### Annex I: Minimum Technical Specifications and Security Features

#### 1.1. Minimum Physical Security Features

<table>
<thead>
<tr>
<th>Elements</th>
<th>Mandatory Features</th>
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</table>
| **i.** Paper Substrates | – controlled UV response  
– two-tone watermark  
– chemical sensitizers  
– appropriate absorbency and surface characteristics  
– reactive inks and chemical sensitizers in paper |
| **ii.** Background and Text Printing | – two-colour guilloche background  
– rainbow printing  
– microprinted text  
– unique data page design  
– offset/intaglio printing techniques for static data |
| **iii.** Inks | – UV fluorescent ink  
– reactive inksign  
– ink with optically variable properties |
| **iv.** Numbering | – page numbering on all visa pages  
– printed and/or laser-perforated passport number |
| **v.** Protection against photo substitution and alteration | – integrated biographical data  
– security background merged within portrait area  
– visible security device overlapping portrait area  
– heat-sealed secure laminate or equivalent  
– additional photo (ghost photo/ultra violet)  
– DOVID/hologram |
| **vi.** Protection against page substitution | – secure sewing technology  
– UV fluorescent sewing thread  
– unique data page design  
– page numbers integrated into security design  
– multi-color sewing thread |

#### 1.2 Protection against Theft and Abuse

- good physical security
- full audit trail
- serial numbers on blank documents, as applicable
- tracking and control numbers of components, as applicable
- secure transport of blank documents
- international information exchange on lost and stolen documents (INTERPOL)
- internal fraud protection procedures
- security vetting of staff
- CCTV in production areas
- centralized storage and personalization, where possible

#### 1.3 Electronic Security Features

<p>| Location of | - either back cover of passport or bio data page |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>chip</strong></td>
<td>(polycarbonate)</td>
</tr>
<tr>
<td><strong>ii. Minimum size of chip</strong></td>
<td>- 32 kilobytes</td>
</tr>
</tbody>
</table>
| **iii. Biometrics** | - Electronic/digital photo (facial image) – minimum size as per ICAO standards  
- Fingerprint (number of digits stored subject to national laws and regulations)  
- signature |
| **iv. Electronic Security Mechanisms** | - passive authentication  
- active authentication  
- BAC and PACE access control  
- extended access control |

### 1.4 Public Key Directory (PKD)

All Member States are recommended to implement and join the public key directory.

**NOTE:**
The above-mentioned are the adopted minimum security features. Member States have the discretion to add other features as they deem necessary.