

# HNS SPC

Statistical process and quality control

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## Report



## **Report**

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# **HNS SPC**

Statistical process and quality control

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*The analyses already existing in the HNS SPC software are suitable for checking one process at a time. With the new reports, it will be possible to display the indices characterising the capability of several processes, several products or even all the processes defined in a factory at the same time.*

*In the individual reports it is possible to display the data within one – the actually selected – factory.*

*Compared to the foregoing calculations, these reports were also extended with new indices that are based on the Six Sigma method. Instead of process capability indices, the Six Sigma reports contain Z value for showing the capability of the processes, which also show the probability of being outside the tolerance limits*

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# 1 Capability analysis

## 1.1 Aim

The capability analysis is a quick technical status report for managers and technical professionals on the actual and possible capabilities of the selected processes, indicating poor results.

Capability analysis contains only measured parameters.

## 1.2 Creation of the report

The creation of the capability analysis can be initiated from the **Reports – Capability analysis** menu item. Afterwards the software leads the user through those settings that are necessary to specify for creating the report. You can switch between the individual settings windows with the **<Previous** and **Next>** buttons and you can abort the report creation with **Cancel** button.

### 1.2.1 Choosing report template or create report

User can choose between creating a new report and making a report by means of either report template.

#### Comment

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

It can be **private** or **public report** templates.

By **Select** button user can make report by means of template appointed by the cursor. It is necessary after template selection to select only time range (see in **Time range** item), other settings are made after selected template.

By **Delete** button user can delete a report template.

The asterisk located in the first column (**S** = status) denotes that this report template was displayed after open the **Report Templates** window.

If user have any template, or does not want to use any template either of them, than user can go on by **Create report** button, and create a report with going along all the settings.

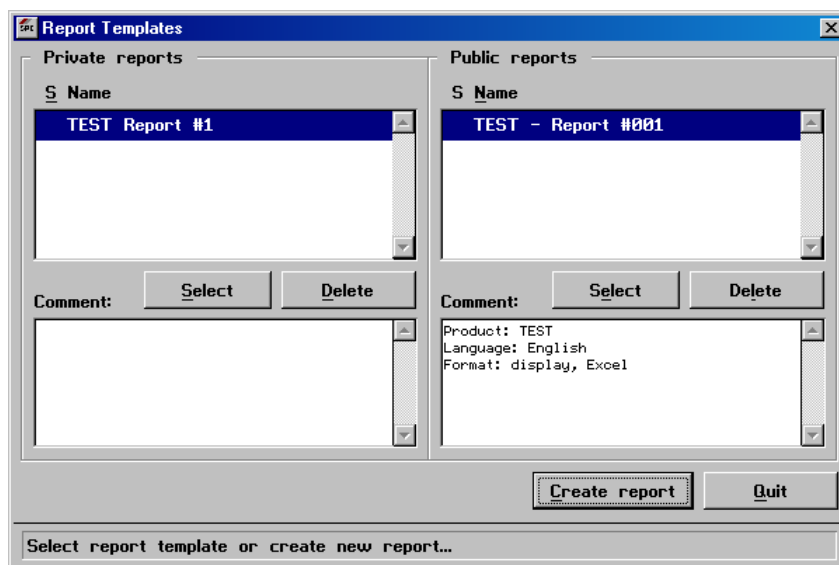


Figure 1: Capability analysis – Report templates

## 1.2.2 Report type

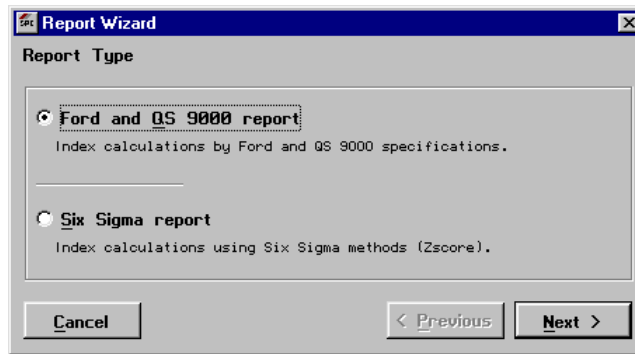


Figure 2: Selecting the type of capability analysis

Two types of reports can be created:

- Six Sigma report  
It contains (Z) indices calculated according to the Six Sigma method.
- Ford and QS9000 report  
It contains capability indices calculated according to the Ford and QS9000 specifications.

## 1.2.3 Types of parameters to report (CTQ)

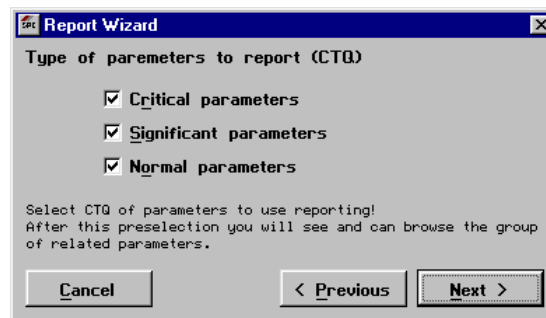


Figure 3: Setting the types of parameters (CTQ) for the capability analysis

You can select which CTQ categories out of the measured parameters the software should offer for selection in the next step. All three CTQ categories are offered as default.

### Note

The CTQ categories can be specified and modified in the **Database – Measured parameter** menu item.

## 1.2.4 Process selection

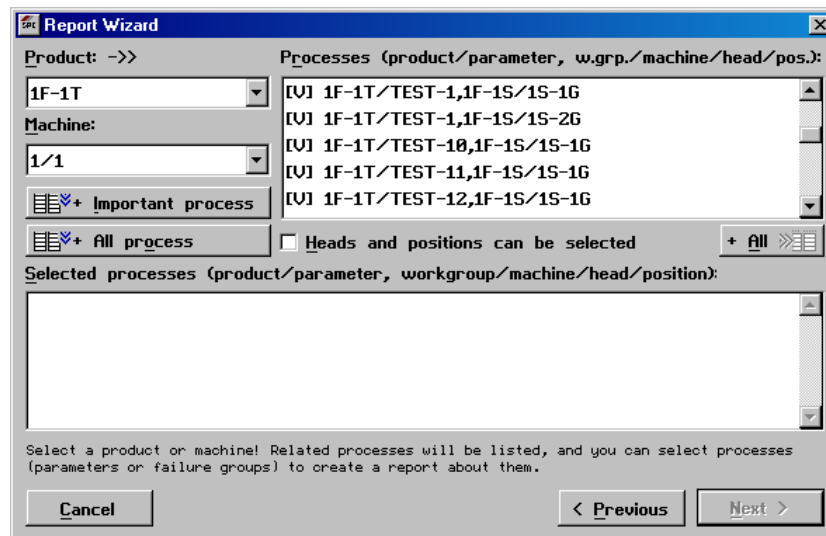


Figure 4: Process selection for the capability analysis

The list of processes wished to be featured in the report has to be compiled. The processes are selected as follows:

All the products found in the given factory are featured in the **Product** field. When a specific product is selected, all the processes belonging thereto appear in the **Processes** field.

All the machines found in the given factory are featured in the **Machine** field. When a specific machine is selected, all the processes belonging thereto appear in the **Processes** field.

The **Processes** field contains the information in the following order:

Product / Parameter, Workgroup / Machine / Head / Position

The serial number of the Head / Position is featured at the end of the row only if the **Heads and positions can be selected** option is enabled and if these levels are defined in the database.

The processes featured in the **Processes** field can be moved into the **Selected processes** field by double-clicking the left mouse button. The processes featured here will be featured in the report to be created. Any process can be deleted by highlighting it in the **Selected processes** field and pressing the Delete button of the keyboard.

It is possible to select more processes at a time according to the following:

Out of the processes featured in the **Processes** field, those will be selected with the **Important processes** button, which are selected for automatic alert.

### Note

*The processes can be selected in the **Database – Measured process** or in the **Database – Process settings – Change menu items** with the **Important process** switch.*

When the **All processes** button is pressed, all the processes featured in the **Processes** field are selected.

With the **All** button, you can select all the processes found in the given factory – the number whereof will naturally be restricted according to the limiting conditions possibly specified previously.

## 1.2.5 Summarisation

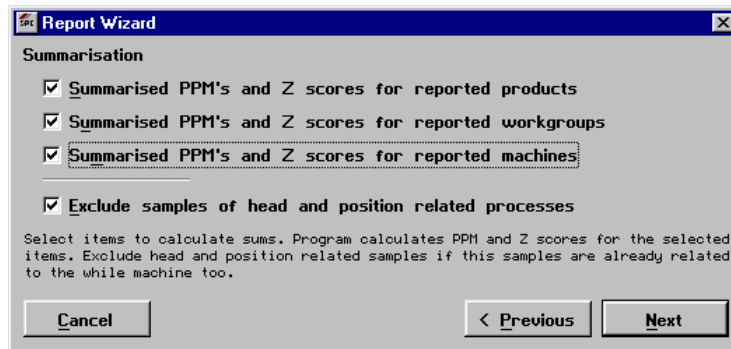


Figure 5: Selecting the requested summarisation for the capability analysis

The software can be requested to calculate summarised results for the reported processes. Summarisation can happen for:

- the reported product(s),
- the reported workgroup(s),
- the reported machine(s).

With the **Exclude samples of head and position related processes** option it can be specified that the software should include only the machine-related data in the summarisation.

The summarised results are featured in a separate row at the bottom of the report.

## 1.2.6 Time range

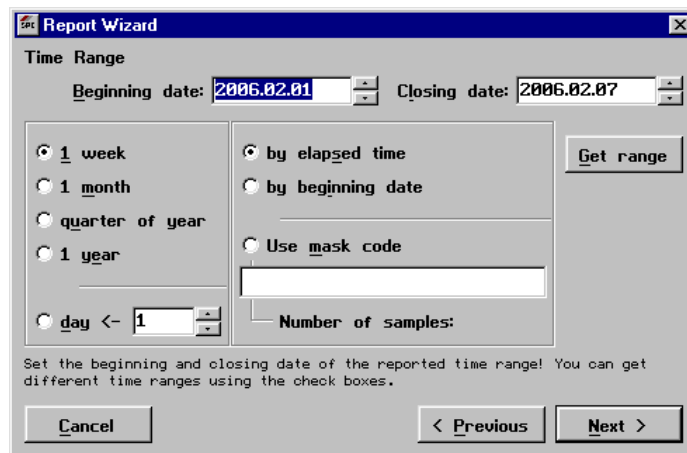


Figure 6: Selecting time range for the capability analysis

Following process selection, you have to select the time range related to which you want to create the report.

Possibilities for time range selection:

- The user specifies the beginning and closing date of the given time range.
- A time range of a given length that can be:
  - 1 week
  - 1 month
  - 1 quarter of a year
  - 1 year

It is possible to select the listed time ranges according to two methods:

- by elapsed time: the software calculates the time in conformity with the given period backwards starting from today's date and that will be the starting date of the time range,

*Example*

1 month is selected, the elapsed time is 1 month and today is 11.09.2005, then the time range will be 10.09.2005 – 11.09.2005.

- by beginning date: last full time period, with the given length.

*Example*

1 month is selected, calculation is based on the starting date and today is 11.09.2005, then the selected time range will be 10.01.2005 – 10.31.2005.

- Data of a given number of days.
- Based on mask code.

Only the data featured with the mask code here specified will be featured in the report.

When the **Get range** button is pressed, the starting and closing date conforming to the settings and the number of samples based on the mask code selection appear in the upper part of the window.

**Attention!**

*It can happen that in the time range selected by the user, the parameter or any other setting (e.g. tolerance limits, type of distribution, capability study, sample size...) was changed in any of the selected processes (or even in several processes). In this case, the software takes the last settings into account and indicates the modification with a (!) mark besides the parameter's name in the printed format. At the bottom of the page it notes that "settings are changed".*

## 1.2.7 Report mode

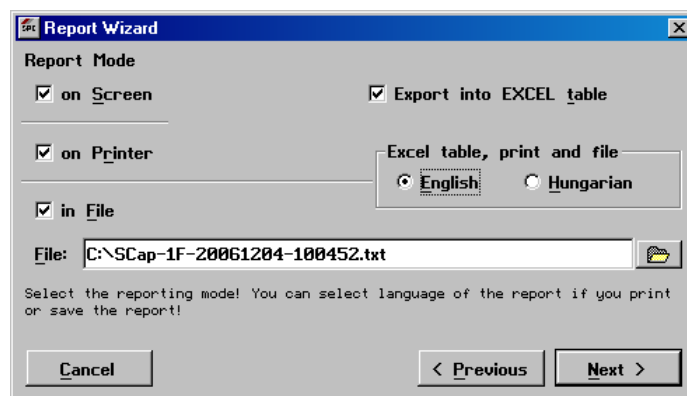


Figure 7: Selecting the report mode for the capability analysis

There are four types of report formats:

- **on Screen**  
The report will be displayed on the screen.
- **Export into EXCEL table** (in Hungarian or English language)  
Report will be exported in an Excel table. User can edit or save this file.
- **on Printer** (in Hungarian or English language)  
The report will be printed on the printer set in the **File – Printer** menu item.
- **in File** (in Hungarian or English language)  
The report will be saved in the specified file.

If the user does not specify any access route for file name, then the software will provide the following as default:

*C:\Scap-'Factory code'-'Date and time of report creation (year, month, day – hour, minute, second)'.txt*

The folder can also be browsed with the help of the  icon.

In **EXCEL table, print and file** field can be choose the language of the report (excepting the report displayed on screen), which can be Hungarian or English.

In case of exporting into Excel table in **Reports** menu **Report settings** menu item can be set the format of measured value and date

Out of the listed options, several can be selected at a time – even all.

## 1.2.8 Report creation

When the necessary settings are specified, the software compiles the report, then after moving on, it creates it in the requested format(s) (displays it on screen / starts printing / exports it into EXCEL table / saves it in a file).

### Comment

*The down status row has reference to processes whereof Johnson – transformation is the selected distribution type. The calculation time is longer for this processes through technical reasons, so program warns the user to this.*

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

User can save the settings of report (excepting time range) as a report template. When next time user wants to create report with the same settings it is necessary to select the report template and time range. If **Save report as template** switch is on, **Report Wizard** window has further fields. User have to give a **Name**, respectively it can be given optional **Comment** text which helps user to select a template. Report templates can be saved in two ways: **save as private** or **as public template**. Selection the place of report templates see in **Reports** menu **Settings** menu item.

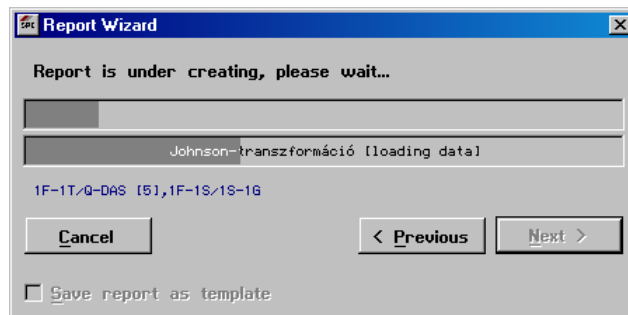


Figure 8: Capability analysis under creation

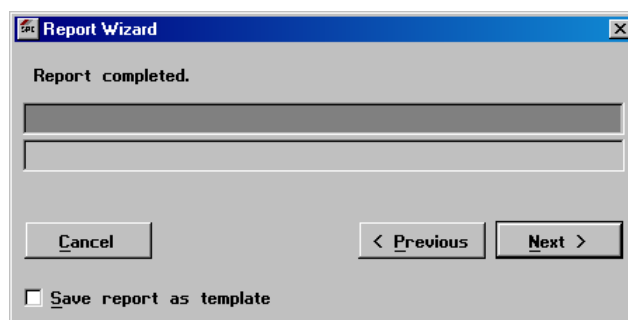


Figure 9: Capability analysis completed

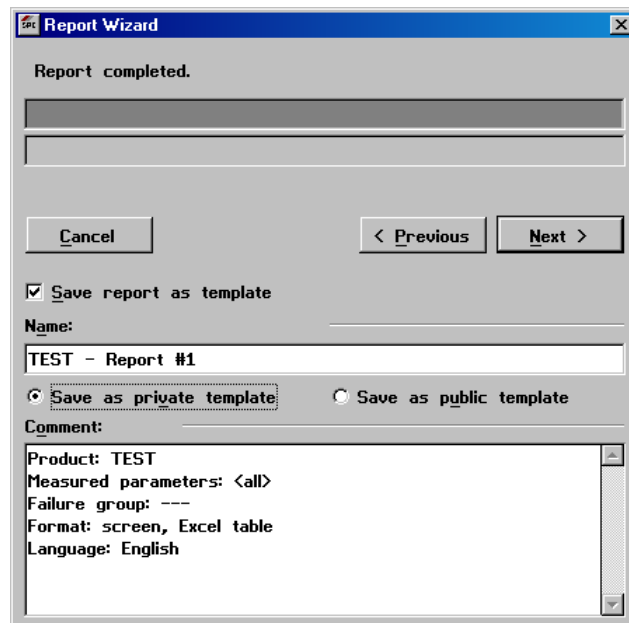


Figure 10: Saving capability analysis report as template

## 1.3 Contents

### 1.3.1 Identification data

- **Product**  
Product code and name (on screen).
- **Parameter**  
Name of measured parameter.
- **Workgroup, machine, head, position**  
Workgroup code, machine code, head number, position number.
- **Unit of measurement**  
The measured parameter's unit of measurement.
- **Nominal value, LSL, USL**  
The measurable parameter's nominal value, its upper and lower tolerance limit – in case of tolerances limited only one side, obviously one date is given out of the three data.
- **Number of samples**  
Number of samples in the selected time range.

