

Using Tags to Make Teeth

A French company has created an RFID-based process for making crowns, bridges and other dental prosthetics.

By Catherine Ilic

Oct. 25, 2004—French RFID startup Dentalax has launched its RFID-based system to provide a way to reduce errors and improve productivity in the development of dental prosthetics such as crowns and bridges. According to the company, there is a significant advantage in deploying RFID in the dental prosthetics manufacturing process. “Every prosthesis technician knows how much of their time is taken up filling in paper documents and that there is always a risk of human error,” says Rémy-Jean Cachia CEO at Dentalax.

By deploying the Dentalax RFID system, the company maintains, a dental lab can cut the time taken to accurately process each item. “With the Dentalax system the time savings for each workstation operator is on average three minutes per job—that can save up to 45 minutes each day,” says Cachia.

Dentalax’s RFID System is aimed at laboratories employed by dentists to produce dental prostheses. In France alone, the company says, there are 8,000 labs that could use its RFID offering. Furthermore, the company is looking to sell its system another to the 42,783 laboratories in Germany, Netherlands, Belgium, Italy, Spain, the U.K., Portugal and Luxembourg. The company also plans to market the system in the U.S.

Dentalax system uses 13.56 MHz chips and readers from [Inside Contactless](#), as well as its own software to manage the system. The company had originally used tags from Texas Instruments but maintains that the Inside PicoPass chips, which come with 2, 16 or 32 kbits of read-write memory and comply with the ISO 15693-3 standard provide greater memory and smaller size more suited to its application.

A dentist makes an initial cast of the patient’s teeth, and then sends the cast to the laboratory. At the lab, technicians use the initial cast to make a second cast, or die, that will be used to create the actual bridge or crown. Before the second cast hardens, a technician embeds a PicoPass chip into it. Once the plaster or resin used to make the die has cured, the tag is locked inside the material. Throughout the prosthesis manufacturing process, each time an operation is carried out on the prosthesis, that action is recorded on the chip inside the die by the technician using a PC fitted with a RFID reader.

Using an INSIDE reader attached via a USB connection to a PC running the Dentalax system, an operator can check the identity of the die by reading the embedded chip as well as record in the chip's memory all the work carried out on the prosthesis. The memory capacity of PicoPass chips varies from 2 to 32 kbits, but Dentalax says the 16-kbit option is the best size for its application.

Each time an operator carries out work on the prosthesis, details of that work are written to the tag in the die including the date, the name of the operator and the materials employed including their lot numbers, which can identify the date of manufacturing and the materials used.

Before delivering the prosthesis to the dentist, the lab retrieves the data contained in the die’s RFID chip and

copies to a smart card also fitted with a PicoPass chip. The dentist can then pass on to the patient. “The advantage of such a card is that if a patient requires another prosthesis for other teeth at another stage in his life, he can present it to the practitioner, who will retrieve all the data related to all the prostheses of the patient,” says Cachia.

In addition, a European sanitary regulation—European directive 9342C which was implemented in 1993—requires the prosthesis that a laboratory delivers to a dentist be accompanied by a record, either paper or digital, that includes the history of the making of the item. According to Dentalax, the lab technician who made the prosthesis can then wipe out the chip’s data, thereby ensuring confidentiality.

Although the company considered automating the copying of data from the die’s chip to the smart card’s chip, it opted for a manually activated copying process carried out on the PC to maintain human control so that the data can be checked or added to if required.

Dentalax RFID package is priced at 380 euros (US\$462). It contains 100 PicoPass 16KS chips, Dentalax software and a one RFID reader. Dentalax sells the smart cards that contain the prosthesis’s manufacturing records for around 20 euros each. Individual readers are priced at 290 euros (US\$353); a pack of 100 PicoPass 16KS chips costs 100 euros (US\$122).

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