

BFA Hot Air Balloon Repairman Training – Repair Shop Certification

INTRODUCTION

Ballooning has grown to its present state with the guidance of the BFA and all its offerings to pilots, crew, and other members. Now comes the recognition of the importance of repair station training for anyone wishing to join the work of maintenance, repair, and rebuilding hot air balloons. There are many excellent repair stations in the United States. You may find their listing on the BFA website. The issue we wish to address in this document is how one starts in this profession of Balloon Maintenance. Most owners and repairers in current repair stations have paid the price of following others around, learning on the job, and complying with the FAA regulations to obtain their Repairman Certificates and Repair Station Certificates for hot air balloons.

Most hot air balloon repair stations have been around for decades. Starting from scratch is a complex and time-consuming task. Many new shop owners are those who can find a repair station owner who wants to retire and is willing to train someone to take their place. This may be the easiest way to obtain a repair station. There is also the option that you can find a repair shop owner who is willing to open a satellite repair station. If the repair station has a “work away from” clause in their manual, they would be able to set someone up in a new location that may be lacking in balloon maintenance services. This would give you and the original owner additional income as the process is worked out. This option is also time-consuming but may be easier than starting from scratch. The best course of action will depend on your available resources and how much time you will devote to the effort.

This do-it-yourself approach is a significant effort. Other than the Manufacturers Maintenance Seminars, there is very little formal training. This document is not that formal training. The intent is defined in the MVV (Mission, Vision, and Values) statement in this document. If there is sufficient interest in the BFA for proper training, perhaps a course will be built. This document is an all-in-one guideline to help you understand the requirements and process for obtaining your FAA Repairman and Hot Air Balloon Repair Station certificates.

Like in all of Aviation, we find that our numbers are dwindling. When you count the number of pilots today versus in the 80s and 90s, our numbers in 2021 are half what they were 30 or 40 years ago. We have many programs in place to encourage young people to become pilots. There is nothing in place to help and promote repairmen. Whether a pilot or crew, you can become a repairman with passion and drive.

To support the hot air balloon industry, we will need repairmen working in repair shops across the country. As more and more repair station owners retire, more repairmen will need to take their places. If ballooning grows to numbers like 30 years ago, we will need many more repairmen. It will be in everyone’s best interest to encourage the training of more repairmen for the future of ballooning.

The BFA wishes to offer the aspiring repairman an organized approach to finding all the available resources and qualifications you must achieve as quickly as possible. We provide direct links to the major manufacturer’s websites for specific brand instructions and requirements. We hope to save you the effort of having to discover by yourself the things you must do. We expect the

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journey is rewarding, and this guideline will help you become an active repairman and a sustaining member of the BFA.

The Guideline slogan is “all balloons with a Standard Air Worthiness Certificate are safe and worthy of our complete support.” Brand-specific comparison is not a part of this Guideline.

We have provided links to much of the documentation in this manual, so if you desire, you may check out the source and authenticity of the information provided. As a living document, if you find any errors, misquotes, or essential new additions to be incorporated, please contact the BFA for changes or updates.

The phrase repairman in the context of this document is gender neutral. There is no intention to be exclusionary, discriminatory, or political. We hope any able person wishing to become a repairman may do so. Let’s move on.

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MISSION, VISION, AND VALUES

Mission

Our Mission is to stimulate interest in Hot Air Balloon maintenance and repair. A BFA Repairman Manual will provide an easy-to-follow training guideline for achieving the FAA Repairman Certificate. The BFA recognizes the importance of balloon repair and proper training by providing a structured outline of that activity. We hope to interest those who wish to learn more about balloons and their continued airworthiness requirements. We offer an essential resource to achieve your ambitions of becoming a certified Hot Air Balloon repairman.

Vision

By interesting more individuals in balloon maintenance, we aim to improve the number and quality of maintenance specialists and facilities to support the sport. Balloonists will have easier access to repair facilities and staff by training more skilled workers. As a part of the BFA educational offerings, this document will provide a sturdy foundation for building skills and knowledge in maintaining balloons.

Values

Our most important contributions to Hot Air Ballooning are Safety. All accidents are preventable. The activity of Hot Air Balloon Maintenance is all-inclusive. Anyone may achieve the certification through proper training and sufficient effort. Many current repair stations will welcome you for training. You may wish to open your repair shop. The BFA will help you in any direction you want to go.

TRAINING

Recognizing training is essential to obtain and maintain the necessary skills to provide inspection, repair effectively, and maintenance services for Hot Air Balloons. “Where do I get trained?” is a reasonable question. Training in Hot Air Balloon Repairs is not a well-organized activity in 2022; The only organized training comes from the Manufacturers; perhaps this will change. There are some very excellent Manufacturers Seminars.

We also have access to very skilled individuals in repair shops who have shared their craft with most practicing repairmen over the years. A Facebook group shares its knowledge on all issues that arise. The social side of Hot Air Ballooning is healthy and active. It is good to be engaged in this small group of specialists to find ways to resolve repair and service issues. There is talent available. As stated earlier, this manual aims to help aspiring repairmen become trained and join the many who are repairmen. You will be glad you did. The purpose of this document is to make the task of obtaining knowledge and skills a one-stop shopping experience. All you need to know to get started is listed below.

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PART 43 - MAINTENANCE, PREVENTIVE MAINTENANCE, REBUILDING, AND ALTERATION <https://www.ecfr.gov/current/title-14/chapter-I/subchapter-C/part-43>

This regulation covers the applicability and conditions of repairs and maintenance. Your customers may ask you if they may perform some work on their balloon. Suppose the customer wishes you to do the job, all well and good. It is embarrassing and unsuitable for business if the customer finds you doing work and charging them for your time when they should have the option to do maintenance before your shop does the job.

Records for maintenance and repair are required and will be audited by the FAA Inspectors. Your shop must have complete, accurate files and documents of all work performed and billed to the customers. A Work Order form must always be used to record the detail of all work performed with parts included. There are as many different Work Order (WO) layouts as Repair Stations. There is no prescribed style or design, but many included items. The form offered in the appendix is one of many. You may copy this design and change it to fit your logo, address, serial numbers, etc. Spend some time getting this right. It is inconvenient to have to update this form continually. You will leave an impression on the customer of how well you present the data on the WO and endorsement. Several shops do a very professional job, and some are so casual as to be hard to read. It is your reputation.

