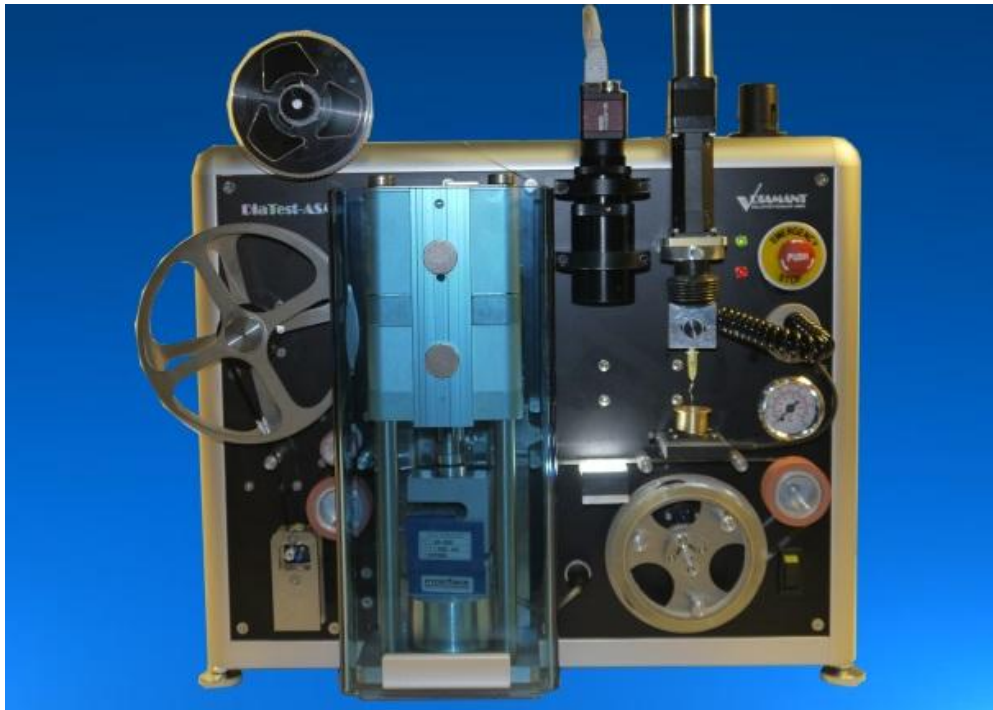


DiaTest-ASM



Operating manual

Version 2.2.3

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1. Application of the device

DiaTest-ASM is an an automatic single particle strength testing machine. It combines uniaxial fracture test of separated particles and optical size and shape analysis of the particles. The separation and handling of the single particles is done automatically.

The machine can be used for the testing of superabrasive powders like diamond as well as for conventional abrasives, compounds and other brittle particles.

2. Operating concept

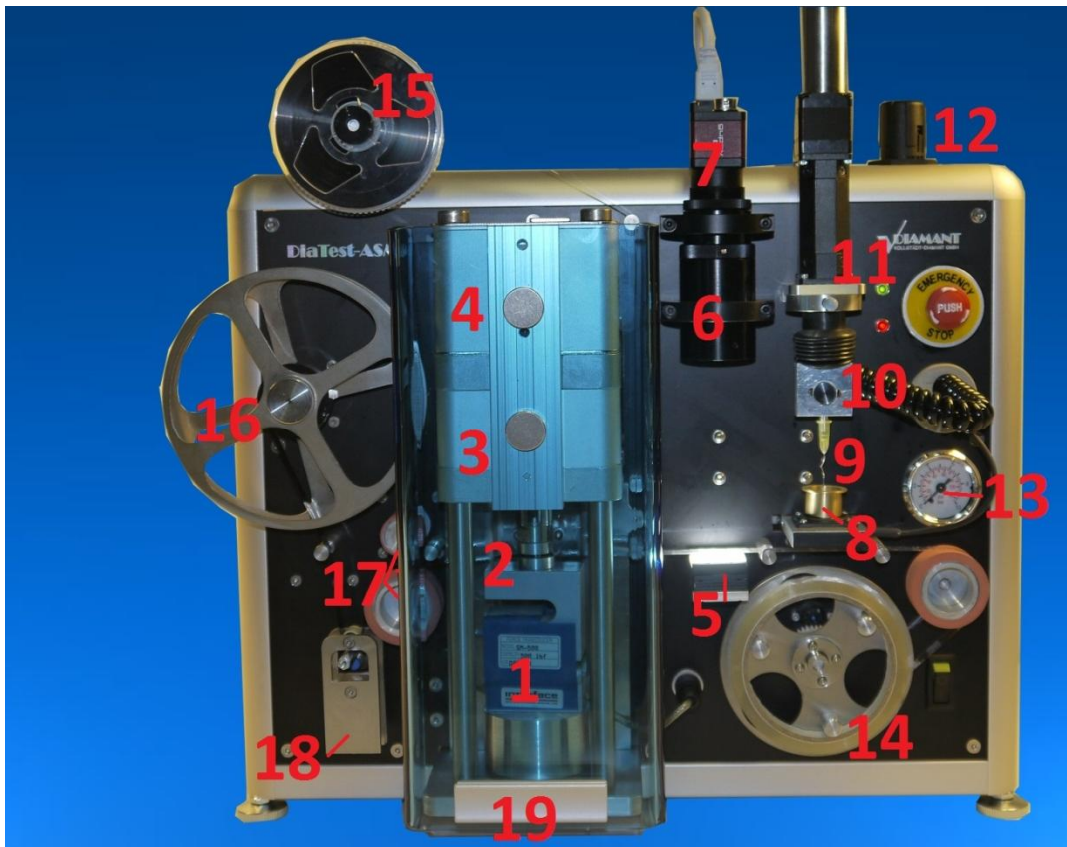
The operation of DiaTest-ASM is optimised for an easy to handle, automated measuring process. Machine parameters and data management are based on standard operating procedures, which can be specified for every kind of particles. The software forces the operator to maintain a strict classification system of the samples according to “products” and “batches” of the product. All batches belonging to a product will be measured under the same conditions, and their results will be placed into product specific files and folders. The folder structure on the hard disc is created automatically by the program. This makes it easy to compare batches from a product.

The hardware allows for the automatic processing of a batch containing several hundred particles.

The consumables of the machine are as inexpensive as possible and easy to replace.

The storage and the presentation of the data is flexible: the machine setter can define which parameters should appear on the main panel and in the reports and from which parameters the program should save the distribution in the product file. The result files are written in EXCEL (.XLS) format.

2.1. Hardware



Picture 1: DiaTest-ASM components

The main components of DiaTest-ASM are shown in picture 1.

1. force sensor
2. anvil holders with PCD anvil inserts
3. pneumatic short stroke cylinder
4. distance sensor (behind the housing)
5. high brightness LED lighting
6. telecentric lens
7. industrial megapixel digital colour camera
8. removable sample container on vibration unit and sample slider
9. hollow needle (picking needle)
10. airflow flow sensor with vacuum connection
11. picking needle linear drive
12. pressure regulator
13. pressure indicator

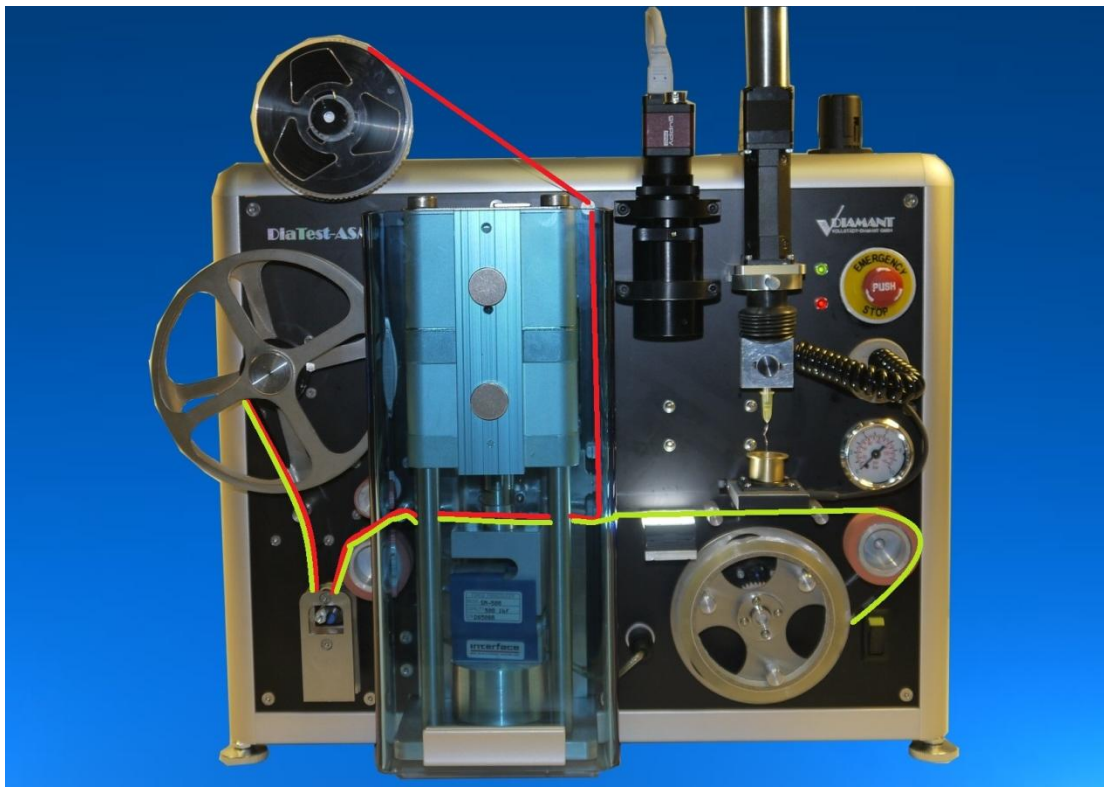
14. coil of carrier tape (glue tape)
15. coil of cover tape (VHS tape)
16. take-up reel on rotary drive
17. tape drive with driven roller on rotary drive and counter roller
18. weight and collection coil sensor
19. safety door

2.1.1. Particle handling unit: tapes

Inside DiaTest-ASM the particles are moved on a carrier tape (14), which is conventional glue tape. The sticky side carries the particles. The tape moves through the machine from right to left.

