



VIII. Inspection program QM-CALIP

VIII.1. Introduction

The QM-CALIP program serves as a computer support program for the inspection of calipers according to different national standards (see the list), respective according to customised factory standards.

The use of the program itself, however, requires little knowledge of computers. An extensive help text as well as the integration of thorough safety measures ensures quick a simple operation of the program.

Measurement data can be entered directly from the caliper (if the calliper have a RS 232 interface) or from the keyboard. From the measured data the program determines the errors of external, internal and depth measurement of the inspected calliper. The evaluation results can be re-produced on the screen and/or the printer. Tolerance excesses will be shown.

The following standards form the basis of the evaluation:

- DIN 862, December 1988,
- VDI/VDE/DGQ 2618, January 1991
- Australian Standard AS 1984-1977
- British standard BS 887
- Norme francais NFE 11-091, NFE 11-096
- Indian Standard IS:3651-1982 (2000)

The program QM-CALIP can be started directly out of the database program QM-MANAQ - also offered by L&W GmbH - and provided with initial data (such as ID-number, measuring range and graduation of the product to be inspected etc.), in this case the inspection results are directly transmitted back to the database.

VIII.2. Program start

You can start the QM-CALIP program directly from the QMSOFT-command-Shell (click the corresponded symbol in the shell). The other way is to start the program through the WINDOWS Explorer .

Especially at the first start of the program you should check some basic parameters of the program. See the next section for this

VIII.3. Program settings

Working with the program you should make different settings to define the program environment and especially program conditions. Use the menu "Settings" to do this.

VIII.3.1. "Settings | General settings"

Using this option you have the following registers to change program settings:

Register „General“

Here you can choose the program language, switch on/off the help text and set the directory to save calibration certificates.

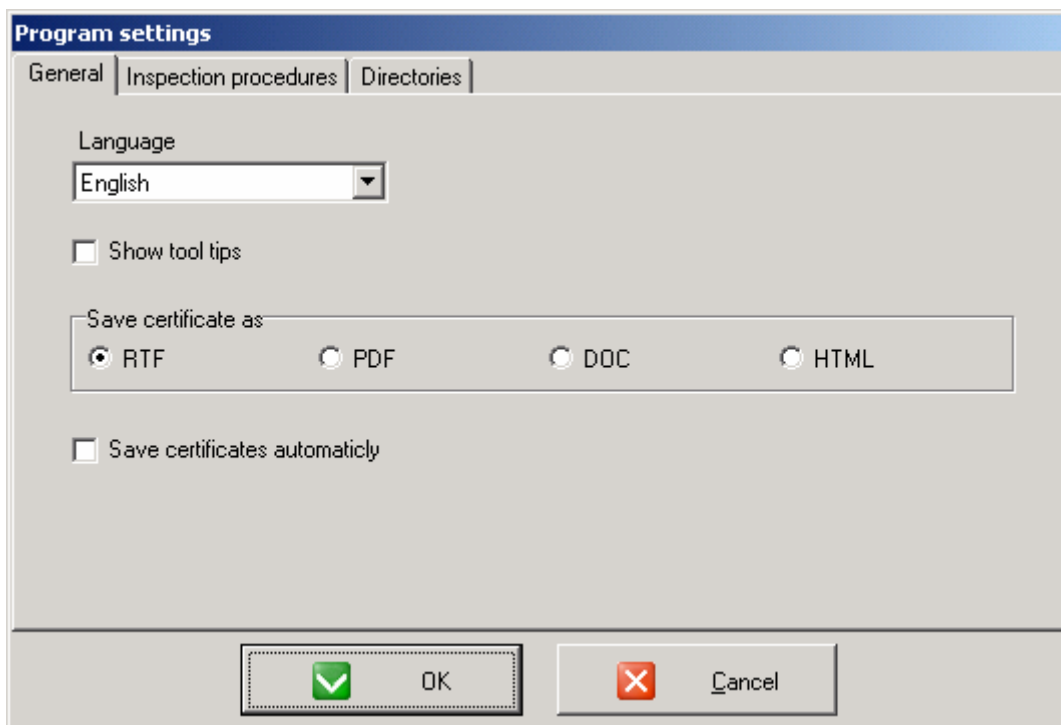


Figure: general program settings

Register „Inspection procedures“

Here you can enter for each gauge type a reference to a corresponded text file including the inspection procedure as a text.

Enter your own text for the procedures here.