The FAA describes the standards of disassembly, cleaning, repair, and replacement of parts to be achieved before any work may be endorsed in a logbook or record. It is incumbent on you to find out what is required in balloon maintenance conformance to requirements. Each Manufacturer has a Continued Airworthiness Manual (CAM). The repair procedures of their balloons are described in detail as how to repair and maintain each balloon. The annual inspection checklists provided by each Manufacturer are also required to be completed as part of the Annual Inspection process. You must keep a copy of this completed document. The best place to learn brand-specific techniques is to attend the several maintenance seminars produced by the balloon manufacturers. Call the Manufacturers' offices and inquire when to sign up. You will discover things in these group sessions with other maintenance specialists that you will never realize working in one shop with only a few people around you. Also, join the balloon maintenance groups available on the internet. Read and stay current. Several very skilled balloon repairmen are happy to discuss any issue you may have. They are reachable via social media. Check out the various groups. You will be glad you did.

The regulations in 14CFR Part 43.3 specify persons authorized to perform maintenance, repair, and inspection. Pilots may do some preventive care that non-pilots may not. Much of this regulation section contains statements that do not pertain to balloons. They do not apply to you. It is good to read this, but you will quickly become glazed over from disinterest. Be sure you do not miss any balloon-centric regulations. 14CFR Part 43.3 describes what work is considered maintenance, preventive maintenance, rebuilding, alterations, and who is authorized to perform that. If your customer wants to perform certain types of preventative maintenance (mostly considered not to require complex disassembly), they must do so by the manufacturer's recommendations. Any work done by the aircraft owner can "return to service" with a simple logbook entry. It will have to be redone if the work is not done to the manufacturer's specific instructions. Suppose a pilot is capable of complex repair but does not hold a repairman certificate. In that case, they must perform the work under the supervision of a mechanic or repairman certificate holder. The item serviced must be tested after the inspection, maintenance, or repair is

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complete. The work must be described in the Balloon Logbook with all copies of the WO, the endorsement, and the parts tags retained in the repair station files.

[§ 43.7 Persons authorized to approve aircraft, airframes, aircraft engines, propellers, appliances, or parts for return to service after maintenance, preventive maintenance, rebuilding, or alteration.](#)

Part 43.7 regulates who is authorized to approve items returned to service. It is detailed for Fixed-wing aircraft, but a certified repairman and the responsible Manager may endorse any work done in a Certified Balloon Repair Station. Please read these portions of the 14CFR; you will develop an appreciation for how the regulators' view balloons.

[§ 43.9 Content, form, and disposition of maintenance, preventive maintenance, rebuilding, and alteration records](#) (except inspections performed by part 91, part 125, § 135.411(a)(1), and § 135.419 of this chapter).

Part 43.9 discusses the disposition of the records after work on balloons is completed. If you plan on setting up a repair station, you will be steeped in this subject. The FAA lives on paperwork, as they should. The FAA will review your records to ensure you comply with the regulations. You will need to set up your records system in a way that makes sense to you but also keeps everything in order and easy to find using the 14CFR guidelines. Your paperwork must: be accurate, correct for the work being performed, and easy to read. They must be in perfect order.

Each item maintained, repaired, or replaced must be recorded, including 1) A description of the work, 2) The date of completion of the work performed, 3) The name of the person performing the work, 4) and if the work has been performed satisfactorily by returning the item to service. Balloons are not very complex aircraft, so the documentation required is commensurate with meeting the requirements of items 1 through 4 in this paragraph.

The person approving or disapproving for return to service an aircraft shall make an entry in the maintenance record of that equipment containing the following information:

- (1) The type of inspection and a brief description of the extent of the inspection.
- (2) The inspection date and aircraft's total service time.
- (3) The signature, the certificate number, and the kind of certificate held by the person approving or disapproving for return to service of the aircraft,
- (4) If the aircraft is found to be airworthy and approved for service return, the following or a similarly worded statement - "I certify that this aircraft has been inspected by (insert type) inspection and was determined to be in airworthy condition."

If the aircraft is not approved for return to service because of needed maintenance, noncompliance with applicable specifications, airworthiness directives, or other approved data, the following or a similarly worded statement - "I certify that this aircraft has been inspected by (insert type) inspection and a list of discrepancies and unairworthy items dated (date) has been provided for the aircraft owner or operator."

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§ 43.10 Disposition of life-limited aircraft parts.

Definitions are used in this section. or this section, the following definitions apply.

Life-limited part means any part for which a mandatory replacement limit is specified in the type design, the Instructions for Continued Airworthiness, or the maintenance manual.

Life status means the accumulated cycles, hours, or any other mandatory replacement limit of a life-limited part. There are some life-limited parts you must be aware of. Hoses for most manufacturers must be replaced every 9 or 10 years, depending on the manufacturer's requirements. Some O-rings and copper gaskets may or may not have to be replaced annually. Again, you must refer to the applicable manufacturer's Continued Airworthiness Manual for that balloon.

Maintenance records: Falsification, reproduction, or alteration. § 43.12

(a) No person may make or cause to be made:

(1) Any fraudulent or intentionally false entry in any record or report that is required to be made, kept, or used to show compliance with any requirement under this part.

(2) Any reproduction, for a fraudulent purpose, of any record or report under this part; or

(3) Any alteration, for a fraudulent purpose, of any record or report under this part.

(b) The commission by any person of an act prohibited under paragraph (a) of this section is a basis for suspending or revoking the applicable airman, operator, or production certificate, Technical Standard Order Authorization, FAA-Parts Manufacturer Approval, or Product and Process Specification issued by the Administrator and held by that person.

Performance rules (general). § 43.13

(a) Each person performing maintenance, alteration, or preventive maintenance on an aircraft, engine, propeller, or appliance shall use the methods, techniques, and practices prescribed in the current Manufacturer's maintenance manual or Instructions for Continued Airworthiness prepared by its Manufacturer, or other forms, procedures, and practices acceptable to the Administrator, except as noted in § 43.16. He shall use the tools, equipment, and test apparatus necessary to assure completion of the work by accepted industry practices. If special equipment or test apparatus is recommended by the manufacturer involved, he must use that equipment or device or its equivalent acceptable to the Administrator. Using the proper tools will make your job easier. You can either purchase specialized tools, or you may create your own.

(b) Each person maintaining or altering, or performing preventive maintenance, shall do that work in such a manner and use materials of such a quality that the condition of the aircraft, airframe, aircraft engine, propeller, or appliance worked on will be at least equal to its original or appropriately altered condition (about aerodynamic function, structural strength, resistance to vibration and deterioration, and other qualities affecting airworthiness) The text cited above applies to Balloons and Fixed Wing Aircraft maintenance.

