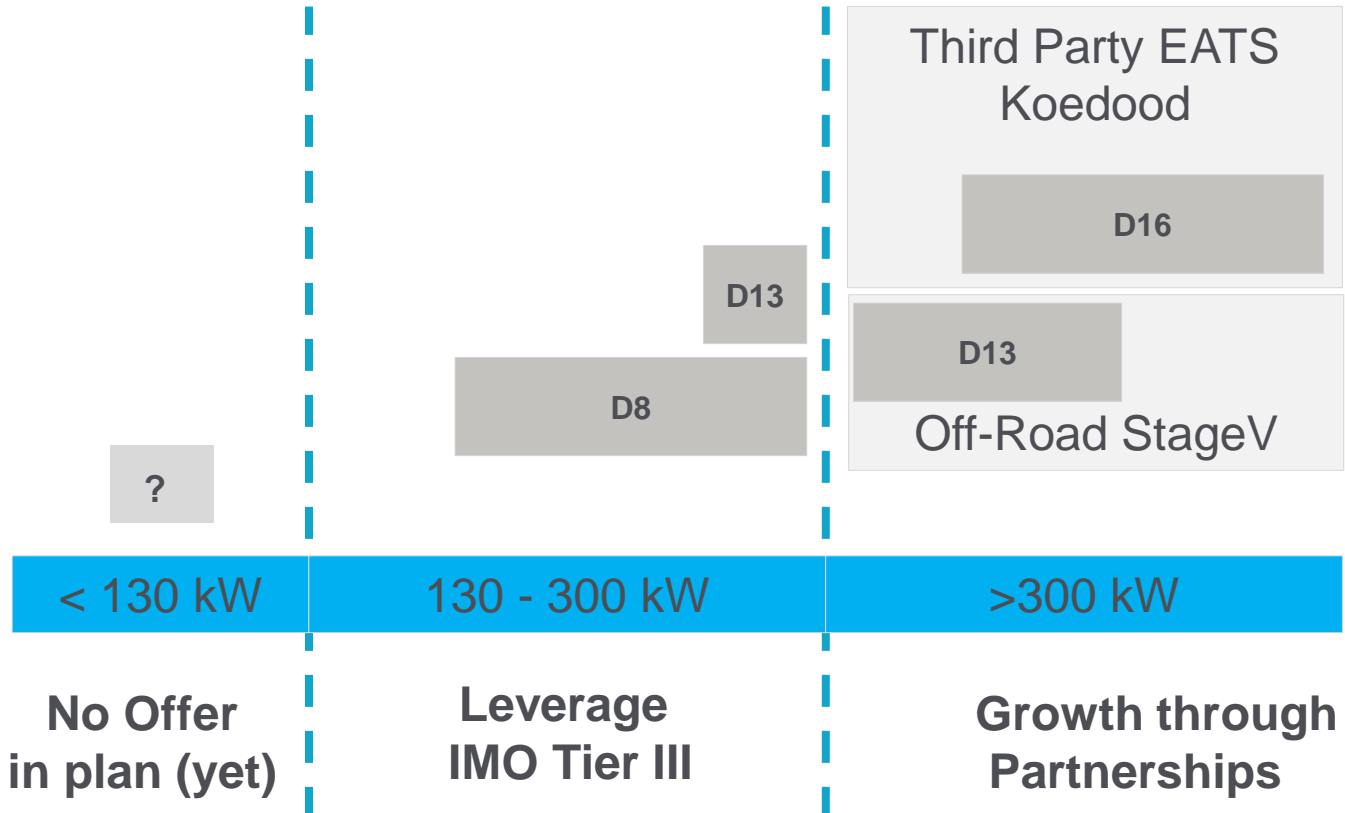


# STAGE V MARINE DEVELOPMENTS

J.W. Vissers, Director Marine Commercial Europe



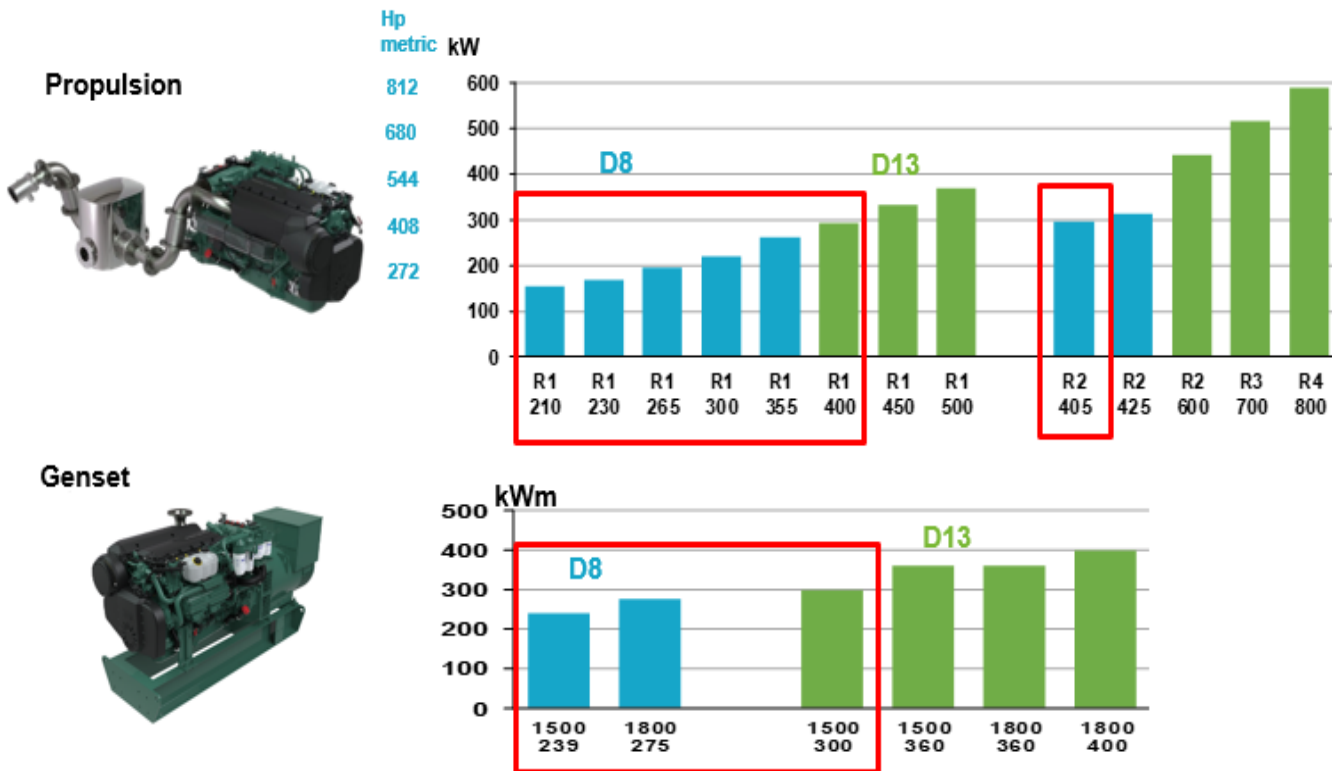
# VP EU/IWW StageV Offer Strategy



# Leverage IMO Tier III (<300kW)

## IMO TIER III RANGE 2020 - MH/MG

Stage V



# Leverage IMO Tier III (<300kW)

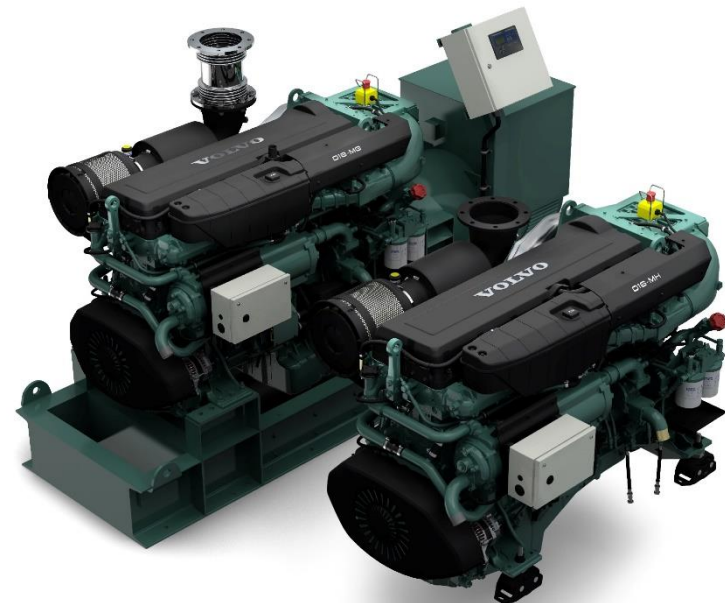
- Stage V certified.
- Delivery according to class and with product certificate possible.
- Time to market:
  - D13 ⇔ February 2021
  - D8 ⇔ June 2021
- Distribution to market through Volvo Penta dealer.
- Market price = **+20k€ to 22k€** on top of engine for Stage V.
- Compact solution!!
- Flexible installation possible in the engine room.



