

Chapter A6

Oil Burner Flammability Test for Magnesium Alloy Seat Structure

A6.1 Scope

A6.1.1 Applicability

This test method evaluates the ignition resistance and flammability of magnesium alloy when used in the construction of aircraft seat primary structural components by using a high-intensity open flame to show the material adequately resists involvement in a post-crash fire.

A6.2 Definitions

A6.2.1 Magnesium Alloy

A magnesium alloy is defined as any solid form of magnesium containing a variety of alloying materials (e.g., zinc) or rare-earth elements (e.g., yttrium). Any component or material containing more than 10 percent elemental magnesium by weight shall be considered a magnesium alloy.

A6.2.2 Sample Set

A sample set consists of three or more replicate test samples of a particular magnesium alloy used in the construction of an aircraft seat primary load path structural component.

A6.2.3 Melting

Melting is defined as the point at which the sample becomes elastic enough that a significant portion of the sample breaks free and falls into the catch pan. Bending, warping, or sagging alone does not constitute melting.

A6.2.4 Ignition

Ignition is defined as the first observation of sparking of the magnesium alloy sample when subjected to the burner flames. The point of ignition is typically a very bright, intense, blue-white flame that can be differentiated from the surrounding yellow-orange flames being produced by the oil burner. Ignition is often the precursor to burning, in which the material experiences sustained ignition.

A6.2.5 Burning

Burning (sustained ignition) is defined as an ignition lasting for 10 consecutive seconds (i.e., the start time of an ignition lasting for more than 10 seconds shall be considered the beginning of the burning period in the event that ignition stops and then restarts).

A6.2.5 Weight Loss

The sample weight loss is the amount of weight a sample loses during exposure to the burner flames, which includes any portion of the test sample that melts and falls into the catch pan. Molten pieces of the test sample must be retrieved from the catch pan following test completion once sufficient cooling has taken place. Molten/resolidified pieces of the test sample must be blown off with compressed air to eliminate the inclusion of oxidized material or talc during the final weight measurement. The percentage weight loss for a sample is defined as the pretest weight of the sample less the posttest weight of the sample and any droppings, expressed as the percentage of the pretest weight.

A6.3 Apparatus

A6.3.1 Test-sample Apparatus

The test-sample apparatus is shown in figures A6-1 and A6-2. The test-sample apparatus must allow movement of the test sample so it can be positioned in front of the burner at the proper distance. It is recommended that the apparatus allow for a minimum of 36 inches of distance between the burner cone and sample during burner warmup to prevent preheating of the sample.

A6.3.1.1 Catch Pan

The test-sample apparatus must include a suitable catch pan lined with a layer of dry talc powder, capable of preventing backsplash of molten magnesium alloy. The talc should be filled to a depth of 0.25 inches (6 mm), as measured from the highest point on the base of the catch pan. The catch pan should measure at least 8 inches (200 mm) wide by 16 inches (410 mm) long and at least 1.5 inches (38 mm) deep. A test-sample holder can be mounted directly to the sides of the catch pan.

A6.3.1.2 Talc

Talc is a magnesium-silicate-based mineral. Talc should be kept dry between test runs and renewed as appropriate. Storage in a sealed plastic bag is recommended to avoid moisture pickup.

