



Advisory Circular

AC174-1

Aviation Meteorological Service Organisations Certification

Initial Issue

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GENERAL

Civil Aviation Authority Advisory Circulars (AC) contain information about standards, practices and procedures that the Director has found to be an Acceptable Means of Compliance (AMC) with the associated rule.

An AMC is not intended to be the only means of compliance with a rule, and consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices or procedures are found to be acceptable, they will be added to the appropriate Advisory Circular.

PURPOSE

This Advisory Circular provides methods, acceptable to the Director, for showing compliance with the certification requirements of Part 174 and explanatory material to assist in showing compliance.

RELATED CAR

This AC relates specifically to Civil Aviation Rule Part 174.

CHANGE NOTICE

There was no previous issue of this AC, consequently no change is in effect.

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Subpart A — General

174.1 Applicability

This rule introduces the objective of Part 174 — that is to prescribe rules for those organisations that are wholly or partly devoted to the supply of meteorological information for aviation. Any organisation that wishes to supply meteorological information to aviation in Papua New Guinea territory can only do so with certification under Part 174. The more specific requirements to hold a certificate are contained within Rule 174.5 and those activities that do not require a certificate are contained in Rule 174.6.

Further explanatory information is contained within paragraph 174.5.

174.3 Definitions

This section contains only those definitions that have a specified meaning relevant to Part 174. Other generally used definitions will be found in Civil Aviation Rule Part 1, Definitions and Abbreviations. Information is set out below to help in the understanding of the terms unique to Part 174 —

Basic weather report —

- The word verbal is used in its primary sense — of, or concerned with words. This is distinct from the situation with meteorological reports which comprise a mix of official meteorological code and, occasionally, words.
- The secondary meaning of the word verbal is of less significance — oral not written. It is expected that most basic weather reports will be passed immediately to second parties directly or through radio or other electronic communication media.
- It is also expected that basic weather reports will generally be provided on a one-to-one basis (ground to air, air to air, air to ground), generally in-house, and occasionally promulgated by paper or electronic means.
- The elements allowable in basic weather reports have been purposely restricted. This is because basic weather reports must not be considered an alternative to meteorological reports that are required for the normal planning and conduct of flights. Basic weather reports, as defined, contain sufficient information for incorporation in a landing report for piston-powered or turbine-powered aircraft.

Plain language meteorological reports as described in ICAO Annex 3 are not regarded as basic weather reports. Such plain language meteorological reports are considered to fall within the meaning of meteorological reports.

Examples of basic weather reports —

- An aircraft operator's ground staff passing a landing report to their incoming aircraft at an aerodrome unattended by Air Traffic Services (ATS)
- An ATS officer passing a landing report to aircraft entering the aerodrome control zone or circuit
- An individual, normally working outside aviation, conveying current information about local weather to an aircraft operator or aircrew

Information on the requirements for the preparation of basic weather reports is contained in paragraph 174.6.

Erroneous meteorological information —

- Forecasting is not an exact science, therefore some meteorological information will be in error to some degree. Erroneous meteorological information, however, is that which is significantly inaccurate.

- A forecast that has simply proven inaccurate is not seen as erroneous. However, a lengthy series of particular forecasts or reports that are, and may continue to be, completely inaccurate, or contain important omissions, are considered to be erroneous information.

Facility —

- Some comment on the relationship of the ownership of facilities described in Part 174 and the flow of meteorological information is warranted regarding this definition —
- The correct operation of a facility is the responsibility of the certificated meteorological supplier that uses the facility to provide meteorological services. Should a facility deliver meteorological services to an aviation customer of the certificated meteorological supplier, the responsibility of the supplier ends at the point and time of delivery of the meteorological information.
- If an aviation customer has a system for the internal distribution of meteorological information they are not required to be certificated under Part 174. Such an internal mechanism is an information management system and as such will need to be encompassed within the customer's exposition to be required by the Aircraft Operators Part.

Examples of a facility —

- an automatic weather station
- a weather surveillance radar
- a meteorological information communication system
- a computer system running meteorological analysis and prediction software

Meteorological information —

This definition is that used by ICAO in Annex 3.

Meteorological office —

Based on the ICAO Annex 3 definition, this term is intended to cover all physical premises from which meteorological services are undertaken.

Meteorological report —

This definition is that used by ICAO in Annex 3. Plain language meteorological reports, as described in ICAO Annex 3, are considered to fall within the meaning of meteorological reports. Meteorological reports are not regarded as basic weather reports.

Examples of meteorological reports —

- SYNOP, METAR, SPECI, BUOY (as described in WMO documents)
- PIREP, AIREP, AMDAR bulletins (as described in ICAO documents)
- volcanic activity report

Meteorological service —

ICAO Annex 3 has been used as the basis for defining meteorological service. As shown in the Rule, there are six different types of meteorological service. Paragraph 174.9 contains explanatory material on each of these meteorological services.

174.5 Requirement for Meteorological Service Certificate

- (1) This rule states that it is necessary to hold a meteorological service certificate for the provision of meteorological services in Papua New Guinea. The Director may grant a certificate to cover a

range of services, varying from a single meteorological service to an integrated meteorological service supported by a network of meteorological offices and facilities.

All Papua New Guinea domiciled meteorological service providers will need certification under Part 174 if they wish to provide aviation with meteorological information. Any overseas based meteorology service provider, including meteorological authorities, will need certification under Part 174 to be able to supply aviation operations in Papua New Guinea with meteorological information.

Before an application for certification under Part 174 will be accepted, overseas based meteorology suppliers, wishing to provide aviation operations in Papua New Guinea with meteorological information, will need to satisfy the Director that they genuinely intend to provide meteorological services in Papua New Guinea.

- (2) Some meteorological service organisations or individuals may want to subcontract elements of their business to other individuals or organisations. They could, for example, contract an individual or organisation to prepare meteorological reports, or forecasts, or to manage or provide particular facilities. In such circumstances a contractor to a certificate holder is not required to be certificated under Part 174 (providing the certificate holder is certificated appropriately). It is, however, the responsibility of the certificate holder to ensure that the contractor conforms to the requirements set out in the certificate holder's exposition.

