

## AIR M2-19: Requirements for powered aircraft in towing activities

### Background to and legal basis of the Regulation

The need to amend the Regulation is primarily based on the fact that it is considered appropriate to base the strength requirements of launching hook attachments on the maximum strength of the weak link, in accordance with e.g. the EASA standard CS-22 and German ultralight standards, and not on maximum permissible towed weight as in the current Regulation. According to the German ultralight standard and EASA requirements, the strength requirement for the attachment is 1.5 times the maximum permissible strength of the weak link. The strength requirement based on towed weight in the current national Regulation has created difficulties as the average weight of sailplanes has increased. Permissions to derogate from the Regulation have frequently had to be granted because in many cases the test load required by the Regulation could break ultra-light aircraft at the towed masses of sailplanes currently in use.

In addition, the scope of the Regulation must be updated so that it applies only to towing aircraft subject to national regulation. National regulation covers aircraft referred to in Annex I of the EASA Regulation<sup>1</sup> (e.g. home-built, experimental, ultralight and historic aircraft) as well as ultralight aircraft with an increased weight limit in accordance with Article 2(8) of the EASA Regulation.

The amended regulation is intended to apply, insofar as necessary, not only to the towing of sailplanes but also banners. However, it should be noted in this context that, according to section 4.12, paragraph (c) of Regulation OPS M2-11 ('Air operations involving aircraft in compliance with national regulations'), ultralight aircraft, recreational aircraft or autogyros may not engage in commercial air transport or aerial work. According to the explanatory memorandum to the same Regulation, aerial work refers to the use of an aircraft for special duties, such as agricultural and forestry flights, construction-related flights, aerial photography and mapping flights, research flights, power line inspection and clearing flights, or banner towing. On the other hand, aerotowing and skydiving flights are not considered aerial work. Therefore, banner towing is not permitted without exemption for ultra-light aircraft, aircraft assembled by an amateur, and autogyros. On the other hand, banner towing and other aerial work are permitted for experimental aircraft within the meaning of point 1(b) of Annex I to the EASA Regulation, i.e. for aircraft specifically designed or modified for research, experimental or scientific purposes, and likely to be produced in very limited numbers, as well as historic aircraft. Banner towing does not affect, for example, the strength requirements of the launching hook attachment, but may have an impact on the control characteristics of the aircraft (AIR M2-19, section 3.2).

In connection with the amendment to the Regulation, for reasons of clarity the intention is to repeal aeronautical information service document AIR T2-4, 'Approval of powered aeroplanes for aerotowing' and include the requirements set out therein in the Regulation itself insofar as necessary.

<sup>1</sup> Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (OJ L 212, 22.8.2018, p. 1-122)

The legal basis of the amended Regulation is section 33 of the Aviation Act, according to which, to ensure a sufficient level of air safety, the Finnish Transport and Communications Agency shall issue more detailed provisions on the design, manufacture, equipment, characteristics, and maintenance of aircraft and their devices and parts, and on the content and other organisation of the inspections and tests required for approval based on the standards and recommendations referred to in the Chicago Convention and the principles of the EASA Regulation and Commission Regulations adopted pursuant to it.

Activities contrary to this Regulation may be punishable as transport offences or serious transport offences in accordance with chapter 23, section 1 or 2 of the Criminal Code, as provided in section 175 of the Aviation Act, or as aviation offences under section 178 of the Aviation Act. Under section 178 of the Aviation Act concerning aviation offences, the use of an aircraft or transfer of an aircraft to another person for aviation use in violation of section 34, subsection 2, i.e. if the aircraft is not airworthy or the equipment required for its operation is not properly installed and in working order, is a punishable offence.

The Regulation is notified to the European Commission in accordance with Directive (EU) 2015/1535 of the European Parliament and of the Council laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services. The purpose of the notification procedure is to ensure the functioning of the internal market and to remove unnecessary barriers to trade resulting from technical regulations on products.

## **Preparation of the amended Regulation**

The amendment was initiated by a decision to amend the Regulation published on 14 March 2023. The draft Regulation was produced by the Finnish Transport and Communications Agency as official work. The draft regulation will be released for consultation and stakeholders will have approximately five weeks to submit their statements and comments.

## **Feedback from consultation**

*(To be completed after the close of consultation)*

## **Assessment of the effects of the amendment**

Updating the Regulation would reduce the need for derogations and thus reduce the administrative burden on customers. It would also reduce the workload of the authority caused by the need to grant derogations. Between one and three applications for exemptions related to AIR M2-19 are received each year, requiring 0.5 to 1 man-days of work by airworthiness operations, depending on the need for further clarifications.

The amendment to the Regulation is not expected to have an impact on accessibility, non-discrimination or equality.

## **Detailed rationale**

The revised Regulation combines the necessary elements of both the previous regulation AIR M2-19 and the aeronautical information service document AIR T2-4. The amendments in relation to both these documents are set out below.

*Title of the Regulation:* The term “moottorilentokoneet” (‘engine powered planes’) in the title is changed to “moottorikäyttöiset ilma-alukset” (‘powered aircraft’) since in addition to traditional piston engine aircraft, powered sailplanes and ultra-light aircraft can also be used as towing aircraft. In principle, it would also be possible to tow a rotor kite with a powered autogyro.

