

# Safety Guidelines for Hot Air Ballooning

## Introduction

Hot air balloon flights are done in VMC conditions which requires visibility of 5 KMS. Hot Air balloon flights are seasonal and balloon fly at Sunrise and 2 hrs before sunset. A Hot Air Balloon moves at the speed of the localised wind conditions. As per existing operational - guidelines of manufactures, a Hot Air Balloon is not flown in wind conditions exceeding 15 knots (27.8km/h) on the surface. A Hot Air Balloon is a very large (over 14 metres in width and 30 metres in height), brightly coloured, - slow moving object that maintains the same shape and size as seen from a 360° perspective of approaching aircraft. A Hot Air Balloon can safely alter its altitude to climb or descend immediately and at a rate of 1000ft/min (5m/second). A Hot Air Balloon is the only aircraft that allows the Pilot in Command to have a visual 360° direct line of sight whilst piloting the aircraft. The pilot maintains a two way communication with the ATC, hot air balloon is also equipped with GPS, Altimeter and other important instruments. Hot Air Balloons don't take off from airports they operate at faraway places as allowed by the relevant ATC.

Hot Air Balloons work according to the natural law that hot air is lighter than cold air. To generate lift and therefore take flight, hot air balloons employ a burner that heats the air within the balloon until it becomes lighter than the external air. The difference in the temperature inside the balloon relative to the outside temperature, determines the amount of lift the balloon will have. Accordingly, by controlling the internal temperature, the balloon's flight is controlled with respect to ascent and descent. The single most defining factor of balloon Flight Safety is the weather. From take-off to landing; fog, rain, snow, wind, thermal winds etc. are all key elements to consider when attempting a safe hot air balloon flight. Before a safe balloon flight can begin, the pilot must always check the forecast and select a suitable departure and landing area.

The D.G.C.A.(Director General Civil Aviation - [www.dgca.nic.in](http://www.dgca.nic.in)) in India has formulated

regulations for Hot Air Balloons in the Civil Aviation Requirements, CAR Section 2 – Airworthiness, Series ‘F’ Part XV, Revision-1, Dated 11th November 2008 of D.G.C.A., Min of Civil Aviation, Govt. of India and wherever any clarification needed should be read with this CAR.

### **There are two main types of Hot Air Balloon Flight:**

- 1) **Free Flight** – This is where a Balloon takes off from one location and travels with the wind to land at another alternate location.
- 2) **Tethered Flight** – This is when ropes are safely attached to the Balloon and the Balloon ascends and descends on the spot, with the ropes restraining the Balloon from flying away with the wind. There is no difference as far as the regulations are concerned between Free Flights (without ropes) and Tethered Flights (with ropes). All the requirements for Operator certification, pilot qualifications and equipment registration & maintenance have to be met for tethered flights as well.

### **Adventure Guides/ Instructors**

Basic minimum qualifications and experience to fly Hot Air Balloons one must have a Balloon Pilot License issued by DGCA.

If an operator employs Foreign Pilots then those Pilots must have a Valid FATA (Foreign Aircrew Temporary Authorization) which is issued by DGCA.

As part of all Pilot license requirements, every Pilot must be having a Medical Certificate endorsed by the relevant Civil Aviation Authority

### **Equipment required**

Instruments & Equipment to be carried by Balloons in flight:

1. Hand fire extinguisher of an approved type, in the main compartment carrying personnel.
2. Safety harness for each personnel on board. The harness for each person need not be provided for gondola or basket type of balloons.
3. A compass
4. An altimeter
5. A rate of climb indicator.

6. First Aid Kit (as per CAR Series X Part III)
7. A fuel quantity gauge.
8. An envelope temperature indicator.
9. 3 separate ignition sources
10. Two way R/T Communication Equipment.
11. Flight Manuals, Operations manual and all other relevant manuals as specified by DGCA.
12. Equipment care and maintenance Balloons are certified aircraft and, as such, are regulated by the D.G.C.A.. They must meet manufacturing standards and are subject to periodic inspections, just like a commercial aircraft. All Balloons must be registered with the D.G.C.A. and its registration no. displayed on the Balloon.

