

How to isolate the environment from disturbing vibrations created by a machine, where a rigid mounting to the ground is required.

update: December 2013

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**SWISS TECHNOLOGY**

How can we isolate a machine that must stand on a rigid foundation?

It is contradictory: the machine manufacturer requires the machine to be rigidly anchored at the foundation to provide its full performance. The company operating the machine must comply with the emission and vibration regulations that can only be satisfied when the machine is isolated, in other words installed resiliently. How can we fulfil both conditions?

Printing presses, for example, require a very accurate alignment of the individual print stages. Direct isolation - that is underlying isolation plates directly under the machine frame - therefore requires a very large effort. The reason is that the isolation material takes some time to compress. The print stages are installed one by one in succession, aligned, and connected with each other. If we used isolation plates under the print stages, we would have to wait for at least 4 to 7 days after the installation of each print stage until the resulting compression can be neglected. Assembly work could only be continued when the next print stage is installed. With five print stages, you can easily end up being more than four weeks.

An isolation of the foundation or base, in contrast, offers the printing press the required ground stiffness and decouples the entire system from the environment by isolating vibrations, at the same time.

Foundation isolation means casting a concrete block in a tank with isolated walls and ground.

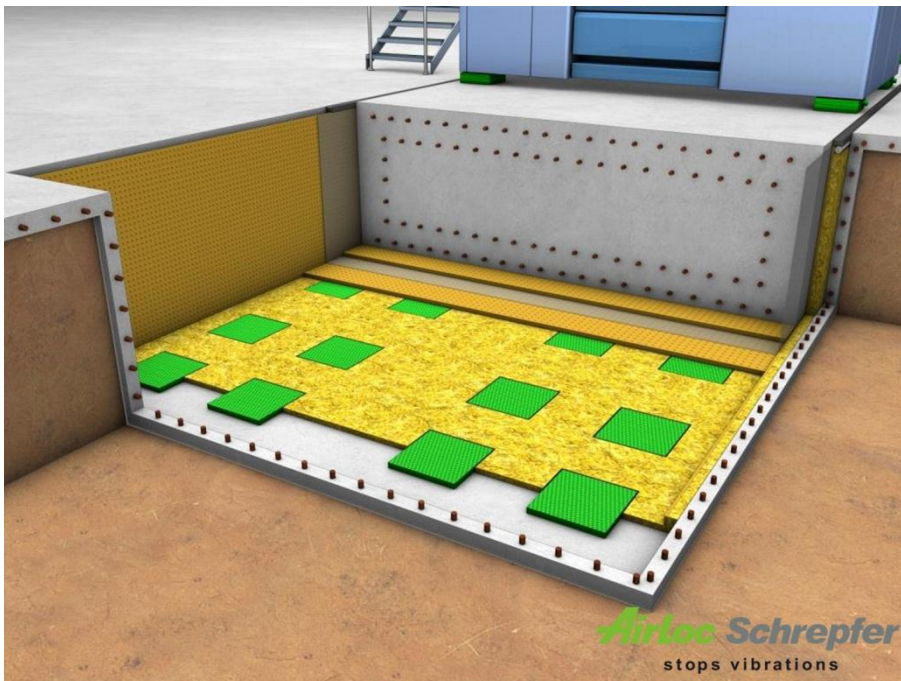


Figure 1: Structure of a foundation isolation

Base isolation is the isolated installation of a concrete plate on the existing floor, without a tank.

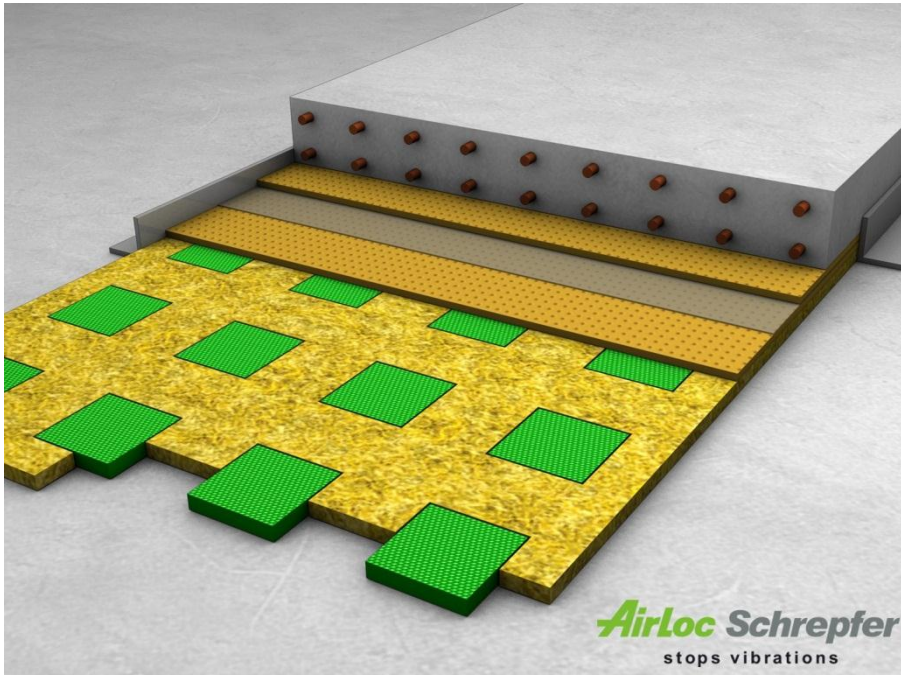


Figure 2: Structure of a base isolation

Building base isolations requires less effort. In most cases, base isolation is the only possibility of isolating a machine with critical installation in an existing building. However, due to the smaller dimensions of the base - in contrast to the block of a foundation isolation - its application is frequently limited to smaller machines. When you design the base dimensions, ensure that there is sufficient stiffness for the machine.

