Doc 9303

Tenth DRAFT 20th July 2005

Machine Readable Travel Documents

Part 1
Machine Readable Passports
Volume 1 Machine Readable Passports without additional data storage

Approved by the Secretary General
and published under his authority

Sixth Edition – 2005

International Civil Aviation Organization

CONTENTS

	Page
Foreword to Volume 1 of Doc 9303 Part 1	1
Section I - Introduction	I-1
General Considerations - ICAO's Leadership Role	I-1
Relative Costs & Benefits of Machine Readable Travel Documents	I-2
Operations	I-2
Endorsement by ISO	I-3
Section II - Technical Specifications for MRPs References & Definitions	II-1
Scope	II-1
Normative References	II-1
Definitions	II-2
Technical Specifications for machine readable passports	II-4
Section III - Technical Specifications for the Security of the Design, Manufacture and Issuance of Machine Readable Passports	III-1
Security of the MRP and its Personalisation	III-1
Machine Assisted Document Verification	III-1
Security of MRP Production and Issuance Facilities	III-2
Provision of Information on Newly Issued MRPs	III-2
Provision of Information on Lost and Stolen Passports	III-3
Appendix 1 Security Standards for MRTDs	III-A1-1
Appendix 2 Machine-assisted Document Verification	III-A2-1
Appendix 3 Security Standards for the Handling & Issuance of MRPs	III-A3-1
Section IV - Technical Specifications for Machine Readable Passports	IV-1
Scope	IV-1
Physical Characteristics	IV-1
Construction and dimensions of the MRP & MRP Data Page	IV-2
General Layout of the MRP Data Page	IV-3
Content and Use of Zones	IV-4
Displayed Identification Feature of the Holder	IV-6
Detailed Layout of the MRP Data Page	IV-10
Visual Inspection Zone - Data Element Directory	IV-11
Mandatory Machine Readable Zone	IV-14
Data Structure of the Machine Readable Zone	IV-16
Machine Reading Requirements and the Effective Reading Zone	IV-19
Convention for Writing the Name of the Holder	IV-20
Representation of the Issuing State and Nationality of the Holder	IV-24
Representation of Dates	IV-25
Check Digits in the MRZ	IV-26
Character Set and Fonts	IV-28
Characteristics of the Machine Readable Zone	IV-29
Quality Specifications of the Machine Readable Zone	IV-29
Passport Card	IV-31
Emergency and Short Term Passports	IV-31
Passports with additional data storage and biometric capability	IV-32

Appendix 1 Sequence/Location of data elements on the Data Page
Appendix 2 Dimensional Specifications of the Data Page
Appendix 3 Schematic Diagrams of the MRZ and the ERZ
Appendix 4 Positioning of Zones on a Data Page
Appendix 5 Examples of personalised MRP Data Pages
Appendix 6 Construction of data in the MRZ
Appendix 7 Three Letter Codes
Appendix 8 Permitted OCR-B Characters in the MRZ
Appendix 9 Transliterations
Appendix 10 Location of Structure and Substance features
Appendix 11 Guidelines for the Portrait in an MRP

FOREWORD TO DOC 9303 PART 1 (FIRST VOLUME)

The sixth edition of Doc 9303, Part 1, updates and replaces the specifications for machine readable passports as published in the fifth edition (2003) and represents a substantial modernization of the material contained in previous editions. In particular, this sixth edition incorporates the new globally interoperable standard for biometric identification of the holder and for the storage of the associated data on a contactless integrated circuit. In consequence, some other biometric identification methods and data storage media, described in the fifth edition, are no longer to be regarded as options within the globally interoperable standard. States may, however, use them for their own or agreed bilateral purposes.

Such is the magnitude of the specification for the new globally interoperable biometric identification system and the data storage using a contactless integrated circuit, that ICAO Doc 9303 Part 1 is now divided into two volumes. The first volume, known as Doc 9303 Part 1 Volume 1, is an updated version of the fifth edition containing all the specifications required for a State to issue a machine readable passport book where the State does **not** wish to incorporate the global facilitation for its citizens that will be available with machine assisted biometric identification. The second volume, known as Doc 9303 Part 1 Volume 2, contains the additional specifications for the globally interoperable system of biometric identification and its associated data storage utilising a contactless integrated circuit. **A State wishing to issue a passport designed to facilitate cross-border travel with enhanced security by incorporating the globally interoperable machine assisted biometric identification/data storage system will therefore need comply with both Volumes of Part 1**. Certain specifications within Volume 1, particularly in relation to the portrait and other identification features, have been amended to ensure that when a State decides to upgrade to a globally interoperable biometric passport, the minimum amount of change to the passport will be involved.

The expanded specifications and guidance material on matters such as naming conventions, transliteration of national characters in the machine readable zone and the calculation of check digits have been retained in this first volume of Part 1. The option for the inclusion and placement of a bar code on the data page remains but it is to be emphasised that the inclusion of a bar code and its data is solely for use by the issuing State or by other States by bilateral agreement; it is not globally interoperable. As before, provision is made for issuing the passport as a wallet-size card in accordance with the specifications for the Size-1 machine readable official travel document as set forth in Doc 9303, Part 3. The emphasis on the security of the document against fraud by alteration or counterfeit is given greater prominence in this sixth edition, as is the need for security of the premises in which a passport is made, personalised and issued, and for the vetting of staff employed in these activities.

A concept, highlighted in the fifth edition was that of "global interoperability". In this context, the term is understood as the capability of inspection systems (either manual or automated) in different States throughout the world to exchange data, to process data received from systems in other States, and to utilize that data in inspection operations in their respective States. Global interoperability is a major objective of the standardized specifications for placement of both eye readable and machine readable data in all MRTDs. In the security conscious world of today, the need for machine assisted global interoperability

has become pressing. This has necessitated the standardisation on one primary biometric identification method and of one method of data storage. The New Technologies Working Group, established by the ICAO TAG in the mid 1990s, commenced an evaluation in 1998 of the various options and, in early 2001, selected and recommended facial recognition as the primary biometric with contactless integrated circuit as the data storage technology. The recommendation was made specifically in response to the needs of passport issuing and immigration authorities to ensure accurate identification of a passport applicant or holder while minimising facilitation problems for the traveller. This recommendation was endorsed by the ICAO TAG and by the ICAO Air Transport Committee in 2003.

Applicability. Although the specifications in Doc 9303, Part 1 are intended for particular application to the passport, issuing States and organizations are encouraged to apply them as well to other ID-3 size identity documents, for example the Laissez-Passer, the Seafarer's Identity Document and refugee travel documents.

I. INTRODUCTION

ICAO's work on machine readable travel documents began in 1968 with the establishment, by the Air Transport Committee of the Council, of a Panel on Passport Cards. This Panel was charged with developing recommendations for a standardized passport book or card that would be machine readable, in the interest of accelerating the clearance of passengers through passport controls. The Panel produced a number of recommendations, including the adoption of optical character reading (OCR) as the machine reading technology of choice due to its maturity, cost-effectiveness and reliability. In 1980, the specifications and guidance material developed by the Panel were published as the first edition of Doc 9303, titled *A Passport with Machine Readable Capability*, which became the basis for the initial issuance of machine readable passports by Australia, Canada and the United States.

In 1984, ICAO established what is now known as the Technical Advisory Group on Machine Readable Travel Documents (TAG/MRTD), comprised of government officials who specialize in the issuance and border inspection of passports and other travel documents, in order to update and enhance the specifications which had been prepared by the Panel. Subsequently, this group's terms of reference were expanded to include, first, the development of specifications for a machine readable visa and, later, specifications for machine readable cards that may be used as official travel documents. Doc 9303 is now published in separate parts, one for each type of document.

In 1997, the TAG/MRTD commenced a comprehensive revision of Doc 9303, Parts 1, 2 and 3. In this revision process, the structure and organization of the three parts were harmonized. The familial relationship between the three parts of Doc 9303 is demonstrated in Figure I-1. This new sixth edition represents the first stage of a new revision process; as a result there are some changes in format from the previous generation of the Parts of Doc 9303.

By the mid-1990's, the TAG/MRTD had established three Working Groups. The New Technologies Working Group (NTWG) was tasked with planning and implementing the long term development of MRTD's. The Document Content and Format Working Group's role was to review and edit future editions of Doc 9303, while the Education and Promotion Working Group undertook the task of providing information and guidance to States on the implementation of MRTD schemes.

In 1998, the NTWG began work to establish the most effective biometric identification system and associated means of data storage for use in MRTD applications, particularly in relation to document issuance and immigration considerations. The bulk of the work had been completed by time the events of September 11th 2001 caused greater emphasis to be paid to the security of a travel document and the identification of its holder. The work was quickly finalised, endorsed by the TAG/MRTD and the Air Transport Committee and the results published as a standard in Volume 2 of this edition of Doc 9303.

GENERAL CONSIDERATIONS

ICAO's leadership role

ICAO's initiative to develop standard specifications for passports and other travel documents followed the tradition established by the League of Nations Passport Conferences of the 1920s and the work of the League's successor, the United Nations Organization. ICAO's mandate to continue in its leadership role stems from the Chicago Convention, which covers the full range of requirements for efficient and orderly civil aviation operations, including provisions for clearance of persons through border controls, i.e.:

a) the requirement for persons travelling by air and aircraft crews to comply with immigration, customs and passport regulations (Article 13);

b) the requirement for States to facilitate border clearance formalities and prevent unnecessary delays (Article 22); and

c) the requirement for States to develop and adopt internationally standard procedures for immigration and customs clearance (Article 37 (j)).

Under this mandate, ICAO develops and maintains international standards in Annex 9 to the Convention *(Facilitation)* for implementation by Contracting States. In the development of such standards, it is a fundamental precept that if public authorities are to offer facilitation benefits to the vast majority of air travellers, those authorities must have a satisfactory level of confidence in the reliability of travel documents and in the effectiveness of inspection procedures. The production of standardized specifications for travel documents and the data contained therein is aimed at building that confidence.

For these reasons, the Council of ICAO has affirmed that work on specifications for travel documents is an appropriate part of the work programme for the Organization. Nevertheless, ICAO is prepared to cooperate with any other international organization that might wish to promote the use of MRTDs. In addition to the International Organization for Standardization (ISO), consultants to the TAG/MRTD include the International Air Transport Association (IATA), the Airports Council International (ACI), and the International Criminal Police Organization (INTERPOL).

Relative costs and benefits of machine readable travel documents

Experience with the issuance of machine readable passports, in conformity with the specifications set forth in Doc 9303, Part 1, indicates that the cost of producing MRTDs may be no greater than that of producing conventional documents, though the cost will be higher when biometric identification and electronic on-document data storage become involved. As traffic volumes grow and more States focus on how they can rationalize their clearance processes with the employment of computerized data bases and electronic data interchange, the MRTD plays a pivotal part in modern, enhanced compliance systems. Equipment to read the documents and access the data bases may entail a substantial investment, but this can be expected to be returned by the improvements in security, clearance speed and accuracy of verification which such systems provide. Use of MRTDs in automated clearance systems may also make it possible for States to eliminate both the requirement for paper documents, such as passenger manifests and embarkation/disembarkation cards, and the administrative costs associated with the related manual procedures.

Operations

The basic machine readable travel document, with its OCR medium, is designed for both visual and mechanical reading. This feature is essential, since the conversion of travel documents to machine readable format can only be made gradually as current travel documents expire and are renewed or reissued, and the introduction of machine readability at border-crossing points is only being introduced gradually according to traffic volumes. This Sixth Edition of Doc 9303 Part 1 specifies one additional machine reading technology for future global interoperability which is to be introduced on an optional basis in the various travel documents; however the OCR will be retained as the basic technology, considered mandatory to ensure global interoperability.

It has been discovered that the benefits of adopting the machine readable formats for passports and other travel documents extend beyond the obvious advantages for States that have the machine readers and data bases for use in automated clearance systems. Many developing countries have elected to invest resources in the introduction of machine readable travel documents because the physical characteristics and data security features of the documents themselves offer strong defense against alteration, forgery or counterfeit. Moreover, adoption of the standardized format for the visual zone of an MRTD facilitates inspection by airline and government officials, with the result that clearance of low-risk traffic is expedited, problem cases are more readily identified, and enforcement is improved. The optional introduction of biometric identification with data stored on a contactless integrated circuit will provide greater security and resistance to fraud and bring greater facilitation for the document holder and international travel.

Endorsement by ISO

The technical specifications sections of Doc 9303, Parts 1, 2 and 3 have received the endorsement of the International Organization for Standardization as ISO Standards 7501-1, 7501-2, and 7501-3, respectively. Such endorsement is made possible by means of a liaison mechanism through which manufacturers of travel documents, readers and other technologies provide technical and engineering advice to the TAG/MRTD under the auspices of ISO. Through this working relationship, the ICAO specifications have achieved, and are expected to continue to receive, the status of worldwide standards by means of a simplified procedure within ISO.

The liaison mechanism with ISO has been successfully applied not only to the endorsement of new specifications for travel documents as ISO standards but also to the approval of amendments to the specifications. Subsequent revisions to Doc 9303, Parts 1, 2 and 3, will therefore be processed for ISO endorsement in the same manner as previously.

II. TECHNICAL SPECIFICATIONS FOR MACHINE READABLE PASSPORTS

REFERENCES AND DEFINITIONS

Scope

1. This first Volume of Part 1 of Doc 9303 defines the specifications for machine readable passports (MRP) which allow compatibility and global interchange using both visual (eye readable) and machine readable (optical character recognition) means. The specifications lay down standards for passports which can, where issued by a State or organization and accepted by a receiving State, be used for travel purposes. The MRP shall, as a minimum, contain the data specified herein in a form that is legible both visually and by optical character recognition methods, as presented herein. Specifications are included for the mandatory and discretionary incorporation of MRP security features. Technical specifications for a passport card are also included, with references to further specifications in Doc 9303, Part 3, for optional use by States and organizations. The discretionary incorporation of additional electronic data storage, principally to permit biometric identity confirmation of the MRP holder forms the Second Volume of Part 1 of Doc 9303.

Normative references

2. Certain provisions of the following International Standards, referenced in this text, constitute provisions of Part 1 of Doc 9303. Where differences exist between the specifications contained in Part 1 and the referenced Standards, to accommodate specific construction requirements for machine readable travel documents including machine readable passports, the specifications contained herein shall prevail.

ISO 1073/II : 1976 *Alphanumeric character sets for optical character recognition — Part 2: Character set OCR-B — Shapes and dimensions of the printed image*

ISO 1831 : 1980 *Printing specifications for optical character recognition*

ISO 3166 : 1997 *Codes for the representation of names of countries*

ISO/IEC 7810 : 1995 *Identification cards — Physical characteristics*

ISO 8601 : 2001 *Data elements and interchange formats — Information interchange — Representation of dates and times*

Note.— The date indicates the most recent edition of the Standard at the time of publishing. Hereinafter, this document will cite the ISO Standards only, without reference to the year.

General Note.— The decimal notation used in these specifications conforms to ICAO practice. The ISO practice is to use a decimal point (.) in imperial measurements and a comma (,) in metric measurements.

Definitions

3. For the purpose of Part 1 Volume 1 of Doc 9303, the following definitions shall apply.

- *Machine readable travel document (MRTD):* Official document issued by a State or organization which is used by the holder for international travel (e.g. passport, visa, official document of identity) and which contains mandatory visual (eye readable) data and a separate mandatory data summary in a format which is capable of being read by machine.

- *Machine readable passport (MRP):* Passport conforming with the specifications contained in Doc 9303, Part 1Volume 1 and optionally Volume 2. Normally constructed as an ID-3 size book containing pages with information on the holder and the issuing State or organization and pages for visas and other endorsements. Machine readable information is contained in two lines of OCR-B text, each with 44 characters. These specifications permit the MRP to be in the form of a free-standing card of ID-1 size; ID-1 sized passport cards are specified in Doc 9303 Part 3.

- *MRP data page:* Fixed dimensional page within the MRP containing a standardized presentation of visual and machine readable data. This may be on the front or back of an inner page adjacent to the cover or on the inside of a front or back cover .

- *Machine readable visa (MRV):* A visa (also known as an entry clearance but not referred to as such in these specifications) conforming with the specifications contained in Doc 9303, Part 2. The MRV is normally attached to a visa page in a passport.

- *Full size (Format-A) machine readable visa (MRV-A):* An MRV conforming with the dimensional specifications contained in Doc 9303, Part 2, sized to completely fill a passport visa page.

- *Small size (Format-B) machine readable visa (MRV-B):* An MRV conforming with the dimensional specifications (ID-2 size) contained in Doc 9303, Part 2, sized to maintain a clear area on the passport visa page adjacent to the visa to allow, for example, a seal to be placed on the visa and the passport page on which it is affixed or enable a number perforated through the passport pages to remain visible.

- *Size 1 machine readable official travel document (TD-1):* A card with nominal dimensions guided by those specified for the ID-1 type card (ISO/IEC 7810) (excluding thickness). In the case of a plastic card which carries any optional, additional data storage technology, the reading of which requires it to be inserted into a slot reader, (i.e. magnetic stripe, optical memory or integrated circuit with contacts), the TD-1 conforms to the precise dimensions and tighter tolerances specified in ISO/IEC 7810.

- *Size 2 machine readable official travel document (TD-2):* A card or label conforming with the dimensions defined for the ID-2 type card (ISO/IEC 7810) (excluding thickness). In the case of a card which carries any optional, additional data storage technology, the reading of which requires the TD-2 to be inserted into a slot reader, (e.g. a magnetic stripe), the TD-2 conforms to the precise dimensions and tighter tolerances specified in ISO/IEC 7810.

- *United Nations Laisser-passer:* A document, generally equivalent to a passport, issued under the auspices of the United Nations to allow authorised persons to travel across international borders.

- *Machine readable zone (MRZ):* Fixed dimensional area located on the MRTD data page, containing mandatory and optional data formatted for machine reading using OCR methods.

- *Effective reading zone (ERZ):* Fixed dimensional area, common to all MRTDs, in which the machine readable data in the MRZ can be read by document readers.

- *Visual inspection zone (VIZ):* Those portions of the MRTD (data page in the case of MRP), i.e. front and back (where applicable), not defined as the MRZ.

- *Issuing State:* The country issuing the MRTD.

- *Receiving State:* The country to which the MRTD holder is applying for entry.

- *Issuing organization:* Organization authorized to issue an official travel document (e.g. the United Nations Organization, issuer of the Laissez-passer).

- *Zone:* An area containing a logical grouping of data elements on the MRTD. Seven (7) zones are defined for MRTDs.

- *Field:* Specified space for an individual data element within a zone.

- *Caption:* Printed word or phrase to identify a field.

- *Portrait:* A visual representation of the facial image of the holder of the document.

- *Fingerprint(s):* One (or more) visual representation(s) of the surface of the holder's fingertip(s).

- *Bar code:* A means of storing data as a pattern of lines or dots.

- *Laminate:* A protective film with a degree of cohesive strength bonded over some or all of the MRP data page to protect and secure the page and its personalisation data.

- *Overlay:* A very thin protective layer with negligible cohesive strength bonded over some or all of the MRP data page to protect and secure the page and its personalisation data.

- *Biometric Identification:* A means of identifying or confirming the identity of the holder of an MRTD by the measurement of one or more properties of the holder's person.

- *Electronically enabled MRP (or e-Passport):* An MRP conforming to the specifications in this Volume of Part 1 of Doc 9303, which additionally incorporates a contactless integrated circuit including the capability of biometric identification of the MRP holder conforming to the specifications in Volume 2 of Part 1 of Doc 9303.

- *Emergency Passport:* A passport issued to a traveller in a situation where the normal procedure for issuing an MRP cannot be followed because of the need to travel is urgent. The situations in which this could occur are, for example, following the death of a relative in another State, or where the traveller has lost his MRP or had it stolen in another State when the emergency passport would be issued by the embassy of the traveller's State. The emergency passport ideally should conform to the specifications for an MRP.

Technical specifications for machine readable passports

- Technical specifications for machine readable passports (MRPs) are presented in two sections as follows:

  Section III — Technical specifications for the security to be incorporated into the book at its time of manufacture and of personalisation, together with specifications for the security of the facilities in which such operations are carried out in addition to secure methods of auditing and issuance.
  Section IV — Technical specifications applicable to all machine readable passports.

  Both Section III and Section IV have Appendices which form part of the specifications of ICAO Doc. 9303 Part 1. If an Appendix is Normative, its contents are mandatory. If an Appendix is Informative, the contents are provided for information or as a recommendation of good practice without being mandatory.

  A separate Volume 2 of Part 1 of Document 9303 contains the additional specifications necessary for a State to issue a globally interoperable electronically enabled MRP, incorporating biometric identification.

III. TECHNICAL SPECIFICATIONS FOR THE SECURITY OF THE DESIGN, MANUFACTURE AND ISSUANCE OF MACHINE READABLE PASSPORTS

Scope

1. This section provides mandatory and optional specifications for the precautions to be taken by an issuing State to ensure that its passport, and the passport's means of personalisation to its rightful holder, are secure against fraudulent attack. Mandatory and optional specifications are also provided for the physical security to be provided at the premises where the passport is produced and personalised and for the vetting of personnel involved in these operations.

Security of the MRP and its Personalisation

2. The MRP, and its method of personalisation, shall be designed to incorporate safeguards to protect the document against fraudulent attack during its validity period. Methods of fraudulent attack can be classified as follows:

2.1 *Counterfeit* involves the creation of all or part of a document which resembles the genuine MRP with the intention that it be used as if it were genuine. Counterfeits may be produced by attempting to duplicate or simulate the genuine method of manufacture and the materials used therein or by using copying techniques.

2.2 *Fraudulent Alteration, also known as Forgery*, involves the alteration of a genuine document in an attempt to enable it to be used for travel by an unauthorised person, or to an unauthorised destination. The biographical details of the genuine holder, particularly the portrait, form the prime target for such alteration.

2.3 There are established methods of providing security against both types of fraudulent attack. These involve the use of materials which are not readily available, combined with highly specialised design systems and manufacturing processes requiring special equipment and expertise. Appendix 1 to this Section, lists some of the techniques currently known to be available to provide security to an MRP enabling an inspecting officer to detect a counterfeit or fraudulently altered document either visually or with the aid of simple equipment such as a magnifying glass or ultra violet lamp.

2.4 All MRPs that conform to ICAO Doc 9303 Part 1 shall use the specified Basic Security Features listed in Table III-A1 of the Appendix 1.

Machine Assisted Document Verification

3. An issuing State may wish to incorporate into its MRP one or more security features which

require the use of detection equipment to detect and verify its presence within the normal time for immigration clearance. Such features fall into three types as described in paragraphs 3.1 to 3.3. Doc 9303 Part 1 does not specify any feature as a means of globally interoperable machine assisted document verification as the use of a single feature world wide would make the feature highly vulnerable to fraudulent attack. The features may vary in size from less than 1 mm (0.04 in) square up to the whole area of the data page. Where the area occupied is less than the page area, this document recommends, in Appendix 10 to Section IV, preferred locations for two of the three types of feature. States are therefore free to select none or one or more machine verifiable features to assist in document verification but this feature will be for their own or agreed bilateral use.

3.1 *Substance features*. A substance feature involves the incorporation into the MRP of a material, which would not normally be present and is not obviously present on visual inspection. The presence of the material may be detected by the presence and magnitude of a suitable property of the added substance. Appendix 2 to this Section provides details of some available substances.

3.2 *Structure features.* A structure feature involves the incorporation of a measurable structure into or onto the MRP data page. The presence of the structure may be detected and measured by the detection machine. Appendix 2 gives details of some currently available structures.

3.3 *Data Features* . A data feature involves the incorporation of encoded information into the document data or image structure, usually into the personalisation data, especially the portrait. The term steganography, in this context, describes a special class of data features typically taking the form of digital information which is concealed within an image, usually either the personalisation portrait or the background security printing. The concealed image may be made visible by the use of a suitable device which could be built into a passport reader. The concealed image may contain data such as the holder's name or passport number which may be read by the immigration officer using the detector. In more complex forms the amount of stored data can be significant and this can be verified by electronic comparison with data stored in the contactless integrated circuit. Appendix 2 gives details of some currently available techniques.

Security of MRP Production and Issuance Facilities

4. The State issuing the MRP shall ensure that the premises in which the MRP is printed, bound, personalised and issued are appropriately secure and that staff employed therein have an appropriate security clearance. Appropriate security shall also be provided for MRPs in transit between facilities and from the facility to the MRP's holder. Appendix 3 to this Section provides recommendations as to how these requirements can be met.

Provision of Information on Newly Issued MRPs

5. A State launching a new design of MRP is requested to inform all other States of the details of the new MRP including evident security features, preferably providing personalised specimens for use as a reference by the receiving State's department which is responsible for verifying the authenticity of passports. The distribution of such specimens should be made to established contact points agreed by the receiving States.

Provision of Information on Lost and Stolen Passports

6. States should provide specific information on lost or stolen passports, such as passport or book numbers, to the central database operated by Interpol at the appropriate time and according to agreed procedures. This includes details of any unpersonalised MRPs which may be stolen from a production or issuance facility or in transit.

INFORMATIVE APPENDIX 1 to Section III

SECURITY STANDARDS FOR MACHINE READABLE TRAVEL DOCUMENTS

1. Scope

1.1 This Appendix provides advice on the security of machine-readable travel documents made in accordance with the specifications set out in ICAO Doc 9303 Part 1 (Machine Readable Passports), Part 2 (Machine Readable Visas) and Part 3 (Machine Readable Size 1 and Size 2 Official Travel Documents). The recommendations cover the security of the materials used in the document's construction, the security printing and copy protection techniques to be employed and the processes used in the production of document blanks as well as the security considerations that apply to the imaging and finishing processes involved in personalisation and the protection of the biographical data in the document. Those States not yet issuing machine-readable travel documents shall also consider this Appendix.