174.6 Basic Weather Reporting

- (1) Certification under this part is not required where verbal comment on actual weather conditions at a particular aerodrome or place is provided in the form of a basic weather report. Such basic weather reporting activity is intended to include only —
 - (i) verbal provision of basic weather reports to incoming aircraft at aerodromes; and
 - (ii) verbal comment on present weather conditions passed between aircraft and other aeronautically associated parties.

Particular examples of basic weather reports are —

- (i) an aircraft operator's ground staff passing a basic weather report, as part of their landing report, to their incoming aircraft at an unattended aerodrome.
- (ii) an ATS officer passing a basic weather report, as part of a landing report, to aircraft entering their aerodrome control zone or circuit.
- (iii) an individual, normally working outside aviation, conveying basic weather information to an aircraft operator or aircrew, by any means of communication.

Refer to the definition information in paragraph 174.3 before moving on to the remainder of this section.

- (2) People providing a basic weather report using equipment to measure meteorological parameters (wind speed and direction, air pressure, and air temperature) are required to ensure such equipment is properly calibrated and maintained. Frequent checking of equipment against other equipment known to be accurate (QNH readings checked against visiting aircraft's altimeters for example) is considered adequate for calibration purposes. Maintenance of equipment should follow the manufacturer's guidelines.

The person providing a basic weather report is required to have been trained to provide such reports. Anyone providing basic weather reports need not be trained to the broad requirements expected of people providing meteorological reports. However, because basic weather reports still need to be accurate, some training is required. The holder of any pilots licence, or a person who is qualified and competent as outlined in paragraph 174.51(b) is considered adequately trained to provide basic weather reports.

Other persons would need to receive training from a suitably qualified person such as the holder of a license to act as pilot-in-command, or from a person who is qualified and competent as outlined in paragraph 174.51(b).

All such training should pay particular attention to the place and surroundings for which the basic weather reports will be made.

174.7 Application and Issue

This rule sets out the conditions under which a certificate will be granted. The application is made on form CAA 174/01.

174.9 Scope of Certificate

An applicant for a certificate is required under Rule 174.79 to list meteorological services, locations and airspace for which the certificate is sought. The types of meteorological service authorised will be shown on the certificate.

Explanation of the definitions of the types of *meteorological service* is set out below;

- (1) **Climatology service** — the production of aeronautical climatological information for the planning of flight operations. Such a service specifically prepares historical meteorological information for aviation purposes.

Climatological information that is published for a general audience is not regarded as a climatological service under Part 174.

The production and distribution of historical meteorological information to meet an aviation requirement such as aerodrome reference temperatures and meteorological data required for application to aircraft take-off performance requirements.

- (2) **Forecast service** — the production and supply of forecast meteorological information, for a specified area or portion of airspace, as required for aircraft operations. Provision of forecast services may be manual or electronic and production may incorporate electronic data analysis. Any individual or organisation that prepares or edits or updates any type of forecast targeted at any aviation organisation must be certificated under Part 174.

The provision of upper-air forecasts of temperature and winds (ROFOR, GRIDWIND), aerodrome forecasts (TAF, TTL), and SIGMET forecast products or their equivalents.

- (3) **Information dissemination service** — the collection and dissemination of meteorological information to meet aviation requirements. The delivery portion is analogous to a post system but with the specialty of providing transmission facilities that are designed to cope especially with meteorological information. Such a service may be internal or external to a meteorological service operation.

The provision of a VOLMET service and the provision of meteorological information from a data base through various telecommunication media. Any publicly accessible network that is used to distribute meteorological information is not regarded as an information dissemination service.

- (4) **Meteorological briefing service** — the supply, by a person or system, of meteorological information together with specialist interpretation of that information. Such briefings may be supplied manually or electronically and may or may not be provided from a meteorological briefing office at an aerodrome.

The provision of a spoken or written summary or interpretation of both forecast meteorological conditions and meteorological reports that may complement formal text or graphical forecast products such as upper-air forecasts and aerodrome forecasts. Such complementary information provided will be based on the experience of the person giving the briefing.

- (5) **Meteorological reporting service** — the supply of routine meteorological reports. The reports

may be compiled and supplied manually, automatically or electronically.

The provision of formal meteorological information on actual meteorological conditions at a particular place such as —

- meteorological aerodrome reports (METAR, SPECI)
- meteorological reports (SYNOP, SHIP, BUOY)
- volcanic activity reports

or any other products derived from the operation of manual weather observing systems or remote observing systems such as —

- automatic weather observing stations
- vertical wind and temperature profilers
- weather surveillance radar
- weather satellite

Plain language meteorological reports as described in ICAO Annex 3 are regarded as meteorological reports.

- (6) **Meteorological watch service** — the maintenance of a watch over current meteorological conditions affecting aircraft operations in a particular area. Such a service would be providing meteorological information relating to that area to the aircraft operators, ATS operations, and meteorological watch services serving adjacent areas, flight information regions, or control areas.

The maintenance of a watch over meteorological information for a particular aircraft, airspace or aerodrome, the provision of SIGMET, wind shear reports, and aerodrome warnings.

The provision of a meteorological watch service may use all or part of the products from the World Area Forecast System (WAFS). The meteorological watch service need not be a Regional Area Forecast Centre within the WAFS.

174.13 Duration of Certificate

The Director will issue certificates for such periods as he or she sees fit considering the circumstances of the application and issue. Factors to be considered include —

- the Director's previous knowledge of the applicant
- whether the applicant is an existing certificate holder
- whether the application is in respect of a new type of service where approval has not previously been given.

Certificates should not be valid for more than five years because in this period there can be significant changes in technology and industry requirements. Therefore it is reasonable to conduct a reassessment by new entry control.

174.15 Renewal of Certificate

The certificate holder should apply for the renewal of the certificate in sufficient time to allow the renewal process to be accomplished before the certificate expires. At the time of issue the certificate may be endorsed with an application renewal date. This date may vary significantly dependent upon the extent of the meteorological service provided and the period for which the certificate has been in force. Where the certificate has been in force for the maximum period of five years the application will be subjected to full entry level examination. This will require more lead time than the renewal of a certificate which has been in force

for a much shorter period.

