OECD Approval No. : 2 / 2 375

Date of approval : 20th June, 2007

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



Agricultural Tractor

SONALIKA INTERNATIONAL DI 75 (4 WD) TRACTOR

ZK – 30 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- 590/1091/15/OECD**
Date	:	**June, 2007**

GOVERNMENT OF INDIA
Ministry of Agriculture, (Deptt. of Agriculture and Co-opn.)
CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
P.O. Tractor Nagar, BUDNI (M.P.) 466 445
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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:	**20th June, 2007**	**OECD No.:**	**2 / 2 375**

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:								
Force	1	kN	=	1000	N	=	102	kgf
Power	1	kW	=	1000	W	=	1.36	Ps
Pressure	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.

[C]	Tractor manufacturer's name and address	:	M/s International Tractors Limited, Village Chak Gujran, P.O. Piplanwala , Jalandhar Road, HOSHIARPUR (Pb.) – 146 022
[D]	Location of tractor assembly	:	Village Chak Gujran, P.O. Piplanwala , Jalandhar Road, HOSHIARPUR (Pb.) – 146 022
[D]	Submitted for test by	:	The manufacturer
[C]	Selected for test by	:	Testing Authority in the agreement with the manufacturer
[D]	Place of running-in	:	Central Farm Machinery Training & Testing Institute, Tractor Nagar, Budni (M.P.) – 466 445
[D]	Duration of running-in	:	35 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	:	Sonalika International
[C]	Model (trade name)	:	DI – 75
[C]	Type	:	4WD, Agricultural tractor

1.1.2 Numbers:

[D]	1st Serial No. or prototype	:	62724
[C]	Serial No.	:	0503ZK62724/3

1.1.3	**Other specification (if applicable):**		
[D]	Model(s) for other countries	:	**None**
[C]	Transmission type or gear ranges	:	8 speed, mechanical, constant mesh
[C]	Speed version	:	30 km/h
[D]	Manufacturer identification or Technical type no.	:	ZK
1.2	**Engine:**		
[C]	Make	:	Sonalika
[C]	Model	:	4100FLT
[C]	Type	:	Four stroke, water cooled, direct injection diesel engine
[C]	Serial No.	:	58952
1.2.1	**Cylinders:**		
[C]	Number and disposition	:	Four, vertical, in-line
[D]	Bore/Stroke	:	100 mm / 118 mm
[D]	Capacity	:	3707 cm^3
[D]	Compression ratio	:	17.4 : 1
[D]	Arrangement of valves	:	Overhead
[D]	Cylinder liners	:	Wet
1.2.2	**Supercharging:**		
[D]	Make	:	Holset
[D]	Model	:	H X 25
[D]	Type	:	Exhaust operated turbine compressor
[D]	Pressure	:	0.17 MPa at rated rpm
1.2.3	**Fuel system:**		
[C]	Fuel feed system	:	Lift pump, piston-type, integral with fuel injection pump
	Filter(s):		
[C]	Make	:	MICO
[C]	Model	:	9 450 030 120
[C]	Type	:	Primary cloth and secondary paper element
[C]	Number	:	Two
[D]	Capacity of fuel tank	:	55 dm^3

Injection pumps:

[C]	Make	:	BOSCH
[C]	Model	:	E 040 1710 00
[C]	Type	:	Plunger, in-line
[C]	Serial Number	:	491 000 10

Manufacturer's production setting of injection pump:

[D]	Flow rate (rated engine speed & full load)	:	13.00 to 14.52 dm^3 / h
[D]	Timing	:	18 degree before TDC

Injectors:

[D]	Make	:	MICO
[D]	Model	:	F002 C30128-DLLA15051377
[D]	Type	:	Multihole
[D]	Injection pressure	:	22.0 to 22.8 MPa

1.2.4 Governor:

[D]	Make	:	BOSCH
[D]	Model	:	E 042 149 400
[D]	Type	:	Mechanical, variable speed
[D]	Governed range of engine speed	:	650 ± 50 to 2400 ± 50 rev/min
[C]	Rated engine speed	:	2200 rev/min.

1.2.5 Air cleaner:

Pre-cleaner:

[C]	Make	:	Donaldson
[C]	Model	:	Not provided
[C]	Type	:	Cyclone type, integrated with main air cleaner
[C]	Location of air intake	:	Forward of radiator, under the bonnet

	Main cleaner:		
[C]	Make	:	Donaldson
[C]	Model	:	LDCS/2
[C]	Type	:	Dry, paper element
[C]	Maintenance indicator	:	Warning light on dash board
1.2.6	**Lubricating System:**		
[D]	Type of feed pump	:	Gear pump
[C]	Type of filter(s)	:	Full flow, replaceable paper element
[C]	Number of filter(s)	:	One
1.2.7	**Cooling System:**		
[C]	Type of coolant	:	Water
[D]	Type of pump	:	Centrifugal pump
	Specification of fan:		
[C]	Number of fan blades	:	06
[C]	Fan diameter	:	380 mm
[D]	Total coolant capacity	:	10.5 dm^3
[C]	Type of temperature control	:	Thermostat
[D]	Super pressure system	:	49 kPa
1.2.8	**Starting system:**		
[C]	Make	:	LUCAS – TVS
[C]	Model	:	3SM114
[C]	Type	:	Electrical, solenoid operated
[D]	Starter motor power rating	:	1.9 kW
[C]	Cold starting aid	:	None
[C]	Safety device	:	None

