

Cargoshell Reefer awarded CSC certificate

For more than half a century, it has been impossible to imagine international freight transport without the sea container. As the volume of transport increased, so did the requirements that were placed on the containers being used. The Cargoshell Reefer is the first composite sea container to meet these strict standards, and this month it was awarded the CSC certificate from DNV GL at Drehtainer in Valluhn, Germany. We talked about this with dr.ir. Albert ten Busschen, who is responsible for the Cargoshell design.

Why did the Cargoshell need to undergo a new CSC test when it had already been certified?

"In 2012, we were awarded the CSC certificate for the 20ft Cargoshell container, which proved that it was possible to develop and manufacture a composite sea container that meets all of the strict requirements. However, that design was for what we call a 'dry box' container," explained Ten Busschen. "A new schedule of requirements was drawn up for the Cargoshell Reefer. This container had to have thermally insulated walls, it needed to be hermetically sealed and had to have an integrated refrigerator unit. Moreover, the design had to be suitable for mass production and capable of competing with existing containers in terms of price. The modifications entailed re-testing the strength of the prototype as well as all of its components." Ten Busschen and his team did not let the certification depend on the DNV GL test. He continues: "During the five-month research period and the seven-month manufacturing period, we conducted a variety of interim tests on the Reefer's details and components as not a single part may fail the CSC test. For this purpose, we set up special tests, lots of specific details underwent FEM analyses and the results were fully documented. Only when these analyses had proven convincingly that the schedule of requirements would be met, could production be started."

What makes composite suitable for a container like Cargoshell?

"Composite is highly suited to constructing a container," explains Ten Busschen. "The Cargoshell Reefer is built like an integral sandwich with reinforced outer skins and an insulating



inner layer. These layers are manufactured in a single process. This contrasts with steel container manufacture where the insulating layer is injected between the walls at a later stage. Thanks to the internal links, the problem of delamination has been resolved. This is a frequently occurring problem in practice, and can greatly reduce a container's insulating properties. What's more, we also retain the other benefits of the material such as its lightness, strength, resistance to corrosion, hygiene and radio transparency."

How do composite's special characteristics contribute to the Cargoshell's rigidity?

"When we say composite, we mean fibre-reinforced plastic. The fibre reinforcement means we create a material that has great strength and low weight. The fibres can be built up and laid in different directions. In most of the parts, we use glass fibre; in the supporting columns and corners of the container we use carbon fibre, which, despite its low weight, has outstanding strength and rigidity. By making the supporting columns from carbon fibre, we were able to pass the stacking test, in which each of the corner posts is subjected to a compression force of no less than 85 tons."

Please follow the Cargoshell's progress at www.cargoshell.com