



Public Input No. 7-NFPA 1125-2019 [Section No. 7.4.1]

7.4.1

A solid-propellant rocket motor ~~shall~~ using a metallic casing shall be designed and constructed so that the temperature of the external surface of the rocket motor casing and fittings, if any, shall not exceed 200°C (392°F) for motors generating under 160 N-sec (36 lb-sec) of total impulse, and 220°C (428°F) for motors generating in excess of 160 N-sec (36 lb-sec), during or after operation.

Statement of Problem and Substantiation for Public Input

The casing temperature standard unnecessarily restricts certain long burn motors with non-metallic casings from being certified that are otherwise perfectly safe for consumer use. Provided the rocket motor does not fail, non-metallic casings do not have the thermal conductivity or thermal capacity to cause a fire hazard in the rocket or on the ground.

Submitter Information Verification

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Submittal Date: Sun Jun 16 09:46:16 EDT 2019
Committee: PYR-AAA

Committee Statement

Resolution: [FR-6-NFPA 1125-2019](#)

Statement: The temperature limit for external casings have been revised to allow for certification of long burn motors as their external case temperature is higher due to longer burn time. The committee is seeking additional comment, testing, or data to justify the 316 C temperature limit.



Public Input No. 1-NFPA 1125-2019 [Section No. 8.1.6]

8.1.6

Any changes exceeding manufacturing tolerances made to the physical design or chemical composition of a model rocket motor, motor reloading kit, or component(s) by a manufacturer after certification testing shall be reported to the recognized testing organization that originally granted the certification prior to sale or shipment. If the changes ~~potentially~~ affect performance characteristics measured in the original certification testing, that testing organization shall be permitted to require that samples of the changed product and any supporting changes to the user instructions be submitted for testing.

Statement of Problem and Substantiation for Public Input

The existing document does not define who determines whether the changes may affect characteristics measured during the original performance testing. Adding the word "performance" refines the criteria to be considered when determining whether the changed product requires retest.

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Submittal Date: Wed Jun 12 22:42:19 EDT 2019
Committee: PYR-AAA

Committee Statement

Resolution: FR-3-NFPA 1125-2019
Statement: Changes in the performance characteristics are what affects the certification of the rocket motor and not other characteristics that do not affect performance.



Public Input No. 5-NFPA 1125-2019 [Section No. 8.1.7]

8.1.7

Before granting such certification, samples of a motor or reloadable motor system shall be examined as follows:

- (1) Static testing, conducted at or corrected to sea level and $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ($68^{\circ}\text{F} \pm 9^{\circ}\text{F}$), of a minimum of 10 samples to determine that total impulse, average thrust, and delay time comply with the following requirements:
 - (2) Standard deviation of the total impulse data shall be no greater than 6.7 percent of the mean measured value.
 - (3) No time delay shall be measured to have a variation greater than 1.5 seconds or 20 percent (whichever is greater, but not to exceed 3 seconds) from the labeled value.
 - (4) Labeled value of average thrust shall be within 20 percent [or 10 N (2.25 lbf), whichever is greater] of the average thrust that is computed by dividing the mean total impulse measured during propellant burn time by the mean propellant burn time.
- (5) For metal-casing reloadable motors, rupture testing of one sample to ensure that the casing complies with the burst pressure requirement of Section 7.4.6 and longitudinal failure mode requirements of 7.4.4
- (6) Thermal testing to ensure that the casing temperature during and after static firing complies with 7.4.1
- (7) Heat sensitivity testing to ensure that the motor or motor-reloading kit complies with 7.1.2
- (8) Examination of the packaging, marking, and instructions to verify compliance with all provisions of Sections 7.3 and 7.12 through 7.14

Statement of Problem and Substantiation for Public Input

Adding the reference to Section 7.4.6 in sub-paragraph 2 provides clarification of the requirement source. Adding the reference to Section 7.3 in sub-paragraph 5 provides clarification of the reloadable rocket motor packaging requirements

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Submittal Date: Wed Jun 12 23:29:48 EDT 2019
Committee: PYR-AAA

Committee Statement

Resolution: [FR-7-NFPA 1125-2019](#)

Statement: Cross referencing the relevant requirement sections for bursting pressure and the packaging, marking, and instructions.



