Command Reference: WriteTimeSeriesToExcel()

Write one or more time series to a Microsoft Excel workbook file

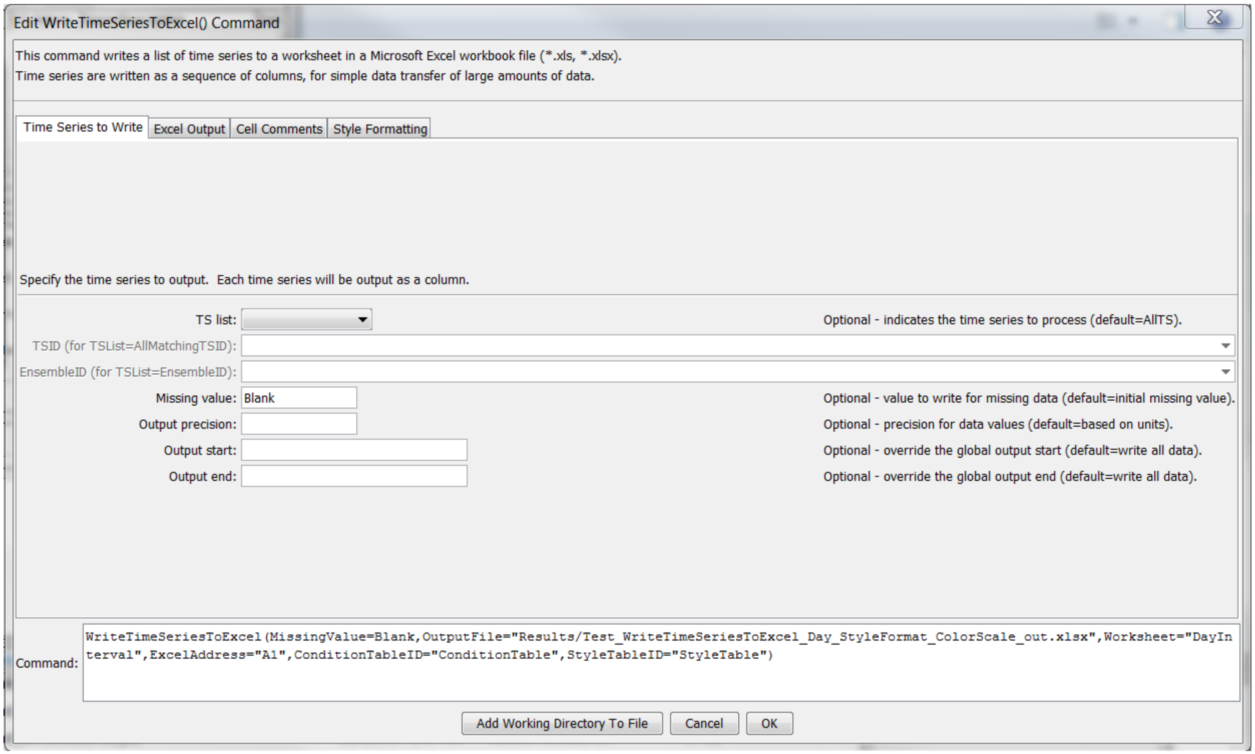
Version 11.03.07, 2015-06-24

The `WriteTimeSeriesToExcel()` command writes one or more time series to an Excel workbook. The following functionality is provided:

- Time series are written in columns (see `WriteTimeSeriesToExcelBlock()` for alternate formatting options).
- The worksheet and position in worksheet can be specified.
- The output can be created or appended.
- Separate columns can be written for date/time, date, and/or time. Currently date/time values are written as strings but Excel date objects will be enabled in the future.
- Cell comments can be formatted using data flags and other time series properties.

TSTool uses the Apache POI software, version 3.9 (http://poi.apache.org) to read/write the Excel file and consequently functionality is constrained by the features of that software package.

The following figures illustrate the dialog used to edit the command and the syntax for the command.



