



**Public Authority for Civil Aviation**

# **CAR-174**

## **Civil Aviation Regulation**

# **Aviation Meteorological Service Organisations — Certification**

**Effective: 31<sup>st</sup> January 2020**

**Approved by: HE Dr. Mohamed bin Nasser Al-Zaabi (CEO)**

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**Corrigendum of Amendments**

No.	Ref	Description
01	02	This CAR has been fully amended including additional sections applicable to
		Aviation Meteorological Service Organisations - Certification.
		All users are required to read completely.
02	03	CAR-174.650 and 174.655 inserted – Transition period and Exemptions

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## Glossary of Terms or Abbreviations

The following terms or acronyms may be used in any manual or document published by PACA. Reproduction in part or whole is allowed without prior approval. The Document Control Office reserves the rights to include such a listing in any PACA manual or document prior to publishing.

ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACCID	Accident
ADREP	Accident/Incident Reporting System
AFIS	Aerodrome Flight Information Service
AFTN	Aeronautical Fixed Telecommunication Network
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
A/C	Aircraft
AMSL	Above Mean Sea Level
AOC	Air Operator Certificate
APP	Approach Control Office
ARO	Air Traffic Services Reporting Office
ATC	Air Traffic Control
ATS	Air Traffic Service
CAR	Civil Aviation Regulation
CFMU	Central Flow Management Unit
COM	Communications/Equipment
FIC	Flight Information Centre
FIS	Flight Information Service
GM	Guidance Material
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IIC	Investigator in Charge
INCID	Serious Incident
ISA	International standard atmosphere
Minister	Minister of Transport
NOTAM	Notice to Airmen
NPA	Notice of Proposed Amendment
OTSB	Oman Transport Safety Bureau
PL	Policy Lead
RCC	Rescue Co-ordination Centre of the Sultanate
RNAV	Area Navigation
SAR	Search and Rescue
SIGMET	Significant Meteorological Report
SRA	Surveillance Radar Approach
SSR	Secondary Surveillance Radar
TCAS	Traffic Alert and Collision Avoidance System
TL	Technical Lead
UTC	Universal Time Coordinated
VHF	Very High Frequency
WX	Weather

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## FOREWORD

- (a) Enforcement Procedures ensuring compliance against Civil Aviation Regulation have been issued by the Public Authority for Civil Aviation of Oman (hereinafter referred as PACA or “the Authority”) under the provisions of the Civil Aviation Law of the Sultanate of Oman.
- (b) This CAR has been modelled upon similar regulations implemented by other member states and includes the subject matter endorsed within ICAO Annex 3 – Meteorological Services for International Air Navigation
- (c) CAR-174 prescribes the requirements for:
  - (1) The establishing, implementation, and maintaining an Aviation Meteorological Service - Organisation
  - (2) Punitive actions can and will be enforced by the Authority against recognised actions of non-compliance.
  - (d) Amendments to the text in CAR-174 in revised editions are issued as a complete amendment of pages contained within.
- (e) The editing practices used in this document are as follows:
  - (1) ‘Shall’ is used to indicate a mandatory requirement and may appear in CARs.
  - (2) ‘Should’ is used to indicate a recommendation
  - (3) ‘May’ is used to indicate discretion by the Authority, or the industry as appropriate.
  - (4) ‘Will’ indicates a mandatory requirement and is used to advise of action incumbent on the Authority.

***Note: The use of the male gender implies the female gender and vice versa.***

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## SUBPART A - GENERAL

### CAR 174.001 Applicability

CAR-174 prescribes the requirements applicable to:

- (a) The establishing, implementation, and maintaining an Aviation Meteorological Service – Organisation;
- (b) The applicable punitive actions that can and will be enforced by the Authority against recognised actions of non-compliance.

### CAR 174.005 Definitions

When the following terms are used in the Standards and Recommended Practices for Meteorological Service for International Air Navigation, they have the following meanings:

**Aerodrome.** A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

**Aerodrome climatological summary.** Concise summary of specified meteorological elements at an aerodrome, based on statistical data.

**Aerodrome climatological table.** Table providing statistical data on the observed occurrence of one or more meteorological elements at an aerodrome.

**Aerodrome control tower.** A unit established to provide air traffic control service to aerodrome traffic.

**Aerodrome elevation.** The elevation of the highest point of the landing area.

**Aerodrome meteorological office.** An office designated to provide meteorological service for aerodromes serving international air navigation.

**Aerodrome reference point.** The designated geographical location of an aerodrome.

**Aeronautical fixed service (AFS).** A telecommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air services.

**Aeronautical fixed telecommunication network (AFTN).** A worldwide system of aeronautical fixed circuits provided, as part of the aeronautical fixed service, for the exchange of messages and/or digital data between aeronautical fixed stations having the same or compatible communications characteristics.

**Aeronautical meteorological station.** A station designated to make observations and meteorological reports for use in international air navigation.

**Aeronautical mobile service.** A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies.

**Aeronautical telecommunication station.** A station in the aeronautical telecommunication service.

**Aircraft.** Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

**Aircraft observation.** The evaluation of one or more meteorological elements made from an aircraft in flight.

**AIRMET information.** Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of low-level aircraft operations and which was not already included in the forecast issued for low-level flights in the flight information region concerned or sub-area thereof.

**Air-report.** A report from an aircraft in flight prepared in conformity with requirements for position, and operational and/or meteorological reporting.

*Note: Details of the AIREP form are given in the PANS-ATM (Doc 4444).*

**Air traffic services unit.** A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.

**Alternate aerodrome.** An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate aerodromes include the following:

**Take-off alternate.** An alternate aerodrome at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure.

**En-route alternate.** An alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en route.

**Destination alternate.** An alternate aerodrome at which an aircraft would be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing.

*Note: The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for that flight.*

**Altitude.** The vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL).

**Approach control unit.** A unit established to provide air traffic control service to controlled flights arriving at, or departing from, one or more aerodromes.

**Appropriate ATS authority.** The relevant authority designated by the State responsible for providing air traffic services in the airspace concerned.

**Area control centre (ACC).** A unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction.

**Area navigation (RNAV).** A method of navigation which permits aircraft operations on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

*Note. Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.*

**Automatic dependent surveillance — contract (ADS-C).** A means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions ADS-C reports would be initiated, and what data would be contained in the reports.

*Note: The abbreviated term “ADS contract” is commonly used to refer to ADS event contract, ADS demand contract, ADS periodic contract or an emergency mode.*



**Basic weather report.** Means a verbal comment, in support of aviation, describing any of the following current weather conditions observed at a particular place or airspace:

- (a) wind direction and strength;
- (b) mean sea level air pressure;
- (c) air temperature;
- (d) weather conditions and cloud cover.

**Briefing.** Oral commentary on existing and/or expected meteorological conditions.

**Cloud of operational significance.** A cloud with the height of cloud base below 1,500 m (5,000 ft) or below the highest minimum sector altitude, whichever is greater, or a cumulonimbus cloud or a towering cumulus cloud at any height.

**Consultation.** Discussion with a meteorologist or another qualified person of existing and/or expected meteorological conditions relating to flight operations; a discussion includes answers to questions.

**Control area (CTA).** A controlled airspace extending upwards from a specified limit above the earth.

**Cruising level.** A level maintained during a significant portion of a flight.

**MET Authority.** The Directorate General for Meteorology. The relevant department designated by the Chairman of the PACA responsible for providing or arranging for the provision of meteorological service for national and international air navigation on behalf of the Sultanate of Oman.

**Elevation.** The vertical distance of a point or a level, on or affixed to the surface of the earth, measured from mean sea level.

**Erroneous meteorological information.** Means any meteorological information that is or has the potential to be significantly outside the allowable accuracy or tolerance for that information.

**Extended range operation.** Any flight by an aeroplane with two turbine engines where the flight time at the one engine inoperative cruise speed (in ISA and still air conditions), from a point on the route to an adequate alternate aerodrome, is greater than the threshold time approved by the State of the Operator.

**Facility.** Means any system or equipment which provides an automatic function that supports a meteorological office or provides meteorological information, and includes any system or equipment for the following:

- (a) Electronic data analysis and forecast production;
- (b) Remote weather sensing;
- (c) Electronic or automatic meteorological information delivery

**Flight crew member.** A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.

**Flight documentation.** Written or printed documents, including charts or forms, containing meteorological information for a flight.

**Flight information centre (FIC).** A unit established to provide flight information service and alerting service.

**Flight information region (FIR).** An airspace of defined dimensions within which flight information service and alerting service are provided.

**Flight level.** A surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals.

*Note 1: A pressure type altimeter calibrated in accordance with the Standard Atmosphere:*

- (a) When set to a QNH altimeter setting, will indicate altitude;*
- (b) When set to a QFE altimeter setting, will indicate height above the QFE reference datum;*
- (c) When set to a pressure of 1013.2 hPa, may be used to indicate flight levels.*

*Note 2: The terms “height” and “altitude”, used in Note 1, indicate altimetric rather than geometric heights and altitudes.*

**Forecast.** A statement of expected meteorological conditions for a specified time or period, and for a specified area or portion of airspace.

**GAMET area forecast.** An area forecast in abbreviated plain language for low-level flights for a flight information region or sub-area thereof, prepared by the meteorological office designated by the meteorological authority concerned and exchanged with meteorological offices in adjacent flight information regions, as agreed between the meteorological authorities concerned.

**Grid point data in digital form.** Computer processed meteorological data for a set of regularly spaced points on a chart, for transmission from a meteorological computer to another computer in a code form suitable for automated use.

*Note: In most cases, such data are transmitted on medium- or high-speed telecommunications channels.*

**Height.** The vertical distance of a level, a point or an object considered as a point, measured from a specified datum.

**Human Factors principles.** Principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.

**ICAO meteorological information exchange model (IWXXM).** A data model for representing aeronautical meteorological information.

**International airways volcano watch (IAVW).** International arrangements for monitoring and providing warnings to aircraft of volcanic ash in the atmosphere.

*Note: The IAVW is based on the cooperation of aviation and non-aviation operational units using information derived from observing sources and networks that are provided by States. The watch is coordinated by ICAO with the cooperation of other concerned international organizations.*

**Level.** A generic term relating to the vertical position of an aircraft in flight and meaning variously height, altitude or flight level.

**Meteorological authority.** The authority providing or arranging for the provision of meteorological service for international air navigation on behalf of the Sultanate of Oman.

**Meteorological bulletin.** A text comprising meteorological information preceded by an appropriate heading.

**Meteorological information.** Meteorological report, analysis, forecast, and any other statement relating to existing or expected meteorological conditions.

**Meteorological office.** An office designated to provide meteorological service for international air navigation.

**Meteorological report.** A statement of observed meteorological conditions related to a specified time and location.

**Meteorological satellite.** An artificial Earth satellite making meteorological observations and transmitting these observations to Earth.

**Meteorological service.** Means any of the following services that provide meteorological information in support of aviation:

- (a) Climatology service: A service for the development and supply of climatological information for a specific place or airspace;
- (b) Forecast service: a service for the supply of forecast meteorological information for a specific area or portion of airspace;
- (c) Information dissemination service: a service for the collection and dissemination of meteorological information;
- (d) Meteorological briefing service: a service for the supply of written and oral meteorological information on existing and expected meteorological conditions;
- (e) Meteorological reporting service: a service for the supply of routine meteorological reports;
- (f) Meteorological watch service: a service for maintaining a watch over meteorological conditions affecting aircraft operations in a specific area.

**Meteorological watch office (MWO).** An office designated to provide information concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations within its specified area of responsibility.

**Minimum sector altitude.** The lowest altitude which may be used which will provide a minimum clearance of 300 m (1,000 ft) above all objects located in an area contained within a sector of a circle of 46 km (25 NM) radius centred on a radio aid to navigation.

**Navigation specification.** A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications:

Required navigation performance (RNP) specification. A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.

Area navigation (RNAV) specification. A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

*Note: The Performance-based Navigation (PBN) Manual (Doc 9613), Volume II, contains detailed guidance on navigation specifications.*

**Observation (meteorological).** The evaluation of one or more meteorological elements.

**Operational control.** The exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight.

**Operational flight plan.** The operator's plan for the safe conduct of the flight based on considerations of aeroplane performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes concerned.

**Operational planning.** The planning of flight operations by an operator.

**Operator.** The person, organization or enterprise engaged in or offering to engage in an aircraft operation.

**PACA.** Public Authority for Civil Aviation

**Performance-based navigation (PBN).** Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

*Note: Performance requirements are expressed in navigation specification (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.*

**Pilot-in-command.** The pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight.

**Prevailing visibility.** The greatest visibility value, observed in accordance with the definition of “visibility”, which is reached within at least half the horizon circle or within at least half of the surface of the aerodrome. These areas could comprise contiguous or non-contiguous sectors.

*Note: This value may be assessed by human observation and/or instrumented systems. When instruments are installed, they are used to obtain the best estimate of the prevailing visibility.*

**Prognostic chart.** A forecast of a specified meteorological element(s) for a specified time or period and a specified surface or portion of airspace, depicted graphically on a chart.

**Quality assurance.** Part of quality management focused on providing confidence that quality requirements will be fulfilled (ISO 9000\*).

**Quality control.** Part of quality management focused on fulfilling quality requirements (ISO 9000\*).

**Quality management.** Coordinated activities to direct and control an organization with regard to quality (ISO 9000\*). \* ISO Standard 9000 — Quality Management Systems — Fundamentals and Vocabulary.

**Regional air navigation agreement.** Agreement approved by the Council of ICAO normally on the advice of a regional air navigation meeting.

**Reporting point.** A specified geographical location in relation to which the position of an aircraft can be reported.

**Rescue coordination centre.** A unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

**Runway.** A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

**Runway visual range (RVR).** The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

**Search and rescue services unit.** A generic term meaning, as the case may be, rescue coordination centre, rescue sub-centre or alerting post.

**SIGMET information.** Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations.

**Space weather centre (SWXC).** A centre designated to monitor and provide advisory information on space weather phenomena expected to affect high-frequency radio communications, communications via satellite, GNSS-based navigation and surveillance systems and/or pose a radiation risk to aircraft occupants.

*Note: A space weather centre is designated as global and/or regional.*

**Standard isobaric surface.** An isobaric surface used on a worldwide basis for representing and analysing the conditions in the atmosphere.

**State volcano observatory.** A volcano observatory, designated by regional air navigation agreement, to monitor active or potentially active volcanoes within a State and to provide information on volcanic activity to its associated area control centre/flight information centre, meteorological watch office and volcanic ash advisory centre.

**Threshold.** The beginning of that portion of the runway usable for landing.

**Touchdown zone.** The portion of a runway, beyond the threshold, where it is intended landing aeroplanes first contact the runway.