# Growth through Partnerships

## Koedood D16 MG/MH (368 - 550kW)

- Existing Volvo Penta D16 MH and MG will be Stage V certified by Koedood Marine Group with Koedood after treatment.
  - Same after treatment package as Mitsubishi S6R.
  - Stage V certificate by Koedood in collaboration with Volvo Penta.
  - Final responsibility emissions and installation by Koedood or their Partners.
  - Market price = **+70k€ to 90k€\*** on top of the engine.
- \* Incl. burner for low load applications.

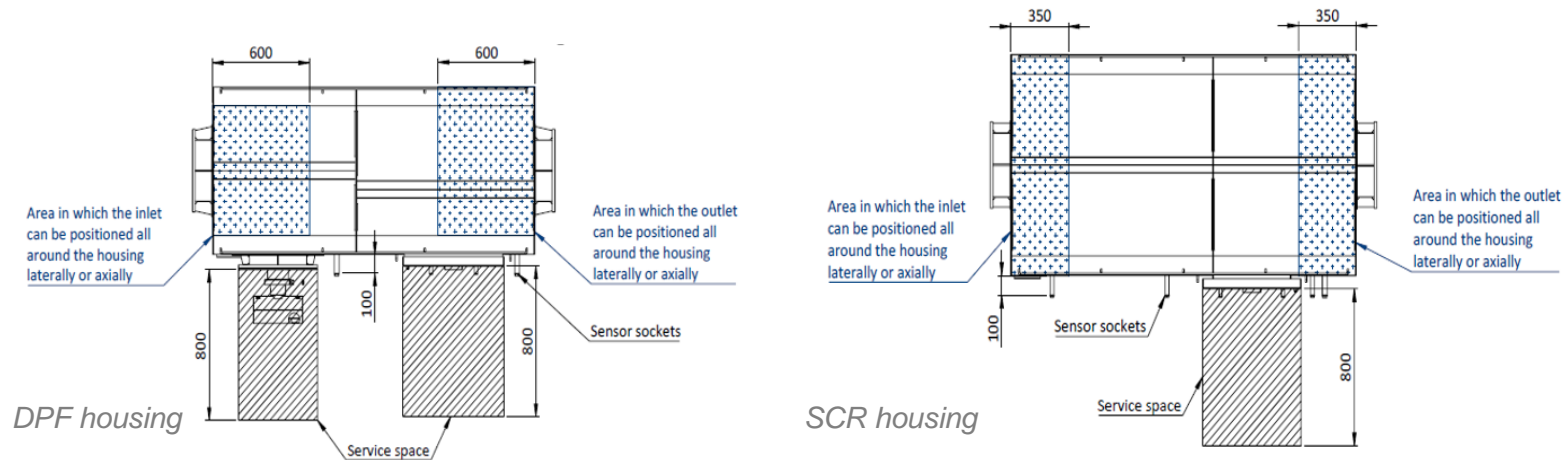


# Growth through Partnerships

## Koedood D16 MG/MH (368 - 550kW)

- Stage V certified. (by Koedood)
- Delivery according to class and with product certificate possible.
- Time to market:
  - Aiming for summer 2021

Distribution to market through Volvo Penta dealernetwork.



# Growth through Partnerships

## Conversion of TAD1381-85 VE for IWW use

- Convert a TAD1381-85VE NRMM (NRE) engine base on equivalency and existing rules for IWW. From 285kW@1900 rpm to 405kw@1700rpm.



