



SCHOTTEL

SCHOTTEL RUDDERPROPELLER FOR PUSHER OPERATING IN INLAND SHALLOW WATER

IN THE WORLD

Dipl. -Phys. Uwe Weineck

Cartagena, 14.03.2013





OUTLOOK

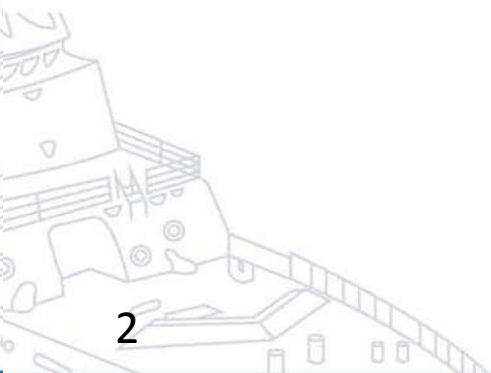
01 HISTORY

02 SCHOTTEL GROUP

03 SHALLOW WATER OPERATION FOR INLAND WATERWAYS

04 SCHOTTEL PROPULSION SYSTEMS

05 IMPRESSIONS





THE COMPANY'S ORIGIN



Josef Becker (1897 – 1973)



Company site 1950



PRODUCTION PLANTS



top left: SCHOTTEL GmbH in Spay,
Germany

top right: SCHOTTEL Schiffsmaschinen
GmbH and SCHOTTEL GmbH Plant
Wismar, Germany

left: SCHOTTEL Suzhou Propulsion Co.,
Ltd., Suzhou, PR China



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SCHOTTEL IN SPAY PRODUCTION





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SCHOTTEL IN WISMAR PRODUCTION

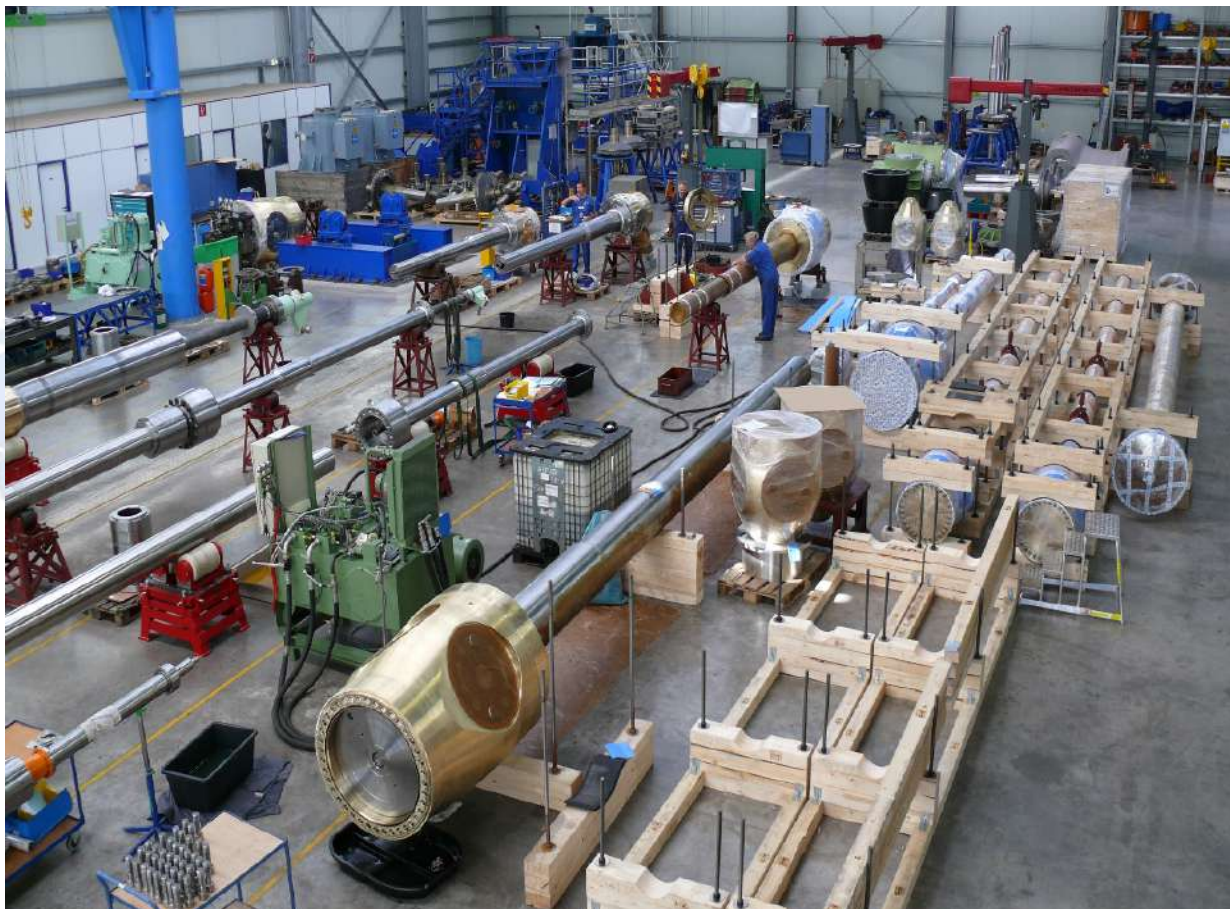




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SCHOTTEL IN WISMAR

PRODUCTION





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SCHOTTEL IN WISMAR PRODUCTION





