OECD Approval No. : **2/3 170**

Date of approval : **25th of September 2019**

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

Agricultural Tractor Make	:	**TAFE**
Model	:	**MF 295 T**
Type	:	**4 WD (MEAYJ118 < 40 km/h Speed)**
Manufactured by	:	**M/s. Tractors and Farm Equipment Limited, P.O. Box No.3302, 77 (Old 35), Mahatma Gandhi Road, Nungambakkam, CHENNAI - 600 034, (TAMIL NADU), INDIA.**
Submitted for test by	:	**The manufacturer**
Report No.	:	**T-1270/1797/62/OECD/2019**
Date	:	**October, 2019**

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
(DEPARTMENT OF AGRICULTURE, CO-OPERATION AND FARMERS WELFARE)
Mechanization and Technology Division
CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
(An ISO 9001: 2015 Certified Institute)
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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.

OECD No.:	2/3 170	Date of approval:	25th of September 2019

In this report unit 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	metric horsepower
Pressure	1 100	MPa kPa	= =	10 1000	bar mbar	= =	10.2 750.1	kgf/cm^2 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.Tractors and Farm Equipment Limited, P.O. Box No.3302, 77 (Old 35), Mahatma Gandhi Road, Nungambakkam, Chennai - 600 034, (Tamil Nadu) India.**
[D]	Location of tractor assembly	:	**(i) M/s.Tractors and Farm Equipment Limited, 10/205, Kalladipatti (P.O) 624201, Dindigul District, (Tamil Nadu) India.** **(ii) M/s.Tractors and Farm Equipment Limited, Doddaballapur Plant, Plot No. 1, Kiadb Industrial area, Doddaballapur, Bangalore-561203 (Karnataka), India.**
[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	:	At manufacture's works
[D]	Duration of running-in:		
	-Engine	:	12 hours
	-Transmission	:	16 hours
[C]	Date of start of test	:	05th March, 2019
[C]	Location of test	:	Government of India, Central Farm Machinery Training and Testing Institute, P.O. - Tractor Nagar, BUDNI – 466445 (M.P.), INDIA
[C]	Code version	:	OECD Standard Code 2 (February, 2019)

1. SPECIFICATIONS OF TRACTOR

1.1 Identification:

1.1.1 Denomination

[C]	Make of tractor	:	TAFE
[C]	Model (trade name)	:	MF 295 T
[C]	Type	:	4 WD, Agricultural Tractor

1.1.2 Numbers:

[D]	1st Serial No. or prototype	:	MEA14629YJ1189193
[C]	Serial No.	:	MEA14629YJ1218917

1.1.3 Other specification (if applicable):

[D]	Model(s) for other countries	:	MF 295
[C]	Transmission type or gears x ranges	:	Mechanical, Partial synchromesh gears. 12 Forward, 4 Reverse gears

[C]	Speed version	:	<40 km/h
[D]	Manufacturer identification or Technical type no.	:	MEAYJ118
1.2	**Engine:**		
[C]	Make	:	SIMPSON & Co.Ltd.
[C]	Model	:	ST440E2
[C]	Type	:	Four stroke, turbocharged, water cooled, direct injection, diesel engine
[C]	Serial No.	:	ST440E2 06649
1.2.1	**Cylinders:**		
[C]	Number/disposition	:	Four, vertical, in-line
[D]	Bore/Stroke	:	100 mm / 127 mm
[D]	Capacity	:	4000 cm^3
[D]	Compression ratio	:	16.7 (±0.3) :1
[D]	Arrangement of valves	:	Overhead
[D]	Cylinder liners	:	Dry type
1.2.2	**Supercharging**	:	Turbocharger
[C]	Make	:	HOLSET
[C]	Model	:	HE200WG
[C]	Type	:	Waste gate vanes type
[C]	Serial No.	:	D1803203313
[D]	Pressure	:	0.15 Mpa at rated engine speed
1.2.3	**Fuel system:**		
[C]	Fuel feed system	:	Electrical operated
	Filter(s):		
[C]	Make	:	Bosch, India
[C]	Model	:	F 002 H20 108, F002 H20 196
[C]	Type	:	Primary and secondary - paper element
[C]	Number(s)	:	Two
[D]	Capacity of fuel tank	:	88.5 dm^3
	Injection pump:		
[C]	Make	:	Bosch, India
[C]	Model	:	F002A4ZR10, PES4A95D320/3RS4000
[C]	Type	:	Plunger, In-line
[C]	Serial Number	:	82080803
	Manufacturer's production setting of injection pump:		
[C]	Flow rate (rated engine speed & full load)	:	21.50 to 22.44 dm^3/h
[D]	Timing	:	17 ± 1 degree before TDC