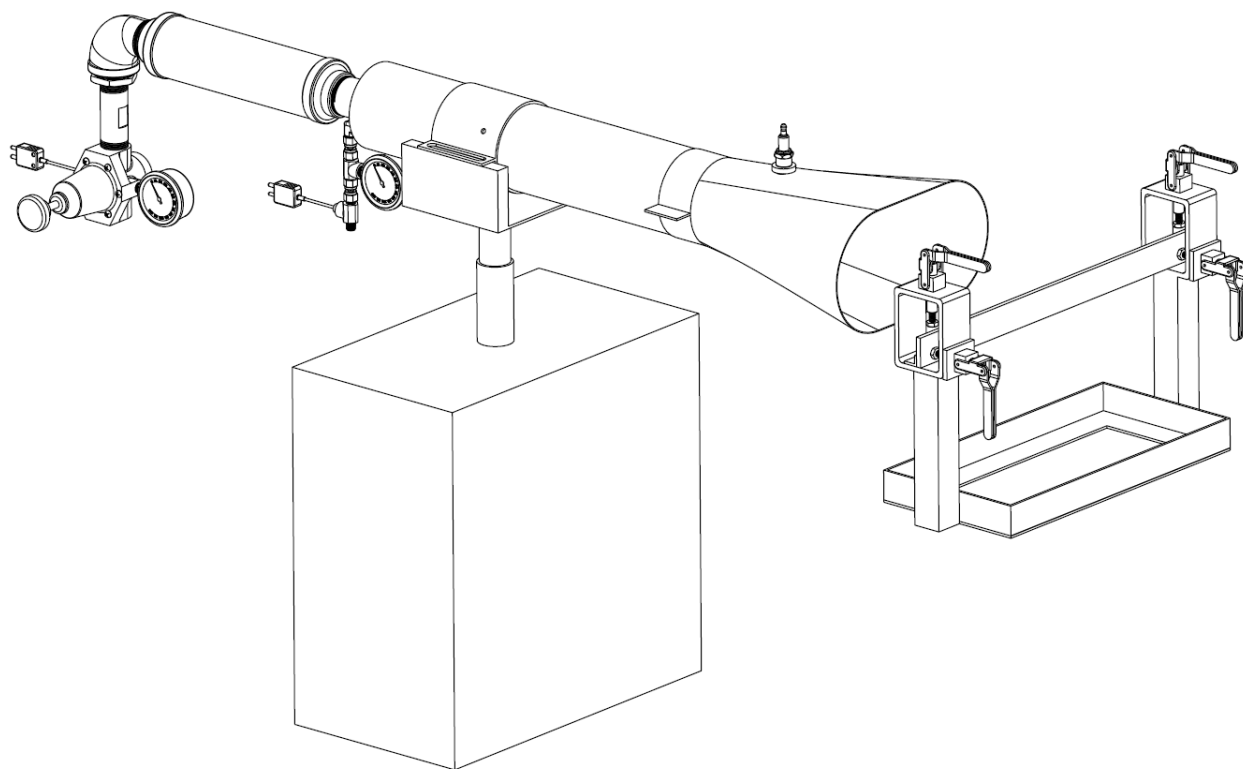


Figure A6-1. Magnesium alloy testing apparatus

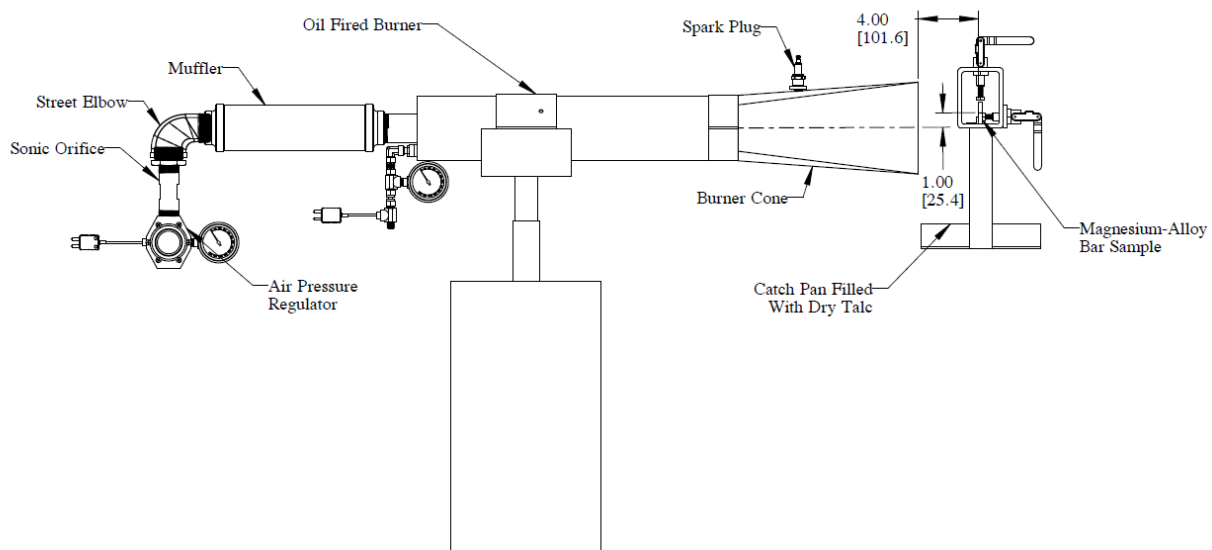


Figure A6-2. Magnesium alloy testing apparatus

A6.3.1.3 Test-sample Stand and Holder

A test-sample mounting stand and holder must be used to rigidly mount the horizontal bar sample in the proper position with respect to the test burner (see figure A6-3). A suitable sample holder can be fabricated using 2-inch (51 mm) lengths of 3- by 4- by 0.250-inch-thick (76- by 102- by 6-mm) steel box tubing. Two sections of box tubing can be mounted on top of 1.5-inch by 1.5-inch (38- by 38-mm) box tubing uprights that are welded to the sides of the catch pan. The rectangular cross section sample holder segments can be drilled for insertion of push-/pull-style toggle clamps that hold the sample in the proper position (see figure A6-4). The toggle clamps should have adjustable plungers to allow the proper amount of pressure against the sample.

NOTE: Push/pull-toggle clamps manufactured by Carr Lane (www.carrlane.com), part number CL-250-TPC, have been found suitable for this application.

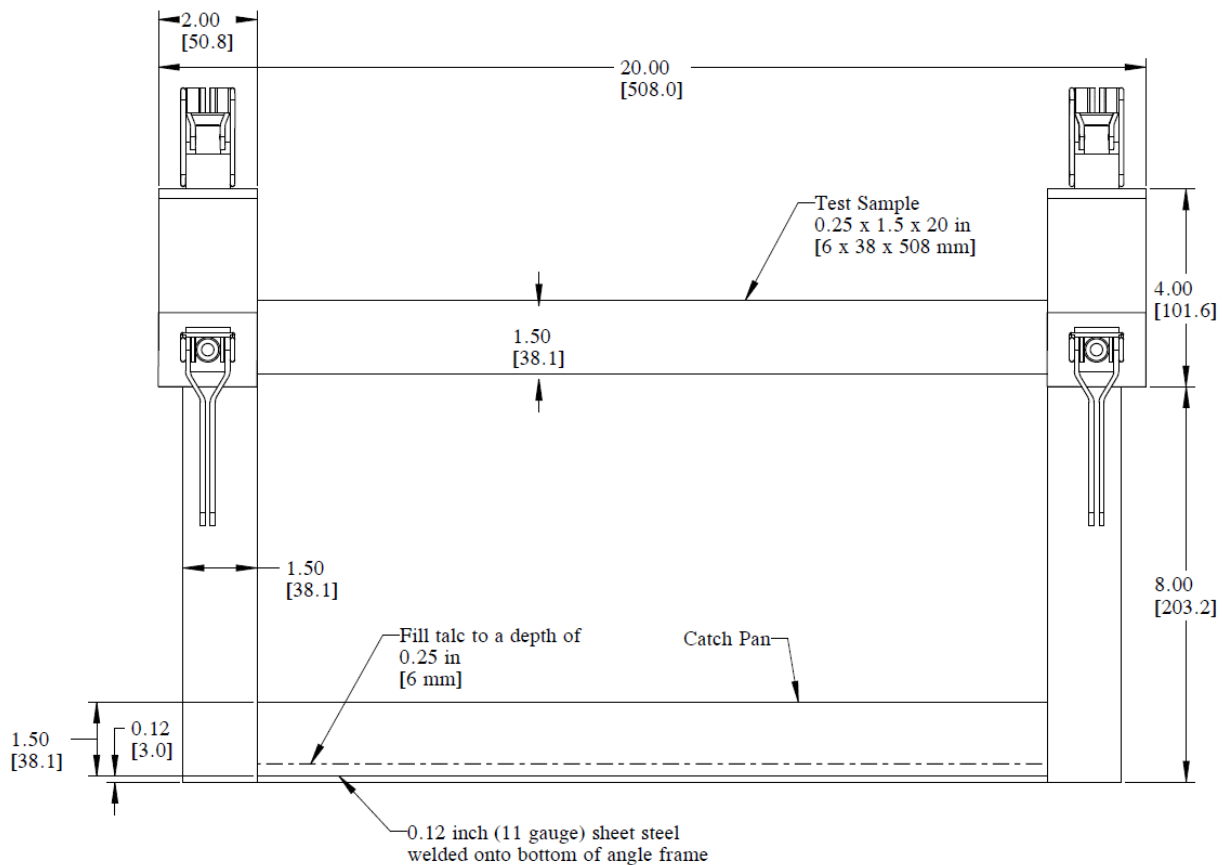


Figure A6-3. Magnesium alloy test-sample mounting stand and holder (front)

