



Accreditation Audit Checklist (Version 3.0)

(Based on EASA Std. AR100-2015 and applies for all audits completed after April 1, 2018)

Scope

The EASA Accreditation Program applies only to three-phase, squirrel-cage motors that are repaired in accredited service centers. As such, the scope of the program includes mechanical repairs as well as electrical rewinding.

Audit Record

Company Information

Service Center Name _____

Street Address _____

City, State/Province, Zip/Postal Code/Country _____

Phone _____ Email _____

Company contact for the EASA Accreditation Program

First Name _____ Initial ____ Last Name _____ Title _____

Email _____ Phone _____

Signature* _____ Date _____

Accreditation Audit Approval by EASA-Sanctioned Third-Party Auditor (to be completed by auditor)

(Check one)

- Initial accreditation audit Re-accreditation audit (renewal fee required)
- Internal self-audit – year 1 Internal self-audit – year 2

Auditor Company Name _____

Third-Party (On-site) Audit Date _____ Approval (Anniversary) Date _____

Internal Self-Audit Submission Date _____ Approval Date _____

Auditor's Name (print) _____ Signature* _____

* The auditor hereby certifies that he/she has completed a third-party (on-site) audit of the above-named service center or reviewed its internal self-audit, and that the service center meets all requirements of the EASA Accreditation Checklist in effect as of the stated approval (anniversary) date. By signing this Audit Record, the service center understands and agrees that for its accreditation to remain in effect it must submit internal self-audits that must be approved by an EASA-sanctioned third-party auditor and received by EASA by the accreditation (anniversary) date in years one and two, and that its accreditation will lapse if the approved internal self-audit is not received by EASA within 60 days of the accreditation (anniversary) date. The service center also understands and agrees that another third-party (on-site) audit and payment of the EASA renewal fee are required after three years.

Continues on next page.

Notes

- An EASA-approved third-party auditor will determine conformance to the criteria in each line item of the Accreditation Checklist by reviewing applicable service center documents and observing service center practices on site.
- The auditor will record the audit outcome (“score”) for each item on the service center’s Accreditation Checklist by marking the corresponding check box (first column to the right of “Criteria”) as follows:

S – Satisfactory

U – Unsatisfactory*

N – Not observed**

N/A – Not applicable***

* Description of any unacceptable condition(s) will be provided.

** Applicable mandatory criteria not observed in a prior audit must be observed at the next scheduled audit; the auditor’s comments must also include the reason(s) that the criteria could not be observed.

*** Criteria that do not apply to a specific service center.

- The auditor also will review the service center’s calibration program and the calibration status of associated equipment. (See Annex A for list of equipment that must be calibrated.)
- For each criteria the service center must record all applicable tests and measurements made with calibrated equipment.
- **Audit criteria**

All criteria on the EASA Accreditation Audit Checklist are mandatory. To obtain EASA Accreditation, a service center must submit to an external audit by an EASA-approved third-party auditor and receive a Satisfactory (S), Not Observed (N) or Not Applicable (N/A) score on each checklist item. The symbol Ø indicates a line item that is not audited or a check box that does not require an entry. Any checklist criterion marked “Unsatisfactory” will require Corrective Action (CA) that the auditor will specify and review before accreditation will be granted. Note: Corrective Actions (CA) are measures taken to rectify conditions adverse to motor efficiency and reliability, and where applicable, to prevent repetition.

Outsourcing

Outsourcing of some but not all repair activities is permitted. The outsource vendor must provide documentation to confirm that repairs meet the requirements of this program. If outsourced repair requires measurements or testing, proof that calibrated equipment was used is also required.

Exclusions

Excluded from the scope of the EASA Accreditation Program are specific requirements, certification, and inspection required for listed explosion proof, dust-ignition-proof, and other listed machines for hazardous locations. Also excluded are specific or additional requirements for hermetic motors, hydrogen-cooled machines, submersible motors, traction motors, or Class 1E nuclear service motors.