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SCHOTTEL IN SUZHOU ■ CHINA





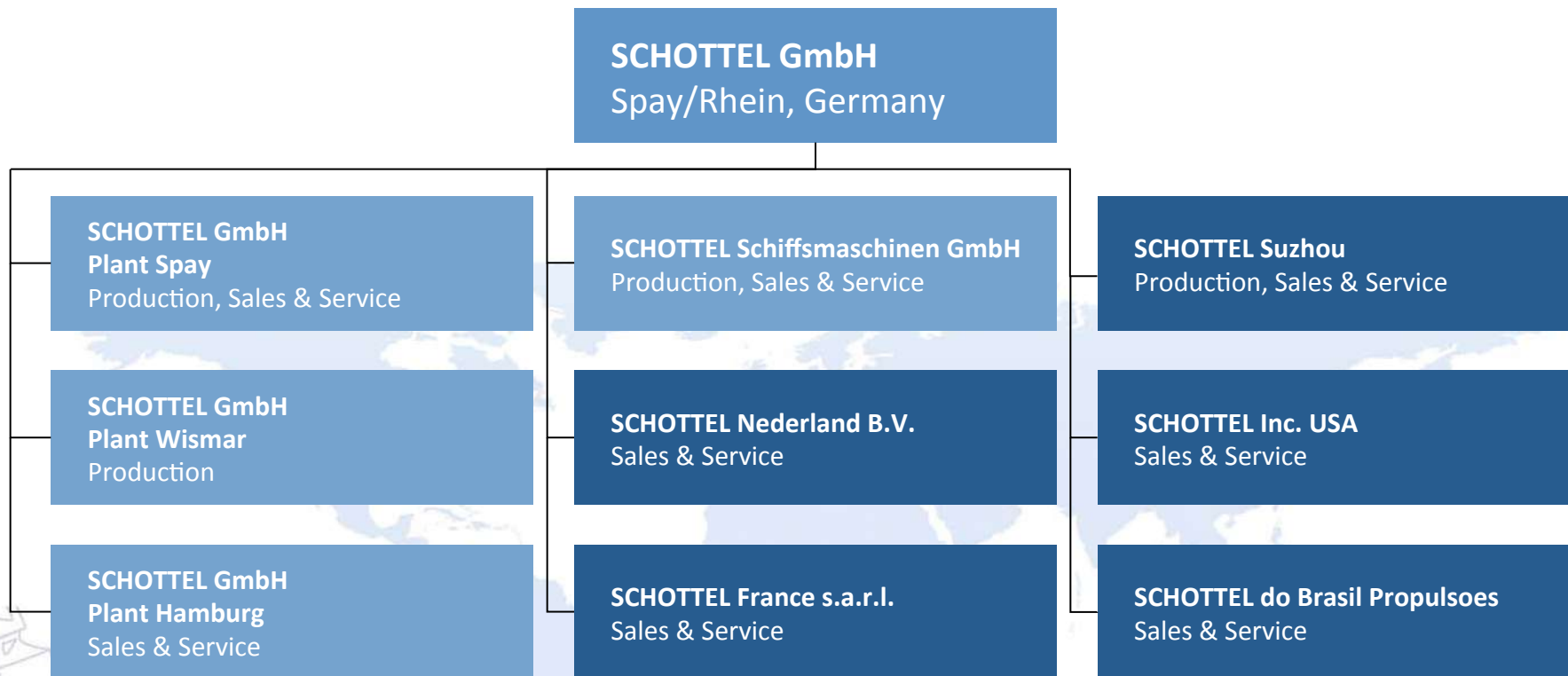
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SCHOTTEL IN SUZHOU PRODUCTION





SCHOTTEL GROUP WORLDWIDE



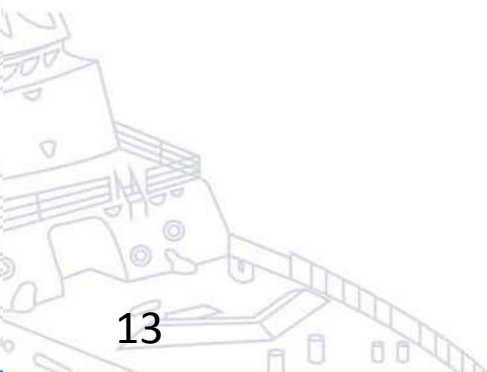
**About 100 SCHOTTEL sales and service partners
in the major shipping centres all over the world**

SCHOTTEL is four times certified according to DIN EN ISO 9001:2000 by ABS, BV, DNV und GL





SHALLOW WATER OPERATION FOR INLAND WATERWAYS





SHALLOW WATER OPERATION FOR INLAND WATERWAYS

General

- inland waterways shipping is the most cost effective, fuel efficient and safest way to transport goods
- flexible tug/barge system with towed barges (established already in 19th century) have been developed into push/barge train (in 20th century)
 - flexibility of transport system
 - push tugs and barges form an integrated system with resistances and propulsive performances quite close to single hull vessels
 - manoeuvring is done by the push tug only, means manning the barge is not necessary
- systems are required whose propulsion and steering units generate adequate thrust and steering force -> distinguished manoeuvrability
- efficient ship operation especially in shallow water is also connected to hull design, space requirement, minimum draught, risk of damage due to grounding, easy maintenance / overhaul
- propellers have to be arranged in a special tunneled or ducted aft body for good efficiency and optimum protection
- speed of river going craft depends mainly on the water depth (shallow water effect)



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Comparison Rudderpropeller vs Conventional solutions in shallow water

- Rudderpropeller combines steering and propulsion functions and consequently requires less space and less loss of displacement than conventional shaft and rudder installation.
- This leads to higher deadweight capacity, much shorter stopping distances.
- The steering forces of a rudder are low when the ship is moving slowly.

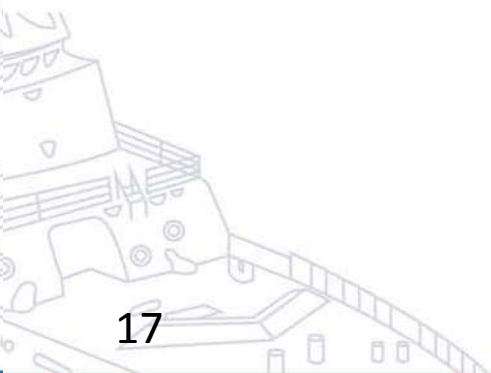


SHALLOW WATER OPERATION FOR INLAND WATERWAYS

Push/Barge Train Performance

close cooperation with DST (Development Centre for Ship Technology and Transport Systems)
in Duisburg / Germany

