Accessibility Excel:

Extended checklist according to EN 301 549

SHUFFLE - University initiative digital accessibility for all

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# Introduction

We want to make Excel spreadsheets as accessible as possible for a broad user group. This extended checklist contains all the aspects to be considered that an Excel spreadsheet should fulfil according to the criteria of BITV 2.0 (based on EN 301 549). If all EN requirements are met, the document is accessible in accordance with the legal requirements for public bodies in Germany. You can find explanations on the implementation of the individual aspects in the implementation guide "How do I make my Excel spreadsheets accessible" (currently still in progress).

When creating a new Excel document, it is recommended that the integrated accessibility check in Excel is activated from the start and is running parallel to the creation process. This allows some barriers to be recognised and removed immediately. The "Check accessibility" option is helpful, but does not guarantee complete accessibility, which is why a manual check should always be carried out.

# Notes on the extended checklist

As a general rule, each EN criterion must at least be fulfilled in the standard layout (editing mode as the default setting) without changing the document. The other views (pagination preview, page layout, user-defined views) are helpful for certain applications, but cannot replace the functionality of the standard layout.

The criteria listed here refer to the programme provided by Microsoft for editing (Excel application). We use the current version of Excel (Microsoft 365) as a basis. There may be deviations with older versions.

This checklist is not suitable if at least one of the following cases applies. In these cases, all criteria of EN 301 549 in section 10 should be used.

* Scripts or macros are used (e.g. VBScript)
* There are embedded objects (created with the Excel function "Insert object")
* There are videos or online videos

# General notes on Excel

This checklist focuses on the use of Excel files for tabular and numerical data and their visualisation using diagrams. Other uses for which Excel was not originally intended are difficult or impossible to implement without accessibility (e.g. large tables with structured text, site maps).

Other special features of Excel:

* The last position (cell) is saved so that all users in this table start at this position.
* Settings for grid lines are saved.
* "Fix window" (window sections, rows, columns) is also saved for other users.
* For freely positionable elements, Excel differentiates between illustrations, diagrams, text fields and embedded objects. Illustrations are: Images, shapes, pictograms, 3D models, SmartArt, screenshots. Embedded objects are all types of external files (including videos).
* There is only one main language in Excel. Individual worksheets or cells cannot be labelled as a different foreign language.
* Templates in Excel (e.g. table templates, chart formatting) are not automatically accessible. They often do not fulfil the contrast requirements.
* There are special keyboard shortcuts to operate Excel with the keyboard. These can be found on the [Microsoft support page.](https://support.microsoft.com/de-de/office/tastenkombinationen-in-excel-1798d9d5-842a-42b8-9c99-9b7213f0040f)

# Authorship and licence

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This document has been developed with great care. Nevertheless, we cannot guarantee that it is complete and free of errors. You are welcome to send us any information on errors found or other feedback [by email to the Digital Accessibility Competence Centre.](mailto:barrierefreiheit@hdm-stuttgart.de)

