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## Performance documentation for Desmi fire booms

D 4.12

WP4 Combat of oil spill in coastal arctic water



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## Table of content

Executive Summary .....	4
Status Report.....	5
Performance .....	6

## Executive Summary

In the summer of 2017 pilot scale oil spill experiments were carried out in Greenland. 1.000 liters of IFO180 were released and burned at sea and 600l of a medium light crude oil was released and burned at the shoreline. For further information on these experiments, please see <https://youtu.be/51ieM7h7yKM>.

The Desmi fire boom system "Pyroboom", performed well for the in situ burning at sea and on the shoreline, the biggest challenge was in the maneuvering of the vessels when conducting in situ burning at sea, a challenge that is not present when conducting in situ burning at the shoreline.

## Status Report

In the summer of 2017 pilot scale oil spill experiments were carried out in Greenland. 1.000 liters of IFO180 were released and burned at sea and 600l of a medium light crude oil was released and burned at the shoreline. For further information on these experiments, please see <https://youtu.be/51ieM7h7yKM> .

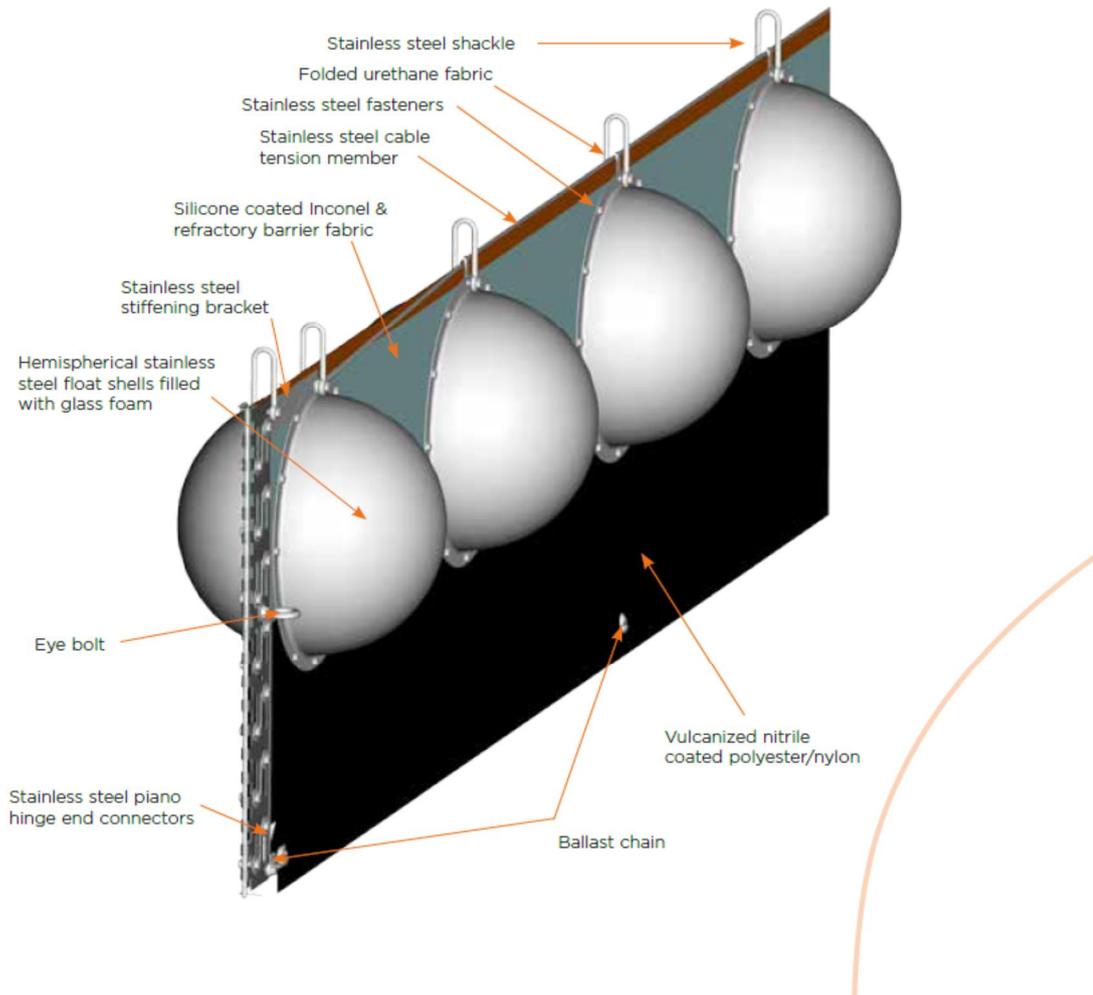
Tasks “4.3.2 Pilot scale oil spill field experiment” and “4.3.3 In situ burning of oil at shoreline” were carried out in July 2017. The Desmi fire boom system “Pyroboom” was used to contain the released oil during both tasks.

GOSR personnel had had extensive practice with the Desmi fire boom system in connection with cold weather exercises held annually in March, thus the fire boom system was not tested prior to the in situ burning tasks. However when the fire booms were deployed for task 4.3.2, the two vessels towing the booms in a U formation practiced extensively on keeping the formation before any oil was released. When the in situ burning had taken place in connection with task 4.3.2 the fire booms were moored up immediately and was thereafter towed to the location for the in situ burning of oil at shoreline, where it was then moored to the coast line in a U formation for task 4.3.3.

## Performance

### Desmi fire booms

The Desmi PyroBoom is a solid flotation barrier that combines a wire reinforced refractory fabric for the above surface barrier with conventional fabric for the skirt. The glass foam filled, steel hemispheres are mechanically attached to the barrier. The fireproof section consists of silicone coated, high temperature metallic (Inconel®) wires interwoven with similar wires and refractory materials (Fiberfrax®). For strength and flexibility below the water line, the PVC coated Polyester "ED" fabric is used. Construction features are illustrated below:



**Figure 1.** Desmi illustration of Desmi Pyroboom construction features

GOSR personnel had as mentioned exercised extensively with the Desmi firebooms, however this was the first time to exercise with oil. The deployment of the fire booms went well, the system is low-tech in the sense that it doesn't require any pumps or compressors to deploy. It is however heavy but if placed correctly the booms can "self-deploy" as the deployment vessel moves ahead, lifting equipment (eg. crane) is however needed when recovering the booms. In order to keep the contained oil in the fire booms it was necessary to sail at a very slow speed, this is the biggest challenge that GOSR has come upon when using the fire booms, as most vessels have some difficulty at maneuvering at less than 2 knots per hour, it is however manageable with practice, which was also the case when conducting the field tests in Greenland. For task 4.3.3 the fire boom was as mentioned moored for the in situ burning at the shoreline, getting the fire boom in position for this task was physically hard work with the resources available, but manageable and compared to task 4.3.2 much less stressful as the pressure of keeping the oil contained in the fireboom was not present as the moored fire booms held the oil against the shoreline during the in situ burning, thus avoiding the risk of oil slipping out from the fire booms when sailing in a U formation during a conventional in situ burning at sea.

The fire booms were not cleaned or repaired in between the two burns and performed well for both burns, after the second burn it was however visible that the fabric was somewhat damaged from the burn, as can be seen below:



*Figure 2. Picture of Desmi firebooms after termination of both burns*

Cleaning the fire booms after use proved quite unsuccessful, it was not possible to get the fire booms back to their former states with the cleaning options available in Nuuk and this is something that would have to be investigated further for future use.