Terminology

procella

Information about this document

Document History

Version	Date	Author(s)	Modifications / Remarks
v-0.6	23.Nov.2021	SJ	Translation
v-0.22	10.01.2023	SJ	Revision spelling
v-0.24	25.01.2023	SJ	Revision chapter "Definition of the term Group"

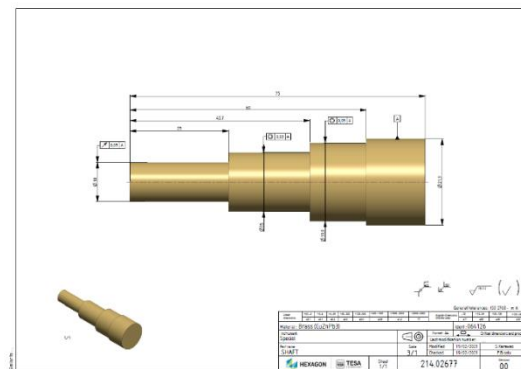**CONTENTS**

1 Terminology in procella

For working with the Q-DAS application procella and especially for considering possible applications of the measurement sequence control, it is first necessary to clarify the technical terms used in advance.

The definition of terms is explained in this document using the "TESA shaft" as an example. As can be seen in the drawing, the test object itself consists of four diameters and four length dimensions.

Test object „TESA shaft"

Drawing „TESA shaft"

Depending on the metrological or organisational context, the requirements of the measurement situations can be different.
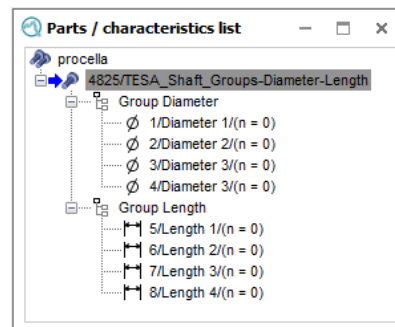
Depending on which measurement devices are available and how the measurement procedure is organised, different data sets can be generated.

Example dataset of the "TESA Shaft" for recording at one measuring station using different measuring devices.
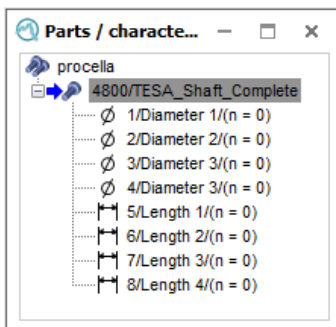

Example dataset of the "TESA shaft" for recording at two measuring stations using different measuring devices.

With the target of better comprehensibility, only the four diameters of the "TESA shaft" are considered in this document. Different data sets with different measurement procedure and requirements of the measurement situations are used. The test plan configuration is not part of this documentation.
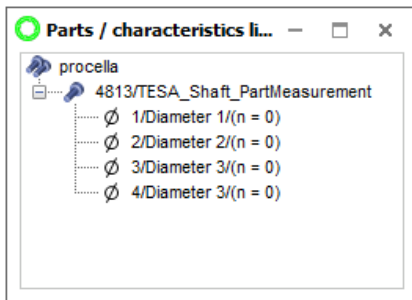
Example of a part measurement on a TESA air pressure measuring device with 4 probes
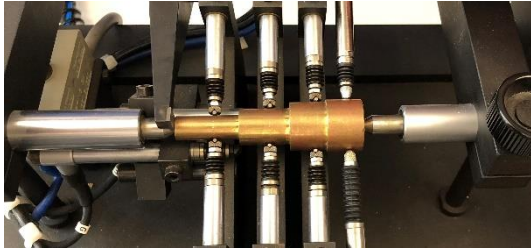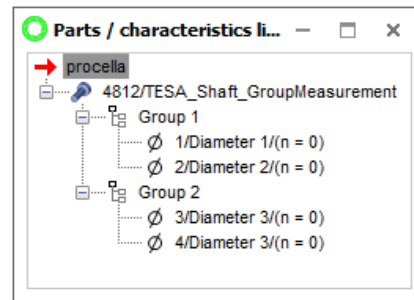

Example of a group measurement on different measuring devices
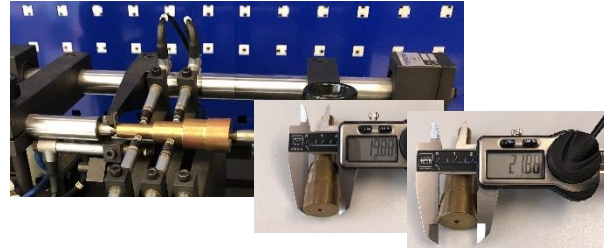

Data set structure for this test order

Data set structure for this test order

The "Test plan" graphic is the central graphic for visualising the inspection procedure for the user. The Measurement procedure is easily recognisable, especially through the representation of the status display in different colours.

The following explanations of the terms are mainly based on the test plan graphic in connection with a schematic drawing of the "TESA Shaft".

Grafic test plan
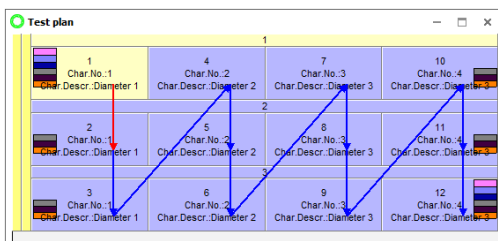
Schematic drawing of the test object
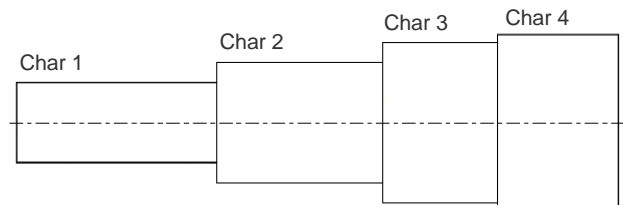
2 Examples of use of the procella terms

A rough overview of how the term definitions is used in procella is explained in the following examples.

