PRODUCTS PRESENTATION
Settima products

*Settima* designs and manufactures hydraulic 3 screw pumps and helical rotors pumps. *Settima* screw pumps, coupled together with external or immersed motors, run quietly and with no pulsations, they are used in hydraulic applications and systems of many types.

*Settima* Screw pumps are positive displacement rotary pump with axial flow design. There are only three moving parts. The power rotor is the only driven part that extends outside the case. The idler screws act as sealing parts and are turned hydraulically by the fluid being pumped. There is only a rolling action between the drive screw and the idler ones. The rolling action eliminates noise and vibration.
Market proposal

High flow
Low noise
Low pulsations
High pressure
High and low viscosity fluids handling

Settima solutions for many requests
Product innovations

- Hollow shaft pump
- SMT8B short pumps
- Customization
- Continuum ® pumps

SETTIMA PRODUCT RANGE

3 SCREW PUMPS

2 ROTORS PUMPS
<table>
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<th>3 Screw Pumps</th>
</tr>
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<td><strong>FGM series</strong></td>
</tr>
<tr>
<td>Industrial application up to 80 bar</td>
<td>Industrial application up to 40/80 bar</td>
</tr>
<tr>
<td><strong>SMT16B series</strong></td>
<td><strong>HA TM series</strong></td>
</tr>
<tr>
<td>Industrial application up to 40 bar</td>
<td>Industrial application up to 80 bar</td>
</tr>
<tr>
<td><strong>SMT16B G HD series</strong></td>
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</tr>
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<td><strong>FOTP series</strong></td>
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<tr>
<td>Industrial application up to 70 bar</td>
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<td>Industrial application up to 20 bar</td>
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<td><strong>SMT8B series</strong></td>
<td></td>
</tr>
<tr>
<td>Industrial application up to 15 bar</td>
<td></td>
</tr>
<tr>
<td><strong>SMAPI series</strong></td>
<td></td>
</tr>
<tr>
<td>Industrial API676 application up to 60 bar</td>
<td></td>
</tr>
<tr>
<td><strong>SM series</strong></td>
<td><strong>SM EU series</strong></td>
</tr>
<tr>
<td>Lift/elevators applications up to 80 bar</td>
<td>SMU USA (USA market)</td>
</tr>
</tbody>
</table>
# Settima product range

**Special gear pump (2 helical rotors pump) – Continuum® Series**

<table>
<thead>
<tr>
<th>Continuum® series</th>
<th>Industrial application up to 280 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>2VHL Continuum® series</td>
<td>Industrial application up to 25 bar</td>
</tr>
</tbody>
</table>
SMT & SMT16B series

Screw pumps for low & medium pressure
no noise applications

SMT and SMT16B series are 3 screw pump for industrial use up to 80 bar and 40 bar. Technology and characteristics are similar between the two series with the only design difference for the SMT16B of shorter screws to be used in application where the space is restricted, and a maximum pressure of 40 bar.
SMT & SMT16B series

- **Characteristics and limits**
  - *Flows*: 4L/min (4 poles) → 3.200L/min (2 poles overboosted)
  - *Viscosity*: 2 → 10.000 cSt
  - *Temperature*: -20° → 60/180°C
  - *Motor speed*: 3.600 rpm max
  - *Pressure*: 40 bar (**SMT16B**) – 80 bar (**SMT**)

- **Flows**
  - Available pump groups:
    - GR20, GR25, GR32, GR40, GR45, GR55, GR60, GR70, GR80, GR90*, GR110*
  - The nominal flows, reported into the catalogue, are related to the following spec.:
    - 40 bar, oil ISO VG 68
    - NOTE: the pumps are volumetric, but if the viscosity decreases, the flows decrease (at same pressure)