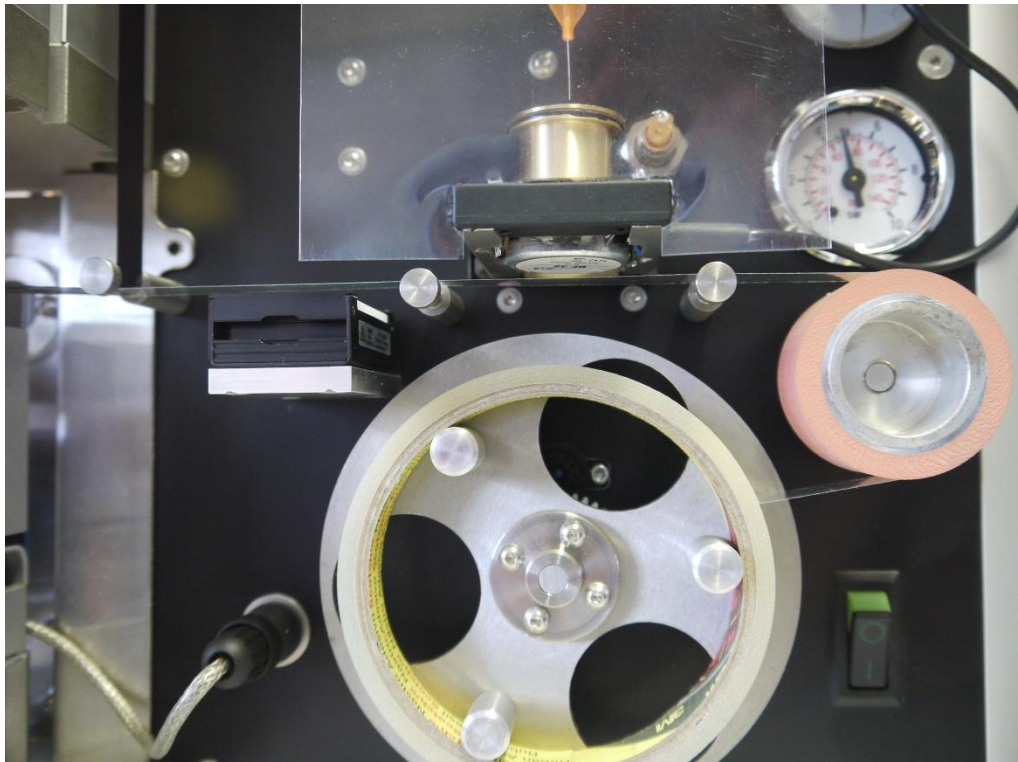
A cover tape (15) covers the sticky surface of the carrier tape on the way between microscope and crushing unit.

The tape drive (17) pulls carrier tape and cover tape through the machine. The weight (18) removes the tape from the drive rollers and acts as a sensor for the collection coil drive (16).

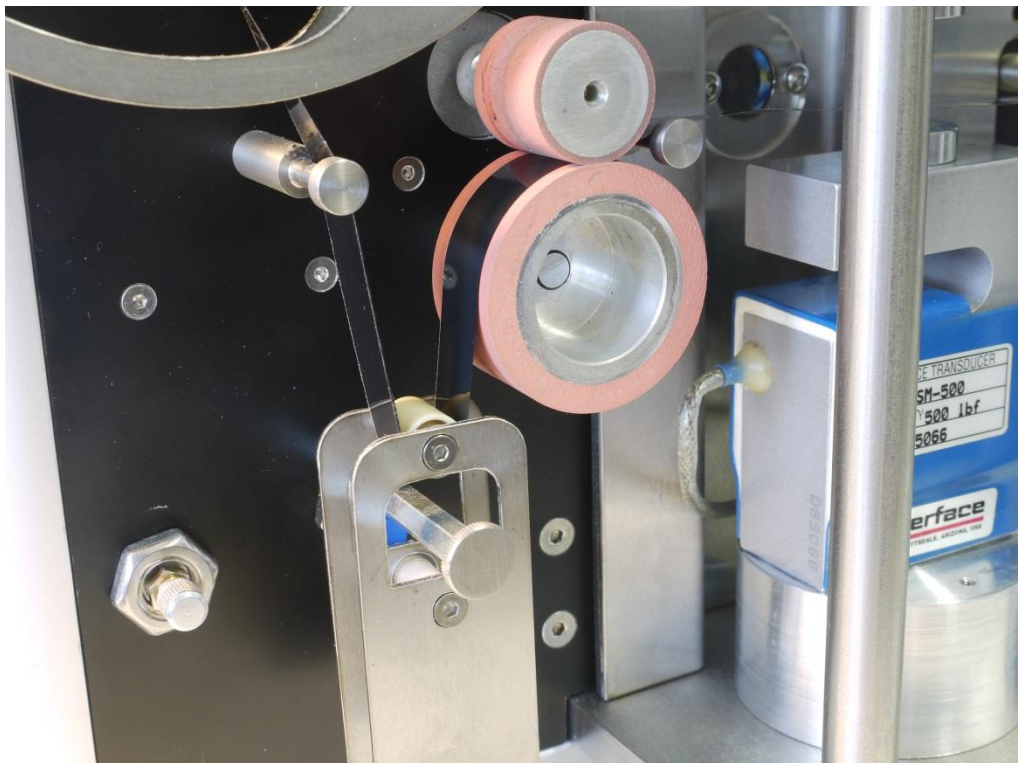


Picture 2: path of carrier tape (green) and cover tape (red)

The proper path of the tapes is shown in picture 2. Please observe the relative position of the tapes to the support rods as shown in picture 3 and 4.



Picture 3: path of the carrier tape, connection with the cover tape on the left side



Picture 4: path of the tapes after the crushing unit, nozzle for the air brush at the lower left side

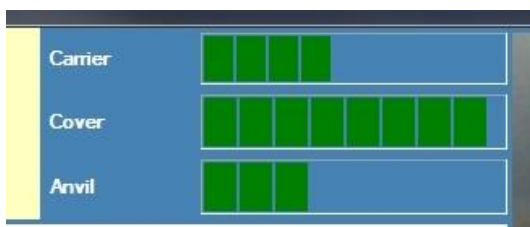
When loading the machine with fresh tape we recommend the following procedure:

- switch off the machine, this releases the pressure between the roller of the tape drive
- mount the coil of cover tape onto the axis, secure it with the clamping ring
- pull the cover tape through the machine as shown in picture 2
- fix the end of the cover tape on the take-up reel by means of a piece of scotch tape
- mount the coil of carrier tape on the holder and tear of approximately 25 cm
- place the carrier tape with the sticky side up around the rubber roller and into the gap of the support rods
- glue the end of the carrier tape onto the bottom of the cover tape
- pull the cover tape by pressing it onto the counter roller and turning the counter roller counter-clockwise, while pulling make sure the tapes settle properly in the gaps of the support rods
- operate the take-up reel manually and make sure the tapes are passing through the weight properly
- switch on the machine, the lower roller of the tape drive will be pressed now against the upper roller

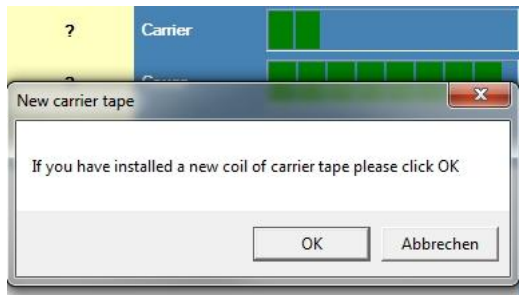
If only one type of tape must be replaced it is the easiest way to do this before the old coil is absolutely empty. Then you can cut off the old tape, exchange the coil and fix the new tape at the end of the old one.

When a new coil of tape was mounted please reset the tape counter in the program.

This is done by right-clicking the label “Carrier” or “Cover” and answering the following dialog with “OK”. See pictures 5 and 6.



Picture 5: consumables counter, a right click onto the label opens the dialog for resetting the counter

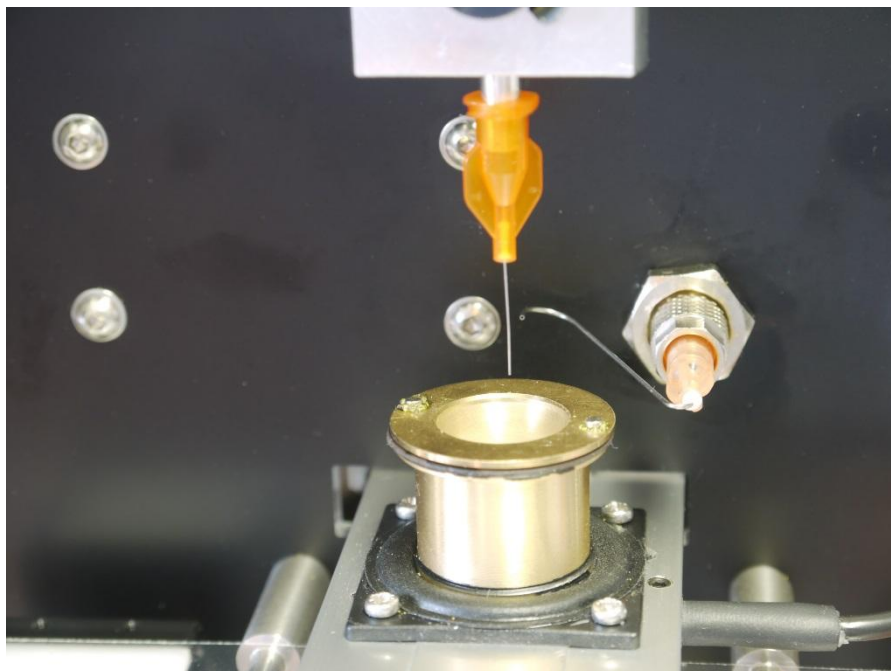


Picture 6: Dialog for resetting the carrier tape counter

The counters will be re-set to the predefined values for the specific type of tape (i.e. 66 m for the Scotch carrier tape and 348 m for the E-240 cover tape. The tape types can be changed in the program setup.

2.1.2. Particle handling unit: batch container and slider

The sample container (8) is made from brass and has a conical shape. It is fixed to the cylindrical container holder by two small magnets. The container holder is mounted onto a vibration unit, which is fixed on the sample slider. Except of cleaning the batch container requires no service.



