Federal Ministry
for the Environment, Nature Conservation,
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Short Guide for external service providers: How to create and deliver accessible PDF files

Contents

Legal provisions

Why do PDF documents need to be accessible?

Accessible online content allows as many users as possible, including those with visual, auditory, motor or cognitive impairments/disabilities, to fully benefit from digital information services. This applies to websites as well as to the most commonly used file format PDF.

Which provisions apply to accessible PDFs?

Under section 2a of the German Disability Equality Act (*Behindertengleichstellungsgesetz*, BGG)[1], public authorities are obligated to make their online information services accessible. Websites and mobile apps of public sector bodies must be easily accessible and usable for everyone without third-party assistance. This includes all PDF documents regardless of their size or design. Technical details are regulated by the German Ordinance for Accessible Information Technology (*Barrierefreie- Informationstechnik-Verordnung BITV 2.0*)[2], section 3 of which refers to the requirements set out in harmonised European standard EN 301 549[3].

Accessibility requirements

Why must the PDF/UA standard be applied?

BITV 2.0 does not lay down detailed requirements for creating accessible PDF documents. Uniform and comparable results for publications in PDF format can be achieved by conforming to the international standard for accessible PDF documents, DIN ISO 14289 – PDF/UA. Applying this standard meets the requirements on the use of current technical standards set out in BITV 2.0 section 3. The checkpoints for the PDF/UA standard can be found in the publicly accessible Matterhorn Protocol.

Does the PDF/UA standard apply to all PDF publications?

Since January 2017, the BMUV has sought to ensure that as many as possible of the PDF documents appearing on its website comply with the PDF/UA standard, irrespective of the author or publisher of the original content. In addition to brochures, leaflets and posters, PDF publications include any form of report, surveys, studies, documentation, technical instructions and similar.

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[1] http://www.gesetze-im-internet.de/bgg/
[2] http://www.gesetze-im-internet.de/bitv_2_0/
[3] Etsi.org: EN 301 549 V3.2.1 (2021-03) - PDF, 2.2 MB

Background:

Creating accessible PDF documents

An accessible PDF document allows all users to comprehend and navigate content. Clear language and a consistent structure help the user to grasp the information easily. For any document, a clear structure and the correct use of style sheets is a basic prerequisite. Used properly, established authoring tools such as *Microsoft Office Word* and *Adobe InDesign* can already lay the foundation for accessible PDF files during the creation of the original document.

Is creating an accessible PDF complicated?

Depending on the nature and amount of the content, making a publication consistently accessible can require some time and effort if it contains complex structures, extensive tables, footnotes, graphics or formulas. Alongside preliminary considerations in the design of the document in its original format, a number of manual steps are required both in the original document and the PDF file. Some of these can be simplified using software applications. If the author is inexperienced, sufficient time, effort and potentially additional costs for training or expert support need to be factored in to ensure technical completion of the product. Alternatively, an experienced service provider should be commissioned from the outset with making the document accessible.

What do I need to create an accessible PDF?

Achieving the best possible compliance with accessibility standards in accordance with BITV 2.0 requires commercial software such as *Adobe Acrobat Pro, Foxit PhantomPDF or similar*. These programmes allow files to be converted from source formats like *Microsoft Office Word* or *Adobe InDesign* and enable the revision, remediation and completion of the exported PDF.

Using the latest versions of authoring tools – *Word from Word 2016 on, InDesign from CS 6* – will also help achieve better results.

A separate testing software is needed for quality assurance. *Acrobat's* own, basic accessibility checker can only act as a starting point. It cannot verify that accessibility conforms to the PDF/UA standard. Only the free software *PDF Accessibility Checker (PAC) 2021* tests conformance with the technical checkpoints of the Matterhorn Protocol as required under PDF/UA-Standard DIN ISO 14289-1. However, an additional visual inspection must also always be carried out (see section Testing for accessibility below).

To create accessible documents, besides the requisite software it is useful to have relevant technical knowledge, accuracy and some stamina.

What is the easiest way to create an accessible PDF?