Public Input No. 8-NFPA 1125-2019 [Section No. 8.1.7]

8.1.7

Before granting such certification, samples of a motor or reloadable motor system shall be examined as follows:

- (1) Static testing, conducted at or corrected to sea level and $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ($68^{\circ}\text{F} \pm 9^{\circ}\text{F}$), of a minimum of 10 samples to determine that total impulse, average thrust, and delay time comply with the following requirements:
 - (2) Standard deviation of the total impulse data shall be no greater than 6.7 percent of the mean measured value.
 - (3) No time delay shall be measured to have a variation greater than 1.5 seconds or 20 percent (whichever is greater, but not to exceed 3 seconds) from the labeled value.
 - (4) Labeled value of average thrust shall be within 20 percent [or 10 N (2.25 lbf), whichever is greater] of the average thrust that is computed by dividing the mean total impulse measured during propellant burn time by the mean propellant burn time.
- (5) For metal-casing reloadable motors, rupture testing of one sample to ensure that the casing complies with the burst pressure and longitudinal failure mode requirements of 7.4.4
- (6) ~~Thermal~~ For metal-casing motors, thermal testing to ensure that the casing temperature during and after static firing complies with 7.4.1
- (7) Heat sensitivity testing to ensure that the motor or motor-reloading kit complies with 7.1.2
- (8) Examination of the packaging, marking, and instructions to verify compliance with all provisions of 7.12 through 7.14

Statement of Problem and Substantiation for Public Input

The casing temperature standard unnecessarily restricts certain long burn motors with non-metallic casings from being certified that are otherwise perfectly safe for consumer use. Provided the rocket motor does not fail, non-metallic casings do not have the thermal conductivity or thermal capacity to cause a fire hazard in the rocket or on the ground.

Related Public Inputs for This Document

Related Input	Relationship
<u>Public Input No. 7-NFPA 1125-2019 [Section No. 7.4.1]</u>	Proposed change to casing temperature standard.

Submitter Information Verification

Submitter Full Name: Gary Rosenfield
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Submittal Date: Sun Jun 16 10:14:42 EDT 2019

Committee: PYR-AAA

Committee Statement

Resolution: [FR-6-NFPA 1125-2019](#)

Statement: The temperature limit for external casings have been revised to allow for certification of long burn motors as their external case temperature is higher due to longer burn time. The committee is seeking additional comment, testing, or data to justify the 316 C temperature limit.



Public Input No. 2-NFPA 1125-2019 [Section No. 8.2.6]

8.2.6

Any changes exceeding manufacturing tolerances made to the physical design or chemical composition of a high-power rocket motor, motor-reloading kit, or component(s) by a manufacturer after certification testing shall be reported to the recognized testing organization that originally granted the certification prior to sale or shipment. If the changes ~~potentially~~ affect performance characteristics measured in the original certification testing, that testing organization shall be permitted to require that samples of the changed product and any supporting changes to the user instructions be submitted for testing.

Statement of Problem and Substantiation for Public Input

The existing document does not define who determines whether the changes may affect characteristics measured during the original performance testing. Adding the word "performance" refines the criteria to be considered when determining whether the changed product requires retest.

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Committee: PYR-AAA

Committee Statement

Resolution: [FR-4-NFPA 1125-2019](#)

Statement: Changes in the performance characteristics are what affects the certification of the rocket motor and not other characteristics that do not affect performance.



Public Input No. 4-NFPA 1125-2019 [Section No. 8.2.7]

8.2.7

Before granting such certification, samples of a high-power motor or reloadable motor system shall be examined as follows:

- (1) Static testing, conducted at or corrected to sea level and $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ($68^{\circ}\text{F} \pm 9^{\circ}\text{F}$), of two or more samples to determine that total impulse, average thrust, and delay time comply with the following requirements:
 - (2) Standard deviation of the total impulse data shall be no greater than 6.7 percent of the mean measured value.
 - (3) No time delay shall be measured to have a variation greater than 1.5 seconds or 20 percent (whichever is greater, but not to exceed 3 seconds) from the labeled value.
 - (4) Imprinted average thrust shall be within 20 percent [or 10 N (2.25 lbf), whichever is greater] of the average thrust that is computed by dividing the mean total impulse measured during propellant burn time by the mean propellant burn time.
 - (5) Imprinted total impulse shall be the mean measured value.
- (6) For metal-casing reloadable motors, rupture testing of one sample to ensure that the casing complies with the burst pressure of Section 7.4.6 and failure mode requirements of 7.4.3 and 7.4.4
- (7) Thermal testing to ensure that the casing temperature during and after static firing complies with 7.4.1
- (8) Heat sensitivity testing to ensure that the motor or motor-reloading kit complies with 7.1.2
- (9) Examination of the packaging, marking, and instructions to verify compliance with all provisions of Sections 7.3 and 7.12 through 7.14

Statement of Problem and Substantiation for Public Input

Adding the reference to Section 7.4.6 in sub-paragraph 2 provides clarification of the requirement source. Adding the reference to Section 7.3 in sub-paragraph 5 provides clarification of the reloadable rocket motor packaging requirements.

