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|  | Ändringsförordning 2021/1296  Delen som avser kraven för bränsle-/energiplanering och bränsle-/energiuppföljning  Ikraftträdande 2022-10-30  Uppdaterad 2022-07-27 | | |  |
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| Information | | | | |
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| Denna checklista innehåller endast delar av de förändringar som träder i kraft den 30 oktober 2022.  Fokus här är fuel schemes, då dessa är föremål för förhandsgodkännande och måste finnas på plats detta datum.  Ändringsförordning [2021/1296 (Fuel schemes)](https://www.easa.europa.eu/document-library/regulations/commission-implementing-regulation-eu-20211296) och 2021/2237 (All Weather Operations) går i vissa delar ihop; men när det gäller 2021/2237 kommer compliance checklistor Del-CAT och Del-ORO att uppdateras med giltighetsdatum från 30 oktober 2022.  Notera att definitioner i Annex I förändrats, tagits bort eller tillkommit; dessa ingår inte i denna checklista utan endast stickprov kommer att genomföras.  **Denna checklista är endast framtagen för att vara ett stöd vid implementeringen av Fuel schemes; det är alltid förordning (EU) nr 965/2012 som gäller.**  Checklistan är gulmarkerad enligt följande:   |  |  |  | | --- | --- | --- | | Ny punkt | Samma regelpunkt men förändrad rubrik | Endast förändring av regeltext | | Regelpunkt Rubrik  Text | Regelpunkt Rubrik  Text | Regelpunkt Rubrik  Text |   På vissa ställen är tabellerna direkt inklippta i detta dokument från ED Decision 2022/005/R samt delar av ED Decision 2022/012/R; de blå fälten anger då ändringarna. | | | | |
| Operatör | | | | |
| Namn på operatör | | | | |
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| Tillståndsnummer eller organisationsnummer | | Kontaktuppgifter | | |
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| Transportstyrelsen | | | | |
| Ärendenummer | | Handläggare | | |
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| Berörda sektioner/samråd | | | | |
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| AMC1 CAT.GEN.MPA.180(a)(18) Documents, manuals and information to be carried | | | | |
| APPROPRIATE METEOROLOGICAL INFORMATION ED Decision 2022/005/R | | | | |
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| The appropriate meteorological information should be relevant to the planned operation, as specified in point (a) of point MET.TR.215 of Annex V (Part-MET) to Regulation (EU) 2017/373, and comprise the following:  (a) the meteorological information that is specified in point (e) of point MET.TR.215 of Part-MET; and  (b) supplemental meteorological information:  (1) information other than that specified in point (a), which should be based on data from certified meteorological service providers; or  (2) information from other reliable sources of meteorological information that should be evaluated by the operator. | | | | |
| Referens i OM: | | TS notering: | | |
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| GM1 CAT.GEN.MPA.180(a)(18) Documents, manuals and information to be carried | | | | |
| DATA FROM CERTIFIED METEOROLOGICAL SERVICE PROVIDERS ED Decision 2022/005/R | | | | |
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| In the context of point (b)(1) of AMC1 CAT.GEN.MPA.180(a)(18), the operator may consider that any meteorological information that is provided by the organisation within the scope of the meteorological information included in the flight documentation defined in point (e) of point MET.TR.215 of [Part-MET](https://www.easa.europa.eu/regulations/atmans-provision-services-air-traffic-managementair-navigation-services#part-met) should originate only from authoritative sources or certified providers, and should not be transformed or tampered, except for the purpose of presenting the data in the correct format. The organisation’s process should provide assurance that the integrity of such service is preserved in the data to be used by both flight crews and operators, regardless of their form. | | | | |
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| GM2 CAT.GEN.MPA.180(a)(18) Documents, manuals and information to be carried | | | | |
| INFORMATION FROM OTHER RELIABLE SOURCES OF METEOROLOGICAL INFORMATION ED Decision 2022/005/R | | | | |
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| In the context of point (b)(2) of AMC1 CAT.GEN.MPA.180(a)(18), reliable sources of meteorological information are organisations that are able to provide an appropriate level of data assurance in terms of accuracy and integrity. The operator may consider in the evaluation that the organisation has a quality assurance system in place that covers source selection, acquisition/import, processing, validity period check, and distribution phase of data. | | | | |
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| GM3 CAT.GEN.MPA.180(a)(18) Documents, manuals and information to be carried | | | | |
| SUPPLEMENTAL METEOROLOGICAL INFORMATION AND SUPPLEMENTARY INFORMATION ED Decision 2022/005/R | | | | |
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| Supplemental meteorological information: when operating under specific provisions and without the meteorological information from a certified service provider, the operator should use ‘supplemental meteorological information’, such as digital imagery. Related information can be found in point (e)(4) of AMC1 CAT.OP.MPA.192.  Supplementary information: it is included in point (a) of AMC1 CAT.GEN.MPA.180(a)(18) and refers to meteorological information to be reported in specific cases such as freezing precipitation, blowing snow, thunderstorm, etc. | | | | |
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| CAT.OP.MPA.100 Use of air traffic services (EU) 2021/1296 | | | | |
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| (b)(3) local helicopter operations (LHOs) | | | | |
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| CAT.OP.MPA.106 Isolated aerodrome (EU) 2021/1296 | | | | |
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| *This point is deleted* | | | | |
| GM1 CAT.OP.MPA.107 Adequate aerodrome | | | | |
| VERIFICATION OF WEATHER CONDITIONS ED Decision 2022/005/R | | | | |
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| This GM clarifies the difference between ‘adequate aerodrome’ and ‘weather-permissible aerodrome’. The two concepts are complementary:  — ‘adequate aerodrome’: see definition in Annex I (Definitions for terms used in Annexes II to VIII) and point CAT.OP.MPA.107 of Annex IV (Part-CAT) to Regulation (EU) No 965/2012; and  — ‘weather-permissible aerodrome’ means an adequate aerodrome with additional requirements: see definition in Annex I (Definitions for terms used in Annexes II to VIII).  Weather conditions are not required to be considered at an adequate aerodrome. | | | | |
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| CAT.OP.MPA.150 Fuel policy (EU) 2021/1296 | | | | |
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| CAT.OP.MPA.151 Fuel policy – alleviations (EU) 2021/1296 | | | | |
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| *This point is deleted* | | | | |
| CAT.OP.MPA.175 Flight preparations (EU) 2021/1296 | | | | |
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| (b)(7) the provisions specified in the operations manual in respect of fuel/energy, oil, oxygen, minimum safe altitudes, aerodrome operating minima and availability of alternate aerodromes, where required, can be complied with for the planned flight | | | | |
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| AMC1 CAT.OP.MPA.175(a) Flight preparation | | | | |
| OPERATIONAL FLIGHT PLAN – COMPLEX MOTOR-POWERED AIRCRAFT ED Decision 2022/005/R | | | | |
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| (a) The operational flight plan used and the entries made during flight should contain the following items: | | | | |
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| …  (13) planned cruising speed and flying times between check-points/waypoints (estimated, revised, and actual times overhead);  …  (18) alternate(s) for destination, including the information required in (a)(12) to (15), as well as destination 2 and destination 2 alternate aerodromes in case of a reduced contingency fuel (RCF) procedure;  (19) where applicable, a take-off alternate and fuel ERA aerodrome(s);  (20) initial ATS flight plan clearance and subsequent reclearance;  (21) in-flight replanning calculations; and  (22) meteorological information, as specified in point (a) of point MET.TR.215 of [Part-MET](https://www.easa.europa.eu/regulations/atmans-provision-services-air-traffic-managementair-navigation-services#part-met).  … | | | | |
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| OPERATIONAL FLIGHT PLAN – OTHER-THAN-COMPLEX MOTOR-POWERED AIRCRAFT OPERATIONS AND LOCAL OPERATIONS ED Decision 2022/005/R | | | | |
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| (e) An operational flight plan may be established in a simplified form relevant to the type of operation for operations with other-than-complex motor-powered aircraft as well as local operations with any aircraft. Local operations should be defined in the OM. | | | | |
| Referens i OM: | | TS referens: | | |
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| OPERATIONAL FLIGHT PLAN – HELICOPTERS OPERATED WITH A SINGLE PILOT AND WITHOUT A STABILITY AUGMENTATION SYSTEM OR AN AUTOMATIC FLIGHT CONTROL SYSTEM (AFCS) ED Decision 2022/005/R | | | | |
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| (f) No entries should be made in the operational flight plan during the flight. | | | | |
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| OPERATIONAL FLIGHT PLAN PRDUCED BY A COMPUTERISED FLIGHT-PLANNING SYSTEM ED Decision 2022/005/R | | | | |
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| (g) When the operator uses a computerised flight-planning system to produce an operational flight plan, the functionality of this system should be described in the OM. | | | | |
| Referens i OM: | | TS notering: | | |
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| (h) If the computerised flight-planning system is used in conjunction with a basic fuel scheme with variations or an individual fuel scheme, the operator should ensure that the quality and the proper functionality of the software are tested after each upgrade. The test should verify that the changes to the software do not affect the final output. | | | | |
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| CAT.OP.MPA.177 Submission of the ATS flight plan (EU) 2021/1296 | | | | |
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| (a) If an air traffic services (ATS) flight plan is not submitted because it is not required by the rules of the air, adequate information shall be deposited in order to permit alerting services to be activated if required. | | | | |
| Referens i OM: | | TS notering | | |
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| (b) When operating from a site where it is impossible to submit an ATS flight plan, the ATS flight plan shall be transmitted as soon as possible after take-off by the commander or the operator. | | | | |
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| AMC1 CAT.OP.MPA.177 Submission of the ATS flight plan | | | | |
| FLIGHTS WITHOUT AN ATS FLIGHT PLAN ED Decision 2022/005/R | | | | |
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| (a) When unable to submit or close the ATS flight plan due to lack of ATS facilities or of any other means of communications to ATS, the operator should establish procedures, instructions, and a list of nominated persons to be responsible for alerting search and rescue (SAR) services. | | | | |
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| (b) To ensure that each flight is located at all times, these instructions should:  (1) provide the nominated person with at least the information required to be included in a VFR flight plan, and the location, date, and estimated time for re-establishing communications;  (2) if an aircraft is overdue or missing, ensure that the appropriate ATS or SAR service is notified; and  (3) ensure that the information will be retained at a designated place until the completion of the flight. | | | | |
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| CAT.OP.MPA.180 Fuel/energy scheme aeroplanes (EU) 2021/1296 | | | | |
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| (a) The operator shall establish, implement, and maintain a fuel/energy scheme that:  (1) is appropriate for the type(s) of operation performed;  (2) corresponds to the capability of the operator to support its implementation; and  (3) is either:  (i) a basic fuel/energy scheme, which shall form the basis for a basic fuel/energy scheme with variations and an individual fuel/energy scheme; the basic fuel/energy scheme derives from a large-scale analysis of safety and operational data from previous performance and experience of the industry, applying scientific principles; the basic fuel/energy scheme shall ensure, in this order, a safe, effective, and efficient operation of the aircraft; or  (ii) a basic fuel/energy scheme with variations, which is a basic fuel/energy scheme where the analysis referred to in point (i) is used to establish a variation to the basic fuel/energy scheme that ensures, in this order, a safe, effective, and efficient operation of the aircraft; or  (iii) an individual fuel/energy scheme, which derives from a comparative analysis of the operator’s safety and operational data, applying scientific principles; the analysis is used to establish a fuel/energy scheme with a higher or equivalent level of safety to that of the basic fuel/energy scheme that ensures, in this order, a safe, effective, and efficient operation of the aircraft. | | | | |
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| (b) All fuel/energy schemes shall comprise:  (1) a fuel/energy planning and in-flight re-planning policy;  (2) an aerodrome selection policy; and  (3) an in-flight fuel/energy management policy. | | | | |
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| (c) The fuel/energy scheme and any change to it shall require prior approval by the competent authority. | | | | |
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| (d) When the operator intends to apply for an individual fuel/energy scheme, it shall:  (1) establish a baseline safety performance of its current fuel/energy scheme;  (2) demonstrate its capability to support the implementation of the proposed individual fuel/energy scheme, including the capability to exercise adequate operational control and to ensure exchange of the relevant safety information between the operational control personnel and the flight crew; and  (3) make a safety risk assessment that demonstrates how an equivalent level of safety to that of the current fuel/energy scheme is achieved. | | | | |
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| AMC1 CAT.OP.MPA.180 Fuel/energy scheme - aeroplanes | | | | |
| INDIVIDUAL FUEL SCHEME ED Decision 2022/005/R | | | | |
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| (a) Prior to submitting an individual fuel scheme for approval, the operator should perform all the following actions to establish a baseline safety performance:  (1) measure the baseline safety performance of its operation with the current fuel scheme by:  (i) selecting safety performance indicators (SPIs) and targets that are agreed with the competent authority; and  (ii) collecting statistically relevant data for a period of at least 2 years of continuous operation (note: the number of flights should be sufficient to provide data to support the intended deviation);  (2) identify the hazards associated with the individual fuel scheme and carry out a safety risk assessment of these hazards; and  (3) based on this safety risk assessment, establish a mechanism for risk monitoring and risk control to ensure an equivalent level of safety to that of the current fuel scheme. | | | | |
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| (b) In order to ensure the approval of the competent authority and its continuous oversight, the operator should establish an effective continuous reporting system to the competent authority on the safety performance and regulatory compliance of the individual fuel scheme. | | | | |
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| (c) When determining the extent of the deviation from the current fuel scheme, the operator should take into account at least the following elements for the relevant area of operation:  (1) the available aerodrome technologies, capabilities, and infrastructure;  (2) the reliability of meteorological and aerodrome information;  (3) the reliability of the aeroplane systems, especially the time-limited ones; and  (4) the type of ATS provided and, where applicable, characteristics and procedures of the air traffic flow management and of the airspace management. | | | | |
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| (d) An operator wishing to apply for the approval of an individual fuel scheme should be able to demonstrate that it exercises sufficient organisational control over internal processes and the use of resources. The operator should adapt its management system to ensure that:  (1) processes and procedures are established to support the individual fuel scheme;  (2) involved flight crew and personnel are trained and competent to perform their tasks; and  (3) the implementation and effectiveness of such processes, procedures, and training are monitored. | | | | |
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| (e) The operator should have as a minimum the following operational capabilities that support the implementation of an individual fuel scheme:  (1) use a suitable computerised flight-planning system;  (2) ensure that the planning of flights is based upon current aircraft-specific data that is derived from a fuel consumption monitoring system and reliable meteorological data;  (3) have airborne fuel prediction systems;  (4) be able to operate in required navigation performance (RNP) 4 oceanic and remote continental airspace and in area navigation (RNAV) 1 continental en-route airspace, as applicable;  (5) be able to perform APCHs that require an LVO approval and RNP APCHs down to VNAV minima; and  (6) update the available landing options by establishing an operational control system with the following capabilities:  (i) flight monitoring or flight watch;  (ii) collection and continuous monitoring of reliable meteorological, aerodrome, and traffic information;  (iii) two independent airborne communications systems to achieve rapid and reliable exchange of relevant safety information between flight operations personnel and flight crew during the entire flight; and  (iv) monitoring of the status of aircraft systems that affect fuel consumption and of ground and aircraft systems that affect landing capabilities. | | | | |
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| (f) After receiving the approval, the operator should:  (1) continually measure and monitor the outcome of each SPI; and  (2) in case of degradation of any SPI:  (i) assess the root cause of the degradation;  (ii) identify remedial actions to restore the baseline safety performance; and  (iii) when the associated safety performance target is not met, inform the authority as soon as practicable. | | | | |
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| GM1 CAT.OP.MPA.180 Fuel/energy scheme - aeroplanes | | | | |
| FUEL SCHEMES ED Decision 2022/005/R | | | | |
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| An operator can choose between three different fuel schemes. For the development of each fuel scheme, the following AMC are applicable:   1. (a) Basic fuel scheme: all the AMC that apply to the basic fuel scheme. 2. (b) Basic fuel scheme with variations: when an operator decides to deviate fully or partly from the basic fuel schemes, the AMC for basic fuel schemes with variations apply to the specific deviation. 3. (c) Individual fuel scheme: when an operator wishes to apply an individual fuel scheme, the AMC for the individual fuel scheme apply; for the part of the scheme where the operator still follows the basic fuel scheme, the operator should apply the AMC referred to in (a) and (b). | | | | |
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| GM2 CAT.OP.MPA.180 Fuel/energy scheme - aeroplanes | | | | |
| INDIVIDUAL FUEL SCHEMES – BASELINE SAFETY PERFORMANCE INDICATORS (SPIs) AND EQUIVALENT LEVEL OF SAFETY ED Decision 2022/005/R | | | | |
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| (a) Establishing the baseline safety performance of a current fuel scheme involves collecting historical statistical data for the selected SPIs over a defined period of time, e.g. a minimum of 2 years. The safety performance of the operator’s processes is then measured against this baseline safety performance before and after implementation of the individual fuel scheme. | | | | |
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| (b) Agreed SPIs should be commensurate with the complexity of the operational context, the extent of the deviations of the individual fuel scheme from the current fuel scheme, and the availability of resources to address those SPIs. | | | | |
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| (c) The following is a non-exhaustive list of SPIs that are used to measure the baseline safety performance:  (1) flights with 100 % consumption of the contingency fuel;  (2) flights with a percentage consumption of the contingency fuel (e.g. 85 %), as agreed by the operator and the competent authority;  (3) difference between planned and actual trip fuel;  (4) landings with less than the final reserve fuel (FRF) remaining;  (5) flights landing with less than minutes of fuel remaining (e.g. 45 minutes), as agreed by the operator and the competent authority;  (6) ‘MINIMUM FUEL’ declarations;  (7) ‘MAYDAY MAYDAY MAYDAY FUEL’ declarations;  (8) in-flight re-planning to the planned destination due to fuel shortage, including committing to land at the destination by cancelling the planned destination alternate;  (9) diversion to an en route alternate (ERA) aerodrome to protect the FRF;  (10) diversion to the destination alternate aerodrome; and  (11) any other indicator with the potential of demonstrating the suitability or unsuitability of the alternate aerodrome and fuel planning policy.  Note: Although the above-list includes quantitative SPIs, for certain non-data-based monitoring SPIs, alert and target levels may be qualitative in nature. | | | | |
