



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: Approved Model List Supplemental
Type Certificate (AML-STC)

Date: 08/16/2013

AC No. 20-180

Initiated by: AIR-110

Change:

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- 1. Purpose.** This advisory circular (AC) provides guidelines to obtain approved model list (AML) supplemental type certificate (STC). This AC is not mandatory and does not constitute a regulation. It describes an acceptable method, but not the only method to obtain an AML-STC. You may use an alternate method if you establish that it adequately meets the requirements. However, if you use this AC to obtain approval, you must comply with all of its provisions.
 - 2. Applicability.** This AC applies to all certificated aircraft and rotorcraft. You can also apply this AC to engines and propellers using the same method of approval. It is effective on the date of issuance for new applications for AML-STC projects and is not retroactive to previously-issued AML-STCs.
 - 3. Reference Documents.** For related information, refer to Federal Aviation Administration (FAA) Order 8110.4 - *Type Certification*; Title 14 of the Code of Federal Regulations (14 CFR) part 21 - *Certification Procedures for Products and Parts*; AC 20-158 - *The Certification of aircraft Electrical and Electronic Systems for Operation in the High-Intensity Radiated Fields (HIRF) Environment*; AC20-136B - *Aircraft Electrical and Electronic System Lightning Protection*; AC 20-155 – *SAE Documents to Support Aircraft Lightning Protection Certification*, and FAA Order 8110.54B - *Instructions for Continued Airworthiness, Responsibilities, Requirements, and Contents*. AC 21-51 - *Applicant’s Showing of Compliance and Certifying Statement of Compliance*.
 - 4. Background.**
 - a.** A standard STC is an approval method for a change in type design that is limited to a single type certificate (TC). An AML-STC is a multi-model approval method that allows a set of compliance data (i.e., type design data and substantiating data) to be designated as “baseline data” that is applicable to various aircraft models. This method of approval may apply to multiple aircraft on the same type certificate data sheet (TCDS), or multiple aircraft on various TCDSs.
 - b.** An AML-STC is intended for installations that are identical or similar and that share baseline data between the models. This streamlines the certification effort by avoiding unnecessary testing and re-submittal of data that is common to more than one model aircraft. If installation variation between models is such that the similarities and baseline data cannot be established, then AML-STC is not the proper method of approval.

5. AML-STC. The AML-STC must comply with the requirements of 14 CFR part 21, subpart E, for the issuance of STCs.

a. The applicability of the baseline data for each model must clearly be established.

b. An AML-STC is issued for aircraft that are type-certificated in the same category (e.g., an AML-STC for an aircraft certificated under 14 CFR part 23 cannot include aircraft certificated under parts 25, 27, or 29. Further, it is recommended that each category of aircraft within 14 CFR part 23 (i.e., normal, utility, acrobatic, and commuter) have a separate AML-STC due to possible differences that may exist in the certification requirements. This depends on the type of modification to the affected area (e.g. structure, powerplant, systems, avionics, etc.). Coordination with the responsible ACO may be required to review the proposed modification and determine whether it is necessary to issue a separate AML-STC to document the specific certification requirement for each category.

c. Compliance with the requirements of section 21.20 and applicable data must be shown for every model on the AML (e.g., type design, substantiating data, and flight manual supplement (FMS)). Whether this data is generated from testing (e.g., flight testing), or re-submitted from a previous approval, substantiation for each additional aircraft model is required. When adding new model(s) or amending an existing model, an AML-STC approval allows the use of previously-submitted compliance data that are applicable without the need for further review. If adding a new model that has differences from the previously-approved models, then further substantiation may be required in order to address those differences. The AML-STC is not meant to be a blanket approval by allowing additional models without further substantiation.

d. The certification basis and amendment level to the areas affected by the modification is established for each model.

e. The modification to the affected area does not create an acoustical change to the type-certificated product per section 21.93(b).

f. The Flight Manual Supplement (FMS) is applicable to each model per section 21.5.

g. The AML-STC may not be suitable for systems that can directly control the aircraft. For example, autopilot installations or similar systems that involve control inputs may require careful design installation, and testing on each proposed model regardless of baseline data shared between them. For these types of installations, there may be serial number specific requirements that have to be assessed on a case-by-case basis. Another example would be an STC for reduced vertical separation minimum (RVSM) equipment, where the model and serial number specific static source error correction curve for RVSM approval is only applicable to a single serial number aircraft.

h. It is important for those who are seeking an AML-STC approval to discuss their plan early with their respective aircraft certification office (ACO). Coordination with the ACO is imperative in order to determine any outstanding issues that may have an impact on a multi-model installation approval.

