

**WORLD WEATHER WATCH
COMMISSION FOR BASIC
SYSTEMS**



World Meteorological Organization
Working together in weather, climate and water

**Task Team on Aviation XML
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**DRAFT GUIDELINES ON THE PREPARATION AND PROMULGATION OF
WMO TECHNICAL REGULATIONS**

1. This document, approved by WMO Executive Council 65, describes the standards to be used when preparing WMO technical regulations.
2. TT-AvXML is invited to consider how the regulations for AvXML should be presented so that they are consistent with this approach.

World Meteorological Organization

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**DRAFT GUIDELINES ON THE PREPARATION AND PROMULGATION OF
WMO TECHNICAL REGULATIONS**

SUMMARY

CONTENT OF DOCUMENT:

This information document contains draft Guidelines on the preparation and promulgation of WMO Technical Regulations.

DRAFT GUIDELINES ON THE PREPARATION AND PROMULGATION OF WMO TECHNICAL REGULATIONS

13 May 2013, v.3

1. INTRODUCTION

1.1. Historical perspective

There are many definitions as to what constitutes a «standard». It could simply be considered a rule aiming at ensuring quality. The *ISO/IEC Directives, Part 2: 2011* defines a standard as being a «document established by consensus and approved by a recognized body that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context». Furthermore, it is indicated in an associated note that «standards should be based on the consolidated results of science, technology and experience, and aimed at the promotion of optimum community benefits» (Definition 3.1.1 refers). In the *ISO/IEC Directives, Part 2:2011*, an «international standard» is defined as being a «standard that is adopted by an international standardizing/standards organization and made available to the public» (Definition 3.1.2 refers). For WMO standards, the two preceding definitions apply.

WMO has a central role in standardization since the Convention (Article 2 c) refers) clearly indicates that WMO should «promote standardization of meteorological and related observations and to ensure the uniform publication of observations and statistics. WMO is one of a number of international standard-making organizations, e.g. within the United Nations family, the International Civil Aviation Organization is responsible for standardization concerning international civil aviation and the International Telecommunication Union for standardization related to international telecommunications while, beyond the United Nations, the International Organization for Standardization is responsible for developing standards in a wide variety of areas. All these organizations contribute to creating an international regulatory framework.

The WMO standards are issued as «regulations» which are adopted or approved by governing bodies, in particular by Congress and the Executive Council. The Convention stipulates that a function of World Meteorological Congress is «to determine regulations prescribing the procedures of the various bodies of the Organization, in particular the General, Technical, Financial and Staff Regulations» (sub-paragraph d) of Article 8 refers). The development of Standards is delegated to technical commissions, in accordance with Annex III (Structure and Terms of Reference of Technical Commissions) of the General Regulations, which indicate under «General terms of reference» that «each technical commission shall ... develop, for consideration by the Executive Council and Congress, proposed international standards for methods, procedures, techniques and practices in meteorology and operational hydrology including, in particular, the relevant parts of the Technical Regulations, guides and manuals (sub-paragraph 2) refers). Accordingly, standardization tasks have been included in the terms of reference of the Commission for Basic Systems, Commission for Instruments and Methods of Observation, Commission for Atmospheric Sciences, Commission for Aeronautical Meteorology and Joint Technical Commission for Oceanography and Marine Meteorology.

The standardization has been part of international meteorological activity since the very beginning. The predecessor of WMO, i.e. the International Meteorological Organization (IMO), created a number of international regulations (called Technical Resolutions); they lay the foundation for the future regulation and standardization of meteorological practices and procedures worldwide. The status of the IMO Technical Resolutions were reconfirmed by the First World Meteorological Congress (1951) which agreed that they should remain valid until their future amendment or repeal by an appropriate WMO body (Res. 4 (Cg-I) refers).

Four years later, the Second World Meteorological Congress defined the WMO Technical Regulations by stipulating that they should cover “standard meteorological practices and

procedures” and “recommended meteorological practices and procedures” (Res. 17 (Cg-II) refers). Furthermore, the Second Congress introduced the definition of the WMO Guides (Res. 18 (Cg-II) refers), which is still valid and available (*Resolutions of Congress and Executive Council* (WMO–No. 508 refers)). This resolution indicates clearly that Article 8 (currently Article 9) of the Convention is not applicable to guides. The Second Congress also adopted the Technical Regulations (corresponding to current Volumes I and II, for implementation on 1 January and 1 July 1956, respectively) and directed the Executive Council (called Executive Committee until 1983) to review them and to recommend amendments thereto, as necessary, for consideration by the Third Congress (Res. 19 (Cg-II) refers). Thus, the need for a continued review and update of Technical Regulations was identified as early as 1955, and similar resolutions have been regularly formulated by subsequent Congresses. Finally, the Second Congress introduced the obligation for Members to notify deviations from standard meteorological practices and procedures (Res. 20 (Cg-II) refers). The Third Congress (1959) complemented this obligation by the requirement to include a notification of compliance, as well (Res. 18 (Cg-III) refers).

The Sixth Congress (1971) introduced the concept of Manuals, which were to be Annexes to the Technical Regulations; the global aspects of Annexes (i.e. Manuals) would consist of «standard meteorological practices and procedures», and «recommended meteorological practices and procedures» which would have the same status as Technical Regulations. The layout of the Manuals reflected the needs of the main components of the World Weather Watch, i.e. those of the Global Observing System, the Global Telecommunication System and the Global Data-processing System (currently called the Global Data-processing and Forecasting System). The Sixth Congress also adopted Volume III – *Hydrology* (Res. 2 (Cg-VI) refers).

In conclusion, by 1971, an efficient framework had been put in place to develop, update and implement Technical Regulations, which should, in principle, ensure their relevance and an extensive compliance thereto by Members. The system is based on clearly distinguished roles of:

- (a) The technical commissions: expected to propose amendments to Technical Regulations, as necessary;
- (b) The Executive Council: expected to keep Technical Regulations under review and approve, on behalf of Congress under delegated authority, amendments thereto;
- (c) Congress: expected to adopt amendments to Technical Regulations;
- (d) The Secretary-General: expected to arrange for the inclusion of approved amendments in the Technical Regulations and ensure the editorial consistency of the relevant documents; and
- (e) Members: expected to implement the amendments to Technical Regulations, or if not feasible, to file deviations.

Note: Congress delegates authority to the Executive Council to approve amendments, on its behalf, in particular those that are considered to be urgent to be implemented before the next session of the Congress.

1.2. Rationale for development of the Guidelines

Over the last few decades, it has become clear that the revision and implementation of Technical Regulations have not been fully satisfactory and that the currency of some of the Technical Regulations could be questioned. This situation is demonstrated by the fact that the 1988 edition of the Technical Regulations remained legally valid (with minor changes contained in Supplements), although outdated, until the Sixteenth Congress (2011). Furthermore, the Technical Regulations do not fully reflect the needs of the new WMO Programmes, such as the WMO Information System, WMO Integrated Global Observing System and Global Framework for Climate Services. The problems may be attributed to a number of factors: the technical commissions do not systematically review the existing provisions; outdated parts may continue to form part of the Technical Regulations; the governing bodies and the Secretariat, whilst checking the technical

relevance of new or amended provisions, do not always review their consistency with the existing provisions and do not generally carry out any rigorous check related to their formulation. A more complete overview of these problems and inconsistencies are given in Table 1 which is based on a recent review of the Technical Regulations. It shows that problems exist as to the *quality* and *currency* of the WMO Technical Regulations.

