TECHNICAL SPECIFICATION FOR FOLDABLE HANGAR DOOR

1. **Design.** The doors shall be designed as per details below: -
   (a) Electrical or Electro-hydraulic operated folding door.
   (b) Door shall be made of two panels.
   (c) In the open condition the projection of the door from the hangar boundaries shall be as less as possible.
   (d) The door shall be completely safe and fully secured in the stowed position and shall not vibrate with the ship's motion.
   (e) The door shall be of rigid construction under operation load conditions and to be flexible under extreme load condition.
   (f) The Clear opening of Hangar after opening of door - 6000 mm (W) x 6196 mm inboard/6361mm Outboard Height.

2. **Design**. The doors shall be designed for loads & operating conditions as detailed below: -
   (a) **Rotor Downwash Loads.**

   (i) The hangar door shall be capable of withstanding the forces generated by the rotor downwash of all aircraft types which can be operated on that ship. The door may be in any position from fully open to fully closed during aircraft operations.
   (ii) In order to achieve the above, the hangar door shall be capable of being closed and opened in wind speeds of upto 60 knots from any direction and withstanding a wind velocity of 80 knots gusting upto 115 knots (rotor downwash loads) without distortion at all opening positions.

   (b) **Green Sea Loads.**

   (i) The hangar door shall be able to withstand forces from green water on deck.
   (ii) Green Sea load of 10KPa at the bottom reducing to 2.5 KPa up to 2m height, a constant loading thereafter.

   (c) **Environmental Conditions**. The doors shall operate smoothly under the following environmental conditions: -

(i)	Rolling	- Up to ± 45º
(ii)	Pitching	- Up to ± 15º
(iii)	Rolling	- Up to ± 30º (For shop trials ± 5º)
(iv)	Rolling period	- 10 Seconds
(v)	Pitching	- Up to ± 10º (for shop trials ± 5º)
(vi)	Pitching period	- 10 Seconds (Unless otherwise stated)
(vii)	Permanent list	- Up to ± 20º
(viii)	Permanent trim	- Up to ± 5º

(d) **Shock Standard.** The Hangar doors shall meet the shock requirements of NSS grade II.

3. **Door Operation.** The door shall be operated as follows: -

(a) **Mode.**

(i) In Normal mode of operation, the doors shall be operated by means of Hydraulic or Electric or Electro-hydraulic using PLC based control system.

(ii) In Emergency mode of operation, the doors shall be manually operated, the manual mechanism shall be operable by one-person effort for opening and closing of one door.

(iii) The hangar door should have single operating mode which means that the closing or opening of the complete door shall happen in one phase.

(iv) Effort required for Door to open and close in emergency mode to be approximately equal.

(b) **Time Required.**

(i) Time required for Door to open/ close in Power mode is not to exceed 2 Minutes.

(ii) Time required for Door to open/close in emergency mode is not to exceed 4 min. (One-man effort)

(c) **Operating Location.** The hangar door shall be capable of being operated from inside and outside the hanger and are to be clearly visible from the operating position (Not applicable for emergency operation). Location of control/ operation panel will be as follows: -

(i) Local Control Panel – Inside the hangar
(ii) Operating panel – Both inside and outside the hangar.
(iii) Hangar door to be clearly visible from the door control post.

4. Safety.

(a) Locking arrangement to be provided for arresting uncontrolled free fall due to machinery failure.
(b) Locking arrangement of doors from both outside and inside.
(c) Display for the status of the door (open/shut) in bridge.
(d) Over load protection/low voltage protection by means of cut-off.
(e) Emergency run indicators are to be provisioned along with audio-visual alarms.

5. **Material.** The material used for manufacturing of Hangar door are as follows: -

(a) Door & Frame carbon steel DMR 249A or equivalent.
(b) Door Hinges – Teflon or more superior material.
(c) Material used for the frame is to be compatible for welding with the hanger structure installed on the ships & suitable for marine applications.

6. **Door Slope.** The slope of door shall be 7 Degrees.

7. **Surface of Exposed Door.** To be flat and smooth to avoid Radar Scattering.

8. **Sealing Arrangement.**

(a) To be provided to make the door splash proof weather tightness from all edges.
(b) EPDM/Neoprene/Silicon to be used.

9. **Dogging down arrangement.** To be provided to keep the door taut and secure the door to the deck. No fittings shall be permissible that protrude from deck, in way of the clear opening.

10. **Locking Arrangements.** The doors to be made lockable from within the hangar.

11. **Service Door.**

(a) Service door shall be provided on the lower end of the door and should be flushed with the hangar door with no protrusions on the outer side.
(b) The door is to be manually operable from both sides.
(c) The door is to open on the weather side by a minimum of 90º.

12. **Control System**. The Control Console shall be equipped with necessary power supply, Programmable Logic Controller (PLC), relays, selector switches, indicators, fuses and terminals for interfacing with and controlling the handling system. The control console should be provided with suitable safety interlocks.