Service Center–General

A. Housekeeping

	Score	Checklist item
Criteria		Work areas and equipment are clean and orderly, by auditor observation.
Equipment	Ø	N/A

Comments:

B. Training

	Score	Checklist item
Criteria		Internal training of technicians is documented.
Equipment	Ø	N/A

Comments:

C. Internal audits

	Score	Checklist item
Criteria		Annual internal audits are performed and documented.
		Annual internal audit reports are submitted to external auditor for review.
		If applicable, corrective actions for internal audit findings are taken and documented.
Equipment	Ø	N/A

Comments:

Conformance to recommended practices and guidelines

Recommended Practice: ANSI/EASA AR100-2015 [AR100]

Guideline: Good Practice Guide to Maintain Motor Efficiency [GPG]

1. Identification and condition assessment

	Score	Checklist item
Criteria		Original nameplate data of repaired motors is documented; or document if nameplate is not present or illegible.
		Shop order number is permanently marked on motors received for repair.
		Records of each shop order are established and retained for at least 3 years after repair.
		The primary cause of failure is determined, if possible, and documented in the repair record.
		Job records document findings during incoming inspections, such as physical condition, mechanical damage, and evidence of overheating; and customer's reason for repair.
Equipment	Ø	N/A
Source references: AR100-1.3-1.5; GPG 1, 2.7-2.8		

Comments:

2. Terminal leads, connectors and boxes

	Score	Checklist item
Criteria		Terminal leads of completed repairs are labeled.
		Terminal lugs, if so equipped, are properly crimped.
		Size and type of replacement lead wire are documented.
		Terminal box integrity (e.g., not damaged) is checked.
Equipment	Ø	Confirm calibration and functionality of associated equipment.
		Terminal crimpers function checked at least quarterly for wear and proper crimp by service center
Source references: AR100-1.6-1.8; GPG 2.1		

Comments:

3. Cooling system

	Score	Checklist item
Criteria		Fan and fan cover integrity (e.g., not damaged) are checked.
		Check is performed for evidence of damaged or missing cooling system parts.
Equipment	Ø	N/A
Source references: AR100-1.9; GPG 5.5, 6, 7.3.10		

Comments:

4. Shafts

	Score	Checklist item
Criteria		Shaft integrity (e.g., not damaged or worn) is checked.
		Mounting position of the shaft in relation to the leads (e.g., F1 or F2) is noted.
		Initial and, if applicable, after repair shaft dimensions and runout are documented.
Equipment	Ø	Confirm calibration and functionality of associated equipment.
		Outside micrometers
		Dial indicators verified by service center
Source references: AR100-2.1; GPG 2.5, 5.2		

Comments:

5. Bearings (ball, roller; sleeve)

	Score	Checklist item
Criteria		Visually inspect bearings for evidence of fretting, fluting, scoring or other damage.
		As-received, and if repaired, post-repair bearing fit dimensions are documented.
		If repaired, rolling bearing fits are rebuilt to applicable AR100 table size.
		Replacement bearings are equivalent to the original or are better suited to the application; and original and replacement bearing numbers are documented.
Equipment	Ø	Confirm calibration and functionality of associated equipment.
		Inside micrometers (including bore gauges)
		Outside micrometers
Source references: AR100-2.2; GPG 2.3		

Comments:

6. Lubrication

	Score	Checklist item
Criteria		Lubricant used is compatible with the customer's lubricant; and lubricant used by service center is documented.
		In the absence of the motor manufacturer's lubrication instructions, the grease reservoir is filled to approximately 1/3 capacity.
		If motor is oil-lubricated, there is a means to indicate proper oil level.
		If motor is oil-lubricated, check is performed for evidence of lubricant leakage.
Equipment	Ø	N/A
Source references: AR100-2.3; GPG (none)		

Comments:

7. Frame and bearing housings

	Score	Checklist item
Criteria		Frame and bearing housing integrity (e.g., not damaged) are checked.
		Check is performed for evidence of damaged or missing frame or bearing housing parts.
		Parts are match-marked in accordance with service center policy.
Equipment	∅	Confirm calibration and functionality of associated equipment.
		Inside micrometers (including bore gauges)
		Outside micrometers
Source references: AR100-2.4; GPG 2.2, 5.3		

Comments:

8. Squirrel cage rotors

	Score	Checklist item
Criteria		Check is performed for evidence of rotor damage.
		Rotor core is checked for tightness on shaft or spider.
		If repaired, original electrical and mechanical characteristics are maintained. Repair method used is documented.
		Rotor is growler and/or single-phase tested. Test results are documented.
Equipment	∅	Confirm calibration and functionality of associated equipment.
		Growler (functionality)
Source references: AR100-2.5.1, 3.8, 4.3.2; GPG 1.2, 2.6-2.7		

