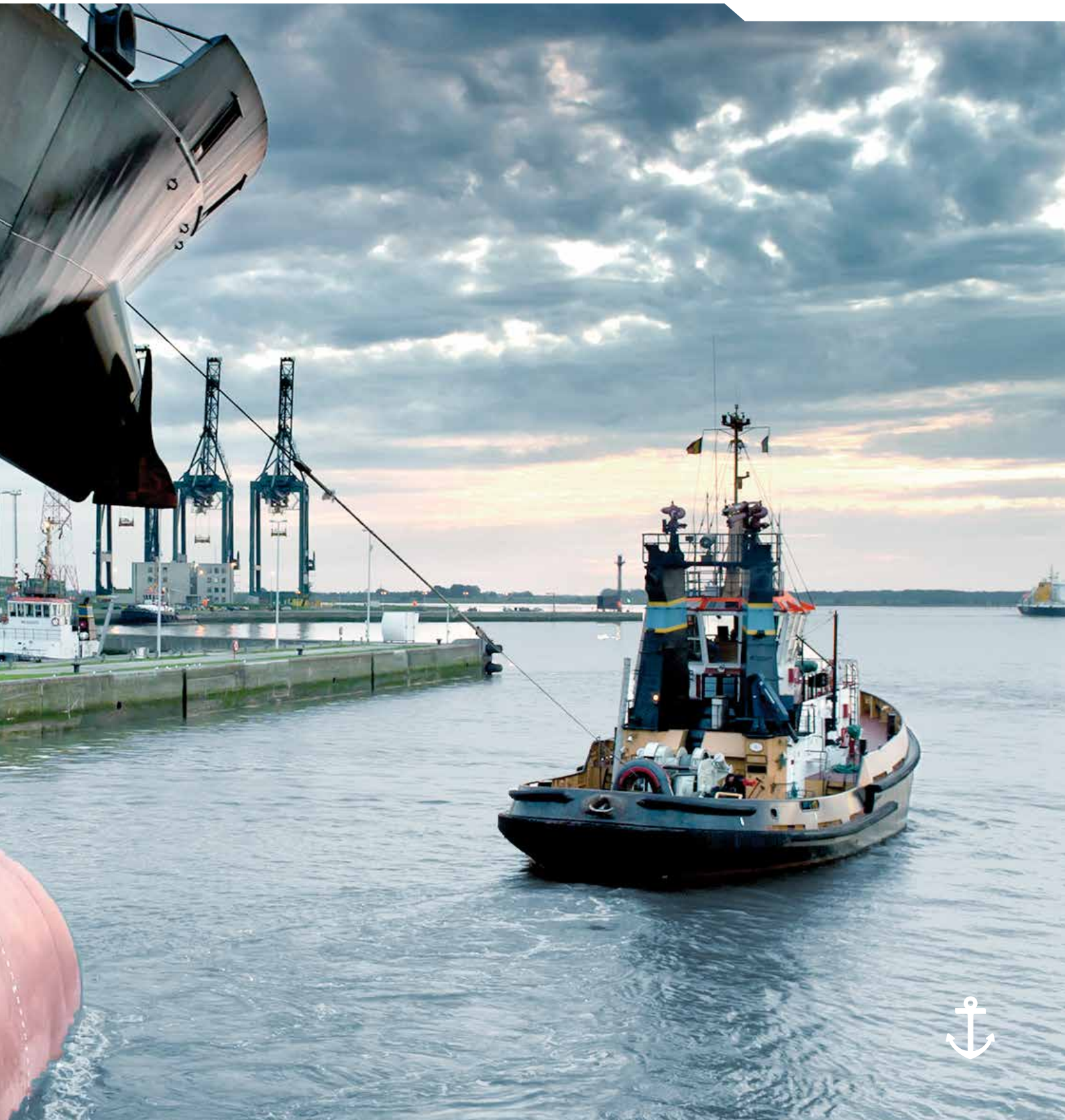


# APPLICATION

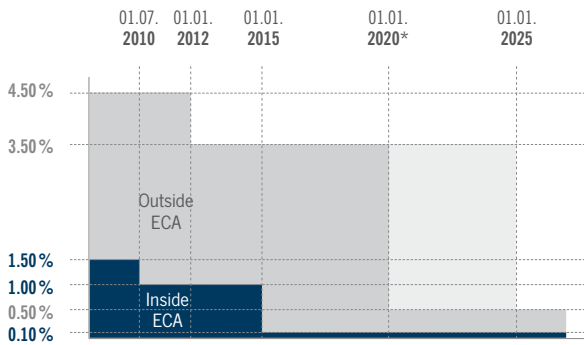
## HYBRID TUG BOATS WITH TDS PLAFRIX



# THE TASK

Increasing demands to comfort and noise levels even on workboats, extension of emission control areas and increasing fuel costs are only some of the new challenges faced by tug boats operating in especially in harbors around the world. To meet this demands sophisticated hybrid have been developed

