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APPENDIX I

PHASE II DIESEL FUEL PERFORMANCE DATA

- I-1 Simulated Air-to-Air Aftercooler**
- I-2 Simulated Air-to-Air Aftercooler and High Pressure Fuel Injection System**

*** SYMUEL PROJECT 03-8538 TEST RESULTS ***

RUH NUMBER	1264	1265	1266	1267	1268	1269	1270	1271	1272
TEST CODE	21 1 1	21 2 1	21 3 1	21 4 1	21 5 1	21 6 1	21 7 1	21 8 1	21 9 1
DAY (julian)	6238	6238	6238	6238	6238	6238	6238	6238	6238
TIME (military)	111036	1215 1	1257 8	134641	143844	153754	161528	164915	11 3 7
PHASE	2	2	2	2	2	2	2	2	2
TYPE FUEL	COND F2	COND F2	COND F2	COND F2	COND F2	COND F2	COND F2	COND F2	COND F2
ENGINE HOURS	202.2	203.4	204.1	205.9	206.1	207.0	207.3	207.9	210.2
ENGINE PARAMETERS									
ENGINE SPEED (rpm)	809	1401	1404	1401	1404	2203	2202	2207	2202
TORQUE (N-M)	36.7	920.5	459.4	238.0	83.6	625.1	337.1	169.5	45.6
POWER (KW)	3.1	135.1	67.5	33.7	9.3	144.2	77.7	39.2	19.5
BSFC (g/kw-hr)	458.	213.	215.	234.	333.	229.	254.	311.	611.
BMEP (bar)	.6	15.1	7.6	3.8	1.8	10.3	5.5	2.8	.7
BTE (%)	18.5	39.7	39.3	36.1	21.8	37.0	33.3	27.2	13.9
ENGINE FLOW PARAMETERS									
FUEL FLOW (kg/hr)	1.4	28.8	14.5	7.9	3.3	33.0	19.7	12.2	6.4
AIR FLOW (kg/hr)	201.2	630.7	446.4	374.1	353.2	963.1	783.0	649.8	579.3
AIR FUEL RATIO	141.2	21.9	30.7	47.3	106.5	29.2	38.7	53.3	90.2
CHEMICAL AIR FUEL RATIO	113.3	21.4	28.8	43.6	91.8	29.5	39.3	53.6	86.1
SMOKE OPACITY (%)	.6	11.5	7.2	1.6	1.1	6.5	5.2	3.1	1.9
TEMPERATURE PARAMETERS (deg.c)									
COOLANT IN	91	87	90	91	92	90	91	91	92
COOLANT OUT	93	93	94	93	93	93	94	93	94
OIL SUMP	97	111	106	103	98	112	108	105	103
OIL GALLERY	95	106	103	108	97	108	105	103	101
INTAKE AIR	31	33	34	35	35	36	38	37	31
CELL AMBIENT	34	45	41	40	38	46	44	41	36
BOOST B4 INNER COOLER	52	136	80	61	51	148	103	77	59
BOOST AF INNER COOLER	41	61	41	43	43	73	53	43	41
FUEL IN	37	37	37	37	37	48	40	39	37
EXHAUST #1	121	553	402	286	162	494	384	383	187
EXHAUST #2	145	560	407	297	178	495	382	380	214
EXHAUST #3	139	589	436	309	191	550	424	341	242
EXHAUST #4	133	560	407	287	171	517	400	381	220
EXHAUST #5	140	561	408	292	163	507	405	318	212
EXHAUST #6	143	584	424	292	194	569	419	305	253
EXHAUST STACK	152	540	404	283	180	451	364	288	213
PRESSURE PARAMETERS									
OIL (kpa)	239.2	313.1	314.9	316.5	319.6	345.1	346.8	348.6	349.5
FUEL (kpa)	131.8	130.2	141.7	151.4	156.7	89.1	97.3	105.3	109.9
EXHAUST B4 TURBO (kpa)	3.9	54.4	23.4	13.5	9.6	99.8	57.7	37.1	26.1
FILTER RESTRICTION (kpa)	24.9	373.3	224.8	174.2	149.3	748.2	547.4	622.1	547.4
BOOST AF INNER COOLER (kpa)	1.4	56.3	31.8	11.4	4.2	99.8	49.7	24.2	11.8
EXHAUST STACK (kpa)	.3	2.4	1.8	1.8	.7	4.1	.7	.3	.1
EMISSION PARAMETERS									
BSHC (g/kw-hr)	7.3143	.5316	.7187	1.2445	4.8218	.9762	1.3025	2.6689	11.229
BSCO (g/kw-hr)	9.4682	4.9812	2.4367	2.7218	6.1883	2.8239	2.6487	4.7768	13.263
BSMOx (g/kw-hr)	25.724	7.2807	7.9567	8.8228	9.7212	5.6584	4.9552	5.4038	8.7484
CO2 (%)	1.8	10.1	7.4	4.9	2.3	7.3	5.4	3.9	2.4
O2 (%)	18.8	6.9	10.5	13.9	17.5	10.7	13.2	15.2	17.3
AMBIENT PARAMETERS									
BARO PRESSURE (mm-Hg)	742.7	742.7	742.7	741.7	741.7	741.7	741.7	741.7	741.7
ABSOLUTE HUMIDITY (gm/lb)	142.8	142.8	142.8	77.9	77.9	77.9	77.9	77.9	113.8
RELATIVE HUMIDITY (%)	83.7	83.7	83.7	31.8	31.8	31.8	31.8	31.8	57.5
INDICATED PARAMETERS									
IKW	9.7	149.9	82.1	48.5	23.9	176.1	109.7	70.9	42.5
ISFC (kg/iku-hr)	147.8	191.8	177.2	163.8	138.9	187.2	179.9	171.9	151.0
IMEP (bar)	1.9	16.8	9.2	5.4	2.6	12.5	7.8	5.9	3.8
ITE, actual (%)	57.6	44.1	47.7	51.9	68.9	45.2	47.0	49.2	56.0
ITE, theoretical (%)	63.3	56.9	58.9	60.9	62.9	58.6	60.8	61.3	62.6
RATIO, actual/theoretical	.989	.775	.810	.852	.968	.771	.783	.803	.895

*** SYN FUEL PROJECT 03-8538 TEST RESULTS ***

RUN NUMBER	1295	1296	1297	1298	1299	1300	1301	1302	1303
TEST CODE	31 1 1	31 2 1	31 3 1	31 4 1	31 5 1	31 6 1	31 7 1	31 8 1	31 9 1
DAY (julian)	6282	6282	6282	6282	6282	6282	6286	6286	6286
TIME (military)	10 543	102344	111431	1153 9	13 522	134454	10 821	1055 8	114935
PHASE	3	3	3	3	3	3	3	3	3
TYPE FUEL	COND2	COND2	COND2	COND2	COND2	COND2	COND2	COND2	COND2
ENGINE HOURS	246.0	246.4	247.2	248.1	249.1	249.8	251.9	257.6	253.6
ENGINE PARAMETERS									
ENGINE SPEED (rpm)	799	1402	1400	1402	1407	2201	2201	2199	2204
TORQUE (N-H)	37.4	885.6	459.9	231.4	64.2	706.5	338.3	171.8	45.3
POWER (kW)	3.1	130.1	67.3	34.0	9.5	162.8	78.0	39.6	10.5
BSFC (g/kw-hr)	466.	288.	216.	237.	356.	216.	245.	301.	628.
IMEP (bar)	1.6	14.6	7.6	3.8	1.1	11.6	5.6	2.8	7.
ITE (Z)	18.2	48.6	39.1	33.7	23.8	39.2	34.6	28.1	13.5
ENGINE FLOW PARAMETERS									
FUEL FLOW (kg/hr)	1.5	27.1	14.6	9.1	3.4	35.1	19.1	11.9	6.6
AIR FLOW (kg/hr)	280.0	384.4	427.8	373.1	351.7	973.5	787.2	664.2	589.8
AIR FUEL RATIO	137.1	21.6	29.3	46.3	104.5	27.7	41.3	55.7	89.8
CHEMICAL AIR FUEL RATIO	189.7	21.4	28.5	43.9	69.8	28.4	58.1	65.2	160.3
SMOKE DENSITY (Z)	1.5	5.0	3.8	3.0	2.7	3.1	2.5	3.1	1.7
TEMPERATURE PARAMETERS (deg.c)									
COOLANT IN	88	89	90	91	92	89	92	92	93
COOLANT OUT	90	94	93	94	94	94	95	94	94
OIL SUMP	91	106	106	102	98	112	107	105	104
OIL GALLERY	89	102	102	100	97	108	105	103	101
INTAKE AIR	26	29	30	30	30	31	14	16	17
CELL AMBIENT	28	35	32	32	31	38	30	30	29
BOOST B4 INNER COOLER	37	113	76	59	47	149	77	58	47
BOOST AF INNER COOLER	34	57	42	47	44	73	40	40	40
FUEL IN	31	34	35	35	35	41	32	34	34
EXHAUST #1	148	534	488	387	189	509	353	279	207
EXHAUST #2	131	535	410	387	189	515	354	286	213
EXHAUST #3	137	570	416	393	182	549	374	305	230
EXHAUST #4	118	559	409	287	160	555	367	299	215
EXHAUST #5	116	528	486	386	171	506	347	281	202
EXHAUST #6	141	521	400	289	192	532	382	325	237
EXHAUST STACK	127	512	396	289	180	453	329	278	211
PRESSURE PARAMETERS									
OIL (kpa)	256.0	315.3	315.5	317.0	319.1	343.7	349.4	351.4	351.9
FUEL (kpa)	183.4	139.9	158.8	158.8	161.9	103.2	122.3	128.5	128.7
EXHAUST B4 TURBO (kpa)	3.7	46.5	29.3	13.2	8.9	103.5	61.7	41.6	26.8
FILTER RESTRICTION (pa)	124.4	447.9	298.6	273.7	248.8	771.4	597.2	485.2	423.0
BOOST AF INNERCOOLER (kpa)	7	83.8	29.4	11.7	4.2	105.3	52.6	26.4	14.3
EXHAUST STACK (kpa)	0.0	1.7	7	3	3	4.1	2.0	1.3	1.0
EMISSION PARAMETERS									
BSHC (g/kw-hr)	9.2176	7.7359	8.8125	1.4484	5.6546	8.8514	1.6312	2.9299	10.397
BSCO (g/kw-hr)	8.1253	3.9148	1.7238	2.2250	5.3808	1.1133	1.9151	3.3554	10.045
BSMOx (g/kw-hr)	32.597	18.451	12.967	11.174	12.909	8.7145	7.6432	7.8984	13.367
CO2 (Z)	1.9	18.1	7.5	4.8	2.3	7.6	4.2	3.2	2.1
O2 (Z)	17.3	6.5	18.4	14.1	17.2	10.0	14.7	16.2	17.4
AMBIENT PARAMETERS									
BARO. PRESSURE (mm-Hg)	742.2	742.2	742.2	742.2	742.7	742.7	745.0	745.0	745.0
ABSOLUTE HUMIDITY (gm/lb)	180.6	180.6	180.6	180.6	104.8	144.8	42.6	42.6	42.6
RELATIVE HUMIDITY (Z)	77.9	77.9	77.9	77.9	56.6	56.6	65.2	65.2	65.2
INDICATED PARAMETERS									
IMEP (kg/iku-hr)	9.7	144.7	82.1	48.5	24.6	194.7	109.7	71.6	42.5
BSFC (kg/iku-hr)	138.4	187.2	177.6	166.1	136.7	189.4	173.9	166.5	154.1
IMEP (bar)	1.9	16.2	9.2	5.4	2.7	13.9	7.8	5.1	3.0
ITE, actual (Z)	56.3	45.2	47.6	58.9	61.9	46.9	48.6	50.8	54.8
ITE, theoretical (Z)	63.3	56.8	58.7	60.8	62.9	58.3	60.3	61.4	62.6
RATIO, actual/theoretical	.889	.796	.812	.838	.984	.804	.806	.827	.875

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APPENDIX J

PHASE II TAR SANDS PERFORMANCE DATA

- J-1 Simulated Air-to-Air Aftercooler**
- J-2 Simulated Air-to-Air Aftercooler and High Pressure Fuel Injection System**

*** SYN FUEL PROJECT 03-8538 TEST RESULTS ***

RUN NUMBER		1273	1274	1275	1276	1277	1278	1279	1280	1281
TEST CODE		23 1 1	23 2 1	23 3 1	23 4 1	23 5 1	23 6 1	23 7 1	23 8 1	23 9 1
DAY	(julian)	6239	6239	6239	6239	6239	6240	6240	6240	6240
TIME	(military)	133316	14 625	144458	15 958	154535	104548	113851	12 748	13 413
PHASE		2	2	2	2	2	2	2	2	2
TYPE FUEL		TARSAN	TARSAN	TARSAN	TARSAN	TARSAN	TARSAN	TARSAN	TARSAN	TARSAN
ENGINE HOURS		211.8	212.0	213.4	213.9	214.5	217.4	218.1	218.6	219.7
ENGINE PARAMETERS										
ENGINE SPEED	(rpm)	823	1403	1407	1406	1408	2202	2202	2206	2218
TORQUE	(N-H)	37.1	965.6	458.7	228.2	64.5	634.1	336.9	168.2	45.7
POWER	(KW)	3.2	141.9	67.6	33.6	9.5	146.2	77.7	38.8	16.6
BSFC	(g/kw-hr)	397.	212.	222.	242.	371.	229.	252.	299.	628.
BMEP	(bar)	6	15.9	7.5	3.8	1.1	10.4	5.5	2.8	8
BTE	(%)	21.7	40.8	38.9	35.7	23.3	37.7	34.3	28.9	13.7
ENGINE FLOW PARAMETERS										
FUEL FLOW	(kg/hr)	1.3	30.0	15.8	8.1	3.5	33.5	19.6	11.6	6.6
AIR FLOW	(kg/hr)	283.2	640.5	437.6	367.7	352.8	974.3	772.1	647.5	576.0
AIR FUEL RATIO		160.2	21.3	29.2	45.2	100.1	29.1	39.5	55.8	86.9
CHEMICAL AIR FUEL RATIO		110.6	28.5	27.7	41.6	87.5	29.3	39.0	53.9	81.3
SMOKE OPACITY	(%)	1.9	16.5	6.3	1.3	1.7	7.9	6.6	1.8	1.2
TEMPERATURE PARAMETERS (deg.c)										
COOLANT IN		91	87	89	90	92	90	91	92	92
COOLANT OUT		92	92	93	93	93	94	94	94	94
OIL SUMP		93	189	107	103	99	112	108	105	103
OIL GALLERY		93	195	183	101	98	109	105	103	101
INTAKE AIR		34	36	37	37	37	32	33	33	33
CELL AMBIENT		37	48	44	41	39	43	40	39	38
BOOST B4 INNER COOLER		44	137	82	62	53	146	98	72	62
BOOST AF INNER COOLER		41	63	41	44	43	71	51	41	46
FUEL IN		35	37	37	37	37	39	39	39	38
EXHAUST #1		121	565	398	280	161	490	375	291	192
EXHAUST #2		141	567	485	294	179	580	381	380	220
EXHAUST #3		138	594	434	306	199	544	417	325	258
EXHAUST #4		123	565	411	289	172	518	397	296	234
EXHAUST #5		123	571	413	288	179	511	397	304	220
EXHAUST #6		130	684	438	296	195	561	421	294	251
EXHAUST STACK		129	542	488	278	179	449	358	278	218
PRESSURE PARAMETERS										
OIL	(tpa)	254.4	314.5	315.4	317.1	318.7	343.2	345.5	347.2	348.7
FUEL	(tpa)	161.6	110.6	137.7	147.8	155.4	84.7	95.1	101.7	106.6
EXHAUST B4 TURBO	(tpa)	3.8	56.1	22.3	12.8	9.4	100.7	57.0	35.1	24.5
FILTER RESTRICTION	(pa)	199.1	547.4	497.7	298.6	298.6	846.1	622.1	497.7	423.0
BOOST AF INNER COOLER	(tpa)	8	188.1	30.1	10.2	3.2	103.8	52.3	24.1	12.4
EXHAUST STACK	(tpa)	3	2.8	1.0	.7	.3	4.1	2.0	1.7	.7
EMISSION PARAMETERS										
BSHC	(g/kw-hr)	8.4597	.6510	.8257	1.3352	5.1823	1.8164	1.3987	2.6448	15.898
BSCO	(g/kw-hr)	13.174	5.8812	2.8774	2.8363	11.591	1.8169	2.9291	7.6978	32.247
BSMOx	(g/kw-hr)	26.167	7.7133	8.8476	12.294	15.917	6.2371	5.6194	7.3337	11.655
CO2	(%)	1.9	18.7	7.8	5.2	2.4	7.4	5.5	3.9	2.5
O2	(%)	17.9	6.6	10.1	13.6	17.2	18.8	13.2	15.2	17.1
AMBIENT PARAMETERS										
BARO. PRESSURE	(mm-Hg)	741.2	741.2	741.2	741.2	741.2	741.2	741.2	741.2	741.2
ABSOLUTE HUMIDITY	(gn/lb)	112.2	112.2	112.2	112.2	112.2	115.4	115.4	115.4	115.4
RELATIVE HUMIDITY	(%)	54.8	54.8	54.8	54.8	54.8	75.3	75.3	75.3	75.3
INDICATED PARAMETERS										
IKW		9.7	156.7	82.8	48.5	24.6	178.3	189.7	70.9	42.5
ISFC	(kg/iku-hr)	138.8	191.7	181.8	167.6	143.2	187.7	178.4	163.8	155.9
IRFP	(bar)	1.8	17.5	9.2	5.4	2.7	12.7	7.8	5.8	3.0
ITE, actual	(%)	66.8	45.0	47.7	51.5	68.3	46.0	48.4	52.7	55.3
ITE, theoretical	(%)	63.4	56.7	58.6	60.7	62.8	58.6	60.1	61.4	62.6
RATIO, actual/theoretical		1.048	.794	.813	.848	.959	.784	.804	.858	.885

*** SYNFUEL PROJECT 03-8538 TEST RESULTS ***

RUN NUMBER		1304	1305	1306	1307	1308	1309	1310	1311	1312
TEST CODE		33 1 1	33 2 1	33 3 3	33 4 1	33 5 1	33 6 1	33 1 8	33 1 1	33 9 1
DAY	(julian)	6287	6287	6287	6287	6287	6287	6287	6287	6287
TIME	(military)	91726	10 154	1041 8	111650	121733	125817	1325 1	14 342	144128
PHASE		3	3	3	3	3	3	3	3	3
TYPE FUEL		TARSAN	TARSAN	TARSAN	TARSAN	TARSAN	TARSAN	TARSAN	TARSAN	TARSAN
ENGINE HOURS		253.8	256.6	257.3	257.9	258.9	259.4	268.0	268.6	261.2
ENGINE PARAMETERS										
ENGINE SPEED	(rpm)	802	1481	1488	1399	1399	2201	2282	2201	2283
TORQUE	(N-m)	37.1	923.1	459.2	229.7	64.8	748.4	336.3	171.8	45.8
POWER	(kW)	3.1	135.4	67.3	33.7	9.5	178.6	77.5	39.4	18.6
BSPC	(g/kw-hr)	348.	283.	288.	218.	262.	208.	223.	259.	478.
BMEP	(bar)	.6	15.2	7.6	3.8	1.1	12.2	5.5	2.8	.8
BTE	(%)	25.4	42.6	41.5	41.8	33.8	41.5	38.7	33.3	18.1
ENGINE FLOW PARAMETERS										
FUEL FLOW	(kg/hr)	1.1	27.4	14.8	7.1	2.5	35.5	17.3	18.2	5.0
AIR FLOW	(kg/hr)	198.8	613.9	426.6	374.8	356.4	1085.5	758.3	648.6	590.7
AIR FUEL RATIO		186.6	22.4	38.5	53.8	143.5	28.3	43.8	63.6	117.1
CHEMICAL AIR FUEL RATIO		115.4	22.6	29.9	44.9	92.1	28.7	41.8	56.6	91.3
SMOKE DENSITY	(%)	1.1	4.3	2.1	1.3	2.4	2.6	3.0	2.5	1.9
TEMPERATURE PARAMETERS (deg.c)										
COOLANT IN		92	88	91	92	93	98	91	93	93
COOLANT OUT		94	93	94	94	95	94	94	95	94
OIL SUMP		98	111	188	183	98	112	109	106	183
OIL GALLERY		97	186	184	188	97	188	106	184	181
INTAKE AIR		18	19	21	22	23	26	27	27	27
CELL AMBIENT		33	37	25	23	24	34	32	31	30
BOOST B4 INNER COOLER		44	114	78	52	48	146	98	78	54
BOOST AF INNER COOLER		48	54	39	38	37	73	45	46	33
FUEL IN		33	34	35	32	34	39	38	38	38
EXHAUST #1		158	535	398	297	179	588	366	281	198
EXHAUST #2		136	527	399	295	191	512	371	291	282
EXHAUST #3		158	561	418	291	175	552	384	384	224
EXHAUST #4		133	557	485	277	149	559	389	382	217
EXHAUST #5		119	527	385	284	176	587	353	279	282
EXHAUST #6		161	515	398	273	174	536	396	324	236
EXHAUST STACK		169	513	386	275	173	452	341	277	201
PRESSURE PARAMETERS										
OIL	(kpa)	235.1	313.7	315.1	317.8	318.5	342.8	344.0	345.9	347.1
FUEL	(kpa)	136.8	122.8	146.4	155.1	168.8	96.4	115.7	121.2	125.1
EXHAUST B4 TURBO	(kpa)	2.1	48.2	18.3	10.4	7.1	187.8	52.8	33.8	24.5
FILTER RESTRICTION	(pa)	124.4	447.9	298.6	248.8	248.8	771.4	497.7	522.6	447.9
BOOST AF INNER COOLER(kpa)		2.2	92.2	29.8	12.5	5.4	113.6	48.9	25.3	12.6
EXHAUST STACK	(kpa)	8.8	1.7	.7	.3	.3	3.7	2.8	1.3	1.0
EMISSION PARAMETERS										
SSHC	(g/kw-hr)	7.2529	.6526	.7562	1.2288	4.3118	.8578	1.1861	2.1223	8.6762
BSCO	(g/kw-hr)	7.8485	2.9398	1.4662	2.8825	6.8865	1.8611	1.7945	3.8542	18.882
BSNOx	(g/kw-hr)	31.176	11.648	16.818	13.316	11.969	9.6985	7.3322	8.2278	12.837
CO2	(%)	1.8	7.7	7.5	4.8	2.3	7.6	5.1	3.8	2.3
O2	(%)	18.1	7.7	18.5	14.2	16.4	18.6	14.1	15.9	17.3
AMBIENT PARAMETERS										
BARO. PRESSURE	(mm-Hg)	744.8	744.8	744.8	744.8	744.8	744.2	744.2	744.2	744.2
ABSOLUTE HUMIDITY	(gm/lb)	53.4	53.4	53.4	53.4	53.4	57.2	57.2	57.2	57.2
RELATIVE HUMIDITY	(%)	68.8	68.8	68.8	68.8	68.8	46.4	46.4	46.4	46.4
INDICATED PARAMETERS										
IKM		9.7	149.9	82.1	48.5	24.6	282.2	189.7	71.6	42.5
ISFC	(kg/iku-hr)	119.4	182.9	178.8	146.8	189.9	175.6	157.7	142.4	118.6
IMEP	(bar)	1.9	16.8	9.2	5.4	2.8	14.4	7.8	5.1	3.8
ITE, actual	(%)	78.9	47.2	58.6	59.1	85.5	49.1	54.7	68.6	72.8
ITE, theoretical	(%)	63.6	57.0	58.9	61.3	63.3	58.5	68.6	61.8	63.1
RATIO, actual/theoretical		1.241	.827	.859	.965	1.351	.841	.903	.988	1.154

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APPENDIX K

PHASE II 57 PERCENT EDS PERFORMANCE DATA

- K-1 Simulated Air-to-Air Aftercooler**
- K-2 Simulated Air-to-Air Aftercooler and High Pressure Fuel Injection System**

*** SYNFUEL PROJECT 03-8538 TEST RESULTS ***

RUN NUMBER	1282	1283	1284	1285	1286	1287	1288	1289	1290
TEST CODE	26 1 1	26 2 1	26 3 1	26 4 1	26 5 1	26 6 1	26 7 1	26 8 1	26 9 1
DAY (julian)	6241	6241	6241	6241	6241	6241	6241	6241	6241
TIME (military)	11 3 9	12 0 2	123836	133733	144220	152914	16 440	1636 3	173032
PHASE	2	2	2	2	2	2	2	2	2
TYPE FUEL	57ZED5	57ZED5	57ZED5	57ZED5	57ZED5	57ZED5	57ZED5	57ZED5	57ZED5
ENGINE HOURS	222.1	223.0	223.8	225.0	226.0	226.5	227.1	227.5	238.4
ENGINE PARAMETERS									
ENGINE SPEED (rpm)	829	1401	1405	1408	1410	2204	2201	2198	2201
TORQUE (N-M)	37.4	972.9	458.6	229.7	64.0	663.5	336.7	168.6	46.4
POWER (KW)	3.2	142.8	67.5	33.9	9.4	153.1	77.6	38.8	10.7
BSFC (g/kw-hr)	445.	312.	224.	243.	378.	226.	244.	286.	585.
BMEP (bar)	.6	16.0	7.5	3.8	1.1	10.9	5.5	2.8	.8
BTE (%)	19.3	40.6	38.4	35.4	22.7	38.1	35.2	30.1	14.7
ENGINE FLOW PARAMETERS									
FUEL FLOW (kg/hr)	1.4	30.2	15.1	8.2	3.6	34.6	18.9	11.1	6.3
AIR FLOW (kg/hr)	286.9	652.6	438.7	373.7	356.5	996.0	769.6	646.4	577.7
AIR FUEL RATIO	143.1	21.6	29.0	45.4	99.9	28.8	40.7	58.2	92.3
CHEMICAL AIR FUEL RATIO	145.8	28.9	27.3	41.1	86.4	28.5	38.8	53.5	82.2
SMOKE OPACITY (%)	1.5	15.6	6.1	1.0	1.4	8.6	5.7	1.5	1.0
TEMPERATURE PARAMETERS (deg.c)									
COOLANT IN	91	87	89	90	91	90	91	91	91
COOLANT OUT	93	93	93	93	92	94	94	94	93
OIL PUMP	94	110	105	102	97	111	107	104	102
OIL GALLERY	93	105	102	99	96	107	104	102	100
INTAKE AIR	28	30	31	31	31	33	33	33	33
CELL AMBIENT	28	36	34	32	31	37	36	34	34
BOOST B4 INNER COOLER	46	134	77	56	47	158	97	71	61
BOOST AF INNER COOLER	39	59	42	42	40	73	49	39	45
FUEL IN	33	34	34	34	34	37	38	37	37
EXHAUST #1	129	561	392	275	149	501	371	287	190
EXHAUST #2	148	562	409	287	170	511	374	304	221
EXHAUST #3	146	586	439	310	193	556	419	316	250
EXHAUST #4	132	566	406	286	180	526	396	295	229
EXHAUST #5	130	567	410	282	173	518	397	309	234
EXHAUST #6	135	588	432	291	189	576	412	293	244
EXHAUST STACK	145	536	402	275	173	456	354	275	215
PRESSURE PARAMETERS									
OIL (kpa)	256.8	314.7	316.6	318.3	319.9	344.3	346.1	347.6	349.2
FUEL (kpa)	166.0	114.9	141.7	153.8	156.3	85.7	98.5	105.8	110.1
EXHAUST B4 TURBO (kpa)	5.4	59.6	24.8	15.6	9.5	106.9	59.8	38.6	28.9
FILTER RESTRICTION (pa)	149.3	522.6	323.5	273.7	273.7	945.6	746.5	622.1	547.4
BOOST AF INNER COOLER (kpa)	.5	102.9	30.8	10.2	4.0	107.3	49.6	22.3	11.4
EXHAUST STACK (kpa)	0.8	1.0	.7	.3	0.0	3.7	1.0	.3	0.0
EMISSION PARAMETERS									
BSHC (g/kw-hr)	8.4149	.6868	.8461	1.4230	6.6101	1.8145	1.5353	3.2086	10.479
BSCD (g/kw-hr)	12.767	4.4274	2.6756	2.7242	12.729	1.8249	2.8759	7.8410	30.617
BSMOx (g/kw-hr)	32.749	7.8971	9.3812	12.671	16.581	6.5202	5.6657	7.3984	11.558
CO2 (%)	2.0	18.5	7.9	5.2	2.4	7.6	5.5	3.9	2.5
O2 (%)	17.8	6.8	10.1	13.6	17.2	10.5	13.1	15.3	17.3
AMBIENT PARAMETERS									
BARO. PRESSURE (mm-Hg)	744.2	744.2	744.2	744.2	744.2	744.2	744.2	744.2	744.2
ABSOLUTE HUMIDITY (gn/lb)	91.8	91.8	91.8	91.8	90.8	90.8	90.8	90.8	90.8
RELATIVE HUMIDITY (%)	60.5	60.5	60.5	60.5	41.7	41.7	41.7	41.7	41.7
INDICATED PARAMETERS									
IKW	9.7	157.4	82.1	48.5	24.6	185.8	109.7	70.9	42.5
ISFC (kg/iku-hr)	149.2	192.1	184.1	169.6	145.8	186.7	172.6	156.7	147.1
IMEP (bar)	1.8	17.6	9.2	5.4	2.7	13.2	7.8	5.0	3.0
ITE, actual (%)	57.6	44.7	46.7	50.7	59.3	46.0	49.8	54.9	58.4
ITE, theoretical (%)	63.3	56.8	58.6	60.7	62.8	58.6	60.3	61.6	62.7
RATIO, actual/theoretical	.910	.780	.797	.835	.944	.786	.827	.891	.932

*** SYNFUEL PROJECT 03-8538 TEST RESULTS ***

RUN NUMBER	1313	1314	1315	1316	1317	1318	1319	1320	1321
TEST CODE	36 1 1	36 2 1	36 3 1	36 4 1	36 5 1	36 6 1	36 7 1	36 7 1	36 8 1
DAY (julian)	6288	6288	6288	6288	6288	6288	6288	6288	6288
TIME (military)	95438	101420	184344	111645	114727	1220 9	124745	131137	14 256
PHASE	3	3	3	3	3	3	3	3	3
TYPE FUEL	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS
ENGINE HOURS	263.9	264.3	264.8	265.3	265.8	266.3	266.8	267.7	268.8
ENGINE PARAMETERS									
ENGINE SPEED (rpm)	688	1401	1401	1399	1396	2199	2202	2200	2286
TORQUE (N-M)	37.1	935.9	459.0	231.3	64.3	741.8	336.2	178.1	45.8
POWER (KW)	3.1	137.3	67.4	33.9	9.4	178.8	77.5	39.2	10.6
BSEC (q/kw-hr)	466.	286.	218.	235.	348.	213.	234.	278.	539.
BMEP (bar)	.6	15.4	7.5	3.8	1.1	12.2	5.5	2.8	.8
BTE (%)	18.5	41.7	39.4	36.6	24.7	48.3	36.7	30.9	15.9
ENGINE FLOW PARAMETERS									
FUEL FLOW (kg/hr)	1.5	28.3	14.7	8.8	3.3	36.4	18.2	10.9	5.7
AIR FLOW (kg/hr)	295.5	611.2	422.7	374.3	355.8	1085.3	757.7	647.7	582.0
AIR FUEL RATIO	148.7	21.6	28.8	47.8	106.7	27.6	41.7	59.4	102.1
CHEMICAL AIR FUEL RATIO	119.3	22.2	28.5	44.1	91.8	28.4	41.4	56.5	87.8
SMOKE OPACITY (%)	1.4	4.7	2.6	1.5	2.4	3.2	3.5	2.7	2.1
TEMPERATURE PARAMETERS (deg.c)									
COOLANT IN	86	87	90	91	93	98	92	95	93
COOLANT OUT	88	93	94	94	94	94	94	95	94
OIL SUMP	88	108	108	103	99	112	109	106	106
OIL GALLERY	87	104	104	100	97	108	106	104	101
INTAKE AIR	21	24	25	25	25	28	29	28	27
CELL AMBIENT	23	33	31	29	29	38	34	33	32
BOOST B4 INNER COOLER	31	115	72	52	43	149	93	68	56
BOOST AF INNER COOLER	29	55	39	39	40	75	47	39	39
FUEL IN	31	35	35	34	35	39	39	39	36
EXHAUST #1	156	535	398	295	189	511	365	277	204
EXHAUST #2	135	535	399	295	189	516	372	288	287
EXHAUST #3	112	588	404	295	179	555	385	343	233
EXHAUST #4	94	585	405	276	156	566	391	298	222
EXHAUST #5	129	524	387	279	171	513	355	279	201
EXHAUST #6	119	528	387	276	176	537	396	318	229
EXHAUST STACK	121	518	384	271	178	455	343	273	205
PRESSURE PARAMETERS									
OIL (kpa)	264.3	315.8	315.6	317.3	318.5	342.4	343.6	345.7	347.5
FUEL (kpa)	187.2	128.4	148.8	157.8	162.3	99.5	117.9	124.8	128.4
EXHAUST B4 TURBO (kpa)	3.6	49.5	19.4	12.3	9.8	189.6	54.2	35.4	25.2
FILTER RESTRICTION (pa)	124.4	472.8	298.6	248.8	248.8	796.3	497.7	522.6	447.9
BOOST AF INNERCOOLER(kpa)	1.8	91.4	27.9	11.5	4.6	113.8	48.1	23.7	11.6
EXHAUST STACK (kpa)	8.8	1.7	.3	.3	.3	4.1	1.7	1.8	.7
EMISSION PARAMETERS									
B5HC (g/kw-hr)	9.9888	.7853	.8111	1.3371	5.3452	.8418	1.2799	2.3194	9.0781
B5CO (g/kw-hr)	15.318	3.8843	1.4485	2.1649	8.6229	1.8652	1.8481	4.3689	28.726
B5NOx (g/kw-hr)	35.427	11.368	16.719	15.187	16.378	9.9562	7.5582	9.1982	14.212
CO (%)	1.7	9.6	7.6	4.9	2.3	7.7	5.2	3.8	2.4
O2 (%)	18.2	7.6	18.7	14.1	17.2	18.2	13.9	15.6	17.2
AMBIENT PARAMETERS									
BARR. PRESSURE (mm-Hg)	746.3	746.3	746.3	746.3	746.3	747.3	747.3	747.3	747.3
ABSOLUTE HUMIDITY (gm/lb)	58.6	58.6	58.6	58.6	58.6	57.7	57.7	57.7	57.7
RELATIVE HUMIDITY (%)	58.2	58.2	58.2	58.2	58.2	39.7	39.7	39.7	39.7
INDICATED PARAMETERS									
IKM	9.7	152.2	82.1	48.5	23.9	282.9	189.7	78.9	42.5
ISFC (kg/kwhr)	158.6	185.9	179.2	164.3	136.7	179.5	163.6	153.9	134.1
IMEP (bar)	1.9	17.8	9.2	5.4	2.6	14.5	7.8	5.8	3.8
ITE, actual (%)	57.1	46.2	48.8	52.3	62.8	47.9	31.9	53.9	64.1
ITE, theoretical (%)	63.3	56.8	58.6	61.8	63.8	58.3	68.4	61.6	62.9
RATIO, actual/theoretical	.982	.814	.828	.868	.998	.821	.868	.986	1.020

*** SYNFUEL PROJECT 03-8538 TEST RESULTS ***
COLD START TEST @ 0 DEGREES C

RUN NUMBER		1529	1530	1531	1532	1533	1534	1535	1536	1537
TEST CODE		3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2
DAY	(julian)	6293	6293	6293	6293	6293	6293	6293	6293	6293
TIME	(military)	17 651	17 655	17 658	17 7 1	17 7 5	17 7 8	17 711	17 714	17 717
PHASE		3	3	3	3	3	3	3	3	3
TYPE FUEL		57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS

ENGINE PARAMETERS

ENGINE SPEED	(rpm)	-0	-0	-0	-0	-0	-0	1281	1135	980
TORQUE	(N-M)	-0.3	-0.2	-0.2	-86.3	-172.3	-173.5	19.0	23.8	15.0
POWER	(KW)	-0.0	-0.0	-0.0	0.0	0.0	0.0	2.7	2.8	1.6
SMOKE OPACITY	(%)	1.7	1.7	1.8	1.8	83.3	99.4	72.8	92.7	99.0

TEMPERATURE PARAMETERS (deg.c)

COOLANT IN		3	5	5	5	5	5	5	5	5
COOLANT OUT		4	4	4	4	4	4	4	4	4
OIL SUMP		2	2	2	2	2	2	2	2	2
OIL GALLERY		2	2	2	2	2	2	2	2	2
INTAKE AIR		1	1	1	1	1	1	1	1	1
CELL AMBIENT		2	2	2	2	2	2	2	2	2
BOOST B4 INNER COOLER		2	2	2	2	2	2	2	2	2
BOOST AF INNER COOLER		1	1	1	1	1	1	1	1	1
FUEL IN		1	1	1	1	1	1	1	1	1
EXHAUST #1		1	1	1	1	-0	-2	61	53	47
EXHAUST #2		1	1	1	1	-0	-2	60	122	162
EXHAUST #3		1	1	1	1	-0	-2	65	141	175
EXHAUST #4		1	1	1	1	0	-1	54	107	98
EXHAUST #5		1	1	1	1	-1	-2	60	44	33
EXHAUST #6		1	1	1	1	-0	-2	75	124	93
EXHAUST STACK		-0	-0	-0	-0	-1	-1	42	61	66

PRESSURE PARAMETERS

OIL	(kpa)	4.0	4.0	3.8	3.8	17.5	36.5	59.0	82.7	107.7
FUEL	(kpa)	118.7	118.5	118.5	124.2	132.6	126.5	132.2	132.0	129.2

COLD START TEST @ 0 DEGREES C

RUN NUMBER		1538	1539	1540	1541	1542	1543	1544	1545	1546
TEST CODE		3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2
DAY	(julian)	6293	6293	6293	6293	6293	6293	6293	6293	6293
TIME	(military)	17 728	17 723	17 727	17 730	17 733	17 736	17 740	17 743	17 746
PHASE		3	3	3	3	3	3	3	3	3
TYPE FUEL		57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS

ENGINE PARAMETERS

ENGINE SPEED	(rpm)	859	813	838	1418	1602	1520	1465	2051	2011
TORQUE	(N-M)	16.2	16.1	19.2	24.9	36.1	27.3	26.8	41.4	35.1
POWER	(KW)	1.5	1.4	1.6	3.7	6.1	4.3	4.1	8.8	7.4
SMOKE OPACITY	(%)	99.7	99.9	98.9	71.3	68.1	65.8	68.4	35.5	32.3

TEMPERATURE PARAMETERS (deg.c)

COOLANT IN		5	5	4	5	5	5	4	5	5
COOLANT OUT		4	4	4	5	4	4	4	4	4
OIL SUMP		4	3	4	4	3	3	3	3	3
OIL GALLERY		2	2	3	3	3	3	3	3	3
INTAKE AIR		1	0	0	0	-0	-1	-1	-1	-1
CELL AMBIENT		2	2	2	2	1	1	1	1	1
BOOST B4 INNER COOLER		2	2	1	1	1	1	1	1	1
BOOST AF INNER COOLER		2	2	2	2	3	3	4	4	5
FUEL IN		1	1	0	0	0	0	0	1	1
EXHAUST #1		41	40	37	51	95	75	63	107	112
EXHAUST #2		185	197	205	213	252	259	261	288	295
EXHAUST #3		194	206	217	229	270	282	287	317	322
EXHAUST #4		188	134	173	209	260	303	323	354	352
EXHAUST #5		26	21	21	37	64	48	39	69	56
EXHAUST #6		72	58	47	59	137	96	73	139	158
EXHAUST STACK		72	78	85	96	125	130	133	157	164

PRESSURE PARAMETERS

OIL	(kpa)	133.2	158.8	184.1	211.7	246.9	279.6	303.9	327.7	349.4
FUEL	(kpa)	121.7	134.5	145.6	138.0	141.2	142.0	140.7	137.2	135.3

**** SYNFUEL PROJECT 03-8538 TEST RESULTS ****
 COLD START TEST # 0 DEGREES C

RUN NUMBER	1547	1548	1549	1550	1551	1552	1553	1554	1555
TEST CODE	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2
DAY (julian)	6293	6293	6293	6293	6293	6293	6293	6293	6293
TIME (military)	17 750	17 754	17 757	17 8 1	17 8 4	17 8 7	17 8 10	17 8 13	17 8 16
PHASE	3	3	3	3	3	3	3	3	3
TYPE FUEL	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS
ENGINE PARAMETERS									
ENGINE SPEED (rpm)	1849	783	780	897	1	0	0	0	0
TORQUE (N-H)	9.2	11.4	17.4	18.8	4.5	.7	.5	.5	.5
POWER (KW)	1.0	.9	1.4	1.3	.0	.0	.0	.0	.0
SMOKE OPACITY (Z)	3.4	18.8	21.7	23.1	4.1	2.2	1.9	2.0	2.0
TEMPERATURE PARAMETERS (deg.c)									
COOLANT IN	5	6	6	6	6	6	7	7	7
COOLANT OUT	8	9	9	9	9	9	9	9	9
OIL SUMP	5	6	6	7	7	7	7	7	7
OIL GALLERY	4	4	4	4	4	4	5	5	5
INTAKE AIR	-1	-2	-2	-2	-2	-2	-2	-2	-2
CELL AMBIENT	1	1	1	1	0	0	0	0	0
BOOST B4 INNER COOLER	1	1	1	1	1	1	0	0	1
BOOST AF INNER COOLER	6	6	6	6	6	6	5	5	5
FUEL IN	1	1	1	1	1	1	1	1	1
EXHAUST #1	80	72	80	88	77	72	71	70	68
EXHAUST #2	216	177	171	168	145	133	131	128	125
EXHAUST #3	238	191	178	169	147	137	125	123	120
EXHAUST #4	267	217	200	188	164	152	148	144	140
EXHAUST #5	48	36	48	44	37	34	34	33	32
EXHAUST #6	186	88	91	98	77	71	70	69	67
EXHAUST STACK	132	114	109	106	96	91	89	87	85
PRESSURE PARAMETERS									
OIL (kpa)	351.4	336.7	328.8	323.4	311.9	253.3	281.1	164.9	139.6
FUEL (kpa)	148.4	154.1	158.7	153.3	145.4	128.3	126.1	125.8	125.5

COLD START TEST # 0 DEGREES C

RUN NUMBER	1556	1557	1558	1559	1560	1561	1562	1563	1564
TEST CODE	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2	3610 2
DAY (julian)	6293	6293	6293	6293	6293	6293	6293	6293	6293
TIME (military)	17 819	17 822	17 825	17 828	17 831	17 834	17 837	17 841	17 844
PHASE	3	3	3	3	3	3	3	3	3
TYPE FUEL	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS
ENGINE PARAMETERS									
ENGINE SPEED (rpm)	0	0	-0	-0	-0	-0	-0	-0	-0
TORQUE (N-H)	.5	.5	.5	.5	.4	.5	.5	.5	.5
POWER (KW)	.0	.0	-0	-0	-0	-0	-0	-0	-0
SMOKE OPACITY (Z)	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9
TEMPERATURE PARAMETERS (deg.c)									
COOLANT IN	7	7	7	7	7	7	7	7	7
COOLANT OUT	9	9	9	9	9	9	9	9	9
OIL SUMP	7	6	6	6	6	6	6	6	6
OIL GALLERY	5	5	4	4	3	3	3	3	3
INTAKE AIR	-2	-2	-2	-2	-2	-2	-2	-2	-2
CELL AMBIENT	0	-0	-0	-0	-0	-1	-1	-1	-1
BOOST B4 INNER COOLER	1	0	0	0	0	-0	-0	-0	-0
BOOST AF INNER COOLER	5	5	5	5	5	5	5	5	4
FUEL IN	1	1	1	1	1	1	1	1	1
EXHAUST #1	67	66	64	63	62	60	59	58	57
EXHAUST #2	122	120	117	114	111	109	106	104	101
EXHAUST #3	128	125	122	120	117	115	112	110	108
EXHAUST #4	135	131	127	123	120	116	112	109	106
EXHAUST #5	32	31	30	30	29	29	28	27	25
EXHAUST #6	66	64	63	61	60	59	57	56	54
EXHAUST STACK	84	82	80	78	77	75	73	72	71
PRESSURE PARAMETERS									
OIL (kpa)	129.6	106.0	93.5	83.4	74.8	67.6	68.9	55.5	50.3
FUEL (kpa)	125.2	124.9	124.7	124.3	124.1	123.9	123.6	123.3	123.1

APPENDIX M
PHASE II, -20° C COLD START DATA

**** SYNFUEL PROJECT 03-8538 TEST RESULTS ****
 COLD START TEST # -20 DEGREES C

RUN NUMBER		1673	1674	1675	1676	1677	1678	1679	1680	1681
TEST CODE		3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2
DAY	(julian)	6294	6294	6294	6294	6294	6294	6294	6294	6294
TIME	(military)	162938	162941	162944	162947	162950	162953	162956	1630 0	1630 3
PHASE		3	3	3	3	3	3	3	3	3
TYPE FUEL		57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS
ENGINE PARAMETERS										
ENGINE SPEED	(rpm)	-0	-0	-0	-0	-0	-0	-0	-0	-0
TORQUE	(N-M)	-2	-2	-2	-2	-260.6	-364.2	-148.6	-173.1	-169.4
POWER	(KW)	-0	-0	-0	-0	-0	-0	-0	-0	-0
SMOKE OPACITY	(%)	1.3	1.3	1.3	1.3	1.3	1.6	87.5	98.9	99.9
TEMPERATURE PARAMETERS (deg.c)										
COOLANT IN		-19	-19	-19	-19	-19	-19	-19	-19	-19
COOLANT OUT		-20	-18	-18	-19	-19	-19	-19	-19	-18
OIL SUMP		-18	-18	-18	-18	-18	-18	-18	-17	-16
OIL GALLERY		-19	-19	-19	-19	-19	-19	-19	-19	-19
INTAKE AIR		-23	-23	-23	-23	-23	-23	-23	-22	-22
CELL AMBIENT		-22	-22	-22	-22	-22	-22	-22	-22	-22
BOOST B4 INNER COOLER		-22	-22	-22	-21	-21	-21	-21	-21	-21
BOOST AF INNER COOLER		-20	-20	-20	-20	-20	-20	-20	-20	-20
FUEL IN		-21	-21	-21	-21	-21	-21	-21	-21	-21
EXHAUST #1		-20	-20	-20	-20	-20	-20	-13	-6	1
EXHAUST #2		-20	-20	-20	-20	-20	-20	-2	20	32
EXHAUST #3		-20	-20	-20	-20	-20	-20	-4	17	32
EXHAUST #4		-20	-20	-20	-20	-20	-19	-2	20	32
EXHAUST #5		-20	-20	-20	-20	-20	-20	-15	-17	-18
EXHAUST #6		-20	-20	-20	-20	-20	-20	-3	15	25
EXHAUST STACK		-21	-21	-21	-21	-21	-21	-16	-11	-6
PRESSURE PARAMETERS										
OIL	(kpa)	3.1	3.2	2.9	3.1	3.1	3.3	2.5	3.7	5.6
FUEL	(kpa)	20.7	20.7	20.7	20.7	22.5	29.6	48.6	73.0	100.2

COLD START TEST # -20 DEGREES C

RUN NUMBER		1682	1683	1684	1685	1686	1687	1688	1689	1690
TEST CODE		3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2
DAY	(julian)	6294	6294	6294	6294	6294	6294	6294	6294	6294
TIME	(military)	1630 6	1630 9	1630 12	1630 16	1630 19	1630 22	1630 25	1630 28	1630 32
PHASE		3	3	3	3	3	3	3	3	3
TYPE FUEL		57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS	57ZEDS
ENGINE PARAMETERS										
ENGINE SPEED	(rpm)	-0	-0	-0	-0	-0	768	1461	1734	1573
TORQUE	(N-M)	-20.4	1.9	-85.1	4.7	16.4	27.4	41.6	58.1	27.9
POWER	(KW)	-0	-0	-0	-0	-0	2.2	6.4	9.1	4.6
SMOKE OPACITY	(%)	99.5	99.6	99.3	99.7	100.1	99.7	70.8	85.4	70.6
TEMPERATURE PARAMETERS (deg.c)										
COOLANT IN		-19	-19	-19	-19	-19	-20	-20	-20	-19
COOLANT OUT		-18	-18	-18	-18	-18	-18	-17	-17	-17
OIL SUMP		-15	-15	-16	-16	-16	-16	-16	-15	-14
OIL GALLERY		-18	-18	-18	-19	-19	-19	-19	-19	-19
INTAKE AIR		-22	-22	-22	-22	-22	-22	-22	-21	-21
CELL AMBIENT		-22	-22	-22	-22	-21	-21	-21	-21	-21
BOOST B4 INNER COOLER		-21	-21	-21	-21	-21	-21	-21	-21	-21
BOOST AF INNER COOLER		-20	-20	-20	-20	-20	-20	-21	-20	-19
FUEL IN		-21	-21	-21	-20	-20	-20	-20	-20	-20
EXHAUST #1		6	22	22	29	39	64	121	190	151
EXHAUST #2		46	46	52	61	70	87	122	220	236
EXHAUST #3		42	52	68	69	74	83	100	193	214
EXHAUST #4		40	50	55	65	76	89	151	193	142
EXHAUST #5		-11	7	3	18	20	46	102	180	124
EXHAUST #6		46	59	67	76	87	112	166	190	141
EXHAUST STACK		1	9	12	18	25	39	55	101	109
PRESSURE PARAMETERS										
OIL	(kpa)	7.4	9.3	11.8	14.6	17.5	20.7	24.2	27.4	30.8
FUEL	(kpa)	124.5	134.0	136.7	134.7	132.0	132.6	141.0	135.9	132.4

**** SYN FUEL PROJECT 03-8538
 COLD START TEST @ -20 DEGREES C

TEST RESULTS ****

	1691	1692	1693	1694	1695	1696	1697	1698	1699
RUN NUMBER	1691	1692	1693	1694	1695	1696	1697	1698	1699
TEST CODE	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2
DAY (julian)	6294	6294	6294	6294	6294	6294	6294	6294	6294
TIME (military)	163035	163038	163041	163044	163047	163050	163054	163057	1631 0
PHASE	3	3	3	3	3	3	3	3	3
TYPE FUEL	57XEDS	57XEDS	57XEDS	57XEDS	57XEDS	57XEDS	57XEDS	57XEDS	57XEDS

ENGINE PARAMETERS									
ENGINE SPEED (rpm)	1503	1110	1512	1628	1812	1909	1972	1758	2044
TORQUE (N-M)	38.9	24.4	39.2	35.2	45.9	35.7	41.6	33.5	48.0
POWER (KW)	6.1	2.8	6.2	6.0	8.7	7.1	9.2	6.2	10.3
SMOKE OPACITY (%)	80.9	98.4	50.5	70.5	51.4	58.8	52.9	60.3	28.6