**Tropical cyclone.** Generic term for a non-frontal synoptic-scale cyclone originating over tropical or sub-tropical waters with organized convection and definite cyclonic surface wind circulation.

**Tropical cyclone advisory centre (TCAC).** A meteorological centre designated by regional air navigation agreement to provide advisory information to meteorological watch offices, world area forecast centres and international OPMET databanks regarding the position, forecast direction and speed of movement, central pressure and maximum surface wind of tropical cyclones.

**Upper-air chart.** A meteorological chart relating to a specified upper-air surface or layer of the atmosphere.

**Visibility.** Visibility for aeronautical purposes is the greater of:

- (a) the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a bright background;
- (b) the greatest distance at which lights in the vicinity of 1 000 candelas can be seen and identified against an unlit background.

*Note: The two distances have different values in air of a given extinction coefficient, and the latter b) varies with the background illumination. The former a) is represented by the meteorological optical range (MOR).*

**Volcanic ash advisory centre (VAAC).** A meteorological centre designated by regional air navigation agreement to provide advisory information to meteorological watch offices, area control centres, flight information centres, world area forecast centres and international OPMET databanks regarding the lateral and vertical extent and forecast movement of volcanic ash in the atmosphere following volcanic eruptions.

**VOLMET.** Meteorological information for aircraft in flight.

Data link-VOLMET (D-VOLMET). Provision of current aerodrome routine meteorological reports (METAR) and aerodrome special meteorological reports (SPECI), aerodrome forecasts (TAF), SIGMET, special air-reports not covered by a SIGMET and, where available, AIRMET via data link.

**VOLMET broadcast.** Provision, as appropriate, of current METAR, SPECI, TAF and SIGMET by means of continuous and repetitive voice broadcasts.

**World area forecast centre (WAFC).** A meteorological centre designated to prepare and issue significant weather forecasts and upper-air forecasts in digital form on a global basis direct to States using the aeronautical fixed service Internet based services.

**World area forecast system (WAFS).** A worldwide system by which world area forecast centres provide aeronautical meteorological en-route forecasts in uniform standardized formats.

**Terms used with a limited meaning**

For the purpose of this CAR, the following terms are used with a limited meaning as indicated below:

To avoid confusion in respect of the term “service” between the meteorological service considered as an administrative entity and the service which is provided, “MET Authority” or “aviation meteorological service provider” is used for the former and “service” for the latter;

- (a) “provide” is used solely in connection with the provision of service;
- (b) “issue” is used solely in connection with cases where the obligation specifically extends to sending out the information to a user;
- (c) “make available” is used solely in connection with cases where the obligation ends with making the information accessible to a user; and
- (d) “supply” is used solely in connection with cases where either c) or d) applies.

## SUBPART B – General provisions

***Introductory Note 1:*** It is recognized that the provisions of this CAR with respect to meteorological information are subject to the understanding that the obligation of the Sultanate of Oman is for the supply, under Article 28 of the Convention on International Civil Aviation, of meteorological information and that the responsibility for the use made of such information is that of the user.

***Introductory Note 2:*** Although the Convention allocates to the State of Registry certain functions which that State is entitled to discharge, or obligated to discharge, as the case may be, the Assembly recognized, in Resolution A23-13, that the State of Registry may be unable to fulfil its responsibilities adequately in instances where aircraft are leased, chartered or interchanged — in particular without crew — by an operator of another State and that the Convention may not adequately specify the rights and obligations of the State of an operator in such instances until such time as Article 83 bis of the Convention enters into force. Accordingly, the Council urged that if, in the above-mentioned instances, the State of Registry finds itself unable to discharge adequately the functions allocated to it by the Convention, it delegate to the state of the Operator, subject to acceptance by the latter State, those functions of the State of Registry that can more adequately be discharged by the State of the Operator. It was understood that pending entry into force of Article 83 bis of the Convention the foregoing action would only be a matter of practical convenience and would not affect either the provisions of the Convention prescribing the duties of the State of Registry or any third State. However, as Article 83 bis of the Convention entered into force on 20 June 1997, such transfer agreements will have effect in respect of Contracting States that have ratified the related Protocol (Doc 9318) upon fulfilment of the conditions established in Article 83 bis.

***Introductory Note 3:*** In the case of international operations effected jointly with aeroplanes not all of which are registered in the same Contracting State, nothing in this CAR prevents the States concerned entering into an agreement for the joint exercise of the functions placed upon the State of Registry by the provisions of this CAR.

### CAR 174.050 Objective, Determination and Provision of Meteorological Service

- (a) The objective of meteorological service for international air navigation shall be to contribute towards the safety, regularity and efficiency of international air navigation.
- (b) This objective shall be achieved by supplying the following users: operators, flight crew-members, air traffic services units, search and rescue services units, airport managements and others concerned with the conduct or development of international air navigation, with the meteorological information necessary for the performance of their respective functions.
- (c) The PACA shall determine the meteorological service, which it will provide to meet the needs of international air navigation. This determination shall be made in accordance with the provisions this CAR, this instruction and in accordance with regional air navigation agreement; it shall include the determination of the meteorological service to be provided for international air navigation over international waters and other areas, which lie outside the territory of the Sultanate of Oman.
- (d) PACA has designated the MET Authority, hereinafter referred to as the meteorological authority, to provide or to arrange for the provision of meteorological service for international air navigation on its behalf. Details of the MET Authority shall be included in the State Aeronautical Information Publication (AIP) of Oman, in accordance with CAR-175

*Note: Detailed specifications concerning presentation and contents of the aeronautical information publication is provided in PANS-AIM (Doc 10066), Appendix 2.*

- (e) PACA shall ensure that the MET Authority complies with the requirements of the World Meteorological Organization (WMO) in respect of qualifications, competencies, education and training of meteorological personnel providing service for international air navigation.

*Note: Requirements concerning the qualifications, competencies, education and training of meteorological personnel in aeronautical meteorology are given in the Technical Regulations (WMO-No. 49), Volume I — General Meteorological Standards and Recommended Practices, Part V — Qualifications and Competencies of Personnel Involved in the Provision of Meteorological (Weather and Climate) and Hydrological Services, Part VI — Education and Training of Meteorological Personnel and Appendix A Basic Instruction Package*

### **CAR 174.055 Supply, Use, Quality Management and Interpretation of Meteorological Information**

- (a) Close liaison shall be maintained between those concerned with the supply and those concerned with the use of meteorological information on matters which affect the provision of meteorological service for international air navigation.
- (b) PACA shall ensure that MET Authority establishes and implements a properly organized quality system comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to the users listed in CAR-174.050 paragraph (b) and CAR-100.
- (c) The quality system established in accordance with paragraph (b) above, shall be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards and should be certified by an approved organization.

*Note: The ISO 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme. The details of a successful programme are to be formulated by PACA. Guidance on the establishment and implementation of a quality system is given in the Manual on the Quality Management System for the Provision of Meteorological Service for International Air Navigation (Doc 9873).*

- (d) The quality system shall provide the users with assurance that the meteorological information supplied complies with the stated requirements in terms of the geographical and spatial coverage, format and content, time and frequency of issuance and period of validity, as well as the accuracy of measurements, observations and forecasts. When the quality system indicates that meteorological information to be supplied to the users does not comply with the stated requirements, and automatic error correction procedures are not appropriate, such information shall not be supplied to the users unless it is validated with the originator.

*Note: Requirements concerning the geographical and spatial coverage, format and content, time and frequency of issuance and period of validity of meteorological information to be supplied to aeronautical users are given in SUBPARTS C, D, E, F, G, H, I, J, and K and ICAO Annex 3, Appendices 2, 3, 5, 6, 7, 8 and 9 and the relevant regional air navigation plans. Guidance concerning the accuracy of measurement and observation, and accuracy of forecasts is given in Attachments A and B respectively, and forming an integral part of this Regulation, respectively.*

- (e) In regard to the exchange of meteorological information for operational purposes, the quality system shall include verification and validation procedures and resources for



monitoring adherence to the prescribed transmission schedules for individual messages and/or bulletins required to be exchanged, and the times of their filing for transmission. The quality system shall be capable of detecting excessive transit times of messages and bulletins received.

*Note: Requirements concerning the exchange of operational meteorological information are given in SUBPART L of this Regulation and Appendix 10 of ICAO Annex 3 and forming an integral part of this Regulation.*

- (f) Demonstration of compliance of the quality system applied shall be by audit. If non-conformity of the system is identified, action shall be initiated to determine and correct the cause. All audit observations shall be evidenced and properly documented.
- (g) Owing to the variability of meteorological elements in space and time, to limitations of observing techniques and to limitations caused by the definitions of some of the elements, the specific value of any of the elements given in a report shall be understood by the recipient to be the best approximation of the actual conditions at the time of observation.

*Note: Guidance on the operationally desirable accuracy of measurement or observation is given in Attachment A.*

- (h) Owing to the variability of meteorological elements in space and time, to limitations of forecasting techniques and to limitations caused by the definitions of some of the elements, the specific value of any of the elements given in a forecast shall be understood by the recipient to be the most probable value which the element is likely to assume during the period of the forecast. Similarly, when the time of occurrence or change of an element is given in a forecast, this time shall be understood to be the most probable time.

*Note: Guidance on the operationally desirable accuracy of forecasts is given in Attachment B.*

- (i) The meteorological information supplied to the users listed in CAR-174.050 paragraph (b) shall be consistent with Human Factors principles and shall be in forms which require a minimum of interpretation by these users, as specified in the following Subparts.

*Note: Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683).*

## **CAR 174.060 Notifications Required from Operators**

- (a) An operator requiring meteorological service or changes in existing meteorological service shall notify, sufficiently in advance, the MET Authority or the aerodrome meteorological office concerned. The minimum amount of advance notice required shall be as agreed between the MET Authority or aerodrome meteorological office and the operator concerned.
- (b) The MET Authority shall be notified by the operator requiring service when:
  - (1) New routes or new types of operations are planned;
  - (2) Changes of a lasting character are to be made in scheduled operations; and
  - (3) Other changes, affecting the provision of meteorological service, are planned.

Such information shall contain all details necessary for the planning of appropriate arrangements by the MET Authority.

- (c) The aerodrome meteorological office, or the meteorological office concerned, shall be notified by the operator or a flight crew member:

- (1) Of flight schedules;

- (2) When non-scheduled flights are to be operated; and
  - (3) When flights are delayed, advanced or cancelled.
- (d) The notification to the aerodrome meteorological office of individual flights shall contain the following information except that, in the case of scheduled flights, the requirement for some or all of this information may be waived as agreed between the aerodrome meteorological office and the operator concerned:
- (1) Aerodrome of departure and estimated time of departure;
  - (2) Destination and estimated time of arrival;
  - (3) Route to be flown and estimated times of arrival at, and departure from, any intermediate aerodrome(s);
  - (4) Alternate aerodromes needed to complete the operational flight plan and taken from the relevant list contained in the regional air navigation plan;
  - (5) Cruising level;
  - (6) Type of flight, whether under visual or instrument flight rules;
  - (7) Type of meteorological information requested for a flight crew member, whether flight documentation and/or briefing or consultation; and
  - (8) time(s) at which briefing, consultation and/or flight documentation are required.

## SUBPART C – GLOBAL WORLD AREA FORECAST SYSTEM & METEOROLOGICAL OFFICES

*Note: Technical specifications and detailed criteria related to this Subparts are given in ICAO Annex 3, Appendix 2.*

### CAR 174.100 Objective of the World Area Forecast System

The objective of the world area forecast system (WAFS) shall be to supply meteorological authorities and other users with global aeronautical meteorological en-route forecasts in digital form. This objective shall be achieved through a comprehensive, integrated, worldwide and, as far as practicable, uniform system, and in a cost-effective manner, taking full advantage of evolving technologies.

### CAR 174.105 World Area Forecast Centres

(a) The Sultanate of Oman, having accepted the responsibility for providing a world area forecast centre (WAFC) within the framework of the WAFS, shall arrange for that centre:

(1) to prepare gridded global forecasts of:

- i. Upper wind;
- ii. Upper-air temperature and humidity;
- iii. Geopotential altitude of flight levels;
- iv. Flight level and temperature of tropopause;
- v. Direction, speed and flight level of maximum wind;
- vi. Cumulonimbus clouds;
- vii. Icing; and
- viii. Turbulence;

(1) To prepare global forecasts of significant weather (SIGWX) phenomena;

(2) To issue the forecasts referred to in a) and b) in digital form to meteorological authorities and other users, as approved by the PACA on advice from the MET Authority;

(3) To receive information concerning the release of radioactive materials into the atmosphere from its associated World Meteorological Organization (WMO) regional specialized meteorological centre (RSMC) for the provision of transport model products for radiological environmental emergency response, in order to include the information in SIGWX forecasts; and

(4) To establish and maintain contact with volcanic ash advisory centres (VAACs) for the exchange of information on volcanic activity in order to coordinate the inclusion of information on volcanic eruptions in SIGWX forecasts.

(b) In case of interruption of the operation of a WAFC, its functions shall be carried out by the other WAFC.

*Note: Back-up procedures to be used in case of interruption of the operation of a WAFC are updated by the Meteorology Panel (METP) as necessary; the latest revision can be found on the ICAO METP website.*

**CAR 174.110 Aerodrome Meteorological Offices**

- (a) The MET Authority shall establish one or more aerodrome and/or other meteorological offices which shall be adequate for the provision of the meteorological service required to satisfy the needs of international air navigation.
- (b) An aerodrome meteorological office shall carry out all or some of the following functions as necessary to meet the needs of flight operations at the aerodrome:
  - (1) prepare and/or obtain forecasts and other relevant information for flights with which it is concerned; the extent of its responsibilities to prepare forecasts shall be related to the local availability and use of en-route and aerodrome forecast material received from other offices;
  - (2) prepare and/or obtain forecasts of local meteorological conditions;
  - (3) maintain a continuous survey of meteorological conditions over the aerodromes for which it is designated to prepare forecasts;
  - (4) provide briefing, consultation and flight documentation to flight crew members and/or other flight operations personnel;
  - (5) supply other meteorological information to aeronautical users;
  - (6) display the available meteorological information;
  - (7) exchange meteorological information with other aerodrome meteorological offices; and
  - (8) supply information received on pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud, to its associated air traffic services unit, aeronautical information service unit and meteorological watch office (MWO) as agreed between the meteorological, aeronautical information service and ATS authorities concerned.
- (c) The aerodromes for which landing forecasts are required shall be determined by regional air navigation agreement.
- (d) For an aerodrome without an aerodrome meteorological office located at the aerodrome:
  - (1) the MET Authority shall designate one or more aerodrome meteorological office(s) to supply meteorological information as required; and
  - (2) the MET Authority shall establish means by which such information can be supplied to the aerodromes concerned.

