Smooth Floor Guides for a Quiet Environment

A quiet surrounding can help you keep your focus in the office and prevent any unnecessary annoyance with your local supermarket when the door squeaks. The availability of smooth floor guides and quiet automatic sliding doors is therefore something affecting everyone in our society, even if no one has ever heard about this product before. This thesis has investigated friction and noise related to floor guides and was executed in collaboration with Assa Abloy Entrance Systems.

Many parameters limit the design process, however, the result is of high importance since quietly moving sliding doors are taken for granted in today's society. Noise between two materials can be related to high friction and is best reduced through using the material felt. Felt is a soft material that is considered to be an optimal solution for reducing noise since it dampens unnecessary vibrations and avoids particles and dust from scratching surfaces. This project presents four final concept solutions for two different types of doors and all solutions include felt covered contact surfaces. Three of the solutions consist of more than one part and are called modular solutions, which is considered an effective way to indirectly reduce friction through exchanging the worn down part as soon as it is run-down. A modular solution including felt is part of the optimal solution, but the best concept of them all also includes a part that is flexible even when it is sticking up the door. This makes the floor guide align with the door, and the noise is most likely totally absent; however, further real-life tests are required.

High friction preventing the door from opening and closing also affects the motor operating the door. Unnecessary friction causes the motor to overheat and waste electricity. Solving the problem regarding the noise is an unrewarding task since the standard expectancy is that there is no sound from the door. The sound generated from the floor guide results in unsatisfied customers and users, which makes solving the problem even more important.

Developing a floor guide for an automatic sliding door is more complex than firstly considered. A floor guide is a small component placed in between the moving part and the static part of a sliding door. Today's design of the floor guide used is U-shaped, where one vertical side is attached through screws in the static part, and the other vertical part of the U-shape is sticking up a track running through the door. The main function of a floor guide is to keep the door running smoothly on track without causing any disturbing noise.

The floor guide may seem simple, but in order to get to know it thoroughly a lot of team effort was needed. Interviews with installation and service personnel, as well as with product specialists, were needed for clarifying all its little quirks. The existence of the floor guide eliminates the need for a rail on the floor, which instead is replaced by a track at the bottom of the door. The floor guide itself is only a few centimeters long!

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