

FDS 15

Application Examples for Installation of the Fine Dust Sensor

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FLOERGER®**

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Introduction

The air is the elixir of life. However, the air contains impurities, whose composition and concentration vary depending on the location.

Various researches have shown that the fine dust particles in the air are damaging to the heart, lungs and brain. For measurement is often used complex and expensive measurement technology.

Thanks to the compact fine particles sensor FDS 15 of Dr. Födisch Umweltmesstechnik AG this is now history.



The fine dust sensor FDS 15 is an optical sensor for continuous measurement and control of fine dust contents $PM_{2.5}$ in the measuring range of 2 to 2000 $\mu\text{g}/\text{m}^3$. It can be integrated into several applications.



Exclusive advantages

- gain in time because of easy, fast data provision
- traceability of fine dust increase in consequence of meteorological conditions
- higher information density compared to daily average values of official measuring stations
- reduction of health hazard of employees
- avoidance of quality loss caused by fine dust in production processes

Application

By means of the FDS 15 it is possible to determine the current fine dust loading of the environment and make out health hazards.

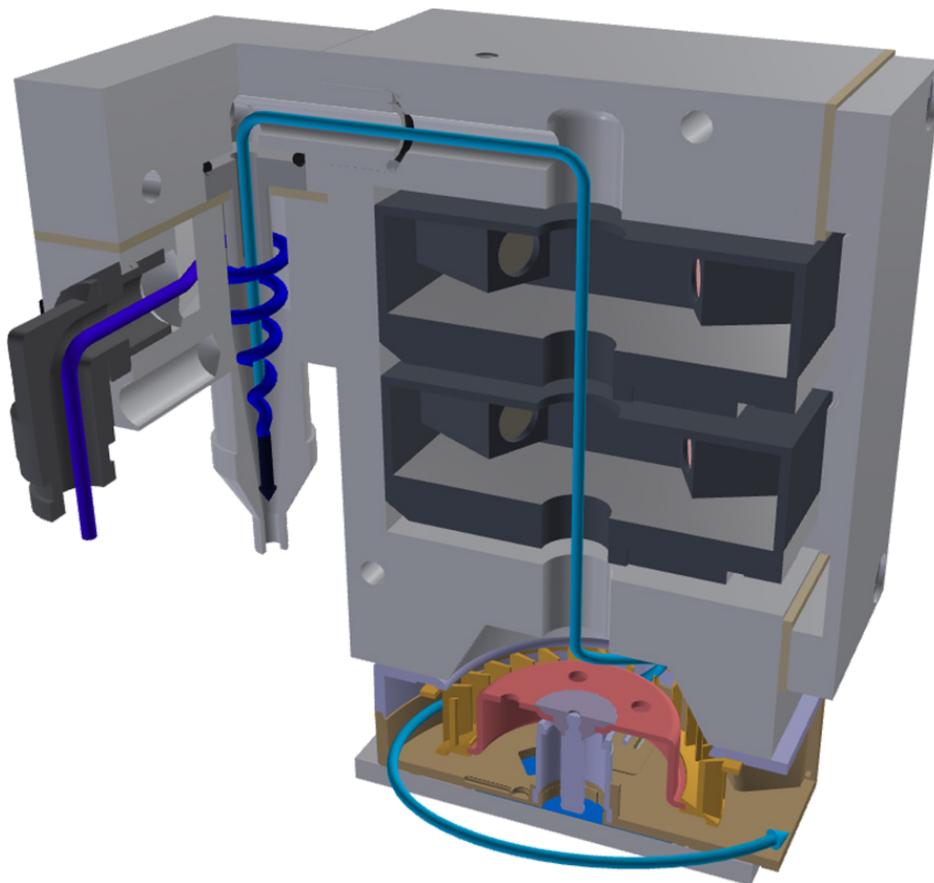
Application examples

- monitoring of fine dust in the range of production (workshops, factory buildings etc.)
- monitoring of room air quality in offices and public institutions (hospitals, schools etc.) or in the private domain
- monitoring of ambient air
- upgrading of weather stations

Function

The determination of the dust content in the FDS 15 is based on the method of scattered light measurement. The sucked air is pre-heated to 50 °C. Thereby flow enforcement takes place via the integrated fan. The velocity of the measuring gas is chosen in a way that particles are determined representatively. For the analysis of alveolar particle fractions ($PM_{2.5}$) an integrated pre-separator is used.

In the FDS 15 a periodic control and correction of zero point and reference point is carried out. By evaluation of the internal measuring signals a high zero point stability is achieved.



Application of the FDS 15 at SNF Floerger

The company SNF Floerger is a manufacturer for water-soluble polymers. In its factories world-wide the chemical company manufactures products for the following sectors:

- drinking water production
- wastewater treatment
- enhanced oil recovery
- mining plants
- agriculture
- paper manufacture
- textile industry
- cosmetics industry

One location of the company SNF Floerger is in the town Taixing in the province Jiangsu in China. There the factory is in a large industrial zone in the midst of several chemical plants.