Edit WriteTimeSeriesToExcel() Command

This command writes a list of time series to a worksheet in a Microsoft Excel workbook file (*.xls, *.xlsx).
Time series are written as a sequence of columns, for simple data transfer of large amounts of data.

Specify the time series to output. Each time series will be output as a column.

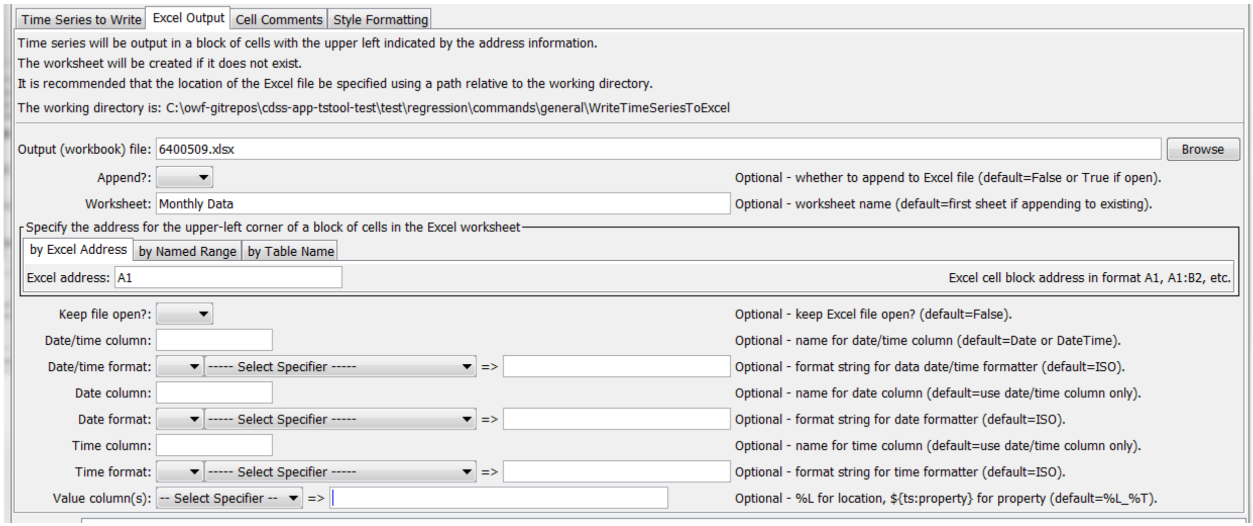
TS list: | Optional - indicates the time series to process (default=AllTS).
TSID (for TSList=AllMatchingTSID):
EnsembleID (for TSList=EnsembleID):
Missing value: Blank | Optional - value to write for missing data (default=initial missing value).
Output precision: | Optional - precision for data values (default=based on units).
Output start: | Optional - override the global output start (default=write all data).
Output end: | Optional - override the global output end (default=write all data).

Command:

```
WriteTimeSeriesToExcel(MissingValue=Blank,OutputFile="Results/Test_WriteTimeSeriesToExcel_Day_StyleFormat_ColorScale_out.xlsx",Worksheet="DayIn
terval",ExcelAddress="A1",ConditionTableID="ConditionTable",StyleTableID="StyleTable")
```