Subpart B — Certification Requirements

174.51(a)(1) Personnel Requirements — Chief Executive

The applicant is required to nominate a person to be identified as the Chief Executive. This is the person in whom the authority of the meteorological service certificate is vested. This person must have the ultimate responsibility, including financial authority, to ensure that all the necessary resources are available to provide the meteorological service in compliance with Part 174 and the organisation's exposition.

In organisations where only some of the total operational resource is deployed in the supply of meteorological services, the Chief Executive for the purposes of Part 174 is expected to be responsible for the that part of the organisation which supplies the aeronautical meteorological information.

174.51(a)(2) Personnel Requirements Senior Persons

The person or persons nominated in the exposition must be part of the management structure of the applicant's organisation. They must also be suitably qualified for the position held and must be responsible for the provision, operation, and maintenance of all the meteorological offices, facilities and meteorological services covered by the certificate.

The titles and responsibilities of the nominated persons will vary, dependent upon the size of the applicant's organisation, and may be subdivided under individual persons or combined in any number of ways. Irrespective of the titles or the number of persons nominated, the following areas of responsibility are expected to be addressed where they are applicable to the activities of the applicant's organisation.

In respect of meteorological offices or facilities —

Responsibility for the operation of meteorological office(s) or facilities to ensure that they continue to operate to the required performance standards and that the output follows the requirements of Part 174 and the organisation's procedures.

In respect of Internal Quality Assurance —

Responsibility for the organisation's quality assurance procedures to ensure compliance with the organisation's exposition and with Part 174. Responsibilities include ensuring the adequacy of the organisation's exposition and associated procedures in meeting the requirements of Part 174, in reflecting the scope of the service provided, and ensuring that corrective actions in respect of any deficiencies are fully implemented.

The organisation may choose to appoint managers for all or any combination of the above areas of responsibility, however it must be clear to whom the responsibilities devolve. It is necessary in all cases that these managers report to, and are responsible ultimately to, the Chief Executive.

The persons so nominated are to be identified on form CAA 24FPP and credentials supplied with the application. To be accepted, such nominated persons should have adequate knowledge and satisfactory experience relative to their position and responsibility.

174.51(a)(3) Personnel Requirements — Meteorological office

The number and location of suitably qualified and trained personnel required will depend on —

- the scope of the meteorological service and meteorological office activities
- the location of the meteorological offices and facilities
- the role of the meteorological offices and facilities in the air navigation system

174.51(b) Personnel Requirements — Competency assessment

It is necessary for an organisation to have procedures for assessing and maintaining the competency of personnel. Particularly those authorised to compile or derive meteorological information, and to release such information to customers. The procedures should include the levels of training, qualification, and experience necessary to ensure that quality systems work and quality output from the meteorological office or facility concerned.

The Authority expects that personnel will have a basic recognised qualification for performing their particular functions. The organisation's initial training programme should cover the procedures for the particular functions for which the person is employed.

Meteorological office personnel are expected to be qualified and have shown competence in the relevant components of the following guidelines and syllabuses or equivalent —

WMO Publication 258	Guide-lines for the Education and Training of Personnel in Meteorology and Operational Hydrology
WMO Publication 266	Compendium of Lecture Notes for Training Class IV Meteorological Personnel, Volume II
WMO Publication 364	Compendium of Lecture Notes for Training Class I and II Meteorological Personnel, Volume II part II
WMO Publication 622	Compendium of Lecture Notes in Meteorological Instrumentation for Training Class III & IV Meteorological Personnel

The overall training of all personnel is expected to meet all relevant parts of any ICAO or WMO Annexes, Publications or Documents listed in this AC.

To be acceptable, personnel should be given specialised training on the types of service being provided followed by an on-the-job evaluation related to the particular meteorological service, meteorological office or facility and their location. The specialised training should include an examination to assess the person's knowledge of the production methodologies. The on-the-job evaluation must establish that the person complies with the procedures relating to the meteorological service, meteorological office or facility and fully understands —

- (1) the role of the organisation within the air navigation system; and
- (2) the functions, limitations and use of any built in executive monitor, verification or self check system or procedure.

A competency check on meteorological office personnel must establish that each person can satisfactorily meet all of the necessary requirements of the particular meteorological office they work at.

It is expected that these on-the-job competency checks would be carried out at regular intervals with appropriate continuation training to maintain the competence level of the authorised person. Continuation training should also cover any changes in relevant technology, or the organisation's procedures, and any changes to the meteorological office or facility procedures involved.

Personnel competency checks and continuation training must be carried out by personnel qualified in the respective meteorological areas to at least the level being checked or depth of continuation training being given. It is also preferable that such checking and training staff have undertaken appropriate education in the management and application of such procedures and of training requirements.

To help in the assessment of competence it is recommended that job descriptions be formulated for all positions within the organisation's structure. The job descriptions for all personnel who manage, verify or do work, which can affect quality and safety of the meteorological service provided should define their responsibilities, authority and their interrelationships. Job descriptions are particularly important for personnel who need the organisational freedom and authority to —

- (1) initiate action to prevent inaccurate or unsafe situations developing;
- (2) identify and record problems which may affect quality and safety;

- (3) initiate, recommend or provide solutions through designated channels;
- (4) verify the implementation of solutions; and
- (5) control further activities following the detection of low quality or unsafe situations until deficiencies have been corrected.

174.53 Site Requirements

Security of all systems interacting with aviation is imperative to safety. Procedures for ensuring such security should encompass —

- the physical and electronic integrity of a meteorological office or facility
- the access rights and movement of people to or within a meteorological office or in or near a facility

Organisations must comply with the relevant requirements of Civil Aviation Rule Part 112, Airways Security Programmes, for those meteorological offices or facilities sited on aerodromes.

(1)(i) Organisations should establish appropriate agreements with site owners and adjacent site owners or operators to ensure that no incidents occur that will affect performance of the meteorological office or facility.

