Ditching, Emergency Flotation and Limited Overwater Operations

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An Agency of the European Union
Ditching, Emergency Flotation & Limited Overwater Ops

→ Airworthiness Categories

→ Phases of Water Emergency Landing:
  → Water Entry
  → Capsize Resistance
  → Egress
  → Underwater Egress

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Airworthiness Categories

Ditching

Flight over hostile sea conditions
✓ Enhanced occupant survivability in the event of a survivable water impact
✓ Capsize resistance considering functional failure case
✓ Consideration of behaviour of aircraft during ditching water entry

Emergency Flotation

Flight over non-hostile sea conditions
✓ Provisions in the event of an emergency landing up to selected sea conditions
✓ Capsize resistance demonstration

Limited Overwater Ops

Flight over calm water (inland waters or close to shore)
✓ Provisions in the event of an emergency landing on calm water
✓ Basic principles of occupant survivability in the event of an unforeseen failure resulting in a survivable water impact

Note: Hostile Sea: open sea area north of 45 N and south of 45 S, unless any part is designated as non-hostile by the responsible authority of the State in which the operations take place, ref: Regulation (EU) 965/2012 on air operations, ANNEX I – Definitions (69)(b)(i)
Proposed OPS Rules for Airworthiness Categories

(1) Criteria to be defined by RMT.0230 as part of the Air Ops Rules Update

Ditching
- > 10 minutes from land
  - Hostile Sea

Equivalent to rotorcraft
CAT.IDE.H.320

Emergency Flotation
- > 10 minutes from land
  - Non-hostile Sea

Equivalent to rotorcraft
CAT.IDE.H.320

Limited Overwater Ops
- 3 minutes (total) of flight of water
  - or over water segment > time after critical failure for performance (CFP)
  - or landing/take off over water

NEW CATEGORY

Unless the responsible authority reclassifies the specific operation as a different operational category based on a risk assessment
Phase: Water Entry

**Ditching**
- **Structural Provisions**
  - Applicable to **whole aircraft** up to sea state selected
  - **Behaviour during ditching**
  - Minimise probability of injury, no unsafe characteristics
  - **Water Impact**
  - Design review of EFS / or buoyancy components

**Emergency Flotation**
- **Structural Provisions**
  - Applicable to EFS and attachments (or buoyancy components) up to sea state selected
  - **Energy Storage**
  - Specific Considerations paragraph (a)

**Limited Overwater Ops**
- **Structural Provisions**
  - Applicable to EFS and attachments (or buoyancy components) in **calm water**
  - **Energy Storage**
  - Specific Considerations paragraph (b)
  - **EFS Deployment**
  - Must not rely on pilot action in flight (auto-arm and auto-deploy)

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(1) Unless other rational landing conditions acceptable to the Agency are defined, the landing (entry) conditions of CS27.563 are applicable
(2) Emergency Flotation System not required if design criteria can be met without EFS installation
Phase: Capsize Resistance

Ditching

Irregular Wave Testing
• With critical EFS compartment (or buoyancy component) failed

Emergency Flotation

Irregular Wave Testing
• Fully operable EFS (or buoyancy components)

Intended Floating Attitude
• Mean static level of water is lower than the upper surface of the seat cushion.
• Presence of water will not restrict ability of occupants to evacuate and enter the liferaft

Sea Conditions Published
• Substantiated sea conditions in the Flight Manual

Limited Overwater Ops

N/A

Note: Sea conditions are not applicable for flight over harbours, rivers, lakes etc. Therefore, the water conditions are not possible to define and monitor. Capsize resistance not necessary for continued overwater ops (i.e. no capsize cannot be assumed)
Phase: Egress above water

Ditching
- Non Jettisonable Doors
  - Non-jettisonable ditching exits remain open and secure
  - CS27.783(c)

Emergency Flotation
- No additional criteria for Emergency Flotation

Limited Overwater Ops
- Emergency Exits
  - Protected from becoming jammed as a result of fuselage deformation
  - CS27.807(b)(4)
- Obstruction of Emergency Exits
  - Must not be obstructed by EFS (stowed or deployed), in all stable floating attitudes
  - CS27.805(c), CS27.807(a)(3)
Phase: Underwater Egress (1/2)