### 1.3.2 Calculated parameters

#### 1.3.2.1 Six Sigma type

- **Mean**  
The mean of the values measured in the selected time range (long-term average).
- **Deviation LT**  
The long-term deviation of the values measured in the selected time range.
- **Deviation ST**  
The short-term deviation of the values measured in the selected time range.

- **Z LT**  
Long-term Z value.
- **Z ST**  
Short-term Z value.  
*It is not calculated in the case of Weibull and Rayleigh distribution!*
- **PPM LT**  
Long-term PPM value that shows the probability of defect related to one million manufactured pieces.
- **PPM ST**  
Short-term PPM value that shows the probability of defect related to one million manufactured pieces.  
*It is not calculated in the case of Weibull and Rayleigh distribution!*
- **Potential Z**  
A potential index that shows the possible Z value for the case when process average is located in the middle of the tolerance field.  
*It is not calculated in the case of one-sided tolerance!*
- **Potential PPM**  
A potential index that shows the possible PPM value for the case when process average is located in the middle of the tolerance field.  
*It is not calculated in the case of one-sided tolerance!*
- **Mean Shift**  
It shows the relative change of the sample averages.  
The mean shift is indicated with colours depending on its size. The limit values to be used for colouring can be specified in the **Reports – Settings** menu item.  
The application of colours can be enabled and disabled in the same menu item with the **Use next colours for marking status of indexes** switch.
- **Relative variation**  
The maximum sample deviation compared to the width of the tolerance field.  
The relative variation is indicated with colours depending on its size. The limit values to be used for colouring can be specified in the **Reports –Settings** menu item.  
The application of colours can be enabled and disabled in the same menu item with the **Use next colours for marking status of indexes** switch.  
*It is not calculated in the case of one-sided tolerance!*
- **Z stability**  
The difference between the short- and long-term Z value.  
The Z stability is indicated with colours depending on its size. The limit values to be used for colouring can be specified in the **Reports – Settings** menu item.  
The application of colours can be enabled and disabled in the same menu item with the **Use next colours for marking status of indexes** switch.  
*It is not calculated in the case of Weibull and Rayleigh distribution!*

### 1.3.2.2 Ford and QS9000 types

- **Mean**

The mean of the values measured in the selected time range (long-term mean).

- **Deviation**

The long term deviation of the values measured in the selected time range (long-term deviation).

- **Process capability indices (  $C_p$  ;  $C_{pk}$  ;  $P_p$  ;  $P_{pk}$  )**

On-going and preliminary process capability indices.

If an on-going process capability study is set for the given process in the database, then  $C_p$  and  $C_{pk}$  are calculated, if a preliminary process capability study is set, then  $P_p$  and  $P_{pk}$  indices are calculated.

*In the case of one-sided tolerance, only  $C_{pk}$  and  $P_{pk}$  indices are calculated!*

- **Process capability index ratios (  $C_{pk}/C_p$  ;  $P_{pk}/P_p$  )**

The ratio of the two process capability indices in conformity with the set process capability study.

The ratio is indicated with red colour if it is smaller than a given value. The limit value to be used for colouring can be specified in the **Reports – Settings** menu item.

Colouring can be enabled and disabled in the same menu item with the **Use next colours for marking status of indexes** switch.

*It is not calculated in the case of one-sided tolerance (as in that case, only  $C_{pk}$  and  $P_{pk}$  indices are calculated)!*

## 2 Capability Frequency Table

### 2.1 Aim

The capability frequency table shows the actual capability of the selected processes and its deviation for the selected time range.

The capability frequency table contains only measured parameters and only Six Sigma report can be created.

### 2.2 Creation of the report

The creation of the capability frequency table can be initiated from the **Reports – Capability Frequency Table** menu item. Afterwards the software leads the user through those settings that are necessary to specify for creating the report. You can switch between the individual settings windows with the **<Previous** and **Next>** buttons and you can abort the report creation with **Cancel** button.

#### 2.2.1 Choosing report template or create report

User can choose between creating a new report and making a report by means of either report template.

##### *Comment*

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

It can be **private** or **public report** templates.

By **Select** button user can make report by means of template appointed by the cursor. It is necessary after template selection to select only time range (see in **Time range** item), other settings are made after selected template.

By **Delete** button user can delete a report template.

The asterisk located in the first column (**S** = status) denotes that this report template was displayed after open the **Report Templates** window.

If user have any template, or does not want to use any template either of them, than user can go on by **Create report** button, and create a report with going along all the settings.

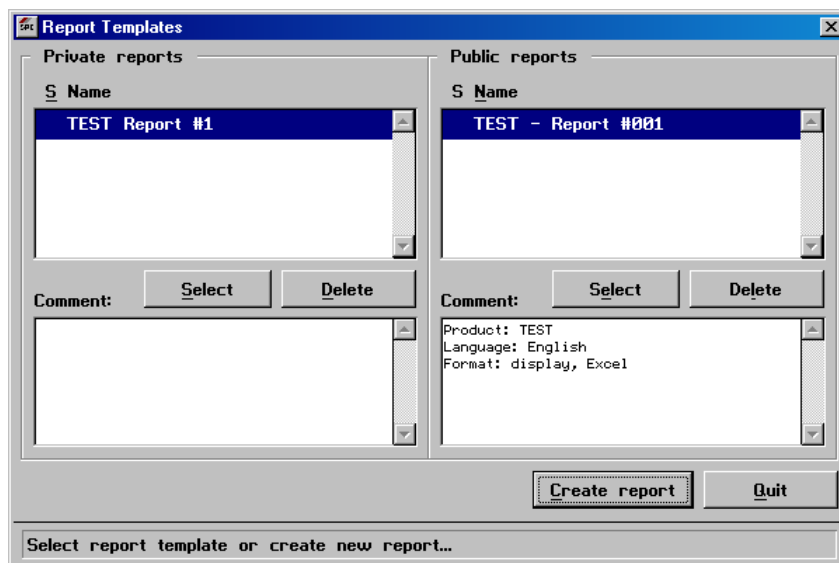


Figure 11: Capability Frequency Table – Report templates

## 2.2.2 Types of parameters to report (CTQ)

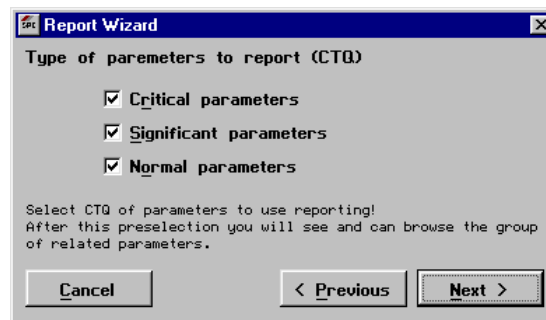


Figure 12: Setting the types of parameters (CTQ) for the capability frequency table

You can select which CTQ categories out of the measured parameters the software should offer for selection in the next step. All three CTQ categories are offered as default.

*Note: The CTQ categories can be specified and modified in the **Database – Measured parameters** menu item.*

## 2.2.3 Process selection

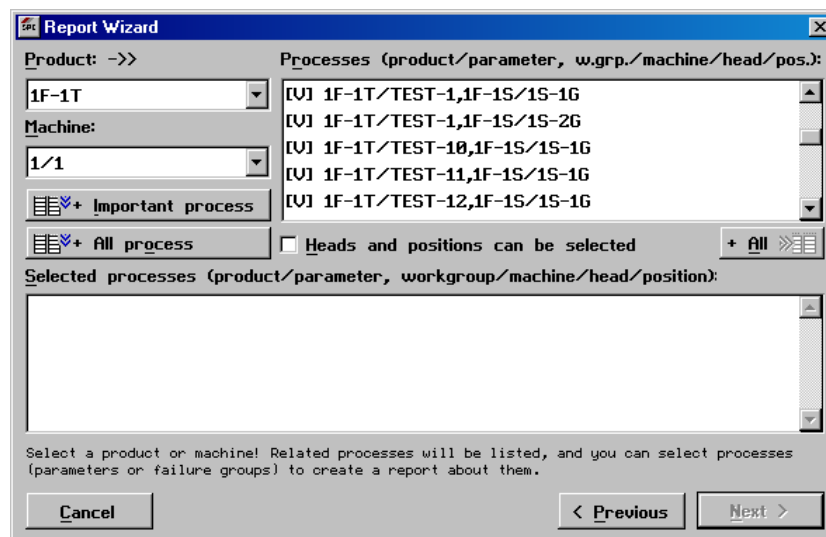


Figure 13: Process selection for the capability frequency table

The list of processes wished to be featured in the report has to be compiled. The processes are selected as follows:

All the products found in the given factory are featured in the **Product** field. When a specific product is selected, all the processes belonging thereto appear in the **Processes** field.

All the machines found in the given factory are featured in the **Machine** field. When a specific machine is selected, all the processes belonging thereto appear in the **Processes** field.

The **Processes** field contains the information in the following order:

Product / Parameter, Workgroup / Machine / Head / Position

The serial number of the Head / Position is featured at the end of the row only if the **Heads and positions can be selected** option is enabled and if these levels are defined in the database.

The processes featured in the **Processes** field can be moved into the **Selected processes** field by double-clicking the left mouse button. The processes featured here will be featured in the report to be created. Any process can be deleted by highlighting it in the **Selected processes** field and pressing the Delete button of the keyboard.

It is possible to select more processes at a time according to the following:

Out of the processes featured in the **Processes** field, those will be selected with the **Important processes** button, which are selected for automatic alert.

**Note**

The processes can be selected in the **Database – Measured process** or in the **Database – Process settings – Change menu items** with the **Important process** switch.

When the **All processes** button is pressed, all the processes featured in the **Processes** field are selected.

With the **All** button, you can select all the processes found in the given factory – the number whereof will naturally be restricted according to the limiting conditions possibly specified previously.

### 2.2.4 Time range

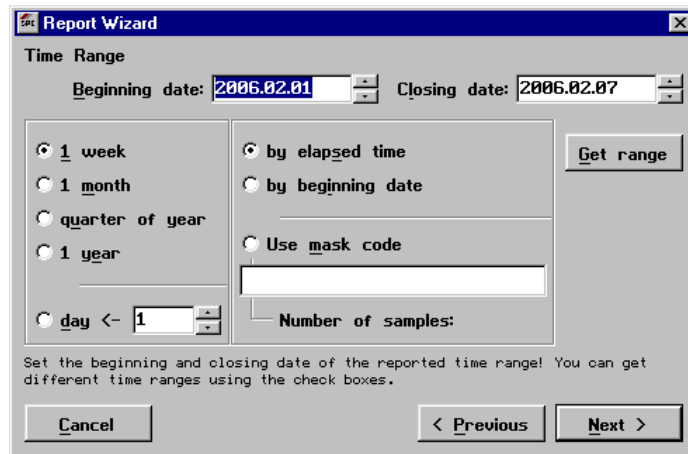


Figure 14: Selecting time range for the capability frequency table

Following process selection, you have to select the time range related to which you want to create the report.

Possibilities for time range selection:

- The user specifies the beginning and closing date of the given time range.
- A time range of a given length that can be:
  - 1 week
  - 1 month
  - 1 quarter of a year
  - 1 year

It is possible to select the listed time ranges according to two methods:

- by elapsed time: the software calculates the time in conformity with the given period backwards starting from today's date and that will be the starting date of the time range,

*Example*

*1 month is selected, the elapsed time is 1 month and today is 11.09.2005, then the time range will be 10.09.2005 – 11.09.2005.*

- by beginning date: last full time period, with the given length.

*Example*

*1 month is selected, calculation is based on the starting date and today is 11.09.2005, then the selected time range will be 10.01.2005 – 10.31.2005.*

- Data of a given number of days.
- Based on mask code.

Only the data featured with the mask code here specified will be featured in the report.

When the **Get range** button is pressed, the starting and closing date conforming to the settings – except if you entered a starting and closing date – and the number of samples based on the mask code selection appear in the upper part of the window.

**Attention!**

*It can happen that in the time range selected by the user, the parameter or any other setting (e.g. tolerance level, type of distribution, status of checking, sample size...) was changed in any of the selected processes (or even in several processes). In this case, the software takes the last settings into account and indicates the modification with a (!) mark besides the parameter's name in the printed format. At the bottom of the page it notes that "settings are changed".*

## 2.2.5 Segment type

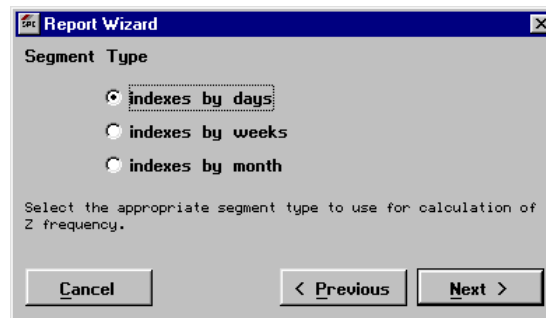


Figure 15: Selecting segment type for the capability frequency table

For the capability frequency table, you have to select the interval related to which the Z frequency values are calculated.

The calculated values can be daily, weekly or monthly indices.

## 2.2.6 Report mode

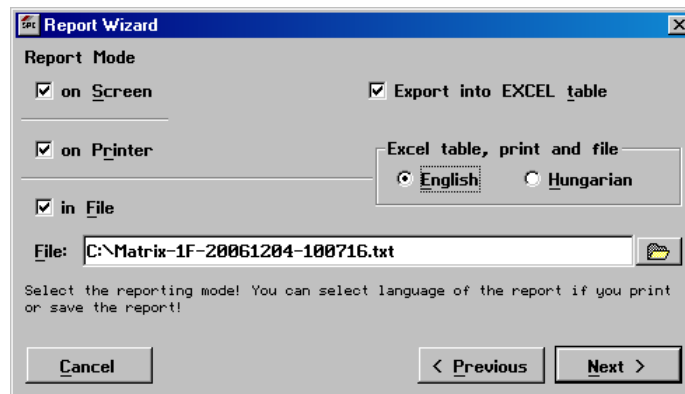



Figure 16: Specifying the report mode for the capability frequency table

There are four types of report formats:

- **on Screen**  
The report will be displayed on the screen.
- **Export into EXCEL table** (in Hungarian or English language)  
Report will be exported in an Excel table. User can edit or save this file.
- **on Printer** (in Hungarian or English language)  
The report will be printed on the printer set in the **File – Printer** menu item.
- **in File** (in Hungarian or English language)  
The report will be saved in the specified file.

If the user does not specify any access route for file name, then the software will provide the following as default:

*C:\Matrix-'Factory code'-'Date and time of report creation (year, month, day – hour, minute, second)'.txt*

The folder can also be browsed with the help of the  icon.

In **EXCEL table, print and file** field can be choose the language of the report (excepting the report displayed on screen), which can be Hungarian or English.

In case of exporting into Excel table in **Reports** menu **Report settings** menu item can be set the format of measured value and date

Out of the listed options, several can be selected at a time – even all.

## 2.2.7 Report creation

When the necessary settings are specified, the software compiles the report, then after moving on, it creates it in the requested format(s) (displays it on screen / starts printing / exports it into EXCEL table / saves it in a file).

### Comment

*The down status row has reference to processes whereof Johnson – transformation is the selected distribution type. The calculation time is longer for this processes through technical reasons, so program warns the user to this.*

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

User can save the settings of report (excepting time range) as a report template. When next time user wants to create report with the same settings it is necessary to select the report template and time range. If **Save report as template** switch is on, **Report Wizard** window has further fields. User have to give a **Name**, respectively it can be given optional **Comment** text which helps user to select a template. Report templates can be saved in two ways: **save as private** or **as public template**. Selection the place of report templates see in **Reports** menu **Settings** menu item.