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| (d) Equivalent level of safety: SPIs and associated targets that are achieved after the introduction of an individual fuel scheme ‘should be equivalent to’ or ‘exceed’ the SPIs and associated targets that were used in the previously approved fuel scheme. To determine if such equivalence is achieved, the operator should carefully compare with one another the safety performance of operational activities before and after the application of the individual fuel scheme. For example, the operator should ensure that the average number of landings with less than the FRF does not increase after the introduction of the individual fuel scheme. | | | | |
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| (e) The applicability of the individual fuel scheme may be limited to a specific aircraft fleet or type/variant of aircraft or area of operations. Different policies may be established as long as the procedures clearly specify the boundaries of each policy so that the flight crew is aware of the policy being applied: for example, the operator may wish to deviate from the basic 5 % contingency fuel policy only in certain areas of operations or only for a specific aircraft fleet or type/variant of aircraft. The safety performance of the fuel scheme may be measured according to the relevant area of operation or aircraft fleet or type/variant of aircraft so that any degradation of the safety performance can be isolated and mitigated separately. In that case, the approval for a deviation may be suspended for the affected area of operations and/or type/variant of aircraft until the required safety performance is achieved.  Note: ICAO Doc 9976 Flight Planning and Fuel Management (FPFM) Manual (1st Edition, 2015) and the EASA Fuel Manual provide further guidance. | | | | |
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| GM3 CAT.OP.MPA.180 Fuel/energy scheme - aeroplanes | | | | |
| INDIVIDUAL FUEL SCHEMES – OPERATOR CAPABILITIES – COMMUNICATIONS SYSTEMS ED Decision 2022/005/R | | | | |
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| (a) In the context of point (e)(6) of AMC1 CAT.OP.MPA.180, the availability of two independent communications systems at dispatch is particularly relevant for flights over oceanic and remote areas (e.g. when flying over the ocean without VHF coverage, operators need either HF or satellite communications (SATCOM)). | | | | |
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| (b) Consideration should also be given to the operational control system associated with the use of the aircraft communications addressing and reporting system (ACARS). Two communications systems (e.g. VHF and SATCOM) should be used to support the ACARS functionality to ensure the required degree of independence unless the operator has established contingency procedures for reverting to voice communication only. | | | | |
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| (c) Additional means of communications may be required by other regulations that are not linked to fuel schemes.  Note: For further information, see ICAO Doc 9976 Flight Planning and Fuel Management (FPFM) Manual, Appendix 7 to Chapter 5 A performance-based approach job-aid for an approving authority (1st Edition, 2015). | | | | |
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| CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight re-planning policy – aeroplanes (EU) 2021/1296 | | | | |
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| (a) The operator shall:  (1) establish a fuel/energy planning and in-flight re-planning policy as part of the fuel/energy scheme;  (2) ensure that the aeroplane carries a sufficient amount of usable fuel/energy to safely complete the planned flight and to allow for deviations from the planned operation;  (3) develop procedures for the fuel/energy planning and in-flight re-planning policy that shall be contained in the operations manual.  (4) ensure that the fuel/energy planning of the flight is based on:  (i) current aircraft-specific data derived from a fuel/energy consumption monitoring system or, if not available;  (ii) data provided by the aeroplane manufacturer. | | | | |
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| (b) The operator shall ensure that the planning of flights includes the operating conditions under which the flight is to be conducted; the operating conditions shall include at least:  (1) aircraft fuel/energy consumption data;  (2) anticipated masses;  (3) anticipated meteorological conditions;  (4) the effects of deferred maintenance items and/or of configuration deviations;  (5) the expected departure and arrival routing and runways; and  (6) anticipated delays. | | | | |
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| (c) The operator shall ensure that the pre-flight calculation of the usable fuel/energy that is required for a flight includes:  (1) taxi fuel/energy that shall not be less than the amount expected to be used prior to take-off;  (2) trip fuel/energy that shall be the amount of fuel/energy that is required to enable the aeroplane to fly from take-off, or from the point of in-flight re-planning, to landing at the destination aerodrome;  (3) contingency fuel/energy that shall be the amount of fuel/energy required to compensate for unforeseen factors;  (4) destination alternate fuel/energy:  (i) when a flight is operated with at least one destination alternate aerodrome, it shall be the amount of fuel/energy required to fly from the destination aerodrome to the destination alternate aerodrome; or  (ii) when a flight is operated with no destination alternate aerodrome, it shall be the amount of fuel/energy required to hold at the destination aerodrome, while enabling the aeroplane to perform a safe landing, and to allow for deviations from the planned operation; as a minimum, this amount shall be 15-minute fuel/energy at holding speed at 1 500 ft (450 m) above the aerodrome elevation in standard conditions, calculated according to the estimated aeroplane mass on arrival at the destination aerodrome;  (5) final reserve fuel/energy that shall be the amount of fuel/energy that is calculated at holding speed at 1 500 ft (450 m) above the aerodrome elevation in standard conditions according to the aeroplane estimated mass on arrival at the destination alternate aerodrome, or destination aerodrome when no destination alternate aerodrome is required, and shall not be less than:  (i) for aeroplanes with reciprocating engines, the fuel/energy to fly for 45 minutes; or  (ii) for turbine-engined aeroplanes, the fuel/energy to fly for 30 minutes;  (6) additional fuel/energy, if required by the type of operation; it shall be the amount of fuel/energy to enable the aeroplane to land at a fuel/energy en route alternate aerodrome (fuel/energy ERA aerodrome critical scenario) in the event of an aircraft failure that significantly increases the fuel/energy consumption at the most critical point along the route; this additional fuel/energy is required only if the minimum amount of fuel/energy that is calculated according to points (c)(2) to (c)(5) is not sufficient for such an event;  (7) extra fuel/energy to take into account anticipated delays or specific operational constraints; and  (8) discretionary fuel/energy, if required by the commander | | | | |
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| (d) The operator shall ensure that in-flight re-planning procedures for calculating the usable fuel/energy that is required when a flight proceeds along a route or to a destination aerodrome other than the ones originally planned include points (c)(2) to (c)(7). | | | | |
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| AMC1 CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight replanning policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – PRE-FLIGHT CALCULATION OF USABLE FUEL FOR PERFORMANCE CLASS A AEROPLANES ED Decision 2022/005/R | | | | |
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| For the pre-flight calculation of the usable fuel in accordance with point CAT.OP.MPA.181, the operator should:  (a) for taxi fuel, take into account the local conditions at the departure aerodrome and the APU consumption; | | | | |
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| (b) for trip fuel, include:  (1) fuel for take-off and climb from the aerodrome elevation to the initial cruising level/altitude, taking into account the expected departure routing;  (2) fuel from the top of climb to the top of descent, including any step climb/descent;  (3) fuel from the top of descent to the point where the approach procedure is initiated, taking into account the expected arrival routing; and  (4) fuel for making an approach and landing at the destination aerodrome; | | | | |
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| (c) for contingency fuel, calculate for unforeseen factors either:  (1) 5 % of the planned trip fuel or, in the event of in-flight re-planning, 5 % of the trip fuel for the remainder of the flight; or  (2) an amount to fly for 5 minutes at holding speed at 1 500 ft (450 m) above the destination aerodrome in standard conditions,  whichever is the higher; | | | | |
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| (d) for destination alternate fuel, include:  (1) when the aircraft is operated with one destination alternate aerodrome:  (i) fuel for a missed approach from the applicable DA/H or MDA/H at the destination aerodrome to the missed-approach altitude, taking into account the complete missed-approach procedure;  (ii) fuel for climb from the missed-approach altitude to the cruising level/altitude, taking into account the expected departure routing;  (iii) fuel for cruising from the top of climb to the top of descent, taking into account the expected routing;  (iv) fuel for descent from the top of descent to the point where the approach is initiated, taking into account the expected arrival routing; and  (v) fuel for making an approach and landing at the destination alternate aerodrome; and  (2) when the aircraft is operated with two destination alternate aerodromes, the amount of fuel that is calculated in accordance with point (d)(1), based on the destination alternate aerodrome that requires the greater amount of fuel; | | | | |
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| (e) for FRF, comply with point CAT.OP.MPA.181(c); | | | | |
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| (f) for additional fuel, include an amount of fuel that allows the aeroplane to proceed, in the event of an engine failure or loss of pressurisation, from the most critical point along the route to a fuel en route alternate (fuel ERA) aerodrome in the relevant aircraft configuration, hold there for 15 minutes at 1 500 ft (450 m) above the aerodrome elevation in standard conditions, make an approach, and land; | | | | |
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| (g) for extra fuel, include anticipated delays or specific operational constraints that can be predicted; and | | | | |
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| (h) for discretionary fuel, include a quantity at the sole discretion of the commander. | | | | |
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| AMC2 CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight replanning policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – PREFLIGHT CALCULATION OF USABLE FUEL FOR PERFORMANCE CLASS B AND C AEROPLANES ED Decision 2022/005/R | | | | |
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| * 1. (a) taxi fuel, if significant;   2. (b) trip fuel;   3. (c) contingency fuel that is not less than 5 % of the planned trip fuel, or in the event of in-flight re-planning, 5 % of the trip fuel for the remainder of the flight;   4. (d) alternate fuel to reach the destination alternate aerodrome via the destination if a destination alternate aerodrome is required;   5. (e) FRF to comply with point CAT.OP.MPA.181(c);   6. (f) extra fuel if there are anticipated delays or specific operational constraints; and   7. (g) discretionary fuel, if required by the commander.   The pre-flight calculation of required usable fuel should include:  The operating conditions may include rounded-up figures of fuel for all flights. | | | | |
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| AMC3 CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight replanning policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – PRE-FLIGHT CALCULATION OF USABLE FUEL FOR ELA2 AEROPLANES ED Decision 2022/005/R | | | | |
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| For operations, take-off, and landing at the same aerodrome or operating site under VFR by day, operators should specify the minimum FRF in the OM. This FRF should not be less than the amount needed to fly for a period of 45 minutes. The operating conditions may be rounded up to a single figure of fuel for all flights. For the pre-flight calculation of the required usable fuel, a single rounded-up figure for the particular flight is needed, which includes trip fuel, contingency fuel, extra fuel, discretionary fuel, and alternate fuel, to reach a destination alternate aerodrome if such an aerodrome is required. | | | | |
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| AMC4 CAT.OP.MPA.181 Fuel/energy scheme – Fuel/energy planning and in-flight replanning policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – PRE-FLIGHT CALCULATION OF USABLE FUEL ED Decision 2022/005/R | | | | |
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| The additional fuel required by the type of operation in the event of an aircraft failure that significantly increases fuel consumption at the most critical point along the route should be calculated according to the engine failure or loss of pressurisation, whichever requires a greater amount of fuel. | | | | |
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| GM1 CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight replanning policy - aeroplanes | | | | |
| BASIC FUEL SCHEME ED Decision 2022/005/R | | | | |
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| TAXI FUEL — LOCAL CONDITIONS  (a) Local conditions, as referred to in point (a) of AMC1 CAT.OP.MPA.181, include NOTAMs, meteorological conditions (e.g. winter operations), ATS procedures (e.g. LVP, collaborative decision-making (CDM)), and any anticipated delay(s). | | | | |
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| PLANNING OF FLIGHTS  (b) A flight should be planned by using the most accurate information available. If aircraft-specific data that is derived from a fuel consumption monitoring system is available, this data is used in preference to data that is provided by the aircraft manufacturer. Data that is provided by the aircraft manufacturer should be used only in specific cases, e.g. when introducing a new aircraft type into service. | | | | |
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| FUEL CONSUMPTION MONITORING SYSTEM  (c) Extensive guidance on a fuel consumption monitoring system is provided in ICAO Doc 9976 Flight Planning and Fuel Management (FPFM) Manual, Appendix 5 to Chapter 5 Example of a fuel consumption monitoring (FCM) programme (1st Edition, 2015). As a basic requirement, the fuel consumption monitoring system (commonly referred to as ‘hull-specific fuel bias’) is a process of comparing an aeroplane’s achieved in-flight performance to an aeroplane’s predicted performance. Variations between the achieved performance and the predicted performance result in a variation of the fuel consumption rate, which should be accounted for by the operator during flight planning and in-flight re-planning.  The fuel consumption monitoring system is used to determine an individual aeroplane’s performance in comparison with its predicted one. In no case, should data that is collected from one aeroplane be used as a basis for varying another aeroplane’s performance figures away from the predicted values.  The data that is collected and used to determine an aeroplane’s actual performance should be collected in a manner acceptable to the competent authority. The operator should demonstrate that the data collected during in-service operation of the aeroplane is accurate. Where possible, the data should be collected automatically; however, manual recording of data does not preclude an operator from participating in a fuel consumption monitoring system. | | | | |
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| ANTICIPATED MASSES — LAST-MINUTE CHANGES  (d) Where appropriate, the operating procedures should include means to revise the fuel quantity and define limits to zero fuel weight (ZFW) changes, beyond which a new operational flight plan should be calculated. | | | | |
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| TRIP FUEL — ARRIVAL ROUTING  (e) POINT MERGE PATTERN  When planning for a STAR to point merge, fuel for the direct STAR to the point merge should be included in the trip fuel. The fuel required to account for the probability that part of or the entire point merge route needs to be flown may be included in the contingency fuel unless there is an anticipated delay, in which case, the fuel required for the route should be included in the extra fuel. | | | | |
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| (f) POINT TROMBONE PATTERN  When planning for a STAR or transition including a trombone pattern, fuel for the reasonably expected route should be included in the trip fuel. The fuel required to account for the probability that an extended part of or the entire trombone pattern route needs to be flown may be included in the contingency fuel unless there is an anticipated delay, in which case, the fuel required for the trombone pattern route should be included in the extra fuel. | | | | |
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| UNFORESEEN FACTORS  (g) According to its definition, contingency fuel is the amount of fuel required to compensate for unforeseen factors.  Unforeseen factors are those that could have an influence on the fuel consumption to the destination aerodrome, such as deviations of an individual aeroplane from the expected fuel consumption data, deviations from forecast meteorological conditions, extended unexpected delays in flight, extended unexpected taxi times, and deviations from planned routings and/or cruising levels.  Unforeseen factors may differ based on the type of fuel scheme adopted by each operator; the higher the capability of the operator, the fewer unforeseen factors there may be.  For example, operators that have a fuel consumption monitoring system should calculate the trip fuel based on the individual fuel consumption. Extended unexpected delays or deviations from forecast meteorological conditions are mitigated by means of statistical data. | | | | |
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| DESTINATION ALTERNATE AERODROME  (h) The departure aerodrome may be selected as the destination alternate aerodrome. | | | | |
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| FINAL RESERVE FUEL  (i) The operator may determine conservative (rounded-up) FRF values for each type and variant of aeroplane that is used in operations. The intent of this recommendation is:  (1) to provide a reference value for comparing to pre-flight fuel planning computations, and for the purpose of a ‘gross error’ check; and  (2) to provide flight crews with easily referenced and recallable FRF figures to support in-flight fuel monitoring and decision-making activities. | | | | |
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| ANTICIPATED DELAYS  (j) In the context of fuel schemes, an anticipated delay is defined as one that can be predicted based on the information that is provided by the State of the aerodrome and/or ATS provider before the flight commences. For example, restrictions due to scheduled maintenance work on a runway are likely to cause a delay to the normal flow of inbound traffic. That delay may be promulgated either through NOTAMs or via the aeronautical information publication (AIP), including a specific time and/or date.  Another example is an ATS procedure that requires an operator to fly longer routes, e.g. due to curfew during night-time. | | | | |
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| DISCRETIONARY FUEL  (k) Discretionary fuel is defined as ‘fuel at the sole discretion of the commander’ (PIC). The commander’s discretion over the amount of fuel to be carried is independent and cannot be encouraged or discouraged. | | | | |
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| IN-FLIGHT RE-PLANNING  (l) In the context of fuel policy, in-flight re-planning means voluntarily changing the destination aerodrome, any alternate aerodrome, or the remainder of the route after the flight commences, even when the flight can be completed as originally planned. In-flight re-planning has a broader sense than being obliged to change the intended course of action due to safety issues (remaining fuel, failures, bad weather conditions, etc.). In-flight re-planning allows the operator to modify the filed flight plan after flight commencement for commercial or other reasons. However, the modified flight plan should fulfil all requirements of a new flight plan. The use of en route alternate (ERA) aerodromes to save fuel should comply with the in-flight re-planning requirements.  In-flight re-planning should not apply when the aircraft no longer continues via the flight plan route to the intended destination for reasons that could not be anticipated. In such cases, the in-flight fuel management policy dictates the commander’s course of action. | | | | |
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| BASIC FUEL SCHEME WITH VARIATIONS – TAXI FUEL ED Decision 2022/005/R | | | | |
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| To calculate taxi fuel for a basic fuel scheme with variations, the operator may use statistical taxi fuel. | | | | |
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| AMC6 CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight replanning policy - aeroplanes | | | | |
