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Investigation of airship regulations for certification

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Abstract

Airship technical regulations for certification system of each countries are reviewed to assist the development of medium size airship that can be applied observation and communication relay with the ability of holding position at high altitude.

: (airship), (certification), (type certificate), (airworthiness regulation)

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FAR Part

, FAA ,
 FAA P-8110-2('92. 7. 24) AC 21.17-1A('92. 9. 25) JAA

JAR Part가 ,

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1. , ,

	1	FAR Part 1	JAR-1
가 (N), (U), (A)	2	FAR Part 23	JAR-23
가 (T)	3	FAR Part 25	JAR-25
가 (N)	4	FAR Part 27	JAR-27
가 (TA, TB)	5	FAR Part 29	JAR-29
	6		
	7		
	8	FAR Part 33	JAR-E
	9	FAR Part 35	JAR-P
()	10		
. 가	11		

(design and construction),

CAP 471 Section Q : (power plant) 7

Non-Rigid Airship FAA P-8110-2 , 가 .
 가
 (flight), (structure), .

2.

7	FAA-P-8110-2	CAP 471 Sec' Q
1	Subpart - General	Sub-sec'Q 1 General and Definitions
2	Subpart - Flight	Sub-sec'Q 2 Flight
3	Subpart - Structure	Sub-sec'Q 3 Structures
4	Subpart - Design and Construction	Sub-sec'Q 4 Design and Construction
5	Subpart - Powerplant	Sub-sec'Q 5 Powerplant Installations
6	Subpart - Equipment	Sub-sec'Q 6 Equipment Installations
7 ,	Subpart - Operating Limitations and Information	Sub-sec'Q 7 Operating Limitations and Information

3. " (General)"

	7	FAA-P-8110-2	CAP 471 Sec' Q
1.1	- - -	1.1 Applicability - - -	Q1-1 <u>General</u> 1. Introduction 2. Applicability 3. Altitude and Temperaure Rages 4. Weight Limitations 5. Variations from Rqmnt 6. Calculations and Tests 7. Relationship to air navl' order and regulations
7	- 1	1.2 Definitions 1.3 Abbreviations and Symbols	Q1-2 <u>Definitions</u> 1. General 2. Weight / 3. Speed 4. Structural

2. Part 2.2 (Flight)

Part ,
1 , ,
(General) " , , , ,
'General' , "
, Part'
3 , (Vectored Thrust)
S.I Unit , Imperial ,
Unit , Handling Ditching
Alighting
Part (Flight Characteristics),
(Controllability and Maneuverability),
(Stability)
2Page
1 Part ,

4. “ (Flight)”

	7	FAA-P-8110-2	CAP 471 Sec' Q
	-	<u>Flight Characteristics</u> 2.13 General <u>Controllability / Manoeuvrability</u> 2.14 General 2.15 Longitudinal control 2.16 Control during landing	<u>Q2-5 Handling - General</u> 1. Introduction 2. General <u>Q2-6 Controllability</u> 1. General 2. Engine Failure 3. Max' climb & descent 4. Radius of turn 5. Max' surface wind V 6. Alighting 7. Ditching
	-	<u>Trim</u> 2.17 Trim	<u>Q2-7 Ability to Trim</u>
&	-	<u>Stability</u> 2.18 Stability <u>Miscellaneous Flight Regmt</u> 2.19 Vibration & buffeting 2.20 Envelope press' and distortion 2.21 Ground handling character	<u>Q2-8 Stability</u> 1. General 2. Flutter, Vibration and Buffeting

300ft/ min 400ft/ min Landing Conditions),
 , 1
 (OEI) 100ft/ min, 150ft/ min , ,
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 ,
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2.3 (Structures)

Part'
 1 , 2
 Load
 Part
 (Flight Loads),
 (Control Surface and Loads), 가
 (Ground Loads), (Emergency 5

5. “ (Structure)”