	Injectors:		
[C]	Make	:	Bosch, India
[C]	Model	:	F 002 C80 021
[C]	Nozzle Number	:	DSLA 150 P5647
[C]	Type	:	Multi hole (six holes)
[D]	Injection pressure	:	26.0 + 0.8 MPa
1.2.4	**Governor:**		
[C]	Make	:	Bosch, India
[C]	Model	:	RSV475…1100A5C1843R
[C]	Type	:	Mechanical, centrifugal, variable speed
[D]	Governed range of engine speed	:	800 to 2510 rev/min
[C]	Rated engine speed	:	2200 rev/min.
1.2.5	**Air cleaner:**		
	Pre-cleaner	:	**Not available**
	Main cleaner:		
[C]	Make	:	Mann Hummel
[C]	Model	:	Not announced
[C]	Type	:	Dry
[C]	Location	:	In front of radiator, under the bonnet
[C]	Maintenance indicator	:	Warning light provided on dashboard
1.2.6	**Lubrication System:**		
[D]	Type of feed pump	:	Rotary pump
[C]	Type of filter(s)	:	Full flow, spin on, replaceable paper element
[C]	Number of filter(s)	:	One
1.2.7	**Cooling System:**		
[C]	Type of coolant	:	Water (with coolant)
[D]	Type of pump	:	Semi-open, Centrifugal pump
	Specification of fan:		
[C]	Number of fan blades	:	06
[C]	Fan diameter	:	470 mm
[D]	Total Coolant capacity	:	14.3 dm^3
[C]	Type of temperature control	:	Thermostat
[D]	Over pressure system	:	88 kPa
1.2.8	**Starting system:**		
[C]	Make	:	Not announced
[C]	Model	:	Not announced
[C]	Type	:	Electrical, solenoid operated.
[D]	Starter motor power rating	:	3.2 kW
[C]	Cold starting aid	:	None
[C]	Safety device	:	Starter will not operate unless the 'Low-High' gear lever is in neutral position.

1.2.9 Electrical System:

[C]	Voltage	:	12V
	Generator:		
[C]	Make	:	M/s. Spark minda
[C]	Model	:	CL008-3048-S
[C]	Type	:	Alternator
[D]	Power	:	0.78 kW@ 6000 rev/min.
	Battery:		
[C]	Number	:	One
[D]	Rating	:	100 Ah at 20 hours discharge rate

1.2.10 Exhaust System:

[C]	Make	:	Not announced
[C]	Model	:	Not announced
[C]	Type	:	Updraft, cylindrical
[C]	Location	:	On RHS of engine

1.2.11 Reagent Injection System : Not applicable

1.2.12 Diesel Particulate Filter : Not applicable

1.3 Transmission:

1.3.1 Clutch (Travel alone):

[D]	Make	:	LUK India
[D]	Model	:	Not announced
[D]	Type	:	Single, Dry friction plate
[D]	Number of plate(s)	:	One
[D]	Diameter of plate(s)	:	330.2 mm
[C]	Method of operation	:	By pressing clutch pedal fully, on LHS

1.3.2 Gear Box:

[D]	Make	:	TAFE
[D]	Model	:	Not announced
[D]	Type	:	Mechanical, partial synchromesh mesh gears.

	Description:	Forward	Reverse
[C]	Number of gears	3	1
[C]	Number of ranges	4 (‘L’ ‘H’ ‘A’ & ‘B’)	4 (‘L’ ‘H’ ‘A’ & ‘B’)
[C]	Total of arrangements	12	4

‘L’ = LOW; ‘H’ = HIGH, “A” = TORTOISE & “B” = “RABBIT”

[D] Available options : None

1.3.3 Rear axle and final drives:

[D]	Make	:	TAFE
[D]	Model	:	Not announced

[D]	Type	:	Planetary reduction unit
	Differential lock:		
[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	:	Not announced
[D]	Type	:	Planetary reduction unit
	- Differential lock	:	Not available

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)
[C]	Forward	1	LA1	290.36	2.34
[C]		1	LA2	193.58	3.51
[C]		2	LA3	105.59	6.44
[C]		2	LB1	236.22	2.88
[C]		3	LB2	157.37	4.32
[C]		3	LB3	85.83	7.93
[C]		1	HA1	70.90	9.59
[C]		1	HA2	47.30	14.39
[C]		2	HA3	25.79	26.39
[C]		2	HB1	57.65	11.79
[C]		3	HB2	38.46	17.67
[C]		3	HB3	20.97	32.47
[C]	Reverse	1	LAR	193.57	3.51
[C]		1	LBR	157.35	4.32
[C]		2	HAR	47.20	14.41
[C]		2	HBR	38.46	17.71

'L' = LOW, 'H' = HIGH, "A" = TORTOISE & 'B' = "RABBIT"
* Calculated with a tyre dynamic radius index of 820 mm (ISO: 4251-1:2005)

[C]	**Number of revolutions of front wheels for one revolution of rear wheels**	:	**1.340**

1.4	**Power take-off:**		
1.4.1.	**Main Power Take-Off:**		
[C]	Type	:	Not Independent
[C]	Method of engagement	:	Mechanical, by a hand lever provided below the operator's seat on LHS.
[C]	Number of shafts	:	One
[C]	Method of changing power take-off shaft ends and speeds.	:	Not available.
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, in conformity with ISO:500-3:2004
[C]	- Height above ground	:	690 mm
[C]	- Distance from the median plane of the tractor	:	0 mm
[C]	- Distance behind rear-wheel axis	:	290 mm
[C]	- PTO speed at rated engine speed	:	628 rev/min
[C]	- Engine speed at standard power take-off speed	:	1893 rev/min
[C]	- Ratio of rotation speeds (Engine speed/ PTO speed)	:	3.506 : 1
[D]	- Power restriction	:	None
[D]	Maximum torque transmissible	:	1400 Nm
[C]	Direction of rotation (viewed from rear of tractor)	:	Clockwise
1.4.1.2	**Power take-off proportional to ground speed**	:	**Not available**
1.4.2	**Optional power take-off**	:	**Not available**
1.5	**Hydraulic power-lift:**		
[C]	Make	:	Not announced
[C]	Model	:	Not announced
[C]	Type of hydraulic system	:	Open centre, live, ADDC
[C]	Type and number of cylinders	:	Single acting, one
[C]	Type of linkage lock for transport	:	Hydraulic
[D]	Relief valve pressure setting (tolerance)	:	23 ± 1 MPa
[D]	Opening pressure of cylinder safety valve	:	25 ± 1 MPa