# Extended checklist according to EN criteria (Excel)

| **No./  Check** | **Type** | **EN requirement** | **Aspect** | In digital education, **particularly** helpful for individuals who... |
| --- | --- | --- | --- | --- |
| D1 | Document (title) | 10.2.4.2 (A) Document with title | The title is stored in the metadata, meaningful and easy to understand. | ... want to find a document via a search engine. |
| D2 | Document (language) | 10.3.1.1 (A) Language of the document | The main language of the document corresponds to the language for the spell check. | ... use a voice output or a screen reader. |
| D3 | Document | 10.1.3.3 (A) Sensory properties | Reference to internal or external textual or graphical objects and cell contents is made by explicit naming, not exclusively by means of a description via visual or auditory features. | ... would like to orientate themselves in the document.  ... that primarily utilise a sensory channel. |
| D4 | Document (colour) | 10.1.4.1 (A) Use of colour | If colours are used to convey information (e.g. in diagrams or to mark text), labels, symbols or patterns also convey the same information.  Note: This applies in particular to the (conditional) formatting templates offered by Excel, such as "Good" or "Bad". | ... work independently of colour display.  ... be distracted by colours.  ... perceive stimuli strongly.  ... do not perceive all colours clearly. |
| L1 | Spreadsheet | 10.2.4.6 (AA) Headings and labels | Spreadsheets have meaningful and easy-to-understand names. | ... use a voice output or a screen reader.  ... want to find their way around quickly. |
| L2 | Spreadsheet | 10.1.3.2 (A) Meaningful sequence | The worksheets are arranged in a sensible order. | ... use a voice output or a screen reader.  ... would like to orientate themselves in the document. |
| L3 | Spreadsheet | 10.1.3.2 (A) Meaningful sequence | If a spreadsheet contains several tables, these are arranged in a sensible order. | ... use a voice output or a screen reader.  ... would like to orientate themselves in the document. |
| B1 | Table | 10.1.3.1 (A) Info and relationships | Tables are labelled as such and have a unique name. | ... use a voice output or a screen reader. |
| B2 | Table | 10.1.3.1 (A) Info and relationships | The column header is in the first row; "Header" is highlighted. Row headings (if available) are in the first column; "First column" is then highlighted. | ... use a voice output or a screen reader. |
| B3 | Table | 10.2.4.6 (AA) Headings and labels | Column and row headings are meaningful and easy to understand. | ... use a voice output or a screen reader.  ... want to find their way around quickly. |
| B4 | Table | 10.1.3.1 (A) Info and relationships | Tables are not nested and do not contain split or merged cells.  Note: If there are several dimensions, the contents are divided into several tables. | ... use a voice output or a screen reader.  ... enlarge the table. |
| B5 | Table | 10.1.3.1 (A) Info and relationships | Complex tables (more than 2 dimensions) are divided into several simple tables. | ... use a voice output or a screen reader.  ... need/want structure.  ... find it difficult to understand the content of complex tables. |
| B6 | Table | 10.1.4.3 (AA) Contrast (minimum) | The selected table template provides sufficient contrast for the table contents. In the case of banded tables, this applies to both types of rows and to the headings.  For large texts from 18pt or bold texts from 14pt at least 3:1. For all other texts at least 4.5:1. | ... do not perceive all colours clearly.  ... cannot see well.  ... read the document in poor lighting conditions (or via the projector). |
| Z1 | Cell | 10.1.3.2 (A) Meaningful order / 10.2.4.3 (A) Focus order | The contents of cells are arranged in a meaningful order.  Note: The reading order is line by line from left to right. | ... use a voice output or a screen reader.  ... need/want structure. |