* only **SMT16B**
SMT & SMT16B series: FGM pumps

Medium / high pressure transfer pump

Leakage free solution

Magnetic coupling: ultimate concept for total safety and no maintenance

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>DETAILED APP.</th>
<th>SIZE</th>
<th>FLOWRATE</th>
<th>MAX PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT 3 SCREW</td>
<td>Fuel transfer oil, corrosive liquids, high temperatures oil, chemicals and food</td>
<td>GR20 → GR60</td>
<td>8→500L (@2950rpm)</td>
<td>40bar (if SMT16B)</td>
</tr>
</tbody>
</table>
SMT & SMT16B series: SMT16B G HD pumps

Screw pumps for heavy duty filtration applications

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>DETAILED APP.</th>
<th>SIZE</th>
<th>FLOWRATE</th>
<th>MAX PRESSURE</th>
<th>FLOW MEDIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT16B 3 SCREW</td>
<td>Off-line filtration, off-line filtration cart/trolleys, filtration &amp; oil transfer</td>
<td>GR20 → GR110</td>
<td>8→3.200L (@2950rpm)</td>
<td>40bar</td>
<td>Hydraulic oils, water-oil emulsions, water-glycol emulsions, diesel oils</td>
</tr>
</tbody>
</table>
SMT & SMT16B series: SMT HA TM pumps

High pressure coolant, fuel oil handling and filtration applications

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>DETAILED APP.</th>
<th>SIZE</th>
<th>FLOWRATE</th>
<th>MAX PRESSURE</th>
<th>FLOW MEDIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT 3 SCREW</td>
<td>Filtration systems, tool cooling, CNC machines, Chip conveyors</td>
<td>GR20 → GR80</td>
<td>4→1.800L (@2950rpm)</td>
<td>80bar</td>
<td>Cutting oils, water-oil emulsions, water-glycol emulsions</td>
</tr>
</tbody>
</table>
SMT & SMT16B series – application sectors

- Gear Box Lube oil
  - High viscosity lube
  - Air emulsion
  - Heavy duty application

Wind Energy
- High viscosity lubrication and filtration
- Cooling (gear boxes, transmissions, bearings, shaft)
SMT & SMT16B series – application sectors

Power generation

- Tandem solution for burner boosting systems
- Burners injection (power plants)
- Turbine & compressors lubrication (gear boxes, transmissions, bearing, shaft)
- Seal oil applications
- Jacking oil systems
- Filtration
- Lube service
- Seal oil services
- Oil transfer
SMT & SMT16B series – applications sectors

Industrial

- **Power hydraulics**
  - Presses, machine tools, working machines, rolling mill, dumping equipment, elevators, carriage pitch propellers, hydraulic winches etc. Power unit, mini power packs.

- **Injection moulding machines**
  - Cooling & filtration system

- **High & low pressure filtration systems**
  - Filtration systems, high pressure coolant, tool cooling, CNC machines (grinding machines, machine centers, deep hole drilling machines etc). Chip conveyors, Off-line filtration systems, off-line filtration cart/trolleys, filtration & oil transfer.

- **Hydro power**
  - Turbines & compressor lubrication power

- **Paper industry**
  - Lubrication, filtration
SFO series

Fuel oil handling pump (marine – power generation)

In the SFO pumps the fluid has a uniform axial flow, which drives to a minimum of fluid pulsation and extremely quiet operation.

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>DETAILED APP.</th>
<th>SIZE</th>
<th>FLOWRATE</th>
<th>MAX PRESSURE</th>
<th>FLOW MEDIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT16B</td>
<td>Engine fuel filtration and boosting, burner boosting</td>
<td>GR25</td>
<td>12→75L</td>
<td>20bar</td>
<td>Mineral oil, synthetic oil, oil water emulsions, fuels, marine distillate fuels, marine residual fuels.</td>
</tr>
<tr>
<td>3 SCREW</td>
<td>burner systems burners injection</td>
<td>GR32</td>
<td>(@1450rpm)</td>
<td>(40 bar intermittent)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GR40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SFO series – applications sectors

