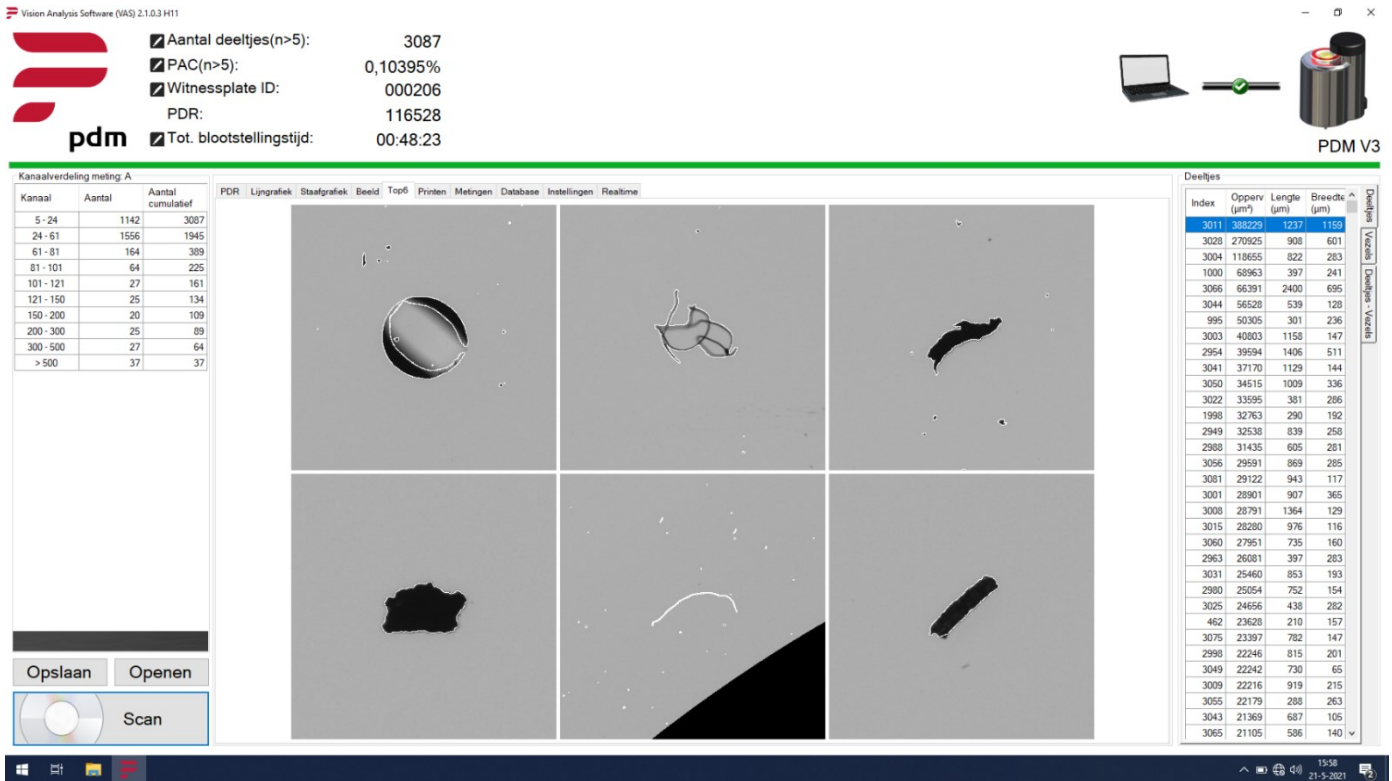


## 48 minutes of dust deposition out door



Friday the 21<sup>st</sup> of may 2021 was a windy day. In the morning dust clouds were visible over the fields and wind played around with the. So an interesting day to see if deposition can be caught in the open air.

A witness plate in an exposure box was exposed just outside our office to see what happens. A large container was used to act as Stokes Chamber.

The above screenshot is of a measurement carried out with the Mask method software and a PDM III. There was no shield for rain. The largest particle caught was indeed an occasional raindrop. It shows on the top left side of the group of 6 sub images. Furthermore some fibers were captures and some particles showing up like flakes in the images.