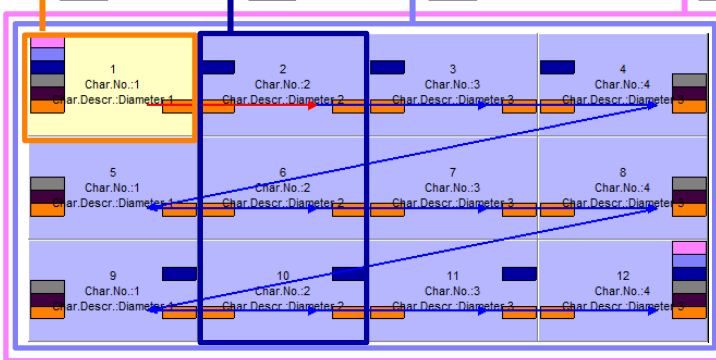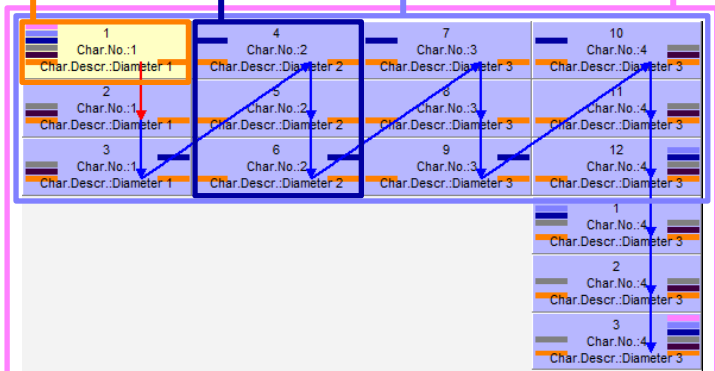## Definition of terms using equal subgroup incidence

Characteristics information

Subgroup size (K8500)

Subgroup type (K8501)

Subgroup incidence (K8504)

In this example, the same subgroup size, subgroup type and subgroup incidence are configured in the characteristics mask for all four characteristics that are to be measured. The measurement direction specified in the measurement procedure is horizontal. This means that this measurement procedure follows a part measurement in which the test objects are measured completely one after the other.

Definition of terms using different subgroup incidences

In this example, the same subgroup size and subgroup type are configured for the characteristics to be measured. The configured subgroup incidence for the fourth characteristic is different from the first three characteristics. The measurement direction specified in the measurement procedure is vertical. This means that this measurement procedure follows a subgroup in which the same characteristics of all test objects are measured one after the other.

3 Definition of the term "Measurement procedure"

All measurements, subgroups, number of test objects and characteristics to be measured as well as the defined frequencies specified in the test plan represent the measurement procedure in the procella environment.

The graphic "Test plan" shows the entire measurement procedure. The test plan contains information about the number of test objects, the characteristics to be measured per test object and the order in which the measurements are carried out.
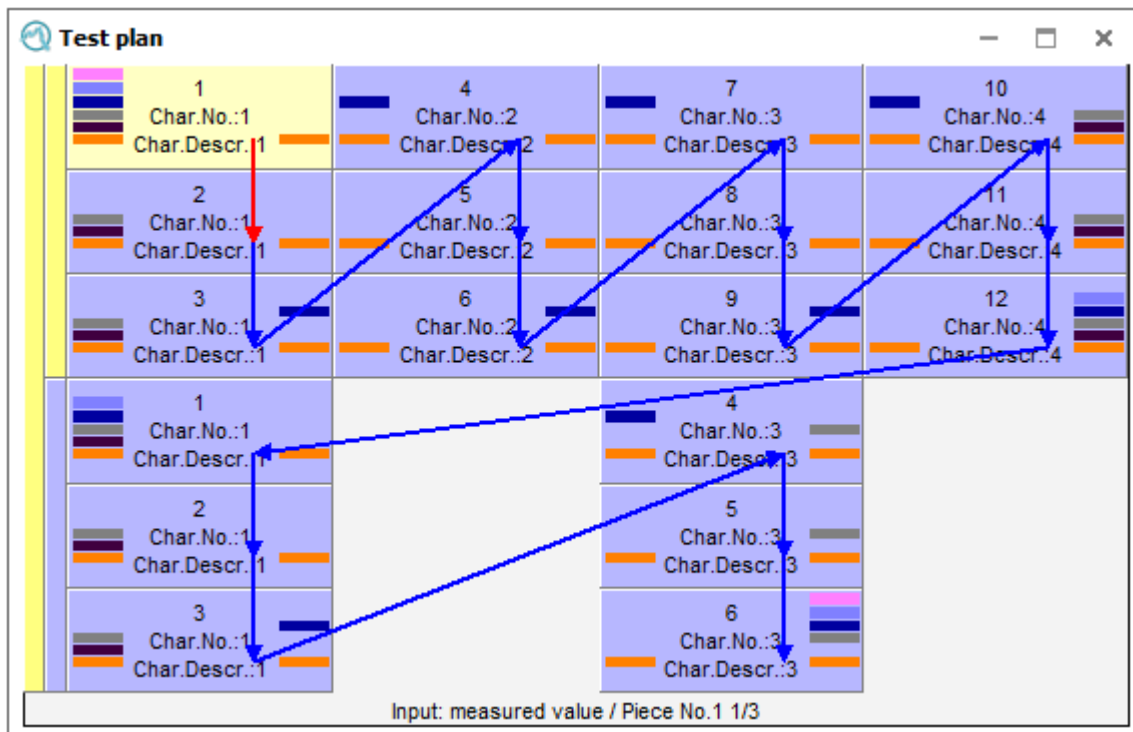
4 Definition of the term "Measurement direction"