The following table shows the dimensions of some base isolations that were successfully implemented by AirLoc-Schrepfer:

Machine type	Isolation plate material	Block length [mm]	Block width [mm]	Block height [mm]	Concrete weight [t]	Machine weight [t]
Washing machine	AirLoc B3	3,100	1,600	500	6.2	4.2
Fan	AirLoc K905	4,100	2,200	815	90.6	28.5
CNC machine	AirLoc B2	2,900	2,800	150	3.0	4.9
Laser cutter	AirLoc K905	12,500	4,850	250	37.9	19.7
Measuring space	AirLoc K974	6,395	5,090	430	35.0	6.1
Printing press	AirLoc B4	29,830	6,035	300	133.3	134.8
Lathe	AirLoc B2	5,350	2,060	150	4.1	6.1

Provided that the load bearing capacity of the building is adequate, base isolation can also be used on an upper floor. Determining the natural frequency of the ceiling is recommended since the isolation loses its effect at a resonance between the natural frequency of the isolation material under the base and the natural frequency of the floor. Ceiling supports at specific points, that detune the natural frequency of the ceiling, can remedy the problem. The ceiling supports can also increase the load bearing capacity of the ceiling, after the calculations have been made by a structural engineer.

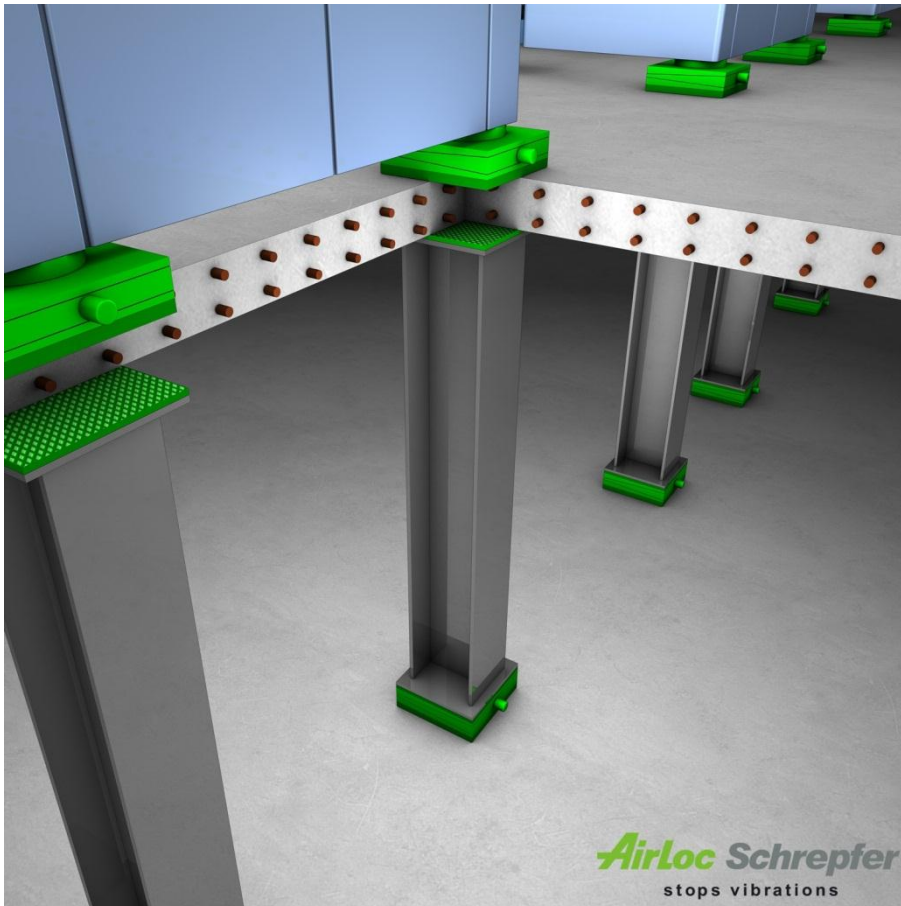


Figure 3: Specific installation of ceiling supports

The solution to use a base or foundation block for isolating a machine with critical installation has been tried and tested hundreds of times. AirLoc Schrepfer offers comprehensive consultation and individual design of such an isolation as a service. Taking the individual basic conditions into account, we select the appropriate isolation material and calculate the number of isolation plates required by the weight of the machine and its base.

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