| BASIC FUEL SCHEME WITH VARIATIONS – CONTINGENCY FUEL ED Decision 2022/005/R | | | | |
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| (a) Contingency fuel variations are methods of reducing the basic amount of contingency fuel based on established mitigating measures. | | | | |
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| (b) If the operator establishes and maintains a fuel consumption monitoring system for individual aeroplanes, and uses valid data for fuel calculation based on such a system, the operator may use any of the requirements in point (c) or (d) of this AMC to calculate the contingency fuel. | | | | |
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| (c) The contingency fuel should be the fuel described in points (c)(1) or (c)(2) of this AMC, whichever is higher:  (1) an amount of fuel that should be either: (i) not less than 3 % of the planned trip fuel, or in the event of in-flight re-planning, 3 % of the trip fuel for the remainder of the flight provided that a fuel en route alternate (fuel ERA) aerodrome is available; or  (ii) an amount of fuel sufficient for 20-minute flying time based upon the planned trip fuel consumption; or  (iii) an amount of fuel based on a statistical fuel method that ensures an appropriate statistical coverage of the deviation from the planned to the actual trip fuel; prior to implementing a statistical fuel method, a continuous 2-year operation is required during which statistical contingency fuel (SCF) data is recorded — note: to use SCF on a particular city pair/aeroplane combination, sufficient data is required to be statistically significant; the operator should use this method to monitor the fuel consumption on each city pair/aeroplane combination, and to carry out a statistical analysis to calculate the required contingency fuel for that city pair/aeroplane combination;  or  (2) an amount of fuel to fly for 5 minutes at holding speed at 1 500 ft (450 m) above the destination aerodrome in standard conditions. | | | | |
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| (d) RCF procedure: if the operator’s fuel policy includes pre-flight planning to a destination 1 aerodrome (commercial destination with an RCF procedure using a decision point along the route) and a destination 2 aerodrome (optional refuelling destination), the amount in the pre-flight calculation of the required usable fuel should be greater than the sum in points (d)(1) or (d)(2):  (1) the sum of:  (i) taxi fuel;  (ii) trip fuel to the destination 1 aerodrome via the decision point;  (iii) contingency fuel equal to not less than 5 % of the fuel that is estimated to be consumed from the decision point to the destination 1 aerodrome;  (iv) the amount of fuel specified in AMC2 CAT.OP.MPA.182: destination 1 alternate fuel or no alternate fuel if the remaining flying time from the decision point to destination 1 aerodrome is less than 6 hours;  (v) FRF;  (vi) additional fuel;  (vii) extra fuel if there are anticipated delays or specific operational constraints; and  (viii) discretionary fuel, if required by the commander; or  (2) the sum of:  (i) taxi fuel;  (ii) trip fuel to the destination 2 aerodrome via the decision point;  (iii) contingency fuel equal to not less than the amount that is calculated in accordance with point (c) of this AMC, from the departure aerodrome to the destination 2 aerodrome;  (iv) alternate fuel if a destination 2 alternate aerodrome is required;  (v) FRF;  (vi) additional fuel;  (vii) extra fuel if there are anticipated delays or specific operational constraints; and  (viii) discretionary fuel, if required by the commander. | | | | |
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| AMC7 CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight replanning policy - aeroplanes | | | | |
| BASIC FUEL SCHEME WITH VARIATIONS – LOCATION OF THE FUEL EN ROUTE ALTERNATE AERODROME TO REDUCE CONTINGENCY FUEL TO 3% ED Decision 2022/005/R | | | | |
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| The fuel en route alternate (fuel ERA) aerodrome should be located within a circle with a radius equal to 20 % of the total flight plan distance; the centre of this circle lies on the planned route at a distance from the destination aerodrome equal to 25 % of the total flight plan distance, or at least 20 % of the total flight plan distance plus 50 NM, whichever is greater. All distances should be calculated in still-air conditions (see Figure 1). The fuel ERA aerodrome should be nominated in the operational flight plan.  **Figure 1 — Location of the fuel ERA aerodrome to reduce contingency fuel to 3 %** | | | | |
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| GM2 CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight replanning policy - aeroplanes | | | | |
| BASIC FUEL SCHEME WITH VARIATIONS – STATISTICAL CONTINGENCY FUEL METHOD ED Decision 2022/005/R | | | | |
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| As an example of statistical contingency fuel, the following statistical values of the deviation from the planned to the actual trip fuel provide appropriate statistical coverage:  (a) 99 % coverage plus 3 % of the trip fuel if the calculated flight time:  (1) is less than 2 hours; or  (2) is more than 2 hours and no fuel ERA aerodrome is available;  (b) 99 % coverage if the calculated flight time is more than 2 hours and a fuel ERA aerodrome is available; and  (c) 90 % coverage if:  (1) the calculated flight time is more than 2 hours;  (2) a fuel ERA aerodrome is available; and  (3) at the destination aerodrome, two separate runways are available and usable, one of which is suitable for type B instrument approach operations, and the meteorological conditions are in accordance with point CAT.OP.MPA.182(e). | | | | |
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| AMC8 CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight replanning policy - aeroplanes | | | | |
| INDIVIDUAL FUEL SCHEME – FUEL CONSUMPTION MONITORING SYSTEM ED Decision 2022/005/R | | | | |
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| A fuel consumption monitoring system should be data driven, and should include the following:  (a) a fuel performance monitoring system;   * 1. (b) a database that contains statistically significant data of at least 2 years;   2. (c) statistics and data normalisation; and   3. (d) data transparency and verification. | | | | |
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| GM3 CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight replanning policy - aeroplanes | | | | |
| INDIVIDUAL FUEL SCHEME – FUEL CONSUMPTION MONITORING SYSTEM ED Decision 2022/005/R | | | | |
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| More information can be found in ICAO Doc 9976 Flight Planning and Fuel Management (FPFM) Manual, Appendix 5 to Chapter 5. | | | | |
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| GM4 CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight replanning policy - aeroplanes | | | | |
| INDIVIDUAL FUEL SCHEME – ANTICIPATED METEOROLOGICAL CONDITIONS ED Decision 2022/005/R | | | | |
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| When determining the extent of the deviation in the area of operation, the operator should monitor the reliability of the meteorological forecast reports. The competent authority should consider restricting or even not allowing a deviation when reliable meteorological information is not available. To this end, tools to predict and improve the reliability of the meteorological forecast reports may be explored to allow for the intended deviation. | | | | |
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| CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy – aeroplanes (EU) 2021/1296 | | | | |
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| (a) At the planning stage, the operator shall ensure that once the flight has commenced, there is reasonable certainty that an aerodrome where a safe landing can be made will be available at the estimated time of use of that aerodrome. | | | | |
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| (b) At the planning stage, to allow for a safe landing in case of an abnormal or emergency situation after take-off, the operator shall select and specify in the operational flight plan a take-off alternate aerodrome if either:  (1) the meteorological conditions at the aerodrome of departure are below the operator’s established aerodrome landing minima for that operation; or  (2) it would be impossible to return to the aerodrome of departure for other reasons. | | | | |
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| (c) The take-off alternate aerodrome shall be located within a distance from the departure aerodrome that minimises the risk of exposure to potential abnormal or emergency situations. In selecting the take-off alternate aerodrome, the operator shall consider at least the following:  (1) actual and forecast meteorological conditions;  (2) availability and quality of the aerodrome infrastructure;  (3) navigation and landing capabilities of the aircraft in abnormal or emergency conditions, taking into account the redundancy of critical systems; and  (4) approvals held (e.g. extended range operations with two-engined aeroplanes (ETOPS), low visibility operation (LVO), etc.). | | | | |
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| (d) At the planning stage, for each instrument flight rules (IFR) flight, the operator shall select and specify in the operational and air traffic services (ATS) flight plans one or more aerodromes so that two safe-landing options are available during normal operation when:  (1) reaching the destination aerodrome; or  (2) reaching the point of no return, to any available fuel/energy ERA aerodrome during isolated aerodrome operations; a flight to an isolated aerodrome shall not be continued past the point of no return unless a current assessment of meteorological conditions, traffic, and other operational conditions indicates that a safe landing can be made at the destination aerodrome at the estimated time of use. The operator shall obtain prior approval from the competent authority for the use of an isolated aerodrome as destination aerodrome. | | | | |
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| (e) The operator shall provide appropriate safety margins to flight planning to take into account a possible deterioration of the available forecast meteorological conditions at the estimated time of landing. | | | | |
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| (f) For each IFR flight, the operator shall ensure that sufficient means are available to navigate to and land at the destination aerodrome or at any destination alternate aerodrome in the event of loss of capability for the intended approach and landing operation. | | | | |
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| AMC1 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – TAKE-OFF ALTERNATE AERODROME ED Decision 2022/005/R | | | | |
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| The take-off alternate aerodrome should not be farther from the departure aerodrome than:  (a) for two-engined aeroplanes:  (1) 1-hour flight time at an one-engine-inoperative (OEI) cruising speed according to the AFM in ISA and still-air conditions using the actual take-off mass; or  (2) the extended-range twin operations (ETOPS) diversion time that is approved in accordance with Subpart F of Annex V (Part-SPA) to Regulation (EU) No 965/2012, subject to any minimum equipment list (MEL) restriction, up to a maximum of 2-hour flight time at OEI cruising speed according to the AFM in ISA and still-air conditions using the actual take-off mass; and | | | | |
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| (b) for three- or four-engined aeroplanes, 2-hour flight time at an all-engines-operating cruising speed according to the AFM in ISA and still-air conditions using the actual take-off mass; | | | | |
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| (c) for operations approved in accordance with Annex V (Part-SPA), Subpart L SINGLE-ENGINED TURBINE AEROPLANE OPERATIONS AT NIGHT OR IN IMC (SET-IMC), 30 minutes flying time at normal cruising speed in still-air conditions, based on the actual take-off mass; | | | | |
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| (d) in the case of multi-engined aeroplanes, if the AFM does not contain an OEI cruising speed, the speed to be used for calculation shall be that which is achieved with the remaining engine(s) set at maximum continuous power. | | | | |
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| AMC2 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – DESTINATION ALTERNATE AERODROME ED Decision 2022/005/R | | | | |
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| (a) For each IFR flight, the operator should select and specify in the operational and ATS flight plans at least one destination alternate aerodrome. | | | | |
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| (b) For each IFR flight, the operator should select and specify in the operational and ATS flight plans two destination alternate aerodromes when for the selected destination aerodrome, the safety margins for meteorological conditions of AMC5 CAT.OP.MPA.182, and the planning minima of AMC6 CAT.OP.MPA.182 cannot be met, or when no meteorological information is available. | | | | |
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| (c) The operator may operate with no destination alternate aerodrome when the destination aerodrome is an isolated aerodrome or when the following two conditions are met:  (1) the duration of the planned flight from take-off to landing does not exceed 6 hours or, in the event of in-flight re-planning, in accordance with point CAT.OP.MPA.181(d), the remaining flying time to destination does not exceed 4 hours; and  (2) two separate runways are usable at the destination aerodrome and the appropriate weather reports and/or weather forecasts indicate that for the period from 1 hour before to 1 hour after the expected time of arrival, the ceiling is at least 2 000 ft (600 m) or the circling height 500 ft (150 m), whichever is greater, and ground visibility is at least 5 km. | | | | |
| Referens i OM. | | TS notering: | | |
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| AMC3 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – AERODROME FORECAST METEOROLOGICAL CONDITIONS ED Decision 2022/005/R | | | | |
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| AMC4 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – REACHING THE DESTINATION AERODROME ED Decision 2022/005/R | | | | |
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| In the context of the basic fuel scheme and basic fuel scheme with variations, ‘reaching the destination’ means the point at which the aircraft has reached the applicable DA/H or MDA/H at the destination aerodrome. | | | | |
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| AMC5 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – SAFETY MARGINS FOR METEOROLOGICAL CONDITIONS ED Decision 2022/005/R | | | | |
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| 1. (a) The operator should only select an aerodrome as:   (1) take-off alternate aerodrome; or  (2) destination aerodrome  when the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the applicable landing minima as follows:  (i) RVR or VIS specified in accordance with point CAT.OP.MPA.110; and  (ii) for a type A or a circling operation, ceiling at or above MDH. | | | | |
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| (b) The operator should only select an aerodrome as:  (1) destination alternate aerodrome;  (2) fuel ERA aerodrome; or  (3) isolated destination aerodrome  when the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the planning minima. | | | | |
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| (c) For the take-off alternate aerodrome and isolated destination aerodrome, any limitations related to OEI operations should be taken into account. | | | | |
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| AMC6 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – PLANNING MINIMA ED Decision 2022/005/R | | | | |
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| The operator should select an aerodrome as:  (a) destination alternate aerodrome;  (b) fuel ERA aerodrome; or  (c) isolated destination aerodrome  only when the appropriate weather reports and/or forecasts indicate that the weather conditions will be at or above the planning minima of Table 2 below (any limitations related to OEI operations are also taken into account): | | | | |
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| GM1 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME ED Decision 2022/005/R | | | | |
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| SAFE-LANDING OPTIONS  (a) Point CAT.OP.MPA.182 sets out the safety objectives of the selection of aerodromes policy. This GM expands on the intent of that provision. | | | | |
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| ONE SAFE-LANDING OPTION  (b) Point CAT.OP.MPA.182(a) requires the fuel planning and in-flight re-planning policy to ensure that the aircraft can always proceed to at least one aerodrome where landing is possible, even in abnormal operational conditions. This may require additional fuel (point CAT.OP.MPA.181(c)(6)) to reach an en route alternate (ERA) aerodrome in case of engine or pressurisation failure. | | | | |
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| ONE OR MORE AERODROMES  (c) Point CAT.OP.MPA.182(d) requires the operator to select one or more aerodromes at the planning stage; the operator may select only one aerodrome, i.e. the destination aerodrome, in compliance with point CAT.OP.MPA.181(c)(4)(ii). | | | | |
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| TWO SAFE-LANDING OPTIONS  (d) Point CAT.OP.MPA.182(d) requires that when planning the flight, two safe-landing options are expected to remain available until the flight reaches its destination, where a decision will be made to commit to land or divert. This will typically be a runway at the destination aerodrome itself and a runway at a destination alternate aerodrome.  The requirement may also be satisfied by two landing runways at the destination aerodrome, provided that the risk of a single event (such as an aircraft accident) or meteorological deterioration at that single aerodrome will not eliminate both options. | | | | |
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| (e) Point CAT.OP.MPA.182(d) may also be satisfied by two destination alternate aerodromes when the destination aerodrome is not a weather-permissible aerodrome or when there is insufficient weather information at the time of planning. | | | | |
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| (f) In the case of an isolated aerodrome, only one safe-landing option exists beyond the point of no return (PNR), therefore, an exception is set out in point CAT.OP.MPA.182(d)(2), where the conditions to proceed beyond the PNR are laid down, and further explained in AMC7 CAT.OP.MPA.182 and in point (b) of AMC2 CAT.OP.MPA.185(a). | | | | |
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| SAFETY MARGINS  (f) Point CAT.OP.MPA.182(e) requires operators to apply safety margins to the aerodrome operating minima to mitigate the risk that the destination alternate aerodromes, isolated aerodromes, or fuel ERA aerodromes fall below aerodrome operating minima due to minor unforeseen weather deteriorations. | | | | |
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| AMC7 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEMES WITH VARIATIONS ISOLATED AERODROME – POINT OF NO RETURN ED Decision 2022/005/R | | | | |
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| (a) Unless destination alternate fuel is carried, the operator should use a destination aerodrome as an isolated aerodrome if the alternate fuel plus the FRF that is required to reach the nearest adequate destination alternate aerodrome is more than:  (1) for aeroplanes with reciprocating engines, the amount of fuel required to fly either for 45 minutes plus 15 % of the flying time planned for cruising, including FRF or for 2 hours, whichever is less; or  (2) for turbine-engined aeroplanes, the amount of fuel required to fly for 2 hours with normal cruise consumption above the destination aerodrome, including the FRF. | | | | |
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| (b) If the operator’s fuel planning policy includes an isolated aerodrome, a PNR should be determined by a computerised flight-planning system and specified in the operational flight plan. The required usable fuel for pre-flight calculation should be as indicated in points (b)(1) or (b)(2), whichever is greater:  (1) the sum of:  (i) taxi fuel;  (ii) trip fuel from the departure aerodrome to the isolated aerodrome via the PNR;  (iii) contingency fuel that is calculated in accordance with the operator’s current fuel scheme;  (iv) additional fuel, if required, but not less than:  (A) for aeroplanes with reciprocating engines, the fuel to fly either for 45 minutes plus 15 % of the flight time planned for cruising or for 2 hours, whichever is less; or  (B) for turbine-engined aeroplanes, the fuel to fly for 2 hours with normal cruise consumption above the destination aerodrome, including the FRF;  (v) extra fuel if there are anticipated delays or specific operational constraints; and  (vi) discretionary fuel, if required by the commander; or  (2) the sum of:  (i) taxi fuel;  (ii) trip fuel from the departure aerodrome to the fuel ERA PNR aerodrome via the PNR;  (iii) contingency fuel that is calculated in accordance with the operator’s current fuel scheme;  (iv) additional fuel, if required, but not less than:  (A) for aeroplanes with reciprocating engines, fuel to fly for 45 minutes; or  (B) for turbine-engined aeroplanes, fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above the fuel ERA aerodrome elevation in standard conditions, which should not be less than the FRF;  (v) extra fuel if there are anticipated delays or specific operational constraints; and  (vi) discretionary fuel, if required by the commander. | | | | |
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| AMC8 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME WITH VARIATIONS – PLANNING MINIMA ED Decision 2022/012/R | | | | |