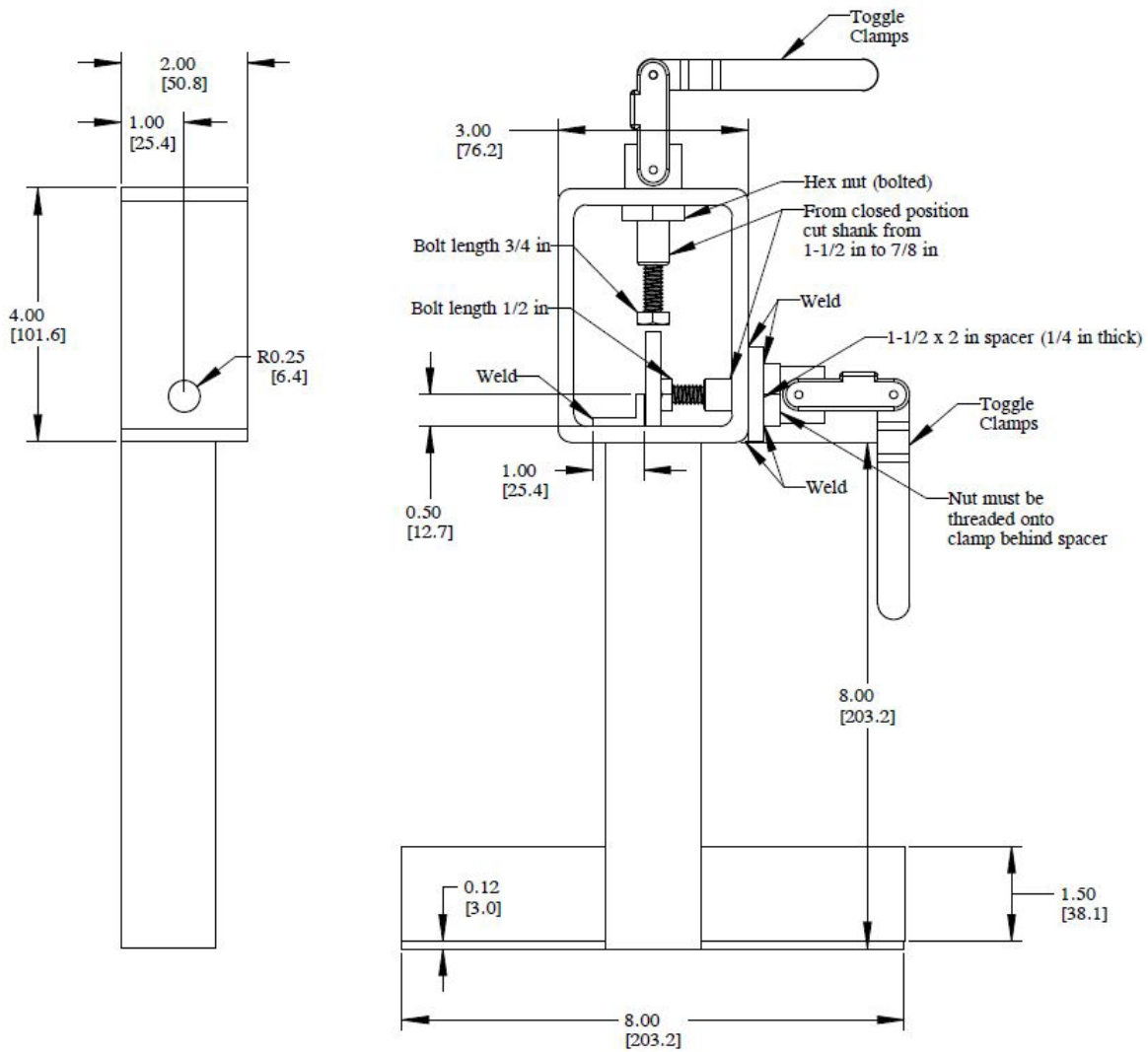


Figure A6-4. Magnesium alloy test-sample mounting stand and holder (side)

A6.3.2 Test Burner

The test burner is the Sonic Fire Test Burner, described in detail in appendix K. The burner configuration for this test method is displayed in table A6-1.

Table A6-1. Burner configuration for the magnesium alloy flammability test

Fuel	Nozzle	2.0 gal/hr 80° Solid Spray
	Volumetric Flow Rate (gal/hr)	2.0 ± 0.1
	Pressure (psi)	110 ± 10
Air	Diffusion Method	Stator and Turbulator
	Pressure (psig)	45 ± 1
	Mass Flow Rate (SCFM)	54.2
	Burner Orientation	Horizontal

A6.3.2.1 Inlet Condition Measuring

To obtain an accurate measurement of the conditions entering the burner, the fuel pressure and temperature, and air pressure and temperature measurements must be made nearest to the burner inlet (see figure A6-5). To minimize air stream disruptions, the intake air temperature must be measured prior to the sonic nozzle.

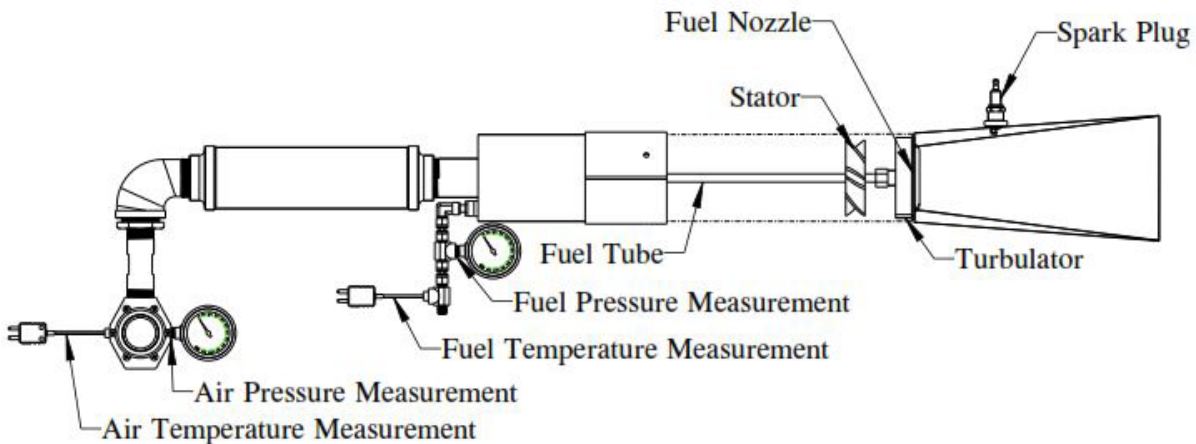


Figure A6-5. Inlet condition measurement location (side view)

