OECD Approval No. : 2/2 236
Date of approval : 29th March, 2005

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



Agricultural Tractor

MAHINDRA 585 DI^{S} TRACTOR

Manufactured by	:	M/s Mahindra & Mahindra Limited, (Farm Equipment Sector) Akurli Road, Kandivli (East) Mumbai- 400 101 (M.S.), India
Submitted for test by	:	The manufacturer
Report No.	:	T- 534/1021/10/OECD
Date	:	November, 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.

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In this report units of 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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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.

The testing station has checked that the series production conforms to the tested tractor.

[C]	Tractor manufacturer's name and address	:	M/s Mahindra & Mahindra Limited, (Farm Equipment Sector) Akurli Road, Kandivli (East) Mumbai- 400 101 (M.S.), India
[D]	Location of tractor assembly	:	Kandivli- East, MUMBAI (M.S.)
[D]	Submitted for test by	:	The manufacturer
[C]	Selected for test by	:	The manufacturer
D]	Place of running-in		Kandivli (East) Mumbai (M.S.), India
[D]	Duration of running-in	:	45 hours
[C]	Location of test	:	Government of India, Central Farm Machinery Training and Testing Institute, P.O.- Tractor Nagar, BUDNI – 466445 (M.P.), INDIA

SPECIFICATIONS OF TRACTOR

1.1 Identification:

1.1.1

[C]	Make of tractor	:	Mahindra
[C]	Model (trade name)	:	585DI^S
[C]	Type	:	2 WD , Agricultural Tractor

1.1.2 Numbers:

[D]	1st Serial No. or prototype	:	PNS- 101
[C]	Serial No.	:	PNS- 101

1.1.3 Other specification (if applicable):

[D]	Model(s) for other countries	:	585 DI^S
[C]	Transmission type or gear ranges	:	8-Speed, mechanical, partial syncromesh
[C]	Speed version	:	**Not specified**
[D]	Manufacturer identification or Technical type no.	:	Mahindra 585 DI^S

1.2 Engine:

[C]	Make	:	Mahindra
[C]	Model	:	MDI 3000 B
[C]	Type	:	Four stroke, water cooled, direct injection, diesel engine
[C]	Serial No.	:	PNS- 101

1.2.1 Cylinders:

[C]	Number and disposition	:	Four,Verticle, In-line
[D]	Bore/Stroke	:	88.9mm/101.6mm
[D]	Capacity	:	2523 cm^3
[D]	Compression ratio	:	18:1±0.5
[D]	Arrangement of valves	:	Over head
[D]	Cylinder liners	:	Wet

1.2.2	**Supercharging:**		**Not Provided**
1.2.3	**Fuel system:**		
[C]	Fuel feed system	:	Lift pump, piston-type, integral with fuel injection pump
	Filter(s):		
[C]	Make	:	MICO LIC BOSCH
[C]	Model	:	9 450 030 117
[C]	Type	:	Primary cloth and secondary paper element
[C]	Number	:	Two
[D]	**Capacity of fuel tank**	:	56 dm^3
	Injection pump:		
[C]	Make	:	MICO LIC BOSCH
[C]	Model	:	F002 AOZ 203
[C]	Type	:	Plunger, in-line
[C]	Serial Number	:	48665911
	Manufacturer's production setting of injection pump:		
[C]	Flow rate (rated engine speed & full load)	:	10.25 to 11.5 dm^3/h
[D]	Timing	:	17 degree before TDC
	Injectors:		
[D]	Make	:	MICO LIC BOSCH
[D]	Model	:	9 430 032 256
[D]	Type	:	Multihole
[D]	Injection pressure	:	19.61 + 0.98 MPa
1.2.4	**Governor:**		
[C]	Make	:	MICO LIC BOSCH
[C]	Model	:	RSV 425 – 1300 A2C 1201R
[C]	Type	:	Mechanical, variable speed
[C]	Governed range of engine speed	:	850 ± 50 to 2850 ± 50 rpm
[C]	Rated engine speed	:	2600 rpm
1.2.5	**Air cleaner:**		
	Pre-cleaner:		
[C]	Make	:	CONAL
[C]	Model	:	**Not specified**
[C]	Type	:	Centrifugal with transparent plastic dust collector
[C]	Location of air intake	:	On top of main air cleaner tube, RHS of engine
	Main cleaner:		
[D]	Make	:	Chromwell
[C]	Model	:	**Not specified**
[C]	Type	:	Twin, paper element & oil bath
[C]	Maintenance indicator	:	None