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| (a) Variations to the basic fuel schemes in the selection of aerodromes in regard to the planning minima are methods to reduce the meteorological margins based on the established mitigating measures. | | | | |
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| (b) As a minimum, the operator should:  (1) use a suitable computerised flight-planning system; and  (2) have established an operational control system that includes flight monitoring. | | | | |
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| (c) In addition:  (1) the duration of the planned flight from take-off to landing does not exceed 6 hours or, in the event of in-flight re-planning, in accordance with point CAT.OP.MPA.181(d), the remaining flying time to destination does not exceed 4 hours; and  (2) the planned flight should have a minimum flight crew of two pilots. | | | | |
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| (d) Additionally, the operator should select an aerodrome as:  (1) a destination alternate aerodrome, or  (2) a fuel ERA aerodrome,  only when the appropriate weather reports and/or forecasts indicate that the weather conditions will be at or above the planning minima of Table 3 below. | | | | |
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| AMC9 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME WITH VARIATIONS – PLANNING MINIMA ED Decision 2022/012/R | | | | |
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| (a) Variations to the basic fuel schemes in the selection of aerodromes in regard to the planning minima are methods to reduce the meteorological margins based on the established mitigating measures. | | | | |
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| (b) As a minimum, the operator should:  (1) use a suitable computerised flight-planning system;  (2) hold an approval for limited-visibility approach operations for that fleet; and  (3) have established an operational control system that includes flight monitoring. | | | | |
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| (c) Additionally, the operator should select an aerodrome as:  (1) destination alternate aerodrome;  (2) fuel ERA aerodrome; or  (3) isolated destination aerodrome  only when the appropriate weather reports and/or forecasts indicate that the weather conditions will be at or above the planning minima of Table 4 below. | | | | |
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| GM2 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| **BASIC FUEL SCHEME WITH VARIATIONS – NORMAL CRUISE CONSUMPTION** ED Decision 2022/005/R | | | | |
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| In the context of AMC7 CAT.OP.MPA.182 on isolated aerodromes, normal cruise consumption is the consumption of fuel for 2 hours above the isolated aerodrome. These two hours include 30-minute FRF, leaving enough fuel for an approximately 90-minute hold over the destination.  More information is provided in ICAO Doc 9976 Flight Planning and Fuel Management (FPFM) Manual (1st Edition, 2015). | | | | |
| Referens i OM: | | TS notering: | | |
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| GM3 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME WITH VARIATIONS – FACILITIES WITH A SYSTEM MINIMUM OF 200 FT OR LESS ED Decision 2022/005/R | | | | |
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| * 1. (a) Table 3 in AMC8 CAT.OP.MPA.182 and Table 4 in AMC9 CAT.OP.MPA.182 refer to type A instrument approach operations based on a facility with a system minimum of 200 ft or less. Such facilities include ILS/MLS, GBAS landing system (GLS) and GNSS/SBAS (LPV). The system minima for various facilities are contained in AMC3 CAT.OP.MPA.110, Table 3. | | | | |
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| (b) In regard to system minima and type of instrument approach operation (type A or B), the following should be noted:  (1) System minimum is the lowest height to which a facility can be used without visual references. This value is not related to a particular runway or obstacle environment.   * 1. (2) The type of instrument approach operations is related to each individual runway with its obstacle environment. | | | | |
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| (c) Amongst other things the lowest DH for an instrument approach operation is determined by the system minima for the facility and the obstacle clearance height (OCH). The resulting DH determines the type of approach operation (type A or B). If the DH is 250 ft or more, it will be a type A approach operation; if the DH is less than 250 ft, it will be a type B approach operation. So, while ILS approaches to most runways may be conducted as type B approach operations, difficult obstacle situations, driving up the DH to 250 ft or higher, will result in type A approach operations. | | | | |
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| (d) For example, Row 2 of Table 3 in AMC8 CAT.OP.MPA.182 refers to a case where the obstacle situation and associated OCH result in a DH of 250 ft or more, even though the facility involved supports a DH of 200 ft or less. | | | | |
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| (e) This GM refers only to DH (not MDH) since facilities with a system minimum of 200 ft or less are only operated with a DH (or DA), not an MDH. | | | | |
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| GM4 CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| FUEL SCHEMES – PLANNING MINIMA – INSTRUMENT APPROACH OPERATIONS ED Decision 2022/005/R | | | | |
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| An instrument approach operation is considered usable for planning minima (e.g. Tables 2, 3 and 4 in AMC6 CAT.OP.MPA.182, AMC8 CAT.OP.MPA.182 and AMC9 CAT.OP.MPA.182 respectively) when the approach facilities are available, the aircraft is equipped to perform such an approach, the flight crew is accordingly trained, and the runway is available for landing. | | | | |
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| GM1 CAT.OP.MPA.182(d)(1) Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| INDIVIDUAL FUEL SCHEME – REACHING THE DESTINATION AERODROME ED Decision 2022/005/R | | | | |
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| In the context of individual fuel schemes, ‘reaching the destination’ means being as close as possible to the destination, but not necessarily overhead the destination, and no farther than IAF of the planned instrument approach procedure for the destination aerodrome. | | | | |
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| AMC1 CAT.OP.MPA.182(f) Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – DESTINATION AERODROMES – PBN OPERATIONS ED Decision 2022/012/R | | | | |
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| 1. (a) To comply with point CAT.OP.MPA.182(f), when the operator intends to use PBN, the operator should select an aerodrome as destination alternate aerodrome only if an approach procedure that does not rely on a GNSS is available either at that aerodrome or at the destination aerodrome. | | | | |
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| 1. BASIC FUEL SCHEME — DESTINATION AERODROMES — OPERATIONAL CREDITS 2. (b) To comply with point CAT.OP.MPA.182(f), when the operator intends to use ‘operational credits’ (e.g. EFVS, SA CAT I, etc.), the operator should select an aerodrome as destination alternate aerodrome only if an instrument approach procedure that does not rely on the same ‘operational credit’ is available either at that aerodrome or at the destination aerodrome. | | | | |
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| GM1 CAT.OP.MPA.182(f) Fuel/energy scheme – aerodrome selection policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – DESTINATION AERODROMES – PBN OPERATIONS ED Decision 2022/005/R | | | | |
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| (a) Point (a) of AMC1 CAT.OP.MPA.182(f) applies only to destination alternate aerodromes in flights that require a destination alternate aerodrome. A take-off or an ERA aerodrome with instrument approach procedures that rely on a GNSS may be planned without restrictions. A destination aerodrome with all instrument approach procedures that rely solely on a GNSS may be used without a destination alternate aerodrome if the conditions for a flight without a destination alternate aerodrome are met. | | | | |
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| (b) The term ‘sufficient means are available to navigate to and land at’ means that the procedure can be used in the planning stage and should comply with planning minima requirements. | | | | |
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| CAT.OP.MPA.185 Fuel/energy scheme – inf-flight fuel/energy management policy – aeroplanes (EU) 2021/1296 | | | | |
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| (a) The operator shall establish procedures for in-flight fuel/energy management that ensure:  (1) continual validation of the assumptions made during the planning stage (pre-flight or in-flight re-planning, or both);  (2) re-analysis and adjustment, if necessary;  (3) that the amount of usable fuel/energy remaining on board is protected and not less than the fuel/energy that is required to proceed to an aerodrome where a safe landing can be made; and  (4) relevant fuel/energy data for the purpose of points (1), (2), and (3) shall be recorded. | | | | |
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| (b) The operator shall have procedures in place to require the commander to obtain delay information from a reliable source when unforeseen circumstances may result in landing at the destination aerodrome with less than the final reserve fuel/energy plus any:  (1) fuel/energy to proceed to an alternate aerodrome, if required; or  (2) fuel/energy required to proceed to an isolated aerodrome. | | | | |
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| (c) The commander shall advise air traffic control (ATC) of a ‘minimum fuel/energy’ state by declaring ‘MINIMUM FUEL’ when the commander has:  (1) committed to land at a specific aerodrome; and (2) calculated that any change to the existing clearance to that aerodrome may result in landing with less than the planned final reserve fuel/energy. | | | | |
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| (d) The commander shall declare a situation of ‘fuel/energy emergency’ by broadcasting ‘MAYDAY MAYDAY MAYDAY FUEL’ when the usable fuel/energy that is calculated to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel/energy. | | | | |
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| GM1 CAT.OP.MPA.185 Fuel/energy scheme – in-flight fuel/energy management policy - aeroplanes | | | | |
| BASIC FUEL SCHEME ED Decision 2022/005/R | | | | |
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| RELEVANT FUEL DATA TO BE RECORDED  (a) The operator may decide at which regular intervals the relevant fuel data should be recorded.  An example of such intervals could be every 30 minutes for short-range flights and every 60 minutes for longer flights. | | | | |
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| (b) The operator should record at least the following relevant fuel-related data:  (1) off-block fuel;  (2) take-off fuel if this data can be recorded automatically;  (3) ‘MINIMUM FUEL’ declarations;  (4) ‘MAYDAY MAYDAY MAYDAY FUEL’ declarations;  (5) fuel after touchdown if this data can be recorded automatically; and  (6) on-block fuel.  When an aircraft communications addressing and reporting system (ACARS) is available, the operator does not need to record this data. | | | | |
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| RELIABLE SOURCE TO OBTAIN DELAY INFORMATION  (c) A reliable source to obtain delay information may be derived from data provided by an air navigation services provider (ANSP) and should have the following characteristics ranked in order of priority:  (1) integrity: provide timely warnings to users when the delay information should not be used;  (2) availability: the time during which the delay information is accessible to the crew;  (3) accuracy: the degree of conformity between the estimated delay and the true delay; the delay information should be communicated with its corresponding gap error, e.g. delay of 15 ± 2 minutes; the gap error should be added to the base value; and  (4) continuity: the capability of the service to provide the delay information without unscheduled interruptions during the intended operation. | | | | |
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| ‘MINIMUM FUEL’ DECLARATION  (d) The ‘MINIMUM FUEL’ declaration informs the ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing. It also informs the ATC that any change to the existing clearance may result in landing with less than the planned FRF. This is not an emergency situation but an indication that an emergency situation is possible, should any additional delay occur. | | | | |
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| (e) When committed to land at a specific aerodrome, the commander should take into account any operational factor that may cause a delay to landing, and thus determine whether the aircraft will land with less than the planned FRF, even after receiving clearance from ATC. A change that may cause a delay to landing could be other than the ATC, e.g. a change of weather conditions, etc. If any such factor is likely to result in landing with less than the planned FRF, the commander should declare ‘MINIMUM FUEL’ to ATC. | | | | |
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| (f) The pilot should not expect any form of priority handling as a result of a ‘MINIMUM FUEL’ declaration. However, the ATC should advise the flight crew of any additional expected delays, as well as coordinate with other ATC units when transferring the control of the aeroplane, to ensure that the other ATC units are aware of the flight’s fuel state. | | | | |
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| (g) Example 1: The aircraft is on the final approach to the destination aerodrome with a single runway, with just the destination alternate fuel plus FRF available. The aircraft ahead has a tyre burst upon landing and has stopped on the runway. The ATC orders the aircraft on final approach to execute a go-around as the destination aerodrome is closed due to a blocked runway. After completing the go-around, the flight crew decides to divert to the destination alternate aerodrome. After the ATC gives clearance for the destination alternate aerodrome and if the calculated fuel upon landing is close to the FRF, the flight crew should declare ‘MINIMUM FUEL’. The flight crew has now committed to land at the destination alternate aerodrome, and any change to the clearance may result in landing there with less than the planned FRF. | | | | |
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| (h) Example 2: The aircraft is approaching the clearance limit point, which has a holding pattern operating at this point in time. The ATC gives the aircraft an expected arrival time that would result in a delay of 25 minutes, and the aircraft enters the holding zone. On receiving this information and prior to entering the holding pattern, the remaining fuel is 7-minute contingency fuel plus 25-minute destination alternate fuel plus 30-minute FRF. The weather conditions and aircraft serviceability are such that the flight crew can convert the destination alternate fuel into holding time over the destination aerodrome. When the remaining fuel no longer allows a diversion from the holding pattern, then the flight crew should declare ‘MINIMUM FUEL’. The flight crew has committed to land at the destination aerodrome, and any change to the clearance may result in landing with less than the planned FRF. | | | | |
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| (i) Example 3: The aircraft reaches FL 350, which is the cruising flight level on its 5-hour flight. The weather forecast information that was obtained before departure was favourable and, therefore, the commander did not order any discretionary fuel. The destination alternate fuel is sufficient for 25-minute flight time and the destination alternate aerodrome is located beyond the destination aerodrome. For some reason (unexpected severe turbulence, cockpit window crack, etc.), the aircraft has to descend and continue the flight at FL 230, where fuel consumption is higher. In-flight fuel checks and fuel management now show that the destination aerodrome can still be reached but only if in-flight re-planning is done without the destination alternate aerodrome (the destination aerodrome has two runways and good weather, and it is less than 6-hour flight time away, thus meeting the conditions for not requiring an alternate aerodrome). By doing so, the aircraft will arrive at destination for a straight-in approach with exactly the FRF plus 15-minute flight time. During the next 3,5 hours, an ERA aerodrome is available, and the situation is under control. When approaching the destination, the aircraft has to commit to land at the destination aerodrome as there is no other destination alternate aerodrome within 15 minutes of reaching the destination aerodrome. The ATC now informs the pilots that there is a change of landing runway resulting in a 12-minute trip fuel increase. It is time to declare ‘MINIMUM FUEL’. | | | | |
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| (j) Several scenarios illustrating circumstances that could lead to a ‘MINIMUM FUEL’ declaration are provided in ICAO Doc 9976 Flight Planning and Fuel Management (FPFM) Manual (1st Edition, 2015) and the EASA Fuel Manual. | | | | |
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| ENSURING A SAFE LANDING — FINAL RESERVE FUEL PROTECTION | | | | |
| (k) The objective of the FRF protection is to ensure that a safe landing is made at any aerodrome when unforeseen circumstances may not allow to safely complete the flight, as originally planned.  The commander should always consider first planning a safe-landing option and estimating whether this landing can be performed with more than the FRF. When this estimation indicates that the FRF can no longer be protected, then a fuel emergency should be declared and any landing option explored (e.g. aerodromes not assessed by operators, military aerodromes, closed runways), including deviating from rules, operational procedures, and methods in the interest of safety (as per point CAT.GEN.MPA.105(b)). ICAO Doc 9976 and the EASA Fuel Manual provide further detailed guidance on the development of a comprehensive in-flight fuel management policy and related procedures.  Note: See Annex I (Definitions) to Regulation (EU) No 965/2012 for the definition of ‘safe landing’. | | | | |
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| FURTHER GUIDANCE ON PROCEDURES FOR IN-FLIGHT FUEL MANAGEMENT  (l) ICAO Doc 9976 and the EASA Fuel Manual provide guidance on procedures for in-flight fuel management including reanalysis, adjustment, and/or re-planning considerations when a flight begins to consume contingency fuel before take-off. | | | | |
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| AMC1 CAT.OP.MPA.185(a) Fuel/energy scheme – in-flight fuel/energy management policy - aeroplanes | | | | |
| BASIC FUEL SCHEME – PROCEDURES FOR IN-FLIGHT FUEL MANAGEMENT ED Decision 2022/005/R | | | | |
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| (a) In-flight fuel checks  (1) The operator should establish a procedure to ensure that in-flight fuel checks are carried out at regular intervals or at specified points indicated in the operational flight plan (one check at least every 60 minutes).  (2) The remaining usable fuel should be evaluated to:  (i) compare the actual consumption with the planned consumption;  (ii) check that the remaining usable fuel is sufficient to complete the flight, in accordance with point (b); and  (iii) determine the usable fuel that is expected to remain upon landing at the destination aerodrome.  (3) In relation to the recording of relevant data, the operator should:  (i) agree with the competent authority on what constitutes relevant data for the purpose of recoding;  (ii) use the relevant data as safety performance indicators (SPIs) of the current fuel scheme; and  (iii) ensure that the recorded data is stored for at least 2 years.  The operator should establish a procedure for the data to be de-identified to a level that ensures the implementation of a ‘just culture’. | | | | |
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| (b) In-flight fuel management  (1) The flight should be conducted to ensure that the usable fuel expected to remain upon landing at the destination aerodrome is not less than:  (i) the required alternate fuel plus the FRF; or  (ii) the FRF if no alternate aerodrome is required.  (2) If an in-flight fuel check shows that the usable fuel expected to remain upon landing at the destination aerodrome is less than:  (i) the required alternate fuel plus the FRF, the commander should request delay information from the ATC, and take into account the prevailing traffic and operational conditions at the destination aerodrome, at the destination alternate aerodrome, and at any other adequate aerodrome, to decide whether to proceed to the destination aerodrome or to divert in order to perform a safe landing with not less than the FRF; or  (ii) the FRF, if no destination alternate aerodrome is required, the commander should take appropriate action and proceed to an aerodrome where a safe landing can be made with not less than the FRF. | | | | |
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| (c) The use of fuel after flight commencement for objectives other than the ones originally intended during pre-flight planning should require reanalysis and, if applicable, adjustment of the planned operation. | | | | |
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| AMC2 CAT.OP.MPA.185(a) Fuel/energy scheme – in-flight fuel/energy management policy - aeroplanes | | | | |
| BASIC FUEL SCHEME WITH VARIATIONS – PROCEDURES FOR IN-FLIGHT FUEL MANAGEMENT ED Decision 2022/005/R | | | | |
