

**Scope of delivery per frigate:**

- ✓ 2 x frequency drive systems
- ✓ 2 x electric propulsion motors
- ✓ Simulation test

## Damen Shipyards Group

PKR guided missile frigates - 2017

Damen Schelde Naval Shipbuilding has delivered two Perusak Kawal Rudal (PKR) guided missile frigates designated for the Indonesian Navy. Bakker Sliedrecht was responsible for the electrical auxiliary propulsion system. The frequency drives of this propulsion system are directly connected to the power grid while complying with the EMC regulations.

### Water-cooled frequency drives

Key components of the electrical auxiliary propulsion system are two electric propulsion motors from Indar and two water-cooled variable-frequency drives with active front ends. Both frequency drives are cooled by one water-cool unit to save weight, space and costs.

### Installation process

After assembling the electrical drive systems in our workshop, the installations were delivered to Damen Shipyards where one of the ship segments was built. Damen installed the electrical propulsion system after which Bakker Sliedrecht conducted an installation check on the finished ship segment. Then, the ship segment was shipped to Indonesia where all ship segments were connected to each other.

### Electromagnetic Compatibility Control (EMC)

Each frequency drive is connected to the vessel's power grid, without the use of a transformer, to save weight

and space. Without certain measures, this direct (conductive) coupling can cause unwanted effects on sensitive operational equipment connected to the grid.

Bakker Sliedrecht created smart filter techniques to mitigate the disturbance levels in order to comply with the IEC- and Navy regulations. Prior to realization, model based simulations were used to prove this brand new design. A selective earth fault detection is also included in this design.

### Sea trials

Bakker Sliedrecht participated in the sea trials that took place in Indonesian waters. During the sea trials, the electrical auxiliary propulsion system performed perfectly. The electrical auxiliary propulsion systems of both frigates were delivered according to schedule and to satisfaction of Damen Schelde Naval Shipbuilding.



**Do you have any questions?**

Call: +31(0)184 43 66 66

Mail: [info@bakker-sl.nl](mailto:info@bakker-sl.nl)