

Report

Documentation for effectiveness
of asbestos Fiberbinder_MO_22-05-2022

Carried out by Dank MiljøAnalyse



Fiberbinder[®]

International patent application No. WO2022/218751

Fiberbinder – Report concerning documentation for effectiveness of Fiberbinder_MO_22-05-2022

BACKGROUND

This report has been compiled on the basis of Fiberbinder, of Jesper Haunstoft, has asked Dansk MiljøAnalyse to make a set-up that can measure and document the effectiveness of the Fiberbinder product.

The existing report is an update of the previous report from 14-01-2022 with updates of remeasurements as well as revision of the text according to the requisitioner's wish and dialogue concerning this.

The basis of this is that the Fiberbinder product is used in the construction sector for bonding residual remains of asbestos fibres after thoroughly cleaning asbestos off especially difficult surfaces as well as spaces and other not easily accessible spaces to clean in constructions.

Thus, Fiberbinder wanted to carry out qualified readings of the effectiveness of the Fiberbinder, including under the influence of air current, as well as documenting this and the "shelf life" of the Fiberbinder product. By "shelf life" is meant to examine if there is a time where the product is no longer effective after application.

As the product only should be used to bond any remains of asbestos fibres after thorough asbestos cleaning, for example in roofs where the roof surface and building insulation material has been removed and

new insulation must be laid out as well as a new roof, the idea was originally to study the effect for a short period, approx. 14 days. The period was extended during the study.

PRODUCT

The product was mixed by Fiberbinder after their own formula and appears as a red liquid that when dried leaves a greasy surface that binds the fibre. The product has also had a fluorescence added so application can be controlled by UV light for use as quality assurance.

The Fiberbinder product can be mixed with water in different mix proportion - in this study the following mix proportions are used: 1/1. The product is water based and thus allows for moisture to be transported to and from underlying materials as no water-proof film is formed upon drying.

TEST SETUP AND PROCEDURE

A cardboard box was covered in double adhesive tape this was attached to the bottom of the test box which was made of plexi-glas with the option to blow air around in the box as well at measuring asbestos in the air in it.

A soft sheet of asbestos with Chrysotile and Amosite (50-75%) is shredded and spread on the double adhesive tape.

TEST & REPORT CARRIED OUT BY:

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Setup



Text box of plexiglas



Leaf blower connected to the box



Test sheet was shredded



Shredded sheet of material (free asbestos fibres) on double adhesive tape

Setup



Setup in box



Measuring equipment connected to box for measuring airborne asbestos



Fluorescence by illumination with UV lamp on tree and plastic in roof



Fluorescence by illumination with UV lamp on tree in dark room

SETUP

The plexiglas box is sealed and a leaf blower is used to whirl free asbestos fibres in the air and then measuring with standard asbestos analysis (modified method: DS2169/NIOSH 7400).

Test box was placed in shed with no insulation and a plastic roof which is why part of the reading period was around 40 degrees Celsius, which is similar to a situation under a roof and/or total roofing on scaffold in the summer.

As we are dealing with a setup test with a limited volume, strong air impact as well as powerful concentration of asbestos material as seen compared to a remaining total roof that has been thoroughly cleaned of asbestos the readings must be seen as worst case.

The tests logbook can be seen in **Appendix A**.

Results and observations

For updates of report with additional readings the logbook is partially updated as we are dealing with the same procedure and thus only data are updated.

Below you find a small but representative segment of results from the test to assess the effectiveness.

	Without Fiberbinder (fibre/m ³)	Without Fiberbinder (fibre/m ³)
Initial reading without upwhirling (28/4-2021)	4700	-
First series of readings with upwhirling (28/4-2021)	59700	-
First series of readings without upwhirling (10/5-2021)	-	3100
First series of readings with upwhirling (10/5-2021)	-	1200
Second series of readings without upwhirling (18/5-2021)	-	1600
16 th series of readings with upwhirling (20/9-2021)	-	1600
26 th series of readings with upwhirling (19/4-2022)	-	1600