- resistance estimation of push/barge train

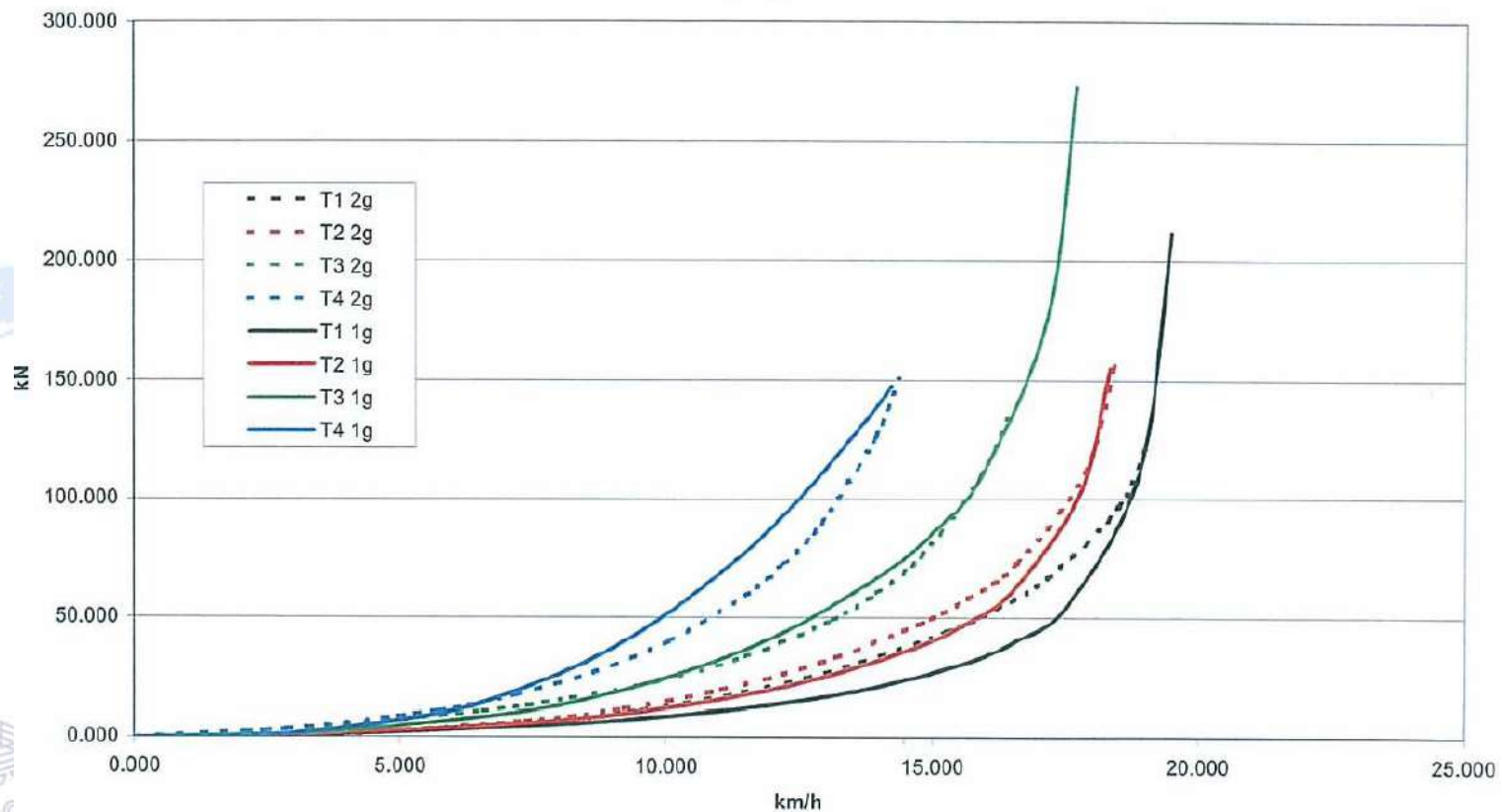




SHALLOW WATER OPERATION FOR INLAND WATERWAYS

Push/Barge Train Performance

Vergleich einspuriger Verband je 1 und 2 gliedrig bei einer mittleren Wassertiefe und vier Tiefgängen



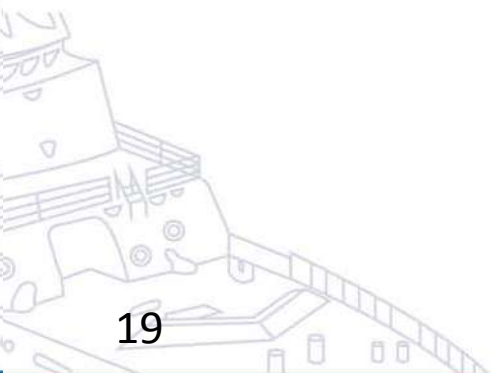


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Push/Barge Train Performance



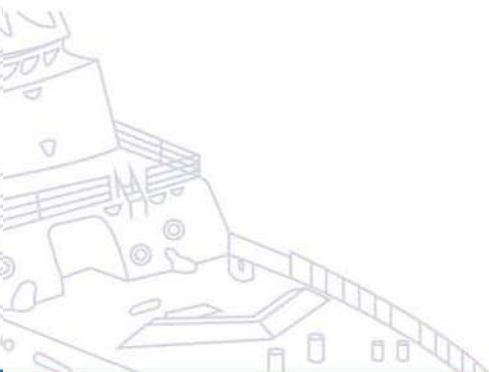


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- resistance estimation of push/barge train
- model propulsion test
- layout of propeller protection