Fuel oil Handling – Marine & power generation

• Engine fuel filtration and boosting (shipyards and power plants)
• Circulation for filtration and cooling
• Engine fuel boosting and filtration
• Burner boosting systems
• Burners injection
• Transfer onboard
• refineries
### FOTP series

**Fuel oil handling pump (marine – power generation)**

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>DETAILED APP.</th>
<th>SIZE</th>
<th>FLOWRATE</th>
<th>MAX PRESSURE</th>
<th>FLOW MEDIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT 3 SCREW</td>
<td>Burner boosting systems, burners injection.</td>
<td>GR20, GR25</td>
<td>8→30L (@3.000rpm)</td>
<td>70bar</td>
<td>Fuels, marine distillate fuels, marine residual fuels, all fuels according to latest ISO 8217 (DMX, DMA, DMB, DMC, DMZ)</td>
</tr>
</tbody>
</table>

Designed also as solution for low viscosity and low sulphur content for new marine diedel fuels (MDO), according to latest ISO8217.
FOTP series – application sectors

Fuel oil Handling – Marine & power generation

- Burner boosting systems
- Burners injection (shipyards and power plants)
- Feeder and circulation for fuels and lubricants in Marine environments
- Feeder, transfer and filling tank systems MDO, MGO, Low sulphur MDO, bunker oil
- Handling DMX (according to latest ISO 8217), DMA DMB, DMC, DMZ
SMAPI series

Oil & gas, power generation, Fuel oil handling pump: **API676 compliant**

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>DETAILED APP.</th>
<th>SIZE</th>
<th>FLOWRATE</th>
<th>MAX PRESSURE</th>
<th>FLOW MEDIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT 3 SCREW</td>
<td>Off-shore platform, refineries, petrochemical, turbine &amp; compressor, seal oil applications, jacking oil systems</td>
<td>GR20 → GR110</td>
<td>4→1.800L (@2950rpm) 1.800→3.200 over-busted</td>
<td>60 bar (80 bar intermittent)</td>
<td>Diesel fuel, HFO, MAZUT, bunker oil, furnace oil, engines oil, heating oil &amp; mineral, oil-in-water emulsions HFA, polyglycol water HFC, hydraulic oils DIN 51524</td>
</tr>
</tbody>
</table>

Smapi series HA designed for fuel compatibility with: SMX (ISO8217), DMA, DMB, DMC, DMZ
SMAPI series – application sectors

Oil & Gas

- Fuel oil pipe line
- Off-shore platform
- Refineries
- Petrochemical industry
- Off-line filters
- Transfer service

Marine Industry

- High flow & pressure steam boiler ignition
- Burner feeding
- Diesel engines feeding and ignition
- Fuel oil transfer (filtration, loading & unloading)
- Biodiesel applications

ACCORDING TO API 676 REGULATION
# SMT8B series

## Product range

- **Operating pressure**: 0-15 bar
- **Delivery flow range**: 15-80 L/min

## Standard hollow shaft availability

<table>
<thead>
<tr>
<th>Size</th>
<th>Type</th>
<th>LPM @1450rpm</th>
<th>AC14</th>
<th>AC19</th>
<th>AC24</th>
<th>AC28</th>
<th>AC38</th>
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</thead>
<tbody>
<tr>
<td>GR32</td>
<td>26L</td>
<td>13</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>30L</td>
<td>15</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>35L</td>
<td>17</td>
<td></td>
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<tr>
<td></td>
<td>45L</td>
<td>22</td>
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<tr>
<td>GR40</td>
<td>60L</td>
<td>30</td>
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<td></td>
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<tr>
<td></td>
<td>80L</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GR45</td>
<td>80L</td>
<td>40</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12L</td>
<td>60</td>
<td>X*</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>155L</td>
<td>77</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Technology: SMT 3 screws

*GR32 – AC14, GR45 – AC24 available on request*
SMT8B series – application sectors

Wind energy

- Low pressure cooling
- Low pressure recirculation (pitch control)

Industrial

- Low pressure cooling
- Off-line compact cooling systems
- Powerpacks cooling
- Chillers