TEMPERATURE PARAMETERS (deg.c)									
COOLANT IN	-18	-18	-18	-17	-17	-16	-15	-14	-14
COOLANT OUT	-16	-16	-15	-15	-14	-14	-13	-12	-11
OIL SUMP	-13	-12	-12	-11	-11	-11	-11	-10	-9
OIL GALLERY	-19	-19	-19	-19	-19	-18	-18	-17	-17
INTAKE AIR	-21	-21	-21	-20	-20	-20	-20	-19	-19
CELL AMBIENT	-21	-21	-21	-21	-21	-21	-20	-20	-20
BOOST BA INNER COOLER	-21	-21	-21	-20	-20	-20	-20	-20	-20
BOOST AF INNER COOLER	-18	-18	-18	-17	-16	-15	-14	-13	-11
FUEL IN	-20	-20	-20	-20	-20	-20	-20	-20	-20
EXHAUST #1	113	86	86	85	69	55	50	45	46
EXHAUST #2	257	254	269	263	285	286	292	297	307
EXHAUST #3	255	251	271	274	304	310	319	320	337
EXHAUST #4	218	158	197	238	282	302	321	326	348
EXHAUST #5	85	58	41	29	23	19	19	17	19
EXHAUST #6	211	140	191	182	256	219	256	180	254
EXHAUST STACK	117	107	118	122	141	146	155	153	166

PRESSURE PARAMETERS									
OIL (kpa)	34.0	37.3	48.7	44.5	48.4	52.0	57.6	62.5	67.7
FUEL (kpa)	132.9	131.8	131.6	132.3	134.3	133.9	133.5	132.4	133.8

COLD START TEST @ -20 DEGREES C

	1700	1701	1702	1703	1704	1705	1706	1707	1708
RUN NUMBER	1700	1701	1702	1703	1704	1705	1706	1707	1708
TEST CODE	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2	3611 2
DAY (julian)	6294	6294	6294	6294	6294	6294	6294	6294	6294
TIME (military)	1631 3	1631 6	1631 9	163113	163116	163119	163122	163125	163128
PHASE	3	3	3	3	3	3	3	3	3
TYPE FUEL	57XEDS	57XEDS	57XEDS	57XEDS	57XEDS	57XEDS	57XEDS	57XEDS	57XEDS

ENGINE PARAMETERS									
ENGINE SPEED (rpm)	1979	1378	749	750	758	760	746	750	742
TORQUE (N-M)	43.4	27.6	11.9	21.4	23.3	23.9	23.8	23.9	23.5
POWER (KW)	9.0	4.8	1.9	3.7	1.8	1.9	1.9	1.9	1.8
SMOKE OPACITY (%)	36.5	18.5	14.6	59.6	64.6	65.0	66.6	67.2	68.5

TEMPERATURE PARAMETERS (deg.c)									
COOLANT IN	-13	-12	-12	-11	-11	-11	-11	-11	-10
COOLANT OUT	-11	-10	-9	-9	-8	-8	-8	-7	-7
OIL SUMP	-9	-8	-7	-8	-8	-8	-8	-8	-8
OIL GALLERY	-16	-15	-14	-13	-13	-13	-12	-12	-11
INTAKE AIR	-19	-18	-18	-18	-18	-18	-18	-18	-18
CELL AMBIENT	-20	-20	-19	-19	-19	-19	-19	-19	-18
BOOST BA INNER COOLER	-20	-19	-19	-19	-19	-19	-19	-19	-18
BOOST AF INNER COOLER	-18	-9	-18	-18	-18	-18	-11	-11	-11
FUEL IN	-20	-20	-20	-20	-20	-20	-20	-19	-19
EXHAUST #1	46	41	31	28	25	23	22	21	20
EXHAUST #2	302	270	201	187	182	170	176	175	174
EXHAUST #3	331	296	224	287	282	199	197	196	196
EXHAUST #4	342	349	239	221	213	207	202	200	198
EXHAUST #5	21	19	12	9	6	3	2	8	-1
EXHAUST #6	273	280	153	155	163	169	175	180	183
EXHAUST STACK	167	151	123	115	111	108	106	105	105

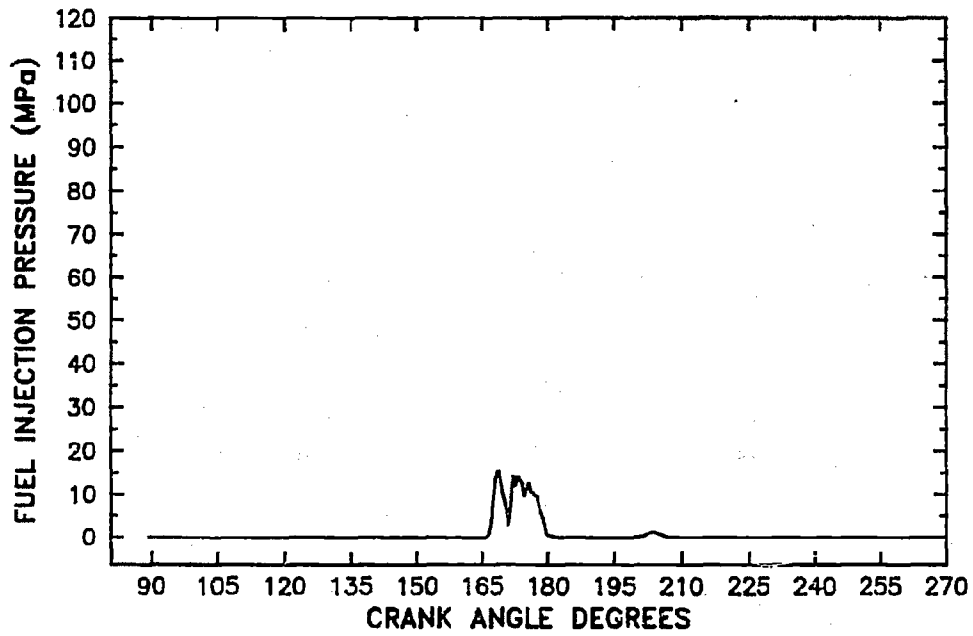
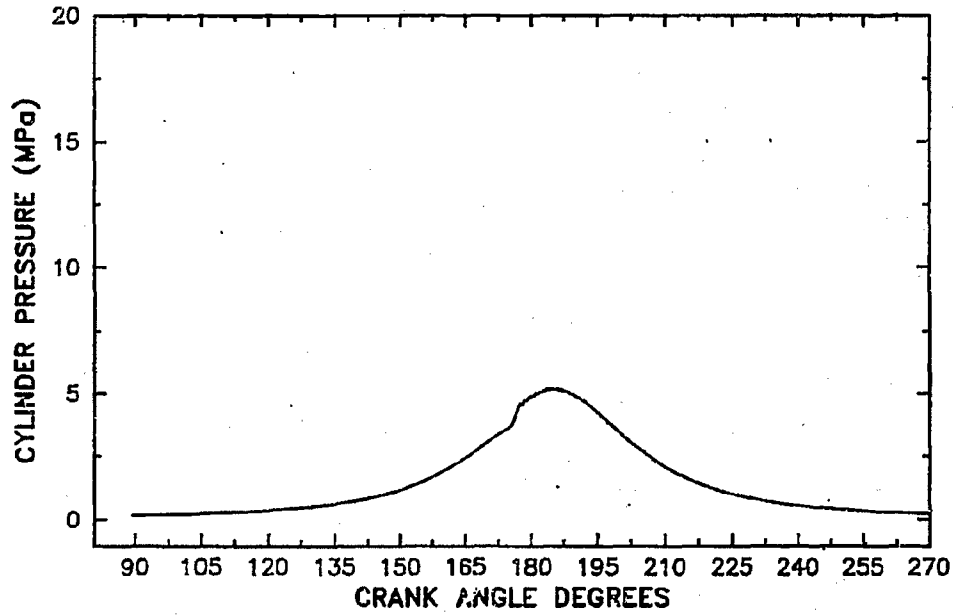
PRESSURE PARAMETERS									
OIL (kpa)	73.2	78.9	84.1	89.0	94.3	100.0	105.8	111.9	118.3
FUEL (kpa)	134.5	146.4	154.9	158.8	155.1	152.2	151.8	151.8	150.0

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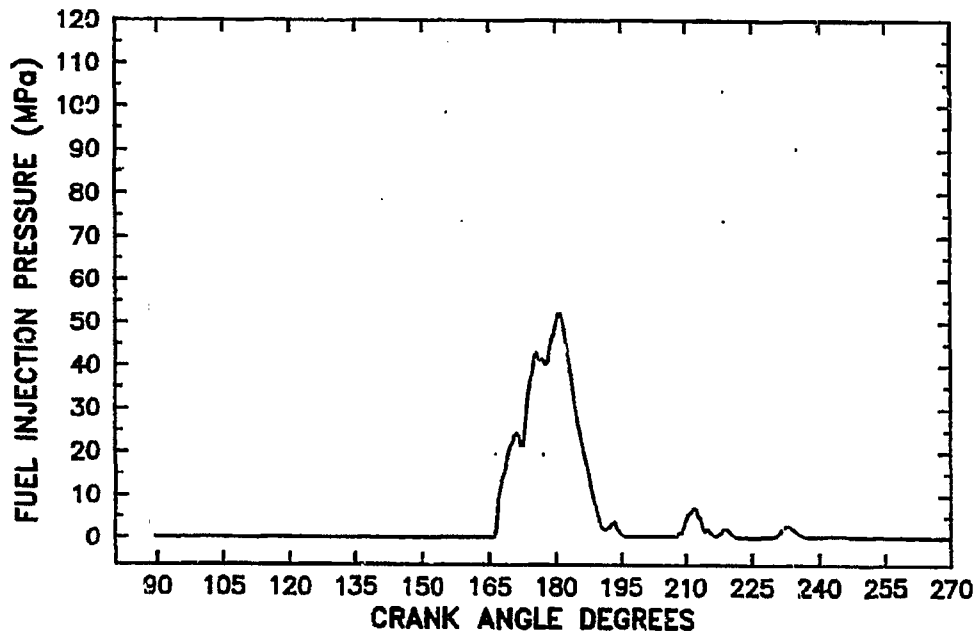
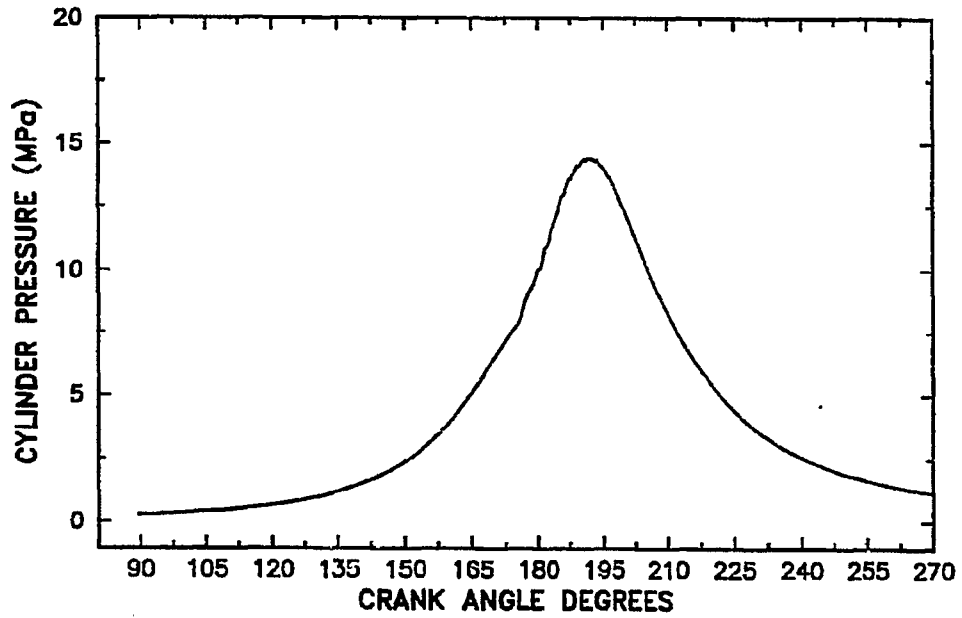
APPENDIX N
PHASE I CYLINDER PRESSURE
AND FUEL INJECTION PRESSURE DIAGRAMS

Note: The 0 percent load (shown on the figures) actually corresponds to 7 percent load. The 7 percent load was the minimum required to ensure stable dynamometer operation.

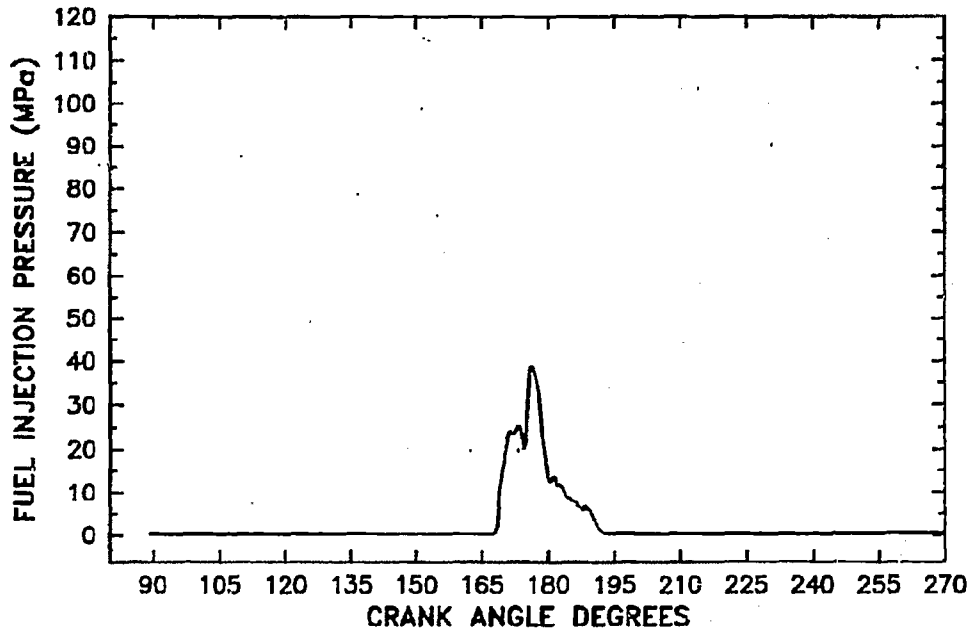
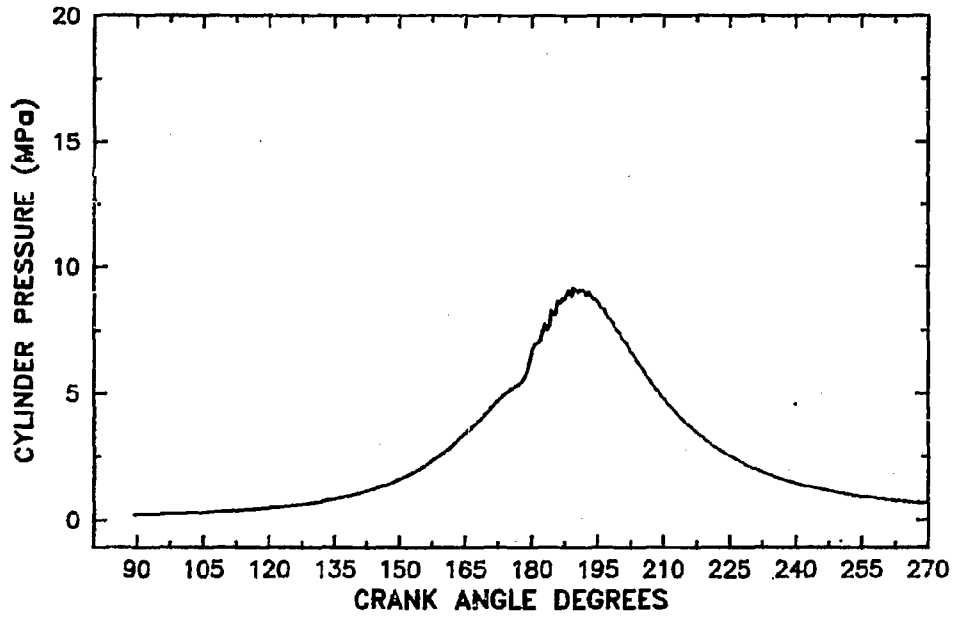
SPEED 834 LOAD %000 FUEL CONDF2 TEST CODE 1112



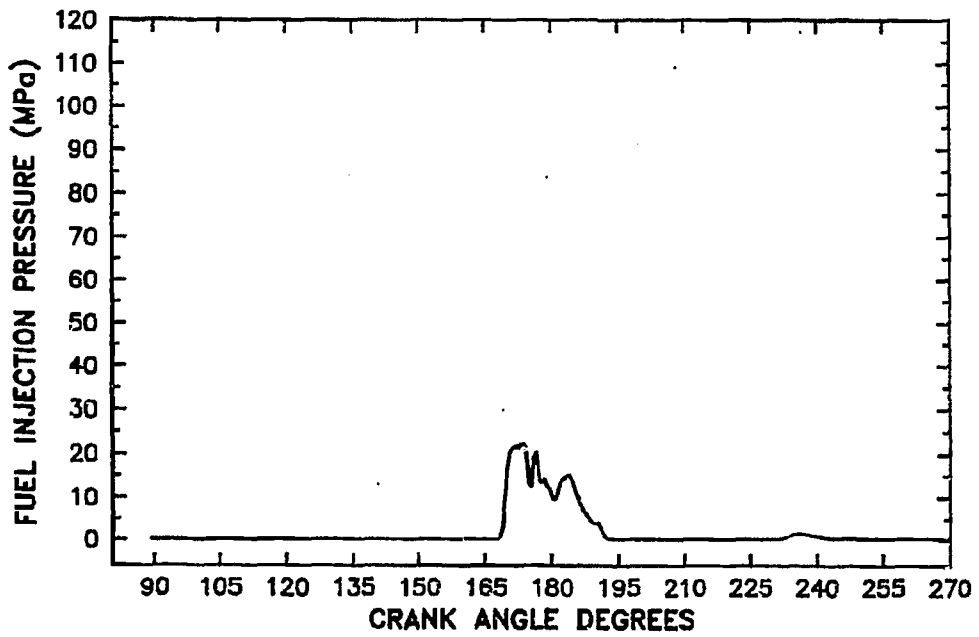
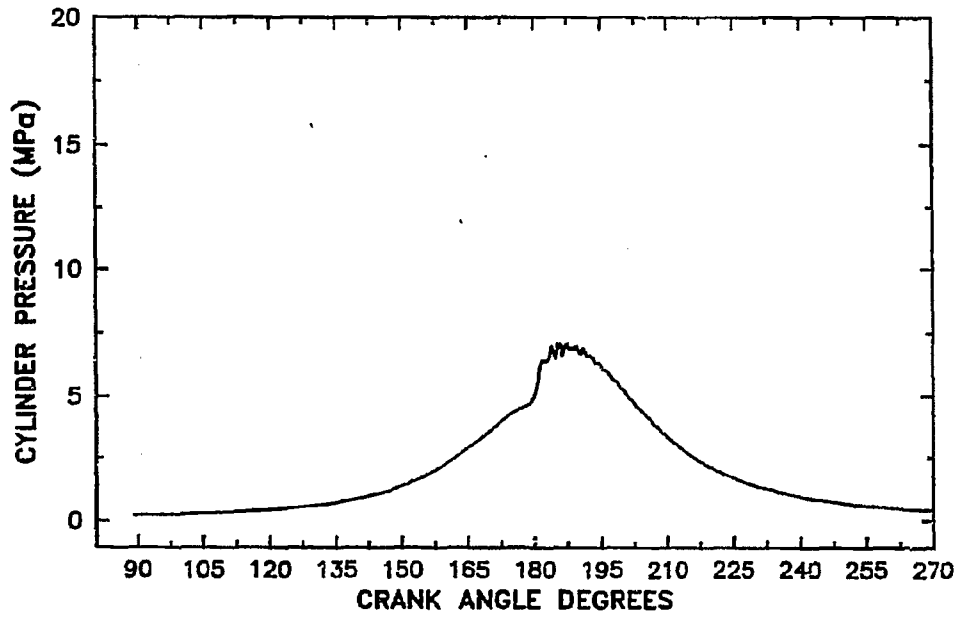
SPEED 1400 LOAD %100 FUEL CONDF2 TEST CODE 1122



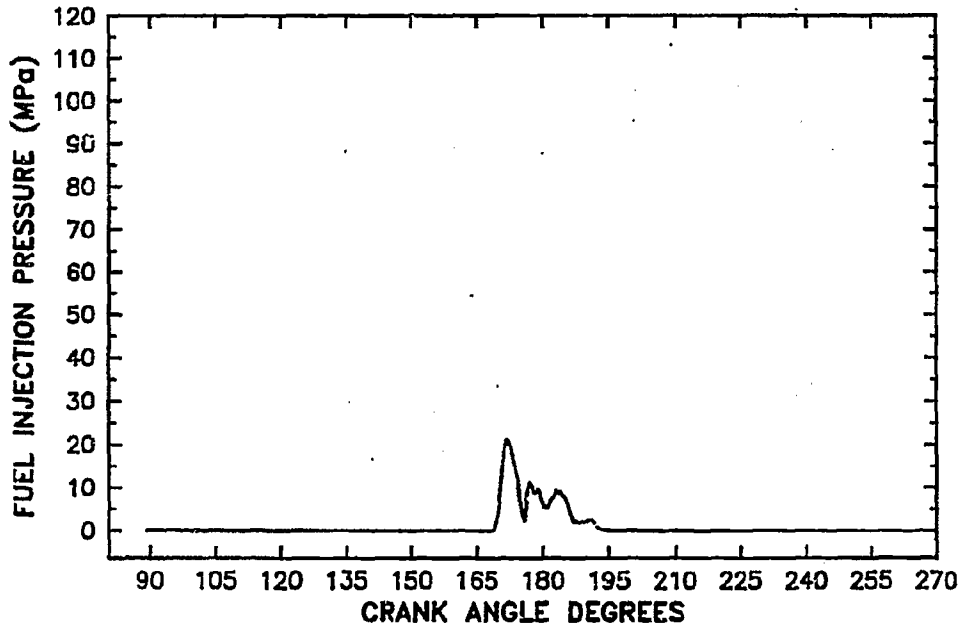
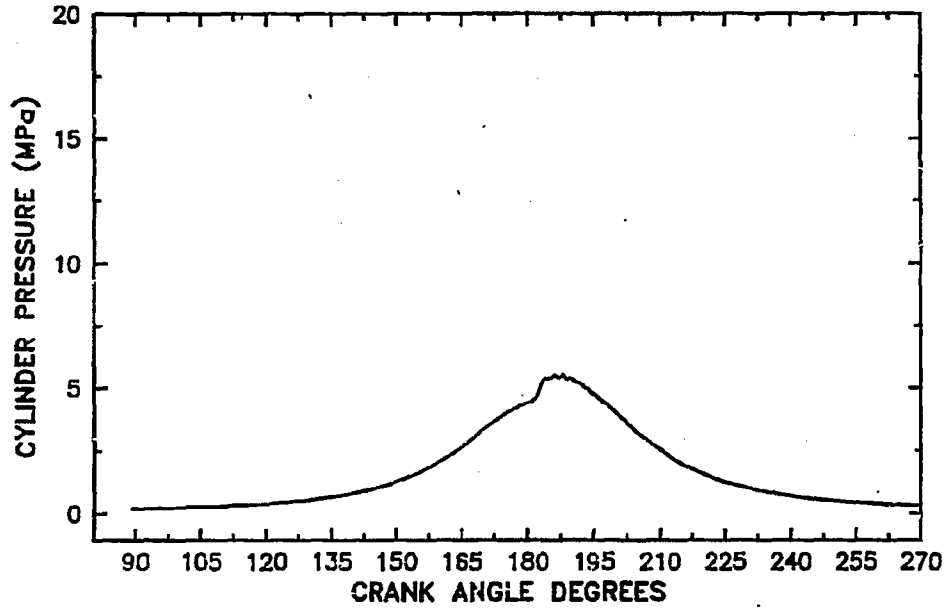
SPEED 1400 LOAD %050 FUEL CONDF2 TEST CODE 1132



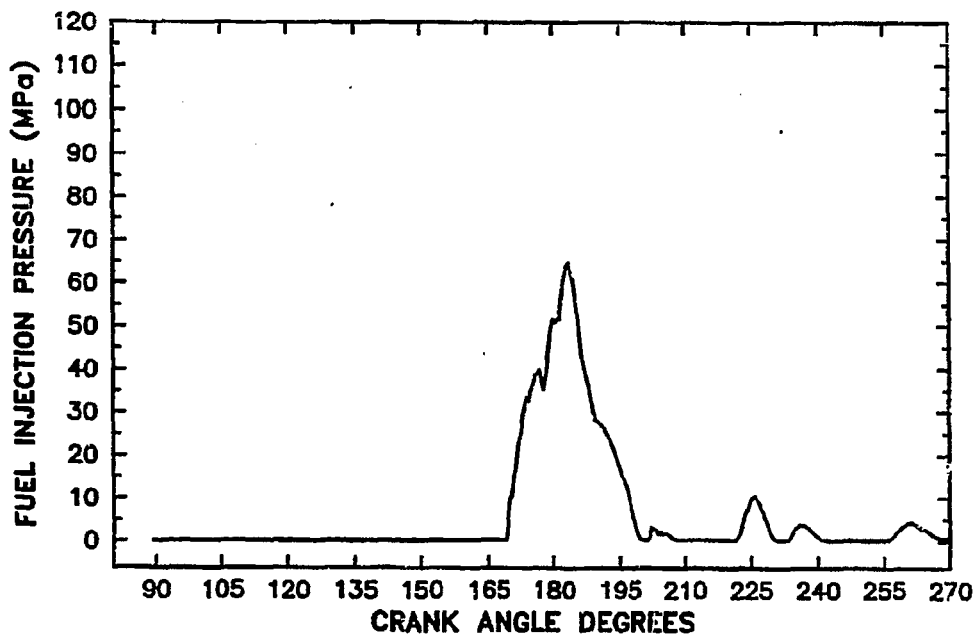
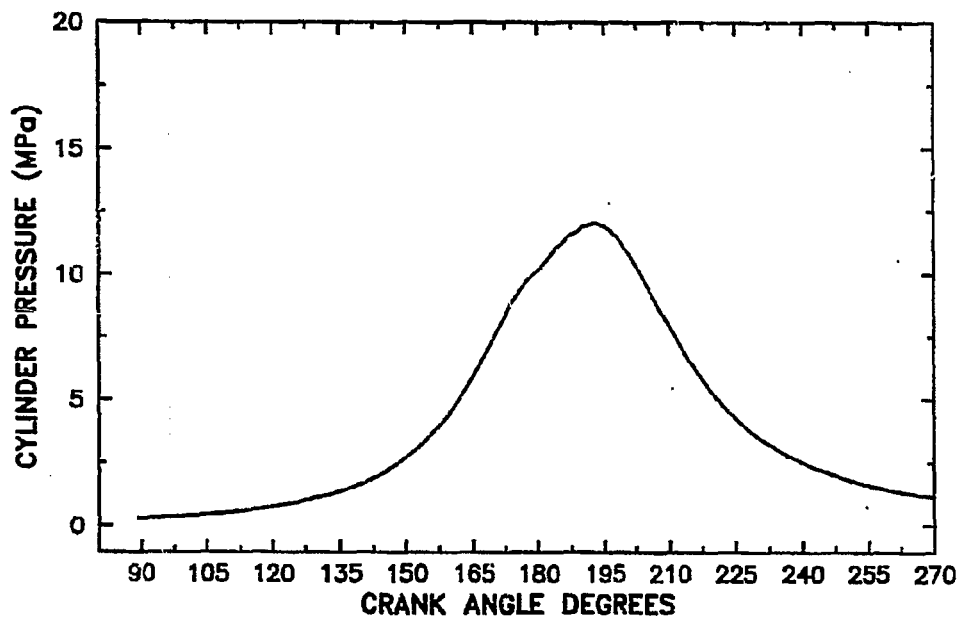
SPEED 1400 LOAD %025 FUEL CONDF2 TEST CODE 1142



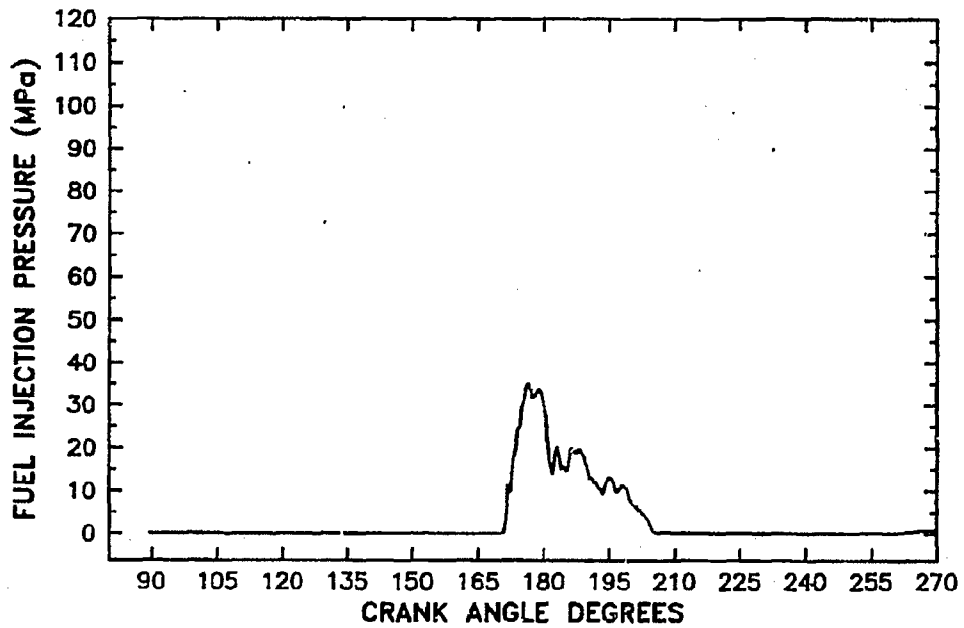
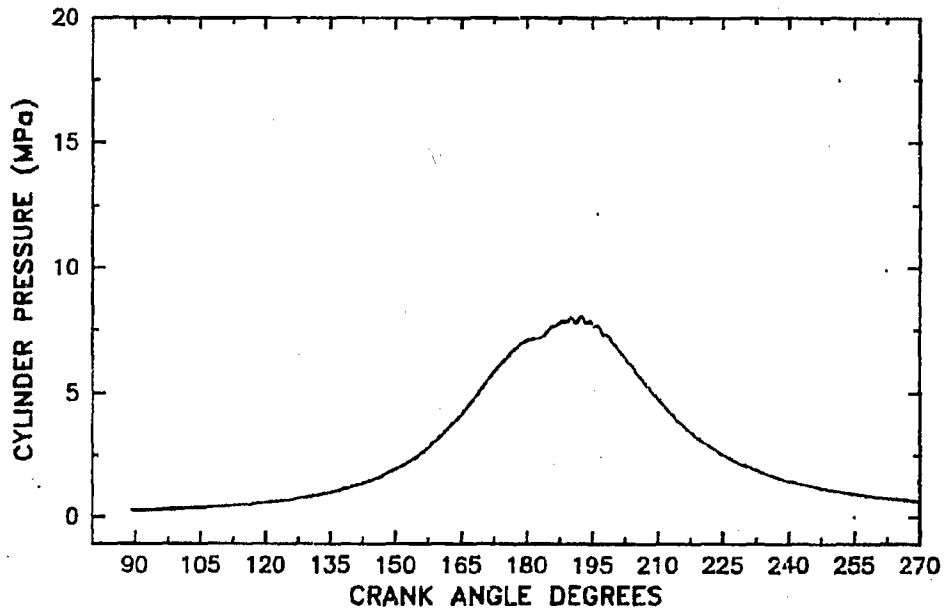
SPEED 1400 LOAD %000 FUEL CONDF2 TEST CODE 1151



SPEED 2200 LOAD %100 FUEL CONDF2 TEST CODE 1162



SPEED 2200 LOAD %050 FUEL CONDF2 TEST CODE 1172

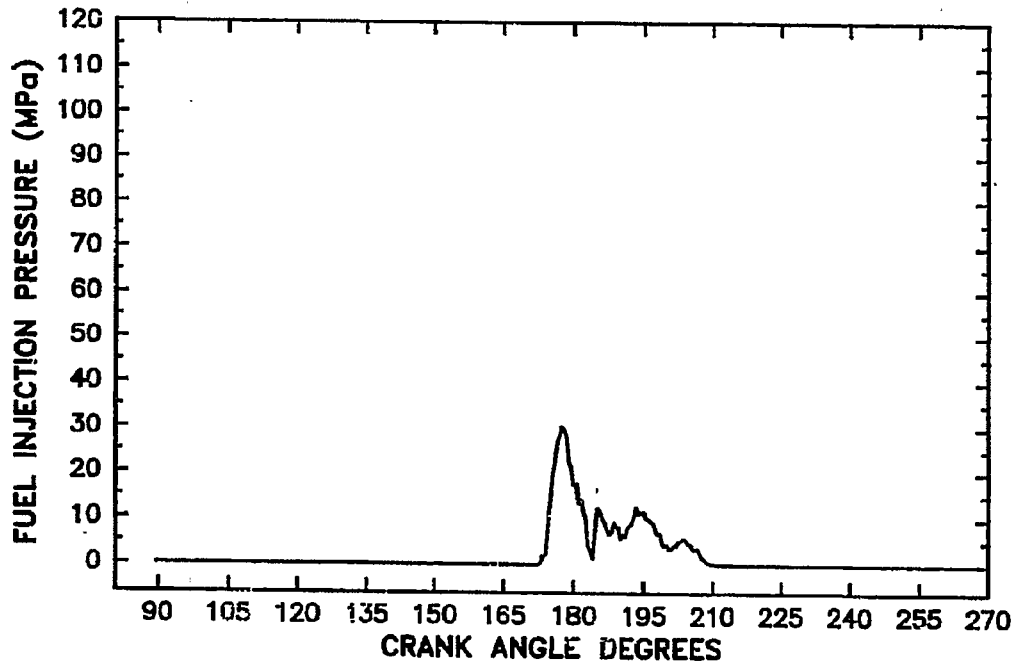
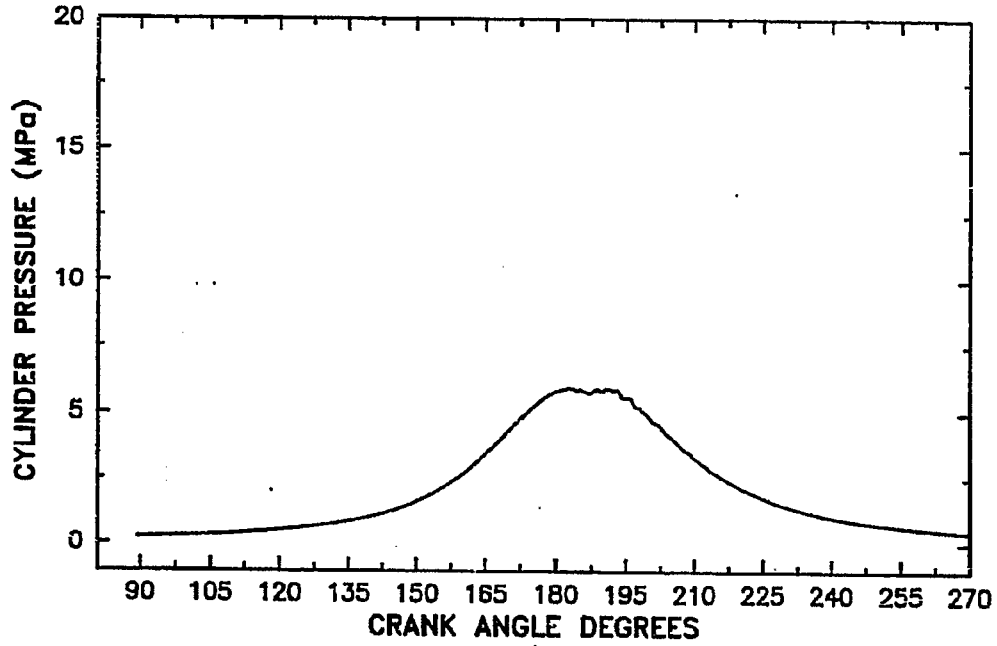


SPEED 2200

LOAD %025

FUEL CONDF2

TEST CODE 1182

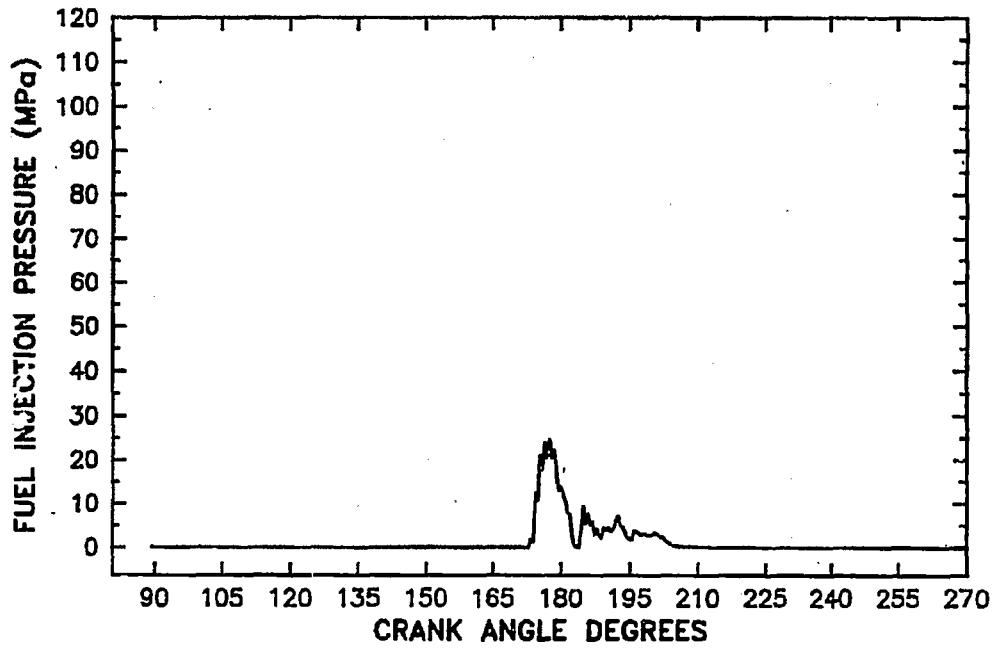
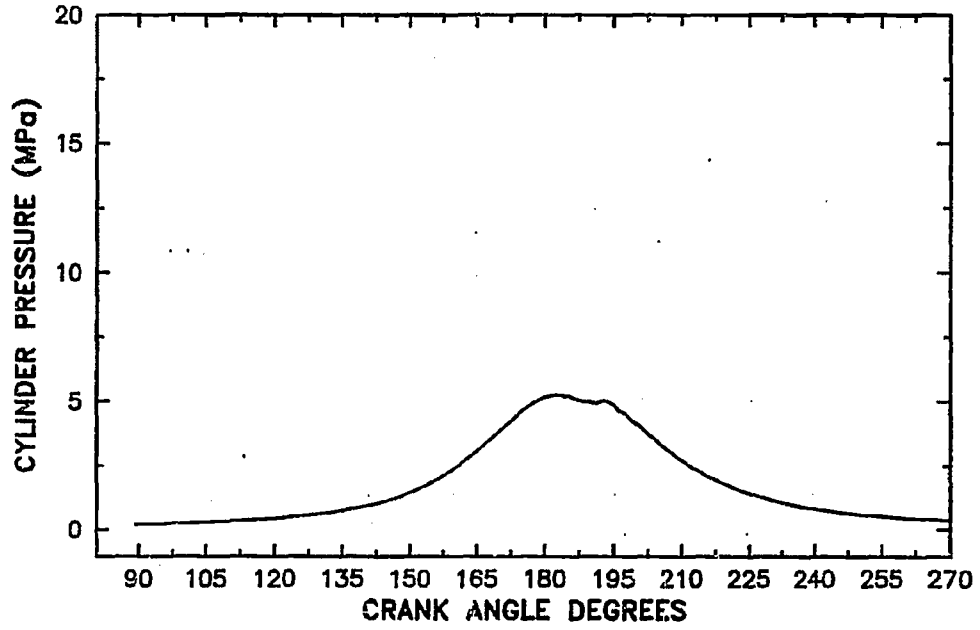


SPEED 2200

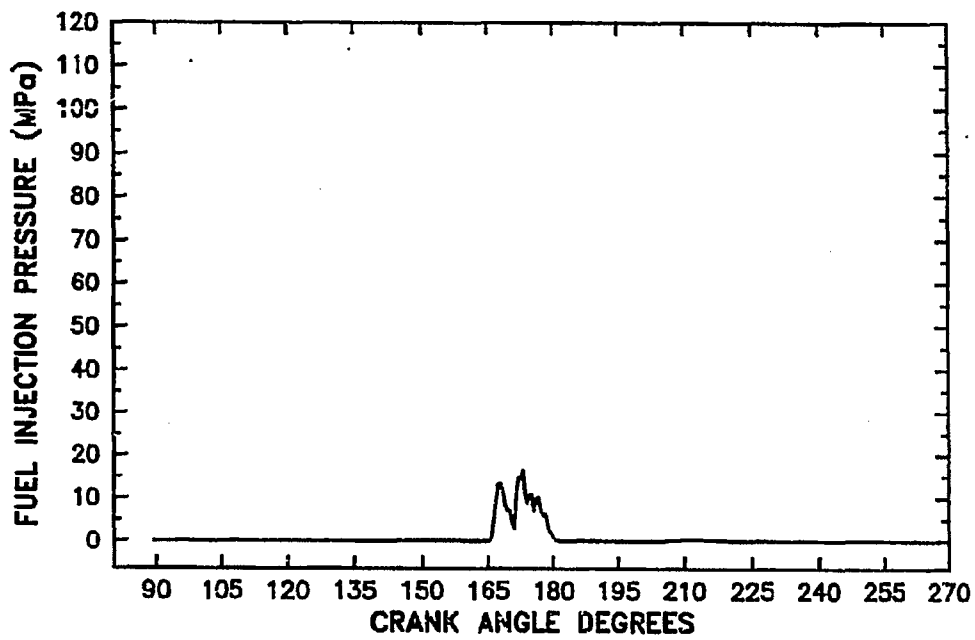
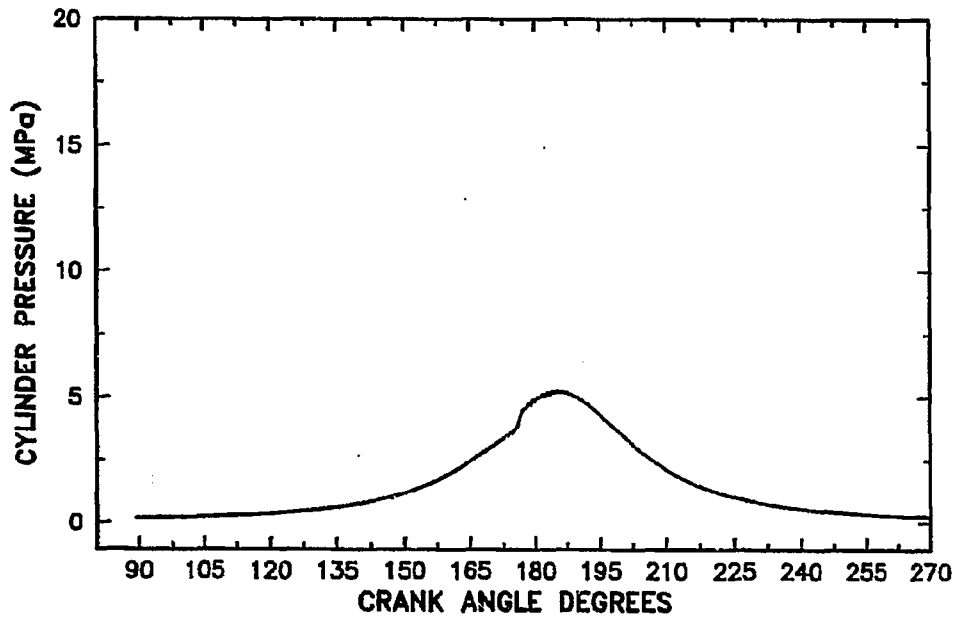
LOAD %000

FUEL COND F2

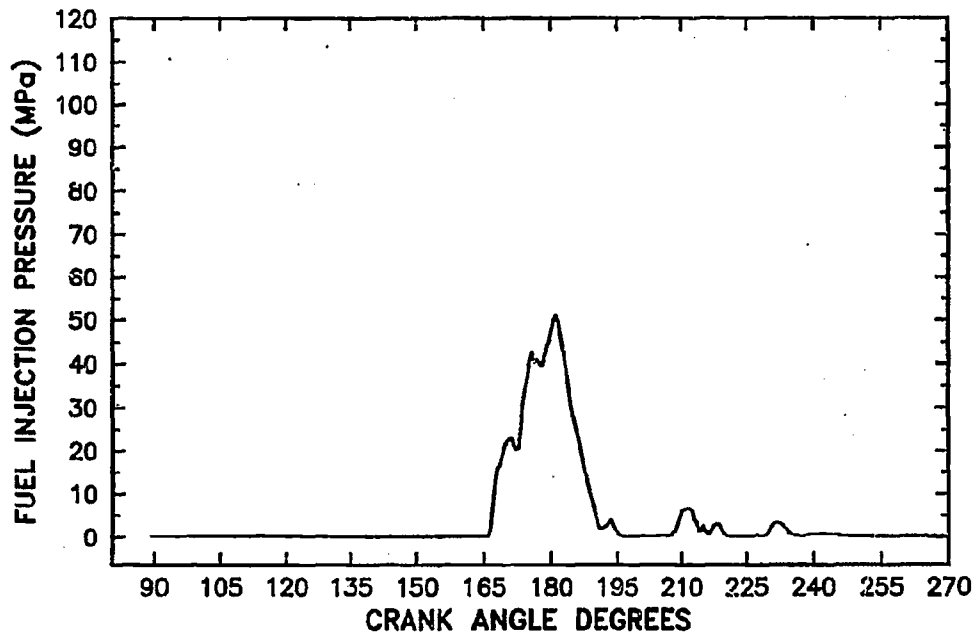
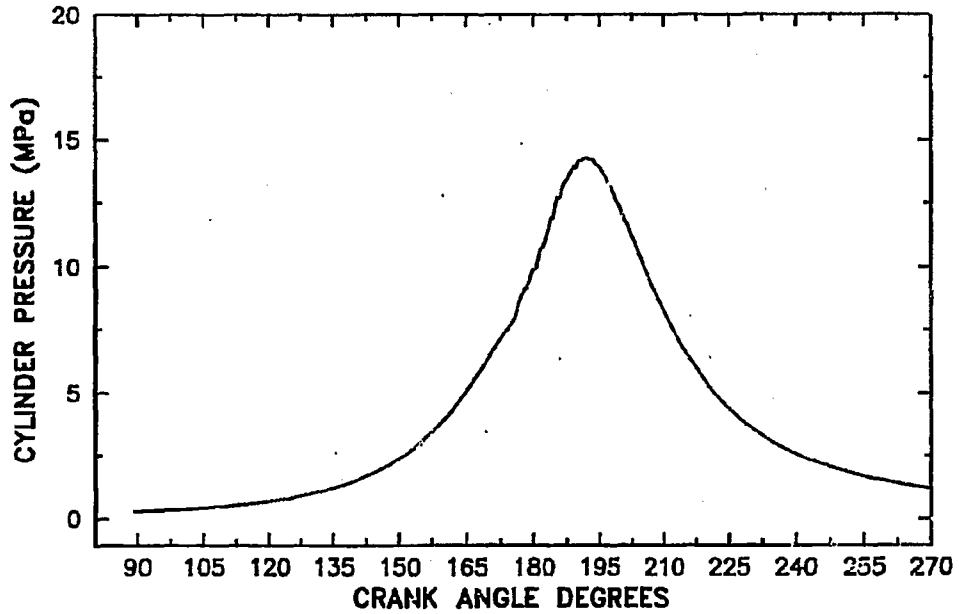
TEST CODE 1191



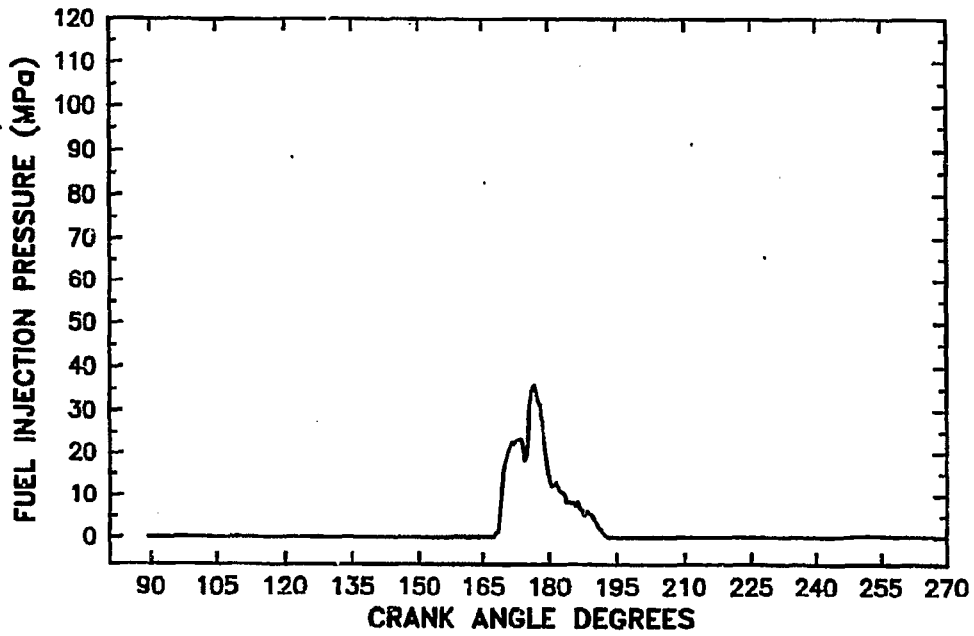
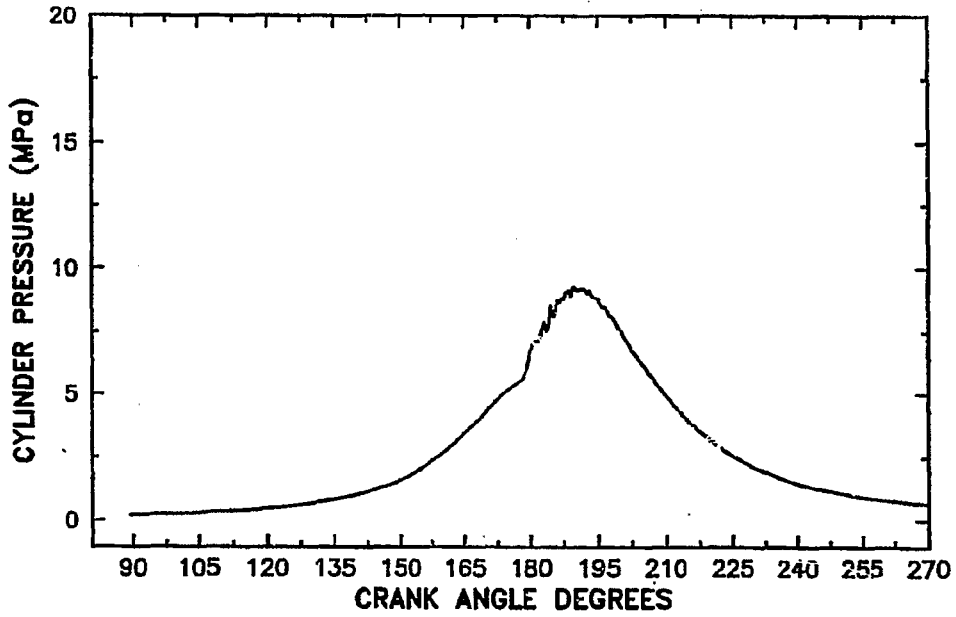
SPEED 825 LOAD %000 FUEL SHALE TEST CODE 1211