D13 MH



TAD 1381-85 VE

# Growth through Partnerships

## Conversion of TAD1385 VE for IWW use

- **Hardware / mechanical conversion to comply to ES-TRIN rules (HW)**
  - *Done by **Visscher Scheepsreparatie and Volvo Marine & Industrie Center** in collaboration and with approval of AB Volvo Penta.*
  - *Engine has arrived in week 39 at Visscher for marine and ES-TRIN conversion.*
- **Software / emission conversion to comply to EU and ES-TRIN rules (SW)**
  - *Emission conversion /testing is not required since no adaptations will be made on emission components. All installation work according to Volvo Penta Industrial installation instructions.*
  - *To comply to ES-TRIN rules, some software modifications might be required If so it will be carried out by Volvo Penta but will cost extra time and money.*
  - *Volvo Penta remains responsible for emission systems of the engine.*



# Growth through Partnerships

## Conversion of TAD1385 VE for IWW use (HW)

- Differences: (most important ones listed below)
  - *Cooling, from Radiator Cooling to Keel Cooling. (HT)*
  - *New Charge Aircooler required. (from Air to Air to water to air)*
  - *Keel Cooling requires extra waterpump. (2 circuit watercooling) + coolant tanks*
  - *Engine mounts (bracket) and electronic connections differ.*
  - *Exhaust manifold requires heat shield / insulation.*
  - *Crancase ventilation should be modified.*
  - *Air filter position and connection to turbo.*
  - *Drip trays filters missing.*
  - *Different flywheel housings.*
  - *Etc.*



# Growth through Partnerships

## Conversion of TAD1385 VE for IWW use (HW)



Marine  
#78467590

Position  
seawater  
pump?