WriteTimeSeriesToExcel

WriteTimeSeriesToExcel() Command Editor

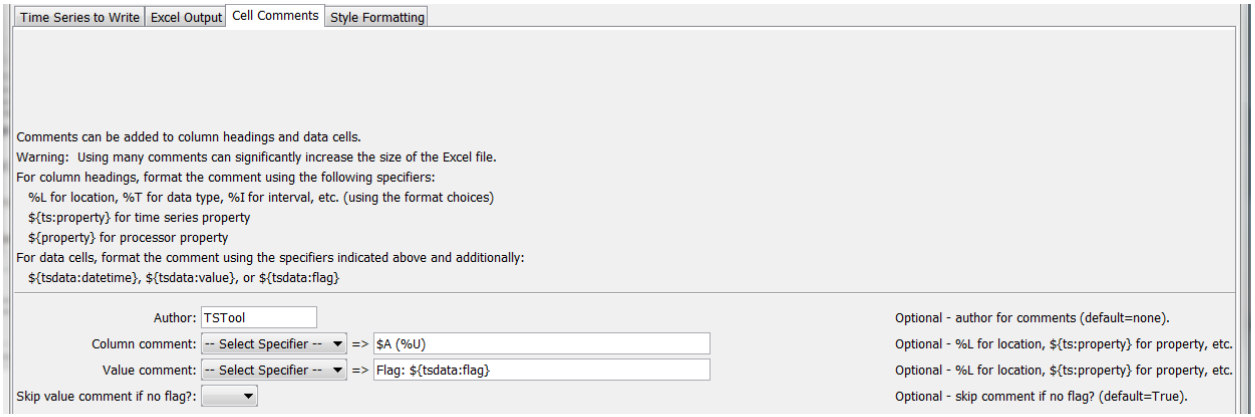


Time series will be output in a block of cells with the upper left indicated by the address information.
The worksheet will be created if it does not exist.
It is recommended that the location of the Excel file be specified using a path relative to the working directory.
The working directory is: C:\owf-gitrepos\cdss-app-tstool-test\test\regression\commands\general\WriteTimeSeriesToExcel

Output (workbook) file: 6400509.xlsx
Append?: Optional - whether to append to Excel file (default=False or True if open).
Worksheet: Monthly Data Optional - worksheet name (default=first sheet if appending to existing).
Specify the address for the upper-left corner of a block of cells in the Excel worksheet
Excel address: A1 Excel cell block address in format A1, A1:B2, etc.
Keep file open?: Optional - keep Excel file open? (default=False).
Date/time column: Optional - name for date/time column (default=Date or DateTime).
Date/time format: ----- Select Specifier ----- => Optional - format string for data date/time formatter (default=ISO).
Date column: Optional - name for date column (default=use date/time column only).
Date format: ----- Select Specifier ----- => Optional - format string for date formatter (default=ISO).
Time column: Optional - name for time column (default=use date/time column only).
Time format: ----- Select Specifier ----- => Optional - format string for time formatter (default=ISO).
Value column(s): -- Select Specifier -- => Optional - %L for location, ${ts:property} for property (default=%L_%T).

WriteTimeSeriesToExcel_ExcelOutput

WriteTimeSeriesToExcel() Command Editor for Excel Output Parameters

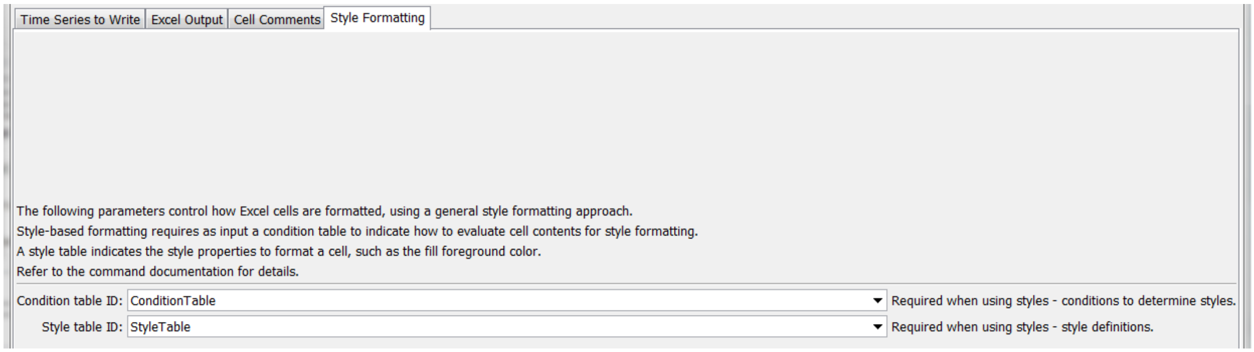


Comments can be added to column headings and data cells.
Warning: Using many comments can significantly increase the size of the Excel file.
For column headings, format the comment using the following specifiers:
%L for location, %T for data type, %I for interval, etc. (using the format choices)
${ts:property} for time series property
${property} for processor property
For data cells, format the comment using the specifiers indicated above and additionally:
${tsdata:datetime}, ${tsdata:value}, or ${tsdata:flag}

