Boiler for LNG fueled vessel
Gas/Oil simultaneous mixed combustion DF burner

**Vignis**

Gas/Oil simultaneous mixed combustion DF burner called "Vignis" is developed for boilers of LNG fueled vessels and LNG carriers. Vignis contributes to zero methane gas release into the atmosphere because it equips GCU mode as a standard specification.

Note: GCU stands for "Gas Combustion Unit". GCU combusts boil off gas containing inert gas in various situation.

"Methane" is a major component of LNG (liquefied natural gas fuel and has a global warming potential 25 times that of carbon dioxide! The release of combustible gases into the atmosphere is prohibited under the IGF code*1.

*1. International Code of Safety of Ships Using Gases or Other Low-flashpoint Fuels

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**When use GCU mode?**

1. **LNG tank pressure adjustment**
   - If the engine cannot completely consume the gas, the boil off gas will need to be treated in order to adjust the pressure inside the tank.

2. **Inert gas treatment during LNG bunkering**
   - Boil off gas becomes mixed with inert gas inside pipes, and must be treated when bunkering.

3. **LNG tank cooling down / gas-freeing**
   - Gas let out from the tank during initial bunkering, when docking, or when performing maintenance work on the tank must be treated.

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We have a **wide range type** with three times higher capacity than standard type on GCU mode.

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**Gas/Oil simultaneous mixed combustion DF burner features**

- **Gas/Oil simultaneous mixed combustion**: Capable of burning Gas and Oil simultaneously as well as separately.
- **Equipped GCU mode**: Usable of boiler as GCU by Gas/Oil simultaneous mixed combustion.
- **Combustion gas of any ratio**: Capable of treating inert gas up to 100% content due to Gas/Oil simultaneous mixed combustion.
- **Wide range Turndown Ratio**: Reductive of heat loss by decreasing frequency of both firing and extinguishing thanks to wide range Turndown Ratio up to 10:1.
- **Target boilers**: Applicable to boilers with evaporation rate of 1 to 7 t/h Gas/Oil simultaneous mixed combustion DF burner “3FEG II” can be used for boilers which evaporation rate is higher than 7 t/h.
Vignis

Gas/Oil simultaneous mixed combustion DF burner

Specifications of Vignis

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</thead>
<tbody>
<tr>
<td>Boiler evaporation</td>
<td>t/h</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<td>Usable fuel</td>
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<tr>
<td>Max. Combustion Rate (HFO)</td>
<td>kg/h</td>
<td>100</td>
<td>150</td>
<td>150</td>
<td>180</td>
<td>250</td>
<td>330</td>
<td>410</td>
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<tr>
<td>Max. Combustion Rate (MGO)</td>
<td>kg/h</td>
<td>95</td>
<td>150</td>
<td>150</td>
<td>180</td>
<td>250</td>
<td>330</td>
<td>410</td>
</tr>
<tr>
<td>Max. Combustion Rate (Gas)*1</td>
<td>kg/h</td>
<td>80</td>
<td>120</td>
<td>150</td>
<td>210</td>
<td>280</td>
<td>350</td>
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<tr>
<td>Rated discharge pressure of HFO pump</td>
<td>MPaG</td>
<td>2.0</td>
<td>From free flow to 1.0*2</td>
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<tr>
<td>Atomized air pressure</td>
<td>MPaG</td>
<td>0.5</td>
<td>From free flow to 1.0*2</td>
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<tr>
<td>Control method</td>
<td>Proportional control</td>
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<tr>
<td>Turn down ratio (gas)</td>
<td>10:1</td>
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</tbody>
</table>

*1: CH6: 100% (as low calorific value 50 MJ / kg)  
*2: Gas supply pressure at gas valve unit inlet  
*3: 'Free flow' is when gas is supplied at the tank pressure without pressurizing BOG

Specifications of Vignis -W (wide range type)

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Vignis-W240</th>
<th>Vignis-W360</th>
<th>Vignis-W450</th>
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<tbody>
<tr>
<td>Mode</td>
<td>Normal use</td>
<td>GCU mode</td>
<td>Normal use</td>
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<tr>
<td>Boiler evaporation</td>
<td>t/h</td>
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<td>-</td>
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<tr>
<td>Max. Combustion Rate (HFO)</td>
<td>kg/h</td>
<td>100</td>
<td>-</td>
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<tr>
<td>Max. Combustion Rate (MGO)</td>
<td>kg/h</td>
<td>95</td>
<td>-</td>
</tr>
<tr>
<td>Max. Combustion Rate (Gas)*1</td>
<td>kg/h</td>
<td>80</td>
<td>240</td>
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</tbody>
</table>

*1: CH6: 100% (as low calorific value 50 MJ / kg)

Configuration

1. Burner assembly (Include a pilot burner, FD fans, HFO heater)
2. Gas valve unit (right picture) & solenoid valve board
3. Control panel & remote control panel
4. Pilot burner pump unit

Possible vessel types for installation

- All types of gas fueled vessels
- Gas fueled bunkering vessels
- Not just LNG gas fuel! Supports a various kinds of gas fuels.
- LNG-Ready vessels
- LNG carrier, LPG carrier etc

VOLCANO solution for LNG fueled vessel issues

Use/treat Boll Off Gas as fuel

VOLCANO Gas/Oil simultaneous mixed combustion DF burners for boiler

“Vignis” is for boiler-evaporation rate 1 ~ 7t/h

“SFFG II” is for boiler-evaporation rate more than 7t/h

Combust and treat Boll Off Gas

VOLCANO Gas Combustion Unit [MECS-GCU]

Combustion Engineering Expert

VOLCANO Co., Ltd. provides products for LNG as fuel and solution for LNG utilization, based on our experiences on Gas/Oil simultaneous mixed combustion DF burner for Marine-use, Gas burner for Industrial-use and Ultra-low NOx burner for Industrial-use.

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