FOR INLAND WATERWAYS

131,25

UK Schürze

MITTE SCHWELFSCHAFT

12,5

60°

2

1

100

50

2

65°

BASIS

0

81,25

Seite Schiff

Propeller - Schutz

25

31,25

1

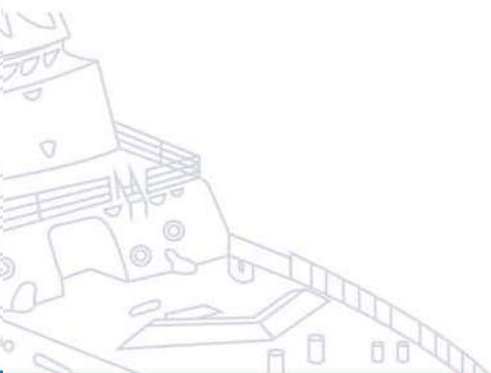


SHALLOW WATER OPERATION FOR INLAND WATERWAYS

Push/Barge Train Performance

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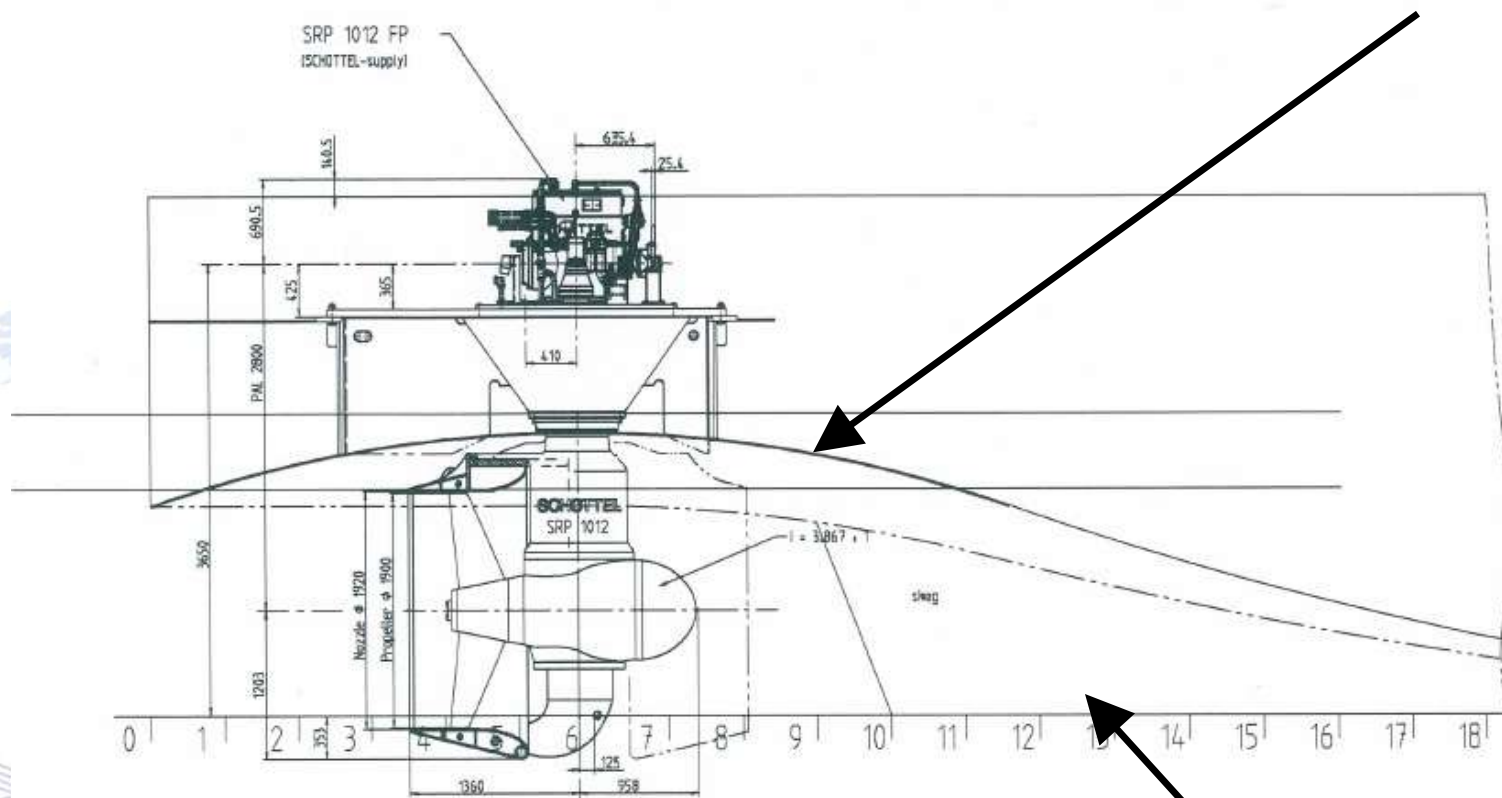
- resistance estimation of push/barge train
- model propulsion test
- recommendation of propeller protection layout
- recommendation of special tunneled or ducted aft body; skegs





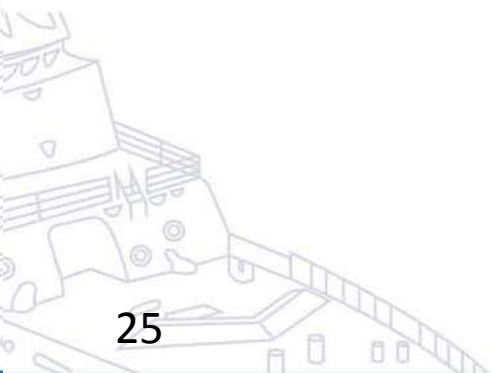
SHALLOW WATER OPERATION FOR INLAND WATERWAYS

Push/Barge Train Performance





SCHOTTEL PROPULSION SYSTEMS





SCHOTTEL PROPULSION SYSTEMS

- Product range





SRP

- SCHOTTEL RUDDERPROPELLER

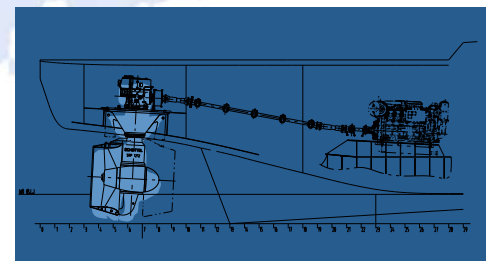
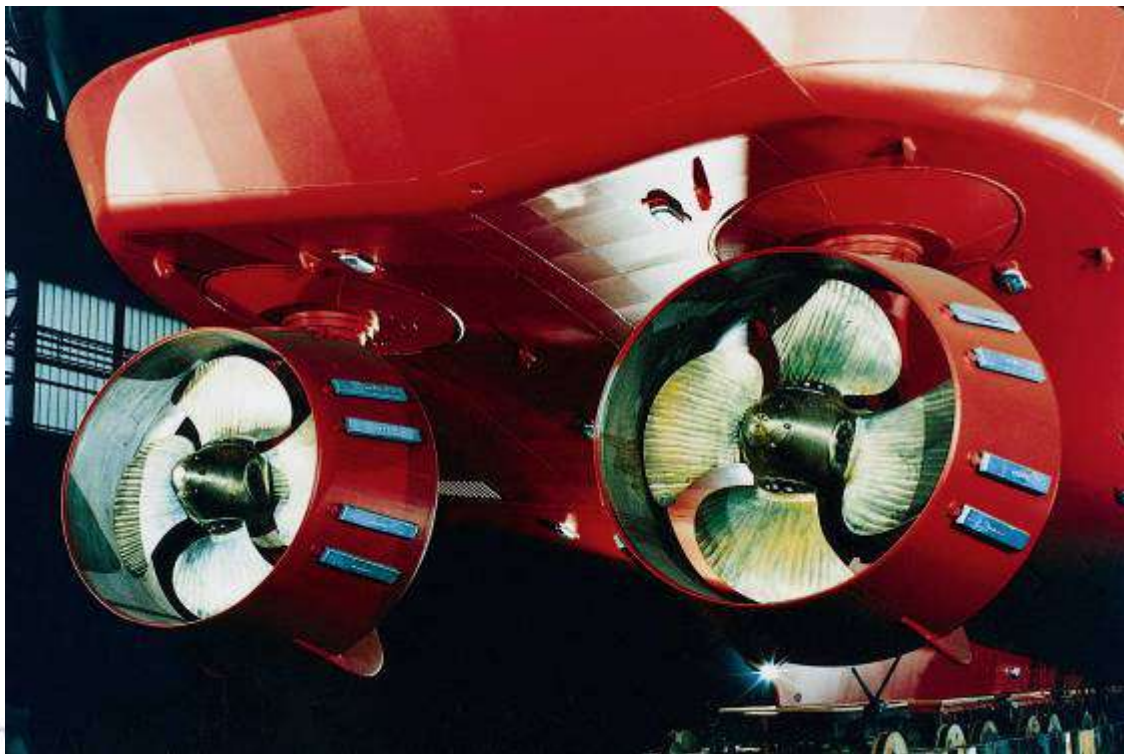




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SRP

SCHOTTEL RUDDERPROPELLER





SCHOTTEL RUDDERPROPELLER FIXED PITCH

	Power* [kW]	Diameter [m]	rpm [min ⁻¹]	Weight [t]
SRP 0320	150-220	0.65-0.85	1800/2300	1.50
SRP 170	220-280	0.90-1.10	1800/2000	1.65
SRP 200	280-350	1.00-1.20	1800/2100	2.10
SRP 330	400-530	1.25-1.40	1800	3.60
SRP 440	600-780	1.45	1600/1800	7.50
SRP 550	630-920	1.50-1.75	1000/1200 / 1500/1800	9.60

*The max. allowable power per unit is dependent on the vessel type, the operation profile, the specific use and the classification of the vessel.