Manufacturers advise Repair Stations to use their fabrics and aircraft parts for repair and alterations. You can use other materials if you can prove these materials are of equal value through documentation.

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§ 43.15 Additional performance rules for inspections

(c) Annual and 100-hour inspections.

(1) Each person performing an annual or 100-hour inspection shall use a checklist while performing the inspection. The checklist may be of the person's design, provided by the manufacturer of the equipment being inspected, or obtained from another source. This checklist must include the scope and detail of the items in appendix D to this part and [paragraph \(b\)](#) of this section.

Most manufacturers will have an Annual and 100-hour inspection checklist available for you. This is the best way to ensure you complete the tasks required to maintain that equipment. Making up your checklist is also acceptable if it is acceptable also to your FAA Primary Maintenance Inspector (PMI).

Appendix A to Part 43 - Major Alterations, Major Repairs, and Preventive Maintenance

Preventive maintenance is limited to the following work, provided it does not involve complex assembly operations:

- (5) Replacing defective safety wiring or cotter keys.
- (6) Lubrication not requiring disassembly other than removal of nonstructural items such as cover plates,
- (7) Making simple fabric patches not requiring rib stitching or the removal of structural parts or control surfaces. In the case of balloons, making minor fabric repairs to envelopes (as defined in and per the balloon manufacturers' instructions) does not require load tape repair or replacement.
- (8) not included.
- (9) Refinishing decorative coating of balloon baskets when removal or disassembly of any primary structure or operating system is not required.
- (10) Applying preservative or protective material to components where no disassembly of any primary structure or operating system is involved and where such coating is not prohibited or is not contrary to good practices.
- (11) Repairing upholstery and decorative furnishings of the balloon basket interior when the repairing does not require disassembly of any primary structure or operating system or interfere with an operating system or affect the primary form of the aircraft.
- (14) Replacing safety belts.
- (15) Replacing seats or seat parts with replacement parts approved for the aircraft, not involving disassembly of any primary structure or operating system.
- (22) Replacing prefabricated fuel lines.
- (24) Replacing and servicing batteries.
- (25) Cleaning of balloon burner pilot and main nozzles following the balloon manufacturer's instructions.
- (26) Replacement or adjustment of nonstructural standard fasteners incidental to operations.

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(27) The interchange of balloon baskets and burners on envelopes when the basket or burner is designated as interchangeable in the balloon type certificate data and the baskets and burners are specifically designed for quick removal and installation.

(30) The inspection and maintenance tasks prescribed and specifically identified as preventive maintenance in a primary category aircraft type certificate or supplemental type certificate holder's approved special inspection and preventative maintenance program when accomplished on a primary category aircraft provided:

(i) They are performed by the holder of at least a private pilot certificate issued under part 61, who is the registered owner (including co-owners) of the affected aircraft and who holds a certificate of competency for the affected aircraft (1) issued by a school approved under [§ 147.21\(e\) of this chapter](#); (2) issued by the holder of the production certificate for that primary category aircraft that has a unique training program approved under [§ 21.24 of this subchapter](#); or (3) issued by another entity that has a course approved by the Administrator; and

(ii) The inspections and maintenance tasks are performed following instructions from the special inspection and preventive maintenance program approved as part of the aircraft's type design or supplemental type design.

Appendix B to Part 43 - Recording of Major Repairs and Major Alterations

(a) Except as provided in paragraphs (b), (c), and (d) of this appendix, each person performing a significant repair or major alteration shall -

(1) Execute [FAA Form 337](#) at least in duplicate.

(2) Give a signed copy of that form to the aircraft owner; and

(3) Forward a copy of that form to the FAA Aircraft Registration Branch in Oklahoma City, Oklahoma, within 48 hours after the aircraft, airframe, aircraft engine, propeller, or appliance is approved for return to service.

For major repairs made in accordance with a manual or specifications acceptable to the Administrator, a certificated repair station may, in place of the requirements of paragraph (a) -

(1) Use the customer's work order upon which the repair is recorded.

(2) Give the aircraft owner a signed copy of the work order and retain a duplicate copy for at least two years from the date of approval for return to service of the aircraft, airframe, aircraft engine, propeller, or appliance.

(3) Give the aircraft owner a maintenance release signed by an authorized representative of the repair station and incorporating the following information:

(i) Identity of the aircraft, airframe, aircraft engine, propeller, or appliance.

(ii) If an aircraft, the make, model, serial number, nationality and registration marks, and location of the repaired area.

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(iii) If an airframe, aircraft engine, propeller, or appliance, give the manufacturer's name, name of the part, model, and serial numbers (if any); and

(4) Include the following or a similarly worded statement -

“The aircraft, airframe, aircraft engine, propeller, or appliance identified above was repaired and inspected in accordance with current regulations of the Federal Aviation Agency and is approved for return to service.

Pertinent details of the repair are on file at this repair station under Order No. _____,

Date

Signed

For the signature of the authorized representative)

Repair station name) (Certificate No.) _____.”

(Address)

(c) Except as provided in paragraph (d) of this appendix, for a major repair or major alteration made by a person authorized in § 43.17, the person who performs the major repair or major alteration and the person authorized by § 43.17 to approve that work shall execute an FAA Form 337 at least in duplicate. A completed copy of that form shall be -

(1) Given to the aircraft owner; and

(2) Forwarded to the Federal Aviation Administration, Aircraft Registration Branch, Post Office Box 25504, Oklahoma City, OK 73125, within 48 hours after the work is inspected.

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REGULATION AND APPLICATION STANDARDS FOR REPAIRMEN

Requirements for attaining your certification for Repairman are covered in FAA Part 145. The title links directly to that regulation.

[Become an Aviation Mechanic | Federal Aviation Administration \(faa.gov\)](#). You may find this overwhelming. Please feel free to read all you wish. Most of the text does not apply to Hot Air Balloon Maintenance and Repair; however, it does regulate what we do. Stated,

You must be

at least 18 years old; and

able to read, write, speak, and understand the Language.

You must have at least:

18 months of practical experience with the procedures, practices, materials, tools, machines, and equipment generally used in constructing, maintaining, or altering an airframe or powerplant appropriate to the rating sought. (Hot Air Balloons)

There are several ways to obtain 18 months of practical experience. You can find an existing repair station willing to work with you. You can get involved with your annual at the repair station and log that time. You could also volunteer for every annual of your friends and acquaintances. All this time can be logged as training. You can go to the Manufacturer's maintenance seminars to get specific training on their balloon brand. The more different types of experience you can get, the better. Also, read whatever relevant material you can find.

