

Masdar PV:

“Keller Lufttechnik’s specialists discovered an appropriate solution for the separation of fine silicon oxide particles”



Transparent PV modules at Masdar allow their use for building facades.

When glass plates are coated with silica they convert into a photovoltaic (PV) module. During this coating process fine silicon oxides (in nanometer size) are created which presents a special challenge for separation. Masdar PV GmbH in Thuringia invested in a Keller Lufttechnik filtration system to separate the finest dust from the exhausted air by nearly 100 %. A special briquetting machine was an ideal solution for waste disposal.

Located in Germany - Ichtershausen, a town south of D-Erfurt, Masdar PV GmbH produces micro-morphous thin-film PV modules. This company is a subsidiary of Abu Dhabi’s Initiative for Future Technologies, Masdar, whose most well-known project is the nearly pollutant-free future-town, Masdar City. Masdar PV in Germany specializes in large-scale thin-layer solar modules which are particularly suitable for outdoor

installations and large-sized roofing. Transparent PV modules can be used for facades (building integrated PV – in short: BIPV). Consequently, the futuristic building fronts transform into a source of energy. Because of the inexpensive manufacturing process, the thin-layer modules are characterized by their capability to deliver a high output even under low light conditions. In addition, they retain their full functionality even at very high temperatures.

Measurements detected a high concentration of fine dust in the exhaust air.

At Masdar PV, D-Ichtershausen there are four PECVD coating plants which currently produce PV modules up to a size of 2.2m x 2.6m. The glass plates are coated with photosensitive silica inside vacuum chambers. Residues of the gaseous source material are oxidized by introducing natural gas, then they are “washed”. As a result, a very fine film of silicon oxide still remains. “The particle size falls in the nanometer range. They are practically invisible to the naked eye”, Mario Manthey reports; he is Equipment Engineer at Masdar PV and is responsible for the coating plants. When the company initiated production they did not realize that the plant’s filtration systems did not capture this fine dust. “Further measurements provided proof”, Mario Manthey remembers. Then the manufacturer further performed tests to

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Mario Manthey, Masdar PV

efficiently separate these dusts but were unsuccessful because of the unusually fine particulate. “We realized that we require a specialist. We contacted Keller Lufttechnik, as we were already utilizing their

excellent filtration units for our laser systems, which burn the current lines into the silica layer. >

Suitable filtration technology was discovered after analyses and tests

However, the filtration solution was not easy to apply. “The coating plants required filtration systems of a completely different type”, says Bernd Müller, Sales Manager at Keller Lufttechnik.

Working in conjunction with experts of Cottbus University, Keller’s specialists first investigated, the exact particle sizes of the dust to be separated and installed test plants at Masdar PV, as well. They further determined the ideal filtration technology – a dry filtration filter VARIO 4 which is equipped with high-quality membrane filter elements. “The filtration efficiency is brilliant. At nearly 100 %, the values are clearly below allowable limits”, Manthey says enthusiastically.

Filtration efficiency is clearly below existing limit values:

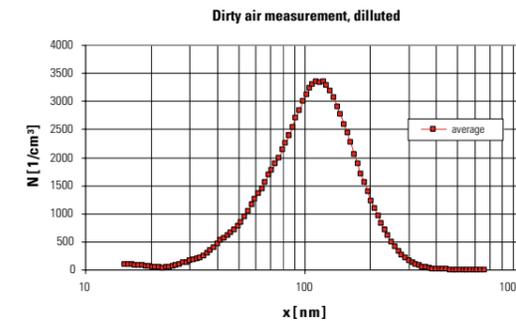


Image 3: dirty air, averaged

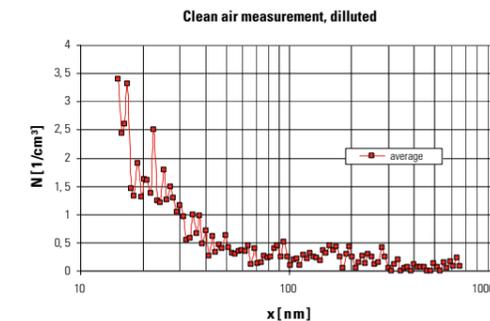


Image 4: clean air, averaged

The dust must be compressed for waste disposal

The fine dust and light weight present a problem regarding waste disposal. The waste material was collected in Big Bags with a volume of 1 cbm. The resulting weight of such a Big Bag filled with this

dust totaled a mere 40 kg. “The bags had to be changed and emptied every three or four days”, Manthey said, “This wasn’t manageable”. Therefore, Keller Lufttechnik combined a briquetting system with the filtration unit. “Although the unit does not press briquettes from that fine dust, the dust is compressed enough so that ten times the dust can be collected inside a container, at about 400 kg”, Bernd Müller reports.

Masdar PV expands its production plant

The first two systems have been operating for one year. “During that time we have not had to clean the filter unit once. The filter’s differential pressure is correct, which not only saves time and money but is also an important help for environmental protection,” Manthey says. In 2012 they plan to build a new facility with four plants which will also be equipped with the well-proven Keller Lufttechnik filtration technology. “It is important for us that our products are a positive influence on environmental protection. Even the production process must be according to ecological criteria with minimal impact on the environment”, Manthey says.



Dry separation VARIO 4 with briquetting system

Masdar PV’s corporate philosophy: Minimizing energy consumption

Quoting Masdar on their homepage: “We ensure that no unnecessary energy is consumed in the production of our modules so that the energy turn-around time of our products is less than two years”. Keller Lufttechnik supports them with well thoughtout filtration technology to ensure that Masdar is able to comply with its pledge. <

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