Even though many different combinations of a measurement procedure are possible, a measurement procedure basically has two directions. The horizontal and the vertical direction.
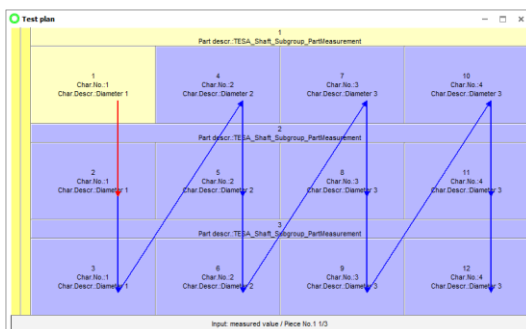
Horizontal measurement procedure (per test object)
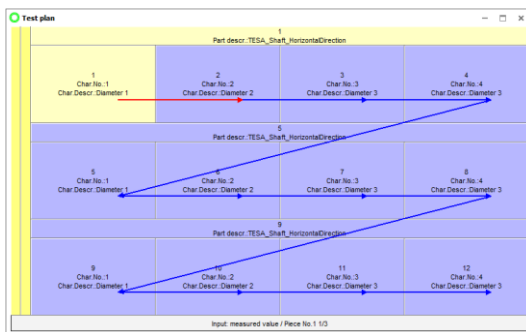
According to the manufacturing process and the organisation of the workflows, the test plans for recording the measurement data of a test object can be organised differently. A horizontal measurement procedure refers to the characteristics of a test object to be measured. Each line represents one test object.

The Test objects are measured completely one after the other.

Vertical measurement procedure (per characteristic of all test objects of a subgroup)

The vertical measurement procedure specifies the number of characteristics to be measured for different test objects (subgroup size).

The configuration of this measurement procedure combines the individual characteristics of all test objects into subgroups. Each column represents a subgroup. Each row stands for one test object.

The same characteristics of all test objects are measured one after the other.

5 Definition of the term "Measurement"

Depending on the metrological or organisational context, a measurement can mean the following:

- The recording of a measured value of a characteristic (single measurement).

- The recording of several measured values of a test object (group/part measurement).
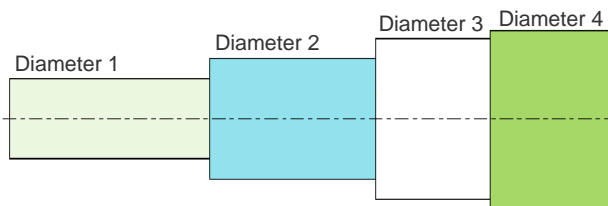
The start and end of a measurement are shown in the test plan with an orange bar.
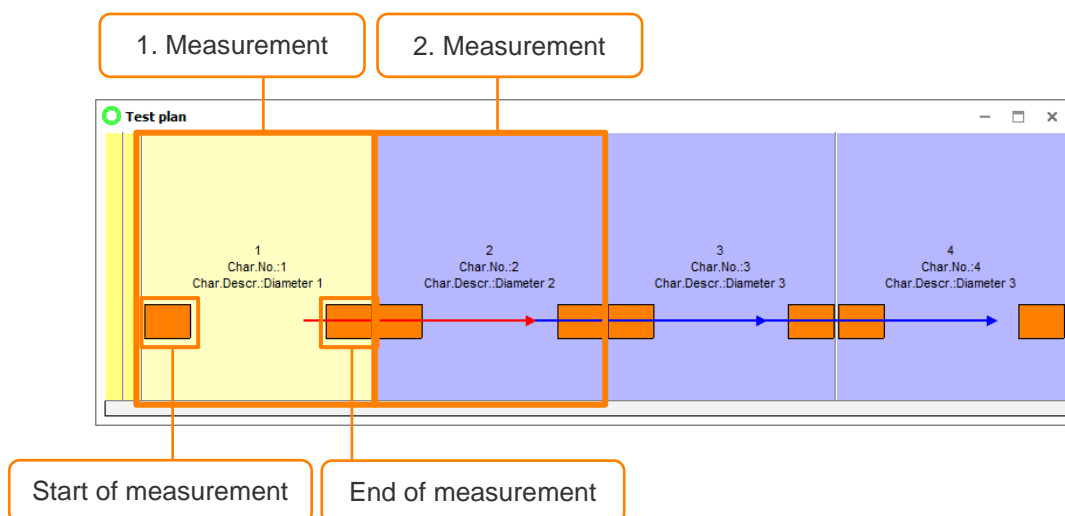

Single measurement

In a single measurement, one measured value entered corresponds to one measurement.
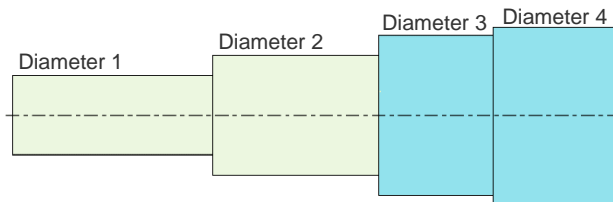

In this example, the test object "Shaft" is configured so that all four characteristics (Diameter 1 to 4) are treated as individual measurements.