(1)(ii) Meteorological offices and facilities must have suitable power supplies and means to ensure their continuity appropriate to the nature of the meteorological service provided. This requirement applies particularly to electronic remote weather sensing equipment and meteorological offices that are reliant on computer-based production and electronic communication systems.

(2) The siting of remote weather sensing facilities (such as automatic weather observing stations) should follow closely the requirements for manual visual observations and instrument exposure. The minimum acceptable technical siting requirements are contained in —

ICAO Annex 3	Meteorological Services for International Air Navigation
WMO Publication 49	Technical Regulations, Volume II, Meteorological Services for Air Navigation
WMO Publication 8	Guide to Meteorological Instruments and Methods.
WMO Publication 488	Guide on Global Observing System
WMO Publication 544	Manual on Global Observing System

However, it is accepted that there are often situations where constraints, such as terrain or communications logistics, make the ideal siting of a facility impracticable. In such situations less than ideal siting is acceptable providing the information gathered by the facility remains representative of the area concerned.

The Director may accept other technical siting criteria for the installation and maintenance of remote weather sensing facilities.

174.55 Communication Requirements

Useful flow of meteorological information is based on the ability of the communication systems used. Meteorological service organisations should ensure that the equipment and software used are adequate for the volume and type of information being communicated.

Organisations may use third party communication providers, however, it is the organisation's responsibility to ensure that the contracted communication provider meets the communication requirements specified. That specification must be stated in their exposition and conform to Part 174.

Each organisation should decide upon the best communication system for its operations. However, it is expected that organisations, apart from those providing a climatological service, will have a capability to, directly or indirectly, link their communication system to the Aeronautical Fixed Telecommunications Network.

The communication protocols to be used by organisations are expected to be those found within —

ICAO Annex 3	Meteorological Services for International Air Navigation
ICAO Annex 10	Aeronautical Telecommunications
ICAO Annex 15	Aeronautical Information Services
WMO Publication 49	Technical Regulations, Volume II, Meteorological Services for International Air Navigation

And further in —

ICAO Document 7030	Regional Supplementary Procedures
ICAO Document 8126	Aeronautical Information Services Manual
ICAO Document 8896	Manual of Aeronautical Meteorological Practice
ICAO Document 8700	Air Navigation Plan Mid Asia Region
ICAO Document 8733	Air Navigation Plan CAR/SAM Regions
ICAO Document 8755	Air Navigation Plan NAT/NAM/PAC Regions
WMO Publication 386	Manual on Global Telecommunications Systems
WMO Publication 731	Meteorological Observing and Information Distribution Systems at Aerodromes
WMO Publication 732	Guide to Practices for Meteorological Offices serving Aviation

Deviation from the above protocols for the purposes of serving particular customers will be considered if they are fully described and supported in the organisation's exposition. However, the organisation is expected to be able to switch to the standard protocols should a safety situation demand such a change.

174.57 Input Requirements

Good meteorological forecast information depends on timely response to changes in the dynamics of the present and expected meteorological conditions in any particular airspace. Such responses may take the form of new reports of actual meteorological conditions or the creation or amendment of forecast meteorological conditions. Always, the ability of an organisation to produce such information is predicated on that organisation's ability to access and pass on meteorological information quickly and accurately.

(b)(1) Adequate sources of real-time meteorological information for the production of forecasts (aerodrome forecasts TAF, route forecast ROFOR, or acceptable equivalents) are considered to be the demonstrated access to, and use of, the following information within an organisation's exposition —

- (1) hourly reports of meteorological conditions at aerodromes for which forecast products are provided,
 - METAR or acceptable equivalent
- (2) reports of significant meteorological conditions when they occur and when they cease at aerodromes for which forecast products are provided.
 - SPECI OR ACCEPTABLE EQUIVALENT
- (3) regular macro-scale numerical weather prediction analyses and prognoses of Papua New Guinea airspace for which aircraft route forecasts and aerodrome forecasts are prepared,

- (4) regular macro-scale numerical weather prediction analyses and prognoses of foreign airspace for which aircraft route forecasts and aerodrome forecasts are prepared as appropriate and practicable,
- (5) appropriate issues of the World Area Forecast System (WAFS) wind and temperature data including appropriate significant weather (SIGWX) information for the airspace for which aircraft route forecasts are prepared,
- (6) suitable validating upper-air wind, temperature and humidity data for (ii), (iii) and (v) above,
- (7) synoptic observations and analyses for Papua New Guinea territory,
 - SYNOP, SHIP, BUOY OR EQUIVALENT
- (8) all reports of meteorological conditions furnished by aircraft within Papua New Guinea and adjacent airspace,
 - PIREP, AMDAR AND AIREP BULLETINS OR THEIR EQUIVALENTS
- (9) timely access to infrared and visible wavelength satellite imagery for the Papua New Guinea and over other areas for which forecasts may be produced).

Real-time meteorological input information is expected to be used throughout the validity period of the meteorological forecast products and information produced.

Examples are drawn from WMO Pub 306 Manual of Codes — other forms or formats of the particular information may be acceptable to the Director.

(b)(2) Where an organisation gives face-to-face briefings to aircrew or makes available any form of interactive information service regarding meteorological information, the organisation is expected to ensure a high level of pictorial and graphic meteorological information depiction is available to the aircrew or their delegate.

Acceptable levels are described in WMO documents 731 and 732.

The organisation is expected to delineate the nature and display methods of pictorial and graphic meteorological information in their exposition.

