

The Table Tool in axesPDF®

V01.2025





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1 Basic knowledge about tables

1.1 The difference between data tables and layout tables

In nearly all cases, in which you use the expression “table”, you talk about data tables. Data tables are used to organize data with a logical relationship in grids. Accessible PDF tables need tags to indicate header cells and data cells as well as tag attributes that define the relationship between the cells.

In order to make data tables accessible, they have to fulfil the following pre-requisites:

- The table is built logically
- The relationship between header cells and data cells or between header cells and subordinated header cells is clear and distinct
- The table is understandable

In the perspective of semantics, layout tables are no real tables but hacks for positioning elements. You must linearize them to make their content accessible.

1.2 Requirements for data tables

1.2.1 Built logically

Correct tables always have a rectangular shape

There may be empty cells but no cell is missing.

	Column Header 1	Column Header 2	Column Header 3
Row Header 1	Data Cell 1	Data Cell 4	Data Cell 7
Row Header 2	Data Cell 2	Data Cell 5	Data Cell 8
Row Header 3	Data Cell 3	Data Cell 6	Data Cell 9

Incorrect tables have incomplete rows or columns

If a table has incomplete rows or columns then it cannot be made accessible.



	Column Header 1	Column Header 2	
Row Header 1	Data Cell 1	Data Cell 4	Data Cell 10
Row Header 2	Data Cell 2	Data Cell 5	Data Cell 11
Row Header 3	Data Cell 3	Data Cell 6	Data Cell 12

1.2.2 Clear and distinct relationships

Have a look at data cells 4, 5 and 6: their relationship to the header cells is not clear. Are they associated with the cell "Column Header 1" or "Column Header 2"? Such a table cannot be made accessible.

	Column Header 1	Column Header 2	
Row Header 1	Data Cell 1	Data Cell 4	Data Cell 7
Row Header 2	Data Cell 2	Data Cell 5	Data Cell 8
Row Header 3	Data Cell 3	Data Cell 6	Data Cell 9

1.2.3 Understandable

Understanding first, making accessible second: An author or remediator must understand the table data and their relationships. Otherwise, it is not possible to make the table accessible.



1.3 Simple Table

A table is simple if every header cell is valid for the complete column or row.

Table 1: Room allocation schedule as an example for a simple table

Room	Monday	Tuesday	Wednesday	Thursday	Friday
201	Course 18-2305	Course 18-5563		Reserved	
202		Course 18-2310	Course 18-2310	Course 18-2310	
301	Course 18-4101	Course 18-4102	Course 18-4103	Course 18-4104	Course 18-4105
302	Course 18-4473	Course 18-4483	Course 18-4328	Course 18-4905	
303	Course 18-4219		Course 18-4106	Reserved	Reserved

Room	Monday	Tuesday	Wednesday	Thursday	Friday
201	Course 18-2305	Course 18-5563		Reserved	
202		Course 18-2310	Course 18-2310	Course 18-2310	
301	Course 18-4101	Course 18-4102	Course 18-4103	Course 18-4104	Course 18-4105
302	Course 18-4473	Course 18-4483	Course 18-4328	Course 18-4905	
303	Course 18-4219		Course 18-4106	Reserved	Reserved

Figure 1: The column header "Monday" (like all the other column headers) is valid for a complete column.



Room	Monday	Tuesday	Wednesday	Thursday	Friday
201	Course 18-2305	Course 18-5563		Reserved	
202		Course 18-2310	Course 18-2310	Course 18-2310	
301	Course 18-4101	Course 18-4102	Course 18-4103	Course 18-4104	Course 18-4105
302	Course 18-4473	Course 18-4483	Course 18-4328	Course 18-4905	
303	Course 18-4219		Course 18-4106	Reserved	Reserved

Figure 2: The row header "301" (like all the other row headers) is valid for a complete row.

1.4 Complex tables

1.4.1 Define the relationship by using Header IDs or by reworking the complex table into several simple tables

A table is complex if there is at least one header cell, that is not valid for the complete column or row. You have to define their relationship by adding **Header IDs** and specifying which Headers each cell is associated with.