Register „Directories“

For some functions (indicating of measuring values; creation and edit of certificate layouts) external programs will be used. Here you have to enter the directory where the corresponded program can be found.

While doing the program installation all directories will be set to a correct value !

ATTENTION: Make sure that this entries are correct. Errors while operating the program may be caused by incorrect settings in the screen "Directories".

VIII.3.2. “Settings | Inspection conditions”

Here you can set some general conditions for the caliper inspection and also the reading position you want to use.

VIII.3.2.1. “Inspection conditions | General settings”

General settings

Type of inspection: Periodical inspection

Enter measuring values as: deviation

Inspection period: 1 Year(s)

☐ Values for Flatness, Parallelism.. as a numeric value

☒ Increase tolerance while changing measurem. direction

☐ Read "inside, Middle, outside" for external meas.

☒ Preset of measuring values

☒ Reduce the number of readings

Default certificate layout file

for "mm" measurements: QMCALIP_English

for "inch" measurements: QMCALIP_English

OK Abort

Figure: Inspection conditions – general settings

Set the following parameters:

Type of inspection:

Select “Periodical..” or “Incoming inspection”. For an “Incoming inspection” some additional inspections (e.g. hardness inspection) have to be done.

Enter measuring values as:

Select if you want to enter the measures as direct readings or if you want to enter the “deviation”. In the most cases the second option is more convenient.

Inspection period:

Enter a default “Inspection period” to calculate the date for the next inspection. This can be print on the certificate. If the program is called from the database the “Next inspection date” value from the database will be used.

Values for flatness, parallelism... as numeric values: If you are inspecting a caliper you have also to check parameters like "Flatness of measuring faces", "Parallelism of measuring faces" and others. If you activate this option you can enter the results for this inspection as numerical values. Otherwise you have only a "Pass" / "Fail" decision for these parameters.

Increase tolerance while changing the meas. Force: The German "DIN" standard defines a increased tolerance (compared with the general defined) for all measures with a change of the force. Activate this, the tolerance for internal measures will be increased with "0.02 mm".

Pre set of measuring values: Switch "on" this to fill the column "Measure" in the measuring table with the nominal values. If the option "Enter measuring values as" was set to deviation all deviation values will be preset to the value "0.00 mm" (or "0.000 inch").

Reduce the number of readings: If this option is switched "on" for the second (and following) parameter you inspect on a caliper the short list "Reading positions for reduced meas." (see the next section of this manual) will be used. For example if you inspect an caliper with two external measuring jaws and one pair of internal measuring jaws then only for the first external jaws the "full" measurement will be done. The second external jaws and the internal jaws will be inspected on the positions entered in the short list (see the next figure – entering of reading positions).

Read "inside, Middle, outside" for external meas.: Some inspection procedures (e.g. the german VDI/VDE/DGQ 2618 Page 9.1) does demand for the external measurements: ".. to be probed at three points of the measuring faces (inside, middle, outside)..". If it is switched off you has to enter only one reading for each external position.

Default certificate layout file: Enter here the name and directory for the certificate layout files you want to use to create your calibration certificates. For "mm" and "inch" measurements different files are used.

NOTE: Because the program will be installed to support different languages you will find serious "L32" files in the related directory. Note: the file name (for example the "QMCALIP_English") will show you the used language. Using the Windows-Explorer you can delete all certificate layout files you do not use.

VIII.3.2.2. Setting of inspection positions

The inspection of a caliper can be made on different positions of the applicable measuring range of the caliper inspected. For this, appropriated gauge blocks (for external or depth measurements) or setting rings (for internal measurements) will be used. The readings you get have to be compared with the sizes of your reference gauges. To make this comparison the program must be informed about the inspection positions you use.

For a inspection according DIN, BS or NF standards there may exist tables with pre-defined measuring positions.

Use the option "Settings | Inspection positions" to define the related positions for different types of calipers. The tables with all entered reading positions will be saved into the "Inspection position file" (see also section VII.2.1. 'Directories'). The default file name is "SETS.XML".