For face-to-face briefings it is expected that the organisation will follow the requirements or guidelines stated in the documents below or such guidelines, developed by the organisation, which are acceptable to the Director —

ICAO Annex 3	Meteorological Services for International Air Navigation
ICAO Annex 15	Aeronautical Information Services
WMO Publication 49	Technical Regulations, Volume II, Meteorological Services for International Air Navigation
WMO Publication 306	Manual on Codes

and further in —

ICAO Document 8896	Manual of Aeronautical Meteorological Practice
WMO Publication 731	Meteorological Observing and Information Distribution Systems at Aerodromes
WMO Publication 732	Guide to Practices for Meteorological Offices serving Aviation

(b)(3)(4) Adequate observing systems for provision of meteorological reports or provision of a meteorological watch service are considered to be the demonstrated adherence to, and use of, the following weather observing procedures and methodologies, reporting procedures, and instrumentation systems within an organisation's exposition —

ICAO Annex 3	Meteorological Services for International Air Navigation
ICAO Annex 15	Aeronautical Information Services
WMO Publication 49	Technical Regulations, Volume II, Meteorological Services for International Air Navigation
WMO Publication 306	Manual on Codes

and further in —

ICAO Document 8896	Manual of Aeronautical Meteorological Practice
WMO Publication 386	Manual on Global Telecommunications Systems
WMO Publication 488	Guide on the Global Observing System
WMO Publication 544	Manual on the Global Observing System
WMO Publication 732	Guide to Practices for Meteorological Offices serving Aviation

These publications cover the provision of at least the following types of meteorological reports —

- (1) hourly reports of meteorological conditions at aerodromes,
 - METAR
- (2) reports of significant meteorological conditions when they occur and when they cease,
 - SPECI
- (3) synoptic observations, and
 - SYNOP, SHIP, BUOY
- (4) upper-air wind, temperature and humidity data.
 - WINTEM

Applicants may deviate from the above documents if they fully describe and support the deviation in their exposition and the deviation is acceptable to the Director. However, the organisation is expected to be able to operate with the criteria outlined in the above documents should an operational situation dictate.

(b)(5) Adequate historical meteorological data and resources necessary to provide aeronautical climatological information are described in —

Chapter 8, ICAO Annex 3 Meteorological Services for International Air Navigation

174.59 Output Requirements

It is expected that the organisation will define the meteorological service output requirements in terms of form, adequacy, accuracy, timeliness and productivity in their exposition (refer also 174.79 (a)(8)).

The Director will endeavour to hold all information relating to customer specific products confidential unless such information comes within the public domain.

It is also expected that the service provider's products meet acceptable international standards.

The Director may accept standards that are the same as, equivalent to or better than those of ICAO or WMO if they can be proved by the supplier.

If the equivalent or better information product, accepted by the Director, differs significantly from that described within the ICAO Annexes, the Director will decide whether to file a deviation with ICAO.

The list below serves as a guideline about which ICAO Annexes and WMO Publications contain relevant product and service standards, procedures and formats —

International Document Meteorological reference	Aeronautical Service Type as listed in paragraph 174.9
ICAO Annex 3	a, b, c, d, e and f
ICAO Annex 5	a, b, e and f
ICAO Annex 10	b & c
ICAO Annex 15	c
WMO Publication 49	a, b, c, d, e and f

Attachment E to ICAO Annex 3, Part I, and WMO Technical Specifications Publication 49, provide the most significant requirements for the operationally desirable accuracy of meteorological forecasts.

174.61 Facility Requirements

It is not the intention of the Director to require any organisation to use any particular electronic or automatic systems, brands or configurations in particular facilities.

The routine operation of the facility is expected to yield adequate, accurate and timely input or output for the meteorological offices it supports or meteorological service it provides.

Minimum requirements, of any electronic data processing system used by the organisation, are set out in —

WMO Publication 485,	Manual on Global Data Processing System.
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Different systems performing similar functions effectively may be acceptable to the Director.

174.63 Documentation

An organisation is required to hold, and make available to personnel —

- copies of its exposition
- all applicable meteorological office manuals
- facility and procedures manuals
- technical standards and practices
- equipment manuals

that are necessary for the provision of the relevant meteorological service.

Procedures for the amendment of documents should ensure that all pertinent background information and reasons for the change are adequately documented and retained for possible audit purposes. Changes to documents must be reviewed and approved by the same personnel or functional positions that did the original review and approval unless specifically designated otherwise. Access to the background information is an important part of this review and approval process. Where practical, the nature of any change should be identified in the document in which the change has been made or in appropriate attachments to that document.

Incorporation of procedures manuals, required by Part 174, in a larger set of documents is acceptable as long as such procedures manuals are readily accessible for operational and audit purposes.

A discrete set of documents relating to certification under Part 174 represents an ideal situation. However, a master cross reference matrix against which procedures manual contents are listed is acceptable.

174.65 Verification, Periodic Inspection, Testing and Calibration

The organisation is required to establish documented procedures to ensure that each meteorological office and facility is subjected to periodic internal inspections, verifications and tests to confirm that the office or facility is meeting the applicable performance standards.

Such procedures and the periodicity of inspections and tests must show that the meteorological office and facility not only meets the applicable operational requirements and performance standards, but that it will continue to meet those requirements and standards with a high probability.

The periodic inspection of each meteorological office and facility should be carried out regularly. Aspects to be assessed during the inspection should include —

- (1) Meteorological Offices —
 - continuing access to approved and appropriate real-time meteorological information.
 - continuing adherence to approved production procedures and methodologies.
 - continuing access to approved computing and communication facilities.
 - continuing attainment of defined product quality parameters.
 - continuing upkeep of production equipment, site and site services.
 - continuing adequacy of production records and documentation.
 - continuing the security of the site.

Unless otherwise proven by reliability data it is considered that the maximum period between meteorological office inspections should be one month.

- (2) Facilities —
 - security of the facility and site.
 - adherence to the approved maintenance programme.
 - upkeep of the equipment, site and site services.
 - adequacy of facility records and documentation.
 - continuing attainment of required quality in the output parameters.
 - The Maximum Period Between Tests (MPBT) of facilities should be based on —
 - the proven reliable performance of the facility,

- the proven performance of any other similar facility,
- the stability of the facility's operating environment.

Facilities may be categorised but not limited to the following examples (stated MPBT are examples only) —

- (3) computing, communication and electronic delivery facilities, MPBT 3 months.
- (4) weather surveillance radar (WSR), MPBT 2 months.
- (5) automatic weather observing equipment, MPBT 12 months.
- (6) servo-mechanical devices, MPBT 24 months.

If, after a period of operation, it can be shown that the stability of a meteorological office or facility in the operational environment is such that a longer period between tests is justifiable, an increase in the maximum time between tests from that stated in the initial exposition may be considered by the Director.