As can be seen in the test plan, each characteristic in this example has a measurement start and end.

Group measurement

A group measurement is a measurement in which several characteristics of a test object are combined into one measurement. The grouping of characteristics reflects the metrological or organisational context.
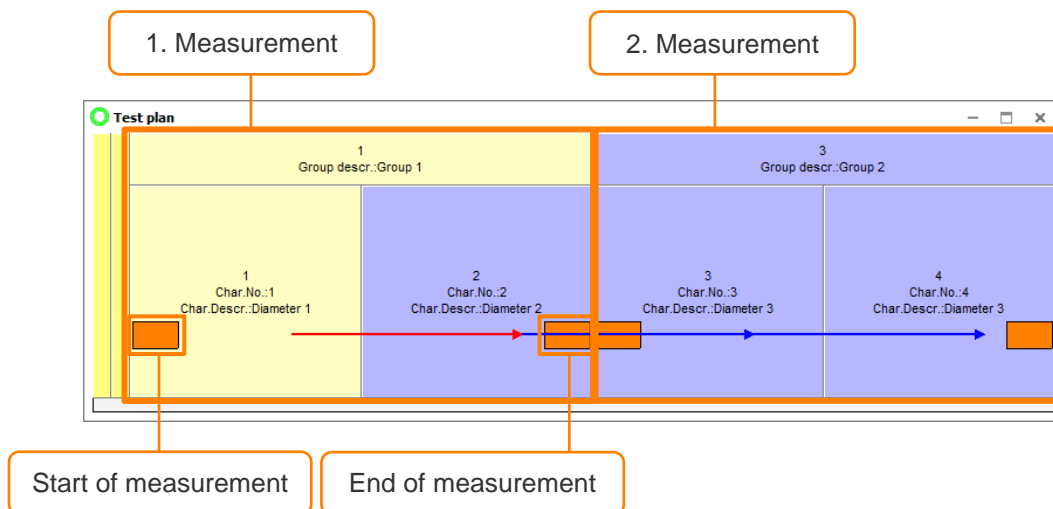

In this example, the test object "TESA_Shaft" is configured in such a way that two diameter characteristics each can be measured on different measuring devices.

First group measurement (diameters 1 and 2) is measured at measuring device 1.
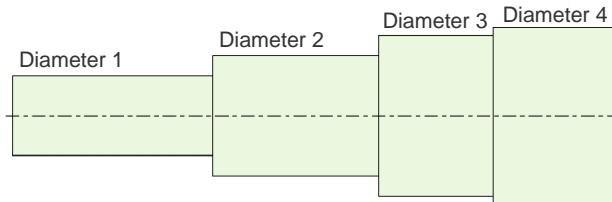
Second group measurement (diameters 3 and 4) is measured at measuring device 2.

As can be seen in the test plan, the start and end of measurement correspond to the characteristics group.
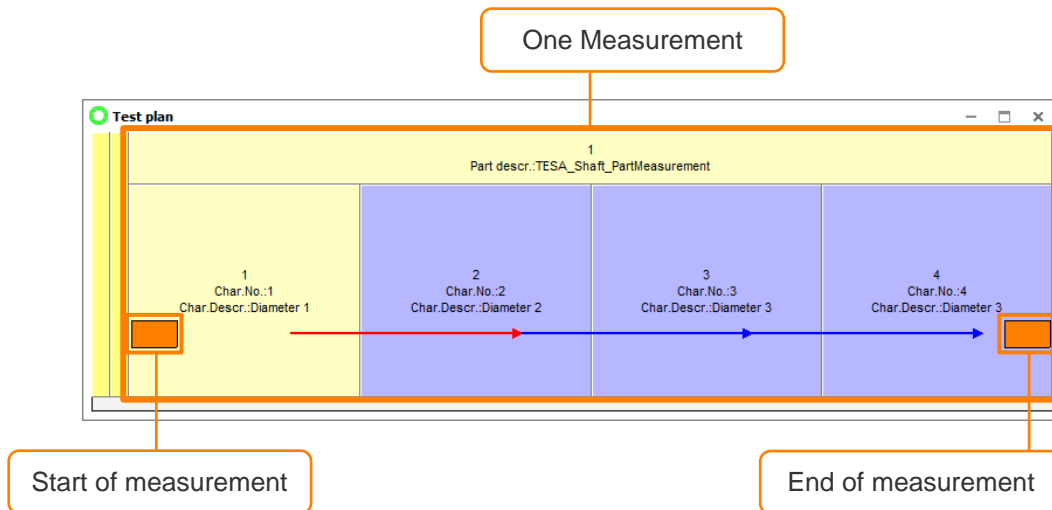
Part measurement

In a part measurement, all characteristics of a test object are combined to one measurement.

In this example, the test object "TESA_Shaft" is configured so that the four diameter characteristics (Diameter 1 to 4) are treated as one measurement.

