Figure 6.1 Simulation Pressure Profiles at 2.50 Hz

CHARGE PRESSURE 0.715 BARS

FREQUENCY 2.500 Hz

○ COMPRESSION SPACE
△ EXPANSION SPACE

FLM ERROR = 0.0233
FREQUENCY 4.350 Hz

Figure 6.3 Simulation
Pressure Profiles at 4.35 Hz

CHARGE PRESSURE 0.705 BARS
Figure 6.4 Simulation and Experimental Compression Space Pressure Profiles at 2.50 Hz

Charge pressure 0.715 bars

Frequency 2.500 Hz

Plot Error ±0.028 bar
Figure 6.5 Simulation and Experimental Compression Space Pressure Profiles at 3.35 Hz.
TEST 7

FREQUENCY 2.500Hz

CHARGE PRESSURE 0.715 BAR

Figure 6.7 Simulation and Experimental Expansion Space Pressure Profiles at 2.50 Hz
Figure 6.8 Simulation and Experimental Expansion Space Pressure Profiles at 3.35 Hz.
Figure 6.9 Simulation and Experimental Expansion Space Pressure Profiles at 4.35 Hz
Figure 6.12 Wall Temperature Distribution at 4.35 Hz
TEST 7.

FREQUENCY 2.5000Hz

CHARGE PRESSURE 0.715 BARS

Figure 6.13 Work Rate and Cyclic Work at 2.50 Hz
Test 5.  

Frequency 3.35 Hz  

Simulation Cyclic Work $= 1.251$ J  
Experimental Cyclic Work $\Delta = 2.592$ J  

Charge Pressure 0.723 Bars  

Figure 6.14 Work Rate and Cyclic Work at 3.35 Hz
TEST 6.

FREQUENCY 4.350 Hz

CHARGE PRESSURE 0.705 BARS

FIGURE 6.15 Work Rate and Cyclic Work at 4,35 Hz
Figure 6.16 Heat Rates and Cyclic Heat Transferred at 2,50 Hz
Figure 6.17 Heat Rates and Cyclic Heat Transferred at 3.35 Hz
TEST 6.

FREQUENCY 4.350Hz

CHARGE PRESSURE 0.703 BARS

SIMULATION CYCLIC COOLING ○ -44.680 J
EXPERIMENTAL CYCLIC COOLING -51.227 J
SIMULATION CYCLIC HEATING △ 42.238 J
EXPERIMENTAL CYCLIC HEATING 41.156 J

Figure 6.18 Heat Rates and Cyclic Heat Transferred at 4.35 Hz
TEST 6.

FREQUENCY 4.350 HZ

CHARGE PRESSURE 0.703 BARS

Figure 6.21  Regenerator Heat Rate at 4.35 Hz
Test 1.

Frequency 2.500Hz

Charge Pressure 0.715 Bars

Plot Error ±0.5K

Simulation Avg Compr Temp  ○  219.244K
Experimental Avg Compr Temp  △  235.600K
Simulation Avg Expan Temp  △  302.610K
Experimental Avg Expan Temp  340.900K

Figure 6.22 Working Spaces
Temperature Profiles and
Average Temperatures at
2.50 Hz
Figure 6.23 Working Spaces Temperature Profiles and Average Temperatures at 3.35 Hz
Figure 6.24 Working Spaces
Temperature Profiles and
Average Temperatures at
4.35 Hz

TEST C
FREQUENCY 4.350 Hz
CHARGE PRESSURE 0.705 BARS

SIMULATION AVG COMP TEMP O 225.425K
EXPERIMENTAL AVG COMP TEMP 241.400K
SIMULATION AVG EXPN TEMP A 305.115K
EXPERIMENTAL AVG EXPN TEMP 341.700K

Theta (Degrees)
Figure 6.25 Simulation
Pressure Profiles at 4.35 Hz
(Central Difference)
Figure 6.26 Simulation and Experimental Compression Space Pressure Profile at 4.35 Hz (Central Difference)
Figure 6.27 Simulation and Experimental Expansion Space Pressure Profiles at 4.35 Hz (Central Difference)
TEST 6.

FREQUENCY 4.350 Hz

CHARGE PRESSURE 0.703 BARS

SIMULATION CYCLIC WORK $\circ$ -0.282 J
EXPERIMENTAL CYCLIC WORK $\triangle$ -0.880 J

Figure 6.29 Work Rate and Cyclic Work at 4.35 Hz (Central Difference)
Figure 6.30 Heat Rates and Cyclic Heat Transferred at 4.35 Hz (Central Difference)