

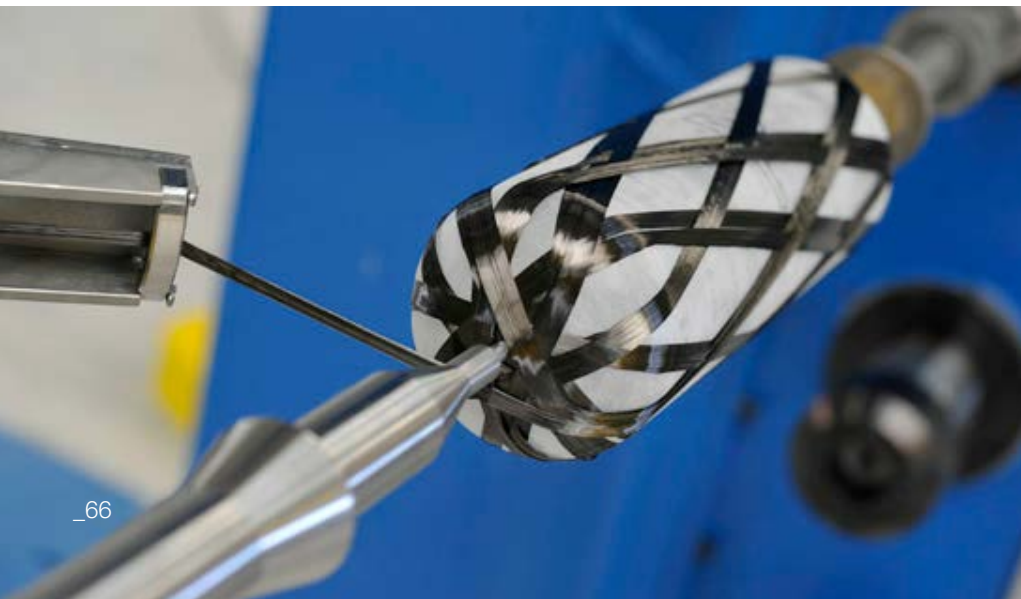
liner a barrier to oxygen up to as much as 100 times higher. Initial target application for its new invention is oxygen breathing tanks for use by fire fighters, but the potential is much greater, ranging from scuba diving kit, through fuel tanks for cars, to apparatus in outer space. CTS came to SIPA to help it perfect a process for making PET liners that it had begun to develop on its own, without achieving the results it was looking for. It had developed its own rudimentary injection molding machine, as well as an equally simple blow molding machine, which together were capable of producing containers with tolerances that were unacceptable. In fact, dimensions varied between containers by a centimetre or more! No two containers were the same,

and machine operators were constantly adjusting the settings. Something had to be done. And done it was. SIPA's experts worked with the CTS team to create a PET liner perfectly matched to the application. The two companies worked hand in hand on container development, prototyping, testing, and production.

CTS General Manager Giovanni Artusi says he is totally satisfied with the work SIPA has done in helping to create a product ready for the market that offers the very highest levels of safety. Production is now underway on a range of the new pressure cylinders, with volumes ranging from two to nine liters. The smallest one weighs 0.9 kg, and the largest one just 4.0 kg – that's

around 30% lighter than a cylinder with an aluminium liner, and five times lighter than an all-steel one. They can all withstand a service pressure of 300 bar, and CTS gives them an unlimited service life. For its part, SIPA is very happy to be working with such a highly innovative customer. "The collaboration with CTS has provided us with extra insight into the capabilities of PET as a packaging material," says Alberto Uliana. "This is the very first time that we have worked on an application where internal pressures so high! We have all gained a lot from the experience."

The two companies are now collaborating on experimentation with various types of plastics for the liners that could provide even higher performance in terms of oxygen barrier. CTS is a new company, but the experience of its founders in pressure canisters dates back some 30 years. With its highly innovative know-how, CTS describes itself as "an organization capable of grasping the global opportunities that the composite materials sector has to offer in the field of pressure cylinders." CTS has patented its new technology for making the PET liner around the world.



SUPER RESULTS FROM SIPA AND SACMI NECK & CAP WATER BOTTLE COLLABORATION



Collaboration between SIPA and Italian cap & closure production technology specialist SACMI is yielding positive results. The two companies have been working together since 2012 on the S.U.P.E.R. project, which aims to deliver new combinations of lightweight screw caps and PET bottle necks for the latest generation of bottles for still and sparkling waters. Their target is a new combination of PET preforms and closures that provides advantages for processors and end-users alike. S.U.P.E.R. stands for Sustainable, Unique, Productive, Easy, and Reliable.

The two companies set themselves various objectives, apart from weight reduction. The first objective was to use the same combination of neck/cap both for still and carbonated water eliminating the time for line changes and therefore saving money. Then, they wanted to create a closure system that was as easy as possible to use while still offering the safety and security features of current systems, for example. The development was aimed at bottles up to 3.5vol of CO2 and 1,5L in volume, and was intended to be compatible with 26-mm CETIE

GME 30.28 necks.

