Comment				Comment summary	Suggested resolution	Comment is an observation or is a suggestion*	Comment is substantive or is an objection**	EASA comment disposition	EASA response
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1	ALEXANDER SCHLEICHER GmbH & Co. SEGELFLUGZEUGBAU	All	All	CS-E does not cover electric motors so far, so the aim of the proposed special condition is the certification of an electric propulsion unit (electric motor and power electronics) according CS-E. This would allow the installation on CS-22 powered sailplanes too. For the installation of electric power-plants on CS-22 aircraft already SC-22.2014-01 "*Installation of electric propulsion units in powered sailplanes*" and SC E-01 "*Airworthiness Standard for CS-22H Electrical Retractable Engine to be operated in powered sailplanes*" are existing.	A reference to these existing special conditions is missing in the new proposed special condition. Further, it should be stated that the new proposed special condition is independent of the existing ones. This means, there will be two ways for the certification of electric propulsion units for CS-22 aircraft: via the existing special conditions only applicable to CS-22 aircraft or via the new proposed special condition valid also for LSA, VLA and CS-23 Level 1. This coexistence is not new as the same exists for combustion engines as well (CS-E certified engines and CS-22H certified engines). This is reasonable, as the requirements for CS-22H are much lower than for CS-E (mainly because in case of an engine failure a CS-22 aircraft can be operated as pure glider, which is a normal operation mode and no emergency).	Yes	No	Agreed	Existing special condition EA-42 "Airworthiness Standard for CS-22H Electrical Retractable Engine to be operated in Powered Sailplanes" is added to the final version. The title has been changed to ensure that there is no overlap between the SC E-18 and the EA-42 "Airworthiness Standard for CS-22H Electrical Retractable Engine to be operated in Powered Sailplanes"
2	ALEXANDER SCHLEICHER GmbH & Co. SEGELFLUGZEUGBAU	All	All	Another point, which should be critically scrutinised, is the use of non-public standards for basic requirements. It is accepted and understood that certain standards used also for certification of aircraft are non-public (not at least this applies to all the DIN standards). This was limited to technical details in the past, but it is observed that recently also the basic requirements for an aircraft or propulsion are hidden in ASTM-standards, for instance. This might be okay for larger aeroplanes as their certification bases are quite complex anyway and only a few stakeholders are involved in certification. In case of small aircraft this is much more problematic as lots of small companies, several authorities over the world and even private persons have to work with these standards. For all of them it is much more transparent if at least the basic requirements are public accessible for everyone. Further, smallcompanies struggle already in following the official EASA rulemaking processes. An additional engagement in several working groups developing these additional standards is often not possible. Finally, this leads to the situation that even the basics for certifying small aircraft are more and more hidden for the "small general aviation community". Thus, the community has no possibility anymore to inform itself or to scrutinise the requirements or aircraft designs.		Yes	No	Noted	This topic is part of a wider reflection and should be addressed outside the scope of this special condition. To be noted: a proposed SC E-19 has been published: this SC should also cover sailplane propulsion. This proposed Special Condition is a self-supporting document.
This SC 3	*European Gliders Manufacturer association &* *VERBAND DEUTSCHER SEGELFLUGZEUGHERSTELLER E.V.*	1	1	**General – name of the SC** Older / other SC have some document number / abbreviated name, making referencing the document much easier. (E.g. the new SC E-19 about Electric / Hybrid Propulsion Systems).	We propose to give a similar name here as well, e.g. SC-EPU-01 and to include this in the upper right corner of the document under "Doc. No.". In the following within this memo we will use this proposed name SC-EPU-01 to refer to the said document.	Yes	No	Agreed	A specific reference has been added: SC E-18 The title has been changed to ensure that there is no overlap between the SC E-18 and the EA-42 "Airworthiness Standard for CS-22H Electrical Retractable Engine to be operated in Powered Sailplanes"

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4				**General – other already existing SC** Within the given scope of EPU for the categories CS-22 / CS-LSA / CS-VLA / CS-23 (Level 1) there are already some special conditions existing and published by EASA. It is understood, that SC-EPU-01 addresses especially engines, which want to use the CS-E together with ASTM F3338-18, whereas the other / older SC have another context. Nevertheless, it would avoid confusion to cite the other / older SC and perhaps also to include some context. Last but not least it would be important to clarify, that these other / older documents still do exist and could be applicable as well.	Text proposal: *"Beside SC-EPU-01, other SC exist to cover electric propulsion . these are:* *SC-22.2014-01 - Installation of electric propulsion units in powered sailplanes* *SC-LSA-15-01 - Electric Propulsion Powerplant for CS LSA airplanes* *These SC offer alternative airworthiness requirements and could be applicable within their* *scope as well."*	Yes	No	Agreed.	Existing special condition EA-42 "Airworthiness Standard for CS-22H Electrical Retractable Engine to be operated in Powered Sailplanes" is added to the final version. The title has been changed to ensure that there is no overlap between the SC E-18 and the EA-42 "Airworthiness Standard for CS-22H Electrical Retractable Engine to be operated in Powered Sailplanes"
5				**General – reference to non-public documents (ASTM / EUROCAE / RTCA)** The SC-EPU-01 references some documents which are available only by purchasing these from the regarding organisations, like ASTM / EUROCAE / RTCA. It is understood, that for an applicant who wants to use these documents for showing of compliance this approach might be considered just and reasonable, as this similar to use ETSO or the new CS-23. Nevertheless, for the purpose of commenting a SC open for consultation this is not feasible. More or less forcing the possible future applicant to buy these standards upfront just to comment the SC is simply out of proportionality. Either EASA establishes a system, where relevant excerpts of these documents may be made available for commenting (perhaps with an additional watermark to prevent unsolicited further use or EASA should abstain to incorporate such documents and develop airworthiness requirements as is the case with the CS (certification specifications) openly published by EASA.		Yes	No	Noted	This topic is part of a wider reflection and should be addressed outside the scope of this special condition. To be noted: a proposed SC E-19 has been published: this SC should also cover saiplane propulsion. This proposed Special Condition is a self-supporting document.