Author: TSTool Optional - author for comments (default=none).
Column comment: -- Select Specifier -- => $A (%U) Optional - %L for location, ${ts:property} for property, etc.
Value comment: -- Select Specifier -- => Flag: ${tsdata:flag} Optional - %L for location, ${ts:property} for property, etc.
Skip value comment if no flag?: Optional - skip comment if no flag? (default=True).

WriteTimeSeriesToExcel_CellComments

WriteTimeSeriesToExcel() Command Editor for Cell Comments Parameters



The following parameters control how Excel cells are formatted, using a general style formatting approach.
Style-based formatting requires as input a condition table to indicate how to evaluate cell contents for style formatting.
A style table indicates the style properties to format a cell, such as the fill foreground color.
Refer to the command documentation for details.

Condition table ID: ConditionTable Required when using styles - conditions to determine styles.
Style table ID: StyleTable Required when using styles - style definitions.

WriteTimeSeriesToExcel_StyleFormat

WriteTimeSeriesToExcel() Command Editor for Style Formatting Parameters

The command syntax is as follows:

```
WriteTimeSeriesToExcel(Parameter=Value,…)
```

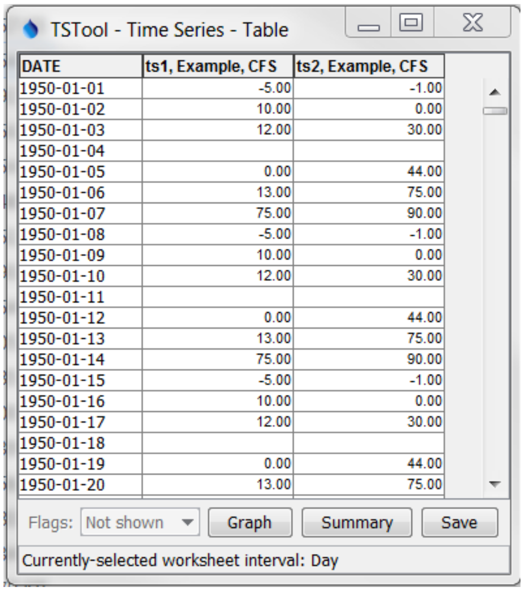
Command Parameters

Parameter	Description	Default
`TSList`	Indicates the list of time series to be processed, one of: • `AllMatchingTSID` – all time series that match the `TSID` (single TSID or TSID with wildcards) will be processed. • `AllTS` – all time series before the command. • `EnsembleID` – all time series in the ensemble will be processed. • `FirstMatchingTSID` – the first time series that matches the `TSID` (single TSID or TSID with wildcards) will be processed. • `LastMatchingTSID` – the last time series that matches the `TSID` (single TSID or TSID with wildcards) will be processed. • `SelectedTS` – the time series are those selected with the `SelectTimeSeries()` command.	`AllTS`
`TSID`	The time series identifier or alias for the time series to be processed, using the `*` wildcard character to match multiple time series. Can be specified using processor `${Property}`.	Required if `TSList=*TSID`.
`EnsembleID`	The ensemble to be processed, if processing an ensemble. Can be specified using processor `${Property}`.	Required if `TSList=EnsembleID`.
`MissingValue`	Value to write to Excel for missing data values.	Original missing value.
`Precision`	The number of digits after the decimal for data values.	Determine from units.
`OutputStart`	The date/time for the start of the output. Can be specified using processor `${Property}`.	Use the global output period.
`OutputEnd`	The date/time for the end of the output. Can be specified using processor `${Property}`.	Use the global output period.
`OutputFile`	The name of the Excel workbook file (**.xls* or **.xlsx*) to write, as an absolute path or relative to the command file location. If the Excel file does not exist it will be created. Can be specified using processor `${Property}`.	None – must be specified.
`Append`	Indicate whether the sheet being written should appended to an existing workbook.	`False` – create a new workbook.
`Worksheet`	The name of the worksheet in the workbook to write. If the worksheet does not exist it will be created. Can be specified using processor `${Property}`.	Write to the first worksheet.

