

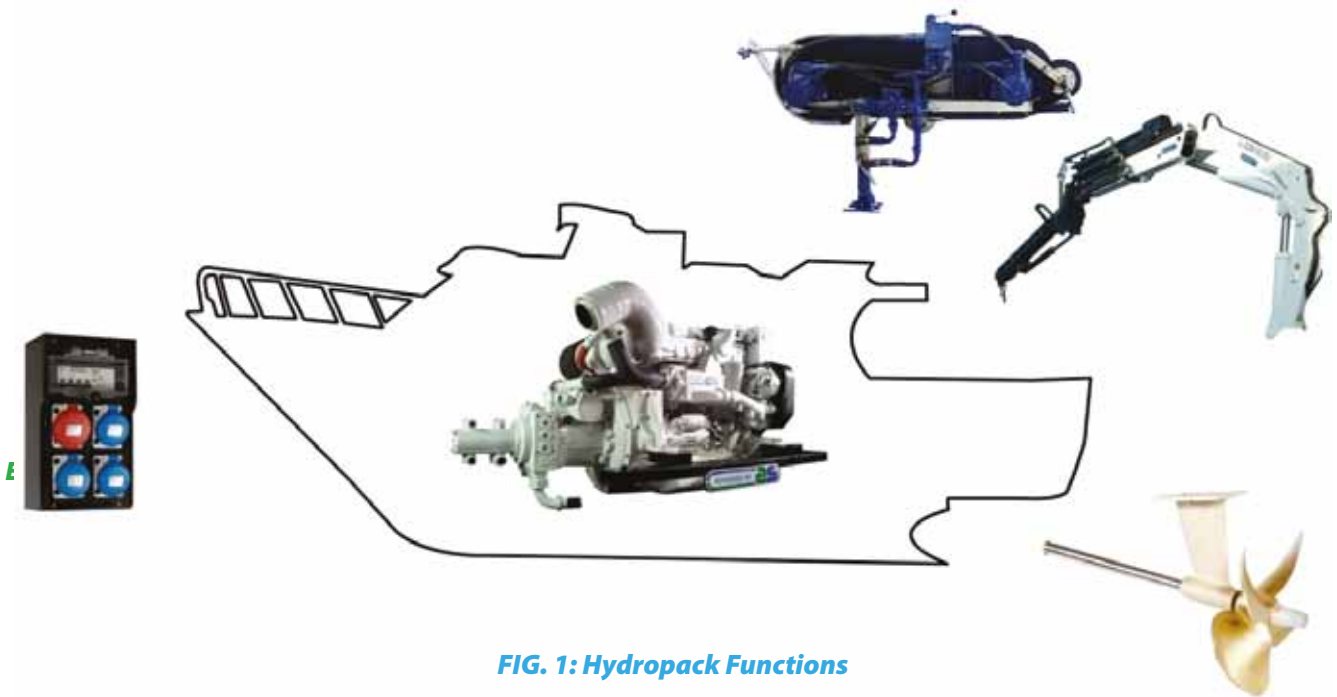
# The new integrated propulsion system





Hydropack is an **Integrated Naval Propulsion System** that manages, with a hydrostatic transmission driven by diesel engines:

1. Vessel propulsion
2. Fishing gears and auxiliary installations
3. Electric energy production.



**FIG. 1: Hydropack Functions**

The **main components** of Hydropack are:

- Diesel engine/s
- Hydraulic pumps
- Hydraulic motor/s
- Oil tank and hydraulic accessories
- HMCS (Hydropack Management and Command System).

