Autogenous Ignition Test Report

Autogenous Ignition Temperature Determination In High Pressure Oxygen

Autogenous Ignition Test to determine the Autogenous Ignition Temperature (AIT) of the following material:

Material #1: OC Three

TEST DOCUMENTS:
ASTM G 72 – 01 (Re-approved Sept. 10, 2001)[1]

TEST PROCEDURES AND CONDITIONS:

A schematic of the Autogenous Ignition Test System is shown in Figure 1 and the sample holding assembly is shown in Figure 2. The holding assembly was changed from the standard design to improve test turnaround and "user-friendliness". The new design was found previously to have no effect on AIT results when performing testing on materials with a known AIT. The thermocouple, pressure transducer and their measurement systems were calibrated and their readings are expressed with an accuracy of ± 1.5 degrees C and ± 6 psi, respectively. The material was tested three times in gaseous oxygen (≥99.5% O_2) at an initial pressure of approximately 1500 psig. The heating rate in the reaction vessel was restricted to 20 ± 1 degrees C per min, up to 150 degrees C and then the heating rate was reduced to 5 ± 1 degrees C per min for the duration of the test (in accordance with the ASTM G72 test requirements). Due to safety considerations, the maximum temperature of the reaction vessel was restricted to 500 degrees C (932 degrees F).

TEST RESULTS, OBSERVATIONS AND COMMENTS:
The sample weight, starting temperature and pressure, AIT and temperature rise at ignition for each test was recorded and is expressed in Table 1. The change in temperature and pressure, as a function of test time, is graphically represented in Appendix A.

[1] ASTM G 72 – 01. *Standard Test Method for Autogenous Ignition Temperature of Liquids and Solids in a High-Pressure Oxygen-Enriched Environment.* (American Society for Testing and Materials, Philadelphia, PA, 2002).

Table 1: Material #1 – OC Three

Test #	Sample Weight (g)	Starting Pressure (psig)	Starting Temperature (^{o}C)	Autogenous Ignition Temperature (^{o}C)	Temperature Rise (^{o}C)	Pressure Rise (psi)
Oxygen Concentration = >99.5%						
1.1	0.205	1520	24	486	147	18
1.2	0.196	1524	31	500	71	15
1.3	0.205	1527	32	475	33	18
	Average AIT ± Standard Deviation			**486 ± 13**		