1.2.6	**Lubricating System:**		
[D]	Type of feed pump	:	Lobe 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 (with coolant)
[D]	Type of pump	:	Centrifugal, belt driven
	Specification of fan:		
[C]	Number of fan blades	:	6
[D]	Fan diameter	:	400 mm
[C]	Total coolant capacity	:	8.3 dm^3
[C]	Type of temperature control	:	Thermostat
[D]	Superpressure system	:	88 kPa
1.2.8	**Starting system:**		
[C]	Make	:	LUCAS TVS
[C]	Model	:	M-14
[C]	Type	:	Electrical, solenoid operated
[D]	Starter motor power rating	:	2.2 kW
[C]	Cold starting aid	:	Coil heater at intake manifold with timer provided
[C]	Safety device	:	None
1.2.9	**Electrical System:**		
[C]	Voltage	:	12 V
	Generator:		
[C]	Make	:	LUCAS TVS
[C]	Model	:	A 115-36
[C]	Type	:	Alternator
[D]	Power	:	12V, 36 Amps
	Battery:		
[C]	Number	:	One
[D]	Rating	:	12V, 75 Ah at 20 hours discharge rate
1.2.10	**Exhaust System:**		
[D]	Make	:	Panchal automobile
[C]	Model	:	**Not specified**
[C]	Type	:	Horizontal, cylindrical
[C]	Location	:	On right hand side of engine
1.3	**Transmission:**		
1.3.1	**Clutch:**		
[D]	Make	:	Valeo
[D]	Model	:	**Not specified**

[D] Type : Diaphragm clutch cover assembly with dry friction plate.

[D] Number of plate (s) : One
[D] Diameter of plate (s) : 280mm
[C] Method of operation: : By depressing the clutch pedal on LHS

1.3.2 Gear Box:

[D] Make : Mahindra
[D] Model : **Not specified**
[D] Type : Mechanical, partial synchromesh

[C] **Description**

		Forward	Reverse
[C]	Number of gears	4	1
[C]	Number of ranges	2 ('L' & 'H')	2 ('L' & 'H')
[C]	Total of arrangements	8	2

'L' = Low 'H' = High

[D] Available options : None

1.3.3 Rear axle and final drives:

[D] Make : Mahindra
[D] Model : **Not specified**
[D] Type : Spur gear bull gear and pinion reduction

Differential lock:

[D] Type : Splined dog clutch on pinion shaft
[C] Method of engagement : By depressing a pedal on RHS
[C] Method of disengagement : By releasing the same pedal

1.3.4 Front axle and final drives:

[D] - Make : Mahindra
[D] - Model **Not specified**
[D] - Type : 3 Piece

- Differential lock : Not Applicable

1.3.5. Total ratios and travelling speeds:

	Movement	GEAR	RANGE	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed (*) at rated engine speed of **2600** rev/min, (km/h)
	1	2	3	5	6
[C]	Forward	1	L	191.9	3.01
[C]		2		119.7	4.83
[C]		3		83.8	6.90
[C]		4		67.8	8.52
[C]		1	H	53.3	10.85
[C]		2		33.4	17.33
[C]		3		23.2	24.91
[C]		4		19.0	30.51
[C]	Reverse	--	L	126.8	4.56
[C]		--	H	35.1	16.46

*Calculated with a tyre dynamic radius index of **590** mm (ISO 4251-1-1998)

1.4 Power take-off:

1.4.1. Main Power Take-Off:

[C] Type : Not independent

[C] Method of engagement : Mechanically, by a hand lever on LHS

[C] Number of shafts : One

[C] Method of changing power take-off shaft ends and speeds : Speed can be changed by high-low range shifter lever

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 : 34.77 mm

[C] - Number of splines : 6 (in conformity with ISO 500 :1991)

[C] - Height above ground : 565 mm

[C] - Distance from the median plane of the tractor : 0 mm

[C] - Distance behind rear wheel axis : 355 mm

[C] - PTO speed at rated engine speed : 722 rev/min.

[C] - Engine speed at standard power take-off speed : 1944 rev/min.

[C]	Ratio of rotation speeds (Engine speed/ PTO speed	:	3.60:1
[D]	Power restriction	:	26.8 kW
[D]	Maximum torque transmissible	:	465.8 Nm
[C]	Direction of rotation (viewed from rear of 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:**		
[D]	Make	:	Mahindra
[C]	Model	:	Not specified
[C]	Type of hydraulic system	:	Open centre
[C]	Type and number of cylinders	:	Single acting, one
[C]	Type of linkage lock for transport	:	Hydraulic
[D]	Relief valve pressure setting (tolerance)	:	15.2 to 19.6 MPa
[D]	Opening pressure of cylinder safety valve	:	18.9 to 21.4 MPa
[D]	Lift pump type	:	External gear type
[D]	Transmission between pump and engine	:	Gear drive
[D]	Number and Type of filters	:	Total three (One suction strainer, one orifice assembly strainer and one return line strainer).
[C]	Site of oil reservoir	:	Above differential housing