1.2.9	**Electrical System:**		
[C]	Voltage	:	12V
	Generator:		
[C]	Make	:	LUCAS TVS
[C]	Model	:	A11536
[C]	Type	:	Alternator
[D]	Power	:	0.4 kW @ 6000 rev/min
	Battery:		
[C]	Number	:	One
[D]	Rating	:	88 Ah at 20 hours discharge rate
1.2.10	**Exhaust System:**		
[D]	Make	:	Sonalika
[D]	Model	:	10007679
[C]	Type	:	Updraft, elliptical
[C]	Location	:	On RHS of engine
1.3	**Transmission:**		
1.3.1	**Clutch (Travel and power take-off):**		
[D]	Make	:	LUK India
[D]	Model	:	LUK DC / 280
[D]	Type	:	Dual, Dry (for travel and PTO)
[D]	Number of plate(s)	:	Two
[D]	Diameter of plate(s)	:	280 mm (for both travelling and PTO)
[C]	Method of operation:		
	- Travel	:	By pressing the clutch pedal, on LHS, half way
	- PTO	:	By pressing the same pedal fully

1.3.2 Gear Box:

[D]	Make	:	Sonalika
[D]	Model	:	Solis III CM 10
[D]	Type	:	Constant mesh

	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	:	Sonalika
[D]	Model	:	CWP / 2SP
[D]	Type	:	Crown wheel and pinion with spur gear reduction

Differential lock:

[D]	Make	:	Sonalika
[D]	Type	:	Dog clutch
[C]	Method of engagement	:	By depressing a pedal on RHS
[C]	Method of disengagement	:	By releasing the above pedal

1.3.4 Front axle and final drives:

[D]	Make	:	Carraro
[D]	Model	:	20.11
[D]	Type	:	Crown wheel and out board epicycle gear reduction
	- Differential lock	:	**None**

1.3.5 Total ratios and traveling speeds:

	Movement	GEAR	RANGE	Number of engine revolutions for one revolution of the driving wheels	Nominal traveling speed (*) at rated engine speed of **2200** rev/min, (km/h)
	1	2	3	4	5
[C]	Forward	1	L	190.5	3.03
[C]		2	L	138.8	4.15
[C]		3	L	87.8	6.56
[C]		4	L	64.6	8.93
[C]		1	H	47.5	12.14
[C]		2	H	34.6	16.68
[C]		3	H	21.8	26.39
[C]		4	H	16.1	35.75
[C]	Reverse	–	L	148.6	3.88
[C]		–	H	37.0	15.57

* Calculated with a tyre dynamic radius index of 695 mm (ISO: 4251-1-1998)
'L' = LOW; 'H' = HIGH

[C] Number of revolution of front wheels for one revolution of rear wheels : 1.417

1.4 Power take-off:

1.4.1. Main Power Take-Off:

[C] Type : Semi Independent

[C] Method of engagement : Mechanical, by a hand lever

[C] Number of shafts : One

[C] Method of changing power take-off shaft ends and speeds. : **None**

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	:	34.85 mm
[C]	- Number of splines	:	6
[C]	- Height above ground	:	695 mm
[C]	- Distance from the median plane of the tractor	:	0 mm
[C]	- Distance behind rear wheel axis	:	365 mm
[C]	- PTO speed at rated engine speed	:	707 rev/min
[C]	- Engine speed at standard power take-off speed	:	1680 rev/min
[C]	- Ratio of rotation speeds (Engine speed/ PTO speed	:	3.111 : 1
[D]	- Power restriction	:	**None**
[D]	Maximum torque transmissible	:	1250 Nm
[C]	Direction of rotation (viewed from rear of tractor)	:	Clockwise
1.4.1.2	**Power take-off proportional to ground speed**	:	**Not applicable**
1.4.2	**Optional power take-off**	:	**None**

1.5	**Hydraulic power-lift:**		
[D]	Make	:	Sonalika
[D]	Model	:	Sonalika New hydraulic
[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)	:	20 ± 1 MPa
[D]	Opening pressure of cylinder safety valve	:	21 ± 1 MPa
[D]	Lift pump type	:	Gear type
[D]	Transmission between pump and engine	:	Gear drive
[D]	Number and Type of filter(s)	:	One, strainer type
[C]	Site of oil reservoir	:	Transmission housing
	Type, number and location of tapping points:		
[C]	- Type	:	Quick coupling
[C]	- Number	:	Two
[C]	- Location	:	Behind the operator's seat
[D]	- Maximum volume of oil available to external cylinders	:	58 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