	7	FAA-P-8110-2	CAP 471 Sec' Q
	3.1 3.1.1 3.1.2 3.1.3 3.1.4	<u>General</u> 3.1 Loads 3.2 Factors of Safety 3.3 Strength & Deformation 3.4 Proof of structure 3.5 Design weight 3.6 Design air speeds	Q3-1 <u>General</u> 1. Introduction 2. Weight and Distribution 3. Static strength Q3-2 <u>Design airspeed</u> and maneuver
	-	<u>Flight Loads</u> 3.7 <i>General</i> 3.8 <i>Design maneuver load</i> 3.9 <i>Gust Loads</i> 3.10 <i>Engine Torque</i> 3.11 <i>Side load on eng' torque</i> 3.12 <i>Eng' failure loads</i> 3.13 <i>Gyroscopic loads</i>	<u>Q3-2 Design airspeed</u> and <u>maneuver</u> 1. <i>Introduction</i> 2. <i>Design airspeed</i> 3. <i>Design maneuvers</i> <u>Q3-3 Gust Loads</u> 1. <i>General</i> 2. <i>Gust loads</i> 3. <i>Design Gusts</i> <u>Q3-4 Eng' and Prop' load</u> 1. <i>General</i> 2. <i>Torque</i> 3. <i>Gyroscopic effect</i> 4. <i>Asymmetric flow through propeller disc</i> 5. <i>Engine nodding</i> 6. <i>Crashworthiness</i>
	4 4.3	<u>Control surface and system loads</u> 3.14 Control surface load 3.15 Control system load 3.16 Pilot forces 3.17 Dual control system 3.18 Secondary cont' sys' 3.19 Trim tabs 3.20 Supplementary cond' 3.21 Tail to wind loads	Sub-section Q4 _____ _____ Q4-8 Control system <u>load and Design</u>

6. “ (Design and construction)”

	7	FAA-P-8110-2	CAP 471 Sec' Q
	4.1.1	<u>General</u> 4.1 General	Q4-1 <u>General</u> 1. Intro
	4.1.2	4.2 Materials and workmanship	2. Materials, Fabrication process and assembly item
	4.1.3	4.3 Fabrication method	-
	4.1.4	4.4 Fastenings	-
	4.1.5	4.5 Protection	
	4.1.6	4.6 Accessibility	-
	4.1.7	4.7 Material strength property and design value	-
		4.8 Design properties	
		4.9 Special factors	
	-	4.10 Casting factors	-
		4.11 Bearing factors	
		4.12 Fitting factors	
			3. Flaw Detection
			4. Negative Acceleration
			5. Essential service following engine failure
			6. Inspection and maintenance provisions
			7. Identification of pipe lines
			8. Protection in service
			9. Locking of connections
			10. Incidental loads
			11. Drains
			12. Tests
			<u>Appendix to Q4-1</u>
			Protect' against corrosion

	7	FAA-P-8110-2	CAP 471 Sec' Q
	4.4.1 4.4.2 4.4.3 - - 4.3.1 - 4.4.8 - 4.4.10 -	4.13 General 4.14 Primary flight control 4.15 Stops 4.16 Trim system 4.17 Control sys' locks 4.18 Limit load ststic test 4.19 Operation Test 4.20 Control system details <i>4.21 Spring device</i> 4.22 Cable systems <i>4.23 Joints</i>	Q4-2 <u>General</u> Q4-8 <u>Control system</u> load and design 1. Control system loads 1.1 Primary flight control 1.2 Other cont' system 1.3 Cont' Chains and cables 1.4 Joins 2. Control system design 2.1 General 2.2 Flight control 2.3 Emergency deflation cont'
	- - - -	<i>4.24 Shock absorption test</i> <i>4.25 L/G extend and retract</i> <i>4.26 Wheels</i> <i>4.27 Tires</i>	- - <u>Q4-5 lading gear design</u> <i>1.1 Wheels</i> <i>1.2 Tires</i>
	4.7.1 4.7.2 4.7.3 / 4.7.4 / 4.7.5 4.7.7 4.10 - - 4.7.11 -	4.28 Pilot compartment 4.29 Pilot compartment view 4.30 Windshield / windows 4.31 Cockpit control 4.32 Motion and effect of cockpit control 4.33 Doors 4.34 Seats, berths, belts <i>4.35 Cargo compartment</i> <i>4.36 Emergency exit</i> 4.38 Ventilation -	Q4-2 _____ 3. 3.2 - Q4-8 <u>1_____</u> 4.2 Normal Exit Q4-4 _____ Q4-3 <u>Compartment _____</u> 4.3 5. Ventilation <i>4.4 Ditching</i> 4.5

	7	FAA-P-8110-2	CAP 471 Sec' Q
/	4.9.1 - - - - - -	4.39 4.40 가 4.41 4.42 <i>Electric bonding lightning discharge protection</i> - - - -	6. - - <i>Q4-6 Electric bond' lightning discharge protection</i> 3.3 4. Mount 5. 6. Radio 7.
	4.2 4.7 가 4.5 4.6 -	4.43 4.44 4.45 4.46 <i>Flutter</i>	Q4-9 _____ - 4 -
	4.3 가 - - 4.8 4.9 -	4.48 가 4.49 <i>Ballast</i> 4.50 <i>Leaving</i> - - -	- - - - - <i>Q4-25 2.3</i>

2.5 (Powerplant Installations)

5 (General), . 3 가
(Fuel System), (Fuel System Part)
Component), (Oil System),
(Cooling), (Induction System),
(Exhaust System), (Engine
Controls and Accessories),
(Powerplant Fire Protection)
Sub-system