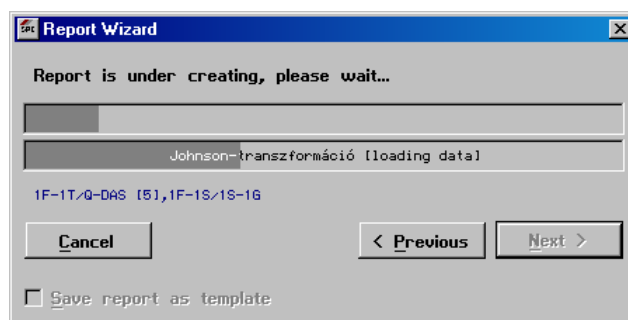


Figure 17: Capability frequency table under creation

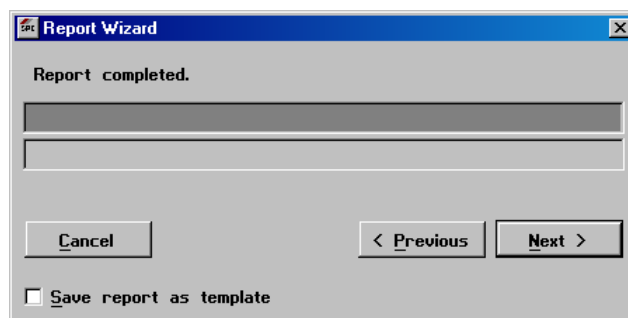


Figure 18: Capability frequency table completed

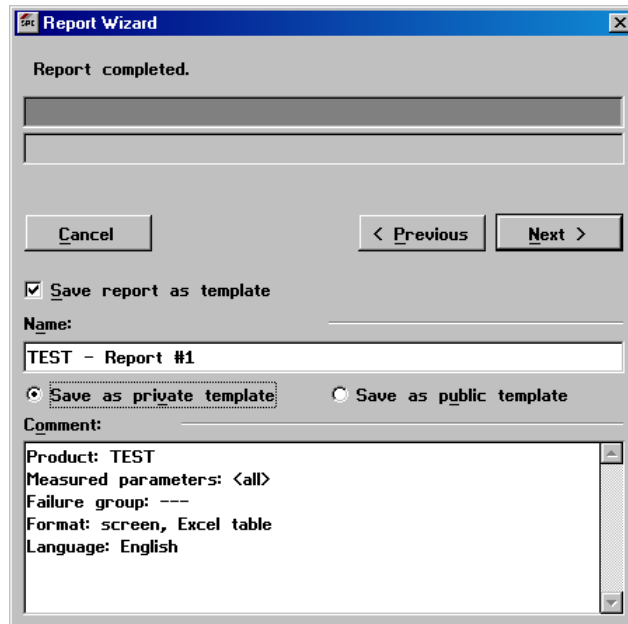


Figure 19: Saving capability frequency table as template

## 2.3 Contents

### 2.3.1 Identification data

- **Product**  
Product code and name (on screen).
- **Parameter**  
Name of measured parameter.
- **Workgroup, machine, head, position**  
Workgroup code, machine code, head number, position number.
- **Number of samples**  
Number of samples in the selected time range.

### 2.3.2 Calculated parameters

- **Z frequency**  
The long-term Z values calculated for the given – daily, weekly or monthly – interval are categorised into 7 classes according to their size, i.e. you have to specify how many times the Z value fell between the given value limits.  
In case only one sample falls into one time interval, then the row is indicated with pink.  
Colouring can be enabled and disabled in the **Reports – Settings** menu item with the **Use next colours for marking status of indexes** switch.  
*In the case of Weibull and Rayleigh distribution, Z frequency values are not calculated!*
- **Z LT**  
Long-term Z value.
- **PPM LT**  
Long-term PPM value, which shows the probability of defect related to one million manufactured pieces.

### 3 CTQ capability – OoC report

#### 3.1 Aim

The summary report of the CTQ capability – OoC report.

In the report there are measured parameters and failure groups as well.

#### 3.2 Creation of the report

The creation of the CTQ capability – OoC report can be initiated from the **Reports – CTQ Capability – OoC Report** menu item. Afterwards the software leads the user through those settings that are necessary to specify for creating the report. You can switch between the individual settings windows with the **<Previous** and **Next>** buttons and you can abort the report creation with the **Cancel** button.

##### 3.2.1 Choosing report template or create report

User can choose between creating a new report and making a report by means of either report template.

###### Comment

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

It can be **private** or **public report** templates.

By **Select** button user can make report by means of template appointed by the cursor. It is necessary after template selection to select only time range (see in **Time range** item), other settings are made after selected template.

By **Delete** button user can delete a report template.

The asterisk located in the first column (**S** = status) denotes that this report template was displayed after open the **Report Templates** window.

If user have any template, or does not want to use any template either of them, than user can go on by **Create report** button, and create a report with going along all the settings.

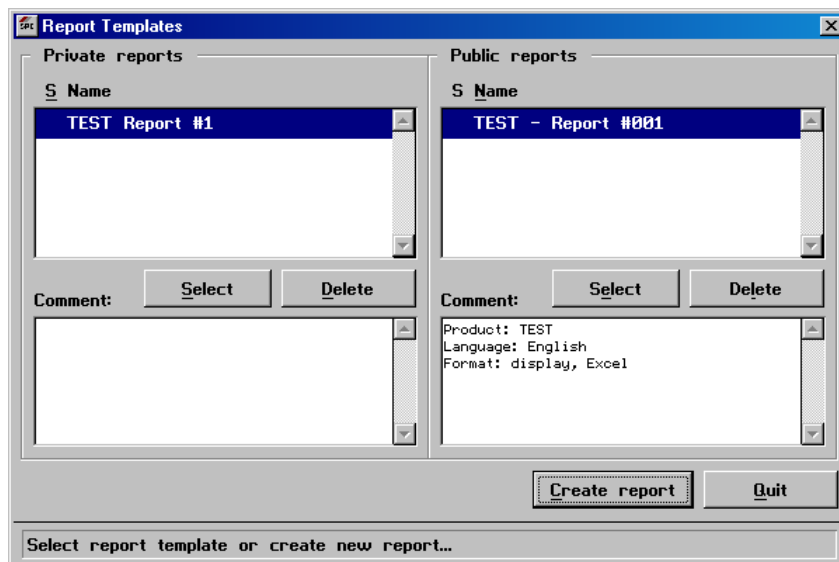


Figure 20: CTQ capability – OoC report templates

### 3.2.2 Report type

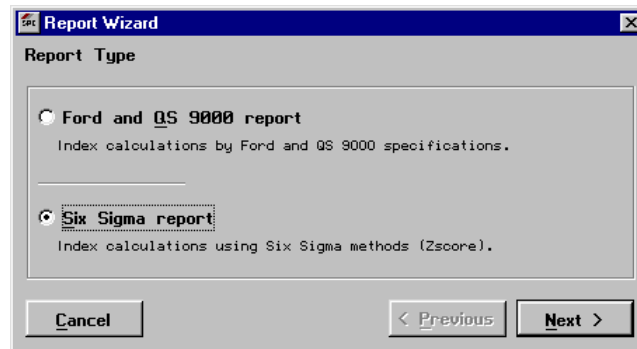


Figure 21: Selecting the type of CTQ capability – OoC report

Two types of reports can be created:

- Six Sigma report  
It contains (Z) indices calculated according to the Six Sigma method.
- Ford and QS9000 report  
It contains capability indices calculated according to the Ford and QS9000 specifications.

### 3.2.3 Types of parameters to report (CTQ)

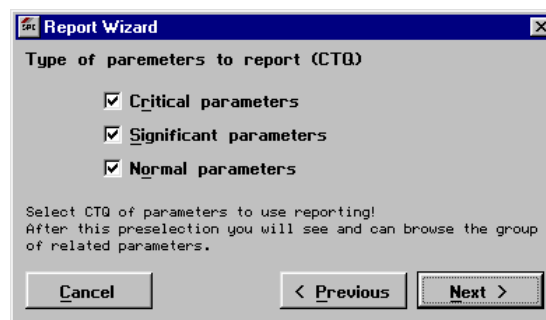


Figure 22: Setting the types of parameters (CTQ) for the CTQ capability – OoC report

You can select which CTQ categories out of the measured parameters the software should offer for selection in the next step. All three CTQ categories are offered as default.

*Note: The CTQ categories can be specified and modified in the **Database – Measured parameters** menu item.*

### 3.2.4 Process selection

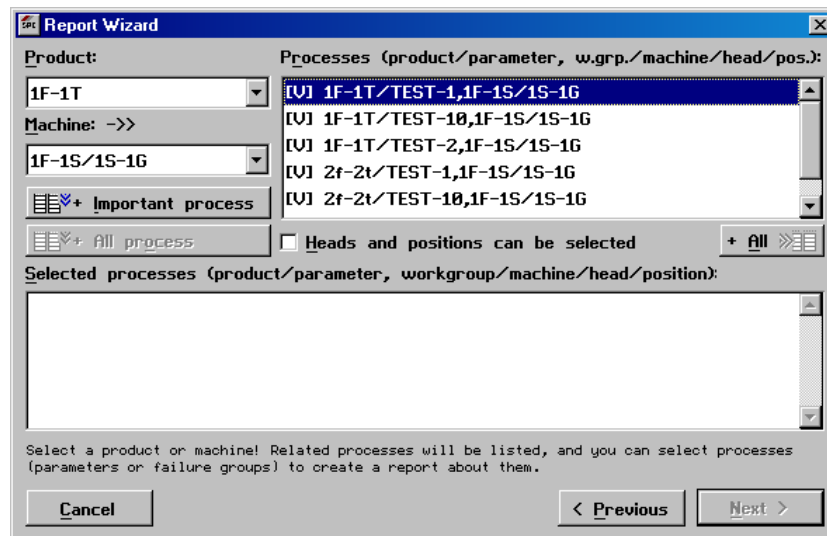


Figure 23: Process selection for the CTQ capability – OoC report

The list of processes wished to be featured in the report has to be compiled. In this report, the software only offers for selection the important processes chosen for automatic alert.

#### Note

The processes can be selected in the **Database – Measured process / Attributed process** or in the **Database – Process settings – Change** menu items with the **Important process** switch.

The processes are selected as follows:

All the products found in the given factory are featured in the **Product** field. When a specific product is selected, all the processes belonging thereto appear in the **Processes** field.

All the machines found in the given factory are featured in the **Machine** field. When a specific machine is selected, all the processes belonging thereto appear in the **Processes** field.

The **Processes** field contains the information in the following order:

Product / Parameter, Workgroup / Machine / Head / Position

The serial number of the Head / Position is featured at the end of the row only if the **Heads and positions can be selected** option is enabled and if these levels are defined in the database.

The processes featured in the **Processes** field can be moved into the **Selected processes** field by double-clicking the left mouse button. The processes featured here will be featured in the report to be created. Any process can be deleted by highlighting it in the **Selected processes** field and pressing the Delete button of the keyboard.

It is possible to select more processes at a time according to the following:

Out of the processes featured in the **Processes** field, those will be selected with the **Important processes** button, which are selected for automatic alert.

With the **All** button, you can select all the processes found in the given factory – the number whereof will naturally be restricted according to the limiting conditions possibly specified previously.

### 3.2.5 Time range

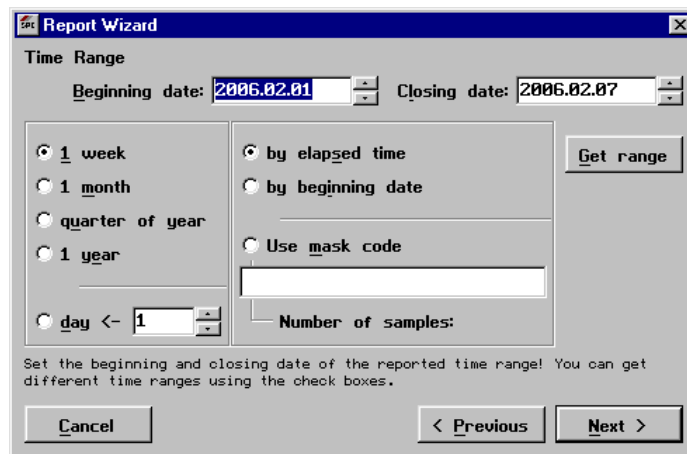


Figure 24: Selecting time range for the CTQ capability – OoC report

Following process selection, you have to select the time range related to which you want to create the report.

Possibilities for time range selection:

- The user specifies the beginning and closing date of the given time range.
- A time range of a given length that can be:
  - 1 week
  - 1 month
  - 1 quarter of a year
  - 1 year

It is possible to select the listed time ranges according to two methods:

- by elapsed time: the software calculates the time in conformity with the given period backwards starting from today's date and that will be the starting date of the time range,

*Example*

*1 month is selected, the elapsed time is 1 month and today is 11.09.2005, then the time range will be 10.09.2005 – 11.09.2005.*

- by beginning date: last full time period, with the given length.

*Example*

*1 month is selected, calculation is based on the starting date and today is 11.09.2005, then the selected time range will be 10.01.2005 – 10.31.2005.*

- Data of a given number of days.
- Based on mask code.

Only the data featured with the mask code here specified will be featured in the report.

When the **Get range** button is pressed, the starting and closing date conforming to the settings – except if you entered a starting and closing date – and the number of samples based on the mask code selection appear in the upper part of the window.

**Attention!**

*It can happen that in the time range selected by the user, the parameter or any other setting (e.g. tolerance level, type of distribution, status of checking, sample size...) was changed in any of the selected processes (or even in several processes). In this case, the software takes the last settings into account and indicates the modification with a (!) mark besides the parameter's name in the printed format. At the bottom of the page it notes that "settings are changed".*

### 3.2.6 Report mode

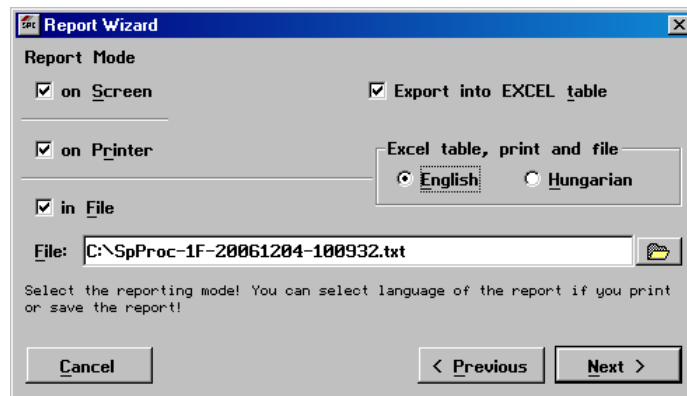



Figure 25: Specifying the report mode for the CTQ capability – OoC report

There are four types of report formats:

- Display on screen.  
The report will be displayed on the screen.
- **Export into EXCEL table** (in Hungarian or English language)  
Report will be exported in an Excel table. User can edit or save this file.
- Printing (in Hungarian or English language).  
The report will be printed on the printer set in the **File – Printer** menu item.
- Saving in file (in Hungarian or English language).  
The report will be saved in the specified file.

If the user does not specify any access route for file name, then the software will provide the following as default:

*C:\SpProc-'Factory code'-'Date and time of report creation (year, month, day – hour, minute, second)'.txt*

The folder can also be browsed with the help of the  icon.

In **EXCEL table, print and file** field can be choose the language of the report (excepting the report displayed on screen), which can be Hungarian or English.

In case of exporting into Excel table in **Reports** menu **Report settings** menu item can be set the format of measured value and date

Out of the listed options, several can be selected at a time – even all.

### 3.2.7 Report creation

When the necessary settings are specified, the software compiles the report, then after moving on, it creates it in the requested format(s) (displays it on screen / starts printing / exports it into EXCEL table / saves it in a file).

#### Comment

*The down status row has reference to processes whereof Johnson – transformation is the selected distribution type. The calculation time is longer for this processes through technical reasons, so program warns the user to this.*

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

User can save the settings of report (excepting time range) as a report template. When next time user wants to create report with the same settings it is necessary to select the report template and time range.

If **Save report as template** switch is on, **Report Wizard** window has further fields. User have to give a **Name**, respectively it can be given optional **Comment** text which helps user to select a template. Report templates can be saved in two ways: **save as private** or **as public template**. Selection the place of report templates see in **Reports** menu **Settings** menu item.