As can be seen from the test plan, the start and end of measurement include all characteristics of a test object.
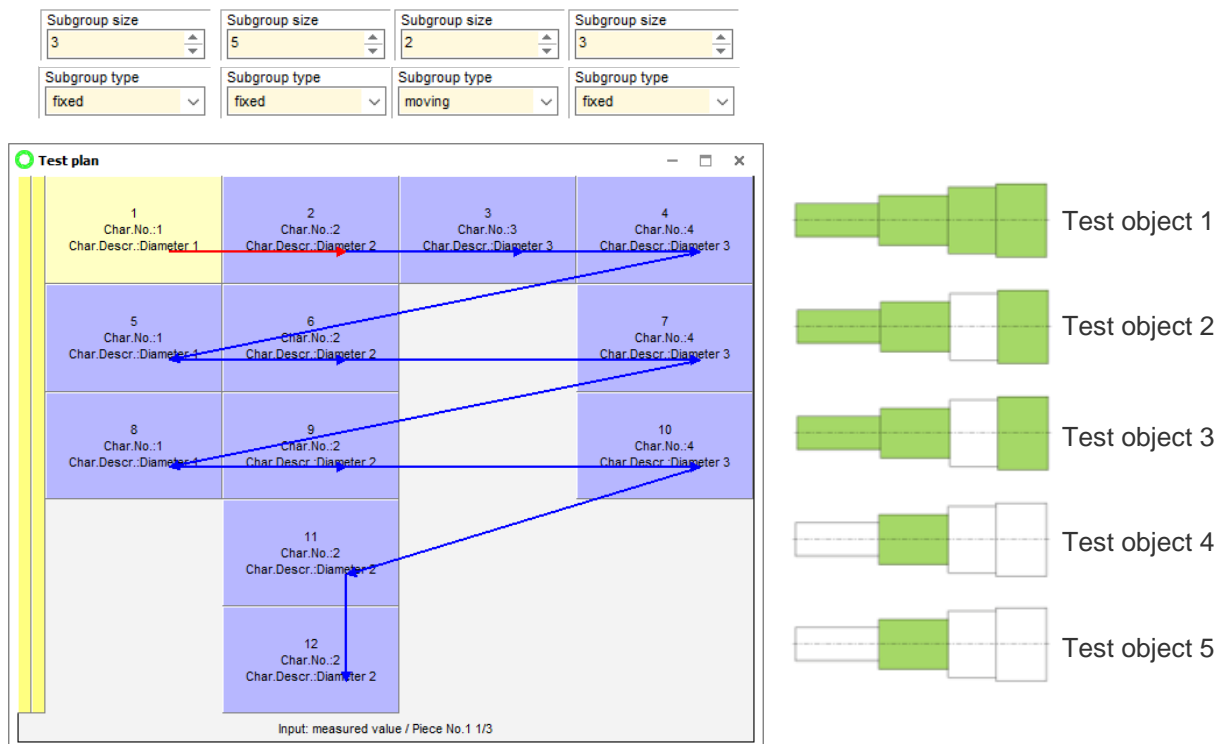
6 Definition of the terms „Subgroup size and subgroup type"

The specification of the subgroup size and type indicates how often a characteristic is to be measured within a measurement procedure and thus also influences the number of test objects.

The configuration of the subgroup size and the subgroup type is done per characteristic in the characteristics mask. The configured subgroup sizes and subgroup types for all characteristics of the data set are summarised and recognisable as subgroup in the "Test plan" graphic.

This Measurement procedure indicates that five test objects are to be measured. The characteristics marked in green represent the characteristics to be measured per test object.

Software documentation

7 Definition of the term „Subgroup"

A subgroup is the summary of several measurements based on the specified subgroup size and the defined subgroup type.

The start and end of a subgroup are shown in the test plan with a blue bar.
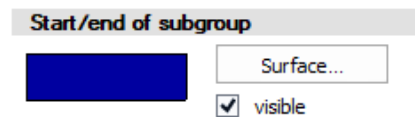
The term "subgroup" refers to the measured values of the characteristics that are grouped together within a measurement definition. Therefore, the start and end of a subgroup depends on the measurement definition.
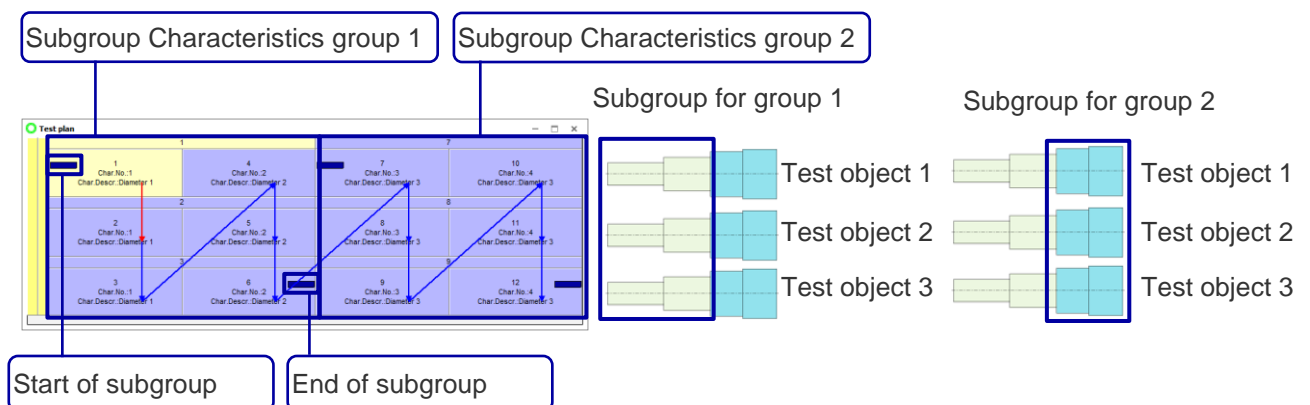
Subgroup for measurement definition Single measurement