2. Introduction

2.1 Historically, Doc 9303 has not made recommendations on the specific security features to be incorporated in travel documents. Each Issuing State has been free to incorporate such safeguards as it deemed appropriate to protect its nationally issued travel documents against counterfeiting, forgery and other forms of attack, with the proviso that nothing was included which would adversely affect their OCR machine-readability.

2.2 The growth in international crime and illegal immigration have led to increasing concerns over the security of travel documents and what may be done to help improve their resistance to attack or misuse.

2.3 With this objective in mind, ICAO decided it would be desirable to publish a set of recommended minimum security standards as a guideline for all States issuing machine-readable travel documents. This Appendix describes security measures to be taken within the structure of the MRP and of the premises in which it is produced. Appendix 2 describes the security measures to be taken to ensure the security of the personalisation operations and of the documents in transit. Appendix 3 describes optional means of achieving machine assisted document verification.

2.4 This Appendix identifies the security threats to which travel documents are frequently exposed and the counter-measures that may be employed to protect these documents and their associated personalisation systems. The lists of security features and/or techniques offering protection against these threats have been sub-divided into, i) basic security features and/or techniques considered essential and; ii) additional features and/or techniques from which States are encouraged to select items which are recommended for providing an enhanced level of security. This approach recognises that a feature or technique that may be necessary to protect one State's documents may be superfluous or of minor importance to another State using different production systems and vice versa. A targeted approach that allows States flexibility to choose from different document systems (paper-based documents, plastic cards etc.) and a

combination of security features and/or techniques most appropriate to their particular needs is therefore preferred to a "one size fits all" philosophy. However, to help ensure that a balanced set of security features and/or techniques is chosen, it is necessary for each State to conduct a risk assessment of its national travel documents to identify their most vulnerable aspects and select the additional features and/or techniques that best address these specific problems.

2.5 The aim of the recommendations in this Appendix is to improve the security of machine-readable travel documents worldwide by establishing a baseline for Issuing States. Nothing within these recommendations shall prevent or hinder States from implementing other, more advanced security features, at their discretion, to achieve a standard of security in excess of the minimum recommended features and techniques set forth in this Appendix.

2.6 A glossary of technical terms has been included with this Appendix in paragraph 8.

2.7 A summary table of typical security threats relating to travel documents and some of the security features and techniques that can help to protect against these threats is included.

3. Basic principles

3.1 Production of passport books and travel documents, including the personalisation processes, should be undertaken in a secure, controlled environment with appropriate security measures in place to protect the premises against unauthorised access. If the personalisation process is decentralised, or if personalisation is carried out in a location geographically separated from where the travel document blanks are made, appropriate precautions should be taken when transporting the blank documents and any associated security materials to safeguard their security in transit.

3.2 There should be full accountability over all the security materials used in the production of good and spoiled travel documents and a full reconciliation at each stage of the production process with records maintained to account for all material usage. The audit trail should be to a sufficient level of detail to account for every unit of material used in the production and should be independently audited by persons who are not directly involved in the production. Certified records should be kept of the destruction of all security waste material and spoiled documents.

3.3 Materials used in the production of travel documents should be of controlled varieties and obtained only from bona fide security materials suppliers. Materials whose use is restricted to high security applications should be used and materials that are available to the public on the open market should be avoided.

3.4 Sole dependence upon the use of publicly available graphics design software packages for originating the security backgrounds should be avoided. These software packages may however be used in conjunction with specialist security design software.

3.5 Security features and/or techniques should be included in travel documents to protect against unauthorised reproduction, alteration and other forms of tampering, including the removal and substitution of pages in the passport book, especially the biographical data page. In addition to those features included to protect blank documents from counterfeiting and forgery, special attention must be given to protect the

biographical data from removal or alteration. A travel document should include adequate security features and/or techniques to make evident any attempt to tamper with it.

3.6 The combination of security features, materials and techniques must be well chosen to ensure full compatibility and protection for the lifetime of the document.

3.7 Although this Appendix deals mainly with security features that help to protect travel documents from counterfeiting and fraudulent alteration, there is another class of security features that are covert (secret) features, designed to be authenticated either by forensic examination or by specialist verification equipment. It is evident that knowledge of the precise substance and structure of such features should be restricted to very few people on a "need to know" basis. The purpose of these features is not to prevent counterfeiting but to enable authentication of documents where unequivocal proof of authenticity is a requirement (eg in a Court of Law). All travel documents should contain at least one covert security feature as a basic feature.

4. Main threats to security of travel documents

4.1 The following list of threats to document security, which is in no particular order of importance, identifies ways in which the document, its issuance and use may be fraudulently attacked.

- Counterfeiting a complete travel document
- Photo-substitution
- Deletion/alteration of text in the visual or machine readable zone of the biographical data page
- The construction of a fraudulent document, or parts thereof, using materials from legitimate documents
- Removal and substitution of entire page(s) or visas
- Deletion of entries on visa pages and the Observations Page
- Theft of genuine document blanks
- Impostors (assumed identity; altered appearance)

4.2 To provide protection against these threats and others a travel document requires a range of security features and techniques combined in an appropriate way within the document. Although some features can offer protection against more than one type of threat, no single feature can offer protection against them all. Likewise, no security feature is 100% effective in eliminating any one category of threat. The best protection is obtained from a balanced set of features and techniques providing multiple layers of security in the document that combine to deter or defeat fraudulent attack.

5. Security Features and Techniques

In the sections that follow, security features, techniques and other security measures are categorised according to the phases passed through during the production and personalisation processes and the components of the travel document created thereby with regard to, i) substrate materials; ii) security printing; iii) protection against copying; and iv) personalisation techniques. Issuing States are recommended to incorporate all of the basic features/measures and to select a number of additional features/measures from the list having first completed a full risk assessment of their travel documents. Unless otherwise indicated, the security features may be assumed to apply to all parts of a travel document and to all the interior pages of a passport, comprising the biographical data page, end leaves and visa pages. Care must be taken to ensure that features do not interfere with the machine readability of the travel document.

5.1 ***Substrate Materials***

5.1.1 Paper forming the pages of a travel document:

Basic features:

- UV dull paper, or a substrate with a controlled response to UV, such that when illuminated by UV light it exhibits a fluorescence distinguishable in colour from the blue used in commonly available fluorescent materials.
- Watermark comprising two or more grey levels in the biographical data page and visa pages.
- Appropriate chemical sensitisers in the paper, at least for the biographical data page (if compatible with the personalisation technique).
- Paper with appropriate absorbency and roughness.

Additional features:

- Watermark in register with printed design.
- Invisible fluorescent fibres and/or planchettes.
- Visible (fluorescent) fibres* and/or planchettes*.
- Security thread (embedded or window)*.

5.1.2 Paper or other substrate in the form of a label used as the biographical data page of a travel document:

Basic features:

---

* The use of these features must not interfere with machine-readability of the document in the B-900 band of the spectrum or with the legibility of the portrait, signature or other biographical data in the visual zone.

– UV dull paper, or a substrate with a controlled response to UV, such that when illuminated by UV light it exhibits a fluorescence distinguishable in colour from the blue used in commonly available fluorescent materials.

– Appropriate chemical sensitisers in the paper (not normally possible in a plastic label substrate).

– Invisible fluorescent fibres and planchettes.

– Visible (fluorescent) fibres* and/or planchettes*.

– A system of adhesives and/or other characteristics that prevents the label from being removed without causing clearly visible damage to the label and to any laminates or overlays used in conjunction with it*.

Additional features:

– Security thread, which may be either embedded or partially embedded and may include special effects such as thermochromic, photochromic or magnetic properties*.

A watermark need not be used in the paper of a data page in paper label form.

5.1.3 Security aspects of paper forming the inside cover of a passport book:

- Paper used to form the inside cover of a passport book need not have a watermark. However, if an inside cover is used as a biographical data page, alternative measures must be employed to achieve a significant level of security.

- Where an inside cover is used as a biographical data page and if compatible with the personalisation technique, the paper forming the inside cover should contain appropriate chemical sensitisers.

Plastic substrates:

- Where the substrate used for the biographical data page (or inserted label) of a passport book, or MRTD card is formed entirely of plastic, it is not usually possible to incorporate many of the security components described in paragraphs 5.1.1 through 5.1.3 above. In such cases additional security properties shall be included, including additional security printed features, enhanced personalisation techniques and/or the use of optically variable features over and above the recommendations contained in paragraphs 5.2 to 5.5.4.

* The use of these features must not interfere with machine-readability of the document in the B-900 band of the spectrum or with the legibility of the portrait, signature or other biographical data in the visual zone.

5.2 ***Security Printing***

5.2.1 Background and text printing:

Basic features:

- Two-colour guilloche security background design pattern*.
- Rainbow printing.
- Anti-scan pattern.
- Microprinted text.
- Security background of the biographical data page printed in a design that is different from that of the visa pages or other pages of the document

Additional features:

- Single or multi-colour intaglio printing comprising a "black-line white-line" design on one or more of the end leaves or visa pages.
- Latent (intaglio) image.
- Duplex security pattern.
- Relief (3-D) design feature.
- Front to back (see-through) register feature.
- Deliberate error (e.g. spelling) incorporated within microprint.
- Every visa page printed with a different security background design.
- Tactile feature.

5.2.2 Inks:

Basic features:

- UV fluorescent ink (visible or invisible) on the biographical data page and all visa pages.

---

* Where the guilloche pattern has been computer-generated, the image reproduced on the document must be such that no evidence of a pixel structure shall be detectable. Guilloches may be displayed as positive images, where the image lines appear printed with white spaces between them, or as negative images, where the image lines appear in white, with the spaces between them printed. A two-colour guilloche is a design that incorporates guilloche patterns created by superimposing two elements of the guilloche, reproduced in contrasting colours.

– Reactive inks, where the substrate of the document pages or of a label is paper, at least for the biographical data page (if compatible with the personalisation technique).

Additional features:

– Inks with optically variable properties.

– Metallic inks.

– Penetrating numbering inks.

– Metameric inks.

– Infra-red drop-out inks.

– Thermochromic inks.

– Photochromic inks.

– Infra-red fluorescent inks.

– Phosphorescent inks.

– Tagged inks .

5.2.3 Numbering:

- A number unique to the document should appear on all pages inside the passport, with the exception of the inside cover pages (unless used for biographical data) and on the biographical data face of an MRTD card or visa.

- The number in a passport shall be either printed or perforated. When it is printed it should ideally be in a special style of figures or typeface and be printed with an ink that fluoresces under ultra violet light in addition to having a visible colour.

- The number on a label used as a biographical data page in a passport, or as a visa, shall be in a special style of figures or typeface and be printed with an ink that fluoresces under ultra violet light in addition to having a visible colour.

- The number on a card used for the biographical data of a passport or on an MRTD card can alternatively be incorporated using the same technique as is used for applying the biographical data.

5.2.4 Special security measures for use with non-laminated biographical data pages:

- If a label or a page of a passport is used for biographical data that is not protected by a laminate film or an overlay (see paragraphs 5.3.2, 5.4.3 and 5.4.4), additional protection shall be provided by the use of intaglio printing incorporating a latent image and microprinting and preferably utilising a colour shifting ink (e.g. Ink with optically variable properties.)

5.2.5 Special security measures for use with plastic cards:

- Where a travel document is constructed entirely of plastic, optically variable security features shall be employed which give a changing appearance with angle of viewing. Such devices may take the form of latent images, lenticular features, colour-shifting ink, or diffractive optically variable image features.

5.3 ***Protection against copying***

5.3.1 Need for anticopy protection:

- The current state of development of generally available digital reproduction techniques and the resulting potential for fraud means that high-grade security features in the form of optically variable features or other equivalent devices will be required as safeguards against copying and scanning. Emphasis should be placed on the security of the biographical data page of a passport book, travel card or visa, based on an independent, complex optically variable feature technology or other equivalent devices complementing other security techniques.

- Appropriate integration of optically variable feature components or other equivalent devices into the layered structure of the biographical data page should also protect the data from fraudulent alteration. The optically variable components and all associated security materials used to create the layered structure must also be protected against counterfeiting.

5.3.2 Anticopy protection methods:

- Subject to the minimum recommendations described in paragraphs 5.4.3 and 5.4.4 on the need for lamination, optically variable features should be used on the biographical data page of a passport book, travel card or visa as a *basic feature*:

- Where a biographical data page of a passport book, travel card or visa is protected by a laminate film or overlay, an optically variable feature (preferably based on diffractive structure) should be integrated into the page. Such a feature should not affect the legibility of the entered data.

- Where the biographical data page is a paper label or a page in a passport with no overlay or laminate protection, an optically variable feature (preferably based on diffractive structure) with intaglio overprinting or other printing technique shall be used.

- Where the machine-readable page of a passport book is made entirely of plastic, or where the travel document is itself a plastic card, an optically variable feature should be

incorporated. The inclusion of a diffractive optically variable feature is recommended to achieve an enhanced level of protection against reproduction.

- Devices offering equivalent protection may be used in place of an optically variable feature.

5.4 ***Personalisation technique***

5.4.1 Document Personalisation:

- This is the process by which the portrait, signature and/or other biographical data relating to the holder of the document is applied to the travel document. This data records the personalised details of the holder and is at the greatest risk of fraudulent alteration. One of the most frequent types of document fraud involves the removal of the portrait image from a stolen or illegally obtained travel document and its replacement with the portrait of a different person. Documents with stick-in portrait photographs are particularly susceptible to photo-substitution. Therefore, this method is not recommended.

5.4.2 Protection against alteration:

- To ensure that data are properly secured against attempts at forgery, it is necessary to integrate the biographical data, including the portrait, signature (if it is included on the biographical data page) and main issue data, into the basic material of the document. A variety of technologies are available for imaging the document in this way, including the following, which are listed in no particular order of importance:

– Electro-photographic printing.

– Thermal transfer printing.

– Ink-jet printing .

– Photographic processes.

– Laser engraving.

The same imaging technologies may also be used to apply data to the observations page of the passport.

5.4.3 Choice of document system:

- The choice of a particular technology is a matter for individual Issuing States and will depend upon a number of factors, such as the volume of travel documents to be produced, the construction of the document and whether it is to be personalised during the document or passport book-making process or after the document or book has been assembled. Whichever method is chosen, it is essential that precautions be taken to protect the personalised details against tampering. This is important because, even though eliminating the stick-in portrait reduces the risk of photo-substitution, the unprotected biographical data

remains vulnerable to alteration and needs to be protected, either by the application of a heat-sealed (or equivalent) laminate, or by a heat-transferred, thin film overlay. Exceptionally, where the imaging technology and the substrate material have been specifically designed to provide equivalent or better protection against tampering (e.g. laser engraving onto plastic, ink-jet printing on security paper using an ink with a high resistance to removal by solvents and mechanical erasure), a laminate or overlay may be dispensed with, at the discretion of the Issuing State provided that this does not result in a reduction in overall security.

5.4.4 Protection against photo-substitution and alteration of data on the biographical data page of a passport book, travel card or visa:

Basic features:

– Imaging the portrait and all biographical data by integration into the basic material.

– Security background guilloche overlapping the portrait area.

– Heat-sealed (or equivalent) laminate or overlay or an imaging technology and substrate material that provide an equivalent resistance to substitution of the portrait and other biographical data (e.g. laser engraved plastic, ink-jet printing on security paper).

Additional features:

– An optically variable feature superimposed on (but not rendering illegible) the portrait.

– Digital signatures incorporated in the document.

– Embedded steganographic images incorporated in the document.

– Secondary portrait image of holder.

– Duplicate information in a machine-readable form in one of the optional data capacity expansion technologies.

– Machine-verifiable biometric feature.

5.5 ***Additional security measures for passport books***

5.5.1 Position of the Biographical Data Page:

- ICAO Doc 9303 Part 1 recommends that States should place the data page on an inside page. When the data page is situated on the inside cover of a MRP, the normal method of construction used in the manufacture of passport covers has facilitated fraudulent attacks on the data page, typically photo-substitution or whole page substitution. However, an issuing State may place the data page on a cover provided that it ensures that the construction of the cover used in its passport offers a similar level of security

against all types of fraudulent attack to that offered by locating the data page on an inside page.

5.5.2 Whole-page substitution:

- Issuing States' attention is drawn to the fact that with integrated biographical data pages replacing stick-in photographs in passports, some cases of whole-page substitution have been noted in which the entire biographical data page of the passport has been removed and substituted with a fraudulent one. Although whole-page substitution is generally more difficult to effect than photo-substitution of a stick-in photo, nevertheless, it is important that the following recommendations are adopted to help in combatting this category of risk. As with all other categories of document fraud it is better to employ a combination of security features to protect against whole-page substitution rather than relying on a single feature which, if compromised, could undermine the security of the whole travel document.

5.5.3 Biographical data whole-page substitution:

Basic features:

– Thread sewing with back-sewn lock stitch or an alternative binding technique with equivalent resistance to unpicking.

– Security background of the biographical data page printed in a design that is different from that of the visa pages.

Additional features:

– Multi-colour and/or fluorescent sewing thread.

– Biographical data page to be an integral, bound-in, page of the passport book or an insert encapsulated between two bound-in sheets of laminate. Where self-adhesive labels are used for the biographical data page additional security requirements as described in paragraphs 5.1.2 and 5.2.4 are advised including linking the label to the passport book by the passport number.

– Programmable thread-sewing pattern.

5.5.4 Visa page whole-page substitution:

Basic feature:

– Thread sewing with back-sewn lock stitch or an alternative binding technique with equivalent resistance to unpicking.

Additional features:

– Page numbers integrated into security background design on every visa page.

– Index or collation marks printed on the fore-edge of every visa page.

– Passport serial number on every visa page (perforated or printed in a non-standard type font).

5.5.5 Deletion of stamps and removal of labels from passports, including the removal of data from the Observations Page.

- This section relates to the deletion of ink stamps and the removal of visa labels applied to the visa page of a passport book. This type of fraud may be carried out to remove evidence from a travel document or to transfer a visa label to another passport book.

Basic features:

– Reactive inks
– Chemical sensitisers in the paper
– High-tack, non-peelable adhesives (for labels)
– Permanent, non-fading inks (for stamps)

Additional features:

– Over-lamination or overlays on stamps and labels
– Visa page paper with appropriate absorbency and surface characteristics
– Frangible substrate (for labels)

5.6 ***Quality control***

Quality checks and controls at all stages of the production process and from one batch to the next are essential to maintain consistency in the finished travel document. This should include QA checks on all materials used in the manufacture of the documents and the readability of the machine-readable lines. The importance of consistency in the finished travel document is paramount because Immigration Inspectors and Border Control Officers rely upon being able to recognise fake documents from variations in their appearance or characteristics. If there are variations in the quality, appearance or characteristics of a State's genuine travel documents, detection of counterfeit or forged documents is made more difficult.

5.7 ***Security Control of production and product***

A major threat to the security of the MRP of an issuing State can come from the unauthorised removal from the production facility of genuine finished but unpersonalised MRPs or the components from which MRPs can be made.

5.7.1 *Protection against theft and abuse of genuine document blanks or document components*:
Blank

documents should be stored in locked and appropriately supervised premises. The following measures should be adopted:

Basic measures:

- Good physical security of the premises with controlled access to delivery/shipment and production areas, and document storage facilitiest.
- Full audit trail, with counting and reconciliation of all materials (used, unused, defective or spoiled) and certified records of same.
- All document blanks, and other security-sensitive components, serially numbered with full audit trail for every document from manufacture to dispatch.
- Where applicable, tracking and control numbers of other principal document components (e.g., rolls or sheets of laminates, optically variable feature devices, etc.).
- Secure transport vehicles for movement of blank passports and other principal document components (if applicable).
- Details of all lost and stolen travel document blanks to be rapidly circulated between governments.
- Appropriate controls to be in place to protect the production systems from internal fraud.

Additional measures:

- CCTV coverage/recording of all production areas, where permitted .

6. Glossary of terms

The glossary of terms in this document is included to assist the reader with understanding the general meanings of such terms within the context of this document. This glossary is not intended to be authoritative or definitive.

Anti-scan pattern: An image usually constructed of fine lines at varying angular displacement and embedded in the security background design. When viewed normally, the image cannot be distinguished from the remainder of the background security print but when the original is scanned or photocopied the embedded image becomes visible.

Biographical data (biodata): The personalised details of the Bearer of the document appearing as text in the Visual and Machine Readable Zones on the biographical data page of a passport book, or on a travel card or visa.

Black-line white-line design: A design made up of fine lines often in the form of a guilloche pattern and

sometimes used as a border to a security document. The pattern migrates from a positive to a negative image as it progresses across the page.

Chemical sensitisers: Security reagents to guard against attempts at tampering by chemical erasure, such that irreversible colours develop when bleach and solvents come into contact with the document.

Counterfeit: An unauthorised copy or reproduction of a genuine security document made by whatever means.

Document blanks: A document blank is a travel document that does not contain the biographical data and personalised details of a document holder. Typically, document blanks are the base stock from which personalised travel documents are created.

Digital signature: A method of securing and validating information by electronic means.

Duplex design: A design made up of an interlocking pattern of small irregular shapes, printed in two or more colours and requiring very close register printing in order to preserve the integrity of the image.

Embedded image: An image or information encoded or concealed within a primary visual image.

Fibres: Small, thread-like particles embedded in a substrate during manufacture.

Fluorescent ink: Ink containing material that glows when exposed to light at a specific wavelength (usually UV) and that, unlike phosphorescent material ceases to glow immediately after the illuminating light source has been extinguished.

Forgery: Fraudulent alteration of any part of the genuine document e.g. changes to the biographical data or the portrait.

Front-to-back (see-through) register: A design printed on both sides of the document or an inner page of the document which when the page is viewed by transmitted light forms an interlocking image.

Guilloche design: A pattern of continuous fine lines, usually computer generated, and forming a unique image that can only be accurately re-originated by access to the equipment, software and parameters used in creating the original design.

Heat-sealed laminate: A laminate designed to be bonded to the biographical data page of a passport book, or to a travel card or visa by the application of heat and pressure.

Impostor: A person who applies for and obtains a document by assuming a false name and identity, or a person who alters his or her physical appearance to represent himself or herself as another person for the purpose of using that person's document.

Infra-red drop-out ink: An ink which forms a visible image when illuminated with light in the visible part of the spectrum and which cannot be detected in the infra-red region.

Intaglio: A printing process used in the production of security documents in which high printing pressure

and special inks are used to create a relief image with tactile feel on the surface of the document.

Laminate: A clear material, which may have security features such as optically variable properties, designed to be securely bonded to the biographical data or other page of the document.

Laser engraving: A process whereby images (usually personalised images) are created by 'burning' them into the substrate with a laser. The images may consist of both text, portraits and other security features and are of machine-readable quality.

Laser-perforation: A process whereby images (usually personalised images) are created by perforating the substrate with a laser. The images may consist of both text and portrait images and appear as positive images when viewed in reflected light and as negative images when viewed in transmitted light.

Latent image: A hidden image formed within a relief image which is composed of line structures which vary in direction and profile resulting in the hidden image appearing at predetermined viewing angles, most commonly achieved by intaglio printing.

Machine-verifiable biometrics feature: A unique physical personal identification feature (e.g. an iris pattern, fingerprint or facial characteristics) stored on a travel document in a form that can be read and verified by machine.

Metallic ink: Ink exhibiting a metallic-like appearance.

Metameric inks: A pair of inks formulated to appear to be the same colour when viewed under specified conditions, normally daylight illumination, but which are a mis-match at other wavelengths.

Micro-printed text: Very small text printed in positive and or negative form, which can only be read with the aid of a magnifying glass.

Optically variable feature (OVF): An image or feature whose appearance in colour and/or design changes dependent upon the angle of viewing or illumination. Examples are: features including diffraction structures with high resolution (Diffractive Optically Variable Image Device/DOVID), holograms, colour shifting inks (e.g. ink with optically variable properties) and other diffractive or reflective materials.

Optional data capacity expansion technologies: Data storage devices (e.g. 2-D barcodes, integrated circuit chips, etc.) that may be added to a travel document to increase the amount of machine-readable data stored in the document. See Doc 9303 Part 1 Volume 2 for guidance on the use of these technologies.

Overlay: An ultra-thin film or protective coating that may be applied to the surface of a biographical data or other page of a document in place of a laminate.

Penetrating numbering ink: Ink containing a component, which penetrates deep into a substrate.

Personalisation: The process by which the portrait, signature and biographical data are applied to the document.

Phosphorescent ink: Ink containing a pigment, which glows when exposed to light of a specific wavelength, the reactive glow remaining visible and then decaying after the light source is removed.

Photochromic ink: An ink, which undergoes a reversible colour change when exposed to UV light.

Photo-substitution: A type of forgery in which the portrait in a document is substituted for a different one after the document has been issued.

Physical security: The range of security measures applied within the production environment to prevent theft and unauthorised access to the process.

Planchettes: Small visible (fluorescent) or invisible fluorescent platelets incorporated into a document material at the time of its manufacture.

Rainbow (split-duct) printing: A technique whereby two or more colours of ink are printed simultaneously by the same unit on a press to create a controlled merging of the colours similar to the effect seen in a rainbow.

Reactive inks: Inks that contain security reagents to guard against attempts at tampering by chemical erasure (deletion), such that a detectable reaction occurs when bleach and solvents come into contact with the document.

Relief (3-D) design (Medallion): A security background design incorporating an image generated in such a way as to create the illusion that it is embossed or debossed on the substrate surface.

Secondary image: A repeat image of the holder's portrait reproduced elsewhere in the document by whatever means.