6. Installation Instructions and Instructions for Continued Airworthiness (ICA).

a. The installation instructions must describe the installation in adequate detail such that follow-on installations are repeatable and result in a consistent and compliant installation for every model when properly followed.

b. For more complex systems, a more detailed set of installation instructions may be necessary. Any suitable format can be used to include a general section with specific model appendices to address individual installation requirements. The key is to provide these instructions and alternatives during the certification program as part of the AML-STC approval.

Note: If a particular model has unique and complex installation issues (e.g., how to properly pierce the pressure vessel on composite structure), it may be desirable to seek a new (non-AML) STC approval using existing baseline data plus any additional requirements resulted by the modification.

c. Instructions for Continued Airworthiness (ICA) per 14 CFR 21.50, meeting the requirements of the appropriate (23, 25, 27, 29, 31, 33, or 35) ICA rule is required.

7. Electromagnetic Compatibility (EMC), Lightning, and High Intensity Radiated Field (HIRF) Considerations.

a. The evaluation of EMC, lightning protection, and HIRF protection is becoming more important with integrated avionics systems and composite structure. New HIRF regulations were adopted in 2007, with substantial differences from previously-issued HIRF special conditions. New lightning regulations were adopted in 2011. An installation that did not require HIRF and lightning consideration on one aircraft model may require further examination on another model. An installation that did not require specific lightning protection on an aircraft with aluminum structure may require further examination on an aircraft with significant composite structure. Standardized tests and categories, such as those found in RTCA DO-160, performed for an aircraft may not be appropriate without further evaluation of the specific HIRF and lightning qualification levels for another aircraft model. HIRF and lightning compliance for systems with catastrophic failure conditions may need more extensive compliance substantiation.

b. HIRF and lightning compliance, as well as assumptions made during the functional hazard analysis (FHA) and system safety assessment (SSA) for a particular system may need further substantiation. These items can be aircraft model-dependent, which requires the FAA and the applicant to agree on the method of compliance in addition to continued airworthiness procedures before an AML approval is considered.

c. In locating and integrating external components the electromagnetic compatibility and the lightning effects should be considered. A transmitting antenna or similar systems may create an Electromagnetic Interference (EMI) on a critical system such as Full Authority Digital Engine Control (FADEC) that is mounted in close proximity to the emitter. For external equipment

installations, it may be necessary for the installation instructions to provide a detailed description of the location, and proximity to other components. Further, the structural attachment should identify and substantiate any changes in the structural installation between models (e.g., differences in metallic skin, doubler material and thickness) and lightning protection integration.

Note: For transmitting antenna, or other external equipment installation, it may be necessary for installation instructions to provide a description of the antenna transmitting levels, equipment qualification, and distance to other critical components that demonstrates interference is minimized.

8. Substantiating AML-STC Approval using a Third Party STC. A situation may arise where Original Equipment Manufacturers (OEMs) sell their product (such as Terrain Awareness Warning System) to an aircraft manufacturer or other end users. Those users, through their own certification program, receive a TC or STC using the OEM's product. Subsequently, the OEM attempts to obtain an AML-STC approval referencing the TC and STC numbers of those third parties as their sole method for showing compliance to AML-STC requirements. Simply referencing a third party TC or STC number (e.g., ST016523LA, ST012345SW) without the required compliance data (i.e., type design data and substantiating data) is not acceptable. OEMs are required to submit the compliance data as part of their own AML-STC approval.