## **Inspection & Maintenance**

Procedures On the basis of Manufacturer Maintenance Manual, operators need to prepare an Aircraft Maintenance Program (AMP) which must be approved by the DGCA. Details of all inspection schedules are as follows:

### **PART 1: SCHEDULED INSPECTIONS**

These routine inspections are accomplished at regular, planned intervals. They consist of following inspections:

Inspection Interval - Inspection

- Pre Flight inspection - Before Every Flight
- 100Hr./1 year inspection schedule - At every 100Hr/1 year of flying

### **PART 2: COMPONENT OVERHAUL & SERVICE LIFE LIMIT**

Item - Frequency - Inspection

- Envelope - 300hr. /3 yrs whichever is earlier and then every 100hr. /1 year whichever is earlier. - Grab Test
- Fuel Cylinder - 5 years & 10 years - Hydrostatic Test
- Fuel Cylinder Pressure Relief valve(PRV) - Every 10 years - Replace

### **PART 3: UNSCHEDULED INSPECTIONS**

This Part contains the special inspections considered necessary if the balloon has been subjected to overheating or a hard landing or contact with power

lines. Following are the conditions in which these inspections are to be carried out:

1. Inspection after Overheating:
2. Power line Contact Inspection:
3. Hard landing Inspection:

## **SOP's & Operating Instructions**

Hot Air Balloon Operations should be undertaken with the following considerations:

- a) Operating instructions must be followed as per the operations manual approved by DGCA.
- b) Flight Manual Information and Approval.

The Flight Manual must contain:

1. A description of the balloon and its technical equipment with explanatory sketches;
2. Operating limitations, normal procedures (including rigging, inflation and deflation), emergency procedures, and other relevant information specific to the balloon's operating characteristics and necessary for safe operation.
3. Specification of the permissible lifting gas
4. Information for ground handling, transport and storage.

## **Documentation**

The following documentation is required to be maintained by the operator:

### **Administrative:**

1. Details of owner and operator
2. Document indicating the annual inspections carried out by an inspecting body
3. List of Pilots along with copies of relevant certifications
4. Evidence of public and other liability insurance
5. Copies of Permission from Airports Authority and Local Collector

### **Operational:**

1. Log book containing the daily operation sheets
2. Accident/ incident report sheets
3. Flight and operations log
4. Passenger Manifest Sheets
5. Risk assessment and management plan
6. Emergency procedures manual
7. Manufacturer's product manual
8. Current inspection report

### **Following manuals have to be prepared and approved by DGCA:**

1. Maintenance Organization Exposition (MOE)
2. Continuing Airworthiness Management Exposition (CAME)
3. Operation Manual
4. Security Manual
5. Flight Safety Manual
6. Safety Management System Manual

### **Information to be provided for participants and visitors:**

- a) Description of the activity
- b) Safety instructions
- c) Weather, Medical and Age restrictions
- d) Information relating to personal public liability insurance of the operator

### **Risk Mitigation & Emergencies & Rescues**

The PIC should be familiar with all emergency procedures listed in the DGCA approved Flight manual including:

- i. Emergency landings
- ii. Pilot flame failure
- iii. Fire on the ground
- iv. Fire in the air
- v. Blast valve failure
- vi. Contact with power lines

Each Ballooning operator should establish and review procedures for all possible emergencies. Every pilot and passenger should thoroughly understand emergency procedures. Pre-flight passenger briefing must be carried out by the Pilot in command.

A monthly risk assessment as per given

Performa needs to be carried out and reviewed by the Chief Pilot and the owner/operator and records maintained.

## **Safety briefing**

Safety information to passenger is essential, as is certain practical advice, like basket layout and how to access the basket. As per the Flight Manual, the following briefing must be provided to passengers:

- General Briefing.
- Passenger Briefing (Pre Inflation).
- Pre Flight Briefing
- Pre Landing
- After Landing

## **Medical Concerns**

As per DGCA guidelines all Hot Air Balloons must have comprehensive insurance that includes coverage of all passengers, Pilot and third party liability.