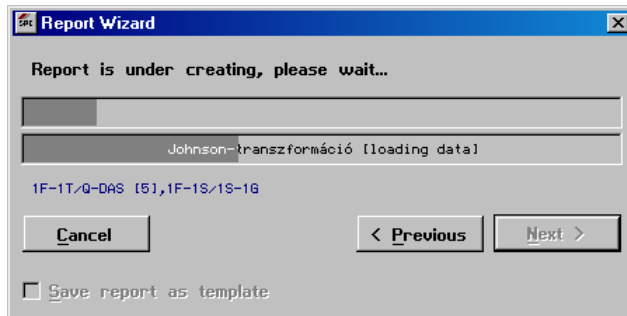


Figure 26: CTQ capability - OoC report under creation

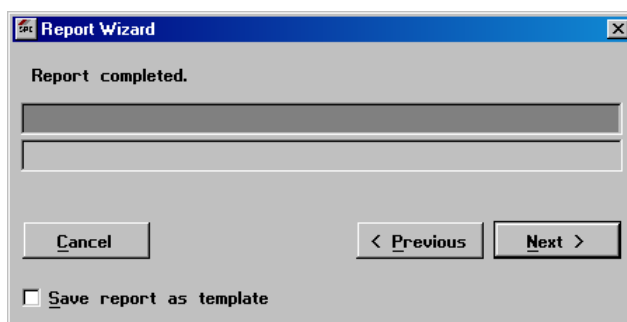


Figure 27: CTQ capability – OoC report completed

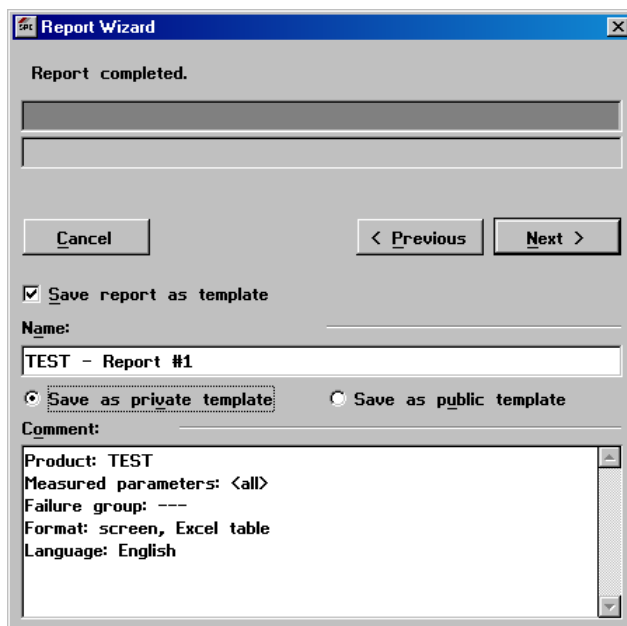


Figure 28: Saving CTQ capability – OoC report as template

## 3.3 Contents

### 3.3.1 Identification data

- **Product**  
Product code and name (on screen).

- **Parameter**  
Name of measured parameter.
- **Workgroup, machine, head, position**  
Workgroup code, machine code, head number, position number.
- **Sample size**  
The sample size set for a selected process section.  
*If the number of samples related to a process is 0 for the selected time range, then the sample size is not featured.*
- **Number of samples**  
The number of samples in the selected time range.
- **Z goal / C<sub>pk</sub> goal**  
The Z and C<sub>pk</sub> minimum values set – in the **Database – Measured parameter / Failure group** menu item – for the selected process section.

### 3.3.2 Calculated parameters

#### 3.3.2.1 Six Sigma type

- **Z It**  
Long-term Z value.
- **PPM It**  
Long-term PPM value that shows the probability of defect related to one million manufactured pieces.

#### 3.3.2.2 Ford and QS9000 types

- **C<sub>pk</sub>**  
An on-going and preliminary process capability index.  
  
If an on-going process capability study is set for the given process in the database, then C<sub>pk</sub> is calculated, if a preliminary process capability study is set, then P<sub>pk</sub> index is calculated. If P<sub>pk</sub> is the calculated capability index, then the value is marked with an exclamation mark.  
  
The indices are indicated with red colour if it is less than the minimum value specified in the **Database – Measured parameter** menu item.  
  
Colouring can be enabled and disabled in the **Reports –Settings** menu item with the **Indication of results with colours enabled** switch.
- **C<sub>pk</sub>/C<sub>p</sub>**  
The ratio of the two process ability indices in conformity with the set process ability checking status. If P<sub>pk</sub>/P<sub>p</sub> is the calculated ability index, then the value is marked with an exclamation mark.  
  
The ratio is indicated with red colour if it is smaller than a given value. The limit value to be used for colouring can be specified in the **Reports – Report settings** menu item.  
  
Colouring can be enabled and disabled in the same menu item with the **Use next colours for marking status of indexes** switch.  
  
*It is not calculated in the case of one-sided tolerance!*
- **Data out of Spec.**  
The actual number of defects in the selected process section.

- **PPM actual**

The actual PPM value related to the selected process section.

### 3.3.3 Out of Control cases

- **CL**

The number of samples on the control chart alerted because of point outside the control limit, related to the selected process section and the percentage of these points compared to the number of samples in the selected section.

In the case of measured parameters, the lower and the upper diagrams of the control chart are checked separately.

If the ratio of the points outside the control limit is above a given value, then the cell is marked with red. The value limit to be used for colouring can be specified in the **Reports –Settings** menu item.

Colouring can be enabled and disabled in the same menu item with the **Use next colours for marking status of indexes** switch.

- **R**

The number of samples on the control chart alerted because of RUN, related to the selected process section.

In the case of measured parameters, the lower and the upper diagrams of the control chart are checked separately.

- **T**

The number of samples on the control chart alerted because of TREND, related to the selected process section.

In the case of measured parameters, the lower and the upper diagrams of the control chart are checked separately.

- **M-T**

The number of samples on the control chart alerted because of Middle-Third, related to the selected process section.

In the case of measurement parameters, the lower and the upper diagrams of the control chart are checked separately.

- **WE1**

The number of samples on the control chart alerted because of WE1, related to the selected process section.

In the case of measurement parameters, the lower and the upper diagrams of the control chart are checked separately.

- **WE2**

The number of samples on the control chart alerted because of WE2, related to the selected process section.

In the case of measurement parameters, the lower and the upper diagrams of the control chart are checked separately.

- **WE3**

The number of samples on the control chart alerted because of WE3, related to the selected process section.

In the case of measurement parameters, the lower and the upper diagrams of the control chart are checked separately.

- **WE4**

The number of samples on the control chart alerted because of WE4, related to the selected process section.

In the case of measurement parameters, the lower and the upper diagrams of the control chart are checked separately.

- **WE5**

The number of samples on the control chart alerted because of WE5, related to the selected process section.

In the case of measurement parameters, the lower and the upper diagrams of the control chart are checked separately.

- **CCL**

The number of samples on the control chart alerted because of Closed to Limits, related to the selected process section.

In the case of measurement parameters, the lower and the upper diagrams of the control chart are checked separately.

- **O1**

The number of samples on the control chart alerted because of O1, related to the selected process section.

In the case of measurement parameters, the lower and the upper diagrams of the control chart are checked separately.

- **O2**

The number of samples on the control chart alerted because of O2, related to the selected process section.

In the case of measurement parameters, the lower and the upper diagrams of the control chart are checked separately.

- **O3**

The number of samples on the control chart alerted because of O3, related to the selected process section.

In the case of measurement parameters, only the upper diagram of the control chart are checked.

Summarisation is extended exclusively to those points for which the condition is valid that when the sample was registered, the important status was enabled related to the process and the given OoC case was selected within the alert settings related to the given process.

## 4 Attribute report

### 4.1 Aim

The aim of the attribute report is to show the capability of the attributed parameters (failure groups). In the report it is possible to display the lower levels – failure categories and failures – as well.

The report contains only attributed parameters.

### 4.2 Creation of the report

The creation of the attribute report can be initiated from the **Reports – Attribute Report** menu item. Afterwards the software leads the user through those settings that are necessary to specify for creating the report. You can switch between the individual settings windows with the **<Previous** and **Next>** buttons and you can abort the report creation with **Cancel** button.

#### 4.2.1 Choosing report template or create report

User can choose between creating a new report and making a report by means of either report template.

##### *Comment*

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

It can be **private** or **public report** templates.

By **Select** button user can make report by means of template appointed by the cursor. It is necessary after template selection to select only time range (see in **Time range** item), other settings are made after selected template.

By **Delete** button user can delete a report template.

The asterisk located in the first column (**S** = status) denotes that this report template was displayed after open the **Report Templates** window.

If user have any template, or does not want to use any template either of them, than user can go on by **Create report** button, and create a report with going along all the settings.

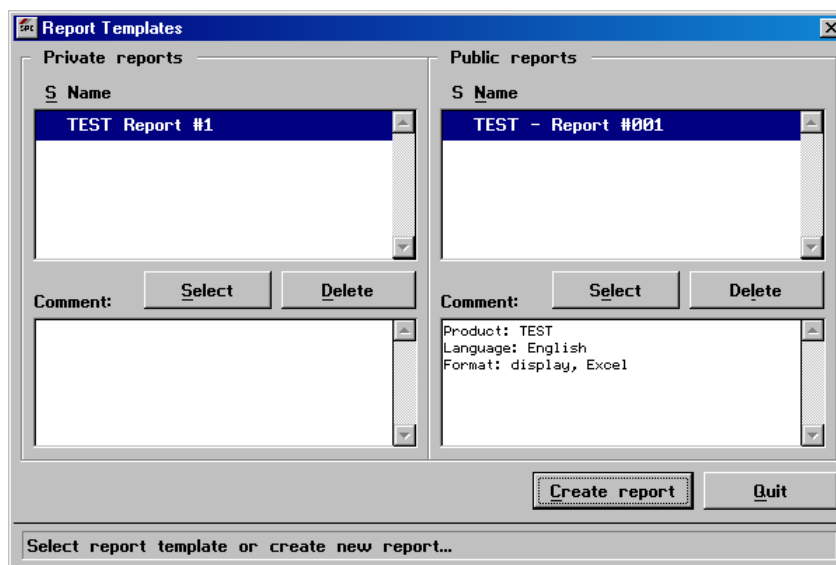


Figure 29: Attribute report templates

## 4.2.2 Report type – according to calculation methods

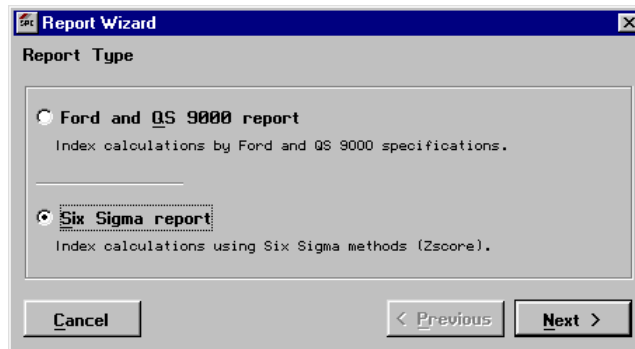


Figure 30: Selecting the type of attribute report – according to calculation methods

Two types of reports can be created – according to calculation methods:

- Six Sigma report  
It contains (Z) indices calculated according to the Six Sigma method.
- Ford and QS9000 report  
It contains capability indices calculated according to the Ford and QS9000 specifications.

## 4.2.3 Report type – according to processes

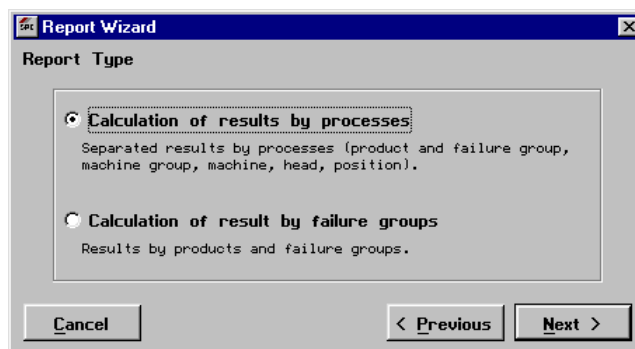


Figure 31: Selecting the type of attribute report – according to processes

Two further report types are possible from the aspect of the processes:

- Calculation of results by processes  
In the report, every process (by machine) belonging to the failure groups is indicated separately.
- Calculation of results by failure groups  
In the report, the summarised results belonging to the individual failure groups are calculated, every failure group is featured in a separate row – independently of the fact whether there is a process related to more machines for a given failure group in the database.

## 4.2.4 Process selection

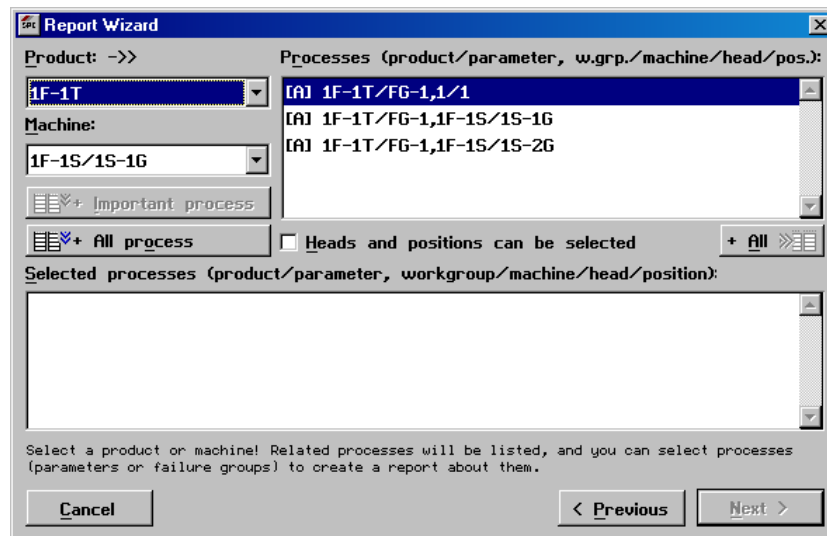


Figure 32: Process selection for attribute report

The list of processes wished to be featured in the report has to be compiled. The processes are selected as follows:

All the products found in the given factory are featured in the **Product** field. When a specific product is selected, all the processes belonging thereto appear in the **Processes** field.

All the machines found in the given factory are featured in the **Machine** field. When a specific machine is selected, all the processes belonging thereto appear in the **Processes** field.

*If in the previous step you selected summary report by failure group, then it is not possible to select the machine.*

The **Processes** field contains the information in the following order:

Product / Parameter, Workgroup / Machine / Head / Position

The serial number of the Head / Position is featured at the end of the row only if the **Heads and positions can be selected** option is enabled and if these levels are defined in the database.

*If in the previous step you selected summary report by failure group, then the **Heads and positions can be selected** switch does not work.*

The processes featured in the **Processes** field can be moved into the **Selected processes** field by double-clicking the left mouse button. The processes featured here will be featured in the report to be created. Any process can be deleted by highlighting it in the **Selected processes** field and pressing the Delete button of the keyboard.

It is possible to select more processes at a time according to the following:

Out of the processes featured in the **Processes** field, those will be selected with the **Important processes** button, which are selected for automatic alert.

*Note*

*The processes can be selected in the **Database – Measured process** or in the **Database – Process settings – Change** menu items with the **Important process** switch.*

When the **All processes** button is pressed, all the processes featured in the **Processes** field are selected.

*If in the previous step you selected summary report by failure group, then the **Important processes** and the **All processes** buttons do not work.*

With the **All** button, you can select all the processes found in the given factory – the number whereof will naturally be restricted according to the limiting conditions possibly specified previously.

## 4.2.5 Time range

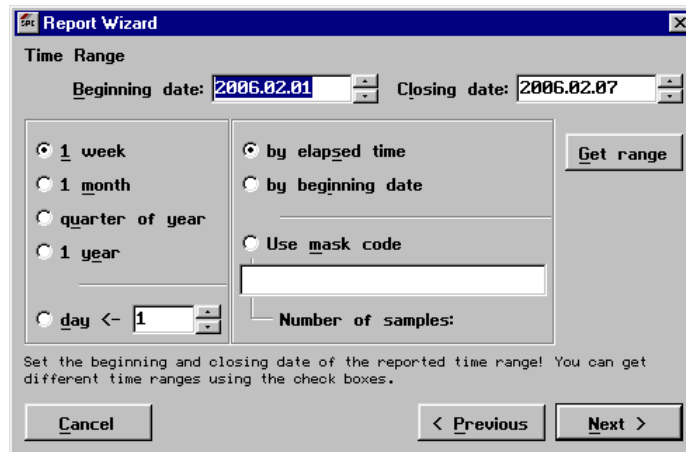


Figure 33: Selecting time range for attribute report

Following process selection, you have to select the time range related to which you want to create the report.

Possibilities for time range selection:

- The user specifies the beginning and closing date of the given time range.
- A time range of a given length that can be:
  - 1 week
  - 1 month
  - 1 quarter of a year
  - 1 year

It is possible to select the listed time ranges according to two methods:

- by elapsed time: the software calculates the time in conformity with the given period backwards starting from today's date and that will be the starting date of the time range,

*Example*

*1 month is selected, the elapsed time is 1 month and today is 11.09.2005, then the time range will be 10.09.2005 – 11.09.2005.*

- by beginning date: last full time period, with the given length.

*Example*

*1 month is selected, calculation is based on the starting date and today is 11.09.2005, then the selected time range will be 10.01.2005 – 10.31.2005.*

- Based on mask code.

Only the data featured with the mask code here specified will be featured in the report.

When the **Get range** button is pressed, the starting and closing date conforming to the settings and the number of samples based on the mask code selection appear in the upper part of the window.

