

FISCHER DataCenter

Software for Evaluating and Archiving Measurement Data

FISCHER DataCenter IP

Inspection plan Software for Quality Assurance



**Fischer
Data
Center**

YOUR COMPANY
Your Street 22
10585 Your City

YOUR COMPANY

Inspection Report "HYBRID Car"

Operator: John Doe
 Model: HYBRID 100kW
 Color: Silvergray
 Serial No: 007

Number of measured cars: 1 HYBRID Car(s)
 Number of characteristics: 8 Measuring parts
 Date of Measurements: 24.02.2011

MEASURING REPORT (in μm) CAR No.: 7

	Left Door Front	Left Door Rear	Right Door Front	Right Door Rear	Hood	Rear	Trunk Above	Trunk Tail
Reading 1	40.3	36.9	42.0	34.9	28.7	41.1	46.8	51.7
Reading 2	37.7	41.1	46.0	46.0	27.8	36.0	36.0	42.2
Reading 3	46.1	46.4	46.0	46.0	35.1	42.0	47.7	42.0
Reading 4					27.1	40.8		43.2
Reading 5					28.8			
Mean Value	38.26	41.31	44.57	46.78	28.26	41.09	41.26	47.1
Std. Deviation	1.44	4.96	1.79	3.84	2.35	1.89	3.54	5.1
C. of Variation	3.7	12.0	4.0	14.3	8.0	2.7	12.4	9.36
Confidence I.	3.9	12.3	4.4	14.4	2.9	1.7	13.7	6.1
X min.	40.3	46.4	46.0	46.0	35.1	42.0	46.8	51.7
X max.	37.7	36.9	42.0	34.9	27.1	36.0	36.0	42.2
Range	2.62	9.51	3.33	11.07	5.92	2.63	11.06	9.9
Upper SL	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Lower SL	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
NOT PASS SL	-	-	-	-	-	-	-	-
NOT PASS UL	-	-	-	-	-	-	-	-
Measuring Date	24.02.2011	24.02.2011	24.02.2011	24.02.2011	24.02.2011	24.02.2011	24.02.2011	24.02.2011
Measuring Time	09:50	09:50	09:50	09:51	09:51	09:51	09:52	09:52

Overall Results: in μm
 Mean Value: 40.03 Standard Deviation: 6.53 CV: 16.0 Xmax: 51.7 Xmin: 27.1
 Range: 24.6 No. of Cars: 1
 Date: 13.04.2011 Time: 08:09 Name Inspection Plan: HYBRID Car Total Number of Readings: 28

FILE: HYBRID Car Page: 1

"I'd say it all had to do with reducing variation"

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W. E. Deming

FISCHER DataCenter Software – Versions

The FISCHER DataCenter Software significantly expands the functionality of the FISCHER measuring instruments. Quickly and easily, measurement data can be transferred to the PC and inspection reports can be created and printed. In addition to the various evaluation options, the Factory Diagnosis Diagram

(FDD) provides a user-friendly tool for process monitoring. With the version DataCenter IP (Inspection Plan), inspection plans can be created on a PC and transferred to our "smart" instruments FMP100 and FMP150.



FISCHER DataCenter

The basic version FISCHER DataCenter is included in delivery of all Fischer instruments with USB and RS232 ports. The basic version comprises all functions for convenient transfer, evaluation and printing of measurement data.

FISCHER DataCenter IP and IP-Multi

The FISCHER DataCenter IP and IP-Multi Software is available for the coating thickness measuring instruments DUALSCOPE® FMP100 and FMP150. In addition to the functions of the DataCenter, this software can be used to implement company-internal inspection regulations in inspection plans. The inspection plans are generated on the PC and loaded onto one (IP) or any number (IP-Multi) of instruments. Step-by-step on-screen guidance leads the operator through the measurement acquisition procedure. The DataCenter IP and IP-Multi, turn the FMP100 and FMP150 into data terminals.