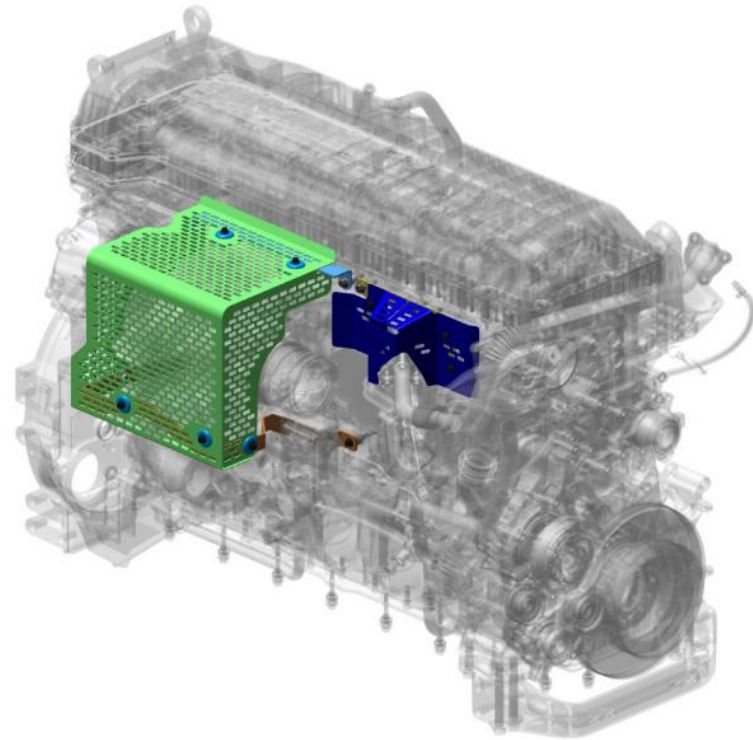
Industrial  
#78467591

# Growth through Partnerships

## Conversion of TAD1385 VE for IWW use (HW)

136298602 Heat guard

- Protect hot spots

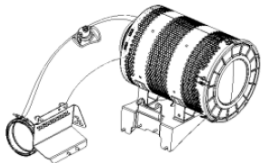


# Growth through Partnerships

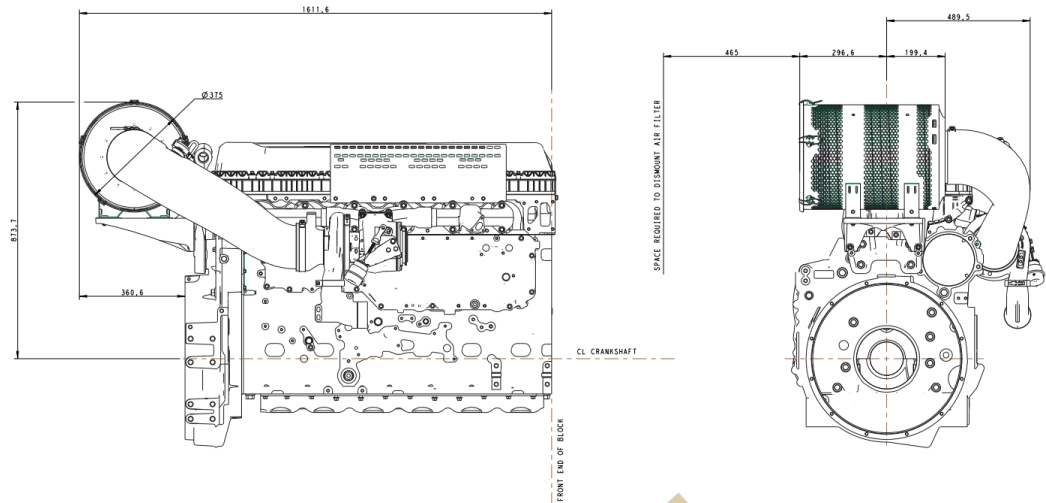
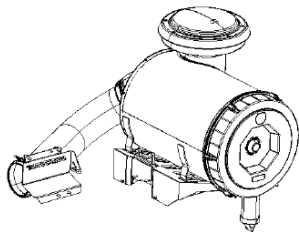
## Conversion of TAD1385 VE for IWW use (HW)

Airfilter connection  
TAD 1385 VE  
Inlet/Exhaust system – Air filter

1



2



Airfilter connection  
D13 MH/MG

No	Module / Kit	S/O	Description
1	136292301		Air filter 1-stage
2	136292302		Air filter 2-stage
3	136292303		Without air filter

# Growth through Partnerships

## Conversion of TAD1385 VE for IWW use (SW)

- The legislation permits the use of an NRE (Stage V VE engine) as long as there is **no** inducement active.
- The inducement principle of an NRE engine:
  1. *Alarm of 10 to 36 hours depending on the event (some listed below)*
    - *Level and quality of urea, sensors failures etc.*
  2. *Power reduction according to pre-defined table. (see next slide)*

After the alarm period operator can manually activate a 120 hour period to avoid power reduction in a critical and dangerous situation and bring vessel in safety. Since this is not unlimited, this control software is not approved for IWW applications.

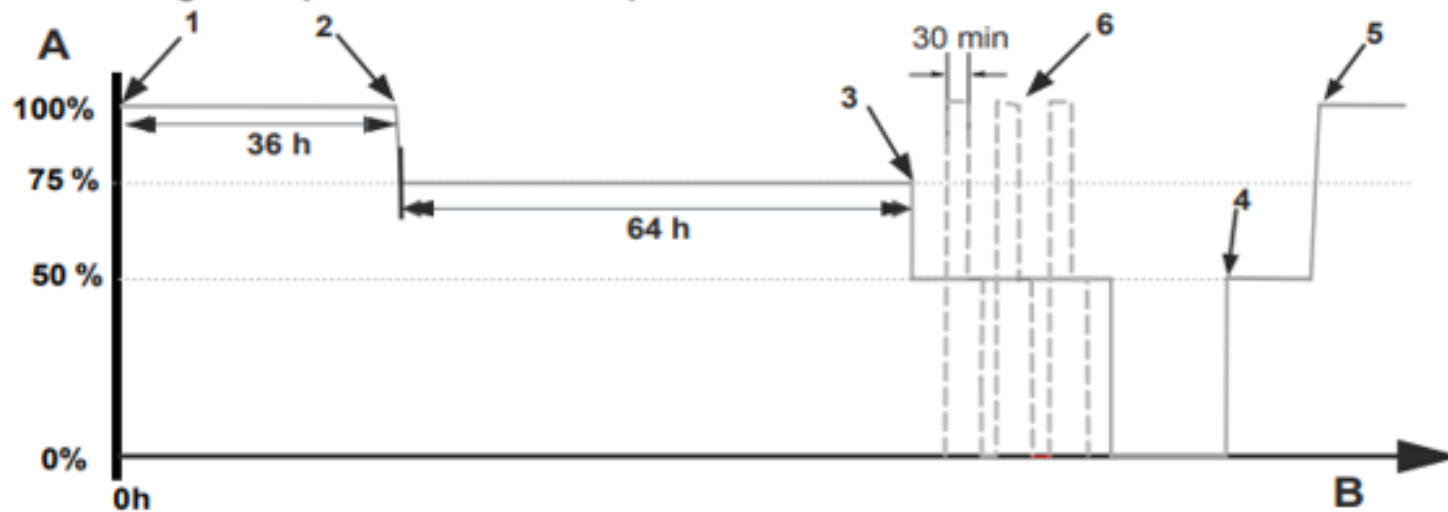
- *Control Software needs to be modified for IWW use.(extra time and costs)*