SCHOTTEL RUDDERPROPELLER FIXED AND CONTROLLABLE PITCH

	Power* [kW]	Diameter [m]	rpm [min ⁻¹]	Weight [t]
SRP 1012	1150-1400	2.10	750/900/1000/ 1200/1600/ 1800	17.00
SRP 1212	1380-1650	2.30	750/900/1000/ 1200/1600/ 1800	17.50
SRP 1215	1500-1800	2.40	750/900/1000/ 1200/1600/1800	19.50
SRP 1515	1750-2200	2.60	750/900/1000/ 1200/1600/1800	27.50
SRP 2020	2200-2600	2.80	750/900/1000/ 1200/1800	40.00
SRP 3030	2850-3400	3.40	600/750/ 900/1000	53.00
SRP 4040	3350-4000	4.00	600/800/1000	78.00
SRP 4500	4000-4900	4.20	750/900/1000	65.00

*The max. allowable power per unit is dependent on the vessel type, the operation profile, the specific use and the classification of the vessel.

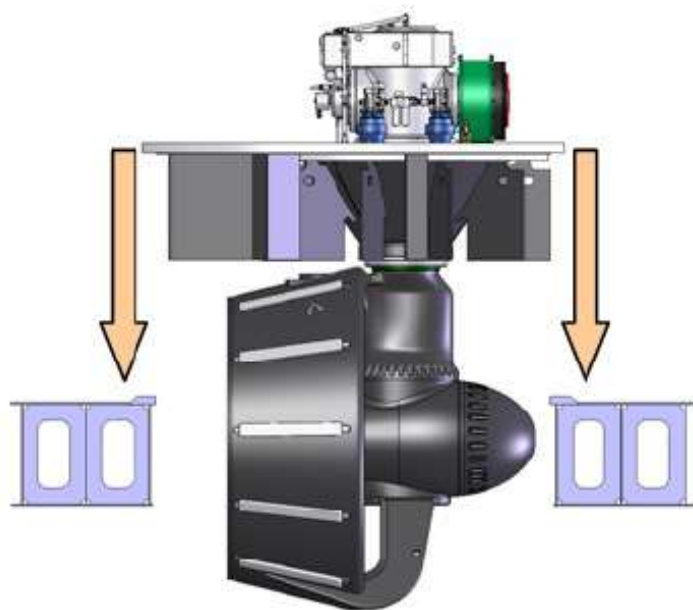


SRP - SCHOTTEL RUDDERPROPELLER

Different Kinds of Installation

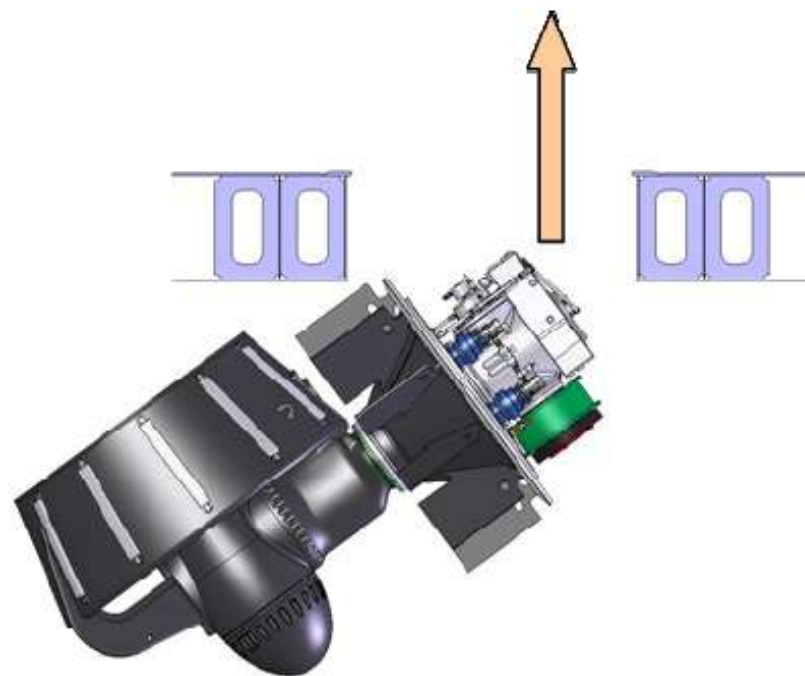
rigid well mounted from above

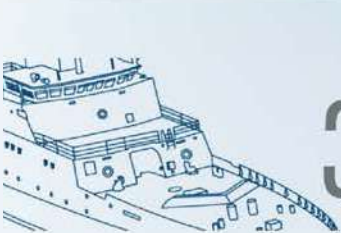
A) from above



rigid well mounted from below

B) from below





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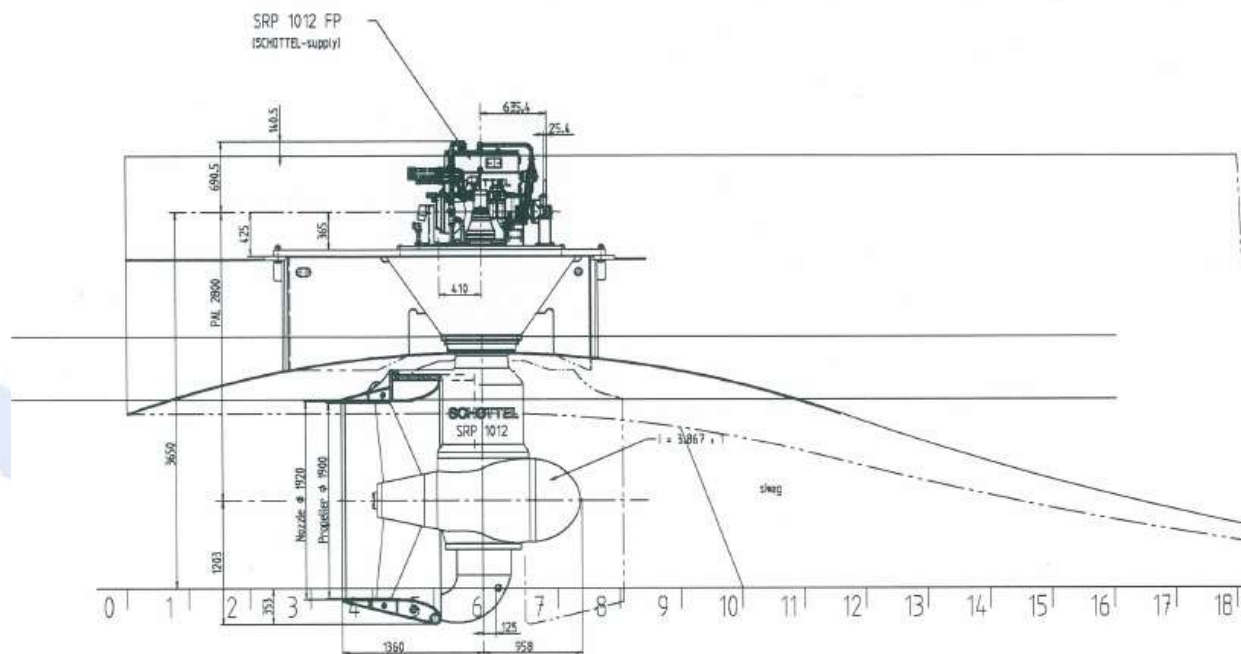
SRP