SPEED 1400 LOAD %100 FUEL SHALE TEST CODE 1221



SPEED 1400 LOAD %050 FUEL SHALE TEST CODE 1231

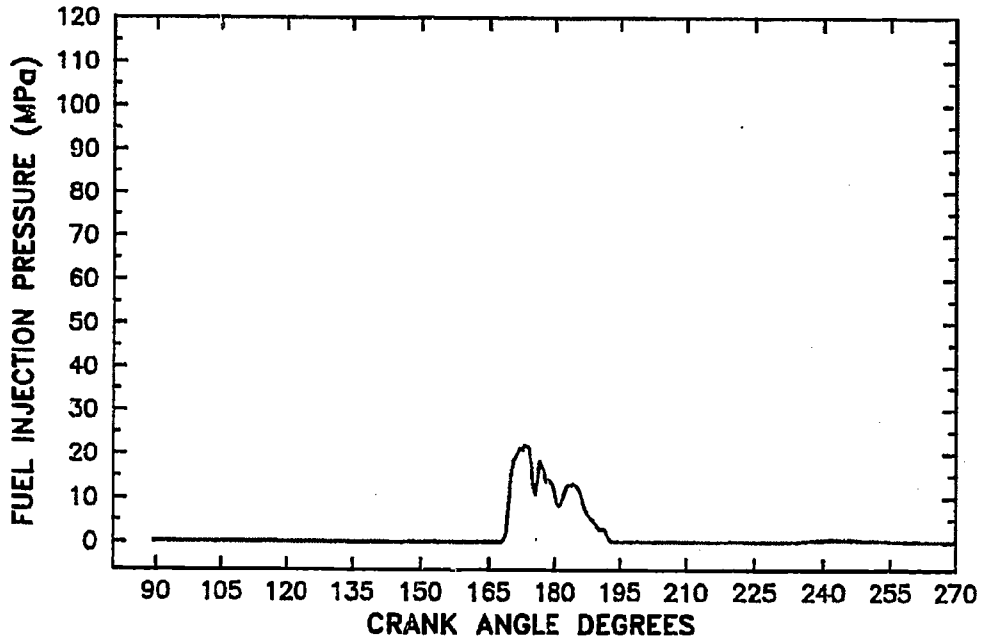
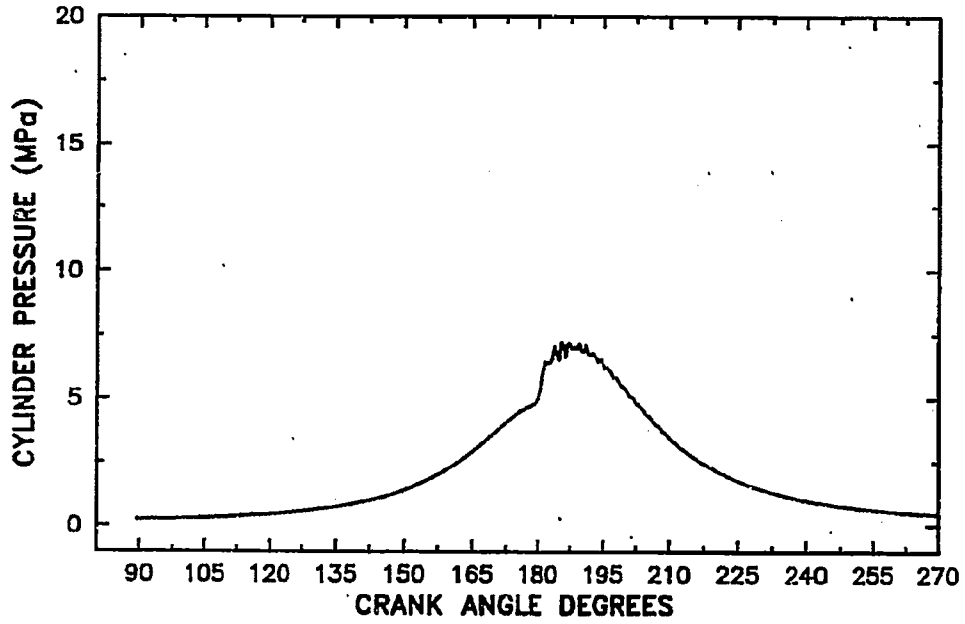


SPEED 1400

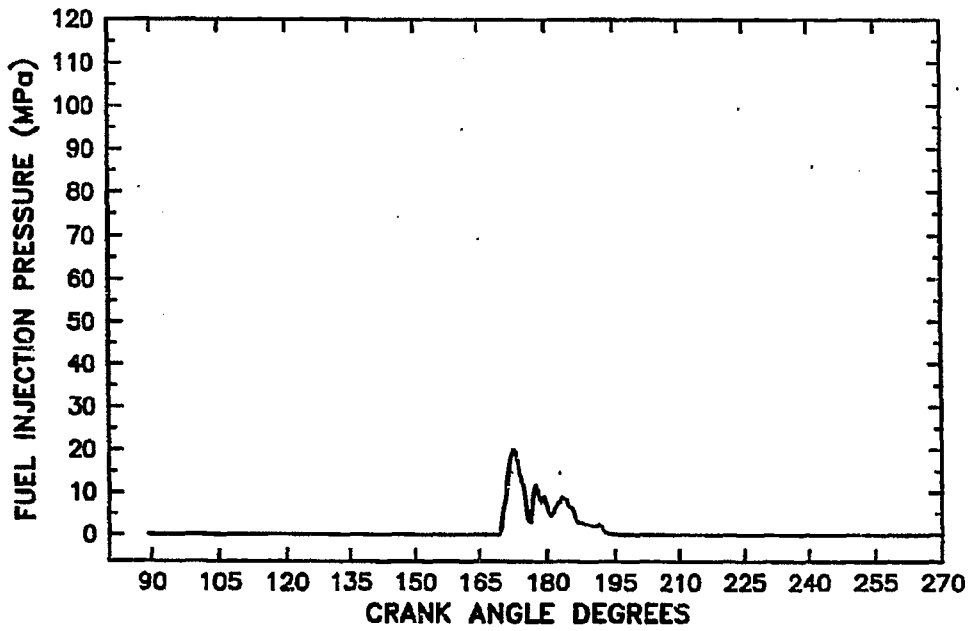
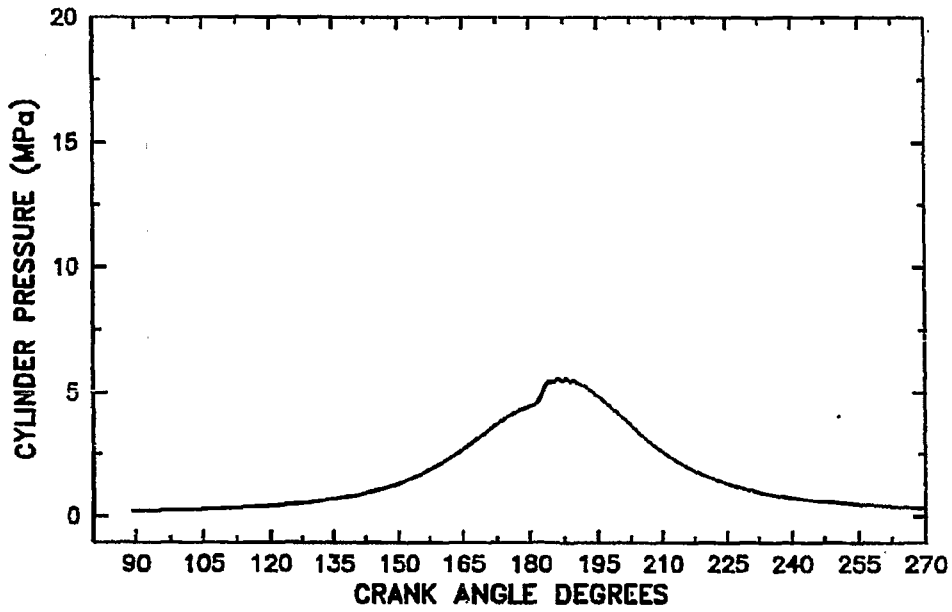
LOAD %025

FUEL SHALE

TEST CODE 1241



SPEED 1400 LOAD 2000 FUEL SHALE TEST CODE 1251

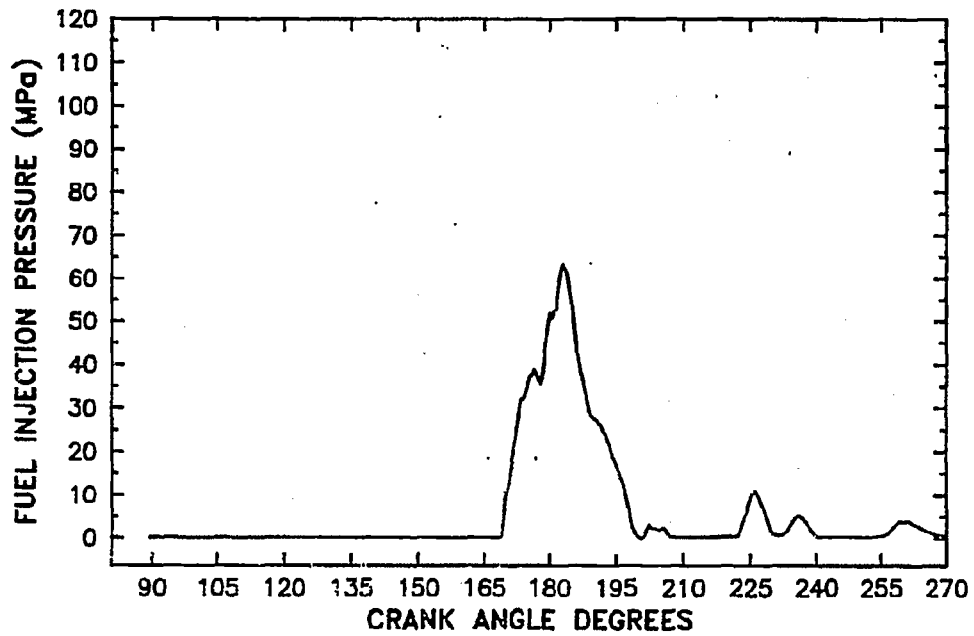
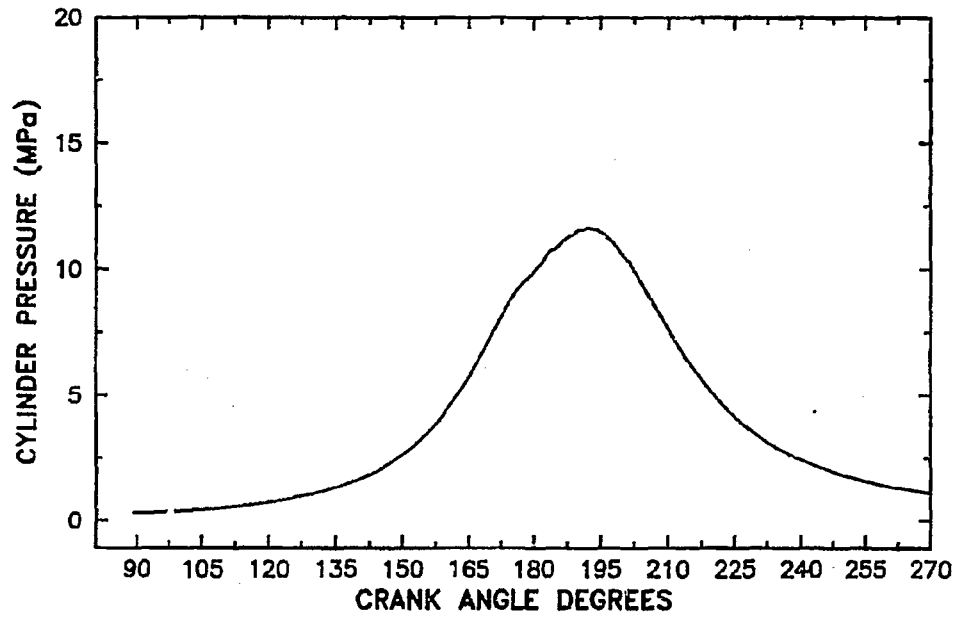


SPEED 2200

LOAD %100

FUEL SHALE

TEST CODE 1261

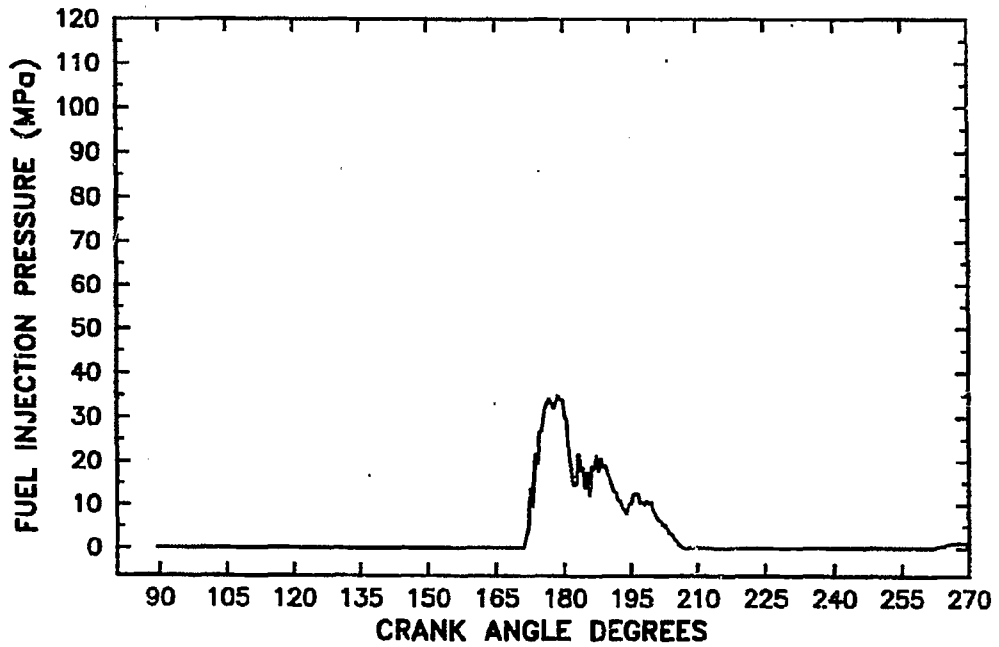
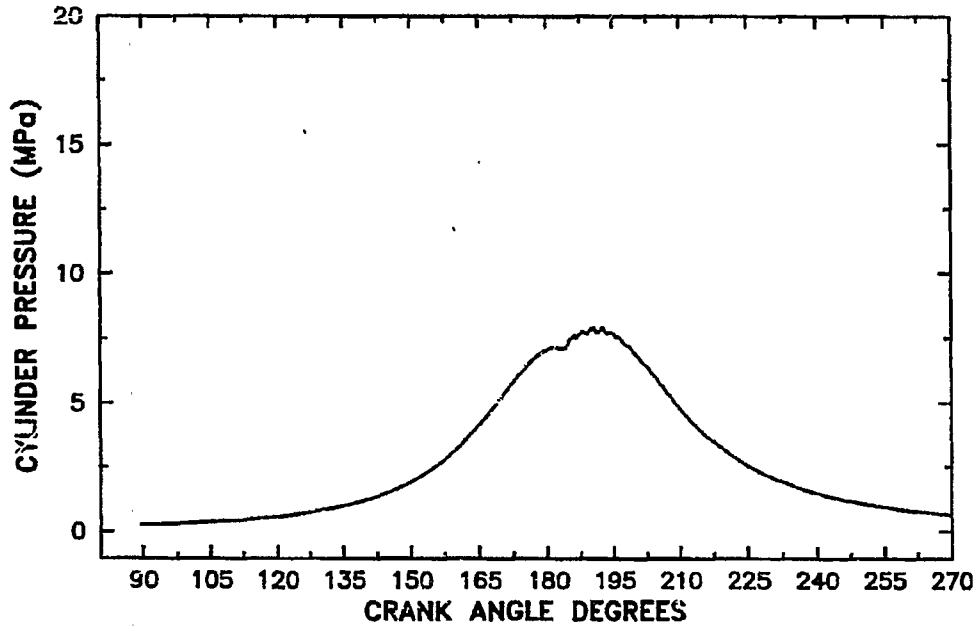


SPEED 2200

LOAD %050

FUEL SHALE

TEST CODE 1271

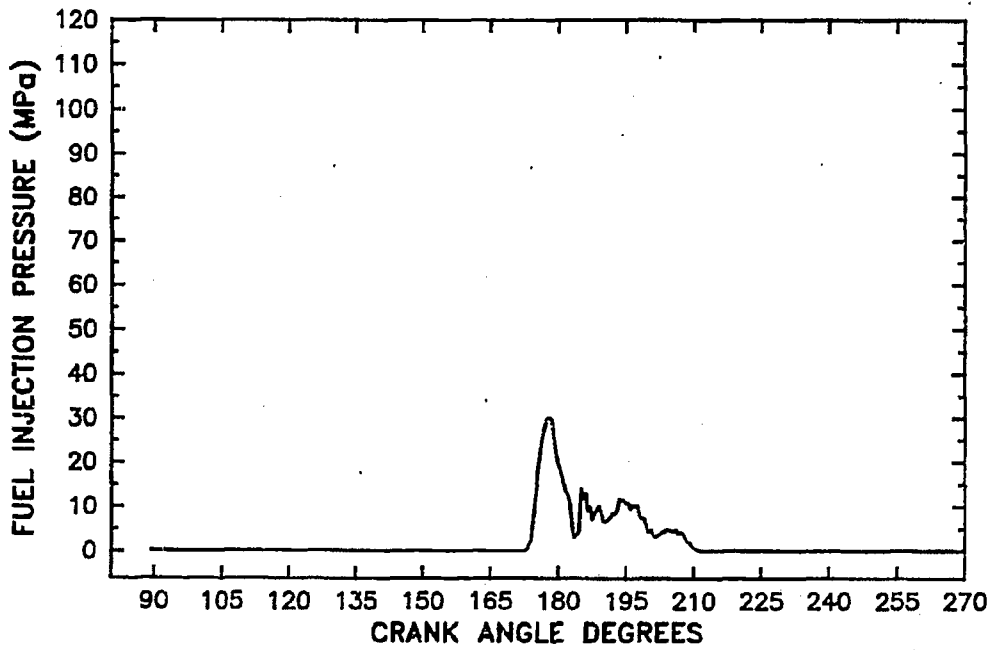
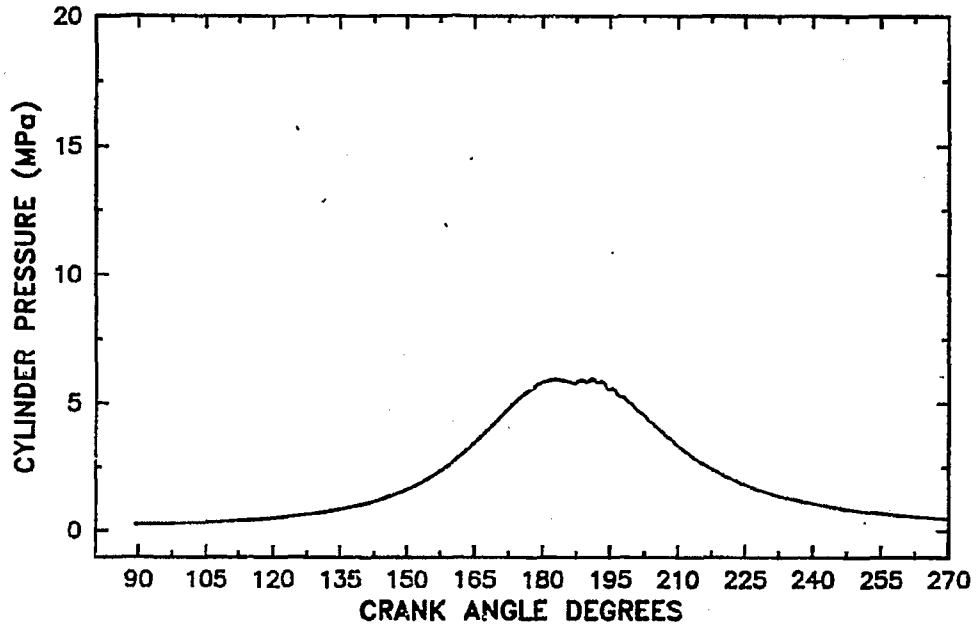


SPEED 2200

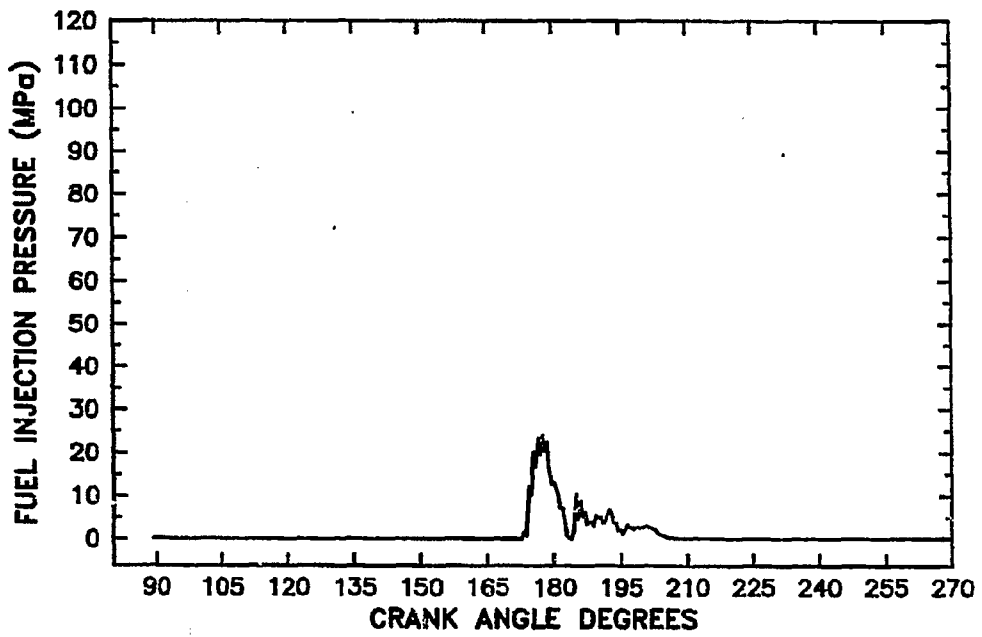
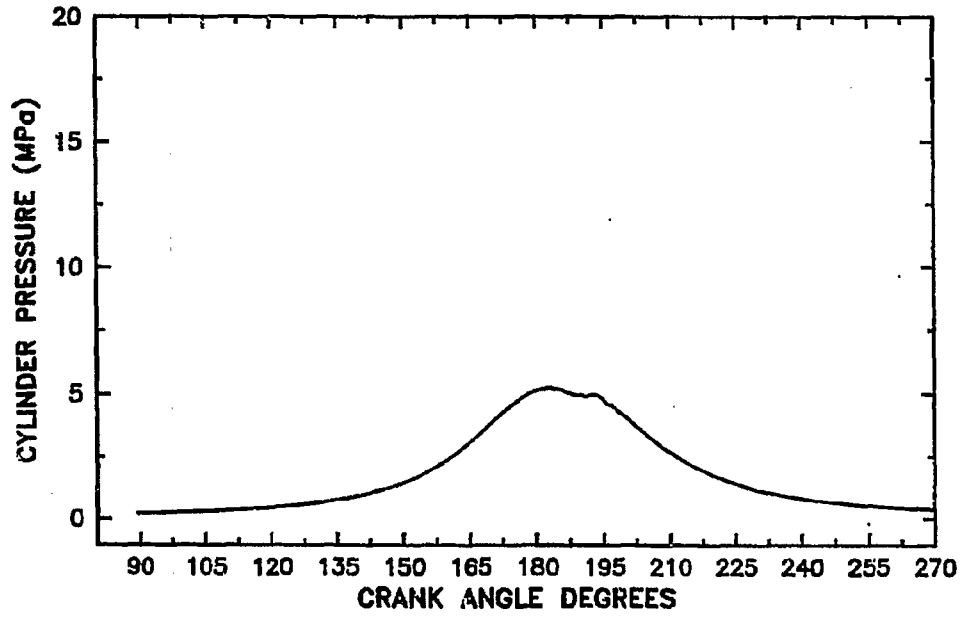
LOAD %25

FUEL SHALE

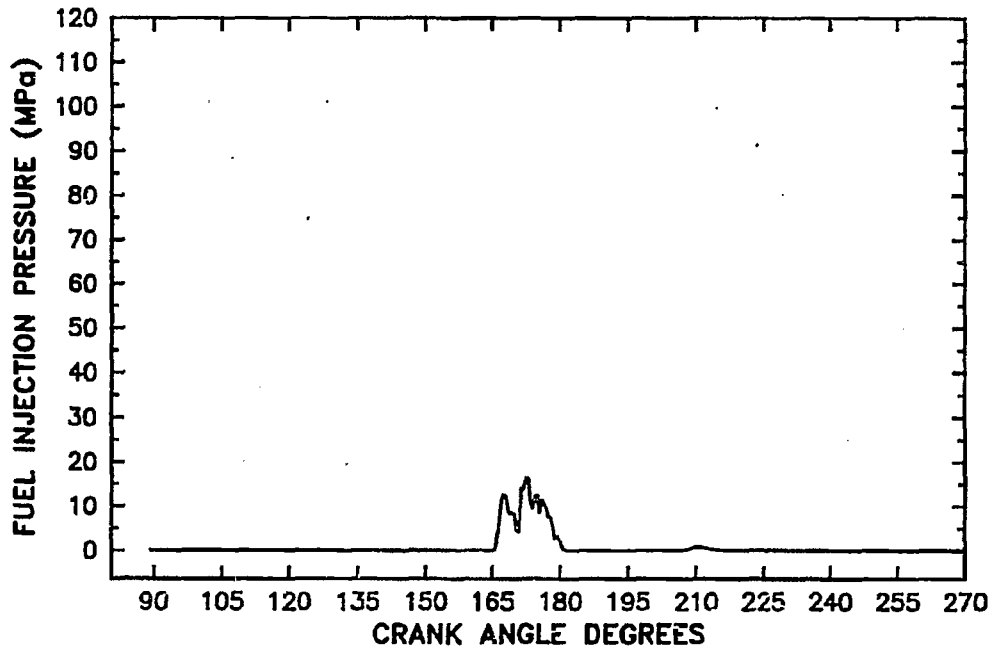
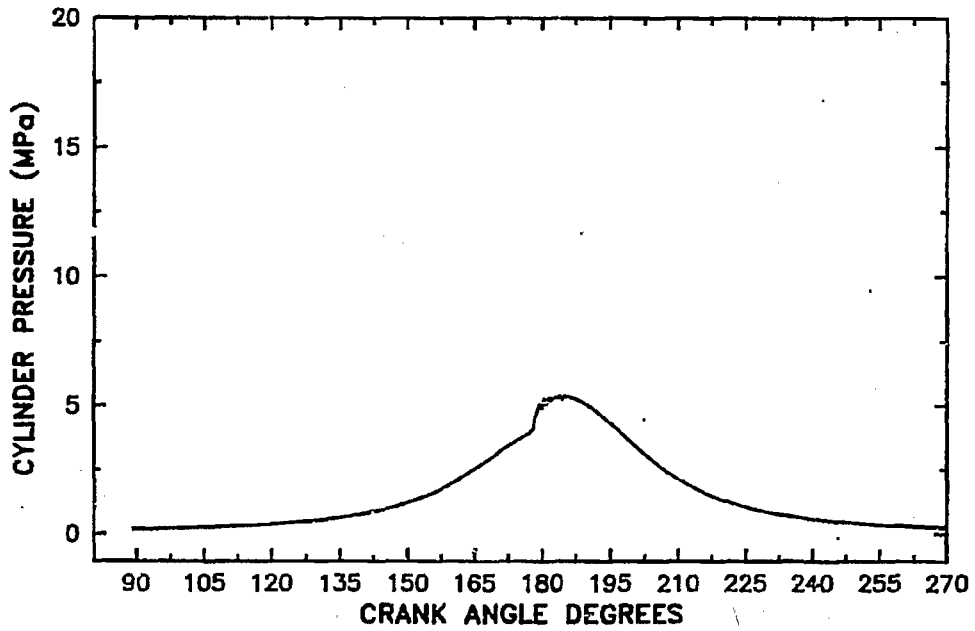
TEST CODE 1281



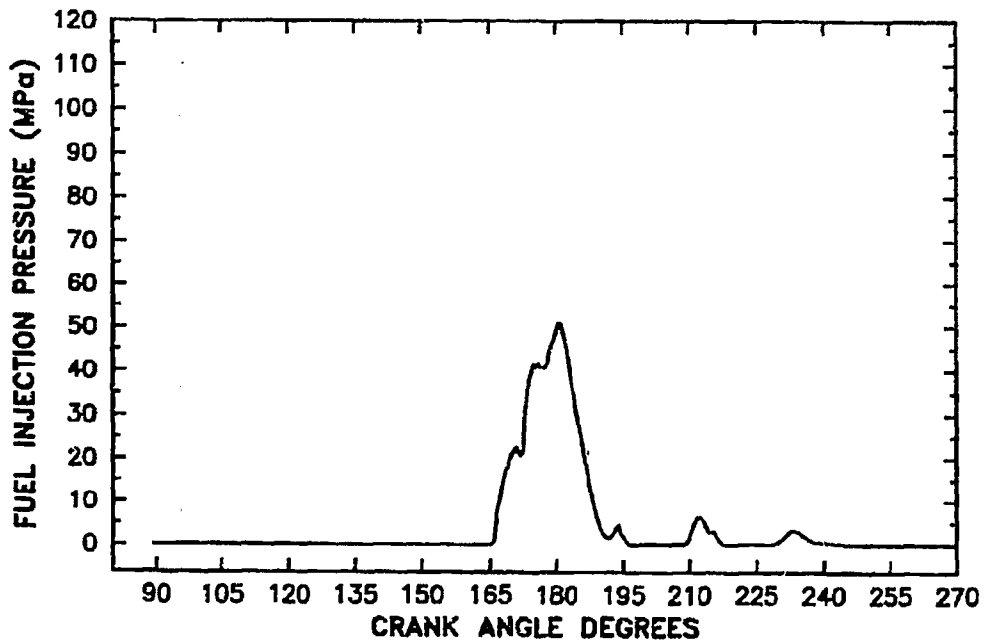
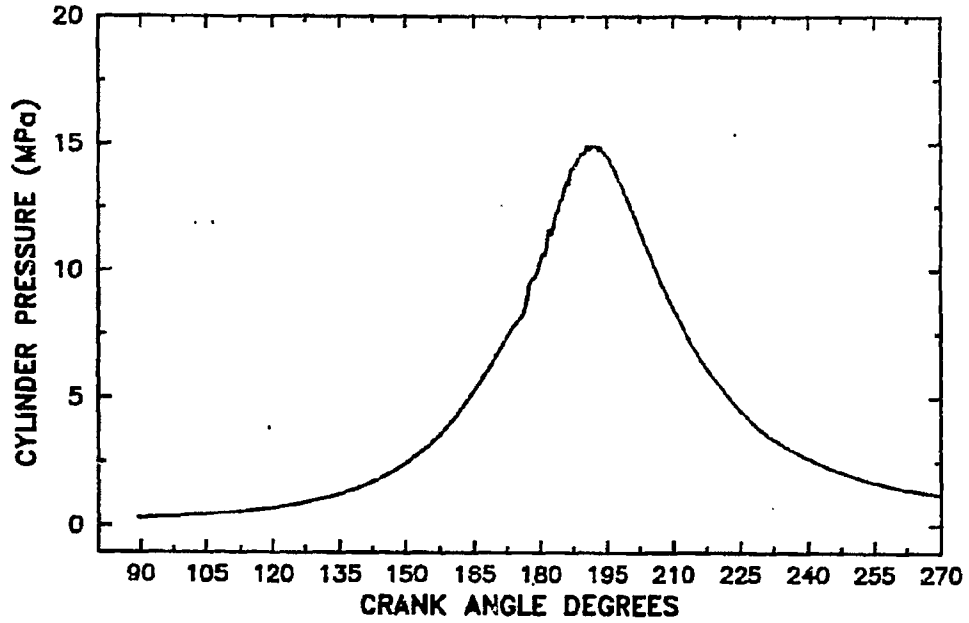
SPEED 2200 LOAD %000 FUEL SHALE TEST CODE 1291



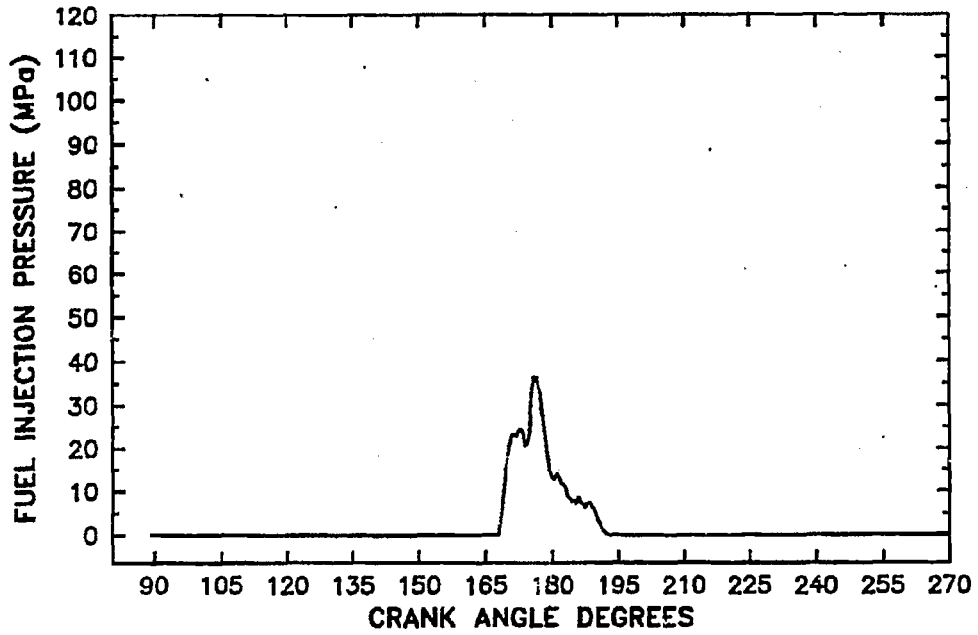
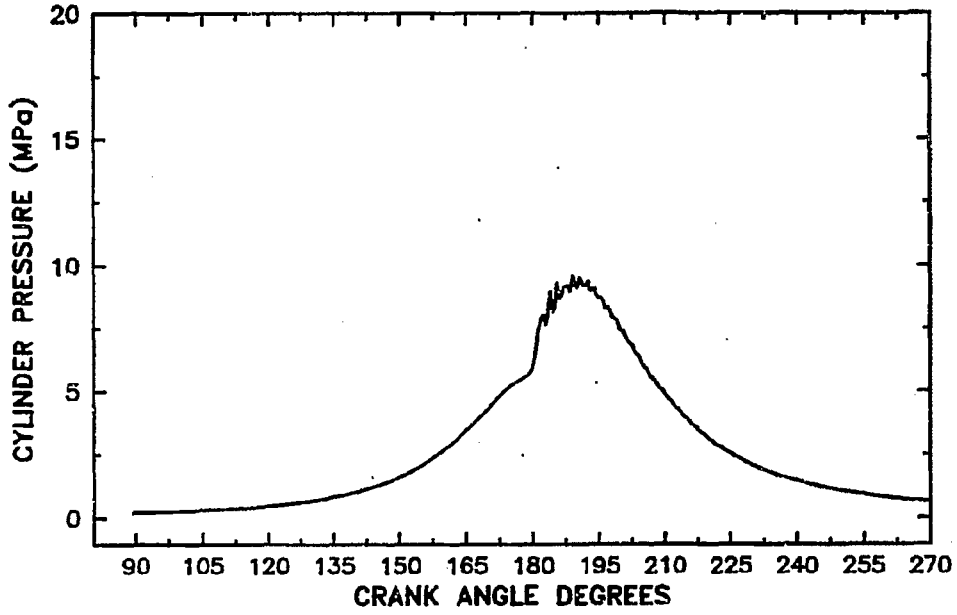
SPEED 833 LOAD %000 FUEL TARSAND TEST CODE 1311



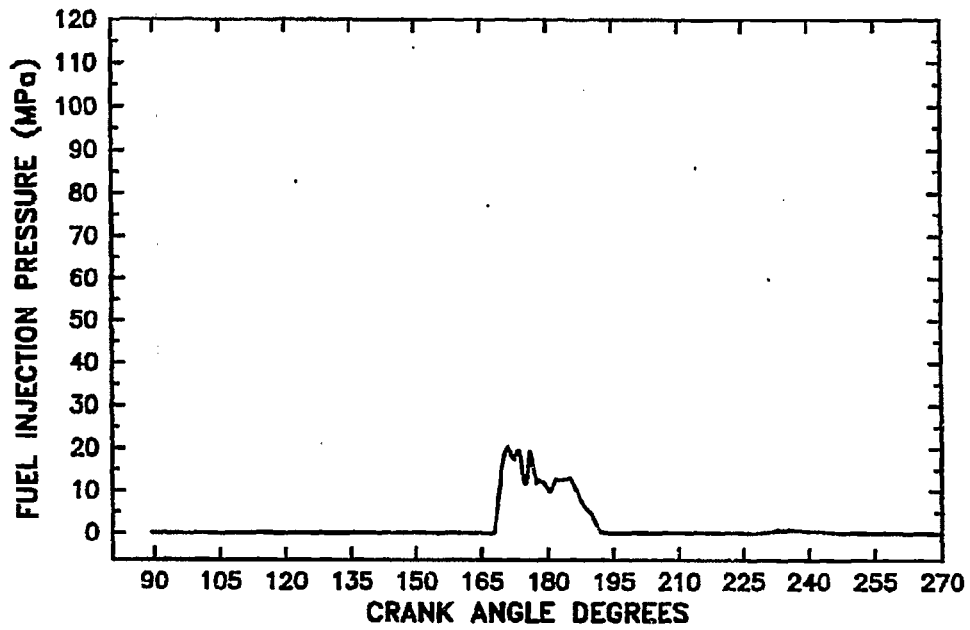
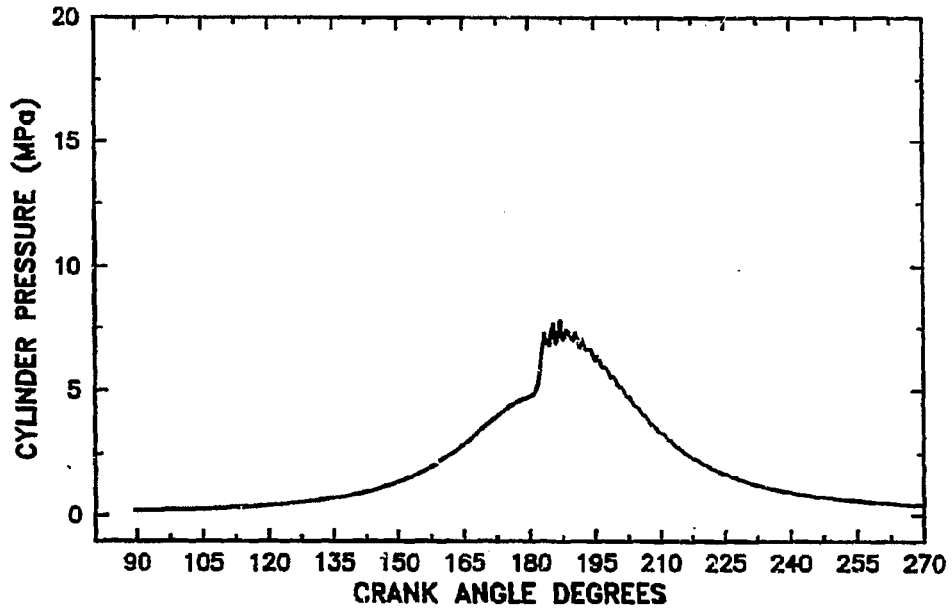
SPEED 1400 LOAD %100 FUEL TARSAND TEST CODE 1321



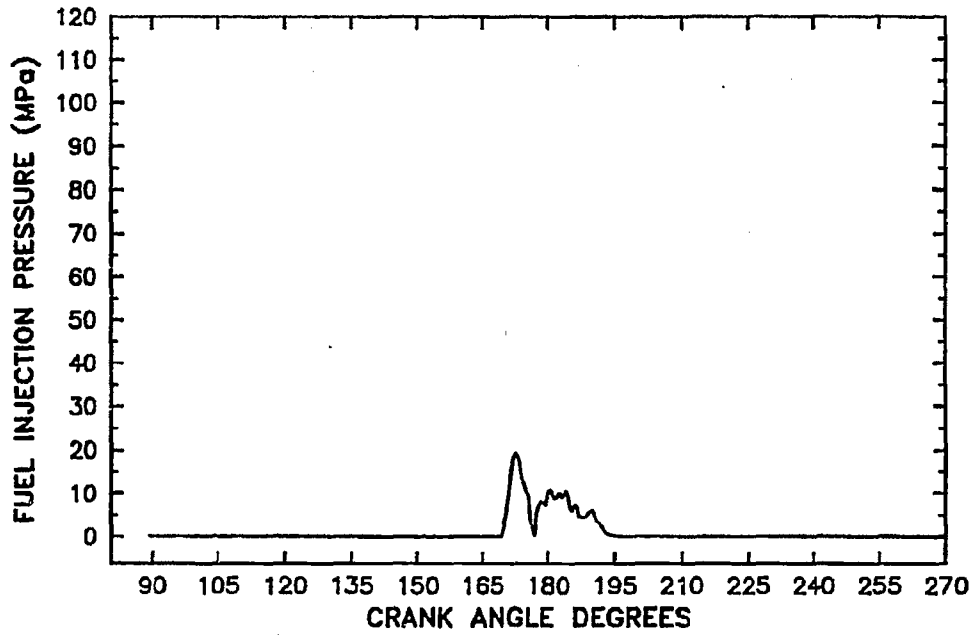
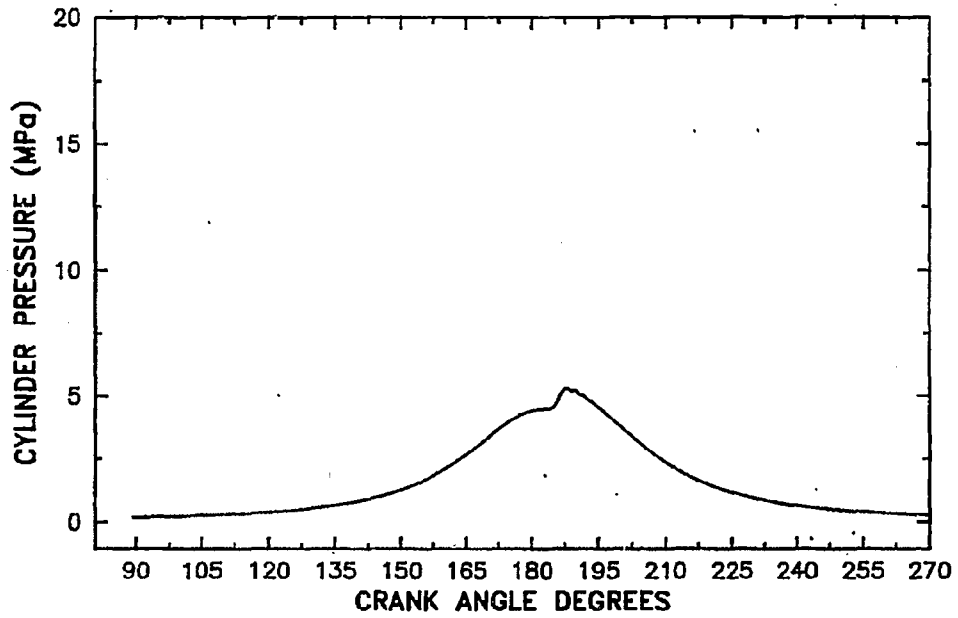
SPEED 1400 LOAD %050 FUEL TARSAND TEST CODE 1331



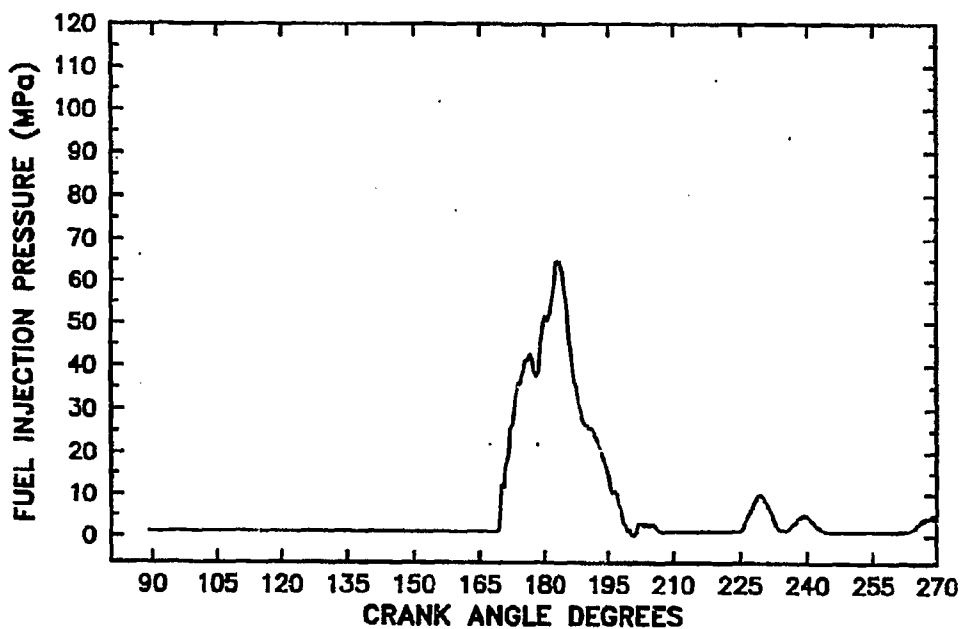
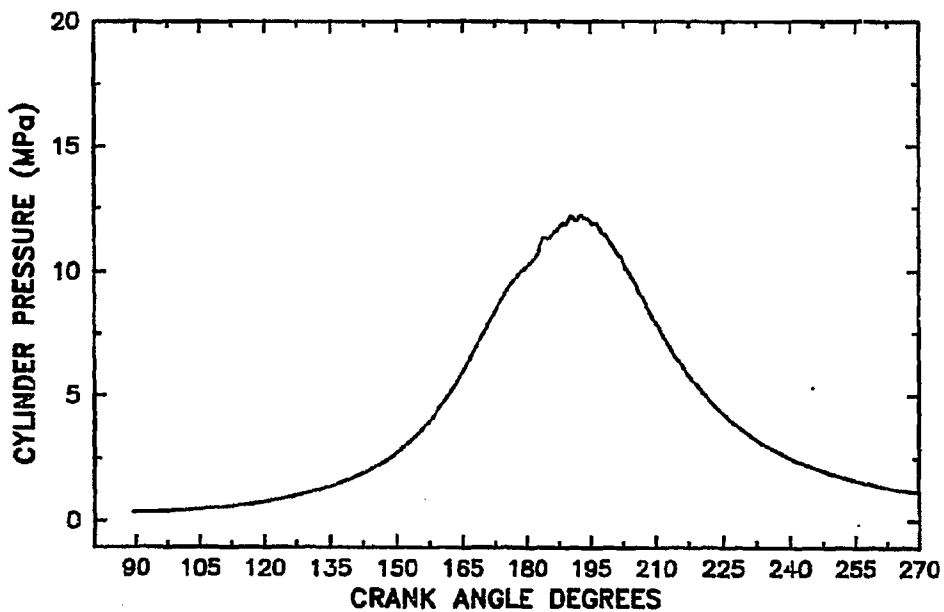
SPEED 1400 LOAD %025 FUEL TARSAND TEST CODE 1341