Parameter	Description	Default
ExcelAddress	Indicates the block of cells to write, using Excel address notation (e.g., A1:D10).	Must specify address using one of available address parameters.
ExcelNamedRange	Indicates the block of cells to write, using an Excel named range.	Must specify address using one of available address parameters.
ExcelTableName	Indicates the block of cells to write, using an Excel named range.	Must specify address using one of available address parameters.
KeepOpen	Indicate whether to keep the Excel file open (True) or close after creating (False). Keeping the file open will increase performance because later commands will not need to reread the workbook. Make sure to close the file in the last Excel command.	False
DateTime Column	The name of the column for the date/time.	Date if day, month, or year interval, DateTime otherwise.
DateTime FormatterType	Specify the date/time formatter type, which indicates the syntax for DateTimeFormat. Currently, only C is supported, corresponding to the C programming language strftime() function, which is also used by other software (see Linux date command).	C
DateTime Format	The format used to expand the date/time corresponding to each time series data value. The format string can contain literal strings and specifiers supported by the DateTimeFormatterType.	
DateColumn	The name of the column for the date, if date and time need to be in separate columns.	Date
Date FormatterType	Specify the date/time formatter type, which indicates the syntax for DateFormat. Currently, only C is supported, corresponding to the C programming language strftime() function, which is also used by other software (see Linux date command).	C
DateFormat	The format used to expand the date/time corresponding to each time series data value. The format string can contain literal strings and specifiers supported by the DateFormatterType.	
TimeColumn	The name of the column for the time, if date and time need to be in separate columns.	Time
Time FormatterType	Specify the date/time formatter type, which indicates the syntax for TimeFormat. Currently, only C is supported, corresponding to the C programming	C

Parameter	Description	Default
	language `strftime()` function, which is also used by other software (see Linux `date` command).	
`TimeFormat`	The format used to expand the date/time corresponding to each time series data value. The format string can contain literal strings and specifiers supported by the `TimeFormatterType`.	
`ValueColumns`	The name(s) of the column(s) corresponding to each time series, to use for the values. Specify with `%` formatters, `${ts:property}` and `${property}`. In the future a parameter may be added to more specifically define the column names.	`%L_%T`
`Author`	Name to use in comments for author.	No author
`ColumnComment`	A string to format for column heading comments for each time series. See `ValueColumns` for formatting options.	No comments.
`ValueComment`	See `ValueColumns` for formatting options. The string `${tsdata:flag}` can also be specified to include the data flag for the cell.	No comments.
`SkipValueComment IfNoFlag`	Indicate whether the `ValueComment` should be skipped if the data flag for a cell is blank.	`True`
`Condition TableID`	Identifier for condition table (see below). Can be specified using processor `${Property}`.	Style formatting is not used.
`StyleTableID`	Identifier for style table (see below). Can be specified using processor `${Property}`.	Style formatting is not used.

Excel cell formatting consists of number formatting, cell colors, cell width, etc. The ***Style Formatting*** tab provides general formatting capabilities for data cells. Consider the following time series data table, where the goal is to write the TSTool time series to Excel and format cells to indicate specific conditions of interest. This approach is implemented similarly in the `WriteTableToExcel()` command.