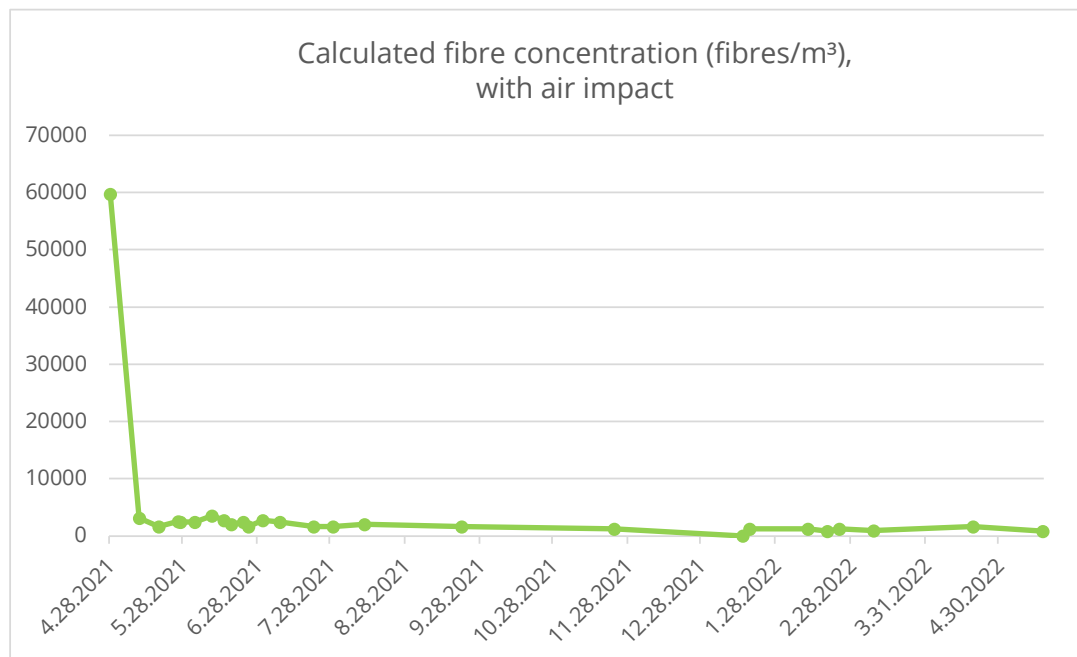
At the first initial reading, without Fiberbinder applied, a much higher concentration of asbestos fibres are seen in the air especially after upwhirling. At the following readings, with Fiberbinder applied, a marked reductions in asbestos fibres in the air is seen compared to the initial reading.

The concentrations are all below the initial reading without upwhirling. And the results shows that the Fiberbinder's effectiveness keep up in the entire reading period with minor variations.

The Fiberbinder product looks like it can reduce the fibre concentrations under controlled setup conditions by up to 97% with air impact of the surface.

The concentrations cannot be directly compared to similar readings "in the real world", that fall within applicable threshold values.

The effectiveness and shelf-life of this is clearly seen on the graph below.



It was observed that the surface stayed greasy throughout the reading period, which indicated that the product does not dry out completely and thus there is a minimal risk that bound fibres on the surface can be released.



Assessment and conclusion

It is considered that the test is to be deemed as worst case as seen compared to the prerequisites for the use of the Fiberbinder product in construction sector.

The Fiberbinder product must not be used as bond of asbestos fibres without previous thorough cleaning of asbestos has been carried out. This should be used as the last possible technical solution to bring down the concentration of asbestos fibre in the air and thus minimise the risk for unnecessary effect of asbestos fibres. The aim is to always get rid of all asbestos fibres from materials, surfaces and air according to the Asbestos Declaration, so no person is unnecessary exposed to the effect of asbestos fibres.

It is considered that the product is effective in terms of binding fibres (asbestos) and that the effectiveness lasts - longer than the 14 days originally desired. Under controlled conditions the effect is at least 11 months as the test results show.

Contrary to other sealing products that leaves a hard fragile surface which can be destroyed by physical impact this Fiberbinder product stays greasy and 'is not destroyed' by physical impact. The product is water based and thus allows moisture to be transported through it after application.

The product can also be used as fibre bond when removing dusty materials such as pipe lagging or contaminated mineral wool to limit dust from spreading and minimise cleaning.

When the product is applied to surfaces with asbestos fibres will the materials the product is applied to be considered as contaminated with asbestos. The product should not be used without an adviser being associate with the relevant project.

The product is under continued readings prospectively.