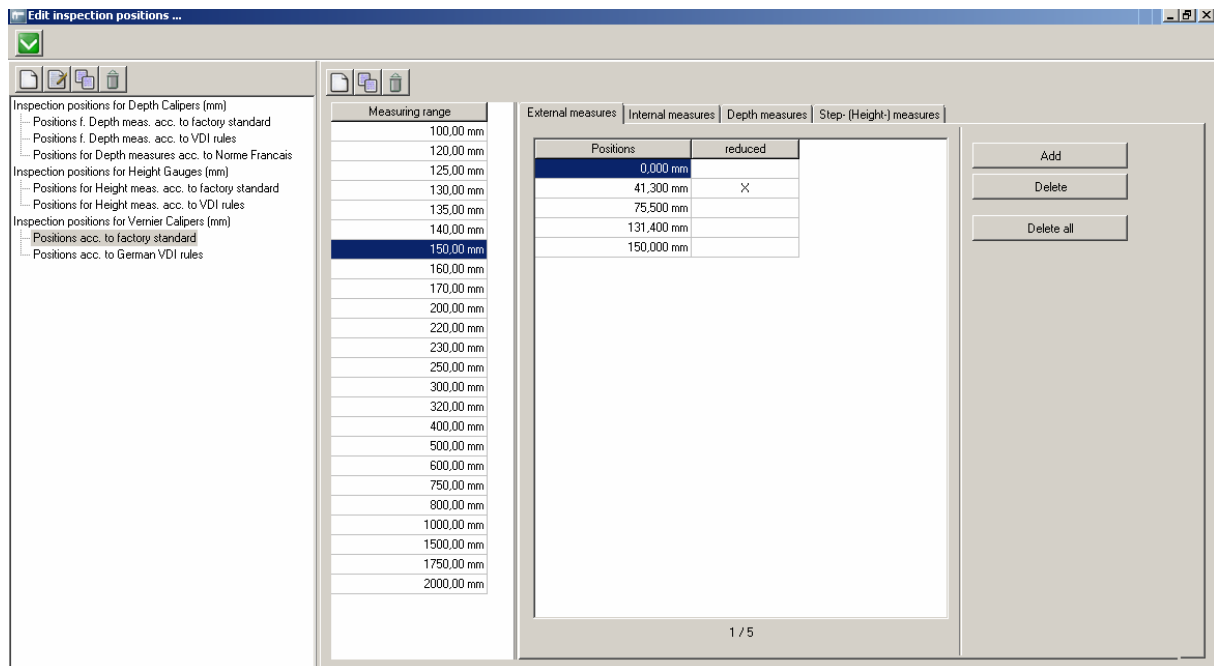


Figure: Entering of reading positions

You can enter positions for „External“, „Internal“, „Depth“ and „Hight“ measures.

To open the related „mm“ or "inch" tables please use the related menu items.

The reading positions entered are always in relation to the measuring range of the caliper should be inspected.

The position lists are usually divided in two columns: the column "Positions" does include the reading positions for a „full inspection“ of the calipers beam. This list will be used for the first parameter on the caliper (in the most cases for the external measurement).

If the switch „Reduce the number of readings“ is activ, for all other parameters the list shown in the column "reduced" will be used. This positions will also be used for the internal measures if an inspection according to „VDI/VDE..“ is selected.

VIII.3.3. “Settings | Factory tolerances”