TSTool - Time Series - Table

DATE	ts1, Example, CFS	ts2, Example, CFS
1950-01-01	-5.00	-1.00
1950-01-02	10.00	0.00
1950-01-03	12.00	30.00
1950-01-04		
1950-01-05	0.00	44.00
1950-01-06	13.00	75.00
1950-01-07	75.00	90.00
1950-01-08	-5.00	-1.00
1950-01-09	10.00	0.00
1950-01-10	12.00	30.00
1950-01-11		
1950-01-12	0.00	44.00
1950-01-13	13.00	75.00
1950-01-14	75.00	90.00
1950-01-15	-5.00	-1.00
1950-01-16	10.00	0.00
1950-01-17	12.00	30.00
1950-01-18		
1950-01-19	0.00	44.00
1950-01-20	13.00	75.00

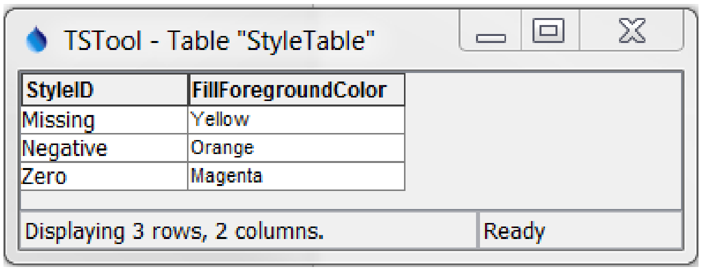
Flags: Not shown

Currently-selected worksheet interval: Day

WriteTimeSeriesToExcel_DataTable

Data Table used with WriteTimeSeriesToExcel() Command Style Formatting

To configure style-based formatting, a style table is defined listing properties for formatting cells. This table can be defined as a CSV file, Excel worksheet or other format and read into TSTool using a suitable command. The following figure illustrates a basic style table, which can be shared among commands.



StyleID	FillForegroundColor
Missing	Yellow
Negative	Orange
Zero	Magenta

Displaying 3 rows, 2 columns. Ready

WriteTableToExcel_StyleTable

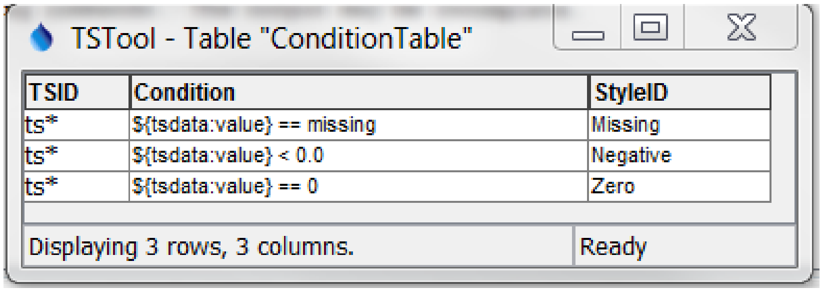
Style Table used with WriteTimeSeriesToExcel() Command for Specific Checks and Formatting

The following style table column names are recognized. The default values for cell style properties not listed in the table are those provided by Excel.

Recognized Style Table Column Names

Column Name	Description	Default
`StyleID`	An identifier for the style, which is used in the format table below.	None – must be specified.
`FillForegroundColor`	The foreground fill color as a named color (e.g., "Red"), RGB triplet (`255,255,255`), or hex color `0xFFFFFF`. The following named colors are recognized: `black`, `blue`, `cyan`, `darkgray`, `gray`, `green`, `lightgray`, `magenta`, `none`, `orange`, `pink`, `red`, `white`, `yellow`.	No fill color.
`FillPattern`	Fill pattern for cells using `FillForegroundColor` and `FillBackgroundColor`.	**Currently always defaults to solid.**

The condition table indicates how the styles are used for time series data. The following example indicates that any time series with identifier (or alias) starting with "ts" should be processed to evaluate for missing, negative, and zero values.