Table 1. Problems occurring in the Technical Regulations and their Annexes (i.e. Manuals)

Issue	Details	Action
Structure of document	<ul style="list-style-type: none"> — history of amendments not well recorded — format of the Table of Content not uniform 	<ul style="list-style-type: none"> — template prepared, included in Volume I — addressed in Section 3 of this publication
Formulation of provisions	<ul style="list-style-type: none"> — provisions cannot be classified <ul style="list-style-type: none"> ○ various categories of provisions (i.e. standards, recommendations and guidance) included in the same paragraph (e.g. the verbs «shall» and «should» used in the same paragraph) ○ non-standard substitutes (e.g. «must», «ought to») used instead of «shall» and «should» — provisions not clearly addressed, rendering their implementation difficult — provisions containing non-technical requirements 	<ul style="list-style-type: none"> — addressed in Section 3 of this publication — addressed in Section 3 of this publication — addressed in Section 3 of this publication
Procedure of maintenance	<ul style="list-style-type: none"> — documents published in a wrong series — irregular updates, i.e. lack of a systematic and regular review (result: provisions and references becoming obsolete) 	<ul style="list-style-type: none"> — addressed in Section 4 of this publication — addressed in Section 4 of this publication

The Sixteenth Congress became aware of some of these issues and called therefore for the Secretary-General «to ensure the revision of the regulatory documents in a systematic manner and ensure that the published versions of the regulatory documents can be used as reference documentation within a nationally implemented quality management system» (Res. 45 (Cg-XVI) refers). Such a revision had become particularly urgent in view of the recent approval by the sixty-second session of the Executive Council (2010) of the inclusion of Volume IV – *Quality Management*, in the WMO Technical Regulations (Res. 16 of the EC-LXII refers).

The development of these guidelines was thus prompted by the issues identified in the foregoing paragraphs. Their purpose is to present methods in view of improving the quality of the WMO regulatory material and ensuring consistency throughout the regulatory documents prepared and maintained by the WMO (i.e. Technical Regulations Volumes I to IV, their Annexes (i.e. Manuals), and guides). These guidelines are addressed both to technical commissions and the WMO Secretariat. They are expected to assist all those concerned to keep the Technical Regulations up-to-date and to suggest ways and means on how to keep track on the level of implementation by Members in a systematic and timely manner.

1.3. Explanation of terms used in these guidelines

The following terms are used throughout these guidelines with the meanings indicated below:

Manual. The term «Manual» (rather than «Annex to the Technical Regulations») is generally used in these guidelines. Their precise nature (i.e. of being annexes to the Technical Regulations) is highlighted only where necessary.

Provision. The generic term «provision» is used throughout these guidelines to designate both the standard practices and procedures; recommended practices and procedures (contained in Technical Regulations and their Annexes); and (non-regulatory) practices, procedures and specifications (contained in WMO Guides).

Note: Such a use is consistent with the *ISO/IEC Directives, Part 2: 2011*; the term «provision» covers requirements (i.e. standards), recommendations and statements conveying information, e.g. guidance and notes.

Recommendation. The term «recommendation» is used to designate a «recommended practice and procedure».

Note: Earlier the term «recommended meteorological practice and procedure» was used in the Technical Regulations.

Standard. The term «standard» is used to designate a «standard practice and procedure».

Note 1: Earlier the term «standard meteorological practice and procedure» was used in the Technical Regulations.

Note 2: In the *Manual on Codes* (WMO–No. 306), the term «Regulation» is currently used in lieu of «Standard practice and procedure». The alignment of the terminology is being considered.

2. CLASSIFICATION OF WMO DOCUMENTS AND PROVISIONS THEREIN

2.1. Hierarchy of WMO documents

As indicated in the foregoing Section, Congress has established three types of WMO documents with a clearly distinguishable hierarchy listed in descending order:

- (a) Technical Regulations (Res. 17 (Cg-II) refers);
- (b) Manuals (as Annexes to Technical Regulations) (Section 2.6.2 (Cg-VI) refers); and
- (c) Guides (Res. 18 (Cg-II) refers).

Note: There are other types of WMO documents (e.g. Guidelines, Compendium etc.) which, being beyond the scope of this document, are not addressed.

The types, characteristics and the corresponding approval processes of WMO Regulatory documents are summarized in Table 2 below:

Table 2. Types, contents, nature, and approval processes of WMO Regulatory documents

Type	Content	Nature of provisions	Adoption / Approval by
Technical Regulations	standards; recommendations	basic, stable, requirements	Congress or Executive Council (under delegated authority) ¹
Manuals (Global aspects)	standards; recommendations	detailed, dynamic, technical specifications	Executive Council (under delegated authority) ¹
Guides	practices, procedures and specifications (of a non-regulatory nature)	implementation guidance, explanations, examples of good practice	Executive Council

¹ President of the Organization may, on behalf of the Executive Council, take action on new provisions considered urgent (in conformity with Regulation 9 (5) of the General Regulations).

The above table suggests that the provisions contained in the Technical Regulations and Manuals are similar. Indeed, both contain standards and recommendations with an identical legal status; however, as depicted in Table 2 above, the provisions in the Technical Regulations are of a basic, fundamental nature, fairly stable in time while those in the manuals are, by and large, more dynamic technical specifications, geared to assist Members in carrying out their responsibilities in implementing the required systems. The provisions in the guides are fundamentally different from those in the Technical Regulations and Manuals: they are not subject to Article 8 of the Convention, i.e. no formal approval by Congress is required, which renders them easier to be updated, as and when required. The material contained in the guides is guidance by nature and mainly intended to assist Members to reach compliance with the Technical Regulations, including the Manuals.

Table 3 below lists all the volumes of the Technical Regulations and their Annexes that are issued as Manuals. The WMO Guides are not included therein.

Table 3. List of WMO Technical Regulations (TR) and Manuals¹ (M), contained in Basic Documents No. 2

Type	Number	Title	WMO number
TR	Volume I	General Meteorological Standards and Recommended Practices	49
TR	Volume II ²	Meteorological Service for International Air Navigation	49
TR	Volume III	Hydrology	49
TR	Volume IV	Quality Management	49
M	Annex I	International Cloud Atlas, Volume I – Manual on the Observation of Clouds and Other Meteors , (in part)	407
M	Annex II	Manual on Codes , Volume I.1 (Part A – Alphanumeric Codes); Volume I.2 (Part B – Binary Codes, Part C – Common Features to Binary and Alphanumeric Codes)	306
M	Annex III	Manual on the Global Telecommunication System , Volume I	386
M	Annex IV	Manual on the Global Data-processing and Forecasting System , Volume I	485
M	Annex V	Manual on the Global Observing System , Volume I	544
M	Annex VI	Manual on Marine Meteorological Services , Volume I	558
M	Annex VII	Manual on the WMO Information System	1060
M	Annex VIII	Manual on the Implementation of Education and Training Standards in Meteorology and Hydrology	1083

¹ All the Manuals listed in Table 3 are annexes to Volume I; and

² Volume II is, *mutatis mutandis*, identical to ICAO Annex 3 – *Meteorological Service for International Air Navigation*.

Only Volumes I of the Manuals (containing the global aspects) are considered to be part of the Technical Regulations while Volumes II of the Manuals (containing the regional aspects and national practices) do not form part of the Technical Regulations. The provisions in Volumes II either go beyond the global standards and recommendations or, in some cases, represent deviations therefrom. They are issued as parts of the Manuals for convenience.

2.2. Classification of WMO provisions

WMO provisions can be divided into three categories:

- (a) Standards (contained in Technical Regulations, both in the main Volumes and their Annexes, i.e. Manuals);
- (b) Recommendations (contained in Technical Regulations, both in the main Volumes and their Annexes, i.e. Manuals); and
- (c) (Non-regulatory) practices, procedures and specifications (guidance contained in the WMO Guides).

Categories (a) and (b) above were defined by the Second Congress (Res. 17 (Cg-II) refers); the definitions are included in the General Provisions of Technical Regulations and repeated in the introduction parts of the Manuals. Category (c) was also defined by the Second Congress (Res. 18 (Cg-II) refers). The definitions are not reproduced in these guidelines; however, a summary thereof is given in Table 4.

Table 4. Characteristics of standards *versus* recommendations

	<i>Standards</i>	<i>Recommendations</i>
Compliance and implementation by Members	Necessary	desirable (for performance or safety)
Action by Members	do their utmost to implement	urged to comply with
Distinguished by the verb	<i>shall</i>	<i>should</i>
Status	requirement (Article 9(b) of the Convention: <i>applicable</i>)	recommendation (Article 9(b) of the Convention: <i>not applicable</i>)
Notification of the Member's intention to implement ¹	Secretary-General to be notified	no need to notify the Secretary-General

¹ In accordance with Article 9 (b) of the Convention and in conformity with Regulation 128 of the General Regulations

Note: Provisions (i.e. practices, procedures and specifications) included in the WMO Guides are guidance material which Members are invited to follow and implement and which often assists Members to implement the provisions in the Technical Regulations.