**CAR 174.115 Meteorological Watch Offices (MWO)**

- (a) The MET Authority, having accepted the responsibility for providing air traffic services within a flight information region (FIR) or a control area (CTA), shall establish, in accordance with regional air navigation agreement, one or more MWOs, or arrange for another Contracting State to do so.

*Note: Guidance on the bilateral or multilateral arrangements between Contracting States for the provision of meteorological watch office services, including for cooperation and delegation, can be found in the Manual of Aeronautical Meteorological Practice (Doc 8896).*

- (b) An MWO shall:
- (1) maintain continuous watch over meteorological conditions affecting flight operations within its area of responsibility;
  - (2) prepare SIGMET and other information relating to its area of responsibility;
  - (3) supply SIGMET information and, as required, other meteorological information to associated air traffic services units;
  - (4) disseminate SIGMET information;
  - (5) when required by regional air navigation agreement, in accordance with CAR-174.305 Paragraph (a);
    - i. prepare AIRMET information related to its area of responsibility;
    - ii. supply AIRMET information to associated air traffic services units; and
    - iii. disseminate AIRMET information;
      - A. supply information received on pre-eruption volcanic activity, a volcanic eruption and volcanic ash cloud for which a SIGMET has not already been issued, to its associated area control centre (ACC)/flight information centre (FIC), as agreed between the meteorological and ATS authorities concerned, and to its associated VAAC as determined by regional air navigation agreement; and
      - B. supply information received concerning the release of radioactive materials into the atmosphere, in the area for which it maintains watch or adjacent areas, to its associated ACC/FIC, as agreed between the meteorological and ATS authorities concerned, and to aeronautical information service units, as agreed between the meteorological and appropriate civil aviation authorities concerned. The information shall comprise location, date and time of the release, and forecast trajectories of the radioactive materials.

*Note: The information is provided by RSMCs for the provision of transport model products for radiological environmental emergency response, at the request of the delegated authority of the State in which the radioactive material was released into the atmosphere, or the International Atomic Energy Agency (IAEA). The information is sent by the RSMC to a single contact point of the national meteorological service in each State. This contact point has the responsibility of redistributing the RSMC products within the State concerned. Furthermore, the information is provided by IAEA to RSMC co-located with VAAC London (designated as the focal point) which in turn notifies the ACCs/FICs concerned about the release.*

- (c) The boundaries of the area over which meteorological watch is to be maintained by an MWO shall be coincident with the boundaries of an FIR or a CTA or a combination of FIRs and/or CTAs.

### **CAR 174.120 Volcanic Ash Advisory Centres (VAAC)**

- (a) The Sultanate of Oman, having accepted the responsibility for providing a VAAC within the framework of the international airways volcano watch, shall arrange for that centre to respond to a notification that a volcano has erupted or is expected to erupt, or that volcanic ash is reported in its area of responsibility, by:

- (1) monitoring relevant geostationary and polar-orbiting satellite data and, where available, relevant ground-based and airborne data, to detect the existence and extent of volcanic ash in the atmosphere in the area concerned;

*Note. Relevant ground-based and airborne data include data derived from Doppler weather radar, ceilometers, lidar and passive infrared sensors.*

- (2) activating the volcanic ash numerical trajectory/dispersion model in order to forecast the movement of any ash “cloud” which has been detected or reported;

*Note. The numerical model may be its own or, by agreement, that of another VAAC.*

- (3) issuing advisory information regarding the extent and forecast movement of the volcanic ash “cloud” to:
  - i. MWOs, ACCs and FICs serving FIRs in its area of responsibility which may be affected;
  - ii. other VAACs whose areas of responsibility may be affected;
  - iii. WAFCs, international OPMET databanks, international NOTAM offices, and centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services; and
  - iv. airlines requiring the advisory information through the AFTN address provided specifically for this purpose; and

*Note: The AFTN address to be used by the VAACs is given in the Handbook on the International Airways Volcano Watch (IAVW) — Operational Procedures and Contact List (Doc 9766) which is available on the ICAO website.*

- (4) issuing updated advisory information to the MWOs, ACCs, FICs and VAACs referred to in paragraph (3), as necessary, but at least every six hours until such time as:
  - i. the volcanic ash “cloud” is no longer identifiable from satellite data and, where available, ground-based and airborne data;
  - ii. no further reports of volcanic ash are received from the area; and
  - iii. no further eruptions of the volcano are reported.

(b) VAACs shall maintain a 24-hour watch.

(c) In case of interruption of the operation of a VAAC, its functions shall be carried out by another VAAC or another meteorological centre, as designated by the VAAC Provider State concerned.

*Note: Back-up procedures to be used in case of interruption of the operation of a VAAC are included in Doc 9766.*

## **CAR 174.125 State Volcano Observatories**

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**CAR 174.130 Tropical Cyclone Advisory Centres (TCAC)**

The PACA having accepted the responsibility for providing a tropical cyclone advisory centre (TCAC) shall arrange for that centre to:

- (a) Monitor the development of tropical cyclones in its area of responsibility, using geostationary and polar-orbiting satellite data, radar data and other meteorological information;
- (b) Issue advisory information concerning the position of the cyclone centre, its direction and speed of movement, central pressure and maximum surface wind near the centre, in abbreviated plain language to:
  - (1) MWOs in its area of responsibility;
  - (2) other TCACs whose areas of responsibility may be affected; and
  - (3) WAFCs, international OPMET databanks, and centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services; and
- (c) Issue updated advisory information to MWOs for each tropical cyclone, as necessary, but at least every six hours.

**CAR 174.135 Space Weather Centres (SWXC)**

(NOT APPLICABLE WITHIN OMAN)

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## SUBPART D – METEOROLOGICAL OBSERVATIONS & REPORTS

*Note: Technical specifications and detailed criteria related to this Subparts are given in ICAO Annex 3, Appendix 3.*

### CAR 174.150 Aeronautical Meteorological Stations and Observations

- (a) The MET Authority shall establish, at aerodromes in its territory, such aeronautical meteorological stations as it determines to be necessary. An aeronautical meteorological station may be a separate station or may be combined with a synoptic station.

*Note: Aeronautical meteorological stations may include sensors installed outside the aerodrome, where considered justified, by MET Authority to ensure the compliance of meteorological service for international air navigation with the provisions of this instruction.*

- (b) The MET Authority shall establish, or arrange for the establishment of, aeronautical meteorological stations on offshore structures or at other points of significance in support of helicopter operations to offshore structures, if required by regional air navigation agreement.
- (c) Aeronautical meteorological stations shall make routine observations at fixed intervals. At aerodromes, the routine observations shall be supplemented by special observations whenever specified changes occur in respect of surface wind, visibility, runway visual range, present weather, clouds and/or air temperature.
- (d) The MET Authority shall arrange for the aeronautical meteorological stations in the Sultanate of Oman to be inspected at sufficiently frequent intervals to ensure that a high standard of observation is maintained, that instruments and all their indicators are functioning correctly, and that the exposure of the instruments has not changed significantly.

*Note. Guidance on the inspection of aeronautical meteorological stations including the frequency of inspections is given in the Manual on Automatic Meteorological Observing Systems at Aerodromes (Doc 9837).*

- (e) At aerodromes with runways intended for Category II and III instrument approach and landing operations, automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure shall be installed to support approach and landing and take-off operations. These devices shall be integrated automatic systems for acquisition, processing, dissemination and display in real time of the meteorological parameters affecting landing and takeoff operations. The design of integrated automatic systems shall observe Human Factors principles and include back-up procedures.

*Note 1: Categories of precision approach and landing operations are defined in ICAO Annex 6, Part I.*

*Note 2: Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683).*

- (f) At aerodromes with runways intended for Category I instrument approach and landing operations, automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure shall be installed to

support approach and landing and take-off operations. These devices should be integrated automatic systems for acquisition, processing, dissemination and display in real time of the meteorological parameters affecting landing and take-off operations. The design of integrated automatic systems shall observe Human Factors principles and include back-up procedures.

- (g) Where an integrated semi-automatic system is used for the dissemination/display of meteorological information, it shall be capable of accepting the manual insertion of data covering those meteorological elements which cannot be observed by automatic means.
- (h) The observations shall form the basis for the preparation of reports to be disseminated at the aerodrome of origin and of reports to be disseminated beyond the aerodrome of origin.

### **CAR 174.155 Agreement Between MET Authority and Air Traffic Service Provider**

An agreement between the MET Authority and the Air Traffic Service Provider shall be established to cover, among other things:

- (a) the provision in air traffic services units of displays related to integrated automatic systems;
- (b) the calibration and maintenance of these displays/instruments;
- (c) the use to be made of these displays/instruments by air traffic services personnel;
- (d) as and where necessary, supplementary visual observations (for example, of meteorological phenomena of operational significance in the climb-out and approach areas) if and when made by air traffic services personnel to update or supplement the information supplied by the meteorological station;
- (e) meteorological information obtained from aircraft taking off or landing (for example, on wind shear); and
- (f) if available, meteorological information obtained from ground weather radar.

Note: Guidance on the subject of coordination between ATS and aeronautical meteorological services is contained in the Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services (*Doc 9377*).

### **CAR 174.160 Routine Observations and Reports**

- (a) At aerodromes, routine observations shall be made throughout the 24 hours of each day, unless otherwise agreed between the MET Authority, the Air Traffic Service Provider and the operator concerned. Such observations shall be made at intervals of one hour or, if so determined by regional air navigation agreement, at intervals of one half-hour. At other aeronautical meteorological stations, such observations shall be made as determined by the MET Authority taking into account the requirements of air traffic services units and aircraft operations.
- (b) Reports of routine observations shall be issued as:
  - (1) local routine reports, only for dissemination at the aerodrome of origin (intended for arriving and departing aircraft); and
  - (2) METAR for dissemination beyond the aerodrome of origin (mainly intended for flight planning, VOLMET broadcasts and D-VOLMET).

Note: Meteorological information used in ATIS (voice-ATIS and D-ATIS) is to be extracted from the local routine report, in accordance with ICAO Annex 11, 4.3.6.1 (g).

- (c) At aerodromes that are not operational throughout 24 hours in accordance with paragraph (a), METAR shall be issued prior to the aerodrome resuming operations in accordance with regional air navigation agreement.

### **CAR 174.165 Special Observations and Reports**

- (a) A list of criteria for special observations shall be established by the MET Authority, in consultation with the Air Traffic Service Provider, operators and others concerned.
- (b) Reports of special observations shall be issued as:
- a) local special reports, only for dissemination at the aerodrome of origin (intended for arriving and departing aircraft); and
  - b) SPECI for dissemination beyond the aerodrome of origin (mainly intended for flight planning, VOLMET broadcasts and D-VOLMET) unless METAR are issued at half-hourly intervals.

*Note: Meteorological information used in ATIS (voice-ATIS and D-ATIS) is to be extracted from the local special report, in accordance with ICAO Annex 11, 4.3.6.1 (g).*

- (c) At aerodromes that are not operational throughout 24 hours in accordance with CAR-174.160 paragraph (a), following the resumption of the issuance of METAR, SPECI shall be issued, as necessary.

### **CAR 174.170 Contents of Reports**

- (a) Local routine reports, local special reports, METAR and SPECI shall contain the following elements in the order indicated:
- (1) identification of the type of report;
  - (2) location indicator;
  - (3) time of the observation;
  - (4) identification of an automated or missing report, when applicable;
  - (5) surface wind direction and speed;
  - (6) visibility;
  - (7) runway visual range, when applicable;
  - (8) present weather;
  - (9) cloud amount, cloud type (only for cumulonimbus and towering cumulus clouds) and height of cloud base or, where measured, vertical visibility;
  - (10) air temperature and dew-point temperature; and
  - (11) QNH and, when applicable, QFE (QFE included only in local routine and special reports).

*Note: The location indicators referred to under b) and their significations are published in Location Indicators (Doc 7910).*

- (b) In addition to elements listed under paragraphs (a) (1) to (11), local routine reports, local special reports, METAR and SPECI shall contain supplementary information to be placed after element (11).
- (c) Optional elements included under supplementary information shall be included in METAR and SPECI in accordance with regional air navigation agreement.

## CAR 174.175 Observing and Reporting Meteorological elements

### (a) Surface wind

- (1) The mean direction and the mean speed of the surface wind shall be measured, as well as significant variations of the wind direction and speed, and reported in degrees true and metres per second (or knots), respectively.
- (2) When local routine and special reports are used for departing aircraft, the surface wind observations for these reports shall be representative of conditions along the runway; when local routine and special reports are used for arriving aircraft, the surface wind observations for these reports shall be representative of the touchdown zone.
- (3) For METAR and SPECI, the surface wind observations shall be representative of conditions above the whole runway where there is only one runway and the whole runway complex where there is more than one runway.

### (b) Visibility

- (1) The visibility as defined in Subpart A shall be measured or observed, and reported in metres or kilometres.

*Note: Guidance on the conversion of instrument readings into visibility is given in Attachment D of this CAR.*

- (2) When local routine and special reports are used for departing aircraft, the visibility observations for these reports shall be representative of conditions along the runway; when local routine and special reports are used for arriving aircraft, the visibility observations for these reports shall be representative of the touchdown zone of the runway.
- (3) For METAR and SPECI, the visibility observations shall be representative of the aerodrome.

### (c) Runway visual range

*Note: Guidance on the subject of runway visual range is contained in the Manual of Runway Visual Range Observing and Reporting Practices (Doc 9328).*

- (1) Runway visual range as defined in Subpart A shall be assessed on all runways intended for Category II and III instrument approach and landing operations.
- (2) Runway visual range as defined in Subpart A shall be assessed on all runways intended for use during periods of reduced visibility, including:
  - i. precision approach runways intended for Category I instrument approach and landing operations; and
  - ii. runways used for take-off and having high-intensity edge lights and/or centre line lights.

*Note: Precision approach runways are defined in CAR-139, under "Instrument runway".*

- (3) The runway visual range, assessed in accordance with paragraphs (c) (1) and (2), shall be reported in meters throughout periods when either the visibility or the runway visual range is less than 1,500 m.
- (4) Runway visual range assessments shall be representative of:
  - i. the touchdown zone of the runway intended for non-precision or Category I instrument approach and landing operations;
  - ii. the touchdown zone and the mid-point of the runway intended for Category II instrument approach and landing operations; and

iii. the touchdown zone, the mid-point and stop-end of the runway intended for Category III instrument approach and landing operations.