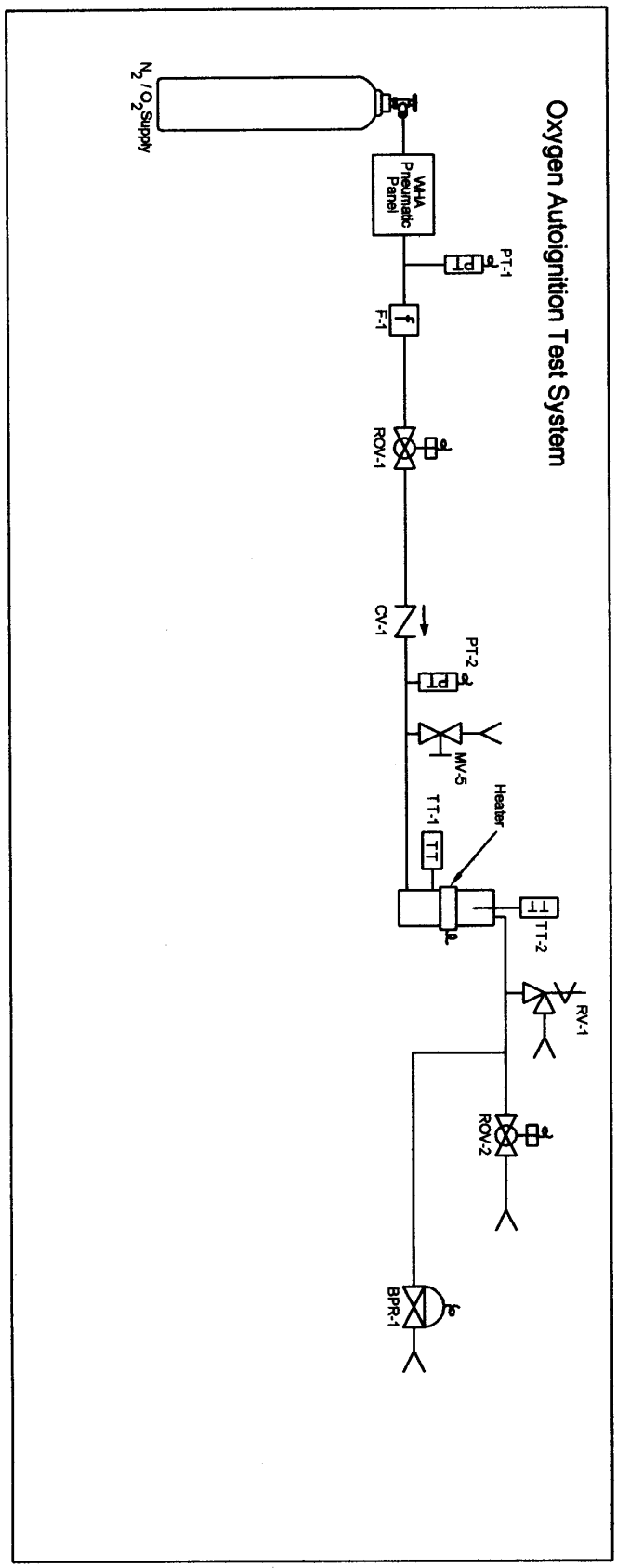


Figure 1 – WHA Autogenous Ignition Test System

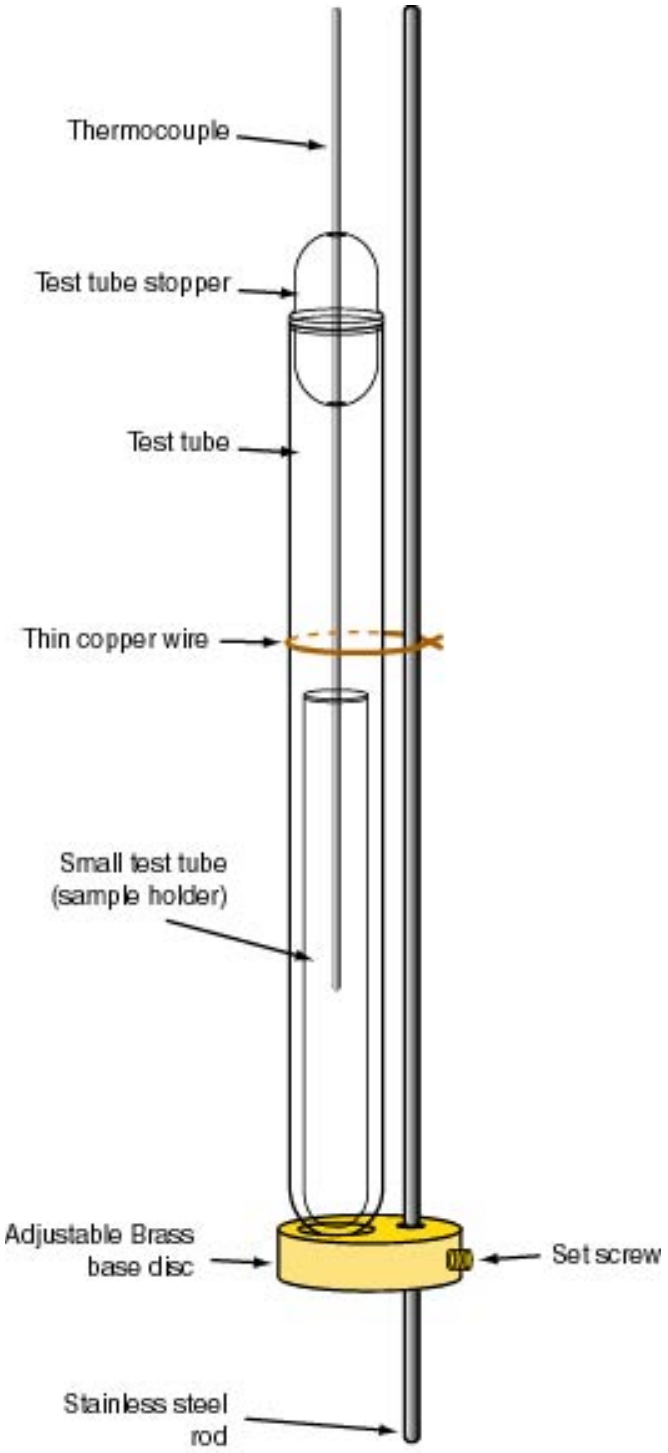
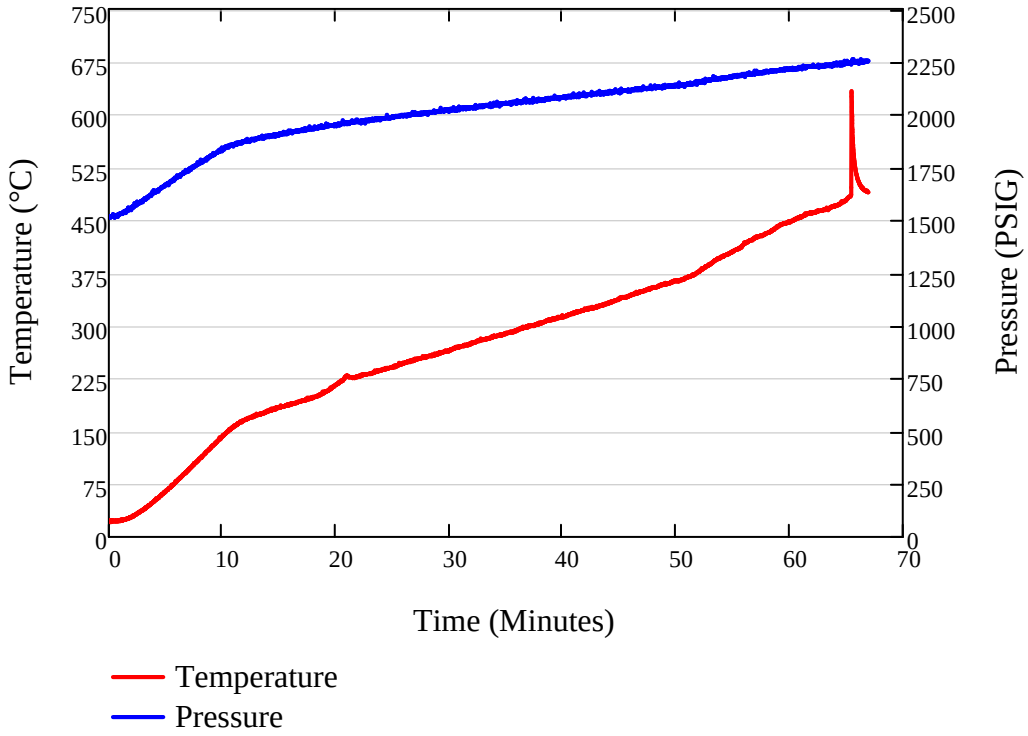