SCHOTTEL RUDDERPROPELLER





SCHOTTEL RUDDERPROPELLER

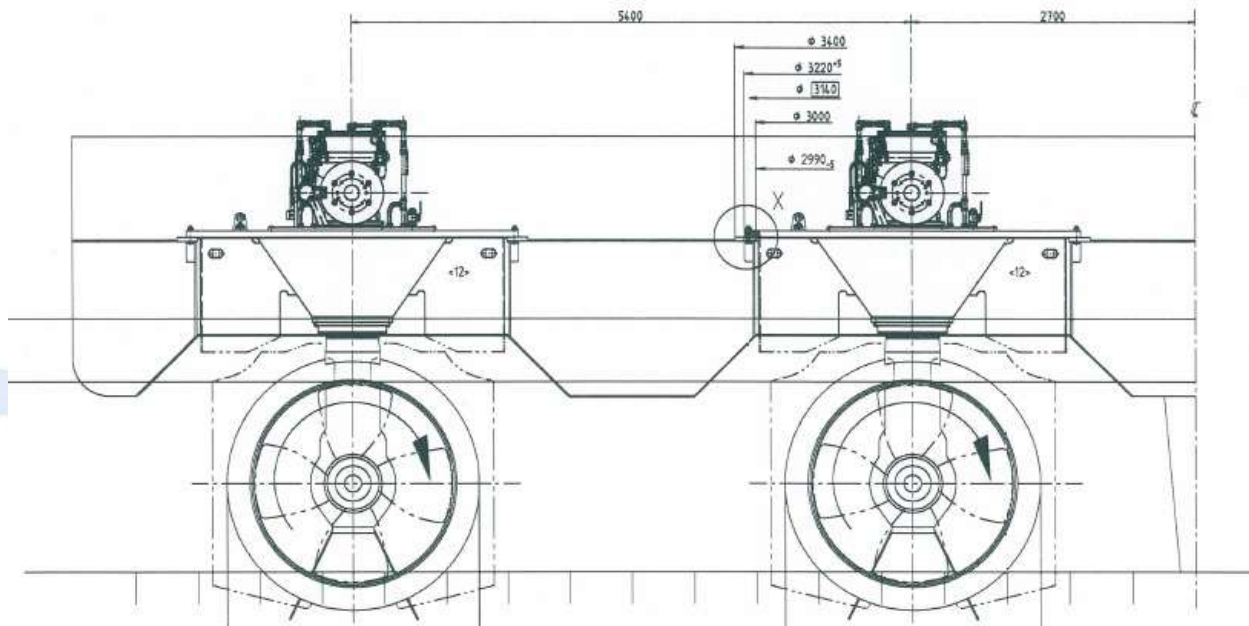


- special attention to avoid air intake to the propellers
- well mounting allows optimum tunnel design for maximum propulsion efficiency
- optimum slope angles for such tunnels:
 - less than 18° in front of propeller
 - less than 12° aft of propeller
 - less than 30° to the ship's side