Picture 7: sample container on the vibration unit and the sample slider, above the picking needle, behind the airbrush needle

2.1.3. Particle handling unit: picking needle with drive and sensor

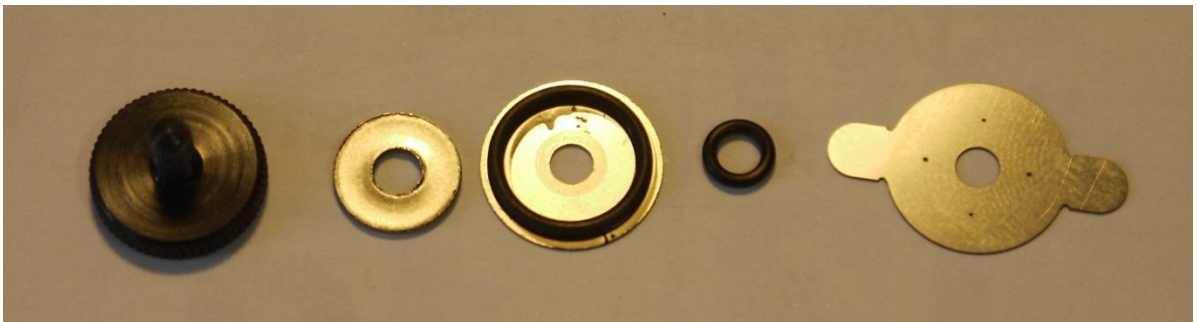
The picking needle is a hollow vacuum tube available in different diameters depending on the particle size.

It can be easily put on and off the holder. Just make sure it sits tightly on the holder in order to prevent vacuum leaks.

The needle must be clean! Otherwise particles will stick on the needle even without vacuum!

Please don't touch the needle tube with fingers!

The airflow through the needle is measured by the program by means of the airflow sensor (10). This sensor contains an orifice, made of a stainless steel plate with 0.2 mm holes. In case debris of particles has clogged the holes, the steel plate can be accessed by removing the screw of the sensor unit. Please note the position of the plate and the O-rings below the screw. Please see picture 8 and 9.



Picture 8: dismounted pressure chamber of the airflow sensor; on the right the stainless steel sheet with 2 holes 0.2 mm (vertical) and 2 holes 0.3 mm (horizontal)



Picture 9: assembled pressure chamber; if mounted horizontally the 0.2 mm orifice is in function, if mounted vertically the orifice is 0.3 mm)

When putting the sensor back together use a thin film of silicone grease as sealing

between steel plate and sensor case, but be careful not to fill the tiny holes with grease.

The linear drive where the needle is mounted doesn't require maintenance.

Next to the picking needle a second needle (airbrush) is mounted with the outlet towards the tip of the picking needle. This needle blows an adjustable airflow onto the picking needle in order to remove particles which stick on the needle just by adhesion or electrostatic attraction force. The airflow through the airbrush is controlled by the nozzle on the lower left side of the front panel (see picture 4).

The airflow must be stronger when picking very small diamonds (0.15 mm) and much less strong when picking large particles.

2.2. Imaging unit

The imaging unit is made of a digital camera (7) equipped with a telecentric lens (6) and a diffuse LED lighting (5). This is a high-quality optical unit and should be handled with care. Don't touch the lens surface with fingers or other objects. Clean the lighting block with a soft brush.

The unit is calibrated and doesn't need any re-calibration or maintenance.

2.3. Crush unit

The force of the crush unit is generated by a pneumatic short-stroke cylinder (3) and is measured by means of an S-shaped force transducer (1).

The contact to the particles is made via PCD anvil inserts, which are fixed with magnets in aluminium anvil holders. The anvil holders are identical for mounting on the upside or downside, on the upside the holder is held in place by a magnet.

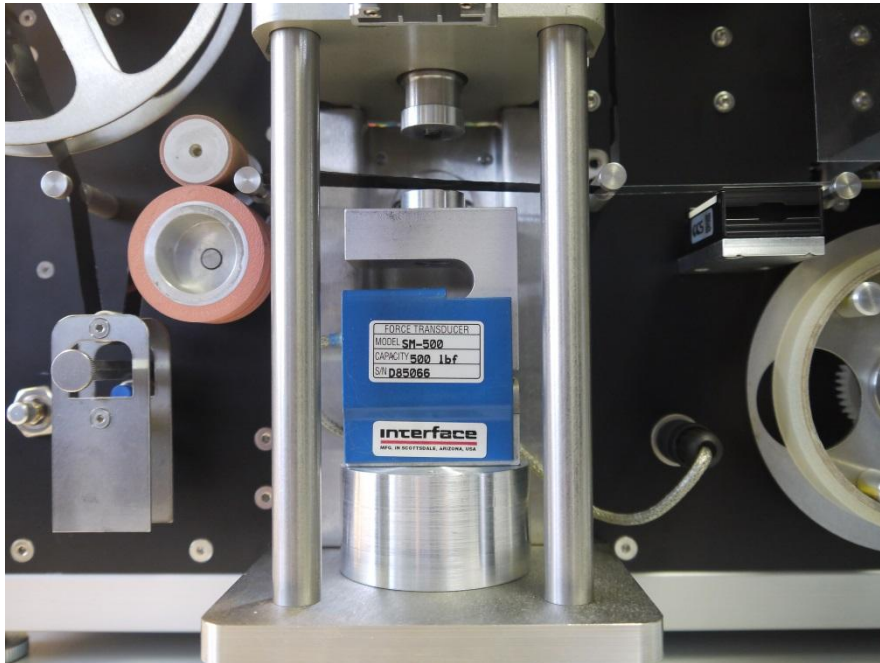
The anvil life depends on the material to be tested. For synthetic diamond a cumulative breaking force in between 100,000 N and 200,000 N can be expected.

The program features a breaking force counter, which can be re-set to the initial value after changing the anvil surface.

As the particles are not being placed exactly in the middle of the anvil there will be the chance to use an undamaged part of the anvil surface just by turning the anvil holder by a certain angle.

Please study the worn anvil surface under the microscope in order to find out the optimum turning angle for the anvils.

On top of the cylinder a displacement sensor is mounted, which provides data for the anvil displacement to the program. At the beginning of a batch test the program measures the reference distance between empty anvils. This allows for particle height measurement later on.



Picture 10: crush unit, force sensor plug with cable on the right side

The force sensor can be exchanged in the following way:

- switch off the machine
- unplug the force sensor
- lift the force sensor holder with the sensor by approx. 5 mm, then take it out
- place the other sensor onto the 3 positioning rods, lower it towards the base plate, plug in the cable, install the anvil holder with inserted PCD plate, close the door

The crush unit is shielded by a transparent vertical safety door. The crush force can only be applied when the door is closed. Please don't manipulate the safety door!.

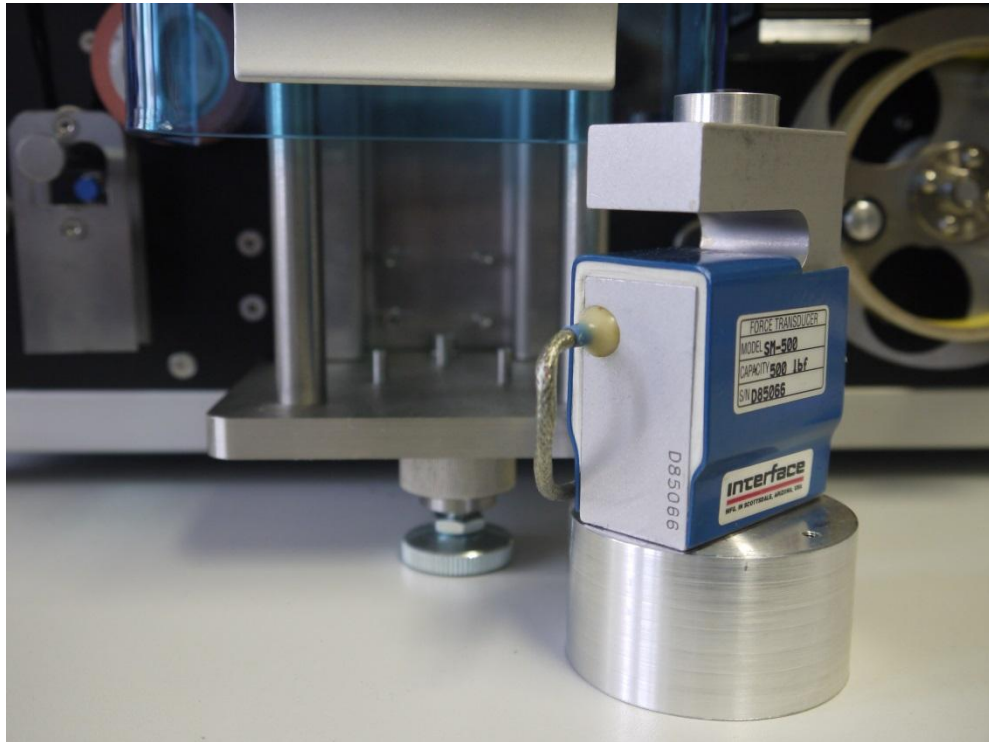
During the crush process splinters of material may fly out from the press!

A small colour camera observes the anvil area and makes it easy to watch the proper positioning of the particles.

We will provide a separate program for the calibration check of the force sensor.

The sensor can be placed outside the machine with the sensor cable plugged into

the machine front. The check program will operate the sensor like an electronic balance. A known weight can be measured by the sensor and the the measured weight will be displayed by the program. This ensures that the whole signal path from sensor via transducer and AD-converter is included in the check.



Picture 11: Force sensor placed outside the machine for checkup

3. Software

The concept of the operation is focused on the product which has to be tested. The software allows for automatic measurement of a particular product, the hardware and software settings will be adjusted according to the predefined specifications for the product. The operator selects the actual product from a list of predefined products and enters a batch description. The following measurement routine itself runs automatically.

The machine setter mode allows for the definition of new products, i.e. which force sensor (if there are 2), which picking needle, which maximum force, which particle analysis filter, which crush detection formula should be used for the product. Newly defined products are available immediately for the operator.

The system checks automatically if the correct setup of picking needle and force

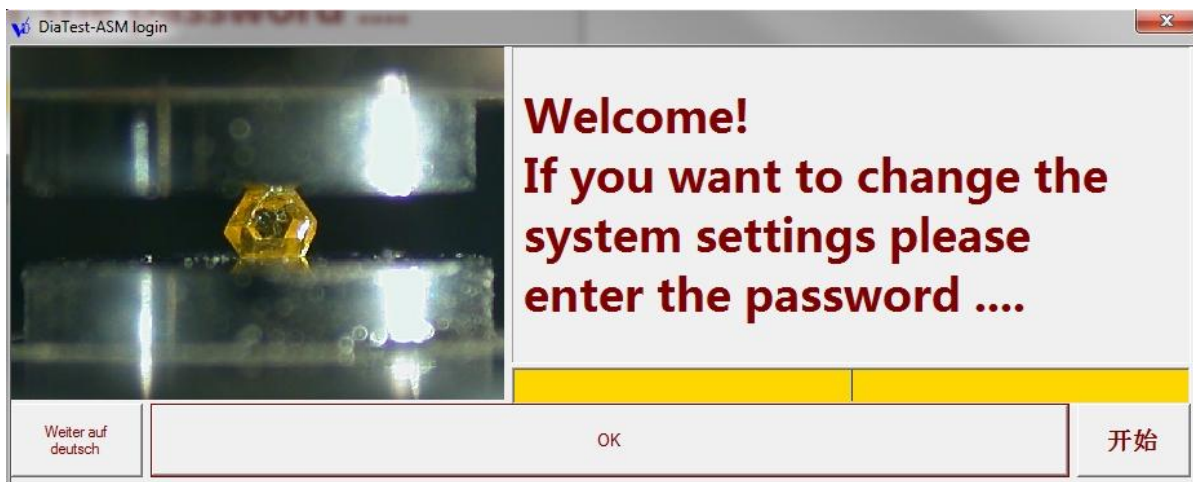
sensor is active.