All DataCenter versions include a powerful tool for quality control – the Factory Diagnosis Diagram (FDD) developed and patented by Fischer. The FDD presents visual processing of measurement data or of characteristic data derived from measurement groups (e.g., mean values) in a manner not known until now.

The FDD enables in the form of so-called rank lines, monitoring and optimization of production processes in the simplest way. The tool enables even users not familiar with the fundamentals of statistical quality management to recognize interference factors and avoidable causes of process variations quickly and to eliminate them if need be. In addition, it is possible to notice at one glance, whether the observed production process meets potential tolerance specifications or not.

Graphical result presentation

FDD answers the following questions using graphical means (see Fig. 1):

- What is the overall distribution of the mean values of measurement data (e.g., coating thickness values)?
- How large is the variation of individual readings around their respective mean value (variation bar, vertical red line)?
- Are there significant (i.e., more than just random) differences between mean values?
- What is the location of the mean values and variation bars relative to a specified tolerance?

Objective: **Everything at a glance.**

The information contents of the FDD®

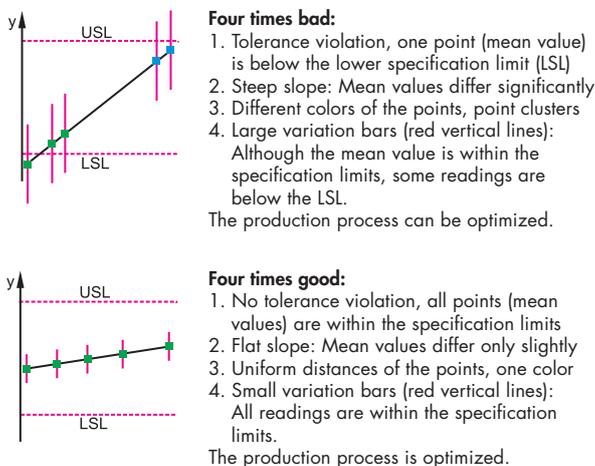


Fig. 1: Simplified presentation of the FDD

Example: Coating of sheet metal

A sheet metal coating production process shall be examined. The same coating thickness is required across the entire sheet metal surface area. The sheet is divided into 20 measurement zones (blocks). Several coating thickness measurements are performed for each measurement zone and the mean value and variation are computed from the measurement data. The mean values are sorted in the FDD in ascending order (ranking) and projected onto a straight line in the graph according to their size (see Fig. 2).

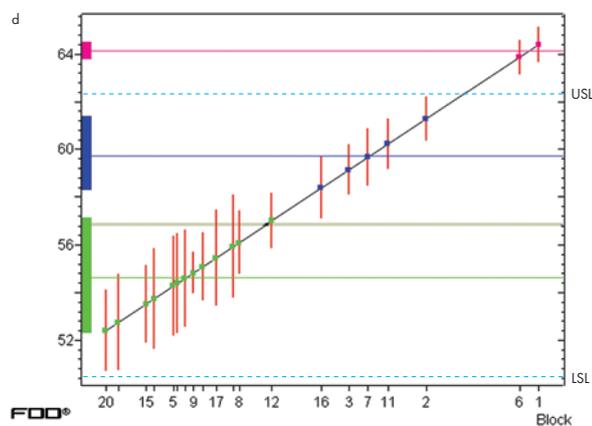


Fig. 2: Ranking Graph for a quick total overview

The measurement zones identified by points of the same color do not contain systematic differences of the coating thickness. Systematic difference between the coating thicknesses of the measurement zones (point clusters) exist if the FDD shows points of different colors. This indicates the need for process improvement measures. In Fig. 2, one can recognize points with three different colors; the red points of blocks 1 and 6 are even above the upper limit value. To optimize this production process, initially the coating thickness in the measurement zones 1 and 6 must be reduced.