The following text is taken from the FAA website, copied and paraphrased here for your easy reference. It has been organized with a table of contents so you can quickly find what you are looking for. We hope by doing this, you will have an immediate sense of the organization of the process, methods, and regulations that will guide your journey. Additionally, it is hoped to save you endless hours trying to find relevant material from the WWW. We have attached links in about every place vital for you to see and understand so that it will save you that time. It is not easy.

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14 CFR Part 145 Repair Stations

Repair Stations General – Subchapter H, Part 145

<https://www.ecfr.gov/current/title-14/chapter-I/subchapter-H/part-145> Only specific paragraphs (§) pertain to hot air balloons, and most do not.

If you plan on building or buying your own HAB Repair Station, you will have to start with this document. [Repair Station Certification](#)

The following links will lead you to some required forms and reading. The presumption is that you have a Repairman Certificate and are ready to have your repair station.

[FAA 8400-6](#) Pre-Application Statement

[FAA Form 8310-3](#), Application for Repair Station Certificate and Rating

AC 145-9A (faa.gov) Guide for Developing and Evaluating Repair Station and Quality Control Manuals.

[AC 21-29B](#) Detecting and reporting SUPS

We hope to help you cut through all this garbagenous and nonessential text and regulations by providing only the process for hot air balloon maintenance and compliance easy to understand. Many regulations and administrivia have been omitted for your reading pleasure.

Part 145 – Repair Stations - Subparts A, B, C, D, and E - Apply to Repair Stations but should be read and understood by Repairmen working in a Repair Station. Many sections of the Subparts listed do not apply to Hot Air Balloon maintenance and repair. However, you need to know the applicability of all parts. Part 145 regulates the required facilities for performing repair and maintenance. Certified Repair Stations require certification.

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Part 145, Subpart A – General

All Repairmen seeking Repair Station Certification should read the following sections.

§ [145.1 Applicability](#).

§ [145.3 Definition of terms](#).

§ [145.5 Certificate and operations specifications requirements](#).

§ [145.12 Repair station records, Falsification, reproduction, alteration, or omission](#).

§ 145.12 Repair station records Falsification, reproduction, alteration, or omission.

No person may make or cause to be made:

(1) Any fraudulent or intentionally false entry in:

(i) Any application for a repair station certificate or rating (including in any document used in support of that application); or

(ii) Any record or report that is made, kept, or used to show compliance with any requirement under this part.

(2) Any reproduction, for a fraudulent purpose, of any application (including any document used in support of that application), record, or report under this part; or

(3) Any alteration, for a fraudulent purpose, of any application (including any document used in support of that application), record, or report under this part.

(b) No person may, by omission, knowingly conceal or cause to be concealed a material fact in:

(1) Any application for a repair station certificate or rating (including in any document used in support of that application); or

(2) Any record or report that is made, kept, or used to show compliance with any requirement under this part.

(c) The commission by any person of an act prohibited under [paragraphs \(a\)](#) or [\(b\)](#) of this section is a basis for any one or any combination of the following:

(1) Suspending or revoking the repair station certificate and any certificate, approval, or authorization issued by the FAA and held by that person.

(2) A civil penalty.

(3) The denial of an application under this part.

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The following sections emphasize the importance of knowing the following explicit content.

§ 145.55 Duration and renewal of the certificate.

(a) A certificate or rating issued to a repair station in the United States is effective from the date of issue until the repair station surrenders the certificate and the FAA accepts it for cancellation, or the FAA suspends or revokes it.

(b) A certificate or rating issued to a repair station located outside the United States is effective from the date of issue until the last day of the 12th month after the date of issue unless the repair station surrenders the certificate and the FAA accepts it for cancellation, or the FAA suspends or revokes it. The FAA may renew the certificate or rating for 24 months if the repair station has complied with the applicable requirements of part 145 within the preceding certificate duration period.

(c) A certificated repair station located outside the United States that applies for a renewal of its repair station certificate must -

(1) Submit its request for renewal no later than 30 days before the repair station's current certificate expires. If a request for renewal is not made within this period, the repair station must follow the application procedures in [§ 145.51](#).

(2) Send its request for renewal to the FAA office that has jurisdiction over the certificated repair station.

(3) Show that the fee prescribed by the FAA has been paid.

(d) The holder of an expired, surrendered, suspended, or revoked certificate must return it to the FAA.

§ 145.61 Limited ratings.

(a) The FAA may issue a limited rating to a certificated repair station that maintains or alters only a particular type of airframe, powerplant, propeller, radio, instrument, or accessory, or part thereof, or performs only specialized maintenance requiring equipment and skills not ordinarily performed under other repair station ratings. Such a rating may be limited to a specific model aircraft, engine, constituent part, or parts made by a particular manufacturer.

(b) The FAA issues limited ratings for -

(1) Airframes of a particular make and model.

(2) Engines of a particular make and model.

(3) Propellers of a particular make and model.

(4) Instruments of a particular make and model.

(5) Radio equipment of a particular make and model.

(6) Accessories of a particular make and model.

(7) Landing gear components.

(8) Floats, by make.

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- (9) Nondestructive inspection, testing, and processing.
 - (10) Emergency equipment.
 - (11) Rotor blades, by make and model.
 - (12) Aircraft fabric work.
 - (13) Any other purpose for which the FAA finds the applicant's request is appropriate.
- (c) For a limited rating for specialized services, the operations specifications of the repair station must contain the specification used to perform the specialized service. The specification may be:
- (1) A civil or military specification currently used by industry and approved by the FAA, or
 - (2) A specification developed by the applicant and approved by the FAA.

§ 145.109 Equipment, materials, and data requirements.

- (a) Except as otherwise prescribed by the FAA, a certificated repair station must have the equipment, tools, and materials necessary to perform the maintenance, preventive maintenance, or alterations under its repair station certificate and operations specifications in accordance with part 43. The equipment, tools, and material must be located on the premises and under the repair station's control when the work is done.
- (b) A certificated repair station must ensure all test and inspection equipment and tools used to make airworthiness determinations on articles are calibrated to a standard acceptable to the FAA.
- (c) The equipment, tools, and material must be those recommended by the manufacturer of the article or must be at least equivalent to those recommended by the manufacturer and acceptable to the FAA.
- (d) A certificated repair station must maintain, in a format acceptable to the FAA, the documents and data required for the performance of maintenance, preventive maintenance, or alterations under its repair station certificate and operations specifications in accordance with part 43. The following documents and data must be current and accessible when the relevant work is being done:
- (1) Airworthiness directives,
 - (2) Instructions for continued airworthiness,
 - (3) Maintenance manuals,
 - (4) Overhaul manuals,
 - (5) Standard practice manuals,
 - (6) Service bulletins, and
 - (7) Other applicable data acceptable to or approved by the FAA.