**Attention!**

*It can happen that in the time range selected by the user, the parameter or any other setting (e.g. tolerance limits, type of distribution, status of checking, sample size...) was changed in any of the selected processes (or even in several processes). In this case, the software takes the last settings into account and indicates the modification with a (!) mark besides the parameter's name in the printed format. At the bottom of the page it notes that "settings are changed".*

## 4.2.6 Report mode

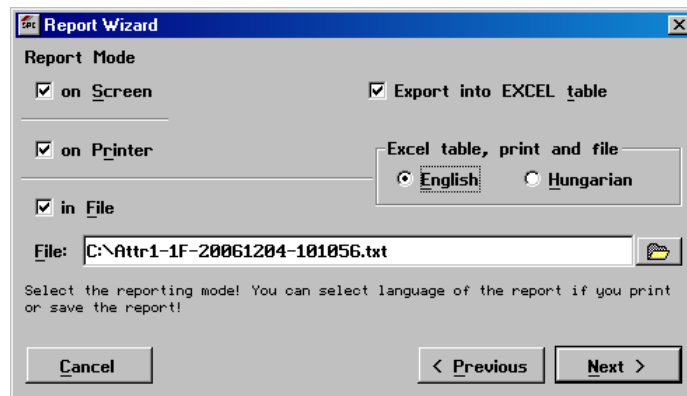



Figure 34: Specifying the report mode for attribute report

There are four types of report formats:

- **on Screen**  
The report will be displayed on the screen.
- **Export into EXCEL table** (in Hungarian or English language)  
Report will be exported in an Excel table. User can edit or save this file.
- **on Printer** (in Hungarian or English language)  
The report will be printed on the printer set in the **File – Printer** menu item.
- **in File** (in Hungarian or English language)  
The report will be saved in the specified file.

If the user does not specify any access route for file name, then the software will provide the following as default:

*C:\Attr1-'Factory code'-'Date and time of report creation (year, month, day – hour, minute, second)'.txt*

The folder can also be selected with the help of the  icon and the file name provided by the software can also be changed.

In **EXCEL table, print and file** field can be choose the language of the report (excepting the report displayed on screen), which can be Hungarian or English.

In case of exporting into Excel table in **Reports** menu **Report settings** menu item can be set the format of measured value and date

Out of the listed options, several can be selected at a time – even all.

## 4.2.7 Report creation

When the necessary settings are specified, the software compiles the report, then after moving on, it creates it in the requested format(s) (displays it on screen / starts printing / exports it into EXCEL table / saves it in a file).

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

User can save the settings of report (excepting time range) as a report template. When next time user wants to create report with the same settings it is necessary to select the report template and time range. If **Save report as template** switch is on, **Report Wizard** window has further fields. User have to give a **Name**, respectively it can be given optional **Comment** text which helps user to select a template. Report templates can be saved in two ways: **save as private** or **as public template**. Selection the place of report templates see in **Reports** menu **Settings** menu item.

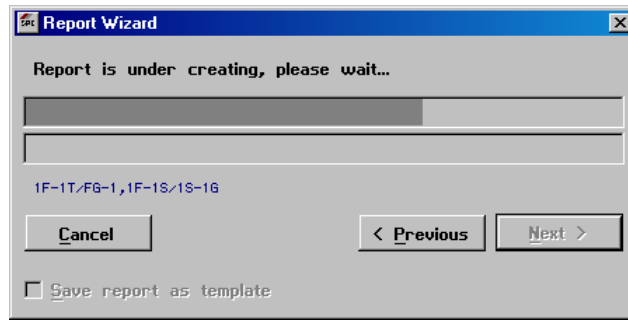


Figure 35: Attribute report under creation

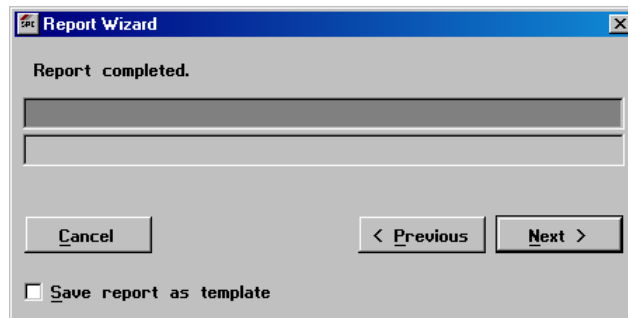


Figure 36: Attribute report completed

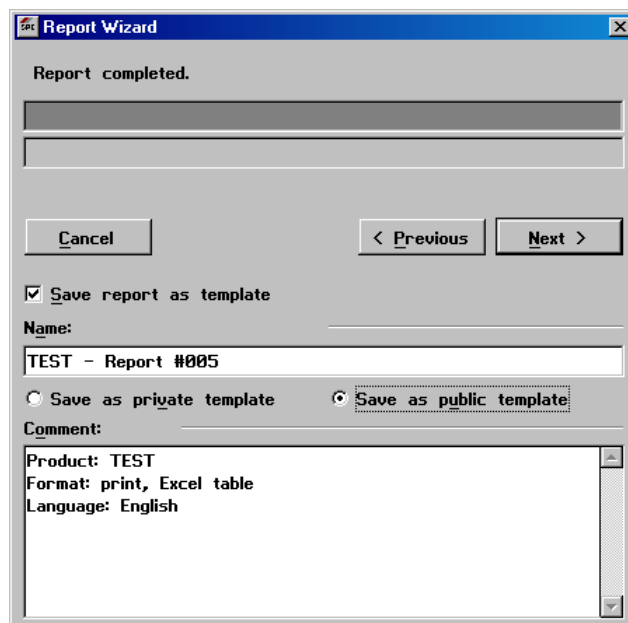


Figure 37: Saving Attribute report as template

## 4.3 Contents

### 4.3.1 Identification data

- **Product**  
Product code and name (on screen).
- **Parameter**  
Name of measured parameter.
- **Workgroup, machine, head, position**  
Workgroup code, machine code, head number, position number.

If you selected **Calculation of result by failure group** type of summary report, then the text **<all>** will appear in this field.

- **Number of samples**

Number of samples checked in the selected time range.

## 4.3.2 Calculated parameters

### 4.3.2.1 Six Sigma type

- **PPM**

PPM value calculated for qualification parameters, which shows the probability of defect related to one million manufactured pieces.

- **Z**

Z value calculated for attributed parameters.

The value received is indicated in red colour if it is smaller than the minimum value specified in the **Database – Failure group** menu item.

Colouring can be enabled and disabled with the **Use next colours for marking status of indexes** switch in the **Reports –Settings** menu item.

- **PPM shifting**

The relative change of the PPM values calculated for the individual samples.

The value received is indicated in red colour if it is smaller than a specified value. The limit values to be used for colouring can be specified in the **Reports –Settings** menu item.

The application of colours can be enabled and disabled in the same menu item with the **Use next colours for marking status of indexes** switch.

### 4.3.2.2 Ford and QS9000 versions

- **PPM**

PPM value calculated for qualification parameters, which shows the probability of defect related to one million manufactured pieces.

- **$P_{pk}$**

Process capability index value calculated for attributed parameters.

The value received is indicated in red colour if it is smaller than one third of the minimum value specified in the **Z goal** field in the **Database – Failure group** menu item.

Colouring can be enabled and disabled with the **Use next colours for marking status of indexes** switch in the **Reports – Settings** menu item.

### 4.3.2.3 Failure category data

The name of the failure categories – defined in the database – and the PPM related thereto.

## 4.3.3 Failure data

It is possible to look at the data of the individual failure groups by failures. In order to display the failure data, you have to click on the given row of the failure group report with the left mouse button.

The appearing window contains the capability data related to the failure group, the name of the failure categories, the PPM values related thereto, the name of the failures, the classification by category and the PPM values by failure.

Failures - QS 9000: Part: TEST - M/c Group,Machine,Head,Position: TEST,TEST,-,-						
Failure group	Category					PPM
A.Adat 1	#1	1. category				8182
	#2	2. category				20909
PPM: 18182	#3	-				-
Z: 2.09	#4	-				-
	#5	-				-
Failure	#1	#2	#3	#4	#5	PPM
1. fault	X	X				3636
2. fault		X				38182
3. fault	X					12727

Figure 38: Failure group data displayed by failures

## 5 Alert Report

### 5.1 Aim

Alert report belongs to *Automatic Out of Control monitoring and alert* function, it contains actual and acknowledged alerts and information related to these. Report can be made for selected measured and attributes processes, too, its aim is support the improvement of processes. See also *Automatic Out of Control monitoring and alert* document to understand this report.

### 5.2 Creation of the report

The creation of the alert report can be initiated from the **Reports – Alert Report** menu item. Afterwards the software leads the user through those settings that are necessary to specify for creating the report. You can switch between the individual settings windows with the **<Previous** and **Next>** buttons and you can abort the report creation with **Cancel** button.

#### 5.2.1 Choosing report template or create report

User can choose between creating a new report and making a report by means of either report template.

##### Comment

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

It can be **private** or **public report** templates.

By **Select** button user can make report by means of template appointed by the cursor. It is necessary after template selection to select only time range (see in **Time range** item), other settings are made after selected template.

By **Delete** button user can delete a report template.

The asterisk located in the first column (**S** = status) denotes that this report template was displayed after open the **Report Templates** window.

If user have any template, or does not want to use any template either of them, than user can go on by **Create report** button, and create a report with going along all the settings.

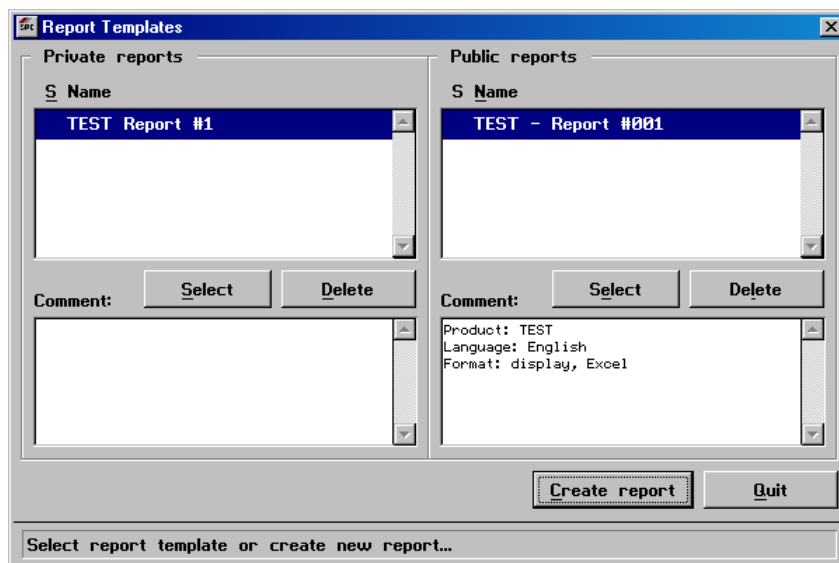


Figure 39: Alert report templates

## 5.2.2 Process type selection

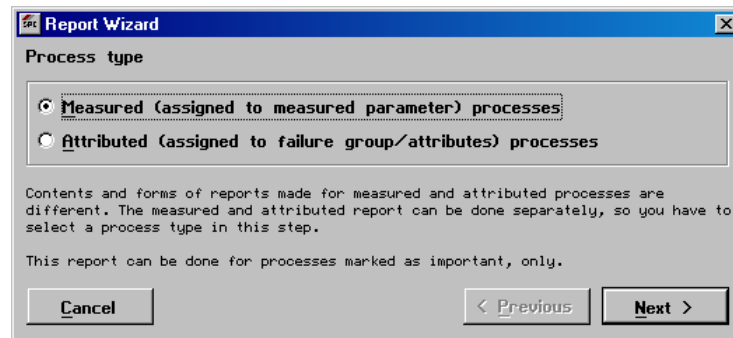


Figure 40: Process type selection to alert report

This report can be made for

- measured processes or
- attributed processes.

## 5.2.3 Types of parameters to report (CTQ)

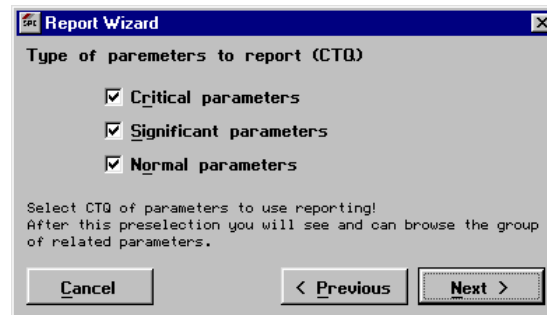


Figure 41: Setting the types of parameters (CTQ) for the alert report

You can select which CTQ categories out of the measured parameters the software should offer for selection in the next step. All three CTQ categories are offered as default.

*Note: The CTQ categories can be specified and modified in the **Database – Measured parameters** menu item.*

This step drops out for attributed processes, because CTQ types are not defined for them.

## 5.2.4 Process selection

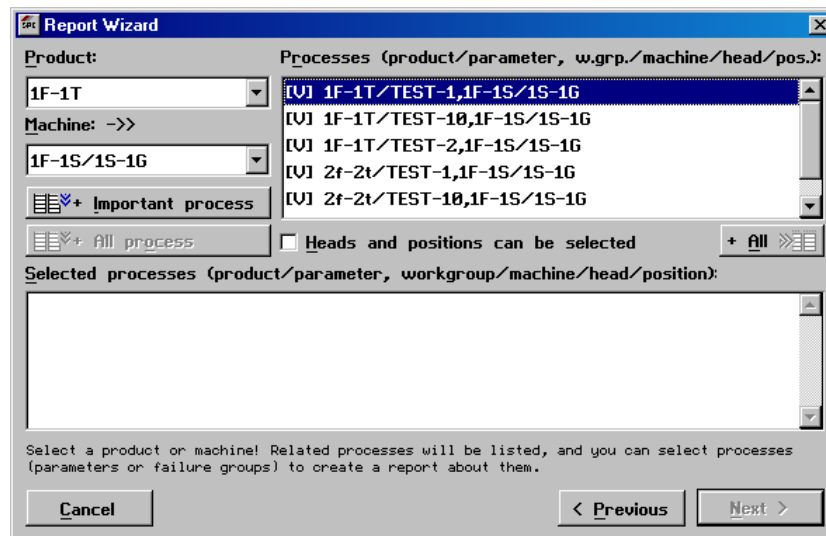


Figure 42: Process selection for the alert report

The list of processes wished to be featured in the report has to be compiled. In this report, the software only offers for selection the important processes chosen for automatic alert.

### Note

The processes can be selected in the **Database – Measured process / Attributed process** or in the **Database – Process settings – Change** menu items with the **Important process** switch.

The processes are selected as follows:

All the products found in the given factory are featured in the **Product** field. When a specific product is selected, all the processes belonging thereto appear in the **Processes** field.

All the machines found in the given factory are featured in the **Machine** field. When a specific machine is selected, all the processes belonging thereto appear in the **Processes** field.

The **Processes** field contains the information in the following order:

Product / Parameter, Workgroup / Machine / Head / Position

The serial number of the Head / Position is featured at the end of the row only if the **Heads and positions can be selected** option is enabled and if these levels are defined in the database.

The processes featured in the **Processes** field can be moved into the **Selected processes** field by double-clicking the left mouse button. The processes featured here will be featured in the report to be created. Any process can be deleted by highlighting it in the **Selected processes** field and pressing the Delete button of the keyboard.

It is possible to select more processes at a time according to the following:

Out of the processes featured in the **Processes** field, those will be selected with the **Important processes** button, which are selected for automatic alert.

With the **All** button, you can select all the processes found in the given factory – the number whereof will naturally be restricted according to the limiting conditions possibly specified previously.

## 5.2.5 Time range

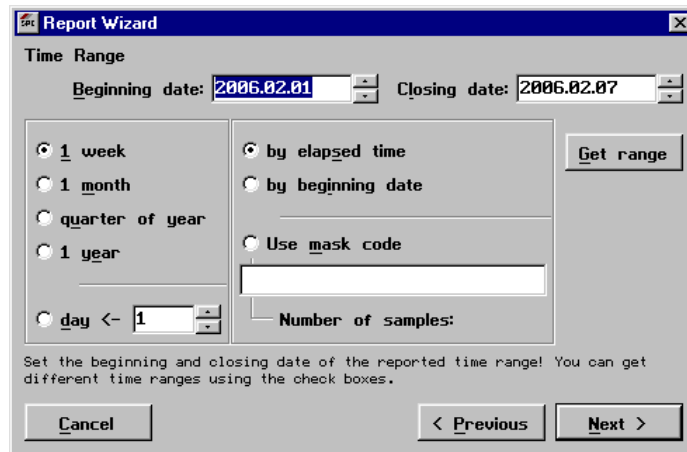


Figure 43: Selecting time range for the alert report

Following process selection, you have to select the time range related to which you want to create the report.

Possibilities for time range selection:

- The user specifies the beginning and closing date of the given time range.
- A time range of a given length that can be:
  - 1 week
  - 1 month
  - 1 quarter of a year
  - 1 year

It is possible to select the listed time ranges according to two methods:

- by elapsed time: the software calculates the time in conformity with the given period backwards starting from today's date and that will be the starting date of the time range,

*Example*

*1 month is selected, the elapsed time is 1 month and today is 11.09.2005, then the time range will be 10.09.2005 – 11.09.2005.*

- by beginning date: last full time period, with the given length.

*Example*

*1 month is selected, calculation is based on the starting date and today is 11.09.2005, then the selected time range will be 10.01.2005 – 10.31.2005.*

- Data of a given number of days.
- Based on mask code.

Only the data featured with the mask code here specified will be featured in the report.