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| (a) In addition to AMC1 CAT.OP.MPA.185(a) and in the context of point (d) of AMC6 CAT.OP.MPA.181, if the RCF procedure is used on a flight to proceed to destination 1 aerodrome, the commander should ensure that the remaining usable fuel at the decision point is at least the total of the following:  (1) trip fuel from the decision point to destination 1 aerodrome;  (2) contingency fuel that is equal to 5 % of the trip fuel from the decision point to destination 1 aerodrome;  (3) destination 1 aerodrome alternate fuel if a destination 1 alternate aerodrome is required;  (4) additional fuel, if required; and  (5) FRF. | | | | |
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| (b) In addition to AMC1 CAT.OP.MPA.185(a), on a flight to an isolated aerodrome, the commander should ensure that the remaining usable fuel at the actual PNR is at least the total of the following:  (1) trip fuel from the PNR to the destination isolated aerodrome;  (2) contingency fuel from the PNR to the destination isolated aerodrome; and  (3) the additional fuel required for isolated aerodromes, as described in AMC7 CAT.OP.MPA.182. | | | | |
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| AMC3 CAT.OP.MPA.185(a) Fuel/energy scheme – in-flight fuel/energy management policy - aeroplanes | | | | |
| INDIVIDUAL FUEL SCHEME – COMMITTING TO LAND AT A SPECIFIC AERODROME ED Decision 2022/005/R | | | | |
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| The operator should provide relevant safety information to the commander before the commander decides to commit to land at a specific aerodrome. | | | | |
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| CAT.OP.MPA.186 Planning minima for IFR flights – helicopters (EU) 2021/1296 | | | | |
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| *This point is deleted* | |  |  | |
| CAT.OP.MPA.190 Fuel/energy scheme – helicopters (EU) 2021/1296 | | | | |
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| (a) The operator shall establish, implement, and maintain a fuel/energy scheme that comprises:  (1) a fuel/energy planning and in-flight re-planning policy; and  (2) an in-flight fuel/energy management policy. | | | | |
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| (b) The fuel/energy scheme shall:  (1) be appropriate for the type(s) of operation performed; and  (2) correspond to the capability of the operator to support its implementation. | | | | |
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| (c) The fuel/energy scheme and any change to it shall require prior approval by the competent authority. | | | | |
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| CAT.OP.MPA.191 Fuel/energy scheme – Fuel/energy planning and in-flight re-planning policy – helicopters (EU) 2021/1296 | | | | |
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| (a) As part of the fuel/energy scheme, the operator shall establish a fuel/energy planning and in-flight re-planning policy to ensure that the aircraft carries a sufficient amount of usable fuel/energy to safely complete the planned flight and to allow for deviations from the planned operation. | | | | |
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| (b) The operator shall ensure that the fuel/energy planning of flights is based upon at least the following elements:  (1) procedures contained in the operations manual as well as:  (i) current aircraft-specific data derived from a fuel/energy consumption monitoring system; or  (ii) data provided by the aircraft manufacturer; and  (2) the operating conditions under which the flight is to be conducted including:   1. aircraft fuel/energy consumption data; 2. anticipated masses; 3. anticipated meteorological conditions; 4. the effects of deferred maintenance items or of configuration deviations, or both; and 5. procedures and restrictions introduced by air navigation service providers | | | | |
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| (c) The operator shall ensure that the pre-flight calculation of the usable fuel/energy that is required for a flight includes:  (1) taxi fuel/energy, which shall not be less than the amount expected to be used prior to take-off;  (2) trip fuel/energy;  (3) contingency fuel/energy;  (4) destination alternate fuel/energy if a destination alternate aerodrome is required;  (5) final reserve fuel/energy, which shall not be less than:  (i) if flying under visual flight rules (VFR) and navigating by day with reference to visual landmarks, 20-minute fuel/energy at best-range speed; or  (ii) if flying under VFR and navigating by means other than by reference to visual landmarks or at night, 30-minute fuel/energy at best-range speed; or  (iii) if flying under instrument flight rules (IFR), 30-minute fuel/energy at holding speed at 1 500 ft (450 m) above the aerodrome elevation in standard conditions, calculated according to the helicopter estimated mass on arrival at the destination alternate aerodrome or at the destination aerodrome when no destination alternate aerodrome is required;  (6) extra fuel/energy, to take into account anticipated delays or specific operational constraints; and  (7) discretionary fuel/energy, if required by the commander. | | | | |
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| (d) The operator shall ensure that if a flight has to proceed along a route or to a destination aerodrome other than the ones originally planned, in-flight re-planning procedures for calculating the required usable fuel/energy include:  (1) trip fuel/energy for the remainder of the flight;  (2) reserve fuel/energy consisting of:  (i) contingency fuel/energy;  (ii) alternate fuel/energy if a destination alternate aerodrome is required;  (iii) final reserve fuel/energy; and  (iv) additional fuel/energy, if required by the type of operation;  (3) extra fuel/energy, to take into account anticipated delays or specific operational constraints; and  (4) discretionary fuel/energy, if required by the commander. | | | | |
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| (e) As an alternative to points (b) to (d), for helicopters with a maximum certified take-off mass (MCTOM) of 3 175 kg or less, flying by day and over routes navigated by reference to visual landmarks, or for local helicopter operations (LHO), the fuel/energy policy shall ensure that on completion of the flight, or series of flights, the final reserve fuel/energy is sufficient for:  (1) 30-minute flying time at best-range speed; or  (2) 20-minute flying time at best-range speed, if operating within an area providing continuous and suitable operating sites’. | | | | |
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| AMC1 CAT.OP.MPA.191(b)&(c) Fuel/energy scheme – fuel/energy planning and in-flights re-planning policy - helicopter | | | | |
| PLANNING CRITERIA ED Decision 2022/005/R | | | | |
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| (a) The pre-flight calculation of the required usable fuel to be carried on board should include the following:  (1) taxi fuel, which should take into account local conditions at the departure site and the APU consumption;  (2) trip fuel, which should include fuel:  (i) for take-off and climb from the departure site elevation to the initial cruising level/altitude, taking into account the expected departure routing;  (ii) from the top of climb to the top of descent, including any step climb/descent;  (iii) from the top of descent to the point where the approach procedure is initiated, taking into account the expected arrival procedure; and  (iv) for the approach and landing at the destination site;  (3) contingency fuel, which should be:  (i) for IFR flights, or for VFR flights in a hostile environment, 10 % of the planned trip fuel; or  (ii) for VFR flights in a non-hostile environment, 5 % of the planned trip fuel;  (4) alternate fuel, which should be:  (i) fuel for a missed approach from the applicable DA/H or MDA/H at the destination to the missed-approach altitude, taking into account the complete missed-approach procedure;  (ii) fuel for climb from the missed approach altitude to the cruising level/altitude;  (iii) fuel for the cruise from the top of climb to the top of descent;  (iv) fuel for descent from the top of descent to the point where the approach is initiated, taking into account the expected arrival procedure;  (v) fuel for the approach and landing at the destination alternate that is selected in accordance with point CAT.OP.MPA.192; and  (vi) for helicopters operating to or from helidecks that are located in a hostile environment, 10 % of points (a)(4)(i) to (a)(4)(v);  (5) FRF;  (6) extra fuel if there are anticipated delays or specific operational constraints; and  (7) discretionary fuel, which should be at the sole discretion of the commander. | | | | |
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| (b) Reduced contingency fuel (RCF) IFR procedure  If the operator’s fuel scheme includes pre-flight planning to a destination 1 aerodrome (commercial destination) with an RCF procedure using a decision point along the route and a destination 2 aerodrome (optional refuelling destination), the pre-flight calculation of the required usable fuel should be according to points (b)(1) or (b)(2), whichever is greater:  (1) the sum of:  (i) taxi fuel;  (ii) trip fuel to the destination 1 aerodrome via the decision point;  (iii) contingency fuel equal to not less than 10 % of the estimated fuel consumption from the decision point to the destination 1 aerodrome;  (iv) alternate fuel;  (v) FRF;  (vi) extra fuel if there are anticipated delays or specific operational constraints; and  (vii) discretionary fuel, which should be at the sole discretion of the commander; or  (2) the sum of:  (i) taxi fuel;  (ii) trip fuel to the destination 2 aerodrome via the decision point;  (iii) contingency fuel equal to not less than 10 % of the estimated fuel consumption from the decision point to the destination 2 aerodrome;  (iv) alternate fuel, if a destination 2 alternate aerodrome is required;  (v) FRF;  (vi) extra fuel if there are anticipated delays or specific operational constraints; and  (vii) discretionary fuel, which should be at the sole discretion of the commander. | | | | |
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| (c) Isolated aerodrome IFR procedure  If the operator’s fuel policy includes planning to fly to an isolated aerodrome under IFR or under VFR over routes not navigated by reference to visual landmarks, for which a destination alternate does not exist, the pre-flight calculation of the required usable fuel should include:  (1) taxi fuel;  (2) trip fuel;  (3) contingency fuel calculated in accordance with point (a)(3);  (4) additional fuel to fly for 2 hours at holding speed, including FRF; and  (5) extra fuel if there are anticipated delays or specific operational constraints; and  (6) discretionary fuel, which should be at the sole discretion of the commander. | | | | |
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| (d) Sufficient fuel should be carried at all times to ensure that following the failure of an engine that occurs at the most critical point along the route, the helicopter is able to:  (1) descend as necessary and proceed to an adequate aerodrome;  (2) hold for 15 minutes at 1 500 ft (450 m) above aerodrome elevation in standard conditions; and  (3) make an approach and land. | | | | |
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| CAT.OP.MPA.192 Selection of aerodromes and operating sites – helicopters (EU) 2021/1296 | | | | |
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| (a) For flights under instrument meteorological conditions (IMC), the operator shall select a take-off alternate aerodrome within one-hour flying time at normal cruising speed if it is not possible to return to the site of departure for meteorological reasons. | | | | |
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| (b) At the planning stage, for each instrument flight rules (IFR) flight, the operator shall select and specify in the operational and air traffic services (ATS) flight plans one or more aerodromes or operating sites so that two safe-landing options are available during normal operation, except as provided for under point SPA. HOFO.120 (b). | | | | |
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| (c) The operator shall apply appropriate safety margins to flight planning to take into account a possible deterioration of the available forecast meteorological conditions at the estimated time of landing. | | | | |
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| (d) For each IFR flight, the operator shall ensure that sufficient means are available to navigate to and land at the destination aerodrome or at any destination alternate aerodrome in the event of loss of capability for the intended approach and landing operation. | | | | |
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| AMC1 CAT.OP.MPA.192 Selection of aerodromes and operating sites - helicopters | | | | |
| PLANNING MINIMA AND SAFETY MARGINS FOR A DESTINATION AERODROME AND SELECTION OF ALTERNATE AERODROMES ED Decision 2022/005/R | | | | |
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| (a) When selecting the destination aerodrome, the operator should ensure that one of the following conditions is met:  (1) for a land destination, the duration of the flight and the prevailing meteorological conditions are such that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome or operating site, an approach and landing is possible under VMC from the minimum safe altitude at the IAF or before;  (2) for a land destination:  (i) the available current meteorological information indicates that the following meteorological conditions at the destination aerodrome will exist from 2 hours before to 2 hours after the estimated time of arrival, or from the actual time of departure to 2 hours after the estimated time of arrival, whichever is shorter:  (A) a ceiling of at least 120 m (400 ft) above the DA/H or MDA/H of the instrument approach procedure; and  (B) visibility of at least 3 000 m;  (ii) a runway and two published instrument approaches with independent navigation aids are available at the aerodrome of intended landing; and  (iii) fuel planning is based upon the approach procedure that requires the most fuel, and 15-minute fuel is added to the trip fuel;  (3) one destination alternate aerodrome is selected, and the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the destination, the weather conditions at the destination will be at or above the applicable planning minima as follows:  (i) RVR or VIS specified in accordance with point CAT.OP.MPA.110; and  (ii) for type A instrument approach operations, ceiling at or above (M)DH;  (4) one destination alternate aerodrome is selected, and based on the meteorological information that is obtained in accordance with the procedures of the operations manual (OM), there is a reasonable probability of landing at the destination;  (5) two destination alternate aerodromes are selected; or  (6) the destination aerodrome is isolated, and the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the destination, the weather conditions at the destination will be at or above the applicable planning minima defined in Table 1. | | | | |
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| (b) The operator should specify any alternate aerodrome(s) in the operational flight plan. | | | | |
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| (c) If the site of intended landing is isolated and no alternate aerodrome is available, a PNR should be determined. | | | | |
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| PLANNING MINIMA FOR DESTINATION ALTERNATE AERODROMES AND ISOLATED AERODROMES ED Decision 2022/005/R | | | | |
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| (d) The operator should select the destination alternate aerodrome(s) only if the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome or operating site, the weather conditions will be at or above the applicable planning minima as follows:  (1) if the destination aerodrome is selected by meeting the conditions in points (a)(3) or (a)(5), the planning minima for the destination alternate aerodrome(s) and an isolated aerodrome are as shown in Table 1: | | | | |
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| DETERMINATION OF THE METEOROLOGICAL CONDITIONS FOR A SAFE LANDING AT THE DESTINATION ED Decision 2022/005/R | | | | |
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| (e) To assess the probability of landing at the destination, when flying under IFR to heliports/operating sites without the meteorological information from a certified service provider, the operator should use supplemental meteorological information, or the operator should select two destination alternates. Such meteorological information is usually available at aerodromes. In Europe, the certification of service providers is based on Annex V (Part-MET) to Regulation (EU) 2017/373. In addition, all the following conditions should be met:  (1) The operator should establish a system for observing and assessing the weather, as well as for distributing meteorological information.  (2) The operator should describe in the OM the system defined in point (1).  (3) The operator should assess the weather at the destination aerodrome, and if different, also at the location of the instrument approach. The assessment should be based on the following:  (i) an appropriate weather forecast at an aerodrome where it is reasonable to expect that the local conditions are not significantly different from the conditions at the destination and the location of the instrument approach;  (ii) if the aerodrome described in point (e)(3)(i) is farther than 15 NM away from the location of the approach and the destination, the following conditions should be met:  (A) supplemental meteorological information should be available and confirm that the current weather conditions at destination and at the location of the instrument approach are expected to remain similar to the conditions at the aerodrome described in point (e)(3)(i); and  (B) low-level area forecasts should confirm that the weather is expected to remain similar at destination and at the aerodrome used for the weather assessment, at the expected time of landing; and  (iii) any risk of adverse local weather condition forecast in the low-level area forecasts and relevant to the destination and the location of the instrument approach.  (4) The following should qualify as supplemental meteorological information:  (i) a reliable, timestamped image from a serviceable digital camera of known location, bearing, and altitude, which shows the weather conditions in the approach path at destination;  (ii) a meteorological observation from a properly trained observer; and  (iii) a report from non-certified automatic weather observation systems to which the operator should apply relevant margins based on the reliability and precision of the system.  (5) The operator should establish that there is a reasonable probability of landing at the destination only if the flight time to the destination and then to the alternate aerodrome is less than 3 hours, and if according to the assessment described in point (e)(3), during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the location of the approach, the following conditions are met:  (i) the weather conditions will be at or above the planning minima for the approach; and  (ii) if the location of the approach is different from that of the destination aerodrome, the weather conditions will allow to continue the flight to the destination.  (6) Weather observations from the aerodrome described in point (e)(3)(i), or the supplemental meteorological information that is described in point (e)(4), should be available, be no more than 30 minutes old, and be used to assess approach and landing conditions in accordance with point CAT.OP.MPA.300.  (7) The weather observations or information that are described in point (e)(6) may be transmitted to the flight crew using installed equipment, a T-PED, radio communication with trained personnel, or any equivalent means.  (8) The operator should store the weather assessments established in point (e)(3) and the weather observations referred to in point (e)(6) for a period of 3 months.  (9) In case a landing at the destination is not possible due to the weather, even though it was assessed that it would be, the operator should investigate and take all necessary measures to improve future weather assessments. | | | | |
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| AMC1 CAT.OP.MPA.192(a) Selection of aerodromes and operating sites - helicopters | | | | |
| PLANNING MINIMA FOR TAKE-OFF ALTERNATE AERODROMES ED Decision 2022/005/R | | | | |
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| The operator should select an aerodrome or landing site as a take-off alternate aerodrome or landing site only when the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the take-off alternate aerodrome or landing site, the weather conditions will be at or above the applicable landing minima specified in accordance with point CAT.OP.MPA.110. The ceiling should be taken into account when the only available approach operations are type A. Any limitations related to OEI operations should be also taken into account. | | | | |
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| GM1 CAT.OP.MPA.192(c)&(d) Selection of aerodromes and operating sites - helicopters | | | | |
| METEOROLOGICAL INFORMATION ED Decision 2022/005/R | | | | |
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| (a) Meteorological data conforms to ICAO Annex 3 and to Annex V (Part-MET) to Regulation (EU) 2017/373. As the following meteorological data is point specific, caution should be exercised when associating it with nearby aerodromes (or helidecks). | | | | |
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| (b) METARs  (1) Routine and special meteorological observations at offshore installations should be made during periods and at a frequency agreed between the competent authority of the meteorological services provider and the operator concerned. They should conform to points MET.TR.200 and MET.TR.205 of Part-MET, including the desirable accuracy of observations, which is specified in GM2 MET.TR.210.  (2) Routine and selected special reports are exchanged between meteorological offices in the METAR (aerodrome routine meteorological report) or SPECI (aerodrome special meteorological report) code forms that are prescribed by the World Meteorological Organization. | | | | |