Type, number and location of tapping points:

[D]	- Number	:	Three
[D]	- Type	:	One internal tapping type and remaining two are of quick release coupling type.
[C]	- Location	:	One point on front side VTU of control valve and two points on LHS of VTU control valve, at auxiliary valve.
[D]	- Maximum volume of oil available to external cylinders	:	7 l

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

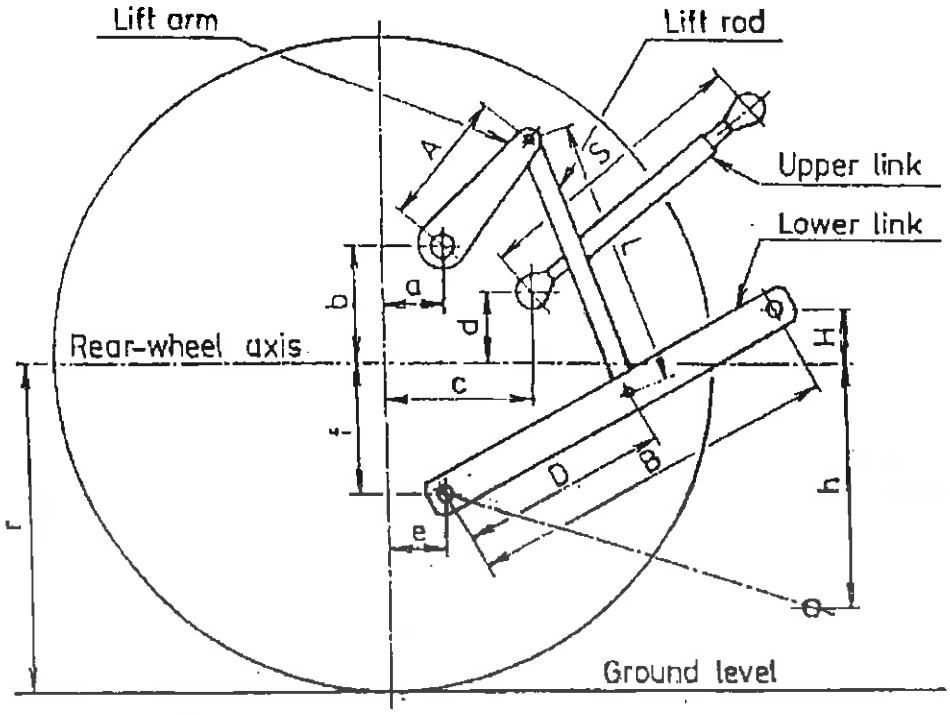


Fig. 1 .1

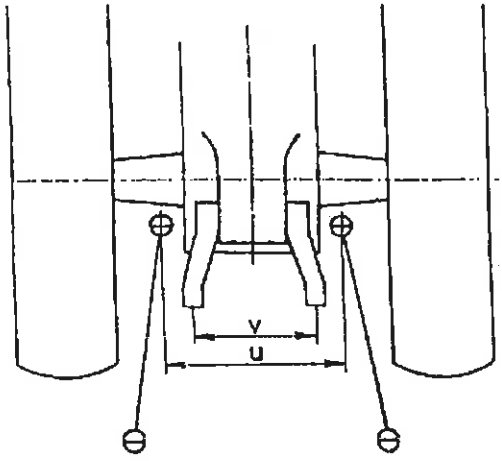


Fig. 1.2

Table: Linkage Geometry dimensions:

			Dimension or range, mm	Settings used during test, mm
[C]	Length of lift arms:	**(A)**	270	270
[C]	Length of lower links:	**(B)**	770	770
	Distance of lift arm pivot point from rear-wheel axis:			
[C]	- Horizontally	**(a)**	35	35
[C]	- Vertically	**(b)**	370	370
[C]	Horizontal distance between the 2 lower link points:	**(u)**	465	465
[C]	Horizontal distance between the 2 lift arm end points:	**(v)**	535	535
[C]	Length of upper link:	**(S)**	From 500 to 760	670
	Distance of upper link pivot point from rear wheel axis:			
[C]	- Horizontally	**(c)**	260	260
[C]	- Vertically	**(d)**	260	260
	Distance of lower link pivot point from rear wheel axis:			
[C]	- Horizontally	**(e)**	145, 150	145
[C]	- Vertically	**(f)**	70, 130	70
[C]	Distance of lower link pivot points to lift rod pivot points on lower links:	**(D)**	385, 450	385
[C]	Length of lift rods:	(L)	From 470 to 620	520
	Height of lower hitch points relative to the rear-wheel axis:			
[C]	- in low position	**(h)**	From -590 to+65	390
[C]	- in high position	**(H)**	From +145 to+405	295
[C]	Height above ground of lower hitch points when locked in transport position (*)	-	--	Any height within lift range