A6.3.2.2 Fuel Nozzle

A screw-in fuel nozzle is required to maintain a fuel pressure that will yield a 2 ± 0.1 gal/hr (7.57 L/hr $\pm$ 0.38 L/hr) fuel flow. A Delavan type-B fuel nozzle with an 80° solid spray angle nominally rated at 2.0 gal/hr (7.57 L/hr) at 100 lb/in² (0.69 MPa) has been found to deliver the appropriate flow rate and produce the proper flame pattern and is the recommended fuel nozzle. Actual flow-rate measurements may deviate from the advertised flow rate. The actual flow rate must be measured manually using a flexible tube, graduated cylinder, and timing device, as described in section A6.5.4.6. The fuel pressure must then be adjusted accordingly to produce the required fuel flow of 2 ± 0.1 gal/hr (7.57 L/hr $\pm$ 0.38 L/hr). For more details, refer to appendix K, section K.3.4.4, Fuel Nozzle.

A6.3.2.3 Fuel Pressure Regulation

The fuel must be properly pressurized to deliver the proper fuel flow. Ideally, this pressure must be in the range of 100–120 lb/in² (0.69 to 0.83 MPa). For details on fuel pressurization and regulation, refer to appendix K, section K.3.4, Fuel System.

A6.3.2.4 Fuel Type

A kerosene-type fuel is used in the burner equipment. Jet A and JP-8 (military equivalent to Jet A) fuel is recommended; however, other fuels are permissible if the flame temperature can be maintained according to section A6.6.1.3. For more details, refer to appendix K, section K.3.4.6, Fuel.

A6.3.2.5 Burner Cone

A 12 ± 0.125 -inch (305 ± 3 -mm) burner extension cone is fitted to the end of the burner draft tube. The opening must be 6 ± 0.125 inches (152 ± 3 mm) high and 11 ± 0.125 inches (280 ± 3 mm) wide. For more details, refer to appendix K, section K.3.7, Burner Cone.

A6.3.2.6 Spark Plug

An automotive-style spark plug is fitted into a threaded boss, which is welded to the burner extension cone. The threaded boss is centered on the upper surface of the burner cone at a distance of 6 ± 0.125 inches (152 ± 3 mm) from the intake end of the burner cone. For more details, refer to appendix K, section K.3.5, Ignition System.

A6.3.3 Burner Flame Consistency Validation Thermocouples

Seven thermocouples must be used to check the flame temperature of the burner. The thermocouples must be 0.125-inch (3.2-mm) diameter, insulation packed, 310 stainless-steel sheathed, type K (chromel-alumel), grounded junction with a nominal 24 American Wire Gauge (AWG) size conductor. Thermocouples purchased with a certificate of calibration may provide more accurate readings but are not required. The seven thermocouples must be attached to a steel mounting plate to form a thermocouple rake for placement in front of the burner cone during the burner-flame consistency-validation procedure (see figure A6-6). It is recommended the thermocouple mounting plate be a minimum of 4 inches (102 mm) away from the tips of the thermocouples.

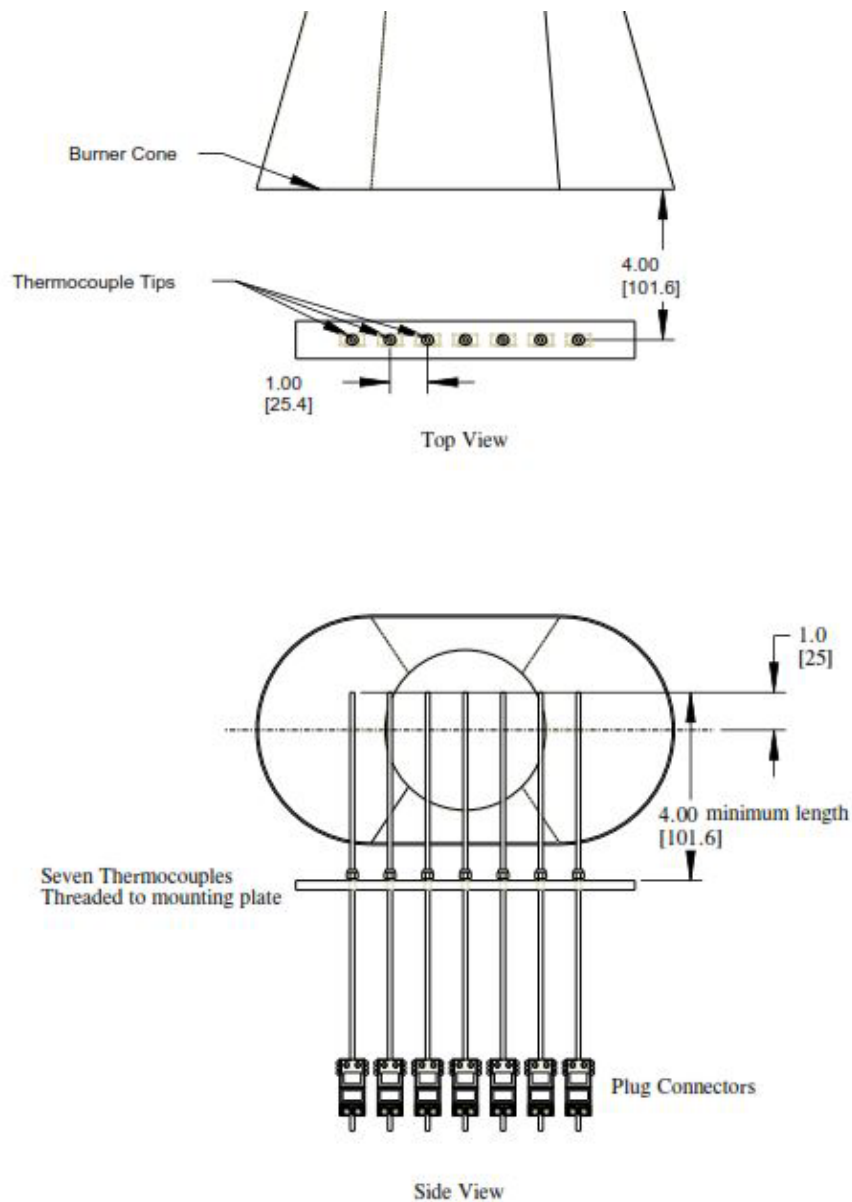


Figure A6-6. Top and side view of thermocouple rake bracket

A6.3.4 Instrumentation and Supporting Equipment

A6.3.4.1 Data Acquisition

A calibrated recording device or a computerized data-acquisition system with an appropriate range must be used to measure and record the outputs of the thermocouples.