Comments:

9. Balancing

	Score	Checklist item
Criteria		Dynamic balancing of the rotating element is to the level specified by the customer; or in the absence of a requested level, dynamic balance is to ISO quality grade G2.5 or better for machines rated 2500 rpm or slower, and to the level of grade G1.0 or better for machines rated above 2500 rpm. Original and final balance values are documented. Exception: Rotors of shaker (vibrator) motors do not need to be balanced.
		Balance weights are located so as not to interfere with other components.
Equipment	Ø	Confirm calibration and functionality of associated equipment.
		Balancing machine (calibration by service center or outsource firm)
Source references: AR100-2.6; GPG (none)		

Comments:

10. Accessories

	Score	Checklist item	
Criteria		Space heaters are tested for rated current or power at rated voltage and subjected to a ground insulation test.	
		Bearing and winding sensors or protectors are identical with or equivalent to the original devices in electrical and thermal characteristics.	
		Check is performed for evidence of damaged or defective accessory components.	
Equipment	Ø	Confirm calibration and functionality of associated equipment.	
		Ammeter and voltmeter or	Wattmeter
		Megohmmeter or	High-potential tester
		Ohmmeter	
Source references: AR100-2.13, 3.1.2, 3.9; GPG (none)			

Comments:

11. Winding removal and core integrity

	Score	Checklist item
Criteria		Core testing is performed before burnout or other equivalent process, and after winding removal, and the results are documented. Evaluation assessment of core acceptability (watts per lb or kg and temperature rise) is documented.
		Burnout oven has part temperature limited to 700°F (370°C) or less, analog or digital recorder; and water mist system is functional.
		If core test losses increase more than 20% between the before and after winding removal tests, the core is repaired or replaced.
		Parts are oriented and supported in oven so as to avoid distortion.
		Check is performed that core slots are clean and free of sharp edges or particles.
		Core teeth are not splayed (i.e., flared at ends of slots).
Equipment	Ø	Confirm calibration and functionality of associated equipment.
		Temperature meter
		Water mist system (functionality)
		Analog/digital recorder
		Core tester (wattmeter, ammeter and voltmeter integral with tester)
	Ø	or loop test with separate/standalone:
		Wattmeter
		Ammeter
	Voltmeter	
Source references: AR100-2.5, 3.1.1, 3.3, 4.2.6; GPG 3.2-3.4, 5.1, 7.3.2-7.3.4, 7.4		

Comments:

12. Rewind data (specification)

	Score	Checklist item
Criteria		Details of old winding are documented (e.g., EASA Polyphase Winding Data Card).
		Winding data is verified for accuracy.
		Winding changes made to maintain or improve efficiency of a rewound motor are documented.
Equipment	Ø	N/A
Source references: AR100-3.2; GPG 3.1, 4.2		

Comments:

13. Stator windings, insulation system, conductors and coils

	Score	Checklist item
Criteria		Voltage rating and insulation class of winding system are equal to or greater than the original, unless redesigned by agreement with, or at the instruction of, the customer.
		Coil extension lengths are not to exceed original.
		Winding wire cross-sectional area per amp is equal to or greater than original.
		Random coils are wedged with full-length top sticks, and phase insulation is used.
		Form coils are wedged and fit securely in slots; and wedges are tight in wedge grooves.
		Magnetic wedges are replaced with equivalent magnetic wedges.
Equipment	Ø	Confirm calibration and functionality of associated equipment.
		Outside micrometer
		Coil winding machine turns counter (accuracy verified by service center)
Source references: AR100-3.4-3.6, 3.10-3.12; GPG 4.4, 7.3.5-7.3.7		

Comments:

14. Winding impregnation

	Score	Checklist item
Criteria		Windings of rewind motors are preheated, varnish/resin treated and cured in accordance with varnish/resin manufacturer's instructions.
		Bake oven temperature control set in accordance with varnish/resin manufacturer's instructions.
		Varnish is maintenance tested in accordance with manufacturer's instructions. Test results and any maintenance actions are documented.
Equipment	Ø	Confirm calibration and functionality of associated equipment.
		Temperature meter
	Ø	Vacuum pressure impregnation (VPI) process (if applicable):
		Vacuum gauge
		Pressure gauge
Source references: AR100-3.14; GPG 4.6		