Mobile

- Mobile machines cooling
- Filtration
- Low pressure recirculation
## 2 Helical Rotors Pumps – Continuum® Series

<table>
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<th>Continuum® series</th>
<th>Industrial application up to 280 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>2VHL Continuum® series</td>
<td>Industrial application up to 25 bar</td>
</tr>
</tbody>
</table>
# Continuum® series

## Product description

*GR92, GR106 available soon

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>DETAILED APP.</th>
<th>SIZE</th>
<th>CC</th>
<th>FLOWRATE (@1450rpm)</th>
<th>MAX PRESSURE</th>
<th>FLOW MEDIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuum® helical rotors</td>
<td>Marine power Hydraulic, Yacht building industry, Elevator, Lift, Hydraulics tyres lift, Power hydraulics, Injection moulding machines, Hydro power, Paper industry, Power units, Steering units, Forklift, Mobile compactors</td>
<td>GR28</td>
<td>4→13</td>
<td>6→18,6L</td>
<td>280bar</td>
<td>Mineral oils , Synthetic oils</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GR33</td>
<td>10→18</td>
<td>14,5→26,1</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GR38</td>
<td>16→28</td>
<td>22,8→40,7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GR47</td>
<td>28→50</td>
<td>40,3→72,4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GR55</td>
<td>50→90</td>
<td>72,7→130,9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GR72</td>
<td>94→220</td>
<td>136→290</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GR92*</td>
<td></td>
<td></td>
<td>(Please contact Settima for single pressure data for each cc)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GR106*</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Available soon
One of the most important request from the industrial world is to create a better working environment, which is synonymous of better efficiency, production lower cost and better life quality of workers. The reduction of function noise goes with no doubt into that direction.

Hydraulic pumps, above all those for high pressure, entail noise and/or vibration level that are unacceptable for certain new applications. This is the main reason why **Settima** has designed a new gear pumps generation capable to eliminate acoustic emissions.

Parameters influencing emissions of hydraulic noise are:
- cavitation
- pressure peaks arising from trapping fluid between gear teeth
- ripple or flow pulsation

**Continuum**® is capable to eliminate those parameters causing noise.
Thinking beyond traditional process design

No noise *Continuum®* concept

Internationally patented:
- the rotors profile
- the screw step
- the inner force balancing

Main *Continuum®* advantages
- average 15 dB(A) less noise than standard external gear pump
- reduced noise level for the machine operator and the surroundings
- cost saving by eliminating second noise reduction measures
- easy to replace thanks to compatibility with all the external gear pumps
- helps meet legal noise limit requirements

The silent way to replace gears pumps
The innovation behind

KNOCK DOWN THE NOISE:

The especially studied rotor profile does not trap any fluid volume (no encapsulation chambers).

The helical course (there is just a single point of contact between rotors) of the Continuum rotor profile makes a gentle transmission of movement and minimization of the any pulsation. Internal hydrostatic mechanisms are put in place in order to avoid trade-off with efficiency.
Sustainable power

![Graph showing the relationship between [dBA] and [rpm] for different pump models.]

- **150 bar Continuum**
- **150 bar Ext Gear 2**
- **150 bar Ext Gear 1**
Pulsation is harmful

- In Hose and Pipe design is paramount pressure pulsation; in fact, pressure pulsation affects the hydraulic system lifetime;
- Noise not only is generated by the pumps but in most cases the systems generated noise by amplifying the ripple. Consequent pressure drops are a noticeable energy consumption and reducing overall efficiency.

