



UNITED STATES COAST GUARD

U.S. Department of Homeland Security

MARINE SAFETY ALERT

Inspection and Compliance Directorate

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Safety Alert 09-26

USE OF PROTOTYPE SHAFT SEAL MATERIAL ON BOARD DEEP DRAFT VESSEL LEADS TO ENGINE ROOM FLOODING

The U.S. Coast Guard (USCG) identified a safety concern after a prototype component used in a mechanical shaft-seal system failed onboard a USCG inspected deep draft vessel. On February 19, 2025, a U.S. flagged crude-oil tanker transiting near Delaware Bay experienced simultaneous failures of its port and starboard shaft seals, resulting in substantial seawater ingress. The crew subsequently deployed emergency collars supplied by the seal manufacturer and used the vessel's emergency bilge system to remove the water.

The investigation revealed that the failed component was a prototype composite seal-facing material installed during dry-dock as part of a shaft-seal system previously approved by the Recognized Organization (RO). Notably, the investigation found that the RO-approved design drawings lacked specific material details, vaguely describing the seal-facing material only as 'composite'. During the vessel's first post dry-dock voyage, sea water flooded through the seals' split face butt when exposed to cold seawater after operating in warm conditions. Although the overall seal system was approved by the RO, the seal manufacturer did not disclose its use of the unapproved prototype material. The USCG, RO, and the vessel owner became aware of the substitution only after the incident occurred.



Figure 1: Sea water discharging through seal face



Figure 2: Seal split face butt

In light of this incident, the USCG strongly recommends that ROs enhance scrutiny of material specifications by requiring detailed descriptions in approved drawings and questioning of vague terms. ROs should also verify material certification during vessel inspections and surveys to ensure installed components match the approved design and improve oversight of supplier quality control to remain vigilant against changes in manufacturing. Furthermore, manufacturers

are reminded to inform vessel owners and operators of any deviations from existing approvals, to include prototype or substitute materials, prior to installation. Vessel owners or operators should then inform the cognizant USCG Office in Charge, Marine Inspection (OCMI) and the applicable RO of any novel materials or arrangements that deviate from applicable standards.

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