Comments:

15. Winding insulation and coil tests

	Score	Checklist item
Criteria		Stator winding insulation resistance is measured, and results are documented.
		Stator winding resistance is measured, and results are documented.
		Stator winding surge comparison test is performed, and results are documented.
Equipment	Ø	Confirm calibration and functionality of associated equipment.
		Megohmmeter
		Ohmmeter or milli-ohmmeter (as applicable)
		Surge tester
Source references: AR100-4.2-4.3; GPG 4.5, 7.4		

Comments:

16. High-potential tests

	Score	Checklist item
Criteria		High-potential test new and reconditioned windings and document results.
		High-potential test accessories of new and reconditioned windings and document results.
		Windings and accessories of windings not reconditioned are insulation resistance tested, and results are documented.
Equipment	Ø	Confirm calibration and functionality of associated equipment.
		High-potential tester
		Megohmmeter
Source references: AR100-4.4; GPG 4.5.3		

Comments:

17. Bearing insulation

	Score	Checklist item
Criteria		If applicable, bearing insulation is insulation resistance tested, and results are documented.
Equipment	Ø	Confirm calibration and functionality of associated equipment.
		Megohmmeter
Source references: AR100-4.2.8; GPG (none)		

Comments:

18. No-load tests

	Score	Checklist item
Criteria		No-load running test using test panel is performed at rated voltage.
		Speed is measured and compared with nameplate speed.
		No-load currents and voltages are measured and documented.
		Vibration levels are measured and documented.
		Evaluation assessment of acceptability is documented (e.g., "OK to ship").
Equipment	Ø	Confirm calibration and functionality of associated equipment.
		Test panel (functionality; instruments calibrated if applicable)
		Voltmeter
		Ammeter
		Digital tachometer (functionality)
		Vibration meter
Source references: AR100-4.5; GPG (none)		

Comments:

19. Finish and handling

	Score	Checklist item
Criteria		Motor is externally clean and painted (if applicable).
		Shaft extensions are treated to prevent corrosion.
		Motor is packed/package suitably for the form of transportation to be used.
		Oil-lubricated motors are shipped without oil, and the need for lubricant is clearly identified.
Equipment	Ø	N/A
Source references: AR100-1.10-1.11; GPG 6		

Comments:

20. Calibration

	Score	Checklist item
Criteria		Proof of current (at least annual) calibration to applicable national standard is available for all applicable instruments.
		Proof of current (at least every 3 years) certification for standards and gauge blocks (if applicable) used for micrometer calibration is available.
Equipment	Ø	All applicable instruments on Equipment List (Note: All applicable are included above)
Source references: AR100-4.7; GPG (none)		

Comments:

Annex A (normative)

Equipment

- Unless noted otherwise, all equipment listed must be on site and functional.
- Except for gauge blocks, all instruments must be calibrated at least annually to applicable national standards. After initial accreditation is achieved, the service center must retain calibration records for a 3-year period, or until the next external audit is performed.
- Verification: Confirming, through the use of objective evidence, that specified requirements have been fulfilled.

Electrical

Milli-ohmmeter
Ohmmeter
Voltmeter (AC)
Ammeter (AC)
Wattmeter (AC)
Megohmmeter
High-potential tester
Surge tester
Core tester [1]
Loop test [1]
Growler (functional)
Test panel (to motor rated voltage; individual instruments calibrated)

Mechanical

Inside micrometers
Outside micrometers
Dial indicators (verification by service center)
Digital tachometer (verification by service center)
Terminal crimpers (verification by service center)
Vibration meter
Balancing machine [2]
Gauge blocks (if applicable) [3]

Physical

Temperature meters
Burnout oven part temperature control
Burnout oven analog or digital recorder
Burnout oven water mist system (verification by service center)
Bake oven temperature control
Winding machine with turns counter (verification by service center)
VPI system vacuum gauge [4]
VPI system pressure gauge [4]

Notes

- [1] Must have either one or both of these items
[2] Outsourcing permissible
[3] Periodic verification by gauge block manufacturer or other qualified external source.
[4] Only applies if service center has VPI system (VPI process outsourcing permissible)