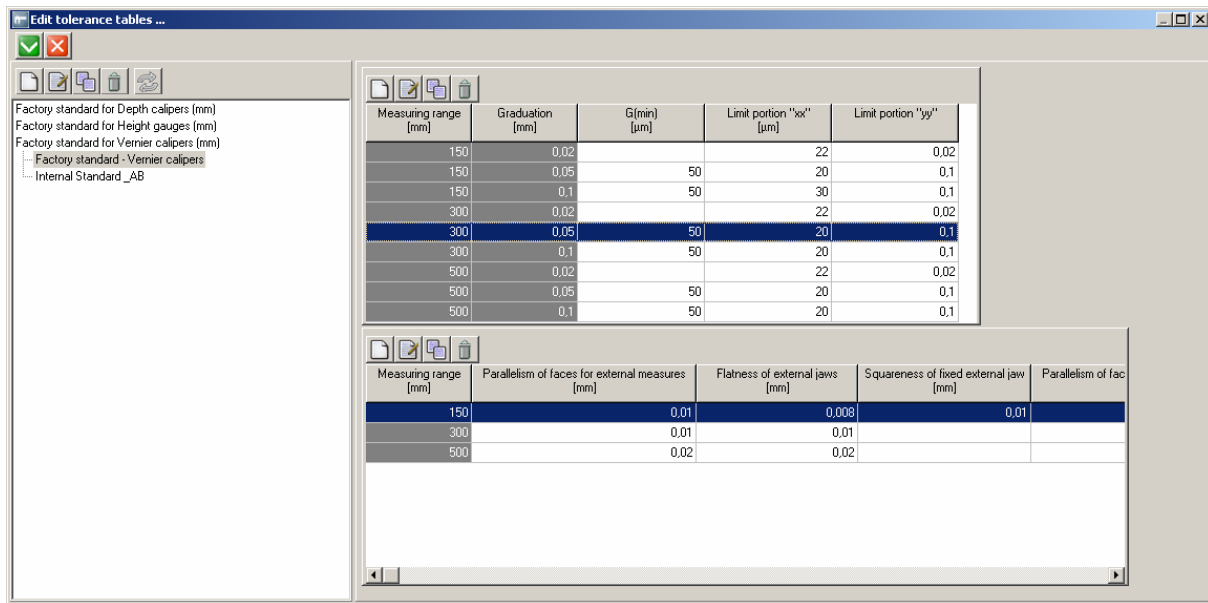


Figure: Entering of factory tolerances

If you have chosen the option "Factory tolerances" a list of already existing tolerance entries (see Figure) will appear on the screen.

Here you can insert new tolerances, delete existing tolerances or change it. With the functions "Copy the tolerance table" and "Create a new factory tolerance table" you can copy a tolerance table from one micrometer type to another.

The tolerance tables will be saved in the file „**TOLERANCES.XML**". When doing a caliper inspection according factory standard this values are used for the valuation of the caliper being inspected. The entered values are related to the type of the caliper, the „Measuring range" and the „Graduation".

If you want to do a caliper inspection acc. to „factory standard" make sure that a corresponding tolerance entry is available. Otherwise the „Continue" button will be locked.

VIII.4. Certificate layout files

The program gives you the possibility to customize the layout of your calibration certificates. The layout of these certificates is based on the so-called "certificate layout file" (template). This file contains all information about the form of the certificate and the values that should appear in it. By editing this certificate layout file, you can change the layout. Saving this file with another file name gives you the possibility to work with different record layouts.

All record model files you have created will be saved in the working directory of the QM-CALIP program. The files have the extension ".L32".

Using the option "**Certificate layouts / Show / edit a certificate layout**" you can load a certificate layout file into the editor program.

ATTENTION: Do not open a certificate layout file ("L32" extension) directly with the QMSOFT editor or with any other program.
In this case the program-dependent fields will be removed !!

A certificate layout file consists of three different types of information:

- "normal" text: is text information just like in a known text processing application; you can change the text as you want and you can set the different text parameters;
- "Placeholders" ("Fields"): a "Field" is including a variable information about the gauge, the measuring process or the measuring environment. A "field" will be fulfilled with the actual information while executing the program. Editing a certificate layout file you can change "field" positions, delete "fields" (if you do not need the related information) and insert new "fields". To insert a new "field" in your certificate layout use the menu "Insert | Fields". Using this menu you can also see all available "Fields" and the related information. For numerical fields you can set the number of decimal points using the menu "Insert | Fields".
- "Line conditions": A line condition gives you the possibility to control the certificate layout in dependence of different program situations. A text or field following an line condition will be printed out on the certificate only if the condition is "true". For example you can print a special text only if an "External measurement" was done. Please open an existing certificate layout and see the comments for the "Line conditions" available.

VIII.5. The calibration process

VIII.5.1. Entering of parameters

Before starting the inspection, a series of parameters must be entered that describe the. The input of the parameters is done in a separate dialog box with a corresponding number of input fields.

The screenshot shows a software window titled "QMSOFT® / QM-CALIP - Inspection of calipers". Inside, there's a section titled "Enter gauge data". Below this title, there are several input fields and dropdown menus arranged vertically. The fields are: "Identity number" with the value "0899", "Form of construction" with a dropdown menu showing "Form 1A - ext., int., depth (with fixing screw)", "Step- (Height) measuring unit" with an unchecked checkbox, "Indication type" with a dropdown menu showing "Vernier scale", "Unit" with a dropdown menu showing "mm", "Measuring range" with a dropdown menu showing "150.0 mm", and "Graduation" with a dropdown menu showing "0.020 mm". Below these, there are two more dropdown menus: "Tolerances acc. to" showing "DIN 862 : 1988" and "Reading positions acc. to" showing "Positions acc. to factory standard". At the bottom of the dialog box, there are three buttons: "Abort" (with a red X icon), "Inspection conditions..." (disabled), and "Continue" (with a green arrow icon).