You can also visualize a complex table as: a table with nested header cells. In nearly all cases you can divide the complex table into several simple tables. This usually takes up more space in your document, but improves the understandability.



Table 2: Room allocation schedule as an example for a complex table with level 2 header cells.

Room	Monday	Tuesday	Wednesday	Thursday	Friday
PC training rooms					
201	Course 18-2305	Course 18-5563		Reserved	
202		Course 18-2310	Course 18-2310	Course 18-2310	
Conference rooms					
301	Course 18-4101	Course 18-4102	Course 18-4103	Course 18-4104	Course 18-4105
302	Course 18-4473	Course 18-4483	Course 18-4328	Course 18-4905	
303	Course 18-4219		Course 18-4106	Reserved	Reserved

Room	Monday	Tuesday	Wednesday	Thursday	Friday
PC training rooms					
201	Course 18-2305	Course 18-5563		Reserved	
202		Course 18-2310	Course 18-2310	Course 18-2310	
Conference rooms					
301	Course 18-4101	Course 18-4102	Course 18-4103	Course 18-4104	Course 18-4105
302	Course 18-4473	Course 18-4483	Course 18-4328	Course 18-4905	
303	Course 18-4219		Course 18-4106	Reserved	Reserved

Figure 3: The column header "Room" is valid for "PC training rooms" and "Conference rooms" and these headers are valid for the corresponding rooms.



Room	Monday	Tuesday	Wednesday	Thursday	Friday
PC training rooms					
201	Course 18-2305	Course 18-5563		Reserved	
202		Course 18-2310	Course 18-2310	Course 18-2310	
Conference rooms					
301	Course 18-4101	Course 18-4102	Course 18-4103	Course 18-4104	Course 18-4105
302	Course 18-4473	Course 18-4483	Course 18-4328	Course 18-4905	
303	Course 18-4219		Course 18-4106	Reserved	Reserved

Figure 4: The column header "Monday" (like all the other weekdays) is valid for the cells marked with a diamond.

Table 3: Room allocation schedule as an example for a complex table with level 3 header cells.

Room	Monday	Tuesday	Wednesday	Thursday	Friday
PC training rooms					
201	Course 18-2305	Course 18-5563		Reserved	
202		Course 18-2310	Course 18-2310	Course 18-2310	
Conference rooms					
Up to 8 persons					
301	Course 18-4101	Course 18-4102	Course 18-4103	Course 18-4104	Course 18-4105
302	Course 18-4473	Course 18-4483	Course 18-4328	Course 18-4905	
Up to 20 persons					
303	Course 18-4219		Course 18-4106	Reserved	Reserved



Room	Monday	Tuesday	Wednesday	Thursday	Friday
PC training rooms					
201	Course 18-2305	Course 18-5563		Reserved	
202		Course 18-2310	Course 18-2310	Course 18-2310	
Conference rooms					
Up to 8 persons					
301	Course 18-4101	Course 18-4102	Course 18-4103	Course 18-4104	Course 18-4105
302	Course 18-4473	Course 18-4483	Course 18-4328	Course 18-4905	
Up to 20 persons					
303	Course 18-4219		Course 18-4106	Reserved	Reserved

Figure 5: The column headers "Room", "PC training rooms", "Conference rooms", "Up to 8 persons" and "Up to 20 persons" are valid for the cells marked with a diamond.

Room	Monday	Tuesday	Wednesday	Thursday	Friday
PC training rooms					
201	Course 18-2305	Course 18-5563		Reserved	
202		Course 18-2310	Course 18-2310	Course 18-2310	
Conference rooms					
Up to 8 persons					
301	Course 18-4101	Course 18-4102	Course 18-4103	Course 18-4104	Course 18-4105
302	Course 18-4473	Course 18-4483	Course 18-4328	Course 18-4905	
Up to 20 persons					
303	Course 18-4219		Course 18-4106	Reserved	Reserved

Figure 6: The column header "Monday" (like all the other weekdays) is valid for the cells marked with a diamond.



