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Multilayer design of materials for marine underwater cables

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Multilayer design of materials for marine underwater cables

Cables are one of the most important and needed technical equipments for ocean technology. Each sensor and each actor must transmit signals to other electronic devices like computers, memories etc.. Using wireless systems like acoustic or radio transmission is one way to achieve this, but there is another method to use wired systems – cables. For the power transmission – beside the use of batteries – it is necessary to integrate cables in each system.

In a lot of cases it is necessary to use multilayer designs for metallic and non-metallic (plastic) elements of the cable. In most of the existing standards for cable materials are described test principles only for single layer materials, no application tests available for multilayer design of materials. But on the other hand some standardisation documents mainly for shipboard cables allow using multilayer designs for plastic insulation and sheathing materials.

The publication describe in the first part different designs of cables with used multilayer materials. Also are given proposals for several definitions for kinds of multilayer design, mainly for the plastic materials.

In the second part the publication contains the description of existing standards for mechanical tests and test of the chemical resistance of insulation and sheathing materials for marine and shipboard cables.

The third part of the publication contains proposals for the application of existing test methods for the introduction of multilayer materials in the test procedures. With these applications it will be possible to use most of the existing standard test methods also for multilayer materials.

One of the most important issues is the measurement of the sticking force of multilayer plastic materials. Until now is not existing a reproducible method to evaluate this force as until now it is only possible to measure connected mechanical properties (indirect measurement). The publication gives first ideas how to develop in future such a test method.

The publication gives a guideline for cable manufacturers and cable users to agree test methods for cables with included multilayer materials until the international standardisation contains such test principles.