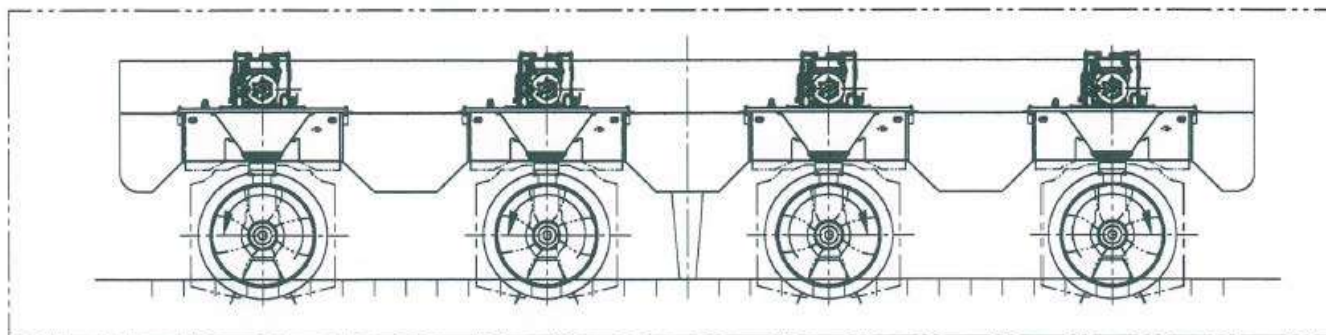


SCHOTTEL RUDDERPROPELLER

Seen from aft



not in Scale



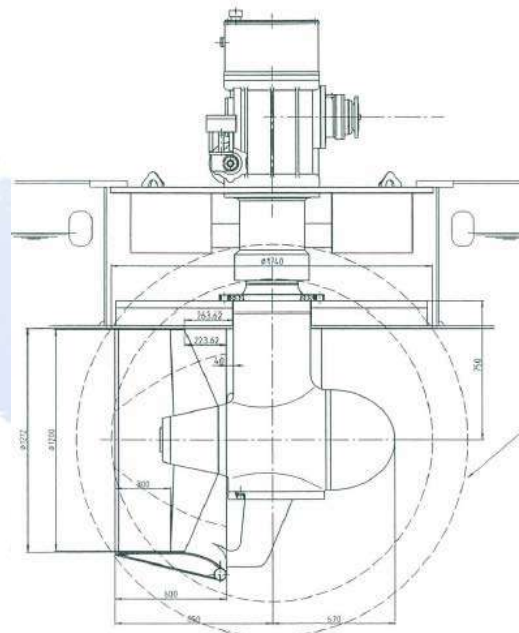
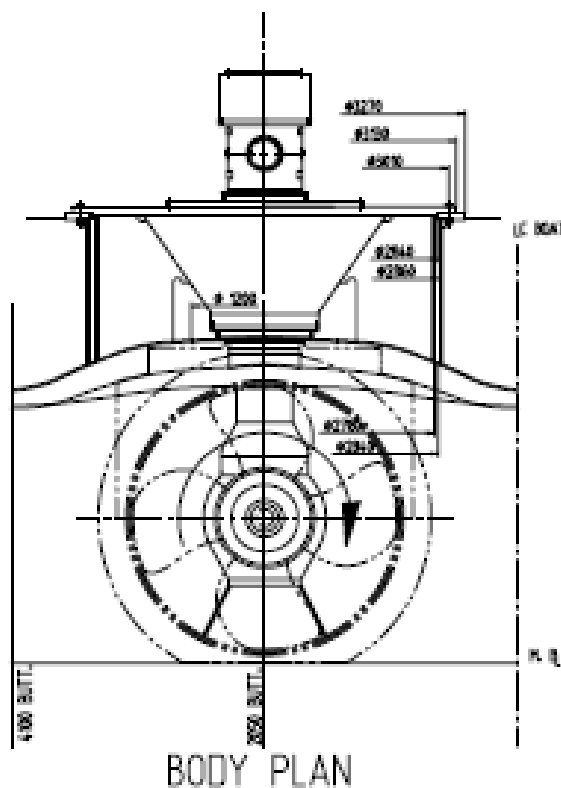