(5) The units providing air traffic service and aeronautical information service for an aerodrome shall be kept informed immediately of changes in the serviceability status of the automated equipment used for assessing runway visual range.

(d) Present weather

(1) The present weather occurring at the aerodrome shall be observed and reported as necessary. The following present weather phenomena shall be identified, as a minimum: rain, drizzle, snow and freezing precipitation (including intensity thereof), haze, mist, fog, freezing fog and thunderstorms (including thunderstorms in the vicinity).

(2) For local routine and special reports, the present weather information shall be representative of conditions at the aerodrome.

(3) For METAR and SPECI, the present weather information shall be representative of conditions at the aerodrome and, for certain specified present weather phenomena, in its vicinity.

(e) Clouds

(1) Cloud amount, cloud type and height of cloud base shall be observed and reported as necessary to describe the clouds of operational significance. When the sky is obscured, vertical visibility shall be observed and reported, where measured, in lieu of cloud amount, cloud type and height of cloud base. The height of cloud base and vertical visibility shall be reported in meters (or feet).

(2) Cloud observations for local routine and special reports shall be representative of the runway threshold(s) in use.

(3) Cloud observations for METAR and SPECI shall be representative of the aerodrome and its vicinity.

(f) Air temperature and dew-point temperature

(1) The air temperature and the dew-point temperature shall be measured and reported in degrees Celsius.

(2) Observations of air temperature and dew-point temperature for local routine reports, local special reports, METAR and SPECI shall be representative of the whole runway complex.

(g) Atmospheric pressure

The atmospheric pressure shall be measured, and QNH and QFE values shall be computed and reported in hectopascals.

(h) Supplementary information

Observations made at aerodromes shall include the available supplementary information concerning significant meteorological conditions, particularly those in the approach and climb-out areas. Where practicable, the information shall identify the location of the meteorological condition.

**CAR 174.180 Reporting Meteorological Information From Automatic Observing Systems**

- (a) METAR and SPECI from automatic observing systems shall be used by during non-operational hours of the aerodrome, and during operational hours of the aerodrome as determined by the MET Authority users based on the availability and efficient use of personnel.

*Note: Guidance on the use of automatic meteorological observing systems is given in Doc 9837.*

- (b) Local routine and special reports from automatic observing systems shall be used during operational hours of the aerodrome as determined by the MET Authority in consultation with users based on the availability and efficient use of personnel.
- (c) Local routine reports, local special reports, METAR and SPECI from automatic observing systems shall be identified with the word "AUTO".

**CAR 174.185 Observations and Reports of Volcanic Activity**

(NOT APPLICABLE)

## SUBPART E – AIRCRAFT OBSERVATIONS AND REPORTS

*Note: Technical specifications and detailed criteria related to this Subparts are given in ICAO Annex 3, Appendix 4.*

### **CAR 174.200 Obligations of States**

THE PACA shall arrange, according to the provisions of this Subpart, for observations to be made by aircraft of its registry operating on international air routes and for the recording and reporting of these observations.

### **CAR 174.205 Types of Aircraft Observations**

The following aircraft observations shall be made:

- (a) Routine aircraft observations during en-route and climb-out phases of the flight;  
and
- (b) special and other non-routine aircraft observations during any phase of the flight.

### **CAR 174.210 Routine Aircraft Observations – Designation**

- (a) When air-ground data link is used and automatic dependent surveillance — contract (ADS-C) or secondary surveillance radar (SSR) Mode S is being applied, automated routine observations shall be made every 15 minutes during the en-route phase and every 30 seconds during the climb-out phase for the first 10 minutes of the flight.
- (b) For helicopter operations to and from aerodromes on offshore structures, routine observations shall be made from helicopters at points and times as agreed between the meteorological authorities and the helicopter operators concerned.
- (c) In the case of air routes with high-density air traffic (e.g. organized tracks), an aircraft from among the aircraft operating at each flight level shall be designated, at approximately hourly intervals, to make routine observations in accordance with paragraph (a). The designation procedures shall be in accordance with regional air navigation agreement.
- (d) In the case of the requirement to report during the climb-out phase, an aircraft shall be designated, at approximately hourly intervals, at each aerodrome to make routine observations in accordance with paragraph (a).

### **CAR 174.215 Routine Aircraft Observations — Exemptions**

Aircraft not equipped with air-ground data link shall be exempted from making routine aircraft observations.

### **CAR 174.220 Special Aircraft Observations**

- (a) Special observations shall be made by all aircraft whenever the following conditions are encountered or observed:
  - (1) moderate or severe turbulence; or
  - (2) moderate or severe icing; or
  - (3) severe mountain wave; or

- (4) thunderstorms, without hail, that are obscured, embedded, widespread or in squall lines; or
- (5) thunderstorms, with hail, that are obscured, embedded, widespread or in squall lines; or
- (6) heavy dust storm or heavy sandstorm; or
- (7) volcanic ash cloud; or
- (8) pre-eruption volcanic activity or a volcanic eruption.

*Note: Pre-eruption volcanic activity in this context means unusual and/or increasing volcanic activity which could presage a volcanic eruption.*

### **CAR 174.225 Other Non-Routine Aircraft Observations**

When other meteorological conditions not listed under 5.5, e.g. wind shear, are encountered and which, in the opinion of the pilot-in-command, may affect the safety or markedly affect the efficiency of other aircraft operations, the pilot-in-command shall advise the appropriate air traffic services unit as soon as practicable.

*Note: Icing, turbulence and, to a large extent, wind shear are elements which, for the time being, cannot be satisfactorily observed from the ground and for which in most cases aircraft observations represent the only available evidence.*

### **CAR 174.230 Reporting of Aircraft Observations During Flight**

- (a) Aircraft observations shall be reported by air-ground data link. Where air-ground data link is not available or appropriate, special and other non-routine aircraft observations during flight shall be reported by voice communications.
- (b) Aircraft observations shall be reported during flight at the time the observation is made or as soon thereafter as is practicable.
- (c) Aircraft observations shall be reported as air-reports.

### **CAR 174.235 Relay of Air-Reports by Air Traffic Services Units**

The MET Authority shall make arrangements with the Air Traffic Services Provider to ensure that, on receipt by the air traffic services units of:

- (a) special air-reports by voice communications, the air traffic services units relay them without delay to their associated meteorological watch office; and
- (b) routine and special air-reports by data link communications, the air traffic services units relay them without delay to their associated meteorological watch office, the WAFCs and the centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services.



**CAR 174.240 Recording & Post-Flight Reporting of Aircraft Observations of Volcanic Activity**

Special aircraft observations of pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud shall be recorded on the special air-report of volcanic activity form. A copy of the form shall be included with the flight documentation provided to flights operating on routes which, in the opinion of the MET Authority, could be affected by volcanic ash clouds.

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## SUBPART F – FORECASTS

*Note: Technical specifications and detailed criteria related to this Subparts are given in ICAO Annex 3, Appendix 5.*

### CAR 174.250 Use of Forecasts

The issue of a new forecast by an aerodrome meteorological office, such as a routine aerodrome forecast, shall be understood to cancel automatically any forecast of the same type previously issued for the same place and for the same period of validity or part thereof.

### CAR 174.255 Aerodrome Forecasts

- (a) An aerodrome forecast shall be prepared, in accordance with regional air navigation agreement, by the aerodrome meteorological office designated by the MET Authority.

*Note: The aerodromes for which aerodrome forecasts are to be prepared and the period of validity of these forecasts are listed in the relevant facilities and services implementation document (FASID).*

- (b) An aerodrome forecast shall be issued at a specified time not earlier than one hour prior to the beginning of its validity period and consist of a concise statement of the expected meteorological conditions at an aerodrome for a specified period.
- (c) Aerodrome forecasts and amendments thereto shall be issued as TAF and include the following information in the order indicated:
- (1) identification of the type of forecast;
  - (2) location indicator;
  - (3) time of issue of forecast;
  - (4) identification of a missing forecast, when applicable;
  - (5) date and period of validity of forecast;
  - (6) identification of a cancelled forecast, when applicable;
  - (7) surface wind;
  - (8) visibility;
  - (9) weather;
  - (10) cloud; and
  - (11) expected significant changes to one or more of these elements during the period of validity.

Optional elements shall be included in TAF in accordance with regional air navigation agreement.

*Note: The visibility included in TAF refers to the forecast prevailing visibility.*

- (d) Meteorological offices preparing TAF shall keep the forecasts under continuous review and, when necessary, shall issue amendments promptly. The length of the forecast messages and the number of changes indicated in the forecast shall be kept to a minimum.

*Note: Guidance on methods to keep TAF under continuous review is given in Subpart C of the Manual of Aeronautical Meteorological Practice (Doc 8896).*

- (e) TAF that cannot be kept under continuous review shall be cancelled.

- (f) The period of validity of a routine TAF shall be not less than 6 hours and not more than 30 hours; the period of validity shall be determined by regional air navigation agreement. Routine TAF valid for less than 12 hours shall be issued every 3 hours and those valid for 12 to 30 hours shall be issued every 6 hours.
- (g) When issuing TAF, aerodrome meteorological offices shall ensure that not more than one TAF is valid at an aerodrome at any given time.

### **CAR 174.260 Landing Forecasts**

- (a) A landing forecast shall be prepared by the aerodrome meteorological office designated by the MET Authority as determined by regional air navigation agreement; such forecasts are intended to meet the requirements of local users and of aircraft within about one hour's flying time from the aerodrome.
- (b) Landing forecasts shall be prepared in the form of a trend forecast.
- (c) A trend forecast shall consist of a concise statement of the expected significant changes in the meteorological conditions at that aerodrome to be appended to a local routine report, local special report, METAR or SPECI. The period of validity of a trend forecast shall be 2 hours from the time of the report, which forms part of the landing forecast.

### **CAR 174.265 Forecasts for Take-Off**

- (a) A forecast for take-off shall be prepared by the meteorological office designated by the MET Authority
- (b) A forecast for take-off should refer to a specified period of time and should contain information on expected conditions over the runway complex in regard to surface wind direction and speed and any variations thereof, temperature, pressure (QNH), and any other elements as agreed locally.
- (c) A forecast for take-off should be supplied to operators and flight crew members on request within the 3 hours before the expected time of departure.
- (d) Aerodrome meteorological offices preparing forecasts for take-off should keep the forecasts under continuous review and, when necessary, should issue amendments promptly.

### **CAR 174.270 Area Forecasts for Low-Level Flights**

- (a) When the density of traffic operating below flight level 100 (or up to flight level 150 in mountainous areas, or higher, where necessary) warrants the routine issue and dissemination of area forecasts for such operations, the frequency of issue, the form and the fixed time or period of validity of those forecasts and the criteria for amendments thereto shall be determined by the MET Authority in consultation with the users.
- (b) When the density of traffic operating below flight level 100 warrants the issuance of AIRMET information in accordance with CAR-174.305 paragraph (a), area forecasts for such operations shall be prepared in a format as agreed between the meteorological authorities in the States concerned. When abbreviated plain language is used, the forecast shall be prepared as a GAMET area forecast, employing approved ICAO abbreviations and numerical values; when chart form is used, the forecast shall be prepared as a combination of forecasts of upper wind and upper-air temperature, and of SIGWX phenomena. The area forecasts shall be issued to cover the layer between the ground and flight level 100 (or up to flight level 150 in mountainous areas, or higher, where necessary) and shall contain information

on en-route weather phenomena hazardous to low-level flights, in support of the issuance of AIRMET information, and additional information required by low-level flights.

- (c) Area forecasts for low-level flights prepared in support of the issuance of AIRMET information shall be issued every 6 hours for a period of validity of 6 hours and transmitted to meteorological watch offices and/or aerodrome meteorological offices concerned not later than one hour prior to the beginning of their validity period.

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## **SUBPART G – SIGMET & AIRMET INFORMATION, AERODROME WARNINGS & WIND SHEAR WARNINGS & ALERTS**

*Note: Technical specifications and detailed criteria related to this Subparts are given in ICAO Annex 3, Appendix 6.*

### **CAR 174.300 SIGMET Information**

- (a) SIGMET information shall be issued by a meteorological watch office and shall give a concise description in abbreviated plain language concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations, and of the development of those phenomena in time and space.
- (b) SIGMET information shall be cancelled when the phenomena are no longer occurring or are no longer expected to occur in the area.
- (c) The period of validity of a SIGMET message shall be not more than 4 hours. In the special case of SIGMET messages for volcanic ash cloud and tropical cyclones, the period of validity shall be extended up to 6 hours.
- (d) SIGMET messages concerning volcanic ash cloud and tropical cyclones shall be based on advisory information provided by VAACs and TCACs, respectively, designated by regional air navigation agreement.
- (e) Close coordination shall be maintained between the meteorological watch office and the associated area control centre/flight information centre to ensure that information on volcanic ash included in SIGMET and NOTAM messages is consistent.
- (f) SIGMET messages shall be issued not more than 4 hours before the commencement of the period of validity. In the special case of SIGMET messages for volcanic ash cloud and tropical cyclones, these messages shall be issued as soon as practicable but not more than 12 hours before the commencement of the period of validity. SIGMET messages for volcanic ash and tropical cyclones shall be updated at least every 6 hours.

### **CAR 174.305 AIRMET Information**

- (a) AIRMET information shall be issued by a meteorological watch office in accordance with regional air navigation agreement, taking into account the density of air traffic operating below flight level 100. AIRMET information shall give a concise description in abbreviated plain language concerning the occurrence and/or expected occurrence of specified en-route weather phenomena, which have not been included in Section I of the area forecast for low-level flights issued in accordance with CAR-174.270 and which may affect the safety of low-level flights, and of the development of those phenomena in time and space.
- (b) AIRMET information shall be cancelled when the phenomena are no longer occurring or are no longer expected to occur in the area.
- (c) The period of validity of an AIRMET message shall be not more than 4 hours.

### **CAR 174.310 Aerodrome Warnings**

- (a) Aerodrome warnings shall be issued by the meteorological office designated by the MET Authority and shall give concise information of meteorological conditions which could adversely affect aircraft on the ground, including parked aircraft, and the aerodrome facilities and services.

- (b) Aerodrome warnings shall be cancelled when the conditions are no longer occurring and/or no longer expected to occur at the aerodrome.