The Deming Circle

As a pioneer in the field of quality management, the American physicist and statistician W. E. Deming (1900–1993) described the Deming Circle named after him. A cycle in the Deming Circle consists of the phases *Plan – Do – Check – Act*. Almost all phases are supported by the FISCHER DataCenter. During testing and optimizing (*Do*) and in the trial phase (*Check*), statistical evaluation tools such as FDD provide a good service. The amount of accumulating data in the actual process are not only stored by the DataCenter but also condensed in a meaningful manner and presented graphically using the FDD.

Bibliography:

Dengel, D.; Fischer, H.; Vollmar, H.-P.:
The Factory Diagnosis Diagram FDD® – an efficient tool for quality control; HTM Zeitschrift für Werkstoffe · Wärmebehandlung · Fertigung [HTM Magazine for materials – heat treatment – manufacturing]

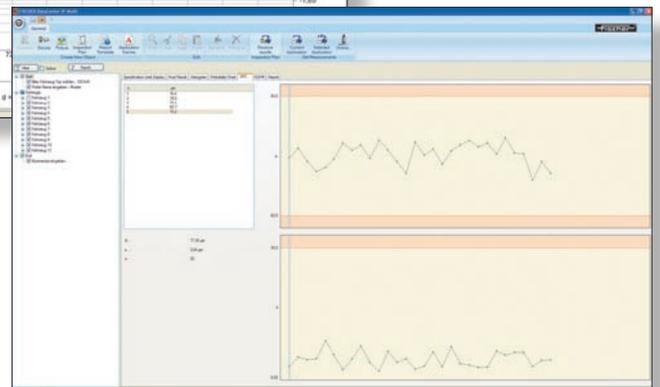
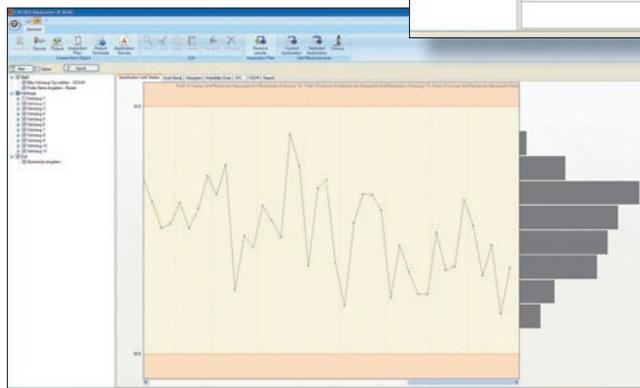
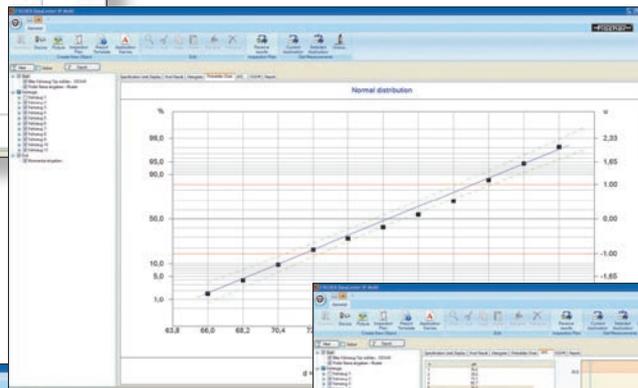
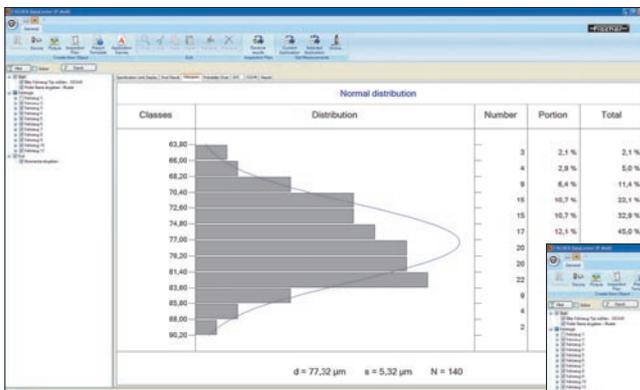


Transferring measurement data

The measurement data of many FISCHER instruments can be transferred easily and quickly to the FISCHER DataCenter using USB or RS232 ports. This eliminates working with pen and paper.

