pairs operating simultaneously (flow through two or in over coupler pair if required)	Not applicable	Not applicable		Not applicable	Not applicable	Not applicable

3.2.2 Power Lift Test:

- Linkage settings for test - See Table at Page 10, and Fig. 1.1 & 1.2

	At hitch point	On the frame
Height of lower hitch points above ground in down position	200mm	200mm
Vertical movement: - Without lifting force - With lifting force	 600mm 535mm	 600mm 540mm
Maximum corrected force exerted through full range	27.9 kN	27.1 kN
Corresponding pressure of hydraulic fluid	16.7 MPa	16.7 MPa
Moment about rear wheel axle	27.8 kNm	43.5 kNm
Maximum tilt angle of mast from vertical	--	6 degree

Lifting height relative to the horizontal plane including the lower link pivot points.												
mm	-340	-300	-200	-100	0	+65	+100	+150	+165	+180	+195	+200
Lifting forces (the values of the force measured have been corrected to correspond to a hydraulic pressure equivalent to 90% of actual relief valve pressure setting of the hydraulic lift system.)												
At the hitch point in (kN)	27.9	28.4	29.3	29.9	30.2	--	30.7	30.8	--	--	31.5	--
Corresponding pressure **16.7** MPa												
At the frame in (kN)	29.6	29.3	29.0	28.8	28.3	28.1	--	--	27.9	27.4	27.3	27.1
Corresponding pressure **16.7** MPa												

3.3 Drawbar power test (unballasted tractor):

Date(s) of tests : 09.11.2004, 10.11.2004, 16.11.2004 and 18.11.2004

Type of track : Concrete

Height of drawbar above ground	Tyre inflation pressure	
	Front	Rear
mm	kPa	kPa
350	157	150

DRAWBAR TEST RESULTS

Gear Number, Group & Range	Drawbar power, kW	Draw-bar pull, kN	Speed, Km/h	Engine speed, rev/min	Slip of wheels (%)	Specific fuel cons-umption, g/kWh	Specific Energy, kWh/l	Temperature, (°°C)			Atmospheric conditions		
								Fuel	Cool-ant	Eng-ine oil	Temp °C	R.H. %	Pres-sure, kPa
3.3.1	**Maximum Power in tested Gears (Unballasted tractor):**												
1 – Ra – I	15.6	28.2	1.99	2538	15.1	518	1.63	36	87	113	32	25	97.4
2 – T – I	18.4	28.2	2.35	2525	15.0	479	1.76	36	87	111	32	23	97.4
2 – Ra – I	22.2	28.2	2.83	2517	15.0	442	1.91	36	87	114	30	31	97.9
3 – T – I	25.8	28.1	3.31	2509	14.5	425	1.99	34	87	113	28	34	98.1
3 – Ra – I	28.9	27.5	3.78	2350	13.8	399	2.12	32	87	109	27	42	98.4
4 – T – I	28.9	24.0	4.34	2249	11.7	381	2.22	38	87	113	32	47	97.2
4 – Ra – I	29.7	21.7	4.93	2082	10.7	354	2.39	38	87	112	32	47	97.3
5 – T – I	30.2	18.5	5.88	2081	8.0	352	2.40	35	85	115	29	48	97.9
1 – T – II	31.7	17.8	6.39	2084	7.9	338	2.50	34	87	111	28	48	98.0
5– Ra – I	30.3	15.1	7.21	2083	7.3	348	2.43	38	87	112	30	29	97.5
1– Ra – II	32.2	14.9	7.79	2080	7.1	330	2.56	37	87	111	29	29	97.6
2– T – II	32.0	12.3	9.40	2100	5.4	333	2.54	37	87	110	28	30	97.8
3.3.2	**Fuel Consumption:**												
3.3.2.1	In Selected gear at Maximum power at rated engine speed:												
1 – Ra – II	30.5	12.4	8.87	2350	6.0	378	2.24	33	87	109	29	36	97.7
3.3.2.1.1	75% of pull corresponding to maximum power at rated engine speed												
1 – Ra – II	24.8	9.3	9.61	2518	4.6	414	2.04	33	87	111	29	34	97.8
3.3.2.1.2	50% of pull corresponding to maximum power at rated engine speed												
1 – Ra – II	16.8	6.2	9.78	2537	3.4	498	1.70	34	87	111	29	34	97.7
3.3.2.1.3	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.1.1:												
2 – T – II	24.7	9.3	9.60	2125	4.5	363	2.33	34	86	107	30	32	97.7
3.3.2.1.4	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.1.2:												
2 – T – II	16.6	6.2	9.72	2130	3.5	427	1.98	35	89	103	30	32	97.6
3.3.2.2	In Selected gear nearest to 7.5 km/h at rated engine speed:												
1 – T – II	30.9	15.3	7.26	2352	7.3	372	2.27	34	87	108	30	32	97.6
3.3.2.2.1	75% of pull corresponding to maximum power at rated engine speed:												
1 – T – II	25.2	11.5	7.88	2513	4.8	407	2.08	34	87	111	30	30	97.6
3.3.2.2.2	50% of pull corresponding to maximum power at rated engine speed:												
1 – T – II	17.1	7.7	8.05	2534	4.3	487	1.73	34	87	112	29	30	97.6
3.3.2.2.3	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.2.1:												
5 – Ra – I	25.1	11.6	7.81	2221	5.6	384	2.20	34	87	109	28	30	97.6
3.3.2.2.4	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.2.2:												
5 – Ra – I	17.2	7.7	8.07	2264	4.1	453	1.87	33	86	107	27	30	97.6

T = Tortoise | Ra = Rabbit | I = Low | II = High

N.B. – Fan speed was not measured

4 REPAIRS AND ADJUSTMENTS DURING TESTS : None

5 REMARKS : None

TEST CARRIED OUT AT C.F.M.T. & T.I., BUDNI (M.P.), INDIA

TESTING AUTHORITY

P.K. PANDEY	R.K. SINGHAI	S.C. JAIN
TEST ENGINEER	SENIOR TEST ENGINEER	DIRECTOR

Draft Test report complied by: **Mr. Chakradhar V. Chimote, Senior Technical Assistant**