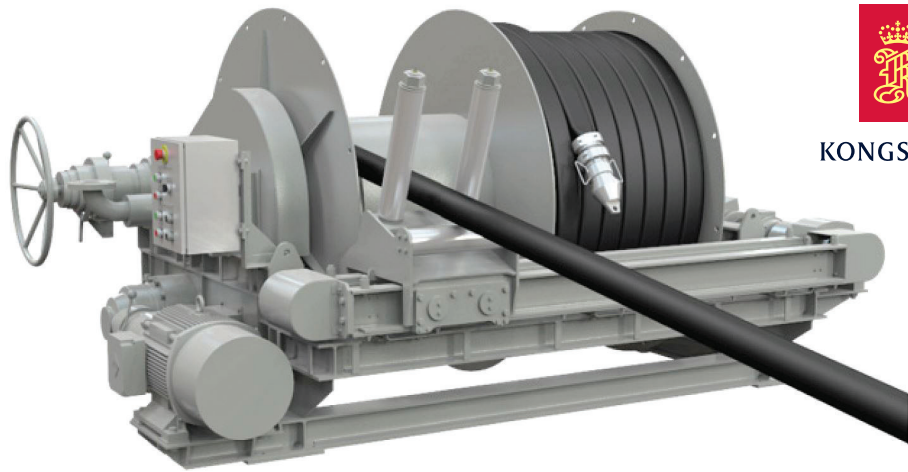


# REFUELLING AT SEA

## OEM FAS PRODUCTS - UK AND WORLDWIDE EXPORT

- FAS delivery systems
- Astern liquids replenishment, available with NATO 1, NATO 3 and NATO 5 connections in accordance with NATO ATP-16 inter-operability standard
- Standard hose diameters Diesel (6"), AVCAT (4"), fresh water and/or potable water (2.5")
- Suitable for use in heavy sea states
- All electric high performance drives
- Transfer with vessel speeds of up to 15knots
- Low through life cost
- 3ph 440V & 690V AC supply options available



KONGSBERG

## KONGSBERG FUELING AT SEA EQUIPMENT

### Astern reel refueling at sea

KONGSBERG produce refueling at sea astern reels to provide an additional dimension to underway replenishment for modern navies. Mounted on the aft of the vessel it gives unsurpassed refueling capability in rough or stormy seas when the abeam method is not possible. By removing the requirement for the vessels to be in close proximity to each other, the refueling process is made safer under these otherwise dangerous conditions.

Capable of supporting multiple hoses, the astern reel gives the added benefit of being able to provide a range of different liquid mediums to the reception vessel, whilst being contained in a relatively compact deck machinery envelope.

To enable the layflat hoses to stow correctly, the astern reel assembly is provided with an air pressure driven pig launcher and blow down system. This ensures the hoses are left empty and clean during storage on the drum.

A manually controlled oscillating hose spooling carriage is fitted to ensure that the hoses are paid out and recovered smoothly and without damage. The hose carriage is driven mechanically by a separate motor. Only one of the two hoses may be deployed at a time so the spooling carriage can be used on any of the hoses fitted to the drum. An associated electrical starter panel is also supplied which is mounted in an enclosed compartment position.



Typical single 6" hose diesel astern reel



Astern reel main drive motor



Astern reel operations at sea

# Typical astern reel equipment specifications for 6" and 2.5" hoses, other configurations available

TECHNICAL DETAIL	SPECIFICATION
Pull from 6" hose barrel section	4 tonne from 1st layer
Barrel speed (slow setting)	24m/min. of hose from 1st layer
Barrel Speed (fast setting)	48m/min. of hose from 1st layer
6" hose accommodation	228m of 6" diameter layflat hose in 5 layers
2.5" hose accommodation	228m of 2.5" diameter conventional hose in 5 layers
Hose pressure ratings (6" & 2.5" hoses)	200psi working pressure
Hose cleaning facilities	300psi test pressure
Hose storage vapour pressure relief	Foam pig cleaning provided for 6" & 2.5" hoses via separate pig launchers



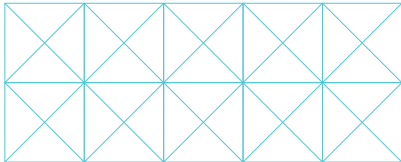
Astern reel pig launcher



Astern reel spooling gear

## TYPICAL ASTERN REEL

- Can be engineered to naval shock ratings
- Fail-safe design including spring applied and magnetically released motor brake
- Motor and brake protected by embedded phase temperature sensors and overcurrent devices
- Wide reference list across NATO fleet
- Structural design fully validated via third party assessment conducted by nominated marine classification society



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