The WMO standards and recommendations, like any other standardized provisions, are expected to lead to generalized improvement of services and facilities provided by Members. Any standards can be classified under four categories according to their main function (*Standards – Recipes for Reality*, 2011 refers):

1. *Olympics standards*: identifying the «best»;
2. *Filters standards*: containing a set of criteria in view of eliminating the unacceptable;
3. *Ranks standards*: putting things and aspects in an order with ranks, i.e. hierarchy; and
4. *Divisions standards*: organizing things and aspects into classes or categories that are unranked.

All the above functions, except for the first, are widely used in the WMO Technical Regulations.

The WMO standards and recommendations can be divided into two broad types, i.e. those including:

1. Institutional or system requirements (i.e. standards) or recommendations:
 - a. Establishment of global, regional, and national networks and facilities (with their scope, objectives and composition);
 - b. Establishment of an authority or a responsibility;
 - c. Human resources requirements (including education and training, competences, qualifications); and
2. Technical requirements (i.e. standards) or recommendations (of an operational, functional or procedural nature).

Examples of the two above types of requirements are given in Example 1 below.

Example 1. Examples of types of requirements.

a) System requirements

- Definition of a system (including its scope and composition):
«The global data-processing system shall include world meteorological centres, regional meteorological centres and national meteorological centres». (*Technical Regulations*, Volume I (WMO–No. 49), (A.2.1) 1.1 refers)
- Designation of national facilities/networks:
«Each Member shall establish and maintain at least one reference climatological station». (*Manual on the Global Observing System* (WMO–No. 544), 2.8.3 refers).

b) Technical requirements:

- Operational nature
«The intermediate standard times for surface synoptic observations shall be 0300, 0900, 1500 and 2100 UTC». (*Manual on the Global Observing System* (WMO–No. 544), 2.3.1.4 refers).

The Technical Regulations also contain material in addition to standards and recommendations, i.e. definitions, appendices, and notes. Such provisions are to complement the standards and recommendations and shall never include verbs «shall» and «should». Their status is summarized in Table 5 below.

Table 5. Status of «definitions», «notes» and «appendices» contained in the Technical Regulations

<i>Type</i>	<i>Status</i>
Definition	Part of the standard or recommendation in which the term is used
Note	Explanatory material (often including references to other parts of the document or to other publications); not having a status of a standard, nor a recommendation
Appendix	The same status as the standard or recommendation to which it refers

3. GUIDELINES RELATED TO THE DEVELOPMENT OF WMO PROVISIONS

3.1. Guidance concerning structure and style

3.1.1 General

This Section provides guidance, mostly based on the *ISO/IEC Directives Part 2: 2011*, concerning structure and style to be used when developing the provisions for inclusion in the Technical Regulations. This Section is also largely applicable for drafting guidance for inclusion in the WMO Guides.

Note: For more complete guidance, see the *ISO/IEC Directives, Part 2: 2011*.

These guidelines are addressed principally to the technical commissions. When drafting new provisions or amending those existing, it is important to bear in mind that the provisions in the Technical Regulations should be related to the *best practices concerning existing services and facilities*; they should not describe visions for expected future developments.

3.1.2 Structure of the documents and their parts

When a new document is being prepared, the desirability of the subdivision of the document, under the same document number, into individual volumes or into separate parts based on the subject matter is to be considered. Such a subdivision has the advantage that each volume or part can be amended separately when the need arises. Since the documents are diverse, there are no simple rules that can be established for the subdivision; however, as a general rule, an individual volume or a separate part must be prepared for each subject to be standardized. In particular, provisions that are addressed to different parties (e.g. general meteorological services, climatological services, hydrological services) shall be clearly distinguished, preferably as parts of a document or as separate documents. Many examples using these principles can be found in the WMO Technical Regulations and Manuals (see Example 2 below concerning the *Manual on Codes* (WMO–No. 306)).

Example 2. An example of a subdivision of a WMO document into volumes and parts, based on subject matter.

Manual on Codes (WMO–No. 306).

Volume I. International codes
 Part A. Alphanumeric codes
 Part B. Binary codes
 Part C. Common features to binary and alphanumeric codes
 Volume II. Regional codes and national coding practices.

If the document were to become too voluminous, a subdivision into individual documents (e.g. volumes) should be considered. In most cases, however, a subdivision into separate parts under the same document number would be sufficient; such a subdivision is preferable in particular if:

- (a) Subsequent portions of the content are interlinked;
- (b) Portions of the document are to be referred to in the provisions, or
- (c) Portions of the document are intended to serve for certification purposes.

It is also advisable to regroup similar provisions together in one part of the document based on their nature, e.g.

- safety requirements;
- performance requirements;
- maintenance and service requirements;
- installation rules; and
- quality assessment.

Within the WMO Manuals and Guides, the *parts* are subdivided into clauses, sub-clauses, secondary sub-clauses (where required) and paragraphs, as shown in Table 6. The clauses, sub-clauses and secondary sub-clauses are terms used for various levels of headings, while the paragraphs contain the provisions.

Table 6. Names of divisions and subdivisions of WMO Technical Regulations and Guides

Term	Template	Examples of numbering from WMO – No. 49, Volumes I and II
Part	PART N (<i>Roman number</i>)	PART I. WORLD WEATHER WATCH
Clause	n (<i>number</i>)	1. GLOBAL OBSERVING SYSTEM
Sub-clause	n.n	1.1 Meteorological observing networks, stations and observations
Secondary sub-clause ¹	n.n.n	1.1.1 General – Scope, purpose and operation of the Global Observing System
Paragraph	– ³ or n.n.n.n ⁴	1.1.1.1 The Global Observing System shall be constituted ...
Appendix ²	APPENDIX X (<i>letter</i>)	APPENDIX A. VALUES OF SOME PHYSICAL FUNCTIONS AND CONSTANTS USED IN METEOROLOGY
Attachment ⁵	ATTACHMENT Y (<i>letter</i>)	ATTACHMENT C. SELECTED CRITERIA APPLICABLE TO AERODROME REPORTS

¹ Only, as required;

² To be included in the order where they are cited in the text. They are normative (containing standards and recommendations);

³ If only one paragraph under the sub-clause;

⁴ If more than one paragraph under the sub-clause; and

⁵ To be included in the order where they are cited in the text. They are informative (containing guidance).

Currently, within individual documents, the structure varies from one document to another as shown in Table 7 below.

Table 7. Organization of elements preceding the provisions (i.e. Technical Regulations) in selected WMO documents

<i>Document</i>	<i>Element I</i>	<i>Element II</i>	<i>Element III</i>
Technical Regulations – Volume I (WMO–No. 49)	General provisions	Contents	Definitions
Technical Regulations – Volume II (WMO–No. 49)	Introduction	Contents	Definitions
Technical Regulations – Volume III (WMO–No. 49)	Introduction	Contents	Definitions
Annex II (WMO–No. 306)	Contents ¹	Introduction	Definitions
Annex III (WMO–No. 386)	Contents	Introduction	
Annex V (WMO–No. 544)	Contents	Introduction	(Definitions) ²
Annex VI (WMO–No. 558)	Contents	Introduction	
Annex VII (WMO–No. 1060)	Contents	Introduction	

¹ Preceded by a «Preface»;² Definitions are in an Appendix.

The table shows that the order of elements (i.e. the structure) varies from one document to another. In principle there is no single correct structure and any of them could be defended. However, it would be highly desirable to aim for standardizing the structure of WMO documents, which would substantially facilitate their use. In order to do this, it is important that the provisions be regrouped in an identical manner throughout the Technical Regulations. The *ISO/IEC Directives Part 2: 2011* give some guidance in this regard; the structure that has been developed is based on that guidance and is shown in the template given in Table 8. The table also lists the permitted content of each of the elements. The elements contained in the WMO documents have been divided into two broad categories, i.e. into informative (guidance) and normative (standards and recommendations) elements. In the Technical Regulations, the core of the document is of a normative nature (i.e. standards and recommendations) while the bulk of informative elements are normally regrouped in the beginning of the document, i.e. in the title page, table of contents and introduction. There may be additional informative elements within the document, i.e. notes and attachments. (Note that the WMO Guides only contain informative elements.) When drafting new WMO regulatory documents, or updating the existing ones, the structure as displayed in Table 8 should be used.