The operator mode has not the right to establish or delete a product definition or to change the program setup. Only tests can be carried out.

3.1. Login panel

The action in the login panel determines the rights of the current session:

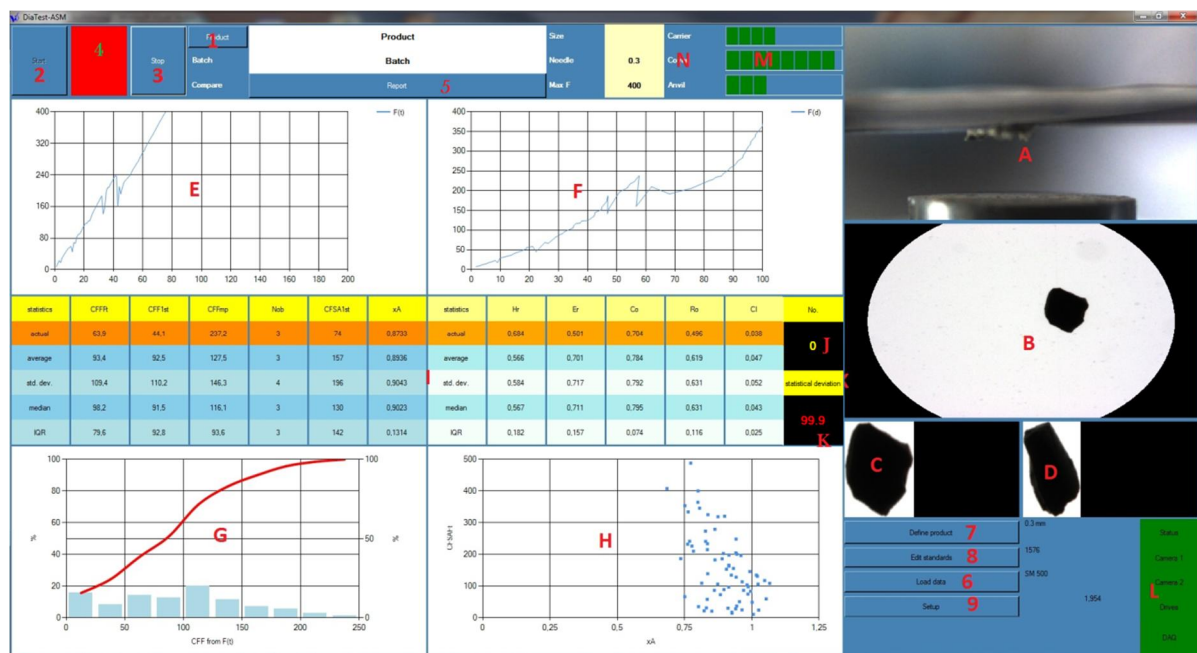
If the password is wrong or missing the session will be in operator mode. If the machine setter password is entered (currently just one character, "v", can be changed in the program setup) the machine setter mode becomes active. For remote service the specialist from Vollstaedt-Diamant may enter the service password, which enables access to service and calibration functionality.



Picture 12: login panel, machine setter needs a password ("v")

The language selection will be available from program version 2, in version 1 the language is always english.

3.2. Main panel machine setter mode



Picture 13: Main panel in machine setter mode

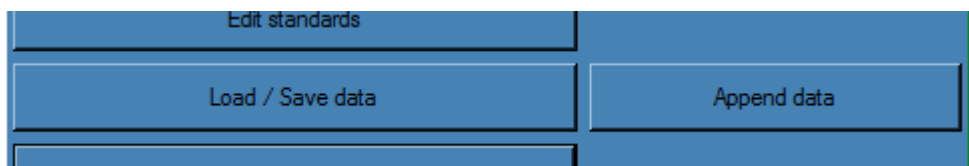
The panel contains the following components:

Test related functions:

1. "Product": open the product selection menu
2. "Start": start button, initiates the test
3. "Stop": stop button terminates the test
4. "Pause": pauses and continues the test

Result related functions:

5. "Report": generates a report and offers printing
6. "Load/Save data": allows for loading data from a previous test into the program. You will be asked if you want to allow data point editing in the scattergram (H). If you have confirmed this you can click on single points in the scattergram and decide to delete these points (or not). The modified dataset can be saved by right-clicking the button Load/Save.



7.

"Append data" allows for combining the data from different parts of a test into one single result file.

8. Right clicking on "Load / Save data" will write the modified data to the disk and insert the results into the .PRODUCT.XLS.

Product related functions:

9. "Define product": opens the product definition panel
10. "Edit standard": opens the standard panel (not yet implemented)

Program setup functions:

11. "Setup": opens the setup panel and the access to the needle calibration

Information areas:

- A) Life images from the anvil observation camera
- B) Captured image from microscope camera
- C) Microscope image from the actually identified particle
- D) Microscope image from the particle actually located on the anvil
- E) F(t) (force vs. time) plot while crushing the actual particle
- F) F(d) (force vs. anvil displacement) plot after crushing the actual particle
- G) Histogram and cumulative histogram of a selected chart parameter #1
- H) Scattergram of 2 selected chart parameter #3 vs. chart parameter #2
- I) Numerical values for the selected display parameters #1 to #11: values for the actual particle, average, standard deviation, median and interquartile range (IQR) for all measured particles
- J) Number of crushed particles
- K) Statistical deviation calculated for the selected display parameter #1
- L) Status of the initialisation of the machine components (green=OK, red=problem)
- M) Status bars for the consumables (carrier tape, cover tape, anvil life)
- N) Right click opens access to the reset function for the consumables counter

3.3. Main panel in operator mode

The buttons "Setup", "Product definition" and "Edit standards" are not accessible.

4. Functions in machine setter mode

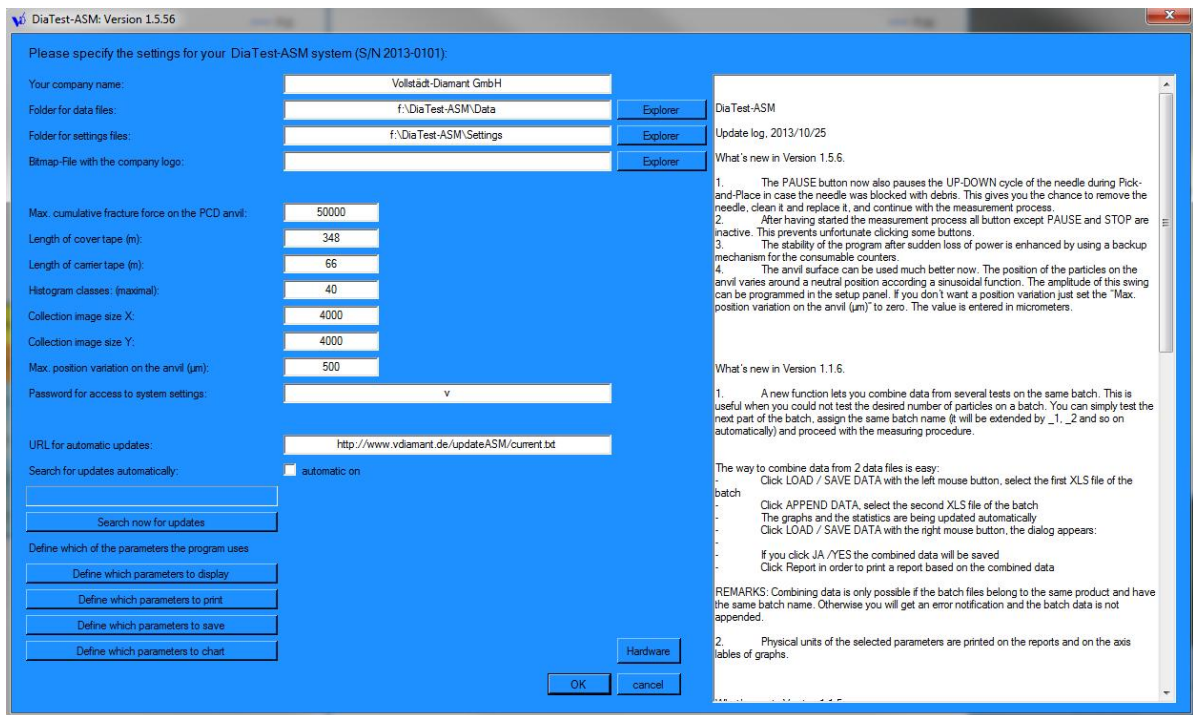
4.1. Basic machine setup

The button "Setup" opens the setup panel, where basic settings for the function of the machine must be entered. The serial number of your machine is displayed top left on the panel.