Maximum allowable sulphur content of fuel oil according to MARPOL Annex VI, Regulation 14



\* Subject to review in 2018

Source: Lloyds Register

Map overview of Emission Control Areas (ECA's)

Existing ECA's Future ECA's



Source: Lloyds Register



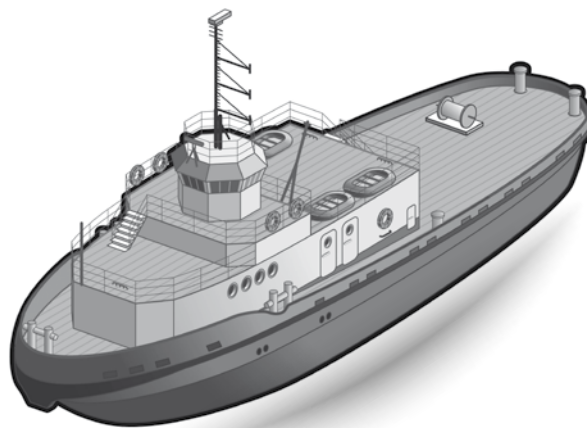
LOW EMISSIONS

24/7

HIGH AVAILABILITY



EMISSION CONTROL AREAS



LOW FUEL COSTS



MEDIUM DUTY OPERATION



LOW ADDITIONAL COSTS

# THE SOLUTION

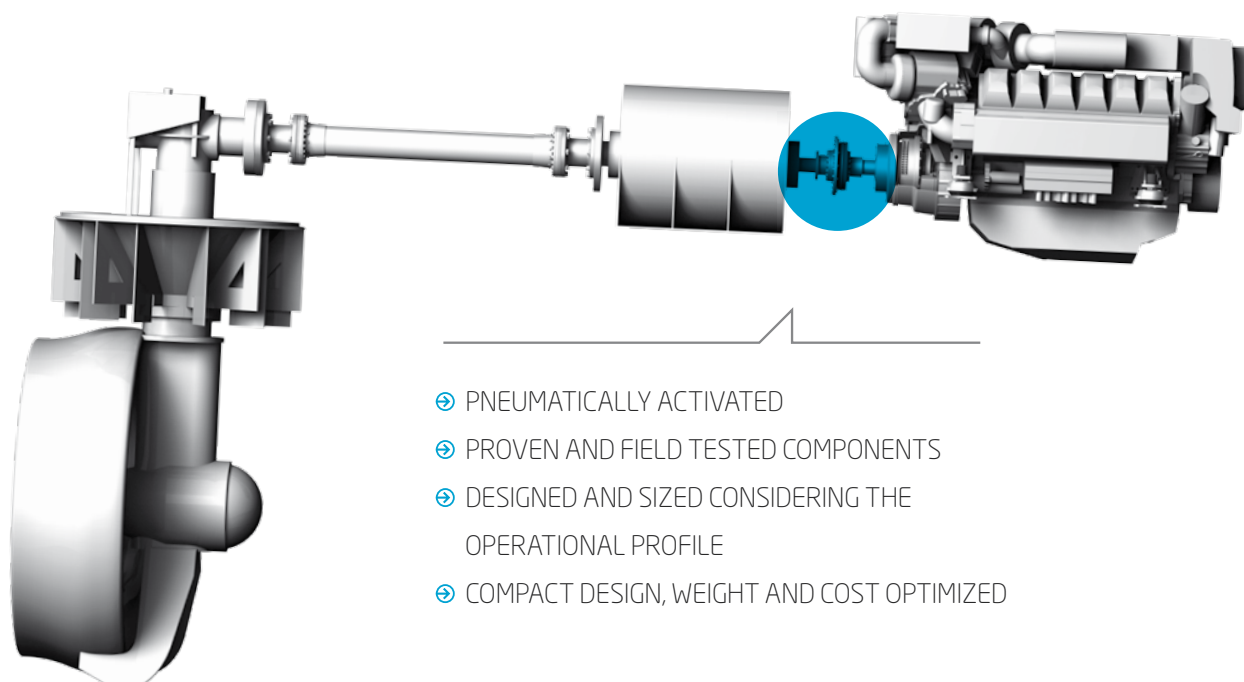
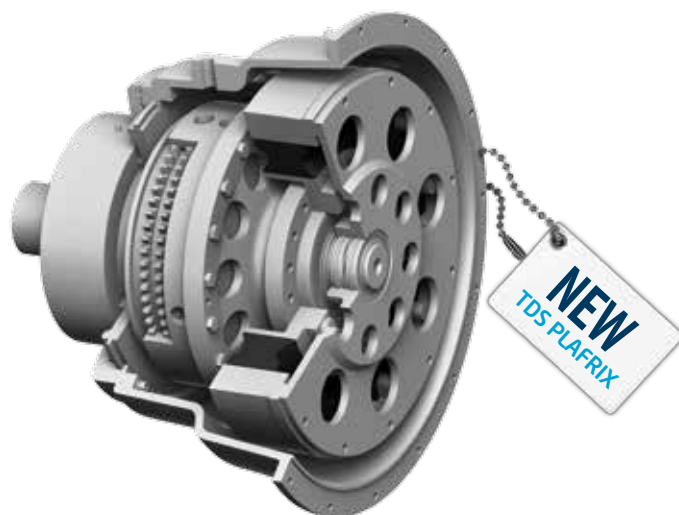
**Modern drive system solutions can answer this challenge by introducing a motor-generator into the propulsion line.**