9. Type Design Changes.

a. Major changes to an AML-STC are considered major changes to type design and require FAA approval (e.g., models added, existing models amended). When the STC holder decides to add a new model or amend an existing approved model, the FAA or an authorized organization designation authorization (ODA) will oversee the AML project. Minor changes to the AML-STC are typically addressed by certificate management agreements (such as a Partnership for Safety Plan (PSP)), or where the FAA accepts the applicant or certificate holder's internal process for handling such changes.

b. There are instances where the STC holder is not adding a new model to the AML, but makes an upgrade to an existing hardware or component on the AML (such as a software revision). In these instances, careful consideration should be given to ensure that the new revision does not have unintended consequences that affect a prior approval. For example, a software revision may have a new functionality both in aural sound or visual display that requires new flight crew training to recognize the warnings and system failures. This may impact the operational characteristics or limitations of the aircraft. These types of changes may require further evaluation of pilot workload, human factor and other consequences from the revised software.

10. Splitting Models. Splitting models from an AML-STC – or splitting up an AML-STC into individual STCs – is not permitted. AML-STC involves the efficient and expeditious handling of multi-model approvals with minimum redundancy in data submittals. The models share baseline data, which remains applicable to each model through the entire model list. Once this chain is broken, by splitting a model, it requires extensive effort to re-establish the history for the particular model (e.g., compliance data, airworthiness directives, service bulletins, issue papers, and exemptions). Design approval holders who wish to transfer their AML-STC to a third party

(e.g., sell, or change ownership) can do so in its entirety.

11. Configuration Control.

a. Configuration control is a method of tracking all the changes made to an AML. These changes may consist of adding a new model(s) or amending an existing model. In either case, the requirement is to maintain the relevant data for each model in such a way that traceability and commonality between models can be verified.

b. It is recommended that current configuration be captured in some tabulated form in order to accurately maintain the configuration control of an AML. Appendix A of this AC provides a sample AML-STC table that may be used as a template. The columns in the template are optional and can be edited to accommodate a specific project. This type of template can provide valuable information about each installation and its relation to the rest of the models. It captures the most pertinent information for tracking and maintaining the configuration changes as more models are added or existing models amended.

12. Conformity. During the certification program, an FAA installation conformity inspection per section 21.33 is required to ensure that the component conforms to the proposed type design, and that it meets its intended function. There are instances where the addition of a new model introduces changes that were not part of the initial installation conformity. These changes may require new installation conformity that is assessed on a case-by-case basis.

13. Checklist. To pursue an AML-STC approval, the following items are required:

a. Compliance must be shown for the modification to the affected area for each certificated category of aircraft listed on the AML.

b. Model(s) on the AML share the same baseline data.

c. Installation similarities that exist between the proposed model(s) and those areas of the modification that are different from the rest of the models are properly noted.

d. Flight Manual Supplement (FMS) are pertinent to each specific model.

e. Installation instructions are adequate to allow for a consistent and compliant installation.

f. Evaluation conducted to possible impacts to the aircraft operation, type rating and limitations.

g. Evaluation conducted to possible pilot workload and human factors impact by multi-model approval. This may include potential evaluation by the Type Evaluation Board in Aircraft Evaluation Group (AEG) to determine the impact of crew workload and training changes such as normal and emergency crew procedures.

h. ICA are applicable to each model listed.

Note: This list may be expanded if necessary depending on the type of installation and the level of integration into the existing system.

14. Referenced Documents. You can view a list of all referenced ACs at http://www.faa.gov/regulations_policies/advisory_circulars/. You can view FAA regulations at http://www.faa.gov/regulations_policies/faa_regulations/.



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**Appendix A. FAA-Approved Model List (AML) SA01157LA
Installation of Generator XXX**