Appendix A - Test logbook

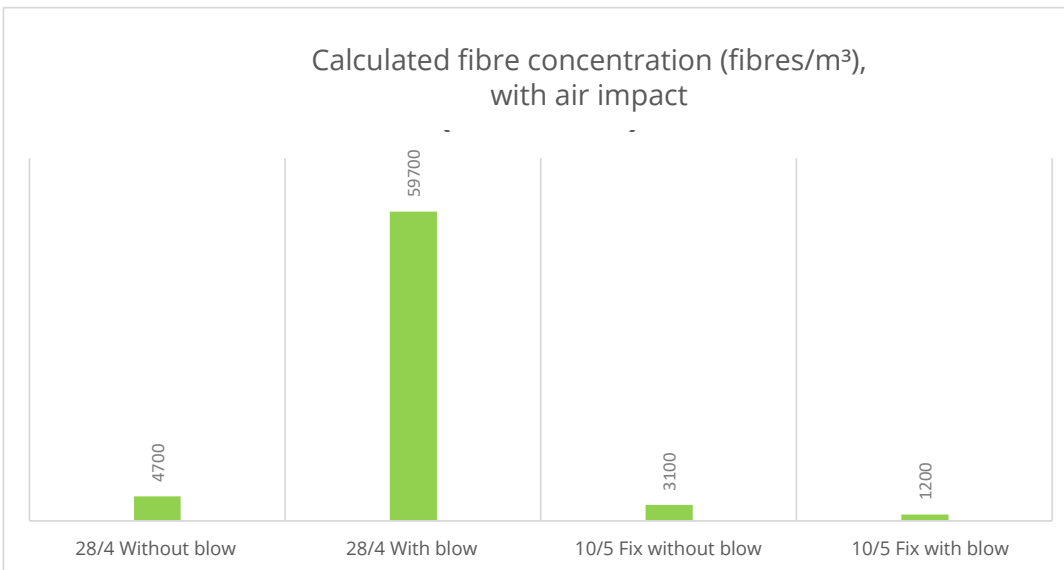
(Partially updated after report of 14-1-2022)

28-04-2021 the area is set up.

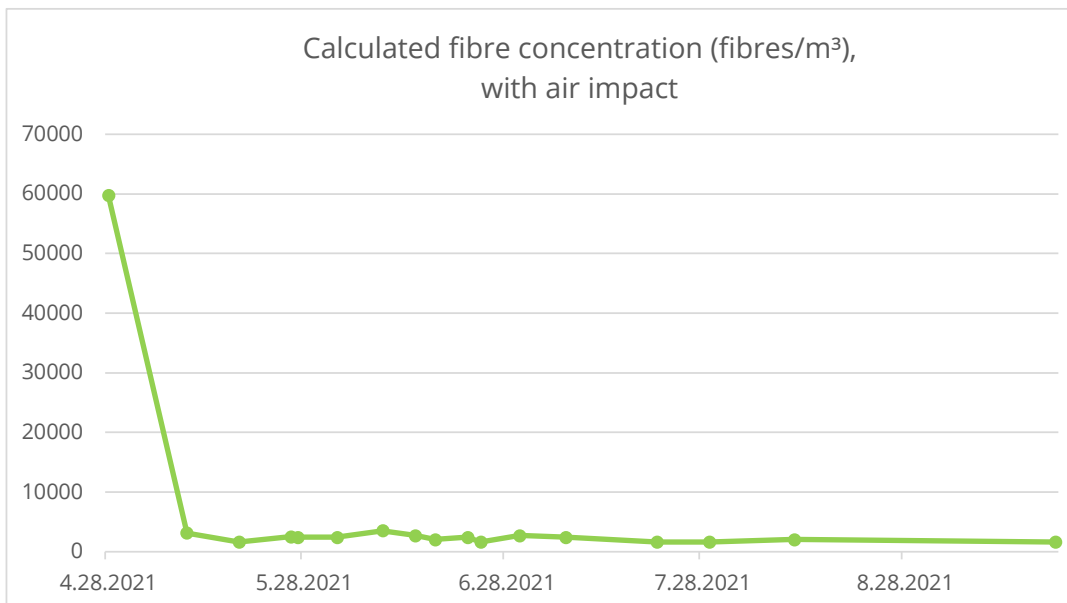
The area is set up with and left to stand for 45 min before being measured 10L/min for 1 hour.

Subsequently the leaf blower is blown for 10 sec. before being measured for 1 hour with 10L/min.

10-05-2021 sprayed with Fiberbinder, before being measured for 1 hour 10L/min, for the next reading the leaf blower is blown for 10-15 sec.