Evaluating measurement data

Until now, it was very time-consuming to prepare measurement results for the purpose of reliably deriving from them significant findings for process management. The FISCHER DataCenter Software provides possibilities for immediate evaluation of the measurement results and thus a quick overview of the process. The software displays a histogram, sum frequency chart, the statistical process control chart and the FDD developed and patented by FISCHER with only one click. With the DataCenter IP or IP-Multi, the measurement results and evaluations are linked to attributes such as measurement location, name of operator, date and time.

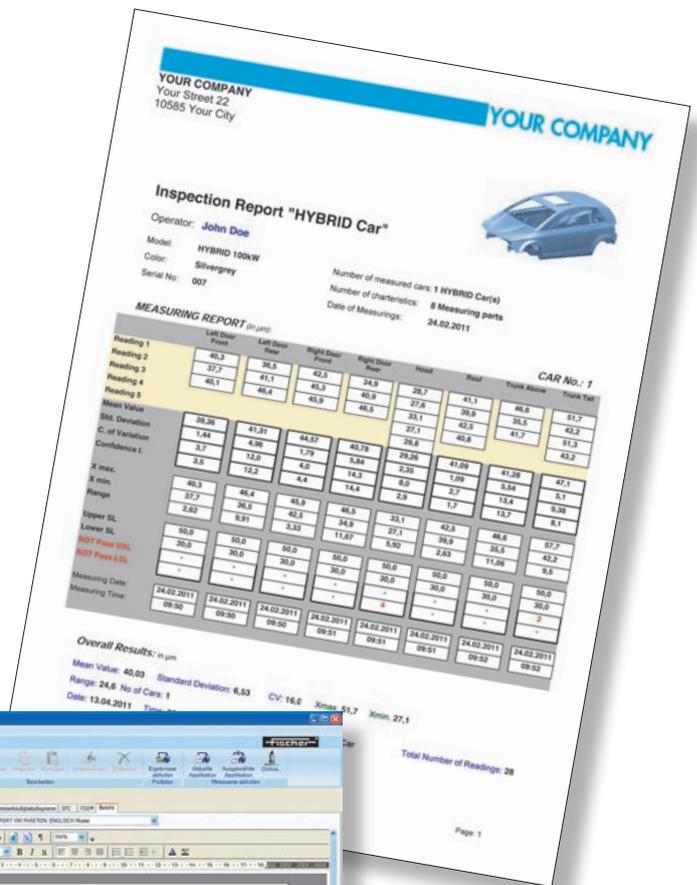


Clear presentation of the measurement results

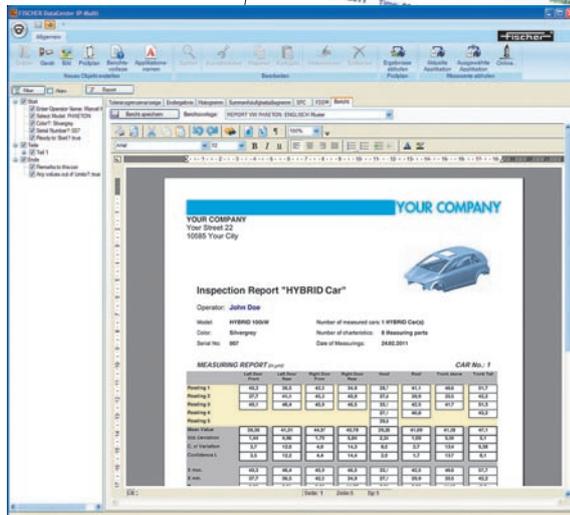
Generating inspection reports

A report that includes the results, statistical evaluations and graphs according to one's own specifications can be generated immediately with a click of the mouse following the transfer of the measurement data. The inspection reports are generated automatically based on custom-created report templates. Report templates are created only once and can be used as often as desired. This ensures the consistency of the inspection reports.