1.5 Simple or complex?

If you have read all the pages carefully, you should be able to answer the following : Is this table simple or complex?

Room		Monday	Tuesday	Wednesday	Thursday	Friday
201	Morning	Course 18-2305	Course 18-5563		Reserved	
	After-noon	Course 18-2305	Course 18-5563			
	Evening			Reserved		
202			Course 18-2310	Course 18-2310	Course 18-2310	
301		Course 18-4101	Course 18-4102	Course 18-4103	Course 18-4104	Course 18-4105
302		Course 18-4473	Course 18-4483	Course 18-4328	Course 18-4905	
303		Course 18-4219		Course 18-4106	Reserved	Reserved

1.6 Read more

- W3C Web Accessibility Tutorials | Tables Concepts: <https://www.w3.org/WAI/tutorials/tables/>



2 The Table Tool

2.1 What is the Table Tool?

With the **Table Tool** you can select table cells, check them, add **scope** attributes or **Header IDs**. In order to use it, the table has to be tagged properly.

If tags are missing in your document, you are not able to select table cells or use the **Table Tool**.

2.2 How do you start the Table Tool?

You can find the **Table** button in the **Viewer** tab:

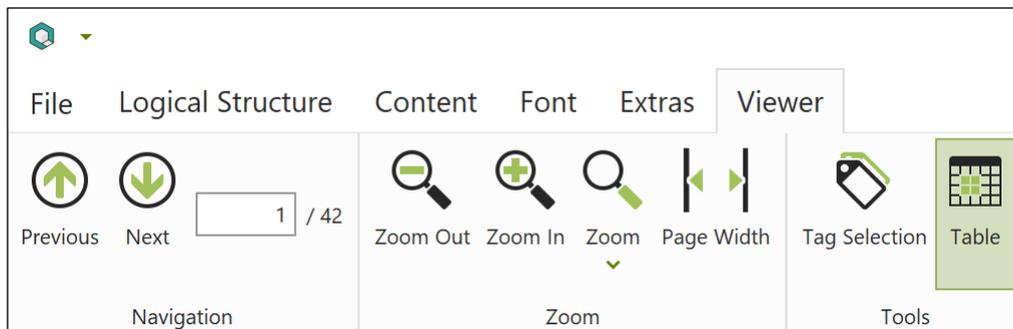


Figure 7: The "Viewer" tab

2.3 Basic features

2.3.1 Different types of table cells

If you select a table cell by using the **Table Tool**, you can recognize the type of cell based on different marks:

Type	Marked with	Example
Table Header Cell (TH)	Purple frame	
Table Data Cell (TD)	Green frame	
Completely empty cell without MarkedContent elements (TH or TD)	Not possible to be marked	-



2.3.2 Understanding the circle symbol

If you select table cells, a circle symbol appears on the left side of the selected cells as well as on the left side of related cells, that could be associated with the selected cells as header cells.

For selected cells: The indicator symbol

If there is no association between selected cells and header cells, the **indicator symbol** is empty. If selected cells are already associated with header cells, the number in the circle symbol indicates how many header cells are associated.

Indicator Symbol	Number of associated header cells
	0
	2 associated header cells Additionally, red lines indicate with which header cells a selected cell is associated.

For header cells that can be assigned to selected cells: The task icon

The **task icon** indicates, with which header cells the selected cells could be associated with and if you could do this for a single header cell or multiple header cells.

Task icon	Symbol	Function
	Triple bar	Direct association of all cells that are marked by this task icon, with all selected cells in a straight line –vertically if the bars are arranged vertically, or horizontally if the 3 bars are arranged horizontally.
	Single bar	Direct association of a single cell that is marked by this task icon, with all selected cells in a straight line –vertically if the bar is arranged vertically, or horizontally if the bar is arranged horizontally.
	Star	Direct association of a single cell that is marked by this task icon, with all selected cells in a curved line.



You can also use the **task icon** to de-associate header cells with selected cells by holding the ALT key. The circle of the task icon changes its color to red. This indicates the de-associating mode.

