

**SPEED TEST
OF
M/V CERESIO**

REPORT N°
2135

YEAR 2021

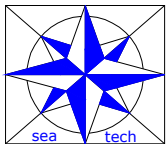
**SPEED TEST
OF
M/V CERESIO**



LUGANO LAKE 26/08/2021 – 03/09/2021

SEA TECH SNC

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BY SEA TECH:

CAVANNA FRANCO

CAVANNA GIOVANNI ALESSIO

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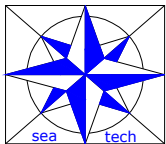
2021

TITLE

“SPEED TEST OF M/V CERESIO”

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SUMMARY

This report describes the speed tests carried out on board of M/V CERESIO, on 26/08/2021 and 03/09/2021.

TECHNICAL DATA

The technical data of M/V CERESIO are reported on the **table 1**.

Hull details

Length OA	m	31,3
Breadth moulded	m	5,4
Displacement (Full load)	t	80
Trial displacement	t	65
Taft	m	1,1
Tcen	m	1
Tfwd	mm	0,9

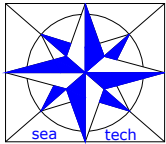
Propulsion details

Type	FPP 4 blades	
Pitch @ 0.7R	mm	1070
Diameter	mm	1050

Machinery details

Type of main engine	Electric	
Nominal Power	kW	167
Nominal Revolution	rpm	500

Table 1: Hull, propellers and machinery details



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MEASUREMENTS SYSTEM

-DGPS

On board it was used a differential GPS model "TRIMBLE DSM 132" .

The GPS receive the information about correction from satellites AORE: European system - EGNOS or USA system WAAS, satellite OMNISTAR (Furgo company).

Otherwise the correction signal is transmit from a "Differential ground station"; in order to obtain the max precision, the station must be locate at a maximum distance of 15 kilometers from the position test; the digital data are transmitted by protocol "RTCM104" at 9600 BAUD UHF band.

TORQUEMETER

The power measure was taken by one torquemeter Type SFC0706 installed on the propeller shaft.

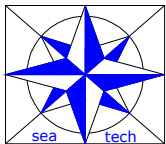
The Calibrations are listen on the Annex A.

-ACQUISITION DATA SYSTEM

For the acquisition of data is used a mobile computer TOUGHBOOK PANASONIC CF-29 and the software (Sea tech property) Type "SEA TECH SEA TRIAL".

The acquisition system recorder, at the same time, at 1 HZ frequency, the following data:

- Progressive Trial Time [sec]
- Latitude
- Longitude
- Speed [kn] (Actual recorded speed coming from DGPS)
- Route [deg]
- Rpm shaft
- Power shaft [kW]
- Torque shaft [kgm]



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SPEED TESTS

In order to calculate the correct maximum speed, has been recorded several rectilinear measured bases with opposite course, to compensate the wind and current effects.

It must be considered that the performance can be different depending on service age, cleanliness condition and loading.

Finds all the tests listed as follow:

- Speed @ Max speed – Two tracks

Speed @ Max speed

1 st		MEAN VALUE				
	Speed[kn]	RPM	Power [kW]	Torque [kgm]	Start deg	Lenght [m]
	12.96	513	174	330	62	1854

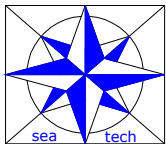
Table 2: Speed @ Max speed 1st track summary data

2 nd		MEAN VALUE				
	Speed[kn]	RPM	Power [kW]	Torque [kgm]	Start deg	Lenght [m]
	12.67	508	170	326	234	691

Table 3: Speed @ Max speed 2nd track summary data

SUMMARY		MEAN VALUE				
	Speed[kn]	RPM	Power [kW]	Torque [kgm]	Start deg	Lenght [m]
	12.8	511	172	328	//	1273