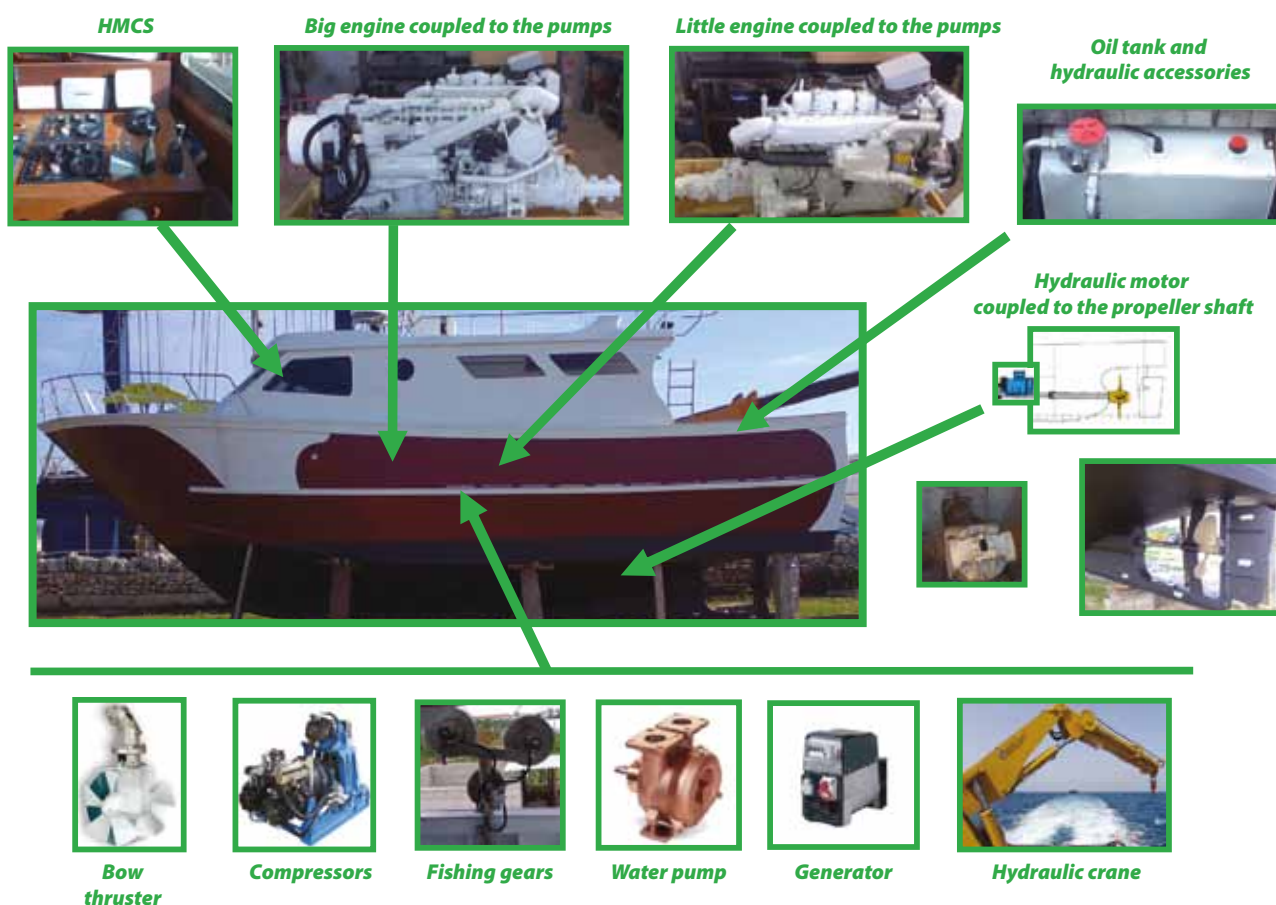
The diesel engine is **coupled to a variable displacement hydraulic pump** that delivers high pressure oil to the hydraulic drive motor.

This is a fixed displacement motor which is **coupled to the transmission type of the boat:**

- Propeller shaft
- Stern drive
- Sail drive
- Pod drive
- Water jet.

Hydropack is a **multi-configurable system**:

- One engine – One propeller
- Multi engines – One propeller
- One engine – Multi propellers
- Multi engines – Multi propellers.