### **CAR 174.315 Wind Shear Warnings and Alerts**

*Note: Guidance on the subject is contained in the Manual on Low-level Wind Shear (Doc 9817). Wind shear alerts are expected to complement wind shear warnings and together are intended to enhance situational awareness of wind shear.*

- (a) Wind shear warnings shall be prepared by the meteorological office designated by the MET Authority for aerodromes where wind shear is considered a factor, in accordance with local arrangements with the appropriate air traffic services unit and the operators concerned. Wind shear warnings shall give concise information on the observed or expected existence of wind shear which could adversely affect aircraft on the approach path or take-off path or during circling approach between runway level and 500 m (1,600 ft) above that level and aircraft on the runway during the landing roll or take-off run. Where local topography has been shown to produce significant wind shears at heights in excess of 500 m (1,600 ft) above runway level, then 500 m (1,600 ft) shall not be considered restrictive.
- (b) Wind shear warnings for arriving aircraft and/or departing aircraft shall be cancelled when aircraft reports indicate that wind shear no longer exists or, alternatively, after an agreed elapsed time. The criteria for the cancellation of a wind shear warning shall be defined locally for each aerodrome, as agreed between the meteorological authority, the appropriate ATS authority and the operators concerned.
- (c) At aerodromes where wind shear is detected by automated, ground-based, wind shear remote-sensing or detection equipment, wind shear alerts generated by these systems shall be issued. Wind shear alerts shall give concise, up-to-date information related to the observed existence of wind shear involving a headwind/tailwind change of 7.5 m/s (15 kt) or more which could adversely affect aircraft on the final approach path or initial take-off path and aircraft on the runway during the landing roll or take-off run.
- (d) Wind shear alerts shall be updated at least every minute. The wind shear alert shall be cancelled as soon as the headwind/tailwind change falls below 7.5 m/s (15 kt).



## SUBPART H – AERONAUTICAL CLIMATOLOGICAL INFORMATION

*Note : Technical specifications and detailed criteria related to this Subparts are given in ICAO Annex 3, Appendix 7.*

### CAR 174.330 General Provisions

*Note: In cases where it is impracticable to meet the requirements for aeronautical climatological information on a national basis, the collection, processing and storage of observational data may be effected through computer facilities available for international use, and the responsibility for the preparation of the required aeronautical climatological information may be delegated as agreed between the meteorological authorities concerned.*

- (a) Aeronautical climatological information required for the planning of flight operations shall be prepared in the form of aerodrome climatological tables and aerodrome climatological summaries. Such information shall be supplied to aeronautical users as agreed between the MET Authority and the user concerned.

*Note: Climatological data required for aerodrome planning purposes are set out in CAR-139.*

- (b) Aeronautical climatological information shall normally be based on observations made over a period of at least five years and the period shall be indicated in the information supplied.
- (c) Climatological data related to sites for new aerodromes and to additional runways at existing aerodromes shall be collected starting as early as possible before the commissioning of those aerodromes or runways.

### CAR 174.335 Aerodrome Climatological Tables

Each Contracting State shall make arrangements for collecting and retaining the necessary observational data and have the capability:

- (a) to prepare aerodrome climatological tables for each regular and alternate international aerodrome within the territory of Sultanate of Oman; and
- (b) to make available such climatological tables to an aeronautical user within a time period as agreed between the MET Authority and the user concerned.

### CAR 174.340 Aerodrome Climatological Summaries

Aerodrome climatological summaries shall follow the procedures prescribed by the World Meteorological Organization (WMO). Where computer facilities are available to store, process and retrieve the information, the summaries shall be published or otherwise made available to aeronautical users on request. Where such computer facilities are not available, the summaries shall be prepared using the models specified by WMO and shall be published and kept up to date as necessary.

### CAR 174.345 Copies of Meteorological Observational Data

The MET Authority, on request and to the extent practicable, shall make available to any other meteorological authority, to operators and to others concerned with the application of meteorology to international air navigation, meteorological observational data required for research, investigation or operational analysis.

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## SUBPART I – SERVICE FOR OPERATORS & FLIGHT CREW MEMBERS

*Note: Technical specifications and detailed criteria related to this Subparts are given in ICAO Annex 3, Appendix 8.*

### CAR 174.360 General Provisions

- (a) Meteorological information shall be supplied to operators and flight crew members for:
- (1) pre-flight planning by operators;
  - (2) in-flight replanning by operators using centralized operational control of flight operations;
  - (3) use by flight crew members before departure; and
  - (4) aircraft in flight.
- (b) Meteorological information supplied to operators and flight crew members shall cover the flight in respect of time, altitude and geographical extent. Accordingly, the information shall relate to appropriate fixed times, or periods of time, and shall extend to the aerodrome of intended landing, also covering the meteorological conditions expected between the aerodrome of intended landing and alternate aerodromes designated by the operator.
- (c) Meteorological information supplied to operators and flight crew members shall be up to date and include the following information, as agreed between the MET Authority and the operators concerned:
- (1) forecasts of:
    - i. upper wind and upper-air temperature;
    - ii. upper-air humidity;
    - iii. geopotential altitude of flight levels;
    - iv. flight level and temperature of tropopause;
    - v. direction, speed and flight level of maximum wind;
    - vi. SIGWX phenomena; and
    - vii. cumulonimbus clouds, icing and turbulence;

*Note 1: Forecasts of upper-air humidity and geopotential altitude of flight levels are used only in automatic flight planning and need not be displayed.*

*Note 2: Forecasts of cumulonimbus clouds, icing and turbulence are intended to be processed and, if necessary, visualized according to the specific thresholds relevant to user operations.*

- (2) METAR or SPECI (including trend forecasts as issued in accordance with regional air navigation agreement) for the aerodromes of departure and intended landing, and for take-off, en-route and destination alternate aerodromes;
- (3) TAF or amended TAF for the aerodromes of departure and intended landing, and for take-off, en-route and destination alternate aerodromes;
- (4) forecasts for take-off;
- (5) SIGMET information and appropriate special air-reports relevant to the whole route;

*Note: Appropriate special air-reports will be those not already used in the preparation of SIGMET.*

- (6) volcanic ash and tropical cyclone advisory information relevant to the whole route;
- (7) as determined by regional air navigation agreement, GAMET area forecasts relevant to the whole route;
- (8) aerodrome warnings for the local aerodrome;
- (9) meteorological satellite images; and

- (10) ground-based weather radar information; and
  - (11) space weather advisory information relevant to the whole route.
- (d) Forecasts listed under paragraph (c)(1) shall be generated from the digital forecasts provided by the WAFCs whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent, unless otherwise agreed between the MET Authority and the operator concerned.
  - (e) When forecasts are identified as being originated by the WAFCs, no modifications shall be made to their meteorological content.
  - (f) Charts generated from the digital forecasts provided by the WAFCs shall be made available, as required by operators, for fixed areas of coverage as shown in ICAO Annex 3, Appendix 8, Figures A8-1, A8-2 and A8-3.
  - (g) When forecasts of upper wind and upper-air temperature listed under paragraph (c) (1) are supplied in chart form, they shall be fixed time prognostic charts for flight levels as specified in ICAO Annex 3, Appendix 2. When forecasts of SIGWX phenomena listed under CAR-174.360 paragraph (c)(1)(vi) are supplied in chart form, they shall be fixed time prognostic charts for an atmospheric layer limited by flight levels as specified in ICAO Annex 3, Appendix 2, and Appendix 5.
  - (h) The forecasts of upper wind and upper-air temperature and of SIGWX phenomena above flight level 100 requested for pre-flight planning and in-flight replanning by the operator shall be supplied as soon as they become available, but not later than 3 hours before departure. Other meteorological information requested for pre-flight planning and in-flight replanning by the operator shall be supplied as soon as is practicable.
  - (i) When necessary, the MET Authority providing service for operators and flight crew members shall initiate coordinating action with the meteorological authorities of other States with a view to obtaining from them the reports and/or forecasts required.
  - (j) Meteorological information shall be supplied to operators and flight crew members at the location to be determined by the MET Authority, after consultation with the operators concerned and at the time agreed between the aerodrome meteorological office and the operator concerned. The service for pre-flight planning shall be confined to flights originating within the territory of the Sultanate of Oman. At an aerodrome without an aerodrome meteorological office at the aerodrome, arrangements for the supply of meteorological information shall be as agreed between the MET Authority and the operator concerned.

### **CAR 174.365 Briefing, Consultation and Display**

*Note: The requirements for the use of automated pre-flight information systems in providing briefing, consultation and display are given in CAR-174.375.*

- (a) Briefing and/or consultation shall be provided, on request, to flight crew members and/or other flight operations personnel. Its purpose shall be to supply the latest available information on existing and expected meteorological conditions along the route to be flown, at the aerodrome of intended landing, alternate aerodromes and other aerodromes as relevant, either to explain and amplify the information contained in the flight documentation, or as agreed between the MET Authority and the operator concerned, in lieu of flight documentation.
- (b) Meteorological information used for briefing, consultation and display shall include any or all of the information listed in CAR-174.360 paragraph (c).
- (c) If the aerodrome meteorological office expresses an opinion on the development of the meteorological conditions at an aerodrome which differs appreciably from the aerodrome forecast included in the flight documentation, the attention of flight crew members shall be

drawn to the divergence. The portion of the briefing dealing with the divergence shall be recorded at the time of briefing and this record shall be made available to the operator.

- (d) The required briefing, consultation, display and/or flight documentation shall normally be provided by the aerodrome meteorological office associated with the aerodrome of departure. At an aerodrome where these services are not available, arrangements to meet the requirements of flight crew-members shall be as agreed between the MET Authority and the operator concerned. In exceptional circumstances, such as an undue delay, the aerodrome meteorological office associated with the aerodrome shall provide or, if that is not practicable, arrange for the provision of a new briefing, consultation and/or flight documentation as necessary.
- (e) The flight crew-member and/or other flight operations personnel for whom briefing, consultation and/or flight documentation has been requested shall visit the aerodrome meteorological office at the time agreed between the aerodrome meteorological office and the operator concerned. Where local circumstances at an aerodrome make personal briefing or consultation impracticable, the aerodrome meteorological office shall provide those services by telephone or other suitable telecommunications facilities.

### **CAR 174.370 Flight Documentation**

*Note: The requirements for the use of automated pre-flight information systems in providing flight documentation are given in CAR-174.375.*

- (a) Flight documentation to be made available shall comprise information listed under CAR-174.360 paragraphs (c)(1)(i) and (vi), (2), (3), (5), (6) and, if appropriate, (7) and (11). However, flight documentation for flights of two hours' duration or less, after a short stop or turnaround, shall be limited to the information operationally needed, as agreed between the MET Authority and the operator concerned, but in all cases it shall at least comprise information on CAR-174.360 paragraphs (c) (2), (3), (5), (6) and, if appropriate, (7) and (11).
- (b) Whenever it becomes apparent that the meteorological information to be included in the flight documentation will differ materially from that made available for pre-flight planning and in-flight re-planning, the operator shall be advised immediately and, if practicable, be supplied with the revised information as agreed between the operator and the aerodrome meteorological office concerned.
- (c) In cases where a need for amendment arises after the flight documentation has been supplied, and before take-off of the aircraft, the aerodrome meteorological office shall, as agreed locally, issue the necessary amendment or updated information to the operator or to the local air traffic services unit, for transmission to the aircraft.
- (d) The MET Authority shall retain information supplied to flight crew members, either as printed copies or in computer files, for a period of at least 30 days from the date of issue. This information shall be made available, on request, for inquiries or investigations and, for these purposes, shall be retained until the inquiry or investigation is completed.

### **CAR 174.375 Automated Pre-flight Information Systems for Briefing, Consultation, Flight Planning and Flight Documentation**

- (a) Where the MET Authority uses automated pre-flight information systems to supply and display meteorological information to operators and flight crew members for self-briefing, flight planning and flight documentation purposes, the information supplied and displayed shall comply with the relevant provisions in CAR-174.360 to CAR-174.375 inclusive.

- (b) Automated pre-flight information systems providing for a harmonized, common point of access to meteorological information and aeronautical information services information by operators, flight crew members and other aeronautical personnel concerned shall be as agreed between the meteorological authority and the civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with CAR-175.

*Note: The meteorological and aeronautical information services information concerned is specified in CAR-174.360 to CAR-174.375 and ICAO Annex 3, Appendix 8 and in PANS-AIM 5.5, respectively.*

- (c) Where automated pre-flight information systems are used to provide for a harmonized, common point of access to meteorological information and aeronautical information services information by operators, flight crew members and other aeronautical personnel concerned, the MET Authority concerned shall remain responsible for the quality control and quality management of meteorological information provided by means of such systems in accordance with CAR-174.055 paragraph (b).

*Note. The responsibilities relating to aeronautical information services information and the quality assurance of the information are given in CAR-175.*

### **CAR 174.380 Information for Aircraft in Flight**

- (a) Meteorological information for use by aircraft in flight shall be supplied by an aerodrome meteorological office or meteorological watch office to its associated air traffic services unit and through D-VOLMET or VOLMET broadcasts as determined by regional air navigation agreement. Meteorological information for planning by the operator for aircraft in flight shall be supplied on request, as agreed between the MET Authority or authorities and the operator concerned.
- (b) Meteorological information for use by aircraft in flight shall be supplied to air traffic services units in accordance with the specifications of Subpart J.
- (c) Meteorological information shall be supplied through D-VOLMET or VOLMET broadcasts in accordance with the specifications of Subpart K of this regulation.

## SUBPART J – INFORMATION FOR AIR TRAFFIC SERVICES, SEARCH & RESCUE SERVICES & AERONAUTICAL INFORMATION SERVICES

*Note: Technical specifications and detailed criteria related to this Subparts are given in ICAO Annex 3, Appendix 9.*

### CAR 174.400 Information for Air Traffic Services Units

- (a) The MET Authority shall designate an aerodrome meteorological office or meteorological watch office to be associated with each air traffic services unit. The associated aerodrome meteorological office or meteorological watch office shall, after coordination with the air traffic services unit, supply, or arrange for the supply of, up-to-date meteorological information to the unit as necessary for the conduct of its functions.
- (b) **Recommendation:** *An aerodrome meteorological office should be associated with an aerodrome control tower or approach control unit for the provision of meteorological information.*
- (c) A meteorological watch office shall be associated with a flight information centre or an area control centre for the provision of meteorological information.
- (d) Where, owing to local circumstances, it is convenient for the duties of an associated aerodrome meteorological office or meteorological watch office to be shared between two or more aerodrome meteorological offices or meteorological watch offices, the division of responsibility should be determined by the MET Authority in consultation with the Air Traffic Service Provider.
- (e) Any meteorological information requested by an air traffic services unit in connection with an aircraft emergency shall be supplied as rapidly as possible.

### CAR 174.405 Information for Search and Rescue Services Units

Aerodrome meteorological offices or meteorological watch offices designated by the MET Authority in accordance with regional air navigation agreement shall supply search and rescue services units with the meteorological information they require in a form established by mutual agreement. For that purpose, the designated aerodrome meteorological office or meteorological watch office shall maintain liaison with the search and rescue services unit throughout a search and rescue operation.