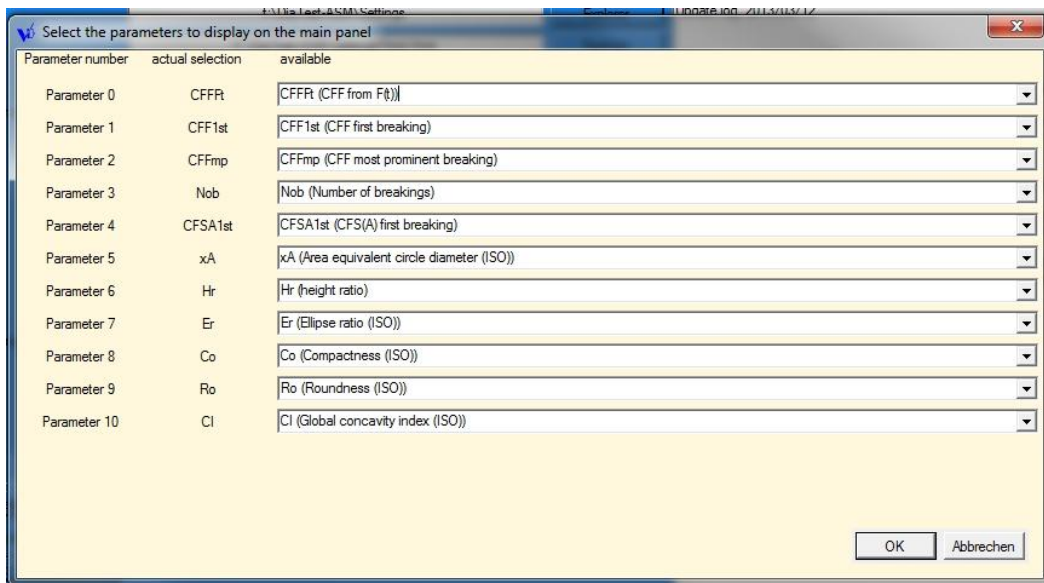
We recommend the following procedure:

1. Type in your company name as it should appear on the printed report
2. Step by step chose the locations, where DiaTest-ASM saves the data and finds the settings for the machine. You can use the “Explorer” button in order to open the Windows explorer. In explorer you can navigate to the desired drive on your PC, establish a folder “DiaTest-ASM”, inside this folder we recommend a folder “Data” and another folder “Settings”. When you click “Open” in the explorer the complete path is inserted into the text box. These settings are VERY IMPORTANT for the program. Do not change the folder structure later on manually!
3. You can show the program the location of a file containing your company logo in BMP or GIF format. This logo will be used in the printed report.
4. The next 3 entries define the lifetime of the different consumables (cumulative crush force limit on the anvil surface), length of the cover tape, length of the carrier tape). The consumable counter will be re-set to this value. There is a file DiaTest_Consumables.xml in the folder \settings\, which contains the maximum values for each consumable and the actually remaining values. If necessary you can adjust these values manually.
5. The collection image size in X and Y define the size of the collection image, where the images of the identified particles will be collected side by side.
6. The field “max. position variation the anvil (μm)” defines the amplitude of a sinusoidal position variation of the particles relative to the original position. This variation allows for a much better usage of the anvil surface. Be careful: too high values may bring the particles too close to the edge of the anvil, and the anvil can easily break off.
7. The password for the machine setter is actually a lower case “v”, it can be changed here.
8. The checkbox “Search for updates automatically” can be checked if the PC is connected to the internet. You will receive a notification if an update is available.
9. There is a group of buttons in the lower left corner of the panel (“Define which parameters to display, print, save, chart”). Here you can customise the program by selecting the parameters, which are the most important for you and you want them on the main program panel, on the report, in the charts or the parameter distributions in the PRODUCT.XLS files. For the beginning we

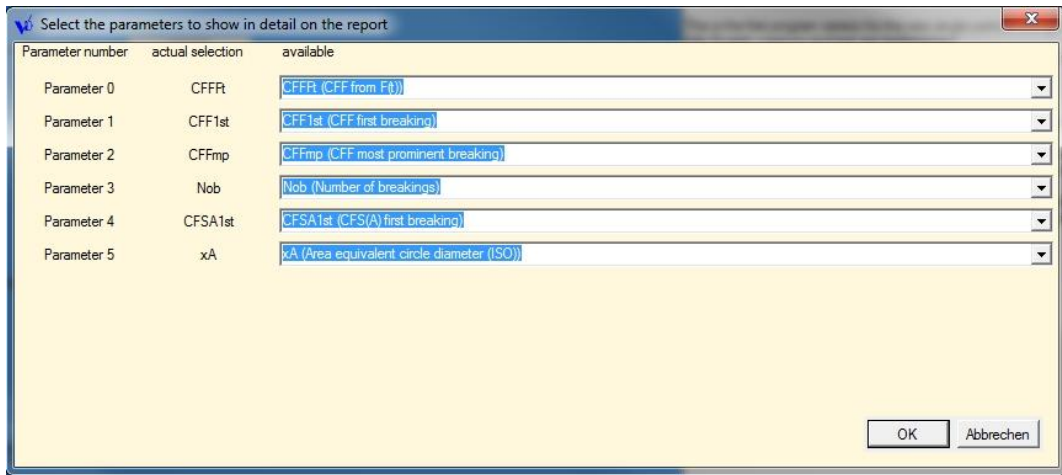
have predefined a set of parameter which fits to most needs.



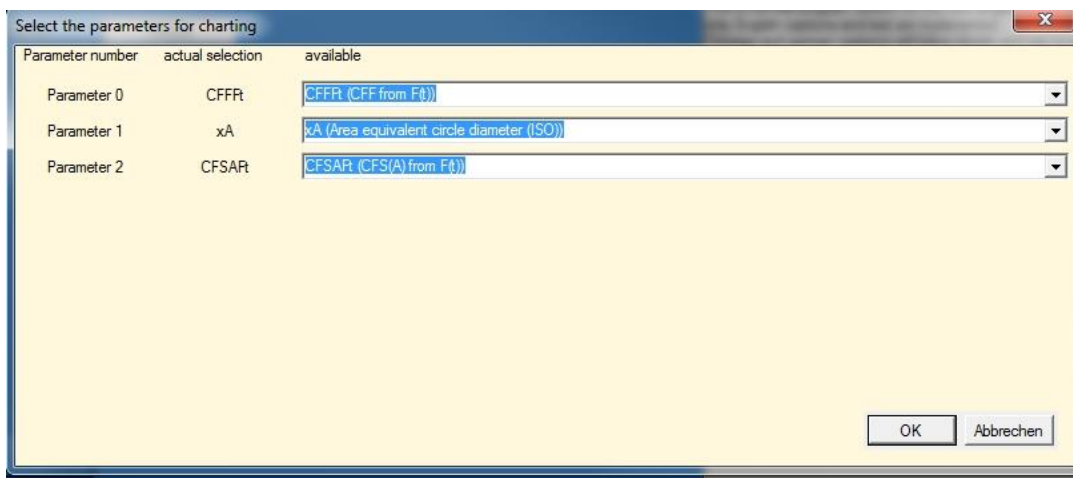
Picture 14: Setup panel



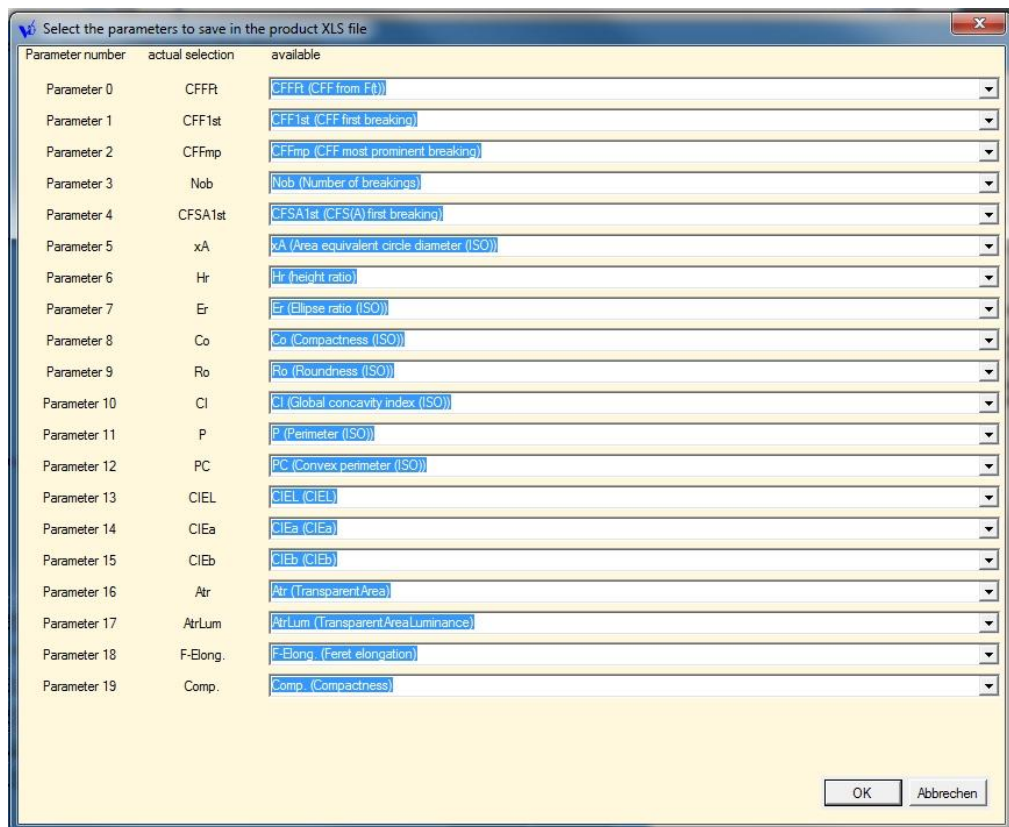
Picture 15: Selection of the parameters which should appear on the panel



Picture 16: Selection of the parameters which should be listed in the report



Picture 17: Selection of the parameters for charting (parameter 0 will be shown as distribution, parameter 1 is X-axis of the scattergram, parameter 2 is Y-axis of the scattergram)



Picture 18: Selection of the parameters to save in the PRODUCT.XLS (each parameter gets a worksheet in the workbook, the cumulated distribution is saved in steps of 1%)

4.1.1. Hardware (needle calibration)

The button “hardware” in the setup panel opens a panel for the check and the calibration of the needles.

Due to slight differences in the properties of the needles and the orifices in the flow sensing chamber it might be necessary to adjust the parameters to the actual situation.

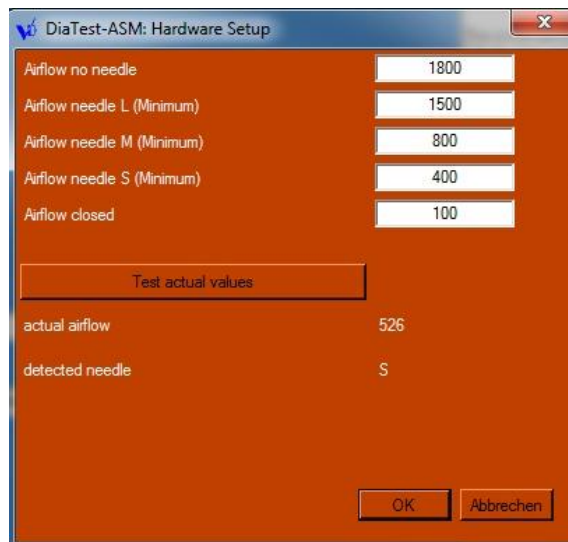
There are 3 types of needles, which vary in diameter:

1. L (large)
2. M (medium)
3. S (small)

The airflow through the needle will be lower at smaller needle diameters. The lower limits of the airflow at open needle tip are listed in the setup panel. The button “Test actual values” operates the vacuum pump and measures the airflow, then it computes from the given limits the type of the inserted needle. If the decision of the program is wrong you may adjust adjust the minimum values listed on the panel.