7. “ (Powerplant)”

	7	FAA-P-8110-2	CAP 471 Sec' Q
	5.1.1	5.1	Q5-1 ____/ Q5-9 ____
	5.1.2	5.2	2.
	5.1.3	5.3	4.
	-	5.4	-
	-	5.5 Turbo supercharger	-
	-	5.6 Turbo propeller-drag limiting system	-
	-	5.7	-
	-	-	3. electric bonding
	-	-	5. instruments/equipments
	-	-	6. pipe lines and ducts
	-	-	7. drains
	-	-	8. valves controlling fluid
	-	-	10. tests
	5.2.1	5.8	1. <u>Q5-2</u>
	-	5.9	2.
	-	5.10	3. electric bonding <u>Q5-1</u>
	-	5.11	3.
	-	5.12	3.3
	-	5.13 Unusable fuel supply	8. determination unusable fuel
	-		9. determination unusable fuel
	5.2.7	5.14	-
	-	5.15 :	4.
	5.2.9	5.16	4.2
	5.2.10	5.17	4.3
	5.2.11	5.18	4.1
	5.19	5.19	4.1
	-	5.20	-
	5.2.14	5.21	4.4 structure containing tanks
	-		4.5 tank vents
	-	5.22 Outlet	4.6
	-	5.23 가	4.1.5 outlets
			3.2 fuel flow rate

	7	FAA-P-8110-2	CAP 471 Sec' Q
	-	5.24	3.4
	5.3.2	5.25	5. lines & fittings
	5.3.3	5.26	-
	5.3.4	5.27	5.2 valves controlling fuel
	5.3.5	5.28	5.3 filters
	-	5.29	4.4 vent & drainage
	-	5.30 Fuel Jettison system	11. fuel jettisoning and pressure refueling systems
	-	-	6. filling point
	-	-	7. fuel quantity ind'
	-	-	10. fuel exhaustion
	-	5.31	1. <u>Q5-3</u>
	5.4.2	5.32	3.
	-	5.33	2.
	5.4.4	5.34	2.5
	-	5.35	4. lines, fittings and accessories
Oil	5.4.6	5.36	4.4 Filters
	5.4.6.2	5.37	4. lines, fittings and accessories
	-	5.38	4.5 oil radiators
	-	-	5. Prop' feathering
	-	-	6. filling point
	-	-	7. oil quantity indicators
	-	-	8. oil cooling tests
	5.5.1	5.39	1. <u>Q5-4</u>
	-	5.40	4. tests
	-	5.41	-
	-	-	3.
	-	5.42	2.

	7	FAA-P-8110-2	CAP 471 Sec' Q
	5.7.1 - - 5.7.7 - -	5.44 Air Induction 5.45 5.46 5.47 5.48 5.49 <i>Bleed air</i>	1. <u>Q5-5</u> 2. <i>de-icing/ anti-icing</i> 2. <i>de-icing/ anti-icing</i> - 3. <i>detail design</i> -
	5.8.1 5.8.2 5.8.3	5.50 5.51 5.52	1. <u>Q5-6</u> - 2.1
	5.9.1 5.9.2 5.9.3 5.9.4 5.9.5 5.9.6 5.9.7 5.9.8 5.9.9 5.9.10 - -	5.53 5.54 5.55 5.56 5.57 5.58 - 5.59 5.60 5.61 5.62 5.63	1. <u>Q5-7</u> 3. 2. 4. 6.1 - - 5. - - 7. -
	- - - - 5.10.4 -	5.64 5.65 , , 5.66 <i>Ventilation</i> 5.67 <i>Shut off</i> 5.68 5.69	4. <i>nacelle skin and other surfaces and items</i> - - - 6. -

	7	FAA-P-8110-2	CAP 471 Sec' Q
	-	5.70	3.
	-	5.72	-
	-	5.73	-
	-	-	1.
	-	-	2. layout of installations
	-	-	5. air intakes
	-	-	7. protection of items outside a designated fire zone
	-	-	8. protection of items inside a designated fire zone
	-	-	9. fire protection standard
	-	-	10. fire detector and extinguisher systems

2.6 (Equipment)

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Turbo Propeller Drag Limiting
 , Unusable Fuel, , Fuel
 Jettison, , , " "

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Power

Power Source

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, Oil (

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(combustion heater system),
 (ballast)

8. " (Equipment)"