Figure 2 – WHA Autogenous Ignition Test Sample Mount

Case Number	09H004
Sample Number	1.1

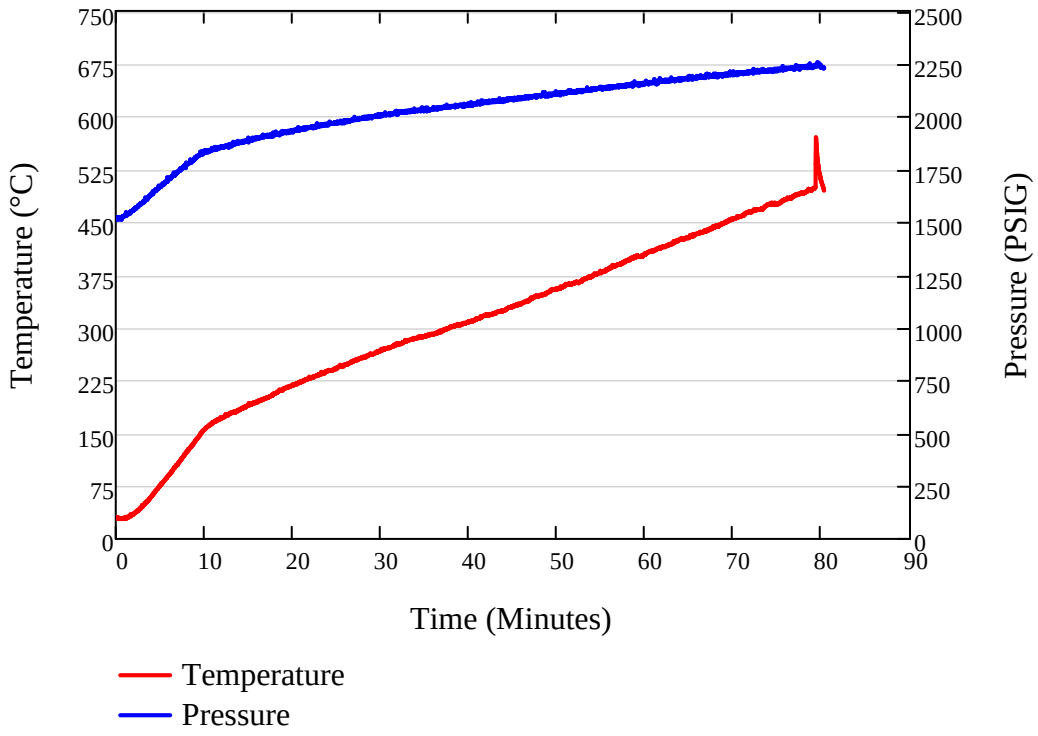
Material	MPT Industries Sample #2 09H004.TA002
Weight	0.205g