In a single measurement, a subgroup is the summary of a characteristic of several test objects.
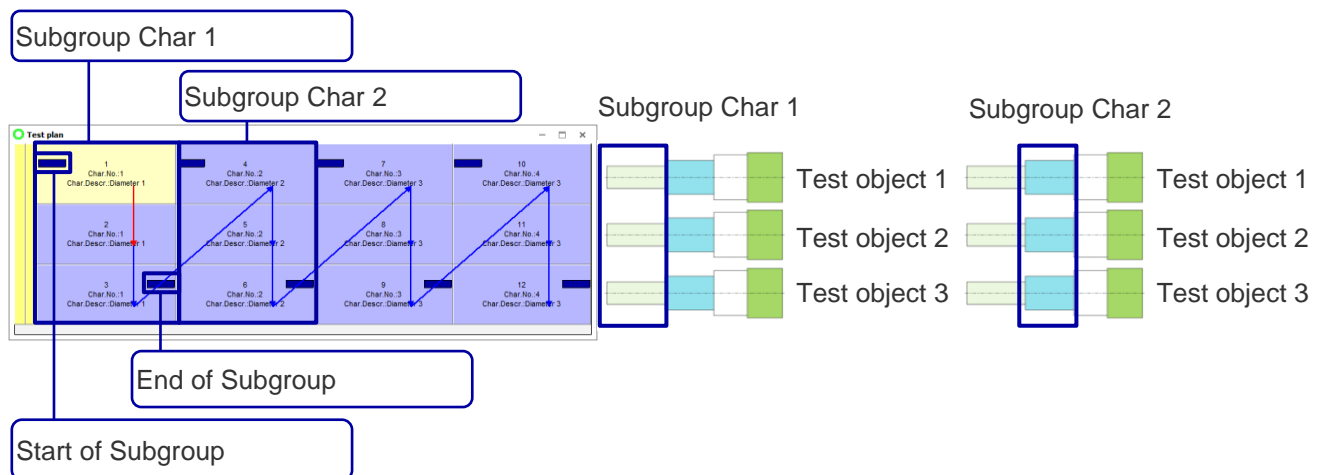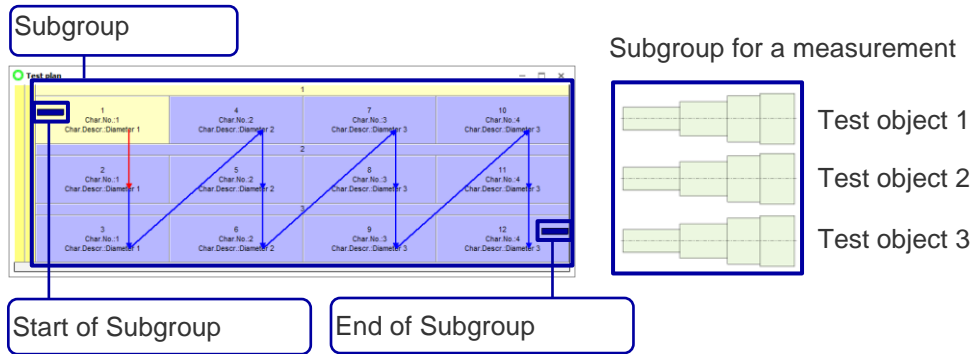

Subgroup for measurement definition group measurement

In a group measurement, a subgroup is the summary of the group-related characteristics of several test objects.

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Subgroup for measurement definition part measurement

In a part measurement, a subgroup is the summary of all characteristics of several test objects.

8 Definition of the term „Subgroup inspection"

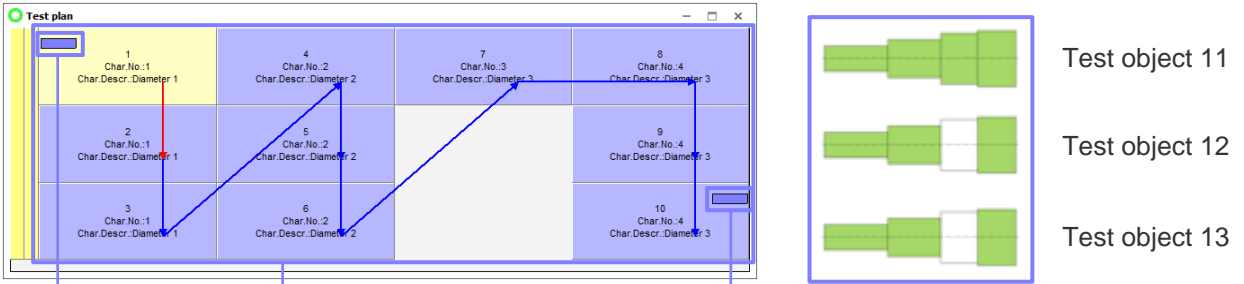A subgroup inspection is the grouping of subgroups into a unit.

The start and end of a subgroup inspection are shown in the test plan with a light blue (blue-magenta) bar.

This measurement procedure indicates that three test objects are to be measured. The characteristics marked in green represent the characteristics to be measured per test object.

9 Definition of the term "Subgroup incidence"

The subgroup incidence indicates the frequency of a subgroup inspection in a measurement procedure. For example, the subgroup incidence is used to record more measurements for important characteristics and fewer measurements for unimportant characteristics.

The configuration of the subgroup incidence is done per characteristic in the characteristics mask. This is the elementary specification for the creation of a subgroup cycle.

10 Definition of the term "Subgroup cycle"

A subgroup cycle is the combination of all subgroup inspections into one unit. According to the specifications of process monitoring and process control, the subgroup cycle contains all measurements including the frequencies to be measured in one unit. A subgroup cycle contains the entire measurement procedure. This means all characteristics to be measured including the frequencies defined in subgroups and subgroup inspections.