[D]	Lift pump type	:	Scotch Yoke (Radial piston pump)
[D]	Transmission between pump and engine	:	Gear drive
[C]	Number and type of filter(s)	:	One, wire mesh strainer inside the transmission housing
[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	:	10 dm^3

1.6 Three point linkage:

[C]	Category	:	2 (Not in conformity with Category 2 of ISO 730: 2009/Amd.1:2014)
[C]	Category adapter	:	Not available

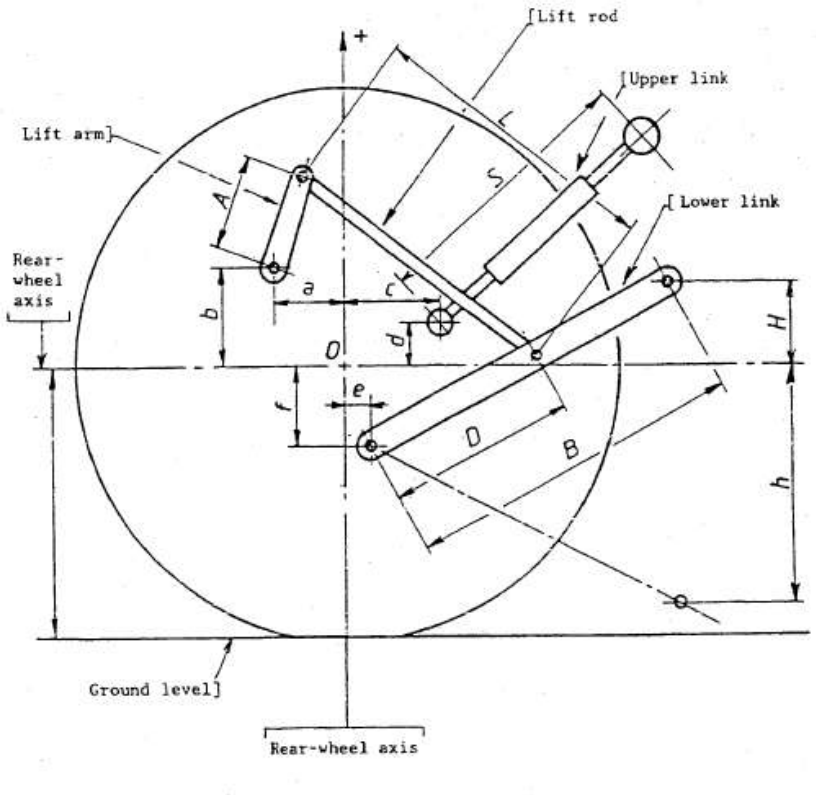


Fig. 1 .1

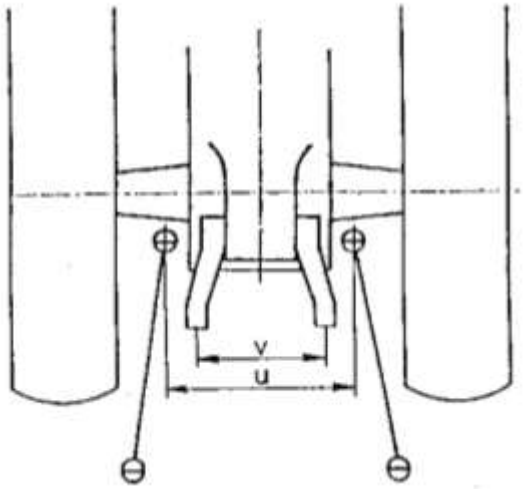


Fig. 1.2

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

			Dimension or range, (mm)	Settings used during test, (mm)
	(1)	**(2)**	**(3)**	**(4)**
[C]	Length of lift arms:	**(A)**	235	235
[C]	Length of lower links:	**(B)**	1075	1075
	Distance of lift arm pivot point from rear-wheel axis:			
[C]	- Horizontally	**(a)**	195, forward	195, forward
[C]	- Vertically	**(b)**	245	245
[C]	Horizontal distance between the 2 lower link points:	**(u)**	500	500
[C]	Horizontal distance between the 2 lift arm end points:	**(v)**	535	535
[C]	Length of upper link:	**(S)**	715 to 915	885
	Distance of upper link pivot point from rear wheel axis:			
[C]	- Horizontally	**(c)**	180, 200 & 210	200
[C]	- Vertically	**(d)**	128, 168 & 208	168
	Distance of lower link pivot point from rear wheel axis:			
[C]	- Horizontally	**(e)**	40,forward	40,forward
[C]	- Vertically	**(f)**	210	210
[C]	Distance of lower link pivot points to lift rod pivot points on lower links:	**(D)**	570	570

	(1)	(2)	(3)	(4)
[C]	Length of lift rods:	**(L)**	670 to 775	750
	Height of lower hitch points relative to the rear-wheel axis:			
[C]	- in low position	**(h)**	-700 to -360	-620
[C]	- in high position	**(H)**	70 to 290	110
[C]	Height above ground of lower hitch points when locked in transport position (*)	**--**	Any height within lift range	

(*) Assuming r = 820 mm, tyre dynamic radius index of ISO: 4251-1:2005 (pneumatic tyred tractors only).