(*) Assuming r=590mm, tyre dynamic radius index of ISO:4251-1:1998

1.7	**Swinging drawbar:**		
[C]	- Type	:	Clevis
[C]	- Height above ground	:	460 mm
[C]	- Type of adjustment	:	None
[C]	- Distance of hitch point from rear wheel axis, horizontally	:	693 mm
	Distance of hitch point from power take-off shaft end:		
[C]	- Vertically	:	105 mm
[C]	- Horizontally	:	338 mm
	Lateral adjustment (centre of clevis)		
[C]	- Right hand	:	160 mm
[C]	- Left hand	:	160 mm
[C]	- Distance of pivot point from rear-wheel axis, horizontally	:	25mm
[C]	- Diameter of drawbar pinhole	:	27.1 mm
[D]	- Maximum vertical permissible load	:	4.71 kN
1.8	**Trailer hitch:**		
[C]	Type	:	Clevis
[C]	Hole diameter	:	30 mm
[C]	Height above ground	:	400 to 670 mm
[C]	Distance of hitch point from rear-wheel axis, horizontally	:	465 mm
	Distance of hitch point from power take-off shaft end:		
[C]	- Vertically	:	- 165 mm to 105 mm
[C]	- Horizontally	:	110 mm
[D]	Maximum vertical permissible load	:	4.71 kN
1.9	**Holed drawbar:**		
[C]	Number of holes	:	9
[C]	Distance between holes	:	80.0mm
[C]	Hole diameter	:	25.0 mm
[C]	Thickness/Width of drawbar	:	30.0 mm/75.0 mm
	Height above ground:		
[C]	- Minimum	:	0 mm
[C]	- Maximum	:	995 mm
[C]	Horizontal distance to power take-off shaft end (rear)	:	560, 565 mm

1.10 Steering:

[D]	Make	:	MIS Eaton (I) Ltd.
[D]	Model	:	Series 5
[D]	Type	:	Hydrostatic
[D]	Method of operation	:	Geroter
[D]	Pump(s)	:	One
[D]	Ram(s)	:	One
[D]	Working pressure	:	12.4MPa

1.11 Brakes:

1.11.1 Service brake:

[D]	Make	:	Mahindra
[D]	Model	:	**Not specified**
[D]	Type	:	Dry, friction plate type
[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 on RHS of operator's seat.

1.12 Wheels:

	Number		
[C]	Front	:	Two, steering
[C]	Rear	:	Two, driving
[C]	Wheel base	:	1920 mm

Track width adjustment:

		Minimum [mm]	Maximum [mm]	Adjustment method
[D]	Front	1168	1372	Front axle is extendable
[D]	Rear	1385	1872	Reversing wheels and offsetting wheel disc on rim lugs

1.13 Protective structure: : **Not provided**

1.14 Seat:

1.14.1 Driver's seat:

[C]	Make	:	ALF Engg. Co.
[C]	Model	:	**Not specified**
[C]	Type	:	Cushioned
[C]	Seat and steering wheel reversible	:	No
[C]	Type of suspension	:	two helical coil springs
[C]	Type of damping	:	Hydraulic shock absorber

Range of adjustment:

[C] Longitudinally : ± 85 mm
[C] Vertically : NIL
[C] Safety belt : None

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	1222	180x100	245
[C]	Side lights	1250	40x65	720
[C]	Rear lights	1250	40x65	640
[C]	Reflectors	1250	40x65	680

2. TEST CONDITIONS

2.1 Overall dimensions (unballasted tractor)

Length [mm]	Width		Height at top of	
	Minimum [mm]	Maximum [mm]	Pre- cleaner [mm]	Steering wheel [mm]
3360	1710	2195	1790	1700

2.2 Ground clearance (unballasted tractor) : 330 mm
Clearance – limiting part : Below steering ram cylinder

2.3 Tractor Mass

	Unballasted (with 32 kg of ballast weight fitted on front axle)	
	Without driver	With driver
	[kg]	[kg]
Front	742	747
Rear	1165	1235
Total	1907	1982