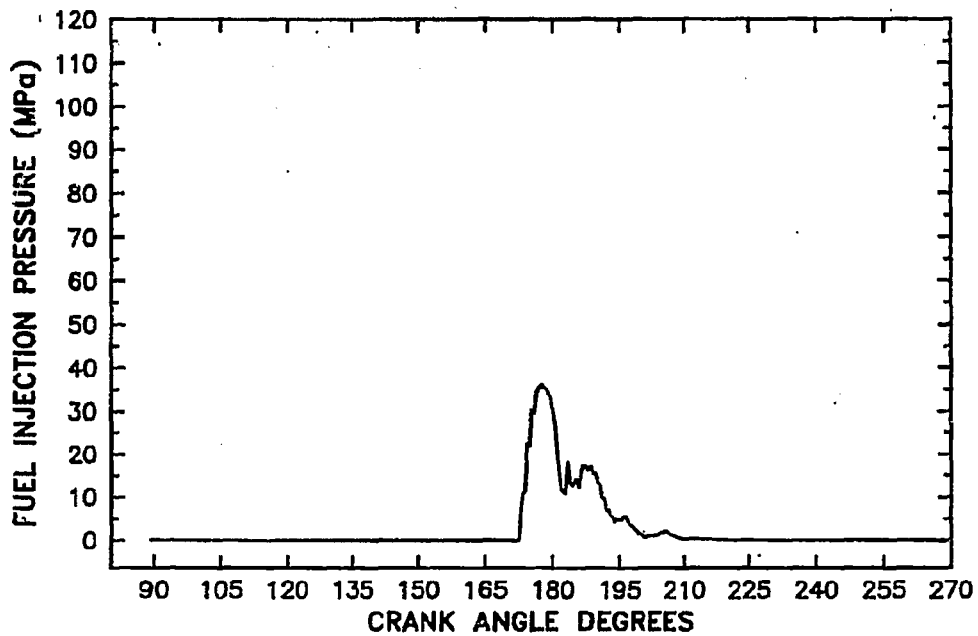
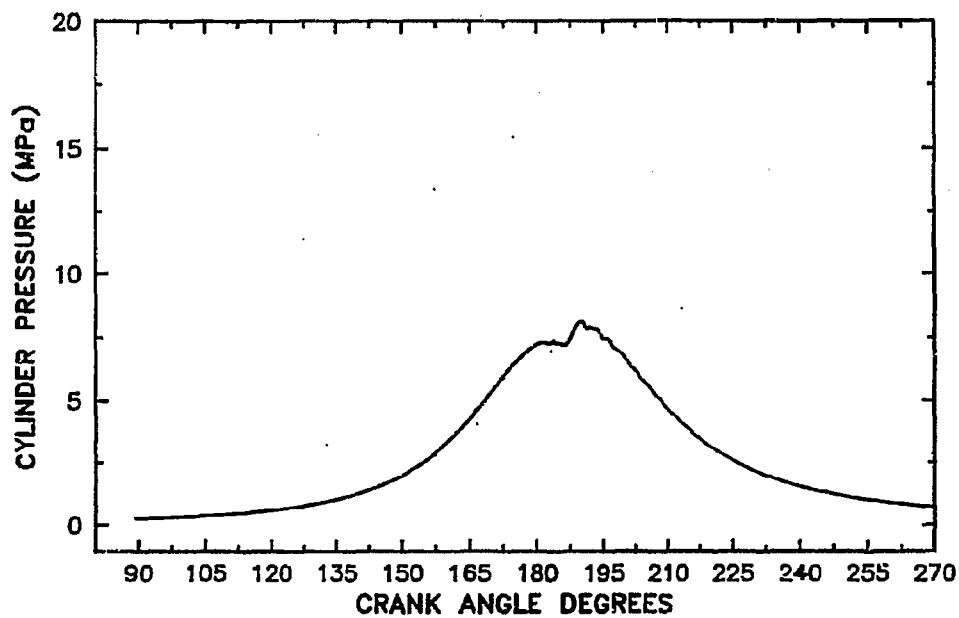
SPEED 1400 LOAD %000 FUEL TARSAND TEST CODE 1351



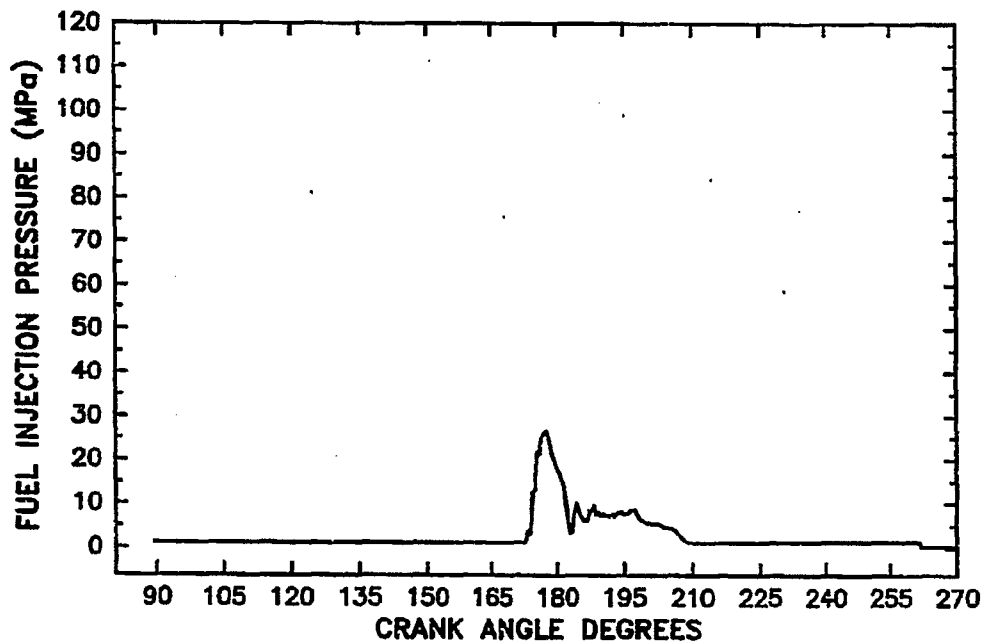
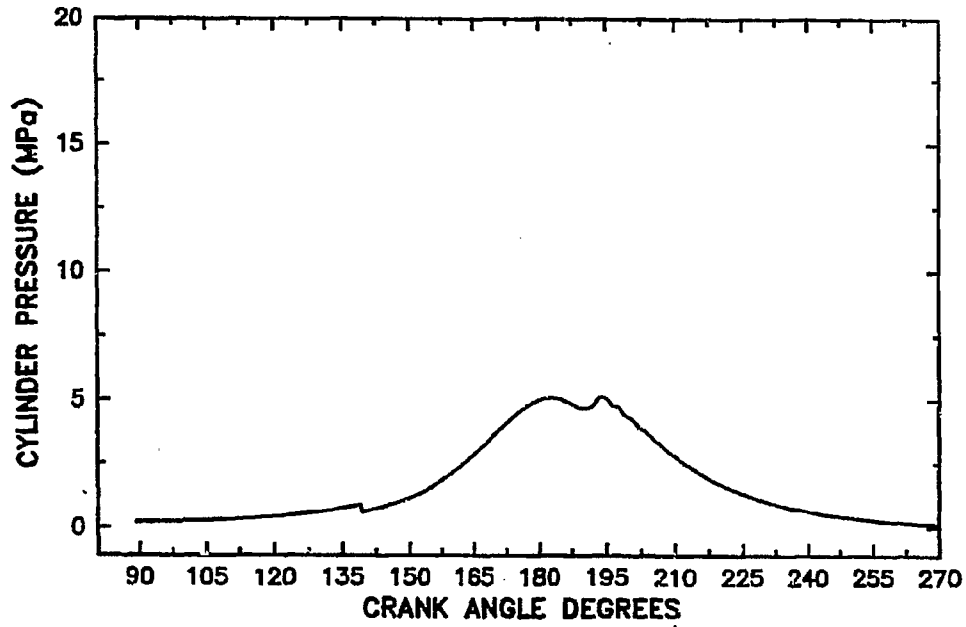
SPEED 2200 LOAD %100 FUEL TARSAND TEST CODE 1361



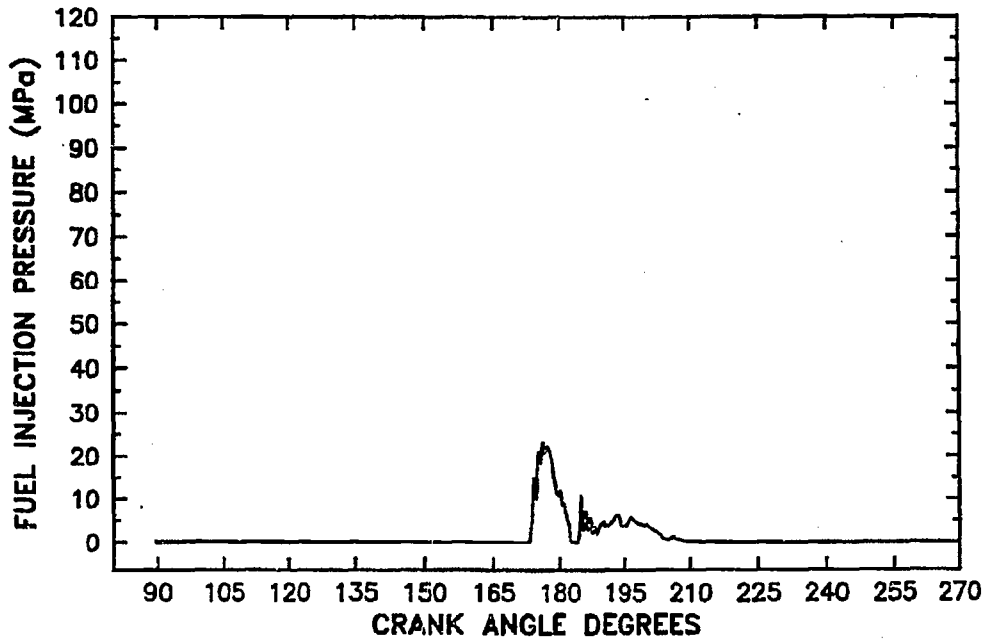
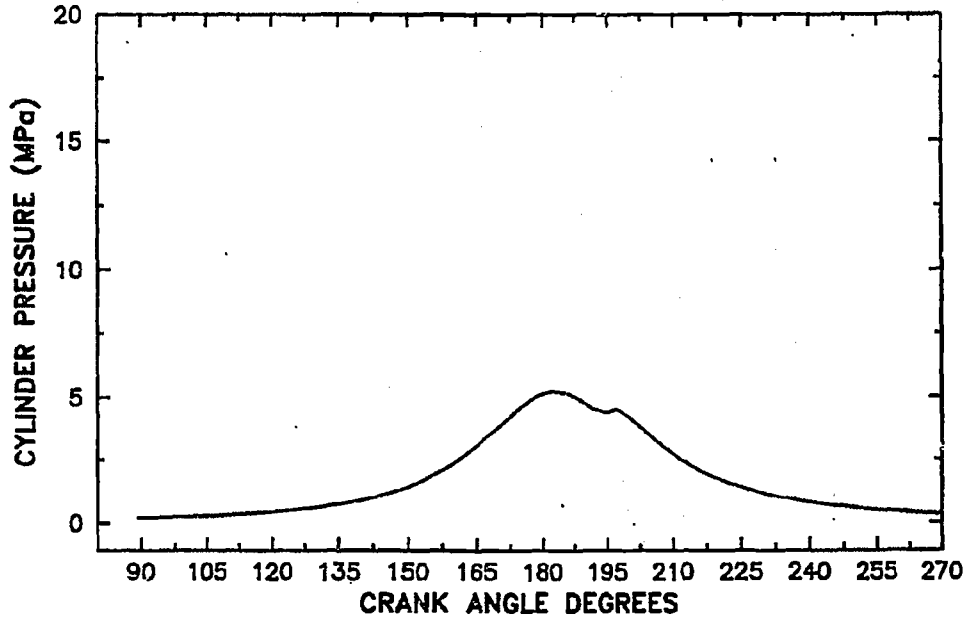
SPEED 2200 LOAD %050 FUEL TARSAND TEST CODE 1371



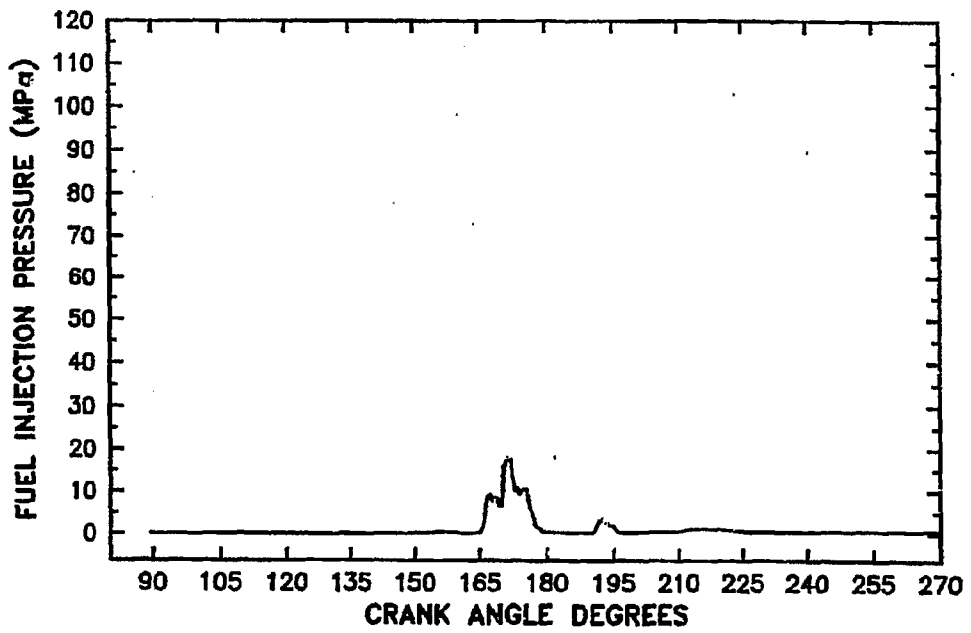
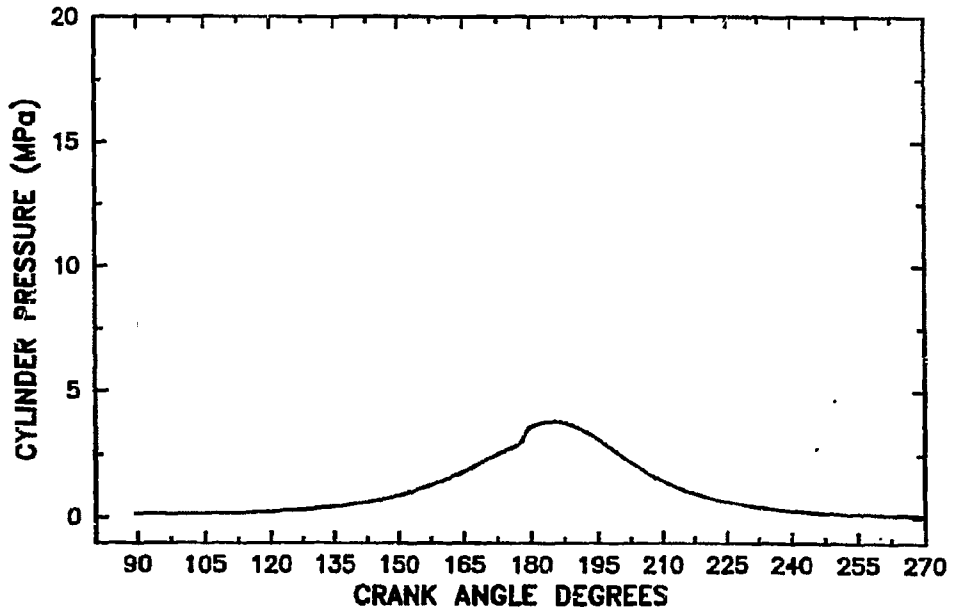
SPEED 2200 LOAD %025 FUEL TARSAND TEST CODE 1381



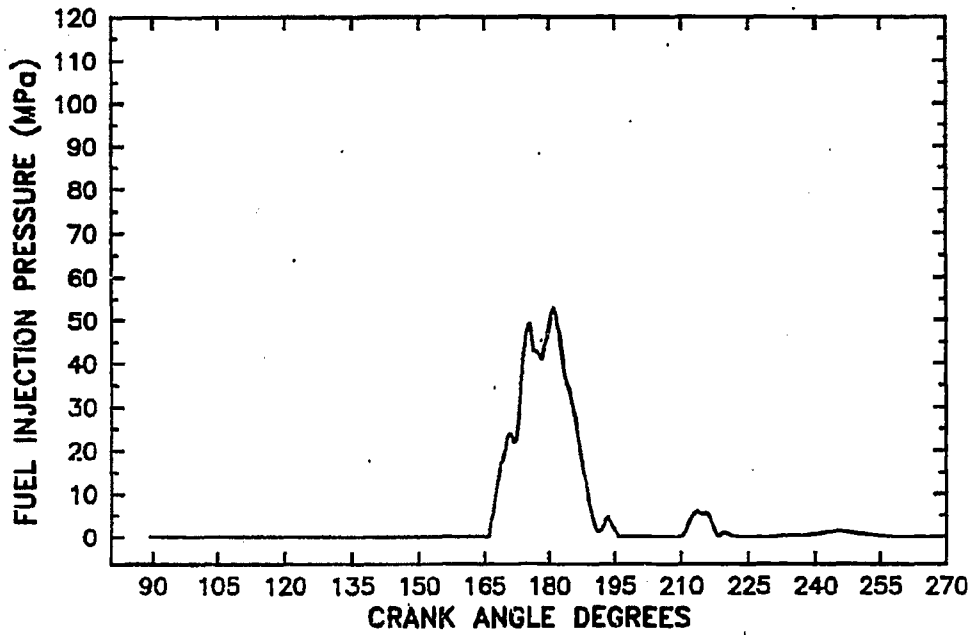
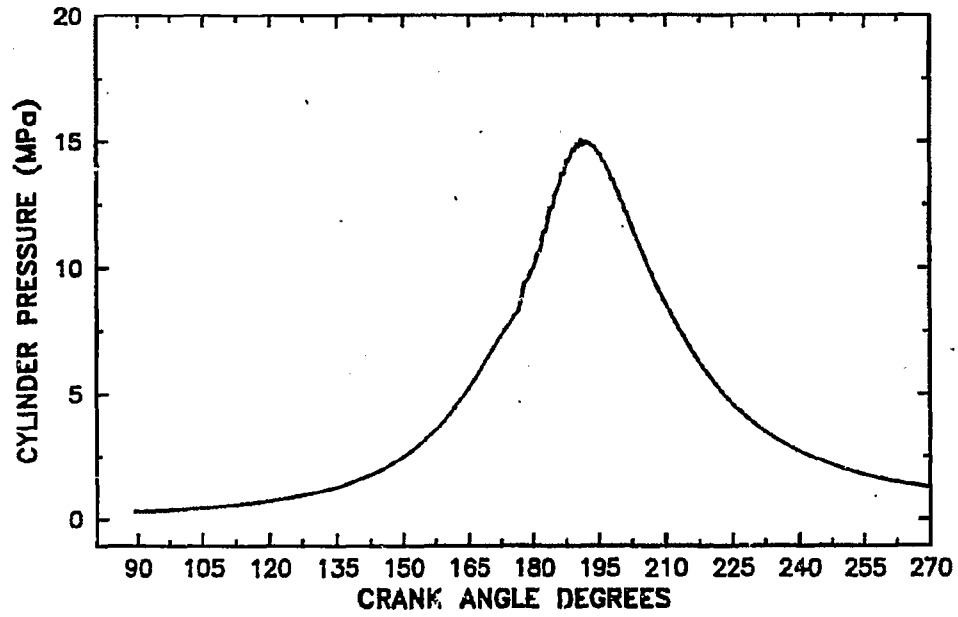
SPEED 2200 LOAD 2000 FUEL TARSAND TEST CODE 1391



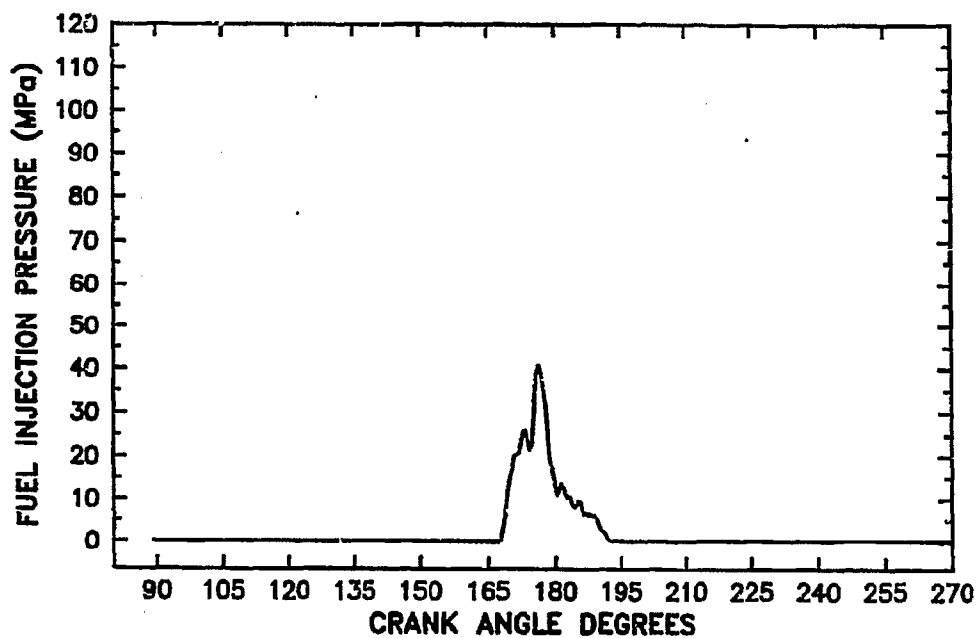
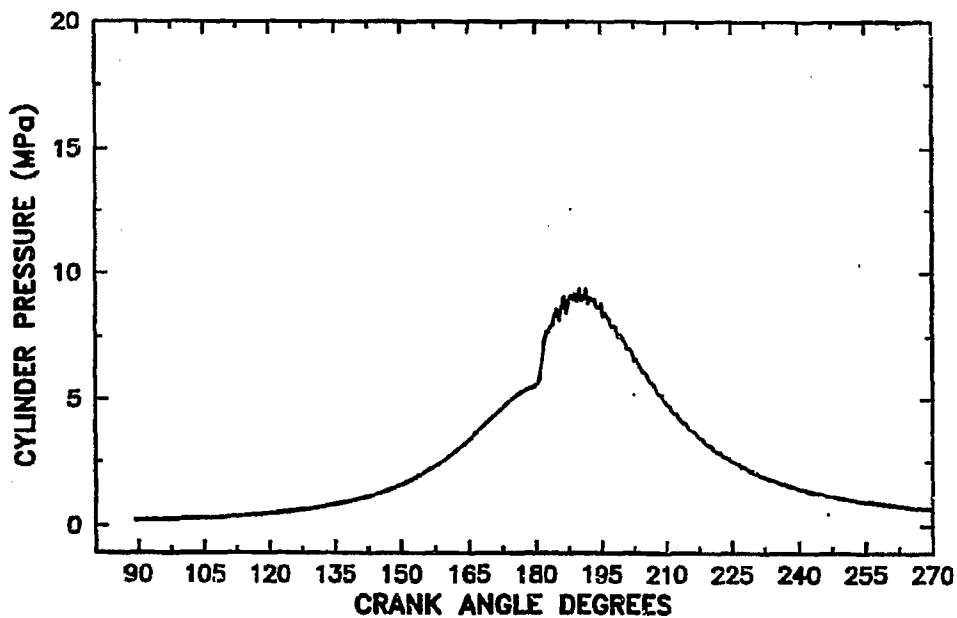
SPEED 844 LOAD %000 FUEL 57% EDS TEST CODE 1611



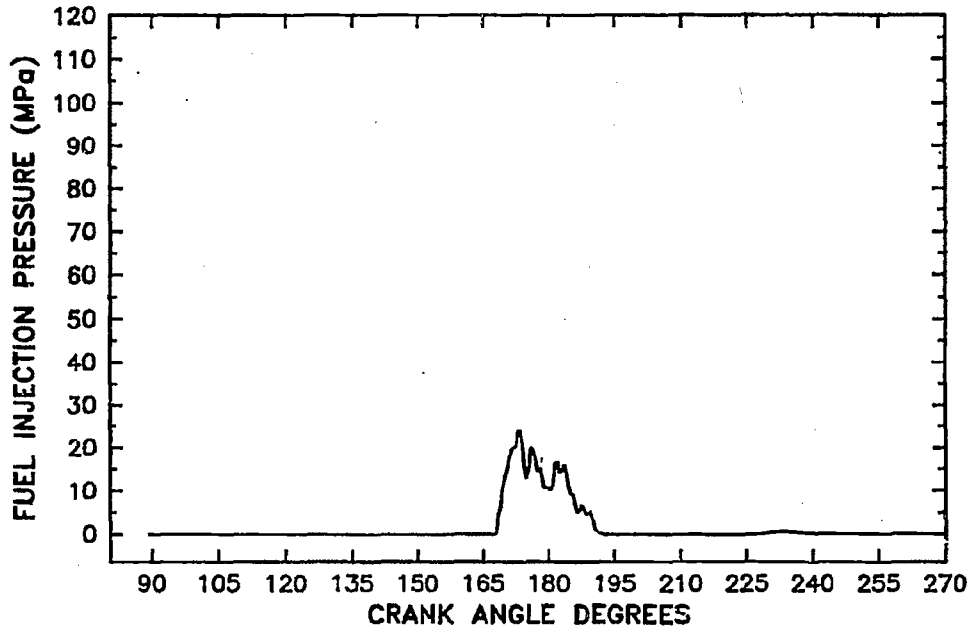
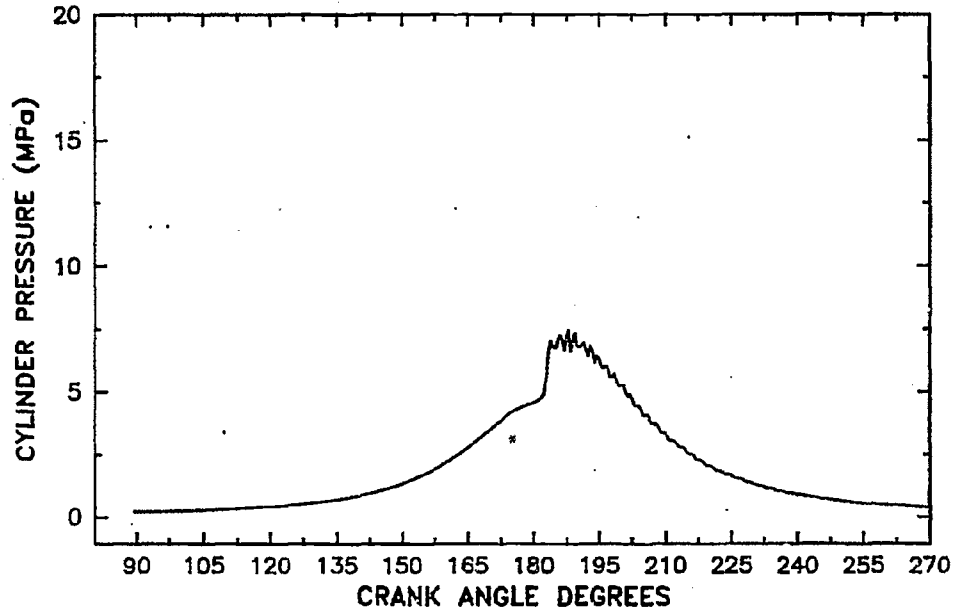
SPEED 1400 LOAD %100 FUEL 57% EDS TEST CODE 1621



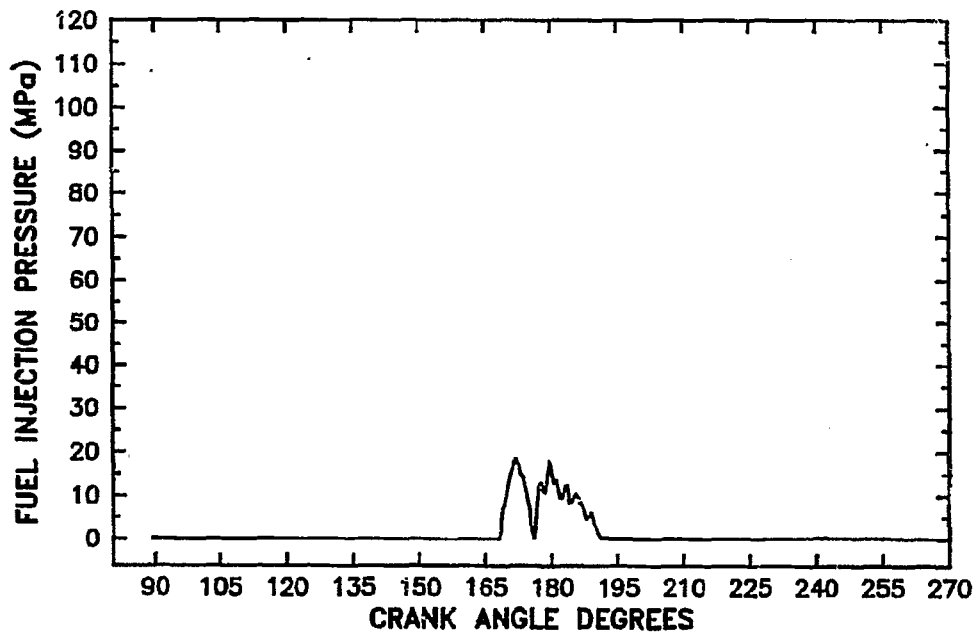
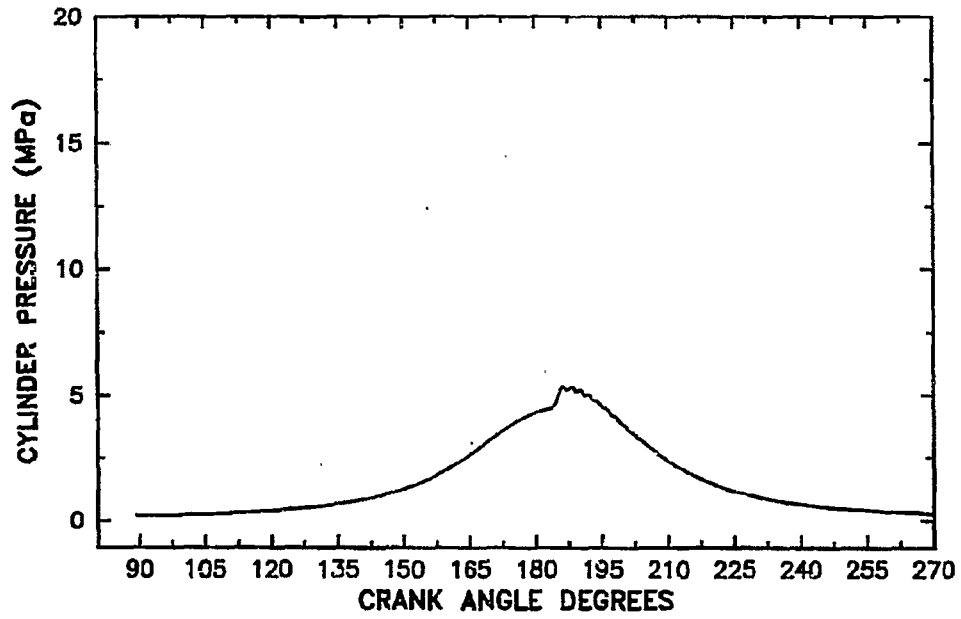
SPEED 1400 LOAD %050 FUEL 57% EDS TEST CODE 1631



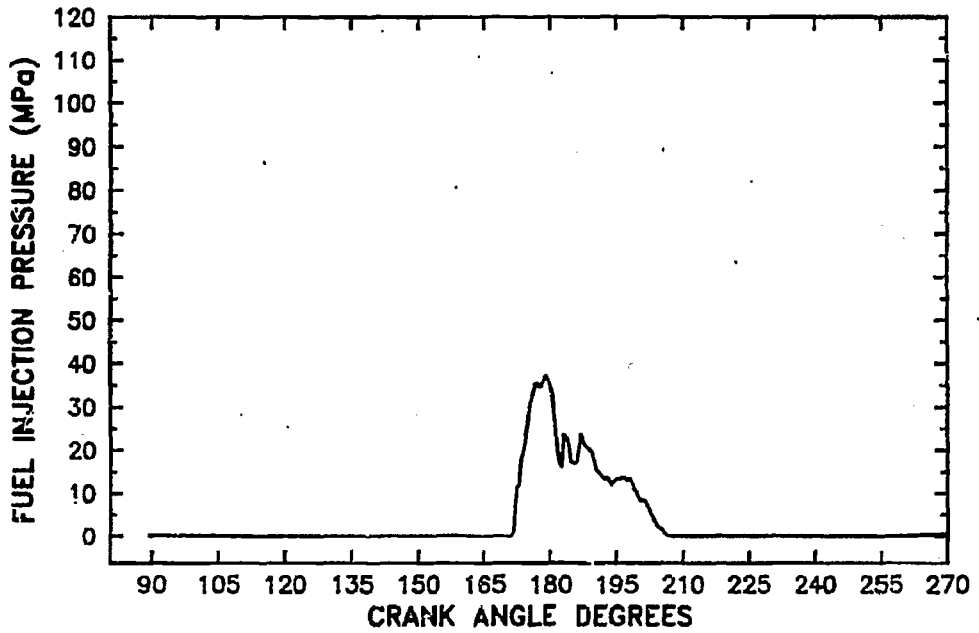
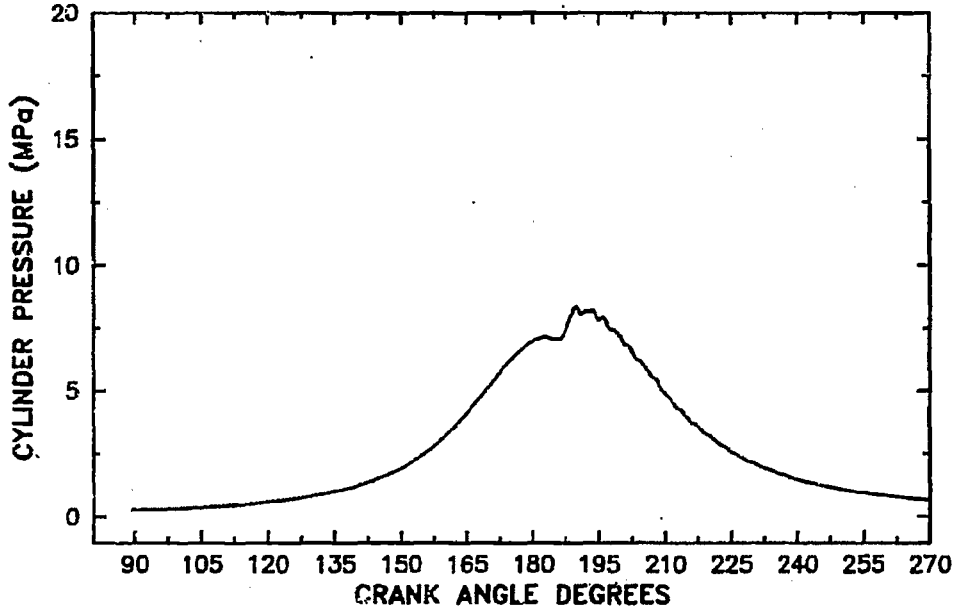
SPEED 1400 LOAD %025 FUEL 57% EDS TEST CODE 1641



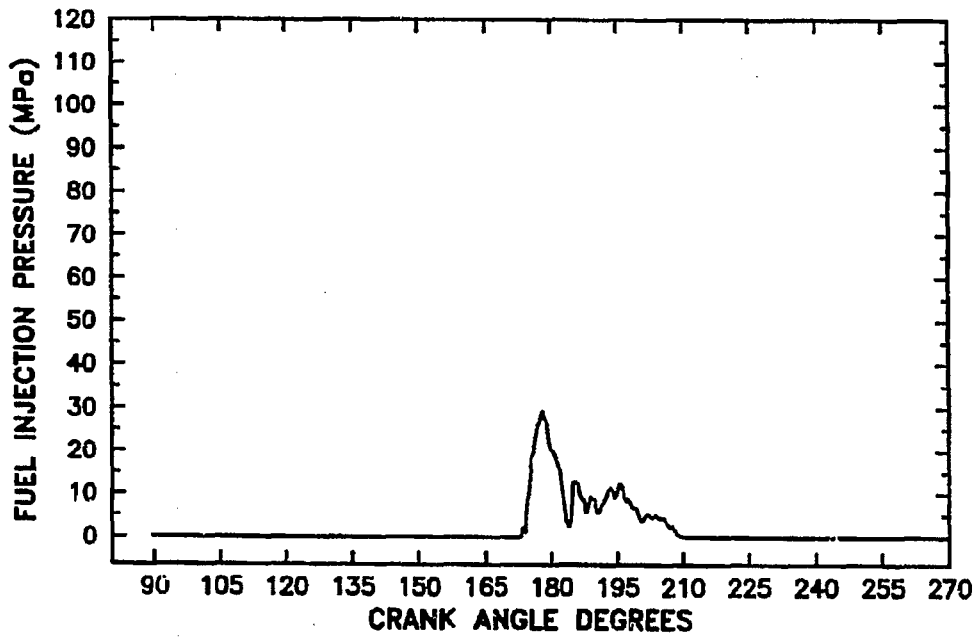
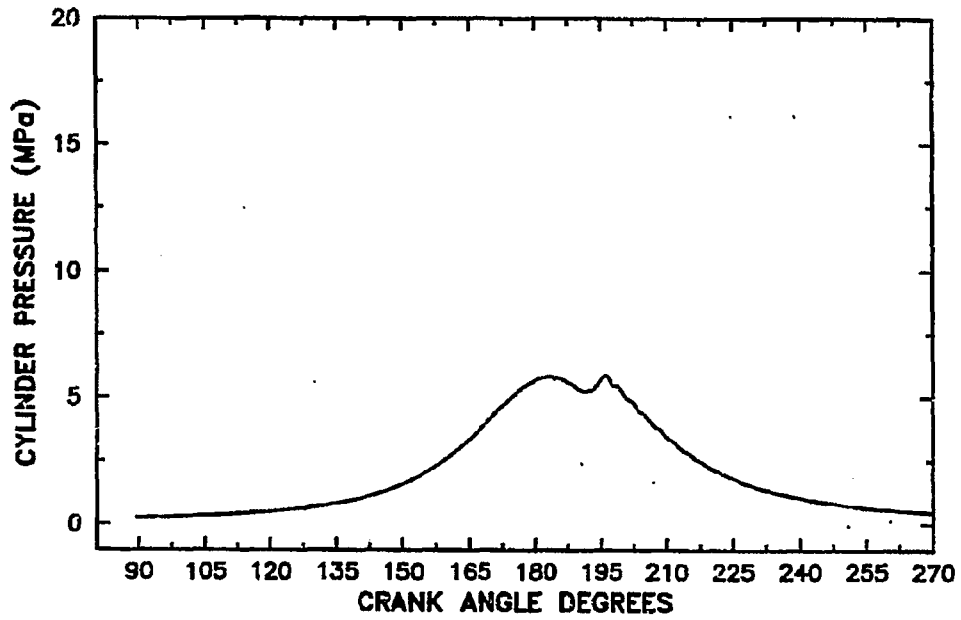
SPEED 1400 LOAD %000 FUEL 57% EDS TEST CODE 1651



SPEED 2200 LOAD %050 FUEL 57% EDS TEST CODE 1671

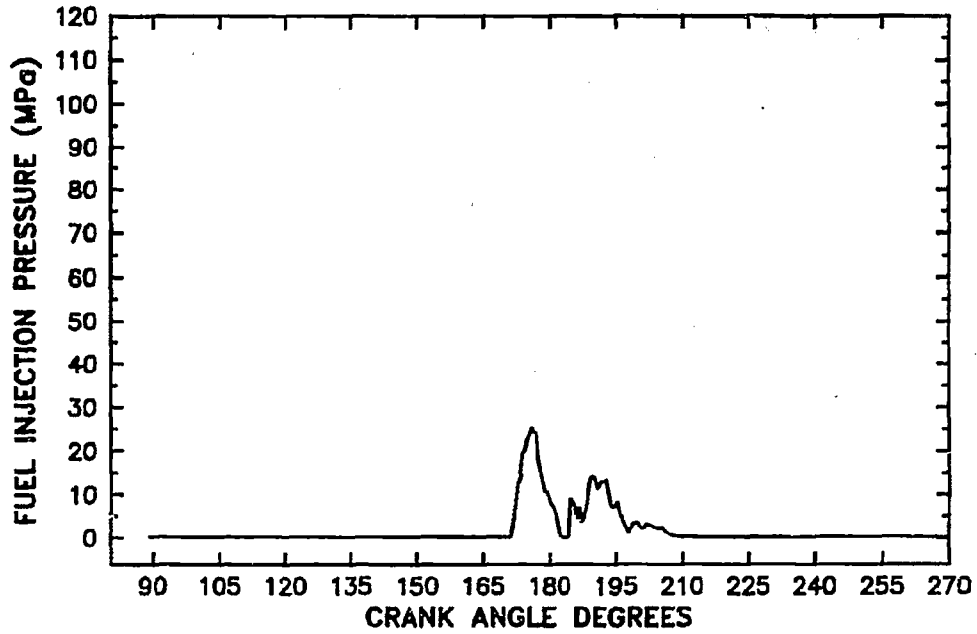
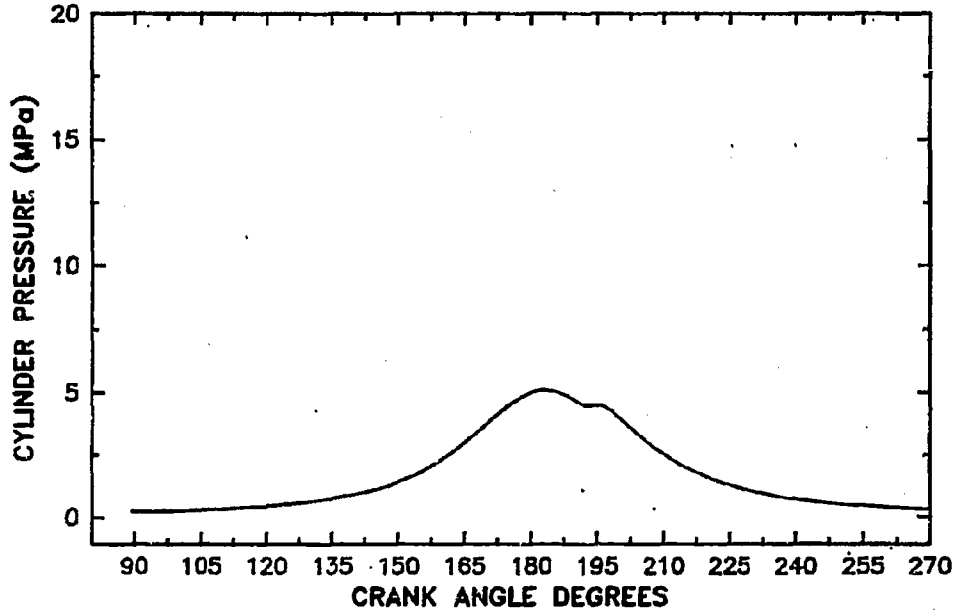


SPEED 2200 LOAD %025 FUEL 57% EDS TEST CODE 1681



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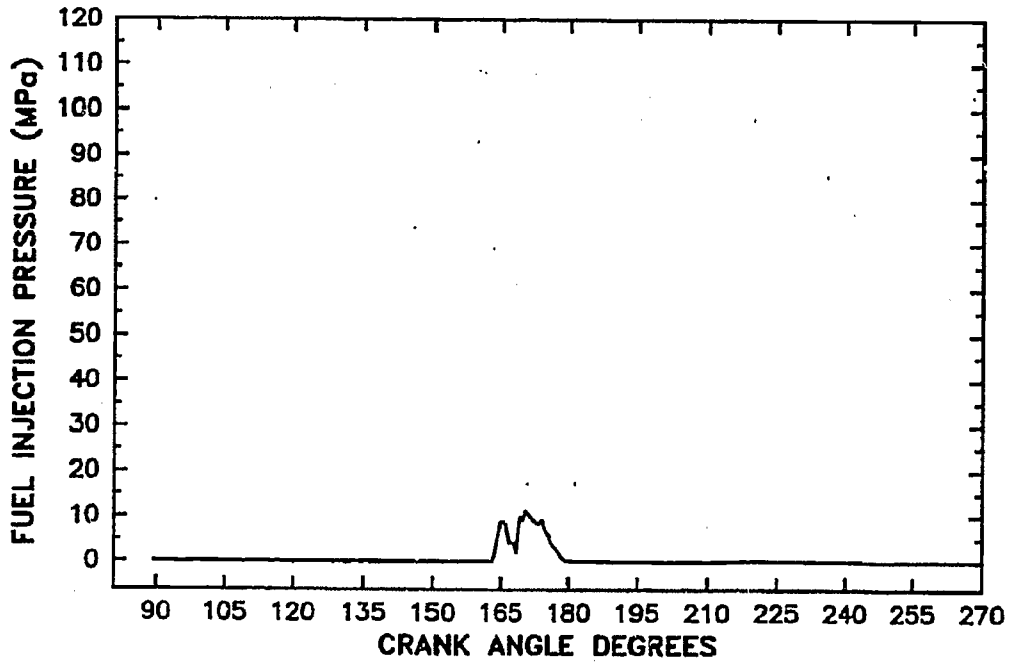
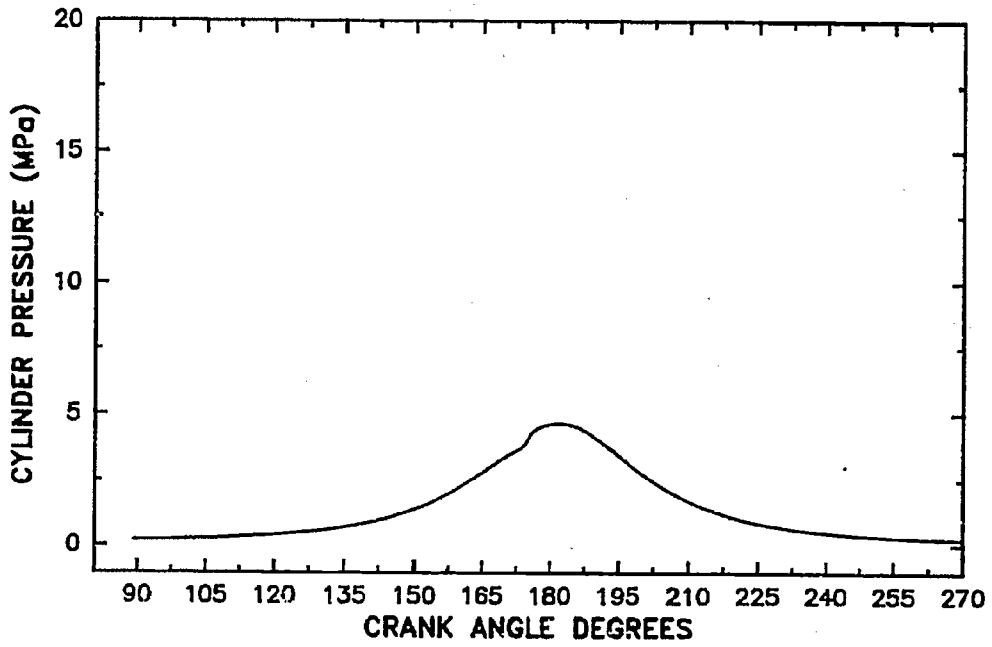
SPEED 2200 LOAD %000 FUEL 57% EDS TEST CODE 1691



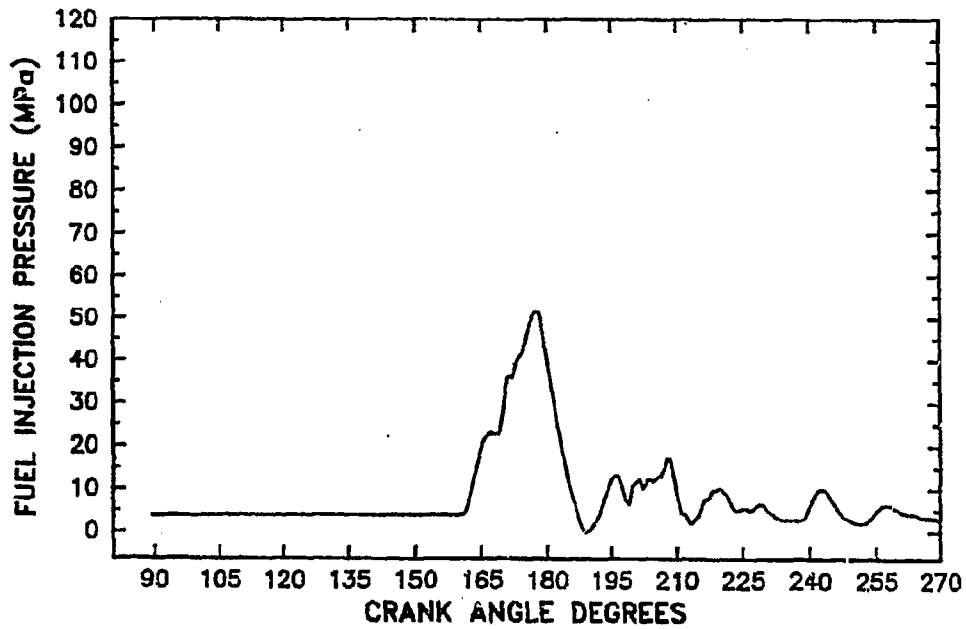
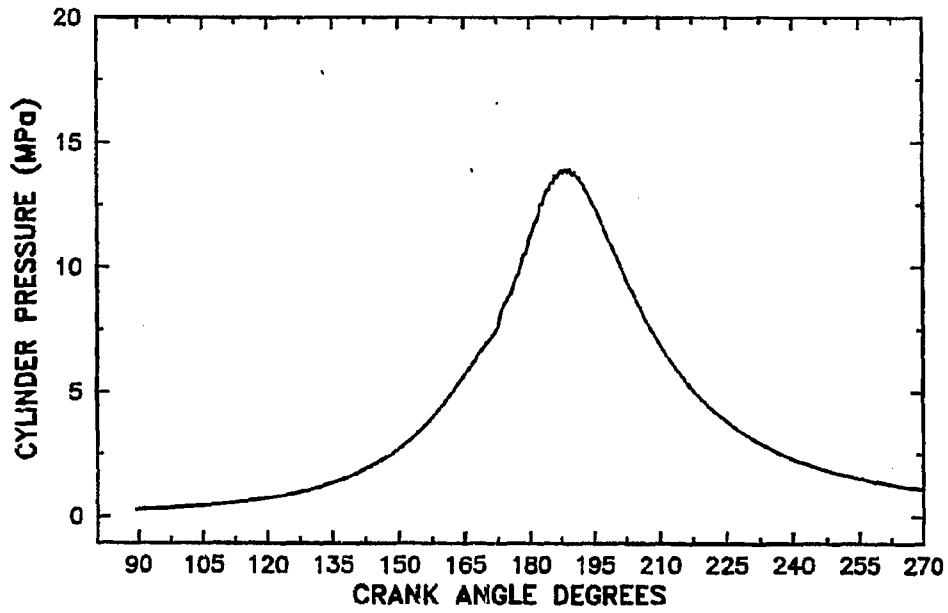
APPENDIX O
PHASE II CYLINDER PRESSURE
AND FUEL INJECTION PRESSURE DIAGRAMS
SIMULATED AIR-TO-AIR AFTERCOOLER

Note: The 0 percent load (shown on the figures) actually corresponds to 7 percent load. The 7 percent load was the minimum required to ensure stable dynamometer operation.

