APPENDIX M – FUEL TANK FLAMMABILITY REDUCTION MEANS (FRM)

M25.1 Fuel tank flammability exposure requirements

ED Decision 2009/010/R

(a) The Fleet Average Flammability Exposure level of each fuel tank, as determined in accordance with Appendix N of CS-25, must not exceed 3 percent of the Flammability Exposure Evaluation Time (FEET), as defined in Appendix N of CS-25. If flammability reduction means (FRM) are used, neither time periods when any FRM is operational but the fuel tank is not inert, nor time periods when any FRM is inoperative may contribute more than 1.8 percent to the 3 percent average fleet flammability exposure of a tank.

(b) The Fleet Average Flammability Exposure, as defined in Appendix N of this part, of each fuel tank for ground, takeoff/climb phases of flight during warm days must not exceed 3 percent of FEET in each of these phases. The analysis must consider the following conditions.

(1) The analysis must use the subset of flights starting with a sea level ground ambient temperature of 26.7°C [80° F] (standard day plus 11.7°C (21° F) atmosphere) or more, from the flammability exposure analysis done for overall performance.

(2) For the ground, takeoff/climb phases of flight, the average flammability exposure must be calculated by dividing the time during the specific flight phase the fuel tank is flammable by the total time of the specific flight phase.

(3) Compliance with this paragraph may be shown using only those flights for which the aeroplane is dispatched with the flammability reduction means operational.

[Amdt 25/6]

M25.2 Showing compliance

ED Decision 2009/010/R

(a) The applicant must provide data from analysis, ground testing, and flight testing, or any combination of these, that:

(1) validate the parameters used in the analysis required by paragraph M25.1;

(2) substantiate that the FRM is effective at limiting flammability exposure in all compartments of each tank for which the FRM is used to show compliance with paragraph M25.1; and

(3) describe the circumstances under which the FRM would not be operated during each phase of flight.

(4) identify critical features of the fuel tank system to prevent an auxiliary fuel tank installation from increasing the flammability exposure of main tanks above that permitted under paragraphs M25.1(a) and (b) of this appendix and to prevent degradation of the performance and reliability of the FRM.

(b) The applicant must validate that the FRM meets the requirements of paragraph M25.1 of this appendix with any aeroplane or engine configuration affecting the performance of the FRM for which approval is sought.

(c) Any FRM failures or failures that could affect the FRM, with potential catastrophic consequences shall not result from a single failure or a combination of failures not shown to be extremely improbable.

(d) It must be shown that the fuel tank pressures will remain within limits during normal operating conditions and failure conditions.

(e) Oxygen-enriched air produced by the FRM must not create a hazard during normal operating conditions.

[Amdt 25/6]

M25.3 Reliability indications and maintenance access

ED Decision 2009/010/R

(a) Reliability indications must be provided to identify failures of the FRM that would otherwise be latent and whose identification is necessary to ensure the fuel tank with an FRM meets the fleet average flammability exposure listed in paragraph M25.1 of this appendix, including when the FRM is inoperative.

(b) Sufficient accessibility to FRM reliability indications must be provided for maintenance personnel or the flight crew.

(c) The accesses to the fuel tanks with FRMs (including any tanks that communicate with a tank via a vent system), and to any other confined spaces or enclosed areas that could contain hazardous atmosphere under normal conditions or failure conditions must be permanently stencilled, marked, or placarded to warn maintenance personnel of the possible presence of a potentially hazardous atmosphere. Those stencils, markings or placards must be installed such as to remain permanently visible during maintenance operations.

[Amdt 25/6]

M25.4 Airworthiness limitations and procedures

ED Decision 2009/010/R

The FRM shall be subject to analysis using conventional processes and methodology to ensure that the minimum scheduled maintenance tasks required for securing the continuing airworthiness of the system and installation are identified and published as part of the CS 25.1529 compliance. Maintenance tasks arising from either the Monte Carlo analysis or a CS 25.1309 safety assessment shall be dealt with in accordance with the principles laid down in AMC 25.1309.

(a) If FRM is used to comply with paragraph M25.1, Airworthiness Limitations must be identified for all maintenance or inspection tasks required to identify failures of components within the FRM that are needed to meet paragraph M25.1.