2.4 Tyres and track width specifications:

Tyres		Front	Rear
- Dimensions		6.00 - 16	12.4 – 28
- Ply rating		8	12
- Type		Pneumatic ribbed	Pneumatic traction
- Maximum load (tyre manufacturer's)	kN	4.0	11.4
- Maximum load (tractor manufacturer's)	kN	4.1	11.4
- Inflation pressure (tyre manufacturer's)	kPa	207	138
- Dynamic radius index	mm	**Not specified**	590
Chosen track width	mm	1270	1385

2.5 Fuel:

Type : High speed diesel (commercial fuel) conforming to IS: 1460-2000

Density at 15 °C : 0.842 g/cm^3

2.6 Oils and lubrication:

2.6.1 Capacity and change interval:

	Capacity, (dm^3)	Oil change, (h)	Filter change, (h)
Air cleaner oil	0.5	First change after 50 hours, subsequent changes after every 200 hours	Filter change not specified however, filter is recommended to be cleaned after 200 hours
Engine oil sump	6.9	First change after 200 hours and subsequent changes after 1000 hours	First change after every 100 hours. Subsequently after every 200 hours
Gear box	25.6	1000	--
Hydraulic system	12.0	1000	First change after 450 hours. Subsequently after every 600 hours
Steering oil	2.8	First change after 50 hours. Subsequent changes after every 1000 hours	First change after 50 hours. Subsequently after every 1000 hours

2.6.2 Specifications:

	Recommended	Used during test
Engine oil:		
Type	15 W - 40	As recommended
Viscosity	14.0 to 16.0 cSt	
Classification	API CF4	
Air cleaner oil:		
Type	SAE 30	As recommended
Viscosity	9.3 to 12.5 cSt	
Classification	--	
Transmission:		
Type	EP 90	As recommended
Viscosity	14.5 to 17.3 cSt	
Classification	API GL 4	
Hydraulic fluid:		As recommended
Type	VG 68	
Viscosity@ 65°C	24.0 to 28.0 cSt	
Classification	ISO VG 68	
Steering oil:		
Type	ENCKLO 46	As recommended
Viscosity	42.0 to 50.0 cSt	
Classification	ISO VG 46	

2.6.3 Grease:

Number of lubricating points:

Grease nipples : 18

Grease cups : Nil

3 COMPULSORY TESTS RESULTS

3.1 Main power take-off:

Date and location of tests : 03.12.04, CFMT&TI, Budni (M.P.) India
Type of dynamometer bench : Eddy current, Fuchino ESF 1000 Dynamometer

Power	Speed		Fuel consumption			Specific energy
	Engine	PTO	Hourly		Specific	
kW	(rev/min)		l/h	kg/h	g/kWh	kWh/l
3.1.1 Maximum Power – Two-Hour Test:						
33.1	2599	722	10.57	8.90	269	3.13
3.1.2 Power at Rated Engine Speed (2600 rev/min) :						
33.1	2599	722	10.57	8.90	269	3.13
3.1.3 Standard Power Take-Off Speed [540 ± 10 (rev/min)] :						
29.0	1944	540	8.36	7.04	243	3.47
3.1.4 Part Loads:						
3.1.4.1 The torque corresponding to maximum power at rated engine speed :						
33.1	2599	722	10.57	8.90	269	3.13
3.1.4.2 85 % of torque obtained in 3.1.4.1 :						
28.9	2682	745	9.48	7.98	276	3.05
3.1.4.3 75 % of torque defined in 3.1.4.2 :						
22.0	2718	755	7.81	6.58	299	2.82
3.1.4.4 50 % of torque defined in 3.1.4.2 :						
14.9	2761	767	6.39	5.38	361	2.33
3.1.4.5 25 % of torque defined in 3.1.4.2 :						
7.6	2797	777	4.94	4.16	547	1.54
3.1.4.6 Unloaded :						
1.3	2815	782	3.81	3.21	2469	0.34
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 :						
29.0	1944	540	8.36	7.04	243	3.47
3.1.5.2 85 % of torque obtained in 3.1.5.1 :						
26.2	2074	576	7.62	6.42	245	3.44
3.1.5.3 75 % of torque defined in 3.1.5.2 :						
20.0	2106	585	6.15	5.18	259	3.25
3.1.5.4 50 % of torque defined in 3.1.5.2 :						
13.6	2138	594	4.80	4.04	297	2.83
3.1.5.5 25 % of torque defined in 3.1.5.2 :						
6.9	2189	608	3.50	2.95	428	1.97
3.1.5.6 Unloaded :						
0.9	2225	618	2.45	2.06	2289	0.37