Security thread: A thin strip of plastic or other material embedded or partially embedded in the substrate during the paper manufacturing process. The strip may be metallised or partially de-metallised.

Tactile feature: A surface feature giving a distinctive “feel” to the document.

Tagged ink: Inks containing compounds that are not naturally occurring substances and which can be detected using special equipment.

Thermochromic ink: An ink which undergoes a reversible colour change when the printed image is exposed to heat (e.g. body heat).

UV: Ultra violet light.

UV dull substrate: A substrate that exhibits no visibly detectable fluorescence when illuminated with UV light.

Variable laser image: Feature generated by laser engraving or laser perforation displaying changing information or images dependent upon the viewing angle.

Watermark: A custom design, typically containing tonal gradation, formed in the paper or other substrate during its manufacture, created by the displacement of materials therein, traditionally viewable by transmitted light.

Summary of Security Recommendations		
Threats	**Basic features**	**Additional features**
Counterfeiting:		
Paper substrates (5.1.1):	Controlled UV response Two-tone watermark Chemical sensitisers Appropriate absorbency and surface characteristics	Registered watermark Invisible UV fibres/planchettes Visible UV fibres/planchettes Embedded or window thread
Label substrates (5.1.2):	Controlled UV response Chemical sensitisers Invisible UV fibres/planchettes Visible UV fibres/planchettes Non-peelable adhesive	Embedded or window thread
Plastic/synthetic substrates (5.1.4):	As per paper or substitute security features providing an equivalent level of security in plastic	Optically variable feature(OVF)
Security printing (5.2):	Two-colour guilloche background Rainbow printing Anti-scan pattern Microprinting Unique biodata page design	Intaglio printing Latent image Duplex pattern 3-D design feature Front-to-back register feature Deliberate error in microprint Unique design on every page Tactile feature
Numbering (5.2.3):	Unique document number	Perforated document number Special typefonts
Inks (5.2.2):	UV inks on all pages Reactive inks	Optically variable properties Metallic inks Penetrating numbering ink Metameric inks Infrared dropout ink Thermochromic ink Photochromic ink Infrared fluorescent ink Phosphorescent ink Tagged ink

Summary of Security Recommendations		
Threats	**Basic features**	**Additional features**
Photo-substitution (5.4.4):	Integrated biodata page Guilloche overlapping portrait Secure laminate or equivalent	OVF over the portrait Digital signature in document Embedded image Secondary portrait image Storage and retrieval system for digital portrait images Biometric feature
Alteration of the biodata (5.4.4):	Reactive inks Secure laminate or equivalent	Chemical sensitisers in substrate Secondary biodata image OVF over the biodata
Page substitution (5.5.3/4):	Lock stitch or equivalent Unique biodata page design	Programmable sewing pattern Fluorescent sewing thread Serial number on every page Page folio numbers in guilloche Index marks on every page Biodata on inside page
Deletion/removal of stamps and labels (5.5.5):	Reactive inks Chemical sensitisers High-tack adhesives (labels) Permanent inks (stamps)	Over-lamination High absorbency substrates Frangible substrate (labels)
Document theft (7.1/2):	Good physical security arrangements Control of all security components Serial numbers on blank documents Secure transport of blank documents Internal fraud protection system International exchange on lost and stolen documents	CCTV in production areas Centralised production Digital signature Embedded image

Notes.–

Issuing States and Organisations are recommended to include all of the Basic features and to select from the additional features those that are best suited to their particular documents and issuing systems after conducting an assessment of the risks to which their documents are most susceptible.

The descriptions in the table above are necessarily abbreviated from the main text. For ease of reference the relevant sections of the Appendix are referenced by the paragraph numbers in

parentheses in the 'threats' column of the above table.

Certain of the features are repeated one or more times in the table. This indicates that the particular feature protects against more than one type of threat. It is only necessary to include these features once within any particular document.

INFORMATIVE APPENDIX 2 TO SECTION III

MACHINE-ASSISTED DOCUMENT SECURITY VERIFICATION

Note: ICAO Doc 9303 does not specify a machine assisted verification method that is globally interoperable. The reliance on a single feature to verify authenticity runs a high risk of being compromised. States should be aware of this risk should they choose to use a machine assisted feature for their own purposes in their MRP.

1. **Scope**

1.1 This Annex indicates machine verifiable security features that a State may optionally use for its own purposes as an aid to the authentication of a travel document, i.e. that help confirm its authenticity as a genuine document made from genuine materials. Features based on the detection of the presence of a substance or of a particular structure at a particular place in the MRP are included, where the means of detection is built into the reader. Features which involve the accessing of data stored on a microchip are excluded as they are considered in Doc 9303 Part 1 Volume 2

2. **Types of Machine Assisted Document Verification Features**

2.1 Doc 9303 distinguishes three main categories of machine-verifiable security features. These are described below along with examples of security features that are capable of machine verification. This Appendix only describes features that can be verified by detection equipment built into the MRP reader during the normal reading process.

2.1.1 *Structure feature:* A structure feature is a security feature containing some form of verifiable information based on the physical construction of the feature. Examples include:

The interference characteristic of a hologram or other optically variable device that can be uniquely identified by a suitable reader.
Retro-reflective images embedded within a security laminate.
Controlled transmission of light through selective areas of the substrate.

2.1.2 *Substance feature*: A substance feature involves the identification of a defined characteristic of a substance used in the construction of the feature. Examples include:

The use of pigments, usually in inks, which respond in specific and unusual ways to specific wavelengths of light (which may include infra red or ultra violet light) or have magnetic or electromagnetic properties.
The incorporation into a component of the data page of materials, e.g. fibres or planchettes whose individual size or size distribution conform to a predetermined specification

2.1.3 *Data feature*: The visible image of the MRP data page may contain concealed information which may be detected by a suitable device built into the reader. The concealed information may be in the security printed image but it is more usually incorporated into the personalisation data especially the portrait. Inserting the concealed information to the MRP data page may involve the application of substance and or structure features in a way which achieves several levels of security. The information may be decoded by a suitable device built into a whole page reader set to look for the feature in a specific location. The

information might, for example, be the passport number. The reader could then be programmed to compare the passport number detected from the feature with the passport number appearing in the MRZ. Such a comparison involves no access to any data stored on the optional microchip described in Volume 2 of Doc 9303 Part 1. Examples of this type of feature are:

Encoded data stored on the document in magnetic media such as special security threads.
Designs incorporating the concealed data which only becomes detectable when viewed using a specific wavelength of light, optical filters, or a specific image processing software.

2.2 All three types of feature, structure, substance and data features may be incorporated in travel documents and verified with suitably designed readers. Readers are now becoming available that can detect such features and use the responses to confirm the authenticity of the document.

2.3 Machine assisted document security verification uses automated inspection technology to assist in verifying the authenticity of a travel document. It should not be used in isolation to determine proof of authenticity, but when used in combination with visible document security features the technology provides the examiner with a powerful new tool to assist in verifying travel documents.

2.4 Machine assisted document security verification features, are optional data elements that may be included on the MRP at the discretion of the Issuing Authority. Appendix 10 to Section IV of Doc 9303 Part 1 Volume 1 provides guidance on the positions these features should occupy to facilitate interoperability. However, at present there are no specifications for the functionality or performance of any of these features and hence their use is currently restricted to national use and between Issuing States by bilateral agreement.

SECTION III INFORMATIVE APPENDIX 3

THE PREVENTION OF FRAUD ASSOCIATED WITH THE ISSUANCE PROCESS

Note: This Appendix is a summary of two papers prepared by Mr John Hotchner of the US State Department. It is recommended that issuing States read the full papers which are available on the ICAO MRTD web site.

Scope

1. This Appendix describes the fraud risks associated with the process of passport application and issuance. These risks are a consequence of the benefits that can accrue from the possession of a passport which can be used to confirm identity and also citizenship of the issuing State. The Appendix recommends precautions that an issuing State can take to prevent such fraud.

Fraud and its prevention

2. Fraud perpetrated as part of the issuance process can be divided into several major types:

A. Theft of genuine blank passports and completion to make them look valid.
B Applying for the passport in a false identity using genuine evidence of nationality and/or identity stolen from another individual, or obtained improperly.
C. Applying for the passport in a false identity using manufactured false evidence of nationality and/or identity.
D. Applying for multiple passports so that a traveler can hide previous suspicious travel evidenced by visas and entry and departure stamps from border officials .
E. Using falsely declared or undeclared lost and stolen passports that can be provided to people who might use them in look-alike fraud or with repetitive photo switches.
F. Reliance on passport employees to manipulate the passport system to issue a passport outside the rules.

2.1 There are two additional categories in which the applicant applies in their real identity but with the intention to be complicit in the later fraudulent use of their passport by:

G. Altering a genuinely issued document to make it fit a bearer who is not the person to whom the passport was issued.
H. Applying for a passport with the intention of giving or selling it to someone not entitled who resembles the true bearer.

3. To combat the above mentioned threats, it is desirable for the passport authority of the issuing State to undertake the following measures, this including ensuring that adequate funding is available for their implementation:

3.1 A suitably qualified person should be appointed to be Head of Security directly responsible to the Chief Executive Officer of the issuing authority. The Head of Security should be responsible for ensuring that security procedures are laid down, observed and updated as necessary.

3.2 In each location where passports are issued there should be a designated Security Manager. The Security Manager should be responsible for the implementation and updating of the security procedures and report directly to the Head of Security.

3.3 Vetting procedures should be established to ensure that all staff are only recruited after searches have verified their identity, ensured that they have no criminal record, and that their financial position is sound. Regular follow-up checks should also be made to detect staff whose changed circumstances mean they may be tempted to succumb to fraudulent activity.

3.4 All staff within the passport authority should be encouraged to have a positive attitude to security matters. There should be a system of rewards for any staff member who reports matters that prevent fraud.

3.5 Controls should be established that provide an account of key components such as blank books and security laminates. Such items should each bear a unique serial number and should be kept locked in suitable secure storage. Only the required number should be issued at the start of each working day or shift. The counting of the items should be done and the figures agreed by two members of staff who should also record the unique numbers of the items. The person to whom they are issued must account for all items at the end of the shift either in the form of personalised books or defective product. All items should be returned to the secure store at the end of the working period, again being counted by two people and the unique numbers logged. The records should be kept at least for the life of the issued passports.

3.6 Defective product or materials should be destroyed under controlled conditions and the unique numbers recorded.

3.7 The issuance process should be divided into discrete operations that are carried out in separate locations within the facility. The purpose is to ensure that no one person can carry out the whole issuance process without venturing into one or more areas that the person has no authorisation to enter.

4 The following procedures are recommended to prevent the issue of a genuine passport as a result of receipt of a fraudulent application. Again full implementation would require adequate funding.

4.1 The passport office should appoint an appropriate number of Anti-Fraud Specialists (AFS) who have received a high level of training in the detection of all types of fraud used in passport application. There should be at least one AFS present in each location in which passport applications and applicants are processed. The AFS should be immediately available to support those whose task it is to process applications (Authorising Officers {AO}) and thus to provide assistance in dealing with any suspicious application. The AFS personnel should regularly provide training to AO's to increase their awareness of potential fraud risks.

4.2 The passport issuing authority should establish close liaisons with the issuers of breeder documents such as birth, marriage and death certificates and driving licences. The State should ensure that the Department holding records of births marriages and deaths are reconciled and the data stored in a database secure acce to which should be available to the passport office. This facilitates rapid verification that submitted breeder documents are genuine and that an application is not being made, for example, in the name of a deceased person.

4.3 An applicant for a passport, who has not held one before, should be required to attend at a passport office bringing supporting breeder documentation for an interview with an AO, supported, where necessary, by an AFS.

4.4 The procedure specified in 4.3 may also be used to process applications for a passport to replace an expiring one. Alternatively, provided the passport office has an adequate database of personal information, including portraits, a replacement application may be processed by submission of the documentation, including a new portrait. In such cases it is desirable that the application and new portrait are endorsed by a responsible person such as a doctor or priest. The return of the expiring passport with the new application should be required.

4.5 The passport office should initiate procedures that would prevent the fraudulent issue of more than one passport to an individual who may have attempted to assume more than one identity. Computer database checks of stored portraits using facial recognition and, where available, fingerprints can assist in this process.

4.6 A staff member of the passport office should be prohibited from taking any part in the processing of the application or issuing of a passport to a family member or close friend. Procedures in the passport office should prevent an applicant selecting the AO with whom to deal. Equally the work flow should be such as to prevent any employee selecting which applications he or she is to process.

4.7 The issue of a passport to a young child should require the attendance at the passport office of preferably both parents and of the child. This is to prevent the risk of child smuggling or the removal of a child by one parent.

4.8 The replacement of a passport claimed to be lost or stolen should only be made after exhaustive checks including a face to face interview with the applicant.

4.9 It is recommended that details, particularly document numbers, of lost and stolen passports are provided to the database operated by Interpol. This database is available to all participating countries and can be used in the development of watch lists.

5. A State should consider the merits of issuing all passports from one or at most two centres. This reduces the number of places where blank documents and other secure components are stored. The control of such a central facility can be much tighter than is possible at each of many issuing centres. If central issuance is adopted, provision of centres where applicant can attend for interview is required. Also, standard passports cannot be issued instantly, so a system must be established for the issue of any emergency passports required urgently following, for example, the death of a relative abroad .

IV. TECHNICAL SPECIFICATIONS FOR MACHINE READABLE PASSPORTS

Scope

1. This section defines the specifications for machine readable passport books (MRP) and including those necessary for global interoperability using visual inspection and the machine readable zone only. These specifications also apply to MRPs that are electronically enabled; further specifications for electronically enabled MRPs are contained in Volume 2 of ICAO Doc 9303 Part 1. Technical specifications for a passport card are also included, with references to further specifications in Doc 9303, Part 3, for optional use by States and organizations.

Physical characteristics

2. Issuing States and organizations have the freedom to choose the materials to be used. Nevertheless, the MRP shall, in normal use throughout its period of validity, meet the following requirements.

2.1 *Deformation*. The MRP shall be of such nature that bends (not creases), i.e. deformation due to normal use, can be flattened by the reading device without impairing the use of the MRP or the functioning of the reader.

2.2 *Toxicity*. The MRP shall present no toxic hazards in the course of normal use (see also ISO/IEC 7810).

2.3 *Resistance to chemicals*. The MRP shall be resistant to chemical effects arising from normal handling and use, except where chemical sensitivity is added for security reasons.

2.4 *Temperature stability*. The MRP shall remain machine readable at operating temperatures ranging from –10/C to +50/C (14/F to 122/F). The MRP should not lose its reliability after being stored or exposed at temperatures ranging from –35/C to +80/C (–31/F to 176/F).

2.5 *Humidity*. The MRP shall be machine readable at a relative air humidity ranging from 5 per cent to 95 per cent, with a maximum wet bulb temperature of 25/C (77/F) (see also ISO/IEC 7810). The MRP should not lose its reliability after being stored at, or exposed to, a relative air humidity ranging from 0 per cent to 100 per cent (non-condensing).

2.6 *Light*. The MRP shall resist deterioration from exposure to light encountered during normal use (see also ISO/IEC 7810).

2.7 While material choices remain at the discretion of the individual issuing State or organization, no materials shall adversely affect any other component in the MRP.

Construction and Dimensions of the MRP and MRP data page

3. The MRP shall take the form of a book consisting a cover and a minimum of eight pages and shall include a data page onto which the issuing State enters the personal data relating to the holder of the document and data concerning the validity of the MRP.

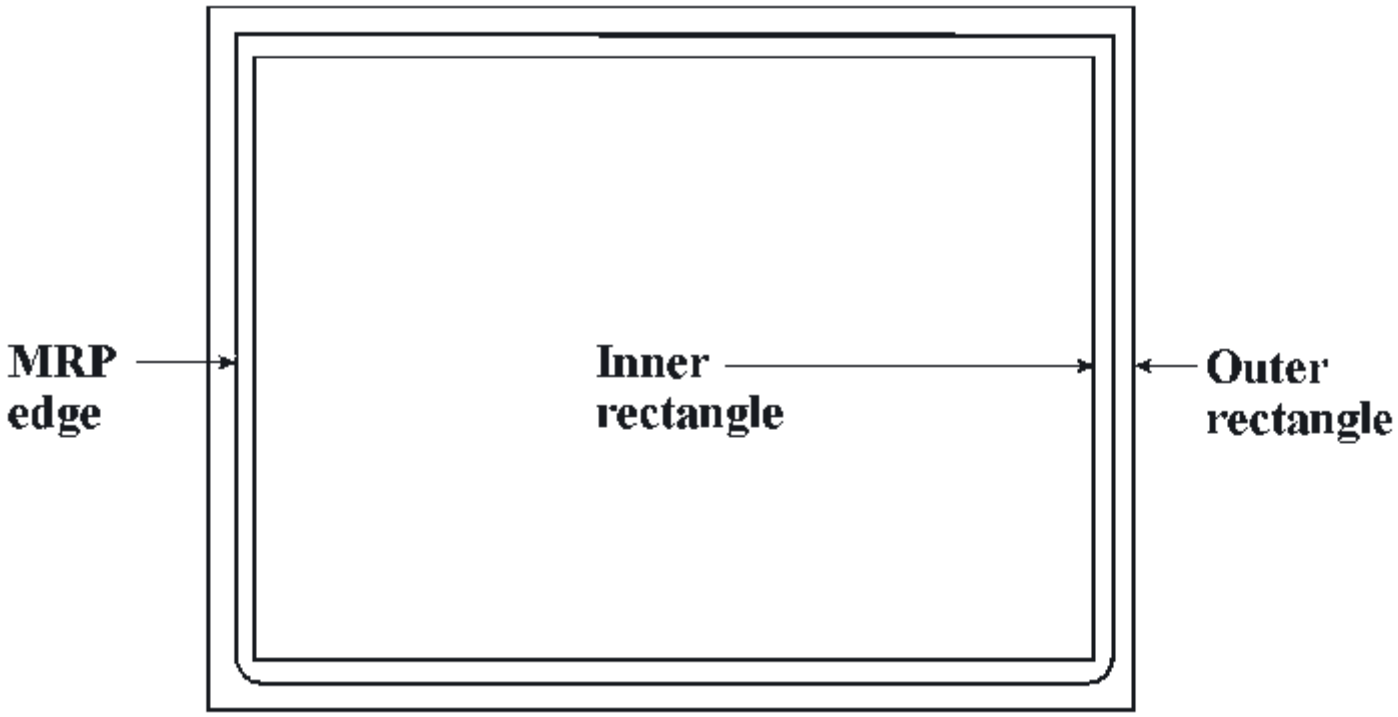
4. The dimensions shall be as follows.

4.1 *MRP data page nominal dimensions*. The nominal dimensions shall be as specified in ISO/IEC 7810 (except thickness) for the ID-3 size card, i.e.:

88.0 mm +/- 0.75 mm × 125.0 mm +/- 0.75 mm (3.46 in +/- 0.039 in × 4.92 in +/- 0.039 in).

4.2 *MRP data page edge tolerances.* The edges of the data page following final preparation shall be within the area circumscribed by the following concentric rectangles as illustrated in Figure IV-1.

Inner rectangle: 87.25 mm × 124.25 mm (3.44 in × 4.89 in)
Outer rectangle: 88.75 mm × 125.75 mm (3.49 in × 4.95 in)



Not to scale

Figure IV-1. MRP data page dimensional illustration

4.3 *MRP data page margins*. The dimensional specifications refer to the outer limits of the MRP data page. A margin of 2.0 mm (0.08 in) along each outer edge, with the exception of the header zone, must be left clear of data.

4.4 *MRP data page thickness*. The thickness, including any final preparation (e.g. laminate), shall be as follows:

4.4.1 Minimum: No minimum thickness is specified. However, States are advised that currently available materials are unlikely to provide an adequately robust data page if the thickness is below 0.15 mm (0.006 in).

4.4.2 Maximum: 0.90 mm (0.035 in)

4.4.3 The thickness of the area within the machine readable zone shall not vary by more than 0.10 mm (0.004 in)

4.5 *MRP dimensions*. The dimensional specifications defined in paragraphs 4.1 and 4.2 also apply to the MRP. If required for binding purposes, the 88.0 mm (3.46 in) dimension may be increased.

General layout of the MRP data page

5 The MRP data page follows a standardized layout to facilitate reading of data globally by visual and machine readable means.

5.1. The MRP data page should be either be an inner page in close proximity to an end leaf of the MRP or form part of the cover of the MRP. Where the MRP is part of the cover, precautions must be taken to ensure that the endleaf/cover assembly combined with the means of personalisation are together resistant to fraudulent attack, particularly by delamination of the cover structure. Where the MRP data page is not constructed as part of the cover, the *recommended practice* is to locate the MRP data page on page 2 or on the penultimate page of the MRP. The location of the MRP data page in any other position in the MRP will give rise to problems for document examiners in the operation of swipe readers reading the MRZ. The MRZ shall be positioned adjacent to the outside edge of the book, parallel to the spine of the book, as illustrated in Appendix 3 to this section.

5.2 To accommodate the various requirements of States' laws and practices and to achieve the maximum standardization within those divergent requirements, the MRP data page is divided into seven zones as follows:

Front of MRP data page

Zone I Mandatory header
Zone II Mandatory and optional personal data elements
Zone III Mandatory and optional document data elements
Zone IV Mandatory holder's signature or usual mark, (original or reproduction)
Zone V Mandatory identification feature
Zone VII Mandatory machine readable zone (MRZ)

Back of MRP data page, or an adjacent page

Zone VI Optional data elements

Note.— Where the data page is situated on an inside page of the MRP, the issuing State may place elements 01 and 02 of Zone 1, the mandatory header, on an adjacent or earlier page.

5.3 Zones I to V, which, together with Zone VI, form the Visual Zone (VIZ) and Zone VII, which is the Machine Readable Zone (MRZ) contain mandatory elements in a standard sequence which represent the minimum requirements for the MRP data page. The optional elements in Zones II, III and VI accommodate the diverse requirements of issuing States and organizations, allowing for presentation of additional data at the discretion of the issuing State or organization, while achieving the desired level of standardization. The location of zones and standard sequence for data elements are set out in Appendix 1 to this section. Appendix 2 (Diagram 1) to this section illustrates the dimensional specifications for the MRP data page. The technical specifications for the printing of data on the MRP data page are defined in Appendices 2 and 3 to this section. Appendix 4 to this section outlines the guidelines for positioning and adjusting the dimensional specifications of Zones I to V to accommodate the flexibility desired by issuing States and organizations. Examples of personalized MRP data pages are shown in Appendix 5 to this section.

5.4 *Zone IV — Location of holder's signature or usual mark*. Field 18, the holder's signature or usual mark, (or a reproduction thereof), shall normally be placed in Zone IV of the MRP data page (see Appendix 4 to this section). Where the issuing State or organization wishes to locate the holder's signature or usual mark on a page other than the MRP data page, it may, as specified in the data element directory (paragraph 8.5), locate Field 18 on the page adjacent to the MRP data page. In this case, the size of adjacent fields in the visual zone on the MRP data page may be increased.

5.5 *Zone V — Position of holder's portrait*. Within Zone V, the holder's portrait shall be at least 2.0 mm (0.08 in) from the left-hand edge of the MRP data page. When using an affixed photograph, it is recommended that this dimension be increased to 6.0 mm (0.24 in) in an effort to reduce the potential for photograph substitution. Where this recommendation is implemented, a consequent reduction in the width of Fields 06 to 18 and in the number of character positions of the data elements appearing in Fields 8, 10 and 12 shall occur. Issuing States should be aware of the additional threat of photo-substitution if affixed

photographs are used; digital printing of the portrait is strongly recommended.

Content and use of zones

6. *Data elements:* The data elements to be included in the zones, the preparation of the zones and guidelines for the dimensional layout of zones shall be as described hereunder.

6.1 *Mandatory zones*

6.1.1 The MRP data page shall contain Zones I through III, Zone V and Zone VII. If the State practice is to omit mandatory elements 01 and 02 (issuing State or organization, in full, and document, in full) from the header (Zone I), these data elements shall appear on an adjacent or earlier page.

6.1.2. Zone IV shall be present either on the data page or on an adjacent page and contain the holder's signature or usual mark; i.e. original or reproduction. Zone V shall include the personal identification feature(s) which shall include a portrait solely of the holder. At the discretion of the issuing State or organization, the name fields in Zone II and the holder's signature or usual mark in Zone IV may overlay Zone V provided this does not hinder recognition of the data in any of the three zones.

6.1.3 Data elements shall appear in a standard sequence as defined in Appendix 1 to this section.

6.1.4 All MRZ (Zone VII) data elements shall be shown as defined in 9.5 and 9.6.

6.2 *Optional data zone.* Zone VI, which may be on the back of the data page or on an adjacent page,is a zone for optional data for use at the discretion of the issuing State or organization.

6.3 *Dimensional flexibility of Zones I to V*

6.3.1 Zones I to V may be adjusted in size and shape within the overall dimensional specifications of the MRP data page to accommodate the diverse requirements of issuing States and organizations. All zones, however, shall be bounded by straight lines, and all angles where straight lines join shall be right angles (i.e. 90 degrees). It is recommended that the zone boundaries not be printed on the MRP data page. The nominal position of the zones is shown in Appendix 4 to this section.

6.3.2. When an issuing State or organization chooses to produce an MRP data page that contains a transparent or otherwise unprintable border, this will result in a reduction of the available area within the zones. The full MRP data page dimensions and zone boundaries shall be measured from the outside edge of this border, which is the external edge of the MRP data page.