A6.3.4.2 Timing Device

A stopwatch or other device, accurate to within ± 1 second per 8 hours (± 3 sec/day), must be used to measure the time of application of the burner flame and the test-sample ignition and extinguishment times.

A6.3.4.3 Test Chamber Anemometer

A handheld vane-type or hotwire-type air velocity sensing unit capable of measuring accurately in the 0–100 ft/min range must be used to monitor the flow of air inside the test chamber when the ventilation hood is operating. Airflow measurements should be taken at the beginning of the day prior to operating the test burner. A suitable hotwire anemometer, which may be mounted to the sample test frame, is manufactured by Dwyer Instruments, model number 641-6-LED. A suitable handheld hotwire anemometer is manufactured by TSI, model number 9515. Vane-type anemometers typically do not function properly with airflow rates of less than 50 ft/min.

A6.3.4.4 Digital Weight Scale

A suitable weight scale must be used to determine the initial and final weights of the test sample and the weight of any molten/resolidified portions of the test sample captured in the catch pan. The scale must have a resolution of 0.02 pounds (0.01 kg) and an accuracy of ± 0.02 pounds (± 0.01 kg).

A6.3.4.5 Test Chamber

A suitable test chamber must be used to reduce or eliminate the possibility of test fluctuation due to air movement. Although not required, the recommended minimum of the test-chamber floor area is 15 feet by 15 feet (4.57 m by 4.57 m) or larger.

NOTE: Smaller test cells may experience significant increases in ambient air temperature while testing. This may increase the severity of the test.

A6.3.4.6 Ventilation Hood

The test chamber must have an exhaust system capable of removing the products of combustion expelled during the tests.

A6.4 Test Samples

A6.4.1 Sample Configuration

Test samples representing the primary seat frame components (e.g., leg, spreader, cross-tube, seat back frame, and lower baggage bar) must be constructed of the identical magnesium-alloy material to be used in service.

A6.4.2 Sample Number

A minimum of three samples for each magnesium alloy type or design configuration must be prepared for testing. These samples must exclude any surface modifications, such as intumescent paints or coatings, or any anodizing processes.

A6.4.3 Sample Size

The samples to be tested must measure 0.25 ± 0.0063 inches (6.4 ± 0.16 mm) thick by 1.5 ± 0.03 inches (38.1 ± 0.8 mm) in height by 20 ± 0.06 inches (508 ± 1.6 mm) in length. Test samples must be constructed according to the dimensions shown in figure A6-7.

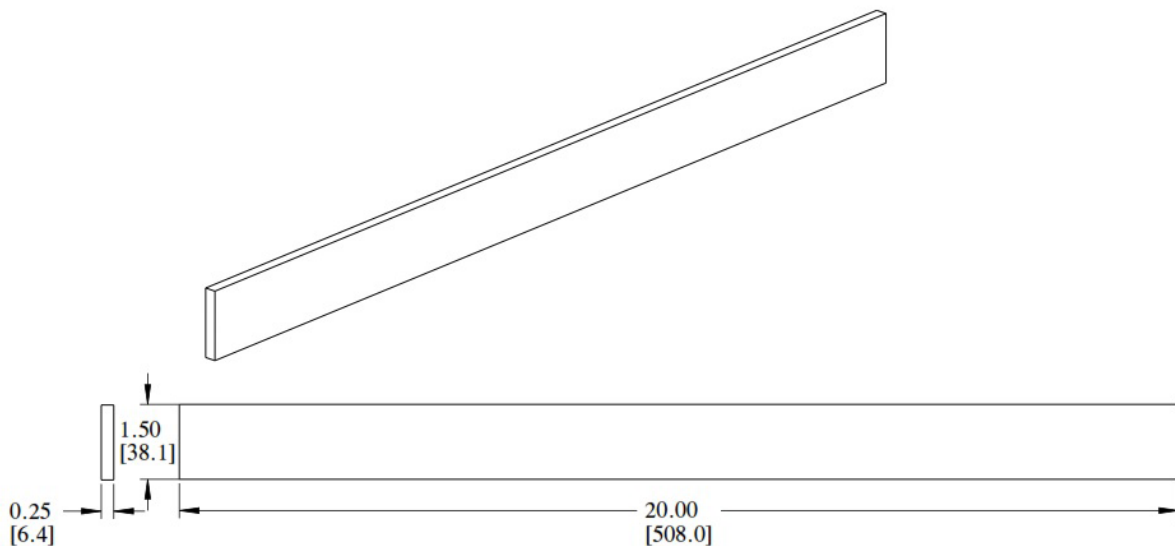


Figure A6-7. Test-sample dimensions

A6.4.4 Sample Orientation

The samples are mounted horizontally, with the midpoint of the sample's face located 4 inches (102 mm) from the vertical exit plane of the burner cone and 1 inch (25 mm) above the burner centerline (refer to figure A6-2).

A6.4.5 Sample Finish

A machined surface finish to all faces is required for the test samples (e.g., an average roughness value R_a of less than $1.75 \mu\text{m}$ and typically $0.9 \mu\text{m}$).

A6.4.6 Sample Coatings

If a finish coating, anodizing, or other standard aerospace grade surface treatment is used on the alloy in service, it is sufficient to test the coated materials using the 12-second vertical Bunsen burner test method described in Chapter A1 of this handbook (Vertical Bunsen Burner

Test for Cabin and Cargo Compartment Materials). Vertical Bunsen burner test samples must be fabricated with the coating applied to the magnesium alloy substrate that it will be used on in service, using the production process. The test must be conducted using a substrate thickness representative of the thinnest cross section of the in-service component. If the coating/substrate passes in this thickness (critical test configuration), the coating can be applied to any thicker in-service components of the identical magnesium alloy material without additional testing. Any in-service components having thinner cross sections will require additional vertical Bunsen burner substantiation using that coating/substrate thickness.