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Submittal Date: Wed Jun 12 23:18:37 EDT 2019

Committee: PYR-AAA

Committee Statement

Resolution: [FR-8-NFPA 1125-2019](#)

Statement: Cross referencing the relevant requirement sections for bursting pressure and the packaging, marking, and instructions.



Public Input No. 9-NFPA 1125-2019 [Section No. 8.2.7]

8.2.7

Before granting such certification, samples of a high-power motor or reloadable motor system shall be examined as follows:

- (1) Static testing, conducted at or corrected to sea level and $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ($68^{\circ}\text{F} \pm 9^{\circ}\text{F}$), of two or more samples to determine that total impulse, average thrust, and delay time comply with the following requirements:
 - (2) Standard deviation of the total impulse data shall be no greater than 6.7 percent of the mean measured value.
 - (3) No time delay shall be measured to have a variation greater than 1.5 seconds or 20 percent (whichever is greater, but not to exceed 3 seconds) from the labeled value.
 - (4) Imprinted average thrust shall be within 20 percent [or 10 N (2.25 lbf), whichever is greater] of the average thrust that is computed by dividing the mean total impulse measured during propellant burn time by the mean propellant burn time.
 - (5) Imprinted total impulse shall be the mean measured value.
- (6) For metal-casing reloadable motors, rupture testing of one sample to ensure that the casing complies with the burst pressure and failure mode requirements of 7.4.3 and 7.4.4
- (7) ~~Thermal~~ For metal-casing motors, thermal testing to ensure that the casing temperature during and after static firing complies with 7.4.1
- (8) Heat sensitivity testing to ensure that the motor or motor-reloading kit complies with 7.1.2
- (9) Examination of the packaging, marking, and instructions to verify compliance with all provisions of Sections 7.12 through 7.14

Statement of Problem and Substantiation for Public Input

The casing temperature standard unnecessarily restricts certain long burn motors with non-metallic casings from being certified that are otherwise perfectly safe for consumer use. Provided the rocket motor does not fail, non-metallic casings do not have the thermal conductivity or thermal capacity to cause a fire hazard in the rocket or on the ground.

Related Public Inputs for This Document

Related Input	Relationship
<u>Public Input No. 7-NFPA 1125-2019 [Section No. 7.4.1]</u>	Proposed change to casing temperature standard.

Submitter Information Verification

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Submittal Date: Sun Jun 16 10:20:26 EDT 2019
Committee: PYR-AAA

Committee Statement

Resolution: [FR-6-NFPA 1125-2019](#)

Statement: The temperature limit for external casings have been revised to allow for certification of long burn motors as their external case temperature is higher due to longer burn time. The committee is seeking additional comment, testing, or data to justify the 316 C temperature limit.



Public Input No. 6-NFPA 1125-2019 [New Section after 8.3]

8.3.1 Manufacturers and testing organizations shall provide data regarding user constraints, recalls, or additional manufacturer instructions for certified motors and motor reload kits on their websites and/or via telephone.

Statement of Problem and Substantiation for Public Input

Manufacturers and testing organization certification lists do not identify manufacturing lots that may have been recalled, have special use constraints e.g. require electronic ejection, or have additional manufacturer instructions (e.g. faulty component replacement in reload kits). There have been several flight failures personally experienced that were recognized after the fact as caused by recalled motors.

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Submittal Date: Wed Jun 12 23:40:24 EDT 2019
Committee: PYR-AAA

Committee Statement

Resolution: [FR-5-NFPA 1125-2019](#)

Statement: This section applies to all rocket motors and AHJs are not the ones to maintain these lists, as that is the testing organizations responsibility.



Public Input No. 3-NFPA 1125-2019 [Section No. 8.3]

8.3 Listing of Certified ~~High-Power~~ Rocket Motors and Motor-Reloading Kits.

The ~~authority having jurisdiction~~ recognized testing organizations shall maintain a current and complete list ~~listings~~ of all ~~these high-power~~ rocket motors and motor-reloading kit types that ~~are they have~~ certified as complying with the standards and requirements detailed in Sections 8.1 and 8.2 and shall make copies of this list available to citizens-~~and~~ , public safety officials, and authorities having jurisdiction who request it.

Statement of Problem and Substantiation for Public Input

Since this section as written refers to Sections 8.1 (model rocket motors) and 8.2 (high power rocket motors) it is assumed that the title and lists were meant to apply to all hobby rocket motors. Elimination of the high power references are error corrections. The authorities having jurisdiction rely on the recognized testing organizations for the certification lists so the recognized testing organizations should be identified as maintaining the certification lists.

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Submittal Date: Wed Jun 12 23:00:47 EDT 2019
Committee: PYR-AAA

Committee Statement

Resolution: FR-5-NFPA 1125-2019

Statement: This section applies to all rocket motors and AHJs are not the ones to maintain these lists, as that is the testing organizations responsibility.