Considering that an average harbor tug demands the full engine performance only around 25% of the operating time it leads to a significant reduction of emissions and fuel consumption by clutching of the diesel engine and driving the tug by the electrical motor the remaining 75% of its operating time.

Especially for this arrangements and the known operational profile of harbor tugs VULKAN and DESCH developed the TDS PLAFRIX a combination of the proven DESCH PLANOX clutch and the established VULKAN VULASTIK L.

This clutch coupling combination offers a perfect torsional tuning of the complete driveline and meets, by being directly flanged to the engine housing, the specific requirements in terms of weight load on the crankshaft bearings. By sizing the clutch according to the load profile and selecting compressed air as medium as well as by the flanged design which requires no complicated foundation work, this solution represents a weight- and cost-optimized complete package.

In case of flexible mounted engines the TDS PLAFRIX can also be extended by an additional displacement coupling as the well proven VULKAN VULKARDAN E.



- ⊕ PNEUMATICALLY ACTIVATED
- ⊕ PROVEN AND FIELD TESTED COMPONENTS
- ⊕ DESIGNED AND SIZED CONSIDERING THE OPERATIONAL PROFILE
- ⊕ COMPACT DESIGN, WEIGHT AND COST OPTIMIZED



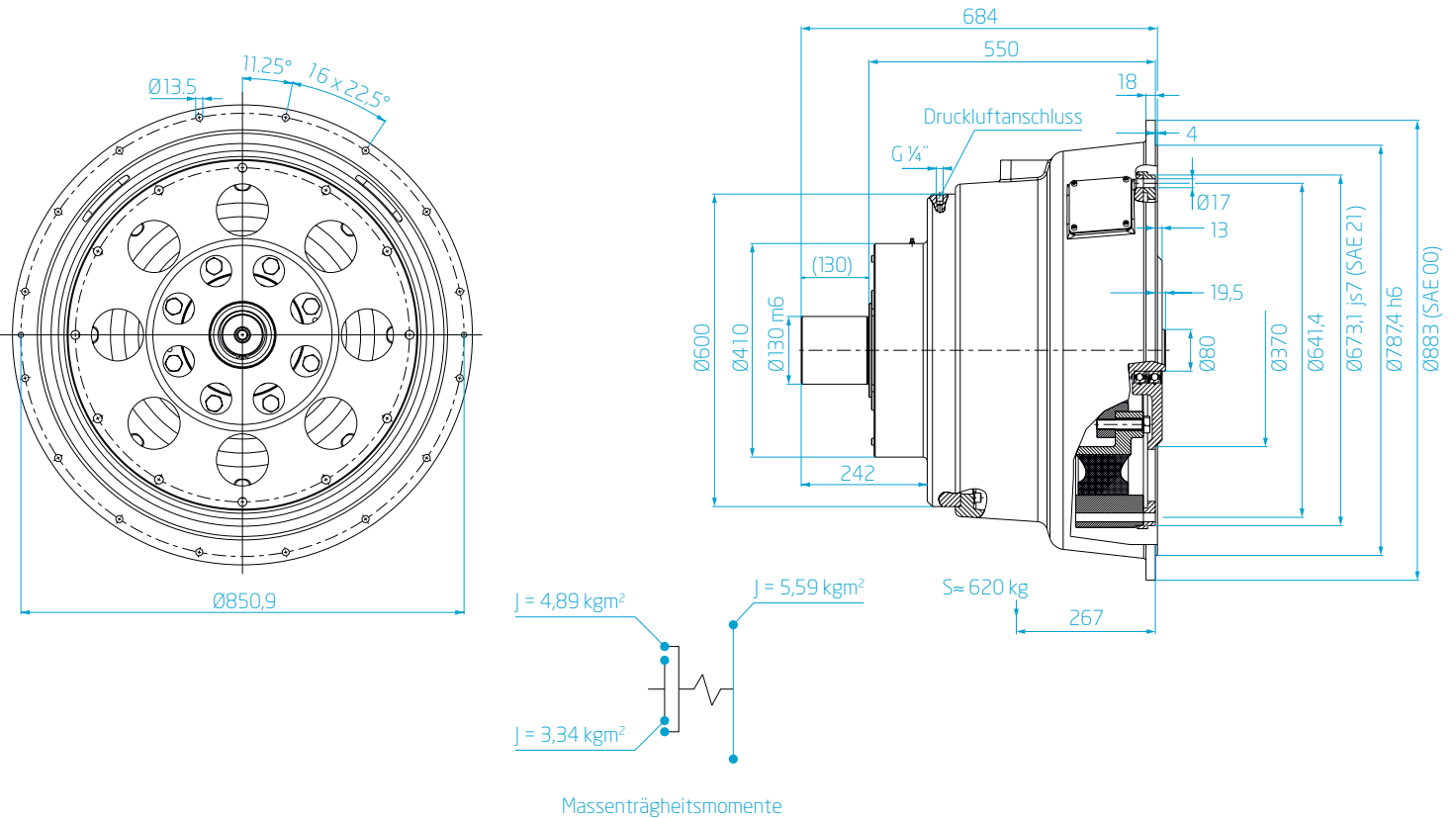
**NEW**  
TDS PLAFRIX



# LISTE DER TECHNISCHEN DATEN

## LIST OF TECHNICAL DATA

### TDS PLAFRIX



Schaltmodul / Clutch module					Elastisches Modul / Elastic module								