(b) Maintenance procedures must be developed to identify any hazards to be considered during maintenance of the fuel system and of the FRM. These procedures must be included in the instructions for continued airworthiness (ICA).

[Amdt 25/6]

APPENDIX N – FUEL TANK FLAMMABILITY EXPOSURE

ED Decision 2016/010/R

(See AMC to Appendix N)

N25.1 General

ED Decision 2009/010/R

(a) This appendix specifies the requirements for conducting fuel tank fleet average flammability exposure analyses required to meet CS 25.981(b) and Appendix M. This appendix defines parameters affecting fuel tank flammability that must be used in performing the analysis. These include parameters that affect all aeroplanes within the fleet, such as a statistical distribution of ambient temperature, fuel flash point, flight lengths, and aeroplane descent rate. Demonstration of compliance also requires application of factors specific to the aeroplane model being evaluated. Factors that need to be included are maximum range, cruise mach number, typical altitude where the aeroplane begins initial cruise phase of flight, fuel temperature during both ground and flight times, and the performance of an FRM if installed (See AMC to appendix N, N25.1(a)).

(b) For fuel tanks installed in aluminium wings, a qualitative assessment is sufficient if it substantiates that the tank is a conventional unheated aluminium wing tank (See AMC to Appendix N25.1(b)).

[Amdt 25/6]

AMC to Appendix N, N25.1(a) Fuel tank flammability assessment method

ED Decision 2009/010/R

The Monte-Carlo program as well as the method and procedures set forth in FAA document, "Fuel Tank Flammability Assessment Method Users Manual" DOT/FAA/AR-05/8 dated May 2008 (or the latest existing revision on the condition that it is accepted by EASA), is an acceptable means of compliance to conduct the flammability assessment specified in Appendix N25.1(a). A copy may be obtained from the Office of the Federal Register, 800 North Capitol Street, N.W., Suite 700, Washington, D.C. The following definitions, input variables, and data tables that are used in the program to determine fleet average flammability exposure for a specific aeroplane model are the ones included into paragraph N25.2 Definitions and N25.4 Variables and data tables.

[Amdt 25/6]

AMC to Appendix N, N25.1(b) Qualitative fuel tank flammability assessment

ED Decision 2009/010/R

(a) A conventional unheated aluminium wing tank is a conventional aluminium structure, integral tank of a subsonic transport aeroplane wing, with minimal heating from aeroplane systems or other fuel tanks and cooled by ambient airflow during flight. Heat sources that have the potential for significantly increasing the flammability exposure of a fuel tank would preclude the tank from being considered "unheated." Examples of such heat sources that may have this effect are heat exchangers, adjacent heated fuel tanks, transfer of fuel from a warmer tank, and adjacent air conditioning equipment. Thermal anti-ice systems and thermal anti-ice blankets typically do not significantly increase flammability of fuel tanks. For these tanks, a qualitative assessment showing equivalency to the unheated aluminium wing fuel tank may be acceptable when considered with the following:

1 A description of the aeroplane configuration, (including subsonic, wing construction, etc.),

2 A listing of any heat sources in or adjacent to the fuel tank,

3 The type of fuel approved for the aeroplane,

4 The tank operating pressure relative to ambient static pressure,

5 The tank is uninsulated and made of aluminium, and

6 The tank has a large aerodynamic surface area exposed to outside air to transfer heat from the tank.

(b) Fuel tanks with an aerodynamic surface area to volume ratio (surface area/volume) greater than 1.0 have been shown to meet these criteria. Fuel tanks with a ratio less than 1.0 are not considered conventional unheated aluminium wing tanks. The aerodynamic surface area includes the area of the integral aluminium wing fuel tank that is exposed to outside air. It does not include any portion of a fuel tank that is shielded from free stream airflow, such as the front and rear spar, or an area under a fairing or wing thermal blanket.

[Amdt 25/6]

N25.2 Definitions

ED Decision 2009/010/R

(a) Bulk Average Fuel Temperature means the average fuel temperature within the fuel tank or different sections of the tank if the tank is subdivided by baffles or compartments.