A6.4.7 Sample Conditioning

The samples must be conditioned at $70^{\circ} \pm 5^{\circ}\text{F}$ ($21^{\circ} \pm 3^{\circ}\text{C}$) and $55\% \pm 10\%$ relative humidity for a minimum of 24 hours prior to testing.

A6.5 Preparation of Apparatus

A6.5.1 Alignment

Mount a test sample on the test-sample frame. Level and center the sample-holder frame assembly to ensure alignment with the burner cone. Move the test-sample mounting frame into position in front of the burner, and check for proper alignment (i.e., distance from exit of burner cone to face of test sample, proper sample height with respect to cone centerline). The movable assembly should incorporate mechanical stops or detents to ensure that the samples can be moved into position quickly without measurement during testing.

A6.5.2 Chamber Ventilation

Turn on the ventilation hood for the test chamber. Do not turn on the pressurized burner air. With the sample still in the test fixture, measure the airflow in the test chamber using a hotwire anemometer or equivalent measuring device. The vertical air velocity within a 12-inch (30.5 cm) radius from any point on the horizontally positioned sample must be less than 100 ft/min (50.8 cm/sec). The horizontal air velocity within a 12-inch (30.5 cm) radius from any point on the sample must be less than 50 ft/min (25.4 cm/sec).

NOTE 1: Airflow measurements do not have to be taken for each sample tested. It is recommended the airflow measurements be taken at the beginning of the day before testing and at the end of the day when testing is completed.

NOTE 2: Personnel present within the test cell may influence air-velocity readings. This may be avoided by mounting the anemometer instrumentation to the sample holder during test cell air velocity measurements.

A6.5.3 Test Chamber Air Temperature

The temperature of the test chamber should be between 50°F and 100°F (10°C and 38°C) before the start of each test. The chamber air temperature should be measured at the same height as the center of the test sample, within 12 inches (30.5 cm) laterally. Remove the sample

from the test frame. Do not use this sample for testing. The sample may be kept for future test-chamber airflow and temperature measurements.

A6.5.4 Sonic Burner Configuration

A6.5.4.1 Fuel Nozzle Location

The tip of the fuel nozzle, or fuel exit plane, must be located 0.1875 ± 0.020 inches (4.763 ± 0.5 mm) from the exit plane of the turbulator (see figure A6-8).

A6.5.4.2 Stator Adjustment

The stator is positioned by adjusting its translational position and its axial position on the fuel rod.

A6.5.4.2.1 Stator Translational Position

The front face of the stator must be located 2.6875 ± 0.020 inches (68.263 ± 0.5 mm) from the exit plane of the turbulator (see figure A6-8). This stator translational position is also 2.5 inches (63.5 mm) from the tip of the fuel nozzle.

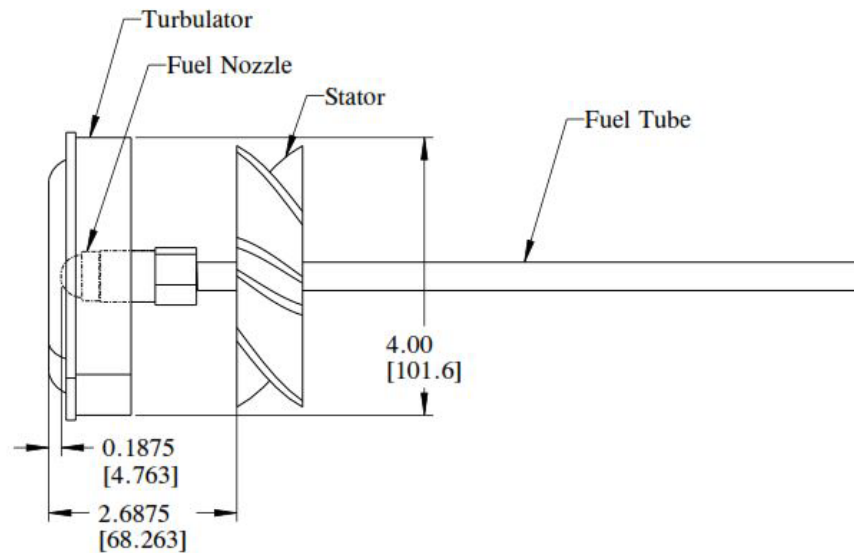


Figure A6-8. Fuel nozzle and stator locations

A6.5.4.2.2 Stator Axial Position

The line running through the set screw and geometric center of the stator will be used as a reference for properly orienting the rotational position of the stator. The stator must be positioned so the reference line angle is 0 degrees (12 o'clock) from the zero position when looking into the burner draft tube (see figure A6-9).

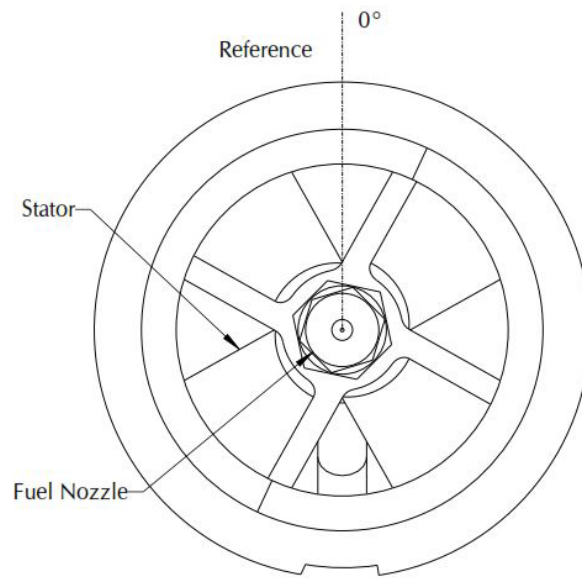


Figure A6-9. Stator axial position

A6.5.4.3 Spark Plug

A high-voltage oil burner ignition transformer with an output of 10 kilovolts is used to create an arc across an automotive-type spark plug mounted in the burner extension cone.

A6.5.4.3.2 Spark Plug Gap

The spark plug gap (distance) between the two electrodes must be 0.100 inch (2.5 mm), as shown in figure A6-10.