As a matter of Best Practice, all commercial operators should expect every passengers to have a basic level of general health and physical well-being, this includes:

- No recent surgery.
- No known significant hip, knee, neck or back problems.
- No recently broken bones.
- Not currently pregnant.
- Ability to stand for at least 1 hour without rest.
- Must be at least 5 years of age.
- Not under the influence of alcohol or drugs at the time of flight. The Pilot is responsible to assess the medical condition of all passengers before boarding a Hot Air Balloon Flight and the Pilot and the operator reserves the right to refuse any passenger to fly if they believe that they

- are not medically fit to fly. “Basic Minimum Standards” for grant of recognition to operators
- For the commercial operations of Hot Air Balloons, an Operator must have a valid Air Operator Permit (AOP) as issued by DGCA.
  - All Balloon Organizations have to be approved by DGCA under Aircraft Maintenance Organization (AMO) as per CAR-145 and Continuing Airworthiness Management Organization (CAMO) as per CAR-M, Sub-Part G.
  - If the operator is certified as an Aircraft Maintenance Organization (AMO), the Quality Manager (QM) must submit a Maintenance Organization Exposition (MOE) which must be subsequently approved by the DGCA.
  - For approval of Continuing Airworthiness Management Organization (CAMO), the Continuing Airworthiness Manager (CAM) must submit a Continuing Airworthiness Management Exposition (CAME) which must be subsequently approved by DGCA.
  - Before every flight the Pilot must ensure that the Balloon has a valid and Current Certificate of Airworthiness (C of A) and Airworthiness Review Certificate (ARC).
  - Pilot has to check Certificate of Release to Service (CRS) before every flight which is issued by Aircraft Maintenance Engineer (AME).
  - Hot air balloons engaged in commercial operations must possess a Type Certificate issued or validated by the DGCA or an export Certificate of Airworthiness issued by a country whose airworthiness standards are equivalent and acceptable to DGCA.
  - All Balloon operators must have an Emergency Action Plan. Training for the EAP must be regularly imparted to pilots and ground personnel. A list of emergency contact numbers must always be with the pilots and ground personnel.

## Log Books

A Technical log in respect of each balloon indicating details of every flight, like the date of flight, lift off time, total flight time, the places of departure and arrival, shall be maintained. The entries in the log book shall be certified by the pilots undertaking the flights. A Balloon log book shall be maintained by every operator to keep a record of the flying hours of a Balloon and the modification and other repair work carried out on the balloon.

## **Documents to be carried on Board the Flight:**

- 1) Technical Log.
- 2) Certificate of Release to Service (CRS).
- 3) Certificate of Airworthiness (C of A).
- 4) Airworthiness Review Certificate (ARC).
- 5) Certificate of Registration (C of R).
- 6) Appropriate license for the Pilot.
- 7) Weight Schedule, duly approved by DGCA.

## **Flying Permission**

1. An Operator is required to take permission from the Airport Authority of India (AAI) for each area in which they plan to operate a flight. This permission is issued after clearance and consultation is taken from the nearest aerodrome and ATC authority.
2. Permission is required in writing from all local Police and Administrative authorities in the area where Balloon flight Operations are planned.
3. The Operator must file a Flight plan with the AAI before every flight.
4. All Operators are required to take an FIC (Flight Information Centre) number and ADC (Air Defense Clearance) code from the relative departments before every flight. This information must be provided to the concerned ATC (Air Traffic Controller) before any flight can commence operations.
5. Pilots have to request for Take-off permission from concerned ATC before every flight and must close the flight plan following the completion of every flight.

**Environment-friendly Practices** - Refer to the [Guidelines for 'Leave Minimum Impact' practices.](#)

**First- Aid Kit:** [Indicative list of items for First-Aid Kit](#)

- End of Safety Guideline -