1	2	3	4	5	6	7
3.1.6 PART LOADS AT DIFFERENT ENGINE SPEEDS						
3.1.6.1 maximum power at rated engine speed :						
33.1	2599	722	10.57	8.90	269	3.13
3.1.6.2 80% of power obtained in 3.1.6.1 at max. speed setting :						
26.4	2696	749	8.93	7.52	285	2.96
3.1.6.3 80% of power obtained in 3.6.1.1 with governor control set to 90% of rated engine speed :						
26.4	2340	650	7.93	6.68	253	3.33
3.1.6.4 40% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed :						
13.2	2340	650	5.10	4.29	325	2.59
3.1.6.5 60% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed :						
19.8	1559	433	5.51	4.64	234	3.59
3.1.6.6 40% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed :						
13.2	1559	433	4.03	3.39	257	3.28

No load maximum engine speed : 2815 rev/min
Torque (equivalent crankshaft) at maximum power:
- At rated engine speed : 121.44 Nm
- At 2 - hour test : 121.44 Nm

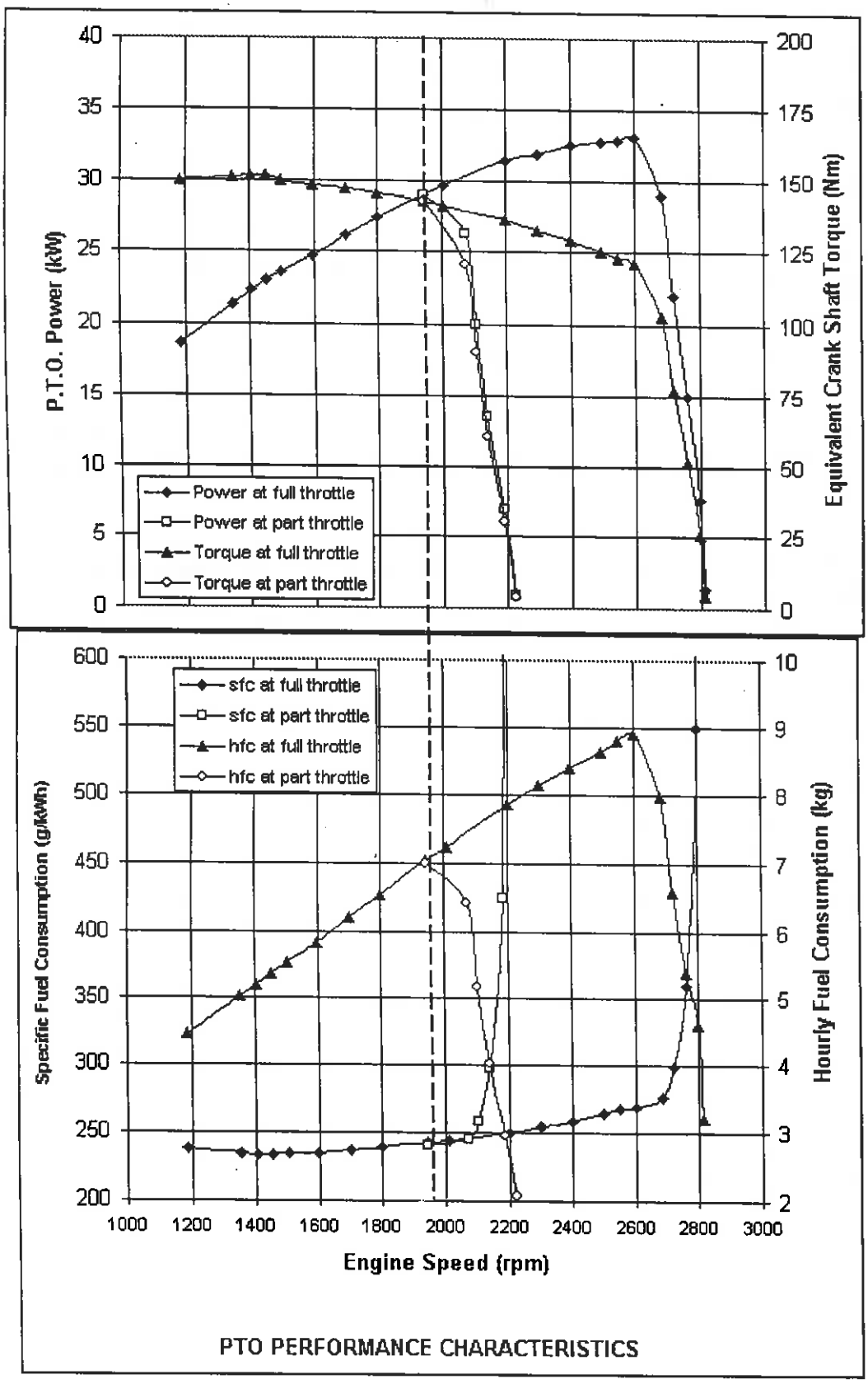
Maximum torque (equivalent crankshaft) : 151.67 Nm
(Engine speed : 1404 (rev/min)