The DataCenter offers a powerful text editor for creating report templates. Among many other things, text editor includes placeholders for measurement data, characteristic statistical parameters and graphical evaluations. Using drag and drop, the placeholders can be placed at the desired location in the document. In addition, one's own graphics, such as logos or images of specimens can be integrated. It is also possible to create report templates based on scanned forms.



Inspection report



Text editor for report templates

Archiving measurement data and inspection reports

You can create any number of folders in a user-defined folder structure, where measurement data and inspection reports can be archived. A search function facilitates quick finding of the stored inspection reports.

Printing inspection reports

For quality assurance purposes, the generated inspection reports can be printed and enclosed with the inspected goods.

FISCHER DataCenter IP – Measurement Strategy and Inspection Plan

The FISCHER DataCenter IP and IP-Multi Software is available for the coating thickness measuring instruments DUALSCOPE® FMP100 and DUALSCOPE® FMP150. The software can be used to implement inspection strategies in inspection plans. The inspection plans are generated on the PC and loaded onto one instrument with the IP version or onto any number of instruments with the IP-Multi version. Step-by-step on-screen guidance leads the operator through the measurement acquisition procedure.

The measurement strategy

Making measurements is a central step in quality control and product development. It is essential to determine the desired understanding one expects to gain from the acquired measurement data and the measurement results derived from the data prior to making measurements. In a measurement strategy, one specifies how and what shall be measured, to obtain findings about a running process for its optimization. Thus, developing a measurement strategy with the associated data acquisition plan is crucial for the information content of the measurement results and the effectiveness of the measures derived from them.

The inspection plan

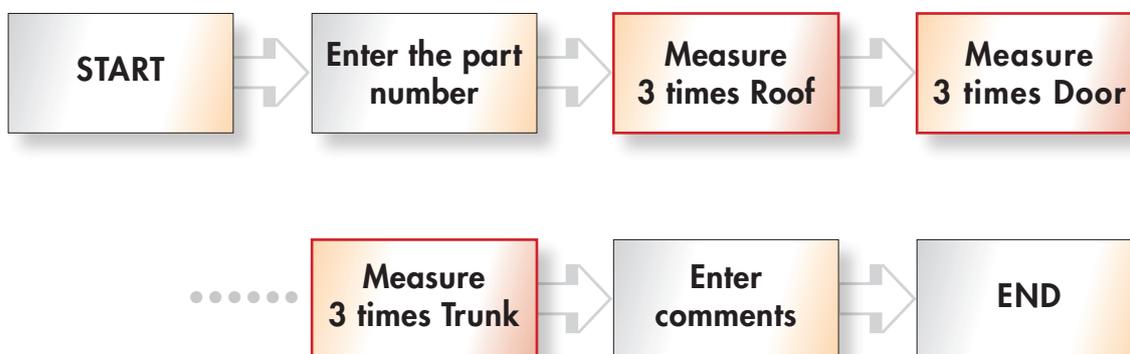
On the basis of the specified measurement strategy, an inspection plan is created on the PC using the software FISCHER DataCenter IP or IP-Multi and then transferred to the coating thickness measuring instrument. Step-by-

For example, if sheet material of a coating plant is to be coated as uniformly as possible, then it will be prudent to divide the material into a grid of measurement points along and across the production direction. Conclusions about the time stability of the process and the adjustments of the system can then be drawn. Dividing the specimen into a grid of measurement points creates a multiplicity to which a measurement strategy is adapted. A measurement sequence, the inspection plan, is specified on the basis of this measurement strategy.

