

Please do not disturb! The NanoLab challenge

Peter Baaij, Profit Center Leader

Construction work on the new NanoLab at the University of Twente (NL) is in full swing. This innovative laboratory for nanotechnology not only aims to set new standards for science, but also poses tremendous challenges for its builders. The building must be absolutely vibrationless because ultrasensitive instruments will be employed there. Cofely Oost and Angst + Pfister joined forces to devise creative and groundbreaking solutions for this demanding construction project.



Everything vibrates!

When viewed from the microscopic perspective of nanotechnology, everything appears to vibrate. Every passing truck, every ventilation system and every technological apparatus can cause vibrations that impede work or even falsify measurement results. To create a vibration-free environment for the NanoLab right from the outset, it is necessary to first isolate it from external influences. Then there are the innumerable sources of disruptive vibrations in the building itself. As the service provider responsible for all of the installations, Cofely Oost, the Hengelo, Netherlands-based subsidiary of the publically traded international industrial group GDF Suez, was confronted with the challenge of blocking all problem-causing vibrations to as great an extent as possible. This is no easy task since all types of installations cause vibrations, including piping, heat pumps, ventilation units, pressurizers and climate chambers. Without additional measures, these vibrations would be transmitted directly to the building via the different installation materials. Standard installation technology construction designs would be of little use here – creativity and experience are called for instead. Cofely is known for its innovative concepts and integral solutions in all stages of wide-ranging construction projects.

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The NanoLab

Customized brand-independent solutions

Cofely developed a concept for the installations and, given the particular sensitivity of the task, chose to engage a brand-independent specialist with longstanding experience in vibration damping: Angst + Pfister. This was the only way to obtain individually tailored solutions. Angst + Pfister's experts put together the ideal combination of vibration dampers for every single piece of equipment for all of the installations. Starting from classical antivibration technology solutions, they developed new variations until the wide array of different damping strategies, like pieces of a jigsaw puzzle, fitted together to form a functional and harmonious whole.

Passive and active vibration damping

Efficient antivibration technology is based on two strategies: passive and active damping. In the case of the NanoLab, the focus was on active damping. This means that vibrations are absorbed directly at their source using APSOVib® vibration dampers, which create a highly efficient barrier that impedes vibrations from being transmitted to the building. The most important selection criteria for the ideal vibration damper are the natural frequency, structure, mass and center of gravity of the specific installation as well as the allowable vibration level and the desired setup. For the installations in the NanoLab, a maximum load of 3.2 tons per element was calculated. The natural frequency of the installations was thus between 3 and 6 Hertz. Based on these values, the most suitable vibration dampers were selected from the extensive APSOVib® assortment.



APSOVib® vibration dampers absorb vibrations directly at their source.

Versatile and creative

In addition to providing the right vibration dampers, Angst + Pfister also supplied the corresponding hoses and hanging elements – exactly in accordance with the customer's wishes. The construction of the NanoLab at the University of Twente demonstrates that even the toughest challenges can be mastered with the right combination of experts, knowledge, experience and an extensive product selection.

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