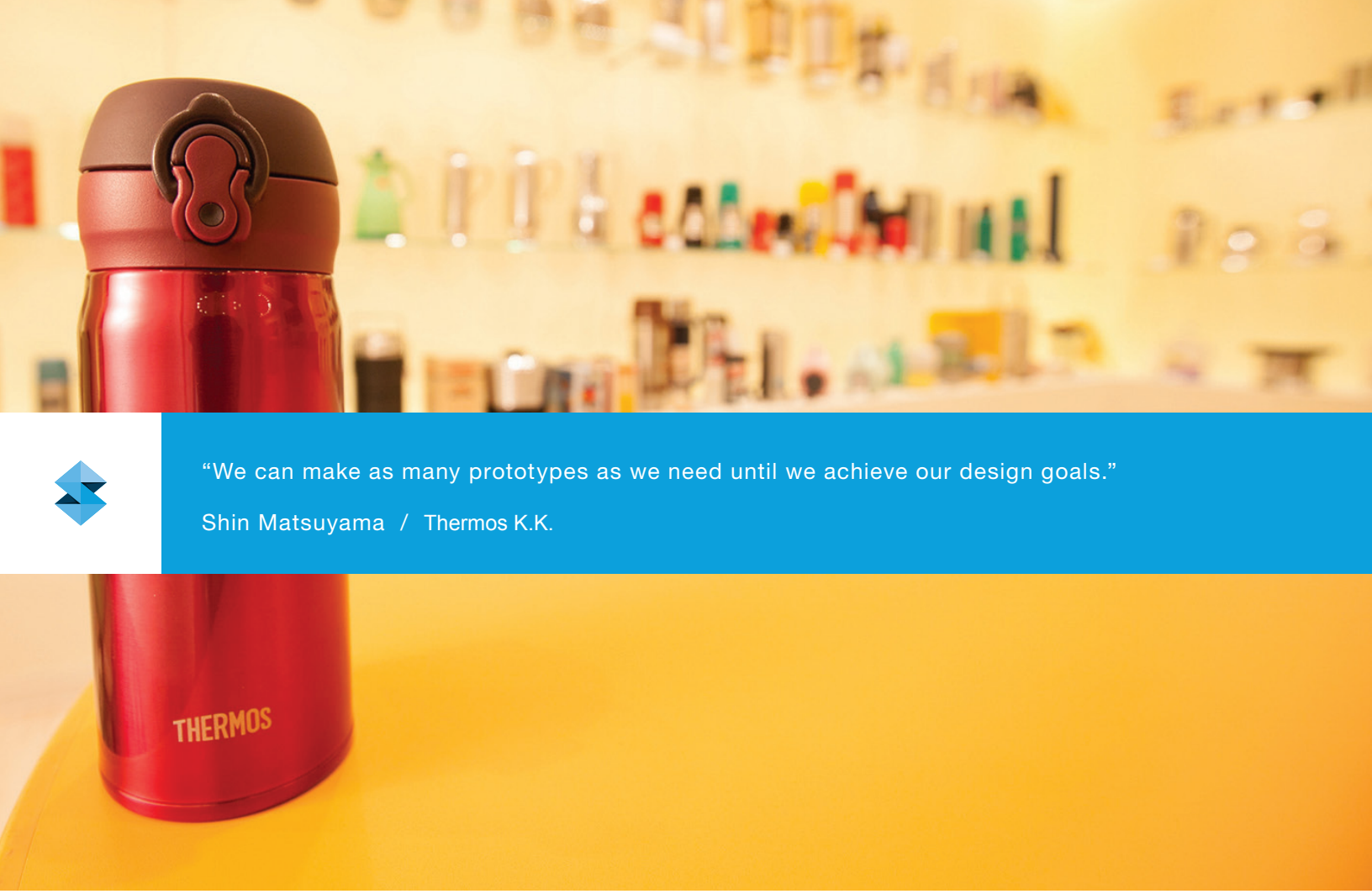

“We can make as many prototypes as we need until we achieve our design goals.”

Shin Matsuyama / Thermos K.K.

Thermos engineers constantly innovate to stay a household name, making mugs like this one ever more portable and pourable.

CASE STUDY

Airtight Performance

3D PRINTING HELPS THERMOS LEAD ITS INDUSTRY

Founded in 1904, Thermos Company is an icon in insulated food and beverage containers. Along with its venerable coffee vessels, Thermos manufactures children’s lunch boxes and other consumer products. The household name continues to innovate, building on its impressive list of firsts that includes vacuum-insulated food jars and personal bottles, and ultra-portable titanium bottles.

“We always think of product development as making something that will change people’s lifestyle,” says Shin Matsuyama, manager of R&D at Thermos K.K. Traditionally, cold and hot beverages were cumbersome, served only in large batches such as iced jugs or heated urns. Now we take personal beverage containers for granted. Matsuyama refers to this cultural change as “revolutionary portability,” and it’s his goal to keep pushing it forward by delivering better products. Last year, customers showed their approval by purchasing three million Thermos mugs.

Better Design, Faster and at Less Cost

To use a Thermos product is to touch it. Because Thermos customers handle their products extensively — with their hands and their mouths — impressive look, feel and ergonomics are vital. Innovating these products requires numerous physical design iterations, and Matsuyama's team must be able to create prototypes quickly and easily. That's why Thermos K.K.'s state-of-the-art research and development facility In Niigata, Japan, includes two Stratasys® 3D Printing technologies.

Final product (left), and a 3D printed model

Matsuyama's team brought Fused Deposition Modeling (FDM®) Technology in-house in 2006, when designers moved to an advanced engineering platform using high-end 3D CAD. The team chose a Dimension® 3D Printer for its ability to make relatively large models with strong thermoplastics. "It also offers excellent cost-performance," says Matsuyama.

Since adopting 3D printing, Matsuyama's team builds prototypes faster and at a reduced cost. Previously, outsourcing a typical prototype took three to five days. "But now we can do it internally, and finish a prototype in hours. If it's a small part, the job is done in minutes," Matsuyama says. And for Thermos, building a prototype in-house costs just one-fifth the price of outsourcing. "With 3D printing, we mostly pay for materials and nothing else," he says.


Before producing this cap, Thermos engineers tested pouring performance using 3D printed prototypes.

Beyond improving speed and cost, 3D printing helps Thermos make better products. "We can make as many prototypes as we need until we achieve our design goals. It allowed us to optimize the fit of the cap stopper and pouring performance of the best-selling Thermos mugs," says R&D engineer Takahiro Maruyama.

Compared with conventional methods, 3D printing creates prototypes with more of the finished product's features. "Threads in the mug's inner cylinder are hard to cut using traditional machining, but the Dimension produces it with no problem," says Maruyama. "All you have to do is send the STL data to the printer and press the start button. Even a young engineer with little experience can make prototypes without a thick user's manual."


3D CAD rendering

Once it had seen the benefits of 3D printing, Matsuyama's design team expanded its capabilities, adding a second Dimension 3D Printer in 2008, and adopting PolyJetTM technology in 2012 with an Objet260 ConnexTM 3D Printer. PolyJet 3D Printing empowers the team to make detailed, smooth models in multiple materials. Impressively, a prototype can emerge from the 3D printer with a mixture of clear and rubberlike features suitable for liquid and gas testing. Together, the two 3D printing technologies enhance design reviews and streamline development, quality testing — even production, where Thermos uses custom FDM tooling built in-house.

Consumers are always looking for impressive new products, and Thermos strives to answer with lighter weight, better usability and better pouring performance. 3D printing gives the company the agility to innovate fast and maintain leadership in its industry.

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