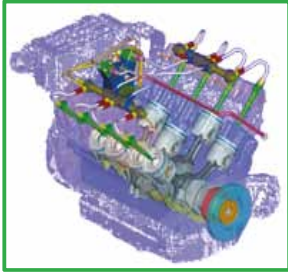
**FIG. 2: Example of configuration "Two engines - One propeller "**

**1. Propulsion:**

- Big engine for cruise
- Little engine for work operations or in case of failure of big engine
- Two engines for fast cruise.

**2. Auxiliary installations and energy production:**

- Little engine in standard conditions
- Big engine in case of failure of little engine.



The engines used in Hydropack are **modern diesel engines**, with innovative technological solution and they are comply with:  
**IMO / MARPOL – 2003 / 44 / EC – CCNR.**

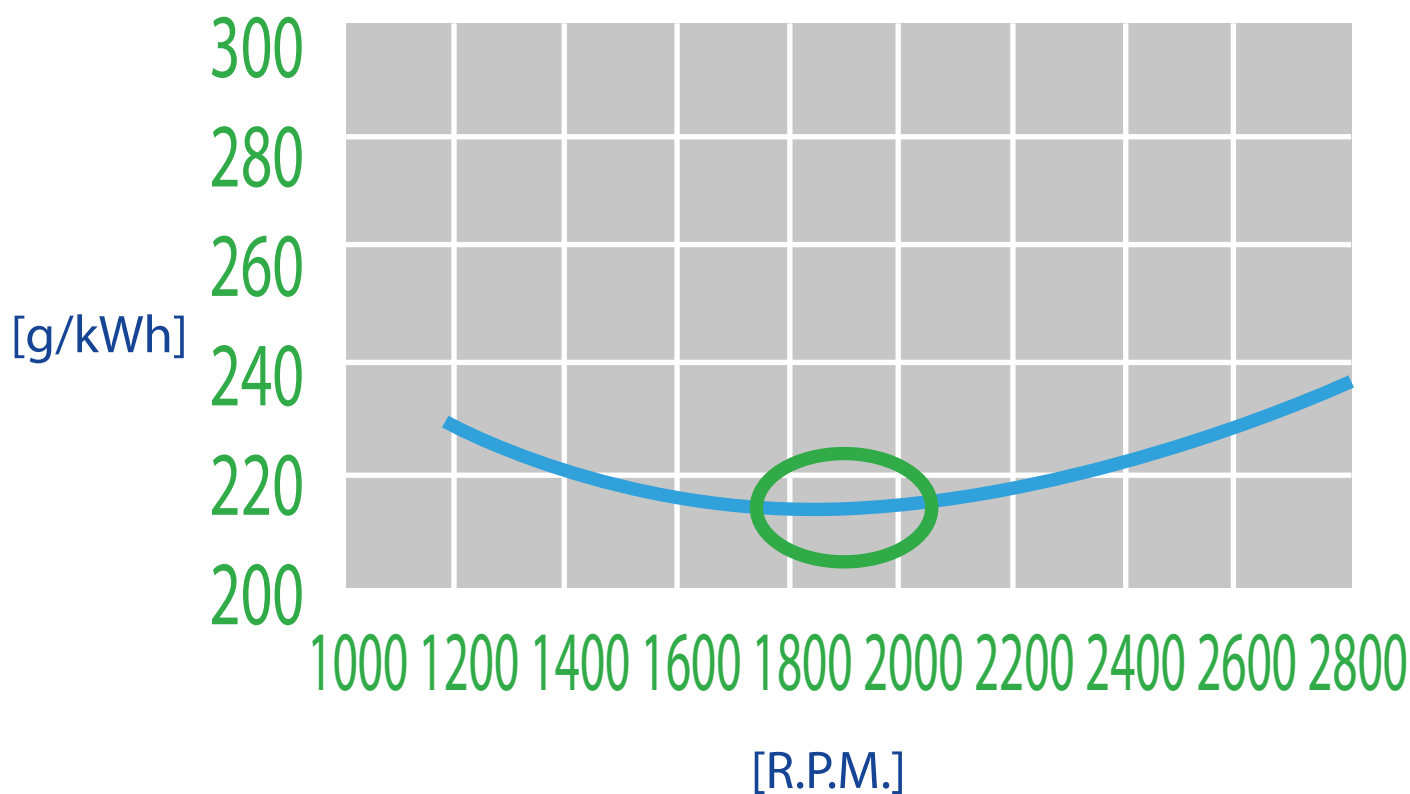


**FIG. 3: Engine coupled to the propulsion pump and auxiliary pumps**



**Hydropack engines work in their best point of efficiency (60-70% of max RPM) with constant speed, so there is:**

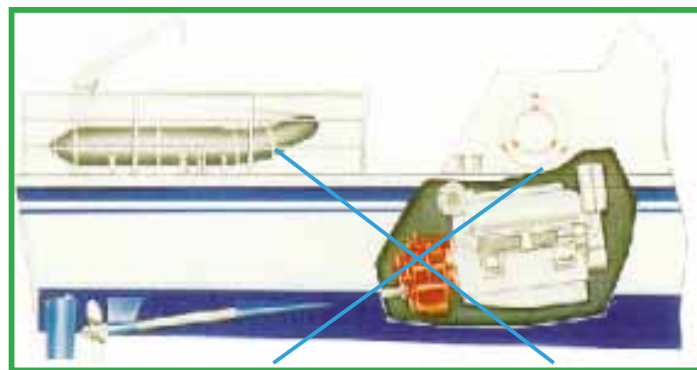
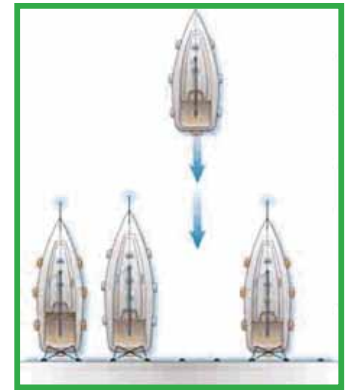
- Optimal management of fuel injection
- Less fuel consumption until 50% than the traditional system
- Lower emissions of Particulate and NOX
- Reduction of smoke levels (no white smoke at cold starting, less acceleration smoke, no black smoke)