The organisation is required to establish documented procedures to ensure that all verification, inspection, measuring, test equipment and systems that are required for the measurement or evaluation of critical equipment, and meteorological information have the precision and accuracy necessary for such measurements. The equipment and systems required for such measurements must be identified, controlled, and calibrated to a known reference standard.

Where facilities include sensors and transducers for the gathering of meteorological information, the organisation is expected to calibrate such systems against recognised international standards (Système International). Traceability of such standards to the national standards is expected to be detailed within the organisation's exposition as are the calibration procedures.

The units of measurement for meteorology are set out in —

ICAO Annex 5,	Units of Measurement to be used in Air and Ground Operations.
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The operations (and maintenance) manual for a meteorological office is required to identify the critical meteorological service and equipment parameters with the nature of the measurements to be made, and the measurement accuracy required.

In meeting the requirement of this section the organisation should —

- (1) identify all verification, inspection, evaluation, measuring, and test equipment and systems required for the measurement or evaluation of critical equipment and output parameters for each meteorological office and facility.
- (2) ensure that such systems and equipment are checked and calibrated before use or at prescribed intervals against certified equipment having a known valid relationship to recognised standards. .
- (3) where no standards exist, the basis for calibration should be documented.
- (4) identify all such critical inspection, measuring, and test equipment and systems with a suitable indicator or identification record to show its calibration status.
- (5) establish, document and comply with calibration procedures for critical equipment. This includes details of equipment type, identification number, location, frequency of checks, check methods, acceptance criteria and action to be taken when the results are unsatisfactory.
- (6) maintain calibration records for this critical inspection, measuring, and test equipment.
- (7) assess and document the validity of previous verification and inspection results when any item of critical verification, inspection, measuring, and test equipment is found out of calibration or

producing plainly anomalous outputs or readings.

- (8) ensure that the environmental conditions are suitable for the calibrations, inspections, and measurements being carried out.
- (9) ensure that the handling, preservation, and storage of critical inspection, measuring, and test equipment and systems are such that their accuracy and fitness for use is maintained.
- (10) safeguard any critical inspection, measuring, and test equipment and systems including software from adjustments which would invalidate such systems or equipment.

174.67 Release of Meteorological Information

This requirement is aimed at ensuring that, when meteorological information is released, all the necessary checks and measurements have been carried out by a competent person. This is to assure the user of an adequate, accurate and timely meteorological service from that meteorological office or facility.

174.69 Notification of Meteorological Office and Facility Status

It is the responsibility of the organisation supplying meteorological services to ensure that the status and operational information concerning its meteorological offices and facilities are published in the aeronautical information publications. Refer to Chapter 10.3 of Annex 3, Meteorological Services for International Air Navigation.

Appropriate notification is to be given to the users of meteorological information from a particular meteorological office or facility whenever there is a change to its status which may affect the safety of aeronautical operations.

The appropriate notification for a meteorological office or facility which has details published in aeronautical information publications is the issue of a NOTAM. The changes in the status of a meteorological office or facility which may require the issue of a NOTAM include —

- failure
- withdrawal from operational service for logistic or maintenance purposes
- operation of an associated facility without normal monitoring functions
- return to operational service
- changes to the published information

The organisation, supplying meteorological services, is responsible for supplying the appropriate information for the issue of the NOTAM. Where possible an estimate on the duration of any outage or inability to supply service or information should be included.

174.71 Meteorological Information Check after Accident or Incident

Each certificated organisation is required to establish and comply with a procedure for the investigation of any meteorological information supplied that may have been used by an aircraft, or ATS unit, involved in an accident or incident.

It is essential that the investigation be carried out without delay. This ensures that any important evidence is not lost, and prevents any repetition of the circumstances which may have lead to the accident or incident. The procedures should establish who is responsible for coordinating the investigation and what actions are required to check the status and performance of the meteorological offices or facility concerned.

All evidence relating to the nature and status of the meteorological information concerned at the time of the occurrence, and the history of performance before the occurrence is to be preserved. This information may be required by the Director or the Accident Investigation Commission.

The personnel carrying out the investigation should not include anyone who was involved with the distribution of any meteorological information from any meteorological office concerned with the incident.

Civil Aviation Rules Part 12, Accidents, Incidents and Statistics, will set out the requirements, responsibilities, and procedures for the notification and reporting of aircraft accidents or incidents. The Civil Aviation Authority has the responsibility to notify relevant certificate holders of accidents or incidents that may require information or action by the certificate holder.

The requirement for the Director or Accident Investigation Commission to investigate the accident or incident should not prevent the organisation from conducting their own investigation in relation to the meteorological services provided.

174.73 Promulgated Information incident

Malfunction or error reporting is an important component of aviation safety and, to be effective, requires both prompt action and the cooperation of all parties involved. Each certificated organisation is required to establish and comply with a procedure to notify, record, investigate any promulgated information incidents and rectify any reported malfunction that may result in erroneous meteorological information being disseminated from a meteorological office or facility.

If there is specific information published in aeronautical flight information or aviation training documents concerning particular erroneous information no notification of such occurrences is expected by the Director.

The report to the Director is expected to be in the form of an Promulgated Information Incident report. A Promulgated Information Incident report is defined by the Director to be an incident, other than those of an operational nature, where meteorological information is, or has the potential to be, outside the allowable accuracy or tolerance for that information.

For example, a forecast that has simply proven to be inaccurate is not seen as an incident. However, a lengthy series of particular forecasts or reports that are and may continue to be completely inaccurate or contain important omissions are considered to be an incident.

Malfunction and Promulgated Information Incident procedures must ensure that there is a rapid investigation of the problem in each affected area so that immediate action can be taken. This is intended to ensure the continued safe operation of aircraft that may use the relevant meteorological information. The procedures should also include any necessary follow up actions to ensure that appropriate personnel or technical solutions are found for any problems discovered during the investigation.

A Promulgated Information Incident report to the Director must include sufficient detail to show —

- the nature of the malfunction or suspected malfunction,
- the conclusions of the investigations carried out,
- the actions taken to remove or correct the malfunction.