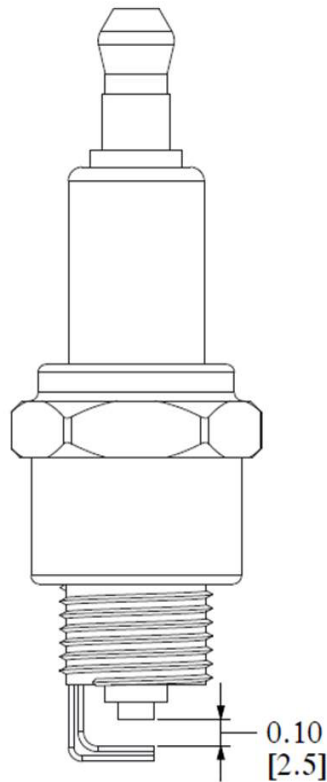


Figure A6-10. Spark plug gap measurement

A6.5.4.4 Spark Plug Wire Routing

The length and arrangement of the spark plug wire must be monitored to prevent heat damage during flame temperature validation and testing. Once the burner is ignited, the outside surface temperature of the burner cone will increase rapidly, becoming capable of damaging the wire if it comes in contact with the cone. The spark plug wire should be carefully routed to prevent contact with the cone or other hot surfaces, and should also be shielded in a heat-resistant covering to further protect it from convective heat damage from the burner flames. The wire can be routed as shown in figure A6-11, such that it does not contact any components in the vicinity of the burner cone.

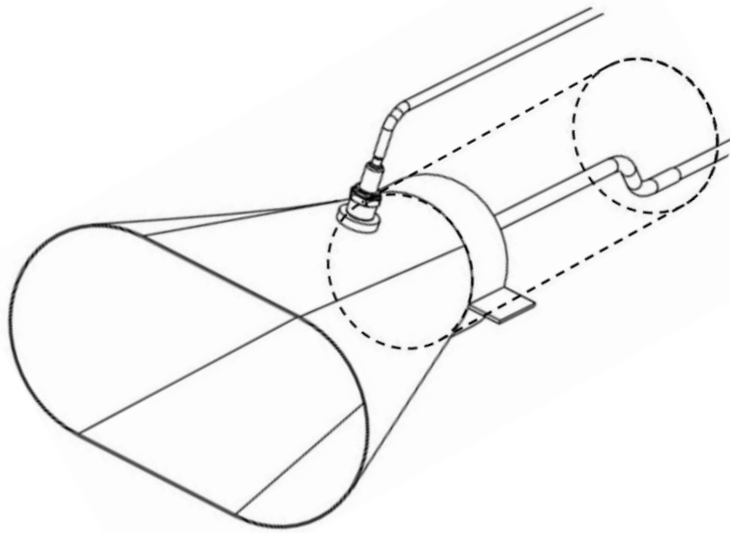


Figure A6-11. Proper routing of the spark plug wire

A6.5.4.5 Volumetric Airflow Control

The volumetric airflow is controlled via a regulated sonic nozzle. Adjust the upstream supply air pressure to $45 \pm 1 \text{ lb/in}^2$ ($0.31 \pm 0.007 \text{ MPa}$). The intake air temperature must be maintained within the range of 40°F to 60°F (4°C to 16°C). For more details, refer to appendix K, section K.3.2, Combustion Airflow Control.

A6.5.4.6 Fuel Flow Calibration

If a calibrated flow meter is not available, measure the fuel flow directly using a length of Tygon tubing and an appropriately-sized graduated cylinder. Slip the Tygon tubing over the end of the fuel nozzle, making certain to establish a good seal. Direct the exit of the Tygon tubing into a small bucket or other collection basin. Turn on the fuel solenoid, making sure the ignition system is off. After establishing a steady stream of fuel flow, simultaneously direct the tubing exit into the graduated cylinder while beginning the stopwatch or timing device. Do not disturb or move the tube while collecting fuel in the graduated cylinder. Collect the fuel for a 2-minute period, making certain to immediately remove the graduated cylinder from the fuel stream at precisely 2 minutes. Calculate the flow rate and ensure that it is $2 \pm 0.1 \text{ gal/hr}$ ($7.57 \pm 0.38 \text{ L/hr}$). If the flow rate is not within the tolerance, adjust the fuel pressure accordingly. Record the fuel pressure necessary to achieve the required fuel flow. The recorded fuel pressure must be monitored and maintained during burner operation and fluctuate no more than $\pm 2 \text{ lb/in}^2$ ($\pm 0.0138 \text{ MPa}$) during flame consistency validation and sample testing. A flame temperature validation or sample test will be void should the fuel pressure fluctuate outside of this range during either

procedure. The temperature of the fuel must be maintained within the range of 32°F to 52°F (0°C –11°C).

NOTE: It is important to establish a steady stream of fuel before starting the fuel-flow measurement process. It is recommended that the fuel flow steadily from the hose for a minimum 10-second period before collecting fuel in the graduated cylinder.

A6.6 Burner Flame Consistency Validation

A6.6.1 Sonic Burner

The sonic burner used in the test must be checked to ensure the proper flame temperature is being produced for consistent and accurate test results.

A6.6.1.1 Move the apparatus from the test position to the warmup position. Examine and clean the burner cone of any evidence of buildup of combustion products such as soot. Soot buildup inside the cone may affect the flame characteristics and cause flame-temperature validation difficulties. Check to ensure the burner cone dimensions are within specified tolerances before flame validation.

A6.6.1.2 Mount the thermocouple rake on a movable stand that is capable of being quickly translated into position in front of the burner. Move the rake into flame temperature validation position and check the distance of each of the seven thermocouples to ensure that they are located 4 ± 0.125 inches (102 ± 3 mm) from the vertical plane of the burner cone exit. Ensure that the horizontal centerline of the thermocouples is offset 1 ± 0.063 inch (25.4 ± 1.6 mm) above the horizontal centerline of the burner cone (see figure A6-6). Place the center thermocouple (thermocouple number 4) in front of the center of the burner cone exit. Note that the movable thermocouple rake stand must incorporate detents that ensure proper centering of the thermocouple rake with respect to the burner cone so that rapid positioning of the rake can be achieved during the validation procedure. Once the proper position is established, move the thermocouple rake away and move back into the temperature-validation position to recheck distances. When all distances and positions are confirmed, move the thermocouple rake away from the burner.