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Sub-part D----Personnel ([Ref: §145.151](#))

First, you must identify the “Accountable Manager.” This individual holds the staff responsibility, and he must have the authority to make changes in the repair station operation and the responsibility for its operation. The Accountable Manager is also the FAA’s point of contact. So, pick the right person, even if it is you. (Ref: §145.151(a).

Next, list the management and supervisory command chain and who reports to whom? Who is responsible for what part of the repair station, and who settles conflicts between individual divisions of the repair station? In addition, you need to state that the repair station will provide enough qualified supervisory and employee personnel to ensure that all work performed is by Part 43.

Refer to your list or roster of management, supervisory, repairman, and personnel who can approve an article for return to service. Make sure you identify where each of the lists is located. Again, make sure this list matches the Organizational chart (Ref: §145.151(b).

Describe how the repair station will determine the abilities of its non-certificated employees that perform maintenance functions. Briefly describe how this determination will be made based on training, knowledge, experience, or practical tests. List the name(s) of those responsible for making this determination (Ref: §145.151).

(1) Supervisory personnel requirements: If the repair station is located within the United States, include a statement that each supervisor will be certificated under Part 65 State that each supervisor must be thoroughly trained in or familiar with the work to be performed and responsible for overseeing the work performed by any individuals who are unfamiliar with the work to be performed (Ref: §145.153 (b).

(2) Inspection personnel requirements: Include a statement that the inspection personnel “understand the applicable regulations of the 14CFR, and are familiar with methods, techniques, and practices to determine the airworthiness condition of the article that is being inspected” (Ref: §145.155).

(3) Supervisory, Inspection Personnel, and Repairmen are required to read, write, and understand English. You might want all of them to take an English skills test. For example, have an applicant read portion of a maintenance manual taken at random, and then ask him to write, in their own words in English, what the manual wanted them to do, then explain the procedure in English. The person responsible for this requirement must be identified (Ref: §145.153, §145.155, §145.157).

(4) This part of the manual should describe how the repair station will select, train, and ensure that each repairman meets the eligibility requirements of §65.101 (Ref: §145.159).

The information and structure of the manual that describes personnel is the same whether you have a one-man shop or 50 employees. If you are the sole owner and worker in your shop, you will still have descriptions of the different positions in Sub Part D. If you expand, you will already be in a good position with your manual.

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§ 145.157 Personnel authorized to approve an article for return to service.

(a) A certificated repair station located inside the United States must ensure each person authorized to approve an article for return to service under the repair station certificate and operations specifications is appropriately certificated as a mechanic or repairman under part 65.

(b) A certificated repair station located outside the United States must ensure each person authorized to approve an article for return to service under the repair station certificate and operations specifications is:

(1) Trained in or has 18 months of practical experience with the methods, techniques, practices, aids, equipment, and tools used to perform the maintenance, preventive maintenance, or alterations; and

(2) Thoroughly familiar with the applicable regulations in this chapter and proficient in using the various inspection methods, techniques, practices, aids, equipment, and tools appropriate for the work being performed and approved for return to service.

(c) A certificated repair station must ensure each person authorized to approve an article for return to service understands, reads, and writes English.

§ 145.159 Recommendation of a person for certification as a repairman.

A certificated repair station that chooses to use repairmen to meet the applicable personnel requirements of this part must certify in a format acceptable to the FAA that each person recommended for certification as a repairman -

(a) Is employed by the repair station, and

(b) Meets the eligibility requirements of [§ 65.101](#).

Management, Supervisors, and Repairman List/Roster ([Ref: 145.161](#))

This list or roster can be separated into three separate lists or include all pertinent information for the three areas onto one list. Management, Supervisors, and Inspection Personnel must be clearly identified as one of the three, whether you use separate lists or combine them into one list. These lists can be in paper or electronic format if they are easily accessible to the FAA.

a. Management List required by §145.161(a)(1),

b. Supervisory List required by §145.161(a)(1),

c. Inspection Personnel list required by §145.161(a)(2), and a list of personnel authorized to sign a maintenance release as required by §145.161(a)(3).

Each roster or list must include a summary of employment for everyone listed as required by §145.161(a)(4). The list must include the following information:

Present title.

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Total years of experience and type of maintenance performed.

Past relevant employment with names of employers and periods of employment.

Scope of present employment.

The type of mechanic or repairman certificate held and the ratings on that certificate, if applicable.

Although not a requirement, §145.161(a)(4) adds a statement that in case of a change, the change(s) to the roster/list will be revised and incorporated within five business days. The FAA office will also be notified within that same period (ref: §145.161(b)).

Training Program ([Ref: §145.163](#))

Give a short narration on who does the training program and assure that the employee can perform the assigned tasks. It is always recommended that you do a complete job on the original submission to save having to do it all over again and wait some time for review and approval.

The training is divided into three categories.

Initial, including

Indoctrination

Technical training

Specialized technical training

Recurrent.

Remedial, based on demonstrated need.

Section [§145.163](#) requires you to develop a training manual and submit it to the FAA.

Here are some ideas you might want to incorporate into your training manual to meet the requirements of [§145.163](#)

1. Who is responsible for the training program and its revision?
2. How often will the training program be reviewed for accuracy and currency?
3. Who will perform the review?
4. How are revisions to the training program identified?
5. How is the FAA notified of the revision?
6. Describe the written or practical tests.
7. The repair station must document this training and keep those records for at least two years.
8. Are there procedures to ensure the employees read and understand the station manuals?

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Training must be documented in a format acceptable to the FAA. (AC145-10)

Each employee's records should contain:

Employee's name and job position

Training requirements as determined by the needs assessment, including requirements for indoctrination (initial and recurrent) and other training required by areas and course titles.

List of accomplished training to include enough information to determine whether it applies to the employee's capability to perform assigned tasks.

Other documentation relevant to determining capability to perform tasks associated with assigned duties

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Hazardous Materials Training. - ([Ref: § 145.165](#))

(a) Each repair station that meets the definition of a hazmat employer under [49 CFR 171.8](#) must have a hazardous materials training program that meets the training requirements of [49 CFR part 172 subpart H](#).

(b) A repair station employee may not perform or directly supervise a job function listed in [§ 121.1001](#) or [§ 135.501](#) for or on behalf of part 121 or 135 operators, including loading of items for transport on an aircraft operated by a part 121 or part 135 certificate holder unless that person has received training in accordance with the part 121 or part 135 operator's FAA approved hazardous materials training program.