Ditching

Emergency Flotation

Limited Overwater Ops

Breath-hold time
- Air pocket available in all stable floating attitude:
  - The size and shape of the air pocket should be sufficient to accommodate all passengers
  - A minimum volume per passenger, in the form of an elliptical column of 70 cm x 50 cm (27 in. x 19 in.) and height of 30 cm (11 in.) relative to the static waterline should be established and demonstrated as fitting into the air pocket

Cross cabin egress

No additional criteria for Emergency Flotation

Limited Overwater Ops

Remain Afloat
- Will not sink with functional loss of any single flotation unit (or any single buoyancy component) for 15 mins

(1) 15 minutes is consistent with the energy source criteria VTOL.MOC.2430(a)(6)
Phase: Underwater Egress (2/2)

**Ditching**

**Underwater exits (no credit for overwater exits when afloat)**

**Flight Crew Underwater Emergency Exits**
- Rapid escape (50lbs)
- CS27.805(c)

**Passenger Underwater Emergency Exits**
- Rapid escape (50lbs)
- Black and yellow marking
- CS27.807(d)
- Markings remain visible if submerged

Exits not blocked by open door CS29.809(j)(2) HEEL CS29.811(h)(1) (CS27 Cat A)

**Limited Overwater Ops**

**Flight Crew Underwater Emergency Exits**
- CS27.805(c)
- If an insufficient number of overwater exits are available in any stable floating position, additional underwater exits must meet:
  - Operable underwater
  - Black and yellow marking
  - Controls accessible
  - Markings remain visible if submerged
  - CS27.807(d)

**Passenger Underwater Emergency Exits**
- If an insufficient number of overwater exits are available in any stable floating position, additional underwater exits must meet:
  - Operable underwater
  - Adjacent handholds
  - Black and yellow marking
  - CS27.807(d)
  - Markings remain visible if submerged

**Emergency Flotation**

No additional criteria for Emergency Flotation
Safety Equipment for Overwater Ops

- **Life jackets**
  - Within easy reach of each occupant

- **Life raft (carried)**
  - Carry on life-raft with long and short line

- **Life Raft (installed)**
  - Deployment controls within easy reach of flight crew, in cabin and of survivors in water in all stable floating positions

Additional Equipment

- Constant wear life-jacket, survival suit and Emergency Breathing System (EBS)

**Offshore, Hostile**
- Currently only required for helicopter, offshore, hostile (SPA.HOFO.165)

- **20nm** distance from land, hostile sea
  - (Installed life raft will assist quick deployment in rough seas / when capsized)

- **20nm** distance from land, non-hostile sea
  - (Distance proposed as this is related to rescue time)

Limited Overwater Ops
- (Aid to occupants necessary for overwater operations)

(1) Criteria to be defined by RMT.0230 as part of the Air Ops Rules Update
**Summary**

*Criteria based on risk exposure (time)*

- **Ditching**
  - HOSTILE SEA >10mins from land
  - Enhanced Occupant Survivability
  - Ditching Water Entry Considerations

- **Emergency Flotation**
  - NON HOSTILE SEA >10mins from land
  - Emergency landing: up to sea conditions
  - Capsize Resistance

- **Limited Overwater Ops**
  - IN-LAND WATER CLOSE TO LAND
  - Emergency Landing: Calm sea
  - Occupant Survivability

3 minutes (total) of flight of water or landing/take off over water or over water segment > time after critical failure for performance (CFP)

*Criteria based on rescue (distance & location)*

- **Additional Equipment**
  - OFFSHORE, HOSTILE SEA
  - HOSTILE SEA >20nm from land

- **Life raft (installed)**
  - NON HOSTILE SEA >20nm from land

- **Life raft (carried)**

- **Life jackets**

*Category Enhanced*

Criteria to be defined by RMT.0230 as part of the Air Ops Rules Update
Thank you for your attention

Feel free to submit your questions on our live event platform.....