- High decrease of sound and vibrational emissions
- Minimum operational and maintenance costs
- Maximum safety and long engine life.





Hydropack has not gearbox and the inversion of movement is done with variation of the displacement of hydraulic pumps, so there is:

- Built - in highly flexible oleodinamic joint to dampen torsional vibrations and shock loads
- Variable transmission ratio
- Excellent resistance to forward - reverse rapid change of movement
- Very flexible speed control available at low rpm.



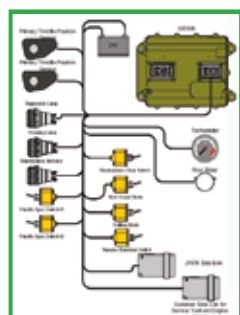
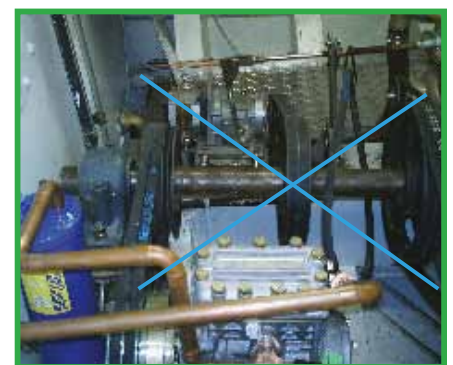
With Hydropack the propeller is **moved by a hydraulic motor** and so:

- Diesel engines can be **installed everywhere in the boat** according naval architect exigencies; also the little boat can be equipped with refrigerated space, can have accommodation and cooking facilities and can be seaworthy
- The engine can be sited away from the steering position to give a quieter cruise

- Small dimensions of propulsion axle
- Best shaft angle with improvement of propulsion efficiency
- The engine can be mounted on very low hardness silent block for high reduction of vibrations.