1.7 Swinging drawbar

[C]	Type	:	Clevis
[C]	Height above the ground	:	550 mm (fixed)
[C]	Type of adjustment	:	Horizontally, by changing the position of hole
[C]	Distance of hitch point from rear-wheel axis, horizontally	:	650 mm & 770 mm
	Distance of hitch point from power take-off shaft end:		
[C]	- Vertically	:	65 mm
[C]	- Horizontally	:	360 mm & 480 mm
	Lateral adjustment (centre of clevis):		
[C]	- Right hand	:	180 mm
[C]	- Left hand	:	180 mm
[C]	Distance of pivot point from rear-wheel axis, horizontally	:	155 mm
[C]	Diameter of drawbar pinhole	:	29.6 mm
[D]	Maximum vertical permissible load	:	10 kN

1.8 Trailer hitch : Not available

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	:	31.5 mm / 101.3 mm
[C]	Height above ground:		
	- Minimum	:	120 mm
	- Maximum	:	1110 mm
[C]	Horizontal distance to power take-off shaft end (rear)	:	745 mm

1.10 Steering:

[D]	Make	:	Danfoss
[D]	Model	:	Not announced

[D]	Type	:	Hydrostatic, open center
[D]	Method of operation	:	Manual, through steering control wheel
[D]	Pump(s)	:	Gear type
[D]	Ram(s)	:	Reciprocating
[D]	Working pressure	:	1.25 MPa

1.11 Brakes:

1.11.1 Service brake:

[D]	Make	:	JMFT
[D]	Model	:	Not announced
[D]	Type	:	Oil immersed multi disc brake
[C]	Method of operation	:	Mechanical, independent or coupled pedal operation
[C]	Trailer braking take-off (hydraulic or air brake)	:	**None**

1.11.2 Parking brake:

[C]	Type	:	Pawl and ratchet
[C]	Method of operation	:	Manual, by a hand lever

1.12 Wheels:

Number

[C]	Front	:	Two (driving & steering)
[C]	Rear	:	Two (driving)
[C]	Wheel base	:	2390 mm

Track width adjustment:

		Minimum [mm]	Maximum [mm]	Adjustment method
[C]	Front	1560	2240	Reversing wheels and offset lug rims
[C]	Rear	1625	2305	Reversing wheels and offset lug rims

1.13 Protective structure:

[C]	Make	:	Not announced
[C]	Model	:	Two post foldable
[C]	Type	:	Rear roll bar
[C]	Manufacturers name and address	:	Not announced
[C]	Protective device	:	Roll
[C]	Tiltable / not tiltable	:	Not tiltable

OECD approval:

[C]	Approval number	:	Not applicable
[C]	Date of approval	:	Not applicable
[C]	Number of minor modification certificates, if any	:	Not applicable

1.14 Seat:

1.14.1 Driver's seat:

[C]	Make	:	M/s Harita Seating Systems Ltd.
[C]	Model	:	Not announced
[C]	Type	:	Cushioned
[C]	Seat and steering wheel reversible	:	No
[C]	Type of suspension	:	Two helical coil springs
[C]	Type of dampening	:	Hydraulic shock absorber

Range of adjustment:

[C]	Longitudinally	:	± 55 mm
[C]	Vertically	:	+ 30 mm
[C]	Safety belt	:	Provided

1.14.2 Optional driver's seat(s) : Not fitted on tractor

1.14.3 Passenger seat : Not fitted on tractor

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	1230	155 x 95	905
[C]	Side lights	1755	105 x 35	382
[C]	Rear lights	1780	120 ¢	482
[C]	Reflectors	780	80 ¢	562

2. TEST CONDITIONS

2.1 Overall dimensions (standard ballasted tractor):

Length [mm]	Width		Height at top of	
	Minimum [mm]	Maximum [mm]	Protective Structure [mm]	Exhaust pipe [mm]
4230	2155	2785	2700	2805

2.2 Ground clearance (standard ballasted tractor) : 432 mm

Clearance – limiting part : Below transmission housing drop box for four wheel drive.

2.3 Tractor Mass (with protective structure):

		Standard ballasted	
		Without driver	With driver
		[kg]	[kg]
	Front	1725	1735
	Rear	2350	2415
	Total	4075	4150

2.4 Tyres and track width specifications:

	Tyres		Front	Rear
	- Dimensions		14.9-28	18.4 - 38
	- Ply rating		8	12
	- Type		Pneumatic, diagonal	Pneumatic, diagonal
	- Maximum load (tyre manufacturer's)	kN	19.0	24.3
	- Maximum load (tractor manufacturer's)	kN	13.0	22.5
	- Inflation pressure (tyre manufacturer's)	kPa	160	110
	- Dynamic radius index	mm	615	820
	- Chosen track width	mm	1860	1765

2.5 Fuel:

Type : High speed diesel conforming to IS:1460-2005

Density at 15 ^{o}C : 0.836 g/cm^{3}

2.6 Oils and lubricants:

2.6.1 Capacity and change interval:

	Capacity, (dm^{3})	Oil change, (h)	Filter change, (h)
Engine oil sump	8.2	After every 250 hours of operation	After every 250 hours of operation
Gear box, differential, rear axle, rear final drive, hydraulic, & service brakes	41.0	After every 600 hours of operation	Not applicable
Front axle	5.5	After every 1000 hours of operation	Not applicable
Front final drive (on each side)	0.6	After every 1000 hours of operation	Not applicable
Steering housing	In common with gearbox		Not applicable

2.6.2 Specifications:

	Recommended	Used during test
1	**2**	**3**
Engine:		
Type	MIL-L-46-46152/MIL-L-2104C	As recommended
Viscosity	10 -12 cst at 100ºC	
Classification	SAE 20W40	
Transmission, hydraulic fluid, service brake, rear axle and rear final drive oil:		
Type	SAE 10W30	As recommended
Viscosity	10 -11 cst at 100ºC	
Classification	API Gulf	

Front axle & front final drive oil:		
1	**2**	**3**
Type	SAE 80W90	As recommended
Viscosity	10-11 cst at 100ºC	
Classification	API Gulf	
Steering oil:		
Type	SAE 10W30	As recommended
Viscosity	10 -11 cst at 100ºC	
Classification	API Gulf	

2.6.3 Grease:

Number of lubricating points:

Grease nipples **:** 13 Nos.