Table 8. Template for a standard arrangement of elements to be used in the Technical Regulations

<i>Type of element</i>	<i>Arrangements of elements in a document</i>	<i>Permitted content of elements in a document</i>
Preliminary informative: Elements that identify the document, introduce its content, and explain its background, its development, and its relationship with other documents	Title page	Title
	Table of contents	Content
	Introduction	Text <i>Notes</i>
Normative: Element that sets out the provisions	Definitions Symbols and abbreviated terms Provisions Appendices (normative)	Text Figures Tables <i>Notes</i> <i>Examples</i> <i>References</i>

Supplementary informative: Element that provides additional information intended to assist the under-standing or use of the document	<i>Attachments (informative)</i>	<i>Text</i> <i>Figures</i> <i>Tables</i> <i>Notes</i>
Key: Bold type = mandatory element; upright type = normative element; <i>italic type</i> = informative element		

Note 1: It is essential that the tables, figures and appendices are always introduced by a sentence in the text;

Note 2: Footnotes are not to be used;

Note 3: Attachments are currently used in Volume II of the Technical Regulations.

The table of contents should reflect the above structure, i.e. it should be in accordance with the arrangement of elements as shown in Table 8, using the divisions and subdivisions as displayed in Table 6 above. Additional guidance is provided under 3.1.3 below.

3.1.3 Style

Technical Regulations should be written in simple, concise, language using short sentences. This is particularly important for those whose mother tongue is not one of the official languages of WMO. To achieve their objectives, new provisions should:

- be precise, consistent, clear and unambiguous;
- be as complete as necessary within the limits specified by their scope;
- take full account of the state-of-the-art;
- provide a framework for future technological development; and
- be comprehensible to qualified persons who have not participated in their preparation.

Issues related to style are addressed item by item in these guidelines. They are listed in the same order as the elements in the second column of Table 8 above.

Title page

The title page shall contain the title of the document. The wording of the title shall be established with the greatest care; while being as concise as possible, it shall indicate, without ambiguity, the subject matter of the document. The title should distinguish it from other documents. Any necessary additional particulars shall be given in the introduction.

Table of contents

The table of contents is a mandatory element in the Technical Regulations and Manuals. The table of contents shall be entitled «Contents» and shall list clauses and, if appropriate, sub-clauses with titles, and appendices. The order shall be as follows:

- parts (starting from «Definitions»);
- clauses;
- sub-clauses;
- appendices (including clauses and sub-clauses, if appropriate); and
- attachments.

All the elements listed shall be cited with their full titles. Terms included under the «Definitions» shall not be listed in the table of contents.

Introduction

The introduction shall appear in the Technical Regulations and Manuals. It shall not contain requirements (i.e. standards), recommendations, figures or tables. The introduction gives information about: the purpose of the document; the types of provisions included therein; the status of annexes (in the case of the Technical Regulations) and appendices; its amendment; and its relationship with other documents.

Definitions

This is a conditional element giving definitions necessary for the understanding of certain terms used in the document. The following introductory wording shall be used: «The following terms, when used in (*name of the document*), have the meanings given below». Before introducing a definition in a document, it is essential to verify whether the term has already been defined in other volumes; if that is the case, the need for it has to be carefully considered; if regarded as indispensable for understanding, the definition has to be aligned with the one already published. Definitions shall not include any abbreviations.

Note: Guidance related to the rules for the drafting and presentation of definitions can be found in Annex D of the *ISO/IEC Directives Part 2:2011*.

Symbols and abbreviated terms

This is a conditional element giving a list of the symbols and abbreviated terms necessary for the understanding of the document.

All the symbols should be listed in alphabetical order in the following sequence:

- upper case Latin letter followed by lower case Latin letter (*A, a, B, b*, etc.);
- letters without indices preceding letters with indices, and with letter indices preceding numerical ones (*B, b, C, Cm, C2, c, d, dext, dint, d1*, etc.);
- Greek letters following Latin letters (*Z, z, A, α, B, β, ..., Λ, λ*, etc.);
- any other special symbols.

Abbreviated terms shall be used with care, and their use shall be limited to those cases where it is not likely to cause confusion. If a list of abbreviated terms is not given in the document, then the first time that an abbreviated term is used, the full term shall be given with the abbreviated term following in parentheses. An abbreviated term shall be specified only if used subsequently in the document. The general rule is that an abbreviated term comprises capital letters, without a full-stop after each letter.

Provisions

This is a mandatory element that may contain standards; recommendations; figures; tables and notes. It is essential to make a clear distinction between normative elements (i.e. standards and recommendations) and informative elements (guidance material). The latter shall be placed in notes. It is important not to mix various types in one single provision. A provision must remain clearly identifiable, i.e. it is either a standard (with the verb «shall») or a recommendation (with the verb «should»). It is also important to consider when a new provision should be drafted as a standard or as a recommendation. The Congress has stated, that the technical commissions should not recommend that a provision be a standard unless it is supported by a «strong majority» of Members (Technical Regulations (WMO—No. 49), Volume I, paragraph 12 (a) refers). In other words, any new standard should be mature for global implementation. If the provision cannot (yet) be implemented by a majority of Members, it should be drafted as a recommendation. Such a

recommendation may be upgraded to a standard in the future, i.e. as soon as an acceptable level of implementation has been reached amongst the Members.

The implementation of normative elements should be supported by the development of appropriate instructions (i.e. guidance) to Members. Such guidance could be included in notes or in attachments included in the Technical Regulations or, when extensive, in a separate WMO Guide.

In order to be able to claim compliance with a provision, the Member needs to be able to identify the requirements that it is obliged to satisfy. The Member also needs to be able to distinguish these requirements from other provisions where there is a certain freedom of choice. Clear rules for the use of verbal forms (including modal auxiliaries) are therefore essential. Table 9 gives, in its second column, the verbal form that shall be used to express each kind of provision in ISO provisions. The equivalent expressions given in the third column are equivalent expressions that shall not be used in their provisions. The table is applicable to WMO provisions as far as standards and recommendations are concerned; concerning guidance, there are no limitations in WMO guidance for the expressions displayed in the third column.

Table 9. Instructions concerning the use verbal forms in ISO provisions

<i>Type</i>	<i>Verbal form</i>	<i>Equivalent expression not to be used in the provisions</i>
Requirement (Standard)	Shall	Must is to is required to is required that has to only...is permitted it is necessary
	shall not	may not is not allowed/permitted/acceptable/permissible is required to be not is required that... be not
Recommendation	Should	is recommended that ought to
	should not	is not recommended that ought not to
Guidance (e.g. notes): Permission	May	is possible is permitted is allowed is permissible
	need not	is impossible is not required that no...is required
Guidance (e.g. notes): possibility and capability	Can	be able to there is possibility of is possible to
	Cannot	be unable to there is no possibility of is not possible to

Figures should be used when they are the most efficient means of presenting information in an easily comprehensible form. It shall be possible to refer to each figure explicitly within the text. Figures shall be designated «Figure» and numbered with Arabic numerals, beginning with 1. This numbering shall be independent of the numbering of the clauses and of any tables. A single figure

shall be designated «Figure 1». The figure designation shall be centred horizontally below the figure.

Notes to figures shall be treated independently from notes integrated in the text. They shall be located above the designation of the relevant figure. A single note in a figure shall be preceded by «Note», placed at the beginning of the first line of the text of the note. When several notes occur in the same figure, they shall be designated «Note» and numbered with Arabic numerals, beginning with 1. A separate numbering sequence shall be used for each figure. Notes to figures shall not contain requirements or any information considered indispensable for the use of the document. Any requirements relating to the content of a figure shall be given in the text. It is not necessary that notes to figures be referred to.