When the **Get range** button is pressed, the starting and closing date conforming to the settings – except if you entered a starting and closing date – and the number of samples based on the mask code selection appear in the upper part of the window.

**Attention!**

*It can happen that in the time range selected by the user, the parameter or any other setting (e.g. tolerance level, type of distribution, status of checking, sample size...) was changed in any of the selected processes (or even in several processes). In this case, the software takes the last settings into account and indicates the modification with a (!) mark besides the parameter's name in the printed format. At the bottom of the page it notes that "settings are changed".*

## 5.2.6 Sort order

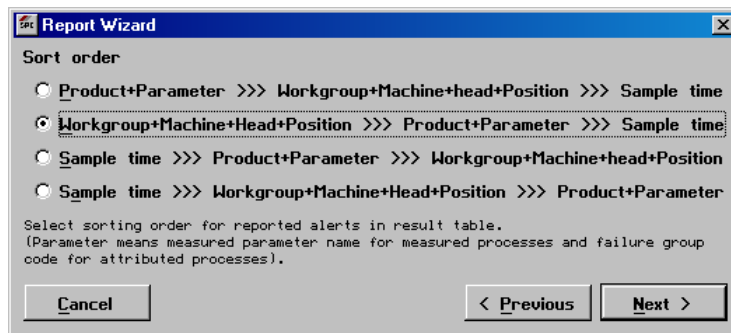


Figure 44: Sort order for alert report

User can set the order of columns or rather processes in report according to following possibilities:

- primary ordering by product code and parameter (in alphabet order),  
secondary ordering by workgroup code, machine cod (in alfaber order), head number, position number (in rising order),  
third ordering by sampling date and time (the oldest sample is the first),
- primary ordering by workgroup code, machine cod (in alfaber order), head number, position number (in rising order),  
secondary ordering by product code and parameter (in alphabet order),  
third ordering by sampling date and time (the oldest sample is the first),
- primary ordering by sampling date and time (the oldest sample is the first),  
secondary ordering by product code and parameter (in alphabet order),  
third ordering by workgroup code, machine cod (in alfaber order), head number, position number (in rising order),
- primary ordering by sampling date and time (the oldest sample is the first),  
secondary ordering by workgroup code, machine cod (in alfaber order), head number, position number (in rising order),  
third ordering by product code and parameter (in alphabet order),

## 5.2.7 Report mode

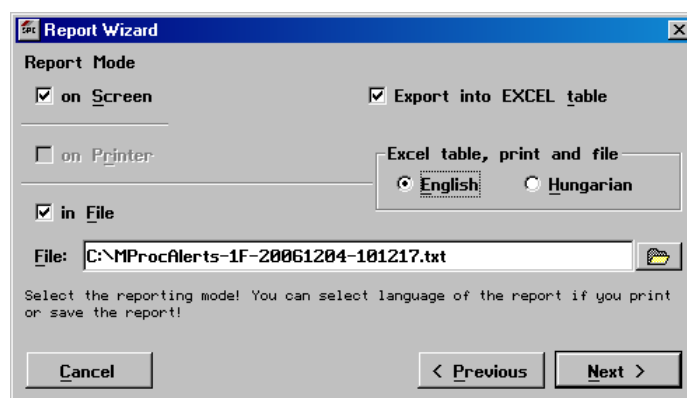


Figure 45: Specifying the report mode for alert report

There are three types of report formats:

- **on Screen**  
The report will be displayed on the screen.
- **Export into EXCEL table** (in Hungarian or English language)  
Report will be exported in an Excel table. User can edit or save this file.

- **in File** (in Hungarian or English language)

The report will be saved in the specified file.


If the user does not specify any access route for file name, then the software will provide the following as default

- in case of measured processes:

*C:\MProcAlerts-'Factory code'-'Date and time of report creation (year, month, day – hour, minute, second)'.txt*

- in case of attributed processes:

*C:\AProcAlerts-'Factory code'-'Date and time of report creation (year, month, day – hour, minute, second)'.txt*

The folder can also be selected with the help of the  icon and the file name provided by the software can also be changed.

In **EXCEL table, print and file** field can be choose the language of the report (excepting the report displayed on screen), which can be Hungarian or English.

In case of exporting into Excel table in **Reports** menu **Report settings** menu item can be set the format of measured value and date

Out of the listed options, several can be selected at a time – even all.

## 5.2.8 Report creation

When the necessary settings are specified, the software compiles the report, then after moving on, it creates it in the requested format(s) (displays it on screen / exports it into EXCEL table / saves it in a file).

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

User can save the settings of report (excepting time range) as a report template. When next time user wants to create report with the same settings it is necessary to select the report template and time range. If **Save report as template** switch is on, **Report Wizard** window has further fields. User have to give a **Name**, respectively it can be given optional **Comment** text which helps user to select a template. Report templates can be saved in two ways: **save as private** or **as public template**. Selection the place of report templates see in **Reports** menu **Settings** menu item.

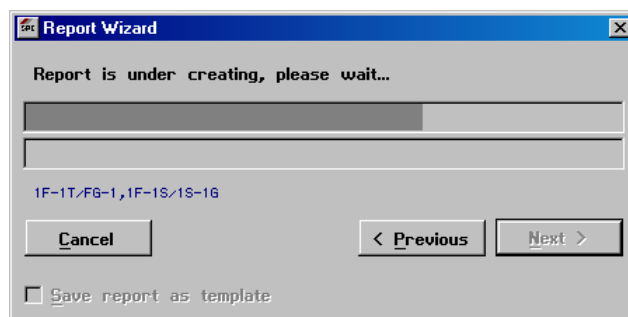


Figure 46: Alert report under creation

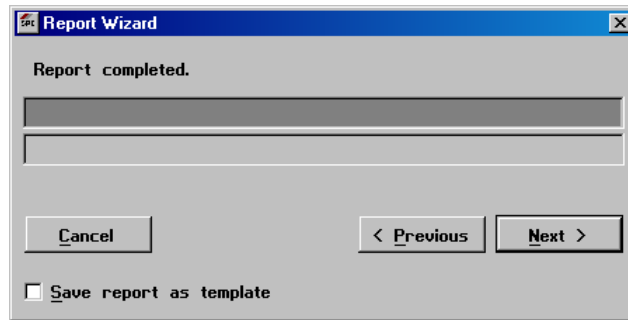


Figure 47: Alert report completed

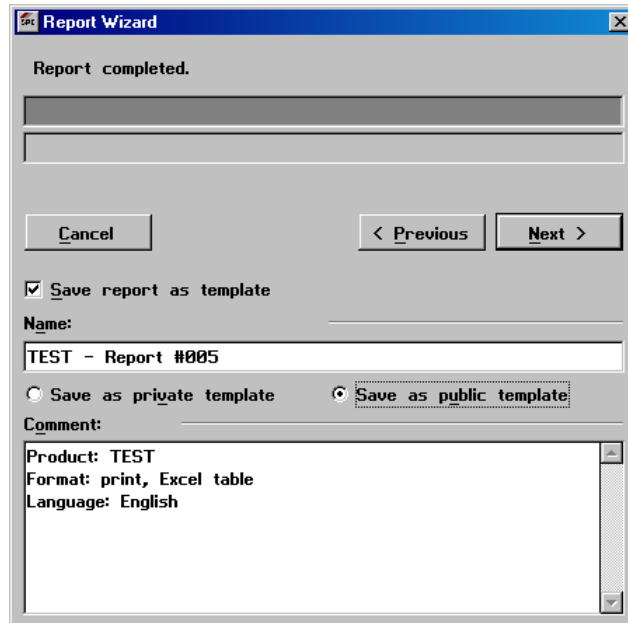


Figure 48: Saving alert report as template

## 5.3 Contents

### 5.3.1 Measured process

- **Product**  
product code
- **CTQ**  
name of measured parameter
- **Workgroup, machine, head, position**  
workgroup code, machine code, head number, position number
- **Sample time**  
sampling date and time of alerted sample

#### Comment

Order of fields above is according to defined order in sort order window.

- **Messages**  
number of messages in reference to this alert so far



- **OoS**  
number of measured value in the sample out of specification, when the cause of this alert was the measured value out of specification)
- **Low capability**  
there is an **X** sing in this field, when the cause of this alert was the low capability
- **Xbar/Xi OoCL**  
there is an **X** sing in this field, when the cause of this alert was point out of control limit – on the xbar / individuals diagram of control chart
- **Xbar/Xi RUN**  
there is an **X** sing in this field, when the cause of this alert was RUN – on the xbar / individuals diagram of control chart
- **Xbar/Xi TREND**  
there is an **X** sing in this field, when the cause of this alert was TREND – on the xbar / individuals diagram of control chart
- **Xbar/Xi M-T**  
there is an **X** sing in this field, when the cause of this alert was Middle-Third – on the xbar / individuals diagram of control chart
- **Xbar/Xi WE1**  
there is an **X** sing in this field, when the cause of this alert was WE1 – on the xbar / individuals diagram of control chart
- **Xbar/Xi WE2**  
there is an **X** sing in this field, when the cause of this alert was WE2 – on the xbar / individuals diagram of control chart
- **Xbar/Xi WE3**  
there is an **X** sing in this field, when the cause of this alert was WE3 – on the xbar / individuals diagram of control chart
- **Xbar/Xi WE4**  
there is an **X** sing in this field, when the cause of this alert was WE4 – on the xbar / individuals diagram of control chart
- **Xbar/Xi WE5**  
there is an **X** sing in this field, when the cause of this alert was WE5 – on the xbar / individuals diagram of control chart
- **Xbar/Xi CtCL**  
there is an **X** sing in this field, when the cause of this alert was Closed to Limits – on the xbar / individuals diagram of control chart
- **Xbar/Xi O1**  
there is an **X** sing in this field, when the cause of this alert was O1 – on the xbar / individuals diagram of control chart
- **Xbar/Xi O2**  
there is an **X** sing in this field, when the cause of this alert was O2 – on the xbar / individuals diagram of control chart
- **Xbar/Xi O3**  
there is an **X** sing in this field, when the cause of this alert was O3 – on the xbar / individuals diagram of control chart
- **R/s OoCL**  
there is an **X** sing in this field, when the cause of this alert was point out of control limit – on the range / standard deviation diagram of control chart

- **R/s RUN**  
there is an **X** sing in this field, when the cause of this alert was RUN – on the range / standard deviation diagram of control chart
- **R/s TREND**  
there is an **X** sing in this field, when the cause of this alert was TREND – on the range / standard deviation diagram of control chart
- **R/s M-T**  
there is an **X** sing in this field, when the cause of this alert was Middle-Third – on the range / standard deviation diagram of control chart
- **R/s WE1**  
there is an **X** sing in this field, when the cause of this alert was WE1 – on the range / standard deviation diagram of control chart
- **R/s WE2**  
there is an **X** sing in this field, when the cause of this alert was WE2 – on the range / standard deviation diagram of control chart
- **R/s WE3**  
there is an **X** sing in this field, when the cause of this alert was WE3 – on the range / standard deviation diagram of control chart
- **R/s WE4**  
there is an **X** sing in this field, when the cause of this alert was WE4 – on the range / standard deviation diagram of control chart
- **R/s WE5**  
there is an **X** sing in this field, when the cause of this alert was WE5 – on the range / standard deviation diagram of control chart
- **R/s CtCL**  
there is an **X** sing in this field, when the cause of this alert was Closed to Limits – range / standard deviation diagram of control chart
- **R/s O1**  
there is an **X** sing in this field, when the cause of this alert was O1 – on the range / standard deviation diagram of control chart
- **R/s O2**  
there is an **X** sing in this field, when the cause of this alert was O2 – on the range / standard deviation diagram of control chart
- **Reset time**  
date and time of reset this alert, the field is empty in case of actual alert
- **Response [day]**  
elapsed time between first message and reset, there is also a **[?]** sign in the field in case of actual alert
- **Intervention**  
intervention related to given sample
- **Comment**  
comment related to given sample

*Comment*

*Program summarizes the number of messages, the number of OoC cases and the response. These results can be seen in the report in down row.*

On the screen can be seeing a status-icon in the first column. This icon is red for actual alerts, and green for acknowledged alerts. The number of envelopes in this icon marks that one or more messages were sent. User can see the text of the alert by clicking on this icon

User can see also given control chart by clicking on  or  icon. This icon is red for actual alerts, and green for acknowledged alerts. Program displays the state of control chart where the given alerted sample was the last. Samples collected after this sample are not displayed.

### 5.3.2 Attributed process

- **Product**  
product code
- **CTQ**  
code of failure group
- **Failure category**  
failure category number
- **Failure**  
failure number
- **Workgroup, machine, head, position**  
workgroup code, machine code, head number, position number
- **Sample time**  
sampling date and time of alerted sample

#### *Comment*

*Order of fields above is according to defined order in sort order window.*



- **Messages**  
number of messages in reference to this alert so far
- **Special care**  
number of rejected failures in the sample with status 'special care', when the cause of this alert was 'special care'
- **OoCL**  
there is an **X** sing in this field, when the cause of this alert was point out of control limit
- **RUN**  
there is an **X** sing in this field, when the cause of this alert was RUN
- **TREND**  
there is an **X** sing in this field, when the cause of this alert was TREND
- **M-T**  
there is an **X** sing in this field, when the cause of this alert was Middle-Third
- **WE1**  
there is an **X** sing in this field, when the cause of this alert was WE1
- **CtCL**  
there is an **X** sing in this field, when the cause of this alert was Closed to Limits
- **O1**  
there is an **X** sing in this field, when the cause of this alert was O1
- **O2**  
there is an **X** sing in this field, when the cause of this alert was O2

- **Reset time**  
date and time of reset this alert, the field is empty in case of actual alert
- **Response [day]**  
elapsed time between first message and reset, there is also a [?] sign in the field in case of actual alert
- **Intervention**  
intervention related to given sample
- **Comment**  
comment related to given sample

*Comment*

*Program summarizes the number of messages, the number of OoC cases and the response. These results can be seen in the report in down row.*

On the screen can be seen a status-icon in the first column. This icon is red for actual alerts, and green for acknowledged alerts. The number of envelopes in this icon marks that one or more messages were sent. User can see the text of the alert by clicking on this icon

User can see also given control chart by clicking on  or  icon. This icon is red for actual alerts, and green for acknowledged alerts. Program displays the state of control chart where the given alerted sample was the last. Samples collected after this sample are not displayed.

*Comment*

*In case of attributed parameters one alert may consist of more rows in this report, because alert criteria may apply to failure group, failure category or failure.*

*Construction and content of rows belonging to an alert as follows:*

- *in case of Ooc standing on failure group chart*
  - *failure group: failure group code,*
  - *failure category: empty,*
  - *failure: empty,*
- *in case of Ooc standing on failure category chart*
  - *failure group: failure group code,*
  - *failure category: number of given failure category,*
  - *failure: empty,*
- *in case of Ooc or 'special care' standing on failure chart*
  - *failure group: failure group code,*
  - *failure category: number of failure category / categories wherein the given failure is hibakategória,*
  - *failure: number of given failure.*

*General information and icons related to alert are in the first row if more rows belong to an alert.*

## 6 Formulas used for calculations

### 6.1 Calculations used for measurement parameters

#### 6.1.1 Mean

##### 6.1.1.1 Long-term

The mean of the measured values.

$$\bar{\bar{x}}_{LT} = \frac{\sum_{i=1}^n x_i}{n}$$

##### 6.1.1.2 Short-term

The arithmetical mean of the sample averages.

$$\bar{\bar{x}}_{ST} = \frac{\sum_{j=1}^m \bar{x}_j}{m}$$

where:

$\bar{x}_j$  - sample average

$m$  - number of samples

*In case of a constant sample size, it corresponds with the long-term mean. It is still necessary to deal with it separately within the reports because it is permissible that the time range specified by the user comprise several process sections with different sample sizes. In the analyses featured in the **Analysis** menu no difference is made between the two types of means because there it is not permissible to select processes with different sample sizes.*

#### 6.1.2 Deviation

##### 6.1.2.1 Long-term

The deviation of the measured values.

$$S_{LT} = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{\bar{x}})^2}{n-1}}$$

##### 6.1.2.2 Short-term

The deviation of the measured values calculated in the following way:

$$S_{ST} = \sqrt{(\bar{s}^2 + s_s^2)}$$

where:

average of sample deviations:

$$\bar{s} = \frac{\sum_{j=1}^m s_j}{m}$$

deviation of sample deviations: 
$$s_s = \sqrt{\frac{\sum_{j=1}^m (s_j - \bar{s})^2}{m-1}}$$

$s_j$  - deviation of the individual samples

$m$  - number of samples

### 6.1.3 Out-of-limit probability

Out-of-limit probability means the probability of a value to be out of the tolerance limit(s). It is calculated in conformity with the distribution set for the given process. Naturally in the case of a one-sided tolerance, only those outside the limit on the given side are taken into account, while in the case of a tolerance with two limits, the out-of-limit probabilities on both sides are added together.