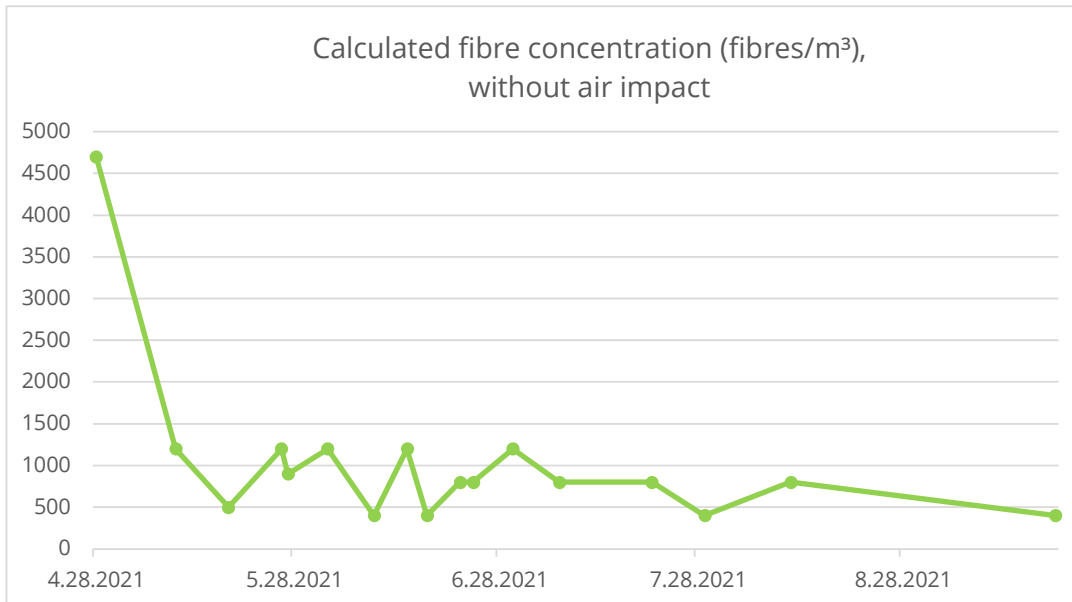
At the start of the test the reading is taken at least once a week, after 12 weeks the reading frequency is reduced and as of 20-09-2021 reading will be carried out every 8th week during the winter.



X axis is dates, Y axis is fibres/m³

Appendix A - Test logbook

(Partially updated after report of 14-1-2022)