Grease cups **:** Not available

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off test:

Date and location of tests : 08.04.2019, CFMTTI, BUDNI (M.P.), India

Type of dynamometer bench : FUCHINO ESF -1000S, Eddy current

Power, (kW)	Speed			Fuel consumption			Specific Energy, (kWh/l)
	Engine	PTO	Fan	Hourly		Specific	
	(rev/min)			(kg/h)	(l/h)	(g/kWh)	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
3.1.1	**Maximum Power – One-Hour Test:**						
68.0	2201	628	3546	18.60	22.25	0.274	3.06
3.1.2	**Power at Rated Engine Speed (2200 rev/min) :**						
68.0	2201	628	3546	18.60	22.25	0.274	3.06
3.1.3	**Standard Power Take-Off Speed [540 ± 10 (rev/min)] :**						
67.4	1893	540	3050	16.61	19.87	0.246	3.39
3.1.4	**Part Loads:**						
3.1.4.1	**The torque corresponding to maximum power at rated engine speed :**						
68.0	2201	628	3546	18.60	22.25	0.274	3.06
3.1.4.2	**85 % of torque obtained in 3.1.4.1 :**						
60.8	2310	659	3721	17.60	21.05	0.289	2.89

1	2	3	4	5	6	7	8
3.1.4.3	**75 % of torque defined in 3.1.4.2 :**						
46.3	2349	670	3784	14.80	17.70	0.320	2.62
3.1.4.4	**50 % of torque defined in 3.1.4.2 :**						
31.4	2384	680	3840	11.86	14.19	0.378	2.21
3.1.4.5	**25 % of torque defined in 3.1.4.2 :**						
15.9	2412	688	3886	8.95	10.71	0.563	1.48
3.1.4.6	**Unloaded :**						
1.2	2433	694	3920	6.18	7.39	5.150	0.16
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 :**						
67.4	1893	540	3050	16.61	19.87	0.246	3.39
3.1.5.2	**85 % of torque obtained in 3.1.5.1 :**						
61.2	2023	577	3259	15.94	19.07	0.261	3.21
3.1.5.3	**75 % of torque defined in 3.1.5.2 :**						
46.7	2058	587	3315	13.03	15.59	0.279	3.00
3.1.5.4	**50 % of torque defined in 3.1.5.2 :**						
31.6	2090	596	3367	10.17	12.17	0.322	2.60
3.1.5.5	**25 % of torque defined in 3.1.5.2 :**						
16.0	2114	603	3406	7.18	8.59	0.449	1.86
3.1.5.6	**Unloaded :**						
0.9	2135	609	3439	4.48	5.36	4.978	0.17
3.1.6	**PART LOADS AT DIFFERENT ENGINE SPEEDS:**						
3.1.6.1	**Maximum power at rated engine speed**:						
68.0	2201	628	3546	18.60	22.25	0.274	3.06
3.1.6.2	**80% of power obtained in 3.1.6.1 at max. speed setting :**						
54.4	2331	665	3755	16.54	19.78	0.304	2.75
3.1.6.3	**80% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed :**						
54.4	1977	564	3185	14.30	17.11	0.263	3.18

1	2	3	4	5	6	7	8
3.1.6.4	**40% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed :**						
27.2	1977	564	3185	8.78	10.50	0.323	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 :**						
40.8	1318	376	2123	9.74	11.65	0.239	3.50
3.1.6.6	**40% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed :**						
27.2	1318	376	2123	6.83	8.17	0.251	3.33

No load maximum engine speed : 2433 rev/min

Torque (equivalent crankshaft) at maximum power:

-At rated engine speed : 295.19 Nm

-At one hour test : 295.19 Nm

Maximum torque (equivalent crank- shaft) (Engine speed 1350 rev/min) : 394.00 Nm

Mean atmospheric conditions:

