

Program for appended hull PMM tests in shallow water

KVLCC1 & KVLCC2

PMM tests shall be conducted in shallow water at 2 water depths i.e. $h/T = 1.2$ and $h/T = 1.5$ with an appended model i.e. equipped with (stock) propeller and rudder. Model size shall be $L_{pp} = 7.0$ m, i.e. a scale of **1:45.71**. This implies a water depth $h = 0.68$ m for the draught $T = 0.46$ m. The model shall be free in heave and pitch but fixed in roll (3 DOF). Approach speed is **7.0 kn** (U_0). The nominal rate of revolutions at this speed is **X rpm** (N_0). The scope of the tests shall cover at least the parameters given in Table 1 in the stated combinations.

Table 1: Scope of appended hull PMM tests in shallow water, KVLCC1 & KVLCC2

	Speed U/U_0 (non-dim.)	Prop. Revs. (non-dim.)	Rudder Angle δ (deg)	Drift Angle β (deg)	Sway Vel. v' (non-dim)	Yaw Vel. r' (non-dim)
STATIC TESTS						
static rudder	1.00	1.00	$\pm 0, 10, 20,$ 30, 35	0	-	-
	0.80	(*)	$\pm 0, 10, 20,$ 30, 35	0	-	-
	0.50	(*)	$\pm 0, 10, 20,$ 30, 35	0	-	-
static drift	1.00	1.00	0	$\pm 0, 0.5, 1,$ 2, 4	-	-
	0.80	(*)	0	$\pm 0, 4, 8$	-	-
	0.50	(*)	0	$\pm 0, 8, 12$	-	-
drift & rudder	0.80	(*)	$\pm 0, 10, 20,$ 30, 35	± 4	-	-
	0.50	(*)	$\pm 0, 10, 20,$ 30, 35	± 8	-	-
DYNAMIC TESTS						
pure sway	1.00	1.00	-	-	0.04, 0.08	-
pure yaw	1.00	1.00	-	-	-	0.05, 0.10, 0.15, 0.20
	0.80	(*)	-	-	-	0.30
	0.50	(*)	-	-	-	0.60
yaw & drift	0.80	(*)	-	± 4	-	0.30
	0.50	(*)	-	± 8	-	0.60
yaw & rudder	0.80	(*)	± 20	-	-	0.30
	0.50	(*)	± 30	-	-	0.60

(*) Note about propeller revolutions

To allow direct comparison of the results with the results from the CFD calculations (at model scale) two conditions should be fulfilled, if possible:

- 1) The rate of revolutions should be adjusted to the model scale self-propulsion point.
- 2) At speed fractions below the nominal approach speed, corresponding to a certain point in the manoeuvre (e.g. a turning circle), the rate of revolutions shall be reduced to maintain the correct loading on the propeller(s). This reduction should follow a constant torque strategy for fixed pitch propellers or a constant power strategy for controllable pitch propellers. Initial speed tests (at zero rudder and drift angles) shall be conducted to determine these rates of revolutions.