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| (c) Aerodrome forecasts (TAFs)  (1) The aerodrome forecast consists of a concise statement of the expected meteorological conditions at an aerodrome and any significant changes expected to occur during a specified period of validity, which is usually not less than 9 hours, and not more than 30 hours. The forecast includes surface wind, visibility, weather and cloud, and expected changes of one or more of these elements during the period. Additional elements may be included as agreed between the meteorological authority and the operators concerned. Where these forecasts relate to offshore installations, barometric pressure and temperature should be included to facilitate the planning of helicopter landing and take-off performance.  (2) Aerodrome forecasts are most commonly exchanged in the TAF code form, and the detailed description of an aerodrome forecast is promulgated in point MET.TR.220 of Part-MET, together with the operationally desirable accuracy elements that are specified in GM3 MET.TR.220. | | | | |
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| (d) Landing forecasts (TRENDS)  (1) The landing forecast consists of a concise statement that indicates any significant changes expected to occur at an aerodrome during the 2-hour period immediately following the time of the observation to which it is appended. It contains one or more of the following meteorological elements: surface wind, visibility, weather phenomena, clouds, and other significant information, such as barometric pressure and temperature, as may be agreed between the meteorological authority and the operators concerned.  (2) The detailed description of the landing forecast is promulgated in point MET.TR.225 of Part-MET, together with the operationally desirable accuracy of the forecast elements. In particular, the value of the observed cloud height and visibility elements should remain within ± 30 % of the forecast values in 90 % of the cases.  (3) Landing forecasts most commonly take the form of a TREND forecast appended to a local routine report, local special report, METAR, or SPECI. | | | | |
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| GM2 CAT.OP.MPA.192(c)&(d) Selection of aerodromes and operating sites - helicopters | | | | |
| SUPPLEMENTAL METEOROLOGICAL INFORMATION USING DIGITAL IMAGERY ED Decision 2022/005/R | | | | |
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| (a) One or more digital images from a digital camera may be considered as supplemental meteorological information if the following criteria are met:  (1) the camera has a known altitude, azimuth, elevation, and field of view; if pan, tilt or zoom functions are available, the image includes the elevation, azimuth, and an indication of how much the image is zoomed;  (2) the camera is robustly fixed to a solid surface and protected from deliberate or accidental interference; it is secured from the effects of wind and precipitation;  (3) the digital image contains date and timestamp information or other means to ensure that the image is up to date; and  (4) the digital image has a clearly specified update frequency. | | | | |
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| (b) If the operator uses the digital image to assess ceiling and visibility, the operator should document the height, bearing, and distance of clearly distinguishable features, and provide a reference image taken on a clear day with negligible cloud or mist. | | | | |
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| (c) The operator may achieve the purpose of point (b) with a selectable reference image or a selectable data layer to be superposed on the image. Any selectable reference image should clearly indicate that it is a reference image, and not a current image. | | | | |
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| (d) If the operator uses night-time digital images, the quality of those images should remain sufficient to be compared to the reference image, and the darkness should not obscure the distinguishable features described in point (b). This may be achieved by adapting the camera to the current luminosity. | | | | |
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| (e) If the digital image is stamped with the value of one or more weather parameters, there should be a means to ensure that each parameter is up to date and provided by a reliable and functional sensor; otherwise, that parameter should not be displayed. | | | | |
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| (f) If the camera is exposed to local meteorological conditions such as the foehn effect, the operator should document these local conditions, or the supplemental meteorological information should only be valid in the immediate vicinity of the camera. | | | | |
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| AMC1 CAT.OP.MPA.192(d) Selection of aerodromes and operating sites helicopters | | | | |
| ED Decision 2022/012/R | | | | |
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| PBN OPERATIONS  (a) To comply with CAT.OP.MPA.192(d), when the operator intends to use PBN, the operator should either: (1) demonstrate that the GNSS is robust against loss of capability; or  (2) select an aerodrome as a destination alternate aerodrome only if an instrument approach procedure that does not rely on a GNSS is available either at that aerodrome or at the destination aerodrome | | | | |
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| GNSS ROBUSTNESS AGAINST LOSS OF CAPABILITY — HELICOPTERS  (b) The operator may demonstrate robustness against the loss of capability of the GNSS if all of the following criteria are met:  (1) SBAS or GBAS are available and used.  (2) The failure of a single receiver or system should not compromise the navigation capability required for the intended instrument approach.  (3) The temporary jamming of all GNSS frequencies should not compromise the navigation capability required for the intended route. The operator should establish a procedure to deal with such cases unless other sensors are available to continue on the intended route.  (4) The duration of a jamming event should be determined as follows:  (i) Considering the average speed and height of a helicopter flight, the duration of a jamming event may be considered to be less than 2 minutes.  (ii) The time needed for the GNSS system to re-start and provide the aircraft position and navigation guidance should also be considered.  (iii) Based on (i) and (ii) above, the operator should establish the duration of the loss of GNSS navigation data due to jamming. This duration should be no less than 3 minutes, and may be no longer than 4 minutes. (5) The operator should ensure resilience to jamming for the duration determined in (4) above, as follows: (i) If the altitude of obstacles on both sides of the flight path is higher than the planned altitude for a given segment of the flight, the operator should ensure no excessive drift on either side by relying on navigation sensors such as a inertial system with performance in accordance with the intended function.  (ii) If (i) does not apply and the operator cannot rely on sensors other than GNSS, the operator should develop a procedure to ensure that a drift from the intended route during the jamming event has no adverse consequences on the safety of the flight. This procedure may involve air traffic services.  (6) The operator should ensure that no space weather event is predicted to disrupt the GNSS reliability and integrity at both the destination and the alternate aerodrome.  (7) The operator should verify the availability of RAIM for all phases of flight based on GNSS, including navigation to the alternate aerodrome.  (8) The operator’s MEL should reflect the elements in points (b)(1) and (b)(2) | | | | |
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| OPERATIONAL CREDITS  (c) To comply with point CAT.OP.MPA.192(d), when the operator intends to use ‘operational credits’ (e.g. EFVS, SA CAT I, etc.), the operator should select an aerodrome as destination alternate aerodrome only if an approach procedure that does not rely on the same ‘operational credit’ is available either at that aerodrome or at the destination aerodrome. | | | | |
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| GM1 CAT.OP.MPA.192(d) Selection of aerodromes and operating sites - helicopters | | | | |
| DESTINATION AND DESTINATION ALTERNATE AERODROMES – PBN OPERATIONS ED Decision 2022/005/R | | | | |
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| (a) AMC1 CAT.OP.MPA.192(d) applies only to destination alternate aerodromes in flights that require a destination alternate aerodrome. A take-off or ERA aerodrome with instrument approach procedures that rely on a GNSS may be planned without restrictions. A destination aerodrome with all instrument approach procedures that rely solely on a GNSS may be used without a destination alternate aerodrome if the conditions for a flight without a destination alternate aerodrome are met. | | | | |
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| (b) The term ‘available’ means that the procedure can be used in the planning stage and should comply with planning minima requirements. | | | | |
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| GM2 CAT.OP.MPA.192(d) Selection of aerodromes and operating sites – helicopters  |  | | --- | | GNSS ROBUSTNESS AGAINST LOSS OF CAPABILITY — HELICOPTERS ED Decision 2022/012/R | | | | | |
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| (a) Redundancy of on-board systems ensures that no single on-board equipment failure (e.g. antenna, GNSS receiver, FMS, or navigation display failure) results in the loss of the GNSS capability. | | | | |
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| (b) Any shadowing of the GNSS signal or jamming of all GNSS frequencies from the ground is expected to be of a very short duration and affect a very small area. Additional sensors or functions, such as inertial coasting, may be used during jamming events. Jamming should be considered on all segments of the intended route, including the approach. | | | | |
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| (c) The availability of GNSS signals can be compromised if space weather events cause ‘loss of lock’ conditions and more than one satellite signal may be lost on a given GNSS frequency. Until space weather forecasts are available, the operator may use ‘nowcasts’ as short-term predictions for helicopter flights of short durations | | | | |
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| (d) SBAS also contributes to the mitigation of space weather effects, by both providing integrity messages and correcting ionosphere-induced errors. | | | | |
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| (e) Even though SBAS should be available and used, RAIM should remain available autonomously. In case of loss of SBAS, the route and the approach to the destination or alternate aerodrome should still be flown with an available RAIM function. | | | | |
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| (f) When available, GNSS based on more than one constellation and more than one frequency may provide better integrity and redundancy regarding failures in the space segment of GNSS, jamming, and resilience to space weather events. | | | | |
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| CAT.OP.MPA.195 Fuel/energy scheme – in-flight fuel/energy management policy – helicopters (EU) 2021/1296 | | | | |
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| (a) The operator shall establish procedures to ensure that in-flight fuel/energy checks and fuel/energy management are performed. | | | | |
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| b) The commander shall monitor the amount of usable fuel/energy remaining on board to ensure that it is protected and not less than the fuel/energy that is required to proceed to an aerodrome or operating site where a safe landing can be made. | | | | |
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| (c) The commander shall advise air traffic control (ATC) of a ‘minimum fuel/energy’ state by declaring ‘MINIMUM FUEL’ when the commander has:  (1) committed to land at an aerodrome or operating site; and  (2) calculated that any change to the existing clearance to that aerodrome or operating site, or other air traffic delays, may result in landing with less than the planned final reserve fuel/energy. | | | | |
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| (d) The commander shall declare a situation of ‘fuel/energy emergency’ by broadcasting ‘MAYDAY MAYDAY MAYDAY FUEL’ when the usable fuel/energy estimated to be available upon landing at the nearest aerodrome or operating site where a safe landing can be made is less than the planned final reserve fuel/energy. | | | | |
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| AMC1 CAT.OP.MPA.195 Fuel/energy scheme – in-flight fuel/energy management policy - helicopters | | | | |
| ENSURING A SAFE LANDING FOR COMPLEX MOTOR-POWERED HELICOPTERS IN OTHER THAN LOCAL OPERATIONS ED Decision 2022/005/R | | | | |
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| The operator should base in-flight fuel management procedures on the following criteria:  (a) in-flight fuel checks:  (1) the commander should establish a procedure to ensure that in-flight fuel checks are carried out at regular intervals; the remaining usable fuel should be recorded and evaluated to:  (i) compare the actual consumption with the planned consumption;  (ii) check that the remaining usable fuel is sufficient to complete the flight; and  (iii) determine the usable fuel that is expected to remain upon landing at the destination; and  (2) the relevant fuel data should be recorded; | | | | |
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| (b) in-flight fuel management:  (1) if an in-flight fuel check shows that the usable fuel that is expected to remain upon landing at the destination is less than the required alternate fuel plus the FRF, the commander should:  (i) divert; or  (ii) replan the flight in accordance with point SPA.HOFO.120(b)(1) unless the commander considers it safer to proceed to the destination; and  (2) at an onshore destination, when two suitable, separate touchdown and lift-off areas are available at the destination, and the expected weather conditions at the destination are as specified for planning in point CAT.OP.MPA.245(a)(2), the commander may permit alternate fuel to be used before landing at the destination; and | | | | |
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| (c) if an in-flight fuel check on a flight to an isolated destination shows that the usable fuel expected to remain at the point of the last possible diversion is less than the sum of the following:  (1) trip fuel from the point of the last possible diversion to the destination isolated aerodrome;  (2) contingency fuel; and  (3) FRF, or the additional fuel required for isolated aerodromes,  the commander should either divert or proceed to the destination, provided that at onshore destinations, two suitable, separate touchdown and lift-off areas are available at the destination, and the expected weather conditions at the destination are as specified for planning in point CAT.OP.MPA.245(a). | | | | |
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| GM1 CAT.OP.MPA.195 Fuel/energy scheme – in-flight fuel/energy management policy - helicopters | | | | |
| ’MINIMUM FUEL’ DECLARATION ED Decision 2022/005/R | | | | |
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| (a) The ‘MINIMUM FUEL’ declaration informs the ATC that all planned landing-site options have been reduced to a specific aerodrome or operating site of intended landing. It also informs the ATC that no other operating site is available, and that any change to the existing clearance, or air traffic delays, may result in landing with less than the planned FRF. This is not an emergency situation but an indication that an emergency situation is possible, should any additional delay occur. | | | | |
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| SAFE LANDING – final reserve fuel PROTECTION ED Decision 2022/005/R | | | | |
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| (b) The protection of the FRF is intended to ensure that a safe landing is made at any aerodrome or operating site when unforeseen circumstances may not allow to safely complete the operation, as originally planned. | | | | |
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| (c) When the FRF can no longer be protected, then a fuel emergency needs to be declared, as per point CAT.OP.MPA.195(d), and any landing option explored, including deviating from rules, operational procedures, and methods in the interest of safety (as per point CAT.GEN.MPA.105(b)). | | | | |
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| (d) The ‘MAYDAY MAYDAY MAYDAY FUEL’ declaration informs the ATC that all available landing options have been reduced to a specific landing site, and that an FRF portion may be consumed prior to landing. | | | | |
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| CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft (EU) 2021/1296 | | | | |
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| (a) Special refuelling or defuelling shall only be conducted if the operator:  (1) has performed a risk assessment;  (2) has developed procedures; and  (3) has established a training programme for its personnel involved in such operations. | | | | |
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| (b) Special refuelling or defuelling applies to:  (1) refuelling with an engine running or rotors turning;  (2) refuelling/defuelling with passengers embarking, on board, or disembarking; and  (3) refuelling/defuelling with wide-cut fuel. | | | | |
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| (c) For aeroplanes, any special refuelling or defuelling procedures and any change to them shall require prior approval by the competent authority. | | | | |
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| (d) For helicopters, refuelling procedures with rotors turning and any change to them shall require prior approval by the competent authority. | | | | |
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| AMC1 CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft | | | | |
| REFUELLING WITH AN ENGINE RUNNING – AEROPLANES ED Decision 2022/005/R | | | | |
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| (a) Refuelling with an engine running should only be conducted:  (1) when there are no other sources of electrical or pneumatic power to start the engine if shut down;  (2) in accordance with the specific procedures established by the type certificate (TC) holder of the aeroplane;  (3) with aeroplanes that use JET A, JET A-1 or TS-1 fuel types or any other fuel type that has a flash point above 38 °C and is approved by the operators’ competent authority;  (4) with no passengers embarking, on board, or disembarking;  (5) with permission from the aerodrome operator; and  (6) in the presence of the aerodrome rescue and firefighting services (RFFSs). | | | | |
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| (b) The operator should assess the risks associated with refuelling with an engine running and establish appropriate procedures to be followed by all involved personnel, such as flight crew, cabin crew, and ground operations personnel. These procedures should be specified in the OM. | | | | |
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| AMC2 CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft | | | | |
| OPERATIONAL PROCEDURES for REFUELLING WITH AN ENGINE RUNNING – AEROPLANES ED Decision 2022/005/R | | | | |
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| (a) To reduce the likelihood of conducting refuelling with an engine running, the operator should include in the MEL an operational procedure for dispatch criteria in case of an unserviceable APU, if applicable, to prevent a flight from being dispatched to an aerodrome where no suitable ground support equipment is available. | | | | |
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| (b) Appropriate training should be provided to flight crew and maintenance/ground operations personnel that are involved in refuelling with one engine running, as well as to cabin crew, if present on board. | | | | |
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| AMC3 CAT.OP:MPA.200 Special refuelling or defuelling of the aircraft | | | | |
| REFUELLING WITH THE ENGINE(S) RUNNING AND/OR ROTORS TURNING – HELICOPTERS ED Decision 2022/005/R | | | | |
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| (a) Refuelling with the engine(s) running and/or rotors turning should only be conducted:  (1) with no passengers or technical-crew members embarking or disembarking;  (2) if the operator of the aerodrome/operating site allows such operations;  (3) in accordance with any specific procedures and limitations in the AFM;  (4) using JET A or JET A-1 fuel types; and  (5) in the presence of the appropriate rescue and firefighting (RFF) facilities or equipment. | | | | |
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| (b) In addition, operational procedures in the OM should specify that at least the following precautions are taken:  (1) all necessary information should be exchanged in advance with the aerodrome operator, operating-site operator, and refuelling operator;  (2) the procedures to be used by crew members should be defined;  (3) the procedures to be used by the operator’s ground operations personnel that may be in charge of refuelling or assisting in emergency evacuations should be described;  (4) the operator’s training programmes for crew members and for the operator’s ground operations personnel should be described;  (5) the minimum distance between the helicopter turning parts and the refuelling vehicle or installations should be defined when the refuelling takes place outside an aerodrome or at an aerodrome where there are no such limitations;  (6) besides any RFFSs that are required to be available by aerodrome regulations, an additional handheld fire extinguisher with the equivalent of 5 kg of dry powder should be immediately available and ready for use;  (7) a means for a two-way communication between the crew and the person in charge of refuelling should be defined and established;  (8) if fuel vapour is detected inside the helicopter, or any other hazard arises, refuelling/defuelling should be stopped immediately;  (9) one pilot should stay at the controls, constantly monitor the refuelling, and be ready to shut off the engines and evacuate at all times; and  (10) any additional precautions should be taken, as determined by the risk assessment. | | | | |