-Temperature : 22.1 ^{o}C

-Pressure : 98.3 kPa

-Relative humidity : 51 %

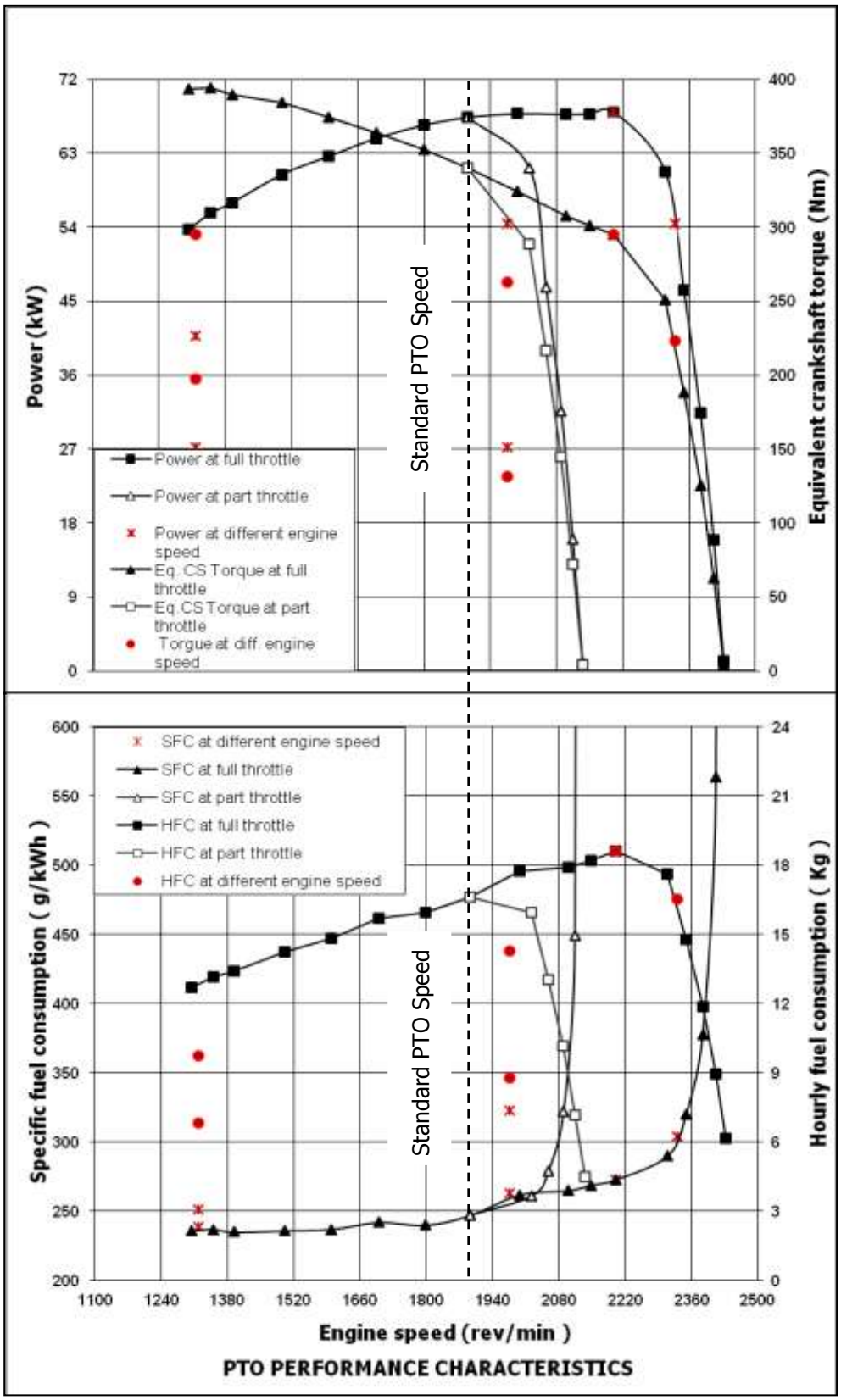
Maximum temperatures:

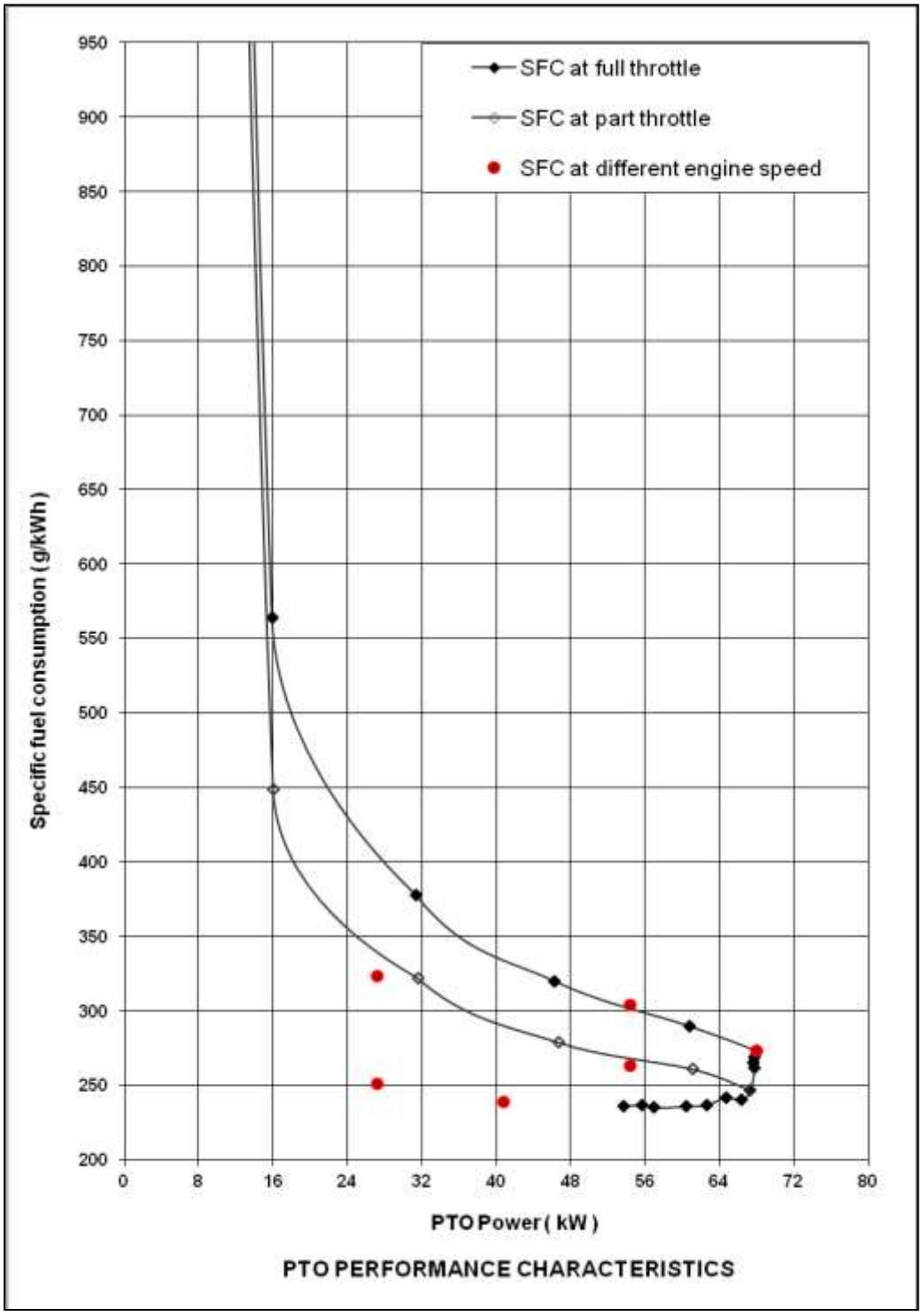
-Coolant : 94 ^{o}C

-Engine oil : 120 ^{o}C

-Fuel : 34 ^{o}C

-Engine air intake : 26 ^{o}C


Power (kW)
Equivalent crankshaft torque (Nm)
Standard PTO Speed
Power at full throttle
Power at part throttle
Power at different engine speed
Eq. CS Torque at full throttle
Eq. CS Torque at part throttle
Torque at diff. engine speed
Specific fuel consumption (g/kWh)
Hourly fuel consumption (Kg)
SFC at different engine speed
SFC at full throttle
SFC at part throttle
HFC at full throttle
HFC at part throttle
HFC at different engine speed
Engine speed (rev/min)
PTO PERFORMANCE CHARACTERISTICS


SFC at full throttle
SFC at part throttle
SFC at different engine speed
Specific fuel consumption (g/kWh)
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
0
8
16
24
32
40
48
56
64
72
80
PTO Power (kW)
PTO PERFORMANCE CHARACTERISTICS

3.2 Hydraulic power and lifting force:

Date of tests : 03.05.2019

3.2.1 Hydraulic Power and Lifting force Test:

3.2.1.1 Hydraulic Fluid Data:

- Hydraulic fluid type : SAE10W30
- Viscosity index (ISO 3448: 1992+ corr 1: 1993) : 104
- Viscosity at 65 ^{o}C : 70 cst

3.2.1.2 Compulsory Reporting (Test Results):

		Pressure, (MPa)	Reservoir oil Temp. ^{o}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	23.0	60	68	2401	0.0	0.0
3.	Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power.	20.7	67		2402	24.0	8.3
4.	Maximum available flow and maximum power from one coupler pair	20.0	67		2403	25.7	8.6
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 11, 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	 730 mm 665 mm	 730 mm 650 mm
Maximum corrected force exerted through full range	16.86 kN	14.69 kN
Corresponding pressure of hydraulic fluid	20.7 MPa	20.7 MPa
Moment about rear wheel axle	17.45 kNm	24.17 kNm
Maximum tilt angle of mast from vertical	--	15.2 degree

Lifting height relative to the horizontal plane including the lower link pivot points:										
mm	-440	-400	-300	-200	-100	0	+100	+150	+210	+225
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)	16.86	17.49	19.02	20.06	20.77	21.44	21.76	21.92	22.00	22.17
Corresponding pressure 20.7 MPa:										
At the Std.frame in (kN)	14.69	15.35	16.65	17.07	17.29	17.44	17.28	16.95	16.04	---
Corresponding pressure 20.7 MPa:										

3.3 Drawbar power and fuel consumption test (standard ballasted tractor):

Date(s) of tests : 18.04.2019

Type of track : Concrete

Height of drawbar above ground, (mm)	Tyre inflation pressure	
	Front	Rear
	[kPa]	[kPa]
400	160	110

DRAWBAR TEST RESULTS

Gear Number & Range	Drawbar power	Drawbar pull	Speed	Engine speed	FAN speed	Slip of wheels	Specific fuel consumption	Specific Energy	Temperature			Atmospheric conditions		
									Fuel	Coolant	Engine oil	Tempe-rature	R.H.	Pressure
	(kW)	(kN)	(km/h)	(rev/ Min)	(rev/ Min)	(%)	(g/kWh)	(kWh/l)	(°C)	(°C)	(°C)	(°C)	(%)	(kPa)
3.3.1	**Maximum Power in tested Gears (Standard ballasted tractor):**													
LA1	23.4	37.70	2.23	2376	3828	15.2	498	1.68	44	83	118	30	33	98.8
LB1	28.1	37.20	2.72	2360	3802	15.4	456	1.83	43	85	118	30	33	98.8
LA2	33.5	36.40	3.31	2343	3775	14.9	421	1.99	47	89	124	33	31	98.5
LB2	40.2	35.79	4.04	2326	3745	15.0	395	2.12	41	88	120	28	32	98.8
LA3	55.6	32.68	6.13	2200	3544	8.5	338	2.47	41	91	125	26	42	98.8
LB3	57.3	26.53	7.77	2200	3544	5.8	328	2.55	39	91	126	24	42	98.7
HA1	58.6	22.02	9.58	2202	3547	4.1	326	2.56	39	88	119	24	38	98.7
HB1	57.8	17.43	11.94	2198	3541	2.6	329	2.54	40	90	125	23	37	98.6