(b) Flammability Exposure Evaluation Time (FEET). The time from the start of preparing the aeroplane for flight, through the flight and landing, until all payload is unloaded, and all passengers and crew have disembarked. In the Monte Carlo program, the flight time is randomly selected from the Flight Length Distribution (Table 2), the pre-flight times are provided as a function of the flight time, and the post-flight time is a constant 30 minutes.

(c) Flammable. With respect to a fluid or gas, flammable means susceptible to igniting readily or to exploding (ref. CS-Definitions). A non-flammable ullage is one where the fuel-air vapour is too lean or too rich to burn or is inert as defined below. For the purposes of this appendix, a fuel tank that is not inert is considered flammable when the bulk average fuel temperature within the tank is within the flammable range for the fuel type being used. For any fuel tank that is subdivided into sections by baffles or compartments, the tank is considered flammable when the bulk average fuel temperature within any section of the tank, that is not inert, is within the flammable range for the fuel type being used.

(d) Flash Point. The flash point of a flammable fluid means the lowest temperature at which the application of a flame to a heated sample causes the vapour to ignite momentarily, or “flash.” Table 1 of this appendix provides the flash point for the standard fuel to be used in the analysis.

(e) Fleet average flammability exposure is the percentage of the flammability exposure evaluation time (FEET) the fuel tank ullage is flammable for a fleet of an aeroplane type operating over the range of flight lengths in a world-wide range of environmental conditions and fuel properties as defined in this appendix.

(f) Gaussian Distribution is another name for the normal distribution, a symmetrical frequency distribution having a precise mathematical formula relating the mean and standard deviation of the samples. Gaussian distributions yield bell shaped frequency curves having a preponderance of values around the mean with progressively fewer observations as the curve extends outward.

(g) Hazardous atmosphere. An atmosphere that may expose maintenance personnel, passengers or flight crew to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a confined space), injury, or acute illness.

(h) Inert. For the purpose of this appendix, the tank is considered inert when the bulk average oxygen concentration within each compartment of the tank is 12 percent or less from sea level up to 10,000 feet altitude, then linearly increasing from 12 percent at 10,000 feet to 14.5 percent at 40,000 feet altitude, and extrapolated linearly above that altitude.

(i) Inerting. A process where a non-combustible gas is introduced into the ullage of a fuel tank so that the ullage becomes non-flammable.

(j) Monte Carlo Analysis. The analytical method that is specified in this appendix as the compliance means for assessing the fleet average flammability exposure time for a fuel tank.

(k) Oxygen evolution occurs when oxygen dissolved in the fuel is released into the ullage as the pressure and temperature in the fuel tank are reduced.

(l) Standard deviation is a statistical measure of the dispersion or variation in a distribution, equal to the square root of the arithmetic mean of the squares of the deviations from the arithmetic means.

(m) Transport Effects. For purposes of this appendix, transport effects are the change in fuel vapour concentration in a fuel tank caused by low fuel conditions and fuel condensation and vaporization.

(n) Ullage. The volume within the fuel tank not occupied by liquid fuel.

[Amdt 25/6]

N25.3 Fuel tank flammability exposure analysis

ED Decision 2009/010/R

(a) A flammability exposure analysis must be conducted for the fuel tank under evaluation to determine fleet average flammability exposure for the aeroplane and fuel types under evaluation. For fuel tanks that are subdivided by baffles or compartments, an analysis must be performed either for each section of the tank, or for the section of the tank having the highest flammability exposure. Consideration of transport effects is not allowed in the analysis.

(b) The following parameters are defined in the Monte Carlo analysis and provided in paragraph N25.4:

(1) Cruise Ambient Temperature – as defined in this appendix.

(2) Ground Temperature – as defined in this appendix.

(3) Fuel Flash Point – as defined in this appendix.

(4) Flight length Distribution –that must be used is defined in Table 2 of this appendix.

(c) Parameters that are specific to the particular aeroplane model under evaluation that must be provided as inputs to the Monte Carlo analysis are:

(1) Aeroplane Cruise Altitude

(2) Fuel Tank quantities. If fuel quantity affects fuel tank flammability, inputs to the Monte Carlo analysis must be provided that represent the actual fuel quantity within the fuel tank or compartment of the fuel tank throughout each of the flights being evaluated. Input values for this data must be obtained from ground and flight test data or the EASA approved fuel management procedures.