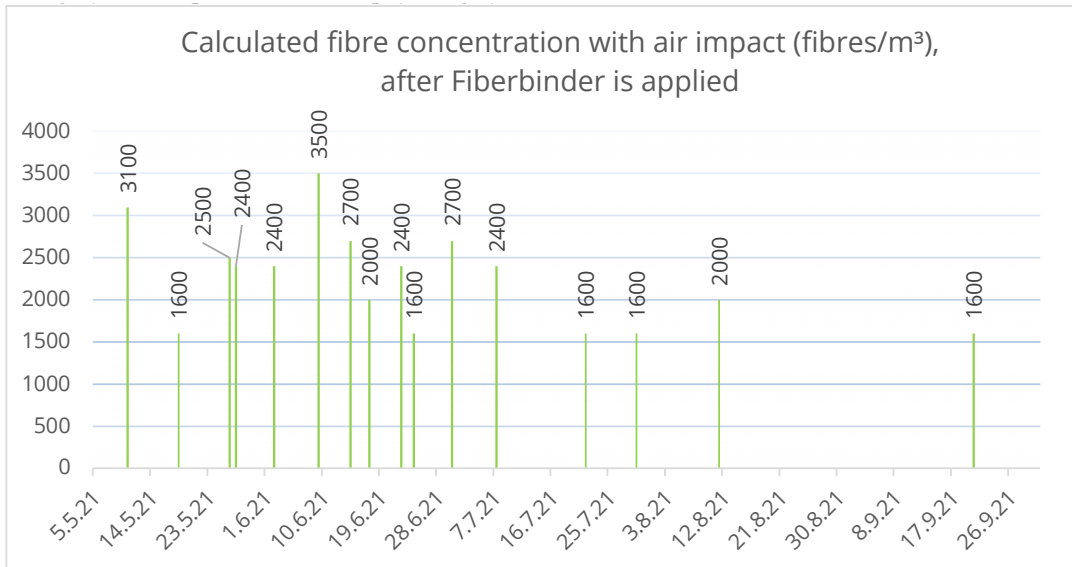


X axis is dates, Y axis is fibres/m³

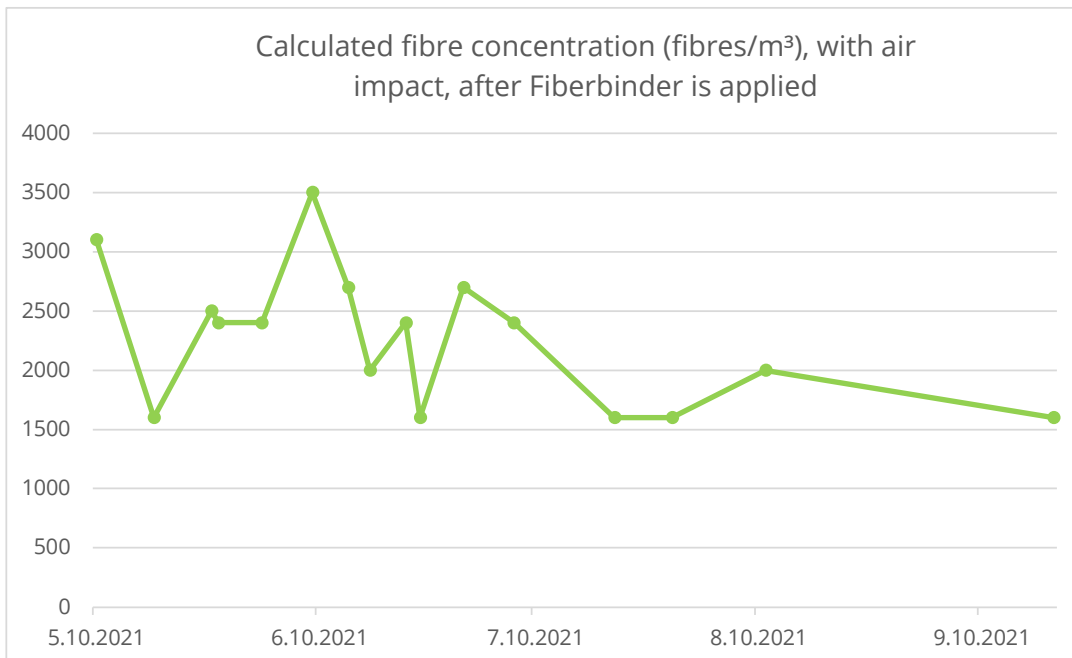
Appendix A - Test logbook

(Partially updated after report of 14-1-2022)

Here graphs where test prior to Fiberbinder being applied are not included.