	7	FAA-P-8110-2	CAP 471 Sec' Q
	6.1	6.1	1. / 2. <u>Q6-1 Equipment installations</u>
	6.2	-	2.5
	6.3	6.2	3.
	-	6.3	2.9
	-	6.4	3.2
	-	6.5	3.3
	-	6.6 ,	2.
	6.4	-	-
		6.7	2.
		6.8 <i>warning, caution and advisory lights</i>	<u>Q6-12</u> 8.7 <i>warning device</i>
		6.9	2.10
		6.10	2.11 <i>Pitot-static systems</i>
		6.11	6. <i>Compass</i>
		6.12	<u>Q6-4 Automatic-Pilots</u>
		6.13	-
		6.14 <i>instruments using a power supply</i>	2.8 <i>F/L instruments requiring power supply</i>
		6.15	-
		6.16	3.2
		-	4. <i>min' equipment for transport ariship</i>
		-	5. <i>min' equipment - particular condition</i>
	-	-	<u>Q6-5 _____</u>
ballast system	-	-	<u>Q6-3 ballast system</u>

	7	FAA-P-8110-2	CAP 471 Sec' Q
	-	<p>6.17</p> <p>6.18 storage battery design and installation</p> <p>6.19</p> <p>6.20 master s/w</p> <p>6.21 electric cables and equipment</p> <p>6.22</p>	<p>1. introduction <u>Q9-12</u></p> <p>9. batteries</p> <p>11. mechanical protection of live parts of the supply and distribution system</p> <p>10. distribution</p> <p>4. system capability</p> <p>-</p> <p>2. system reliability</p> <p>3. system characteristics</p> <p>5. load analysis</p> <p>6. earthing of supply system</p> <p>7. generators</p> <p>8. supply and distribution systems</p> <p>9. batteries</p> <p>10. distribution</p> <p>11. mechanical protection of live parts of the supply and distribution system</p> <p>12. fluid and vapor contamination</p> <p>13. electrical & magnetic interference</p> <p>14. general installation requirements</p> <p>15. Tests</p>
Lights	-	<p>6.23 instrument lights</p> <p>6.24 landing lights</p> <p>6.25 position light system installation</p> <p>6.26 position light system dihedral angles</p> <p>6.27 position light distribution and intensities</p>	<p>2.6 <u>Q6-1</u></p> <p>5. min' equipment <u>Q6-1</u></p> <p>1. applicability</p> <p>2. definitions</p> <p>2.4 dihedral angle</p> <p>3.</p> <p>3.1</p>

	7	FAA-P-8110-2	CAP 471 Sec' Q
Lights	-	<p>6.28 min' intensities in the hor' plane of bow, forward and rear position lights</p> <p>6.29 min' intensities in any vertical plane of bow, forward and rear position lights</p> <p>6.30 max' intensities in overlapping beams of forward and rear position lights</p> <p>6.31 color specifications</p> <p>6.32</p>	<p>3.</p> <p>4. navigation light</p> <p>3.</p> <p>4. navigation light</p> <p>5. anti-collision light</p> <p>3.</p> <p>4. navigation light</p> <p>5. anti-collision light</p> <p>3.3 light filters and covers</p> <p>5. anti-collision light</p>
	-	<p>6.33</p> <p>6.34</p> <p>6.35</p> <p>6.36</p> <p>6.37</p>	<p>-</p> <p>-</p> <p>-</p> <p><u>Q6-6 Life Rdt</u></p> <p>-</p>
	-	<p>6.38</p> <p>6.39</p> <p>6.40</p> <p>6.41</p>	<p><u>Q6-2 gas & air supply systems</u></p> <p>-</p>
	-	-	<p>1. introduction <u>Q6-13</u></p> <p>2. electrical systems</p> <p>3. circuit fault systems</p> <p>4. circuit interlocking</p> <p>5. protection of circuits and equipment</p> <p>6. general requirements for the installation of systems and equipment</p> <p>7. particular requirements for the installation of systems and equipment</p>

2.7 (Operating Limitations and Information)

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" , "markings and placards", "

" , 6 " "

9. " , "

	7	FAA-P-8110-2	CAP 471 Sec' Q
	7.1	7.1	1. <u>Q7-1</u> 2.
	-	7.2 7.3 7.4 7.5 7.6 7.7 7.8 kinds of operation 7.9 7.10 vectoring 7.11 7.12	2. air speed <u>Q7-2</u> 3. weight & ballance 4. powerplant - 6. - - 5.2 4.5 5. -
Markings and Placards	-	7.13 7.14 : 7.15 7.16 7.17 7.18 7.19 7.20 7.21 7.22 7.23 7.24	1. <u>Q7-3</u> 2.1 2.2 5.4 4 2.3.2 3. control marking 4. 5. placards 3.3 / 5.3 5.5
	-	7.25 7.26 7.27 7.28 7.29 (loading) -	1. introduction <u>Q7-5</u> 2. 3. 4. 5. 6. 7. 4. 8. supplements

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