Ideally, most of the work on accessibility should be done directly in the source document, such as in *Word* or *InDesign* - before converting this to a PDF. Consistently using the correct style sheets and the functions available in Word to create tables, lists, cross references and footnotes minimises the amount of remediation the PDF needs at a later stage. The combination of applications used for the PDF export is also important. When converting to PDF, good results can be achieved with *Word (from version 2013 on)* and with *Acrobat PDF Maker*.[4]

Which additional tools are available?

Professional accessibility software makes it much easier to create accessible PDF documents. Useful commercial software products for authoring tools include[5]:

- *axesWord* – plugin for creating and converting from Microsoft Word
- *axaio MadeToTag* – plugin for creating and converting from Adobe InDesign
- *axesPDF* or *CommonLook* – for remediating PDFs.

These applications compensate common shortcomings in authoring tools like Microsoft Word, Adobe InDesign and Acrobat, and bridge the gap to full standard compliance. When used properly, they generate PDFs with a clean PDF/UA-compliant tag structure that ideally requires only minimal remediation in the PDF.

Instructions for submission of accessible PDFs

What must be considered when submitting an accessible PDF?

It must be ensured that the PDF document is accessible to people with different disabilities and functions with the technical tools they use. Therefore, the BMUV only accepts documents that meet the requirements of the currently valid version of BITV 2.0 in general and that comply with DIN ISO 14289-1 (PDF/UA) in particular.

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[4] Note: When generating PDF documents with Word or Acrobat PDF Maker, the automatic hyphenation must be deactivated, as it cannot be correctly exported to the PDF.
[5] A list (in English) of software offering PDF/UA support can be found on the PDF Association website: https://pdfa.org/supporting-pdf-ua/

To demonstrate the technical accessibility of a PDF document, a test report generated with the latest version of the *PDF Accessibility Checker* (currently *PAC 2021*) must be submitted. The BMUV tasks an external service provider with the technical and manual test of the submitted PDF file.

The following documents must be submitted to the BMUV:

- Accessible PDF file pursuant to BITV 2.0 in PDF/UA standard, as described in this guide and in the user manual for external providers at www.bmuv.de/vorlagen .
- A fully passed *PDF Accessibility Checker (PAC) 2021* test report.
- Where relevant, written confirmation from the author that the accessible document submitted contains meaningful and correct alternative texts.

Which formal requirements must PDF files fulfil?

The following formal requirements must be taken into account when submitting accessible PDF files to the BMUV:

1. **PDF files** must be submitted without **password encryption or editing restrictions**.
2. As far as possible, a submitted PDF document should not consist of multiple independent publications. If several files relating to one topic are to be published on the website (e.g. agenda, flyer and directions to an event), these should be planned and submitted as **individual downloads**.
3. Ideally, a PDF file **should not be larger than** 10 MB.
4. The metadata of the PDF must contain the appropriate title (suitably shortened if necessary) of the publication **as the document title** *(Matterhorn Protocol 06-003)*.
5. The **declared natural language** of the document must be set in the metadata *(Matterhorn Protocol Checkpoint 11).*
6. Graphics must be provided with **meaningful alternative texts**. Alternative texts must be supplied for content-relevant figures and scientific formulas. Suppliers of research reports or publications with many graphics must confirm to the BMUV that the submitted document contains meaningful and correct alternative texts.
7. The PDF must contain a clean, standards-compliant and semantically correct tag structure for all key content, as described in more detail in the BMUV User Guide on Creating Accessible PDF Documents. Compliance with this last criterion is verified by the technical test (see sections Requirements for document structure and Testing for accessibility).

What are the main accessibility requirements?

The accessibility requirements set out in PDF/UA standard (DIN ISO 14289-1) must be fully complied with. In addition, design requirements for graphics under BITV 2.0 or EN 301 549 must be complied with.

These include:

Requirements for document structure

- The document must have a structure tree with semantic information (tags) *(Matterhorn Protocol Checkpoint 01)*.
- If possible, standard tags as defined in ISO 32000-1 (PDF 1.7) must be used, including for paragraphs, headings, lists, links, images, tables and footnotes *(Matterhorn Protocol Checkpoint 01 + 09)*.
- Non-standard tags must be mapped to functionally similar standard tags (role mapping) *(Matterhorn Protocol Checkpoint 02-001/02-002)*.
- Decorative and non-informational content (e.g. page numbers, headers, footers and decorative images) must not be included in the structure tree. These must be tagged as artefacts *(Matterhorn Protocol Checkpoint 01-001/01-002)*.
- The tags must be in a logical reading order *(Matterhorn Protocol Checkpoint 09-001)*.
- Only fonts that comply with the Unicode standard may be used. These must be embedded within the PDF *(Matterhorn Protocol Checkpoint 31)*.

