

# GENERAL SELECTION GUIDE

A hydraulic manual steering system consists of three basic main components:

- a) the helm pump
- b) the cylinder
- c) the hose or tubing required to connect the cylinder to the helm pump

To select the type of cylinder and the size of the helm best suited to your boat, take into consideration the following variables:

- 1) Type of boat (planing or displacement)
- 2) Type of engine (outboard, inboard, sterndrive)
- 3) Number of engines
- 4) Total power of the engines
- 5) Space available in the splashwell and dash areas for the steering components

When making your choice, specify the following options:

- 1) Number of steering stations
- 2) Additional features such as autopilots

## NUMBER OF TURNS IN RELATIONS TO STEERING EFFORT

When choosing the responsiveness of a steering system, remember that the steering wheel effort is proportional to the number of wheel turns: the quicker the steering, the harder the effort

The number of wheel turns lock to lock depends on the volume of the cylinder and the displacement of the helm.

Other factors that can influence steering effort are the vessel speed, rudder size and hull type.

## HOW TO CALCULATE THE RUDDER TORQUE

When the torque necessary to manoeuvre a boat was not specified neither by a naval architect nor by the shipbuilder yard, it can be calculated.

It must be known that the torque necessary to manoeuvre a boat depends on:

- the speed of the water flowing on the surface of the rudder at a certain angle;
- the rudder size;
- the total sweep of rudder (and a part of the boat) when rudder shaft is not perpendicular;
- the compensating surface;

Torque calculation for a maxi speed about 25 knots:

$$T = S \times [(0,4 a) - b] \times V^2 \times k$$

T = Torque in kgm

S = Total surface of the rudder in m<sup>2</sup> (h x a)

h = Height of the rudder in m

a = Width of rudder in m

b = The value of the compensation in m

V = Speed of the boat in knots

k = Coefficient according to the total angle of rudder.

-Port to starboard 70°    k = 15,89

-Port to starboard 80°    k = 17,80

-Port to starboard 90°    k = 19,52

Straightening according to the type of boats:

- For boats equipped with jet engine
- For power boats with two engines and one rudder
- For sailboats

T x 1,3

T x 0,5

T x 0,5