Item	Make	Model/ Series	Cert basis/ Amendment	TCDS No	MDL / Inst DWG	FMS	ICA	MFG P/N	Model specific notes	Initial Approve Date	Amended Date
1	Boeing	747-400, -D, - F	25-1 through - 8	A20WE	BE 20001 rev A 6/22/12	2300-1 rev B 6/21/12	BE 24000-2 rev A 6/24/12	WEXON Generator WE-200-3	-----		
2	Airbus	340-200, -300 , -500, -600	25-1 through -97	A43NM rev 6	AB 604001 rev B 8/10/11	32021 rev C 7/2/11	AB 54000-1 rev B 10/14/11	WEXON Generator WE-200-3	-----		
3	Gulf	G-IV	25-1 through -56	A12EA rev 23	GF 350012 rev C 6/10/10	45001 rev D 6/15/10	GF 340020 rev C 7/18/10	WEXON Generator WE-200-3 (see note 3)	-----		
4	Bomb	BO-700- 1A10, -1A11	25-1 through -91, 94-97	T00003N Y Rev 16	BO 88000-1 rev B 3/12/09	64201 rev A 3/22/09	BO 22340 rev D 3/30/09	AMETAC Generator AM-145-200	-----		
5	RAY	Hawker 900XP	25-1 through -40	A3EU rev 39	RA 6600-2 rev A 4/20/08	65141 rev A 5/13/08	RA 61230 rev A 5/20/08	AMETAC Generator AM-145-100	A.D See note 1		
6	MD	DC-10, All	1 through - 22	A22W E Rev	MD 286001 rev C 1/25/07	11002 rev B 02/12/07	MD 145230 rev B 03/14/07	AMETAC Generator AM-145-100	SUR See note 2		

T-Transport, **U**-Utility, **N**-Normal, **A**-Acrobatic
SUR-Surrendered, **SUS**-Suspended, **REV**-Revoked

FAA Approved:
Date issued:
Date reissued:

Sample Only

General Notes:

- AD released on 2/20/2009 involves shearing of generator shaft due to premature spline wear (see 2011-TAD061-AD). Corrective action requires shaft replacement with new material called out in the service bulletin 56432. After service bulletin is incorporated the part number is changed from -100, to - 200 indicating post modification.
- Model DC-10, all series were surrendered on 09/23/2010 by the design approval holder. Currently, there are 4 "N" registered aircraft remain in operation with this STC.
- AMETAC Corporation merged with WEXON Company. As a result of the merger, the generator part number was changed from AK-145-200 to WE-200-3. All other technical specifications (i.e., shaft horse power extraction, max current output) and compliance data remains unchanged.

**Appendix A. FAA-Approved Model List (AML) SA01157LA
Installation of Generator XXX****Instructions/Definitions:**

- 1. Make** as indicated on TCDS: in this column input the manufacturer's name (Boeing, Douglas, etc.).
- 2. Model** as indicated on TCDS: in this column input the model of the aircraft and the following series that is applicable. Some installations are model/series specific and should be captured in the AML.
- 3. Certification basis:** in this column input the certification basis and the amendment level for the areas affected by the modification.
- 4. Type Certificate Data Sheet (TCDS):** in this column input the TCDS number and the last revision level.
- 5. Master Drawing List (MDL)/Installation Drawing:** in this column input the applicant's installation drawing (s) or MDL with revision number, whichever is applicable. Generally, applicants use one of these two documents for their configuration control. Other documents are permissible for substitution if it serves the intended purpose for traceability and configuration control.
- 6. Flight Manual Supplement (FMS):** in this column include the supplement section revision level and the approved date to the existing flight manual. There may be multiple supplement sections added to the AFM for each specific model.
- 7. Instructions for Continued Airworthiness (ICA):** in this column input the document number with revision level and the date.
- 8. Component Manufacturer (P/N):** in this column input the manufacturer's name and the part number of the component or any other information deemed necessary to ensure that the installation contains the same component for all models.
- 9. Model Specific Note:** in this column input any information such as Airworthiness directives (ADs) and Service Bulletins (SBs) that is released against the component (only), not the entire aircraft. Input any additional information, limitations or conditions that could be helpful or important to the reviewer in approving the AML.
- 10. Initial Approved Date:** in this column input the initial approved date for each model. This date may be different for each model if the applicant adds models in subsequent order.

**Appendix A. FAA-Approved Model List (AML) SA01157LA
Installation of Generator XXX**

11. Amended date: in this column input the amended approval date (if applicable) of specific model(s).

Note: Start with the latest approved model (i.e., initial approved date) at the top and list previous models in sequential order based on the approved date (2012, 2011, 2010, 2009, 2008, etc.).