For the measurement of the fine dust content outdoor and inside the office rooms, two fine dust sensors FDS 15 of Dr. Födisch Umweltmesstechnik AG have been installed.

Finally, the measuring data of the installed fine dust sensors were compared with the data of an official measuring point and then evaluated.



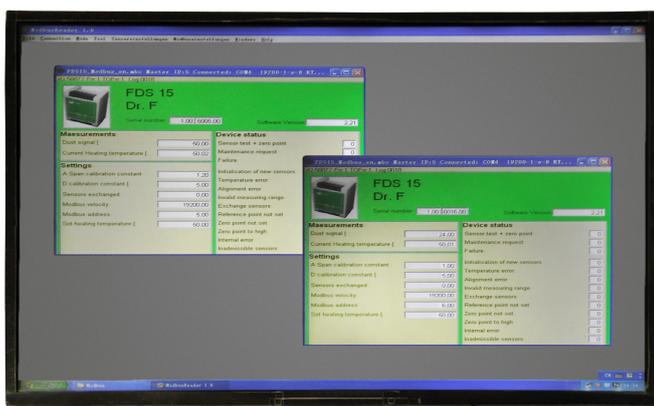
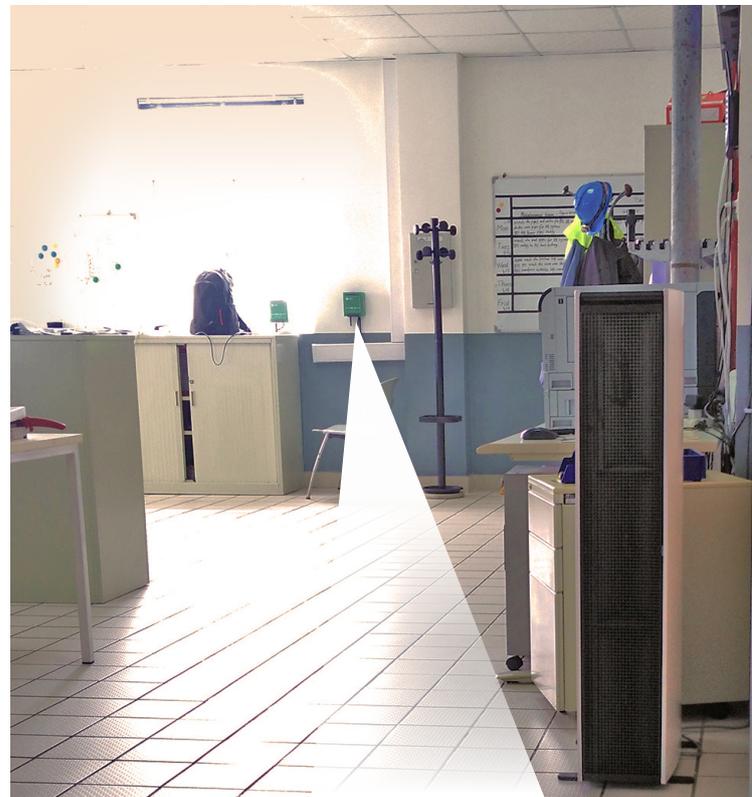
Fine dust measurement for factory premises and office



For monitoring the fine dust content at factory premises of the company SNF Floerger a FDS 15 has been mounted at the outer wall of an office building. By means of this outside installation the own production shall be controlled as well as the actual fine dust content of the ambience shall be monitored.

The second FDS 15 monitors the fine dust content in the office itself. The room has a base area of more than 200 m². 15 employees work in this office which includes also several printers and copiers. Through the application of the FDS 15 a toner dust loading can thereby be detected. Additionally, the office is equipped with several autonomous climate control units and air purifiers. Their performance shall be checked continuously in course of the fine dust monitoring to deduce maintenance actions purposefully.

Both fine dust sensors are connected with a PC in the office. The measuring data are continuously transmitted and visualised via a monitor.



Comprehensive use with precise results

The fine dust sensor FDS 15 offers numerous application possibilities. One example is the upgrading of weather stations. SNF Floerger uses this kind of application by using a weather station of the type Davis Vantage PRO2. So further information of ambient conditions is gathered additionally to fine dust measurement. The weather station thereby outputs comprehensive data of the following parameters:

- temperatures outside and inside
- pressure
- precipitation amount
- wind direction
- air humidity



SNF Floerger counts on the own fine dust measuring results thanks to FDS 15. Although an official measuring station of the government provides also data of fine dust measurement – however these are considered less precise and the own measurement becomes more and more important. The FDS 15 measures directly on-site and regards locally occurring events which are not reflected in official data.

By dint of fine dust measurement in connection with the weather station SNF Floerger wants to assure safety on its own site. The measuring data have an important function for the enhanced monitoring of the ambience.