Sub-Part E----Operating Rules. ([Ref: §145.201](#))

The opening paragraph of this subpart should state that the Repair Station will perform all maintenance, preventive maintenance, or alteration in accordance with Part 43 on any article for which it is rated and within the limitations of its operations specifications. (Ref: §145.201(a)(1)). Now you must describe the following operations.

A brief description of how an article is received, inspected, repaired, approved for return to service, and released or shipped by the repair station. (Ref: §145.205(g))

Explain in detail what happens at each point or station the article stops as it passes through the repair station.

The description of work performed on the article at each station/stop should answer the who, what, when, why, and how questions.

Make sure the responsible individual at each station is identified and the forms and data used (reference the forms manual for samples).

If a certificated person performs a maintenance function outside of the repair station, describe how and what role that is contracted for and how their work is inspected when it comes back.

If a maintenance function is performed by a non-certificated person outside the repair station, describe how that work is contracted, how these persons meet your repair station's equivalent quality control system, and explain how work is inspected when it comes back (Ref: §145.201 (a)(2)).

Describe how the contract maintenance functions are maintained and revised; and how the FSDO is notified of the revisions. (Ref: §145.209(h)(1) and §145.217 (a)(2)(i)).

Describe the necessary equipment, trained personnel, and kinds of technical data required to do the work.

Describe how a major repair or major alterations are performed and recorded on either a Form 337 or with a maintenance release in accordance with Appendix B of Part 43 (Ref: §145.201(b)(2)).

Describe what records are maintained, for how long, where they are kept, and how they are retrieved. If an electronic system is used, how is it backed up, and who is responsible for recordkeeping (Ref: §145.209(i)).

Describe how life-limited parts are controlled in accordance with §43.10.

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Describe the procedures on how to do work at a location other than the repair station by repair station personnel and who is responsible for that work, how the work is to be inspected and signed off; and how FAA approval is granted for a particular circumstance or recurring work away from the repair station (ref: §145.203 and §145.209 (f)).

If you are a satellite station or the parent, explain how maintenance/inspection personnel and equipment are moved between repair stations. Explain how revisions are made to this manual and how the FAA will be notified.

The new rule that controls what the Repair Station manual must contain is §145.209. We will go over it in detail, but while this is not an FAA requirement, I recommend that before you jump right into writing the Sub-parts or chapters in your manual that you first provide the reader with an overview of what services the Repair Stations provides, how it is organized, as well as goals and objectives of the company. Also, I suggest you include the accountable manager's name, department supervisors' telephone, and FAX number in this overview.

Work performed at another location. [§ 145.203](#)

A certificated repair station may temporarily transport material, equipment, and personnel needed to perform maintenance, preventive maintenance, alterations, or certain specialized services on an article for which it is rated to a place other than the repair station's fixed location if the following requirements are met:

- (a) The work is necessary due to a special circumstance, as determined by the FAA; or
- (b) It is necessary to perform such work regularly. The repair station's manual includes the procedures for accomplishing maintenance, preventive maintenance, alterations, or specialized services at a place other than the repair station's fixed location. Having the ability to work at another location is a valuable part of any hot air balloon repair station. Include in your manual:

The rule does not allow continuous, uninterrupted operations at another fixed or permanent location without applying for a new repair station or satellite certificate at that location.

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Repair station manual. ([Ref. § 145.207](#))

A certificated repair station must prepare and follow a repair station manual acceptable to the FAA.

- (b) A certificated repair station must maintain a current repair station manual.
- (c) A certificated repair station's current repair station manual must be accessible for use by repair station personnel required by [subpart D of this part](#).
- (d) A certificated repair station must provide the current repair station manual to its responsible Flight Standards office in a format acceptable to the FAA.
- (e) A certified repair station must notify its responsible Flight Standards office of each revision of its repair station manual per the procedures required by [§ 145.209\(j\)](#).

Repair station manual contents. ([Ref. § 145.209](#))

An organizational chart identifying -

- (1) Each management position with authority to act on behalf of the repair station,
 - (2) The area of responsibility assigned to each management position, and
 - (3) Each management position's duties, responsibilities, and authority.
- (b) Procedures for maintaining and revising the rosters required by [§ 145.161](#);
- (c) A description of the certificated repair station's operations, including the housing, facilities, equipment, and materials as required by [subpart C of this part](#);
- (d) Procedures for -
- (1) Revising the capability list provided for in [§ 145.215](#) and notifying the responsible Flight Standards office of revisions to the list, including how often the responsible Flight Standards office will be notified of revisions; and
 - (2) The self-evaluation required under [§ 145.215\(c\)](#) for revising the capability list, including methods and frequency of such evaluations, and procedures for reporting the results to the appropriate manager for review and action;
- (e) Procedures for revising the training program required by [§ 145.163](#) and submitting revisions to the responsible Flight Standards office for approval.
- (f) Procedures to govern work performed at another location in accordance with [§ 145.203](#);
- (g) Procedures for maintenance, preventive maintenance, or alterations performed under [§ 145.205](#);
- (h) Procedures for -
- (1) Maintaining and revising the contract maintenance information required by [§ 145.217\(a\)\(2\)\(i\)](#), including submitting revisions to the responsible Flight Standards office for approval; and

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(2) Maintaining and revising the contract maintenance information required by [§ 145.217\(a\)\(2\)\(ii\)](#) and notifying the responsible Flight Standards office of revisions to this information, including how often the responsible Flight Standards office will be notified of revisions;

(i) A description of the required records and the recordkeeping system used to obtain, store, and retrieve the required records.

(j) Procedures for revising the repair station's manual and notifying its responsible Flight Standards office of revisions to the manual, including how often the responsible Flight Standards office will be notified of revisions; and

(k) A description of the system used to identify and control sections of the repair station manual

Quality Control Manual: ([Ref: §145.211](#))

Provide an overview of the repair station's quality control system, from the time the article comes into the repair station to the time it is shipped out, the number of times the article is inspected, and the kinds of inspections, starting with:

Give the number of quality control inspectors who report to and who has the final word on airworthiness disagreements between inspection and maintenance personnel.

Inspection of raw materials/parts to ensure acceptable quality and who does the inspection, who is responsible, and how is it recorded.

Preliminary inspection of all incoming articles to be maintained, who does the inspection, who is responsible, and how the inspection is recorded.

Inspection for hidden damage of all articles that have been involved in an accident before work is done, who does the inspection, who is responsible, and how is it recorded.

Explain how inspection personnel will maintain proficiency, training, testing, eye exams, physicals, etc.