TSID	Condition	StyleID
ts*	${tsdata:value} == missing	Missing
ts*	${tsdata:value} < 0.0	Negative
ts*	${tsdata:value} == 0	Zero

Displaying 3 rows, 3 columns. Ready

WriteTimeSeriesToExcel_ConditionTable

Condition Table used with WriteTimeSeriesToExcel() Command for Specific Checks and Formatting

The column names for the condition table must be specified as shown. The ***Condition*** column recognizes the following time series data specifiers:

- `${tsdata:value}` – the time series data value, used to evaluate numerical conditions
- `${tsdata:flag}` – the time series flag, used to evaluate string conditions

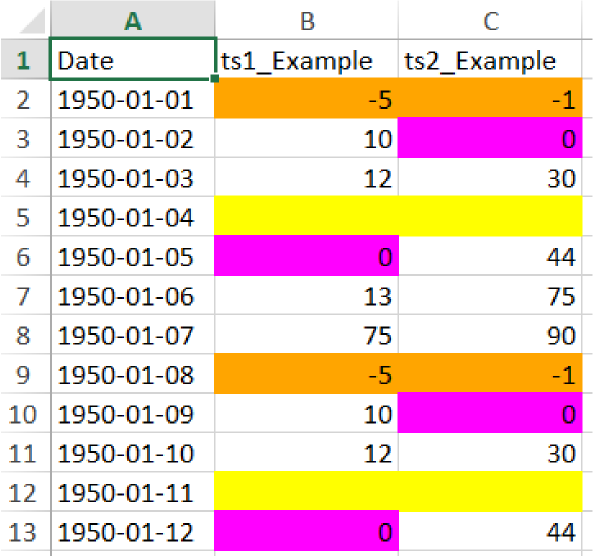
Values on the left and right of the operator must be separated with spaces to facilitate parsing the condition. The ***Condition*** column recognizes the following operators:

Condition Table Operators

Operator	Description
`<`	Less than.
`<=`	Less than or equal to.
`==`	Equal to. Specify the right-side value as `missing` to check for missing.
`!=`	Not equal to. Specify the right-side value as `missing` to check for missing.
`>`	Greater than.
`>=`	Greater than or equal to.
`contains`	Specify for string values to check for substring (case-independent).

Multiple conditions can be specified by using `AND` (surrounded by a single space) between conditions.

The following figure illustrates the output from the above example.

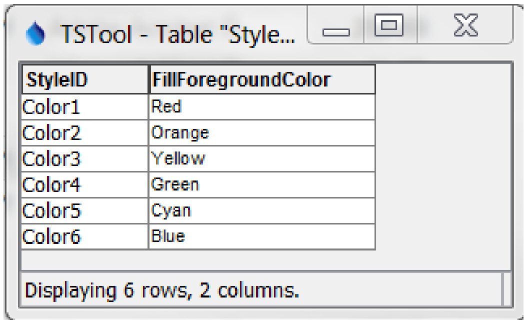


	A	B	C
1	Date	ts1_Example	ts2_Example
2	1950-01-01	-5	-1
3	1950-01-02	10	0
4	1950-01-03	12	30
5	1950-01-04		
6	1950-01-05	0	44
7	1950-01-06	13	75
8	1950-01-07	75	90
9	1950-01-08	-5	-1
10	1950-01-09	10	0
11	1950-01-10	12	30
12	1950-01-11		
13	1950-01-12	0	44

WriteTimeSeriesToExcel_Output

WriteTimeSeriesToExcel() Command Example Output for Specific Checks and Formatting

The following example illustrates using multiple conditions to implement a color scale.