Tables should be used when they are the most efficient means of presenting information in an easily comprehensible form. It shall be possible to refer to each table explicitly within the text. Neither a table within a table, nor the subdivision of a table into subsidiary tables are permitted. Tables shall be designated «Table» and numbered with Arabic numerals, beginning with 1. This numbering shall be independent of the numbering of the clauses and of any figures. A single table shall be designated «Table 1». The table designation shall be centred horizontally above the table. The table designation and title shall be separated by a dash. The first word in the heading of each column or row shall begin with a capital letter. The units used in a given column shall generally be indicated under the column heading.

Notes to tables shall be treated independently from notes integrated in the text. They shall be located within the frame of the relevant table. A single note in a table shall be preceded by «Note», placed at the beginning of the first line of the text of the note. When several notes occur in the same table, they shall be designated «Note» and numbered with Arabic numerals, beginning with 1. A separate numbering sequence shall be used for each table. Notes to tables shall not contain requirements or any information considered indispensable for the use of the document. Any requirements relating to the content of a table shall be given in the text. It is not necessary that notes to tables are referred to.

Notes and examples integrated in the text of a document shall only be used for giving additional information intended to assist the understanding or use of the document. Footnotes should not be used. Notes and examples shall not contain requirements (with the verb «shall») or any information considered indispensable for the use of the document, e.g. instructions, recommendations (with the verb «should»). Notes may be written as a statement of fact. Notes should be used sparingly, mainly to give essential information related to standards and recommendations (e.g. references to guidance material). Examples of notes are given below (Examples 3 and 4 refer).

Example 3. Correctly drafted note.

The example below comprises an extract of a clause together with a corresponding note. The note is correctly drafted since it contains additional information intended to assist the understanding of the document.

«Each label shall have a length of between 25 mm and 40 mm and a width of between 10 mm and 15 mm.

Note: The size of the label was chosen so that it will fit most sizes of syringe without obscuring the graduation marks».

Example 4. Incorrectly drafted notes.

The following notes are incorrectly drafted since they contain respectively a requirement, an instruction, and a recommendation, none of which constitutes «additional information». The problematic text is highlighted in italics and explained in parentheses after the respective example.

Note: In this context a part *shall* be regarded as a separate document ... (a requirement expressed using the verb «shall»).

Note: Where a laboratory is part of a larger organization, the organizational arrangements *should* be such that departments having conflicting interests ... (a recommendation expressed using the verb «should»).

Notes and examples should be placed after the paragraph to which they refer. Notes and examples are not numbered unless more than one appears in the same clause, sub-clause, figure or table.

References to particular pieces of text shall be used instead of repetition of the original source material, since such repetition involves the risk of error or inconsistency and increases the length of the document. However, if it is considered necessary to repeat such material, its source shall be identified precisely. The reference shall contain the official name of the document, followed by the part(s), clause(s), sub-clause(s) or paragraph(s), as appropriate; references shall not be made to page numbers. Internal references within a publication only include the appropriate part(s), clause(s), sub-clause(s) or paragraph(s), in accordance to the following forms:

- «in accordance with Clause 3»;
- «according to 3.1»;
- «as specified in 3.1 b)»;
- «details as given in 3.1.1»;
- «see Annex B»;
- «the requirements given in B.2»;
- «see the Note in Table 2»;
- «see 6.6.3, Example 2»;
- «see 3.1, Formula (3)».

It is unnecessary to use the terms «paragraph» or «sub-clause» before the number. Imprecise references such as «this Paragraph» and «This Annex» shall not be used.

Only references to the Technical Regulations and Manuals shall be included in the text while other references (e.g. to WMO Guides) shall be incorporated in notes.

Every figure and table included in the document shall be referred to in the text, using, e.g. the following forms:

- «shown in Figure 6»;
- «(see Figure 3)»;
- «given in Table 2»;
- «(see Table 1)».

Appendices

Appendices shall be normative and give provisions additional to those in the body of the document. Their presence is conditional. The normative status (as opposed to informative attachments, see below) shall be made clear by the way in which it is referred to in the text.

Attachments

Attachments shall be informative and give additional information intended to assist the understanding or use of the document. They shall not contain requirements. Their presence is conditional. The informative status (as opposed to normative appendices, see above) shall be made clear by the way in which it is referred to in the text.

Note: Additional guidance concerning, inter alia, the representation of numbers and numerical values; Quantities, units, symbols and signs; and mathematical formula are given in the *ISO/IEC Directives, Part 2: 2011*.

3.2 Rules for drafting

3.2.1 General principles

In most documents, the aims of individual requirements are not usually indicated although the purpose of a document and of some requirements can usefully be explained in the introduction. However, it is essential to identify these aims at the earliest possible working stage to facilitate the taking of decisions regarding inclusion of the individual requirements.

In order to facilitate implementation by Members, the aspects which will be of separate interest to the various parties shall be clearly distinguished, either in separate clauses of the document or, preferably, in separate documents or parts of a document. Distinction shall be made, for example, between:

- safety requirements;
- performance requirements;
- maintenance and service requirements, and
- installation rules.

Members often make reference to standards in their national legislation and governmental regulations. Aspects which are expected to form part of governmental regulations, such as requirements dealing with safety, shall receive priority when preparing new standards.

Whatever the aims of a standard, only requirements that can be verified shall be included. Requirements in documents shall be expressed in well-defined values. Where appropriate, requirements should be formulated in terms of the performance of a system (i.e. performance-based standards). Vague phrases shall not be used (e.g. terms «regularly» or «at regular intervals» should be replaced by unambiguous statements, e.g. «every 6 months»). Furthermore, the use of such ambiguous expressions as «as necessary», «as appropriate», «if feasible» should be minimized.

If it is necessary to invoke a requirement elsewhere, this should preferably be done by reference, not by repetition.

3.2.2 Practical rules with examples

This section lists 10 rules for drafting together with some examples from the existing Technical Regulations requiring corrective action. The rules are based on the *ISO/IEC Directives Part 2: 2011*, which provide additional guidance.

Rule 1: ***Favour performance-based provisions.*** Whenever possible, requirements shall be expressed in terms of performance rather than design or descriptive characteristics. This approach leaves maximum freedom to technical development. This is shown in Example 5 below.

Recommended action. Formulate provisions in terms of performance of a system or a facility, rather than its design or characteristics.

Example 5. How to draft performance-based provisions related to observing practices.

In the case of specifications of the requirements for observations, express the specification in terms of required accuracy, frequency, sampling rate, averaging interval etc. Avoid including the type of instrument or the description of the method of observation. It is important that the required performance is achieved; it is of a secondary importance how it is done.

Rule 2: ***Ensure the homogeneity of provisions.*** Uniformity of structure, of style and of terminology shall be maintained not only within each document, but also within a series of associated documents. To achieve this:

- the structure of associated documents and the numbering of their clauses shall, as far as possible, be identical;
- identical wording shall be used to express identical provisions;
- the same term shall be used throughout each document or series of associated documents to designate a given concept;
- the use of an alternative term (synonym) for a concept already defined shall be avoided;
- as far as possible, only one meaning shall be attributed to each term chosen.

These requirements are particularly important not only to ensure comprehension of the document, or of the series of associated documents, but also to derive the maximum benefit available through automated text processing techniques and computer-aided translation.

Note: For historical reasons there are non-homogeneous aspects in the Technical Regulations; they are being gradually addressed as the documents are being updated.

Recommended action 1. Undertake an overview of the document in which the new, or amended, provisions are to be included to ensure that the style and formulation are compatible with the document concerned. If the document is an Annex to the Technical Regulations (i.e. Manual), also check the compatibility of the proposed provisions with those in Volume I of the Technical Regulations.

Recommended action 2. Use the «track-changes» feature in all the amendments striking out the text to be deleted and highlighting the text to be inserted. Exception: if the amendment forms part of a document that will be generated during a meeting (e.g. a session of a technical commission), the changes to the Technical Regulations must be identified in such a manner that they remain visible after the generation of the document (e.g. using a strike-through for deletions and highlights for insertions, *not* forming part of the «track-changes» feature).