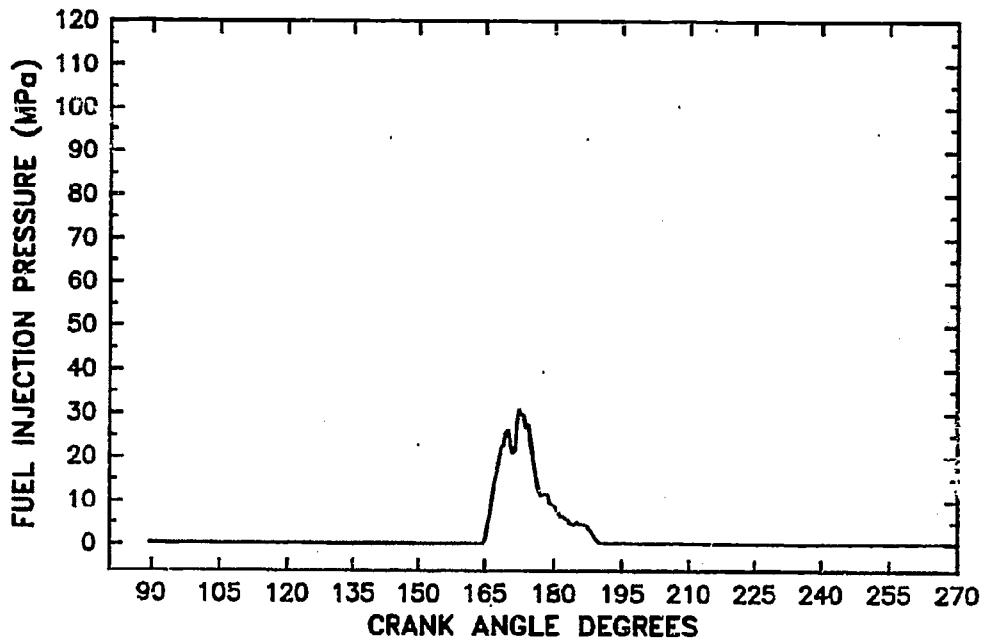
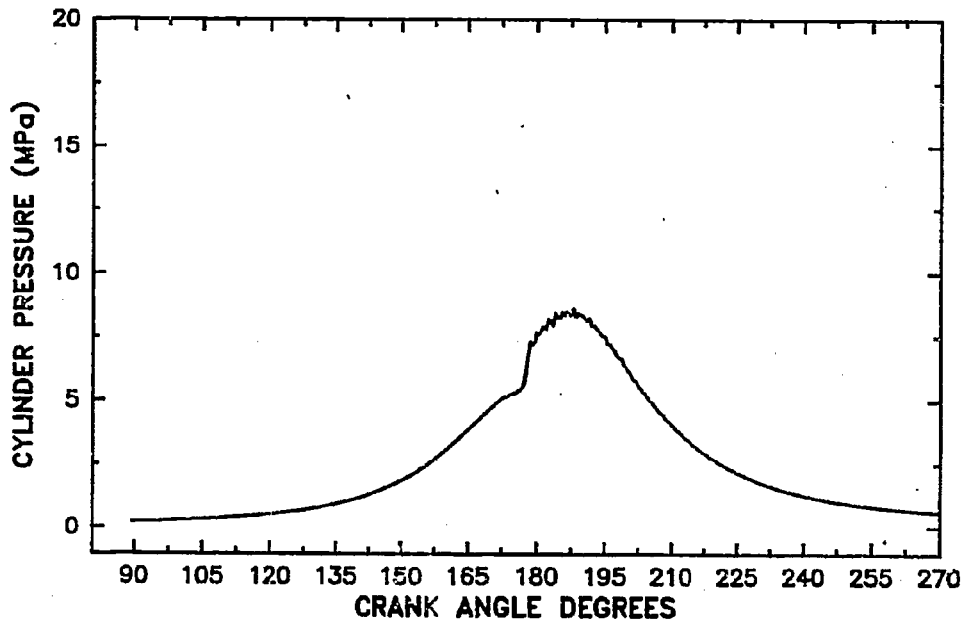
SPEED 808 LOAD %000 FUEL CONDF2 TEST CODE 2111



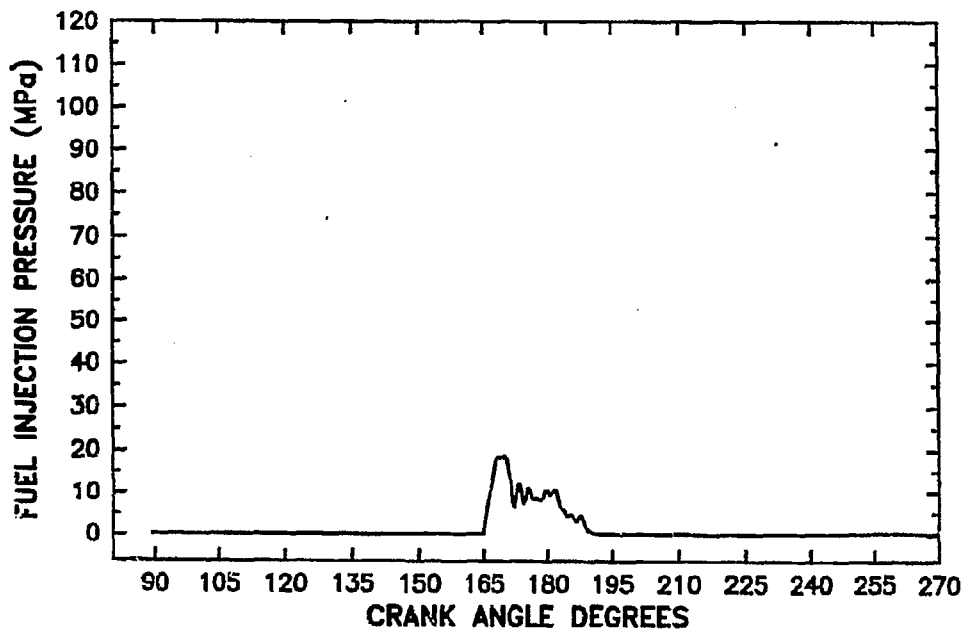
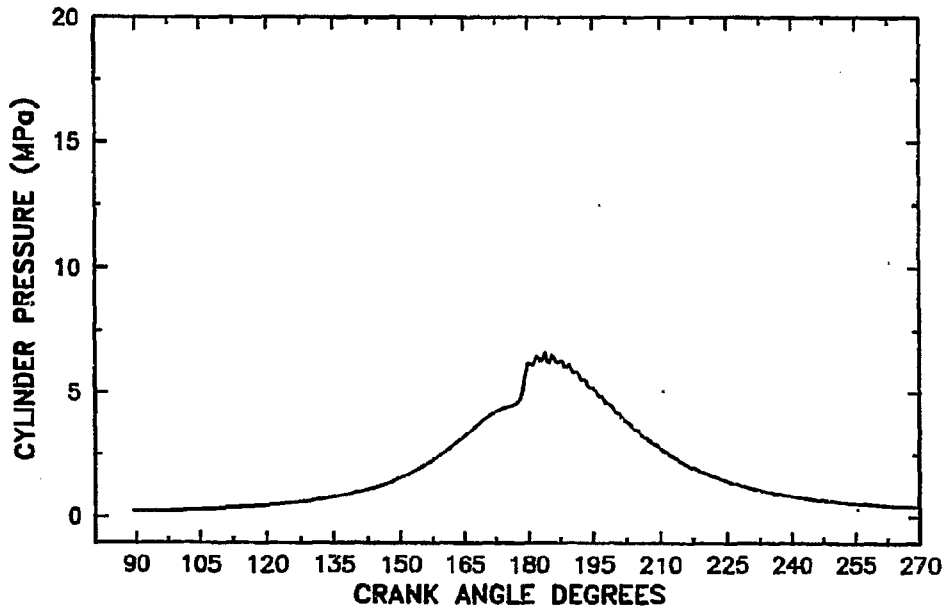
SPEED 1400 LOAD %100 FUEL CONDF2 TEST CODE 2121



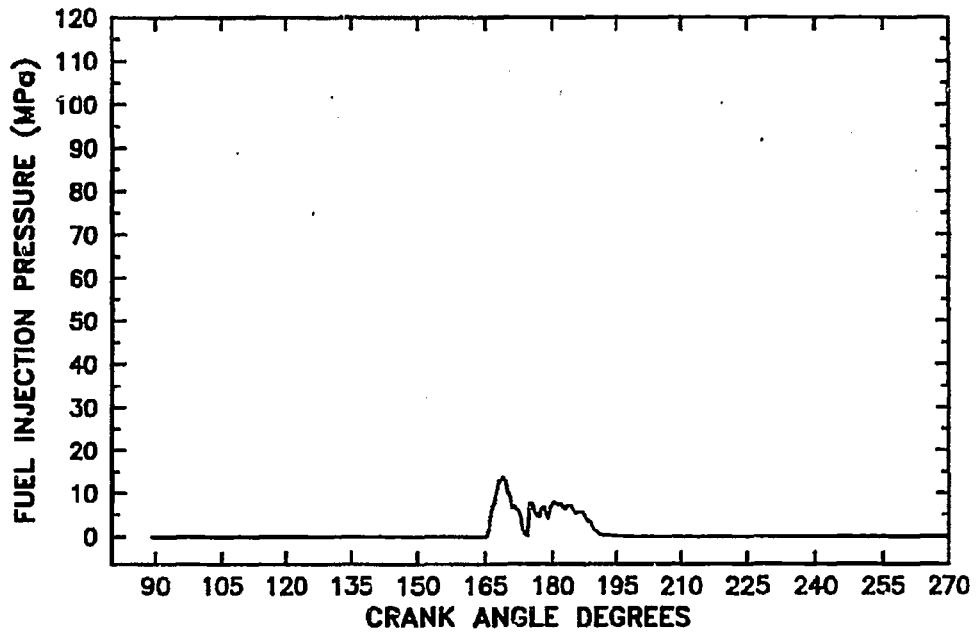
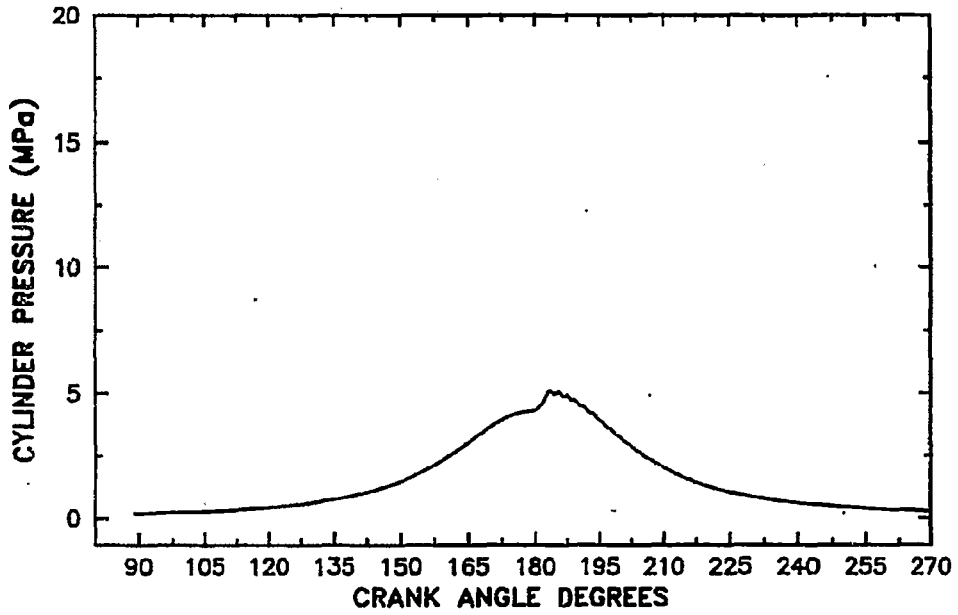
SPEED 1400 LOAD %050 FUEL CONDF2 TEST CODE 2131



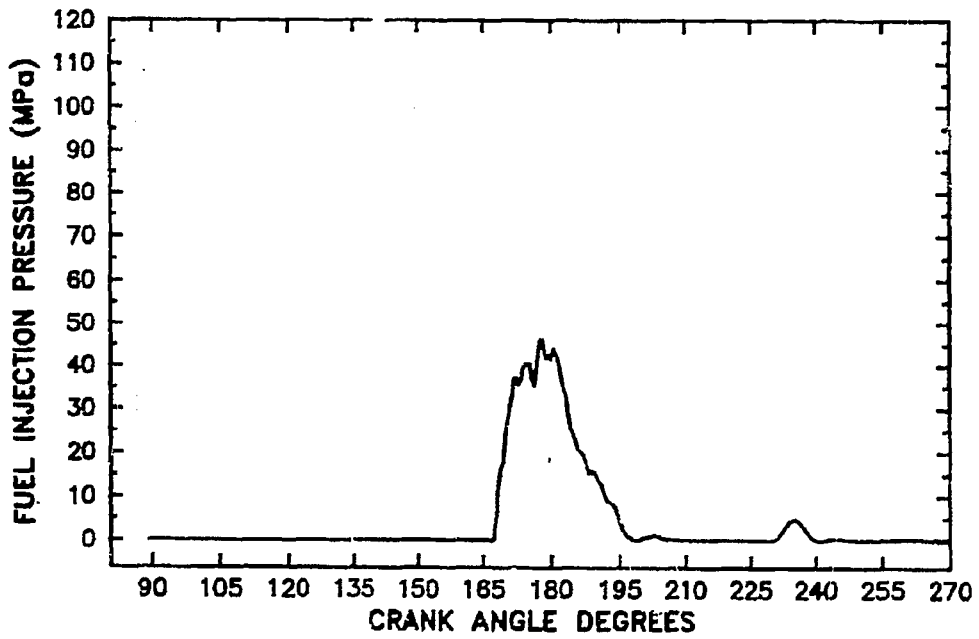
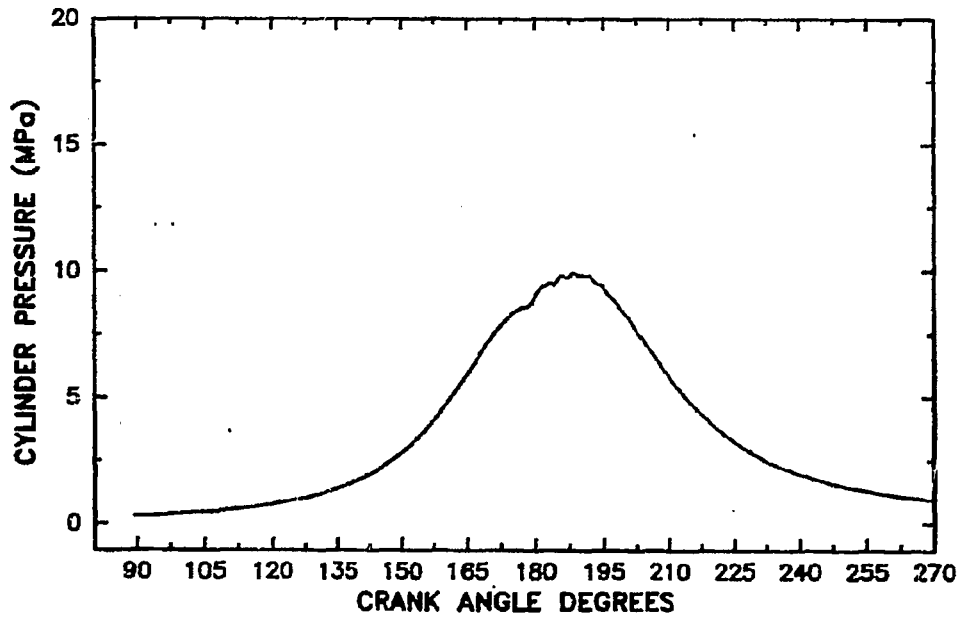
SPEED 1400 LOAD %025 FUEL CONDF2 TEST CODE 2141



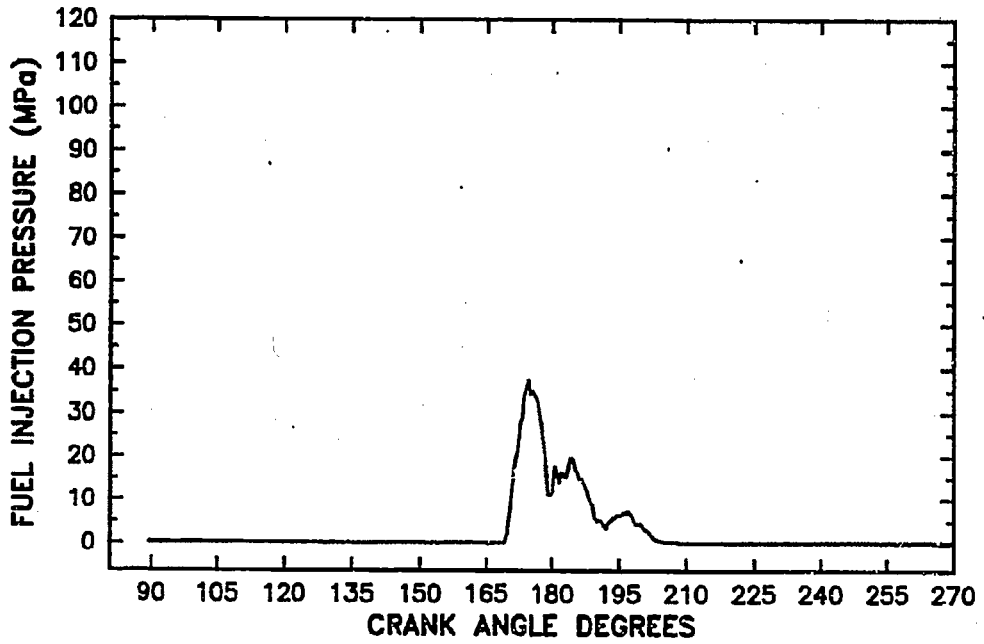
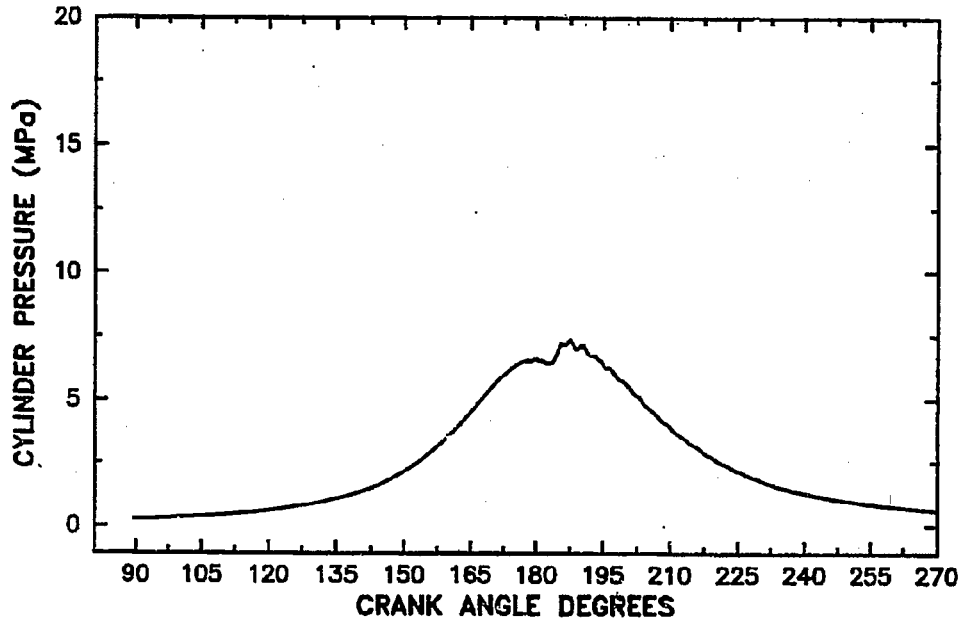
SPEED 1400 LOAD %000 FUEL CONDF2 TEST CODE 2151



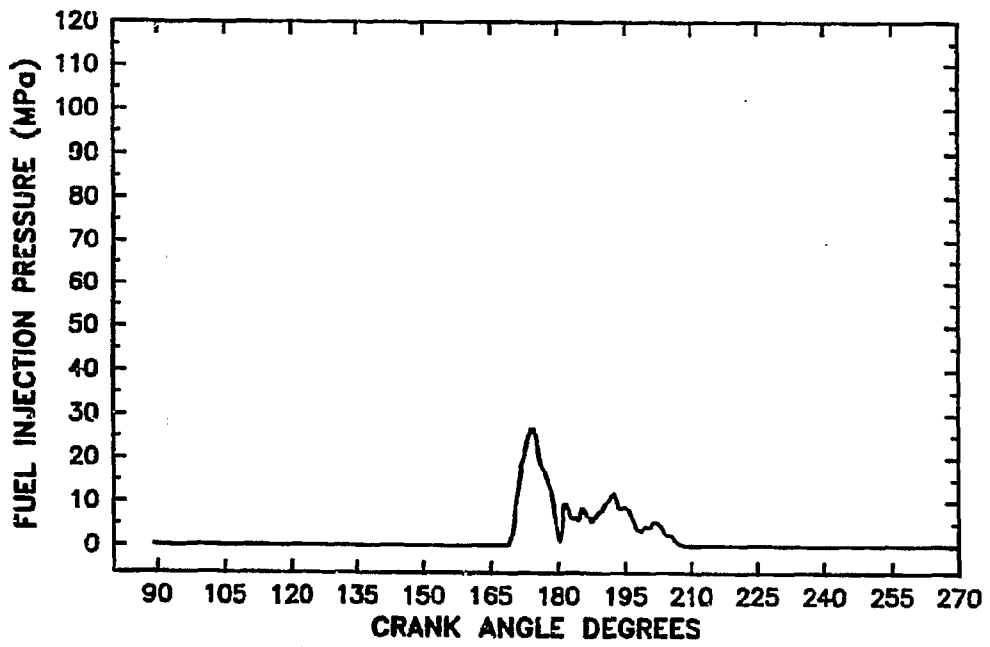
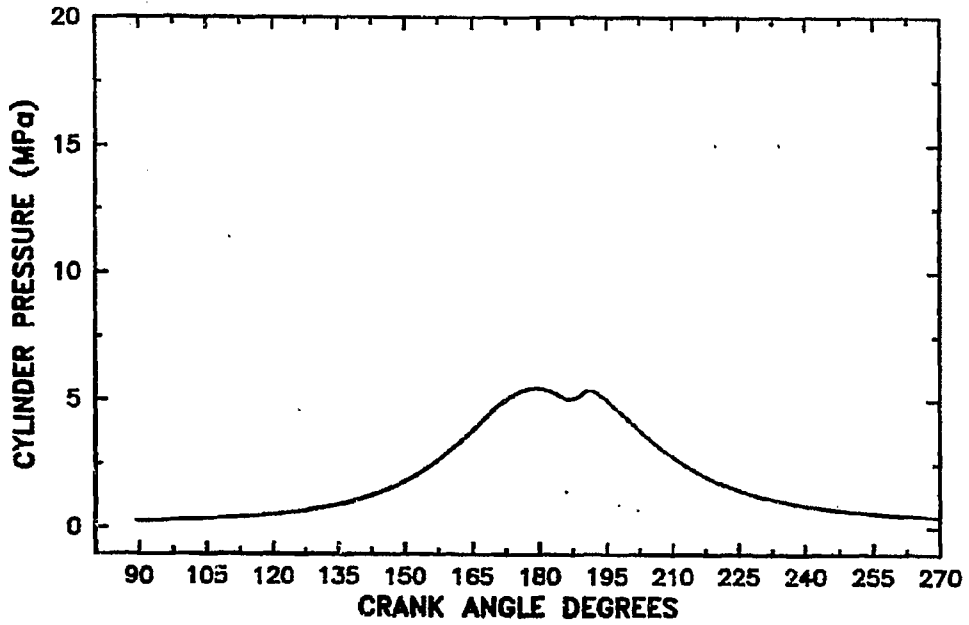
SPEED 2200 LOAD %100 FUEL CONDF2 TEST CODE 2161



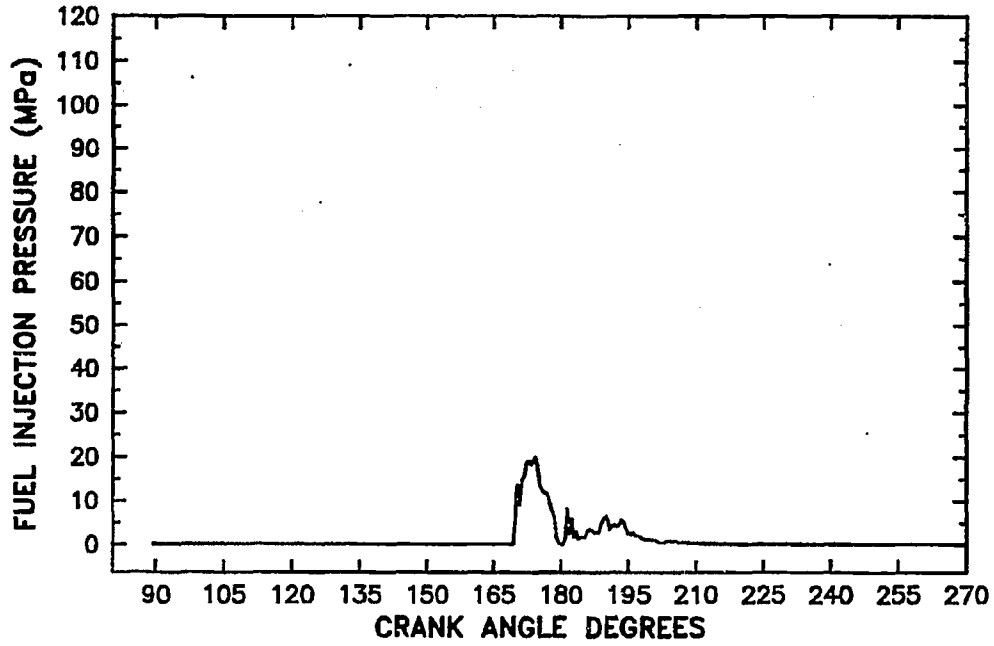
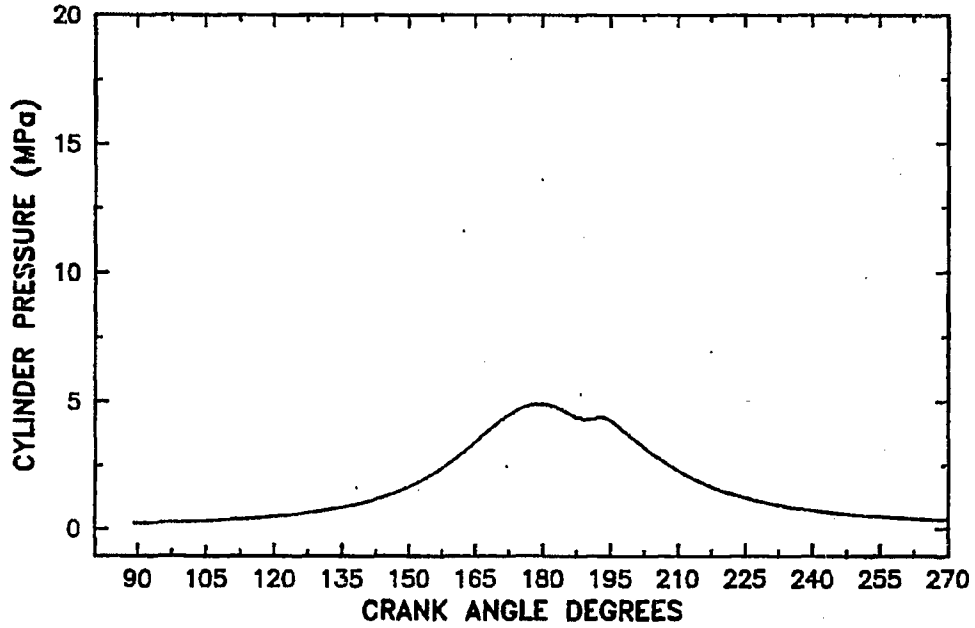
SPEED 2200 LOAD %050 FUEL CONDF2 TEST CODE 2171



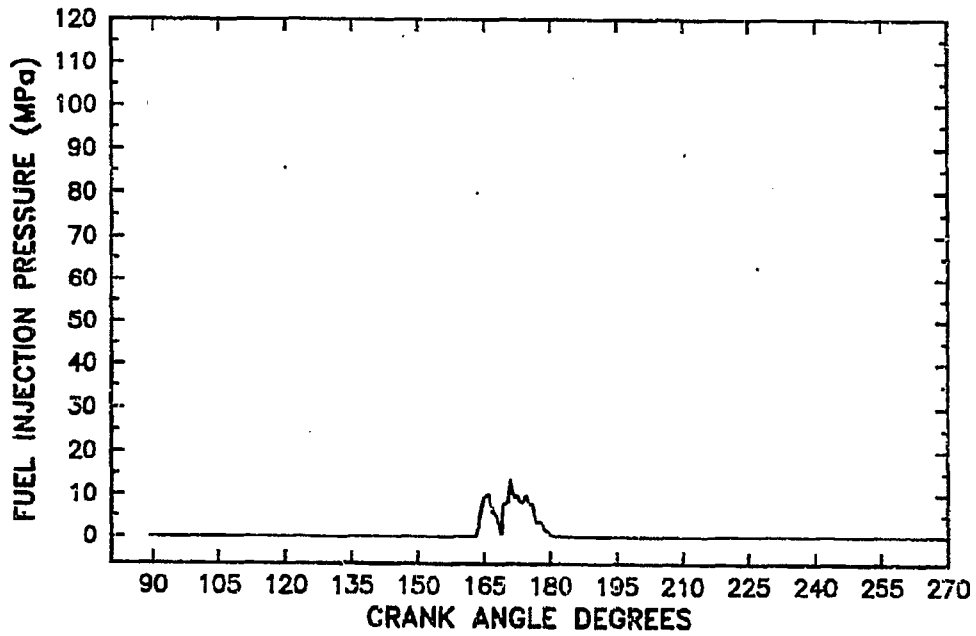
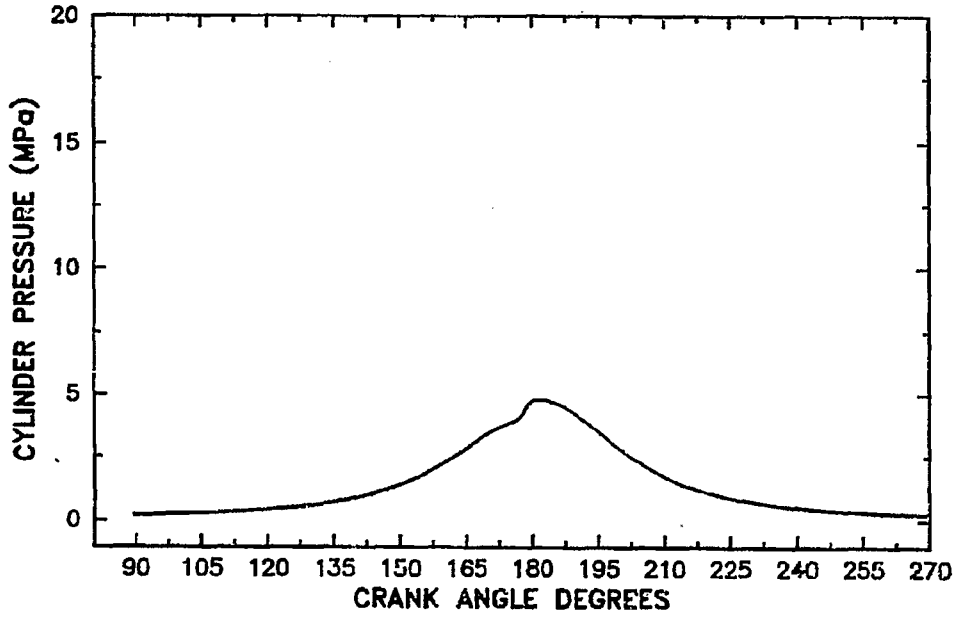
SPEED 2200 LOAD %25 FUEL CONDF2 TEST CODE 2181



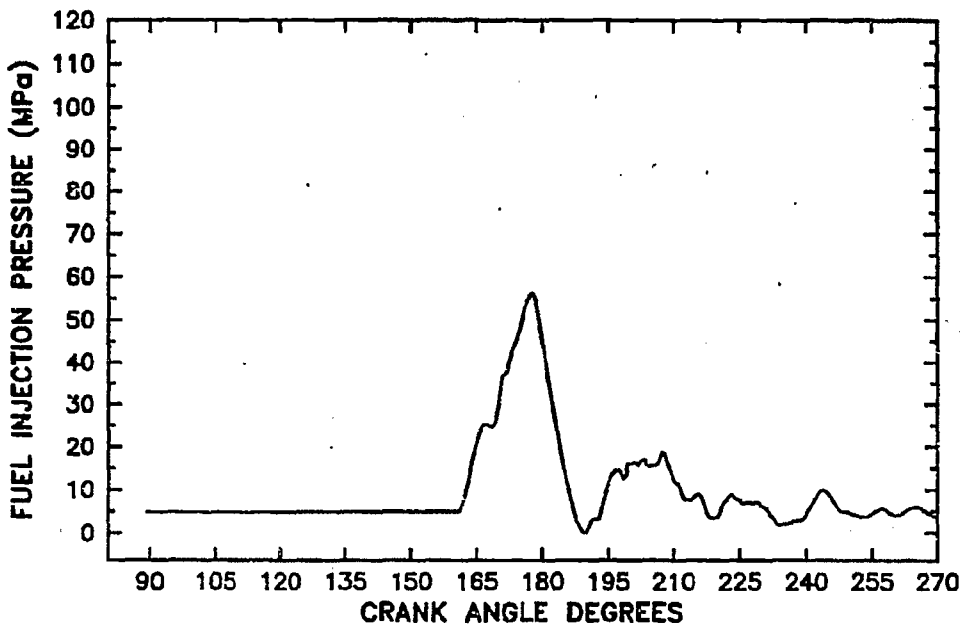
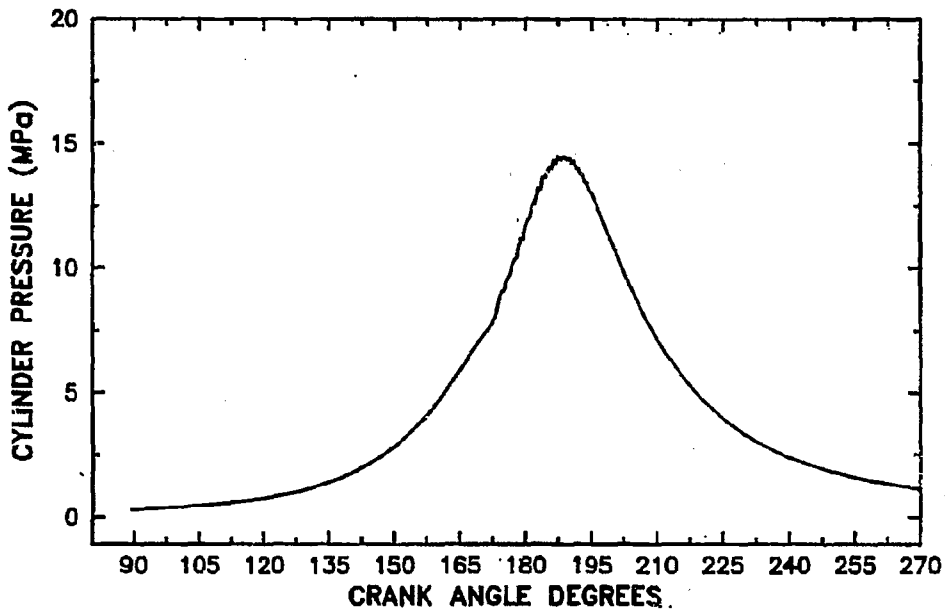
SPEED 2200 LOAD %000 FUEL CONDF2 TEST CODE 2191



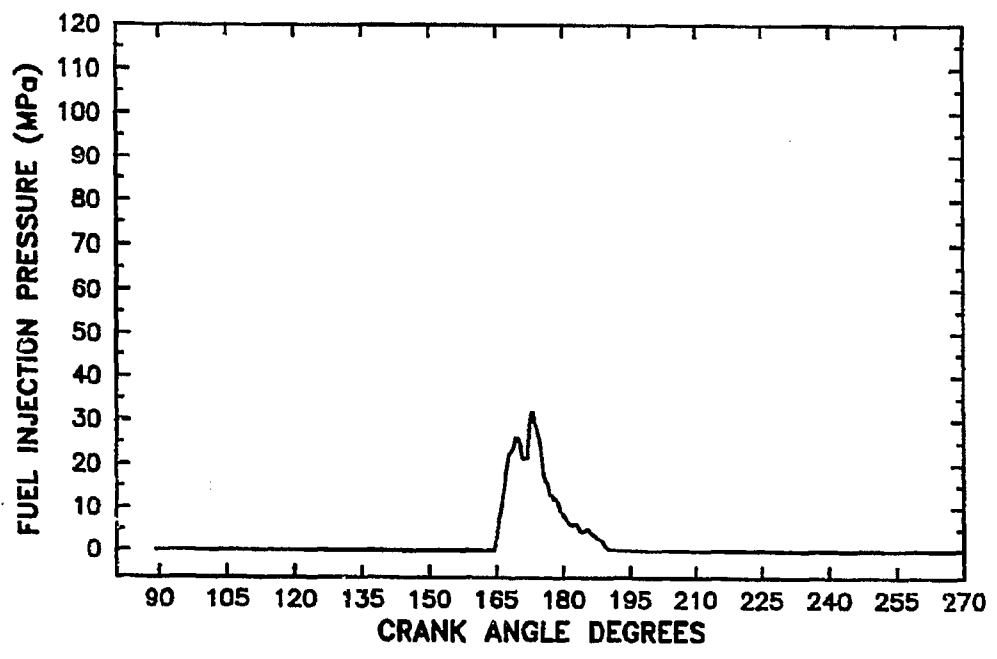
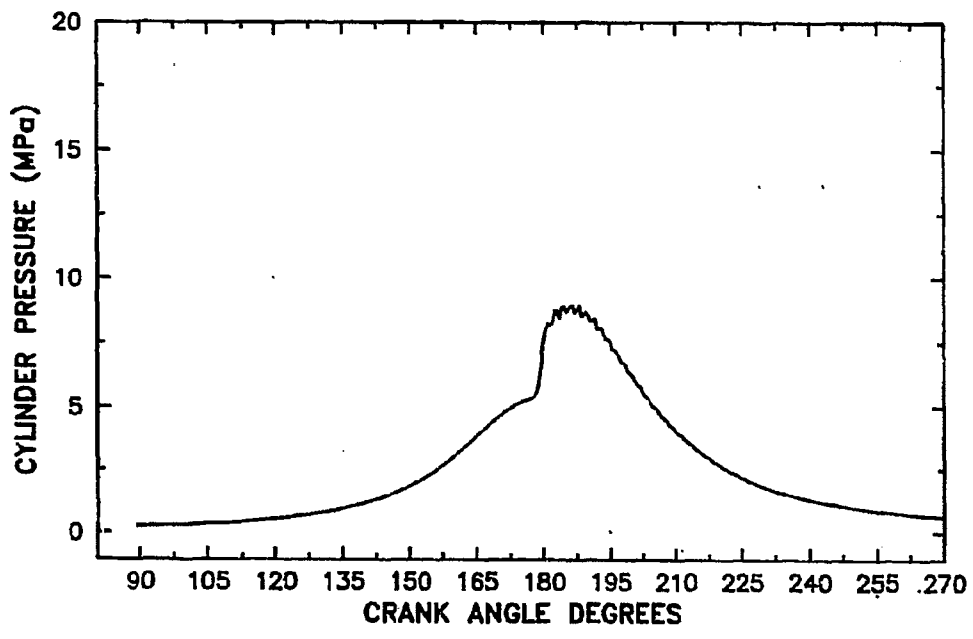
SPEED 824 LOAD %000 FUEL TARSAND TEST CODE 2311



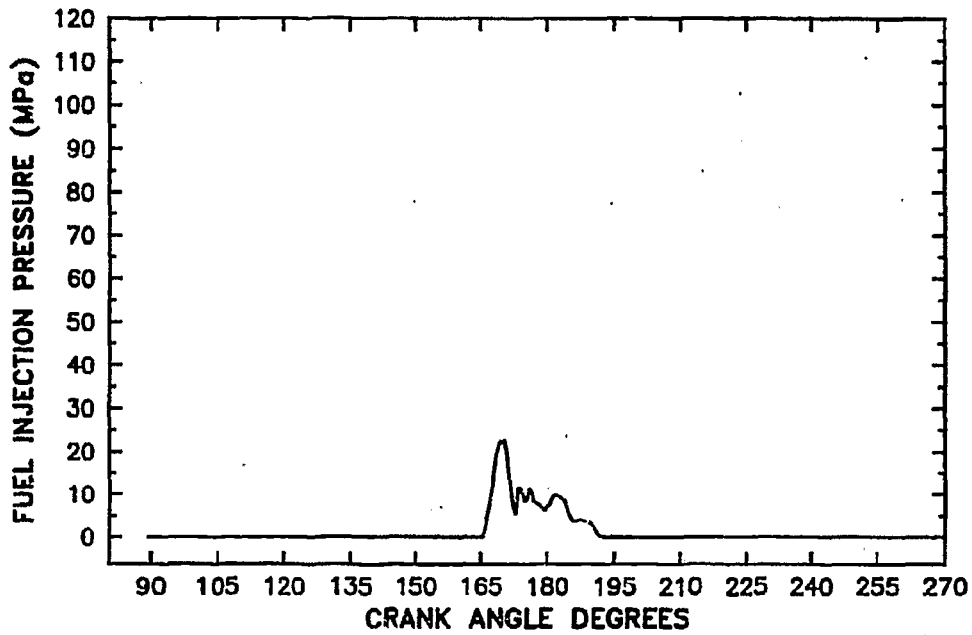
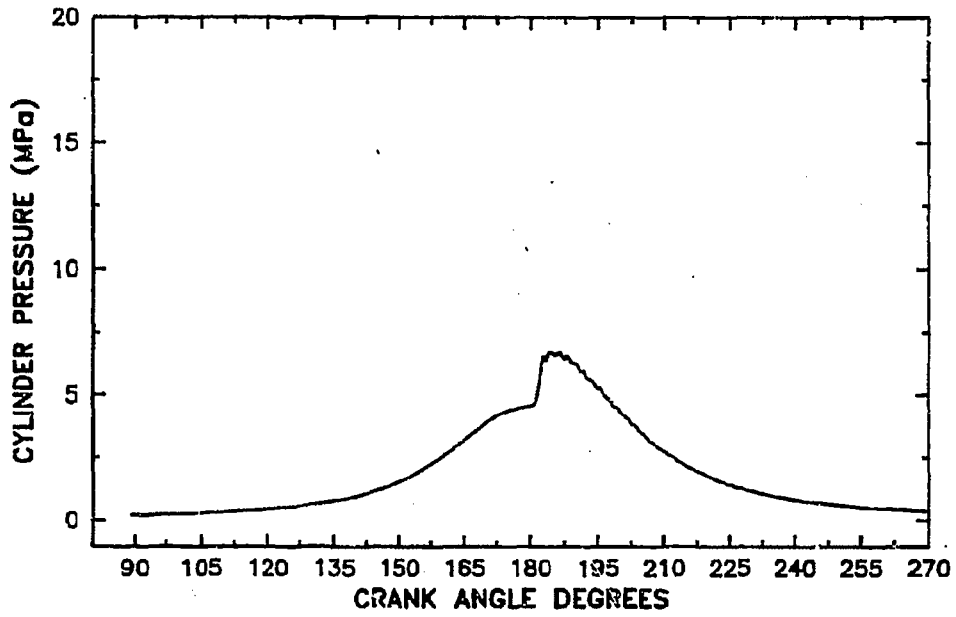
SPEED 1400 LOAD %100 FUEL TARSAND TEST CODE 2321



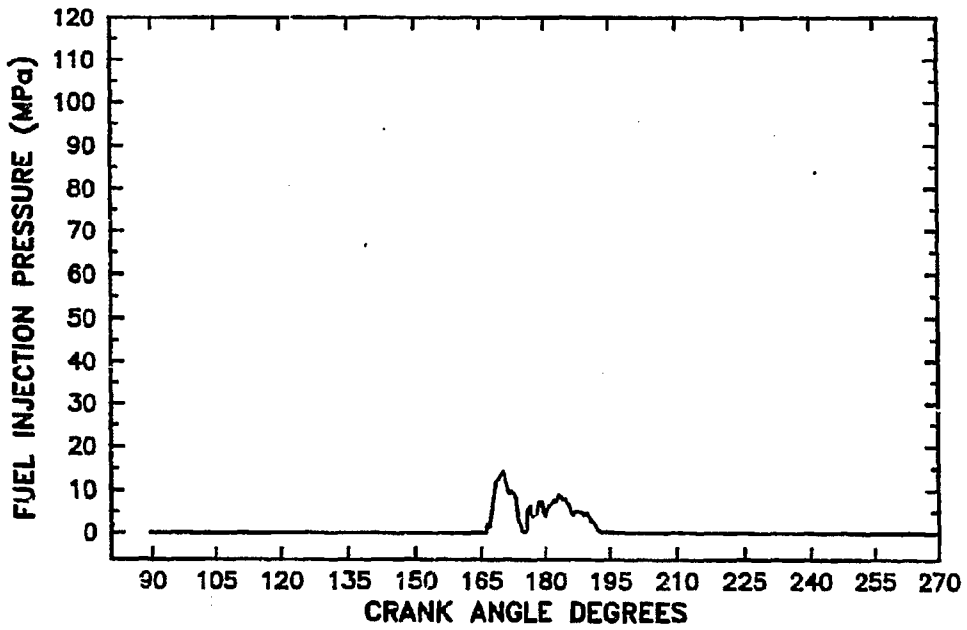
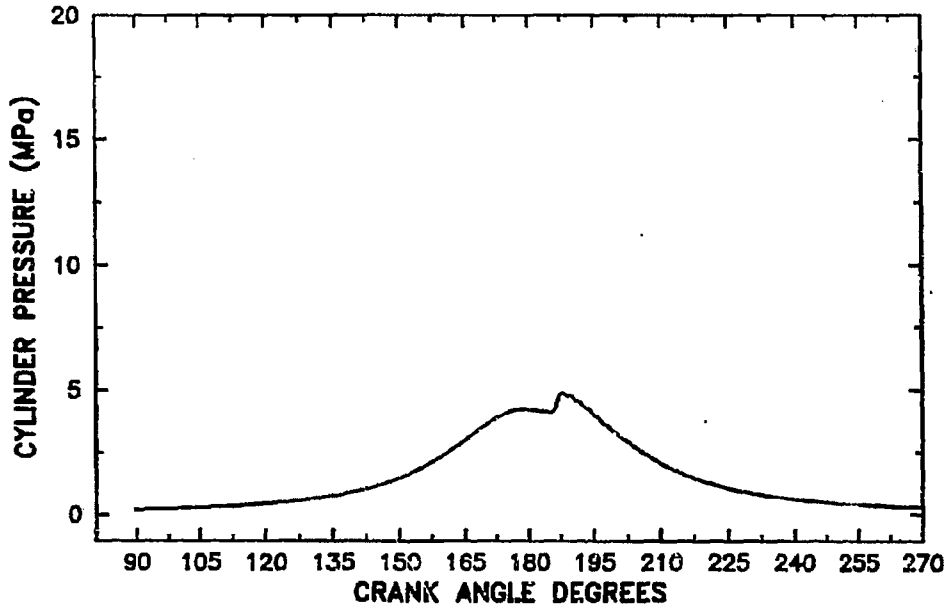
SPEED 1400 LOAD %050 FUEL TARSAND TEST CODE 2331



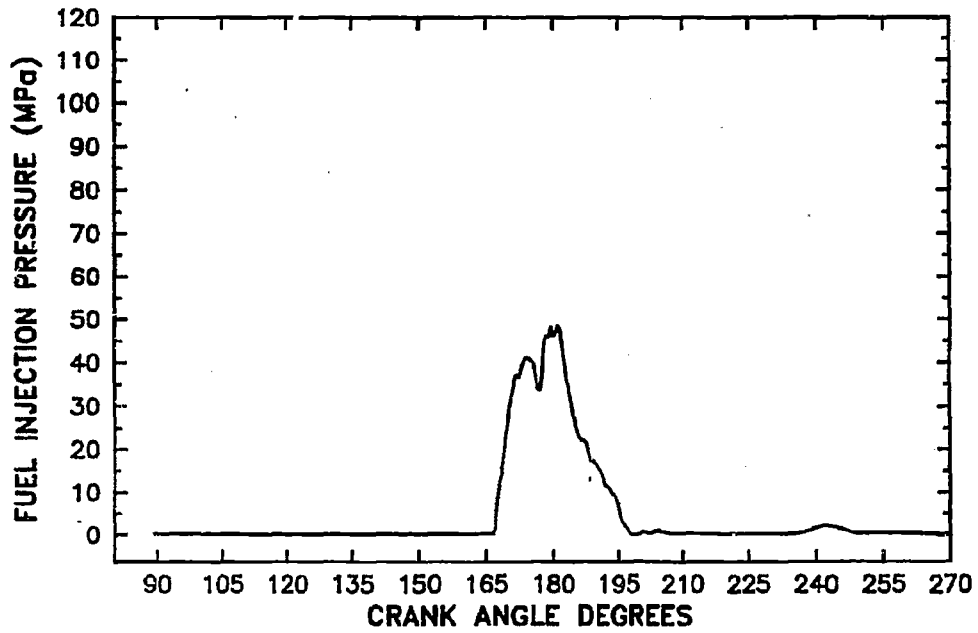
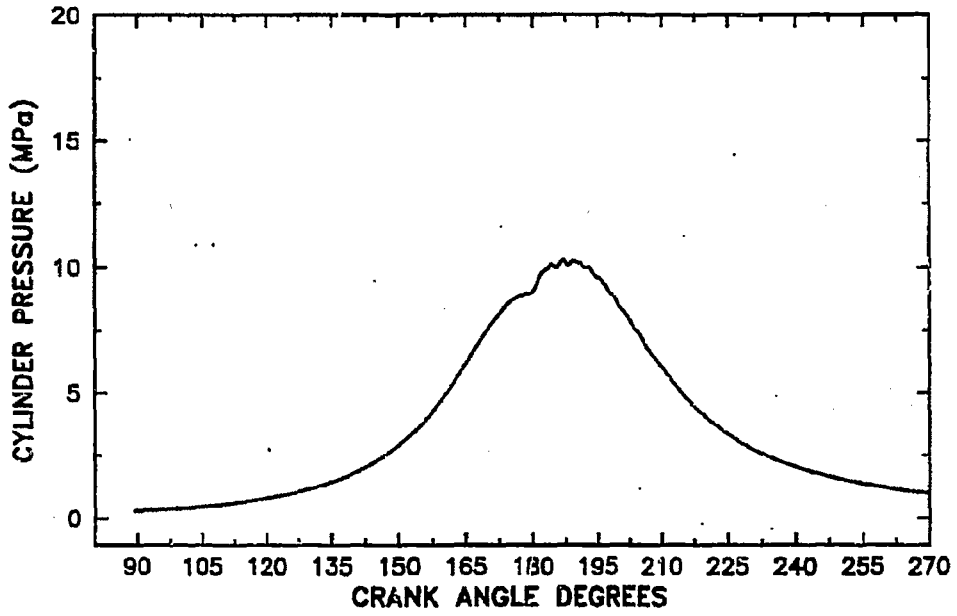
SPEED 1400 LOAD %025 FUEL TARSAND TEST CODE 2341