The Director should also be notified when the situation has been corrected.

174.75 Records

Records are to be of a legible permanent nature and must be identifiable to the meteorological offices involved.

Records may be kept in any format on any type of readily accessible permanent archive, regardless of nature, and should be controlled by a responsible senior person. Access to the record system should be controlled to ensure that the integrity of the records is maintained.

Accurate records are an important element in the quality, safe operation and maintenance of a meteorological office. Records must show achievement of the required level of performance of the meteorological service, office or facility. The record must also show that the prescribed operational and quality assurance and maintenance procedures have been followed.

Records may be required to be produced as evidence in the event of an aircraft accident or incident investigation. The amalgam of records should provide a complete history of events in chronological order. Each entry must be clearly distinguishable. Each certificated organisation is required to keep records of all its personnel who are authorised to release meteorological information and place meteorological offices or facilities into operational service. The following minimum information should be kept in respect of each person —

- Name,
- Date of birth,
- Position held within the organisation,
- Relevant qualifications,
- Experience,
- Specialised training,
- Operational aspects covered by any authorisation,
- Details of competency checks, and
- Date when any changes are made.

Written documentation should be provided to each person authorised to release meteorological information or place meteorological offices or facilities into operational service. The authorisation should be in a style that makes it clear to the holder the types of meteorological service, the meteorological offices and the locations or geographic areas that the authorisation covers.

174.77 Quality Assurance

The Civil Aviation Rule requirements for organisations seeking certification under the Part 174 are structured around the key elements of the ISO 9000 quality systems standard. Part 174 addresses those elements which can affect the quality of meteorological information and therefore the safety of aviation.

Compliance with the certification requirements of Part 174B, by organisations seeking certification as authorised meteorological service providers, will provide them with a Quality (Safety) Management System. Internal quality assurance (evaluation) procedures that are required under 174.77 are an essential component of a certificated service provider's Quality Management System.

When established, the internal quality assurance (evaluation) procedures will provide the quality assurance necessary to assure confidence in the accuracy of a meteorological service and the performance and reliability of its offices and facilities. Quality Assurance is defined in ISO 9000 as: All those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for quality.

Quality Assurance is defined in ISO 8402 as: "all those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for quality".

Advisory Circular AC10 – 1, Internal Quality Assurance contains information about standards and practices that are applicable to organisations required to establish internal quality assurance systems and should be referred to for compliance with this rule.

174.79 Organisation Exposition

The purpose of the Organisation Exposition is to set forth the procedures, means and methods of the organisation.

Compliance with its contents will ensure compliance with Part 174, which is a prerequisite for obtaining and retaining meteorological service certification.

The Organisation Exposition is the means by which the organisation defines its operation. It shows, to both its employees and the Director, how the organisation will conduct its day-to-day business relating to meteorological services for aviation. It is intended to be a tool to help management in the operation of the business. It should commence with the corporate commitment by the Chief Executive.

Paragraphs (a)1 to (a)7 provide the management part of the exposition and should normally be contained within one document. The remaining parts of the exposition may be produced as any number of separate manuals which must be cross-referenced in the management part of the Organisation Exposition.

Managers should hold copies of those parts or manuals that affect their areas of responsibility, and staff should be familiar with the parts of the exposition which affect their area of activity.

(a)(1) A prime objective of the new rules system is that each approved organisation must have the responsibility to ensure that its operation is planned, organised, carried out, developed, maintained and documented according to applicable civil aviation requirements, standards and operating specifications.

As part of its quality system of management, each organisation will also have to establish goals and objectives for its operation, including safety standards, at least equal to the level prescribed by the Director.

The statement by the Chief Executive required by 174.79(a)(1) is viewed by the Director as a corporate commitment by the organisation. Such a statement should clearly address the goals and objectives of the organisation in respect of the safety requirements prescribed by Part 174. The statement may also contain the organisation's goals and objectives in respect of its commercial activities. Ideally, the exposition should be a tool of management by which the organisation's operation is presented to its staff, its customers and the Director.

(a)(2) and (a)(3) Comments are provided under AC174.51 Personnel Requirements.

(a)(4) This means that the organisation must show the lines of responsibility and communication between the Chief Executive, its personnel and customers.

(a)(5) The summary of staff employed by a service provider, and their location, provides the Authority with an indication of the size of the organisation for assessing the application and establishing an audit programme.

(a)(6) and (a)(7) The organisation is to specify the types of meteorological service that the application is to cover and the meteorological office and facilities supporting that service.

The following information is required for each meteorological office and significant facility —

- (1) the location, geographic scope, meteorological service and outputs provided by each meteorological office, and
- (2) the location, geographic scope, and outputs, provided by any facility, accessible directly or indirectly by customers.

The location of remote weather sensing facilities should be identified by latitude and longitude to the nearest second. The location of meteorological offices and other facilities should be by address or location name.

(a)(8) The organisation is to specify the particular nature of the output meteorological information that will be a part of each of its meteorological services.

Each component of output meteorological information must be specified. The specification must include, as appropriate, a full description of the component —

- (1) type (TAF, METAR, aerodrome climatology and so on),
- (2) applicability (airspace, aerodrome or place),
- (3) validity period(s), and
- (4) issue frequency or times.

The specifications must also include a full description of the standards and formats applying to each component of meteorological information, in particular —

- (1) operational review frequency or review criteria,
- (2) input dependency standards,
- (3) accuracy standards,
- (4) timeliness standards,
- (5) formats made available, and
- (6) criteria for change in format.

(a)(9) The procedures listed in this paragraph provide the working documents for the organisation's activities. The headings are generally self-explanatory and must be addressed by all applicants to the extent that they apply to the particular scope of intended activity.

More detailed information will be found under the subparagraph in this circular which calls for the procedure.

(a)(10) These procedures must show how the applicant plans to control, amend and distribute their exposition. The procedures should be similar to those required under 174.63 for controlling, amending and distributing the applicant's documentation.

(b) The acceptance of the organisation's exposition by the Director is the final step in the authorisation process for the provision of a meteorological service. Such acceptance will be followed by the issue of a meteorological service certificate.