2.3.3 Associate header cells

To make associations, select either header cells (for example, to assign them the corresponding **scope** attribute) or data cells.

Only then the task icons with the 3 symbols **triple bar**, **single bar** or **star** will appear.

The exact procedure is described in chapters

- [Step 4a: Associate header cells by using scope attributes](#)
- [Step 4b: Associate header cells by using Header IDs](#)

2.4 Shortcuts

Shortcut	Function
ALT	task icon changes its color to red. You are now able to delete existing associations.
CTRL	task icon with triple bar changes to single bar
	task icon with single bar changes to star

2.5 Use the table tool efficiently

2.5.1 Step 1: Pre-Check

Check first if your table ...

- is a data table
- is built logically
- has clear relations between header cells and data cells
- is understandable

If all requirements are met, continue with step 2. If you have a layout table, linearize it. In all other cases your table cannot be made accessible.

2.5.2 Step 2: Check if your table is tagged properly

Check if your table is tagged properly:



- Are there any table issues in the checking results of the automatic PDF/UA check?
- Are all header cells marked as **TH**?
- Are all data cells marked as **TD**?
- Are all empty cells marked with an appropriate tag (**TD** or **TH**)?
- Do all merged cells have the correct **Colspan** or **Rowspan** attributes?
- Are all rows marked as **TR**?

Select all cells in the table and check the markup based on the colored frames.

If there are still header cells marked as **TD**, select only the related cells and change their structure type in the **Properties** task pane to **TH**.

2.5.3 Step 3: Evaluate if you have a simple or a complex table

Evaluate if every header in your table is valid for a complete column and/or a complete row.

If yes

Your table is a simple table.

You can choose the association based on **scope** attributes. (See [Step 4a: Associate header cells by using scope attributes](#)). The **scope** attribute determines if a header cell is valid for a column, a row or both. You can choose between:

Scope attribute	Header is valid for
Column	Complete column
Row	Complete row
Both	Complete column and complete row

Time Saver

Do not evaluate your table if it is a simple or a complex one. Just associate header cells by using **Header IDs**. If you work with the **Table Tool** in axesPDF® you are as fast as using **scope** attributes. You can skip step 3 and go straight to step 4b: [Associate header cells by using Header IDs](#).

If no

Your table is a complex table. You have to associate header cells by using IDs. (See [Step 4b: Associate header cells by using Header IDs](#)).



2.5.4 Step 4a: Associate header cells by using scope attributes

Use the following check list for associating header cells by using **scope** attributes:

1. Select all column headers
 - a. Add the **scope** attribute **Column** in the **Properties** pane
2. Select all row headers
 - a. Add the **scope** attribute **Row** in the **Properties** pane
3. Select all headers, that are valid for columns as well as for rows
 - a. Add the **scope** attribute **Both** in the **Properties** pane

Example

Row headers are selected. Now define the appropriate **scope** in the **Properties** task pane. This is the **scope Row**.

The screenshot shows the axesPDF interface with a table titled "4.2.3 Variant 3: Table with a header at the top and header column on the left". The table content is as follows:

Date	Max. Temperature	Min. Temperature	Weather
29.04.2020	23 °C	13 °C	cloudy
30.04.2020	20 °C	11 °C	light rain
01.05.2020	19 °C	8 °C	cloudy
02.05.2020	21 °C	13 °C	slightly cloudy
03.05.2020	20 °C	11 °C	slightly cloudy

The Properties pane on the right shows the following settings:

- General: Structure Type: TH, Title: [no value], ID: [various], Alternative Text: [no value], Actual Text: [no value], Expansion Text: [no value], Language: [no value]
- Attributes: Layout: Placement: Inline (default), Writing Mode: Left Right, Top Bottom ...
- Table: Scope: Row, Row Span: None, Column Span: Row, Headers: Column, Both

Figure 8: Row headers were selected with the Table Tool

If you then select the row headers again using the **Table Tool**, you can recognize the associations graphically by the arrow symbols.