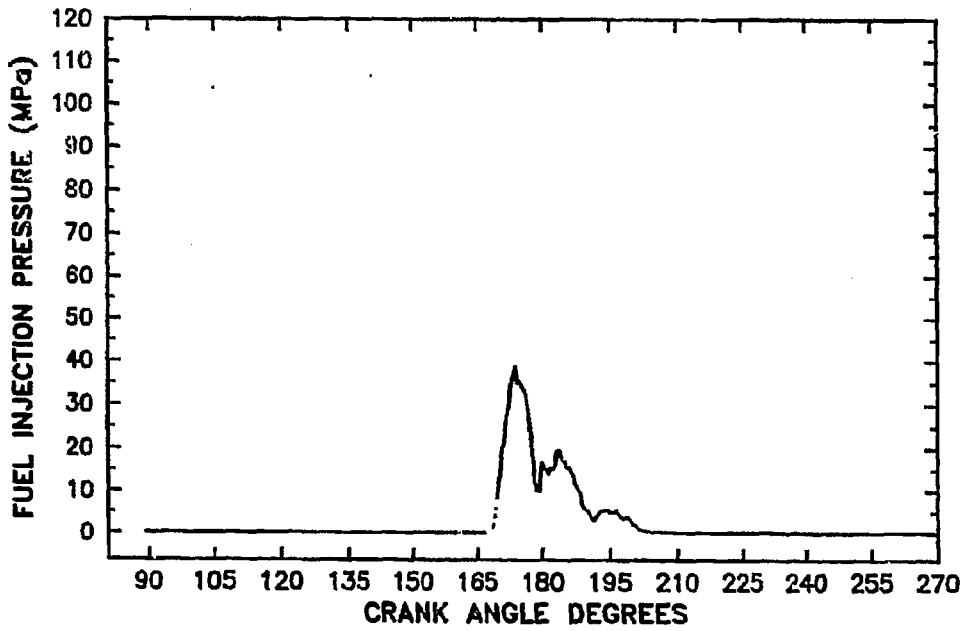
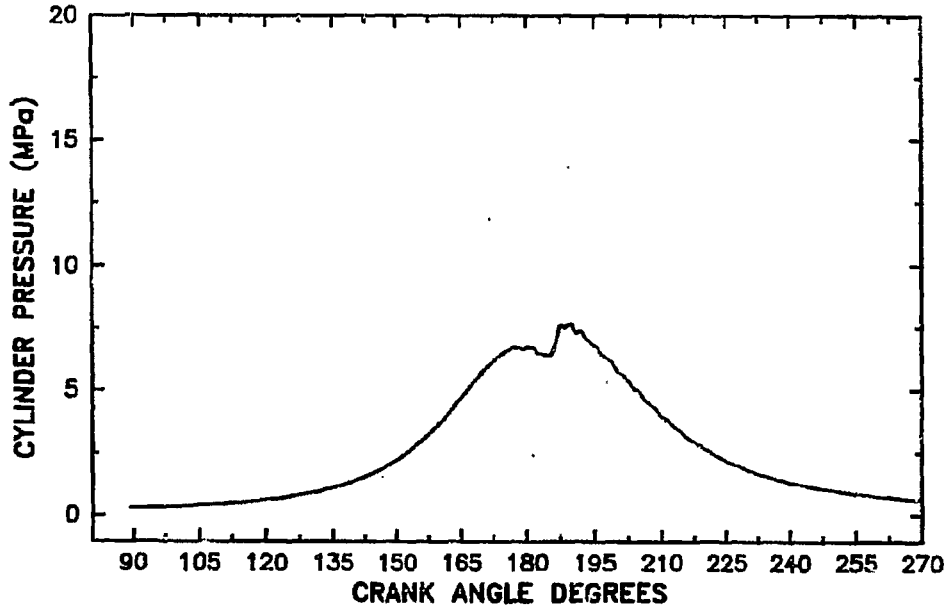
SPEED 1400 LOAD 7000 FUEL TARSAND TEST CODE 2351



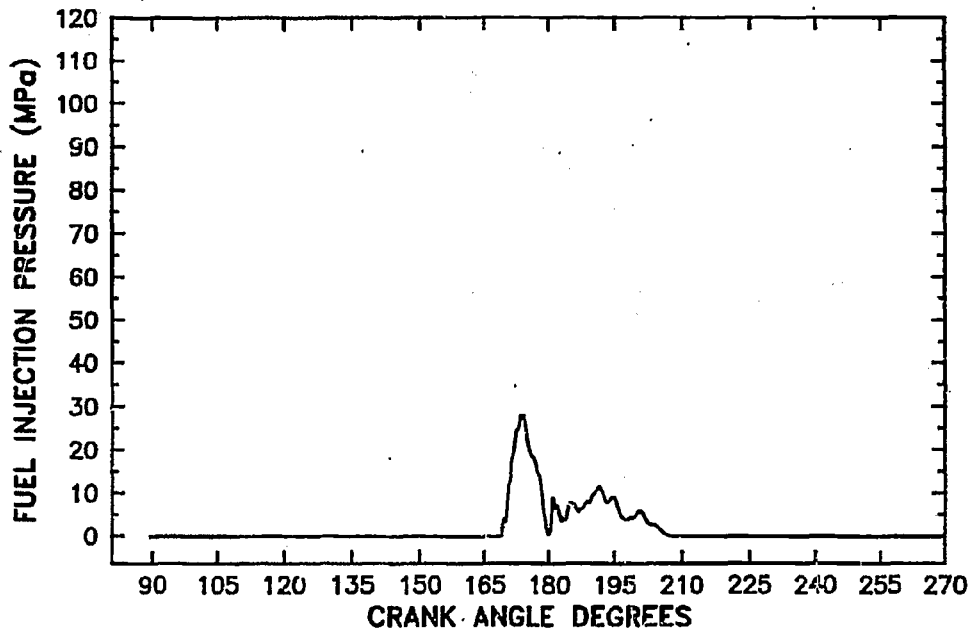
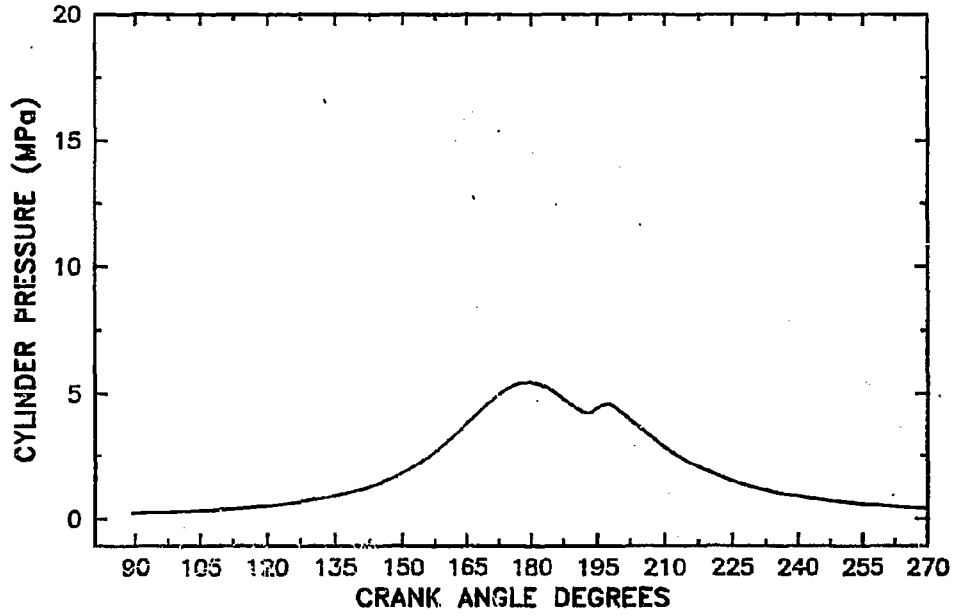
SPEED 2200 LOAD %100 FUEL TARSAND TEST CODE 2361



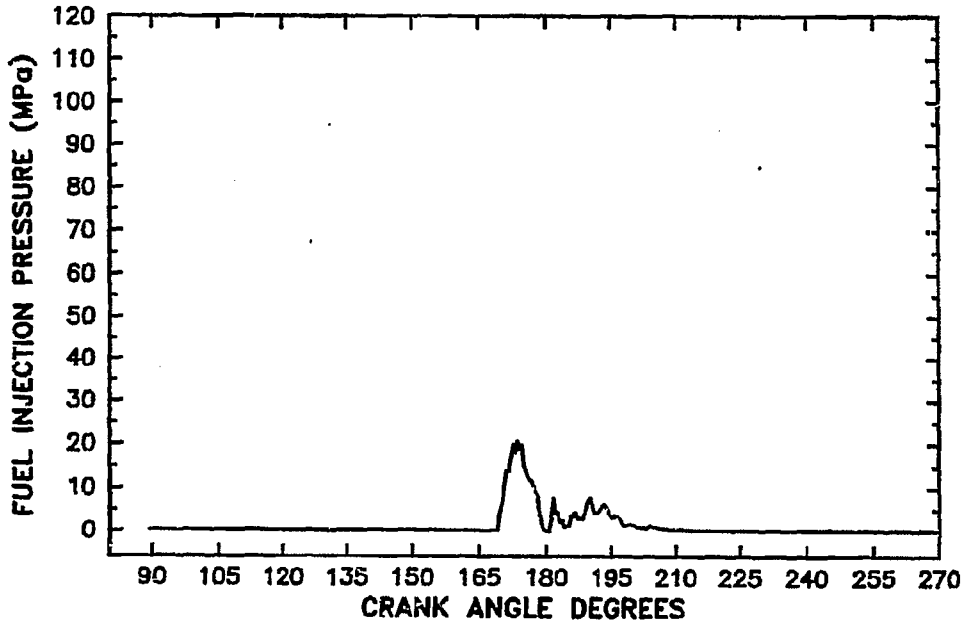
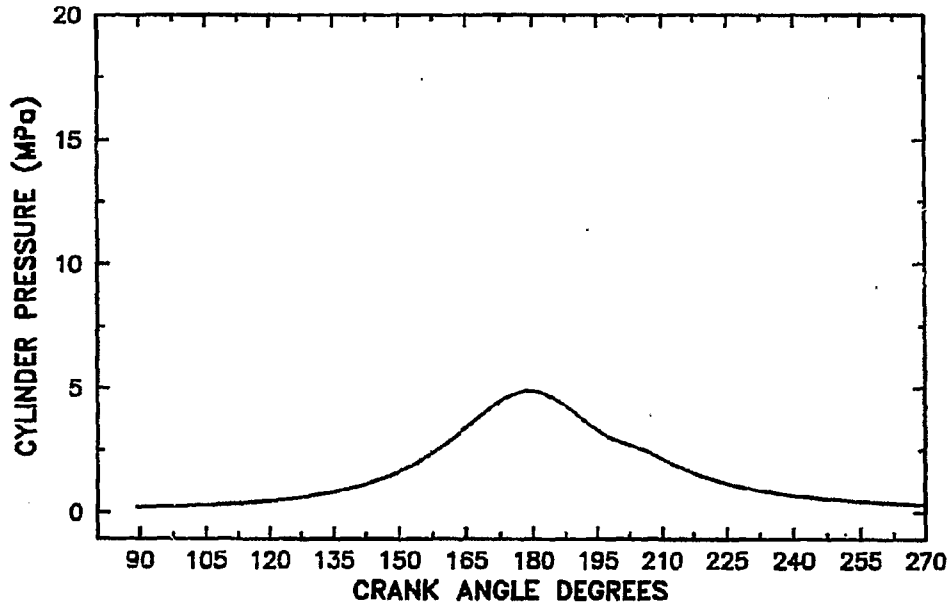
SPEED 2200 LOAD %050 FUEL TARSAND TEST CODE 2371



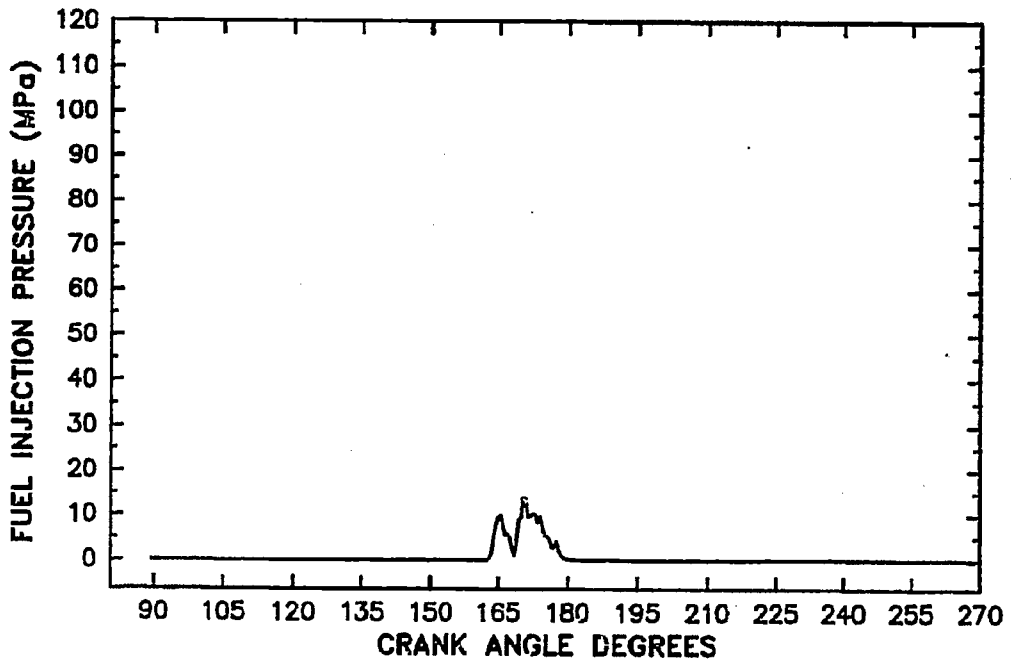
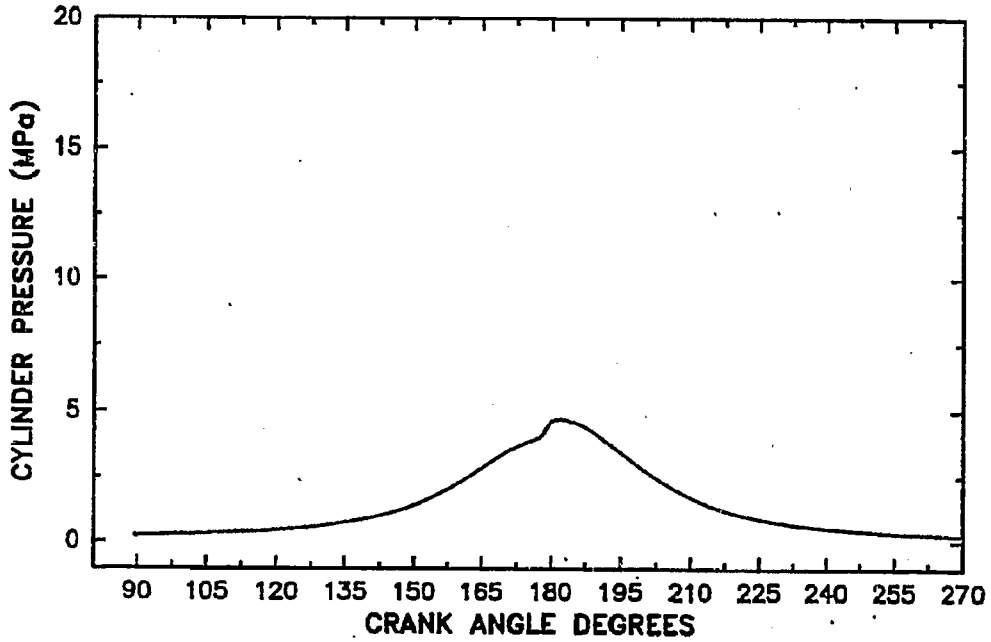
SPEED 2200 LOAD %025 FUEL TARSAND TEST CODE 2381



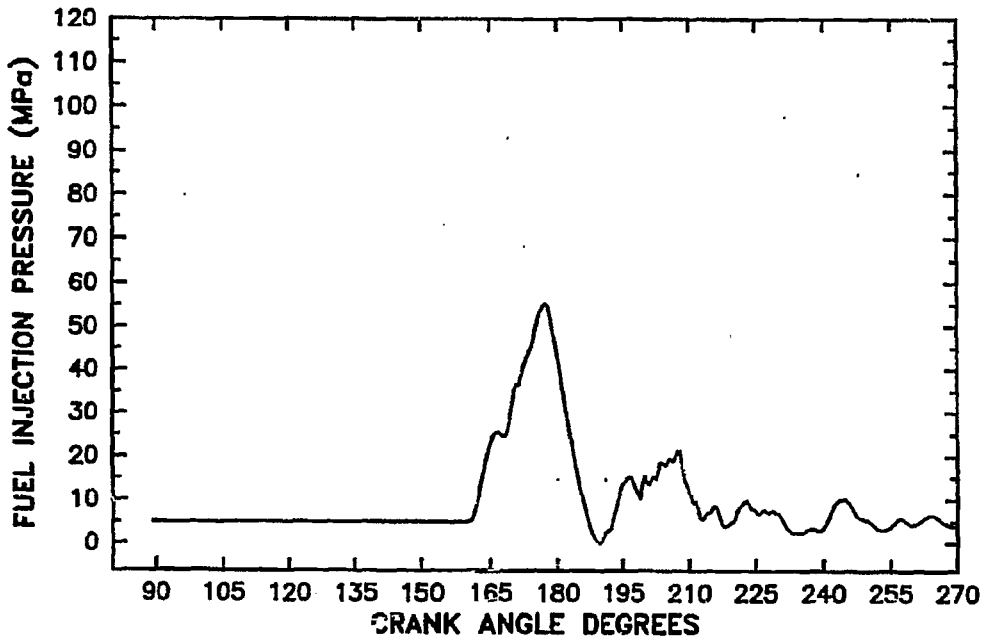
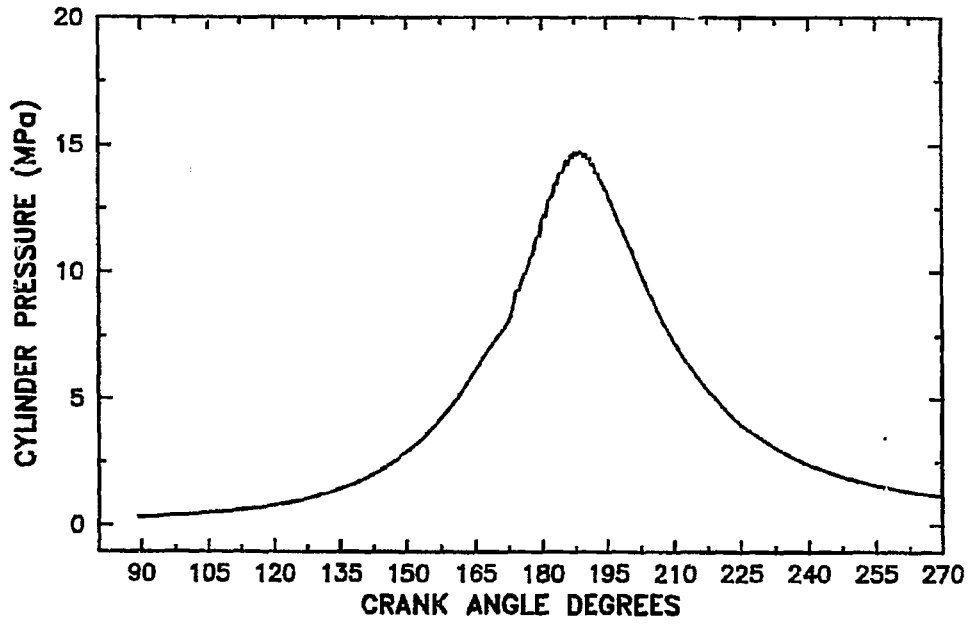
SPEED 2200 LOAD %000 FUEL TARSAND TEST CODE 2391



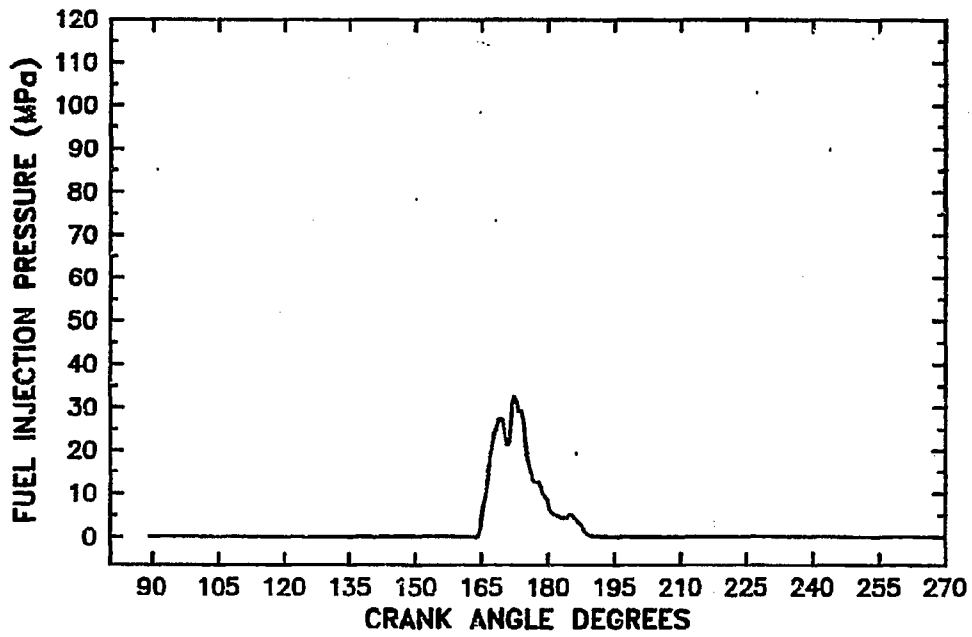
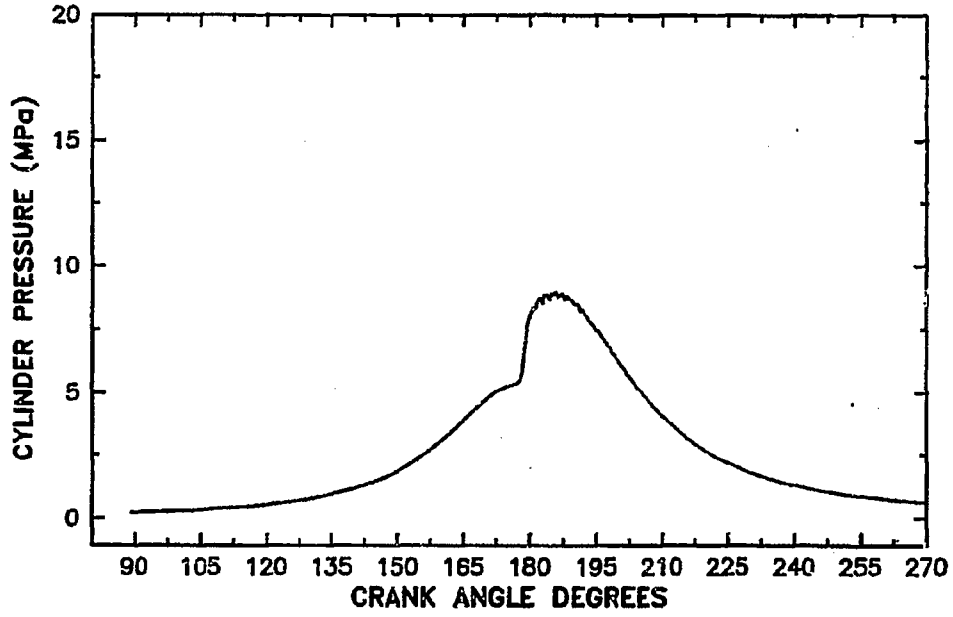
SPEED 829 LOAD %000 FUEL 57% EDS TEST CODE 2611



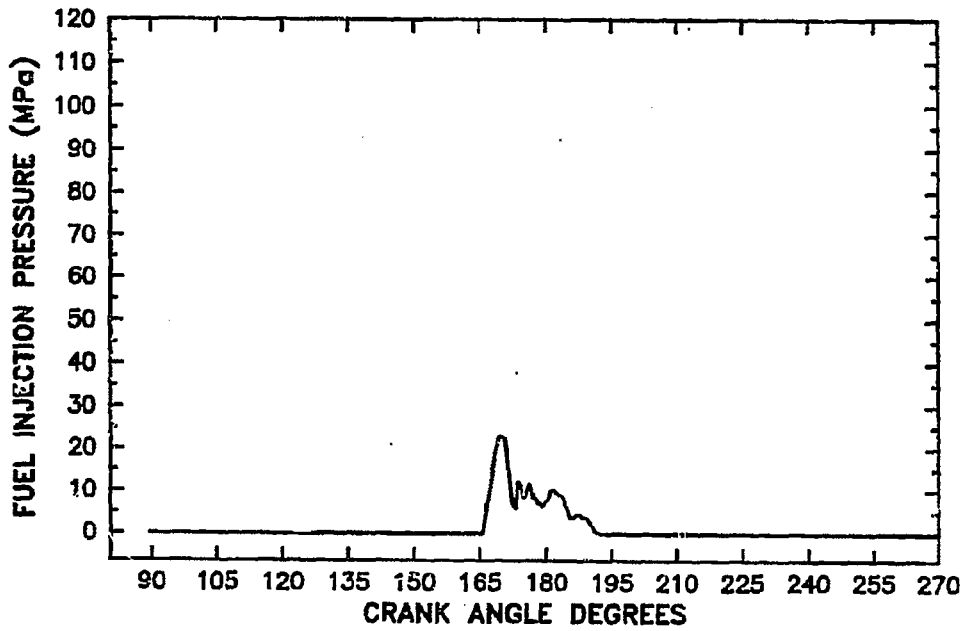
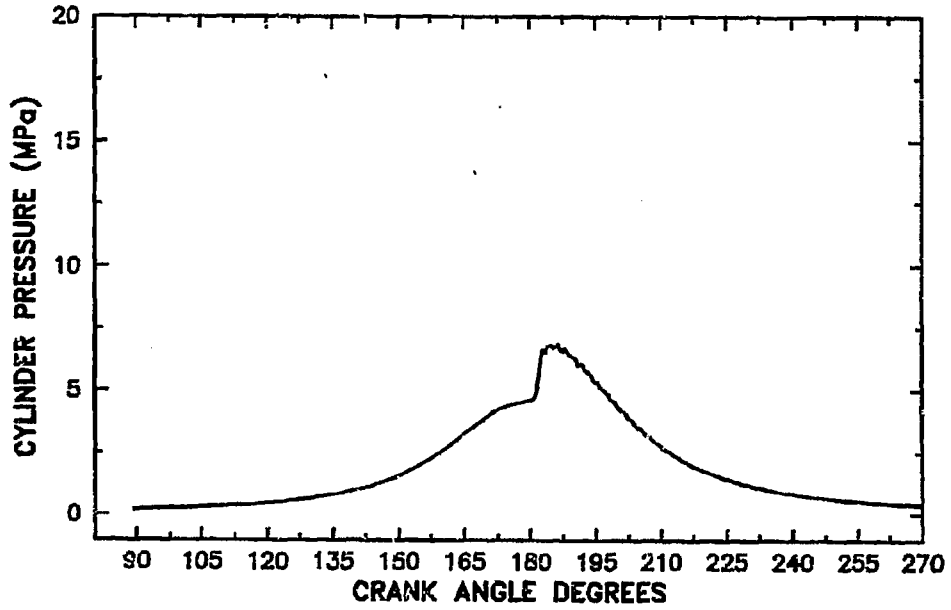
SPEED 1400 LOAD %100 FUEL 57% EDS TEST CODE 2621



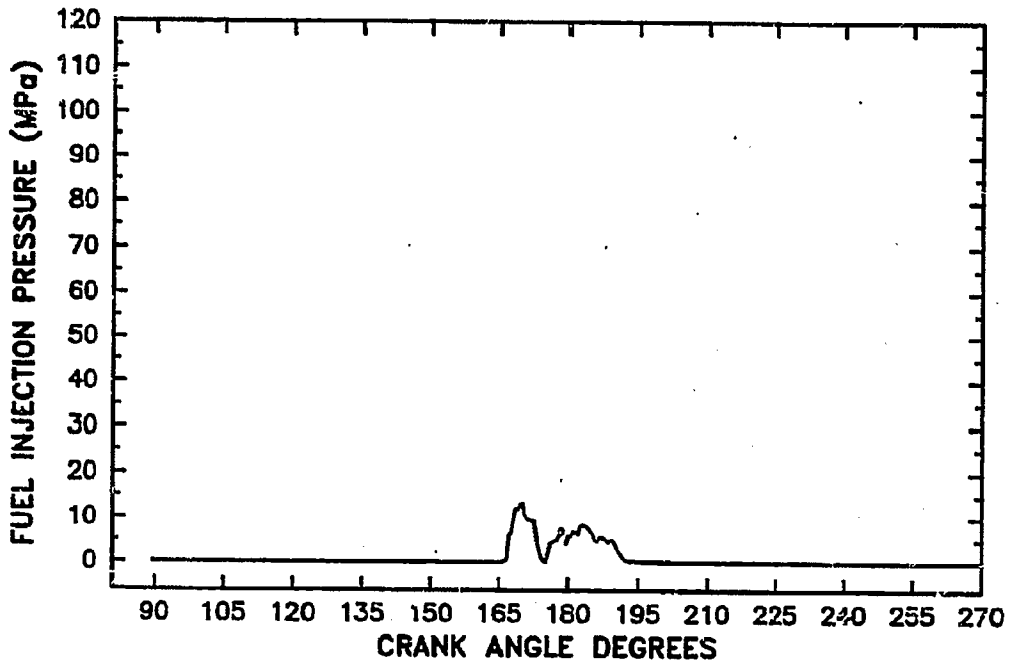
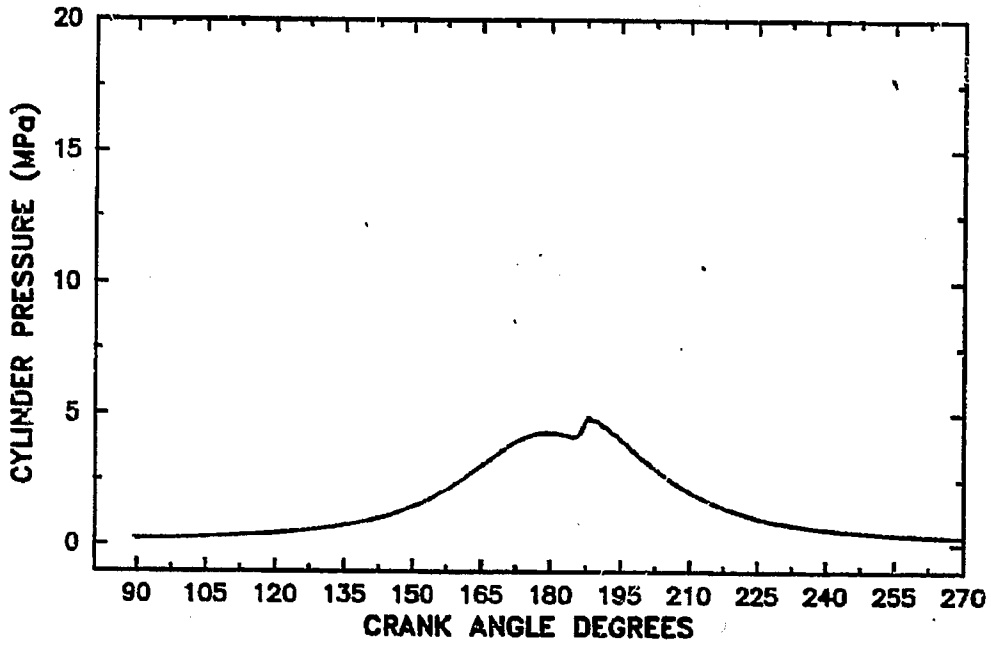
SPEED 1400 LOAD %050 FUEL 57% EDS TEST CODE 2631



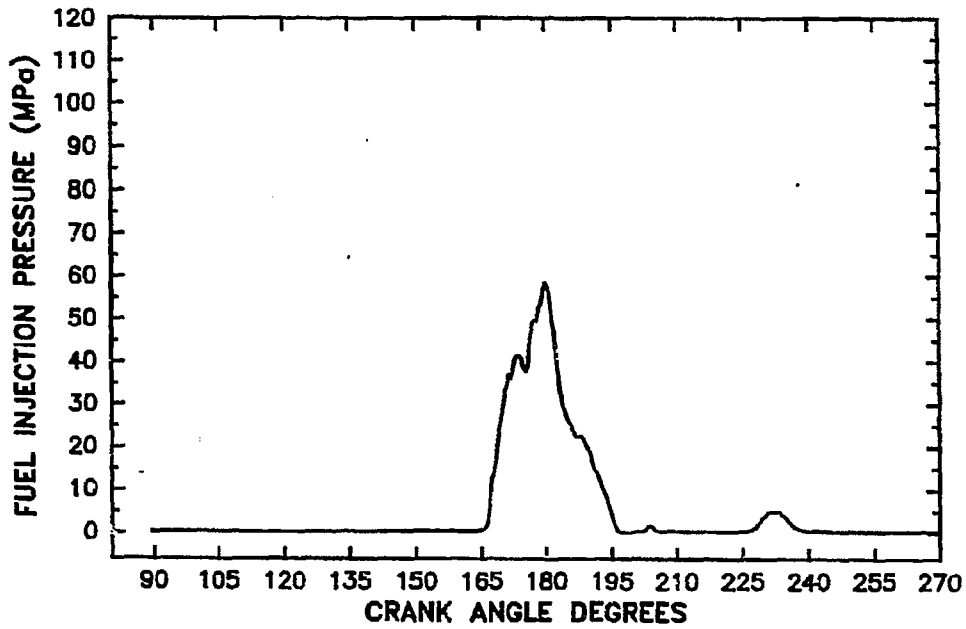
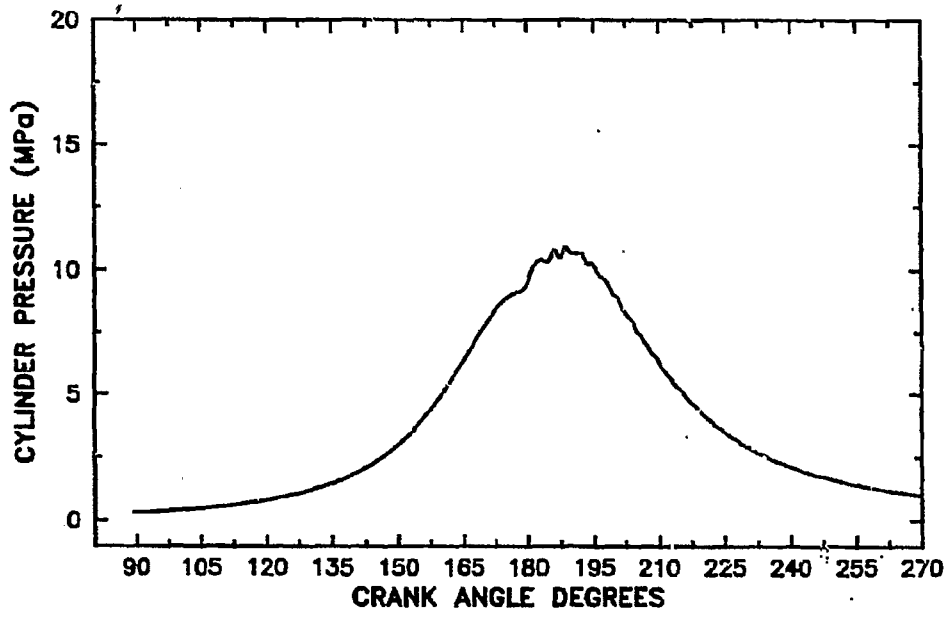
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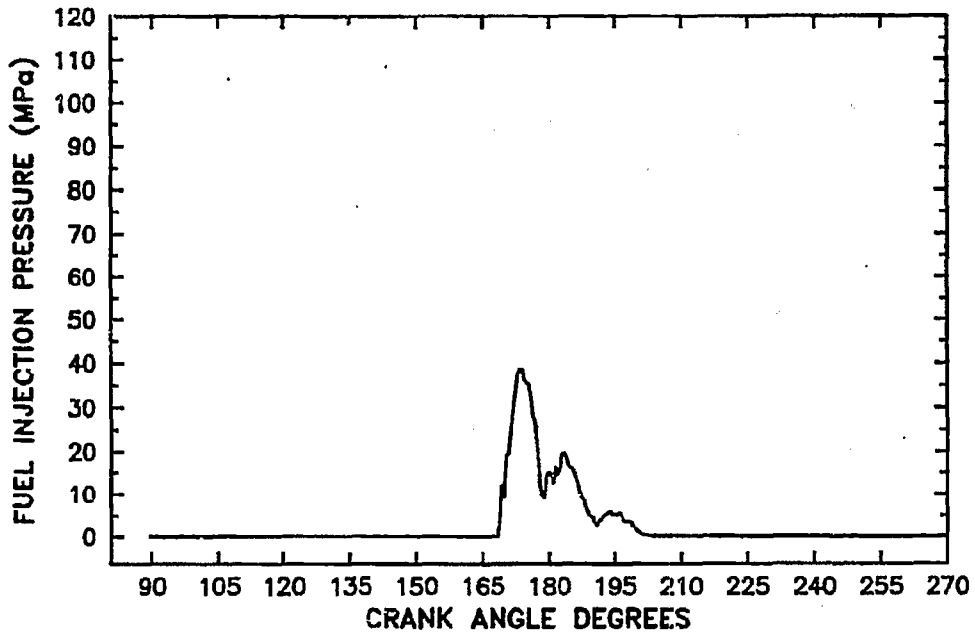
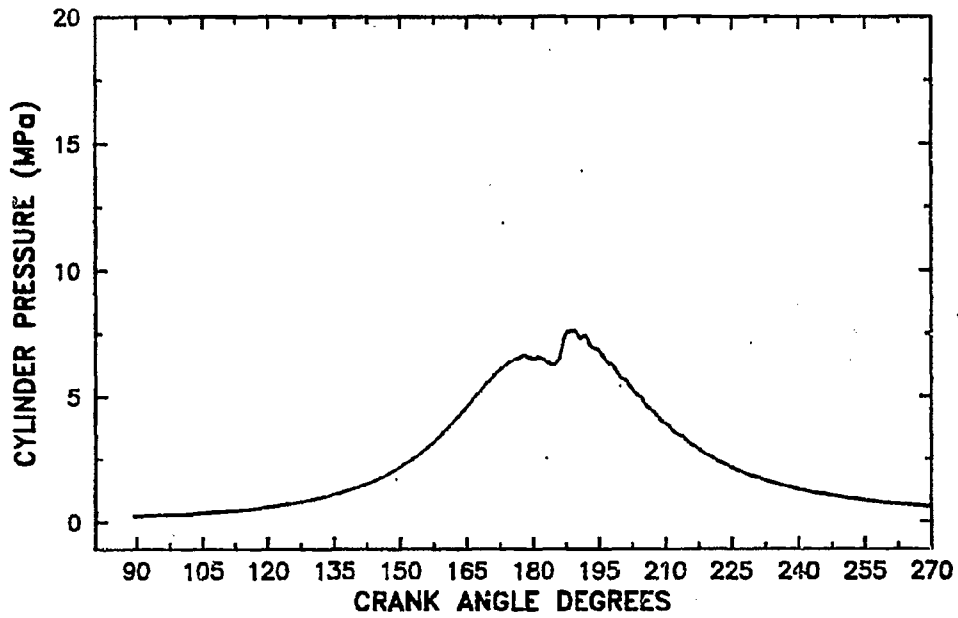
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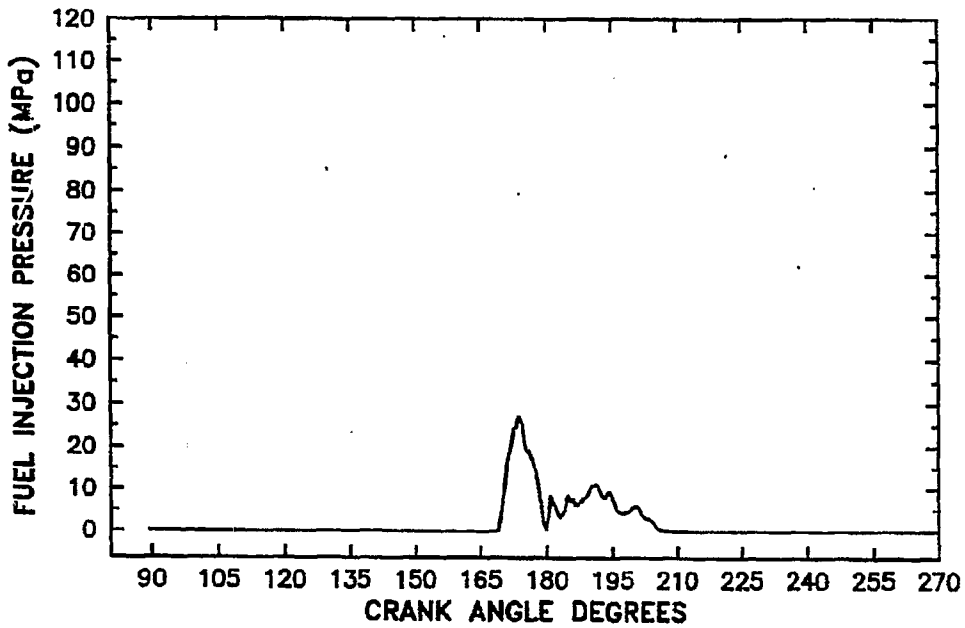
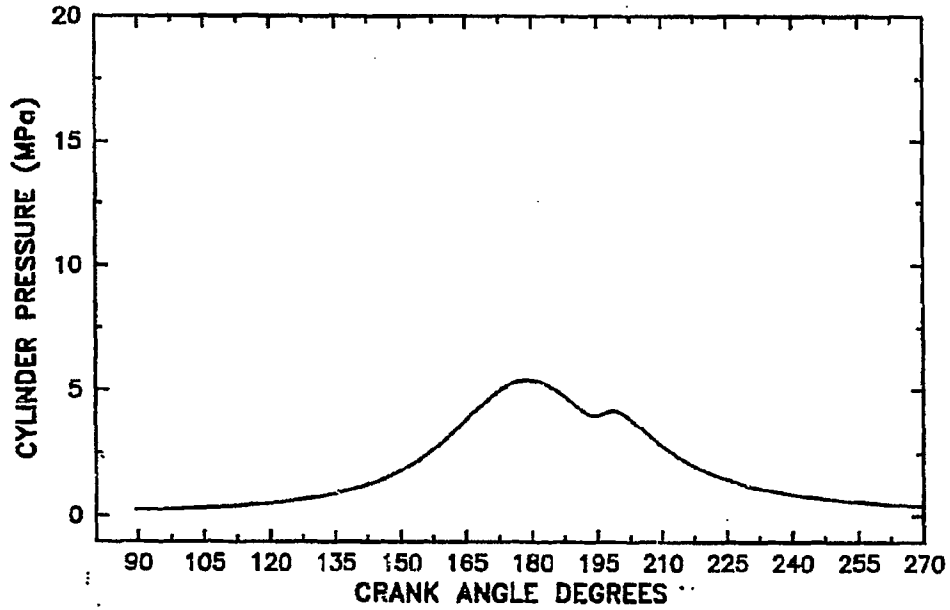
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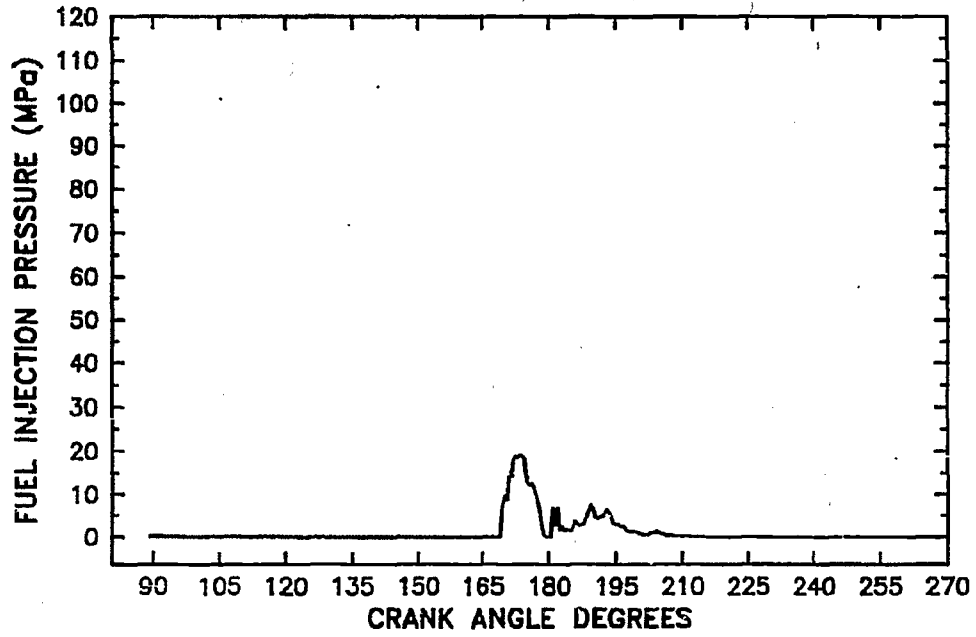
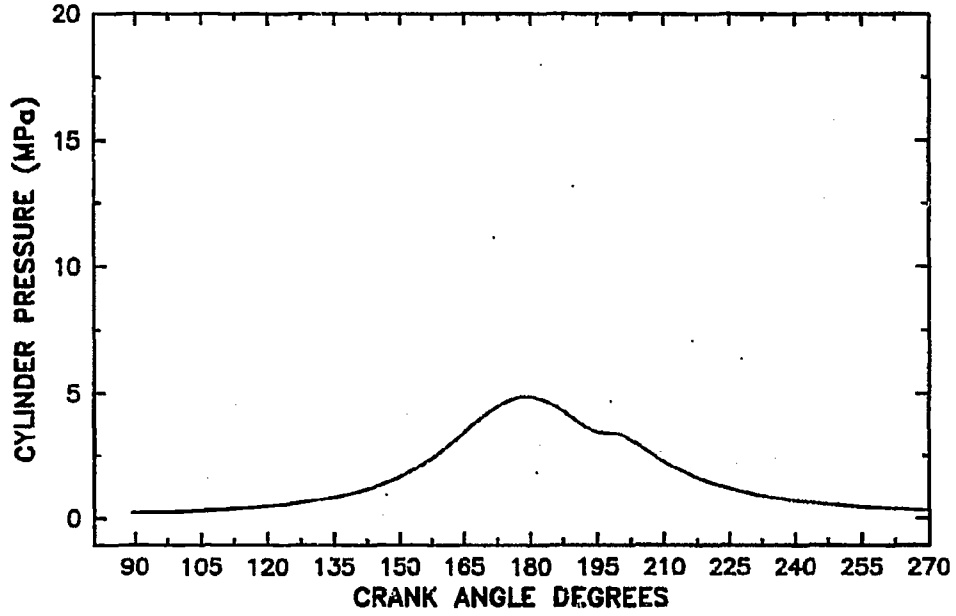


SPEED 2200 LOAD %025 FUEL 57% EDS TEST CODE 2681



315/316

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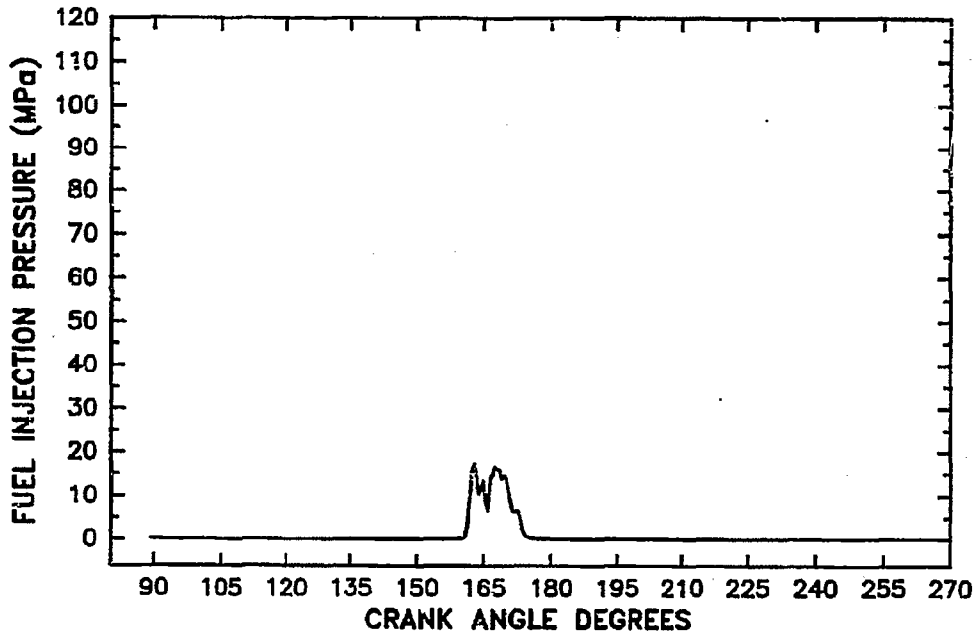
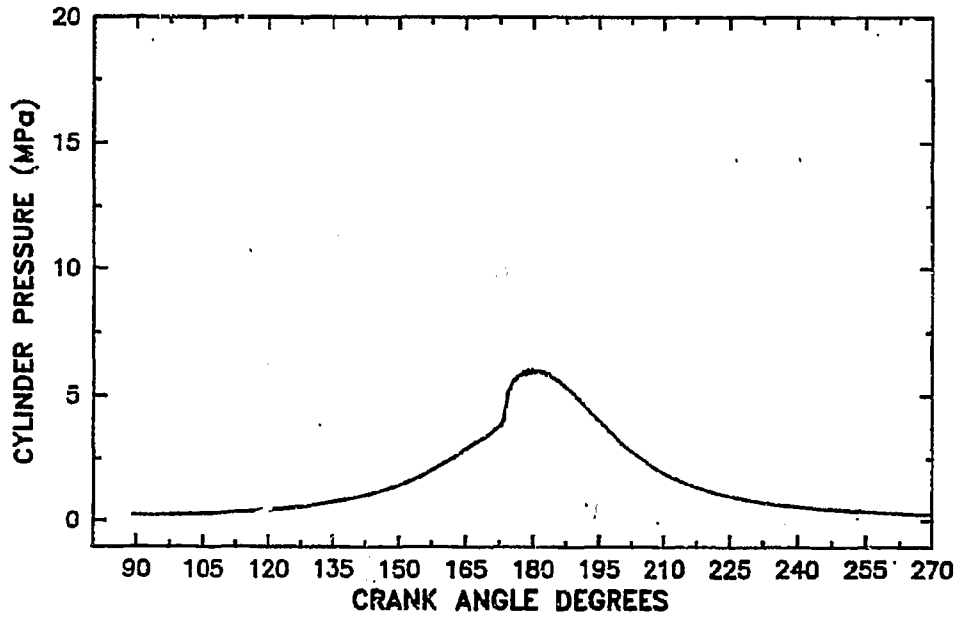


317/318

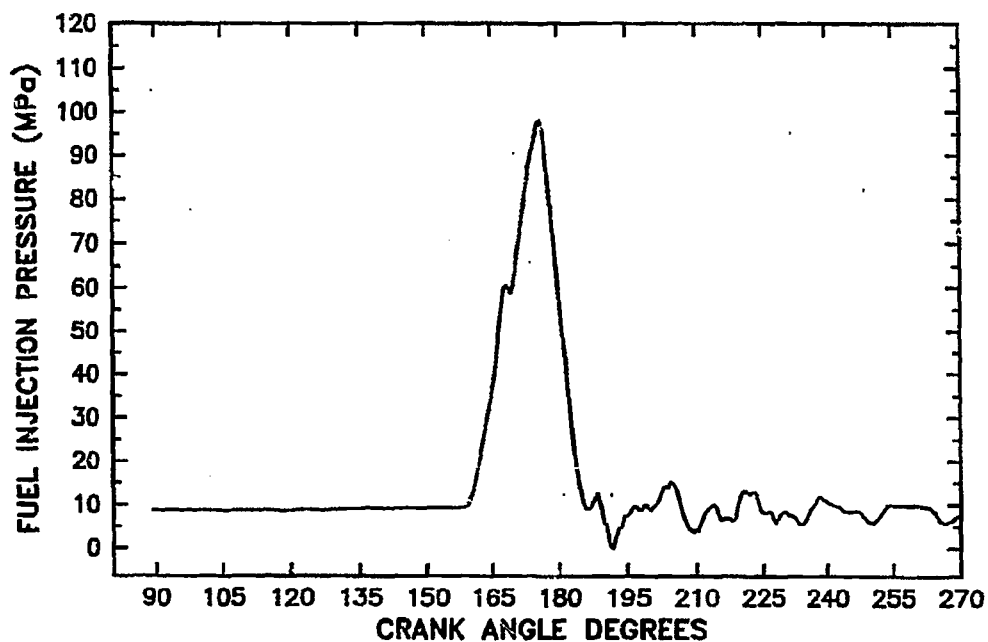
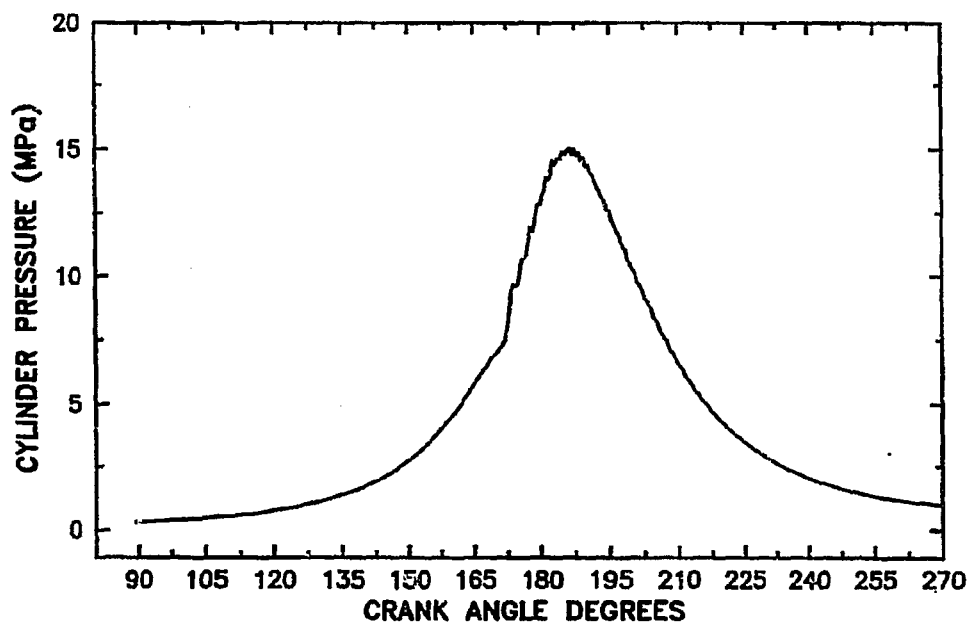
APPENDIX P
PHASE II CYLINDER PRESSURE
AND FUEL INJECTION PRESSURE DIAGRAMS
SIMULATED AIR-TO-AIR AFTERCOOLER AND
HIGH PRESSURE FUEL INJECTION SYSTEM

Note: The 0 percent load (shown on the figures) actually corresponds to 7 percent load. The 7 percent load was the minimum required to ensure stable dynamometer operation.