Please make sure the needle is not blocked by particles.

The classification of the needles by their inner diameter should help you to maintain identical measurement conditions for all batches of a product. Therefore the product definition requires the operator to decide, which needle has to be used for this product.



Picture 19: Hardware setup panel for needle calibration



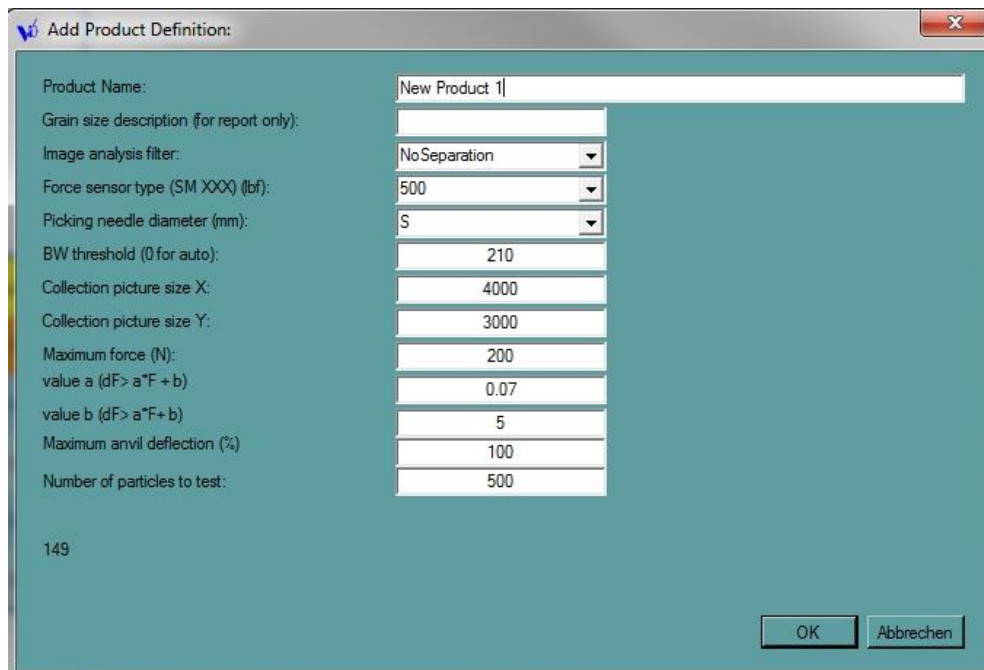
Picture 20: Needle sizes small, medium, large (S 0.1 mm, M 0.15 mm, L 0.2 mm)

Please note that the needle size size refers to diameter of the needle opening.

4.2. Product definition panel

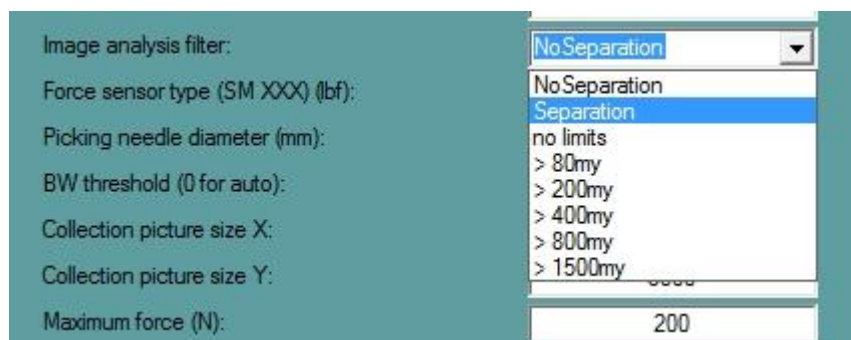
The button “Define product” opens the dialog window, where you can define the name of the product and the measuring conditions. This guarantees, that all batches of the product are being measured under identical conditions and their data are stored together.

The system automatically creates a folder with the product name on the hard disc, therefore the product name should not contain one of the following characters: ***: / \ & < > ? | " .**



Picture 21: Dialog for defining a product

There are 3 dropdown boxes for selecting the image analysis filter, the force sensor type (if there are 2 measuring ranges on your machine) and the picking needle. The image analysis filters are predefined and should be chosen roughly according the grain size of your product. If the particle shape is very irregular you can use the filter “no separation”, if there are still recognition problem the filter “no limits” will consider every dark object on the tape as a particle.



Picture 22: selecting image analysis options



Picture 23: selecting the picking needle

The machine setter can influence the calculation of the fracture of the particles from the force-time data. A fracture causes a detectable drop of the force, thus a drop of the force indicates a breaking. The sensitivity of this detection mechanism can be adjusted by the introduction of a threshold, which is calculated as $F_{thr} = a \cdot F + b$. F is the actual force. If the force drops by more than F_{thr} the maximum force up to this point is recorded as the fracture force.

The values a and b allow for the modification of F_{thr} , this is similar to the parameters in DiaTest-S and DiaTest-SI.

value a ($dF > a \cdot F + b$)	0.07
value b ($dF > a \cdot F + b$)	5
Maximum anvil deflection (%)	100

Picture 24: parameters of the crush force calculation form $F(t)$

The maximum anvil deflection defines the second termination criterion aside from the maximum force criterion.

4.3. Establishing standards

This functionality will be added with version 3 of DiaTest-ASM.

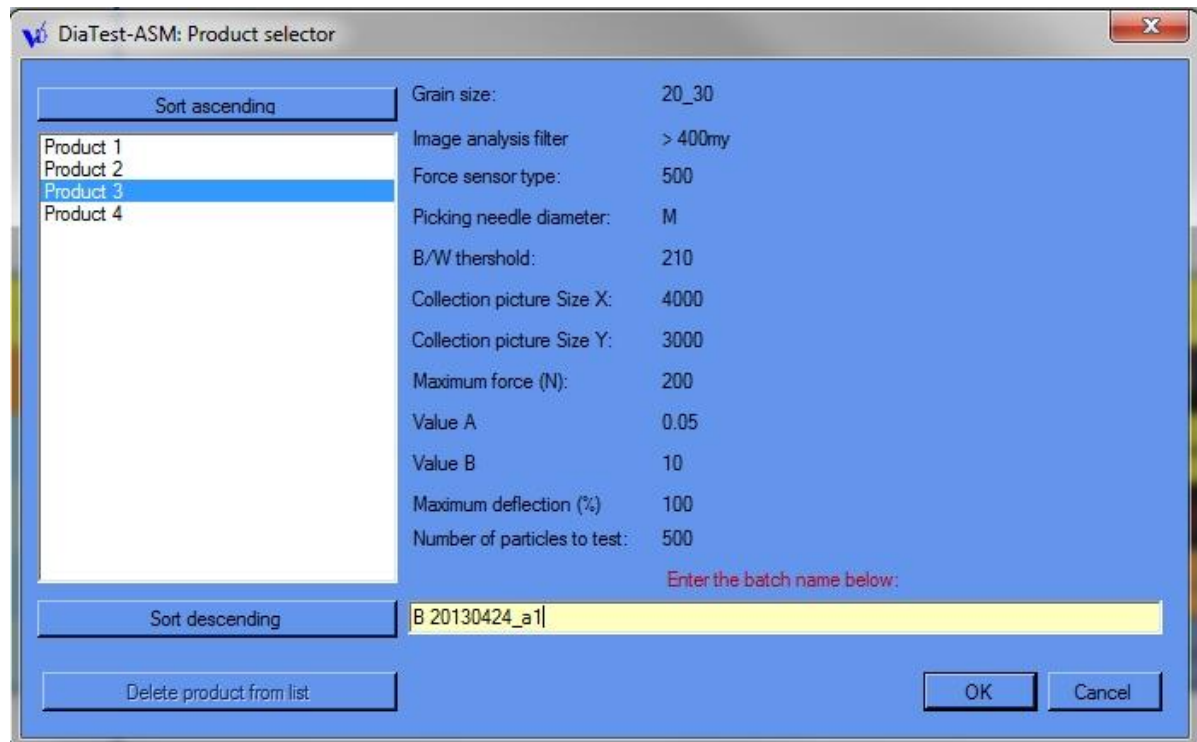
5. Functions in operator mode

The operator can chose from the following functions:

- collect data from batches of predefined products
- print reports with data or test result
- load data from batches and print reports again

The operator mode is automatically active, if the user didn't enter the correct

password on the welcome screen. All functions of the machine setter mode are not accessible for the operator.



Picture 25: Product selection and batch specification in operator mode

After selecting a product and entering the batch description into the yellow field the button “Start” becomes available. “Start” will initiate the test, which can be paused by “Pause” or terminated by “Stop”.

The program will stop the test automatically after crushing the predefined number of particles.

6. Structure of the measuring results

During operation the program automatically stores and updates the result files on the hard disc.

After having finished the measurement the operator can decide, if the results should be stored in the database. If the operator decides not to store the results the program will remove the files which were saved during the test.

From each measurement a file containing the images of the analysed particles is created. A batch related EXCEL files holds the numerical results for every single

particle. A product related EXCEL files collects for every batch the distribution curves of its parameters #1 to #20 which were selected for saving.

The printed report lists some statistical values for the parameters #1 to #6 which were selected for printing. Two charts on the report show the distribution of parameter #1 and the scattergram of parameter #3 versus parameter #2 which were selected for charting.

The device manages all data according to “products”, which can be defined by the user. Every “product” will get an extra folder in the folder specified for DiaTest-ASM data.

The data from every batch of the product will consist of:

- An EXCEL file with the data for every tested particle
- A new line in the .PRODUCT.XLS file with the distribution data for 20 parameters
- A JPG file showing the tested particles.

PLEASE NOTE: Do NOT change the folder structure or the folder names inside the data folder manually, the program will be confused then and cannot find the PRODUCT.XLS files anymore.

If you want to do some calculation in the EXCEL files please make a copy first and work in the copy.

A list of the calculated parameters along with formulas is available in the EXCEL file DiaTest-ASM_Parameters.xls.

7. Reports

The printed reports show the complete list of measurement settings in the header. The data area shows the distribution values of 6 parameters at 2%, 10%, 25%, 50%, 75%, 90%, 98%. Two charts show the same parameters as the charts on the main panel.

8. Maintenance

Most of the debris after crushing is removed from the machine between carrier tape and cover tape. Nevertheless the machine should be cleaned, best results are achieved with a brush and a small sized vacuum cleaner.