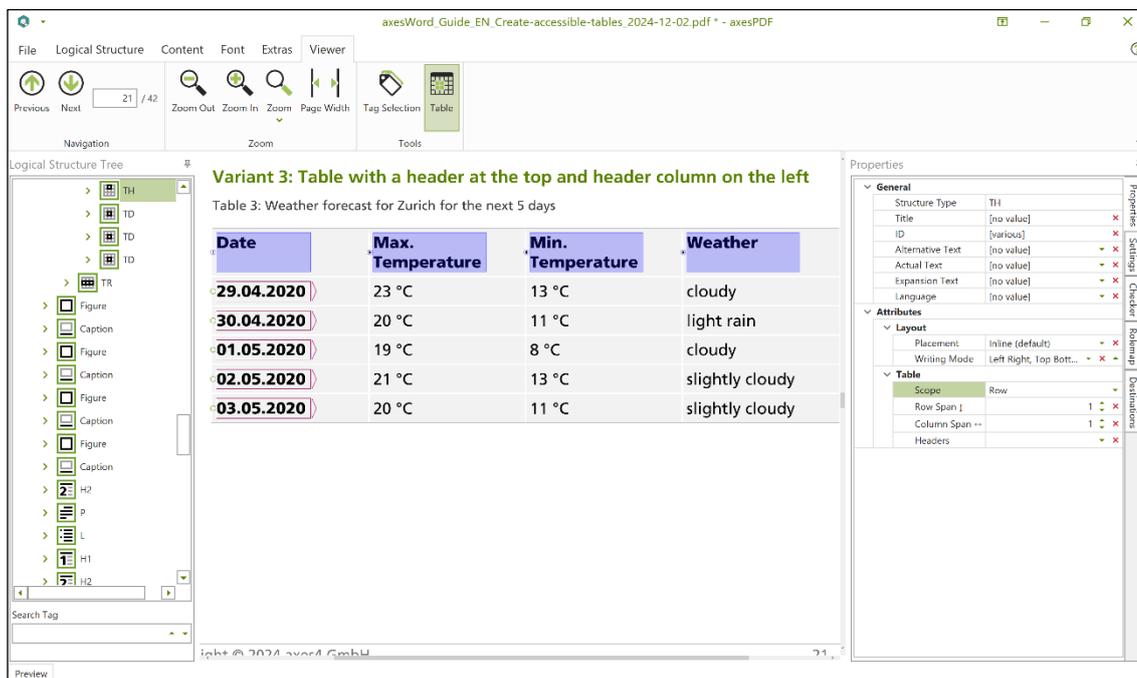


Figure 9: Row headers with scope "Row" were selected with the Table Tool

2.5.5 Step 4b: Associate header cells by using Header IDs

Use the following check list for associating header cells by using Header IDs:

1. Evaluate the deepest level of header cells.¹
2. Select the associated data cells. You can select all these cells in one step. Associate these cells with the header cells by clicking the task icon **triple bar** on the left side of the first header cell with the deepest level. If there is only one header cell that you can associate the selected cells with, click the task icon **single bar**. You can do this at the same time vertically (for column headers) and horizontally (for row headers)
3. Then select the header cells that you have associated with, and associate their headers by clicking the related task icon.
4. Repeat step 3 until you have reached header level 1. You do not have to select these cells because there are no header cells with level 0.

Example

Select a data cell or a nested heading cell: the **task icons** with the symbols **triple bar**, **single bar** or **star** appear on the left-hand side of the heading cells that can be associated to the selected cells. These header cells are also highlighted in blue. If

¹ Related to header cells the deepest level is the level with the highest number. For example: header level 4 is deeper than header level 2.



you move the mouse pointer over a **task icon**, this header cell is highlighted in dark blue.