Perceivability requirements

- Informative graphics and figures must have short descriptive alternative texts (*EN 301 549, section 10.1.1*). These alternative texts must be coordinated with the contracting authority; at least one round of corrections should be allowed for.
- A detailed text description should be planned for complex diagrams and infographics, to be placed near the graphic in question *(EN 301 549, section 10.1.1)*.
- Formulas must be provided with alternative texts that represent the equations in linear format (using e.g. natural language, LaTeX math or Unicode math). *(Matterhorn Protocol Checkpoint 17)*.
- The document must contain searchable text, i.e. no scanned images of texts *(Matterhorn Protocol Checkpoint 01)*.
- Typography images must be avoided. If used, the content must be reproduced in alternative or actual texts *(EN 301 549, section 10.1.4.5)*.
- The contrast ratio for text and background and for significant graphic elements and background must be complied with *(EN 301 549, section 10.1.4.3)*.

- Colour should not be the only means used, e.g. for links, to convey information or prompt a reaction *(EN 301 549, section 10.1.4.1 / Matterhorn Protocol 04-001)*.
- It must be possible to enlarge the text in accordance with BITV 2.0. The sequence of content in reflow is based on the tag structure tree *(EN 301 549, section 10.1.4.4)*.
- Hyphenation: no hard manual hyphens may be used (failure to observe this leads to hyphens being displayed in reflow, *EN 301 549, section 10.1.4.10*).

Operability requirements

- Links and internal references are activated and link to the correct destination *(standard EN 301 549, section 10.2.1)*.
- The destination and purpose of a link can be determined from the link text or the alternative text *(EN 301 549, section 10.2.4.4)*.
- Headings, figures, lists and tables must be tagged appropriately *(Matterhorn Protocol Checkpoint 09)*.
- Headings are correctly nested in the tag tree *(EN 301 549, section 10.2.4.6)*.
- In hierarchical documents, the document title shown on the first page should be tagged as a paragraph and not as part of the heading hierarchy (*recommendation, based on BMUV publications standards*).
- In tables, all header cells and their relationships to rows or columns must be tagged appropriately *(Matterhorn Protocol Checkpoint 15)*.
- The tab sequence must be set *(PDF specification 1.7[6] Chapter 3, Syntax)*.
- Longer documents require a linked table of contents *(EN 301 549, section 10.2.4.5)*.
- Link texts must be understandable or have an understandable alternative text *(EN 301 549, section 10.2.4.4)*.
- Bookmarks must be based on the heading structure *(EN 301 549, section 10.2.4.5)*.
- Form fields must be accessible *(Matterhorn Protocol Checkpoint 28 / EN 301 549, section 10.1 to 10.4)*.

Understandability requirements

- The document must have metadata and a meaningful document title, (also displayed in the window title, *Matterhorn Protocol Checkpoint 06 + 07)*.
- Texts must be readable and understandable *(EN 301 549, section 10.3.1)*.
- The default natural language must be indicated; language changes at paragraph level must be tagged *(EN 301 549, section 10.3.1 + Matterhorn Protocol Checkpoint 11)*.

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[6]PDF specification 1.7 (Standard ISO 32000-1) as PDF document:
https://www.adobe.com/content/dam/acom/en/devnet/pdf/pdfs/PDF32000_2008.pdf

- Abbreviations and acronyms must be used sparingly. They must be explained on first occurrence and, in longer publications, also listed in a glossary (*Recommendation and BMUV standard for publications according to BMUV Corporate Design Manual. See also EN 301 549, section 9.5)*.

Testing for accessibility

Accessibility is tested using the checkpoints of the Matterhorn Protocol. The document lists 31 checkpoints with 136 failure conditions, 87 of which can be determined by software (*PAC 2021*, see below), while 47 conditions require manual inspection by a human expert.