Mean atmospheric conditions:		
-Temperature	:	22°C
-Pressure	:	98.9kPa
-Relative humidity	:	54%
Maximum temperatures:		
-Coolant	:	81°C
-Engine oil	:	106°C
-Fuel	:	27°C
-Engine air intake	:	32°C

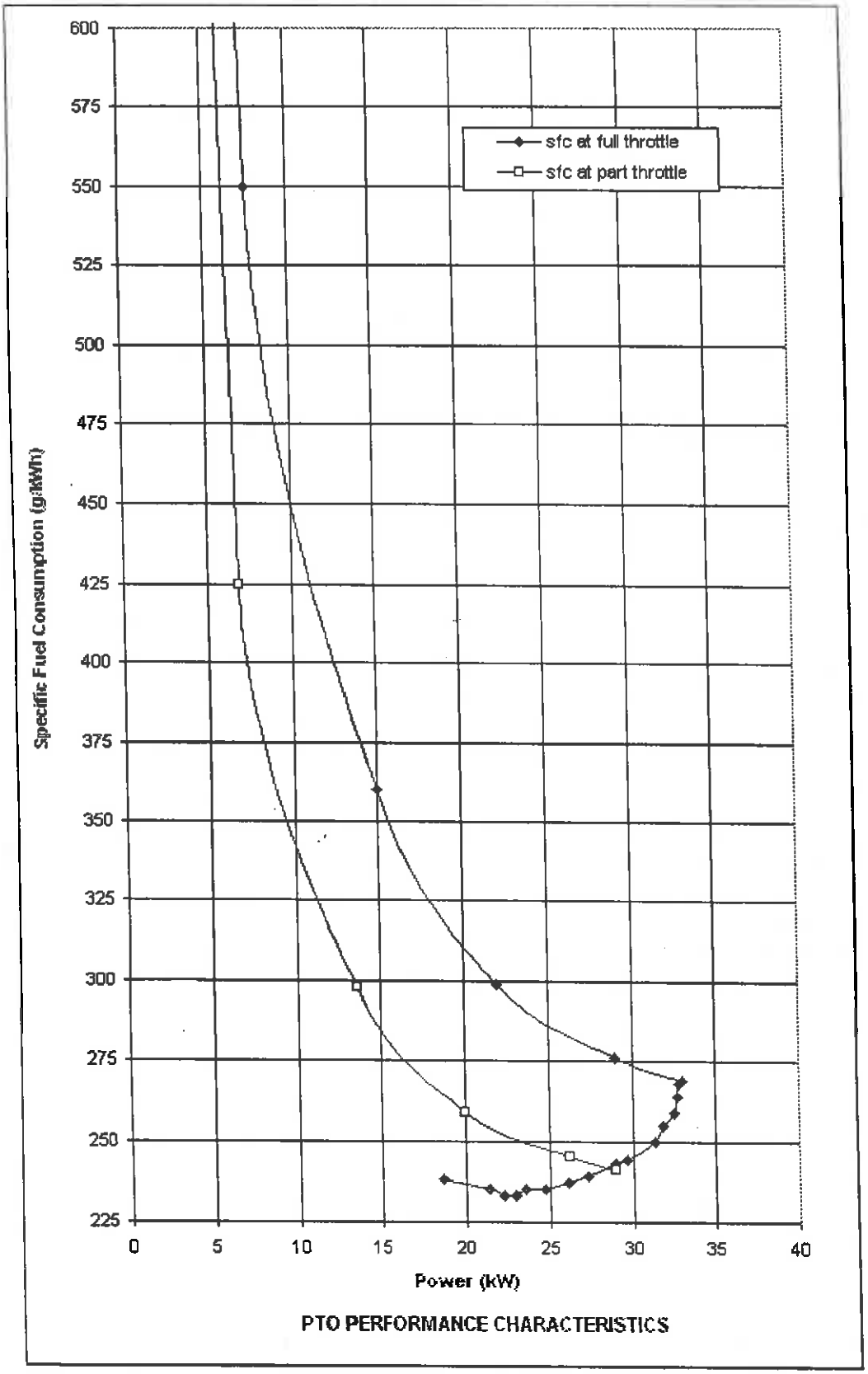
3.2 Hydraulic power and lifting force:
Date of tests : 14.12.2004 to 13.01.2005