| F1 | Form field (unprotected cell) | 10.1.3.2 (A) Meaningful order / 10.2.4.3 (A) Focus order | If an Excel document is used as a form (possibly with protected cells for the labels), the fillable cells are arranged in such a way that the reading order (line by line from left to right) is meaningful. | ... use a voice output or a screen reader.  ... need/want structure. |
| F2 | Form field (unprotected cell) | 10.3.3.2 (A) Labels or instructions | A form field is labelled by a neighbouring cell. | ... use a voice output or a screen reader.  ... need/want structure. |
| F3 | Form field (unprotected cell) | 10.3.3.3 (AA) Suggestion in case of error | An error message on user input is easy to understand, explains the error and helps to rectify it. | ... easily make mistakes when filling in forms.  ... find it difficult to fill in complex forms. |
| T1 | Text (Link) | 10.2.4.4 (A) Link purpose (in context) | Cells for which a link is stored have a text that describes the link target in a meaningful and distinguishable way from other cells.  Note: The reference to the link target can also be established by the corresponding row or column heading. | ... can be easily interrupted in the flow of reading.  ... use a voice output or a screen reader. |
| T2 | Text (colour) | 10.1.4.3 (AA) Contrast (minimum) | Texts have a sufficient contrast ratio to the background.  For large texts from 18 pt or bold texts from 14 pt at least 3:1. For all other texts at least 4.5:1. | ... do not perceive all colours clearly.  ... cannot see well.  ... read the document in poor lighting conditions (or via the projector). |
| I1 | Illustration, diagram, grouping | 10.1.1.1 (A) Non-text content | Content-bearing illustrations, diagrams and groupings have a short, concise alternative text with information on the diagram type and content.  Their content is specifically described in the document as a table (recommended), alternative text, other text or link to a website, if necessary with the data contained. | ... use a voice output or a screen reader.  ... cannot see well. |
| I2 | Illustration, grouping | 10.1.1.1 (A) Non-text content | Illustrations and groupings with no substantive meaning are marked as decorative. | ... use a voice output or a screen reader. |
| I3 | Illustration, diagram, text field | 10.1.3.2 (A) Meaningful order / 10.2.4.3 (A) Focus order | If freely positionable illustrations, diagrams or text fields are located together with cell contents on a spreadsheet, the freely positionable elements are arranged in a logical sequence.  Cell contents in the logical sequence always precede freely positionable elements. | ... use a voice output or a screen reader.  ... need/want structure. |
| I4 | Illustration | 10.1.4.5 (AA) Images of text | No illustrations are used to represent texts ("font graphics").  Exception: Essential font graphics have a meaningful alternative text. Redundant font graphics are labelled as decorative. | ... use a voice output or a screen reader.  ... enlarge texts.  ... want to view texts in high contrast mode. |
| I5 | Illustration, diagram (colour) | 10.1.4.11 (AA) Non-text contrast | Graphic information-bearing elements (e.g. lines, neighbouring areas in diagrams) have a minimum contrast of 3:1 to the background. | ... do not perceive all colours clearly.  ... do not see well.  ... the document in poor lighting conditions (or via projector). |
| I6 | Illustration | 10.2.2.2 (A) Pause, stop, fade out / 10.2.3.1 (A) Flashing, three times or below limit value | No animated graphics (GIFs) are used. | ... react sensitively to light stimuli.  ... are easily distracted. |
| I7 | Illustration | 10.2.5.3 (A) Labelling in the name | Linked illustrations that display text also have this text in the alternative text. | ... use a voice output or a screen reader. |