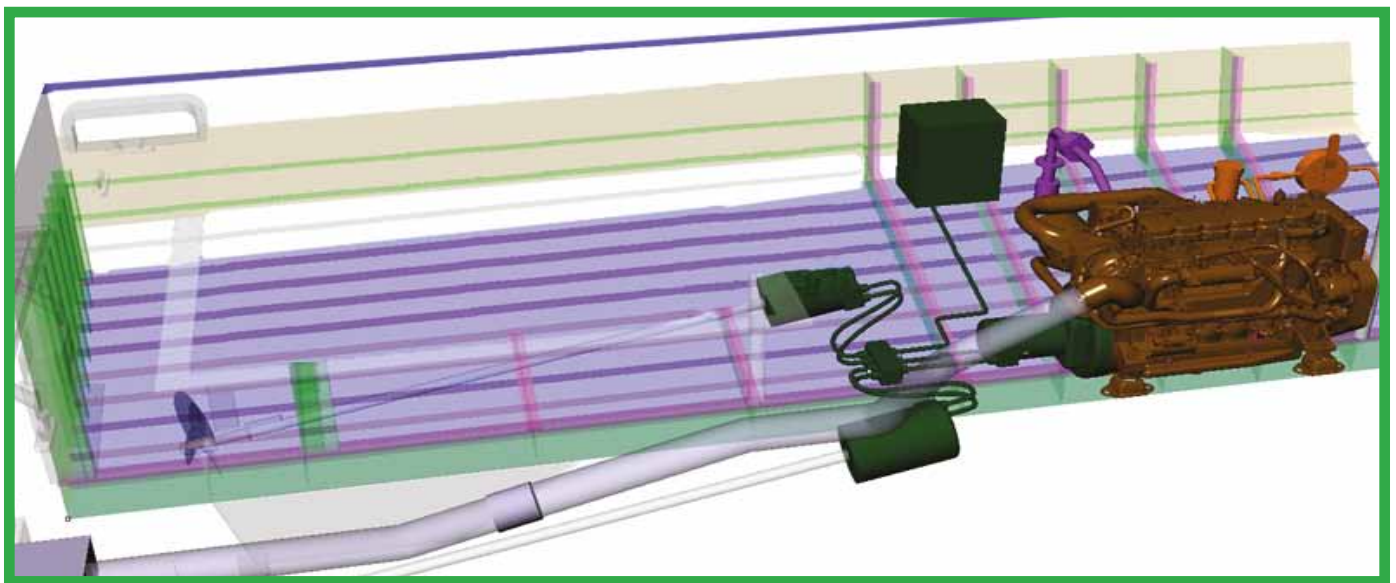
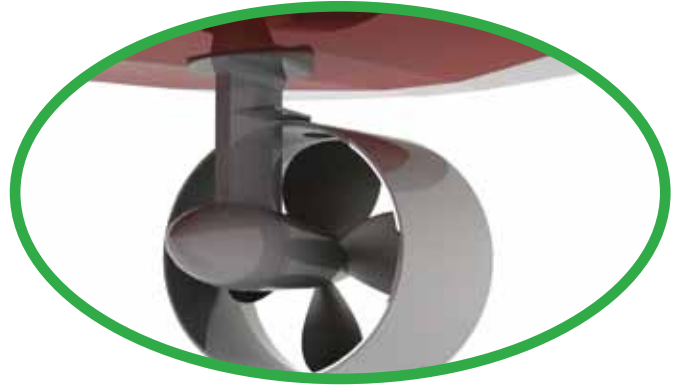
In Hydropack all labor accessories (fishing gears, water pumps, bow thruster, ecc.) are **moved hydraulically with auxiliary pumps connected to diesel engines**, so there is:

- Absence of front axle power take off with pulley
- Reduction of dimensions of auxiliary installations.



Hydropack is governed by an electronic central unit that manages and optimizes engine speed, direction of movement, load sharing, energy consumption, hydraulic oil pressure, acceleration and deceleration ramps.

Through HMCS Hydropack becomes the hearth of the boat.





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