6.3.3 Zone I shall be located along the top edge of the MRP data page and extend across the full 125.0 ± 0.75 mm (4.92 ± 0.03 in) dimension. (The top edge is the edge coincident with the spine of the MRP.) The issuing State or organization may vary the *vertical* dimension of Zone I, as required, but this dimension shall be sufficient to allow legible interpretation of the data elements in the zone and shall not be greater than 17.9 mm (0.70 in).

6.3.4. Zone V shall be located such that its left edge is coincident with the left edge of the MRP data page as defined in Appendix 4 to this section. The dimensions of the portrait contained in Zone V are specified in 7.1 of this Section.

6.3.5 Zone V may move *vertically* along the left edge of the MRP data page and overlay a portion of Zone I as long as individual details contained in either zone are not obscured.

6.3.6 The upper boundary of Zone II shall be coincident with the lower boundary of Zone I.

6.3.7 When there is a specific requirement for the name fields to extend across the MRP data page, Zone II may extend up to the full 125.0 ± 0.75 mm (4.92 ± 0.03 in) dimension of the MRP data page. In the event the full dimension is used, Zone II shall overlay a portion of Zone V. In this case, issuing States and organizations shall ensure that data contained in either zone are not obscured.

6.3.8 The lower boundary of Zone II may be positioned at the discretion of the issuing State or organization. Enough space must be left for Zones III and IV below the boundary. This boundary does not need to be straight across the 125.0 ± 0.75 mm (4.92 ± 0.03 in) dimension of the MRP data page. This is illustrated in Example 1 of Appendix 4 to this section.

6.3.9. Zone III should start at the right vertical boundary of Zone V and may extend, at the discretion of the issuing State or organization, to the right edge of the MRP data page. The nominal position diagram and Examples 1 and 2 of Appendix 4 illustrate the flexibility permitted to issuing States.

6.3.10. If Zone IV is placed on the MRP data page, it shall be at the bottom of the VIZ on the front of the MRP data page, its lower boundary coincident with the top edge of the MRZ. The nominal position diagram and Example 1 of Appendix 4 show two alternative positions for Zone IV. Example 2 shows an MRP data page where Zone IV has been placed on an adjacent page.

6.3.11. Zone IV may also overlay Zone V, though this practice is not encouraged. In this case, issuing States and organizations shall ensure that individual details contained in either zone are not obscured. See Example 3 of Appendix 5.

6.3.12. Where an issuing State wishes to use a bar code to store data relating to the holder and/or the document on the data page, it is recommended that this be sited immediately above the MRZ to the right of the portrait, with a consequent reduction in the area available for Zones II, III and IV. The physical size of the bar code must not prevent the inclusion of all the specified data in Zones II, III and IV. Such a bar code is for use by the issuing State for its own purposes, or for bilateral use by agreement between States, but it is not intended for global interoperability and is <u>not</u> an acceptable alternative to the electronically enabled passport as specified in Doc 9303 Part 1 Volume 2. In consequence, no bar code format or data content is specified in ICAO Doc 9303.

6.3.13. Where an issuing State wishes to have a displayed image of an MRP holder's fingerprint, the image may be displayed within the area designated for Zone II as illustrated in Example 4 in Appendix 5 to this Section.

6.4. The dimensions and boundaries of Zone VII, the machine readable zone, are fixed. Zone VII conforms in height to the MRZ defined for all MRTDs so that the machine readable data lines fall within the effective reading zone (ERZ) specified in paragraph 10 and Appendix 3 to this Section.

Displayed identification feature(s) of the holder

7. *Displayed identification feature(s)*. The MRP shall incorporate on the data page a mandatory displayed portrait of the holder. It may optionally display a fingerprint of the holder or reproduction thereof.

7.1 *Displayed portrait.* A displayed portrait of the rightful holder shall be either a photograph or other faithful reproduction of the image of the holder securely affixed to or represented on/within the substrate of the MRP. See Appendix 11 to this Section for examples of acceptable and unsatisfactory portraits. Necessary measures shall be taken by the issuing State or organization to ensure that the displayed portrait is resistant to forgery and substitution. The displayed portrait shall have been taken within the six months preceding the issue of the MRP. If the actual photograph is to be affixed to the data page of the MRP, its dimensions should be 45.0 x 35.0 mm (1.77 x 1.38 in). If it is to be digitally imaged onto/into the data page the size of the image should also be 45.0 x 35.0 mm (1.77 x 1.38 in). Issuing States should be aware that digital imaging is greatly to be preferred as affixed photographs are prone to fraudulent photo-substitution.

7.1.1 *Pose.* The displayed portrait shall depict the face of the rightful holder of the MRP in a full-face frontal pose with both eyes visible, i.e. captured perpendicular to an imaginary plane formed parallel to the front surface of the face. The pose should be such that an imaginary horizontal line drawn between the centres of the eyes should be parallel to the top and bottom edges of the rectangular image and, when inserted into the MRP, to the long edge of the data page. (See Appendix 11 to this Section).

7.1.2 *Depth of field*. The full-face frontal pose shall be in focus from the crown (top of the head ignoring any hair) to the chin and from the nose to the ears.

7.1.3 *Orientation*. The crown (top of the head ignoring any hair) shall be nearest the top edge of the MRP i.e. the crown-to-chin orientation covering the longest dimension defined for Zone V.

7.1.4 *Face size*. The crown-to-chin portion of the full-face frontal pose shall be 70 to 80 per cent of the longest dimension defined for Zone V, maintaining the aspect ratio between the crown-to-chin and ear-to-ear details of the face of the holder. The 70% to 80% requirement may mean cropping the picture so that not all the hair is visible.

7.1.5 *Centering*. The full-face frontal pose shall be centred within Zone V.

7.1.6 *Capturing the full-face frontal pose of the holder*

7.1.6.1 *Lighting*. Adequate and uniform illumination shall be used to capture the full-face frontal pose, i.e. appropriate illumination techniques shall be employed and illumination used to achieve natural skin tones (and avoid any colour cast) and a high level of detail, and minimize shadows, hot spots, red eye and reflections (such as sometimes caused by spectacles).

7.1.6.2 *Background*. A uniform light coloured background shall be used to provide a contrast to the face and hair. For colour portraits, light blue, beige, light brown, pale grey or white are recommended for the background.

7.1.6.3 *Quality of captured portrait.* The quality of the original captured portrait should at least be

comparable to the minimum quality acceptable for photographs (resolution comparable to 6–8 line pairs per millimetre). To achieve this comparable image quality in a digital reproduction, careful attention must be given to the image capture, processing, digitization, compression and printing technology and the process used to produce the portrait, including the final preparation of the MRP.

7.1.7 *Colour*: The displayed portrait shall be black and white or a true-colour representation of the holder.

7.1.8 *Facial Ornaments:* The issuing State shall use its discretion as to the extent to which facial ornaments (e.g. nose rings, studs etc) may appear in the portrait. It is recommended that a facial ornament should only appear if it is permanently worn.

7.1.9 *Digitally printed reproduction*

7.1.9.1 *Digital reproduction quality*. The digital reproduction shall yield an accurate recognizable representation of the rightful document holder. The quality of a digitally reproduced portrait should be visually comparable to a minimally acceptable photograph. To achieve this comparable image quality in a digital reproduction, careful attention must be given to the image capture, processing, digitization, compression and printing technology and the process used to reproduce the portrait in the final document, including the final preparation of the MRP.

7.1.9.2 *Border*. A border or frame shall not be used to outline a digitally printed reproduction.

7.1.9.3 *Coexistence with background security treatment(s)*. A digitally printed reproduction shall coexist with background security treatment(s) located within Zone V, i.e. background security printing shall not interfere with proper viewing of the displayed portrait, and vice versa.

7.1.10 *Coexistence with final preparation treatment(s) of the MRP*. A displayed portrait shall coexist with final preparation treatment(s), i.e. final preparation treatment(s) shall not interfere with proper viewing of the displayed portrait, and vice versa.

7.1.11 *Portraits of Babies:* A portrait of a baby should be produced if possible conforming to the above specifications. Ideally, the baby should be photographed in an upright position but it is considered acceptable to capture the portrait with the baby lying on a white or plain light coloured blanket. Alternatively the baby may be placed in a baby seat but there shall be white or plain light coloured background behind the head. The baby's eyes shall be open and no supporting hands visible.

7.2 *Displayed signature or usual mark.* A displayed signature or usual mark shall be an original created on the MRP or a digitally printed reproduction of an original. The displayed signature is located in Zone IV - see paragraphs 6.3.10 and 6.3.11 of this Section. Necessary measures shall be taken by the issuing State or organization to ensure that the displayed signature or usual mark is resistant to forgery and substitution. The displayed signature or usual mark shall meet the following requirements.

7.2.1 *Orientation.* The displayed signature or usual mark shall be displayed with its A-dimension parallel to the reference edge of the MRP as defined in Figure IV-2.

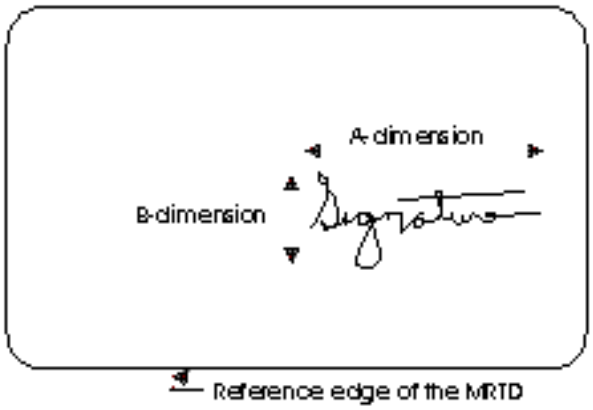


Figure IV-2. Orientation of the displayed signature or usual mark

7.2.2 *Size.* The displayed signature or usual mark shall be of such dimensions that it is discernible by the human eye, and the aspect ratio (A-dimension to B-dimension) of the original signature or usual mark is maintained. (See Paragraphs 6.3.10 and 6.3.11 for guidance of the location of the signature when placed on the data page.)

7.2.3 *Scaling for reproduction using digital printing.* In the event the displayed signature or usual mark is scaled up or scaled down, the aspect ratio (A-dimension to B-dimension) of the original signature or usual mark shall be maintained.

7.2.4 *Cropping for reproduction using digital printing.* The issuing State or organization should take steps to eliminate or minimize cropping.

7.2.5 *Colour.* The displayed signature or usual mark shall be displayed in a colour that affords a definite contrast to the background.

7.2.6 *Borders*. Borders or frames shall not be permitted or used to outline the displayed signature or usual mark.

7.3 *Displayed single-digit fingerprint.* A displayed single-digit fingerprint, if required by the issuing State, shall be either an original created on the MRP substrate by the holder, or a digitally printed reproduction of an original. Necessary measures shall be taken by the issuing State or organization to ensure that the single-digit fingerprint is resistant to forgery and substitution. The single-digit fingerprint shall meet the following requirements.

7.3.1 *Orientation*. The A-dimension (width) of the displayed single-digit fingerprint shall be parallel to the reference edge of the MRP as defined in Figure IV-3. The top of the finger shall be that portion of the single-digit fingerprint furthest away from the reference edge of the MRP. See Example 4 in Appendix 5 to this Section.

7.3.2 *Size.* The displayed single-digit fingerprint shall be a one-to-one replication (A-dimension versus B-dimension) of the original print.

7.3.3 *Scaling for reproduction using digital printing.* Scaling of a single-digit fingerprint shall not be permitted.

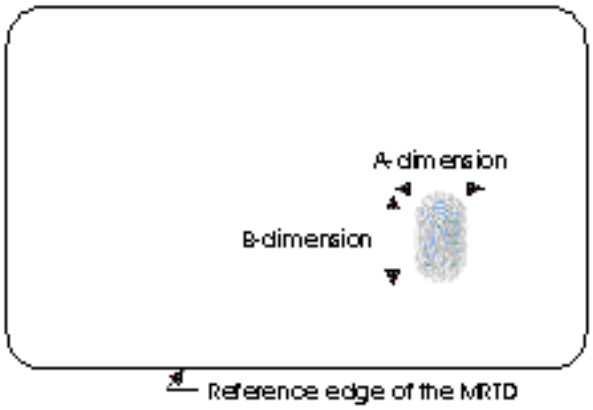


Figure IV-3. Orientation of the displayed single-digit fingerprint

7.3.4 *Cropping for reproduction using digital printing.* The issuing State or organization should take steps to eliminate or minimize cropping.

7.3.5 *Colour.* The displayed single-digit fingerprint shall be displayed in a colour that affords a definite contrast to the background.

7.3.6 *Borders.* Borders or frames shall not be permitted or used to outline the displayed single-digit fingerprint.

Detailed layout of the MRP data page

8. *Visua1 Inspection Zone (VIZ) (Zones I through VI)*

8.1 The VIZ consists of zones containing mandatory and optional data fields to accommodate the diverse requirements of issuing States and organizations while maintaining sufficient uniformity to ensure global interoperability for all MRPs.

8.2 *Entered data in the VIZ*

8.2.1 *Typeface and type size.* The selection of typeface and type size used within the VIZ is at the discretion of the issuing State or organization. For good legibility a type size with 10 characters per 25.4 mm (1.0 in) is recommended. A maximum horizontal printing density of 15 characters per 25.4 mm (1.0 in) should not be exceeded. This printing density has been chosen as the smallest in which information is clear and legible.

8.2.2 Use of upper-case characters is recommended.

8.2.3 Diacritical marks (accents) may be used with either lower- or upper-case characters, at the option of the issuing State or organization.

8.3 *Languages/characters*. These specifications provide for entered data in the VIZ to appear in Latin-alphabet characters and Arabic numerals, i.e. 1234567890. When the mandatory elements of Zones I, II and III are in a national language that does not use the Latin alphabet, a transliteration shall also be provided. States that use other than Arabic numerals to represent numerical data in the VIZ shall provide a translation into Arabic numerals. It is strongly recommended that issuing States using non-Latin alphabet characters in the optional fields of the VIZ translate the entered data into English, French or Spanish in these fields as well, in the interests of facilitation. In the case of the name of the issuing State, or place of issue or place of birth, the representation in the original language shall be accompanied by a translation of the name into English, French or Spanish, when the translated name is more familiar to the international community. Optional data elements should be entered in both the national language and one of the English, French or Spanish languages. Optional date in Zone VI may be entered entirely in the national script and/or language.

8.4 *Fields.* Captions shall be used to identify all fields for mandatory data elements in the VIZ except as specified in the directory below and may be in the language of the issuing State or working language of the issuing organization. If the language of the issuing State or working language of the issuing organization used for captions is other than English, French or Spanish, one of these languages shall also be used, and the translation of the caption should be presented in italics.

8.4.1 *Unused fields*. When a field is not used, the caption shall not appear on the MRP data page.

8.4.2 *Print Spacing.* The design of the MRP data page in Zones II and III is based on a horizontal printing density of 10 characters per 25.4 mm (1.0 in). This printing density has been chosen for good legibility for the normal amount of data required by States in these Zones. If any optional field or data element is not used, the data may be spread more evenly in the visual zone of the MRP data page consistent with the requirement for sequencing zones and data elements. The horizontal printing density and the font and the vertical line spacing may be adjusted at the discretion of each State or organization, provided that in the VIZ all data shall be printed in a size such that they can be easily read and assimilated by a person with normal eyesight. The horizontal printing density should not, however, exceed 15 characters per 25.4 mm (1.0 in). Various configurations are shown in Appendix 5 to this section.

8.5 If any optional field or data element is not used, the data may be spread more evenly in the visual zone of the MRP data page consistent with the requirement for sequencing zones and data elements.

8.6 *Data element directory*. The data elements in the VIZ are specified as follows.

Visual inspection zone — Data element directory

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
01/I	Issuing State or organization (in full)	State or organization responsible for issuing the MRP. This should be printed, the type font being selected at the discretion of the issuing State or organization. A	Variable	Notes a, c, d, f, g. If omitted, shall appear on an adjacent

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
		translation of the name into one or more languages, one of which should be English, French or Spanish, should be given when the translated name is more familiar to the international community.		or earlier page in the passport.
02/I	Document	The word for “passport” in the language of the issuing State or organization, plus either PASSPORT (English), PASSEPORT (French) or PASAPORTE (Spanish) if the language of the issuing State or organization is not English, French or Spanish, the type font being selected at the discretion of the issuing State or organization.	Variable	Notes a, c, g, d, m. If omitted, shall appear on an adjacent or earlier page in the passport.
03/I	Document Code	Capital letter P to designate an MRP. One additional capital letter may be used, at the discretion of the issuing State or organization, to designate other types of passports such as MRP issued to diplomatic staff, and MRP issued for travel on government business, or a passport issued for a special purpose.	2	Notes a, g, l, m
04/I	Issuing State or organization (in code)	As abbreviated in three-letter code specified in Appendix 7 to this Section .	3 Fixed	Notes a, f, l
05/I	Passport Number	As given by the issuing State or organization.	9	Notes a, b, c, g, l
06/07/II	Name	The full name of the holder, as identified by the issuing State or organization. The name shall be divided where possible by the issuing State or organization into two parts, the first representing that portion of the name that the issuing State or organization defines as the “primary identifier” for the holder (e.g. surname, maiden name plus married name, family name) and the second representing all remaining components (e.g. given names, initials) of the holder’s name, which the issuing State or organization considers as collectively representing a “secondary identifier”. The two parts, i.e. primary and secondary identifiers, once integrated, constitute the name of the passport holder. Where the issuing State or organization determines that the holder’s name cannot be divided into the required two parts, as defined above, the full name of the holder shall be defined as the primary identifier.	Variable	Paragraph 11; Notes a, c, g, h, k, l
06/II	Primary identifier	Predominant component(s) of the name of the holder as described above. In cases where the predominant component(s) of the name of the holder (e.g. where this consists of composite names) cannot be shown in full or	Variable	Paragraph 11; Notes a, c, g, h, k, l

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
		in the same order, owing to space limitations of Field(s) 06 and/or 07 or national practice, the most important component(s) (as determined by the State or organization) of the primary identifier shall be inserted.		
07/II	Secondary identifier	Secondary component(s) of the name of the holder as described above. The most important component(s) (as determined by the State or organization) of the secondary identifier of the holder shall be inserted in full, up to the maximum dimensions of the field frame. Other components, where necessary, may be represented by initials. Where the holder's name has only predominant component(s), this data field shall be left blank. A State may optionally utilize the whole zone comprising Fields 06 and 07 as a single field. In such a case, the primary identifier shall be placed first, followed by a comma and a space, followed by the secondary identifier.	Variable	Paragraph 11; Notes a, c, g, h, k, l
08/II	Nationality (in full)	Nationality of the holder as recorded by the issuing State, in the language(s) of the State of issue.	Variable	Notes a, c, f, g, h
09/II	Date of birth	Holder's date of birth as recorded by the issuing State or organization. For unknown dates, see paragraph 15.1.7 of Section IV.	Variable	Paragraph 15 Notes a, b, c, g, l
10/II	Personal number	Field optionally used for personal identification number given to holder by issuing State or organization.	Variable	Notes a, b, c, e, g, h
11/II	Sex	Sex of holder, to be specified by use of the single initial commonly used in the language of the State where the document is issued and, if translation into English, French or Spanish is necessary, followed by a dash and the capital letter F for female, M for male, or X for unspecified.	3	Notes a, c, g, l
12/II Optional element in mandatory zone	Place of birth	Field optionally used for city and State of holder's birthplace. A translation of the name into one or more languages, one of which should be English, French or Spanish, should be given when the translated name is more familiar to the international community. At the discretion of the issuing State, the town or suburb of birth may be used. When the MRP is issued to a person whose place of birth was outside the State issuing the document and it is desired that the State or territory of birth be shown, the three-letter code appearing in Appendix 7 shall be used.	Variable	Notes a, c, e, f, g, h

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
13/II Optional element in mandatory zone	Optional personal data elements	Optional personal data elements e.g. personal identification number or fingerprint, at the discretion of the issuing State or organization. If a fingerprint is included in this field, it should be presented as a 1:1 representation of the original. If a date is included it shall follow the form of presentation described in paragraph 15	Variable	Notes a, b, c, e, g, i
14/III	Date of issue	Date of issue of the MRP.	Variable	Paragraph 15; Notes a, b, c, g, i, l
15/III	Authority or issuing office	Authority or issuing office for the MRP. This field may be used to indicate both the issuing Authority or issuing office and its location, which shall be printed or stamped within this field. A translation of the name into one or more languages, one of which should be English, French or Spanish, should be given when the translated name is more familiar to the international community.	Variable	Notes a, b, c, f, g, h
16/III	Date of expiry	Date of expiry of the MRP.	Variable	Paragraph 15; Notes a, b, c, g, l
17/III Optional element in mandatory zone	Optional document data elements	Optional data elements relating to the document.	Variable	Notes a, b, c, e, g
18/IV	Holder's signature or usual mark	Signature of holder or usual mark of holder (original or reproduction), either directly on the data page in this field or on a label to be affixed within this field. Alternatively, at the discretion of the issuing State or organization, the signature or usual mark may be located in Zone VI. The size of the field to be allocated to the signature or usual mark on the adjoining page shall be at the discretion of the issuing State or organization, subject to the overall dimensional limits of the MRP.	Variable	Notes e, j
19/V	Identification feature	This field shall contain a portrait of the holder. The portrait should be 45.0 mm x 35.0 mm (1.77 in x 1.38 in). At the option of the issuing State or organization, this field may contain another biometric identifier or a security feature(s) provided this does not obscure the portrait.		Note d

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
20/VI	Optional data elements	Additional optional data elements at the discretion of the issuing State or organization.		Note d Notes a, b, c, e, g, i

* Notes can be found following paragraph 9.7

9. *Mandatory machine readable zone (MRZ) (Zone VII)*

9.1 Purpose of the MRZ

9.1.1 MRPs produced in accordance with Doc 9303 Part 1 incorporate an MRZ to facilitate inspection of travel documents and reduce the time taken up in the travel process by administrative procedures. In addition, the MRZ provides verification of the information in the VIZ and may be used to provide search characters for a database inquiry. Equally, it may be used to capture data for registration of arrival and departure or simply to point to an existing record in a database.

9.1.2 The MRZ provides a set of essential data elements in a standardized format that can be used by all receiving States regardless of their national script or customs.

9.1.3 The data in the MRZ are formatted in such a way as to be readable by machines with standard capability worldwide. It must be stressed that the MRZ is reserved for data intended for international use in conformance with international Standards for MRPs. The MRZ is a different representation of the data than is found in the VIZ. The VIZ contains data not specifically intended to be read by machine, and herein data can be included in the national script of the issuing State provided that it is also transliterated into Latin-alphabet characters in conformance with 8.3. On the other hand, the constraints posed by machine reading in the MRZ do not permit such flexibility.

9.2 *Properties of the MRZ*

9.2.1 In consideration of national privacy laws, the data in the MRZ must be visually readable as well as machine readable. Data presentation must conform to a common standard such that all machine readers configured in conformance with Doc 9303 can recognize each character and communicate in a standard protocol (e.g. ASCII) that is compatible with the technology infrastructure and the processing requirements defined by the receiving State.

9.2.2 To meet these requirements, OCR-B typeface is specified in Doc 9303 as the medium for storage of data in the MRZ. The MRZ as defined herein is recognized as the machine reading technology essential for global interchange and is therefore mandatory in all types of MRPs.

9.3 *Constraints of the MRZ*

9.3.1 The characters allowed in the MRZ are a common set (as defined in Appendix 8 to this section) which can be used by all States. National characters generally appear only in the computer-processing systems of the States in which they apply and are not available globally. They shall not, therefore, appear in the MRZ.

9.3.2 Diacritical marks are not permitted in the MRZ. Even though they may be useful to distinguish names, the use of diacritical marks in the MRZ would confuse machine-reading equipment, resulting in less accurate database searches and slower clearance of travellers.

9.3.3 The number of character positions available for data in the MRZ is limited. The length of the data elements inserted in the MRZ must conform to the size of the respective fields as specified in the data element directory in the applicable part of Doc 9303.

9.3.4 In some instances, names in the MRZ may not appear in the same form as in the VIZ. In the VIZ, non-Latin and national characters may be used to represent more accurately the data in the script of the issuing State or organization.

9.4 *Transliteration of national characters in names in the MRZ*

9.4.1 Names in the MRZ are represented differently from those in the VIZ. National characters must be transliterated using only the allowed OCR character set defined in Appendix 8 to this section. Issuing States or organizations should adopt the recommended transliterations specified in Appendix 9 to this section, if applicable. Appendix 9 represents the most commonly used national characters of the Latin and Cyrillic families of languages.

9.5 *Data position/data elements/check digits/print specifications/print position in the MRZ*

9.5.1 *Data position.* The MRZ is located on the front of the MRP data page. Appendix 3 to this Section(s) defines the location of the MRZ and the nominal position of the data therein.

9.5.2 *Check digits.* The data structure of the machine readable lines provides for the inclusion of check digits. The position of check digits and the data used in their calculation is set out in a table in paragraph 15 of this Section.

9.5.3 *Print specifications*. Machine readable data shall be printed in OCR-B type font, size 1, constant stroke width characters, at a fixed width spacing of 2.54 mm (0.1 in), i.e. horizontal printing density of 10 characters per 25.4 mm (1.0 in) as specified in ISO 1073-II. Printed characters are restricted to those defined in Appendix 8 to this section.

9.5.4 *Data elements.* The data elements corresponding to Fields 03 to 9, 11 and 16 of the VIZ shall be printed in machine readable form, in the MRZ, beginning with the left most character position in each field in the sequence indicated in the data structure specifications shown below. Appendix 6 to this section indicates the structure of the MRZ.