These free tools can be used to check the accessibility of the PDF document:

- Automated technical verification with *PDF Accessibility Checker (PAC) 2021.*
- Manual (human) check supported by *Acrobat-Plugin callas pdfGoHTML* or *PAC 2021* Screen Reader Preview (reflow)
- If necessary, additional check with screen reader *NVDA*

## How is technical testing carried out?

PDF Accessibility Checker (*PAC) 2021* is a free desktop-based tool (https://pdfua.foundation/en/pdf-accessibility-checker-pac). *PAC 2021* currently only available for *Windows.* Languages available: Danish, English, French, German and Spanish.

When is the technical test considered as passed?

The PDF document must pass all checkpoints of the *PAC 2021* conformance test. This is considered to be the case when all software-tested checkpoints are indicated as passed by a green tick.

There are 11 test areas in *PAC 2021*:

- PDF Syntax >> Basic technical requirements according to PDF specification
- Fonts >> Embedding, Unicode
- Content >> Tags, Artifacts
- Embedded Files
- Natural Language
- Structure Elements
- Structure Tree
- Role Mapping
- Alternative Descriptions
- Metadata >> PDF/UA Identifier
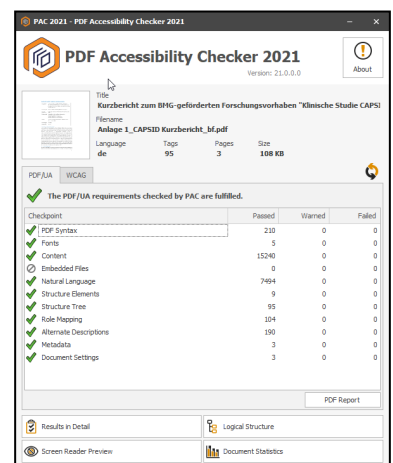
- Document settings >> accessible document settings

If a *PAC 2021* test gives the result "The PDF/UA requirements checked by PAC are fulfilled", **technically** the PDF is accessible in accordance with the PDF/UA standard.

This is followed up by a visual inspection

- for the 47 checkpoints of the Matterhorn Protocol that can only be tested by a human expert
- and for the relevant design requirements for graphics set out in BITV 2.0 (EN 301 549) / WCAG 2.1 respectively.

Where can I get more information?

Accessibility legislation and standards

- German Disability Equality Act (*Behindertengleichstellungsgesetz* - BGG) http://www.gesetze-im-internet.de/bgg/
- German Ordinance for Accessible Information Technology (*Barrierefreie-Informationstechnik-Verordnung) - BITV 2.0* http://www.gesetze-im-internet.de/bitv_2_0/
- Etsi.org: Accessibility requirements for ICT products and services EN 301 549 , V3.2.1 (2021-03) https://www.etsi.org/deliver/etsi_en/301500_301599/301549/03.02.01_60/en_301549v030201p.pdf (PDF, 2,2 MB)

On PDF accessibility

- PDF Association. *PDF in a Nutshell* https://www.pdfa.org/wp-content/uploads/2013/05/PDFA_in_a_Nutshell_211.pdf
- Matterhorn Protocol 1.1 https://www.pdfa.org/wp-content/uploads/2021/04/Matterhorn-Protocol-1-1.pdf
- Examples: Best practice reference documents of the PDF Association https://www.pdfa.org/publication/pdfua-reference-suite/
- Tagged PDF Best Practice Guide of the PDF Association https://www.pdfa.org/pdf-association-veroffentlicht-tagged-pdf-best-practice-guide/
- PDF Association PDF/UA Technical Working Group https://www.pdfa.org/community/pdf-ua-technical-working-group/

Software tools

- Software with PDF/UA support – creation and remediation
https://pdfa.org/supporting-pdf-ua/

- PAC 2021 https://pdfua.foundation/en/pdf-accessibility-checker-pac/pac-guides

- VIP PDF Reader: https://www.access-for-all.ch/en/pdf-accessibility-checker/vip-pdf-reader.html (currently no further technical support)

- Callas PDF go HTML: https://www.callassoftware.com/en/products/pdfgohtml

- Product information axesWord: https://www.axes4.com/en/products-services/axesword; axesPDF: https://www.axes4.com/en/products-services/axespdf

- Product information MadeToTag: https://www.axaio.com/doku.php/en:news:2021-05-26

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