Procedures to be used to replace inspection personnel who are on vacation, sick, or left the station employment.

Explain what kind of data is to be used, how it is kept current when work is performed, reference manufacturer data if applicable, and identify who is responsible for this action.

Explain how non-certificated personnel is qualified to perform a task, how they are surveilled, and who is responsible for ensuring they are qualified?

Explain how the article receives its final inspection, testing, and approval for return to service: Who does it, what kind of paperwork goes with the article, what kind of paperwork stays in the repair station, and who is responsible (ref: the forms manual).

List the tools and test equipment that need calibration and the intervals when it must be done. Identify the person responsible.

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Explain how warranty work (re-work) will be accomplished, how discrepancies are recorded, and corrective action will be taken. Who makes out the service difficulty report? Identify who is responsible.

The rule requires that the quality control manual includes procedures used for taking corrective action on deficiencies (ref: §145.211(c)(ix) and Chapter 15 of AC 145-MAN).

Explain how the quality control manual will be revised and how often the FAA will be notified of the revisions. List the name of the individual who is responsible.

If maintenance is going to be performed outside the repair station facilities, explain how inspections will be performed on that work, how it is recorded, and by whom (ref: §145.203(b))

Capabilities List: (Ref. [§145.215](#))

A repair station with limited ratings can either list the makes and models of the article it maintains on the operation specifications or develops a capabilities list. For ease of making revisions, I recommend using the list. A capabilities list references the aircraft makes and models or articles you work on within the limits of your rating(s). For example, if you are a repair shop that works only on Lindstrand and Cameron balloons, list only those two brands on the Capabilities list. (Note: see Part 145 Preamble pages 41108 and 41109). However, §145.209 requires that before you submit the list to the FAA, you must perform a self-audit to ensure yourself and the FAA that you have the data, equipment, and personnel to complete the work on those balloons.

The capability list must also provide procedures for revising the list as per §145.215 such as:

- a. Describe how the FAA Office will be notified of the revision.
- b. Describe how the self-evaluation required by §145.215 (c) will be addressed.
- c. Describe how the self-evaluations will be reported to the appropriate manager for review and action.
- d. Who maintains the capabilities list?
- e. Who will conduct the self-evaluation?
- f. How many times during the year are the self-evaluations conducted?
- g. How is the self-evaluation documented?
- h. Who is responsible for correcting any discrepancies found during the self-evaluations?

Not everything you read above applies to you. Understanding the regulations above will help you comply with the regulations and avoid difficulties with the regulators.

§ 145.219 Recordkeeping.

(a) A certified repair station must retain records in English that demonstrate compliance with part 43. The records must be kept in a format acceptable to the FAA.

(b) A certificated repair station must provide a copy of the maintenance release to the owner or operator of the article on which the maintenance, preventive maintenance, or alteration was performed.

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(c) A certificated repair station must retain the records required by this section for at least two years from the date the article was approved for return to service.

(d) A certificated repair station must make all required records available for inspection by the FAA and the National Transportation Safety Board.

Environment

The environment of a repair station is very important to produce quality work, work efficiently, and have all the supplies, tools, materials, lighting, etc., available to save frustration and inconvenience. The facility will depend on what part of the country you work in. The weather will significantly affect the comfort of the work environment. The area needed for inspecting a balloon can vary from shop to shop, but space at least 100 feet long by 35 feet wide is optimal for inspecting an envelope. Not every balloon shop has this luxury, and as a result, there are many ingenious ways devised to accomplish inspecting an envelope. At the same time, you are “pulling the fabric,” someone else may be servicing a burner or inspecting tanks for recertification. It helps to have the room, or your shop will produce less in the same space if you do not.

Consider cleaning and sanitation as significant considerations. Balloons bring into the shop dirt, rocks, even boulders, car keys, sunglasses, tree limbs of considerable size, leaves, insects, sand, and an assortment of other substances that need to be removed before the next annual is performed. You also need a convenient restroom nearby. Garbage, trash, cardboard boxes, and an endless supply of discardable items will need to be disposed of. Have a way to collect and dispose of unwanted items conveniently.

Lighting is critical. Inspecting a balloon depends on clear vision and lighting of all balloon parts. For example, it is tough to investigate the dark cavity of a burner and not be able to see clearly what you are doing. Flashlights work but having a more robust lighting system will help you immensely.

Flooring is important. When you drag the envelope across a floor, unless it is smooth and free of defects, you have the possibility of causing wear or damage to the envelope. A floor of polished concrete or VCT (vinyl composite tile) in squares is easy to install, cost-effective, and provides optimal flooring. Not all floors can accommodate this product but being aware of the floor is important.

Contrary to the FAA’s desire, the address of your repair station does not have to be at an airport. The application form suggests that you may operate anywhere you wish. Balloon repair stations do not omit environmentally obnoxious substances, so you will have an easier time than if you were running a paint shop, for instance. Other than testing burners, the shop does not create loud noises. Most neighbors will come to understand the noise of a burner. Check it out in advance. Most industrial parks will not be an issue.

If you do not have an internet connection, you must have the manufacturer’s manuals printed out and keep them current. The internet means easy access to the most up-to-date information without all the paper. If a manufacturer does not have an online copy of their manual, you can copy that document or keep a digital copy on a USB drive. Have a secure place to prepare documentation, file copies of your work orders and invoices, and keep the dirt and dust off your office equipment. You will be glad you do if you have a coffee bar or small refrigerator for drinks and food. You will also enjoy a place to wash the

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oil, grease, and all the stuff on your hands. Try not to prepare food in the same area. If you are a smoker, Krytox is toxic if you inhale the fumes of the lubricant from your cigarette. Be aware of the Material Safety Data Sheets of the products and materials you use in your shop.

Have a secure place for parts inventory and a way to keep parts segregated and labeled. You will want to have a small inventory of frequently used parts. The parts come in the door, and they can walk out of the door.

Tools

Tools are personal. You will want a good set of tools to perform the work you will normally encounter. Become familiar with the types of repairs you do most often and, if necessary, build you that unique tool that accomplishes the unusual and otherwise difficult task with the ease of a professional. This is a list of tools for a particular make of burner. With these tools, you will not need any others. For other burners, it is wise to have a complete set of common mechanics tools in inch and metric sizes. It is also wise to identify which burners require specialty tools and buy or make that tool.