Gear Number & Range	Draw-bar power	Draw-bar pull	Speed	Engin e speed	FAN speed	Slip of wheels	Specific fuel consump-tion	Specific Energy	Temperature			Atmospheric conditions		
									Fuel	Coolant	Engine oil	Tempe-rature	R.H.	Pressure
	(kW)	(kN)	(km/h)	(rev/min)	(rev/min)	(%)	(g/kWh)	(kWh/l)	(°C)	(°C)	(°C)	(°C)	(%)	(kPa)
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**
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:													
LB3	57.3	26.53	7.77	2200	3544	5.8	328	2.55	39	91	126	24	42	98.7
3.3.2.1.1	75% of pull corresponding to maximum power at rated engine speed:													
LB3	46.3	19.89	8.37	2322	3741	1.9	349	2.40	43	92	125	30	37	98.8
3.3.2.1.2	50% of pull corresponding to maximum power at rated engine speed:													
LB3	32.0	13.27	8.67	2358	3799	1.6	404	2.07	43	84	121	30	33	98.8
3.3.2.1.3	Higher gear / speed setting at reduced engine speed: Same pull and traveling speed as in 3.3.2.1.1:													
HA1	46.3	19.89	8.38	1918	3090	1.7	296	2.82	44	90	123	30	33	98.8
3.3.2.1.4	Same gear / speed selection as 3.3.2.1.3 at reduced engine speed: Same pull and traveling speed as in 3.3.2.1.2:													
HA1	32.0	13.27	8.67	1947	3137	1.8	328	2.55	45	82	117	30	33	98.8
3.3.2.2	In Selected gear/speed nearest between 7 km/h and 10 km/h at rated engine speed:													
HA1	58.6	22.02	9.58	2202	3547	4.1	326	2.56	39	88	119	24	38	98.7
3.3.2.2.1	75% of pull corresponding to maximum power at rated engine speed:													
HA1	46.9	16.51	10.23	2318	3734	2.7	347	2.41	45	91	125	30	33	98.8
3.3.2.2.2	50% of pull corresponding to maximum power at rated engine speed:													
HA1	32.3	11.01	10.56	2356	3796	1.2	407	2.05	45	86	123	31	31	98.7
3.3.2.2.3	Higher gear / speed setting at reduced engine speed: Same pull and traveling speed as in 3.3.2.2.1:													
HB1	46.9	16.51	10.23	1879	3028	2.4	296	2.82	46	90	101	31	31	98.7
3.3.2.2.4	Same gear / speed selection as 3.3.2.2.3 at reduced engine speed: Same pull and traveling speed as in 3.3.2.2.2:													
HB1	32.3	11.01	10.57	1917	3088	1.1	330	2.53	47	83	117	31	32	98.7

4. REPAIR AND ADJUSTMENTS PRIOR TO TESTS

Sl. No.	Particular	Hours of run
-----None-----		

5. REMARKS

-----None-----

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

SHWETABH SINGH
AGRICULTURAL ENGINEER

Y.K RAO
SENIOR AGRICULTURAL ENGINEER

J. J. R. NARWARE
DIRECTOR

Annexure-I

Data sheet of the Power take-off curves:

Index	Power kW	Speed		Engine torque Nm	Fuel Consumption	
		Engine min $^{-1}$	PTO min $^{-1}$		Hourly l/h	Specific g/kWh
Full load and varying speed: Maximum power, power at rated engine speed, power at standard power take-off speed and to the torque corresponding to an engine speed from high idle down to 50% of rated engine speed or at least 15% below the point at which maximum torque occurs, whichever is lower.						
3.1.1	68.0	2201	628	295.19	22.25	273
3.1.2	68.0	2201	628	295.19	22.25	273
3.1.3	67.4	1893	540	339.69	19.87	247
1.1	67.8	2149	613	301.21	21.79	269
1.2	67.7	2100	599	307.89	21.45	265
1.3	67.8	1998	570	323.98	21.21	262
1.4	66.4	1799	513	352.52	19.08	240
1.5	64.8	1700	485	363.96	18.78	242
1.6	62.6	1599	456	374.04	17.75	237
1.7	60.4	1501	428	384.51	17.05	236
1.8	57.0	1395	398	389.82	16.04	235
1.9	55.7	1350	385	394.00	15.77	237
1.10	53.7	1304	372	393.51	15.19	236
3.1.4 Part loads: the governor control set for maximum power, at rated speed						
3.1.4.1	68.0	2201	628	295.19	22.25	273
3.1.4.2	60.8	2310	659	251.08	21.05	290
3.1.4.3	46.3	2349	670	188.30	17.70	320
3.1.4.4	31.4	2384	680	125.58	14.19	378
3.1.4.5	15.9	2412	688	62.83	10.71	564
3.1.4.6	1.2	2433	694	4.50	7.39	5374
3.1.5 Part loads: the governor control set for maximum power, at standard power take-off speed						
3.1.5.1	67.4	1893	540	339.69	19.87	247
3.1.5.2	61.2	2023	577	288.66	19.07	261
3.1.5.3	46.7	2058	587	216.61	15.59	279
3.1.5.4	31.6	2090	596	144.37	12.17	322
3.1.5.5	16.0	2114	603	72.23	8.59	449
3.1.5.6	0.9	2135	609	4.01	5.36	4978
3.1.6 Part loads: the governor control set for maximum power, at different engine speeds						
3.1.6.1	68.0	2201	628	295.19	22.25	273
3.1.6.2	54.4	2331	665	222.85	19.78	304
3.1.6.3	54.4	1977	564	262.72	17.11	263
3.1.6.4	27.2	1977	564	131.35	10.50	323
3.1.6.5	40.8	1318	376	295.34	11.65	239
3.1.6.6	27.2	1318	376	197.23	8.17	251