(3) Aeroplane cruise Mach Number.

(4) Aeroplane maximum Range

(5) Fuel Tank Thermal Characteristics. If fuel temperature affects fuel tank flammability, inputs to the Monte Carlo analysis must be provided that represent the actual bulk average fuel temperature within the fuel tank throughout each of the flights being evaluated. For fuel tanks that are subdivided by baffles or compartments, bulk average fuel temperature inputs must be provided either for each section of the tank or for the section of the tank having the highest flammability exposure. Input values for this data must be obtained from ground and flight test data or a thermal model of the tank that has been validated by ground and flight test data.

(6) Maximum aeroplane operating temperature limit as defined by any limitations in the Aeroplane Flight Manual.

(7) Aeroplane Utilization. The applicant must provide data supporting the number of flights per day and the number of hours per flight for the specific aeroplane model under evaluation. If there is no existing aeroplane fleet data to support the aeroplane being evaluated, the applicant must provide substantiation that the number of flights per day and the number of hours per flight for that aeroplane model is consistent with the existing fleet data they propose to use.

(8) Aeroplane climb & descent profiles in accordance with the aircraft performance data documented in the Aircraft Flight Manual.

(d) Fuel Tank FRM Model. If FRM is used, an Agency approved Monte Carlo program must be used to show compliance with the flammability requirements of CS 25.981 and Appendix M of this part. The program must determine the time periods during each flight phase when the fuel tank or compartment with the FRM would be flammable. The following factors must be considered in establishing these time periods:

(1) Any time periods throughout the flammability exposure evaluation time and under the full range of expected operating conditions, when the FRM is operating properly but fails to maintain a non-flammable fuel tank because of the effects of the fuel tank vent system or other causes,

(2) If dispatch with the system inoperative under the Master Minimum Equipment List (MMEL) is requested, the time period assumed in the reliability analysis shall be consistent with the proposed rectification interval, depending on aeroplane utilisation,

(3) Frequency and duration of time periods of FRM inoperability, substantiated by test or analysis, caused by latent or known failures, including aeroplane system shut-downs and failures that could cause the FRM to shut down or become inoperative,

(4) Effects of failures of the FRM that could increase the flammability exposure of the fuel tank,

(5) Oxygen Evolution: If an FRM is used that is affected by oxygen concentrations in the fuel tank, the time periods when oxygen evolution from the fuel results in the fuel tank or compartment exceeding the inert level. The applicant must include any times when oxygen evolution from the fuel in the tank or compartment under evaluation would result in a flammable fuel tank. The oxygen evolution rate that must be used is defined in the FAA document "Fuel Tank Flammability Assessment Method User's Manual", dated May 2008 (or latest revision), document number DOT/FAA/AR–05/8.

(6) If an inerting system FRM is used, the effects of any air that may enter the fuel tank following the last flight of the day due to changes in ambient temperature, as defined in Table 4, during a 12-hour overnight period.

[Amdt 25/6]

N25.4 Variables and data tables

ED Decision 2009/010/R

The following data must be used when conducting a flammability exposure analysis to determine the fleet average flammability exposure. Variables used to calculate fleet flammability exposure must include atmospheric ambient temperatures, flight length, flammability exposure evaluation time, fuel flash point, thermal characteristics of the fuel tank, overnight temperature drop, and oxygen evolution from the fuel into the ullage.

(a) Atmospheric Ambient Temperatures and Fuel Properties.

(1) In order to predict flammability exposure during a given flight, the variation of ground ambient temperatures, cruise ambient temperatures, and a method to compute the transition from ground to cruise and back again must be used. The variation of the ground and cruise ambient temperatures and the flash point of the fuel is defined by a Gaussian curve, given by the 50 percent value and a ± 1-standard deviation value.

(2) Ambient Temperature: Under the program, the ground and cruise ambient temperatures are linked by a set of assumptions on the atmosphere. The temperature varies with altitude following the International Standard Atmosphere (ISA) rate of change from the ground ambient temperature until the cruise temperature for the flight is reached. Above this altitude, the ambient temperature is fixed at the cruise ambient temperature. This results in a variation in the upper atmospheric temperature. For cold days, an inversion is applied up to 10,000 feet, and then the ISA rate of change is used.