9.5.5 The three-letter codes listed in Appendix 7 to this section shall be used to complete the fields identifying the issuing State or organization and the nationality of the holder. The codes listed in Appendix 7 are based on the Alpha-3 codes for entities specified and regularly updated in ISO 3166-1, with extensions for certain States and organizations being identified by an asterisk. The current version of the codes may be obtained from ISO who operate a maintenance agency for ISO 3166-1.

9.5.6 *Print position.* The position of the left-hand edge of the first character shall be 6.0 ± 1.0 mm (0.24 ± 0.04 in) from the left-hand edge of the document. Reference centre lines for the OCR lines and the minimum starting position for the first character of each line are shown in Appendix 3 to this section. The positioning

of the characters is indicated by those reference lines and by the printing zones for the two code lines in Appendix 3 to this section.

Data structure of machine readable data for MRP data page

9.6 *Data structure of the upper machine readable line*

MRZ character positions (line 1)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
1 to 2	03	Document code	The first character shall be P to designate an MRP. One additional letter may be used, at the discretion of the issuing State or organization, to designate a particular MRP. If the second character position is not used for this purpose, it shall be filled by the filler character (<).	2	Notes a, d, m
3 to 5	04	Issuing State or organization	The three-letter code specified in Appendix 8 to this Section shall be used. Spaces shall be replaced by filler characters (<).	3	Notes a, d, f
6 to 44	06, 07	Name	The name consists of primary and secondary identifiers which shall be separated by two filler characters (<<). Components within the primary or secondary identifiers shall be separated by a single filler character (<). When the name of the document holder has only one part, it shall be placed first in the character positions for primary identifier, filler characters (<) being used to complete the remaining character positions of the MRZ.	39 [Primary identifier(s), secondary identifier(s) and fillers]	Paragraph 12 Notes a, c, d
		Punctuation in the name	Representation of punctuation is not permitted in the MRZ.		Paragraph 12.9
		Apostrophes in the name	Components of the primary or secondary identifiers separated by apostrophes in the VIZ shall be combined and no filler character (<) shall be inserted. *Example:* VIZ: D'ARTAGNAN MRZ: **DARTAGNAN**		Paragraph 12.9
		Hyphens in the name	Hyphens (-) in the name shall be converted to the filler character (<) (i.e. hyphenated names shall be represented as separate components). *Example:* VIZ: Marie-Elise MRZ: **MARIE<ELISE**		Paragraph 12.9

MRZ character positions (line 1)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
		Commas	Where a comma is used in the VIZ to separate the primary and secondary identifiers, the comma shall be omitted in the MRZ and the primary and secondary identifiers shall be separated by two filler characters (<<).		Paragraph 12.9
			Where a comma is used in the VIZ to separate two name components, it shall be represented in the MRZ by a single filler character (<).		Paragraph 12.9
		Name prefixes and suffixes	Prefixes and suffixes (such as Dr, Sir, Jr., Sr., II or III) shall not be included in the MRZ except as permitted by paragraph 12.7.		Paragraph 12.7
		Filler	When all components of the primary and secondary identifiers and required separators (filler characters) do not exceed 39 characters in total, all name components shall be included in the MRZ and all unused character positions shall be completed with filler characters (<) repeated up to position 44 as required.		
		Truncation of the name	When the primary and secondary identifiers and required separators (filler characters) exceed the number of character positions available for names (i.e. 39), they shall be truncated as follows:		Paragraphs 12.6 and 12.11. Notes a, d
			Characters shall be removed from one or more components of the primary identifier until three character positions are freed, and two filler characters (<<) and the first character of the first component of the secondary identifier can be inserted. The last character (position 44) shall be an alphabetic character (A through Z). This indicates that truncation may have occurred.		
			Further truncation of the primary identifier may be carried out to allow characters of the secondary identifier to be included, provided that the name field shall end with an alphabetic character (position 44). This indicates that truncation may have occurred.		
			When the name consists of only a primary identifier which exceeds the number of character positions available for the name, i.e. 39, characters shall be removed from one or more components of the name until the last character in the name field is an		

MRZ character positions (line 1)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
			alphabetic character.		

* Notes can be found following paragraph 9.7

9.7 *Data structure of the lower machine readable line*

MRZ character positions (line2)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
1 to 9	05	Passport number	As given by the issuing State or organization to uniquely identify the document. Any special characters or spaces in the passport number as shown in the VIZ shall be replaced by the filler character (<). The number shall be followed by the filler character (<) repeated up to position 9 as required.	9	Notes a, b, d
10		Check digit	See paragraph 16.	1	Notes b, d
11 to 13	08	Nationality	As a three-letter code representing the holder's nationality as listed in Appendix 7 to this Section . Spaces are replaced by filler characters.	3	Notes a, d, f
14 to 19	09	Date of birth	The structure is YYMMDD, where: YY = Year (2 positions) MM = Month (2 positions) DD = Day (2 positions). For unknown dates, see15.2.2	6	Paragraph 15.2; Notes b, d, i
20		Check digit	See paragraph 16.	1	Notes b, d
21	11	Sex	F = Female; M = Male; < = unspecified.	1	Notes a, d
22 to 27	16	Date of expiry	Structure is YYMMDD, where: YY = Year (2 positions) MM = Month (2 positions) DD = Day (2 positions).	6	Paragraph 15.2; Notes b, d, i
28		Check digit	See paragraph 16.	1	Notes b, d

MRZ character positions (line2)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
29 to 42	10	Personal number or other optional data elements	Any special characters, including spaces in the personal identification number given to holder by the issuing State or organization, shall be replaced by the filler character (<). The number shall be followed by the filler character (<) repeated up to position 42 as required. When the personal number field is not used, the character positions 29 to 42 in the second MRZ line should be completed with filler characters (<) (see also under "check digit", character position 43 below).	14	Notes a, b, d
43		Check digit	See paragraph 16 When the personal number field is not used and filler characters (<) are used in positions 29 to 42, the check digit may be zero or the filler character (<) at the option of the issuing State or organization.	1	Notes b, d
44		Composite check digit	Composite check digit for characters of machine readable data of the lower line in positions 1 to 10, 14 to 20 and 22 to 43, including values for letters that are a part of the number fields and their check digits.	1	Paragraph 16; Notes b, d

** Notes for 8.6, 9.6 and 9.7.*

a) Alphabetic characters (A to Z) as defined in Appendix 8 to this Section.

b) Numeric characters (0 to 9) as defined in Appendix 8 to this Section.

c) Punctuation or other special characters allowed only in the VIZ.

d) The field caption is not printed on the document.

e) The use of a caption to identify the field is at the option of the issuing State.

f) In the case of the United Nations Laissez-passer, Field 01 (Issuing State or organization) in the VIZ shall be completed with the words "UNITED NATIONS — NATIONS UNIES". In keeping with the international character of United Nations officials, neither nationality nor place of birth shall be shown. The caption for Field 08 (Nationality) shall read instead: "Official of/Fonctionnaire des" and the words "UNITED NATIONS/ NATIONS UNIES" entered instead of nationality. Field 12 (Place of birth) shall be left blank. The codes to be

used in Field 04 (Code for issuing State or organization) in the VIZ as well as in character positions 3 to 5 (Issuing State or organization) in the upper line of the machine readable zone and in character positions 11 to 13 (Nationality) in the lower line shall be as specified in Appendix 7 to this Section.

g) Space.

h) With respect to the maximum number of character positions and/or the width of the field for this data element, refer to the specifications given for Field 19, when it is necessary to move the holder's portrait 4.0 mm (0.16 in) to the right.

i) The method of writing dates is given in paragraph 15.

j) The space reserved for Field 15 may be expanded to include additionally the space for Field 18 when the option is taken of locating the holder's signature or usual mark on the adjacent page. In this instance, the Authority or issuing office may be expressed as two lines of variable numbers of character positions.

k) When the name cannot be accommodated in the space provided for it in the VIZ, a notation giving the full name may be written on another page of the MRP. Alternatively, a smaller type font may be selected for use in the VIZ only.

l) The field caption shall be printed on the document.

m) In documents other than passports, e.g. UN Laissez-Passer, seafarer's identity document or refugee travel document, the official title of the document shall be indicated instead of "Passport". In these examples, the first character of the document code should be L, S or R, respectively.

Machine reading requirements and the effective reading zone

10. . *Effective reading zone*. A fixed-dimensional reading area (effective reading zone or ERZ of 17.0 mm × 118.0 mm (0.67 in × 4.65 in)), sized to accommodate the MRP, is defined to allow use of a single machine reader for all sizes of MRTDs. The location of the ERZ is as defined in Appendix 3 to this section. The provision of the ERZ is not intended to allow additional tolerance for the printing positions defined in the appendices to the section(s) specific to the preparation of the different types of MRTDs contained in the applicable part of Doc 9303. The ERZ is intended to allow for variances due to the manual placement of machine readable visas (MRVs) and the fanning effect of the pages that takes place when reading an interior page of an MRP. It also allows for the reading of MRTDs with either two or three lines of machine readable data.

10.1 To combat the threat to travel document security posed by, for example, photocopiers, security features are permitted in the MRZ, and any such security feature shall not interfere with accurate reading of the OCR characters at the B900 range, as defined in ISO 1831. While OCR characters must be visible, as specified in 9.2.1, to ensure that all MRPs, including those with security features in the MRZ, can be successfully read, the OCR characters in the MRZ shall be machine readable only in the near infra-red portion of the spectrum (i.e. the B900 band defined in ISO 1831).

Convention for writing the name of the holder

11. *Visual inspection zone (VIZ)*

11.1 The issuing State or organization shall establish which part of the name is the primary identifier — this may be the family name, the main name, the surname, and in some cases, the entire name. This shall be entered in the field for the primary identifier in the VIZ. It is recommended that upper-case characters be used.

11.2 The remaining parts of the name are the secondary identifier. These may be the forenames, familiar names, given names, or any other secondary names. These names shall be written in the field for the secondary identifier in the VIZ. It is recommended that upper-case characters be used throughout. If a single field is used for the name, then the secondary identifier should be separated from the primary identifier by a single comma (,). A comma is not needed if multiple fields are used.

11.3 It is recommended that prefixes and suffixes including titles, professional and academic qualifications, honours, awards, and hereditary status, not be included in the VIZ. However, if an issuing State or organization considers a prefix or suffix to be legally part of the name, the prefix or suffix can appear in the VIZ. Numeric characters should not be written in the name fields of the VIZ. Where the use of numeric characters is a legal naming convention in the issuing States, these should be represented in Roman numerals. Any suffixes or Roman numerals shall be entered in the secondary identifier field.

11.4 National characters may be used in the VIZ. If the national characters are not Latin-based, then a transliteration into Latin characters shall be provided.

12. *Machine readable zone (MRZ)*

12.1 To achieve global interoperability, the primary and/or secondary identifiers shall conform to requirements of the limited OCR-B character set permitted in the MRZ and to the number of character positions available. The issuing State or organization shall be responsible for any transliteration or truncation, specifications for which are provided in paragraph 12.6.

12.2 In the MRZ, the name of the holder shall be printed using upper-case OCR-B characters, specified in Appendix 8 to this Section, without diacritical marks.

12.3 The primary identifier, using the Latin character transliteration (if applicable), shall be written in the upper machine readable line, with the starting character position as set out in Appendix 3 to this Section. It shall be followed by two filler characters (<<). The secondary identifier, using the Latin character transliteration (if applicable), shall be written starting in the character position immediately following the two filler characters.

12.4 If the primary or secondary identifiers have more than one name component, each component shall be separated by a single filler character (<).

12.5 Filler characters (<) should be inserted immediately following the final secondary identifier (or following the primary identifier in the case of a name having only a primary identifier) through to the last character position in the machine readable line.

12.6 The name field in the MRZ of the MRP allows for a maximum of 39 characters, in the upper line. If the primary and secondary identifiers using the above procedure, exceed the available character positions, then truncation shall be carried out using the procedure set out in the following paragraphs. If the total number of characters in the name, including filler characters, is 39 or fewer the name shall not be truncated.

12.6.1 In truncating the name components, the last character of the name field shall be an alpha character (A to Z inclusive) as an indication that truncation has occurred (see the data element directory of the MRZ in paragraph 9.6

Note.— Where long names extend to the last character position in the name field, the presence of an alpha character means that the name must be treated as though truncation had occurred.

12.6.2 Examples of truncation of names are contained in the paragraphs 12.10.3, 12.10.4 and 12.10.5.

12.7 Prefixes and suffixes, including titles, professional and academic qualifications, honours, awards, and hereditary status, shall not be included in the MRZ except where the issuing State considers these to be legally part of the name. In such cases, prefixes or suffixes shall be represented as components of the secondary identifier(s).

12.8 Numeric characters shall not be used in the name fields of the MRZ.

12.9 Punctuation characters are not allowed in the MRZ. Where these appear as part of a name, they should be treated as follows:

Apostrophe:

This shall be omitted; name components separated by the apostrophe shall be combined and no filler character shall be inserted in its place in the MRZ.

Example VIZ: D'ARTAGNAN
MRZ: DARTAGNAN

Hyphen:

Where a hyphen appears between two name components, it shall be represented in the MRZ by a single filler character (<).

Example VIZ: MARIE-ELISE
MRZ: MARIE<ELISE

Comma:

Where a comma is used in the VIZ to separate the primary and secondary identifiers, the comma shall be omitted in the MRZ, and the primary and secondary identifiers shall be separated in the MRZ by two filler characters (<<).

Example VIZ: ERIKSSON, ANNA MARIA
MRZ: ERIKSSON<<ANNA<MARIA

Otherwise, where a comma is used in the VIZ to separate two name components, it shall be represented in the MRZ as a single filler character (<).

Example VIZ: ANNA, MARIA

MRZ: ANNA<MARIA

Other punctuation characters:

All other punctuation characters shall be omitted from the MRZ (i.e. no filler character shall be inserted in their place in the MRZ).

12.10 *Transliteration of national characters in names in the MRZ*

12.10.1 When the alphabet used in the issuing State exceeds or is different from the character set defined in Appendix 8 to this section, the names in the MRZ are represented differently from those in the VIZ. National characters must be transliterated using only the allowed OCR character set defined in Appendix 8 to this Section. Issuing States or organizations should adopt the recommended transliterations specified in Appendix 9 to this section, if applicable. Appendix 9 represents the most commonly used national characters of the Latin and Cyrillic families of languages.

12.10.2 *Examples of name of the holder in the MRZ*

Note.— In the following examples, the document is assumed to be a passport issued by the State of Utopia. The first five characters of the upper machine readable line are P<UTO.

a) Usual representation:

Name: Anna Maria Eriksson
VIZ: ERIKSSON, ANNA MARIA
MRZ: P<UTOERIKSSON<<ANNA<MARIA<<<<<<<<<<<<<<<<<<<

b) Central primary identifier:

Name: Deborah Heng Ming Lo
VIZ: HENG, DEBORAH MING LO
MRZ: P<UTOHENG<<DEBORAH<MING<LO<<<<<<<<<<<<<<<<<<

c) Hyphen as part of the name:

Name: Susie Margaret Smith-Jones
VIZ: SMITH-JONES, SUSIE MARGARET
MRZ: P<UTOSMITH<JONES<<SUSIE<MARGARET<<<<<<<<<<<<

d) Apostrophe as part of the name:

Name: Enya Siobhan O'Connor
VIZ: O'CONNOR, ENYA SIOBHAN
MRZ: P<UTOOCONNOR<<ENYA<SIOBHAN<<<<<<<<<<<<<<<<<<

e) Multiple name components:

Name: Martin Van Der Muellen
VIZ: VAN DER MUELLEN, MARTIN
MRZ: P<UTOVAN<DER<MUELLEN<<MARTIN<<<<<<<<<<<<<<<<

f) No secondary identifier:

Name: Arkfreith

VIZ: ARKFREITH
MRZ: P<UTOARKFREITH<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

12.10.3 *Truncated names — secondary identifier truncated*

a) One or more name components truncated to initials:

Name: Nilavadhanananda Chayapa Dejthamrong Krasuang
VIZ: NILAVADHANANANDA, CHAYAPA DEJTHAMRONG KRASUANG
MRZ: P<UTONILAVADHANANANDA<<CHAYAPA<DEJTHAMRONG<K

b) One or more name components truncated:

Name: Nilavadhanananda Arnpol Petch Charonguang
VIZ: NILAVADHANANANDA, ARNPOL PETCH CHARONGUANG
MRZ: P<UTONILAVADHANANANDA<<ARNPOL<PETCH<CHARONGU

12.10.4 *Truncated names — primary identifier truncated*

a) One or more components truncated to initials:

Name: Dingo Potoroo Bennelong Wooloomooloo Warrandyte Warnambool
VIZ: BENNELONG WOOLOOMOOLOO WARRANDYTE WARNAMBOOL, DINGO POTOROO
MRZ: P<UTOBENNELONG<WOOLOOMOOLOO<WARRANDYTE<W<<DI

b) One or more components truncated:

Name: Dingo Potoroo Bennelong Wooloomooloo Warrandyte Warnambool
VIZ: BENNELONG WOOLOOMOOLOO WARRANDYTE WARNAMBOOL, DINGO POTOROO
MRZ: P<UTOBENNELONG<WOOLOOM<WARRAND<WARNAM<<DINGO

c) One or more components truncated to a fixed number of characters:

Name: Dingo Potoroo Bennelong Wooloomooloo Warrandyte Warnambool
VIZ: BENNELONG WOOLOOMOOLOO WARRANDYTE WARNAMBOOL, DINGO POTOROO
MRZ: P<UTOBENNEL<WOOLOO<WARRAN<WARNAM<<DINGO<POTO

12.10.5 *Names that just fit, indicating possible truncation by letter in the last position of the name field, but which are not truncated*

Name: Jonathon Warren Trevor Papandropoulous
VIZ: PAPANDROPOULOUS, JONATHON WARREN TREVOR
MRZ: P<UTOPAPANDROPOULOUS<<JONATHON<WARREN<TREVOR

Note.— Even though there is an alpha character in the 44th position of this passport upper machine readable line, this name has not been truncated **but it must be assumed that it has been truncated**.

Representation of issuing State or organization and nationality of holder

13. *Visual inspection zone (VIZ)*

13.1 Where the issuing State and/or the place of issue or place of birth are in a national language that does not use Latin characters, the name of the State or other location shall appear in the national language and also shall be either transliterated into Latin characters or translated into one or more languages (at least one of which must be English, French or Spanish) by which the name may be more commonly known to the international community. The name in the different languages shall be separated by an oblique character (/) followed by at least one blank space.

13.2 Where the name of the issuing State or place of issue or place of birth is in a language that uses the Latin alphabet, but where the name is more familiar to the international community in its translation into another language or languages (particularly English, French or Spanish), the name in the national language should be accompanied by one or more translations of the name. The name in the different languages shall be separated by an oblique character (/) followed by at least one blank space.

13.3 The three-letter codes listed in Appendix 7 to this Section may also be used, at the discretion of the issuing State or organization, to complete the field for the place of birth in the VIZ.

14. *Machine readable zone (MRZ)*

14.1. The three-letter codes listed in Appendix 7to this Section shall be used to complete the field for the issuing State or organization and the nationality in the MRZ.

14.2 Use of three-letter codes is mandatory in the MRZ and Field 04 in the VIZ and optional for the holder's nationality in the VIZ. Specific locations are defined in the following table.

	Zone	*Field no.*	*Character position no.*	*Number of character positions*
Issuing State or organization	VIZ MRZ (upper line)	04	 3-5	3 3
Holder's nationality	VIZ MRZ (lower line)	08	 11-13	3 3

Representation of dates

15. Dates shall be presented as set forth hereunder.

15.1 Dates in the VIZ. Such dates on the MRP data page shall be entered in accordance with the Gregorian calendar as follows.

15.1.1 Days shall be shown by a two-digit number, i.e. the dates from one to nine shall be preceded by a zero. This number shall be followed by a blank space.

15.1.2 The month may be printed in the language of the issuing State or organization or abbreviated, using up to four character positions.

15.1.3 Where the language of the issuing State or organization is not English, French or Spanish, the month as defined in paragraph 15.1.2 shall be followed by an oblique character (/) and the month or the abbreviation of the month up to four character positions, in one of the three languages, as shown in the table below.

Abbreviations of months in English, French and Spanish

Month	*English*	*French*	*Spanish*
January	Jan	Jan	Ene
February	Feb	Fév	Feb
March	Mar	Mars	Mar
April	Apr	Avr	Abr
May	May	Mai	Mayo
June	Jun	Juin	Jun
July	Jul	Juil	Jul
August	Aug	Août	Ago
September	Sep	Sept	Sept
October	Oct	Oct	Oct
November	Nov	Nov	Nov
December	Dec	Déc	Dic

Note.— Where the language of the issuing State or organization is English, French or Spanish, the issuing State or organization should use one of the other two languages (shown in the table above) following the oblique character (/).

15.1.4 The year will normally be shown by the last two digits and be preceded by a blank space.

15.1.5 As an example, a date of 12 July 1942 on an MRP data page issued in Italian with French translation of the month would normally appear as follows:

12*b*LUG*b*/JUIL*b*42

where *b* = a single blank space, i.e. 12 LUG /JUIL 42

15.1.6 The month may, however, be printed in numerical form in the VIZ, at the discretion of the issuing State or organization, particularly where this might facilitate the use of the MRP by countries using other than the Gregorian calendar. Following a practice established to facilitate the visual inspection of travel documents, a date would be written DD*b*MM*b*YY, where *b* = a single blank space. For example, a date of 12 July 1942 would appear in the visual zone as follows: 12 07 42. However, when the month is represented numerically, the issuing State or organization may use the four-digit representation of the year in the VIZ, e.g. 12 07 1942.

15.1.7 *Unknown date of birth.* Where a date of birth is completely unknown, that data element shall appear as XX*b*XXX*b*XX where *b* = a single blank space. If only part of the date of birth is unknown, that part shall be represented by XX if it is the day or year, or by XXX if it is the month.

15.2 *Dates in the MRZ.* Such dates on the MRZ shall, in accordance with the principle set forth in ISO 8601, be shown as a six-digit number consisting of the last two digits for the year (YY) immediately followed by two digits for the number of the month (MM) and by two digits for the day (DD). The structure is as follows: YYMMDD.

15.2.1 Following this format, the example given in paragraph 15.1.6 will be shown as: 420712.

15.2.2 If all or part of the date of birth is unknown, the relevant character positions shall be completed with filler characters (<).

Check digits in the MRZ

16. The data structure of the lower machine readable line in paragraph 8.6 provides for the inclusion of five check digits as follows:

Check digit	*Character positions (lower MRZ line) used to calculate check digit*	*Check digit position (lower MRZ line)*
Passport number	1-9	10
Date of birth	14-19	20
Date of expiry	22-27	28
Personal number	29-42	43
Composite check digit	1-10, 14-20, 22-43 *Note.— Positions 11-13 and 21 are excluded when calculating the composite check digit.*	44

16.1 *Calculation of check digits in the MRZ.* A special check digit calculation has been adopted for use in MRPs. The check digits shall be calculated on modulus 10 with a continuously repetitive weighting of 731 731 ..., as follows.

16.1.1 *Step 1.* Going from left to right, multiply each digit of the pertinent numerical data element by the weighting figure appearing in the corresponding sequential position.

16.1.2 *Step 2.* Add the products of each multiplication.

16.1.3 *Step 3.* Divide the sum by 10 (the modulus).

16.1.4 *Step 4.* The remainder shall be the check digit.

16.1.5 For data elements in which the number does not occupy all available character positions, the symbol < shall be used to complete vacant positions and shall be given the value of zero for the purpose of

calculating the check digit.

16.1.6 When the check digit calculation is applied to data elements containing alphabetic characters, the characters A to Z shall have the values 10 to 35 consecutively, as follows:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35

16.1.7 *Example 1 — Application of check digit to date field*. Using 27 July 1952 as an example, with the date in numeric form as specified in ISO 8601, the calculation will be:

	Date:	5	2	0	7	2	7					
	Weighting:	7	3	1	7	3	1					
Step 1 (multiplication)	Products:	35	6	0	49	6	7					
Step 2 (sum of products)		35	+ 6	+ 0	+ 49	+ 6	+ 7	= 103				

Step 3 (division by modulus) $\frac{103}{10}$ = 10, remainder 3

Step 4. Check digit is the remainder, 3. The date and its check digit shall consequently be written as 5207273.

16.1.8 *Example 2 — Application of check digit to document number field*. Using the number AB2134 as an example for coding a 9-character, fixed-length field (e.g. passport number), the calculation will be:

Sample data element:	A	B	2	1	3	4	<	<	<	
Assigned numeric values:	10	11	2	1	3	4	0	0	0	
Weighting:	7	3	1	7	3	1	7	3	1	
Step 1 (multiplication) Products:	70	33	2	7	9	4	0	0	0	
Step 2 (sum of products)	70	+ 33	+ 2	+ 7	+ 9	+ 4	+ 0	+ 0	+ 0	
									=	125

Step 3 (division by modulus) $\frac{125}{10}$ = 12, remainder 5

Step 4. Check digit is the remainder, 5. The number and its check digit shall consequently be written as AB2134<<<5.

16.1.9 *Example 3— Application of composite check digit to MRZ*. Using the lower line of MRZ data from an MRP data page that follows, as an example for coding the composite check digit, the calculation will be:

Character positions 1-43: Example with no alpha-numeric characters in “optional data” field.