When the take-up reel is full please follow this procedure;

- **DO NOT** just tear off the tape from the reel, this may **damage** the electronics as the motor acts as a generator when being turned
- **Instead follow these steps:**
- Cut the tapes close to the take-up reel
- Unscrew the thumbscrew and remove the front disc and the sleeve with with the coil of used tape from the drive shaft
- Push out the sleeve from inside the coil of used tape
- Cut the tape 15 cm from the sleeve
- Reassemble the take-up reel
- Glue the ends of the tape together

When replacing the PCD anvil inserts you should clean the holes where the plates are being held by the magnets.

After finishing the work with DiaTest-ASM please switch off the machine and use the dust cover.

9. Hardware installation

The system comes ready to run with a built in industrial computer. Just connect keyboard and mouse to the USB connectors and one or two displays to the DVI connectors. The industrial computer unit contains no moving parts like fans or conventional hard discs.

The external external power supply unit delivers 24V DC to the machine.

The system requires dry and oil free compressed air at 6 bar., connected via the air pipe with quick lock connectors.

10. Software

The operating system in Windows 7 embedded 64 bit in the language version of the users country.

The machine is **switched on** with the power switch on the lower right corner of the front panel. The program DiaTest-ASM is starting automatically.

After finishing the work and closing the program the device can be **switched off**

with the power switch. There is no need to shut down the Windows operating system.

Additionally a PDF document printer is installed, which can be used for printing reports into PDF files.

The built in mass storage is a solid state disc, we provide an external hard disc for data transfer to other PCs.

IMPORTANT:

The DiaTest-ASM is a measuring device and shall not be used for other purpose.

The installed Windows 7 system will not search for updates!! You should not force the system to search for updates!!

Only programs delivered by Vollstaedt-Diamant GmbH are allowed to install in the future.

The installation of additional programs like games, mail clients, antivirus programs, internet browsers etc. is forbidden and will cause the **immediate expiration of the guarantee.**

10. Maintenance / repair

Picking needle:

Take off the old needle and put on the new one, make sure it is sitting tightly on the connector. Use the machine setter mode → Setup → Hardware → Test actual values in order to verify that the needle is identified properly by the program. If the airflow is very low the needle might be blocked.

Please remove fingerprint etc. from the needle surface, as at those places particles may stick on the surface.

Observation camera window:

If after a while fragments of material have damaged the plexi glass window of the observation camera it can be replaced: unplug the force sensor and take it out of the crushing unit, unscrew the old glass and insert a new one, fix it with the 2 screws, re-insert the force sensor and plug it in.

11. Remote support

On the DiaTest-ASM you find VdiamantOnlineSupport.exe in the “Support” folder. If your PC is connected to the internet this file can be launched and will allow our specialist to investigate problems on your system. Please contact Vollstaedt-Diamant GmbH in order to agree a service time for your system. Our email is list@vdiamant.de.

12. Safety precautions

The machine contains moving parts. Even if the force or torque of the electrical driven parts is low please keep away your fingers. Operate the machine in a room which is accessible for instructed personnel only.

When the machine is being switched on a pneumatic cylinder will press the counter roller onto the driven roller of the tape drive. Please don't put your fingers between the rollers while switching the machine on.

The safety door must never be removed .

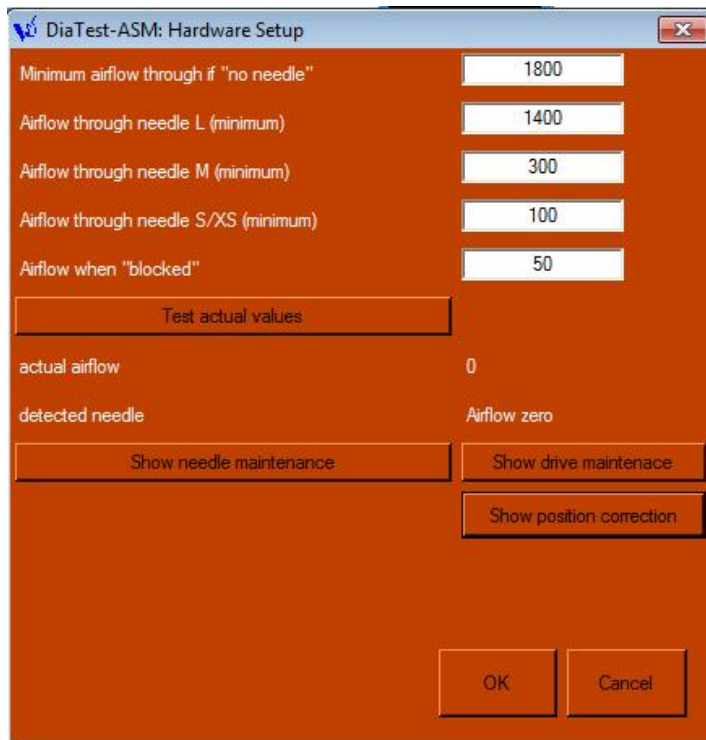
The safety switch on the safety door should never be tampered.

13. Version history

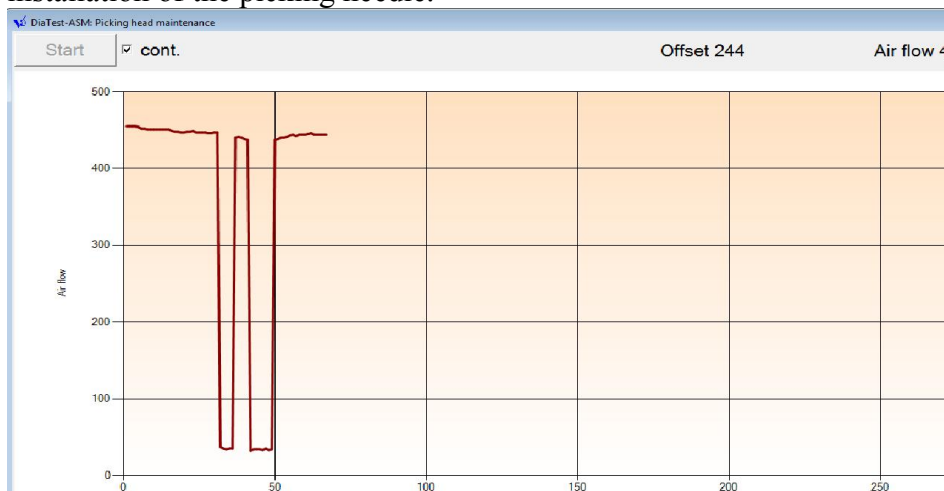
Update log, 2016/03/22

What's new in Version 2.2.3.

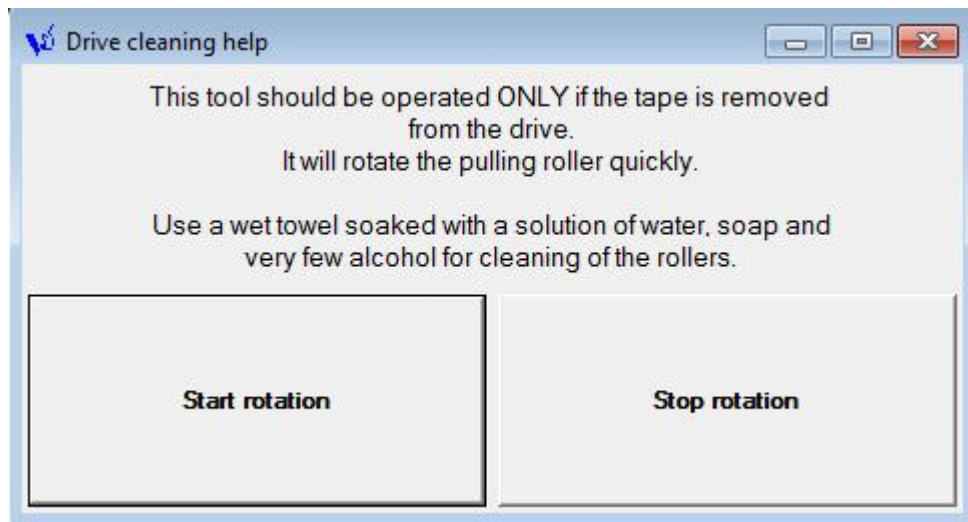
1. The hardware setup gives access to three useful functions.



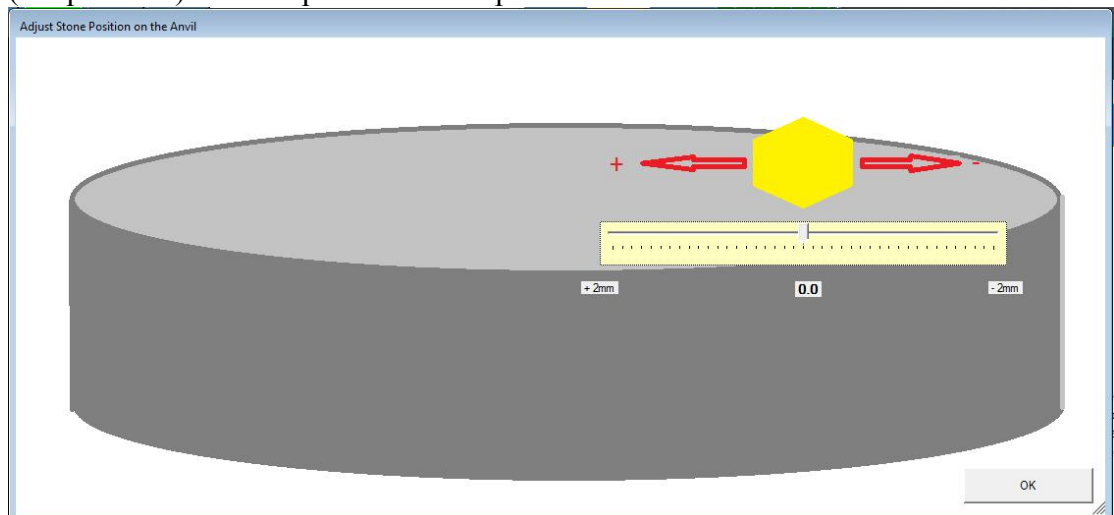
2. “Show needle maintenance” gives access to the maintenance program for the picking head. Especially the continuous display of the airflow values allows for the proper installation of the picking needle.



3. “Show drive maintenance” let you operate the pull motor continuously at higher speed. This is useful for cleaning of the rubber rollers. The cleaning should be done by a wet towel, soaked in water with an addition of dish soap. The addition of alcohol is possible, but will shorten the life of the rollers.



4. "Show position correction" gives access to a fine tuning tool for the position of the particles on the anvils. By using this tool you can place the particles temporarily onto the centerpoint of the anvil and make use of this anvil area. Be aware that changes in the position will not be visible immediately. After advancing the tape by 154 mm (22 particles) the new position of the particles can be observed in the anvil camera..



