

## APPENDIX 1

### TECHNICAL SPECIFICATION OF TEST ENGINE

Make and Model	Kirloskar, SV1
Number of Stroke / Configuration	4-Stroke / Vertical
Type	Compression Ignition
Number of Cylinder	One
Bore	87.5 mm
Stroke	110 mm
Cubic capacity	661 cc
Clearance Volume	37.8 cc
Compression Ratio	17.5: 1
Rated Output	5.9 kW
Rated Speed	1800 rpm
Combustion Chamber	Hemispherical Open
Type of Cooling	Water Cooled

**APPENDIX 2****TECHNICAL SPECIFICATION OF DYNAMOMETER**

Manufacturer	Reckers Automation India private limited
Type	Eddy Current Dynamometer
Model	E – 50
Maximum power	50 BHP – 60BHP
W (PAN) Max	5
W (IND) = W (PAN) Max	5
Dynamometer Constant	7026
BHP	$W (IND) \times \text{rpm} / \text{Dyn. Const.}$

### APPENDIX 3

#### TECHNICAL SPECIFICATION OF EXHAUST GAS ANALYZER

Manufacturer	Crypton Ltd., U.K.
Type & Model	Crypton 290 EN2 five gas analyser
Power requirements	230V AC, 50-60 Hz
Operating pressure	750 mbar - 1100 mbar
Operating temperature	+5°C to +40°C
Storage temperature	-20°C to +55°C
Warm-up Time	< 10 minutes (self controlled) at 20°C
Response Time	11 seconds to 95% of final reading
Flow Rate	5 litres/min nominal
Ranges	CO - 0 to 10 % CO <sub>2</sub> - 0 to 20 % HC - 0 to 10000 ppm O <sub>2</sub> - 0 to 25 % NO <sub>x</sub> - 0 to 5000 ppm
Resolution	CO - 0.01 % CO <sub>2</sub> - 0.01 % HC - 1ppm O <sub>2</sub> - 0.01 % NO <sub>x</sub> - 1 ppm
Master calibration	Six month once

**APPENDIX 4****TECHNICAL SPECIFICATION OF SMOKE METER**

Make	AVL India Private Limited
Model	AVL 437
Measuring range	0 to 100 HSU (Hatridge Smoke Unit)
Smoke Temperature	250°C (Maximum at entrance)
Ambient temperature	0 to 50°C
Humidity	90% at 50°C (Non conditioning)
Power Supply	11.5 -36V DC & 205 A
Principle	Light absorption
Master calibration	Yearly once

## APPENDIX 5

### TECHNICAL SPECIFICATION OF PRESSURE TRANSDUCER

Make	Kistler		
Pressure range		bar	0 to 100
Type	Piezo-electric		
Cooling	Air Cooled		
Calibration at 200°C		bar	0 to 100
Sensitivity ( $\pm 0.5\%$ )		mV/bar	25
Frequency range		Hz	0.016 to 20000
Linearity		% FSO	$\leq \pm 1$
Shock		g	2000
Operating temperature range	Mounting location	°C	-50 to 300
	Viton cable connection	°C	200
	Maximum	°C	240
Sensitivity shift	200 $\pm$ 150 °C	%	$\leq \pm 2.5$
	200 $\pm$ 50 °C	%	$\leq \pm 1$
Thermo shock (Kistler test engine 9.5 bar pmi; 1500 1/min)		bar	$\leq - 0.5$

**APPENDIX 6****TECHNICAL SPECIFICATION OF MASS FLOW CONTROLLER**

Make	Aalborg Instruments & Controls Inc, US
Model	DFC26S
Material	Stainless steel
Maximum flow rate	10 lpm
Display	LCD
Input power	15 Vdc, 450 mA maximum
Input / Output signal	0-5 Vdc / 0-5Vdc
Digital interface	RS485
Accuracy	±1% of FS
Response time	0.6 to 1 second
Maximum differential pressure	3.4 bars
Gas and Ambient temperature	5°C to 50°C