A6.6.1.3 While the thermocouple rake is away from the burner, turn on the spark plug, pressurized air, and fuel flow; light the burner. Allow burner to warm up for 2 minutes. After warmup, move the thermocouple rake into position and allow 1 minute for thermocouple stabilization, then record the temperature of each of the seven thermocouples once every second for 30 seconds. Remove thermocouple rake from the flame-temperature validation position and turn off the burner. Calculate the average temperature of each thermocouple over this period and record. Although not a requirement for testing, the recommended average temperature for each of the seven thermocouples should be 1700°F $\pm$ 100°F (927°C $\pm$ 55°C). The burner should be rechecked to ensure it is configured properly if temperatures are measured outside of this recommended range. A flame that appears biased to one side, or produces significantly higher temperatures on one end of the flame validation thermocouple rake, may indicate that an adjustment of the fuel nozzle/internal stator orientation/distance from the end of the draft tube may be necessary

if the adjustments are within allowable tolerances. If no problems are found with the burner, any thermocouple reading outside of this range may require replacement. It is recommended that the burner flame temperature be validated at the beginning and end of each day testing is performed.

NOTE 1: The thermocouples are subjected to high temperature durations during calibration. Because of this type of cycling, the thermocouples may degrade with use. Small but continuing decreases or extreme variations in temperature or no temperature reading at all are signs that the thermocouple or thermocouples are degrading, or open circuits have occurred. In this case, the thermocouple or thermocouples should be replaced to maintain accuracy in calibrating the burner. It is recommended that a record be kept for the amount of time the thermocouples are exposed to the oil burner's flame.

NOTE 2: The sonic burner is sensitive to proper alignment of the fuel nozzle. It is crucial that the fuel nozzle be aligned to the geometric center of the turbulator. A slight adjustment of the fuel tube between the stator and fuel nozzle may be required to obtain an even temperature profile across the thermocouple rake. The center point of the nozzle where the fuel exits should not deviate more than 0.0625 inch from the geometric center of the turbulator exit plane when looking into the burner draft tube. This should be performed only after checking the burner for proper configuration.

A6.7 Test Procedure

A6.7.1 Examine and clean the cone of soot deposits and debris.

A6.7.2 Weigh the magnesium alloy test sample and record this initial weight.

A6.7.3 Mount the magnesium alloy test sample in the test frame sample holder. Verify that the horizontal test sample is level and that the center of the face of the sample being exposed is at a distance of 4 ± 0.125 inches (102 ± 3 mm) from the vertical exit plane of the burner cone. Ensure that the horizontal centerline of the test sample is offset 1 ± 0.063 inch (25.4 ± 2 mm) above the horizontal centerline of the burner cone (see figure A6-2).

A6.7.4 Move the test frame assembly away from the burner to the standby position so that the flame does not impinge on the test sample during the warmup period. The shortest measured distance between the burner cone and the test sample should be 18 inches (460 mm) or greater when in the warmup position. Turn on the burner and allow it to stabilize for 2 minutes.

A6.7.5 Move the test frame assembly into the test position, and simultaneously start the timing device when the test frame is fully in the test position.

A6.7.6 Record the time for the sample to melt and the time of burning (sustained ignition) of the sample.¹

¹ Burning (sustained ignition) is defined as an ignition lasting for 10 consecutive seconds (i.e., an ignition lasting for more than 10 seconds shall be considered the beginning of sample burning, in the event that ignition stops and then re-starts).

A6.7.7 Expose the test sample to the flames for 4 minutes, then slowly move the test frame assembly away from the burner to the standby position, and turn off the burner.

A6.7.8 Continue to observe the test sample remaining in the sample holder after removal from the test position. If the sample is still burning, measure the time when the burning ends.

A6.7.9 When the test sample has cooled sufficiently, loosen the toggle clamps and remove the sample. Record the final weight. Also remove any sample remnants located in the catch pan, and record these weights after first removing any residual oxidation and talc powder.²

To expedite the sample mounting and testing process, several sample holder/catch pans can be incorporated. The catch pan can use pins or other quick-release mechanisms to facilitate rapid removal following each test. Once the test is complete, the entire sample holder and catch pan, including talc and sample remnants, can be removed from the testing area and replaced with a new sample holder, catch pan, and test sample. Ensure that the new test sample is properly aligned with the burner.

A6.8 Report

A6.8.1 Report a complete description of the material(s) being tested, including manufacturer, alloy content, and trade name.

A6.8.2 For each of the three samples, report the time for the sample to melt (visual observation when sample center section separates from remaining test sample). Also report the time of burning (sustained ignition) and the time when the sample self-extinguishes.

NOTE: Measuring the exact time of flame (self) extinguishment of the test sample is difficult and subjective, given the nature of a burning magnesium alloy. The transition of the alloy from burning to self-extinguishment typically happens gradually rather than instantaneously, as is the case with most traditional cellulosic materials. For this reason, a maximum allowable time until self-extinguishment of the test sample is not required. However, if new magnesium alloys become available that exhibit extended burn periods prior to self-extinguishment but still pass the weight loss criteria, it may be necessary to incorporate a maximum time requirement for the alloy to self-extinguish.

A6.8.3 Calculate and record the weight percentage loss of each test sample by combining the final weight of the sample remaining in the holder and any additional remnants removed from the catch pan. Ensure that the remnant weight includes only metallic components and no oxidized material or talc. The combined weight of the tested sample and remnants can be subtracted from the initial weight of the sample. This value can then be divided by the initial weight and the value multiplied by 100 to determine the percentage weight loss.

² Residual oxidation and talc powder can be removed from the sample and retrieved molten/resolidified pieces by blowing them off with compressed air. This process should be completed within 1 hour of the end of the test.

A6.8.4 Record any observations regarding the behavior of the test sample during flame exposure, such as popping, explosions, smoke, and the time each event occurred.

A6.8.5 Provide a record of burner flame consistency validation.

A6.9 Requirements

A6.9.1 None of the three samples tested may burn (sustained ignition) in less than 2 minutes of burner exposure.

A6.9.2 The calculated weight loss of each sample must not exceed 10 percent.

A6.9.3 If one or more samples fail to meet the above requirements, it is possible to run additional tests if 80 percent or more of the total number of samples meet the requirements. For example, if one of the three original samples fails the test requirement, two additional passing tests can be conducted for a total of four passing tests in five opportunities ($4/5 = 80\%$).

NOTE: The additional testing is intended for materials that typically meet the test requirements but experienced an unexpected failure for unknown reasons. These failures, often referred to as rogue failures, are unanticipated and cannot be explained. Additional testing should not be viewed as a technique for meeting the requirement with inferior materials.