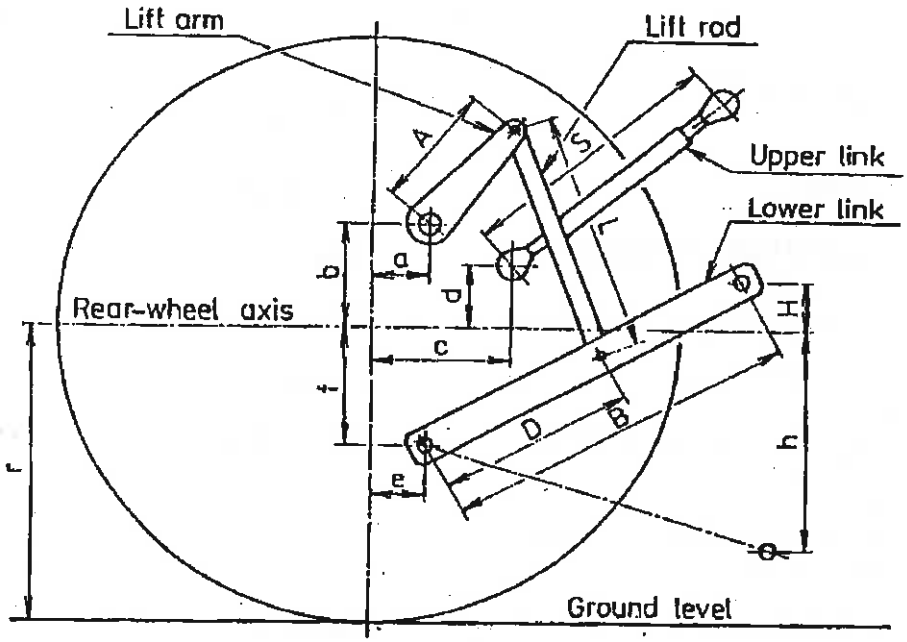

Lift arm
Lift rod
Upper link
Lower link
Rear-wheel axis
Ground level
A
S
r
a
b
d
c
t
e
D
B
H
h
L

Fig. 1 .1

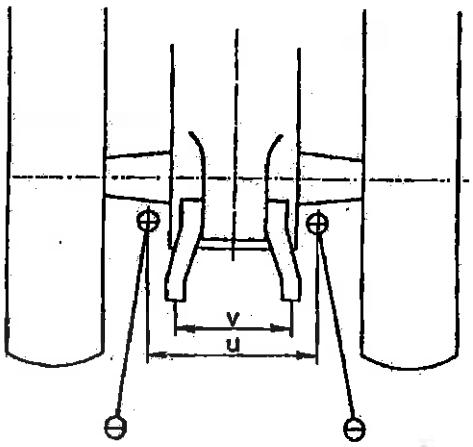

y
u

Fig. 1.2

Table: Linkage Geometry dimensions (Ref. fig. 1.1 & 1.2):

			Dimension or range, (mm)	Settings used during test, (mm)
[C]	Length of lift arms:	(A)	230	230
[C]	Length of lower links:	(B)	770	770
	Distance of lift arm pivot point from rear-wheel axis:			
[C]	- Horizontally	(a)	20	20
[C]	- Vertically	(b)	355	355
[C]	Horizontal distance between the 2 lower link points:	(u)	540	540
[C]	Horizontal distance between the 2 lift arm end points:	(v)	610	610
[C]	Length of upper link:	(S)	430 to 575	510
	Distance of upper link pivot point from rear wheel axis:			
[C]	- Horizontally	(c)	380	380
[C]	- Vertically	(d)	260 & 300	300
	Distance of lower link pivot point from rear wheel axis:			
[C]	- Horizontally	(e)	110	110
[C]	- Vertically	(f)	155	155
[C]	Distance of lower link pivot points to lift rod pivot points on lower links:	(D)	300 to 360	300
[C]	Length of lift rods:	(L)	595 to 770	630
	Height of lower hitch points relative to the rear-wheel axis:			
[C]	- in low position	(h)	– 695 to – 365	– 495
[C]	- in high position	(H)	0 to 300	200
[C]	Height above ground of lower hitch points when locked in transport position (*)	--	Any height within lift range	

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

1.7	**Swinging drawbar**	:	**Not provided**
1.8	**Trailer hitch**		
[C]	- Type	:	Clevis
[C]	- Hole diameter	:	34 mm
[C]	- Height above ground	:	775 mm & 895 mm
[C]	- Distance of hitch point from rear wheel axis, horizontally	:	477 mm
	Distance of hitch point from power take-off shaft end:		
[C]	- Vertically	:	80 mm & 200 mm
[C]	- Horizontally	:	112 mm
[D]	- Maximum vertical permissible load	:	9 kN
1.9	**Holes drawbar:**		
[C]	Number of holes	:	07
[C]	Distance between holes	:	80 mm
[C]	Hole diameter	:	25 mm
[C]	Thickness / Width of drawbar	:	30 mm/ 78.8 mm
[C]	Height above ground:		
	- Minimum	:	0 mm
	- Maximum	:	895 mm
[C]	Horizontal distance to power take-off shaft end (rear)	:	515 mm
1.10	**Steering:**		
[D]	Make	:	Danfoss
[D]	Model	:	OSPC 100 LS
[D]	Type	:	Hydraulic, open centre
[D]	Method of operation	:	Hydraulic power assisted
[D]	Pump(s)	:	Gear type
[D]	Ram(s)	:	Double acting cylinder
[D]	Working pressure	:	14 ± 1 MPa

1.11 Brakes:

1.11.1 Service brake:

[D]	Make	:	Brake India Ltd.,
[D]	Model	:	DB 7.5 / 4
[D]	Type	:	Dry, disc
[C]	Method of operation	:	Mechanical, independent or coupled pedal operation
[C]	Trailer braking take-off	:	None

1.11.2 Parking brake:

[C]	Type	:	Pawl and ratchet
[C]	Method of operation	:	Manual, by pawl & ratchet arrangement on pedal

1.12 Wheels:

Number

[C]	Front	:	Two (steering as well as driving wheels)
[C]	Rear	:	Two (driving)
[C]	Wheel base	:	2305 mm

Track width adjustment:

		Minimum [mm]	Maximum [mm]	Adjustment method
[D]	Front	1560	1861	Reversing wheels and offset lug rims
[D]	Rear	1420	1920	Reversing wheels and offset lug rims