*Section 1, Scope:* For the sake of clarity, the term “suomalaiset” (‘Finnish’) has been changed to “Suomessa rekisteröityt” (‘registered in Finland’). The term “moottorilentokoneet” (‘engine powered planes’) has been changed to “moottorikäyttöiset ilma-alukset” (‘powered aircraft’) for the same reason as in the title. In addition, the scope of the Regulation is limited to apply only to aircraft falling outside the scope of Annex I of the EASA Basic Regulation or outside EU regulation due to other provisions. These include aircraft assembled by amateurs, experimental and ultra-light aircraft, historic aircraft, as well as ultralight aircraft with an increased weight limit in accordance with Article 2(8) of the EASA Regulation. Technical requirements for launching hook attachments for aircraft subject to EU regulation are included in the European Union Aviation Safety Agency EASA’s publication *Certification Specifications, Acceptable Means of Compliance and Guidance Material for Sailplanes and Powered Sailplanes* (CS-22).

Contrary to the previous Regulation, the scope no longer refers only to the towing of sailplanes, but to towing in general. This is because, in principle, the provision is also intended to apply to banner towing. Banner towing does not affect the strength requirements, but may have an impact on the control characteristics of the aircraft. Unlike the towing of sailplanes, banner towing is considered to be aerial work and is not permitted with ultra-light aircraft, recreational aircraft or autogyros without an exemption in accordance with OPS M2-11, section 12. However, towing is permitted for experimental aircraft referred to in Annex I to the EASA Regulation and historic aircraft.

This section also specifies that this Regulation does not apply to gliders specified in section 9, subsection 2 of the Aviation Act such as weight-shift controlled ultralight aeroplanes or powered parachutes; gliders with a structural mass of no more than 80 kg for single-seaters or 100 kg for two-seaters; any other aircraft that has a structural mass of no more than 70 kg including fuel. Requirements for such aircraft are included in the separate glider regulation OPS M2-9. The Regulation also does not apply to unmanned aircraft.

*Section 2, Approval of an aircraft for aerotowing:* The requirements from sections 1 General and section 2.8. Annex to flight manual of the Regulation to be repealed have been moved to a separate section. The content requirements of the aerotowing annex are largely unchanged, but a requirement for the installation and maintenance instructions for towing equipment has been added to section 2.2. These instructions must indicate the main components to be used in the installation and must take into account the maintenance instructions given by the launching hook manufacturer. Performance data relevant to aerotowing such as best rate-of-climb and take-off distance are also required.

By analogy, the regulatory approval under this section and the aerotowing annex to the flight manual or flight handbook are also required for banner towing activities.

Section 2.3 now states that if the towing equipment of an aircraft meets the requirements of EASA standard CS-22 or German ultralight standards BFU or LTF-UL, it is also deemed to comply with the requirements of this Regulation without any further tests or calculations. If necessary, the applicant for approval is responsible for obtaining translations of standards into Finnish, Swedish or English for use in Finnish authority approval.

*Section 3, Technical requirements (section 2 of the Regulation to be repealed):* In section 3.2 on control characteristics, the reference to towing a sailplane has been deleted as the requirement is also intended to apply to banner towing. The air resistance caused by the towed banner may impact the control characteristics of the aircraft, so the aircraft must also be safely under control in such towing operations.

For towing speed, a requirement has been added to section 3.3 that the minimum aerotowing speed and the best-rate-of-climb aerotowing speed shall be determined by test flights. This speed may not be less than 1.3 times the stalling speed of the towing or towed aircraft, whichever is greater. This requirement is the same as in EASA Standard CS-22. Section 3.4 on performance requirements has also been amended to comply with CS-22. Sufficiency of performance can be demonstrated by aerotowing tests, but computational reviews can also be accepted on a case-by-case basis.

In section 3.5, a requirement has been added that generally, in order to determine performance and flight characteristics, a sufficient number of aerotowing tests must be carried out, and a test flight record must be kept. The only exception is a situation where the aircraft already holds a foreign type-certificate according to an acceptable standard (CS-22 or LTF-UL) which includes an approval for aerotowing. During aerotowing tests, at least one test flight must be carried out by towing a sailplane corresponding to the planned maximum mass. The mass of the towed aircraft can be gradually increased as the test flight programme progresses. Testing must also be carried out at different speeds. The previous Regulation required towing at the minimum towing speed, but some of the currently used sailplanes require high towing speeds in addition to this.

In accordance with Regulation AIR M5-10 on ultralight aircraft and Regulation AIR M5-2 on home-built structures, the test flight programme must be presented to the Finnish Transport and Communications Agency. This means no explicit regulatory approval is required for the programme, but if significant deficiencies are identified, the Agency may require it to be amended. The same procedure applies to all aircraft where the launching hook attachment is self-designed and has no prior regulatory approval.