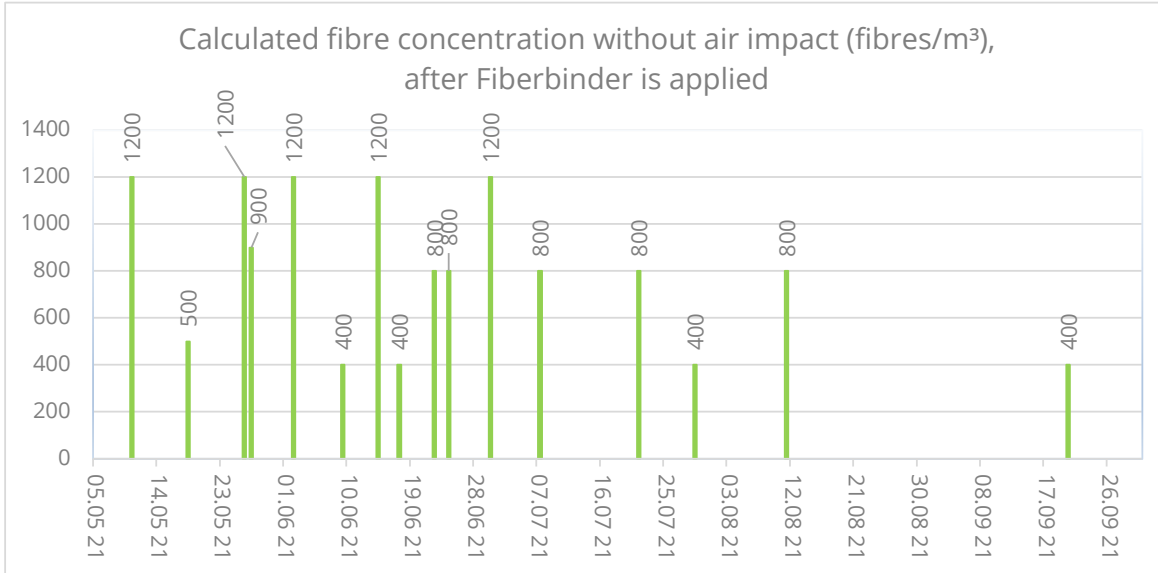
X axis is dates, Y axis is fibres/m³



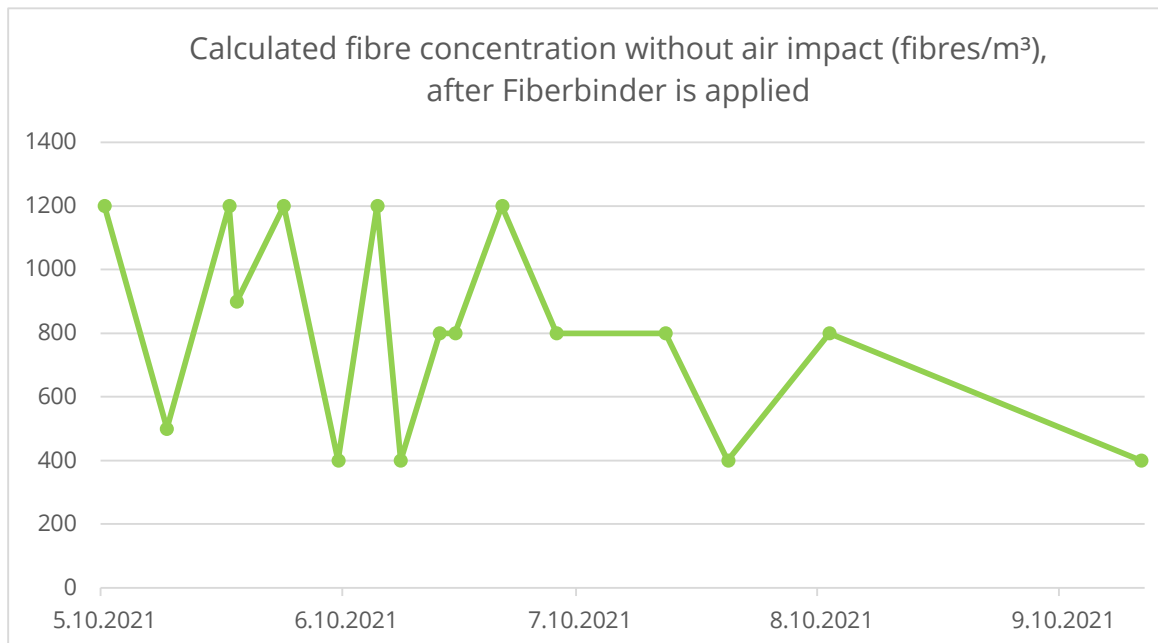
X axis is dates, Y axis is fibres/m³

Appendix A - Test logbook

(Partially updated after report of 14-01-2022)