1.13	**Protective structure:**		
[D]	Make	:	Sonalika
[D]	Model	:	RNLTSTD
[D]	Type	:	Foldable
[D]	Manufacturer's name & address	:	International Tractors Limited, Village – Chak Gujran, P.O. – Piplanwala, Jalandhar Road, Distt. Hoshiarpur (PUNJAB) – 146 022, INDIA
	Protective device:		
[D]	Cab / frame / roll guard / other	:	Roll guard
[D]	Tiltable / Not tiltable	:	Tiltable
	OECD approval :		
[D]	Approval number	:	None
[D]	Date of approval	:	Not applicable
[D]	Nos. of minor modification certificates, if any	:	Not applicable
1.14	**Seat:**		
1.14.1	**Driver's seat:**		
[D]	Make	:	M/s Kalka steel Ltd. India
[D]	Model	:	Kalka cu - 150
[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	:	± 50
[C]	Vertically	:	Nil
[C]	Safety belt	:	Not provided
1.14.2	Optional driver's seat(s)	:	Not provided
1.14.3	Passenger seat	:	Cushioned seat provided

1.15 Lighting:

		Height of centre above ground	Size	Distance from outside edge of lights to median plane of tractor
		[mm]	[mm]	[mm]
[C]	Head lights	1060	140 x 90	200
[C]	Side lights	1425	70 x 65	800
[C]	Rear lights	1410	100 x 65	785
[C]	Reflectors	1410	60 x 30	650

2. TEST CONDITIONS

2.1 Overall dimensions (unballasted tractor):

Length [mm]	Width		Height at top of	
	Minimum [mm]	Maximum [mm]	Steering wheel [mm]	Exhaust pipe [mm]
3795	1965	2365	1800	2400

2.2 Ground clearance (unballasted tractor) : 363 mm

Clearance – limiting part : Front differential housing

2.3 Tractor Mass:

	Unballasted	
	Without driver	With driver
	[kg]	[kg]
Front	1200	1205
Rear	1760	1830
Total	2960	3035

2.4 Tyres and track width specifications:

Tyres		Front	Rear
- Dimensions		9.50 – 24	16.9 – 30
- Ply rating		8	12
- Type		Pneumatic, diagonal	Pneumatic, diagonal
- Maximum load (tyre manufacturer's)	kN	9.0	24.5
- Maximum load (tractor manufacturer's)	kN	8.8	24.5
- Inflation pressure (tyre manufacturer's)	kPa	205	230
- Dynamic radius index	mm	495	695
- Chosen track width	mm	1560	1520

2.5 Fuel:

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

Density at 15 °C : 0.840 g/cm^3

2.6 Oils and lubrication:

2.6.1 Capacity and change interval:

	Capacity, (dm^3)	Oil change, (h)	Filter change, (h)
Engine oil sump	12.5	First change after 50 hrs of operation and subsequently after 250 hrs of operation.	First change after 50 hrs of operation and subsequently after 250 hrs of operation.
Gear box, steering and rear axle	58.0	1000	--
Hydraulic	In common with gear box		300
Front axle	5.5	900	--

2.6.2 Specifications:

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

Transmission, Hydraulic fluid, Steering, Rear axle and front axle oil:		
Type	SAE EP-80	As recommended
Viscosity	9 to 11 cSt	
Classification	GL4	

2.6.3 Grease:

Number of lubricating points:

Grease nipples : 16 Nos.

Grease cups : 01 No.

3. COMPULSORY TESTS RESULTS

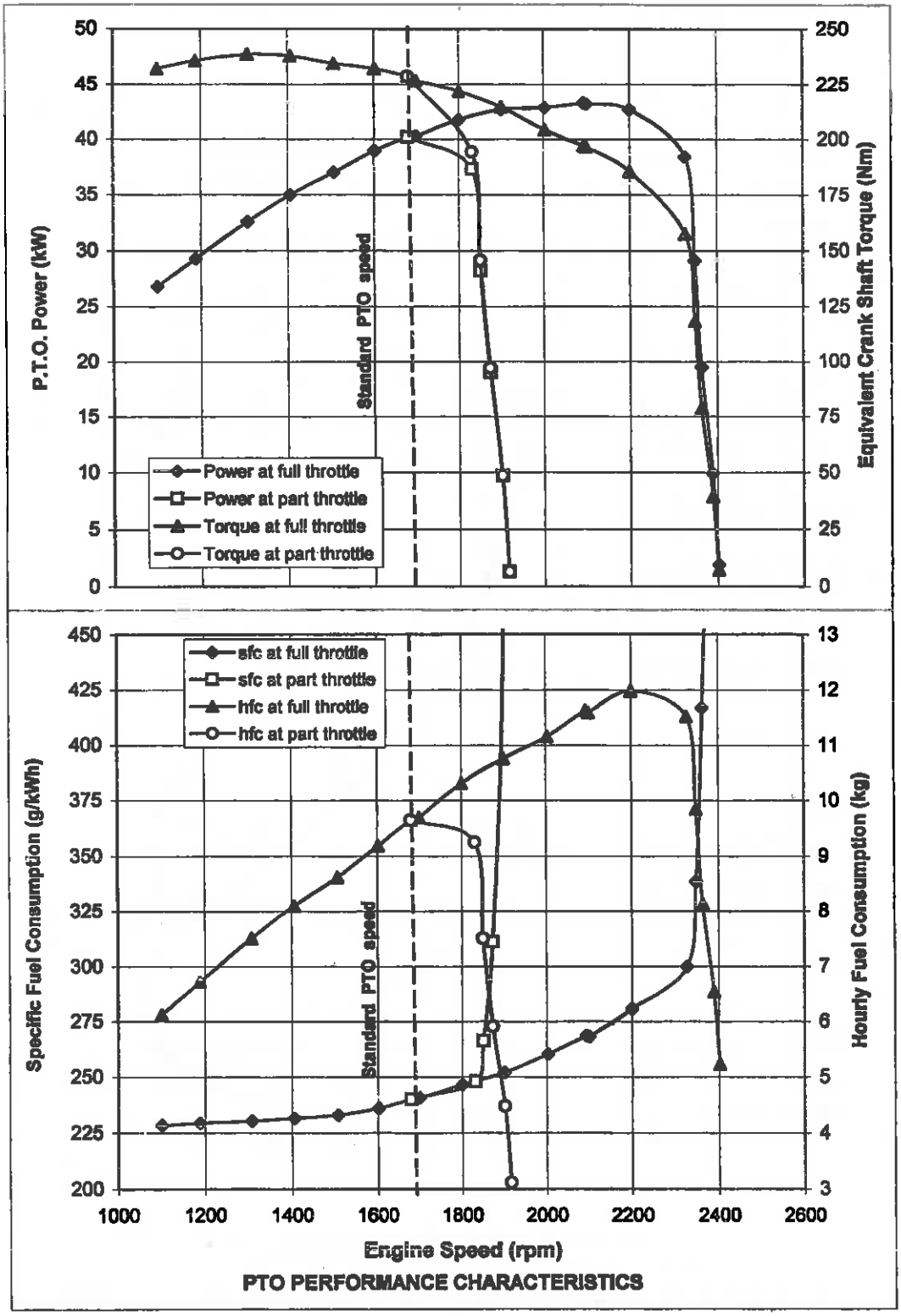
3.1 Main power take-off:

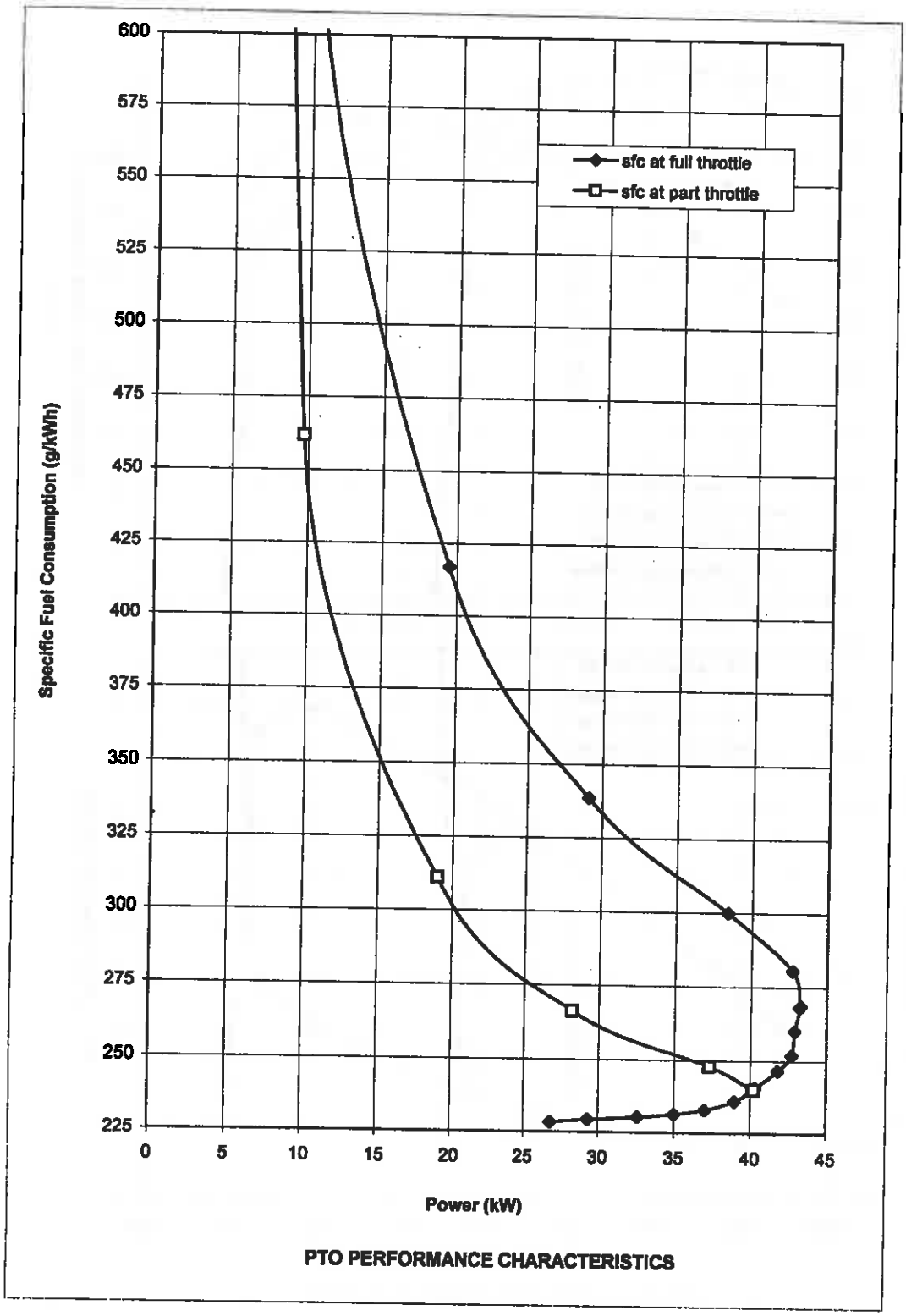
Date and location of tests : 24.04.2006, CFMTTI, BUDNI (M.P.), India