***How many IWW vessels need alarm time + 120 hours to bring ship in safe situation?***

# Growth through Partnerships

## Conversion of TAD1381-85 VE for IWW use (SW)

**AdBlue high temperature and component fault**



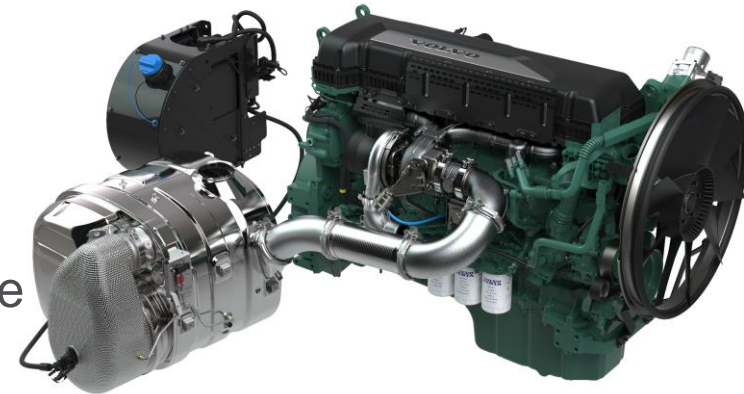
P0018677

- Example of control loop and power reduction, **without** inducement override function.

# Growth through Partnerships

## Conversion of TAD1385 VE for IWW use

- NRE Stage V Industrial certified. (compliant to Stage V marine)
- No delivery under class possible.
- Hardware modifications package under construction by Visscher / VMIC.
- Intention to use as much as possible Volvo Penta components for conversion.
- Time to market depending on outcome of interpretation of rules / legal check which rules are leading. (EU or ES-TRIN)
- Distribution to market through Volvo Penta dealer.
- Market price estimation = **75k€** for complete delivery, engine, after treatment and conversion kit to Keel Cooling.



# Stage V Marine summary

		Power range	Genset and Aux Use fixed speed	Propulsion and Aux Use variable speed	Emission type approval	Class type approval?	Engine	After treatment	Third party deliveries	Timeline
?	Under investigation	>75<130 kW	To early to make any statement							
1	<b>Factory solution</b> D8 + D13 MH and MG	>130kW <300 kW	Yes	Yes	Yes <sup>1</sup> IW-P / IW-A	Yes	VP	VP	N.A.	D8 Stage V, week 23, 2021 D13 Stage V, week 6, 2021
2	<b>Koedood solution</b> D16MH/MG	>368kW <550kW	Yes	Yes	Yes <sup>2</sup> IW-P / IW-A	Yes	VP	Koedood	Koedood	Earliest summer 2021
3	<b>Industrial conversion</b> TAD 1381-85 VE	>300 >405kW	No	Yes	Yes <sup>1</sup> NRE	No	VP	VP	Visscher VMIC	Depending on discussion with official societies
							<b>Warranty</b>			

<sup>1</sup> Emission Certificate by Volvo Penta

<sup>2</sup> Emission Certificate by Koedood



# Volvo Penta Stage V marine Information