Subpart C — Operating requirements

174.101 Continued compliance

After obtaining a meteorological service certificate, it is the responsibility of the certificate holder to ensure that the organisation continues to meet the requirements for certification. The means of meeting these requirements are contained in the certificate holder's exposition. Therefore a copy of the exposition, or at least each applicable part of the exposition, must be available to all personnel who need access to the information to carry out their work. A complete copy of the exposition needs to be held at each meteorological office covered by the exposition.

174.103 Operations Manual

An operations manual is required to be provided to each meteorological office that the organisation operates. A copy of the manual should be available at each site for ready use by personnel working in the meteorological office.

The manual is to include a list of minimum performance levels and critical operating parameters for the meteorological office and associated facilities. Maintenance procedures may include a reference to other documentation.

The following provides guidance information for the contents of the manual —

- (1) the meteorological information and the meteorological services provided —
 - (i) the name of the meteorological office,
 - (ii) any relevant identification or communication codes,
 - (iii) the hours of operation of the meteorological office,
 - (iv) the function of the meteorological office,

- (v) the meteorological services being provided, and
 - (vi) the particular meteorological information being provided,
- (2) the minimum acceptable operating parameters and standards for facilities —
- (i) the location of associated facilities,
 - (ii) instructions on the physical security of the facilities,
 - (iii) procedures for the operational management of facilities,
 - (iv) procedures and standards to be applied during maintenance and routine inspection, test and calibration of facilities including —
 - the frequency of servicing
 - limitations on the scope of maintenance work permitted where performance checks are limited to the capabilities of an executive monitor system
 - detailed performance check procedures to be carried out before any facility is returned to service where the scope of maintenance work has exceeded the limitations above
 - (v) Procedures to identify, and set tolerances for the critical equipment parameters which can directly affect the accurate output of meteorological information from a facility.
 - (vi) Lists of specialised and calibrated test equipment required for the measurement of critical equipment parameters.
 - (vii) This is to include details of accuracy, certification, and recalibration requirements,
 - (viii) procedures to be followed to obtain the release of the facility from operational service for maintenance or other required shutdown,
- This is to include, where applicable, the coordination of the release with air traffic services and the issuing of an appropriate NOTAM.*
- (ix) procedures to be followed for the initialisation or restart of associated facilities, and
 - (x) a description of any critical parts of the associated facility that may not be changed or adjusted without an approved certification check to confirm that performance meets operational requirements,
- (3) the minimum meteorological inputs required —
- (i) details, including schedules, of all meteorological information required for the provision of output meteorological information and meteorological services,
 - (ii) procedures to be followed to decide the minimum level of input meteorological information required,
 - (iii) procedures to be followed to ensure at least the minimum level of meteorological information is available, and
 - (iv) procedures to be followed to verify input meteorological information,
- (4) the minimum performance and quality levels for output meteorological information and meteorological services provided —
- (i) instructions on the physical security of the meteorological office,
 - (ii) details of any licensing requirements for the meteorological office operations, maintenance and personnel,

- (iii) the names, addresses, and telephone numbers of persons to be notified in an emergency,
- (iv) instructions on the keeping of the meteorological office records and other technical records,
- (v) detailed production procedures for the meteorological office including at least —
 - the nature of production,
 - limitations on the scope of work required,
 - identification and scheduling of the output meteorological information to be produced,
 - methodologies and product compilation or creation procedures to be used in the production process,
 - procedures for the quality assessment of relevant information during the production phases,
 - verification procedures required to assess output information,

The production procedures must identify, and set tolerances, for all aspects of the production system that may directly affect the quality of the output of the meteorological office.

- (vi) procedures for the operational monitoring of the meteorological office to ensure that it continues to meet the minimum performance levels,
 - (vii) procedures to be followed for the preservation of evidence in the event of an aircraft accident or incident investigation,
 - (viii) procedures to be followed to obtain the release of the meteorological office from operational service for maintenance or other required shutdown, and
 - (ix) This is to include, where applicable, the coordination of the release with air traffic services and the issuing of an appropriate NOTAM)
 - (x) a description of any critical parts of the meteorological office that may not be changed or adjusted without an approved certification check to confirm that performance meets operational requirements,
- (5) the test equipment and systems required for the measurement of the minimum levels listed under subparagraph (4) —
- (i) identification of all verification, inspection, evaluation, measuring and test equipment and systems required for the evaluation of critical performance and quality levels,
 - (ii) procedures for ensuring all such test equipment and systems are checked and calibrated at prescribed intervals,
 - (iii) methods used to show the status of test equipment and systems,
 - (iv) procedures for keeping records of test equipment and systems, and
 - (v) procedures for the safe keeping of test equipment and systems, and
- (6) any mandatory check procedures for releasing meteorological information —
- (i) the names and positions of the personnel with the authority to release meteorological information,
 - (ii) procedures and criteria for verifying and checking meteorological information before release, and
 - (iii) procedures for submitting unacceptable output meteorological information for rework.

174.105 Limitations on a Certificated Organisation

The requirements of this paragraph are intended to ensure that meteorological services, meteorological offices or facilities that do not comply with the requirements of Part 174 do not provide meteorological information for the air navigation system.

174.107 Changes to a Certificated Organisation

This Rule allows the organisation to make changes to its exposition to reflect changes to its operating practices and procedures, standards, and operational facilities.

Rule 174.107(a), (b), and (c) place on the organisation the responsibility for ensuring that the exposition is always an accurate statement of its service, practices, and procedures and that the Director is kept informed of any changes by an amendment procedure.

Where changes are made to the organisation's procedures or standards which may affect the information accuracy, or the accurate and safe operation of a meteorological office or facility, the organisation should ensure that appropriate background information and reasons for the change are documented and retained for possible audit-trail purposes.

Rule 174.107(d) describes the changes to the exposition which require the prior approval of the Director. It allows the Director to prescribe conditions which may apply because of any change in these specific items. These may be transitional conditions to allow the organisation to continue to operate while negotiations take place with the Director with respect to permanent changes.