Rule 3: **Maintain the consistency of documents.** The text of every document shall be in accordance with the provisions of existing basic documents published by WMO. This relates particularly to:

- standardized terminology;
- principles and methods of terminology;
- quantities, units and their symbols;
- abbreviated terms;
- bibliographic references; and
- equivalence of official language versions (i.e. technically equivalent and structurally identical).

Recommended action. Verify the proposed terminology, abbreviations (to be kept to a minimum) and references to ensure that they are in accordance with those used in the document concerned. If the document is an Annex to the Technical Regulations (i.e. Manual), also carry out the verification against those used in Volume I of the Technical Regulations.

Rule 4: **Consider the fitness for implementation.** A new provision in a WMO document shall be drawn up in such a way as to facilitate its direct application and adoption without change as a regional or national standard. The style and language of a provision shall be carefully considered to make it clear for Members and fit for implementation.

Recommended action. Carry out a systematic review of all the new and amended provisions to ensure that they are fit to be implemented and that the Members can easily assess whether they comply with these provisions or not.

Rule 5: **Define the addressee of a provision.** Where feasible, the addressee of the provision shall be well-defined to ensure its implementation. If not defined, it remains unclear who should implement the provision. In general, provisions in the Technical Regulations shall be addressed to Members (General Regulation 128 refers). If necessary, they could also be addressed to a regional facility (e.g. Regional Specialized Meteorological Centres); however, they should never be addressed to «Permanent Representatives», «National Meteorological and Hydrological Services», nor individuals (e.g. «meteorologists»). Obligations addressed to Members or to a regional facility in one provision shall be enumerated in one provision using sub-paragraphs a), b), c), etc.

Recommended action. Address the new or amended provisions clearly. If it is not clear from the context to whom they are addressed, the addressee has to be stated explicitly.

Rule 6: **Ensure that references be made only to relevant publications.** No reference should be made to outdated or non-existent material.

Recommended action. Systematically verify all the references in new or amended provisions to ensure that the publication referred to is valid and up-to-date. If that is not the case, the reference should not be included.

Rule 7: **Ensure that there are no extraneous definitions in the document.** Only definitions that are used in the same document should be included. In this respect, the Eighth Congress requested the technical commissions concerned to review the respective definitions in Volumes I and III with a view to eliminating definitions of terms not appearing in the text and transferring them, as appropriate, to the relevant Manuals (i.e. Annexes to the Technical Regulations).

Recommended action. Systematically verify all the definitions in new or amended provisions to ensure that the definition concerned are used in the document concerned. If that is not the case, such a definition should not be included.

Rule 8: **Minimize the use of abbreviations.** To facilitate the readability and understanding of the Technical Regulations, the use of abbreviations should be minimized. This is important in particular in the Technical Regulations, which are high-level legal documents, not addressed exclusively to specialists. An example of a correct way of drafting is given below (Example 6 refers).

Recommended action. Review all the proposed abbreviations in the new or amended text; only introduce them if they are considered absolutely necessary; otherwise replace them by unabbreviated words or text.

Example 6: A correct way of avoiding abbreviations.

In Volume I of the Technical Regulations, the term «World Weather Watch» is systematically written in full, never abbreviated as «WWW».

Rule 9: **Ensure that all the proposed provisions can be classified unambiguously.** A provision can only be either a standard (always with the verb «shall»); recommendation (always with the verb «should»); or guidance material (never with verbs «shall» or «should»). The various types shall be separated and can under no circumstances be placed in one single provision. Furthermore, descriptive material (and guidance) should not be «embedded» in the requirements; such material should be transferred to appendices or to relevant guides. Examples of ambiguous provisions are given below (Examples 7, 8 and 9 below refer). In Example 9, two alternative rectifications are proposed: both are correct from the formal point of view; however, they differ as far as the status of the provision is concerned and have to be therefore carefully assessed before deciding.

Recommended action. Review each new or amended provision to ensure that its status is unambiguous, i.e. it must be either a standard (with the verb «shall»), a recommendation (with the verb «should») or guidance material (never with verbs «shall» or «should»); if one provision were containing elements of varying status, then that provision would have to be split into two or more provisions.

Example 7. Incorrect inclusion of standards, recommendations and guidance in one hypothetical provision.

Existing text (comments added are in italics):

«Global data coverage should be provided for the benefit of the WMO World Meteorological Centres, Regional Specialized Meteorological Centres and a number of WMO Members engaged in global NWP (*defines users – correct verb*). Availability of global data *is required* without gaps in coverage or time (*requirement for spatial and temporal coverage – wrong verb*). For global NWP applications, data *are required* no later than four hours, and with a goal of one hour, after the instrument has made the observation (*requirement for temporal Res. of data – wrong verb*). This *can be achieved* from polar orbiting satellites by on-board storage and successive transmission when in view of command and data acquisition stations, or by regional retransmission services from a network of direct broadcast receiving stations, or by using data relay satellites, or by a combination of these systems (*guidance –wrong verb in a recommended practice and procedure*)».

Amended text (assuming that the provision is a recommendation):

«Global data coverage should be provided for the benefit of the WMO World Meteorological Centres, Regional Specialized Meteorological Centres and a number of WMO Members engaged in global NWP. Global data *should be available* without gaps in coverage or time. For global NWP applications, data *should be available* no later than four hours, and with a goal of one hour, after the instrument has made the observation.

Note: This *may be achieved* from polar-orbiting satellites by on-board storage and successive transmission when in view of command and data acquisition stations, or by regional retransmission services from a network of direct broadcast receiving stations, or by using data relay satellites, or by a combination of these systems.»

Example 8. Hypothetical regulatory provisions without «shall» or «should» (using «may», «can» or other type of declarative statement).

Existing text (verbs indicated in italics for emphasis):

«An instrument height of between 1.25 and 1.75 m above ground *is considered* satisfactory to obtain representative air temperature measurements (*requirement for the instrument height – wrong verb*). However, at a station where considerable snow cover may occur, a greater height *is permissible* or, alternatively, a moveable support *can be used* allowing the thermometer housing to be raised or lowered in order to keep the correct height above the snow surface (*guidance for specific circumstances*).»

Amended text (assuming that the provision is a standard):

«An instrument height of between 1.25 and 1.75 m above ground *shall be used* to obtain representative air temperature measurements. However, at a station where considerable snow cover may occur, a greater height *shall be used*.

Note: A moveable support *may be used* allowing the thermometer housing to be raised or lowered in order to keep the height between 1.25 and 1.75 m above the snow surface.»

Example 9. Three examples of hypothetical provisions non-compatible with Rule 9. Two possible corrections are suggested after each example (all the verbs indicated in italics for emphasis; those changed are highlighted).

a) Incorrect combining of a standard and guidance in one provision.

«In the absence of wind instruments, the wind speed *shall* be estimated on the basis of the Beaufort wind scale. The Beaufort number obtained by estimation *is converted* into metres per second or knots by the use of the wind speed equivalent columns of the Beaufort scale, and this speed *is reported*.»

Correction without changing the verbs used (i.e. separating guidance into a note):

«In the absence of wind instruments, the wind speed *shall* be estimated on the basis of the Beaufort wind scale.

Note: The Beaufort number obtained by estimation is converted into metres per second or knots by the use of the wind speed equivalent columns of the Beaufort scale, and this speed is reported».

Correction that upgrades guidance into a standard and maintains the two sentences in one provision:

«In the absence of wind instruments, the wind speed *shall* be estimated on the basis of the Beaufort wind scale. The Beaufort number obtained by estimation ~~is~~ **shall be** converted into metres per second or knots by the use of the wind speed equivalent columns of the Beaufort scale, and this speed ~~is~~ **shall be** reported».

b) Incorrect splitting of a requirement into a standard and a note:

«Code figures 00, 01, 02, 03 of the code table *shall* be considered to represent phenomena without significance.

Note: All present weather and past weather including phenomena without significance observed at sea *shall* be reported in the SHIP message».