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| AMC4 CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft | | | | |
| OPERATIONAL PROCEDURES – PASSENGERS ON BOARD for REFUELLING WITH THE ENGINE(S) RUNNING AND/OR ROTORS TURNING – HELICOPTERS ED Decision 2022/005/R | | | | |
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| * 1. In addition to AMC3 CAT.OP.MPA.200, for refuelling with passengers on board, operational procedures in the OM should specify that at least the following precautions are taken:   2. (a) the positioning of the helicopter and the corresponding helicopter evacuation strategy should be defined taking into account the wind as well as the refuelling facilities or vehicles;   3. (b) on a heliport, the ground area beneath the exits that are intended for emergency evacuation should be kept clear;   4. (c) an additional passenger briefing as well as instructions should be defined, and the ‘No smoking’ signs should be on unless ‘No smoking’ placards are installed;   5. (d) interior lighting should be set to enable identification of emergency exits;   6. (e) the use of doors during refuelling should be defined: doors on the refuelling side should remain closed, while doors on the opposite side should remain unlocked or, weather permitting, open, unless otherwise specified in the AFM;   7. (f) at least one suitable person capable of implementing emergency procedures for firefighting, communications, as well as for initiating and directing an evacuation, should remain at a specified location; this person should not be the qualified pilot at the controls or the person performing the refuelling; and   8. (g) unless passengers are regularly trained in emergency evacuation procedures, an additional crew member or ground crew member should be assigned to assist in the rapid evacuation of the passengers. | | | | |
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| GM1 CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft | | | | |
| OPERATIONAL PROCEDURES for REFUELLING WITH AN ENGINE RUNNING – AEROPLANES ED Decision 2022/005/R | | | | |
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| For the purpose of refuelling with an engine running, the operator’s procedures need to be aligned with the specific procedures laid down in the AFM. In case there are no specific procedures for refuelling with an engine running available in the AFM, the operator and the manufacturer may wish to cooperate to establish such procedures. | | | | |
| GM2 CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft | | | | |
| RISK ASSESSMENT FOR REFUELLING WITH THE ENGINE(S) RUNNING AND/OR ROTORS TURNING – HELICOPTERS ED Decision 2022/005/R | | | | |
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| The risk assessment should explain why it is not practical to refuel with the engine(s) and rotors stopped, identify any additional hazards, and describe how the additional risks are controlled. Helicopter emergency medical services (HEMS) and helicopter offshore operations (HOFO) are typical operations where the benefits should outweigh the risks if mitigation measures are taken.  Guidance on safe refuelling practices is contained in ICAO Doc 9137 Airport Services Manual, Parts 1 and 8. | | | | |
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| The operators’ risk assessment may include, but not be limited to, the following risks, hazards and mitigation measures:  (a) risk related to refuelling with rotors turning;  (b) risk related to the shutting down of the engines, including the risk of failures during start-up;  (c) environmental conditions, such as wind limitations, displacement of exhaust gases, and blade sailing;  (d) risk related to human factors and fatigue management, especially for single-pilot operations for long periods of time;  (e) risk mitigation, such as the safety features of the fuel installation, RFF capability, number of personnel members available, ease of emergency evacuation of the helicopter, etc.;  (f) assessment of the use of radio transmitting equipment;  (g) determination of the use of passenger seat belts;  (h) review of the portable electronic device (PED) policy; and  (i) if passengers are to disembark, consideration of their disembarking before rather than after the refuelling; and  (j) if passengers are to embark, consideration of their embarking after rather than before the refuelling. | | | | |
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| AMC5 CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft | | | | |
| REFUELLING OR DEFUELLING WITH PASSENGERS EMBARKING, ON BOARD OR DISEMBARKING ED Decision 2022/005/R | | | | |
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| (a) When passengers are embarking, on board, or disembarking, an aircraft should not be refuelled/defuelled with avgas (aviation gasoline) or wide-cut type fuel or a mixture of these types of fuel. | | | | |
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| (b) For all other types of fuel, the necessary precautions should be taken, and the aircraft should be properly manned by qualified personnel that should be ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available. | | | | |
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| AMC6 CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft | | | | |
| OPERATIONAL PROCEDURES WITH PASSENGERS EMBARKING, ON BOARD OR DISEMBARKING – AEROPLANES ED Decision 2022/005/R | | | | |
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| (a) When refuelling/defuelling with passengers on board, ground servicing activities and work inside the aeroplane, such as catering and cleaning, should be conducted in such a manner that they do not create a hazard and allow emergency evacuation through those aisles and exits that are intended for emergency evacuation.  (b) The deployment of integral aeroplane stairs or the opening of emergency exits are not necessarily a prerequisite to refuelling.  (c) Operational procedures should specify that at least the following precautions are taken:  (1) one qualified person should remain at a specified location during refuelling/defuelling operations with passengers on board, and be capable of using emergency procedures for fire protection and firefighting, communications, as well as for initiating and directing an evacuation;  (2) two-way communication should be established and remain available through the aeroplane’s intercommunications system, or other suitable means, between the ground crew that supervises the refuelling and the qualified personnel on board the aeroplane; all involved personnel should remain within easy reach of the intercommunications system;  (3) crew, personnel, and passengers should be warned that refuelling/defuelling will take place;  (4) the ‘FASTEN SEAT BELT’ signs should be off;  (5) ‘NO SMOKING’ signs should be on, together with interior lighting to allow the identification of emergency exits;  (6) passengers should be instructed to unfasten their seat belts and refrain from smoking;  (7) the minimum required number of cabin crew should be on board and prepared for an immediate emergency evacuation;  (8) if fuel vapour is detected inside the aeroplane, or any other hazard arises, refuelling/defuelling should be stopped immediately;  (9) the ground area beneath the exits that are intended for emergency evacuation, as well as slide deployment areas, should be kept clear where stairs are not in position for use in the event of evacuation; and  (10) provision is made for a safe and rapid evacuation. | | | | |
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| AMC7 CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft | | | | |
| OPERATIONAL PROCEDURES FOR REFUELLING WITH PASSENGERS DISEMBARKING OR EMBARKING – HELICOPTERS WITH THE ENGINE(S) AND ROTORS STOPPED ED Decision 2022/005/R | | | | |
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| When the helicopter engine(s) and rotors are stopped, the efficiency and speed of passengers disembarking from and re-embarking on board helicopters should be such that disembarking before refuelling and re-embarking after refuelling is the general practice, except for HEMS or air ambulance operations. However, if such operations are needed, the operator should refer to AMC3 CAT.OP.MPA.200 and AMC4 CAT.OP.MPA.200. Operational procedures to be described in the OM should specify that at least the relevant precautions referred to in the aforementioned AMC are taken. | | | | |
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| AMC8 CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft | | | | |
| REFUELLING OR DEFUELLING WITH WIDE-CUT FUEL ED Decision 2022/005/R | | | | |
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| Refuelling/defuelling with wide-cut fuel should be conducted only if the operator has established appropriate procedures, taking into account the high risk of using wide-cut fuel types. | | | | |
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| GM3 CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft | | | | |
| PROCEDURES FOR REFUELLING/DEFUELLING WITH WIDE-CUT FUEL ED Decision 2022/005/R | | | | |
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| CAT.OP.MPA.245 Meteorological conditions – all aircraft (EU) 2021/1296 | | | | |
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| (a)(1) commence the flight; or’ | | | | |
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| CAT.OP.MPA.246 Meteorological conditions – aeroplanes (EU) 2021/1296 | | | | |
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| (a) the decision point when using the reduced contingency fuel/energy procedure; or’ | | | | |
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| CAT.OP.MPA.260 Fuel/energy and oil supply (EU) 2021/1296 | | | | |
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| The commander shall only commence a flight or continue in the event of in-flight re-planning, when satisfied that the aircraft carries at least the planned amount of usable fuel/energy and oil to safely complete the flight, taking into account the expected operating conditions. | | | | |
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| CAT.OP.MPA.280 In-flight fuel management – aeroplanes (EU) 2021/1296 | | | | |
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| CAT.OP.MPA.281 In-flight fuel management – helicopters (EU) 2021/1296 | | | | |
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| CAT.POL.A220 En-route – aeroplanes with three or more engines two engines inoperative (EU) 2021/1296 | | | | |
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| (f) The expected mass of the aeroplane at the point where the two engines are assumed to fail shall not be less than that which would include sufficient fuel/energy to proceed to an aerodrome where the landing is assumed to be made, and to arrive there at an altitude of at least 1 500 ft (450 m) directly over the landing area, and thereafter, to fly for 15 minutes at cruising power or thrust, as appropriate. | | | | |
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| CAT.POL.A.420 En-route – aeroplanes with three or more engines, two engines inoperative (EU) 2021/1296 | | | | |
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| (d) The expected mass of the aeroplane at the point where the two engines are assumed to fail shall not be less than that which would include sufficient fuel/energy to proceed to an aerodrome where the landing is assumed to be made, and to arrive there at an altitude of at least 1 500 ft (450 m) directly over the landing area, and thereafter, to fly for 15 minutes at cruising power or thrust, as appropriate. | | | | |
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| CAT.IDE.A.195 Data link recording (EU) 2021/1296 | | | | |
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| (e) The requirements applicable to the start and stop logic of the data link recorder are the same as the requirements applicable to the start and stop logic of the cockpit voice recorder (CVR) that are contained in point CAT.IDE.A.185. | | | | |
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| SPA.HEMS.150 Fuel/energy supply – alleviation (EU) 2021/1296 | | | | |
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| As an alternative to points CAT.OP.MPA.191 (b), (c), and (d), when the helicopter emergency medical services (HEMS) mission is conducted under visual flight rules (VFR) within a local and defined geographical area, the fuel/energy policy shall ensure that on completion of the mission, the final reserve fuel/energy is sufficient for:  (a) 30-minute flying time at best-range speed; or  (b) 20-minute flying time at best-range speed by day, when operating within an area providing continuous and suitable operating sites. | | | | |
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| SPA.HEMS.155 Refuelling with passengers on board (EU) 2021/1296 | | | | |
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| A refuelling procedure with either rotors stopped or rotors turning shall be provided in accordance with point CAT.OP.MPA.200 ‘Special refuelling or defuelling of the aircraft’. | | | | |
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| SPA.HOFO.120 Selection of aerodromes and operating sites (EU) 2021/1296 | | | | |
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| (a) Onshore destination alternate aerodrome. By way of derogation from points CAT.OP.MPA.192, NCC.OP.152, and SPO.OP.151, the pilot-in-command/commander does not need to specify a destination alternate aerodrome in the operational flight plan when conducting flights from an offshore location to a land aerodrome if either: …….. | | | | |
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| SPA.SET-IMC.110 Equipment requirements for SET-IMC operations (EU) 2021/1296 | | | | |
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| (l) an emergency engine power control device that permits continuing operation of the engine at a sufficient power range to safely complete the flight in the event of any reasonably probable failure of the fuel/energy control unit. | | | | |
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| NCC.OP.105 Specification of isolated aerodromes – aeroplanes (EU) 2021/1296 | | | | |
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| For the selection of alternate aerodromes and the fuel/energy planning and in-flight re-planning policy, the operator shall not consider an aerodrome as an isolated aerodrome unless the flying time to the nearest weather-permissible destination alternate aerodrome is more than:  (a) for aeroplanes with reciprocating engines, 60 minutes; or  (b) for turbine-engined aeroplanes, 90 minutes. | | | | |
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| NCC.OP.130 Fuel/energy scheme – aeroplanes and helicopters (EU) 2021/1296 | | | | |
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| (a) The operator shall establish, implement, and maintain a fuel/energy scheme that comprises:  (1) a fuel/energy planning and in-flight re-planning policy; and  (2) an in-flight fuel/energy management policy.  (b) The fuel/energy scheme shall:  (1) be appropriate for the type(s) of operation performed; and  (2) correspond to the capability of the operator to support its implementation | | | | |
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| NCC.OP.131 Fuel/energy scheme – fuel/energy planning and in-flight re-planning policy – aeroplanes and helicopters (EU) 2021/1296 | | | | |
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| (a) As part of the fuel/energy scheme, the operator shall establish a fuel/energy planning and in-flight re-planning policy to ensure that the aircraft carries a sufficient amount of usable fuel/energy to safely complete the planned flight and to allow for deviations from the planned operation. | | | | |
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| (b) The operator shall ensure that the fuel/energy planning of flights is based upon at least the following elements:  (1) procedures contained in the operations manual as well as:  (i) current aircraft-specific data derived from a fuel/energy consumption monitoring system, or, if not available;  (ii) data provided by the aircraft manufacturer; and  (2) the operating conditions under which the flight is to be conducted including:  (i) aircraft fuel/energy consumption data;  (ii) anticipated masses;  (iii) anticipated meteorological conditions;  (iv) the effects of deferred maintenance items or configuration deviations, or both; and  (v) anticipated delays. | | | | |
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| (c) For aeroplanes, the operator shall ensure that the pre-flight calculation of the usable fuel/energy that is required for a flight includes:  (1) taxi fuel/energy that shall not be less than the amount expected to be used prior to take-off;  (2) trip fuel/energy that shall be the amount of fuel/energy that is required to enable the aeroplane to fly from take-off, or from the point of in-flight re-planning, to landing at the destination aerodrome;  (3) contingency fuel/energy that shall be the amount of fuel/energy required to compensate for unforeseen factors;  (4) destination alternate fuel/energy:  (i) when a flight is operated with at least one destination alternate aerodrome, it shall be the amount of fuel/energy required to fly from the destination aerodrome to the destination alternate aerodrome; or  (ii) when a flight is operated with no destination alternate aerodrome, it shall be the amount of fuel/energy required to hold at the destination aerodrome to compensate for the lack of a destination alternate aerodrome;  (5) final reserve fuel/energy that shall be the amount of fuel/energy that is calculated at holding speed at 1 500ft (450 m) above the aerodrome elevation in standard conditions according to the aircraft estimated mass on arrival at the destination alternate aerodrome, or destination aerodrome when no destination alternate aerodrome is required, and shall not be less than:  (i) for aeroplanes with reciprocating engines on visual flight rules (VFR) flights by night and instrument flight rules (IFR) flights, the fuel/energy to fly for 45 minutes; or  (ii) for aeroplanes with reciprocating engines on VFR flights by day, the fuel/energy to fly for 30 minutes;  (iii) for turbine-engined aeroplanes, the fuel/energy to fly for 30 minutes;  (6) additional fuel/energy, if required by the type of operation; it shall be the amount of fuel/energy to enable the aeroplane to perform a safe landing at a fuel/energy en route alternate aerodrome (fuel/energy ERA aerodrome critical scenario) in the event of an engine failure or loss of pressurisation, whichever requires the greater amount of fuel/energy, based on the assumption that such a failure occurs at the most critical point along the route; this additional fuel/energy is required only if the minimum amount of fuel/energy that is calculated according to points (c)(2) to (c)(5) is not sufficient for such an event;  (7) extra fuel/energy to take into account anticipated delays or specific operational constraints; and  (8) discretionary fuel/energy, if required by the commander. | | | | |
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| (d) For helicopters, the operator shall ensure that the pre-flight calculation of the usable fuel/energy that is required for a flight includes all of the following:  (1) fuel/energy to fly to the aerodrome or operating site of intended landing;  (2) if a destination alternate is required, destination alternate fuel/energy, which shall be the amount of fuel/energy that is required to execute a missed approach at the aerodrome or operating site of intended landing, and thereafter, to fly to the specified destination alternate, approach and land; and  (3) final reserve fuel/energy, which shall not be less than:  (i) for flights under VFR, fuel/energy to fly for at least 20 minutes at best-range speed; or  (ii) for IFR flights, fuel/energy to fly for at least 30 minutes at holding speed at 450 m (1 500 ft) above the aerodrome or operating site of intended landing or destination alternate in standard temperature conditions. | | | | |
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| (e) The operator shall ensure that if a flight has to proceed to a destination aerodrome other than the one originally planned, in-flight re-planning procedures for calculating the required usable fuel/energy are available and comply with points (c)(2) to (c)(7) for aeroplanes, and point (d) for helicopters. | | | | |
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| (f) The pilot in command shall only commence a flight or continue in the event of in-flight re-planning, when satisfied that the aircraft carries at least the planned amount of usable fuel/energy and oil to safely complete the flight. | | | | |
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| NCC.OP.151 Destination alternate aerodromes – aeroplanes (EU) 2021/1296 | | | | |
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| (b) the place of intended landing is designated as an isolated aerodrome and:  (1) an instrument approach procedure is prescribed for the aerodrome of intended landing; and  (2) available current meteorological information indicates that the following meteorological conditions will exist from 2 hours before to 2 hours after the estimated time of arrival:  (i) a cloud base of at least 300 m (1 000 ft) above the minimum associated with the instrument approach procedure; and  (ii) visibility of at least 5,5 km or of 4 km more than the minimum associated with the procedure. | | | | |
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| NCC.OP.155 Refuelling with passengers embarking, on board or disembarking (EU) 2021/1296 | | | | |
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| (b) For all other types of fuel/energy, necessary precautions shall be taken and the aircraft shall be properly manned by qualified personnel ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available. | | | | |