Type of dynamometer bench : FUCHINO, Eddy current

Power, (kW)	Speed			Fuel consumption			Specific Energy, (kWh/l)
	Engine	PTO	Fan	Hourly		Specific	
	(rev/min)			(l/h)	(kg/h)	(g/kWh)	
1	2	3	4	5	6	7	8
3.1.1	**Maximum Power – One-Hour Test:**						
43.3	2096	674	4091	13.85	11.63	269	3.13
3.1.2	**Power at Rated Engine Speed (2200 rev/min) :**						
42.7	2200	707	4294	14.26	11.98	281	2.99
3.1.3	**Standard Power Take-Off Speed [540 ± 10 (rev/min)] :**						
40.2	1680	540	3279	11.49	9.65	240	3.50
3.1.4	**Part Loads:**						
3.1.4.1	**The torque corresponding to maximum power at rated engine speed :**						
42.7	2200	707	4294	14.26	11.98	281	2.99
3.1.4.2	**85 % of torque obtained in 3.1.4.1 :**						
38.4	2327	748	4542	13.71	11.52	300	2.80
3.1.4.3	**75 % of torque defined in 3.1.4.2 :**						
29.1	2349	755	4585	11.73	9.85	338	2.48
3.1.4.4	**50 % of torque defined in 3.1.4.2 :**						
19.5	2364	760	4615	9.68	8.13	417	2.01
3.1.4.5	**25 % of torque defined in 3.1.4.2 :**						
9.9	2389	768	4663	7.79	6.54	661	1.27
3.1.4.6	**Unloaded :**						
1.9	2402	772	4689	6.23	5.23	2753	0.30

1	2	3	4	5	6	7	8
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 :**						
40.2	1680	540	3279	11.49	9.65	240	3.50
3.1.5.2	**85 % of torque obtained in 3.1.5.1 :**						
37.3	1832	589	3576	11.01	9.25	248	3.39
3.1.5.3	**75 % of torque defined in 3.1.5.2 :**						
28.2	1851	595	3613	8.94	7.51	266	3.15
3.1.5.4	**50 % of torque defined in 3.1.5.2 :**						
19.0	1873	602	3656	7.04	5.91	311	2.70
3.1.5.5	**25 % of torque defined in 3.1.5.2 :**						
9.7	1901	611	3711	5.33	4.48	462	1.82
3.1.5.6	**Unloaded :**						
1.3	1916	616	3740	3.71	3.12	2400	0.35
3.1.6	**PART LOADS AT DIFFERENT ENGINE SPEEDS**						
3.1.6.1	**Maximum power at rated engine speed:**						
42.7	2200	707	4294	14.26	11.98	281	2.99
3.1.6.2	**80% of power obtained in 3.1.6.1 at max. speed setting :**						
34.2	2339	752	4566	12.94	10.87	318	2.64
3.1.6.3	**80% of power obtained in 3.6.1.1 with governor control set to 90% of rated engine speed :**						
34.2	1979	636	3863	10.94	9.19	269	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 :**						
17.1	1979	636	3863	7.04	5.91	346	2.43
3.1.6.5	**60% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed :**						
25.6	1319	424	2878	7.20	6.05	236	3.56
3.1.6.6	**40% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed :**						
17.1	1319	424	2575	5.06	4.25	249	3.38


P.T.O. Power (kW)
Equivalent Crank Shaft Torque (Nm)
Standard PTO speed
Power at full throttle
Power at part throttle
Torque at full throttle
Torque at part throttle
Specific Fuel Consumption (g/kWh)
Hourly Fuel Consumption (kg)
sfc at full throttle
sfc at part throttle
hfc at full throttle
hfc at part throttle
Engine Speed (rpm)
PTO PERFORMANCE CHARACTERISTICS



PTO PERFORMANCE CHARACTERISTICS

	No load maximum engine speed	:	2402 rev/min
	Torque (equivalent crankshaft) at maximum power:		
	-At rated engine speed	:	185.47 Nm
	-At one hour test	:	197.04 Nm
	Maximum torque (equivalent crank- shaft) (Engine speed: 1307 (rev/min)	:	238.51 Nm
	Mean atmospheric conditions:		
	-Temperature	:	27°C
	-Pressure	:	97.7 kPa
	-Relative humidity	:	27 %
	Maximum temperatures:		
	-Coolant	:	88°C
	-Engine oil	:	90°C
	-Fuel	:	44°C
	-Engine air intake	:	30°C
3.2	**Hydraulic power and lifting force:**		
	Date of tests	:	13.07.2006, 14.07.2006 & 17.07.2006
3.2.1	**Hydraulic Power Test:**		
3.2.1.1	**Hydraulic Fluid Data:**		
	- Hydraulic fluid type	:	SAE EP–80
	- Viscosity index (ISO 3448 + Corr1: 1993)	:	100
	- Viscosity at 65 °C	:	60 to 65 cSt

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)	--	--	--	2200	--	--
2.	Maximum (sustained) pressure with relief valve open as measured at the coupler. Pump stalled- No	19.0	60	65	2374	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.	17.1	64		2377	14.23	4.1
4.	Maximum available flow and maximum power from one coupler pair	16.0	63		2377	17.20	4.6
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 8, and Fig. 1.1 & 1.2**