Correction without changing the verbs used (i.e. combining two requirements in one standard) :

«Code figures 00, 01, 02, 03 of the code table *shall* be considered to represent phenomena without significance. ~~Note:~~ All present weather and past weather including phenomena without significance observed at sea *shall* be reported in the SHIP message».

Correction that maintains the types of provisions unchanged (i.e. a standard and a note):

« Code figures 00, 01, 02, 03 of the code table *shall* be considered to represent phenomena without significance.

Note: All present weather and past weather including phenomena without significance observed at sea ~~shall~~ **is** reported in the SHIP message».

c) Incorrect combining of guidance and two requirements:

«If more than one form of weather is observed, the highest applicable code figure *shall* be selected. Other weather *may* be reported in Section 3. In any case, code figure 17

shall have precedence over figures 20–49.»

Correction without changing the verbs used (i.e. separating guidance into a note):

«If more than one form of weather is observed, the highest applicable code figure *shall* be selected. ~~Other weather may be reported in Section 3.~~ In any case, code figure 17 *shall* have precedence over figures 20–49.

Note: Other weather *may* be reported in Section 3».

Correction that upgrades guidance into a standard and maintains the three sentences in one provision:

«If more than one form of weather is observed, the highest applicable code figure *shall* be selected. Other weather ~~may~~ *shall* be reported in Section 3. In any case, code figure 17 *shall* have precedence over figures 20–49.»

Rule 10: ***Ensure that the Technical Regulations and their Annexes only include provisions of a technical nature.*** By definition, any new or amended provisions considered for inclusion in the Technical Regulations should be of a technical nature. An example of a provision that is non-technical and which should not have included in Technical Regulations is given in Example 10.

Recommended action. Assess the new and amended provisions to ensure that they are of a technical nature; if not, do not propose their inclusion in the Technical Regulations.

Example 10. A hypothetical example of a non-technical provision, which should not be included in the Technical Regulations.

«Each Member shall ensure that meteorological personnel ... are accorded status, conditions of service and general recognition within that country commensurate with the technical and other qualifications required for the fulfillment of their respective duties».

4. LOGICAL FRAMEWORK OF THE STANDARD MAKING PROCESS WITHIN WMO

This Section describes all the steps required from the identification of a requirement until its adoption by Congress or approval by the Executive Council and implementation by Members. It is important to note that the completion of each step requires a minimum time; therefore, it is essential that the time frames required are respected by all those concerned. Figure 1 describes all the steps involved in this process. It is applicable to all the Technical Regulations, including the Manuals, except for Volume II of the Technical Regulations: the amendments thereto are synchronized with those to Annex 3 by the International Civil Aviation Organization, which are undertaken following a 3-year cycle.

The *first step* consists of the establishment of a new requirement. A new draft requirement is normally proposed by a Member, a user of the service concerned or an international organization. After the receipt of the proposal, the draft requirement is consolidated by the Regional Association or the technical commission concerned that will transmit a recommendation containing the new draft requirement to the expert bodies of the technical commission(s) concerned for evaluation. No major changes should be made to the Technical Regulations without consulting the appropriate technical commissions; this consultation provides an indication of the acceptance and relevance of the new requirement. Furthermore, it is imperative that a cost-benefit analysis, including the assessment of financial implications for Members, together with related capacity development needs, be undertaken by the expert bodies before proceeding with a proposed new requirement. If considered appropriate and cost-effective by the expert bodies, the *second step* will result to the issuance of a document that includes the draft requirement.

During the *second step*, the WMO Secretariat has to carry out a thorough editing of the proposal in view of ensuring that the formulation of the new requirement is in conformity with these guidelines, in addition to the technical relevance previously validated by the technical commission concerned. The WMO Secretariat should also ensure that other departments are aware of the proposed amendments to the Technical Regulations in case there are some coordination requirements or impacts. The importance of the Secretariat involvement in this step cannot be overestimated; this is the last chance to correct any major editorial inconsistencies before the draft proposal is forwarded to the governing bodies for approval or adoption.

The *third step* consists of consultation with Members and international organizations. Any new draft requirement planned to be included in the Technical Regulations should be communicated to all the Members at least three months before they are submitted to the governing bodies (i.e. Congress or the Executive Council). This ensures a global coordination of the new draft requirement. If the Members express broad support for the new draft requirement, it shall subsequently be submitted for adoption by Congress or approval by the Executive Council. These bodies formulate a resolution that contains the new requirement. This is the *fourth step* of the process.

During the *fourth step*, the amendments to the Technical Regulations are normally adopted by Congress. However, in accordance with Article 14 (c) of the Convention, approval by the Executive Council is possible if the change is considered urgent, i.e. its implementation is necessary before the time of next Congress. The latter is called a «fast-track» procedure. Amendments to Manuals proposed by the appropriate technical commissions are nevertheless normally approved by the Executive Council. Also note that the President of the Organization may approve a change on behalf of the Executive Council (in accordance with General Regulation 9(5)), if the change is considered urgent.

The *fifth step* of the process of introducing a new requirement is its implementation. The WMO Secretariat issues the new requirement and the regional associations and technical commissions

concerned will undertake the necessary planning for its implementation. The implementation itself has to be carried out by Members. Finally, the level of implementation is monitored both by regional associations, and technical commissions concerned and the WMO Secretariat. This monitoring is largely based on the Members' obligation to notify the WMO Secretariat if they cannot comply with the new requirement.

Three terms are used in the foregoing process:

- (a) *Amendment.* The term «amendment» is used to designate an approved change to the Technical Regulations (both to the main Volumes I to IV and their Annexes, i.e. the Manuals);
- (b) *Edition.* The term «edition» refers to any consolidated updated publication, published after each Congress, containing all amendments approved since the time of previous Congress. The edition is indicated by the year of the respective Congress; and
- (c) *Update.* The term «update» is used to identify an updated publication, published after approval by the Executive Council or the President of one or more amendments to the Technical Regulations and their Annexes. The updates are numbered sequentially, followed by the year of approval.

The preceding process works fairly well for new requirements; however, it does not ensure that obsolete material contained in the Technical Regulations be deleted in a timely manner. It is therefore, important to assign responsibilities amongst the technical commissions to deal with obsolete material.

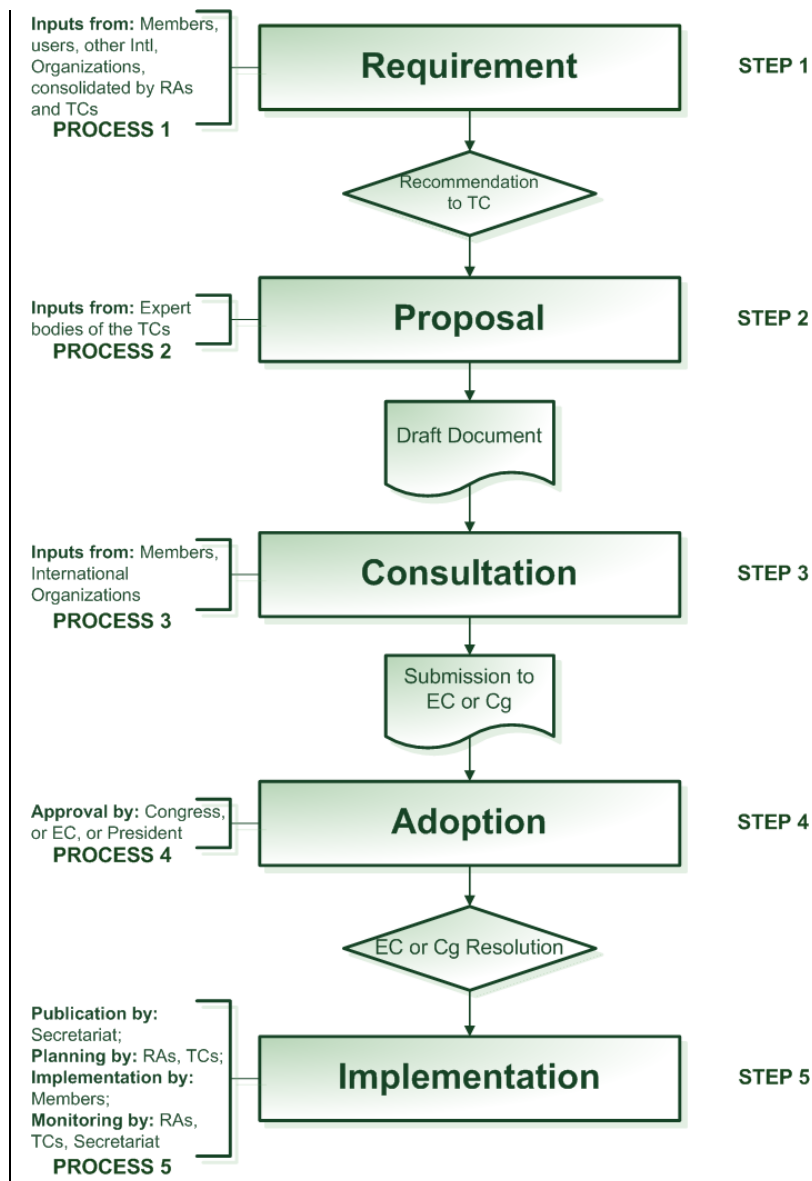


Figure 1. Processes needed from the identification until the implementation of a WMO provision.