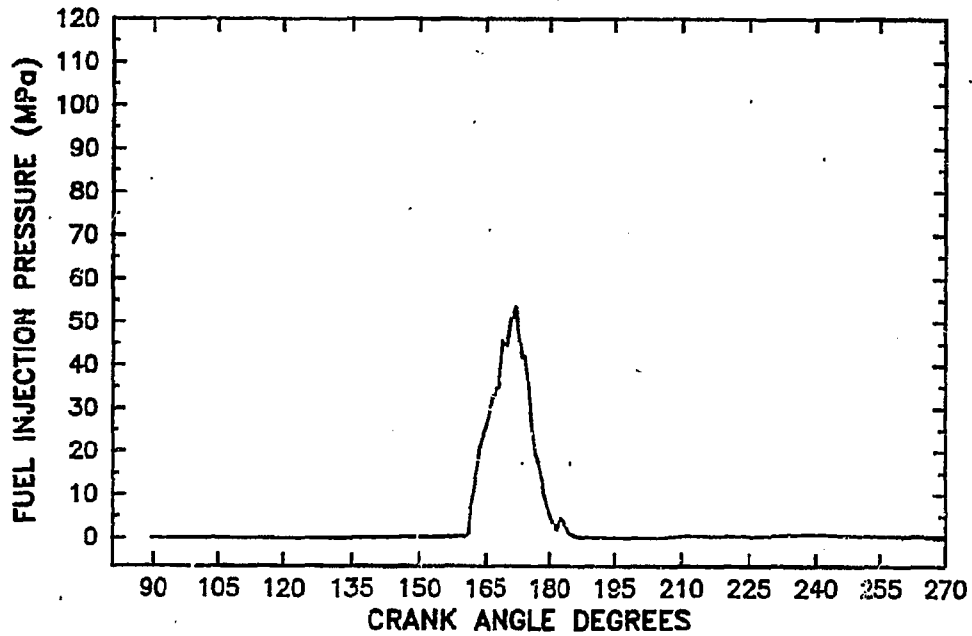
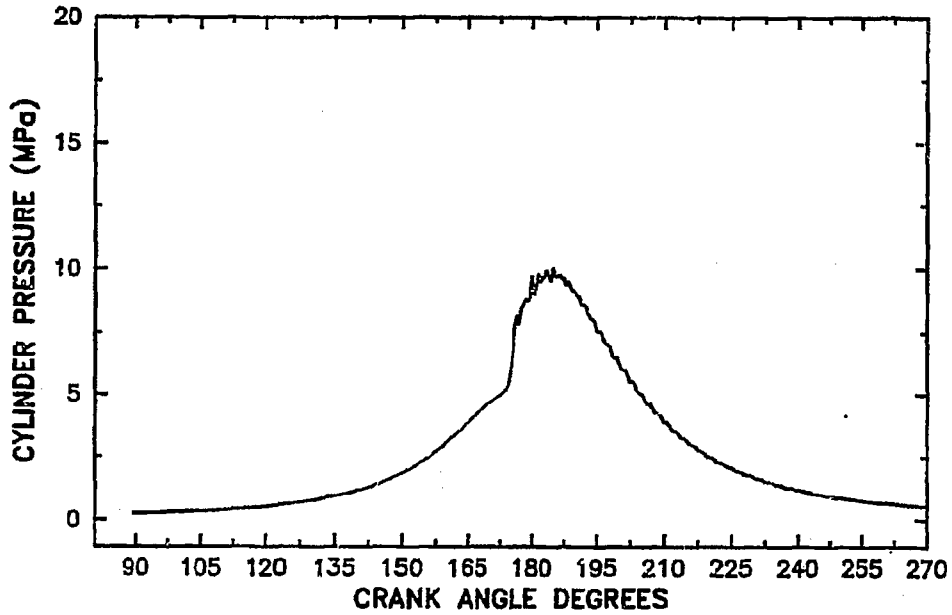
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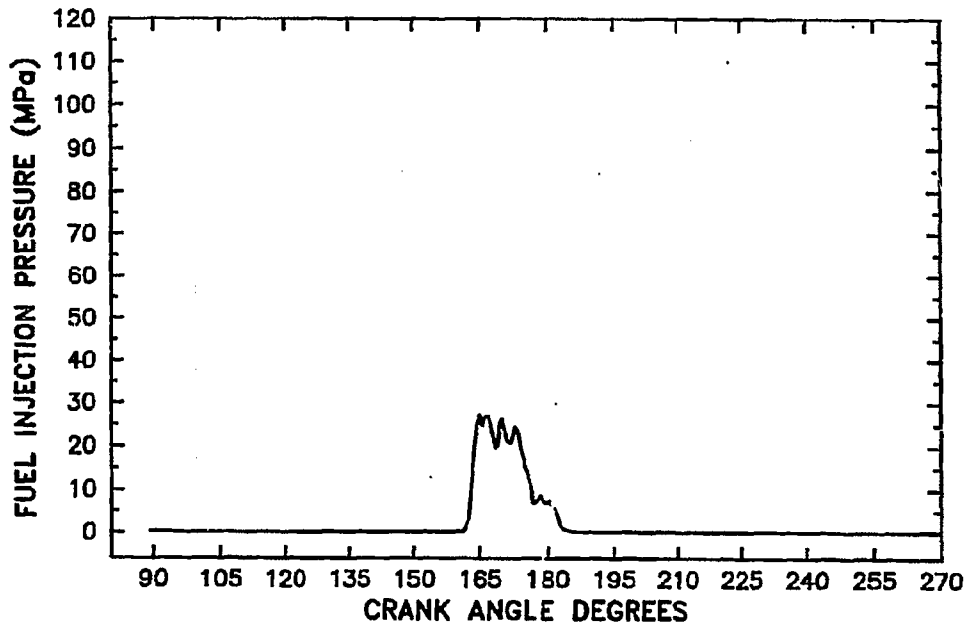
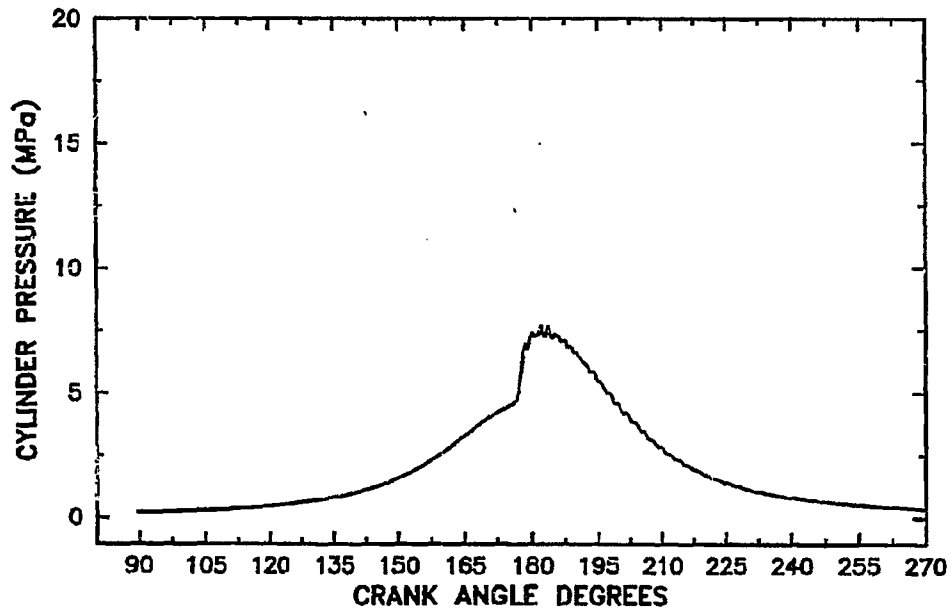
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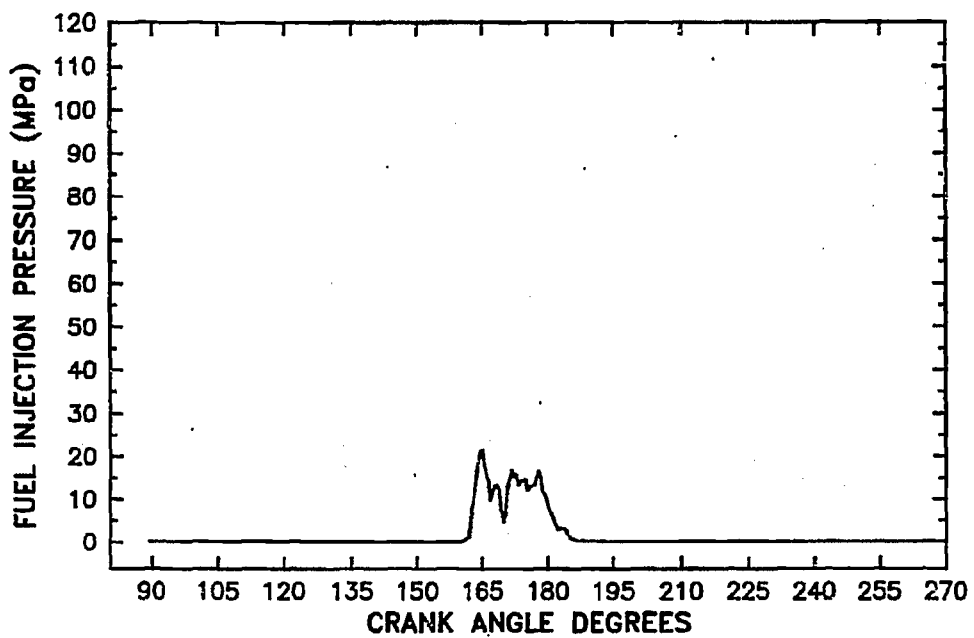
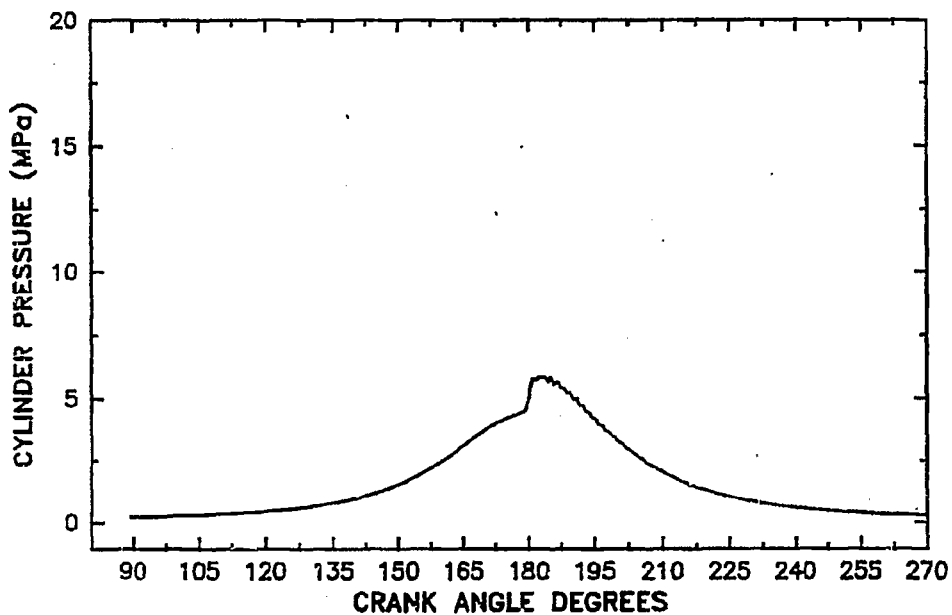
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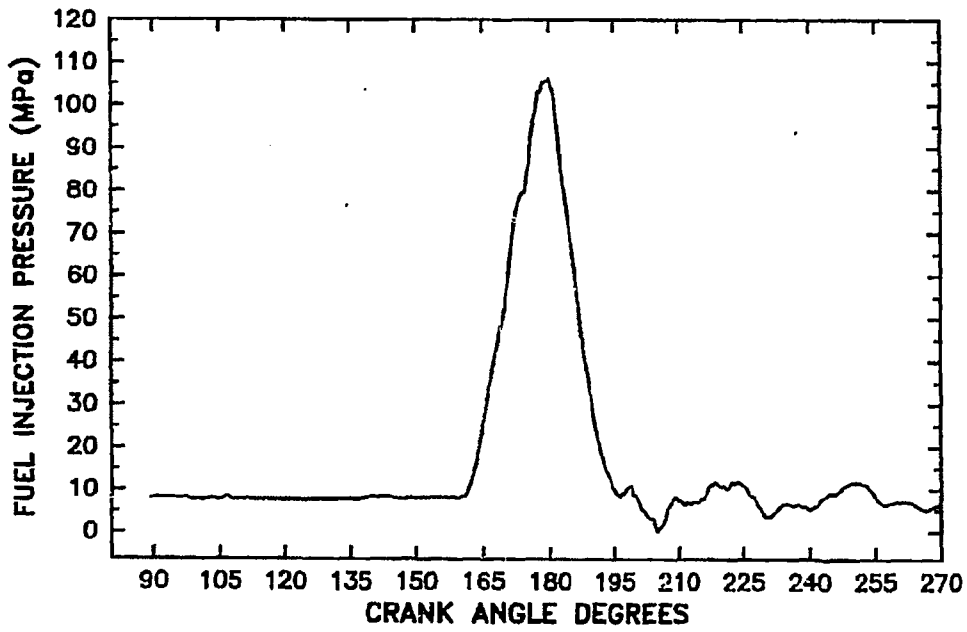
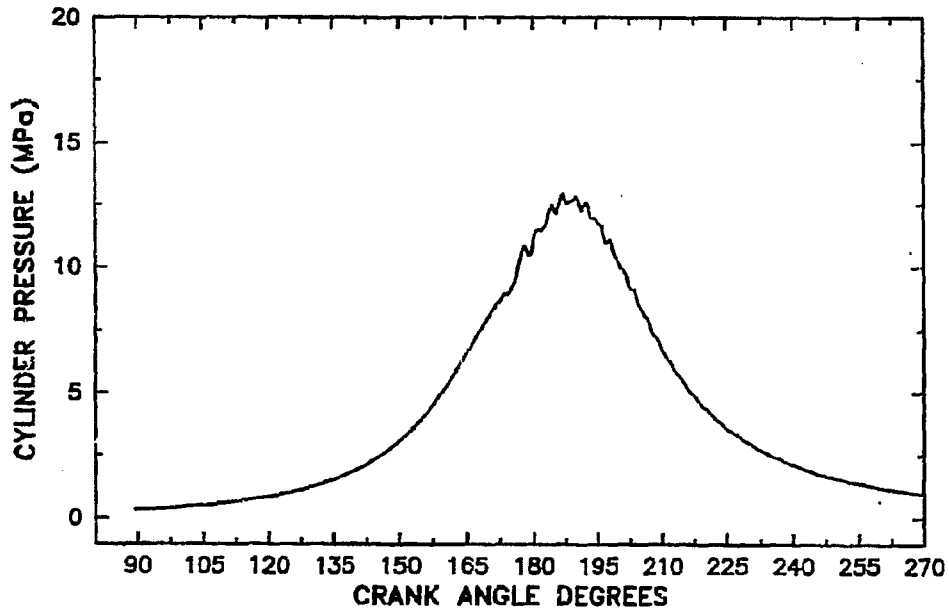
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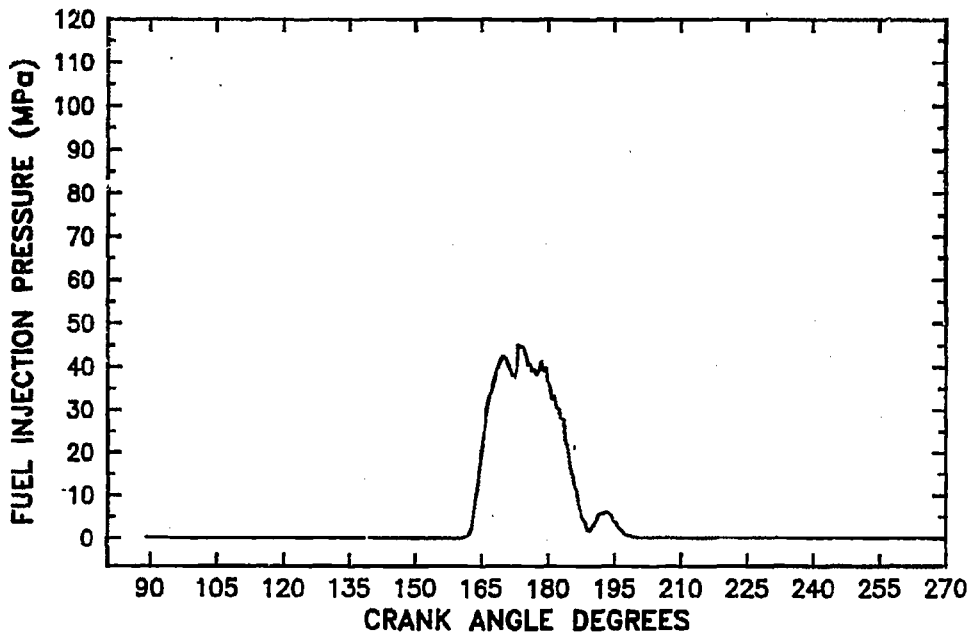
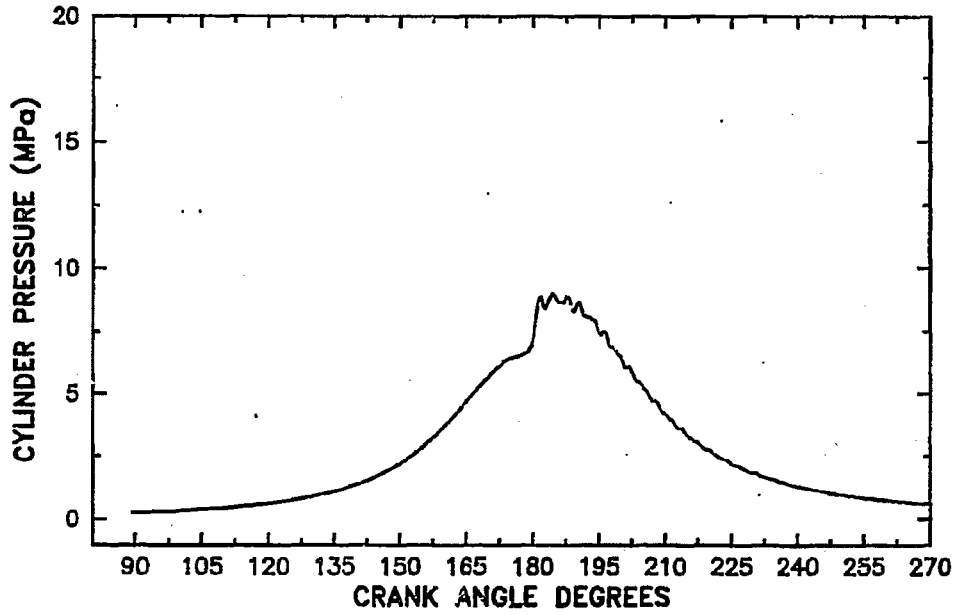
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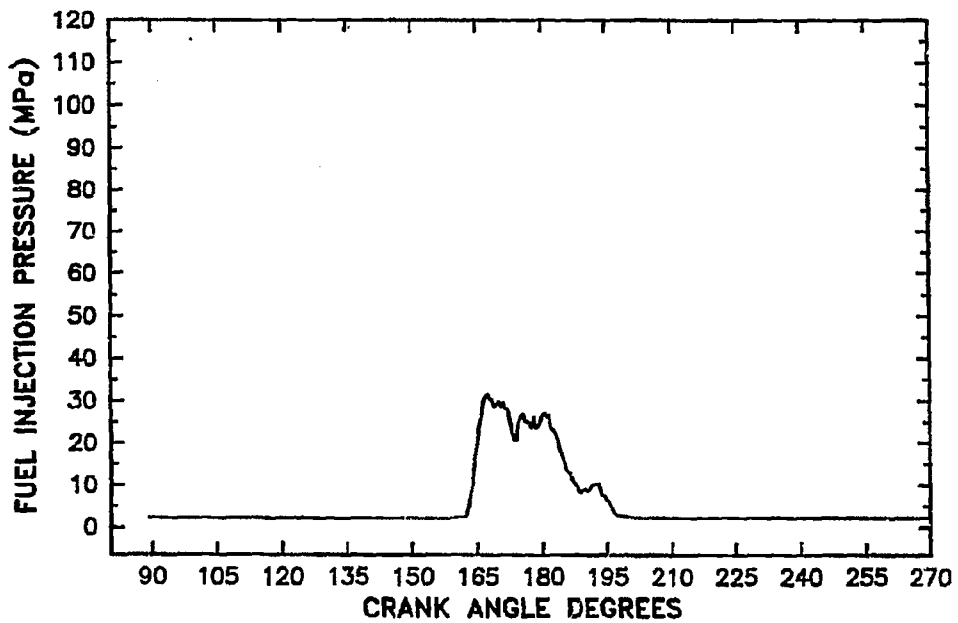
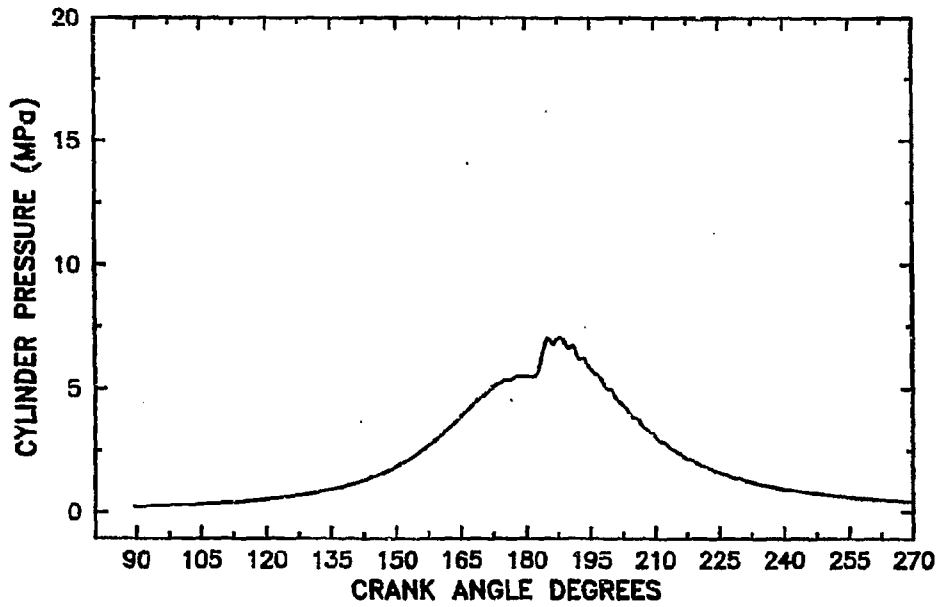
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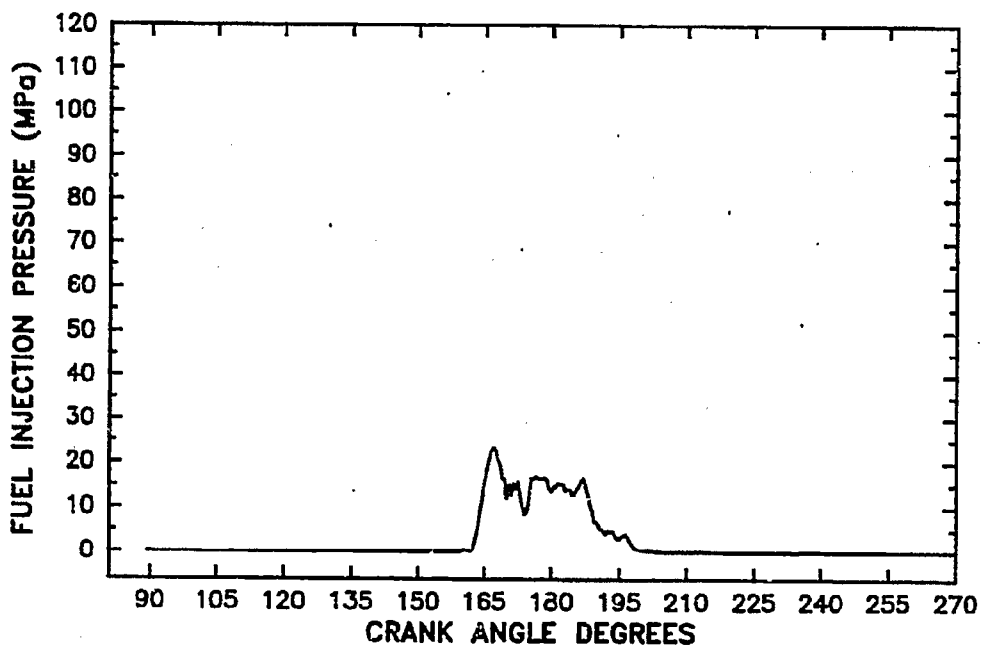
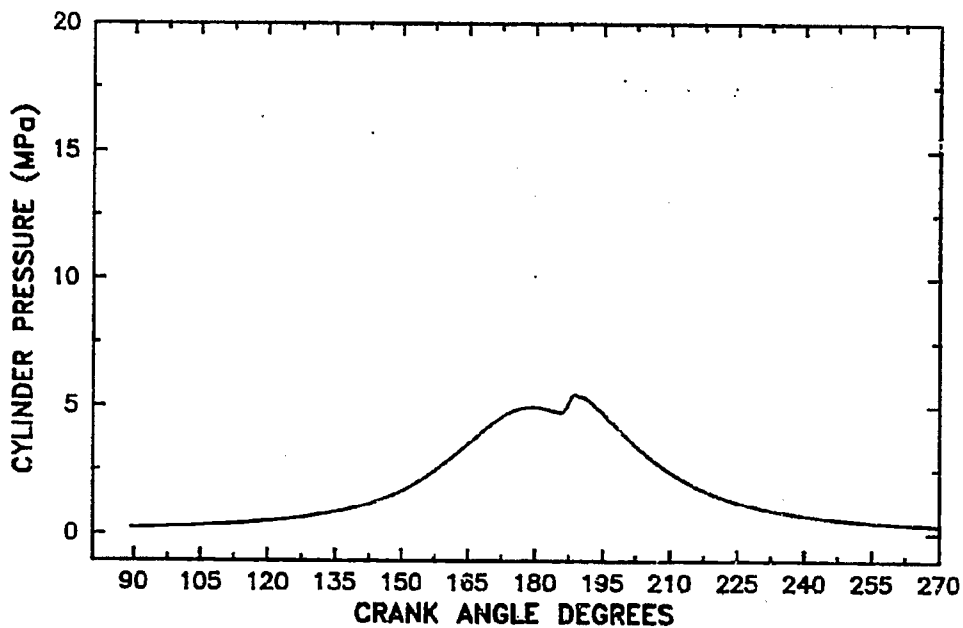
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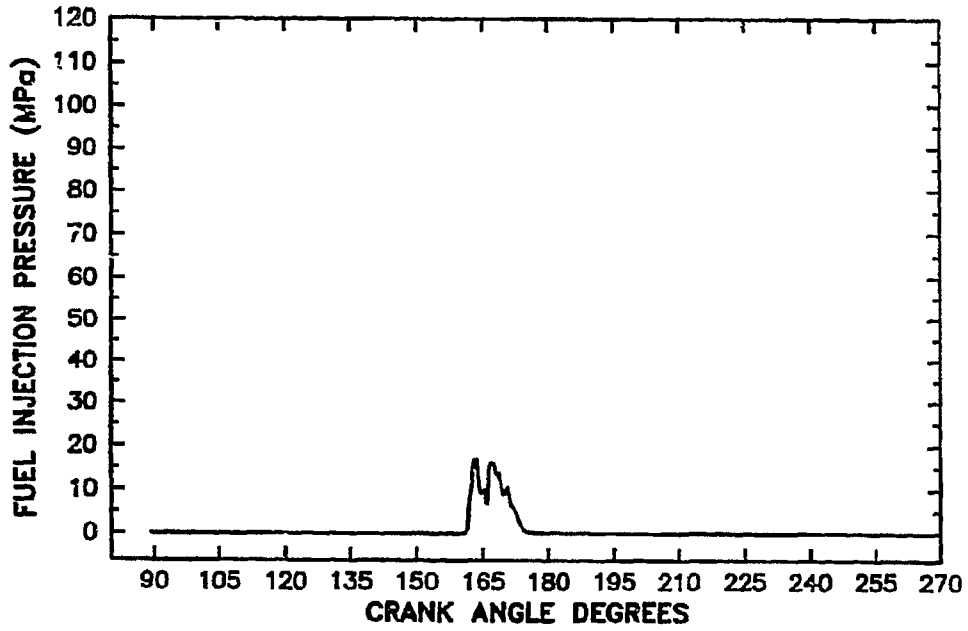
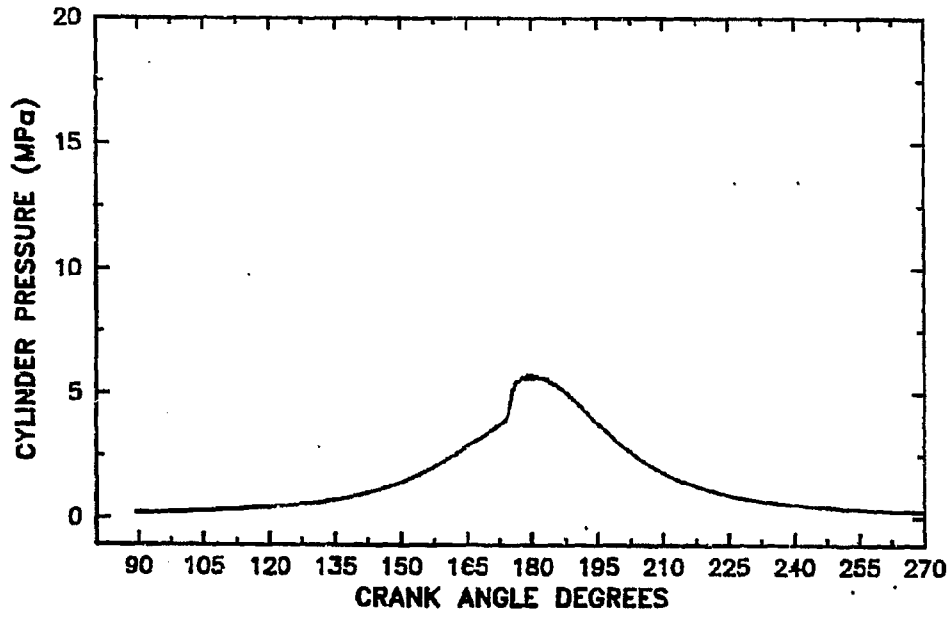
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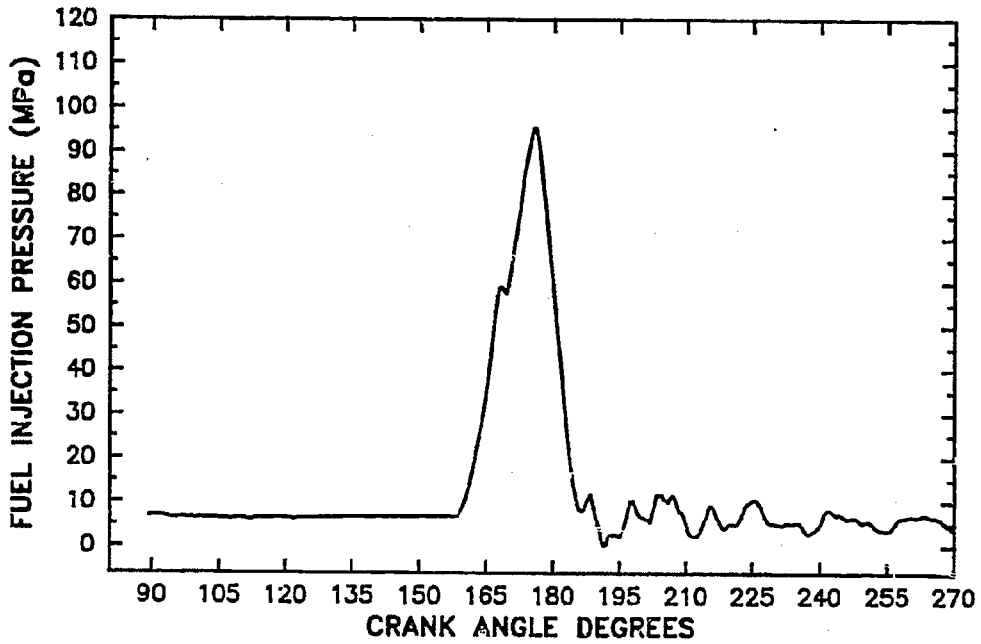
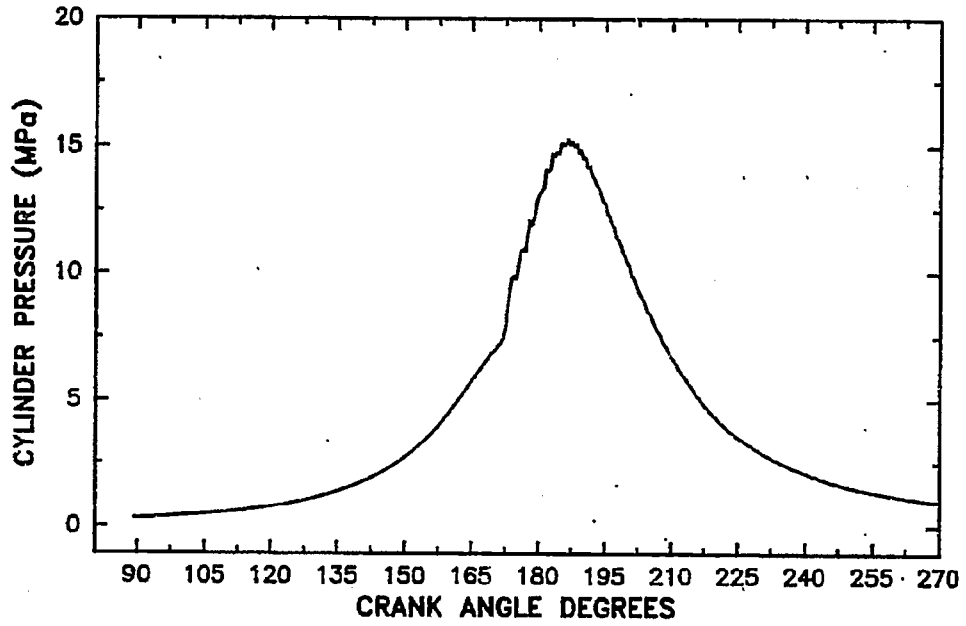
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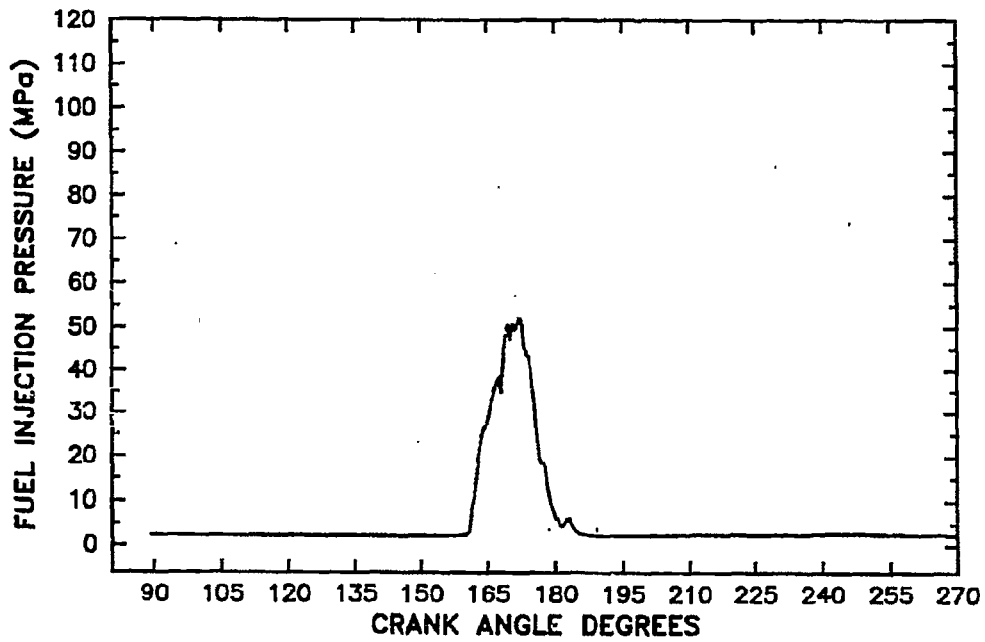
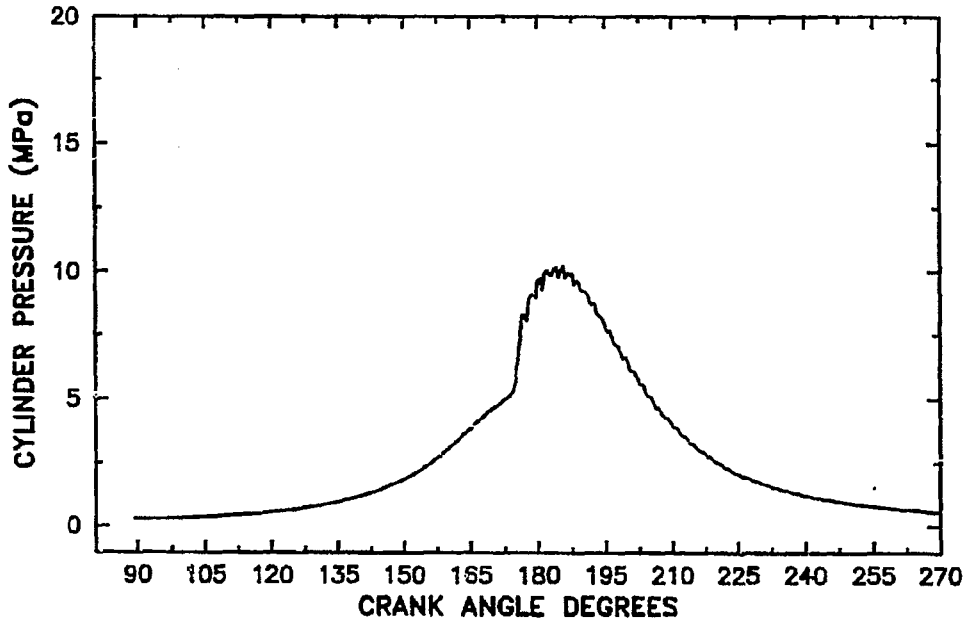
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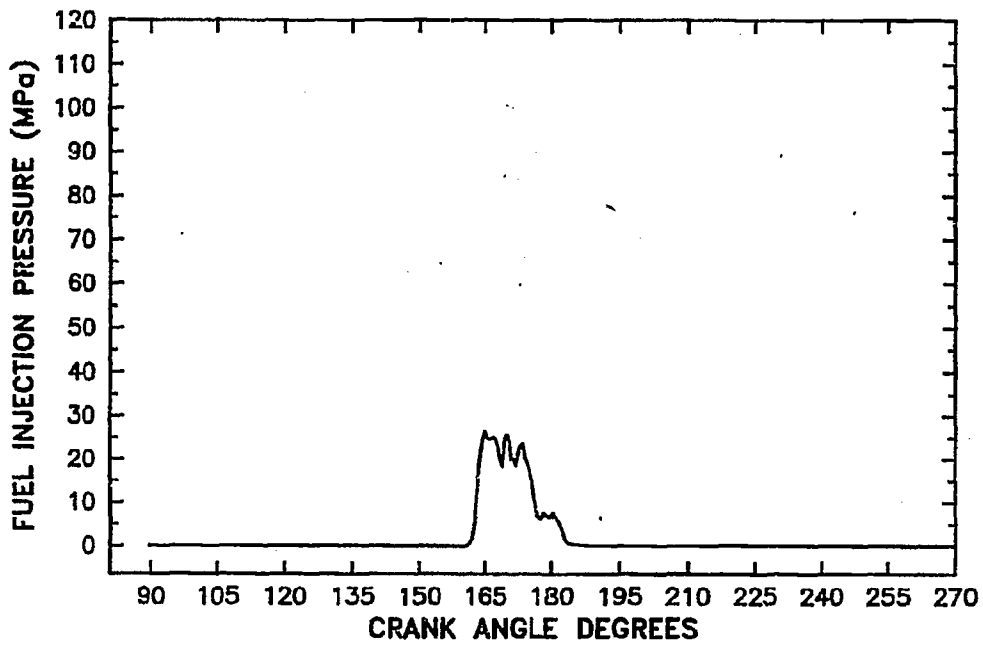
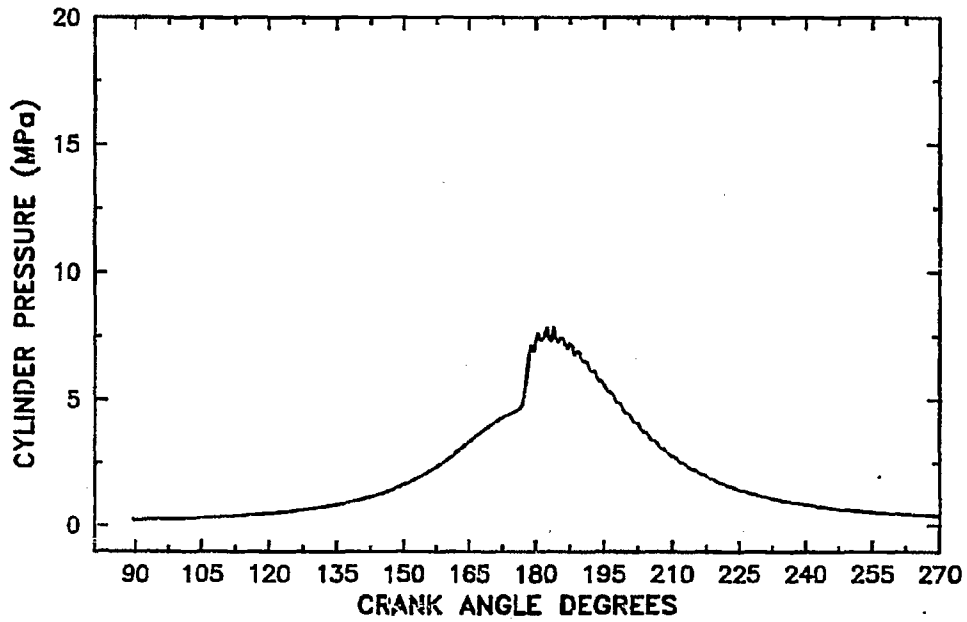
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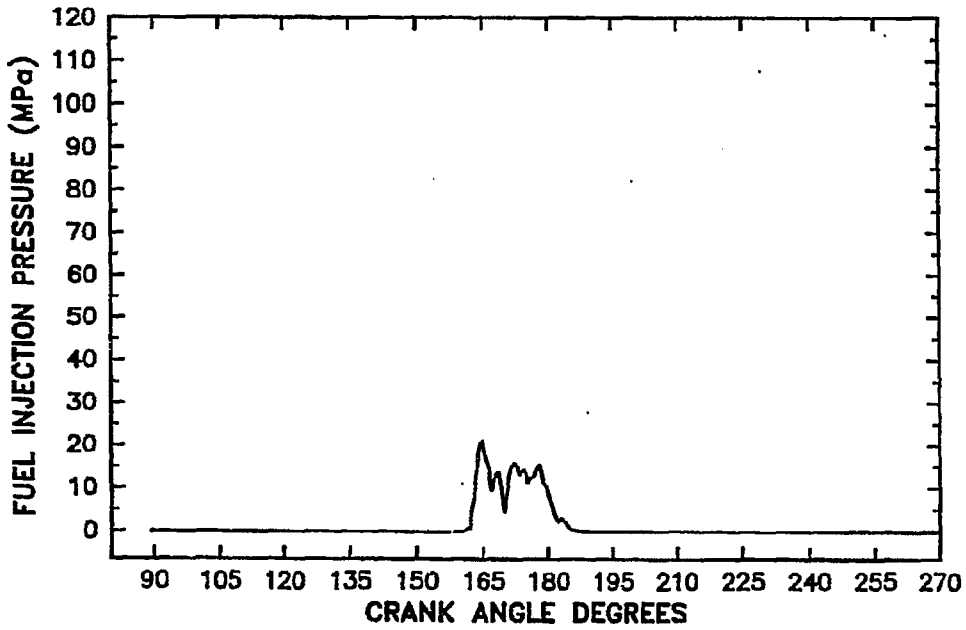
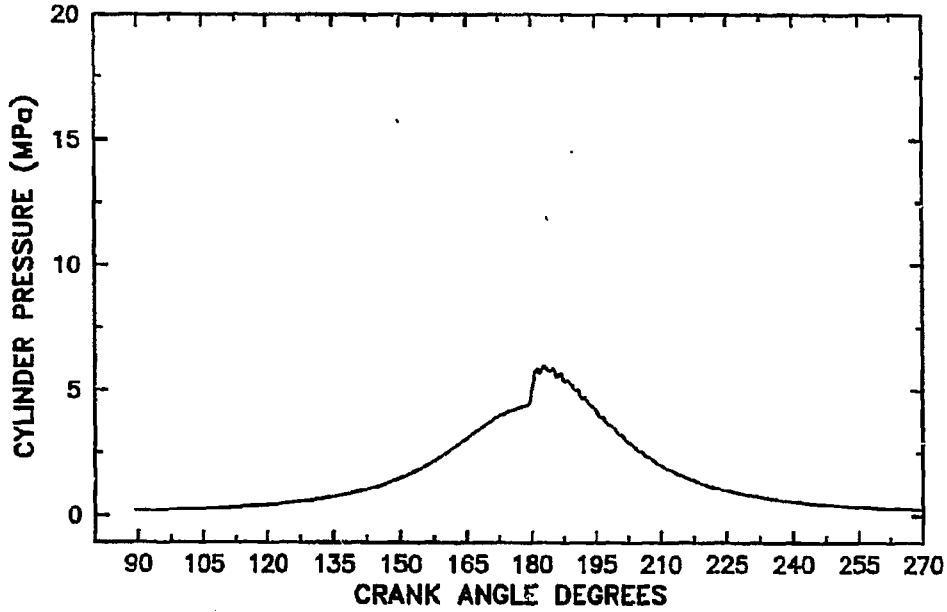
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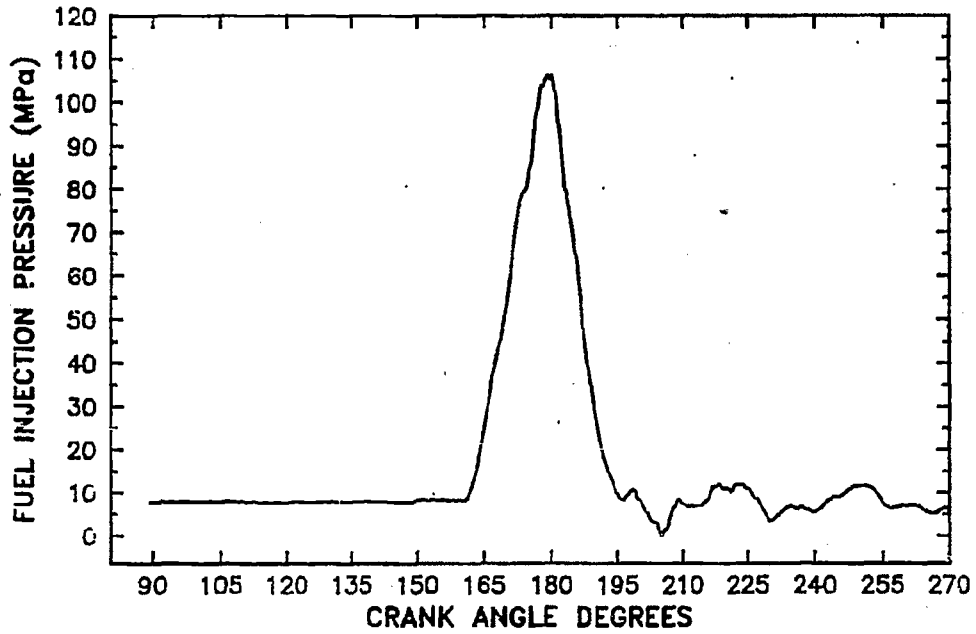
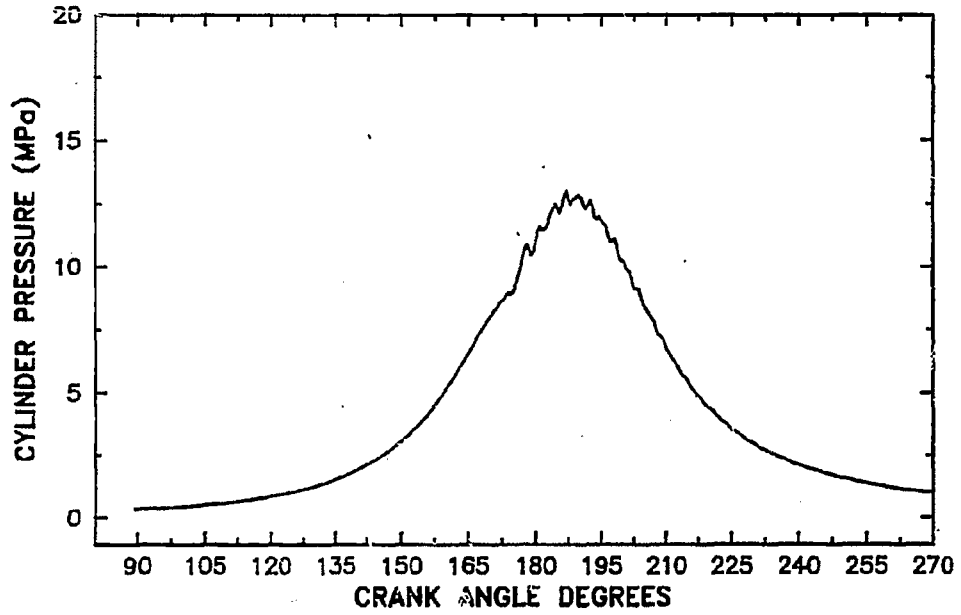