	At hitch point	On the frame
Height of lower hitch points above ground in down position	200 mm	200 mm
Vertical movement: - Without lifting force - With lifting force	 695 mm 680 mm	 695 680
Maximum corrected force exerted through full range	12.65 kN	8.10 kN
Corresponding pressure of hydraulic fluid	17.1 MPa	17.1 MPa
Moment about rear wheel axle	11.13 kNm	12.07 kNm
Maximum tilt angle of mast from vertical	–	13 degree

Lifting height relative to the horizontal plane including the lower link pivot points:											
mm	-340	-300	-200	-100	0	+100	+200	+300	+330	+335	+340
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)	12.65	12.96	12.92	13.60	14.18	14.80	15.41	16.70	17.40	17.26	16.27
Corresponding pressure 17.1 MPa:											
At the frame in (kN)	14.57	13.23	12.92	12.64	12.14	12.14	11.73	10.19	9.75	9.54	8.10
Corresponding pressure 17.1 MPa											

3.3 Drawbar power test (unballasted tractor):

Date(s) of tests : 09.01.2007 & 10.01.2007

Type of track : Concrete

Rolling radius of rear tyres : 703.5 mm

Height of drawbar above ground, (mm)	Tyre inflation pressure	
	Front	Rear
	[kPa]	[kPa]
300	205	110

DRAWBAR TEST RESULTS

Gear Number, Group & Range	Draw-bar power, kW	Draw-bar pull , kN	Speed , Km/h	Engine speed, rev/ min	FAN speed rev/ min	Slip of wheels (%)	Specific fuel cons-ump-tion, 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):**													
L1	20.3	26.15	2.80	2366	4618	15.2	456	1.84	36	83	78	29	28	99.6
L2	27.4	25.85	3.82	2349	4585	15.3	405	2.07	30	83	70	22	41	100.3
L3	35.4	20.87	6.11	2207	4308	8.7	337	2.49	36	87	82	28	29	99.6
L4	36.8	16.33	8.12	2101	4101	5.9	313	2.68	36	88	87	28	27	99.6
H1	37.0	12.01	11.10	2071	4043	4.1	309	2.72	35	88	85	27	29	99.7
3.3.2	**Fuel Consumption:**													
3.3.2.1	In Selected gear / speed setting nearest 7.5 km/h, at maximum power at rated engine speed:													
L3	35.4	20.87	6.11	2207	4308	8.7	337	2.49	31	84	74	23	38	100.2
3.3.2.1.1	75% of pull corresponding to maximum power at rated engine speed:													
L3	29.0	15.69	6.65	2354	4595	6.9	384	2.19	31	83	76	23	37	100.2
3.3.2.1.2	50% of pull corresponding to maximum power at rated engine speed:													
L3	19.9	10.44	6.85	2372	4630	4.7	457	1.84	32	82	75	24	37	100.2
3.3.2.1.3	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.1.1:													
L4	29.0	15.61	6.69	1744	3404	6.7	291	2.89	32	83	84	24	35	100.2
3.3.2.1.4	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.1.2:													
L4	19.9	10.45	6.84	1743	3402	4.5	329	2.55	33	81	82	24	36	100.2
3.3.2.2	In Selected gear/speed nearest between 7 km/h and 10 km/h at rated engine speed:													
L4	36.7	15.59	8.47	2201	4296	6.3	325	2.58	33	85	76	24	35	100.1
3.3.2.2.1	75% of pull corresponding to maximum power at rated engine speed:													
L4	30.1	11.74	9.22	2358	4603	4.9	372	2.26	33	84	75	24	35	100.2
3.3.2.2.2	50% of pull corresponding to maximum power at rated engine speed:													
L4	20.4	7.8	9.43	2377	4640	3.5	436	1.93	33	82	76	24	35	100.1
3.3.2.2.3	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.2.1:													
H1	30.0	11.71	9.22	1734	3385	4.9	285	2.95	33	84	84	24	34	100.1
3.3.2.2.4	Next higher gear at reduced engine speed: Same pull and traveling speed as in 3.3.2.2.2:													
H1	20.5	7.81	9.45	1751	3418	3.4	325	2.59	34	81	84	25	33	100.1

Remark: Maximum power in the gear 'H2' was not measured because forward speed in this gear exceeded the safety limit of testing equipment.

4. OPTIONAL TESTS RESULTS

4.1 Turning area and turning circle :

Wheel Equipment :

- Front : 9.50 – 24
- Rear : 16.9 – 30

Track width :

- Front : 1560 mm
- Rear : 1520 mm

	Without brakes	
	Right hand	Left hand
	[m]	[m]
Radius of turning area	5.72	5.63
Radius of turning circle	5.54	5.45

4.2 Braking :

Date(s) of test : 07.09.2006 & 30.11.2006

Mass of ballasted tractor :

- Front : 1794 kg
- Rear : 2496 kg
- Total : 4290 kg

4.2.1 Cold service braking device test :

Unballasted tractor			
Speed before application of brake	Braking device control force	Mean deceleration	Minimum stopping distance without locking the wheels
(km/h)	(kN)	(m/s^2)	(m)
37.91	0.124	1.81	30.60
37.91	0.152	2.20	25.20
37.91	0.181	2.51	22.10
37.91	0.228	2.74	20.20
37.91	0.277	3.29	16.83
37.91	0.360	4.31	12.85

Maximum deviation of the tractor from its original course : None

Abnormal vibration : None

Ballasted tractor			
Speed before application of brake	Braking device control force	Mean deceleration	Minimum stopping distance without locking the wheels
(km/h)	(kN)	(m/s^2)	(m)
37.27	0.127	1.41	37.90
37.27	0.157	2.06	26.05
37.27	0.216	2.37	22.65
37.27	0.235	2.53	21.15
37.27	0.294	3.13	17.10
37.27	0.373	4.00	13.40