What's new in Version 2.0.5

5. An industrial PC is built in and controls the machine, keyboard, mouse and display can be directly connected.
6. Country specific version of the operating system (English, Chinese, German etc.)
7. Country specific program layout.
8. A new generation of cameras is connected via USB3.
9. The location of the "Pause/Continue" and the "Report" button on the program panel was optimized.
10. The help text on the panel components is more complete.

What's new in Version 1.7.12.

11. The sensitivity of the airflow sensing circuit can be adjusted in the detailed program settings. Airflow_threshold = 50 is applied to the bigger needles, Air-

flow_Threshold_Divider is taken for the smallest needle. It divides the initially measured airflow by the divider and takes the result as threshold. Higher divider values increase the sensitivity for particles at the needle opening.

What's new in Version 1.7.5.

12. The program will retry several times if no more particles were found in the container.
13. The remaining stones on the tape will be processed after the empty container has led to an end of the test.
14. New hardware versions starting from August 2014 have a modified vacuum system, instead of the mechanical pump a pneumatic pump based on the Venturi principle is built in.

What's new in Version 1.6.2.

1. Improved stability of the program.

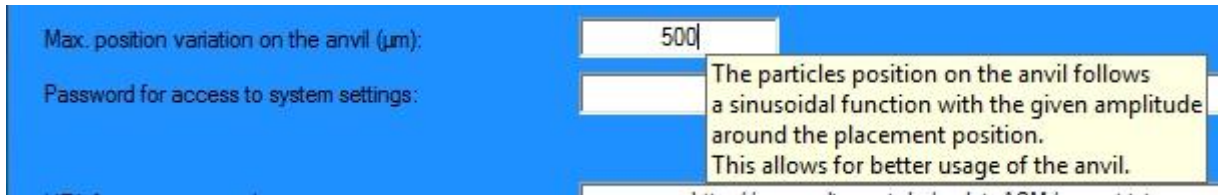
What's new in Version 1.5.55

1. The program will check automatically if the software on the machine needs to be updated.
2. The machine software uses a more gentle management of the stepper drives inside the machine. This reduces electromagnetic interference and increases the stability of the digital communication between PC and machine.
3. The range of available needles is extended to the following inner diameters: 0.1 mm, 0.15 mm, 0.2 mm and for special applications 0.07 mm and 0.3 mm. As the application range of DiaTest-ASM is very wide it depends on the user which needles he defines as "S", "M" and "L" and which measuring range he sets on the vacuum system. We recommend the 0.2 mm orifices for use with 0.07 mm, 0.1 mm and 0.15 mm. The 0.3 mm orifices may be used with 0.15 mm, 0.2 mm and 0.3 mm needles.

What's new in Version 1.5.6

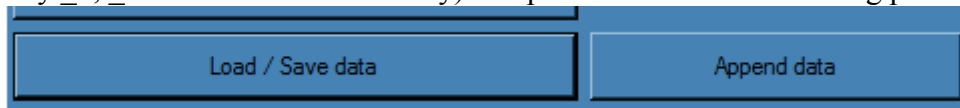
1. The PAUSE button now also pauses the UP-DOWN cycle of the needle during Pick-and-Place in case the needle was blocked with debris. This gives you the chance to remove the needle, clean it and replace it, and continue with the measurement process.
2. After having started the measurement process all button except PAUSE and STOP are inactive. This prevents unfortunate clicking some buttons.
3. The stability of the program after sudden loss of power is enhanced by using a backup mechanism for the consumable counters.
4. The anvil surface can be used much better now. The position of the particles on the anvil varies around a neutral position according a sinusoidal function. The amplitude of this swing can be programmed in the setup panel. If you don't want a position variation just set the "Max. position variation on the anvil (μm)" to zero. The value is

entered in micrometers.



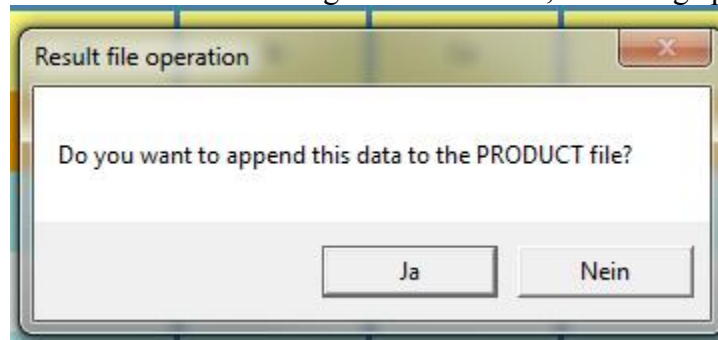
What's new in Version 1.1.6

1. A new function lets you combine data from several tests on the same batch. This is useful when you could not test the desired number of particles on a batch. You can simply test the next part of the batch, assign the same batch name (it will be extended by _1, _2 and so on automatically) and proceed with the measuring procedure.



The way to combine data from 2 data files is easy:

- Click LOAD / SAVE DATA with the left mouse button, select the first XLS file of the batch
- Click APPEND DATA, select the second XLS file of the batch
- The graphs and the statistics are being updated automatically
- Click LOAD / SAVE DATA with the right mouse button, the dialog appears:



- If you click JA /YES the combined data will be saved
- Click Report in order to print a report based on the combined data

REMARKS: Combining data is only possible if the batch files belong to the same product and have the same batch name. Otherwise you will get an error notification and the batch data is not appended.

2. Physical units of the selected parameters are printed on the reports and on the axis labels of graphs.

What's new in Version 1.1.5

In the case the cumulative anvil load has reached the limit you will be requested to change the anvil surface. A message box comes up, after confirmation the machine is in PAUSE mode, you can change the anvil surface, reset the anvil load counter and click CONTINUE.

What's new in Version 1.1.3

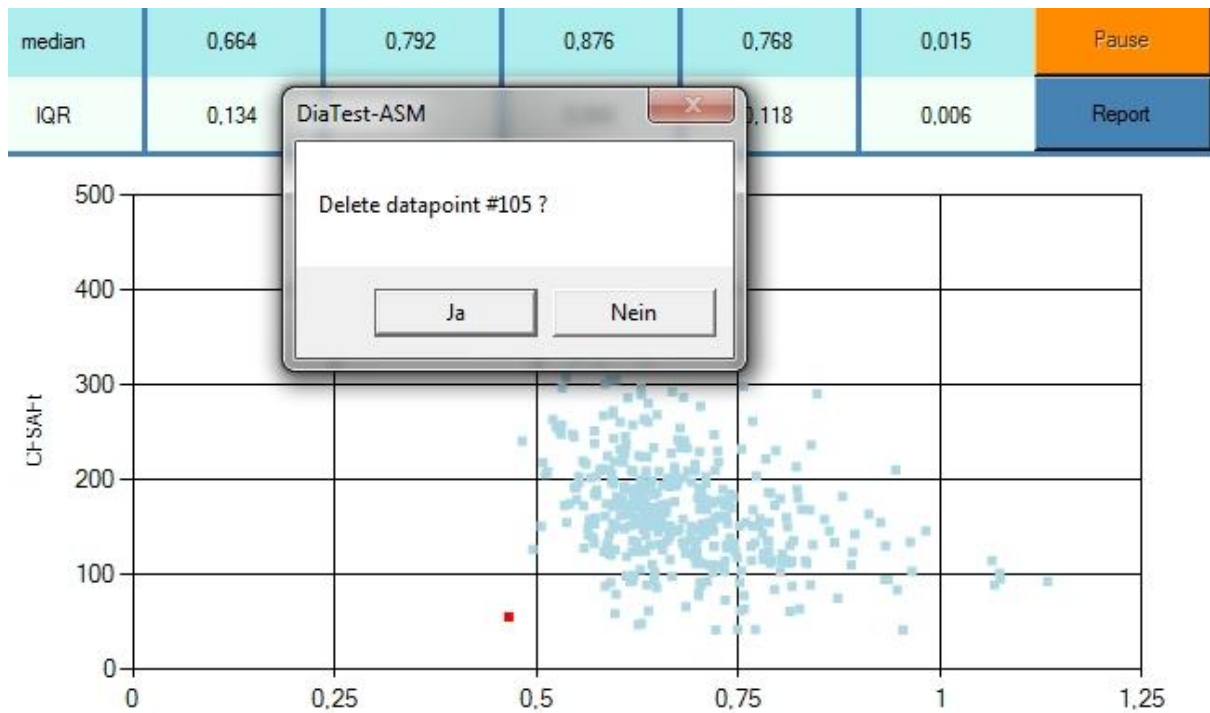
In the case that there is no real particle between the anvils the system will detect this case and insert zero values for CFF , CFS and NoB . These data points stay out of the cloud of normal results and can therefore be deleted easily after finishing the test.

What's new in Version 1.1.2

We have introduced a convenient method to erase wrong data points from the results. Wrong data may be caused by anvil break, by dust or fibers on the tape or by misaligned tape. These data points usually stand out from the cloud of data in the scattergram. After finishing a test or after loading data from the disc you can enable data editing in the scattergram. When you click an outstanding point a messagebox asks to delete this point. If you say "Yes" the data will be erased in the program memory and the the corresponding particle picture is wiped out. You continue until all the wrong data disappeared from the scattergram.

A RIGHT click with the mouse on "Load / save data" opens the confirmation dialog. When you click "Yes" the batch name is extended by "_m" (for modified), the modified batch data and batch image is written to the disc and the PRODUCT.XLS is updated with the distributions of the edited data set.

The original non-modified data files are still available on the disc.



What's new in Version 1.0.9

VERY IMPORTANT: A typing error in the formula for the standard deviation was found and corrected, in the previous version the standard deviation and consequently also the statistical deviation were much too high.

The picking procedure was optimized and makes use of the additional air gun nozzle, which blows away excess particles, which stick on the picking needle.

The image analysis takes into account also particles which are connected to the image border.

The display for the statistical deviation changes its colour according to the actual conditions:

Less than 100 readings → grey

More than 100 readings and value ≥ 5 → red

More than 100 readings and value < 5 → green

What's new in Version 1.0.3

This is the first program version for the new single particle strength tester DiaTest-ASM. At the moment only English captions and text are implemented.

Chinese and german versions will follow shortly and are available via the automated update procedure.

Diatest-ASM has three operating modes:

- The installation mode requires the a special service password and open all settings for the calibration and setup of the machine
- The machine setter mode requires the user definable password and allows the basic

program setup, the definition of products (and later the definition of standards) and the adjustment of the airflow rates in the set of picking needles

- The user mode requires no password. The user can select the product to test. Then he can start, pause and stop the test procedure and print a report. The data files are written automatically by the program.



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