# Recommendations

| **Check** | **Type** | **Aspect** | **Particularly helpful in digital teaching for staff, people who...** |
| --- | --- | --- | --- |
| E-D1 | Document (colour) | The use of colours is generally sparing. | ... do not perceive all colours clearly.  ... be distracted by colours.  ... perceive stimuli strongly.  ... work independently of colour display. |
| E-D2 | Document | The file name is easy to understand and meaningful and has the same or similar content to the title in the metadata. | ... use a voice output or a screen reader.  ... want to find their way around quickly. |
| E-L1 | Spreadsheet | The name of a worksheet differs from the names of other worksheets at the beginning. | ... use a voice output or a screen reader. |
| E-L2 | Spreadsheet | There are no empty spreadsheets. | ... use a voice output or a screen reader. |
| E-L3 | Spreadsheet | Each worksheet contains a maximum of 1 table.  If a spreadsheet is to contain several tables for compelling reasons, these are arranged one below the other, not next to each other. There is a maximum of 1 empty line between the tables. | ... use a voice output or a screen reader.  ... want to find their way around quickly. |
| E-L4 | Spreadsheet | A spreadsheet contains either tables or illustrations, diagrams and text fields. | ... use a voice output or a screen reader. |
| E-L5 | Spreadsheet | If a spreadsheet contains illustrations, diagrams or text fields, there is a note at the beginning of the spreadsheet. | ... use a voice output or a screen reader.  ... navigate with the keyboard. |
| E-L6 | Spreadsheet | When saving for the last time, the worksheet with which the users should start is selected. In all spreadsheets, the cell with which the users should start is also selected (usually A1). | ... use a voice output or a screen reader.  ... want to find their way around quickly. |
| E-L7 | Spreadsheet | If there is a visual title on the spreadsheet, this is located in cell A1 and corresponds to the spreadsheet title (in a longer form if necessary). | ... use a voice output or a screen reader.  ... want to find their way around quickly. |
| E-L8 | Spreadsheet | If there are instructions for complex worksheets, these are located in cell A1 (together with the visual heading, if applicable). | ... use a voice output or a screen reader.  ... want to find their way around quickly. |
| E-L9 | Spreadsheet | If sheet protection is used, e.g. for labelling input fields in forms, at least the following actions are permitted for all users:   * "Select locked cells", * "Select unlocked cells".   Note: Sheet protection can be used on forms to protect the labelling of the input fields. | ... use a voice output or a screen reader.  ... fill in the form using the keyboard only (without mouse). |
| E-L10 | Spreadsheet | Fixations are set sensibly so that column and row headings are always visible. | ... need/want structure.  ... want to find their way around quickly. |
| E-B1 | Table | A table does not have an empty row or column.  Note: Deliberately empty cells should contain the text "empty" or similar. | ... use a voice output or a screen reader. |
| E-B2 | Table | Tables have a meaningful name and meaningful labelling. | ... use a voice output or a screen reader.  ... want to find their way around quickly.  ... want to reference the table. |
| E-B3 | Table | Tables that extend over more than one page have the header and footer on each page and are free of relevant information.  Note: When exporting/printing, the table header row is repeated on each page ("repeat row"). | ... need/want structures.  ... find it difficult to concentrate.  ... would like to orientate themselves in the document. |
| E-B4 | Table | Page breaks in table rows are suppressed for tables.  Note: Important for export/print. | ... quickly lose their bearings. |
| E-B3 | Cell | Cells that only contain letters (as opposed to numbers) are left-aligned. | ... have difficulty following the flow of the text. |
| E-B4 | Cell | Text cells only contain short texts.  Note: There are no other options in Excel for structuring texts and thus making them more accessible. | ... use a voice output or a screen reader.  ... have difficulty following the flow of the text.  ... have difficulties recognising/reading the text.  ... need/want structure. |
| E-B5 | Cell | The appropriate data type is defined for cells that are filled in by users.  Example: Age specification only accepts whole numbers. | ... easily make mistakes when filling in forms.  ... find it difficult to fill in complex forms. |
| E-F1 | Form field (unprotected cell) | All labels that are in protected cells are arranged in a column (preferably to the left of the form field or defined by the table structure). The fillable cells are located in the neighbouring right-hand column (unprotected cells). | ... use a voice output or a screen reader.  ... would like to orientate themselves in the document.  ... automatically fill in form fields if necessary. |
| E-F2 | Form field (unprotected cell) | Where possible, users are notified of incorrect entries.  Examples: (1) Restrict accepted entries by selecting suitable data types. (2) Display that the date of birth is in the future. | ... easily make mistakes when filling in forms.  ... find it difficult to fill in complex forms. |
| E-T1 | Text | The font is sans serif (e.g. Arial, Helvetica) and not too thick or too thin. | ... have difficulty following the flow of the text.  ... have difficulties recognising/reading the text.  ... need/want structure. |
| E-T2 | Text | Highlighting using CAPITAL LETTERS, *italics*, underlining (except for links) and text effects (colour gradient as colour fill, glow effects, text outline) occur at most in individual words.  Exception: "Glow" for text superimposed on photos to increase contrast. | ... have difficulty following the flow of the text.  ... have difficulties recognising/reading the text.  ... need/want structure. |
| E-T3 | Text | Texts are aligned horizontally, not vertically.  Note: This also applies to illustrations and diagrams and their labelling. | ... do not have the option of turning their head, the end device or the document.  ... have difficulty following the reading flow.  ... have difficulties recognising/reading the text. |
| E-N1 | Link | URL does not appear as plain text in the body text (exception for header and footer). Instead, text is marked as a hyperlink that describes the jump destination in an easily understandable way and is clearly distinguishable from the other link texts . | ... use a voice output or a screen reader.  ... can be easily interrupted in the flow of reading. |
| E-N2 | Link | Tooltips are not used. Instead, important information should be given as part of the link text.  Note: Tooltips are displayed when you hover over a cell with the mouse pointer. However, they are not displayed for keyboard and screen reader users. | ... use a voice output or a screen reader.  ... operate the Excel document using the keyboard only (without mouse) |
| E-N3 | Link | If a link opens another programme (e.g. browser, email programme), this is indicated in the link text. Example: "Contact address" (opens email programme)". | ... use a voice output or a screen reader.  ... can be easily interrupted in the flow of reading. |
| E-I1 | Illustration, diagram, text field | Illustrations, diagrams and text fields have a meaningful name.  Note: The name can be specified in the selection area. | ... use a voice output or a screen reader. |
| E-G1 | Diagram | A chart is generated from Excel on the basis of a table. The alternative text refers to this table via its table name. | ... use a voice output or a screen reader. |