The FISCHER DataCenter IP and IP-Multi Software in connection with the coating thickness measuring instrument DUALSCOPE FMP100 and FMP150 is a flexible tool for developing one's own measurement strategies. The user performing the measurements is guided with graphical support through the measuring application.

The coating thickness measuring instruments have a very high storage capacity. In addition, the measurement data can be exported to a PC at any time. This allows for the documentation of production processes across very long periods and to examine very large objects, e.g., ships.

step on-screen guidance on the instrument leads the operator through the measurement acquisition procedure.



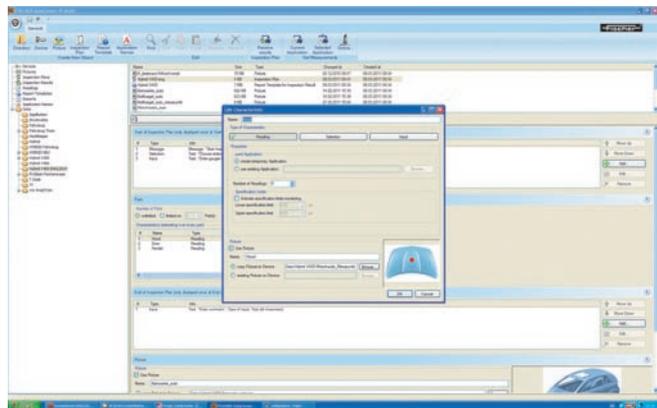
Example of an inspection plan on a coating thickness measuring instrument DUALSCOPE® FMP100 or FMP150



Easy creation of an inspection plan on a PC

Little training is required for the creation of the inspection plan. The user interface of the DataCenter is modern and corresponds to the Windows standard.

The individual elements of an inspection plan are already pre-defined in the DataCenter and only need to be adapted to one's own requirements.



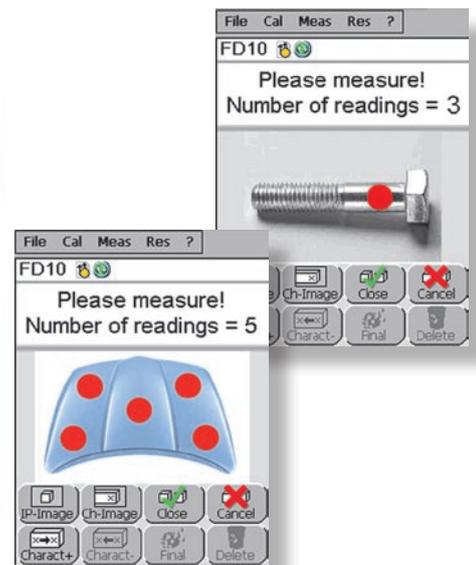
Dialog for creating an inspection plan

Properties of an inspection plan on the instrument

Through the information on the display, the operator is guided intuitively through a sequence of measurements. For example, images show the operator the exact position of the measurement location. Entry boxes prompt the user to enter, for example, the serial number of the current part. In pre-defined selection fields, the operator has to select, for example, a specific production line. Using informative notes, the operator may point to specifics or specifications.

Step-by-step guidance through each measurement minimizes the "human error factor" and thus improves the quality and credibility of the measurement results.

All measurement results are linked to information (attributes) such as measurement location, operator, date and time, which significantly simplifies the evaluation of the measurement results later.



Special evaluations

Special evaluations can be created using selection and filter functions. For example, if in an automotive paint plant only the paint coating thickness of all hoods of a specific car model shall be examined, it is easy to exclude all other measurement data. Only the measurement data of the hood of this car model are then taken into account in all graphs and in the inspection report.

Product	Order no.
FISCHER DataCenter	604-575
FISCHER DataCenter IP (Inspection plan for one instrument FMP100/150)	604-576
FISCHER DataCenter IP-Multi (Inspection plan for any number of FMP100/150 instruments)	604-577

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