Table 4: Speed @ Max speed Summary Speed

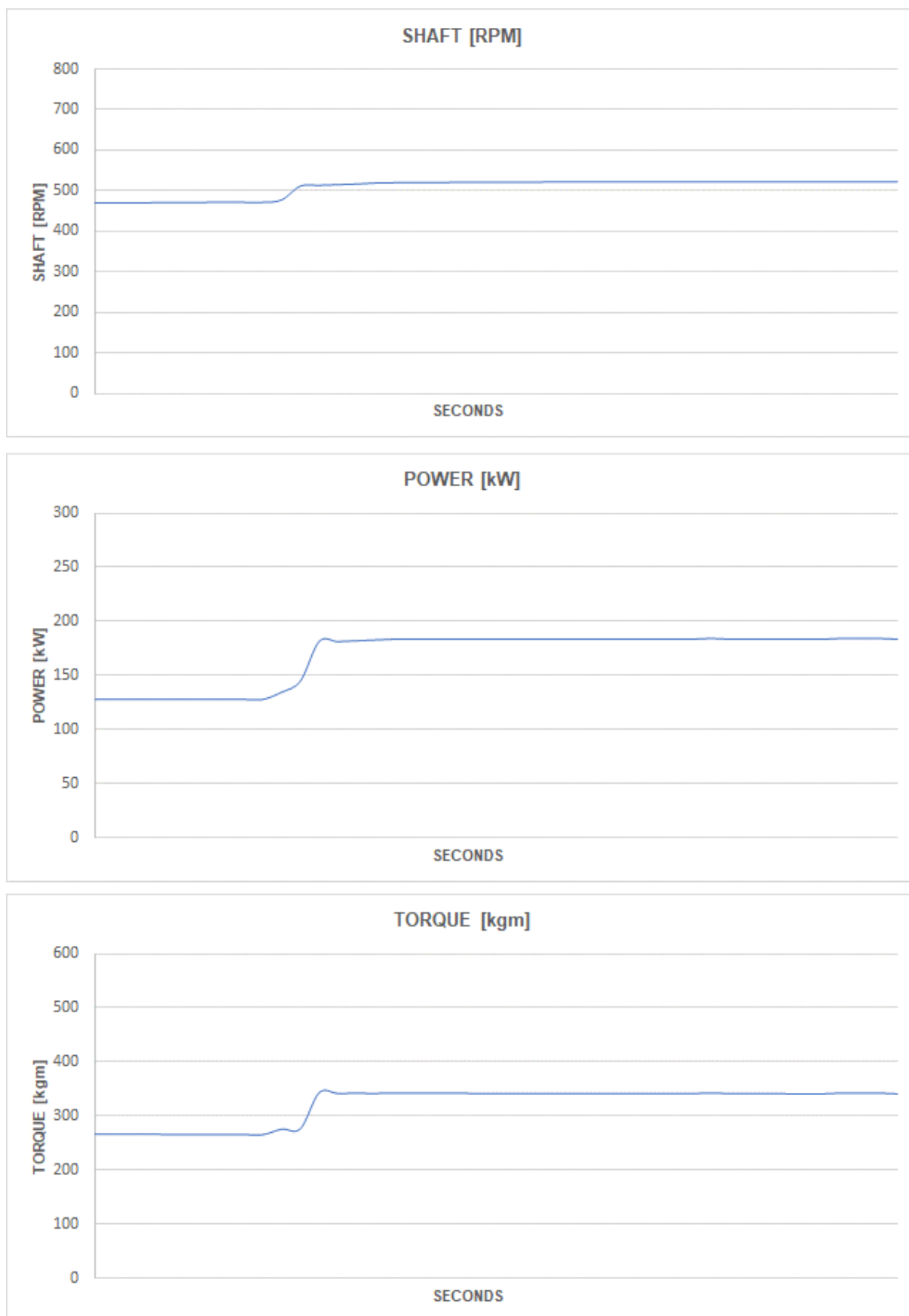


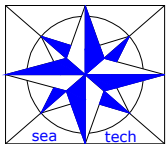
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CONFIGURATION: FROM SLOW POWER TO HIGH POWER