The start and end of a subgroup cycle are shown in the test plan with a pink bar.

In a test plan, the beginning of a subgroup cycle corresponds to the first characteristic to be measured and the end to the last characteristic to be measured.
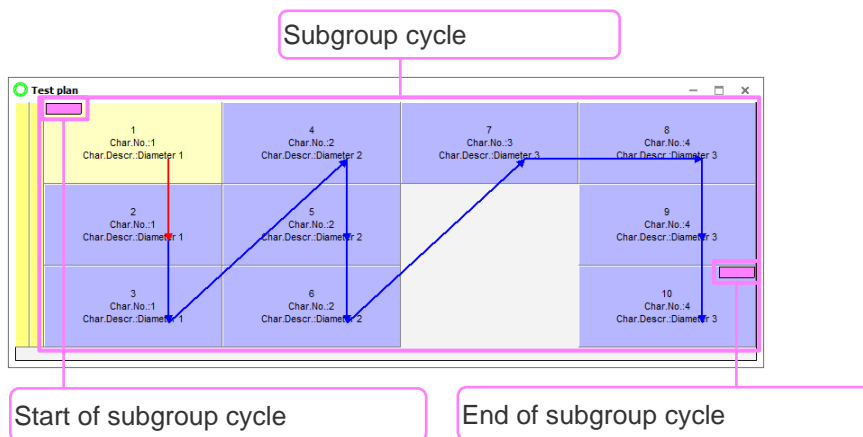
10.1 Influence of the subgroup frequency on the subgroup cycle

If different subgroup incidences are defined for the characteristics in a measurement procedure, a corresponding number of subgroup inspections are created in a subgroup cycle. The number of subgroup inspections in a subgroup cycle is equal to the least common divisor of all subgroup incidences.

In the following example, the subgroup incidences "1" and "2" are used.

This measurement procedure indicates that six test objects are to be measured. Only characteristic 4 is always measured. All other characteristics only in every second subgroup inspection. The characteristics to be measured are marked in green.
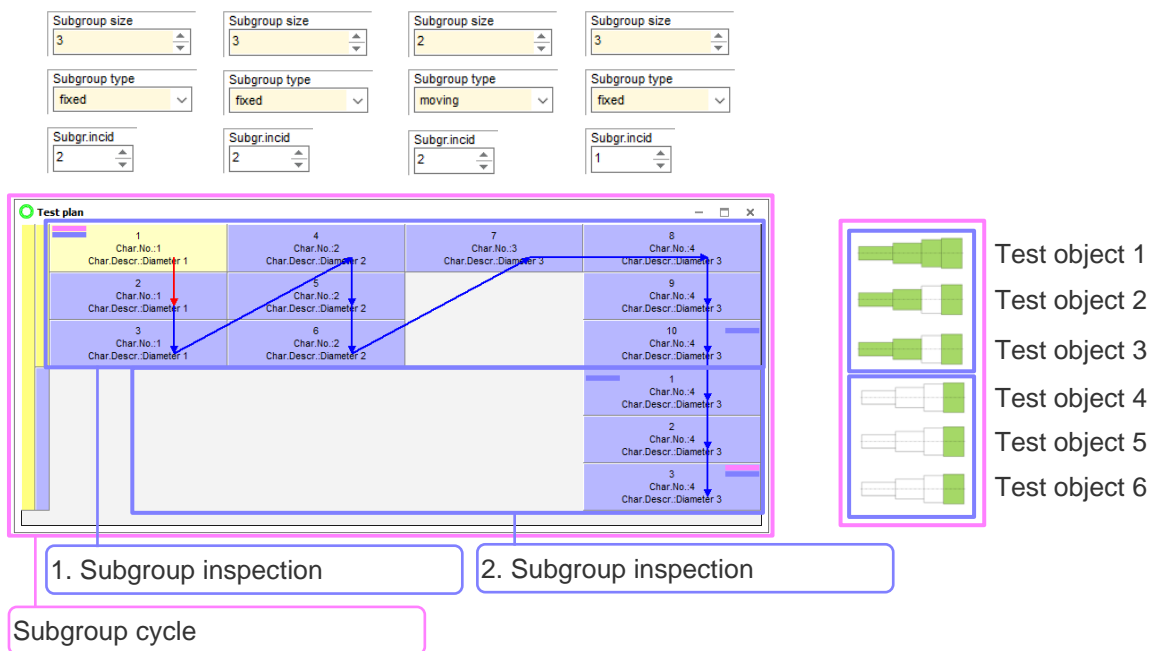
The use of subgroup incidences can also lead to an "overload" in the test plan.

Depending on the metrological or organisational context, it may well make sense to display the entire measurement procedure in the test plan.
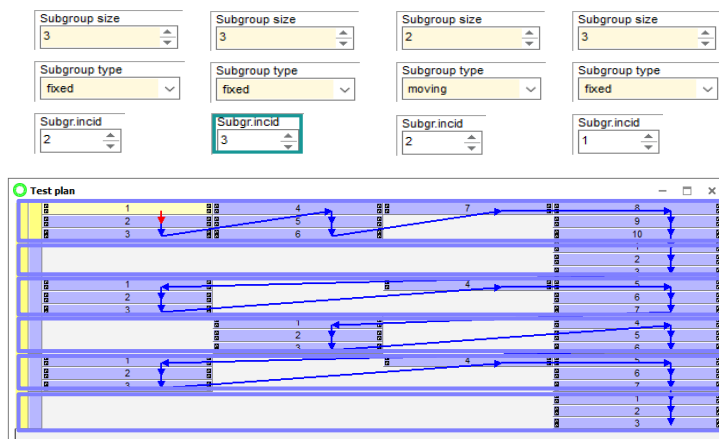
11 Definition of the term "Inspection lot"

An inspection lot is the summary of several subgroups into one unit based on the specified batch size. By specifying an individual lot size, the inspection lot makes it possible to minimise alarm outputs as well as prompts for additional data input.