Maximum deviation of the tractor from its original course : None

Abnormal vibration : None

4.2.2 Fade test :

Ballasted tractor			
Speed before application of brake	Braking device control force	Mean deceleration	Minimum stopping distance without locking the wheels
(km/h)	(kN)	(m/s^2)	(m)
37.27	0.127	1.32	40.55
37.27	0.157	1.72	31.10
37.27	0.206	2.13	25.10
37.27	0.235	2.26	23.70
37.27	0.304	2.87	18.70
37.27	0.373	3.18	16.85

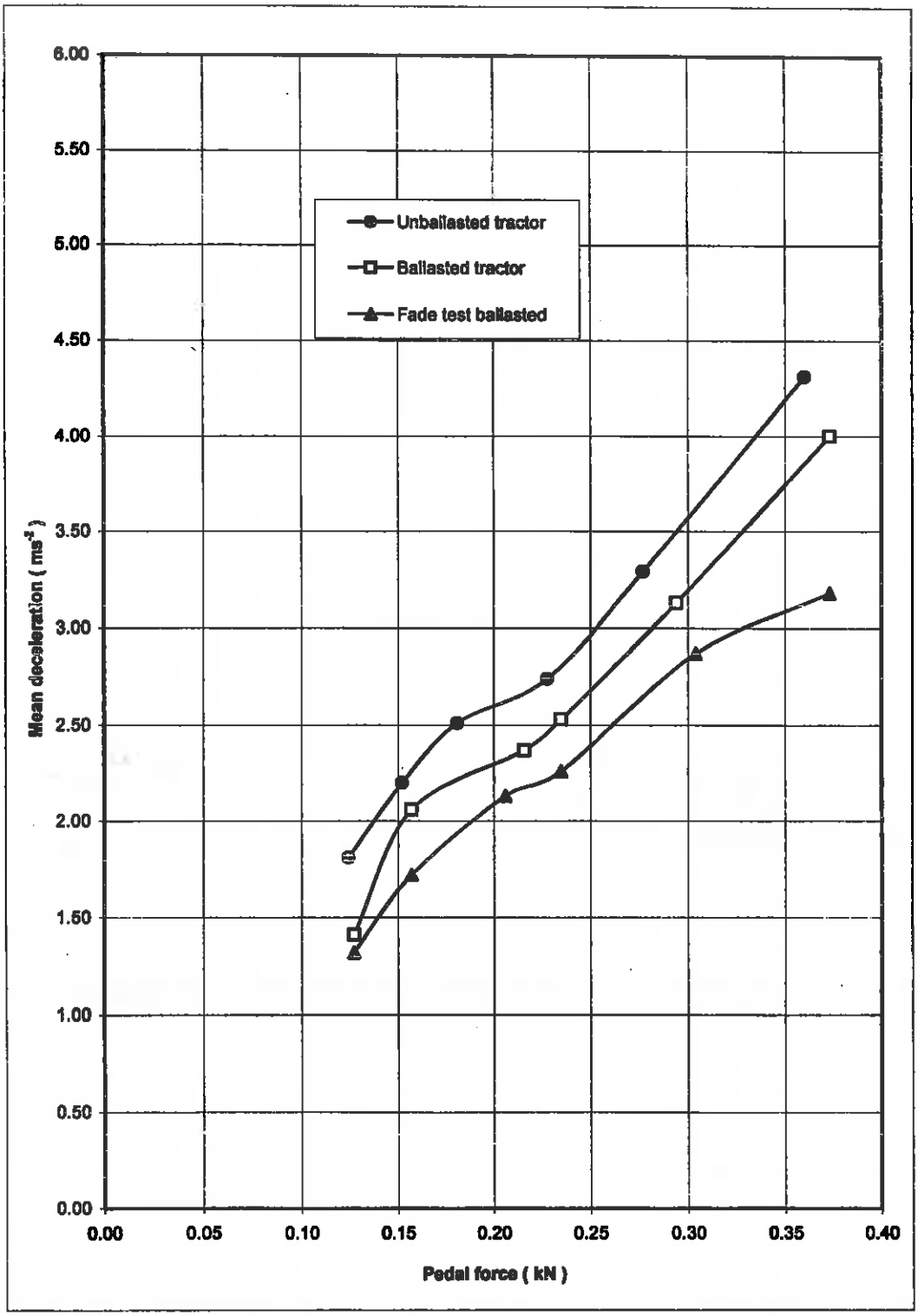
Maximum deviation of the tractor from its original course : None

Abnormal vibration : None

Brake heating method : By means of towing the tractor for 1 km at 80% of maximum speed with a pedal force corresponding to a deceleration of 1 ms^{-2} in cold brake test.

4.2.3 Parking braking device test:

	Uphill	Downhill
Braking device control force	0.167 kN	0.167 kN


Unballasted tractor
Ballasted tractor
Fade test ballasted
Mean deceleration (ms-2)
Pedal force (kN)
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40

5. REPAIR AND ADJUSTMENTS PRIOR TO TESTS

--None--

6. REMARKS

--None--

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

TESTING AUTHORITY

P.K.PANDEY
SENIOR TEST ENGINEER

M. L. MEHTA
DIRECTOR

Draft Test report compiled by: Shri. **Chakradhar V. Chimote**, Senior Technical Assistant

Hari/2007/oecd/oecd-sonalika Inter.DI-75(WD)