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| NCC.OP.157 Refuelling with engine(s) and/or rotors turning – helicopters (EU) 2021/1296 | | | | |
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| (a) Refuelling with engine(s) and/or rotors turning shall only be conducted:  (1) with no passengers embarking or disembarking; (2) if the operator of the aerodrome/operating site allows such operations;  (3) in accordance with any specific procedures and limitations in the aircraft flight manual (AFM);  (4) with JET A or JET A-1 fuel types; and  (5) in the presence of the appropriate rescue and firefighting (RFF) facilities or equipment. | | | | |
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| (b) The operator shall assess the risks associated with refuelling with engine(s) and/or rotors turning. | | | | |
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| (c) The operator shall establish appropriate procedures to be followed by all involved personnel, such as crew members and ground operations personnel. | | | | |
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| (d) The operator shall train its crew members and ensure that the involved ground operations personnel is trained appropriately. | | | | |
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| (e) The operator shall ensure that the helicopter refuelling procedure with engine(s) and/or rotors turning are specified in the operations manual. This procedure and any change thereto shall require prior approval by the competent authority. | | | | |
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| NCC.OP.205 Fuel/energy scheme – in-flight fuel/energy management policy (EU) 2021/1296 | | | | |
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| (a) The operator shall establish procedures to ensure that in-flight fuel/energy checks and fuel/energy management are performed. | | | | |
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| (b) The pilot-in-command shall monitor the amount of usable fuel/energy remaining on board to ensure that it is protected and not less than the fuel/energy that is required to proceed to an aerodrome or operating site where a safe landing can be made. | | | | |
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| (c) The pilot-in-command shall advise air traffic control (ATC) of a ‘minimum fuel/energy’ state by declaring ‘MINIMUM FUEL’ when the pilot-in-command has:  (1) committed to land at a specific aerodrome or operating site; and  (2) calculated that any change to the existing clearance to that aerodrome or operating site, or other air traffic delays, may result in landing with less than the planned final reserve fuel/energy. | | | | |
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| (d) The pilot-in-command shall declare a situation of ‘fuel/energy emergency’ by broadcasting ‘MAYDAY MAYDAY MAYDAY FUEL’ when the usable fuel/energy estimated to be available upon landing at the nearest aerodrome or operating site where a safe landing can be made is less than the planned final reserve fuel/energy. | | | | |
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| NCC.POL.110 Mass and balance data and documentation (EU) 2021/1296 | | | | |
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| (a)  …  ‘(6) mass of the fuel/energy at take-off and mass of trip fuel/energy;  (7) mass of consumables other than fuel/energy, if applicable;  (8) load components including passengers, baggage, freight, and ballast;  (9) take-off mass, landing mass, and zero fuel/energy mass; | | | | |
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| NCO.OP.105 Specification of isolated aerodromes – aeroplanes (EU) 2021/1296 | | | | |
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| For the selection of alternate aerodromes and the fuel/energy supply, the pilot-in-command shall not consider an aerodrome as an isolated aerodrome unless the flying time to the nearest weather-permissible destination alternate aerodrome is more than: (a) for aeroplanes with reciprocating engines, 60 minutes; or (b) for turbine-engined aeroplanes, 90 minutes. | | | | |
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| NCO.OP.125 Fuel/energy and oil supply – aeroplanes and helicopters (EU) 2021/1296 | | | | |
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| (a) The pilot-in-command shall ensure that the quantity of fuel/energy and oil that is carried on board is sufficient, taking into account the meteorological conditions, any element affecting the performance of the aircraft, any delays that are expected in flight, and any contingencies that may reasonably be expected to affect the flight. | | | | |
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| (b) The pilot-in-command shall plan a quantity of fuel/energy to be protected as final reserve fuel/energy to ensure a safe landing. The pilot-in-command shall take into account all of the following, and in the following order of priority, to determine the quantity of the final reserve fuel/energy:  (1) the severity of the hazard to persons or property that may result from an emergency landing after fuel/energy starvation; and  (2) the likelihood of unexpected circumstances that the final reserve fuel/energy may no longer be protected. | | | | |
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| (c) The pilot-in-command shall commence a flight only if the aircraft carries sufficient fuel/energy and oil:  (1) when no destination alternate is required, to fly to the aerodrome or operating site of intended landing, plus the final reserve fuel/energy; or  (2) when a destination alternate is required, to fly to the aerodrome or operating site of intended landing, and thereafter, to an alternate aerodrome, plus the final reserve fuel/energy. | | | | |
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| NCO.OP.126 Fuel and oil supply – helicopters (EU) 2021/1296 | | | | |
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| NCO.OP.145 Refuelling with passengers embarking, on board or disembarking (EU) 2021/1296 | | | | |
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| (b) For all other types of fuel/energy, the aircraft shall not be refuelled when passengers are embarking, on board or disembarking, unless it is attended by the pilot-in-command or other qualified personnel ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available. | | | | |
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| NCO.OP.147 Refuelling with engine(s) and/or rotors turning – helicopters (EU) 2021/1296 | | | | |
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| Refuelling with engine(s) and/or rotors turning shall only be conducted if all those conditions are met simultaneously:  (a) if it is not practical to shut down or restart the engine;  (b) in accordance with any specific procedures and limitations in the aircraft flight manual (AFM);  (c) with JET A or JET A-1 fuel types;  (d) with no passengers or task specialists on board, embarking or disembarking;  (e) if the operator of the aerodrome or operating site allows such operations;  (f) in the presence of the appropriate rescue and firefighting (RFF) facilities or equipment; and  (g) in accordance with a checklist that shall contain: (1) normal and contingency procedures;  (2) the required equipment;  (3) any limitations; and  (4) responsibilities and duties of the pilot-in-command and, if applicable, crew members and task specialists. | | | | |
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| NCO.OP.185 In-flight fuel/energy management (EU) 2021/1296 | | | | |
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| (a) The pilot-in-command shall monitor the amount of usable fuel/energy remaining on board to ensure that it is protected and not less than the fuel/energy that is required to proceed to an aerodrome or operating site where a safe landing can be made.  (b) The pilot-in-command of a controlled flight shall advise air traffic control (ATC) of a ‘minimum fuel/energy’ state by declaring ‘MINIMUM FUEL’ when the pilot-in-command has:  (1) committed to land at a specific aerodrome or operating site; and  (2) calculated that any change to the existing clearance to that aerodrome or operating site, or other air traffic delays, may result in landing with less than the planned final reserve fuel/energy.  (c) The pilot-in-command of a controlled flight shall declare a situation of ‘fuel/energy emergency’ by broadcasting ‘MAYDAY MAYDAY MAYDAY FUEL’ when the usable fuel/energy estimated to be available upon landing at the nearest aerodrome or operating site where a safe landing can be made is less than the planned final reserve fuel/energy.’; | | | | |
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| NCO.SPEC.135 Fuel and oil supply – aeroplanes (EU) 2021/1296 | | | | |
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| NCO.SPEC.140 Fuel and oil supply – helicopters (EU) 2021/1296 | | | | |
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| SPO.OP.105 Specification of isolated aerodromes – aeroplanes (EU) 2021/1296 | | | | |
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| For the selection of alternate aerodromes and the fuel/energy planning and in-flight re-planning policy, the operator shall not consider an aerodrome as an isolated aerodrome unless the flying time to the nearest weather-permissible destination alternate aerodrome is more than:  (a) for aeroplanes with reciprocating engines, 60 minutes; or  (b) for turbine-engined aeroplanes, 90 minutes. | | | | |
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| SPO.OP.130 Fuel/energy scheme – aeroplanes and helicopters (EU) 2021/1296 | | | | |
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| (a) The operator shall establish, implement, and maintain a fuel/energy scheme that comprises:  (1) a fuel/energy planning and in-flight re-planning policy; and  (2) an in-flight fuel/energy management policy.  (b) The fuel/energy scheme shall:  (1) be appropriate for the type(s) of operation performed; and  (2) correspond to the capability of the operator to support its implementation. | | | | |
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| SPO.OP.131 Fuel/energy scheme – fuel/energy planning and in-flight re-planning policy – aeroplanes and helicopters (EU) 2021/1296 | | | | |
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| (a) As part of the fuel/energy scheme, the operator shall establish a fuel/energy planning and in-flight re-planning policy to ensure that the aircraft carries a sufficient amount of usable fuel/energy to safely complete the planned flight and to allow for deviations from the planned operation. | | | | |
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| (b) The operator shall ensure that the fuel/energy planning of flights is based upon at least the following elements:  (1) procedures contained in the operations manual as well as:  (i) current aircraft-specific data derived from a fuel/energy consumption monitoring system or, if not available;  (ii) data provided by the aircraft manufacturer; and  (2) the operating conditions under which the flight is to be conducted including:  (i) aircraft fuel/energy consumption data;  (ii) anticipated masses;  (iii) anticipated meteorological conditions;  (iv) the effects of deferred maintenance items and/or configuration deviations; and  (v) anticipated delays. | | | | |
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| (c) For aeroplanes, the operator shall ensure that the pre-flight calculation of the usable fuel/energy that is required for a flight includes:  (1) taxi fuel/energy that shall not be less than the amount expected to be used prior to take-off;  (2) trip fuel/energy that shall be the amount of fuel/energy that is required to enable the aeroplane to fly from take-off, or from the point of in-flight re-planning, to landing at the destination aerodrome;  (3) contingency fuel/energy that shall be the amount of fuel/energy required to compensate for unforeseen factors;  (4) destination alternate fuel/energy  (i) when a flight is operated with at least one destination alternate aerodrome, it shall be the amount of fuel/energy required to fly from the destination aerodrome to the destination alternate aerodrome; or  (ii) when a flight is operated with no destination alternate aerodrome, it shall be the amount of fuel/energy required to hold at the destination aerodrome to compensate for the lack of a destination alternate aerodrome;  (5) final reserve fuel/energy that shall be protected to ensure a safe landing; the operator shall take into account all of the following, and in the following order of priority, to determine the quantity of the final reserve fuel/energy:  (i) the severity of the hazard to persons or property that may result from an emergency landing after fuel/energy starvation;  (ii) the likelihood of unexpected circumstances that the final reserve fuel/energy may no longer be protected;  (6) additional fuel/energy, if required by the type of operation; it shall be the amount of fuel/energy to enable the aeroplane to perform a safe landing at a fuel/energy en route alternate aerodrome (fuel/energy ERA aerodrome critical scenario) in the event of an engine failure or loss of pressurisation, whichever requires the greater amount of fuel/energy, based on the assumption that such a failure occurs at the most critical point along the route; this additional fuel/energy is required only if the minimum amount of fuel/energy that is calculated according to points (c)(2) to (c)(5) is not sufficient for such an event;  (7) extra fuel/energy to take into account anticipated delays or specific operational constraints; and  (8) discretionary fuel/energy, if required by the pilot-in-command. | | | | |
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| (d) For helicopters, the operator shall ensure that the pre-flight calculation of the usable fuel/energy that is required for a flight includes all of the following:  (1) fuel/energy to fly to the aerodrome or operating site of intended landing;  (2) if a destination alternate is required, destination alternate fuel/energy, which shall be the amount of fuel/energy that is required to execute a missed approach at the aerodrome or operating site of intended landing, and thereafter, to fly to the specified destination alternate, approach and land; and  (3) final reserve fuel/energy, which shall be protected to ensure a safe landing; the operator shall take into account all of the following, and in the following order of priority, to determine the quantity of the final reserve fuel/energy:  (i) the severity of the hazard to persons or property that may result from an emergency landing after fuel/energy starvation; and  (ii) the likelihood of such unexpected circumstances that the final reserve fuel/energy may no longer be protected;  (4) extra fuel/energy to take into account anticipated delays or specific operational constraints; and  (5) discretionary fuel/energy, if required by the pilot-in-command. | | | | |
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| (e) The operator shall ensure that, if a flight has to proceed to a destination aerodrome other than the one originally planned, in-flight re-planning procedures for calculating the required usable fuel/energy are available and comply with points (c)(2) to (c)(7) for aeroplanes, and point (d) for helicopters. | | | | |
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| (f) The pilot in command shall only commence a flight or continue in the event of in-flight re-planning, when satisfied that the aircraft carries at least the planned amount of usable fuel/energy and oil to safely complete the flight. | | | | |
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| SPO.OP.150 Destination alternate aerodromes – aeroplanes (EU) 2021/1296 | | | | |
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| (b) the place of intended landing is designated as an isolated aerodrome and:  (1) an instrument approach procedure is prescribed for the aerodrome of intended landing; and  (2) available current meteorological information indicates that both following meteorological conditions will exist from 2 hours before to 2 hours after the estimated time of arrival, or from the actual time of departure to 2 hours after the estimated time of arrival whichever is the shorter period:  (i) a cloud base of at least 300 m (1 000 ft) above the minimum associated with the instrument approach procedure;  (ii) visibility of at least 5,5 km or of 4 km more than the minimum associated with the procedure. | | | | |
| Referens i OM: | | TS notering: | | |
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| SPO.OP.155 Refuelling with persons embarking, on board or disembarking (EU) 2021/1296 | | | | |
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| (b) For all other types of fuel/energy, necessary precautions shall be taken and the aircraft shall be properly manned by qualified personnel ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available. | | | | |
| Referens i OM: | | TS notering: | | |
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| SPO.OP.157 Refuelling with engine(s) and/or rotors turning – helicopters (EU) 2021/1296 | | | | |
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| (a) Refuelling with engine(s) and/or rotors turning shall only be conducted:  (1) with no task specialists embarking or disembarking;  (2) if the operator of the aerodrome or operating site allows such operations;  (3) in accordance with any specific procedures and limitations in the aircraft flight manual (AFM);  (4) with JET A or JET A-1 fuel types; and  (5) in the presence of the appropriate rescue and firefighting (RFF) facilities or equipment.  (b) The operator shall assess the risks associated with refuelling with engine(s) and/or rotors turning.  (c) The operator shall establish appropriate procedures to be followed by all involved personnel, such as crew members, task specialists, and ground operations personnel.  (d) The operator shall ensure that its crew members, ground operations personnel, as well as any task specialist involved in the procedures, are appropriately trained.  (e) The operator shall ensure that the helicopter refuelling procedures with engine(s) and/or rotors turning are specified in the operations manual. | | | | |
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| SPO.OP.190 Fuel/energy scheme – in-flight fuel/energy management policy (EU) 2021/1296 | | | | |
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| (a) The operator of complex motor-powered aircraft shall establish procedures to ensure that in-flight fuel/energy checks and fuel/energy management are performed.  (b) The pilot-in-command shall monitor the amount of usable fuel/energy remaining on board to ensure that it is protected and not less than the fuel/energy that is required to proceed to an aerodrome or operating site where a safe landing can be made.  (c) The pilot-in-command shall advise air traffic control (ATC) of a ‘minimum fuel/energy’ state by declaring ‘MINIMUM FUEL’ when the pilot-in-command has:  (1) committed to land at a specific aerodrome or operating site; and  (2) calculated that any change to the existing clearance to that aerodrome or operating site, or other air traffic delays, may result in landing with less than the planned final reserve fuel/energy.  (d) The pilot-in-command shall declare a situation of ‘fuel/energy emergency’ by broadcasting ‘MAYDAY MAYDAY MAYDAY FUEL’ when the usable fuel/energy estimated to be available upon landing at the nearest aerodrome or operating site where a safe landing can be made is less than the planned final reserve fuel/energy. | | | | |
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| SPO.POL.110 Mass and balance system – commercial operations with aeroplanes and helicopters and non-commercial operations with complex motor-powered aircraft (EU) 2021/1296 | | | | |
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| (a) The operator shall establish a mass and balance system to determine for each flight or series of flights the following:  (1) aircraft dry operating mass;  (2) mass of the traffic load;  (3) mass of the fuel/energy load;  (4) aircraft load and load distribution;  (5) take-off mass, landing mass, and zero fuel/energy mass; and  (6) applicable aircraft centre of gravity (CG) positions. | | | | |
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| (b) The flight crew shall be provided with a means of replicating and verifying any mass and balance computation based on electronic calculations. | | | | |
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| (c) The operator shall establish procedures to enable the pilot-in-command to determine the mass of the fuel/energy load by using the actual density or, if not known, the density calculated in accordance with a method specified in the operations manual. | | | | |
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| SPO.POL.115 Mass and balance data and documentation – commercial operations with aeroplanes and helicopters and non-commercial operations with complex motor-powered aircraft (EU) 2021/1296 | | | | |
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| (a)  …  (6) mass of the fuel/energy at take-off and mass of trip fuel/energy;  (7) mass of consumables other than fuel/energy, if applicable;  (8) load components;  (9) take-off mass, landing mass, and zero fuel/energy mass; | | | | |
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| SPO.IDE.H.146 Lightweight flight recorder (EU) 2021/1296 | | | | |
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| (a)  …  (1) they are not within the scope of point SPO.IDE.H.145(a); | | | | |
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**GM1 CAT.POL.H.215(b)(3) En-route — critical engine inoperative**

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| FUEL JETTISON ED Decision 2022/005/R | |
| The presence of obstacles along the en-route flight path may preclude compliance with point CAT.POL.H.215 (a)(1) atwith the planned mass at the critical point along the route. In this case, fuel jettison at the most critical point may be planned, provided that the procedures of point (d) (c) inof AMC3 CAT.OP.MPA.150(b)AMC1 CAT.OP.MPA.191(b)&(c) are complied with. | |
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