(3) Fuel properties:

(i) For Jet A and Jet A-1 fuel, the variation of flash point of the fuel is defined by a Gaussian curve, given by the 50 percent value and a ± 1-standard deviation, as shown in Table 1.

(ii) The flammability envelope of the fuel that must be used for the flammability exposure analysis is a function of the flash point of the fuel selected by the Monte Carlo for a given flight. The flammability envelope for the fuel is defined by the upper flammability limit (UFL) and lower flammability limit (LFL) as follows:

(A) LFL at sea level = flash point temperature of the fuel at sea level minus 5.5°C (10°F). LFL decreases from sea level value with increasing altitude at a rate of 0.55 °C (1°F) per 808 feet.

(B) UFL at sea level = flash point temperature of the fuel at sea level plus 19.5°C (63.5°F). UFL decreases from the sea level value with increasing altitude at a rate of 0.55°C (1°F) per 512 feet.

(4) For each flight analyzed, a separate random number must be generated for each of the three parameters (ground ambient temperature, cruise ambient temperature, and fuel flash point) using the Gaussian distribution defined in Table 1.

Table 1. Gaussian Distribution for Ground Ambient Temperature, Cruise Ambient Temperature, and Fuel Flash Point

	Temperature in Deg C/Deg F		
Parameter	Ground Ambient Temperature.	Cruise ambient Temperature.	Fuel Flash Point (FP)
Mean Temp	15.53/59.95	_ -56.67/ -70	48.89/ 120
Neg 1 std dev	11.18/ 20.14	4.4/ 8	4.4/ 8
Pos 1 std dev	9.6/ 17.28	4.4/ 8	4.4/8

(b) The Flight Length Distribution defined in Table 2 must be used in the Monte Carlo analysis.

Table 2. Flight Length Distribution

		Aeroplane Maximum Range – Nautical Miles (NM)									
		1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
Flight Length (NM)		Distribution of flight lengths (Percentage of total)									
From	To										
0	200	11.7	7.5	6.2	5.5	4.7	4.0	3.4	3.0	2.6	2.3
200	400	27.3	19.9	17.0	15.2	13.2	11.4	9.7	8.5	7.5	6.7
400	600	46.3	40.0	35.7	32.6	28.5	24.9	21.2	18.7	16.4	14.8
600	800	10.3	11.6	11.0	10.2	9.1	8.0	6.9	6.1	5.4	4.8
800	1000	4.4	8.5	8.6	8.2	7.4	6.6	5.7	5.0	4.5	4.0
1000	1200	0.0	4.8	5.3	5.3	4.8	4.3	3.8	3.3	3.0	2.7
1200	1400	0.0	3.6	4.4	4.5	4.2	3.8	3.3	3.0	2.7	2.4
1400	1600	0.0	2.2	3.3	3.5	3.3	3.1	2.7	2.4	2.2	2.0
1600	1800	0.0	1.2	2.3	2.6	2.5	2.4	2.1	1.9	1.7	1.6
1800	2000	0.0	0.7	2.2	2.6	2.6	2.5	2.2	2.0	1.8	1.7
2000	2200	0.0	0.0	1.6	2.1	2.2	2.1	1.9	1.7	1.6	1.4
2200	2400	0.0	0.0	1.1	1.6	1.7	1.7	1.6	1.4	1.3	1.2
2400	2600	0.0	0.0	0.7	1.2	1.4	1.4	1.3	1.2	1.1	1.0
2600	2800	0.0	0.0	0.4	0.9	1.0	1.1	1.0	0.9	0.9	0.8
2800	3000	0.0	0.0	0.2	0.6	0.7	0.8	0.7	0.7	0.6	0.6
3000	3200	0.0	0.0	0.0	0.6	0.8	0.8	0.8	0.8	0.7	0.7
3200	3400	0.0	0.0	0.0	0.7	1.1	1.2	1.2	1.1	1.1	1.0
3400	3600	0.0	0.0	0.0	0.7	1.3	1.6	1.6	1.5	1.5	1.4
3600	3800	0.0	0.0	0.0	0.9	2.2	2.7	2.8	2.7	2.6	2.5
3800	4000	0.0	0.0	0.0	0.5	2.0	2.6	2.8	2.8	2.7	2.6
4000	4200	0.0	0.0	0.0	0.0	2.1	3.0	3.2	3.3	3.2	3.1
4200	4400	0.0	0.0	0.0	0.0	1.4	2.2	2.5	2.6	2.6	2.5