### 6.1.4 Z

#### 6.1.4.1 Long-term

The Z value looked up in the standard normal distribution table for the calculated long-term out-of-limit probability. When calculating the out-of-limit probability, the mean and deviation parameters of normal distribution and the distributions originated therefrom are replaced by the long-term mean and deviation.

*In the case of Weibull and Rayleigh distributions, only one type of out-of-limit probability and Z value is calculated and it is regarded as long-term.*

#### 6.1.4.2 Short-term

The Z value looked up in the standard normal distribution table for the calculated short-term out-of-limit probability. When calculating the out-of-limit probability, the mean and deviation parameters of normal distribution and the distributions originated therefrom are replaced by the short-term mean and deviation.

*In the case of Weibull and Rayleigh distributions, no short-term out-of-limit probability and thus no Z value is calculated.*

#### 6.1.4.3 Potential

The Z value looked up in the standard normal distribution table for the calculated potential out-of-limit probability. When calculating the out-of-limit probability, the mean of normal distribution and the distributions originated therefrom are replaced by the mean value of tolerance, and the deviation value is replaced by long-term deviation.

*In the case of parameters with one-sided tolerance, no potential Z value is calculated as tolerance mean cannot be interpreted there.*

### 6.1.5 PPM

#### 6.1.5.1 Long-term

The calculated long-term out-of-limit probability multiplied by one million. When calculating the out-of-limit probability, the mean and deviation parameters of normal distribution and the distributions originated therefrom are replaced by long-term mean and deviation.

*In the case of Weibull and Rayleigh distributions, only one type of out-of-limit probability and PPM value is calculated and it is regarded as long-term.*

#### 6.1.5.2 Short-term

The calculated short-term out-of-limit probability multiplied by one million. When calculating the out-of-line probability, the expected value and deviation parameters of normal distribution and the distributions originated therefrom are replaced by short-term mean and deviation.

In the case of Weibull and Rayleigh distributions, no short-term out-of-limit probability and PPM value are calculated.

### 6.1.5.3 Potential

The calculated out-of-limit probability multiplied by one million. When calculating the out-of-limit probability, the expected value of normal distribution and the distributions originated therefrom are replaced by the mean value of tolerance, and the deviation value is replaced by long-term deviation.

In the case of parameters with one-limit tolerance, no potential PPM value is calculated as tolerance mean cannot be interpreted there.

### 6.1.5.4 Actual

The number of actual defects multiplied by one million.

## 6.1.6 Classification

### 6.1.6.1 Mean shift

The relative change of the sample means.

$$\text{Mean shift} = \frac{\text{Max}(\bar{x}_i) - \text{Min}(\bar{x}_i)}{\text{Max}(\bar{x}_i)}$$

where:

$\bar{x}_i$  sample means

Mean shift is marked with colours depending on its size. The value limits to be used for colouring can be specified in the **Reports –Settings** menu item.

The default value limits used for colouring:

- green                      mean shift < 0.1
- yellow                    0.1 ≤ mean shift < 0.3
- red                         0.3 ≤ mean shift

### 6.1.6.2 Relative variation

Maximum deviation of the samples compared to the width of the tolerance field.

$$\text{Relative variation} = \frac{USL - LSL}{\text{Max}(s_i)}$$

where:

$s_i$  deviation of samples

Relative deviation is marked with colours depending on its size. The value limits to be used for colouring can be specified in the **Reports –Settings** menu item.

The default value limits used for colouring:

- green                      8 ≤ relative variation
- yellow                    5 ≤ relative variation < 8
- red                         relative variation < 5

### 6.1.6.3 Z stability

The difference between the short- and long-term Z values.

$$Z \text{ stability} = Z_{ST} - Z_{LT}$$

Z stability is marked with colours depending on its size. The value limits to be used for colouring can be specified in the **Reports – Settings** menu item.

The default value limits used for colouring:

- green                      Z stability < 0,1
- yellow                    0,1 ≤ Z stability < 0,3
- red                        0,3 ≤ Z stability

### 6.1.7 Process capability index ratios ( $C_p/C_{pk}$ ; $P_p/P_{pk}$ )

The ratio of the two process capability indices in conformity with the set process capability study.

The ratio received is indicated in red colour in case it is smaller than a given value. The value limit to be used for colouring can be specified in the **Reports –Settings** menu item.

The minimum default value is 0.75.

## 6.2 Calculations used in the case of attributed parameters

### 6.2.1 PPM

The number of defect related to one million pieces.

$$PPM = \frac{\text{Number of failure}}{\text{Possible failure per pieces} \cdot \text{Number of checked pieces}} \cdot 1.000.000$$

where:

The number of default possibilities per piece...

... if “looking for all failures” strategy is set (in the **Database – Attributed Process / Process settings** menu item):

- for failure group: the number of failures belonging to the given failure group,
- for failure category: the number of failures belonging to the given failure category,
- for failures: 1,

... if the “most critical failure only” strategy is set (in the **Database – Attributed Process / Process settings** menu item):

- for all levels: 1.

### 6.2.2 PPM shift

$$PPM \text{ shift} = \frac{Max(PPM_i) - Min(PPM_i)}{Max(PPM_i)}$$

where:

$PPM_i$  the PPM value related to the individual samples

### 6.2.3 Actual PPM

The number of faulty pieces found multiplied by one million.

### 6.2.4 Z

The Z value belonging to the one millionth part of the PPM value, looked up from the standard normal distribution table.

### 6.2.5 $P_{pk}$

One third of the Z value.

## 7 Process settings

### 7.1 Aim

A fast and clear query in table format on the processes and process settings found in the HNS SPC database, for technical experts.

### 7.2 Creation of the report

The creation of the failure report can be initiated from the **Reports – Process settings** menu item. Afterwards the software leads the user through those settings that are necessary to specify for creating the report. You can switch between the individual settings windows with the **<Previous** and **Next>** buttons and you can abort the report creation with **Cancel** button.

The report can be created for both measured and attributed processes from the **Measured process settings** and **Attributed process settings** submenus of the menu item.

#### 7.2.1 Choosing report template or create report

User can choose between creating a new report and making a report by means of either report template.

##### *Comment*

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

It can be **private** or **public report** templates.

By **Select** button user can make report by means of template appointed by the cursor. It is necessary after template selection to select only time range (see in **Time range** item), other settings are made after selected template.

By **Delete** button user can delete a report template.

The asterisk located in the first column (**S** = status) denotes that this report template was displayed after open the **Report Templates** window.

If user have any template, or does not want to use any template either of them, than user can go on by **Create report** button, and create a report with going along all the settings.

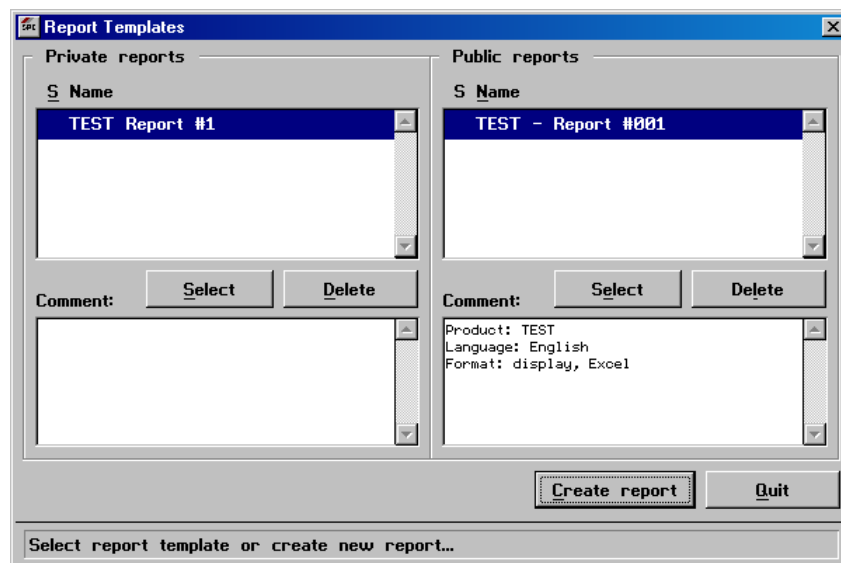


Figure 49: Process settings report templates

## 7.2.2 Report type

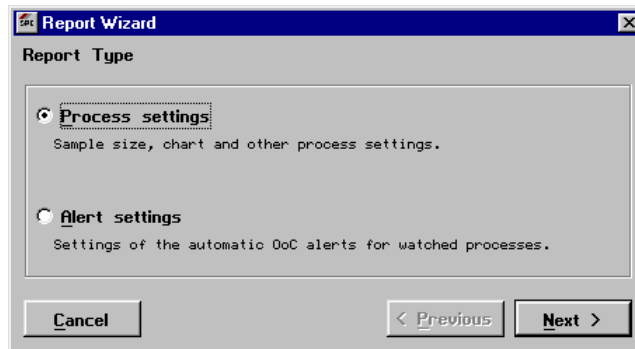


Figure 50: Selecting the type of process settings to be displayed

The settings that can be queried:

- Process settings  
All settings related to the given process except for the settings of the automatic alert.
- Alert settings  
Settings related to the automatic Out of Control alert.

## 7.2.3 Types of parameters to report (CTQ)

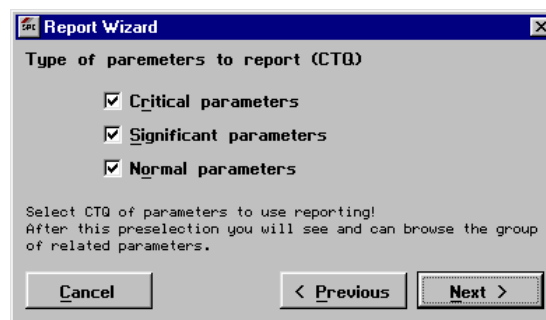


Figure 51: Settings the types of parameters (CTQ) for process settings

You can select which CTQ categories out of the measured parameters the software should offer for selection in the next step. All three CTQ categories are offered as default.

*Note: The CTQ categories can be specified and modified in the **Database – Measured parameters** menu item.*

When attributed process settings are queried, this step drops out as the CTQ categorisation is not interpreted for the failure groups.

## 7.2.4 Process selection

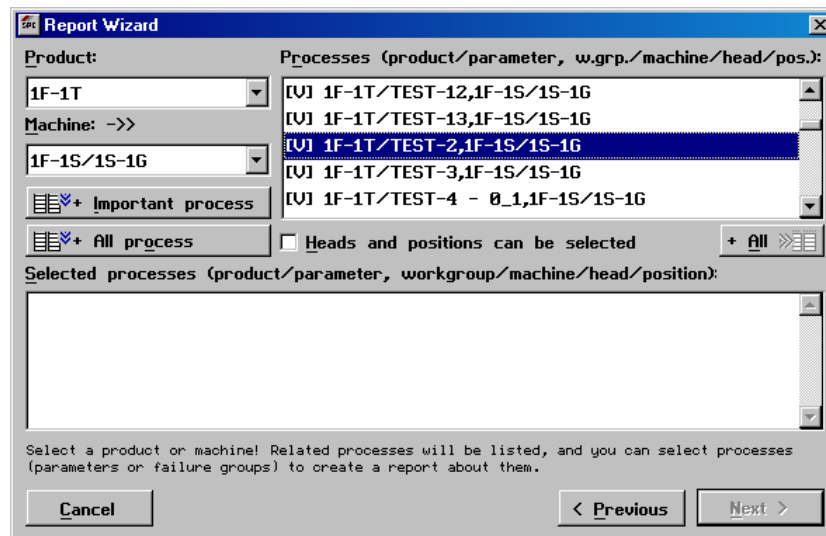


Figure 52: Process selection for process settings

The list of processes wished to be featured in the report has to be compiled. The processes are selected as follows:

All the products found in the given factory are featured in the **Product** field. When a specific product is selected, all the processes belonging thereto appear in the **Processes** field.

All the machines found in the given factory are featured in the **Machine** field. When a specific machine is selected, all the processes belonging thereto appear in the **Processes** field.

The **Processes** field contains the information in the following order:

Product / Parameter, Workgroup / Machine / Head / Position

The serial number of the Head / Position is featured at the end of the row only if the **Heads and positions can be selected** option is enabled and if these levels are defined in the database.

The processes featured in the **Processes** field can be moved into the **Selected processes** field by double-clicking the left mouse button. The processes featured here will be featured in the report to be created. Any process can be deleted by highlighting it in the **Selected processes** field and pressing the Delete button of the keyboard.

It is possible to select more processes at a time according to the following:

Out of the processes featured in the **Processes** field, those will be selected with the **Important processes** button, which are selected for automatic alert.

*Note: The processes can be selected in the Database – Measured processes or in the Database – Process settings – Change menu items with the Important process switch.*

When the **All processes** button is pressed, all the processes featured in the **Processes** field are selected.

With the **All** button, you can select all the processes found in the given factory – the number whereof will naturally be restricted according to the limiting conditions possibly specified previously.

If in the first step you select the query on alert settings, then in this step the software will only offer the important processes for selection and accordingly the **All processes** button will not work.

## 7.2.5 Report mode

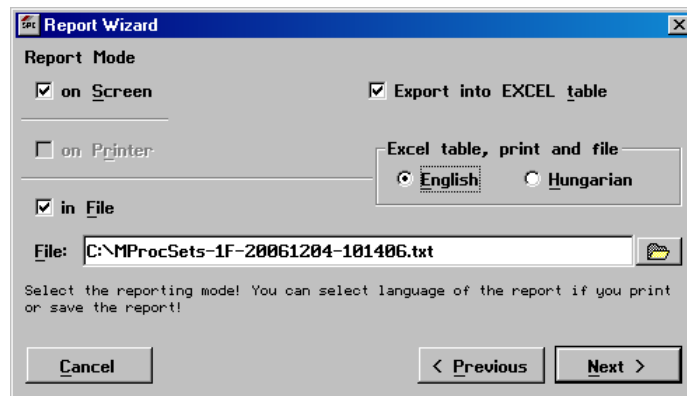


Figure 53: Report mode of the process settings

There are three types of report formats:

- **on Screen**

The report will be displayed on the screen.

- **Export into EXCEL table** (in Hungarian or English language)

Report will be exported in an Excel table. User can edit or save this file.

- **in File** (in Hungarian or English language)

The report will be saved in the specified file.

If the user does not specify any access route for file name, then the software will provide the following as default:

- in the case of measured processes:

*C:\MProcSets-'Factory code'-'Date and time of report creation (year, month, day – hour, minute, second)'.txt*

- in the case of attributed processes:

*C:\AProcSets-'Factory code'-'Date and time of report creation (year, month, day – hour, minute, second)'.txt*

The folder can also be browsed with the help of the  icon.

In **EXCEL table, print, file** field can be choose the language of the report (excepting the report displayed on screen), which can be Hungarian or English.

In case of exporting into Excel table in **Reports** menu **Report settings** menu item can be set the format of measured value and date

Out of the listed options, several can be selected at a time – even all.

## 7.2.6 Report creation

When the necessary settings are specified, the software compiles the report, then after moving on, it creates it in the requested format(s) (displays it on screen / exports it into EXCEL table / saves it in a file).

*Report template determines all settings of a report. If user saves the settings of a created report as template (see in **Report Creation** item) than next time have to select only time range, other settings (report type, processes, report mode) are the same.*

User can save the settings of report (excepting time range) as a report template. When next time user wants to create report with the same settings it is necessary to select the report template and time range. If **Save report as template** switch is on, **Report Wizard** window has further fields. User have to give a **Name**, respectively it can be given optional **Comment** text which helps user to select a template. Report templates can be saved in two ways: **save as private** or **as public template**. Selection the place of report templates see in **Reports** menu **Settings** menu item.