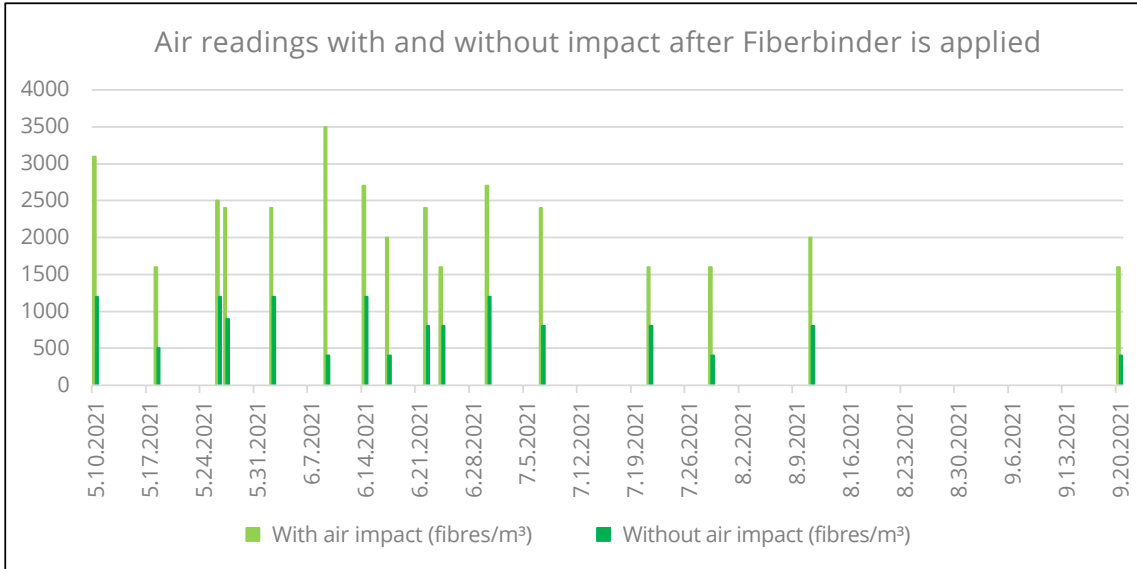
X axis is dates, Y axis is fibres/m³



X axis is dates, Y axis is fibres/m³

Appendix A - Test logbook

(Partially updated after report of 14-1-2022)



X axis is dates, Y axis is fibres/m³

When you look at the graphs you might get the impression of big changes from week to week but in reality it only means that few fibres more or less have been counted from week to week. There are no big changes in the counted fibres over the 12 weeks.

Updated table

Date	Impact	Volume (litres)	Number of fibres	Number of areas counted	Detection limit (fibres/m ³)	Calculated fibre concentration (fibres/m ³)
28-04-2021	Blow 10sec	600	76	100	3900	59700
10-05-2021	Fix + blow	600	3	200	2000	3100
18-05-2021	With blow	750	5	200	1600	1600
26-05-2021	With blow	750	8	200	1600	2500
27-05-2021	With blow	600	6	200	2000	2400
02-06-2021	With blow	600	6	200	2000	2400
09-06-2021	With blow	600	9	200	2000	3500
14-06-2021	With blow	600	7	200	2000	2700
17-06-2021	With blow	600	5	200	2000	2000
22-06-2021	With blow	600	6	200	2000	2400
24-06-2021	With blow	750	5	200	1600	1600
30-06-2021	With blow	600	7	200	2000	2700
07-07-2021	With blow	600	6	200	2000	2400
21-07-2021	With blow	600	4	200	2000	1600
29-07-2021	With blow	600	4	200	2000	1600
11-08-2021	With blow	600	5	200	2000	2000
20-09-2021	With blow	600	4	200	2000	1600
22-11-2021	With blow	600	3	200	2000	1200
14-12-2022	With blow	600	3	200	2000	1200
14-01-2022	With blow	1500	5	200	800	800
17-01-2022	With blow	600	3	200	2000	1200
10-02-2022	With blow	600	3	200	2000	1200
18-02-2022	With blow	600	2	200	2000	800
23-02-2022	With blow	600	3	200	2000	1200
09-03-2022	With blow	800	3	200	1500	900
19-04-2022	With blow	600	4	200	2000	1600
18-05-2022	With blow	900	3	200	1300	800

Date	Impact	Volume (litres)	Number of fibres	Number of areas counted	Detection limit (fibres/m ³)	Calculated fibre concentration (fibres/m ³)
28-04-2021	Without blow	600	6	100	3900	4700
10-05-2021	Fix without blow	600	8	200	2000	1200
18-05-2021	Without blow	900	2	200	1300	500
26-05-2021	Without blow	600	3	200	2000	1200
27-05-2021	Without blow	750	3	200	1600	900
02-06-2021	Without blow	600	3	200	2000	1200
09-06-2021	Without blow	1200	2	200	1000	400
14-06-2021	Without blow	600	3	200	2000	1200
17-06-2021	Without blow	600	1	200	2000	400
22-06-2021	Without blow	600	2	200	2000	800
24-06-2021	Without blow	600	2	200	2000	800
30-06-2021	Without blow	600	3	200	2000	1200
07-07-2021	Without blow	600	2	200	2000	800
21-07-2021	Without blow	600	2	200	2000	800
29-07-2021	Without blow	600	1	200	2000	400
11-08-2021	Without blow	600	2	200	2000	800
20-09-2021	Without blow	600	1	200	2000	400