SCHOTTEL RUDDERPROPELLER

standard

special design

von der Stein nozzle



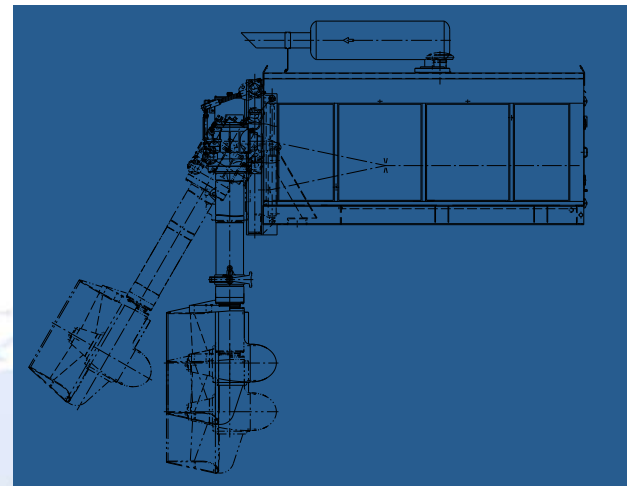


SCHOTTEL RUDDERPROPELLER





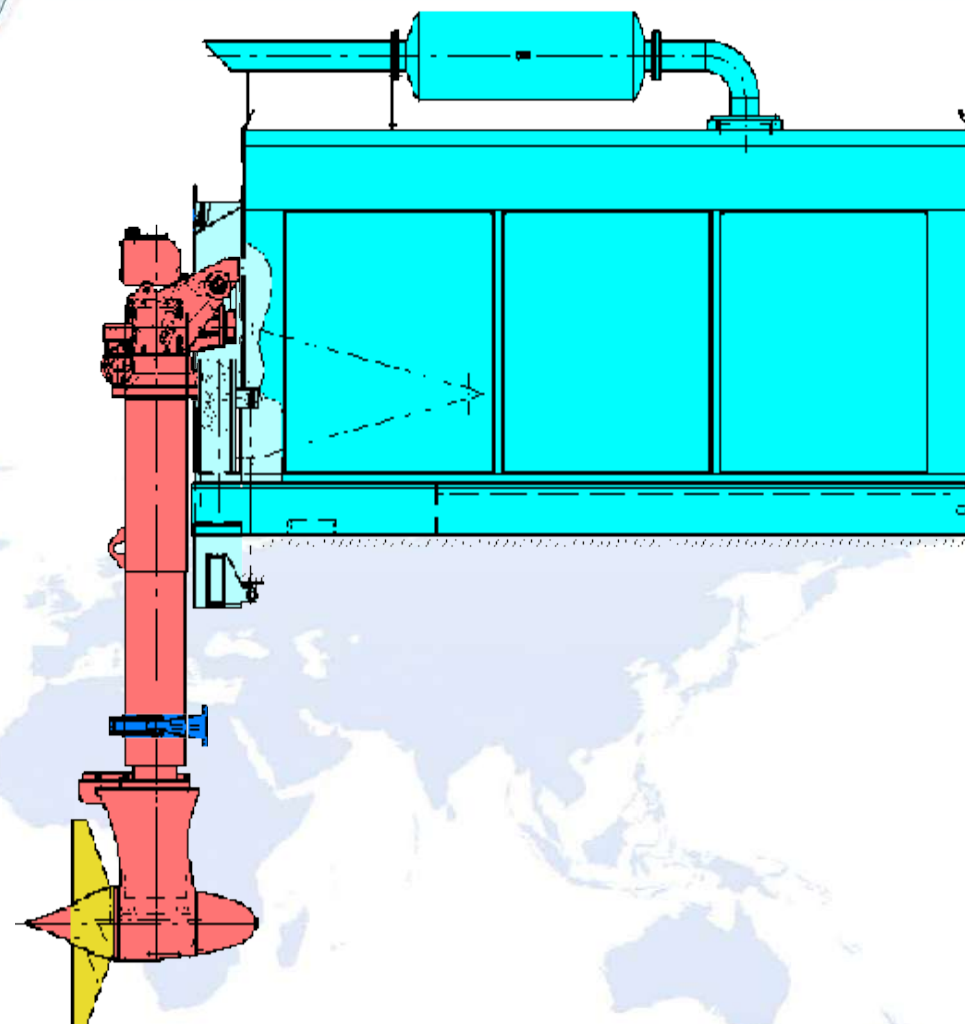
SCHOTTEL NAVIGATOR





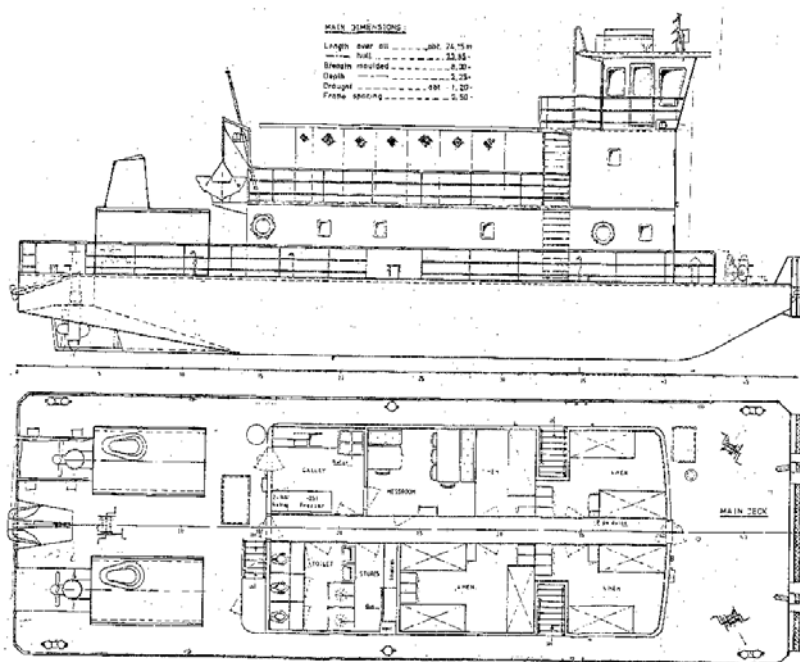
NAV SCHOTTEL NAVIGATOR

- depth adjustment facility
- swing out
- can be installed on an extremely diverse range of vessels



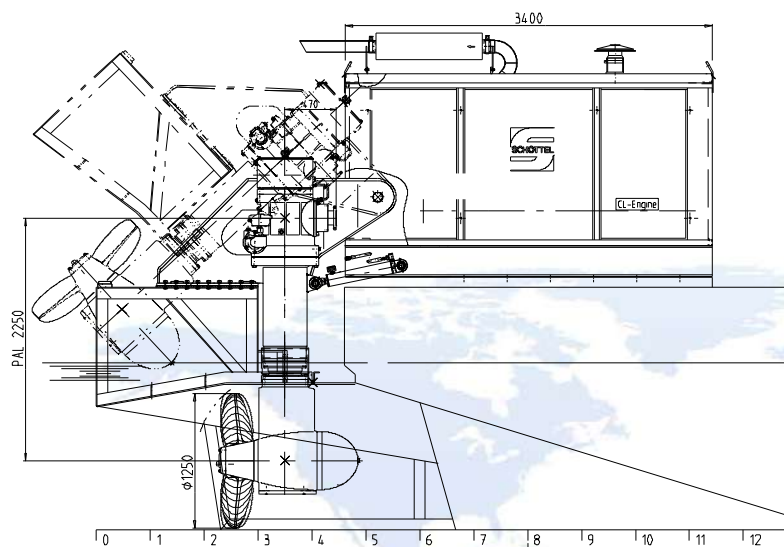


SCHOTTEL NAVIGATOR





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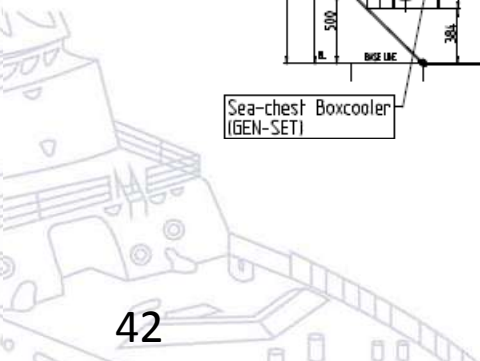
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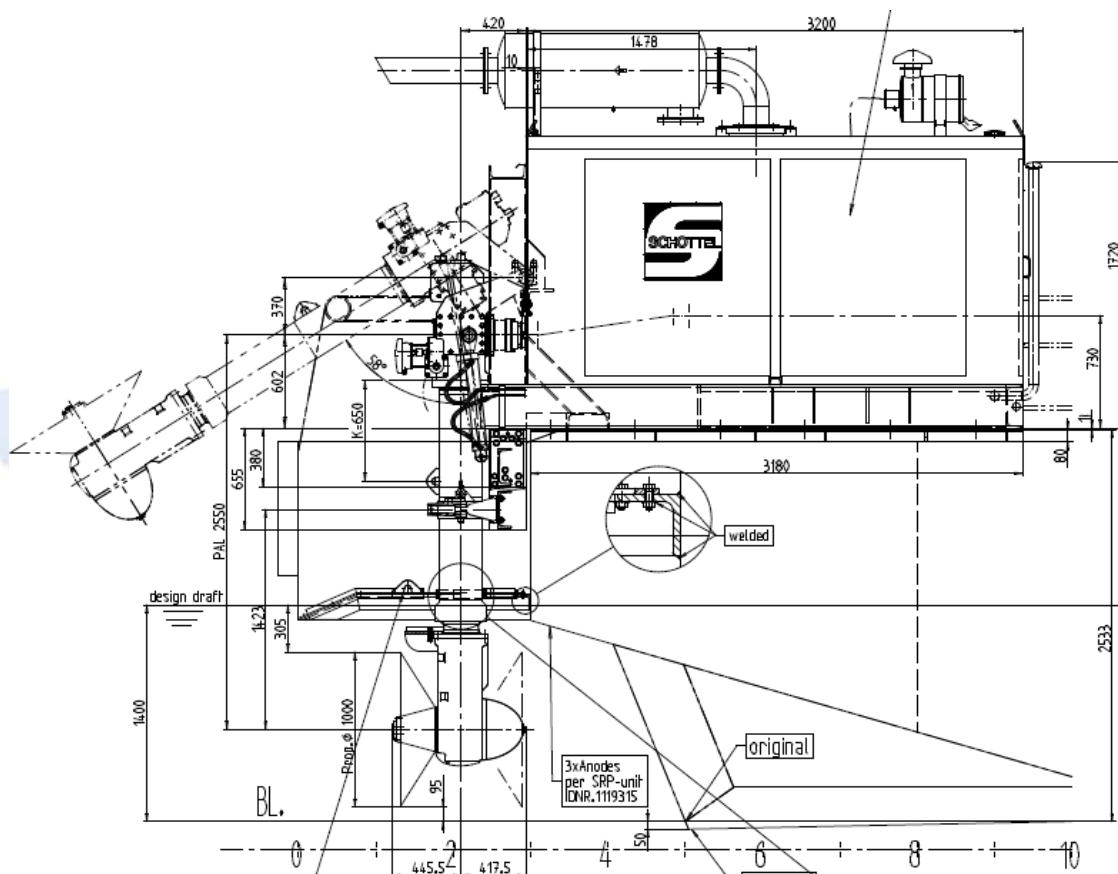
NAV

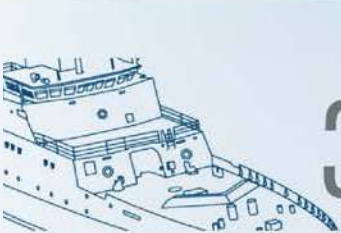
SCHOTTEL NAVIGATOR





SCHOTTEL NAVIGATOR











YOUR PROPULSION EXPERTS