The amount of work to carry out the measurement was limited. First a disk was mildly cleaned with a wipe. The method of cleaning was dry method and

simple hand cleaning. After this the mask was made by scanning the disk on the PDM and the disk was put back in the exposure box. Cleaning, measuring the disk and box handling took about 3 minutes.

The box was brought to the position for the measurement. Top was lifted, not flipped, and put below the bottom part in order not to catch particles during the exposure time. 48 minutes passed and the box was closed. Bottom with disk part was put next to the top section and then the top was put back on the bottom and snapped. In this way the box was brought in for reading out.

Reading the data took about 2 minutes, open the exposure box, place the disk on the PDM III and scan it for information.

Immediately the screen above with data shows up.

## TOP 6 IMAGES

1	2	3
4	5	6

The numbering of the images is according to the pattern to the left. The six images are chosen because of the area covered by the particle shown. If area is a parameter for the non-wanted property of the particle one can say that the above are the leaders in the horror list. All parts are scaled. Dimensional information has to be taken from the table on the right hand side of the screenshot.



### IMAGE 1

This image shows the one and only waterdrop caught in the detection area. It's diameter is about 1.2mm. It shows that even if a Stokes chamber is used best is a roof avoiding these fast particles with a density of close to one to arrive on the disk. The idea is particle deposition and not to measure rainfall.

### IMAGE 2

This is a typical image of a fiber curling in the air. The software does see this as one large particle in the segmentation engine. The fiber detection algorithm does detect that it is a fiber because of it's shape.

### IMAGE 3

This is a kind of a flake about 0.8 mm long. In this image on the top in the middle two other particles are visible. One particle has a bright contour. It means the particle is as well in the list of particles on the left hand side of the screen. The other particle still visible was probably as well on the disk while the mask was made. Therefore it is not highlighted as particle.

### IMAGE 4

This is as well a rather large flake about 0.4 by 0.25 mm. No further information other than this is the second largest flake on the detector surface.

### IMAGE 5

This is a fiber with an overall length of around 2.5mm. The black area in the right hand corner is the edge of the detection area. Must be near the radius of the donut shaped area based on the curve of the long side of the triangle.

### IMAGE 6

The object in this image is nearly of rectangular shape. The thickness is about 1.3 mm and the length just over 5 mm. No clue what it may be but it is large for a particle.

### GENERAL

In the top Image ( Dutch "Beeld" ) a viewer is available. By means of hovering over the particle list on the right hand side it is possible to see every single particle. The position of the particle on the disk will be indicated as well by a hook appearing on the donut image. Zoom in and zoom out works as well. Please note that an image of a 5 micrometer particle does not shown details as it covers not even a 3x3 pixels area.

The glass disk can be used for further microscopic inspection with a device capable of zooming in further. Overall the inspection is a nondestructive inspection.



## CHANNELVIEW.

Kanaalverdeling meting: A

Kanaal	Aantal	Aantal cumulatief
5 - 24	1142	3087
24 - 61	1556	1945
61 - 81	164	389
81 - 101	64	225
101 - 121	27	161
121 - 150	25	134
150 - 200	20	109
200 - 300	25	89
300 - 500	27	64
> 500	37	37

The channels were set to the values as shown in the image at the left hand side. The setting of the channels is not following either a linear scheme nor a logarithmic schema. The smallest channel, only 15 micron wide, does carry the same "magnitude" of particles as the channel above 500 micron that carries 37 particles. The amount of surface covered, or damage induced is for both parties in the same range, that is why "magnitude" is mentioned

Between 100 and 500 micrometer 135 particles are visible and above 500 micrometer still 37 particles are found.

The number of channels available in the overview allows a fast view on what is going on. The channel setting can be improved and a new scan can be done. Unlike particle counters measuring the particles in an air volume, the PDM unit can measure the particles again. They are grounded.

## EXPOSURE BOX



Important for sampling and transportation of the samples are the exposure boxes. These boxes cover the witness plate and preserve the state of exposure after the gathering of the sample. Boxes can be as well used to transport blank premeasured disks to a test location. As the witness plate is detachable and many boxes can be exposed at the same time, parallel measurements are possible. The sampling box allows as well measurement schemes per part of a day night.



Exposure boxes can also be used by volunteers exposing the boxes i.e. for a few hours. This makes it possible to carry out a simultaneous field test over a large area with lots of measuring points. Handling and data processing are made easy.