5. GUIDELINES CONCERNING MEMBERS' COMPLIANCE WITH WMO

Through the issuance of the Technical Regulations, WMO has established a global regulatory framework enabling a harmonized and standardized conduct of the meteorological, hydrological and climatological activities. Within this framework, it is expected that all the Members align their national practices with the standards (an obligation) and recommendations (desirable). This alignment is achieved through the conversion of the Technical Regulations into appropriate regional and national legislation or regulation, which should, in principle, lead to the implementation of the WMO Technical Regulations. Members should endeavor to either reproduce, or include references to, the relevant WMO provisions. The alignment should be strongly promoted by the WMO Secretariat who should be able to provide guidance to Members, as necessary, when Technical Regulations are being introduced or amended.

In practice, however, the foregoing alignment is not always done by Members. There are a number of reasons for that: there is no well-defined meteorological «Regulator» (authority) at a national level responsible for the enforcement of the international regulations; there is little exposure to liability; monitoring of implementation is weak; and there is no systematic approach towards resolving identified deficiencies. In the case of International Civil Aviation Organization (ICAO) and World Health Organization (WHO), the situation is different as shown in Table 10.

Table 10. Mechanisms contributing to the implementation of international provisions promulgated by WMO, ICAO and WHO

<i>Mechanism</i>	<i>WMO</i>	<i>ICAO</i>	<i>WHO</i>
Existence of a regulator	no	yes: meteorological authority in all States	yes: national ministries of health
Exposure to liability	low	high	High
Monitoring of implementation	little	yes: universal safety oversight audit programme	(unknown)
Approach to resolve identified deficiencies	no	yes: maintenance of lists of deficiencies by regional offices	(unknown)

In view of the foregoing, it is essential to promote an enhanced «culture of compliance» with the Technical Regulations amongst the Members and throughout the Organization. This goal can only be met if regulatory documents and related guidance are improved and regularly updated following a pre-fixed cycle. An increased engagement of Members in the development and pre-approval phase of the Technical Regulations is essential. After the adoption of new or amended Technical Regulations, all the deviations must be systematically registered by the Secretariat and those that are considered «critical» singled out in view of their timely elimination.

The introduction of the «culture of compliance» requires that the following four steps be followed:

Step 1. Systematic notification of compliance by Members. In order to be able to address the issue of non-implementation, it is essential, as the first step, to learn Members' real level of implementation. The full knowledge of the implementation is a prerequisite for the enhanced culture of compliance. In this regard, a system of notification of compliance by Members has already been established. The Convention (Article 9 related to the execution of Congress decisions) stipulates that «all Members shall do their utmost to implement the decisions of Congress.

If, however, any Member finds it impracticable to give effect to some requirement in a technical resolution adopted by Congress, such Member shall inform the Secretary-General of the Organization whether its inability to give effect to it is provisional or final, and state its reasons

therefor». Concerning the *notification of non-compliance (deviation)* the General Regulations (Regulation 128 refers) indicate that «a Member which is unable to give effect to a requirement in a technical resolution which has been adopted by Congress, or by the Executive Council on behalf of Congress, and to which the provisions of Article 9 (b) of the Convention and of these Regulations have been specifically stated to apply, shall so inform the Secretary-General in writing within a period of 90 days after the notification of the decision by the latter. The Member concerned must indicate, in its communication to the Secretary-General, whether its inability to give effect to the resolution is provisional or final and state its reasons therefor».

The same regulation also deals with the *notification of compliance* by stating that «Members shall specifically notify the Secretary-General in writing of their intention to apply the «standard practices» of the Technical Regulations except for those for which they lodge specific deviations».

Finally, the same regulation addresses the *notification of change* by indicating that «Members shall also inform the Secretary-General, at least three months in advance, of any change in the degree of their implementation of a «standard practice», as previously notified and of the effective date of the change».

In conclusion, the system of notification forms part of WMO regulations; however, it is not being done systematically, e.g. few Members have notified a non-implementation of 2.4.8 of the *Manual on the Global Observing System* requiring that upper-air observations be made twice a day (at 0000 and 1200 hours UTC); meanwhile it is known from international monitoring that a majority of Members carry out upper-air observations only once a day. Based on the foregoing, it is clear that the systematic notification of deviations by Members needs to be implemented.

Recommended action: In the routine correspondence with Members related to amendments to WMO Technical Regulations, the WMO Secretariat should include a paragraph reminding the Members of their obligation to indicate all the deviations from the standards.

Step 2. Establishment by the WMO Secretariat of a database containing Members' compliance with the Technical Regulations. In this regard, the General Regulations (Regulation 127 refers) require that «decisions concerning changes in the Technical Regulations, together with relevant documents, shall be sent to Members in sufficient time to allow a period of at least nine months between the receipt of these documents and the date of implementation». Moreover, the General Regulations (Regulation 202 entitled «General functions of the Secretariat» refers) stipulate that the Secretariat should «maintain records of the extent to which each Member implements the decisions of the Organization». It can be seen that the second step is already envisaged by the WMO Regulations; the issue has been its non-implementation. Therefore, the WMO Secretariat should create routine procedures for evaluation of Members' compliance with the standards and on the degree of their implementation; Regional Associations and technical commissions should play a major supporting role in this undertaking.

Recommended action: The WMO Secretariat should establish a database containing the full list of deviations from the standards contained in the Technical Regulations (including their annexes).

Step 3. Identification of «critical deviations» (deficiencies) by the WMO Secretariat. In order to address the most urgent deviations as a matter of priority, it is essential that the WMO Secretariat undertakes a thorough review of all the deviations filed and identifies those that can be considered «critical». The deviations that have impacts on safety nationally or internationally (e.g.

a non-implementation of an early-warning system), or that adversely affects other Members in the neighbouring countries, preventing them from providing the required global, regional or national services and facilities in a satisfactory manner should be considered critical. Such critical deviations are to be considered *deficiencies*. A similar system is already in place within ICAO: safety oversight audits, resulting in a list of deficiencies.

Recommended action: Based on the notifications of deviations received from Members, the WMO Secretariat should identify which of the deviations constitute **deficiencies**, i.e. critical deviations that seriously affect either: a) the provisions of safety-related services nationally; or b) the overall performance of required regional or global services and facilities.

Step 4. Feed-back and support by the WMO Secretariat to Members in view of eliminating the deficiencies identified.

As a last step, it is essential that the WMO Secretariat and the Members concerned do their utmost to contribute towards the elimination of the deficiencies identified. The WMO Secretariat should approach the Members experiencing deficiencies, requesting them to strive for their prompt elimination. Furthermore, the list of unresolved deficiencies with their ownership (i.e. Members) should play an important role in setting priorities in the capacity development strategy and in channeling the technical/institutional assistance.

Recommended action: The WMO Secretariat should: a) request the Members concerned to do their utmost to resolve the deficiencies as a matter of priority; and b) give priority in the capacity development strategy to Members who are not in a position to resolve the deficiencies that have been identified.

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