

Appendix A – Test Data Record

Table A.1: Test data records for pure diesel

<i>N</i> (rpm)	<i>m</i> ₁ (kg)	<i>m</i> ₂ (kg)	<i>t</i> (sec)	<i>T</i> (N.m)	CO (ppm)	SO ₂ (ppm)
1000	2.415	2.401	30.03	60	455	48
1250	2.391	2.374	30.33	70	562	71
1500	2.368	2.344	30.22	90	1944	498
1750	2.336	2.301	30.44	120	4098	1297
2000	2.294	2.246	29.96	130	4166	1429

Table A.2: Test data records for 10%BJ90%D

<i>N</i> (rpm)	<i>m</i> ₁ (kg)	<i>m</i> ₂ (kg)	<i>t</i> (sec)	<i>T</i> (N.m)	CO (ppm)	SO ₂ (ppm)
1000	1.312	1.297	30.34	70	361	40
1250	1.243	1.225	30.47	85	470	58
1500	1.185	1.158	30.59	108	1828	463
1750	1.056	1.022	30.51	112	3972	1278
2000	0.919	0.879	30.44	105	4005	1215

Table A.3: Test data records for 20%BJ80%D

<i>N</i> (rpm)	<i>m</i> ₁ (kg)	<i>m</i> ₂ (kg)	<i>t</i> (sec)	<i>T</i> (N.m)	CO (ppm)	SO ₂ (ppm)
1000	1.283	1.267	30.33	70	314	28
1250	1.194	1.176	30.41	85	384	50
1500	1.018	0.988	30.40	110	1698	449
1750	0.905	0.873	30.48	110	3842	1233
2000	0.694	0.652	30.51	115	3849	1090

Table A.4: Test data records for 30%BJ70%D

<i>N</i> <i>(rpm)</i>	<i>m₁</i> <i>(kg)</i>	<i>m₂</i> <i>(kg)</i>	<i>t</i> <i>(sec)</i>	<i>T</i> <i>(N.m)</i>	<i>CO</i> <i>(ppm)</i>	<i>SO₂</i> <i>(ppm)</i>
1000	0.867	0.851	30.56	60	270	12
1250	0.780	0.759	30.04	90	323	24
1500	0.716	0.683	30.29	110	1395	392
1750	0.587	0.552	30.56	120	3207	840
2000	0.464	0.418	30.74	130	3057	1041

Table A.5: Test data records for 50%BJ50%D

<i>N</i> <i>(rpm)</i>	<i>m₁</i> <i>(kg)</i>	<i>m₂</i> <i>(kg)</i>	<i>t</i> <i>(sec)</i>	<i>T</i> <i>(N.m)</i>	<i>CO</i> <i>(ppm)</i>	<i>SO₂</i> <i>(ppm)</i>
1000	0.881	0.864	30.60	65	116	10
1250	0.798	0.776	30.84	80	200	21
1500	0.715	0.687	30.69	105	801	103
1750	0.624	0.590	30.59	115	2585	705
2000	0.559	0.514	30.46	115	2638	582

Note: m_1 = initial mass of fuel tank (kg) m_2 = final mass of fuel tank (kg)

Appendix B – Test Results

Table B.1: Brake power (BP) [kW]

	<i>Fuel sample</i>				
<i>N(rpm)</i>	Diesel	10%BJ90%D	20%BJ80%D	30%BJ70%D	50%BJ50%D
1000	6.283	7.330	7.3304	6.283	6.807
1250	9.163	11.127	11.127	11.781	10.472
1500	14.923	16.965	17.279	17.279	16.493
1750	21.991	20.525	20.159	21.991	21.075
2000	27.227	21.991	24.086	27.227	24.086

Table B.2: Brake specific fuel consumption (BSFC) [kg/kW.h]

	<i>Fuel sample</i>				
<i>N(rpm)</i>	Diesel	10%BJ90%D	20%BJ80%D	30%BJ70%D	50%BJ50%D
1000	0.2664	0.2284	0.2284	0.2664	0.2459
1250	0.2204	0.1815	0.1815	0.1714	0.1929
1500	0.1915	0.1685	0.1654	0.1654	0.1733
1750	0.1883	0.2017	0.2054	0.1883	0.1964
2000	0.1986	0.2459	0.2245	0.1986	0.2245

Table B.3: Brake thermal efficiency ($\eta_{th,B}$) [%]

	<i>Fuel sample</i>				
<i>N(rpm)</i>	Diesel	10%BJ90%D	20%BJ80%D	30%BJ70%D	50%BJ50%D
1000	30.114	33.970	32.246	28.433	29.973
1250	36.527	43.152	43.621	39.928	35.912
1500	41.984	44.036	40.631	37.576	44.225
1750	42.735	42.198	44.557	45.493	46.386
2000	37.972	38.342	40.602	43.109	39.884

Table B.4: CO emission [ppm]

	<i>Fuel sample</i>				
<i>N(rpm)</i>	Diesel	10%BJ90%D	20%BJ80%D	30%BJ70%D	50%BJ50%D
1000	455	361	314	270	116
1250	562	470	384	323	200
1500	1944	1828	1698	1395	801
1750	4098	3972	3842	3207	2585
2000	4166	4005	3849	3057	2638

Table B.5: SO₂ emission [ppm]

	<i>Fuel sample</i>				
<i>N(rpm)</i>	Diesel	10%BJ90%D	20%BJ80%D	30%BJ70%D	50%BJ50%D
1000	48	40	28	12	10
1250	71	58	50	24	21
1500	498	463	449	392	103
1750	1297	1278	1233	840	705
2000	1429	1215	1090	1041	582