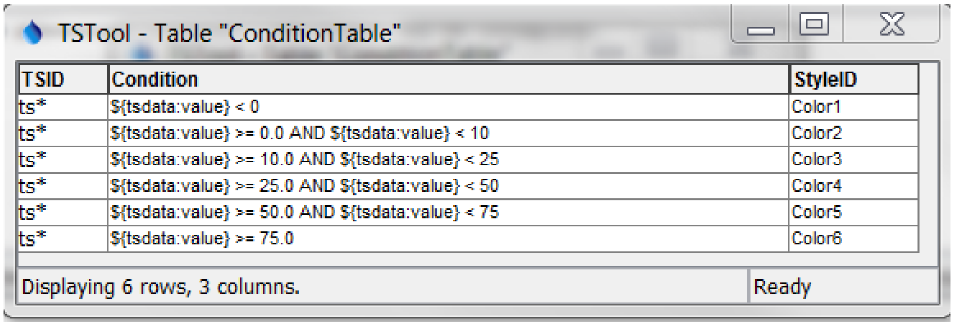
TSTool - Table "Style...

StyleID	FillForegroundColor
Color1	Red
Color2	Orange
Color3	Yellow
Color4	Green
Color5	Cyan
Color6	Blue

Displaying 6 rows, 2 columns.

WriteTableToExcel_StyleTable2

Style Table used with WriteTimeSeriesToExcel() Command for a Color Scale



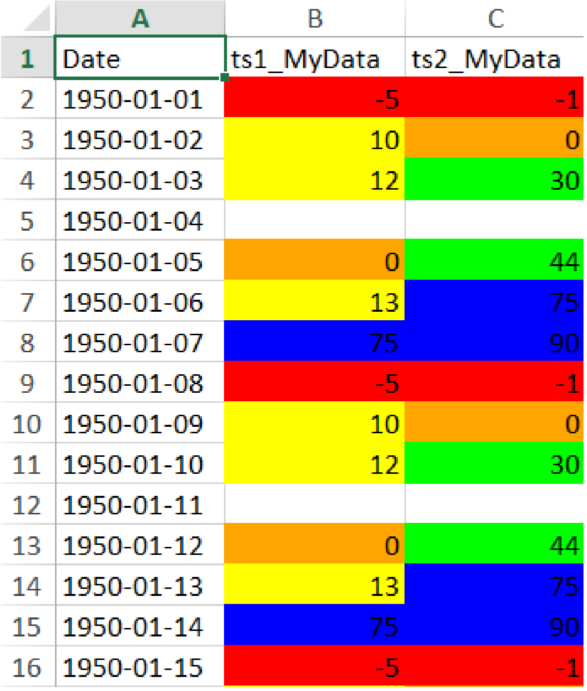
TSTool - Table "ConditionTable"

TSID	Condition	StyleID
ts*	${tsdata:value} < 0	Color1
ts*	${tsdata:value} >= 0.0 AND ${tsdata:value} < 10	Color2
ts*	${tsdata:value} >= 10.0 AND ${tsdata:value} < 25	Color3
ts*	${tsdata:value} >= 25.0 AND ${tsdata:value} < 50	Color4
ts*	${tsdata:value} >= 50.0 AND ${tsdata:value} < 75	Color5
ts*	${tsdata:value} >= 75.0	Color6

Displaying 6 rows, 3 columns. Ready

WriteTimeSeriesToExcel_ConditionTable2

Condition Table used with WriteTimeSeriesToExcel() Command for a Color Scale



	A	B	C
1	Date	ts1_MyData	ts2_MyData
2	1950-01-01	-5	-1
3	1950-01-02	10	0
4	1950-01-03	12	30
5	1950-01-04		
6	1950-01-05	0	44
7	1950-01-06	13	75
8	1950-01-07	75	90
9	1950-01-08	-5	-1
10	1950-01-09	10	0
11	1950-01-10	12	30
12	1950-01-11		
13	1950-01-12	0	44
14	1950-01-13	13	75
15	1950-01-14	75	90
16	1950-01-15	-5	-1

WriteTimeSeriesToExcel_Output2

WriteTimeSeriesToExcel() Command Example Output for Style Formatting