### CAR 174.410 Information for Aeronautical Information Services Units

The MET Authority, in coordination with the PACA, shall arrange for the supply of up-to-date meteorological information to relevant aeronautical information services units, as necessary, for the conduct of their functions.

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## SUBPART K – REQUIREMENTS FOR AND USE OF COMMUNICATIONS

*Note 1: Technical specifications and detailed criteria related to this Subparts are given in ICAO Annex 3, Appendix 10.*

*Note 2: It is recognized that it is for the CNS/ATM to decide upon its own internal organization and responsibility for implementing the telecommunications facilities referred to in this Subpart.*

### CAR 174.430 Requirements for Communications

- (a) Suitable telecommunications facilities shall be made available to permit aerodrome meteorological offices and, as necessary, aeronautical meteorological stations to supply the required meteorological information to air traffic services units on the aerodromes for which those offices and stations are responsible, and in particular to aerodrome control towers, approach control units and the aeronautical telecommunications stations serving these aerodromes.
- (b) Suitable telecommunications facilities shall be made available to permit meteorological watch offices to supply the required meteorological information to air traffic services and search and rescue services units in respect of the flight information regions, control areas and search and rescue regions for which those offices are responsible, and in particular to flight information centres, area control centres and rescue coordination centres and the associated aeronautical telecommunications stations.
- (c) Suitable telecommunications facilities shall be made available to permit world area forecast centres to supply the required world area forecast system products to aerodrome meteorological offices, meteorological authorities and other users.
- (d) Telecommunications facilities between aerodrome meteorological offices and, as necessary, aeronautical meteorological stations and aerodrome control towers or approach control units shall permit communications by direct speech, the speed with which the communications can be established being such that the required points may normally be contacted within approximately 15 seconds.
- (e) Telecommunications facilities between aerodrome meteorological offices or meteorological watch offices and flight information centres, area control centres, rescue coordination centres and aeronautical telecommunications stations shall permit:
  - (1) communications by direct speech, the speed with which the communications can be established being such that the required points may normally be contacted within approximately 15 seconds; and
  - (2) printed communications, when a record is required by the recipients; the message transit time should not exceed 5 minutes.

*Note: In paragraphs (d) and (e), “approximately 15 seconds” refers to telephony communications involving switchboard operation and “5 minutes” refers to printed communications involving retransmission.*

- (f) The telecommunications facilities required in accordance with paragraphs (d) and (e) shall be supplemented, as and where necessary, by other forms of visual or audio communications, for example, closed-circuit television or separate information processing systems.
- (g) As agreed between the meteorological authority and the operators concerned, provision shall be made to enable operators to establish suitable telecommunications facilities for obtaining meteorological information from aerodrome meteorological offices or other appropriate sources.

- (h) Suitable telecommunications facilities shall be made available to permit meteorological offices to exchange operational meteorological information with other meteorological offices.
- (i) The telecommunications facilities used for the exchange of operational meteorological information shall be the aeronautical fixed service or, for the exchange of non-time critical operational meteorological information, the public Internet, subject to availability, satisfactory operation and bilateral/multilateral and/or regional air navigation agreements.

*Note 1: Aeronautical fixed service Internet-based services, operated by the world area forecast centres, providing for global coverage are used to support the global exchanges of operational meteorological information.*

*Note 2: Guidance material on non-time-critical operational meteorological information and relevant aspects of the public Internet is provided in the Guidelines on the Use of the Public Internet for Aeronautical Applications (Doc 9855).*

### **CAR 174.435 Use of Aeronautical Fixed Service Communications & the Public Internet — Meteorological Bulletins**

Meteorological bulletins containing operational meteorological information to be transmitted via the aeronautical fixed service or the public Internet shall be originated by the appropriate meteorological office or aeronautical meteorological station.

*Note: Meteorological bulletins containing operational meteorological information authorized for transmission via the aeronautical fixed service are listed in Annex 10, Volume II, Subpart D, together with the relevant priorities and priority indicators.*

### **CAR 174.440 Use of Aeronautical Fixed Service Communications — World Area Forecast System Products**

World area forecast system products in digital form shall be transmitted using binary data communications techniques. The method and channels used for the dissemination of the products shall be as determined by regional air navigation agreement.

### **CAR 174.445 Use of Aeronautical Mobile Service Communications**

The content and format of meteorological information transmitted to aircraft and by aircraft shall be consistent with the provisions of this CAR.

### **CAR 174.450 Use of aeronautical data link service — contents of D-VOLMET**

D-VOLMET shall contain current METAR and SPECI, together with trend forecasts where available, TAF and SIGMET, special air-reports not covered by a SIGMET.

*Note: The requirement to provide METAR and SPECI may be met by the data link-flight information service (D-FIS) application entitled “Data link-aerodrome routine meteorological report (D-METAR) service”; the requirement to provide TAF may be met by the D-FIS application entitled “Data link-aerodrome forecast (D-TAF) service”; and the requirement to provide SIGMET and AIRMET messages may be met by the D-FIS application entitled “Data link-SIGMET (D-SIGMET) service”. The details of these data link services are specified in the Manual of Air Traffic Services Data Link Applications (Doc 9694).*

#### **CAR 174.455 Use of Aeronautical Broadcasting Service — Contents of VOLMET Broadcasts**

- (a) Continuous VOLMET broadcasts, normally on very high frequencies (VHF), shall contain current METAR and SPECI, together with trend forecasts where available.
- (b) Scheduled VOLMET broadcasts, normally on high frequencies (HF), shall contain current METAR and SPECI, together with trend forecasts where available and, where so determined by regional air navigation agreement, TAF and SIGMET.

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## SUBPART L – CERTIFICATION REQUIREMENTS

### General

#### **CAR 174.500 Applicability**

This CAR prescribes:

- (a) Rules governing the certification and operation of organisations providing meteorological services for aviation; and
- (b) Requirements governing the provision of basic weather reports for aviation.

#### **CAR 174.505 Meteorological Services — Certificate Required**

No person shall provide a meteorological service except under the authority of, and in accordance with the provisions of, a meteorological service certificate issued under this CAR.

#### **CAR 174.510 Basic Weather Reporting**

Every person who provides a basic weather report shall

- (a) Utilise equipment that is suitable for the observations being made; and
- (b) Employ a system for checking that equipment; and
- (c) Be trained to provide accurate basic weather reports.

#### **CAR 174.515 Application for Certificate**

Each applicant for the grant of an aviation meteorology service certificate shall complete form ANS 174.0 and submit it to the Authority with

- (a) The exposition required by CAR-174.615; and
- (b) A payment of the appropriate application fee prescribed by regulations.

#### **CAR 174.520 Issue of Certificate**

An applicant is entitled to a meteorological service certificate if the Authority is satisfied that:

- (a) The applicant meets the requirements of Certification Requirements; and
- (b) The applicant, and the applicant's senior person or persons required by CAR-174.540 paragraphs (a)(1) and (2) are acceptable to the authority; and
- (c) The granting of the certificate is not contrary to the interests of aviation safety.

#### **CAR 174.525 Privileges of Certificate Holder**

- (a) A meteorological service certificate specifies the types of facilities that the certificate holder is authorised to operate.
- (b) Subject to CAR-174.640, the holder of a meteorological service certificate may provide the meteorological services listed on the holder's certificate provided that each meteorological service, and the meteorological information supplied for each meteorological service, and the location and airspace covered by each meteorological service is listed in the certificate holder's exposition.

**CAR 174.530 Duration of Certificate**

- (a) A meteorological service certificate may be granted or renewed for a period of up to three (3) years.
- (b) A meteorological service certificate remains in force until it expires or is suspended or revoked.
- (c) The holder of a meteorological service certificate that expires or is revoked shall forthwith surrender the certificate to the Authority.
- (d) The holder of a meteorological service certificate that is suspended, shall forthwith produce the certificate to the Authority for appropriate endorsement.

**CAR 174.535 Renewal of Certificate**

The application shall be submitted to the Authority before the application renewal date specified on the certificate or, if no such date is specified, not less than thirty (30) days before the certificate expires

## **Certification Requirements**

### **CAR 174.540 Personnel Requirements**

The applicant for the grant of a meteorological service certificate shall engage, employ or contract:

- (a) A senior person identified as the Chief Executive who has the authority within the applicant's organisation to ensure that each meteorological service listed in their exposition can be financed and carried out to meet the operational requirements, and in accordance with the requirements prescribed by this CAR;
- (b) A senior person or group of senior persons who are responsible for ensuring that the applicant's organisation complies with the requirements of this CAR. Such nominated person or persons shall be ultimately responsible to the Chief Executive; and
- (c) A Head of Training responsible for ensuring that the organisation complies with the training requirements of this Part; and
- (d) A safety management post holder responsible for the provision of a safety management system according to the requirements of CAR-100; and
- (e) A quality management post holder responsible for the provision of a quality management system; and
- (f) Sufficient personnel to plan, operate, supervise, inspect, and certify the meteorological offices and facilities and provide the meteorological services listed in the applicant's exposition.
- (g) The applicant shall:
  - (1) establish a procedure to assess the competence of those personnel who are authorised by the applicant to:
    - i. place facilities listed in the applicant's exposition into operational service; and
    - ii. supervise the production and release of meteorological information; and
  - (2) establish a procedure to maintain the competence of those authorised personnel; and
  - (3) provide those authorised personnel with written evidence of the scope of their authorisation.

### **CAR 174.545 Site Requirements**

Each applicant for the grant of a meteorological service certificate shall establish procedures to ensure that:

- (a) Each of the meteorological offices and facilities listed in their exposition is
  - (1) sited and configured in accordance with security measures designed to prevent unlawful or accidental interference; and
  - (2) provided with suitable power supplies and means to ensure appropriate continuity of service; and
- (b) Each of the remote weather sensing facilities listed in their exposition is installed and maintained in a technically appropriate position to ensure that the facility provides an accurate representation of the local meteorological conditions.

### **CAR 174.550 Communication Requirements**

- (a) Each applicant for the grant of a meteorological service certificate shall establish communication systems and procedures to ensure that each of the meteorological offices

and facilities listed in the applicant's exposition can provide the meteorological information for which it is intended.

- (b) The communication systems and procedures must be able to handle the volume and nature of the meteorological information being communicated so that no meteorological information is delayed to the extent that the information becomes out-of-date.

### **CAR 174.555 Input Requirements**

- (a) Each applicant for the grant of a meteorological service certificate shall establish procedures to obtain input meteorological information appropriate for the meteorological services being provided.
- (b) The procedures shall ensure that:
  - (1) each meteorological office and facility listed in the applicant's exposition that provides a forecast service has continuing access to appropriate historical, real-time, and other meteorological information for the applicant's forecast areas; and
  - (2) each meteorological office and facility listed in the applicant's exposition that provides a meteorological briefing service in person or by any other interactive visual means, has adequate display and briefing resources available for the briefings; and
  - (3) each meteorological office and facility listed in the applicant's exposition that provides a meteorological reporting service has adequate observing systems to supply adequate, accurate and timely meteorological reports; and
  - (4) each meteorological office listed in the applicant's exposition that provides a meteorological watch service has adequate meteorological information to supply an adequate, accurate and timely meteorological watch service; and
  - (5) each meteorological office and facility listed in the applicant's exposition that provides a climatology service has adequate meteorological information for the preparation of climatological information.

### **CAR 174.560 Output Requirements**

- (a) Each applicant for the grant of a meteorological service certificate shall:
  - (1) identify the output meteorological information provided by each meteorological service listed in their exposition; and
  - (2) determine the standards and formats for that output meteorological information in accordance with this CAR.
- (b) The applicant shall establish procedures to ensure that the meteorological information supplied by each meteorological office and facility listed in their exposition complies with the standards and formats determined under paragraph (a)(2).

### **CAR 174.565 Facility Requirements**

- (a) Each applicant for the grant of a meteorological service certificate shall determine which meteorological office(s) they wish to establish.

These shall be one or more of the following:



- (1) A meteorological office either located at, or associated with an aerodrome to carry out some or all of the following tasks as required to meet the requirements of flight operations at the aerodrome:
  - i. prepare and/or obtain forecasts complying with CAR-174 format and validity requirements for:
  - ii. departing aircraft
  - iii. local meteorological conditions; or
  - iv. maintain a continuous watch of meteorological conditions over the aerodrome/s for which it prepares forecasts; or
  - v. provide briefing, consultation and flight documentation to crew members and other flight operations personnel; or
  - vi. supply other meteorological information, complying with CAR174 format requirements, to aeronautical users including:
  - vii. routine observations and reports;
  - viii. special observations and reports;
  - ix. aerodrome warnings;
  - x. wind shear warnings;
  - xi. other warnings as locally agreed or
  - xii. display available meteorological information;
  - xiii. exchange meteorological information with other meteorological offices; or
  - xiv. supply information on pre-eruption volcanic activity, volcanic eruptions or ash cloud to associated ATS units, AIS units and meteorological watch offices as per letters of agreement;
- (2) A meteorological watch office which shall
  - i. maintain a watch over meteorological conditions affecting flight operations within the watch office's area of responsibility; and
  - ii. prepare and supply SIGMET and other information related to its area of responsibility to associated air traffic services; and
  - iii. disseminate SIGMET information by AFTN;
  - iv. when required by regional air navigation agreements or letters of agreement
    - A. prepare AIRMET information related to its area of responsibility;
    - B. supply AIRMET information to associated ATS units;
    - C. disseminate AIRMET information;
  - v. supply information on pre-eruption volcanic activity, volcanic eruptions or ash cloud, for which a SIGMET has not been issued, to its associated ATS units, AIS units as per letters of agreement, and to its associated VAAC as determined by regional air navigation agreement;
  - vi. supply information received concerning the accidental release of radioactive materials into the atmosphere in the area for which it has responsibility, or in adjacent areas to its associated ATS units, AIS units as per letters of agreement.
- (3) An aeronautical meteorological station which shall
  - i. be established at aerodromes and offshore structures as deemed necessary by the organisation responsible for the provision of Meteorological Services to support both international air operations and off shore helicopter operations;
  - ii. make routine observations at fixed intervals;
  - iii. at aerodromes, make special observations whenever specified changes occur in respect of surface wind, visibility, runway visual range, present weather, clouds and /or air temperature.

- (b) Each applicant for the grant of a meteorological service certificate shall establish procedures to ensure that all electronic data processing facilities used in the acquisition, compilation, computing, access or dissemination of meteorological information are of a nature, configuration and capability to ensure the adequacy, accuracy and timeliness of that meteorological and related information.