(Example) Lindstrand burner tool list

Allen wrench set, metric range 1.5 – 5 mm

Circlip pliers, sharp point

32 mm open end/box end wrench and/or deep socket

28 mm open end/box end wrench (Single burner)

2-13 mm open-end wrenches

2-10 mm open-end wrenches

Fuel pressure gauge removing tool (available from Lindstrand)

Krytox (a little goes a long way).

¼" - socket wrench (not metric) for pilot light

8mm socket wrench for main jets

Small Swiss army knife

19mm socket wrench for liquid pilot light

22mm socket wrench for coil post nut

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Inspection Checklists

The Inspection Check Lists are developed by the balloon manufacturer. It is highly recommended each balloon inspected use the appropriate check list appropriate to the balloon system. Keep a completed checklist in your records for any future investigation.

Damage And Inspection Charts

Always use a Damage and Inspection (D&I) chart to record all damage, repairs, changes, done to the balloon envelope. It is a massive waste of time to not record a tear, for instance and then go back and attempt to find it again. Use the D&I charts to record the location of repairs so finding items to repair or service is easy to find. Having a record and location of a repair for any future interest is greatly facilitated by this chart.

Work Orders

An example of a work order is appended to this document. Please use it as an example and customize it for your own situation and custom information.

Parts Tags

When you purchase parts from the Manufacturer, they will be shipped with a parts tag. This tag certifies the part is an approved part. These tags should be filed with the records you keep for each customers' balloon. These tags become essential to show the parts used on repairs or replacements are approved.

Calibration Records

Any tools you use in balloon repairs that have a measurement capability must be calibrated. Examples are torque wrenches and fabric pull scales. Have a means of calibration and records as evidence that you perform calibrations each time you use the tool.

Record Keeping

As described earlier in this document record keeping is required. Provide a workspace to fill out work orders, calibration records, invoices, estimates, etc. and a safe and convenient place to store all of your records, be it a file cabinet or file box. Backing up your records is essential to preventing loss.

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Manufacturers' links to maintenance pages

Here is a list of manufacturers with a link to their website pages with the maintenance information.

Lindstrand Balloons USA- <https://www.lindstrand.com/images/Downloads/26MMIssue1119Final.pdf>

Cameron Balloons US - <https://cameronballoons.com/images/Maintenance-Man.-2016-Rev.-A-G-With-All-Appendices.pdf>

Firefly Balloons- https://www.fireflyballoons.net/kb_upload/file/FIREFLY_BALLOONS-ICA_Revision%201.0.pdf

Aerostar is no longer manufactured. Limited support may be available from Lindstrand Balloons. Parts may be available from [Balloonacy, Ltd.](#)

Kubicek Balloons - <https://www.kubicekballoons.eu/technical-support/manuals>

Ultra-Magic - <https://ultramagic.com/technical-support/>

Head - <https://www.headballoons.com/Maintenance.html>

Adams - <https://www.adamsballoons.us/brochures-manuals>

In Conclusion

This document was assembled by BFA members who have gone through this process. Some words of wisdom are in order. Each FAA office attempts to follow their interpretation of 14CFR in reference to the Dynamic Regulatory System (DRS). It is our experience that some Inspectors are good guys / gals, however unfortunately some are not. The one thing they have in common is they are not highly experienced in LTA. When you make your application and present your version of the Operations Manual, do so respectfully. Take all their advice and suggestions, listen carefully to what they are saying. Take notes and revise your application accordingly. You will never win an argument. Attention to the examples they may give you will help you reduce the reiterations required to do it their way. The objective is to walk away with an accepted Operations Manual for your workshop. It is not "approved" because the FAA does not accept responsibility for the contents. The accepted manual nevertheless must be constructed with and contain the items that they understand are required.

The links in the document are not likely to remain current, updates will be required. If you find information that is not current, please contact the BFA office and provide specifics.

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Definitions and Abbreviations

14CFR – Code of Federal Regulations Title 14

BFA – Balloon Federation of America

DRS – Dynamic Regulatory System

FAA – Federal Aviation Administration

FSDO – Flight Standards District Office

FSIMS – Flight Standards Information System

LTA – Lighter than Air

MVV – Mission, Vision, and Values

PMI – Primary Maintenance Inspector

QCM – Quality Control Manual

RSM – Repair Station Manual

SAS – Safety Assurance System

STC – Supplemental Type Certificate

SUPS – Suspicious and Unapproved Parts

WWW – World Wide Web

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Appendix:

Endorsement Examples

Annual Inspection Endorsement Example

his aircraft, (N12345), has received annual inspection in accordance with current FAA rules and regulations and has been found to be airworthy and returned to service. Details of inspection are on file at this repair station under:

W.O.# XYZ123, Dated 12/25/20XX

Authorized Signature _____

Certified Balloon Repairs, Inc.

Certified Repair Station # B41R690K

Repair Endorsement Example

This aircraft, (N12345), has been repaired and inspected in accordance with current FAA rules and regulations and has been returned to service. Details of inspection are on file at this repair station under: W.O.# XYZ123, Dated 12/25/20XX

Authorized Signature _____

Certified Balloon Repairs, Inc.

Certified Repair Station # B41R690K

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FORMS EXAMPLES:

Endorsement Examples

Work Order

Description of Work Order form elements

Damage/Repair Inspection Chart

Invoice Example

Calibration Example

Description of form elements

Work Orders should be numbered serially and uniquely.

1. Number of parts used
2. Part Number
3. Description of Part
4. Unit Price of Part
5. Extended price of #1 times #4.
6. Sum of all prices of parts
7. Date of Maintenance Release
8. Parts or AC repaired or serviced
9. Model of part or AC
10. Serial Number of Part or AC
11. AC total time at time of repair or service
12. Signature of authorized personnel returning the part or AC to service
13. Name of Customer
14. Address of Customer
15. City, Zip, Phone number of Customer
16. Type or Model of Aircraft
17. Serial Number of Aircraft
18. Registration (N) number of Aircraft
19. Total Time of AC at time of WO
20. Indicates which part of the AC or system is being repaired
21. Repair Person doing the actual work on the AC or part.
22. Description of repair or service
23. Labor Cost for services indicated
24. Indicator if owner wishes to retain or destroy used and unserviceable parts
25. Signature of persons authorized to commission work
26. through 35. are cost elements of the service being provided for the customer.

DAMAGE/REPAIR INSPECTION CHART

Panel	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-01	Init./Date	
PARA																						

20 GORE "S" SERIES ENVELOPES

A																						
B																						
C																						
D																						
E																						
F																						
G																						
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NX																						
SCP																						

Lindstrand Model Number: _____ Serial Number: _____ Registration Number: _____

"S" SERIES
Lowest Nylon Panel Designations
210 - X