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6				**General – applicability range / safety continuum** As indicated with the headline, this SC-EPU-01 shall be used for engines to be installed into aircraft for the categories CS-22 / CS-LSA / CS-VLA / CS-23 (Level 1). This is exactly the niche, where engines certified according to CS-22H could be used. Of course it would always be acceptable to use "better" engines (i.e. certified to standard / specifications which require more), but the CS-22H requirements are considered to be sufficient. Historically, this is rooted into the fact, that an engine failure in a powered sailplane is nor hazardous or catastrophic effect, as this type of aircraft may continue safe flight as a sailplane and/or is always technically able to conduct a safe landing outside of an airfield. This leads for example to the possibility to install only a single-circuit ignition system into an engine according to CS-22H. With SC-EPU-01 now much higher standards are put into these aircraft categories through the backdoor of using essentials parts of the CS-E certification philosophy and/or ASTM 3338-18 and/or DO-178. While it is laudable to offer the proposed special condition to allow now also electric motors it must not lead to the misunderstanding that in the niche for CS-22H engines now such much more onerous requirements are the new minimum standard.	At least it should be pointed out that this SC-EPU-01 is mostly addressing engines which would normally aim for certification according to CS-E or ASTM 3338-18 but that it is not replacing use of CS-22H.	Yes	No	Noted	The title has been changed to ensure that there is no overlap between the SC E-18 and the EA-42 "Airworthiness Standard for CS-22H Electrical Retractable Engine to be operated in Powered Sailplanes"
7			2	**Engine requirements – using "probability of failure" as basis for engine certification** Within CS-22H the main approach is to develop an engine, to demonstrate the suitability under certain test conditions (e.g. cooling requirements, power range) and to demonstrate a minimum of 50 hours of safe operation. The whole approach of conducting an extensive failure hazard analysis resulting into failure probabilities and assessing each and single possible failure mode is the approach taken by larger engine certification codes. Es commented with the comparison to CS-22H we point out that this approach is laudable, but especially for the range of aircraft given, this approach should not be established to be the minimum requirement but a possibility to get a "better certified engine fulfilling more than needed". Please consider the relative low margin offered economically by this product range, especially when considering power ranges in the 15 to 50 kW range, where a too onerous certification regime make development simply non-feasible any more. (And therefore CS-22H engines are only possible to be installed in this range of aircraft.)		Yes	No	Noted	The title has been changed to ensure that there is no overlap between the SC E-18 and the EA-42 "Airworthiness Standard for CS-22H Electrical Retractable Engine to be operated in Powered Sailplanes"

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8			3	**Software requirements – using "Software Development Assurance" as basis for engine certification** Similar to the preceding comment, again a new minimum is established by requiring Software Development Assurance using ED-12 or DO-178 standards for the software development. Again, this is laudable and technically certainly higher evolved than the often self-developed software found in existing electric propulsion systems of sailplanes certified according to CS-22H. But again, this should not be misunderstood, that this minimum standard has now to be used on all electric engines used within the CS-22H aircraft range, because the companies developing these products are often small and have not the possibility to fulfil this onerous technical requirement.		Yes	No	Noted	The title has been changed to ensure that there is no overlap between the SC E-18 and the EA-42 "Airworthiness Standard for CS-22H Electrical Retractable Engine to be operated in Powered Sailplanes"
9				**Cooling system – synchronisation with aircraft airworthiness requirements** When developing and certifying a propulsion system for a powered glider, the CS-22H and other parts of the CS-22 already address cooling systems – might they by air-cooled or using liquid coolants. Therefore, care should be taken in the wording of SC-EPU-01 to prevent duplication of requirements or even worse establishing parallel but slightly differing requirements for the same items. This will complicate the showing of compliance and defining proper test sequences during the certification process.		Yes	No	Agreed	The scope of the SC E-18 now excludes the aircraft cooling system.
10				**General – use of established contacts to external experts regarding powered sailplanes propulsion systems** EASA has already established long-standing contacts into international groups regarding possible development of certification requirements on sailplanes and their propulsion systems. A good example is here the cooperation with the Ostiv Sailplane Development Panel, which even had the last meeting at the EASA premises in Cologne last fall of 2019. Beside the public consultation of the SC-EPU-01 it would be certainly helpful for all concerned to discuss this document there as well at this could easily address a wide range of persons and organisations which are already experienced with the development, installation and operation of electrically powered sailplanes.		Yes	No	Noted	The title has been changed to ensure that there is no overlap between the SC E-18 and the EA-42 "Airworthiness Standard for CS-22H Electrical Retractable Engine to be operated in Powered Sailplanes"

* Please complete this column using the word "yes" or "no"
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