3.2.1 Hydraulic Power Test:

3.2.1.1 Hydraulic Fluid Data:
- Hydraulic fluid type : VG 68
- Viscosity index : 130 min
(ISO 3448 + Corr1:1993)
- Viscosity at 65°C : 24.0 to 28.0 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)	--	--	--	2600	--	--
2.	Maximum (sustained) pressure with relief valve open as measured at the coupler. Pump stalled- No	16.5	60	70	2765	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.	14.9	70		2765	11.05	2.7
4.	Maximum available flow and maximum power from one coupler pair	12.0	69		2765	21.9	4.4
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 8, 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	 685mm 665mm	 685mm 665mm
Maximum corrected force exerted through full range	13.9 kN	8.3 kN
Corresponding pressure of hydraulic fluid	14.9 MPa	14.9 MPa
Moment about rear wheel axle	12.7 kN-m	12.7 kN-m
Maximum tilt angle of mast from vertical	--	28.5 degree

Lifting height relative to the horizontal plane including the lower link pivot points.												
mm	-315	-300	-200	-100	0	+100	+200	+300	+325	+335	+345	350
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)	13.9	14.4	14.6	15.3	15.9	15.2	14.8	14.7	14.2	14.0	13.9	15.0
Corresponding pressure **14.9** MPa												
At the frame in (kN)	10.5	10.8	10.8	10.9	11.1	10.4	9.5	9.0	8.7	8.5	8.3	8.8
Corresponding pressure **14.9** MPa												

3.3 Drawbar power test (unballasted tractor):

Date(s) of tests	:	08.12.04 and 09.12.04
Type of track	:	Concrete
Height of drawbar	:	550 mm
Front tyre inflation pressure	:	167 kPa
Rear tyre inflation pressure	:	118 kPa
Rolling radius of rear tyre during drawbar power test.	:	610 mm

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 - L	11.4	14.7	2.81	2751	14.6	463	1.82	32	75	104	25	25	97.9
2- L	17.9	14.6	4.42	2705	15.0	369	2.28	34	77	105	27	28	98.0
*3- L	25.4	14.7	6.21	2652	14.7	346	2.43	34	79	107	27	26	98.0
4- L	26.8	12.3	7.83	2605	11.3	328	2.57	33	80	105	27	25	98.0
1- H	26.8	9.3	10.35	2596	7.6	329	2.56	33	79	106	25	34	98.5
3.3.2	**Fuel Consumption:**												
3.3.2.1	In Selected gear at Maximum power at rated engine speed:												
4 - L	26.7	12.3	7.83	2603	11.2	329	2.57	27	78	99	23	35	98.8
3.3.2.1.1	75% of pull corresponding to maximum power at rated engine speed												
4- L	21.5	9.2	8.44	2702	7.8	322	2.62	29	76	102	24	29	98.6
3.3.2.1.2	50% of pull corresponding to maximum power at rated engine speed												
4- L	15.1	6.2	8.78	2739	5.4	371	2.27	30	75	102	24	27	98.6
3.3.2.1.3	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.1.1:												
1 - H	21.7	9.3	8.42	2108	7.5	294	2.86	31	78	101	25	26	98.5
3.3.2.1.4	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.1.2:												
1 - H	15.0	6.2	8.71	2121	4.8	312	2.70	31	76	99	25	25	98.5
3.3.2.2	In Selected gear nearest to 7.5 km/h at rated engine speed:												
3 – L	25.4	14.7	6.21	2652	14.7	346	2.43	34	79	107	27	26	98.0
3.3.2.2.1	75% of pull corresponding to maximum power at rated engine speed:												
3 – L	20.6	11.0	6.76	2702	8.8	332	2.54	31	76	105	25	27	98.4
3.3.2.2.2	50% of pull corresponding to maximum power at rated engine speed:												
3 – L	14.6	7.4	7.12	2742	5.3	372	2.26	32	76	105	25	26	98.4
3.3.2.2.3	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.2.1:												
4 – L	21.0	11.1	6.82	2217	9.2	289	2.91	32	77	103	26	25	98.3
3.3.2.2.4	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.2.2:												
4 - L	14.6	7.4	7.1	2229	6.0	308	2.73	33	76	100	26	23	98.3

N.B. – Fan speed was not measured

* Slip at rated engine speed was observed more than 16% hence corresponding figures are not reported.

4. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS.

1. During hydraulic performance test, the system ceased to respond to both position control lever and draft control lever. The system was, then cleaned.

5. REMARKS

1. The performance of hydraulic system was initially erratic. During regular production this needs to be looked into.

2. Operator's manual, Service manual and parts catalogue need to be provided for the guidance of users and service personnel as and when regular production is started.

TEST CARRIED OUT AT CFMT & TI., BUDNI (M.P.), INDIA

TESTING AUTHORITY

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

Draft Test report compiled by: **Mr. Manohar Mandal,** Senior Technical Assistant