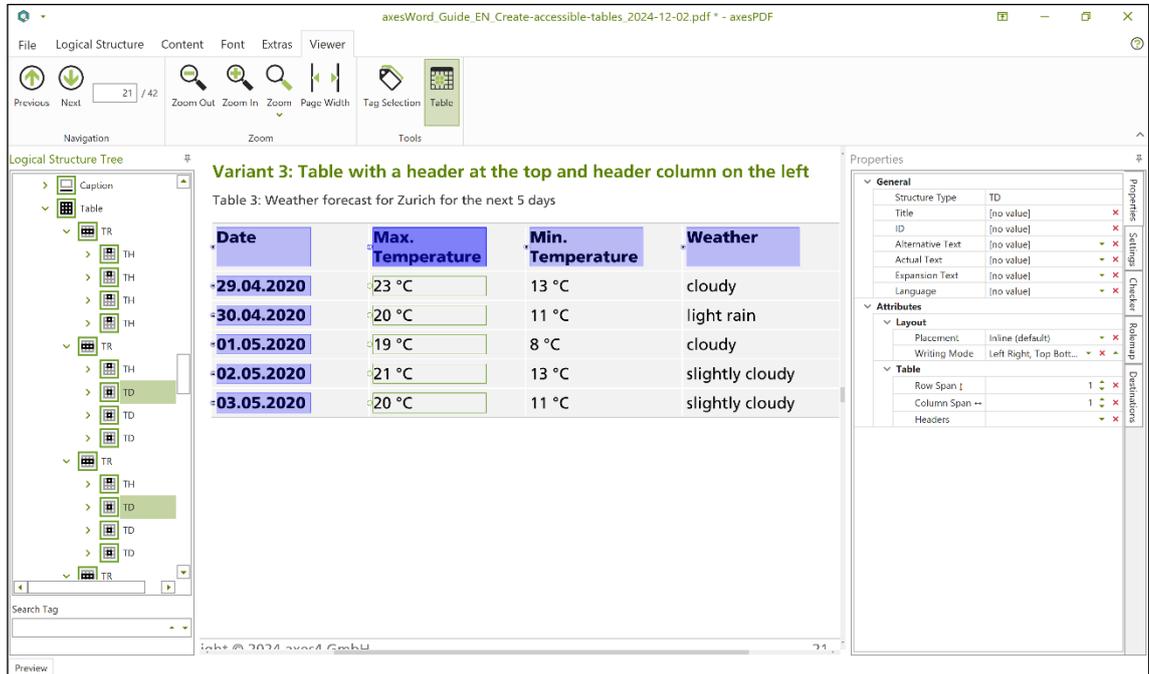


Figure 10: Data cells were selected with the Table Tool

After clicking on a **task icon**, the assignments are immediately displayed by red lines.