Starting Temperature (℃)	24	**Starting Pressure (PSIG)**	1520
Maximum Temperature (℃)	634	**Maximum Pressure (PSIG)**	2263
Autoignition Temperature (℃)	486	**Pressure at Ignition (PSIG)**	2245
Temperature Rise (℃)	147	**Pressure Rise (PSIG)**	18

Case Number	09H004
Sample Number	1.2

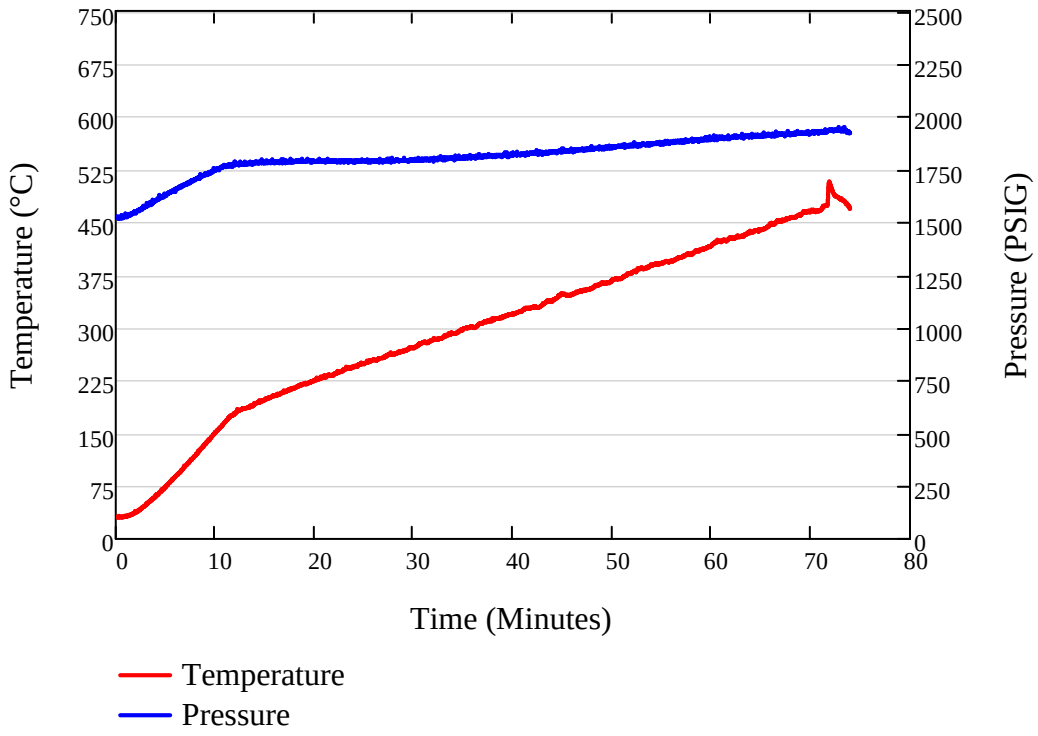
Material	MPT Industries Sample #2 09H004.TA002
Weight	0.196g



Starting Temperature (℃)	31	**Starting Pressure (PSIG)**	1524
Maximum Temperature (℃)	571	**Maximum Pressure (PSIG)**	2260
Autoignition Temperature (℃)	500	**Pressure at Ignition (PSIG)**	2245
Temperature Rise (℃)	71	**Pressure Rise (PSIG)**	15

Case Number	09H004
Sample Number	1.3

Material	MPT Industries Sample #2 09H004.TA002
Weight	0.205g



Starting Temperature (℃)	32	**Starting Pressure (PSIG)**	1527
Maximum Temperature (℃)	508	**Maximum Pressure (PSIG)**	1952
Autoignition Temperature (℃)	475	**Pressure at Ignition (PSIG)**	1934
Temperature Rise (℃)	33	**Pressure Rise (PSIG)**	18