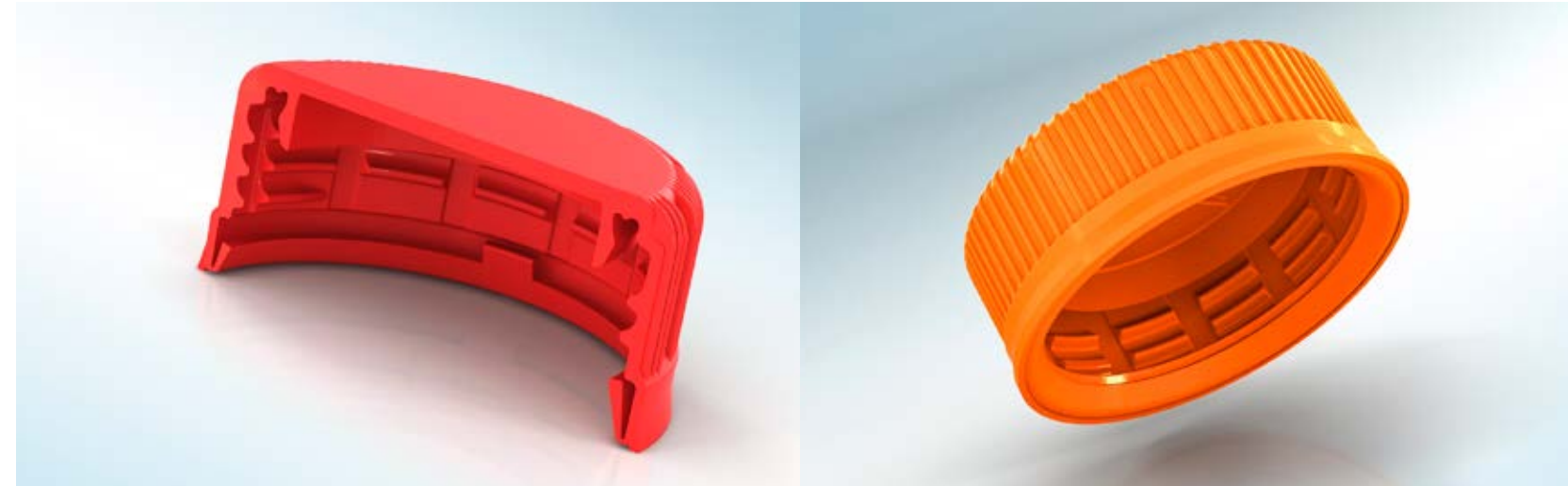
The new SUPER 26/22 system is distinguished by a very low height and weight – the neck is just 12.0 mm high in its standard version and weighs just 1.86 grams (1.82 g in a version with SACMI's Multi-Lock system, which breaks all the links on the security ring as soon as the user begins to unscrew the cap). A CETIE 26/22 for still water is the same height as the SUPER 26/22 neck, but weighs 1.90 g.

A special "high" version suitable also for CSD till 4,2 CO2 weights 2.3 g. This contrasts with a PCO1881 cap that is 17.0 mm high and weighs 3.8g, almost twice as much – and

which takes caps that can be up to 0.6g heavier.

The two companies have in recent months been carrying out various validation tests, in the laboratory and on production lines, on the functionality and ease of use of the SUPER 26/22 system. In a nutshell: the system passed all the tests.

A joint development team checked, in particular, to make sure that the threads on the new neck are sufficient to keep the cap in place, and to ensure that there is minimal risk of 'blow-off' when the cap is first unscrewed from the bottle (this is obviously more important for carbonated products). In the Opening Performance Test, the cap & neck



combination was assessed to make sure that any excess pressure that builds up in a half-empty bottle is released during opening while the cap is still attached to the thread, and that no blow-off occurs – this is when the internal pressure is sufficient to force the cap explosively off the thread).

The two companies have additionally carried out tests to make sure that the closure system is easy to use by the consumer, also due to the multi-lock system. They looked at

how much force is needed to open a still-sealed bottle, for example. This is a particularly important test, not only because there is nothing worse than a closure that won't open, but also because the new SUPER 26/22 cap, being smaller than any other, is a little less easy to grip. Once again, the SUPER 26/22 came through with flying colours. Converting current preform injection molds to the SUPER 26/22 requires few hardware changes. No significant modifications are needed in the blowing machine and in the filling

line changing from CETIE26-22 to Super. Whatever the costs involved in such modifications, these can quickly be recouped through savings in raw materials and in energy. A company producing 150 million preforms a year (in this case, 90 million for still water bottles, 60 million for sparkling water) stands to save close to €250,000 on their PET bill at current prices, and some €25,000 in electricity (in Europe). That works out to a return on investment inside four months.