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# Automatically fulfilled, non-applicable or excluded EN requirements

The following requirements from EN 301 549 section 10 are automatically fulfilled, not applicable or for other reasons not part of the extended checklist.

| **EN requirement** | **Aspect** |
| --- | --- |
| 10.1.2.1 (A) Pure audio and pure video (recorded) | Not applicable: There are no videos and embedded objects (see above). |
| 10.1.2.2 (A) Subtitles (recorded) | Not applicable: There are no videos (see above). |
| 10.1.2.3 (A) Audio description or media alternative (recorded) | Not applicable: There are no videos (see above). |
| 10.1.2.4 (AA) Subtitles (live) | Not applicable: There are no videos (see above). Not possible in Excel application. |
| 10.1.3.4 (AA) Alignment | Automatically fulfilled in Excel applications. |
| 10.1.3.5 (AA) Determine input purpose | Is not supported by Excel (programmatic transmission of the purpose). |
| 10.1.4.2 (A) Audio control element | Not applicable: No embedded objects and no videos. |
| 10.1.4.4 (AA) Change text size | Automatically fulfilled in Excel (normal layout). |
| 10.1.4.10 (AA) Automatic pagination (reflow) | Exception for two-dimensional content (table): Scrolling allowed in both directions. |
| 10.1.4.12 (AA) Text spacing | Not supported in Excel: Text spacing cannot be customised in Excel. |
| 10.1.4.13 (AA) Faded-in content on hover or focus | Automatically supported in Excel application. |
| 10.2.1.2 (A) No keyboard trap | Automatically supported in Excel application. |
| 10.2.1.4 (A) Keyboard shortcuts | Automatically supported in Excel application. |
| 10.2.2.1 (A) Customisable timings | Not applicable: There are no scripts and embedded objects. |
| 10.2.4.1 (A) Areas can be skipped | Empty in EN 301 549, as not applicable to documents. |
| 10.2.4.5 (AA) Alternative access routes | Empty in EN 301 549, as not applicable to documents. |
| 10.2.4.7 (AA) Focus visible | Not applicable: Cannot be influenced by authors in Excel application. |
| 10.2.5.1 (A) Pointer gestures | Automatically fulfilled in Excel application. |
| 10.2.5.2 (A) Cancelling the pointer action | Automatically fulfilled in Excel application. |
| 10.2.5.4 (A) Actuation by movement | Automatically fulfilled in Excel application. |
| 10.3.1.2 (AA) Language of parts | Not applicable: The language of individual words and cells cannot be customised in Excel. |
| 10.3.2.1 (A) With focus | Automatically fulfilled in Excel application if no scripts are used. |
| 10.3.2.2 (A) On entry | Automatically fulfilled in Excel application if no scripts are used. |
| 10.3.2.3 (AA) Consistent navigation | Empty in EN 301 549, as not applicable to documents. |
| 10.3.2.4 (AA) Consistent designation | Empty in EN 301 549, as not applicable to documents. |
| 10.3.3.4 (AA) Error prevention (legal, financial, user data) | Automatically fulfilled because there is no automatic sending. Users can check the Excel document first before sending it. |
| 10.4.1.1 (A) Syntax analysis | Not applicable: An incorrect formula is displayed as an error for all users. |
| 10.4.1.2 (A) Name, role, value | Automatically fulfilled in Excel applications. |
| 10.4.1.3 (AA) Status messages | Not applicable: There are no scripts or embedded objects. |
| 10.5 Positioning of subtitles (should) | Not applicable: There are no videos (see above). |

# Sources

DIN (2022): [DIN EN 301549:2022-06 – Barrierefreiheitsanforderungen für IKT-Produkte und -Dienstleistungen](https://www.beuth.de/de/norm/din-en-301549/353869627). subject to a charge; can be requested free of charge via the [Federal Monitoring Centre for Accessibility of Information Technology](https://www.bfit-bund.de/DE/Home/home_node.html). Last accessed on 17/03/2023.

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W3C (2018): [Web Content Accessibility Guidelines (WCAG 2.1)(en)](https://www.w3.org/TR/WCAG21/). Last accessed on 13/03/2023.