### **CAR 174.570 Documentation**

- (a) Each applicant for the grant of a meteorological service certificate shall hold copies of meteorological office manuals, facility manuals, technical standards and practices, procedures manuals, and any other documentation that is necessary for the provision of the meteorological services listed in their exposition.

These documents shall include, but are not limited to:

- (1) Annex 3;
  - (2) ICAO Doc 7030;
  - (3) ICAO Doc 7192;
  - (4) ICAO Doc 8896;
  - (5) ICAO Doc 9328;
  - (6) ICAO Doc 9377;
  - (7) ICAO Doc 9708;
  - (8) ICAO Doc 9837;
  - (9) ICAO Doc 9859.
  - (10) WMO Publication 49, volumes 1 and 2;
  - (11) WMO Publication 1083, volumes 1 and 2.
- (b) The applicant shall establish a procedure to control the documentation required by paragraph (a). The procedure shall ensure that:
- (1) the documentation is reviewed and authorised by appropriate personnel before issue; and
  - (2) current issues of relevant documentation are available to personnel at all locations where they need access to such documentation for the provision of the meteorological services listed in the applicant's exposition; and
  - (3) obsolete documentation is promptly removed from all points of issue or use; and
  - (4) changes to documentation are reviewed and approved by appropriate personnel; and
  - (5) the current version of each item of documentation can be identified to preclude the use of out-of-date editions.

### **CAR 174.575 Verification, Periodic Inspection, Testing and Calibration**

- (a) Each applicant for the grant of a meteorological service certificate shall establish procedures for
- (1) The routine verification of meteorological information obtained and provided by the applicant; and
  - (2) The periodic inspection of each meteorological office listed in the applicant's exposition; and
  - (3) The periodic inspection, testing and calibration of each facility listed in the applicant's exposition.

- (b) The procedures shall ensure that
- (1) The systems required for the routine verification of meteorological information have the capability and integrity necessary for verifying the meteorological information; and
  - (2) Appropriate inspection equipment and systems are available to personnel for the inspection of each meteorological office; and
  - (3) Appropriate inspection, measuring and test equipment and systems are available to personnel for the inspection, testing and calibration of each facility; and
  - (4) The inspection, measuring and test equipment and systems have the precision and accuracy necessary for the inspections, measurements and tests being carried out; and
  - (5) All meteorological sensing facilities are calibrated and configured so that the environmental sensors fitted or incorporated yield, as far as possible, reliable, accurate and representative meteorological information.

### **CAR 174.580 Release of Meteorological Information**

- (a) Each applicant for the grant of a meteorological service certificate shall establish procedures for
- (1) The release of meteorological information from each meteorological office listed in their exposition; and
  - (2) The placing of facilities listed in their exposition into operational service.
  - (3) The procedures shall ensure that persons authorised to supervise the production and release of meteorological information and persons authorised to place meteorological facilities into operational service have been assessed as competent under the procedures required by CAR-174.540 paragraph (b).

### **CAR 174.585 Notification of Meteorological Office and Facility Status**

- (a) An applicant for a meteorological service certificate must establish procedures to notify the users of the applicant's meteorological services of relevant operational information and of any change in the operational status of each meteorological office or facility listed in the applicant's exposition.
- (b) The applicant must ensure that the procedures established under paragraph (a) require
- (1) the operational information for each of the applicant's meteorological services that support the Oman air navigation system or an air traffic service to be forwarded to the Aeronautical Information Service for publication in the Aeronautical Information Publication Oman; and
  - (2) the users of a meteorological office or facility to be notified without delay of any change in the operational status of the meteorological office or facility if the change may affect the safety of air navigation. For those meteorological offices and facilities published in the Aeronautical Information Publication Oman, the information concerning any change to their operational status must be forwarded to the Aeronautical Information Service for the issue of a NOTAM.

### **CAR 174.590 Meteorological Information Check After Accident or incident**

- (a) Each applicant for the grant of a meteorological service certificate shall establish procedures for checking the adequacy, accuracy and timeliness of any of their

meteorological information that may have been used by an aircraft or an air traffic service involved in an accident or incident.

- (b) The procedures shall ensure that:
- (1) the checks are carried out as soon as practicable after notification to the applicant's organisation of such an accident or incident; and
  - (2) copies of the meteorological information are kept in a secure place for possible use by any subsequent investigation.

### **CAR 174.595 Malfunctions and Erroneous Information**

- (a) Each applicant for the grant of a meteorological service certificate shall establish procedures;
- (1) to identify, record, notify, investigate and rectify any report of erroneous meteorological information; and
  - (2) to identify, record, notify, investigate and rectify any detected malfunction in the facilities and meteorological services listed in their exposition that may result in the supply of erroneous meteorological information; and
  - (3) to notify without delay all users that have received the erroneous meteorological information; and
  - (4) to notify the Authority, within 12 hours, of those malfunctions that cannot be remedied within 72 hours; and
  - (5) for the continuation of malfunction status reports in the event that such reports are required by the Authority.

### **CAR 174.600 Records**

- (a) Each applicant for the grant of a meteorological service certificate shall establish procedures to identify, collect, index, store, maintain and dispose of the records that are necessary for the supply of the meteorological services listed in their exposition.
- (b) The procedures shall ensure that:
- (1) there is a record of the input meteorological information obtained under the procedures required by CAR-174.560; and
  - (2) there is a record of all output meteorological information identified under CAR-174.565; and
  - (3) the records specified in paragraph (b)(1) and (2) are retained for a period of at least sixty (60) days or for such longer period as may be required by the Authority; and
  - (4) there is a record for each meteorological office and facility listed in the applicant's exposition, in order to document the performance of each meteorological office and facility and to provide a traceable history of its maintenance, service and product quality, its periodic inspections, and the persons responsible for each of these activities; and
  - (5) there is a record of the equipment and systems used for verification, inspection, testing and calibration under the procedures required by CAR-174.580. The record shall provide a traceable history of the location, maintenance, and calibration checks for the equipment and systems; and
  - (6) there is a record of each occurrence of erroneous meteorological information reported and of each malfunction detected under the procedures required by CAR-174.600. The record shall detail the nature of the erroneous meteorological information or malfunction and the findings of the investigation and the follow-up corrective actions; and

- (7) there is a record of each internal quality assurance review of the applicant's organisation carried out under the procedures required by CAR-174.610. The record shall detail the CAR or activity of the organisation that was reviewed, the findings of the review and any necessary follow-up corrective actions; and
- (8) there is a record for each person who is authorised by the applicant to supervise the production and release of meteorological information and for each person who is authorised by the applicant to place facilities into operational service. The record shall include details of their experience, qualifications, training and current authorisations; and
- (9) all records are legible, and of a permanent nature; and
- (10) all records other than those required by paragraph (b)(1) and (2) are retained for at least one year, or for such longer period as may be required by the Authority, in order to establish a history of the performance of the meteorological services.

### **CAR 174.610 Quality Management System**

- (a) Each applicant for the grant of a meteorological service certificate shall establish internal quality assurance procedures to ensure compliance with, and the adequacy of, the procedures and systems required by this regulation and CAR-100.
- (a) The senior person who has the responsibility for internal quality assurance shall have direct access to the Chief Executive on matters affecting the adequacy, accuracy and timeliness of meteorological information
- (b) The internal quality management system shall include:
  - (1) An inspection policy;
  - (2) Inspection procedures that are understood, implemented, and maintained at all levels of the organisation;
  - (3) A procedure to ensure quality control indicators, including incident reports and personnel and customer feedback, are monitored to implement required performance standards and to identify existing problems or potential causes of problems within the system;
  - (4) A procedure for corrective action specifying how to:
    - i. correct an existing problem;
    - ii. follow up a corrective action to ensure the action is effective; and
    - iii. measure the effectiveness of any corrective action taken.
  - (5) A procedure for preventive action specifying how to manage a potential problem.

### **CAR 174.615 Organisation Exposition**

- (a) An applicant for the grant of a meteorological service certificate shall provide the Authority with an exposition which shall contain
  - (1) a statement signed by the Chief Executive on behalf of the applicant's organisation confirming that the exposition and any included manuals
    - i. define the organisation and demonstrate its means and methods for ensuring ongoing compliance with this CAR; and
    - ii. will be complied with at all times; and
  - (2) the titles and names of the senior person or persons required by CAR-174.540 paragraph (a)(1) and (2); and

- (3) the duties and responsibilities of the senior person or persons specified in paragraph (a)(2) including matters for which they deal directly with the Authority or the Authority on behalf of the organisation; and
  - (4) an organisation chart showing lines of responsibility of the senior persons specified in paragraph (a)(2); and
  - (5) a summary of the applicant's staffing structure at each meteorological office listed under paragraph (a)(7)(i); and
  - (6) a list of the meteorological services to be covered by the certificate; and
  - (7) a list providing:
    - i. the location of each meteorological office operated by the applicant; and
    - ii. the location of each facility operated by the applicant that provides meteorological information directly to the users; and
    - iii. the meteorological services provided by each of those meteorological offices and facilities; and
    - iv. the locations and airspace covered by such meteorological services; and
  - (8) details of the applicant's output meteorological information identified under CAR-174.565 paragraph (a)(1) and the standards and formats for that information determined under CAR-174.565 paragraph (a)(2); and
  - (9) details of the applicant's procedures and systems required by
    - i. CAR-174.540 paragraph (b) regarding competence of personnel; and
    - ii. CAR-174.545 regarding site requirements; and
    - iii. CAR-174.550 regarding communication requirements; and
    - iv. CAR-174.560 regarding meteorological service input requirements; and
    - v. CAR-174.565 regarding meteorological service output requirements; and
    - vi. CAR-174.570 regarding facility requirements; and
    - vii. CAR-174.575 paragraph (b) regarding control of documentation; and
    - viii. CAR-174.580 regarding verifications, inspections, tests and calibrations; and
    - ix. CAR-174.585 regarding release of meteorological information and the placing of facilities into operational service; and
    - x. CAR-174.590 regarding notification of meteorological office and facility status; and
    - xi. CAR-174.595 regarding meteorological information checks after notification of an accident or incident; and
    - xii. CAR-174.600 regarding malfunctions and erroneous information; and
    - xiii. CAR-174.605 regarding identification, collection, indexing, storage, maintenance and disposal of records; and
    - xiv. CAR-174.610 regarding internal quality assurance of the organisation; and
    - xv. CAR-174.620 regarding safety management of the organization]
  - (10) procedures to control, amend and distribute the exposition.
- (b) The applicant's exposition must be acceptable to the Authority.

### **CAR 174.620 Safety Management System**

- (a) The Meteorological service provider shall establish, implement, maintain and adhere to a safety management system in accordance with CAR-100 and that is appropriate to the size, nature and complexity of all activities authorized to be conducted under its duties.
- (b) That system shall as a minimum:
  - (1) identify safety hazards;
  - (2) ensure that remedial action necessary to maintain an acceptable level of safety is implemented;

- (3) provide for continuous monitoring and regular assessment of the safety level achieved;
  - (4) aim to make continuous improvement to the overall level of safety; and
  - (5) clearly define lines of safety accountability throughout the CNS provider including a direct accountability for safety on the part of senior management for those services with direct air traffic services operational implications.
- (c) The results of this system and related audits and corrective actions shall be made available to the Authority upon request.

## **Operating requirements**

### **CAR 174.625 Continued Compliance**

- (a) Each holder of a meteorological service certificate shall
- (1) hold at least one complete and current copy of their exposition at each meteorological office specified in their exposition; and
  - (2) comply with all procedures and systems detailed in their exposition; and
  - (3) make each applicable CAR of their exposition available to personnel who require those parts to carry out their duties; and
  - (4) continue to meet the standards and comply with the requirements of Subpart B prescribed for certification under this CAR; and
  - (5) notify the Authority of any change of address for service, telephone number, or facsimile number within 28 days of the change.

### **CAR 174.630 Operations Manual**

- (a) Each holder of a meteorological service certificate shall provide an operations manual for each meteorological office listed in their exposition. The manual shall set out the procedures for the operation and maintenance of the meteorological office and associated facilities and shall include a list of:
- (1) the meteorological information and meteorological services provided; and
  - (2) the minimum acceptable operating parameters and standards for facilities; and
  - (3) the minimum meteorological inputs required; and
  - (4) the minimum performance and quality levels for output meteorological information and meteorological services provided; and
  - (5) the test equipment and systems required for the measurement of the minimum levels listed under subparagraph (4); and
  - (6) any mandatory check procedures for releasing meteorological information.

### **CAR 174.635 Limitations on Certificate Holder**

- (a) The holder of a meteorological service certificate shall not
- (1) provide meteorological information where the meteorological input information required to provide that meteorological information is not available; or
  - (2) provide meteorological information where the operational performance of the meteorological office or facility producing that meteorological information does not meet the applicable requirements; or
  - (3) provide meteorological information where any integrity monitoring system associated with that meteorological information is not fully functional; or
  - (4) provide meteorological information where any required verification, inspection, test or calibration relating to that meteorological information has not been completed; or
  - (5) provide meteorological information where there is any cause whatsoever to suspect the integrity of that meteorological information.



### **CAR 174.640 Changes to Certificate Holder’s Organization**

- (a) Each holder of a meteorological service certificate shall ensure that their exposition is amended so as to remain a current description of the holder’s organisation and meteorological services provided.
- (b) The certificate holder shall ensure that any amendments made to the holder’s exposition meet the applicable requirements of this CAR and comply with the amendment procedures contained in the holder’s exposition.
- (c) The certificate holder shall provide the Authority with a copy of each amendment to their exposition as soon as practicable after its incorporation into the exposition.
- (d) Where a certificate holder proposes to make a change to any of the following, prior notification to and acceptance by the Authority is required:
  - (1) the Chief Executive:
  - (2) the listed senior persons:
  - (3) the meteorological services the holder provides:
  - (4) the locations and airspace covered by each of the meteorological services the holder provides.
- (e) The Authority may prescribe conditions under which a certificate holder may operate during or following any of the changes specified in paragraph (d).
- (f) A certificate holder shall comply with any conditions prescribed under paragraph (e).
- (g) Where any of the changes referred to in this rule require an amendment to the certificate, the certificate holder shall forward the certificate to the Authority as soon as practicable.

### **CAR 174.645 Safety Inspections and Audits**

Authority may consider necessary in the interests of aviation safety.

- (a) The Authority may in writing require the holder of a meteorological service certificate to undergo or carry out such inspections and audits of the holder’s meteorological offices, facilities, documents, and records as the Authority considers necessary in the interests of civil aviation safety and security in accordance with the Law.
- (b) The Authority may require from the holder of a meteorological service certificate such information as the Authority considers relevant to the inspection or audit.