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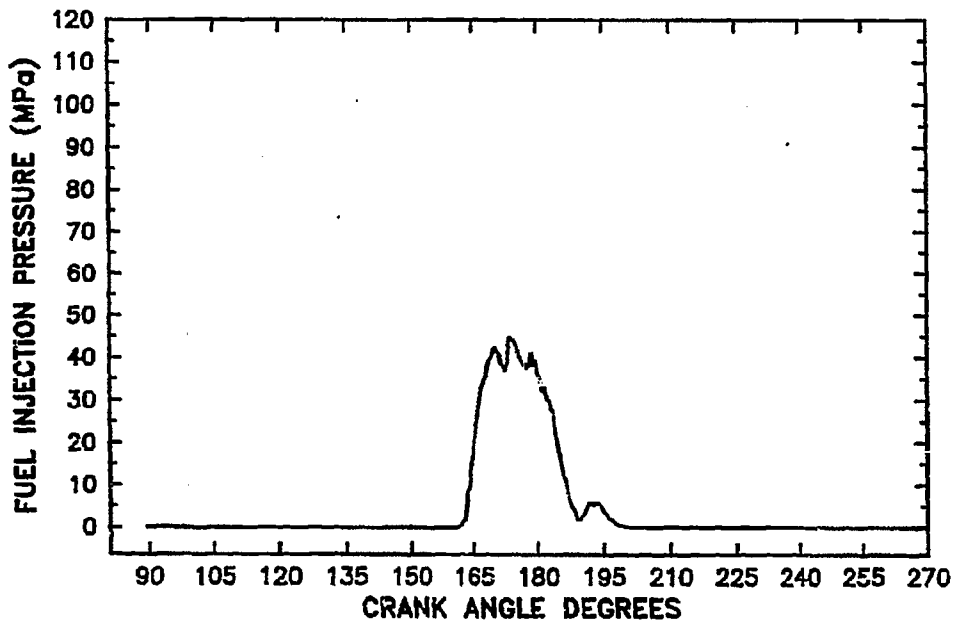
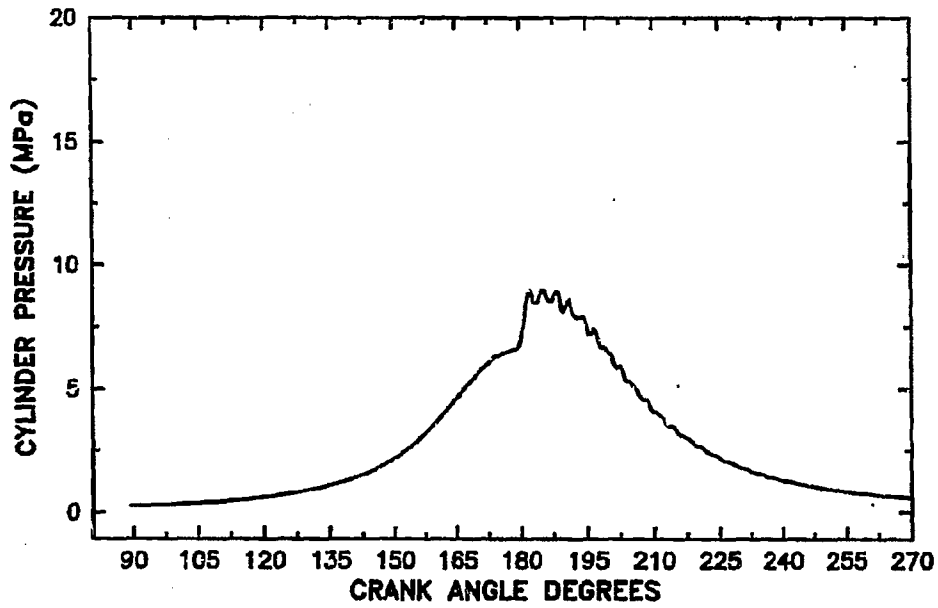
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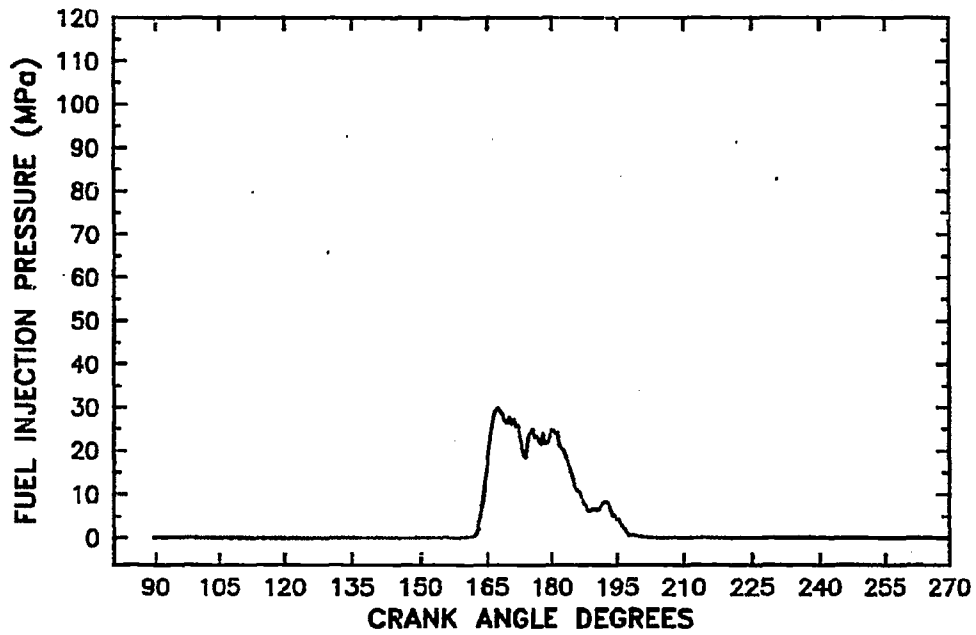
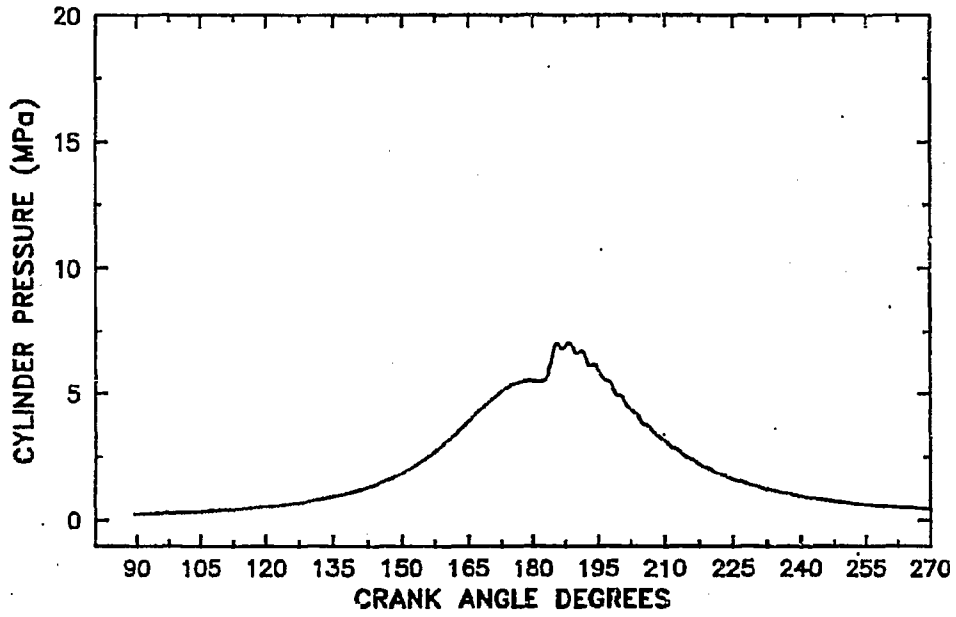
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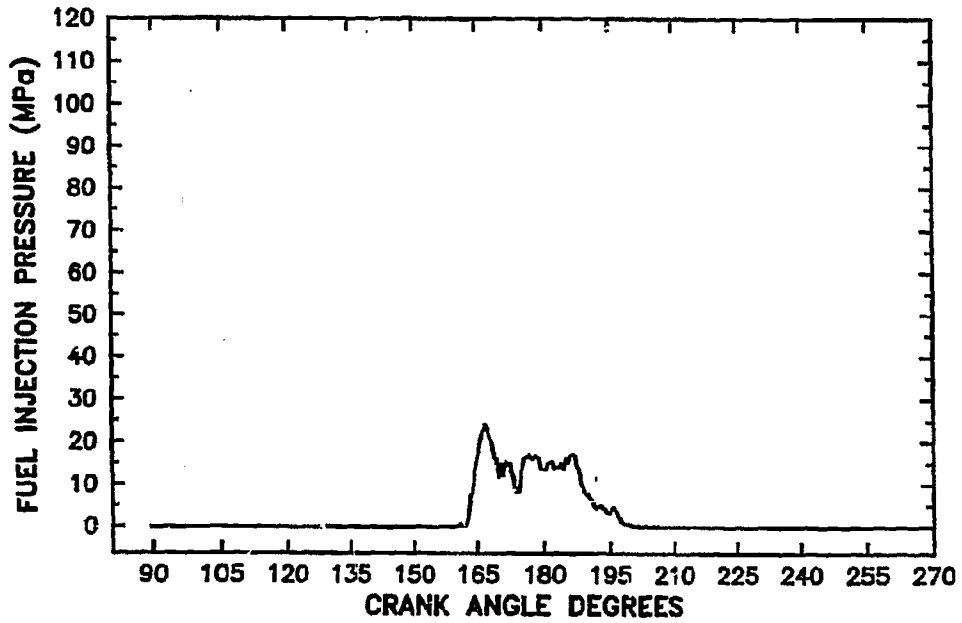
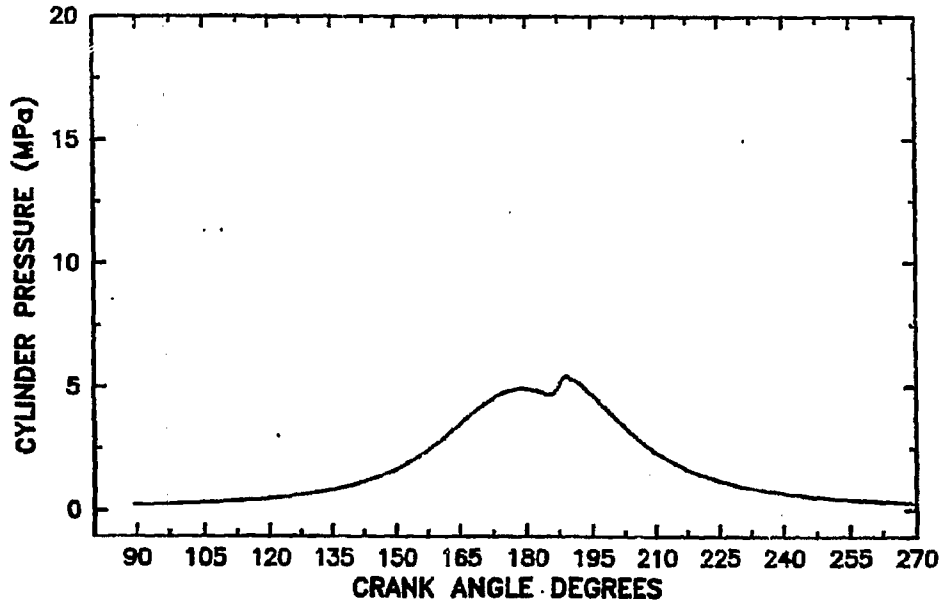
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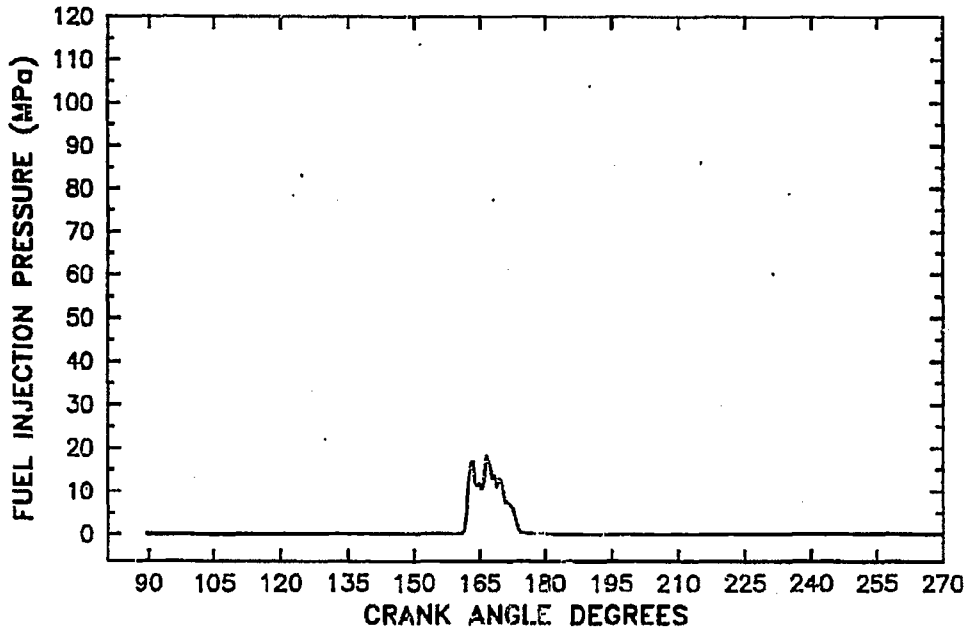
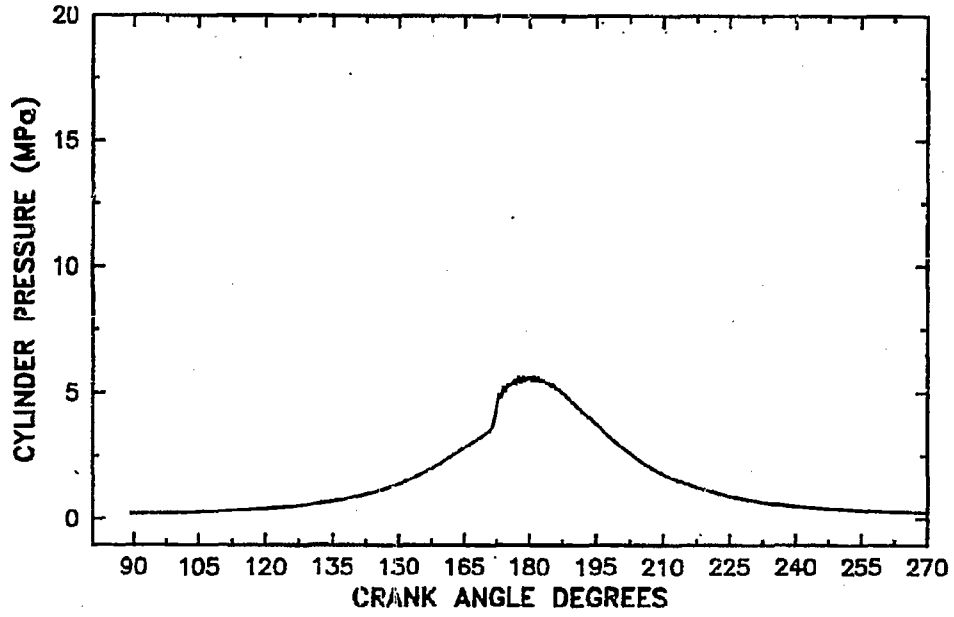
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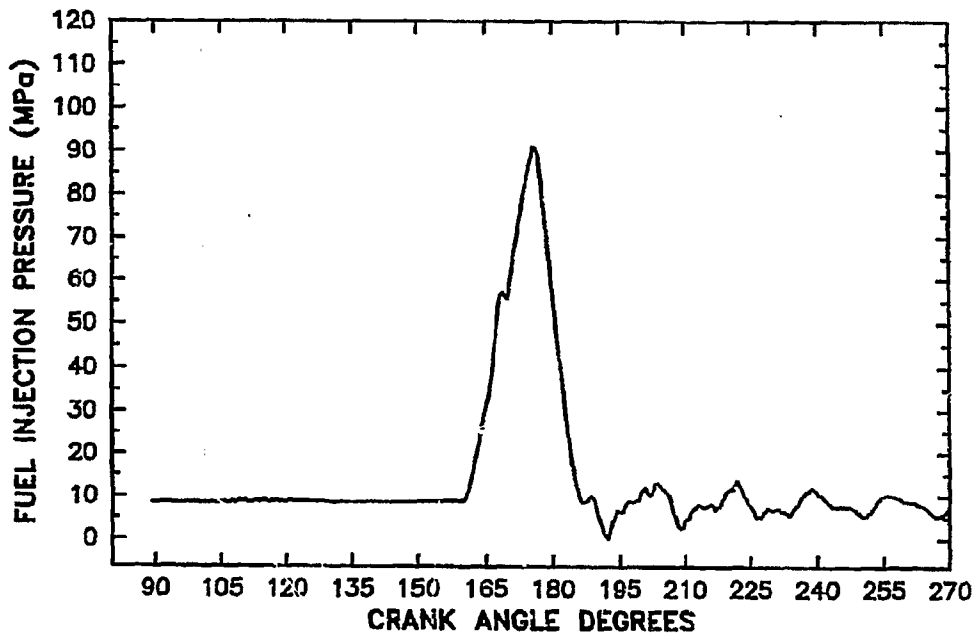
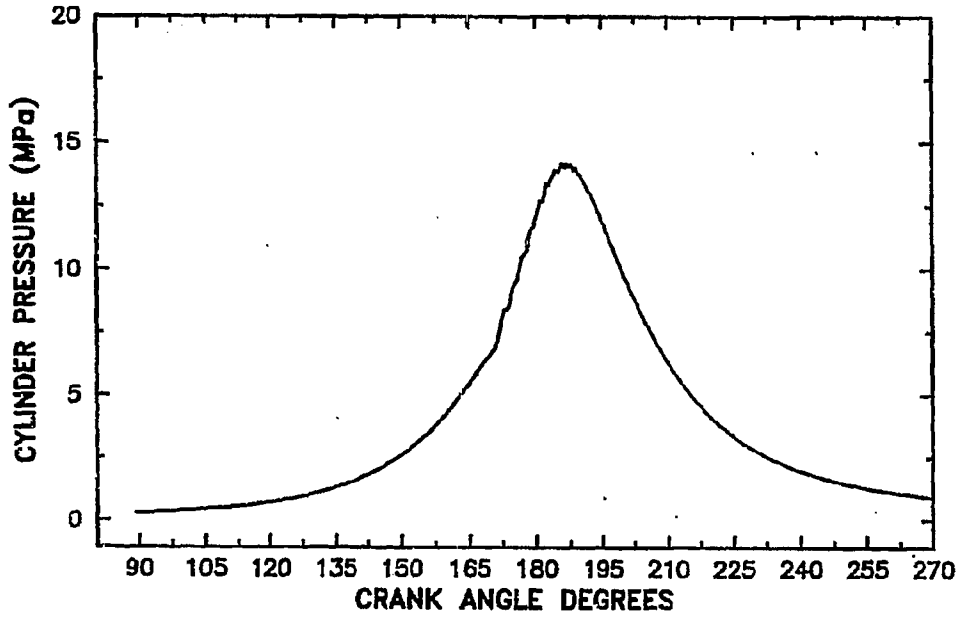
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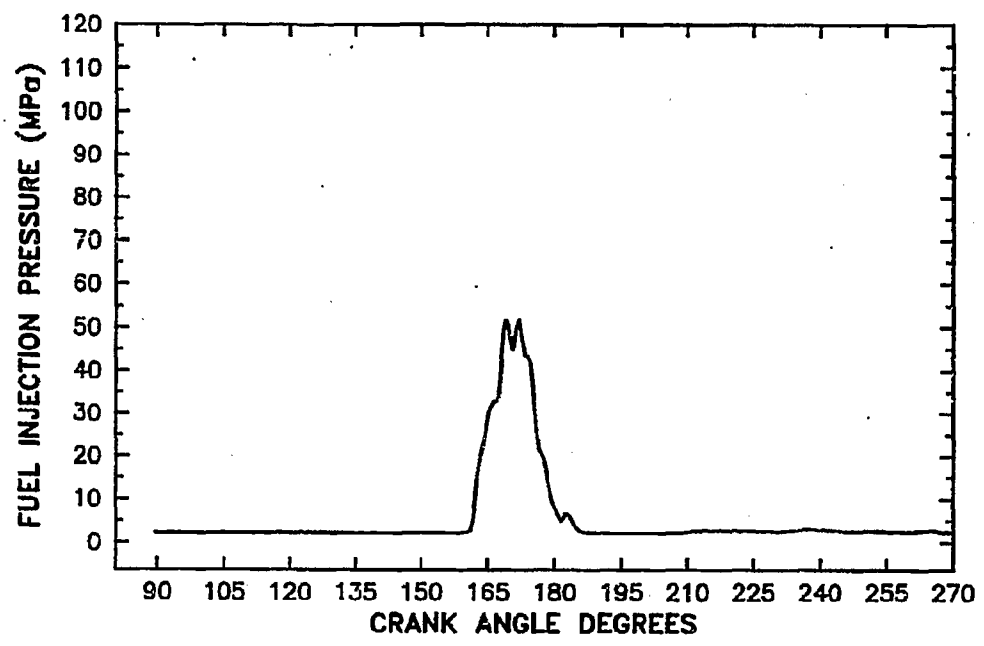
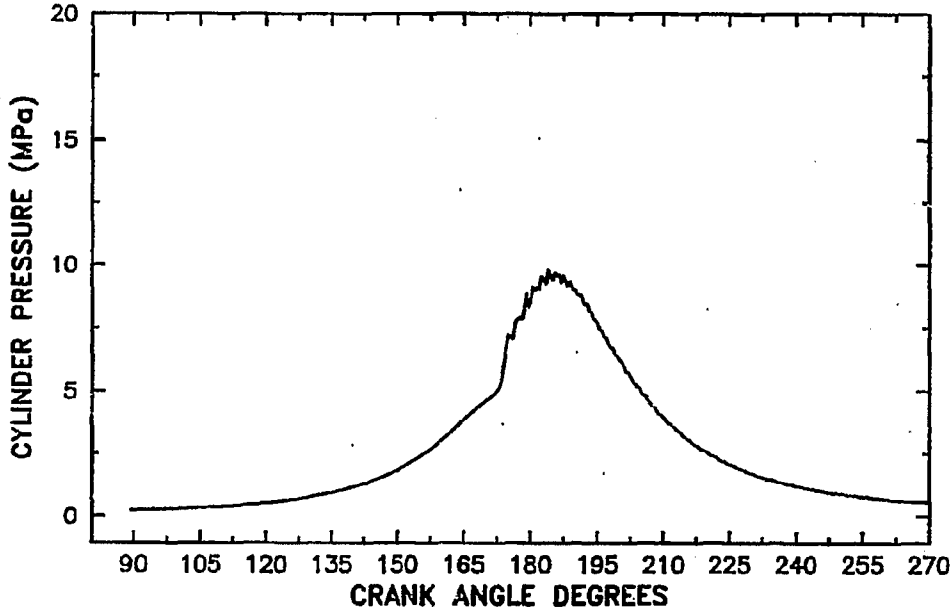
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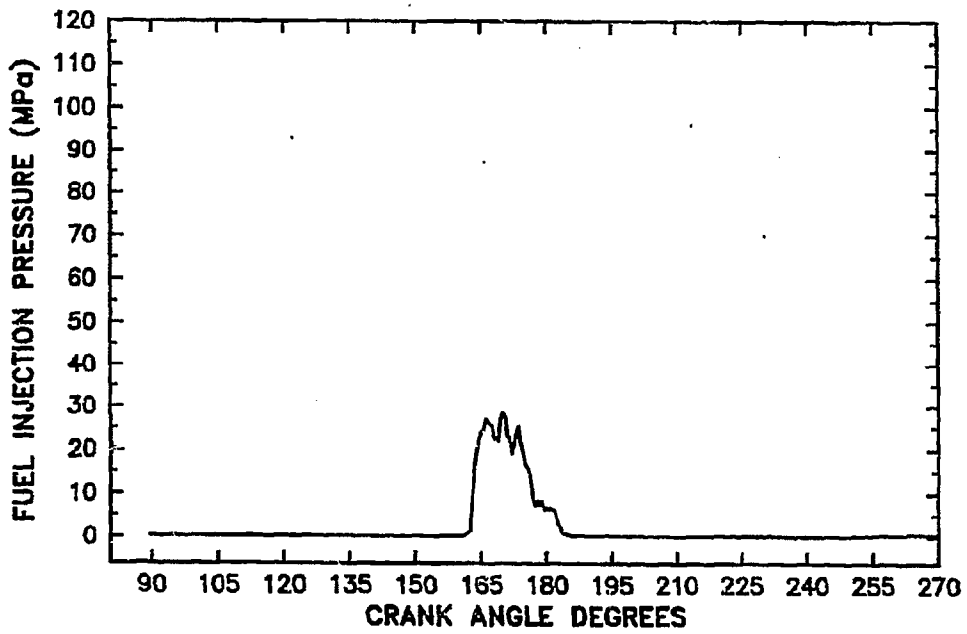
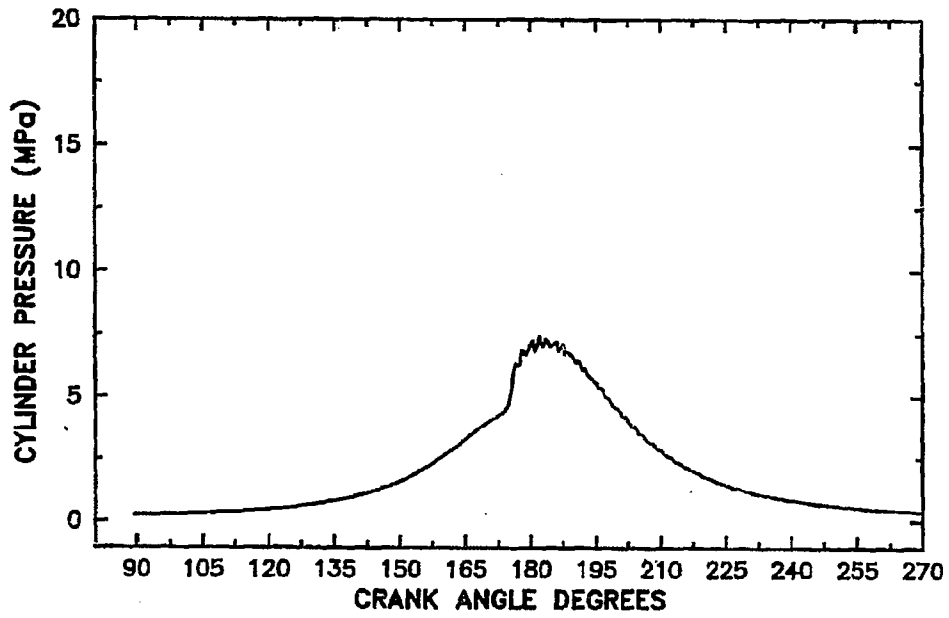
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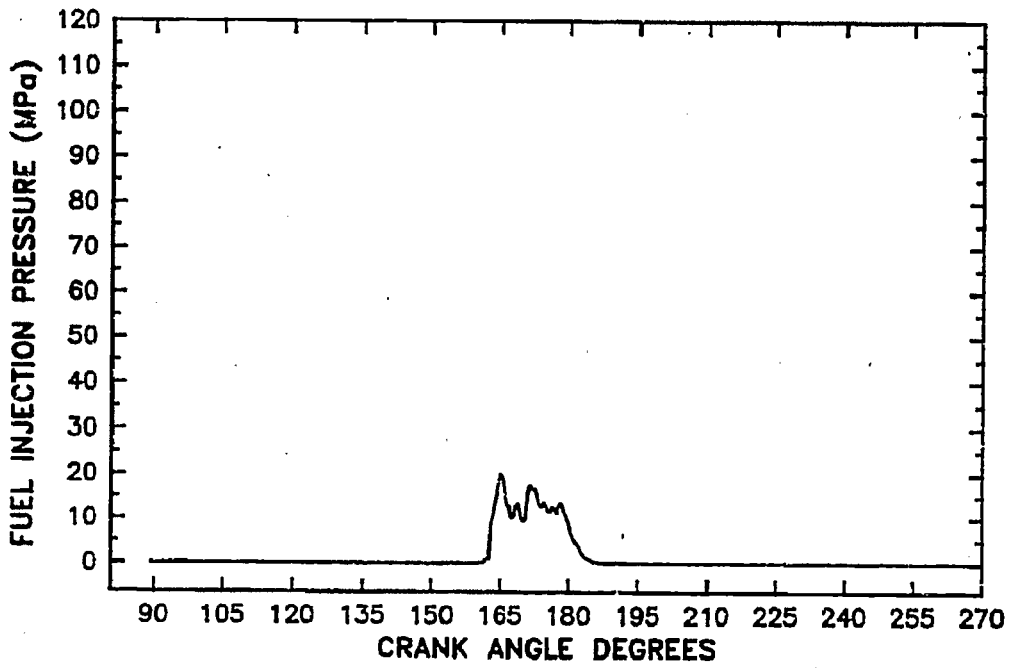
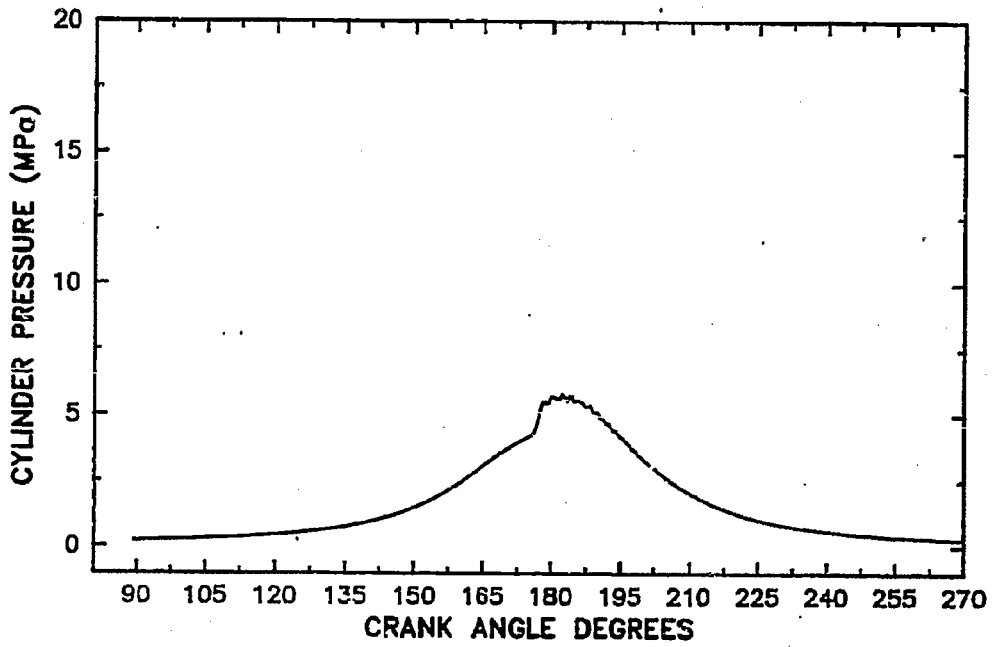
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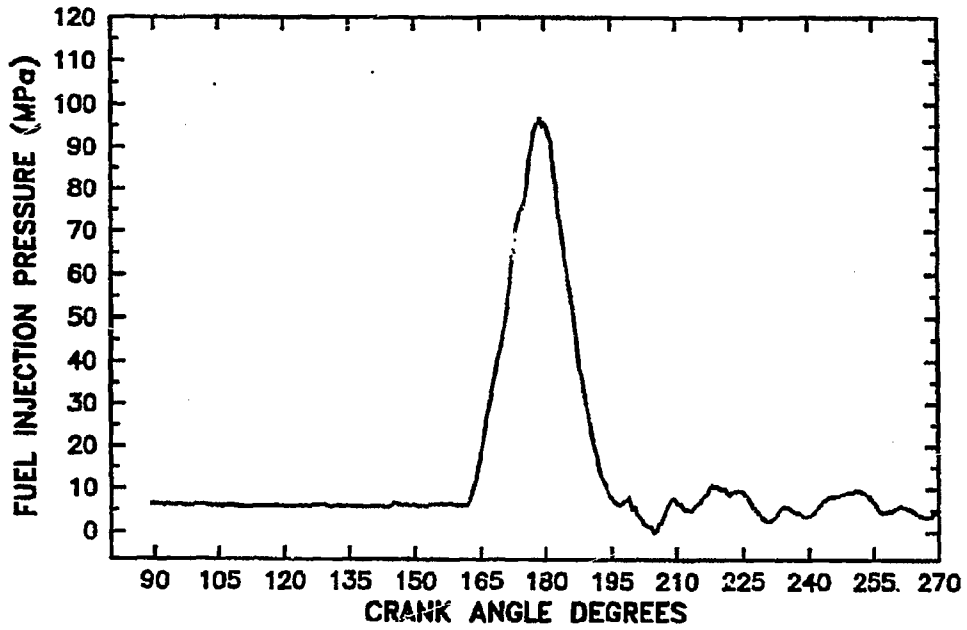
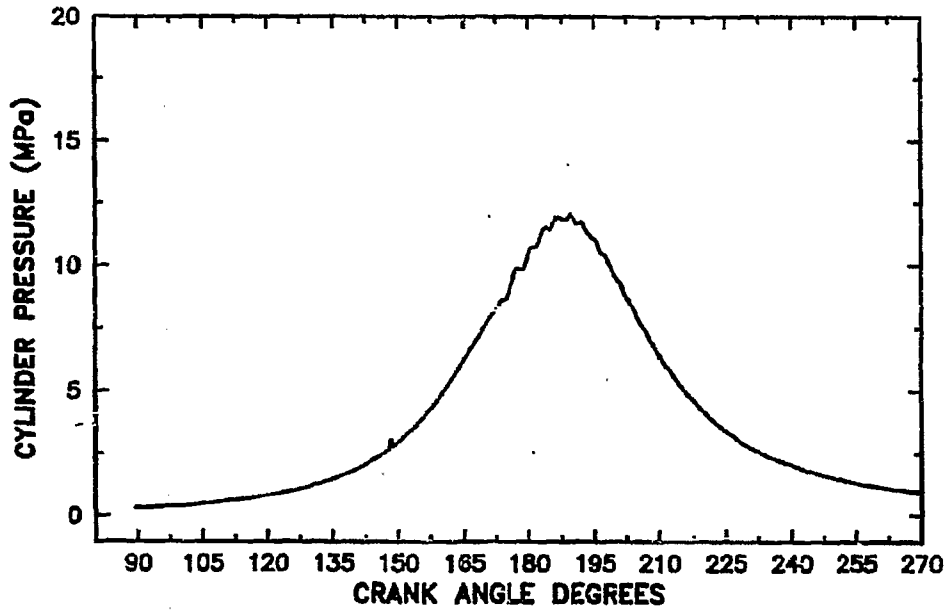
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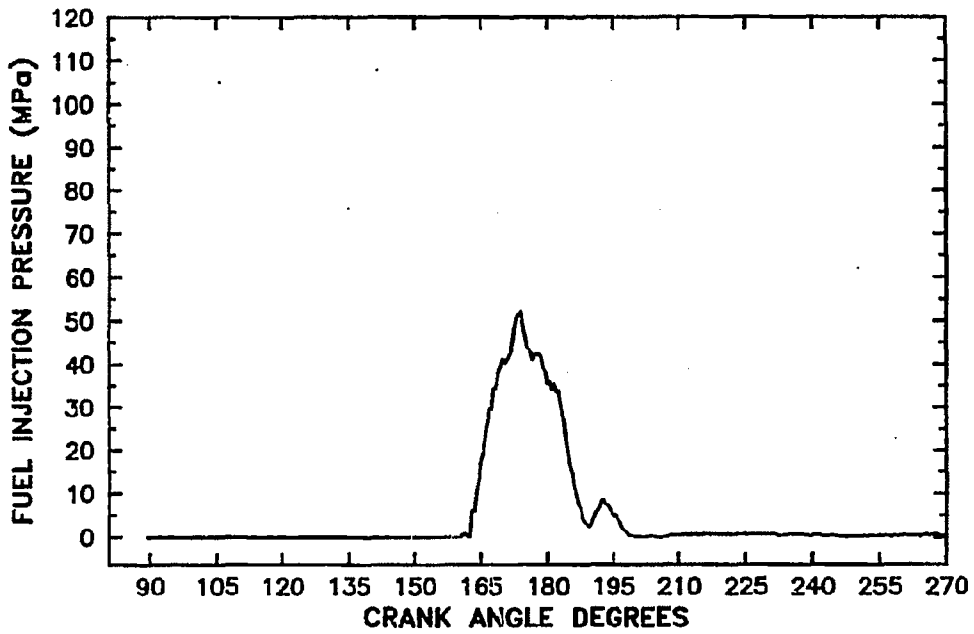
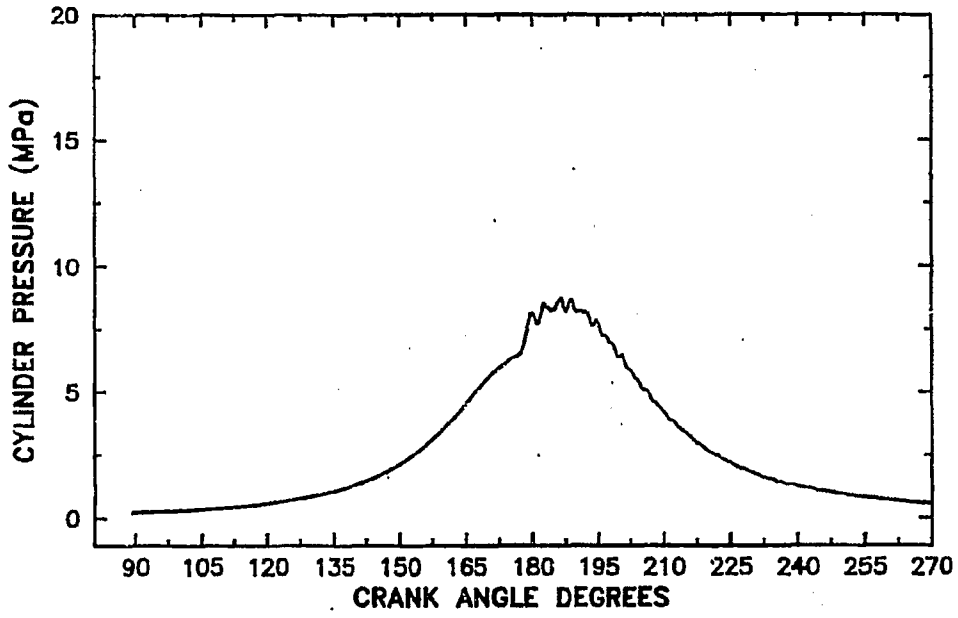
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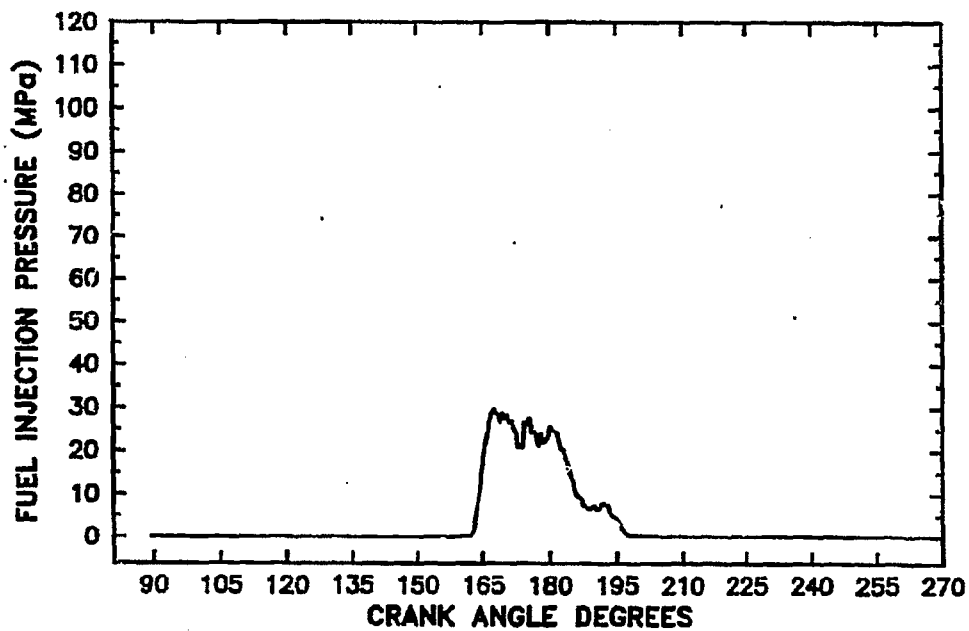
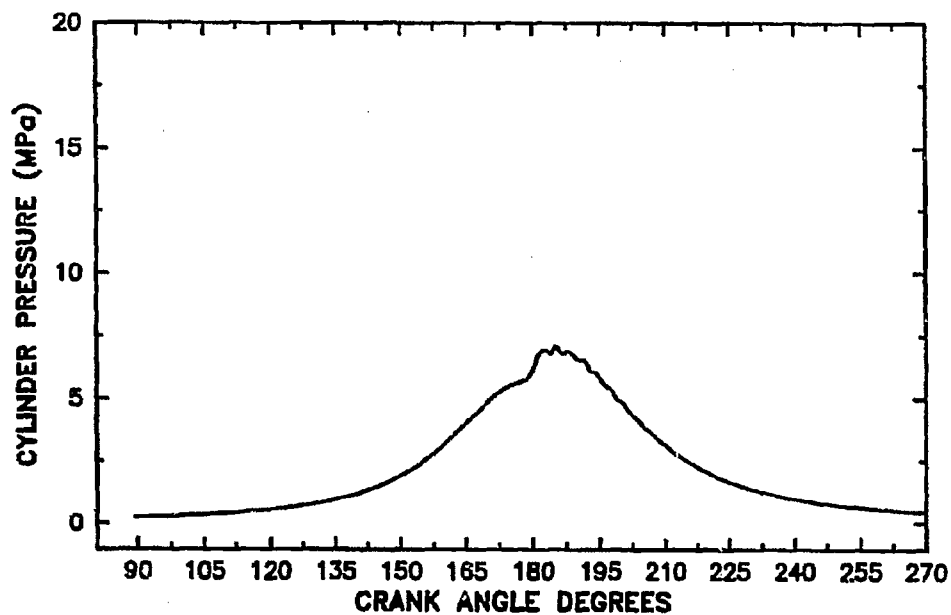
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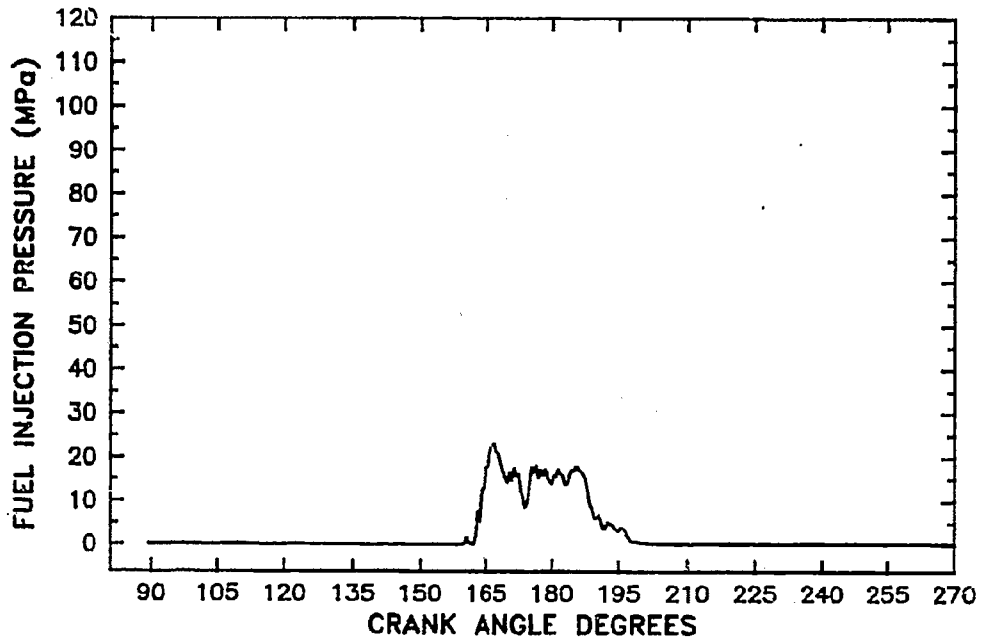
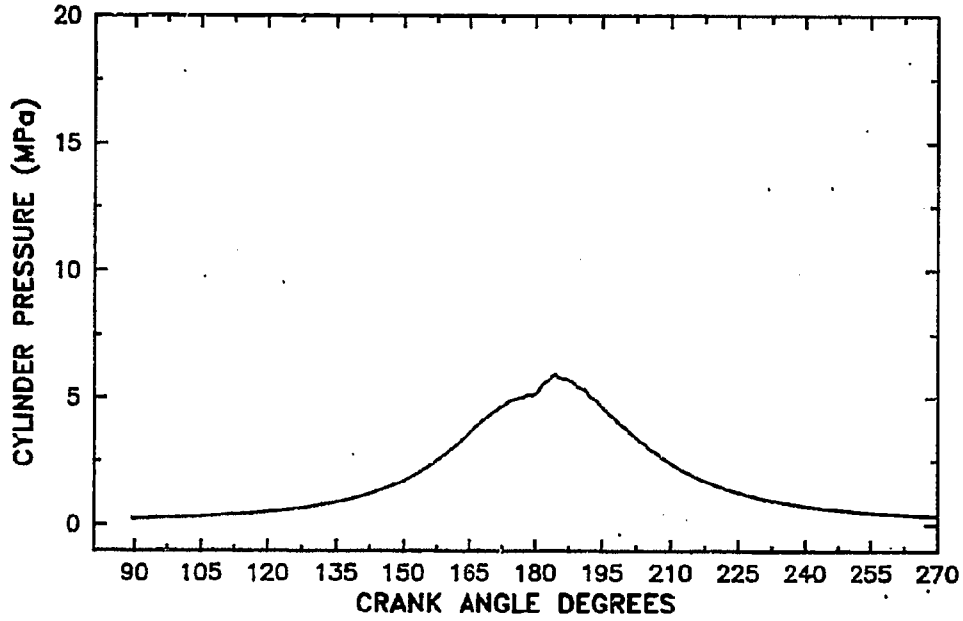


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FUEL CONDF2

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