Baugröße	Zulässige Drehzahl dauernd / kurzzeitig	Zulässige Differenz- drehzahl	Übertragbares Drehmoment bei 5,5 bar	Kupplungs- luftdruck	Baugröße / Rating	Nennreh- moment	Max. Dreh- moment <sub>1</sub>	Zulässiges Wechsel- drehmoment	Zulässige Verlust- leistung	Dynamische Drehfedersteife			Verhältnis- mäßige Dämpfung
Size	Rotational Speed permanent / short time	Permissible Differential Speed	Transmittable Torque at 5,5 bar	Clutch Air Pressure	Size / Rating	Nominal Torque	Max. Torque <sub>1</sub>	Permissible Vibratory Torque	Permissible Power Loss	Dynamic Torsional Stiffness			Relative Damping
Planox	$n_{kmax}$ min <sup>-1</sup>	$\Delta n_{ks}$ min <sup>-1</sup>	$T_{stat}$ kNm	$P_{KN}$ bar	VULASTIK L	$T_{KN}$ kNm	$T_{Kmax1}$ kNm	$T_{KW}$ kNm	$P_{KV50, 1h}$ kW	$C_{rdyn}$ kNm/rad			$\psi$
PPRA 184/00	1800 / 2200	650	30,00	5,5 ± 0,5	4011 / M	11,57	15,00	4,00	0,448	68,00			1,00
					4012 / M	14,46	18,80	5,00	0,448	105,00			1,13
										10% $T_{KN}$	25% $T_{KN}$	50% $T_{KN}$	75% $T_{KN}$
4011S / M	12,51	18,75	4,00	0,817	40,00	48,00	57,00	83,00	135,00	1,13			

Die Richtlinien gemäß „EXPLANATION OF TECHNICAL DATA“ (Stand 07/2013) sind zu beachten.  
Schaltkasten gehört zum Lieferumfang VULKAN.

The „EXPLANATION OF TECHNICAL DATA“ (Stand 07/2013) guidelines are to be observed.  
Switchbox is included in the scope of supply VULKAN.

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