### **CAR 174.650 Transitional Period**

- (a) The provision in this CAR shall be fulfilled within three (3) years after the issuance of this regulation.
- (b) Service providers that fail to meet the certification compliance requirements in accordance with the provisions of CAR 174.505 shall provide alternative means of compliance with this regulation in the conducting of their operational activities, subject to the approval and provisions granted by the AUTHORITY.

### **CAR 174.655 Exemptions**

The AUTHORITY may grant a temporary exemption from the provisions of CAR 174, as outlined under CAR 10, provided the exemption will not reduce the level of safety below an acceptable level. The AUTHORITY may impose conditions or restrictions on the exemption, and may also require a service provider proposal for an alternate means of compliance and/or a safety case and associated functional hazard analysis that supports the granting of the exemption.

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## Attachment A – Operationally Desirable Accuracy of Measurement or Observation

*Note: The guidance contained in this table relates to Subpart B — Supply, use, quality management and interpretation of meteorological information, in particular to CAR-174.055 paragraph (g), and Subpart D — Meteorological observations and reports.*

<i>Element to be observed</i>	<i>Operationally desirable accuracy of measurement or observation*</i>
Mean surface wind	Direction: $\pm 10^\circ$ Speed: $\pm 0.5$ m/s (1 kt) up to 5 m/s (10 kt) $\pm 10\%$ above 5 m/s (10 kt)
Variations from the mean surface wind	$\pm 1$ m/s (2 kt), in terms of longitudinal and lateral components
Visibility	$\pm 50$ m up to 600 m $\pm 10\%$ between 600 m and 1 500 m $\pm 20\%$ above 1 500 m
Runway visual range	$\pm 10$ m up to 400 m $\pm 25$ m between 400 m and 800 m $\pm 10\%$ above 800 m
Cloud amount	$\pm 1$ okta
Cloud height	$\pm 10$ m (33 ft) up to 100 m (330 ft) $\pm 10\%$ above 100 m (330 ft)
Air temperature and dew-point temperature	$\pm 1^\circ\text{C}$
Pressure value (QNH, QFE)	$\pm 0.5$ hPa

\* The operationally desirable accuracy is not intended as an operational requirement; it is to be understood as a goal that has been expressed by the operators.

*Note: Guidance on the uncertainties of measurement or observation can be found in the Guide to Meteorological Instruments and Methods of Observation (WMO-No. 8).*

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## Attachment B – Operationally Desirable Accuracy of Forecasts

*Note 1: The guidance contained in this table relates to Subpart B — Supply, use, quality management and interpretation of meteorological information, in particular to CAR-174.055 paragraph (h), and Subpart F — Forecasts.*

*Note 2: If the accuracy of the forecasts remains within the operationally desirable range shown in the second column, for the percentage of cases indicated in the third column, the effect of forecast errors is not considered serious in comparison with the effects of navigational errors and of other operational uncertainties.*

<i>Element to be forecast</i>	<i>Operationally desirable accuracy of forecasts</i>	<i>Minimum percentage of cases within range</i>
<b>TAF</b>		
Wind direction	± 20°	80% of cases
Wind speed	± 2.5 m/s (5 kt)	80% of cases
Visibility	± 200 m up to 800 m ± 30% between 800 m and 10 km	80% of cases
Precipitation	Occurrence or non-occurrence	80% of cases
Cloud amount	One category below 450 m (1 500 ft) Occurrence or non-occurrence of BKN or OVC between 450 m (1 500 ft) and 3 000 m (10 000 ft)	70% of cases
Cloud height	± 30 m (100 ft) up to 300 m (1 000 ft) ± 30% between 300 m (1 000 ft) and 3 000 m (10 000 ft)	70% of cases
Air temperature	± 1°C	70% of cases
<b>TREND FORECAST</b>		
Wind direction	± 20°	90% of cases
Wind speed	± 2.5 m/s (5 kt)	90% of cases
Visibility	± 200 m up to 800 m ± 30% between 800 m and 10 km	90% of cases
Precipitation	Occurrence or non-occurrence	90% of cases

<i>Element to be forecast</i>	<i>Operationally desirable accuracy of forecasts</i>	<i>Minimum percentage of cases within range</i>
Cloud amount	One category below 450 m (1 500 ft) Occurrence or non-occurrence of BKN or OVC between 450 m (1 500 ft) and 3 000 m (10 000 ft)	90% of cases
Cloud height	± 30 m (100 ft) up to 300 m (1 000 ft) ± 30% between 300 m (1 000 ft) and 3 000 m (10 000 ft)	90% of cases
<b>FORECAST FOR TAKE-OFF</b>		
Wind direction	± 20°	90% of cases
Wind speed	± 2.5 m/s (5 kt) up to 12.5 m/s (25 kt)	90% of cases
Air temperature	± 1°C	90% of cases
Pressure value (QNH)	± 1 hPa	90% of cases
<b>AREA, FLIGHT AND ROUTE FORECASTS</b>		
Upper-air temperature	± 2°C (Mean for 900 km (500 NM))	90% of cases
Relative humidity	± 20%	90% of cases
Upper wind	± 5 m/s (10 kt) (Modulus of vector difference for 900 km (500 NM))	90% of cases
Significant en-route weather phenomena and cloud	Occurrence or non-occurrence Location: ± 100 km (60 NM) Vertical extent: ± 300 m (1 000 ft) Flight level of tropopause: ± 300 m (1 000 ft) Max wind level: ± 300 m (1 000 ft)	80% of cases 70% of cases 70% of cases 80% of cases 80% of cases

# Attachment C – Selected Criteria Applicable to Aerodrome Reports

(The guidance in this table relates to Subpart D)

Specifications	Surface wind		Speed variations <sup>3</sup>		Visibility (VIS)		Runway visual range <sup>4</sup>		Present weather	Cloud			Temperature	Pressure (QNH, QFE)	Supplementary information
	Directional variations <sup>1</sup> ≥ 60° and < 180°	Mean speed	Directional variations <sup>1</sup> ≥ 180°	Mean speed	Minimum VIS # prevailing VIS	Special cases Minimum VIS # prevailing VIS	A -10 (Time, MIN)	B -5 (Time, MIN)		C (Obs TIME)	Amount	Type <sup>2</sup>			
Local routine and special report	2/10 min VRB + 2 mean + 2 extreme directions	2/10 min VRB + 2 mean + 2 extreme directions	≥ 180°	Exceeding the mean speed by ≥ 5 m/s (10 kt)	Minimum VIS < 1 500 m or < 0.5 A prevailing VIS determined	Special cases Minimum VIS # prevailing VIS	1 min 10 min <sup>a</sup>	1 min 10 min <sup>a</sup>	1 min 10 min <sup>a</sup>	No general criteria applicable to all the WX phenomena (for specific criteria, see Appendix 3, 4.4.2)	Layers reported if coverage	Identification	No criteria	Updated if changes > agreed magnitude	Parameter to be included
METAR/ SPECI	10 min VRB (no extremes)	10 min VRB (no extremes)		Maximum speed	Prevailing minimum VIS + direction	Minimum VIS	10 min No tendency observed (N <sup>o</sup> )	10 min No tendency observed (N <sup>o</sup> )	10 min No tendency observed (N <sup>o</sup> )		Lowest layer >	CB or TCU	Always	QNH QFE <sup>10</sup>	All <sup>11</sup>
Relevant reporting scales for all messages	Direction in three figures rounded to the nearest 10 degrees (degrees 1 – 4 down, degrees 5 – 9 up)	Speed in 1 m/s or 1 kt Speed < 0.5 m/s (1 kt) indicated as CALM		Speed in 1 m/s or 1 kt Speed < 0.5 m/s (1 kt) indicated as CALM	Step applicable VIS < 800 m : 50 m 800 m ≤ VIS < 5 000 m : 100 m 5 000 m ≤ VIS < 10 km : 1 km VIS ≥ 10 km : None, given as 10 km or covered under CAVOK	Step applicable RVR < 400 m : 25 m 400 m ≤ RVR ≤ 800 m : 50 m 800 m < RVR < 2 000 m : 100 m <sup>13</sup>	Step applicable Base ≤ 3 000 m (10 000 ft) : 30 m (100 ft)	Step applicable Base ≤ 3 000 m (10 000 ft) : 30 m (100 ft)	Step applicable Base ≤ 3 000 m (10 000 ft) : 30 m (100 ft)	Always	Always	Always	Always	QNH	Recent WX of operational significance and wind shear <sup>12</sup>

Notes –

1. Considered for the past 10 minutes (exception: if the 10-minute period includes a marked discontinuity (i.e. runway visual range changes or passes 175, 300, 550 or 800 m, lasting ≥ 2 minutes), only data after the discontinuity to be used). A simple diagrammatic convention is used to illustrate those parts of the 10-minute period prior to the observation relevant to runway visual range criteria, i.e. AB, BC and AC.
2. Layer composed of CB and TCU with a common base should be reported as <CB>.
3. Considered for the past 10 minutes (exception: if the 10-minute period includes a marked discontinuity (i.e. the direction changes ≥ 30° with a speed ≥ 5 m/s or the speed changes ≥ 5 m/s lasting ≥ 2 minutes), only data after the discontinuity to be used).
4. If several directions, the most operationally significant direction used.
5. Let  $R_{mean}$  = 5-minute mean runway visual range value during period AB and  $R_{obs}$  = 5-minute mean runway visual range value during period BC.
6. CB (cumulonimbus) and TCU (towering cumulus = cumulus congestus of great vertical extent) if not already indicated as one of the other layers.
7. Time averaging for mean values and, if applicable, referring period for extreme values, indicated in the upper left-hand corner.
8. According to the Manual on Codes (WMO-No. 306), Volume I.1, Part A – Alphabetic Codes, paragraph 15.5.5, it is recommended that the wind measuring systems should be such that peak gusts should represent a three-second average<sup>15</sup>.
9. N/A = not applicable.
10. QFE is to be included if required. Reference elevation for QFE should be aerodrome elevation except for precision approach runways, and non-precision approach runways with threshold ≥ 2 m (7 ft) below or above aerodrome elevation, where the reference level should be the relevant threshold elevation.
11. As listed in Appendix 3, 4.8.
12. Also sea-surface temperature, and state of the sea or the significant wave height from offshore structures in accordance with regional air navigation agreement.
13. Report if RVR and/or VIS < 1 500 m, limits for assessments 50 and 2 000 m.
14. For landing at aerodromes with precision approach runways and with the threshold elevation ≥ 15 m below the aerodrome elevation, the threshold elevation to be used as a reference.
15. Measured in 0.1 Hz.

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## Attachment D – Conversion of Instrumented Readings into Runway Visual Range and Visibility

*Note: See ICAO Annex 3, Appendix 3.*

- (1) The conversion of instrumented readings into runway visual range and visibility is based on Koschmieder's Law or Allard's Law, depending on whether the pilot can be expected to obtain main visual guidance from the runway and its markings or from the runway lights. In the interest of standardization in runway visual range assessments, this Attachment provides guidance on the use and application of the main conversion factors to be used in these computations.
- (2) In Koschmieder's Law one of the factors to be taken into account is the pilot contrast threshold. The agreed constant to be used for this is 0.05 (dimensionless).
- (3) In Allard's Law the corresponding factor is the illumination threshold. This is not a constant, but a continuous function dependent on the background luminance. The agreed relationship to be used in instrumented systems with continuous adjustment of the illumination threshold by a background luminance sensor is shown by the curve in Figure D-1. The use of a continuous function which approximates the step function such as displayed in Figure D-1 is preferred, due to its higher accuracy, to the stepped relationship described in paragraph 4.
- (4) In instrumented systems without continuous adjustment of the illumination threshold, the use of four equally spaced illumination threshold values with agreed corresponding background luminance ranges is convenient but will reduce accuracy. The four values are shown in Figure D-1 in the form of a step function; they are tabulated in Table D-1 for greater clarity.

*Note 1: Information and guidance material on the runway lights to be used for assessment of runway visual range are contained in the Manual of Runway Visual Range Observing and Reporting Practices (Doc 9328).*

*Note 2: In accordance with the definition of visibility for aeronautical purposes, the intensity of lights to be used for the assessment of visibility is in the vicinity of 1,000 cd.*

**Table D-1. Illumination threshold steps**

<i>Condition</i>	<i>Illumination threshold (lx)</i>	<i>Background luminance (cd/m<sup>2</sup>)</i>
Night	$8 \times 10^{-7}$	$\leq 50$
Intermediate	$10^{-5}$	51 – 999
Normal day	$10^{-4}$	1 000 – 12 000
Bright day (sunlit fog)	$10^{-3}$	> 12 000

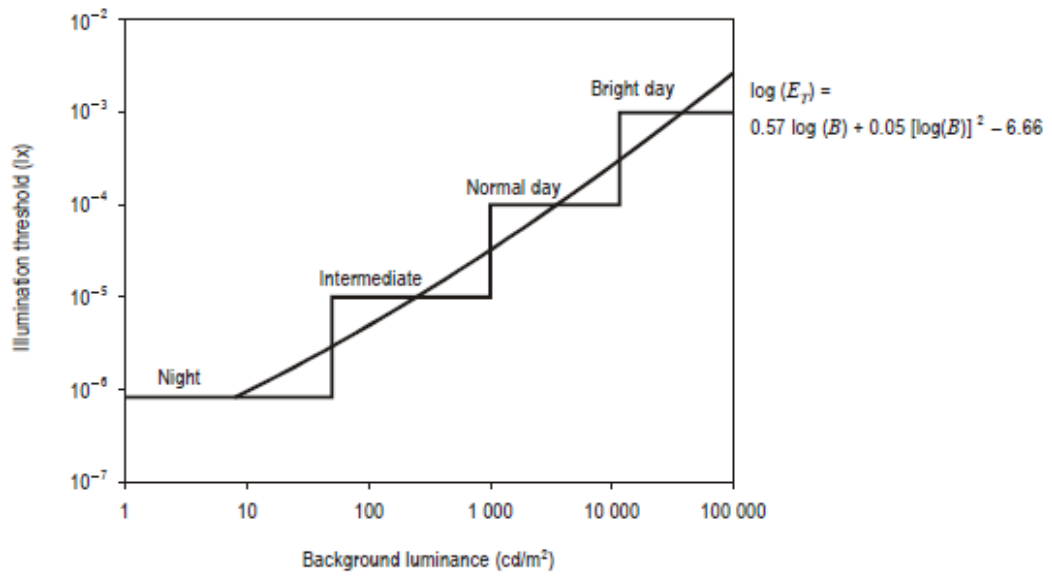


Figure D-1. Relationship between the illumination threshold  $E_T$  (lx) and background luminance  $B$  ( $\text{cd/m}^2$ )