HA672242<6UT05802254M9601086<<<<<<<<<<<<<<0

Sample data element:	H	A	6	7	2	2	4	2	<	6
Assigned numeric values:	17	10	6	7	2	2	4	2	0	6
Weighting:	7	3	1	7	3	1	7	3	1	7
Step 1 (multiplication) Products:	119	30	6	49	6	2	28	6	0	42

Sample data element:	5	8	0	2	2	5	4	9	6	0
Assigned numeric values:	5	8	0	2	2	5	4	9	6	0
Weighting:	3	1	7	3	1	7	3	1	7	3
Step 1 (multiplication) Products:	15	8	0	6	2	35	12	9	42	0

Sample data element:	1	0	8	6	<	<	<	<	<	<
Assigned numeric values:	1	0	8	6	0	0	0	0	0	0
Weighting:	1	7	3	1	7	3	1	7	3	1
Step 1 (multiplication) Products:	1	0	24	6	0	0	0	0	0	0

Sample data element:	<	<	<	<	<	<	<	<	0	
Assigned numeric values:	0	0	0	0	0	0	0	0	0	
Weighting:	7	3	1	7	3	1	7	3	1	
Step 1 (multiplication) Products:	0	0	0	0	0	0	0	0	0	
Step 2 (sum of products)	119	+ 30	+ 6	+ 49	+ 6	+ 2	+ 28	+ 6	+ 0	+ 42 0
Step 2 (sum of products)	15	+ 8	+ 0	+ 6	+ 2	+ 35	+ 12	+ 9	+ 42	+ 0 0
Step 2 (sum of products)	1	+ 0	+ 24	+ 6	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0 0
Step 2 (sum of products)	0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	
Step 2 (sum of products)	=448									
Step 3 (division by modulus)	448 / 10 = 44, remainder 8									

Step 4. Check digit is the remainder, 8. The lower line of MRZ data together with its composite check digit may consequently be written as follows:

HA672242<6UT05802254M9601086<<<<<<<<<<<<<<08

Character sets and fonts

17. The character sets and fonts to be used on the MRP data page shall be as indicated hereunder.

17.1 *Captions*

17.1.1 Captions shall be printed in a clear, linear type font in a size of 1.0 mm to 1.8 mm (0.04 in to 0.07 in).

17.1.2 Captions shall be in the language of the issuing State or organization. When such language uses

the Latin alphabet, regular font style should be used to print the captions.

17.1.3 Where the language of the issuing State or organization is not English, French or Spanish, the printed caption as defined in paragraph 17.1.2 shall be followed by an oblique character (/) and the equivalent of the caption in English, French or Spanish. An italic font style should be used for the second language.

Note.— Where the language of the issuing State or organization is English, French or Spanish, the issuing State or organization should use at least one of the other two languages to print the caption following the oblique character (/).

17.1.4 Entered data, visual inspection zone (VIZ). See, paragraph 8.2.

17.1.5 Entered data, machine readable zone (MRZ). See paragraph 9.5.3.

Characteristics of the machine readable zone

18. Except as otherwise specified herein, the MRP data page shall conform with ISO 1831 concerning the following matters:

Optical properties of the substrate to be used.
Optical and dimensional properties of the image patterns forming OCR characters.
Basic requirements related to the position of OCR characters on the substrate.

18.1 Machine readable data shall be arranged from left to right in fixed-length fields in two lines (upper and lower) in the order specified in the data structure tables shown in paragraphs 9.6 and 9.7 , respectively, and located on the document as shown in Appendix 3 to this section. Data shall be entered in each field, beginning with the left-hand character position.

18.2 Where the entered data do not occupy all the character positions specified for the relevant field, the symbol < shall be used to fill the unoccupied positions.

Quality specifications of the machine readable zone

19 In general, the print quality shall conform to ISO 1831 Range X, except as otherwise provided herein. All quality specifications set forth hereunder shall apply to the MRP data page after final preparation, except where otherwise noted, and conform to the requirements in paragraph 2 to this Section.

19.1 *Substrate quality*. Paragraphs 4.3 through 4.3.2 of ISO 1831 shall be used for reference only.

19.2 *Substrate opacity*. The substrate used, measured before and after final preparation, shall be within the definition of at least medium opacity (ISO 1831, paragraphs 4.4.1 and 4.4.3).

19.3 *Substrate gloss*. The level of gloss is not specified.

19.4 *Fluorescence*. The reflectance of the substrate in the visible spectrum shall exhibit no visibly detectable fluorescence when irradiated by ultraviolet light, except where this is a predictable fluorescence for security reasons.

19.5 *Alternative substrates*. Paragraphs 19.1 to 19.4 should be followed irrespective of the substrate material.

19.6 *Spectral band*. The OCR print shall be legible visually and shall be black (B425 through B680 as defined in ISO 1831). The OCR print shall also absorb in the B900 band as defined in ISO 1831 (i.e. near infra-red). Any protective layers must not adversely affect this property.

19.7 *Print contrast signal (PCS)*. After final preparation, e.g. after the application of any protective layer, the minimum print contrast signal (PCS/min), when measured as specified in ISO 1831, shall be as follows: PCS/ min $\geq$ 0.6 at the B900 spectral band.

19.8 *Character stroke width*. The stroke width after final preparation shall be as specified for Range X in ISO 1831 (paragraph 5.3.1).

19.9 *Contrast variation ratio (CVR)*. After final preparation, i.e. after the application of any protective layer, the CVR should be as is shown for Range X in ISO 1831, i.e. CVR < 1.50.

19.10 *Spots and extraneous marks*. ISO Standard 1831 (paragraphs 5.4.4.6 and 5.4.5.12) shall apply at the reading surface (see also B.6 of Appendix B and C.5.10 of Appendix C to ISO 1831).

19.11 *Voids*. The value of "d" as defined in ISO 1831 (paragraph 5.4.5.9) shall be equal to 0.4 at the reading surface.

19.12 *Line separation*. See paragraph 9.5.6 and Appendix 3 to this section.

19.13 *Line spacing*. See paragraph 9.5.6 and Appendix 3 to this section.

19.14 *Skew*. The provisions relating to skew shall be as follows.

19.14.1 *Skew of MRZ characters*. The skew of individual MRZ characters on the MRP data page shall not exceed 3/ measured from the reference edge.

19.14.2 *Skew of the MRZ lines*. The effect of the actual skew of the MRZ lines and the actual skew of the MRZ characters shall not exceed the limit specified in paragraph 17.14.1 nor shall the skew of MRZ or character misalignment result in the MRZ lines or any part thereof appearing outside the printing zone as defined in Appendix 3 to this section.

20. *Machine assisted document verification*

20.1 Should an issuing State wish to incorporate into its MRP a means by which the document can be authenticated with the aid of a machine, these specifications provide for the use of two generic means using either a substance or a structure as described in paragraph 3 of Section III. Appendix 10 to this Section shows

the recommended areas and nominal centres for these two types of features on all sizes of MRTD.

20.2 It is emphasised that Doc 9303 does not at this time specify any means of globally interoperable machine assisted verification. Issuing States may incorporate such means for their own or bilaterally agreed use only.

Passport card

21. Should a State or organization wish to issue a machine readable passport card specifically for purposes such as facilitating travel to States accepting a passport card without visa for entry (*recognizing that issuing States or organizations must reach specific agreements with such receiving States on acceptance of the passport card*), facilitating identity confirmation of the rightful holder to enhance security or in case of loss/theft of the MRP, and/ or *approved* use in automated passenger clearance schemes, the issuing State or organization shall issue an ID-1 size card in accordance with the specifications for a TD-1 in Part 3 of Doc 9303. This card, consistent with its status as a passport, shall be identified as a passport card and conform as follows.

21.1 *General layout.* The passport card shall comply with the specifications governing the general layout of the TD-1 (see Doc 9303, Part 3).

21.2. *Detailed layout of VIZ.* The passport card shall comply with the specifications governing layout of the VIZ of the TD-1 (see Doc 9303, Part 3) with the following exception.

21.3. *Document.* The designation of the document (Field 01/Zone I) shall be "PASSPORT CARD".

21.4. *Detailed layout of the MRZ.* The passport card shall comply with the specifications governing layout of the MRZ for the TD-1 (see Doc 9303, Part 3) with the following exception.

21.5. *Document Code.* The document code (Line 1) shall be "IP".

21.6 *Document Number:* Where a State issues a passport card to a holder who also holds an MRP book, the numbering schemes used for the book and the card should be different so that it is possible to differentiate between the two in the event that one is stolen or lost.

Emergency and Short Term Passports

22. Wherever possible, States should issue MRPs in their established standard method. However, where a person needs to obtain a passport urgently following a family emergency or the loss or theft of an MRP, it may be necessary for the State to issue an emergency passport. This may be issued either within the issuing State or at that State's embassy/consulate in another country. Such passports are known as Emergency or Short Term Passports.

22.1 States should endeavour to maintain the same standard for security for short-term passports as for the standard MRP. Ideally, the same methods of personalization would be used wherever the passport was personalized, but this is not usually the case. Thus short-term passports issued in less than ideal conditions may

not have all the features afforded by passports issued at the issuing State's domestic facilities.

22.2 As a general principle for short-term passports, all operating standards describing the data placement and content in both the visual information zone (VIZ) and the machine readable zone (MRZ) shall remain as specified in Volume 1 of ICAO Doc 9303 Part 1, to ensure global interoperability.

22.3 Listed below are features that may differ between a full validity, domestically issued passport and a short-term passport issued under less than standard conditions.

22.3.1 *Cover color.* Although a State may wish to use the same color cover as for a normal passport, many States have chosen a color to draw attention to the passport. This attention may be viewed by some States as causing their citizens undue hindrance, while other States may use the color difference to encourage the holder to get a full validity passport. A different color than normal is also a hint to the border control that the passport was issued under less than optimal conditions. Garish colors should be avoided, in deference to the importance of the passport document.

22.3.2 *Period of validity*. Passports issued under less than ideal conditions should have a limited term of validity. Because many nations will not issue a visa on the basis of a passport with less than six months validity, a seven-month minimum validity should be considered for most cases. Consular discretion or citizen needs may indicate a shorter term, and direct repatriation issuances may be valid for only one flight. Under no circumstances should a short-term passport have a term of validity longer than one year.

22.3.3 *Book size:* The dimensions as specified in Paragraph 4 of Section IV of Part 1 Machine Readable Passport specification are to be met. The number of pages may be fewer, reflecting the reduced term of validity. While book personalization and book manufacturing constraints must be honoured, no short-term passport should have fewer than eight (8) pages, including the data page.

22.3.4 *Book designation*. States may choose to add a modifier to the term "passport" stamped on the cover, such as "Provisional", "Short-Term", "Temporary" or "Emergency Issue", or they may not. In Part 1, paragraph 9.6, field 03 Document Code specifies the use of the letter "P" and a second optional letter at the discretion of the issuing State of organization. No recommendation is made as to the potential use of this second letter as a designator of short-term passports.

22.3.5 *Passport number.* The book control number assigned to the book by the security passport manufacturer should be used as the passport number. This practice is especially important for internal control purposes, and accounting for books should they become missing, lost or stolen, which is more likely in de-centralised issuing systems.

22.3.6 *Security features.* Short-term passports will not likely have the same suite of security features as passports issued domestically in the regular way. To compensate, the personalization process should have two or more security features from among the features listed in Paragraph 5.4.3 and 5.4.4 in the Security Standards Appendix 1 to Section III of Volume 1 ICAO Doc 9303 Part 1 Machine Readable Passports.

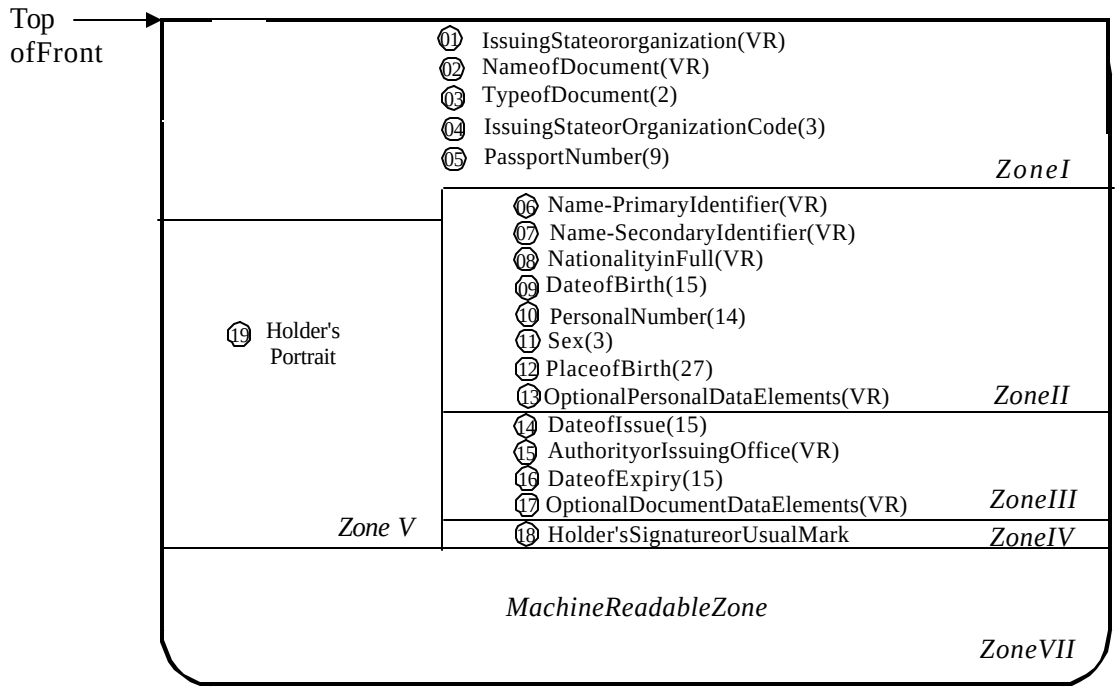
22.3.7. *Security Information:* States shall provide to other States and concerned organisations such as airlines information on the design and security features of emergency and short term passports.

Passports with additional data storage and biometric capability

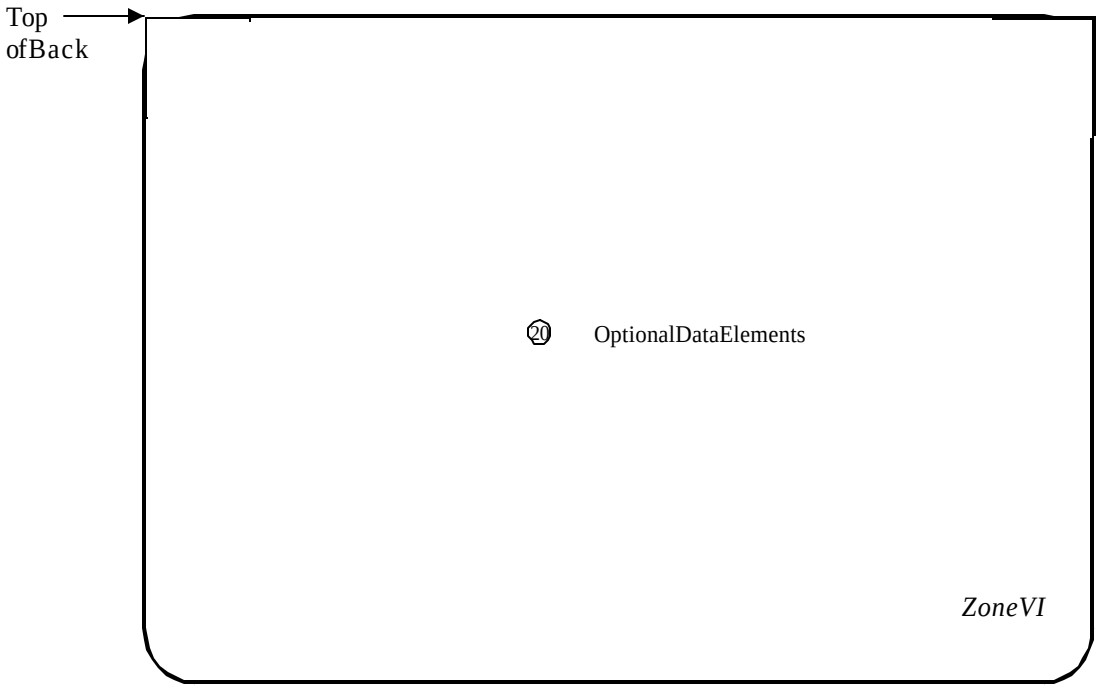
23. Volume 2 of ICAO Doc 9303 Part 1 contains specifications for increasing the data storage capacity and global interoperability of an MRP by the incorporation of a contactless integrated circuit into the structure of the MRP. The resulting extra data capacity may be used for various purposes including the mandatory storage of a globally interoperable image of the face of the holder for use as the input into facial recognition systems. Optionally, fingerprint and iris images may also be stored as secondary globally interoperable biometrics.

NORMATIVEAPPENDIX1toSectionIV
SEQUENCEOFDATAELEMENTSFORTHEMACHINEREADABLEPASSPORT(MRP)DATAPAGE

Diagram1SequenceofDataElements



Front of MRPDataPage



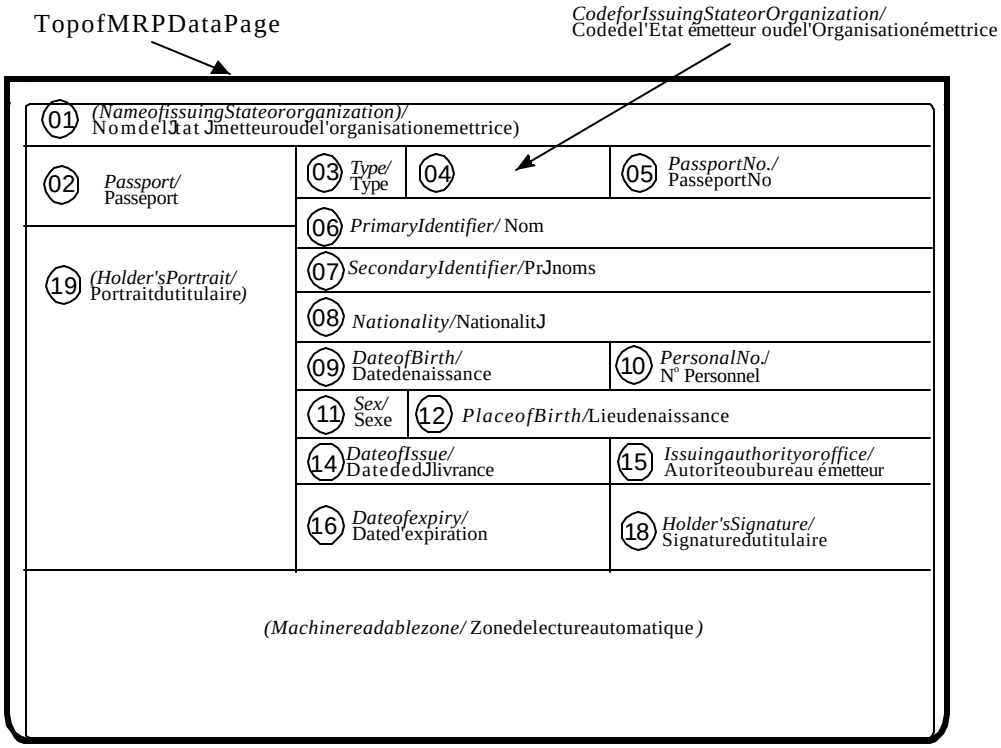
Nottoscale

Back ofMRPDataPageoranadjacentPage

NOTES: 1. (VR)=variablenumberofcharacters
2. ( )=maximumorfixednumberofcharacters
3. =fieldnumber

APPENDIX 1 toSectionIV(cont)

Diagram2 Locationof DataElements-RecommendedPractice



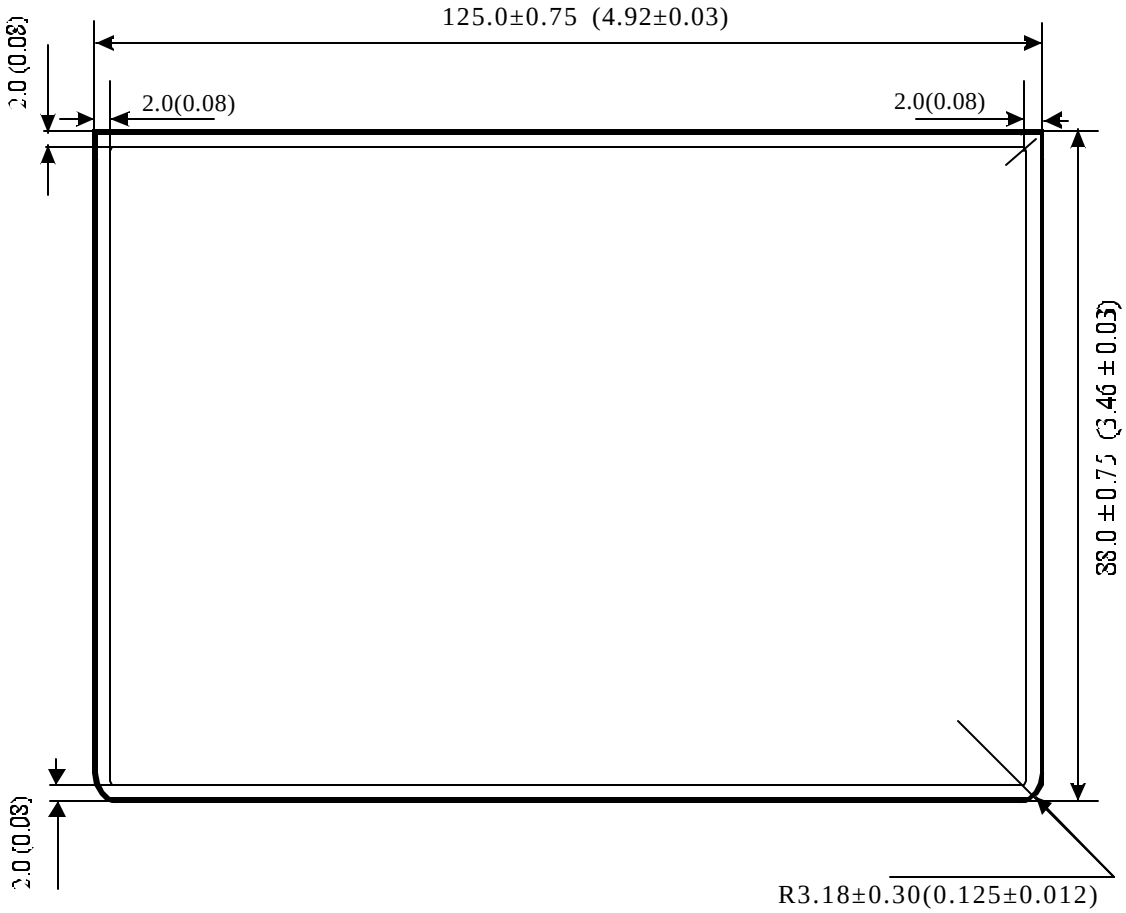
Nottoscale

NOTES:
1. Optionaldatafields13and17areexcludedintheRecommendedPractice.
2. Captionscorrespondingtothefieldnamesprintedintheaboveillustration,exceptthosewithin Parentheses,shallbeprintedontheMRP.

APPENDIX 2 toSectionIV

SCHEMATICDIAGRAMOFMACHINEREADABLEPASSPORT(MRP)DATAPAGE

Diagram1. Dimensional Specifications



R = Radius

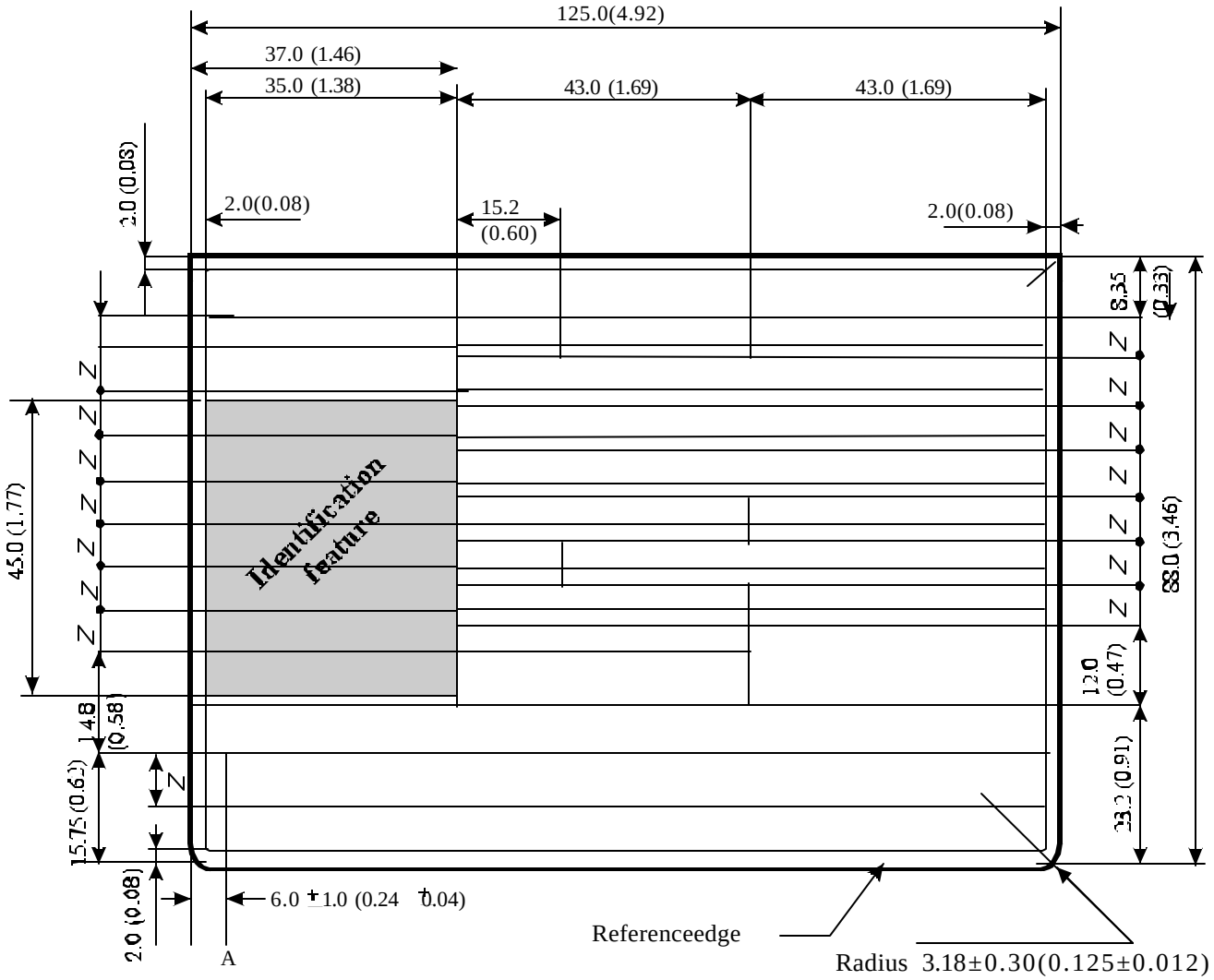
Dimensionsinmillimetres
(inchdimensionsinparentheses)

Nottoscale

APPENDIX2toSectionIV(cont)

SCHEMATICDIAGRAMOFMACHINEREADABLEPASSPORT(MRP)DATAPAGE

Diagram2 PrintingSpecifications-NominalLayout



Note:1.Seeparagraph4.2fortheover-alldimensionaltolerances.