Because of the central location between several chemical plants, it is assumed that there are additional dust emissions which do not arise from the own production. So it already happened that a white dust cloud was streaming through the plant of SNF Floerger whereof employees got eye irritation. Also increased fine dust values during holiday time, weekends or at night substantiate the suspicion of foreign-caused emissions.

To get to the bottom of this, the wind direction and by that the source of the dust emissions can be determined by the weather station. So compared to official stations the FDS 15 fulfils also a function of proof.

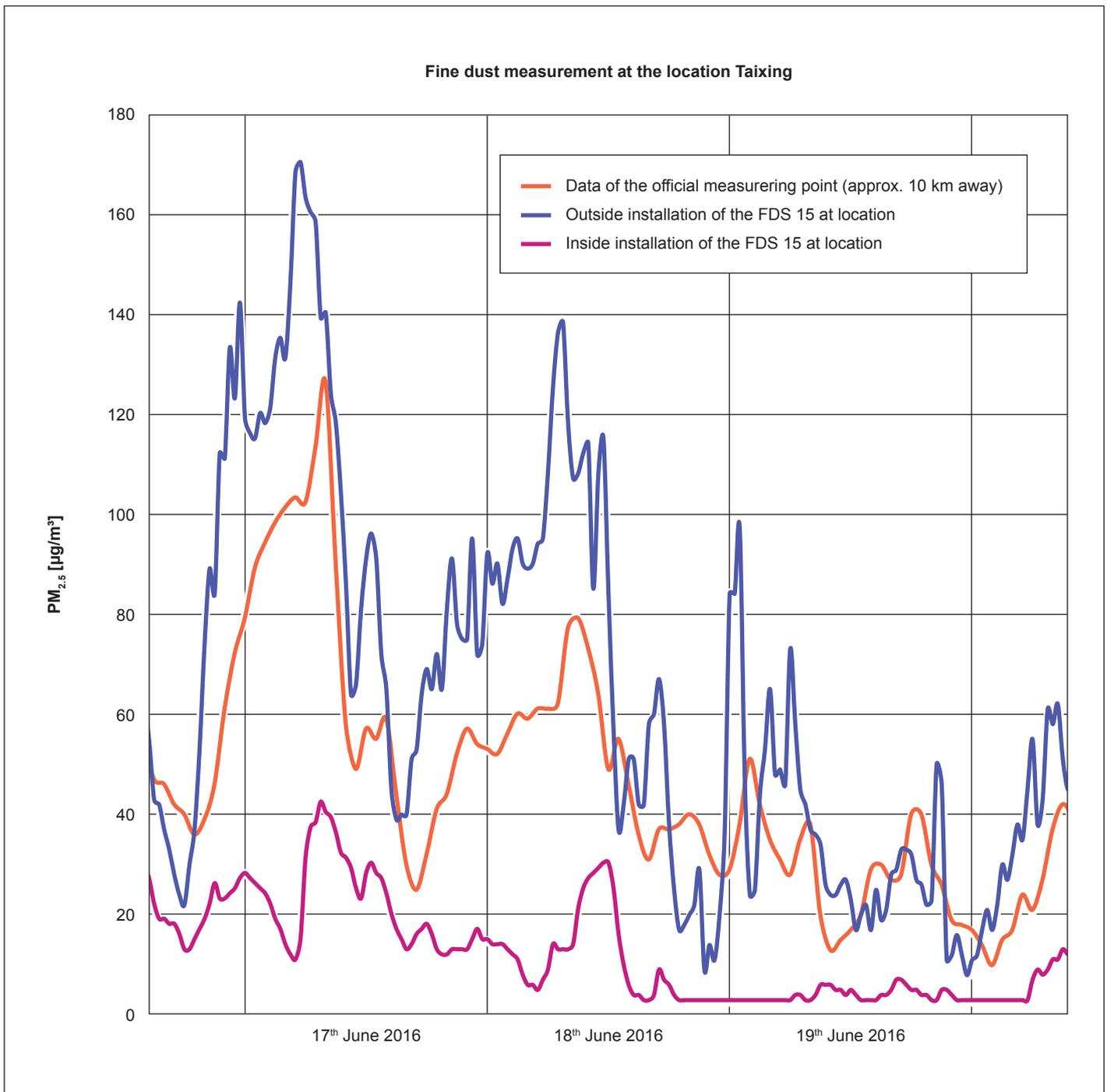


The following diagram shows the measuring data of the fine dust sensors FDS 15 of outside and inside installation at the location of SNF Floerger. To these the official data are faced which were provided by a measuring station of the government approx. 10 km away.

A similar development of the data of the measuring station and the measuring data of the outside installation at location is visible whereat the measured values outside at location are noticeably higher. This can be traced back to the company's location in the midst of

an industrial zone where the fine dust measurement is made directly on-site by the FDS 15 – so this cannot be realised equally by the official measuring station with a distance of more than 10 km.

For the measuring data of the inside installation there is a visible analogy, too. To keep the fine dust content inside the office rooms as low as possible, windows have to be kept close and climate control units as well as air purifiers have to run with maximal performance.



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