A requirement has been added to section 3.6.1 that the tow release must be of a type approved in accordance with EASA CS-ETSO 2C513 or equivalent, or separately approved by the Transport and Communications Agency. Therefore, as part of the approval of an aircraft for aerotowing, the Agency may, upon application, also accept a self-designed launching hook or accept a hook approved by an authority in another country. Acceptable attachment solutions for the launching hook are presented, for example, in the FAA Advisory Circular No. 43.13-2, Chapter 8.

Section 3.6.2. sets out the strength requirements of the launching hook. They were previously defined according to the weight of the heaviest sailplane approved for towing, so that the launching hook had to be able to withstand 2 times the weight of the sailplane at forces affecting a rearward cone-shaped area in line with the longitudinal axis of the aeroplane, where one half of the cone's centre angle is 20°. As the average weight of sailplanes increases, the requirement has proved inappropriate and repeated exemptions have had to be granted. For this reason, the alternative strength requirement has been defined as 1.5 times the maximum strength of the weak link, which is in line with EASA equipment standard CS-ETSO. The 20° cone required by the FAA Advisory Circular 43.13-2B, and corresponding to the requirement of the previous Regulation, was chosen as the directions of force application, which will also allow future approval of FAA-compliant launching hook attachments. The EASA CS-22 standard has a stricter requirement, however, according to which the directions of force applied are 40° upwards and 30° sideways. The second option, if there is no restriction on the maximum strength of the weak link, is to apply as a requirement 1.2 times the maximum permissible weight of the towed or towing aircraft, whichever is lighter. This corresponds to FAA AC No: 43.13-2B.

In addition, it is stated that the strength test of the mounting parts of the launching hook is only required if the launching hook attachment does not have previous approval.

By appropriate size and shape of the release lever referred to in section 3.6.4 is meant that it must be ensured that the required force can be achieved. The recommended shape is a T-shaped lever of sufficient size. The section also specifies that it must be possible to operate the release lever with the same hand as the throttle. Therefore, if the control stick is at the centre, the release lever should be to the left, so that the pilot does not need to remove their hand from the controls for release.

The release force of the lever is usually available from the manufacturer of the lever. When the release force of the lever is known, it is possible to estimate the required release force in the cockpit based on the geometry of the release lever. If the release cable does not travel in a straight line, the cable may “dig” into the bend in the cable guard which may significantly increase the required force. In these cases, the test load of the release cable system alone must be sufficient to ensure that the maximum permissible release force is not exceeded.

Section 3.6.5. of the Regulation to be repealed on recording the launching hook attachment in the aircraft’s technical logbook and recording the change resulting from the installation on the weighing certificate has been deleted. These matters are currently laid down in regulation AIR M1-5 “Maintenance, airworthiness management and modification requirements of aviation equipment”. According to section 3.1 of said regulation, the technical records must include the identification, installation, removal and maintenance data of the aviation equipment. According to section 8.4.1, point (b) of the same Regulation, the aircraft must be weighed after maintenance, repairs, modifications and version changes, the impact of which on mass and centre of gravity cannot be accurately calculated. The installation of a launching hook is also a modification.

An indicator for the critical temperature determined in cooling tests has been added to the equipment requirements of section 3.7 as an alternative to a cylinder head temperature indicator. The addition has been considered necessary because in a liquid-cooled engine the coolant temperature is more critical than the cylinder head temperature and the amendment also takes into account electric motors. A camera display has been added as an alternative to rear-view mirrors, from which the towed aircraft is continuously visible in all required positions without the need for the pilot to significantly turn their head.

*Section 4, Validation of foreign approvals:* A new section allowing the validation upon application of approvals issued by a German or Czech authority or an organisation authorised by them. The acceptable standards can also be validated in accordance with AIR M5-10 “Airworthiness and manufacture of ultralight aircraft”.

*Section 5, Derogations:* A section allowing derogations has been added. The wording of this section is identical to that of Regulation AIR M5-1 on the airworthiness of home-built aircraft.

The list in Annex 1 to the aeronautical information service document AIR T2-4 of aircraft types which can be considered to meet some of the requirements set out in AIR M2-19 has been deleted because type-certified aircraft are not as a rule covered by this Regulation but fall within the scope of EU regulation. Aircraft complying with this Regulation are subject to individual approval for aerotowing operations.

The model aerotowing annex provided in Annex 2 to AIR T2-4 is not published as an annex to the Regulation, but as separate guidance or can be provided as required upon request. In this way, the Regulation only contains mandatory requirements, and any guidance material and model documents are published or provided separately.

**Timetable for the Regulation**

The revised Regulation is planned to be issued in autumn 2023.

**Communications on the regulation**

Information on consultation and the finished Regulation will be notified by e-mail to the subscribers to the list regarding aviation regulations and on the website of the Finnish Transport and Communications Agency. The final Regulation will be published in the Finlex online legislative database and in the set of national aviation regulations on the Agency website. Those who have subscribed to the aviation regulation email list will be informed of the change in the Regulation and the information will be published on the Agency's website. In addition, targeted communication will be made to training organisations providing aerotowing training.

**ANNEXES:**

Summary of statements *(to be added after statements are received)*