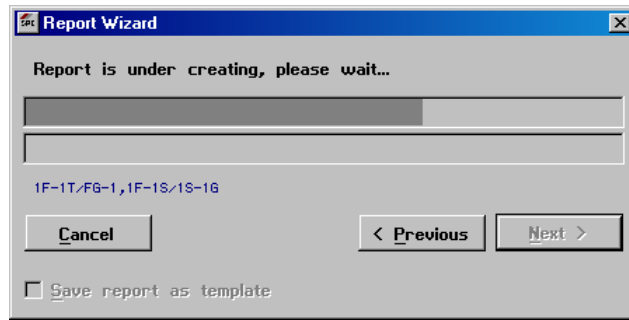


Figure 54: Process settings under creation

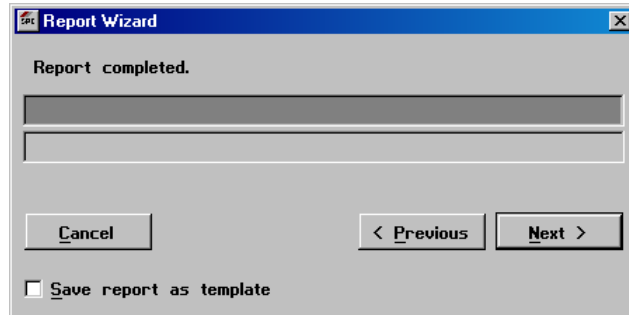


Figure 55: Process settings completed

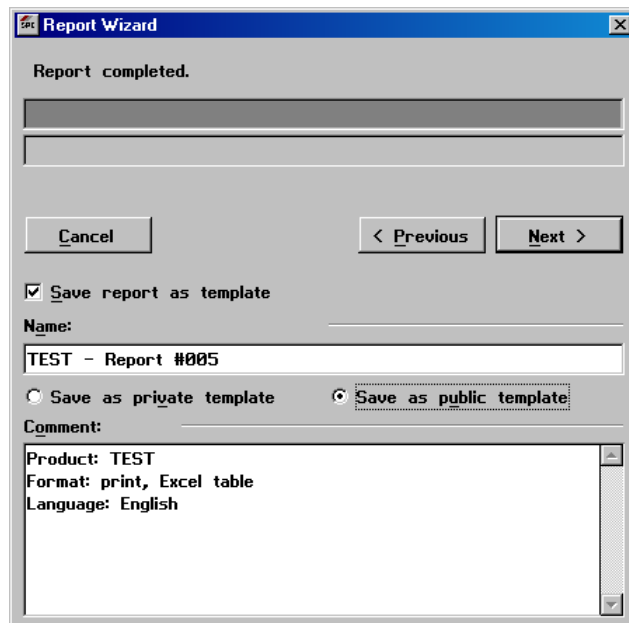


Figure 56: Saving process settings report as template

## 7.3 Contents

### 7.3.1 Measured processes

#### 7.3.1.1 Process settings

- **Product:** product code (**Database – Product – Code**)
- **Parameter:** name of measured parameter (**Database – Measured parameter – Name**)
- **CTQ:** CTQ category of measured parameter (**Database – Measured parameter – CTQ**)
- **Workgroup:** workgroup code (**Database – Workgroup – Code**)

- **Machine:** machine code (**Database – Machine – Code**)
- **Head / Position:** head no. / position no. (**Database – Machine – Head / Position**)
- **Unit:** Measured parameter's... (**Database – Measured parameter – ...**)  
... unit of measurement(... **Unit**)
- **Nominal value:** ... nominal value – in case of bilateral tolerance (... **Nominal value**)
- **Upper difference:** ... upper difference – in case of bilateral tolerance (... **Upper diff.**)
- **Lower difference:** ... lower difference – in case of bilateral tolerance (... **Lower diff.**)
- **UL:** ... upper specification limit – in case of upper bounded tolerance (... **USL [max]**)
- **LL:** ... lower specification limit – in case of lower bounded tolerance (... **LSL [min]**)
- **Capability state:** Measured process settings... (**Database – Measured process / Process settings - ...**)  
... capability study is set (... **Capability state**)
- **Distribution:** ... distribution type (... **Distribution – Type**)
- **Param.1 ... 3:** ... distribution parameters (...**Distribution - Parameters**)
- **Offset:** ... offset factor of distribution (...**Distribution – Off-set**)
- **Test:** ... fitting test (...**Distribution settings – Test**)
- **Confidence level:** ... confidence level of fitting test (...**Distribution settings – Confidence**)
- **Marks:**  
[0] – 90%  
[1] – 95%  
[2] – 99%
- **Sample size:** ... sample size (... **Sample size**)
- **Chart:** ... kind of control chart (... **Control chart – Kind**)
- **Mode:** ... control mode (...**Control chart – Mode**)
- **Type:** ... control chart type (...**Control chart – Type**)
- **Size:** ... control chart size (...**Control chart – Size**)
- **LCL,UCL:** ... control limits of the control chart – separately for the upper and lower diagram of the control chart (...**Control chart – Control limits**)
- **LWL, UWL:** ... warning limits of the control chart – separately for the upper and lower diagram of the control chart (...**Control chart – Warning limits**)
- **OoC:** ... mode of Out of Control monitoring – monitoring both sides or only the critical side – separately for the upper and lower diagram of the control chart (... **Ooc – Detect on critical control chart side only** switch)
- **RUN:** ... criteria set for RUN Out of Control case – separately for the upper and lower diagram of the control chart (... **OoC – RUN**)
- **TREND:** ... criteria set for TREND Out of Control case – separately for the upper and lower diagram of the control chart (... **OoC – TREND**)

- **M-T:** ... criteria set for Middle-Third Out of Control case – Checked samples (min) / Sample in zone min. [%] / Sample in zone max. [%] – separately for the upper and lower diagram of the control chart (... **OoC – Middle-Third**)
  - **WE1:** ... monitoring of WE1 Out of Control case is on / off – separately by two diagram on the chart (... **OoC – WE1**)
  - **WE2:** ... monitoring of WE2 Out of Control case is on / off – separately by two diagram on the chart (... **OoC – WE2**)
  - **WE3:** ... monitoring of WE3 Out of Control case is on / off – separately by two diagram on the chart (... **OoC – WE3**)
  - **WE4:** ... monitoring of WE4 Out of Control case is on / off – separately by two diagram on the chart (... **OoC – WE4**)
  - **WE5:** ... monitoring of WE5 Out of Control case is on / off – separately by two diagram on the chart (... **OoC – WE5**)
  - **Ct CL:** ... criteria set for closeness to limit Out of Control case – Zone size [%] / Checked samples / Samples in zone – separately for the upper and lower diagram of the control chart (... **Ooc – Closed to limits**)
  - **O1:** ... O1 Out of Control case is on / off – separately by two diagram on the chart (... **OoC – O1**)
  - **Process:** ... process type (... **Process – Type**)
  - **Confidence level:** ... confidence level of tool change / tool wear parameters (... **Process – Tool change / Tool wear – Confidence**)
- Marks:
- [0] – 80%
  - [1] – 85,9%
  - [2] – 90%
  - [3] – 95%
  - [4] – 97%
  - [5] – 99%
- **Delta:** ... tool change / tool wear shift ( $\delta$ ) parameter (... **Process – Tool change / Tool wear –  $\delta$** )
  - **Middle:** ... tool change / tool wear middle value (... **Process – Tool change / Tool wear – Middle**)
  - **MINFO:** enabling the MINFO system to forward OoC data related to measured parameter (**Database – Measured parameter – MINFO OoC data** switch)
  - **Alerted:** enabling automatic OoC monitoring and the alert function for the process (**Database – Measured process / Process settings – Important process (enable on-line watching and alerting)** switch)
  - **SControl:** enabling sampling control function for the process (**Database – Measured process / Process settings – Sampling control enabled** switch)
  - **Exported:** enabling the automatic export function for the process (**Database – Measured process / Process settings – Automatic export** switch)
  - **Export from:** the time of the last export related to the process (**Database – Measured process / Process settings – Export form**)

*Comment*

*In case of machine capability study state, the control chart settings are not written in the report.*

### 7.3.1.2 Alert settings

- **Product:** product code (**Database – Product – Code**)
  - **Parameter:** name of measured parameter (**Database – Measured parameter – Name**)
  - **Workgroup:** workgroup code (**Database – Workgroup – Code**)
  - **Machine:** machine code (**Database – Machine – Code**)
  - **Head / Position:** head no. / position no. (**Database – Machine – Head / Position**)
- Durable OoC criteria related to automatic alert ... (**Database – Measured process / Process settings – Alert settings – ...**)
- **Out of Specification:** ... related to the values measured outside tolerance (... **OoS measurements**)
  - **Low capability:** ... related to the process capability indices (... **Low process capability**)
  - **OoCL:** ... related to the points outside the control limit – separately for the upper and lower diagram of the control chart (... **Sample is out of CL's**)
  - **RUN:** ... related to RUN – separately for the upper and lower diagram of the control chart (... **RUN**)
  - **TREND:** ... related to TREND – separately for the upper and lower diagram of the control chart (... **TREND**)
  - **M-T:** ... related to Middle-Third – separately for the upper and lower diagram of the control chart (... **Middle-Third**)
  - **WE1:** ... by WE1 – separately for the upper and lower diagram of the control chart (... – **WE1**)
  - **WE2:** ... by WE2 – separately for the upper and lower diagram of the control chart (... – **WE2**)
  - **WE3:** ... by WE3 – separately for the upper and lower diagram of the control chart (... – **WE3**)
  - **WE4:** ... by WE4 – separately for the upper and lower diagram of the control chart (... – **WE4**)
  - **WE5:** ... by WE5 – separately for the upper and lower diagram of the control chart (... – **WE5**)
  - **Ct CL:** ... related to closed to limits – separately for the upper and lower diagram of the control chart (... **Closed to limits**)
  - **O1:** ... by O1 – separately for the upper and lower diagram of the control chart (... – **O1**)
  - **O2:** ... by O2 – separately for the upper and lower diagram of the control chart (... – **O2**)
  - **O3:** ... by O3 – separately for the upper and lower diagram of the control chart (... – **O3**)
  - **First alert:** the recipients of the first alert mail (... **First alert**)
  - **Repeated alert:** further recipients of the repeated alert mails (... **Further alerts sent to**)

## 7.3.2 Attributed processes

### 7.3.2.1 Process settings

- **Product:** product code (**Database – Product – Code**)
- **Failure group:** failure group code (**Database – Failure group – Code**)
- **Workgroup:** workgroup code (**Database – Workgroup – Code**)
- **Machine:** machine code (**Database – Machine – Code**)
- **Head / Position:** head no. / position no. (**Database – Machine – Head / Position**)
- **Failure category:** list of failure categories belonging to the failure group (**Database – Failure group – Categories**)
- **Failure:** list of the failures belonging to the failure group (**Database – Failure group – Failure name**)

#### Note

The order of the settings belonging to one failure group is the following:

- settings related to failure group,
- settings related to the failure categories defined within the failure group – every failure category in a separate row,
- settings related to the failures defined within the failure group – every failure in a separate row.

Attributed process settings ... (**Database – Attributed process / Process settings - ...**)

- **Sample type:** ... type of sample size (... **Sample size**)
- **Observing mode:** ... sample mode (... **Sample mode**)
- **Chart:** ... chart type (... **Chart settings – Chart type**)
- **Size:** ... chart size (... **Chart settings – Size**)
- **K (CL):** ... constant used for calculating control limits (...**Chart settings – K (CL)**)
- **LCL, UCL:** ... control limits of the chart ( ... **Chart settings – Control limits**)
- **LWL, UWL:** ... warning limits of the control chart (...**Chart settings – Warning limits**)
- **OoC:** ... mode of Out of Control monitoring – monitoring both sides or only the critical side (...**Chart settings – Ooc – Detect on critical control chart side only** switch)
- **RUN:** ... criteria set for RUN Out of Control case (...**Chart settings – OoC – RUN**)
- **TREND:** ... criteria set for TREND Out of Control case (...**Chart settings – OoC – TREND**)
- **M-T:** ... criteria set for Middle-Third Out of Control case – Checked samples (min) / Samples in zone min. [%] / Samples in zone max. [%] (... **Chart settings – OoC – Middle-Third**)
- **WE1:** ... monitoring of WE1 Out of Control case is on / off (... **OoC – WE1**)
- **CtCL:** ... criteria set for closed to limits Out of Control case – Zone size [%] / Checked samples / Samples in zoneside (... **Chart settings – OoC – Closed to limits**)
- **O1:** ... monitoring of O1 Out of Control case is on / off (... **OoC – O1**)
- **MINFO:** enabling the MINFO system to forward OoC data related to failure group (**Database – Failure group – MINFO OoC data** switch)

- **Alerted:** enabling automatic OoC monitoring and the alert function for the process (**Database – Attributed process / Process settings – Important process (enable on-line watching and alerting)** switch)
- **SControl:** enabling sampling control function for the process (**Database – Attributed process / Process settings – Sampling control enabled** switch)
- **Exported:** enabling the automatic export function for the process (**Database – Attributed process / Process settings – Automatic export** switch)
- **Export from:** the time of the last export related to the process (**Database – Attributed process / Process settings – Export from**)

### 7.3.2.2 Alert settings

- **Product:** product code (**Database – Product – Code**)
- **Failure group:** failure group code (**Database – Failure group – Code**)
- **Workgroup:** workgroup code (**Database – Workgroup – Code**)
- **Machine:** machine code (**Database – Machine – Code**)
- **Head / Position:** head no. / position no. (**Database – Machine – Head / Position**)
- **Failure category:** list of failure categories belonging to the failure group (**Database – Failure group – Categories**)
- **Failure:** list of the failures belonging to the failure group (**Database – Failure group – Failure name**)

#### Note

The order of the settings belonging to one failure group is the following:

- settings related to failure group,
- settings related to the failure categories defined within the failure group – every failure category in a separate row,
- settings related to the failures defined within the failure group – every failure in a separate row.

Durable OoC criteria related to automatic alert ... (**Database – Attributed process / Process settings – Alert settings – ...**)

- **Special care:** ... related to special care of the failure (... **Failure charts – Special care**)
- **OoCL:** ... related to the points outside the control limit (... – **Sample is out of CL's**)
- **RUN:** ... related to RUN (... **RUN**)
- **TREND:** ... related to TREND (... **TREND**)
- **M-T** ... related to Middle-Third (... **Middle-Third**)
- **WE1:** ... by WE1 (... – **WE1**)
- **CtCL:** ... related to closed to limits (... **Closed to limits**)
- **O1:** ... by O1 (... – **O1**)
- **O2:** ... by O2 (... – **O2**)
- **First alert:** the recipients of the first alert mail (**First alert**)
- **Repeated alert:** further recipients of the repeated alert mails (**Repeated alert**)

## 8 Report settings

### 8.1 Index criteria settings

It has to be specified what value limits the software should apply for colouring the calculated indices featured in the reports. It is possible to set them in the **Reports –Settings** menu item.

All colouring featured in the reports can be enabled and disabled with the **Use next colours for marking status of indexes** switch.

Setting options:

- **$P_p$ ,  $P_{pk}$ ,  $C_p$ ,  $C_{pk}$**   
The minimum value to be used for colouring the capability indices can be specified separately for each measured parameter (**Database – Measured parameter – Index criteria**).
- **Z goal**  
The minimum value to be used for colouring the Z values can be specified separately for each measured parameter and failure group (**Database – Measured parameter / Failure group – Z goal**).
- **Mean shift**  
Limit values used for colouring mean shift.
- **Relative variation**  
Limit values used for colouring relative variation.
- **Z stability**  
Limit values used for colouring Z stability.
- **$C_{pk}/C_p$**   
Minimum value used for colouring the  $C_{pk}/C_p$  ratio. It is possible, that this field will be red, only if also  $C_{pk}$  value is not correct. To this '**and  $C_{pk}$  is low**' should be switched on.
- **$P_{pk}/P_p$**   
Minimum value used for colouring the  $P_{pk}/P_p$ . It is possible, that this field will be red, only if also  $P_{pk}$  value is not correct. To this '**and  $P_{pk}$  is low**' should be switched on.
- **PPM shift**  
Limit values used for colouring the PPM shift value in the case of the failure groups.
- **OoC CL [%]**  
Maximum value used for colouring the % ratio of the points out of the control limit.

With the **Set default values >>** values, you can reset the default values stored in the database for all the indices (except for those that can be set by parameter). For default values, see the calculations chapter.

In case of exporting into Excel table can be set the format of **decimal point** and **date**.

Here should be set a folder for report templates – separately for **private** and **public** templates.

#### Comment

*It is suggested to set folder for private templates on user's PC, and on a network place for public templates.*

*Program makes subfolders in this selected folder, separately to group reports. First level of folders is marked with factory code, second level is marked with kind of report.*

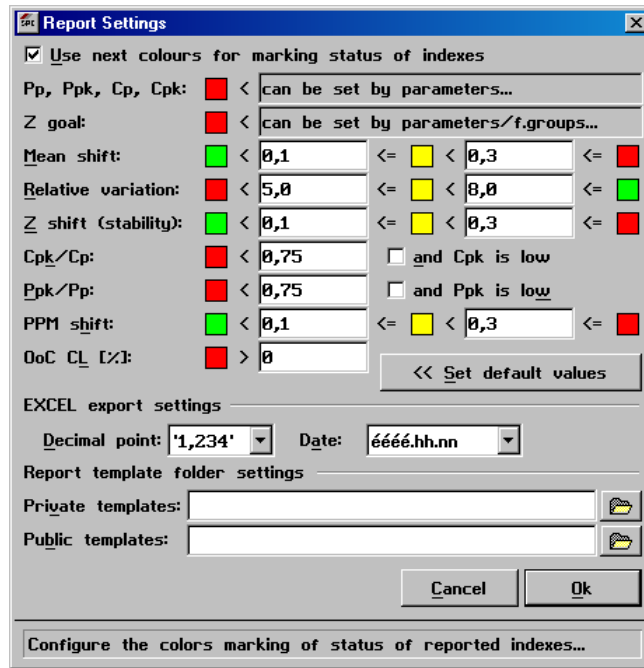


Figure 57: Setting the index criteria

## 8.2 Print settings

The logo and inscriptions to be inserted into the heading of the printed reports can be specified in the **Header** and **Logo** fields of the **File – Print settings** menu item.

The reports will be printed on the printer set in the **File – Printer** menu item.