		Aeroplane Maximum Range – Nautical Miles (NM)									
		1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
Flight Length (NM)		Distribution of flight lengths (Percentage of total)									
4400	4600	0.0	0.0	0.0	0.0	1.0	2.0	2.3	2.5	2.5	2.4
4600	4800	0.0	0.0	0.0	0.0	0.6	1.5	1.8	2.0	2.0	2.0
4800	5000	0.0	0.0	0.0	0.0	0.2	1.0	1.4	1.5	1.6	1.5
5000	5200	0.0	0.0	0.0	0.0	0.0	0.8	1.1	1.3	1.3	1.3
5200	5400	0.0	0.0	0.0	0.0	0.0	0.8	1.2	1.5	1.6	1.6
5400	5600	0.0	0.0	0.0	0.0	0.0	0.9	1.7	2.1	2.2	2.3
5600	5800	0.0	0.0	0.0	0.0	0.0	0.6	1.6	2.2	2.4	2.5
5800	6000	0.0	0.0	0.0	0.0	0.0	0.2	1.8	2.4	2.8	2.9
6000	6200	0.0	0.0	0.0	0.0	0.0	0.0	1.7	2.6	3.1	3.3
6200	6400	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.4	2.9	3.1
6400	6600	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.8	2.2	2.5
6600	6800	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.2	1.6	1.9
6800	7000	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8	1.1	1.3
7000	7200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7	0.8
7200	7400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.7
7400	7600	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.6
7600	7800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.7
7800	8000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.8
8000	8200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8
8200	8400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0
8400	8600	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.3
8600	8800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.1
8800	9000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8
9000	9200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
9200	9400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
9400	9600	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
9600	9800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
9800	10000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

(c) Overnight Temperature Drop. For aeroplanes on which FRM is installed, the overnight temperature drop for this appendix is defined using:

(1) A temperature at the beginning of the overnight period that equals the landing temperature of the previous flight that is a random value based on a Gaussian distribution; and

(2) An overnight temperature drop that is a random value based on a Gaussian distribution.

(3) For any flight that will end with an overnight ground period (one flight per day out of an average of number of flights per day, depending on utilization of the particular aeroplane model being evaluated), the landing outside air temperature (OAT) is to be chosen as a random value from the following Gaussian curve:

Table 3. Landing Outside Air Temperature

Parameter	Landing Outside Air Temperature °C/ °F
Mean Temperature	14.82/ 58.68
negative 1 std dev	11.41/ 20.55
positive 1 std dev	7.34/ 13.21

(4) The outside ambient air temperature (OAT) overnight temperature drop is to be chosen as a random value from the following Gaussian curve:

Table 4. Outside Air Temperature (OAT) Drop

Parameter	OAT Drop Temperature °C/ °F
Mean Temp	-11.11/ 12.0
1 std dev	3.3/ 6.0

(d) Number of Simulated Flights Required in Analysis. In order for the Monte Carlo analysis to be valid for showing compliance with the fleet average and warm day flammability exposure requirements, the applicant must run the analysis for a minimum number of flights to ensure that the fleet average and warm day flammability exposure for the fuel tank under evaluation meets the applicable flammability limits defined in Table 5.

Table 5. Flammability Exposure Limit

Minimum Number of Flights in Monte Carlo Analysis	Maximum Acceptable Monte Carlo Average Fuel Tank Flammability Exposure (%) to meet 3% requirements	Maximum Acceptable Monte Carlo Average Fuel Tank Flammability Exposure (%) to meet 7% requirements
10,000	2.91	6.79
100,000	2.98	6.96
1,000,000	3.00	7.00

[Amdt 25/6]