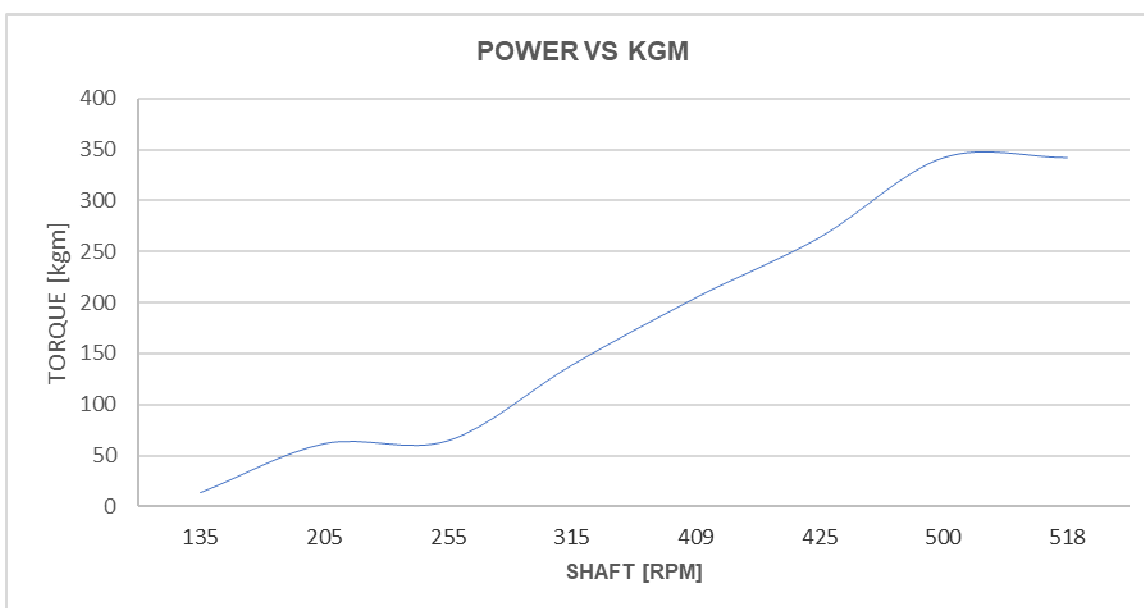
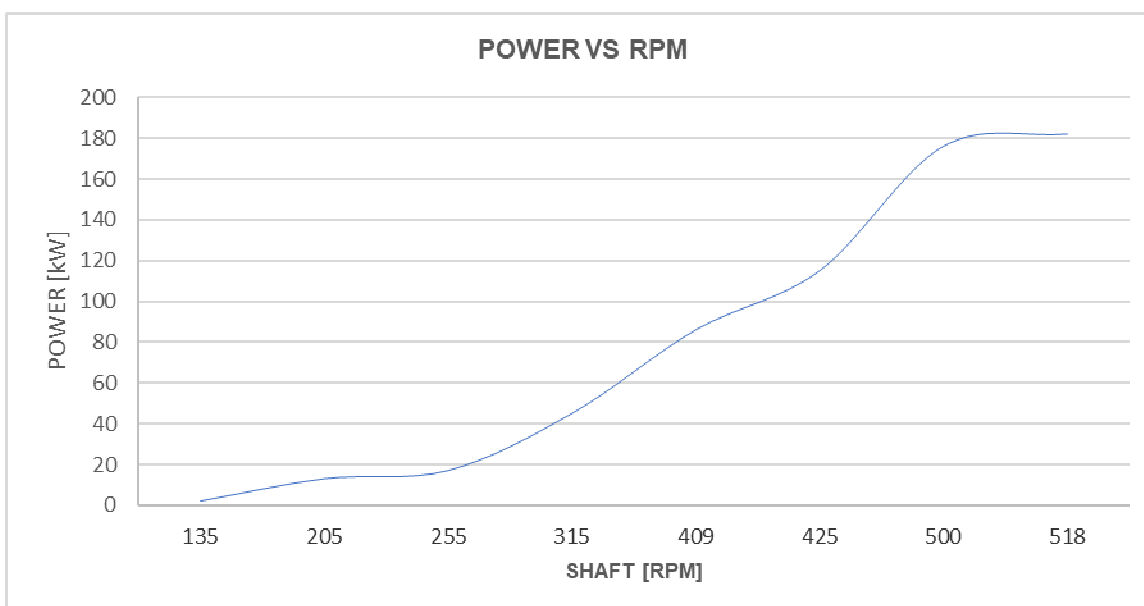
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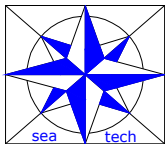
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RPM-POWER-TORQUE

SHAFT [RPM]	POWER [kW]	TORQUE [kgm]
135	2	14
205	13	62
255	17	65
315	45	139
409	86	205
425	115	264
500	176	342
518	182	342



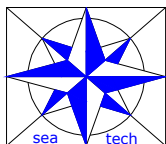


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**ANNEX – A –
TORQUEMETER CALIBRATION**



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Torquemeter calibration for power test

Ship name
M/V Ceresio(elettrico)

Constr.N. Shipyard

Date
21/08/2021

Main shaft

Rated power	P	220	kW
Rated rpm	N	450	Rpm
Shaft external diameter	D	90	mm
Shaft internal diameter	d	0	mm
Tang. Elast. Modulus	G	7900	Kg/mm ²
Rated torque	$Q=973.94 \cdot P / N$	476.193	Kg*m
Shaft inertial moment	$J=3.14(D^4 - d^4)/32$	6.441	1E-6 m ⁴
Shaft constant	$Cs=4 \cdot G \cdot J/D$	2.262	1E6 kg*m
Rated strain	$E=Q/Cs$	210.556	1E-6
Strain-gage resistance	R	350	Ω
Gage factor	K	2.010	
Calibration resistor	$Rc=R(1-4KE)/4KE$	206399	Ω
Normalized calibration resist.	Rc	200000	Ω
Related strain	$Ec=R/(4K(R+Rc))$	217	1E-6
Gain resistor		3418	Ω
Normalized gain resistor		3300	Ω
Zero frequency	Fo		Hz.
Calibration frequency	Fc		Hz.
Span	$DFc=Fc-Fo$		Hz.
Span related to rated torque	$DF=DFc \cdot E/Ec$		Hz.
Calibration constant	$Ct=Cs \cdot Ec/DFc$		Kg*m/Hz
Torquemeter type	SFC1008		
Serial number			

Data for 2000 Hz span :

Span related to rated torque	$DF=DFc \cdot E/Ec$	1938.095	Hz.
Torque constant	$Ct=Cs \cdot Ec/DFc$	0.246	Kg*m/Hz

Remarks