

# Touchy-Feely Computing

Microsoft relies on know-how from Evonik for touch-sensitive screens



The future of computing starts with a table. To be more precise, with a projection screen installed on top of the table. The Microsoft Surface™ is controlled simply by touching its surface, and can even be operated by several people simultaneously. Evonik supplies the crucial element.

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**Evonik. Kraft für Neues.**

The transparent plastic sheet being carefully stacked on the pallet looks quite unremarkable. In fact, it seems rather lost in the huge factory hall with its hundred-yard avenues of high-bay shelves. But the workers preparing a new batch for transport this morning know they are holding an almost revolutionary technology in their hands. The transparent PLEXIGLAS® sheet is set to change the way we handle computers forever. Instead of clicking a mouse or entering data via the keyboard, files can be opened, photos moved around or movies played all by a mere touch of the finger. The magic word is touch-screen technology. A great future lies ahead for the plastic sheet produced in Weiterstadt, in the German state of Hesse. The world's best-known software company is making sure of that. Microsoft developed the surface computer and is now marketing it under the name Microsoft Surface™. At long last, a truly hands-on computer interface.



Gerd Machleid, Dr. Alexander Laschitsch and Steffen Richter scrutinize the finished screen for the last time.

A visit to the plant site of Evonik Röhm GmbH, a subsidiary of the Evonik Group, shows a PLEXIGLAS® sheet being lit from below in a darkened room. Patrick Spiller bends over the display in deep concentration. He spends several minutes looking for tiny bubbles, inclusions and impurities in the sheet. „We have to find every single defect, even if it's only the size of a pinhead,“ explains the young chemical plant technician who coordinates the processing steps at the Weiterstadt plant. Microsoft made very precise specifications. Even a tiny bubble on the yard-wide surface would mean the sheet needs to be rejected immediately. After all, subsequent interface users don't want to be distracted.



PLEXIGLAS® sheets and films are bonded in a special clean room to avoid any contamination.

The touch-sensitive screen is a key element of Microsoft Surface™. Microsoft intends to employ this interactive surface around the globe, in hotel lobbies and restaurants, for instance. The first Surface units have already been set up at select stores of the U.S. company AT&T, and at Harrah's Las Vegas Casino.

But what's so special about Microsoft Surface™? The answer is simple. The existing touchscreens, e.g. in ticket dispensers or certain cell phone models, can only accept input from one finger at a time (one-touch appliances). With Surface, multiple users can work with one computer simultaneously and run applications on it (multi-touch). „The system recognizes more than 50 simultaneous touches or objects. So in theory, you could also work on the interface with all ten fingers at the same time,“ explains Dr. Alexander Laschitsch, Technical Project Manager at Evonik Röhm. „That is a real advance as compared with existing technologies.“ The 37-year-old manager should know what he's talking about. He has been working with the Microsoft Surface™ team on developing the Surface right from the start. As a product manager, he is familiar with the market, the competition and the special requirements made by the Redmond-based company.

To enable the screen to be simultaneously operated by several people, special optical properties have been built in to register all finger movements on the interface. And that is precisely where the many years of expertise offered by Evonik enter the picture. Both the sheet and the films are made of PLEXIGLAS®, one of the industrial group's trademarks.

The production process starts with polymethyl methacrylate (PMMA), a plastic similar to glass. The liquid compound is used to produce sheets of 9.8 x 6.5 feet in size and roughly one inch thickness. Workers examine each sheet for impurities right at this stage of production. Then the plastic parts weighing several hundredweight are cut to various sizes and thicknesses.

But before the plastic can measure up to the stringent quality requirements for Microsoft Surface™, an unusual process is needed. Employees wearing face masks and special clothing bond PLEXIGLAS® sheets and films. To avoid any contamination, the dust level has to be extremely reduced. This is done using special filters and above-atmospheric pressure. „There are a thousand times more particles in an ordinary living room than in our clean room,“ says Evonik employee Gerd Machleid, who monitors this production step. The Surface sheet is later subjected to meticulous examination. Then the defect-free screens using the PLEXIGLAS® sheet are installed in the surface computer.



The sheet/film composite finally cures upon exposure to UV light. The touch-sensitive screen is now ready for use.

Future users who tap the display will hardly be aware of its complex production process. Everyone in Darmstadt, where most of the company's engineers, project planners and economists work and do their research, is very proud of that fact. But the development of the Surface is a milestone for another reason too. For the first time, Evonik Röhm GmbH is not only manufacturing a sheet material - various grades of PLEXIGLAS®—but supplying an entire finished system. „PLEXIGLAS® has indeed been around for 75 years,“ says Project Manager Laschitsch, „but because of its properties, it is an excellent base material for new and innovative applications. It will continue to open up a raft of interesting possibilities in the future too.“