Figure: Entering of caliper parameters

- Identity number:** This field is used to establish an identity for the caliper by entering a number. This number will be noted in the record.
- Form of construction:** Select the "Form of construction" of the caliper from the list of options provided. The content of this field will be entered into the certificate.
- Step- (Height) measuring unit:** Select this option if your calliper has a separate "step" measuring unit which you need to inspect.
- Indication type:** Choose here, from the list provided, the type of the indication (Vernier scale, Dial, Digital). Depended on the chosen option you have to enter in the next field the vernier scale, the graduation or the resolution of the caliper.
- Unit:** Choose the unit for the Caliper.
- Measuring range:** Enter the measuring range of the caliper have to be inspected. For calipers according the DIN or BS standard make sure the validity of this standard.
- Scale, graduation...:** Choose from the list provided, the scale graduation or resolution of the caliper.

Calculate tolerances acc. to: Select the standard you want to use for the caliper tolerances. If you select „Factory standard“ make sure that the required tolerances are entered in the tolerance table.

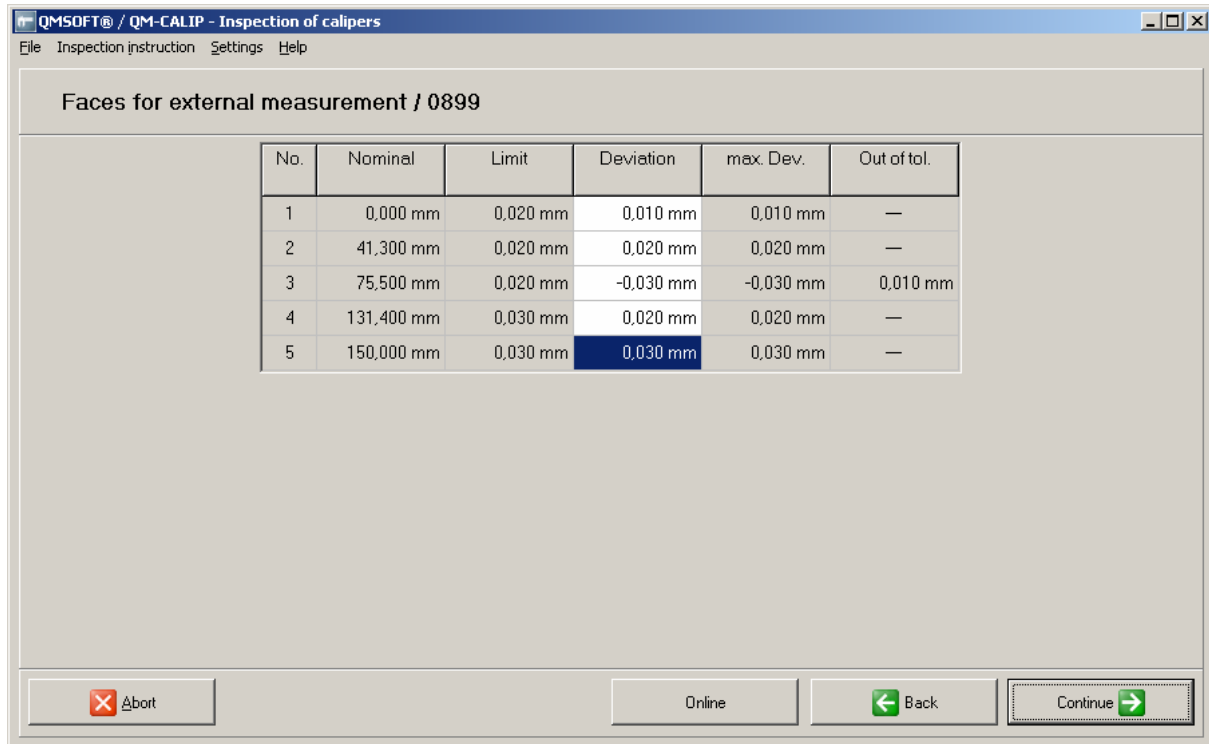
Reading positions acc. to: The shown list is depended on the selected micrometer type. Select the reading positions proposed by the VDI rules or the BS or on your self defined positions. If you want to use your own positions (factory standard) make sure that you have inserted the positions for the used measuring range (see also section VIII.3.2.2).