The inspection lot can be used for fixed subgroups. In this case, the defined batch size (K-2160) is divisible by the subgroup size to an integer.

The start and end of an inspection lot are shown in the test plan with a black bar.
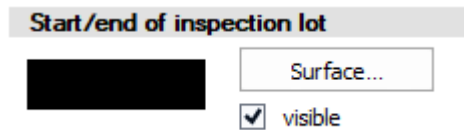
For example, if a batch size of "9" is specified for a data set with fixed three subgroups, an inspection lot consists of three measurement procedures.

The first test object in the first measurement run is marked as the start of the inspection lot. The ninth test object in the third measurement run is defined as the end of the inspection lot. In this way, for example, the additional data can be recorded at the start of the inspection lot and the alarms can only be output after all nine test objects have been recorded.
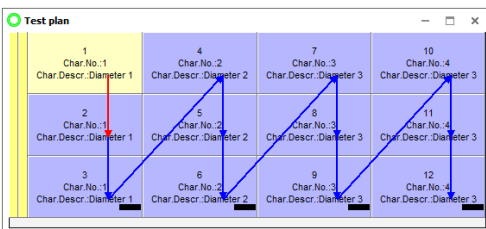
First measurement procedure
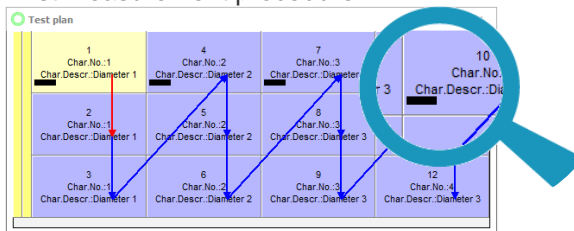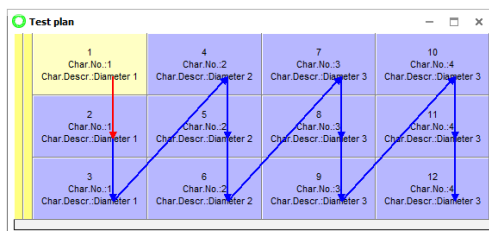
Second measurement procedure

Third measurement procedure

With the fourth measurement run, the next inspection lot begins.
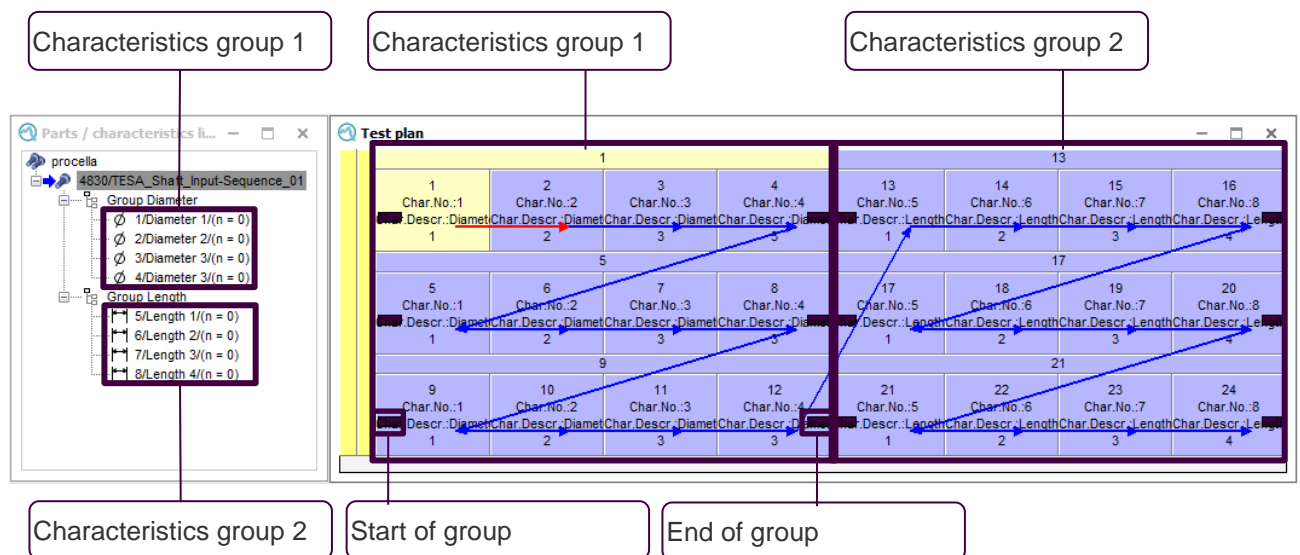
12 Definition of the term "Group"

While in a group measurement several characteristics of a test object are combined to form a recording group, in the graphic test plan the term "group" is used to represent the organisational structure of a data set. Starting from the part level, the individual hierarchical levels of a data set are listed in groups. In the test plan, the groups are only displayed for the individually grouped characteristics. When characteristics are recorded together via an RS232 Interface, they form a virtual recording group. Data recording groups that are virtually combined for data recording do not count as a group.

The start and end of a group are shown in the test plan with a purple bar.