2.ToallowforvariationsarisingduringmanufactureoftheMRP,atoleranceof 1.0 mm(0.04in)isallowedforthe23.2 mm (0.91in)dimensionoftheMRZandwithinthatover-alltolerancetheboundarybetweentheVIZandtheMRZshallnotbe skewedmorethan0.5mm(0.02in)overthe125.0mm(4.92in)dimension.

3.A-ThereshallbenotexttotheleftofthislineintheMRZ.

4.Exceptforthebackgroundsecurityprintasreferredtoinparagraph10.1,thereshallbenoprintinthe2.0mm(0.08 in)margins.

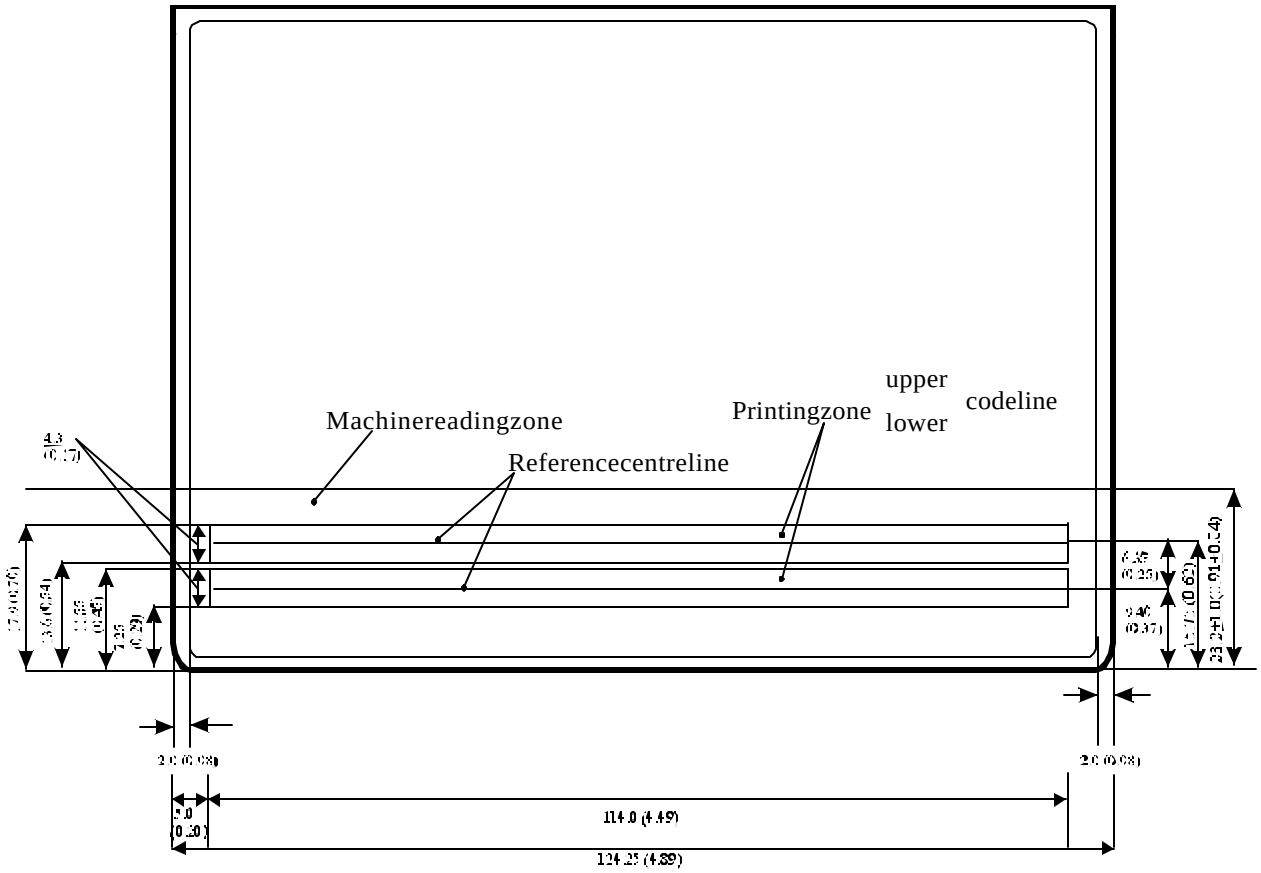
5.Theborderlinesofthefields shouldbeomittedontheactualMRPdatapage.

6.Referto5.5concerningoptionalextensionofField19(holder'sportrait)4.0mm(0.16in)tothe right, withtheconsequent reductioninthefieldstoitsright,andField18(holder'ssignatureorusualmark)whichmaybeplacedonthepageadj acent totheMRPdatapagewithconsequentincreaseinthesizeoftheField15(IssuingAuthority).

.

APPENDIX 3 toSectionIV

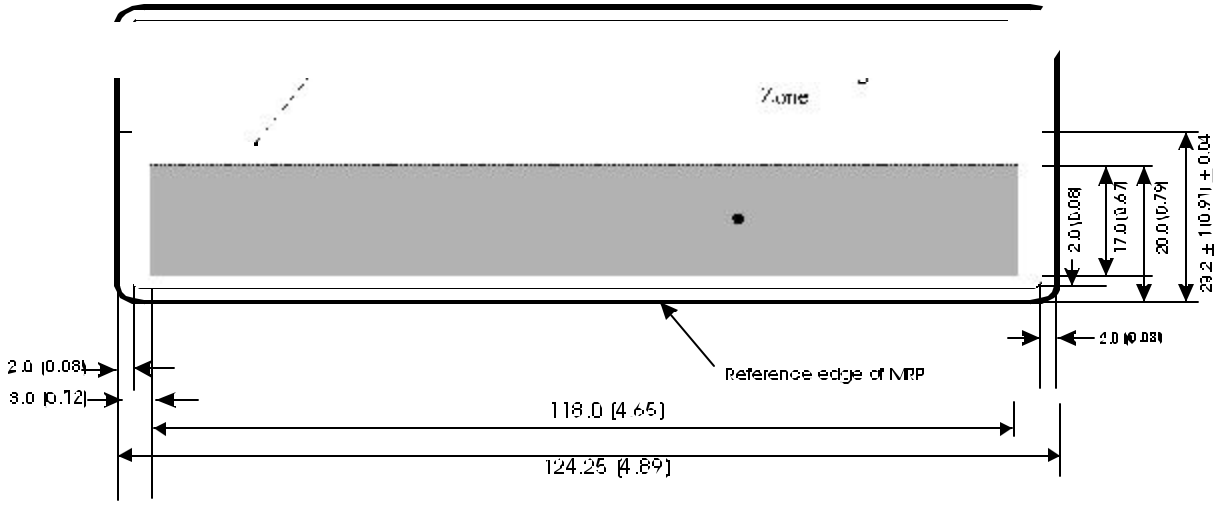
SCHEMATIC DIAGRAMOFMACHINEREADABLEZONE



Note:-Inthisillustrationthesmallestdimensionsallowedforthe125.0mm(4.92in)dimensionofthe MRPdatapageandfortheleft-handmarginintheMRZhavebeenselected.

SCHEMATICDIAGRAMOFEFFECTIVEREADINGZONE

Showninrelationtoan MRPPage

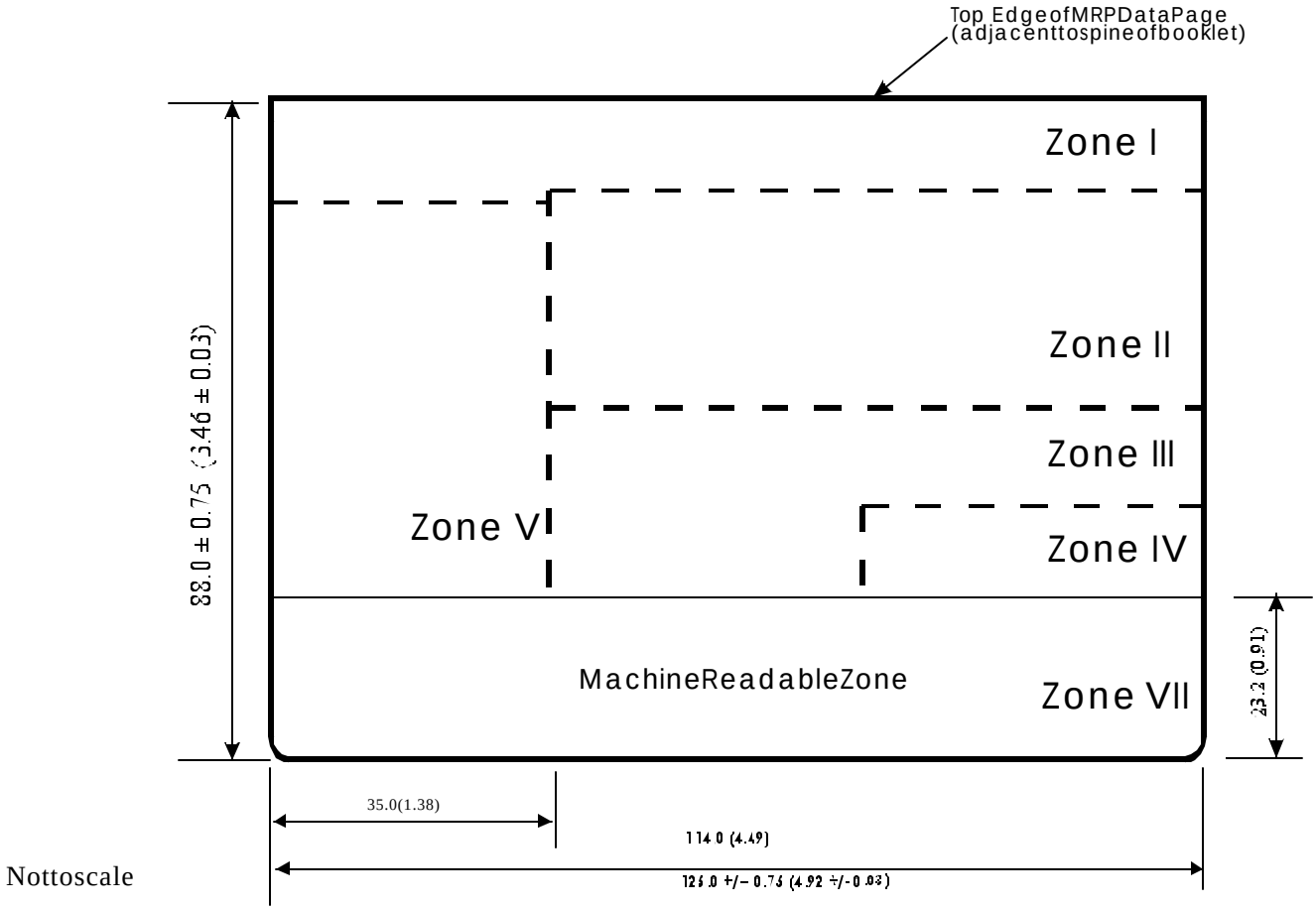


Dimensionsinmillimetres
(inchdimensionsinparentheses)

Not to scale

APPENDIX4toSectionIV

NOMINALPOSITIONINGOFZONESI - V ON MRPDATAPAGE



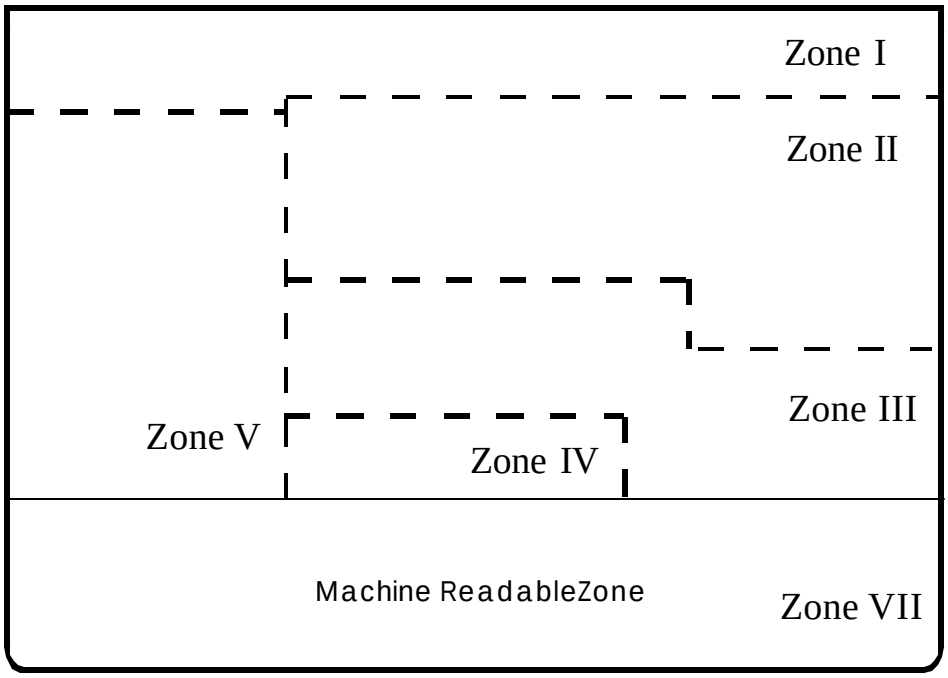
Notes:

1. Thesediagrams shouldbeconsideredinconjunctionwithParagraph5ofSectionIV.
2. Dottedlinesindicatezoneboundarieswhosepositionsarenotfixed,enablingissuingStates andorganizationsflexibilityinthepresentationof data. SeeParagraph5.3ofSectionIV.
3. ZoneVI,where used, appearsonthebackofthedatapageoronanadjacentpage.

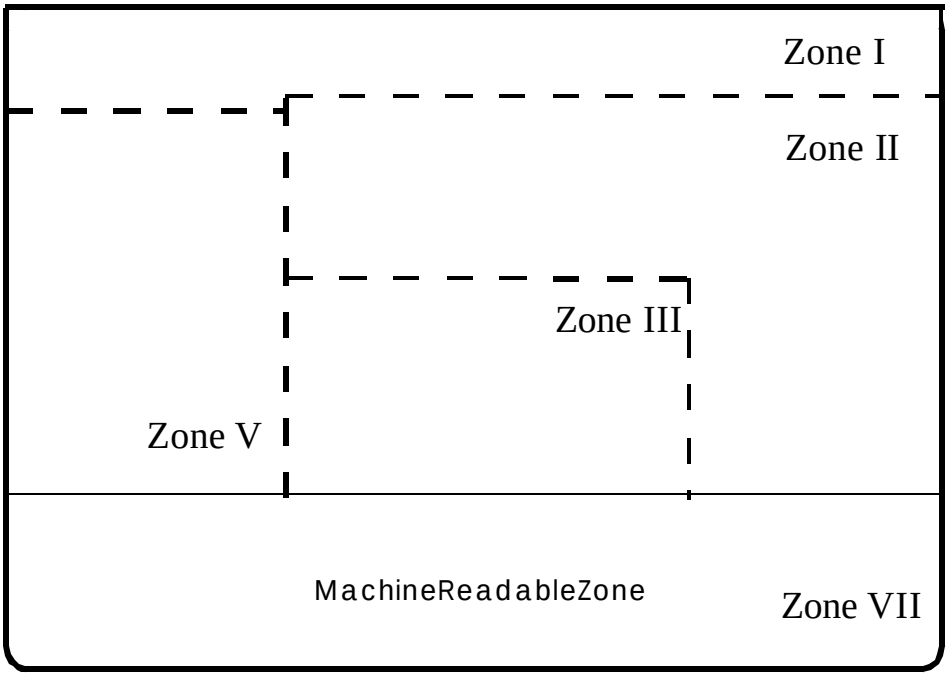
APPENDIX 4 toSectionIVContinued

FLEXIBLE POSITIONING OFZONESI-IVON MRPDATAPAGE

Example1



Example2



NOTES

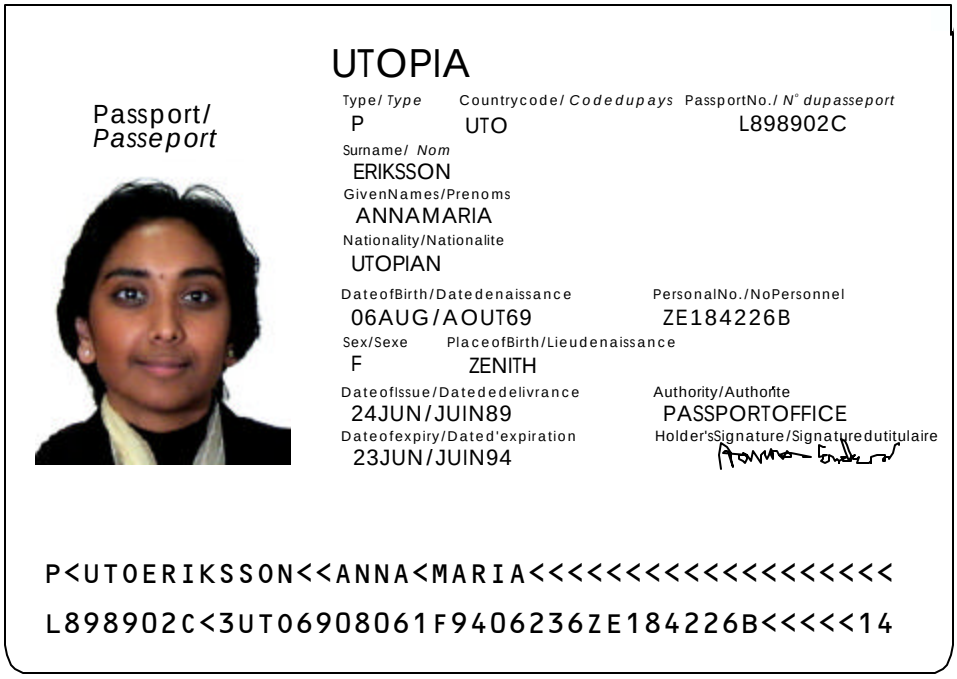
Example1illustratesastaircaselowerboundarybetweenZonesIIandIII.

Example2showsasituationwhereZoneIV(Signature)ismovedtoanadjacentpage,andZoneIIIpositionedsoitdoesnotextendto therighthandedgeofthedatapage.

APPENDIX 5 toSectionIV

EXAMPLE OFAPERSONALIZEDMACHINEREADABLEPASSPORTDATAPAGE

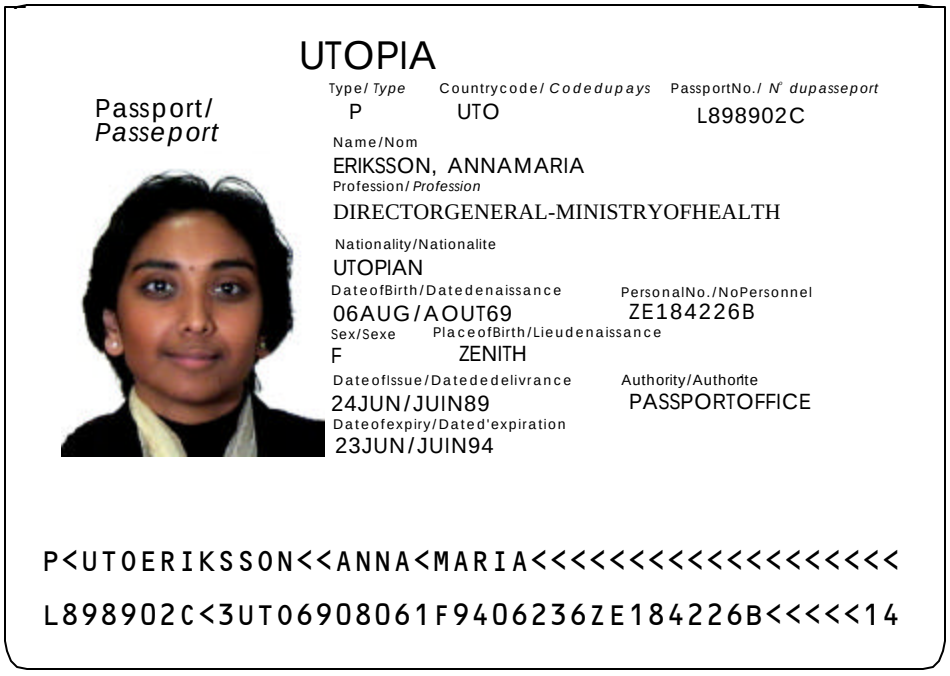
Example1



Note: Example1MRPdatapageconformswith *RecommendedPractice* layout.

APPENDIX 5 toSectionIV

Example2



Example2MRPdatapageillustratesanindentedZoneV(holder'sportrait)asdefinedinParagraph5.5,the absenceof ZoneIV(holder'ssignatureorusualmark)onthedatapage,andtheintroductionofoptional data(i.e.Field13,optionalpersonaldetails)inZoneII(e.g. Occupation).

APPENDIX 5 toSectionIV(cont)

Example 3

Type/ *Type*
P

Countrycode/ *Codedupays*
UTO

PassportNo./ *N° dupasseport*
L898902C

Surname/ *Nom*
ERIKSSON

GivenNames/Prenoms
ANNAMARIA

Nationality/Nationalite
UTOPIAN

DateofBirth/Datedenaissance
06AUG/AOUT69

Sex/Sexe
F

PlaceofBirth/Lieudenaissance
ZENITH

DateofIssue/Datededelivrance
24JUN/JUIN89

Authority/Autho/te
PASSPORTOFFICE

PersonalNo./NoPersonnel
ZE184226B

Dateofexpiry/Dated'expiration
23JUN/JUIN94

P<UTOERIKSSON<<ANNA<MARIA<<<<<<<<<<<<<<<<<<<<

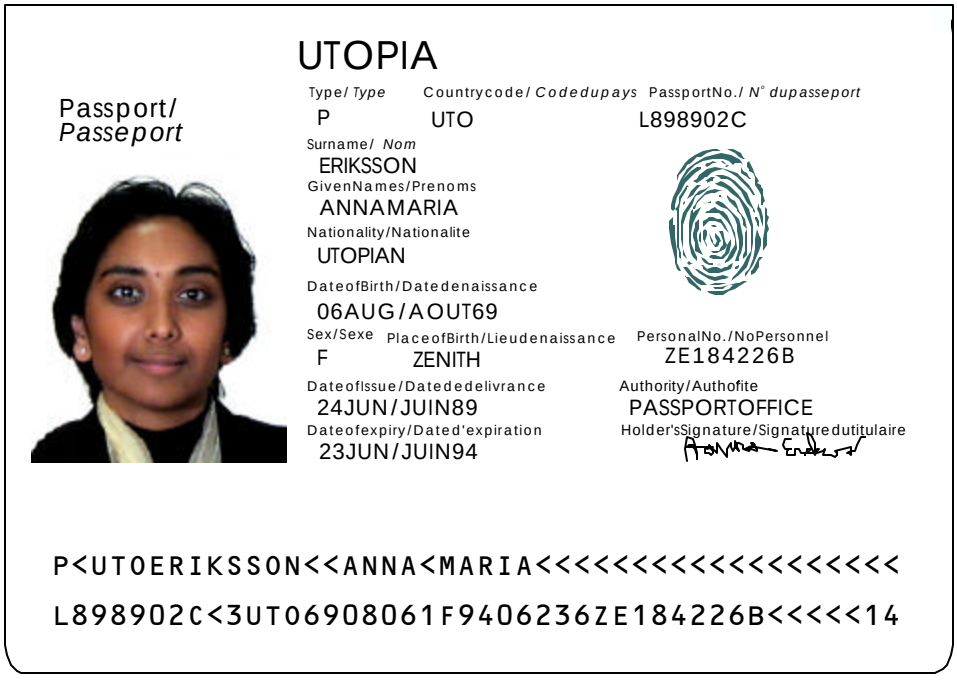
L898902C<3UT06908061F9406236ZE184226B<<<<<14

Example3illustratesanMRPdatapageappearingonaninteriorpageofthebook. ThenameoftheissuingState andthenameofthedocumenthaveappearedonanearlierpageandarethereforeomittedfromthedatapage. TheexamplealsoillustratesZoneV (theportrait)movedverticallyupwards with ZoneIV(thesignature) overlayingtheportraitandthepersonalnumber of ZoneIIIplacedbeneaththeportrait.