NOTE: If the “continue” Button is disabled check the following parameters:

- does the entered values for “Measuring range” and “Graduation” correspond with the standard selected; (for example the BS 887 standard is defining only a graduation of 0.02 mm); if you are not sure switch to “Factory standard”
- if you select the option “Reading positions according to: Factory standard” be sure that you have entered the positions required; otherwise use the function “Inspection conditions” to do it;
- if you select the option “Tolerances according to: Factory standard” be sure that you have entered the related tolerances for the “Measuring range” and the “Graduation”; otherwise use the function “Factory tolerances” to do it;

VIII.5.2. Entering measuring values

The entering of measuring values is divided in the measurement of external, internal and depth measuring values. For each kind of measurement a separate dialog box will appear on the screen. The shown nominal values will be read from the inspection positions entered before.



No.	Nominal	Limit	Deviation	max. Dev.	Out of tol.
1	0,000 mm	0,020 mm	0,010 mm	0,010 mm	—
2	41,300 mm	0,020 mm	0,020 mm	0,020 mm	—
3	75,500 mm	0,020 mm	-0,030 mm	-0,030 mm	0,010 mm
4	131,400 mm	0,030 mm	0,020 mm	0,020 mm	—
5	150,000 mm	0,030 mm	0,030 mm	0,030 mm	—

Figure: Entering of measuring readings

Enter the readings for the related nominal values via keyboard or pressing the corresponding button on your caliper (use the caliper manual to do this). An „Online“ measurement is only for „Digital calipers“ possible.

The submitted deviations will appear in mask fields to which the user does not have access.

VIII.5.3. Entering of additional parameters

After the entering of the calipers readings you have to inspect some other parameters depended on the type of caliper and/or the selected standard.

These are the:

- Function and Visual inspection
- Flatness of faces for external measurement;
- Parallelism of faces for external measurement
- Combined width of faces for internal measurement
- Parallelism of faces for internal measurement.

For this case a input mask will appear on your screen (see Figure VIII-9) including the corresponding tolerances of this parameters. Now you have to check, if the actual values of the caliper inspected are inside the shown tolerance or not. Depended on this, choose the appropriate list entry. If you choose "not inspected" the related parameter will not be shown/printed in the calibration certificate.

VIII.5.4. Evaluation of the measurement

The evaluation of the inspection consists of comparing the measuring values entered with the corresponding error limits. The valuation of the caliper inspected will be done according the following criteria:

- making a inspection for a caliper according the DIN-standard (inspection can be made according DIN or VDI) or the Australian Standard AS 1984 the standardized error limits for the corresponding measuring range and vernier scale / graduation will be used for the calliper valuation;
- for a non-DIN/AS/BS caliper inspection the tolerance assessment is done only if the measuring range and the vernier scale/graduation of the caliper match the corresponding entry in the factory standard tolerance table;
- if neither of the above is filled in, no tolerance assessment will be made.

VIII.6. Output of results

After entry of the measurement data has been completed, the screen "*End of inspection*" will appear.

The screenshot displays the 'End of inspection / Valuation: "0899"' window in the QMSOFT® / QM-CALIP software. The window has a menu bar with 'File', 'Inspection instruction', 'Settings', and 'Help'. The main area is divided into two columns. The left column contains input fields for 'Customer' (filled with 'Miller & Jones'), 'Calibration certificate number' (filled with '2009-09-001712'), 'Valuation' (a dropdown menu showing 'usable'), and a 'Comments' text area. The right column features a dropdown for 'Inspection certificate layout' (set to 'QMCALIP_English') and three buttons: 'Edit certif. layout', 'Show certificate', and 'Print certificate'. At the bottom, there are three date/operator fields: 'Actual Date' (11.06.2009), 'Next inspection' (11.06.2010), and 'Operator' (Flintstone). Below these are three buttons: 'Abort' (with a red X icon), 'Back' (with a green left arrow icon), and 'Finish' (with a green checkmark icon).

Figure: End of inspection – show/print certificate

If the inspection is finished you get the screen shown above. The summary result of the inspection is shown. Here you can enter the name of the customer, the date for the next inspection and also some remarks to the inspection.

Before creating the calibration certificate you can change the "certificate layout" file will be used. To start the output of the results press the "Show certificate" button.

All functions for the editing and the output of calibration certificates will be controlled by the EDITOR - program. See the manual of this program to see how to operate this.

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