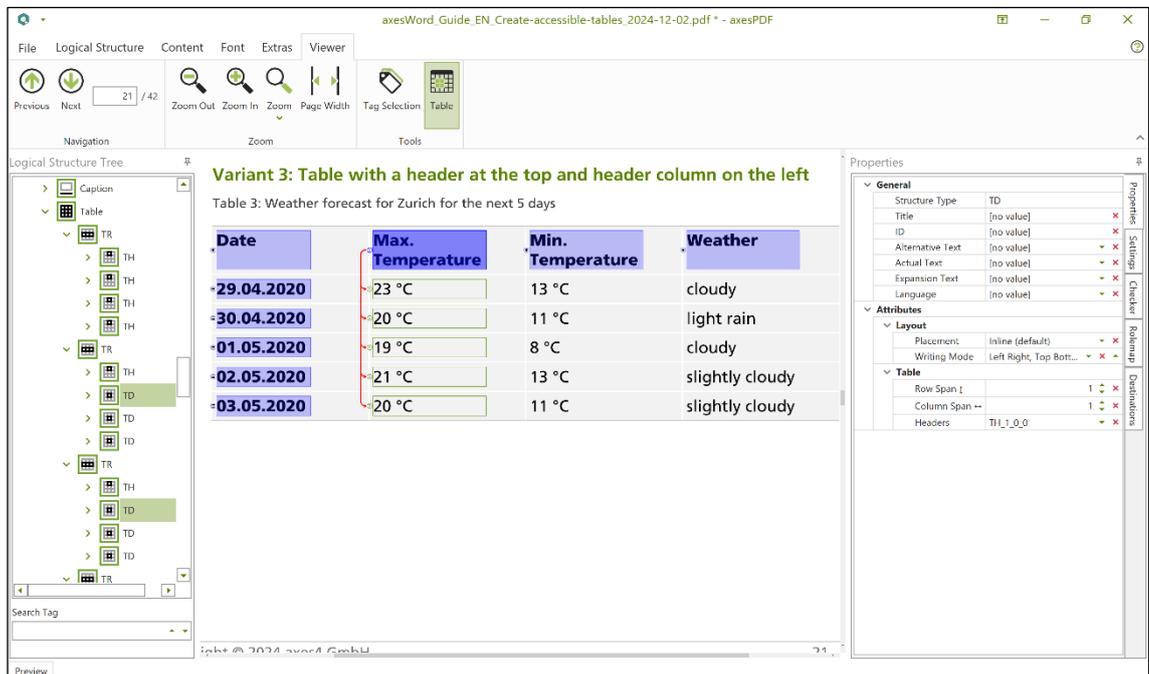


Figure 11: Data cells with Header IDs were selected with the Table Tool



2.5.6 Step 5: Final check of associated header cells

Check with the Table Tool

You can finally check your work by selecting the entire table (or individual cells) with the **Table Tool**.

If you have associated the cells by using the **scope** attributes, you will see arrow symbols on the TH cells:

Date	Max. Temperature	Min. Temperature	Weather
29.04.2020	23 °C	13 °C	cloudy
30.04.2020	20 °C	11 °C	light rain
01.05.2020	19 °C	8 °C	cloudy
02.05.2020	21 °C	13 °C	slightly cloudy
03.05.2020	20 °C	11 °C	slightly cloudy

Figure 12: Complete table with scope attributes was selected with the Table Tool

For associations using **Header IDs**, you will see red lines between the cells:

Date	Max. Temperature	Min. Temperature	Weather
29.04.2020	23 °C	13 °C	cloudy
30.04.2020	20 °C	11 °C	light rain
01.05.2020	19 °C	8 °C	cloudy
02.05.2020	21 °C	13 °C	slightly cloudy
03.05.2020	20 °C	11 °C	slightly cloudy

Figure 13: Complete table with Header IDs was selected with the Table Tool

Check with the Tag Selection tool

Switch to the **Tag Selection** tool and select **TH** cell(s).

If you have used the **scope** attribute, the assigned **TD** cells will be highlighted in bright red for a selected **TH** cell:

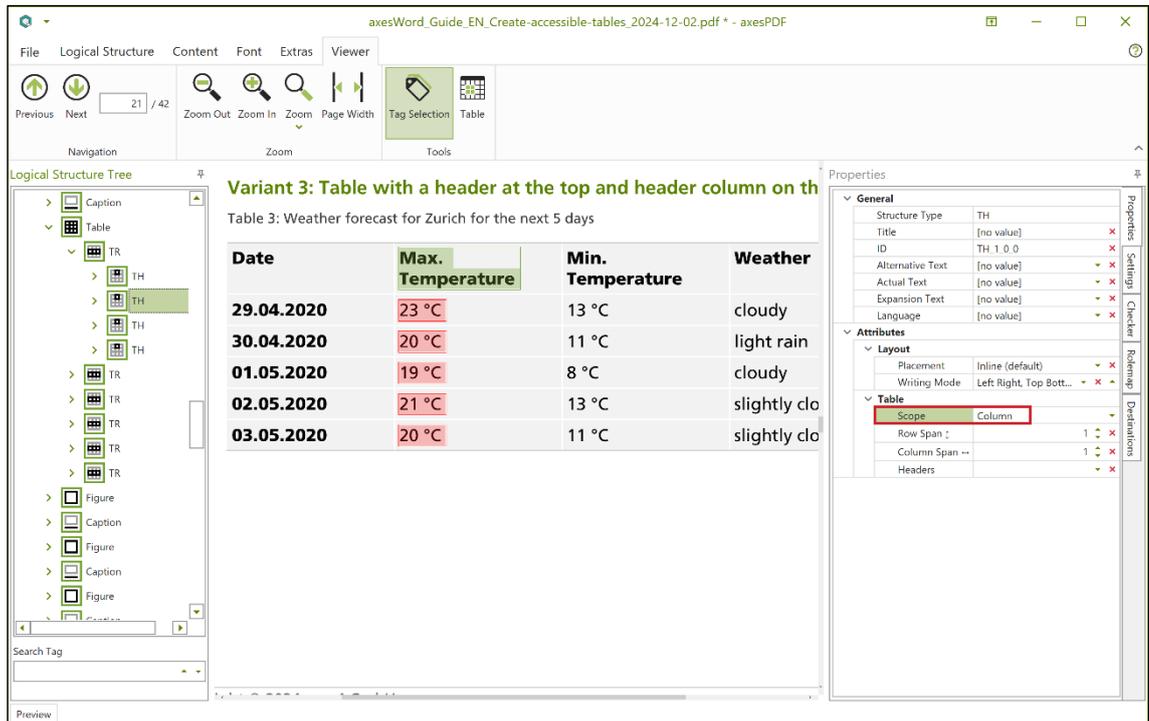


Figure 14: TH with scope "Column" was selected with the Tag Selection Tool

If you have used Header IDs, the associated TH cells will be highlighted in bright red for a selected TD cell:

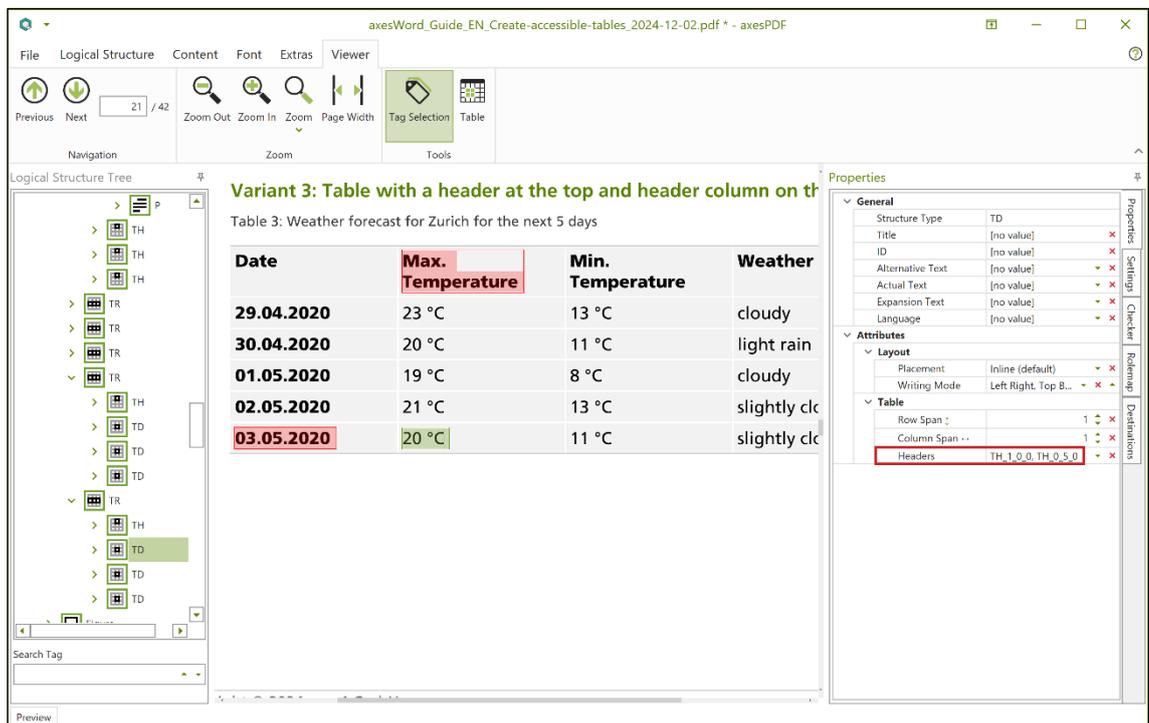


Figure 15: TD with Header IDs was selected with the Tag Selection Tool