APPENDIX 5 toSectionIV

EXAMPLE OFAPERSONALIZEDMACHINEREADABLEPASSPORTDATAPAGE

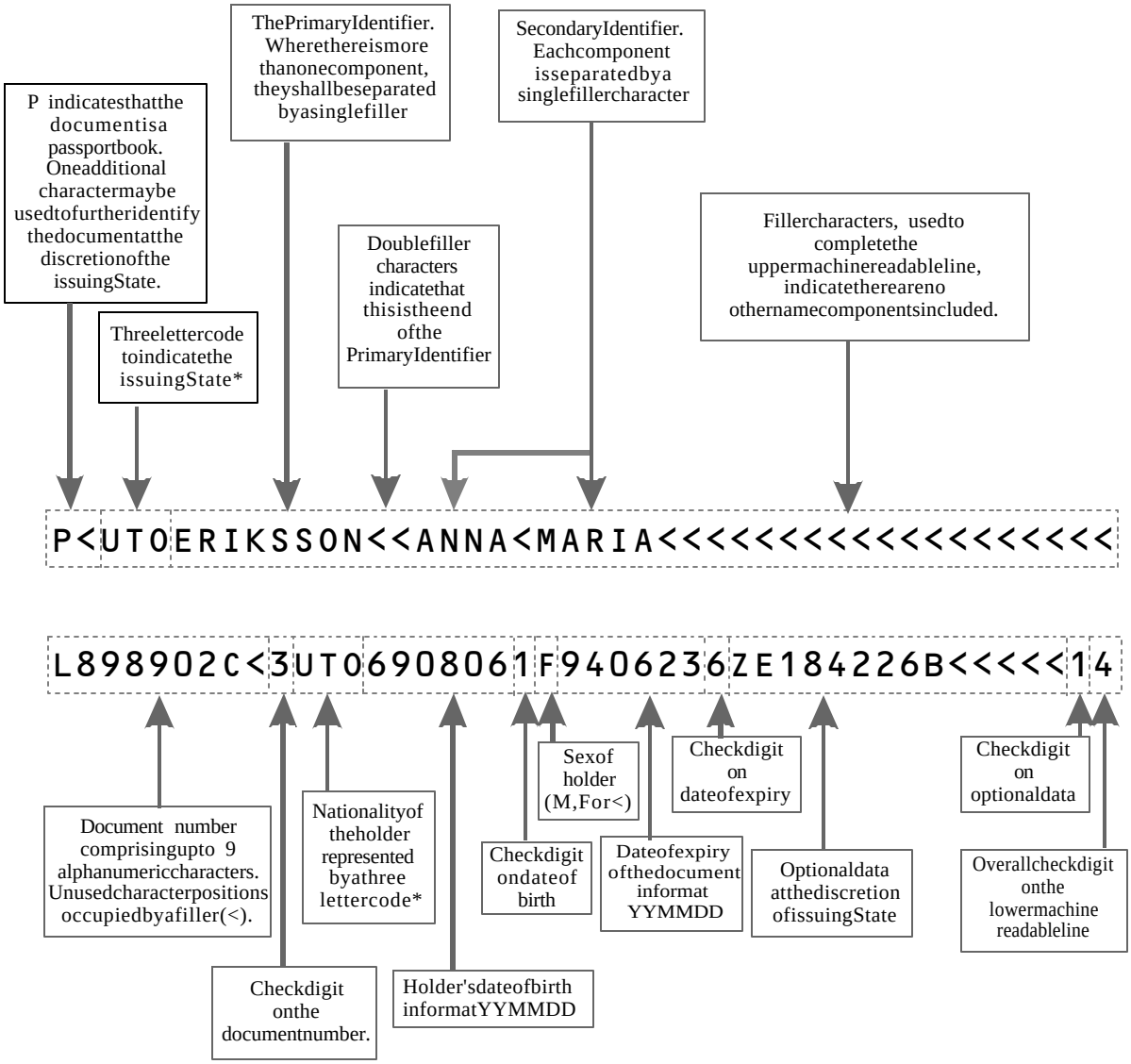
Example4



AnMRPdatapagewiththelayoutadjustedtoaccommodateadisplayedfingerprint inZoneII.SeeParagraph7.3

APPENDIX 6 to Section IV

CONSTRUCTION OFTHEMACHINEREADABLEZONEOF PASSPORT DATA PAGE



Notes

1. * Three lettercodesaregiveninAppendixIofSectionIII.

2. Dottedlinesindicatedatafields;these,togetherwitharrowsandcommentboxes,areshown forthereader'sunderstandingonlyandarenotprintedonthedocument.

3. Dataisinsertedintoafieldbeginningatthefirstcharacterpositionstartingfromtheleft. Anyunusedcharacterpositionsshallbeoccupiedbyfillercharacters(<).

NORMATIVE APPENDIX 7 to Section IV

THREE-LETTER CODES

(Based on Alpha-3 codes for entities specified in ISO 3166-1,
with extensions for certain States being identified by an asterisk)

Part A — Codes for designation of nationality, place of birth or issuing State/authority

Entity (short name)	*Code*
Afghanistan	AFG
Albania	ALB
Algeria	DZA
American Samoa	ASM
Andorra	AND
Angola	AGO
Anguilla	AIA
Antarctica	ATA
Antigua and Barbuda	ATG
Argentina	ARG
Armenia	ARM
Aruba	ABW
Australia	AUS
Austria	AUT
Azerbaijan	AZE
Bahamas	BHS
Bahrain	BHR
Bangladesh	BGD
Barbados	BRB
Belarus	BLR
Belgium	BEL
Belize	BLZ
Benin	BEN
Bermuda	BMU
Bhutan	BTN
Bolivia	BOL
Bosnia and Herzegovina	BIH
Botswana	BWA
Bouvet Island	BVT
Brazil	BRA
British Indian Ocean Territory	IOT
Brunei Darussalam	BRN
Bulgaria	BGR
Burkina Faso	BFA
Burundi	BDI
Cambodia	KHM
Cameroon	CMR
Canada	CAN
Cape Verde	CPV
Cayman Islands	CYM
Central African Republic	CAF
Chad	TCD
Chile	CHL
China	CHN
Christmas Island	CXR
Cocos (Keeling) Islands	CCK
Colombia	COL
Comoros	COM
Congo	COG
Cook Islands	COK
Costa Rica	CRI
Côte d'Ivoire	CIV
Croatia	HRV
Cuba	CUB
Cyprus	CYP
Czech Republic	CZE
Democratic People's Republic of Korea	PRK
Democratic Republic of the Congo	COD
Denmark	DNK
Djibouti	DJI
Dominica	DMA
Dominican Republic	DOM
East Timor (Democratic Republic of)	TLS
Ecuador	ECU
Egypt	EGY
El Salvador	SLV
Equatorial Guinea	GNQ
Eritrea	ERI
Estonia	EST
Ethiopia	ETH
Falkland Islands (Malvinas)	FLK[1]
Faroe Islands	FRO
Fiji	FJI
Finland	FIN
France	FRA
France, Metropolitan	FXX
French Guiana	GUF
French Polynesia	PYF
French Southern Territories	ATF

Gabon	GAB
Gambia	GMB
Georgia	GEO
Germany	D
Ghana	GHA
Gibraltar	GIB
Greece	GRC
Greenland	GRL
Grenada	GRD
Guadeloupe	GLP
Guam	GUM
Guatemala	GTM
Guinea	GIN
Guinea-Bissau	GNB
Guyana	GUY
Haiti	HTI
Heard and McDonald Islands	HMD
Holy See (Vatican City State)	VAT
Honduras	HND
Hong Kong Special Administrative Region of China	HKG
Hungary	HUN
Iceland	ISL
India	IND
Indonesia	IDN
Iran (Islamic Republic of)	IRN
Iraq	IRQ
Ireland	IRL
Israel	ISR
Italy	ITA
Jamaica	JAM
Japan	JPN
Jordan	JOR
Kazakhstan	KAZ
Kenya	KEN
Kiribati	KIR
Kuwait	KWT
Kyrgyzstan	KGZ
Lao People's Democratic Republic	LAO
Latvia	LVA
Lebanon	LBN
Lesotho	LSO
Liberia	LBR
Libyan Arab Jamahiriya	LBY
Liechtenstein	LIE
Lithuania	LTU
Luxembourg	LUX
Macau Special Administrative Region of China	MAC
Madagascar	MDG
Malawi	MWI
Malaysia	MYS
Maldives	MDV
Mali	MLI
Malta	MLT
Marshall Islands	MHL
Martinique	MTQ
Mauritania	MRT
Mauritius	MUS
Mayotte	MYT
Mexico	MEX
Micronesia (Federated States of)	FSM
Monaco	MCO
Mongolia	MNG
Montserrat	MSR
Morocco	MAR
Mozambique	MOZ
Myanmar	MMR
Namibia	NAM
Nauru	NRU
Nepal	NPL
Netherlands	NLD
Netherlands Antilles	ANT
Neutral Zone	NTZ
New Caledonia	NCL
New Zealand	NZL
Nicaragua	NIC
Niger	NER
Nigeria	NGA
Niue	NIU
Norfolk Island	NFK
Northern Mariana Islands	MNP
Norway	NOR
Oman	OMN
Pakistan	PAK
Palau	PLW
Panama	PAN
Papua New Guinea	PNG
Palestinian Territory, Occupied	PSE
Paraguay	PRY
Peru	PER
Philippines	PHL
Pitcairn	PCN
Poland	POL

Portugal	PRT
Puerto Rico	PRI
Qatar	QAT
Republic of Moldova	MDA
Republic of Korea	KOR
Réunion	REU
Romania	ROU
Russian Federation	RUS
Rwanda	RWA
St. Helena	SHN
Saint Kitts and Nevis	KNA
Saint Lucia	LCA
St. Pierre and Miquelon	SPM
Saint Vincent and the Grenadines	VCT
Samoa	WSM
San Marino	SMR
Sao Tome and Principe	STP
Saudi Arabia	SAU
Senegal	SEN
Seychelles	SYC
Sierra Leone	SLE
Singapore	SGP
Slovakia	SVK
Slovenia	SVN
Solomon Islands	SLB
Somalia	SOM
South Africa	ZAF
South Georgia and the South Sandwich Islands	SGS
Spain	ESP
Sri Lanka	LKA
Sudan	SDN
Suriname	SUR
Svalbard and Jan Mayen Islands	SJM
Swaziland	SWZ
Sweden	SWE
Switzerland	CHE
Syrian Arab Republic	SYR
Taiwan, Province of China	TWN
Tajikistan	TJK
Thailand	THA
The former Yugoslav Republic of Macedonia	MKD
Togo	TGO
Tokelau	TKL
Tonga	TON
Trinidad and Tobago	TTO
Tunisia	TUN
Turkey	TUR
Turkmenistan	TKM
Turks and Caicos Islands	TCA
Tuvalu	TUV
Uganda	UGA
Ukraine	UKR
United Arab Emirates	ARE
United Kingdom	
British	
— Citizen	GBR
— Dependent territories citizen	GBD*
— National (Overseas)	GBN*
— Overseas citizen	GBO*
— Protected person	GBP*
— Subject	GBS*
United Republic of Tanzania	TZA
United States	USA
United States Minor Outlying Islands	UMI
Uruguay	URY
Uzbekistan	UZB
Vanuatu	VUT
Vatican City State (Holy See)	VAT
Venezuela	VEN
Viet Nam	VNM
Virgin Islands (British)	VGB
Virgin Islands (U.S.)	VIR
Wallis and Futuna Islands	WLF
Western Sahara	ESH
Yemen	YEM
Yugoslavia	YUG
Zambia	ZMB
Zimbabwe	ZWE

1. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

Part B — Codes for use in United Nations travel documents

*UNO — Designates the United Nations Organization or one of its officials.

*UNA — Designates a specialized agency of the United Nations or one of its officials.

*UNK — Designates a resident of Kosovo to whom a travel document has been issued by the United Nations Interim Administration Mission in Kosovo (UNMIK).

Part C — Codes for persons without a defined nationality

*XXA — Stateless person, as defined in Article 1 of the 1954 Convention Relating to the Status of Stateless Persons.

*XXB — Refugee, as defined in Article 1 of the 1951 Convention Relating to the Status of Refugees as amended by the 1967 Protocol.

*XXC — Refugee, other than as defined under the code XXB above.

*XXX — Person of unspecified nationality, for whom the issuing State does not consider it necessary to specify any of the codes XXA, XXB or XXC above, whatever that person's status may be. This category may include a person who is neither stateless nor a refugee but who is of unknown nationality and legally residing in the State of issue.

* These are the extensions to the ISO 3166-1 codes referred to in Paragraph 14.1 to this Section

NORMATIVE APPENDIX 8 to Section IV

SUBSET OF OCR-B CHARACTERS FROM ISO 1073-II
FOR USE IN MACHINE READABLE TRAVEL DOCUMENTS
(constant stroke width)

(*for illustrative purposes only*)

1. Machine readable zone (MRZ)

Only the following characters shall appear in the MRZ.

0123456789
ABCDEFGHI
JKLMNOPQR
STUVWXYZ <

The above characters are shown larger than actual size. The typeface required in the MRZ on MRTDs is OCR-B, size 1, constant stroke width with a character width spacing of 2.54 mm (0.10 in), i.e. a horizontal printing density of 10 characters per 25.4 mm (1.0 in).

2. Visual inspection zone (VIZ)

The typeface and type size used within the VIZ is at the discretion of the issuing State or organization, although use of OCR-B, size 1, is preferred. Irrespective of typeface used, the printing density should not exceed 15 characters per 25.4 mm (1.0 in).

NORMATIVE APPENDIX 9 to Section IV

TRANSLITERATIONS RECOMMENDED FOR USE BY STATES

Sequence number	*National character*	*Description*	*Recommended transliteration*
A. **Transliteration of multinational characters**			
1	Á	A acute	A
2	À	A grave	A
3	Â	A circumflex	A
4	Ä	A diaeresis	AE
5	Ã	A tilde	A
6	{	A breve	A
7	Å	A ring	AA
8	}	A macron	A
9	€	A ogonek	A
10	,	C acute	C
11	†	C circumflex	C
12	„	C caron	C
13	ˆ	C dot accent	C
14	Ç	C cedilla	C
15	o	Eth	D
16	Š	D caron	D
17	É	E acute	E
18	È	E grave	E
19	Ê	E circumflex	E
20	Ë	E diaeresis	E
21	Œ	E caron	E
22	Ž	E dot accent	E
23	•	E macron	E
24	’	E ogonek	E
25	Œ	E breve	E
26	œ	G circumflex	G
27	–	G breve	G
28	ž	G dot accent	G
29	š	G cedilla	G

Sequence number	*National character*	*Description*	*Recommended transliteration*
30	¢	H bar	H
31		H circumflex	H
32	I	I without dot (Turkey)	I
33	Í	I acute	I
34	Ì	I grave	I
35	Î	I circumflex	I
36	Ï	I diaeresis	I
37	ª	I tilde	I
8	¤	I dot accent	I
39	¦	I macron	I
40	¨	I ogonek	I
41	/	I breve	I
42	®	J circumflex	J
43	°	K cedilla	K
44	º	L slash	L
45	²	L acute	L
46	Ľ	L caron	L
47	¶	L cedilla	L
48	¸	L dot	L
49	¼	N acute	N
50	Ñ	N tilde	N or NXX
51	À	N caron	N
52	Â	N cedilla	N
53	ô	Eng	N
54	Ø	O slash	OE
55	Ó	O acute	O
56	Ò	O grave	O
57	Ô	O circumflex	O
58	Ö	O diaeresis	OE
59	Õ	O tilde	O
60	Ä	O double acute	O
61	Æ	O macron	O
62	3	O breve	O
63	Ê	R acute	R

Sequence number	*National character*	*Description*	*Recommended transliteration*
64	Ì	R caron	R
65	Î	R cedilla	R
66	Ð	S acute	S
67	Ö	S circumflex	S
68	Š	S caron	S
69	Ô	S cedilla	S
70	Ü	T bar	T
71	Ø	T caron	T
72	Ú	T cedilla	T
73	Ú	U acute	U
74	Ù	U grave	U
75	Û	U circumflex	U
76	Ü	U diaeresis	UE or UXX
77	è	U tilde	U
78	Þ	U breve	U
79	à	U double acute	U
80	æ	U ring	U
81	â	U macron	U
82	ä	U ogonek	U
83	ê	W circumflex	W
84	Ý	Y acute	Y
85	ì	Y circumflex	Y
86	Ÿ	Y diaeresis	Y
87	î	Z acute	Z
88	Ž	Z caron	Z
89	ò	Z dot	Z
90	Þ	Thorn (Iceland)	TH
91	Æ	ligature AE	AE
92	¬	ligature IJ	IJ
93	Œ	ligature OE	OE
94	ß	double s (Germany)	SS

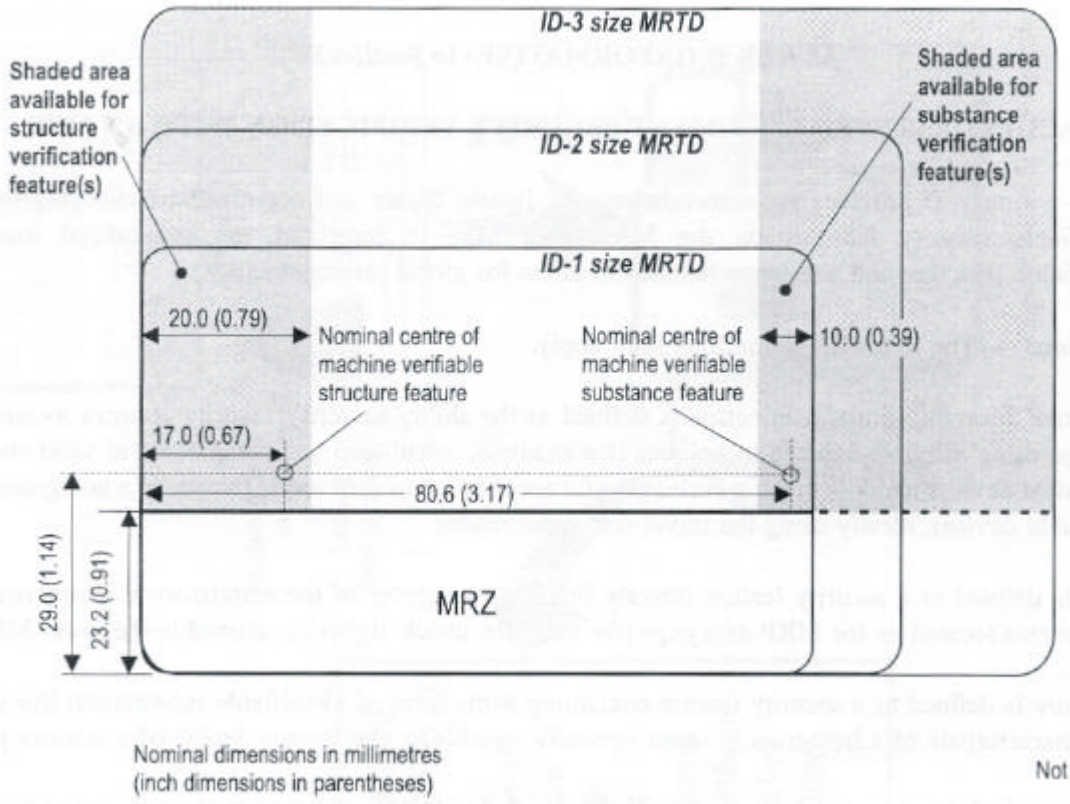
B. **Transliteration of Cyrillic characters** **TO BE UPDATED**

Sequence number	*National character*	*Description*	*Recommended transliteration*
1	!		A
2	#		B
3	%		V
4	'		G (except Belorussian and Serbian-Macedonian = H)
5	)		D
6	+		E
7	-		E (except Belorussian = IO)
8	/		ZH (except Serbian-Macedonian = Z)
9	1		Z
10	3		I (except Ukrainian = Y)
11	I		I
12	5		I
13	7		K
14	9		L
15	;		M
16	=		N
17	?		O
18	A		P
19	C		R
20	E		S
21	G		T
22	I		U
23	L		F
24	M		KH (except Serbian-Macedonian = H)
25	O		TS (except Serbian-Macedonian = C)
26	Q		CH (except Serbian-Macedonian = C)
27	S		SH (except Serbian-Macedonian = S)
28	U		SHCH (except Bulgarian = SHT)
29	Y		Y
30	°		IE
31	]		E

Sequence number	*National character*	*Description*	*Recommended transliteration*
32	_		IU
33	a		IA
34	V		Y
35	g		G
36	–		U
37	´		U
38	e		G
39	k		D
40	S		DZ
41	J		J
42	,		K
43	Š		LJ
44	Ž		NJ
45	¤		C
46	¨		DZ
47	o		IE
48	{		I

APPENDIX 10 to Section IV (Informative)

Recommended Locations of Structure and Substance Machine Assisted Document Verification Features



This diagram shows the three sizes of MRTD including the MRP (ID-3 size) with recommended positions for machine assisted document verification features. The shaded area on the left recommended for the incorporation of a structure feature and that on the right for the incorporation of a substance feature.

NORMATIVE APPENDIX 11 to SECTION IV

ILLUSTRATIVE GUIDELINES FOR PORTRAITS IN AN MRP

The illustrations on the following pages provide guidance for the taking of photographs to be used as the portrait of the holder in an MRP and should be viewed in relation to Paragraph 7 of Section IV.

1. Pose

1.1. The photograph should be less than six months old.
1.2. It should show a close up of the head and shoulders.
1.3. The photograph should be taken so that an imaginary horizontal line between the centres of the eyes is parallel to the top edge of the picture.
1.4. The face should be in sharp focus and clear with no blemishes such as ink marks or creases.
1.5. The photograph should show the subject facing square on and looking directly at the camera with a neutral expression and the mouth closed.
1.6. The chin to crown (crown is the position of the top of the head if there were no hair) shall be 70 -80% of the vertical height of the picture.
1.7. The eyes must be open and there must be no hair obscuring them.
1.8. If the subject wears glasses, the photograph must show the eyes clearly with no lights reflected in the glasses. The glasses shall not have tinted lenses. Avoid heavy frames if possible and ensure that the frames do not cover any part of the eyes.
1.9. Coverings, hair, headdress, or facial ornamentation which obscure the face are not permitted
1.10. The photograph must have a plain light coloured background.
1.11. There must be no other people or objects in the photograph.

2. Lighting, Exposure, and Colour Balance

2.1 The lighting must be uniform with no shadows or reflections on the face or in the background.
2.2 The subject's eyes must not show red eye.
2.3 The photograph must have appropriate brightness and contrast.
2.4 Where the picture is in colour, the lighting, and photographic process must be colour balanced to render skin tones faithfully.

3. Submission of Portrait to the Issuing Authority

3.1 Where the portrait is supplied to the issuing authority in the form of a print, the photograph, whether produced using conventional photographic or digital techniques, should be on good or photo-quality paper.
3.2 Where the portrait is supplied to the issuing authority in digital form, the requirements specified by the issuing authority must be adhered to.

4. Compliance with International Standards

4.1 The photograph shall comply with the appropriate definitions set out in ISO/IEC 19794-5.

PORTRAIT QUALITY

The portrait must be
not more than 6 months old.

It should be 35 x 45 mm (1.38 - 1.77 in) in width and height, and show a close-up of the applicant's head and the top of the shoulders. The face should take up 70-80% of the vertical dimension of the picture.

The portrait must be in sharp focus, of high quality with no creases or ink marks.

The portrait must show the applicant looking directly at the camera. It should have appropriate brightness and contrast. If in colour, it should show skin tones naturally

If submitted as a print, it should be on high quality paper with high resolution.

Portraits taken with a digital camera should be at high quality and resolution and be printed on photo-quality paper.

STYLEANDLIGHTING

The portrait must be colour neutral showing theapplicant with the eyes open and clearly visible; there must be no hair obscuring the eyes. The applicant must be shown facing square to the camera, not looking over oneshoulder (portrait style).

The head should be upright so that an imaginary horizontal line drawn between the centres of the eyes is parallel to the top edge of the picture.

Both edges of the face must beclearly visible.

The background must be plain and light coloured.

The lighting must be uniform with no shadows and no reflections on the face.

There must be no red-eye.

darktintedlenses

flashreflectiononlenses

GLASSES ANDHEAD COVERS

Glasses:

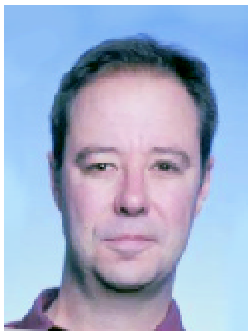
The portrait must show the eyes clearly with no light reflection off the glasses and no tinted lenses. If possible, avoid heavy frames. The frames must not cover any part of the eyes.

frames tooheavy

framescoveringeyes

wearing a h a t

wearinga cap



Head Coverings:

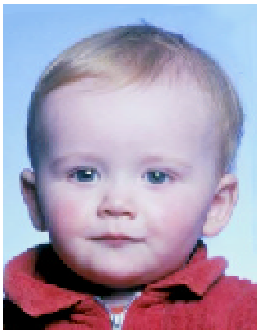
Head coverings shall not be accepted except in circumstanceswhich the competent State authority specifically approves. Such circumstances may be religious, medical or cultural.

face covered

shadowsacrossface

EXPRESSIONANDFRAME

The portrait must show the applicant alone with no other people, chair backs or toys visible. The applicant must be looking at the camera with a neutral expression and themouth closed.

showsanotherperson

mouth openandtoy too closetoface