TEKST Lisette de Jong

ACU-Drop® II has won the NL Packaging Award 2017 in the category Innovation Packaging & Materials.

ACU-Drop® II simplifies control of diagnostic equipment

Testing made simple

Press a button, gently turn the container a few times, and the sample is ready for use. Routine monitoring of diagnostic equipment in hospitals is a piece of cake with the ACU-Drop® II. “We are offering the first all-in-one solution on the diagnostic market,” say Bart Maas, Marc Ramondt and Hans Vereijken – the brains behind it. The innovation has won the NL Packaging Award 2017 in the category Innovation Packaging & Materials.

Hans Vereijken, Marc Ramondt en Bart Maas (fltr).

Blood samples used to be checked in separate central laboratories in hospitals. Nowadays, point-of-care sites in hospitals have their own diagnostic equipment in order to measure, for example, levels of blood gases, electrolytes and metabolites. “This saves a lot of time,” says Bart Maas, Managing Director at Eurotrol, supplier of quality control (QC) fluids to the medical world. “Physicians can often diagnose within minutes and start treatment immediately.”

Stable

Diagnostic equipment should be checked, three times a day, using Quality Control (QC) fluids. “These samples resemble human blood, as far as possible, and must remain stable for at least a year,” says Maas. “For many substances this is a challenge. With a blood glucose test, for example, you need glucose and blood cells, components which should be stored separately in order to prevent the blood cells depleting the glucose.”
Together with Verhoeven Ontwerpbureau, Eurotrol developed a solution to this stability problem. Called ACU-Drop® II, it is a container, with two compartments in which fluids, or a fluid and a powder, can remain stored and separated for one year, without changing composition. “With just one push of a button, the user can quickly merge the components, using our prepared, accurately-weighed quantities. Subsequently, he can test the equipment using the sample”, explains Marc Ramondt, Operations and Supply Chain Director at Eurotrol. The container does not fracture when merging the substances, so there is zero risk of particles contaminating the fluid. Moreover, the user does not come into contact with the contents.

‘Stir the cup – not the spoon’

The substances are mixed quickly and evenly by shaking the container a couple of times. “Inside the container, which is made of inert, pharma grade LDPE, HDPE and PP, is a ‘static stirrer’, a dish that allows the mixing to take place”, explains industrial designer Hans Vereijken, Director of Verhoeven Ontwerpbureau. “You can stir the contents of your cup with a spoon, or you can keep the spoon still and stir the cup itself. We opted for the latter, because we should not go into the container from the outside; it is hermetically sealed. For the user this makes no difference; he only needs to turn the ACU-Drop® II a few times to bring the materials together.” The packaging is also free of constrictions, which allows for optimal flow of the contents. For tests that only need a single drop of QC fluid, the container can be opened, after mixing, via a flip-cap with an integrated dropper tip. “This means the container can be used several times”, says Vereijken. For tests that need more QC fluid, a syringe can be attached via the Luer-connector.

Many criteria

Eurotrol and Verhoeven Ontwerpbureau developed the concept together, and visited several injection-molding companies in the Netherlands and abroad. “After one and a half years, we found a supplier who had affinity with this type of product and had the in-house resources to develop and produce the required tools.”
The packaging had to meet many criteria. “We wanted it to sit nicely in the hand, to be easy to use and to look elegant,” says Ramondt. Security and accuracy were equally important. “We had, for example, to ensure that people could not, inadvertently, press the button; so the cap is covered by a white sheath.”
And the packaging had to be produced by a machine. “The inner sides must not touch each other during the production process, to avoid damaging their surfaces – which would result in unwanted particles in the fluid or leakage of the compartments.”
Shrinkage and expansion of the liquid and container also needed careful consideration. “With one of the early prototypes we noticed that, despite careful sealing, after 24 hours minute amounts of liquid seeped from one compartment into the other,” says Vereijken. “We found that, on the brackets on which the sealing disc rests, tiny crimp-ridges had formed. We solved this problem by adjusting the injection-molding and polishing processes, and the thickness of the material.”

Precision record

The medical world has received ACU-Drop® II with much enthusiasm.
“The proficiency-testing organization, that coordinates external quality-audits by medical laboratories, was the first to try-out our innovation”, says Maas. “They evaluated the product as extremely accurate and precise.”
Now patented, the system has been launched in the Netherlands, the United Kingdom and the United States. “In the US we provide 24 webinars per year explaining how the ACU-Drop® II works; this is common in the American medical world”, says Ramondt. In the Netherlands the information is shared via a video on the website and leaflets. “This approach works just as well, because the system needs little explanation.”
Eurotrol wants to equip the world with its medical innovation. “We are the first to provide an all-in-one solution for testing samples,” says Maas. “And there are many other possible applications. Think of keeping blood-clotting factors stable, or administering drugs and preparations for cosmetic applications.”

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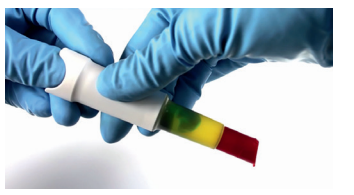
A section through the ACU-Drop® II with, left and right, the compartments for the substances, in the middle the ‘static stirrer’ and, on the far right, the flip-cap.



With one push on the button the contents of the two compartments are brought together.

The contents are mixed by shaking the container a few times.

Subsequently, the mix can be released, drop-by-drop via the flip-cap (right) or, for larger volumes, via the tip of a syringe (left).

Eurotrol

Eurotrol is a trusted supplier of Quality Control liquids (artificial blood samples) to hospitals for monitoring diagnostic devices - for example, to measure the glucose or oxygen in the blood. They supply more than 400 products, accounting for millions of tests. Eurotrol is located in Ede, NL (headquarters) and Burlington, USA.