Environment: 100bar - 40 cSt - 1.500 rpm

Relative pressure pulsation (bar)

Time (msec)

Best External Gear  Best Internal Gear  Continuum
The innovation behind

Continuum® Main characteristics

- Reduced energy requirement
- Lower noise levels
- High speed of operations: up to 6500rpm (only some models at special applications)
- Continuously variable flow rate: 0% to 100%
- Unidirectional pump to bi-directional pump/motor
- Intermittent operation at high pressure and low speed with no net flow is possible
- Driven by servo-motors and/or a variety of asynchronous motors
- Pressure up to 280 bar
- Can operate for some short time as reversible pump
- Fast reverse rpm is allowed: CCW max < 400 rpm
- Response time < 100ms due to very small internal mechanical inertia
The innovation behind

Continuum® volumetric efficiency

The volumetric efficiency of Continuum® pumps is depending on both pressure and speed. Continuum® pumps achieve high volumetric efficiencies.
The innovation behind

Example of press machinery load cycle for a Continuum® pump with variable speed drive

Maximum time for pressure holding duty (Q=0 l/min) is depending on pressure, duty cycle and pump type.

![Typical cycle time graph](image-url)
The innovation behind

Minimum speeds as a function of pressure
Continuum® series – application sectors

Marine
- Marine power hydraulics
- Rudder actuators (tandem systems)
- Propeller pitch control
- Propeller drive (power transmissions from engine)
- Minipowerpacks (Dock operation, door control)
- Diesel pump
- Yacht building industry (Lifting systems: fly bridge cranes, tenderlift, elevators, walkways, transformers, automatic swimming ladders, side boarding ladders, pitch controls and operations)

Building industry
- Elevator
- Lift
- Scissor lift
- Hydraulic tyres lift
Continuum® series – application sectors

Industrial
- Power hydraulics
- Injection moulding machines: servo drive systems, power
- Filtration-cooling
- Hydro power
- Energy, Steel, Paper industry
- Dosing/metering
- Presses, leather cutting syst.

Mobile
- Power Units
- Forklift
- Mobile compactors
- Steering units
- Parking systems
- Truck, Tractors

SETTIMA MECCANICA

Products Presentation

research & innovation, always
# 2VHL Continuum® series

## Product description

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>DETAILED APP.</th>
<th>SIZE</th>
<th>CC</th>
<th>FLOWRATE</th>
<th>MAX PRESSURE</th>
<th>FLOW MEDIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuum® helical rotors</td>
<td>Turbine &amp; compressors (gear boxes, transmissions, bearings, shaft) Filtration Cooling Recirculation</td>
<td>GR47</td>
<td>28→63</td>
<td>40→90 L/min (@1450rpm)</td>
<td>25 bar (peak 40 bar)</td>
<td>Hydraulic fluids (mineral &amp; synthetic), thermal oils, emulsions, polyglycol oil, heavy oil, other fluids upon request</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GR55</td>
<td>75→160</td>
<td>100→230 L/min (@1750RPM)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2VHL Continuum® series – application sectors

**Power generation**
- Oil filtration and cooling for turbine & compressors
- Turbine and compressors lubrication
- Filtration and cooling (gear boxes, transmissions, bearings, shafts)

**Marine**
- Oil filtration
- Cooling
- Recirculation
- Transfer

**Wind energy**
- Lubrication
- Filtration
- Cooling (gear boxes, transmissions, bearings, shafts)

**Industrial**
- Filtration & cooling
# Pump technology comparison

Information reported below is as basic scheme – for more information ask Settima

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Flow</th>
<th>Noise</th>
<th>Pressure / Flow pulsation</th>
<th>Pressure</th>
<th>Efficiency</th>
<th>Energy saving</th>
<th>Dirty particles insensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Continuum</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
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<tr>
<td>External gear</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Internal gear</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Vane</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Piston</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Vane - variable displacement</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Piston - variable displacement</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>
## Application summary

Information reported below is as basic scheme for more information ask Settima

<table>
<thead>
<tr>
<th>Basic</th>
<th>SM</th>
<th>SMT</th>
<th>SMT</th>
<th>SMT</th>
<th>SMT</th>
<th>SMT8B</th>
<th>SMT8B</th>
<th>Continuum</th>
</tr>
</thead>
<tbody>
<tr>
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Product certification

- **ISO 9001 – DNV**
  - All the products of Settima are manufactured according to this standard
- Additional certification (free of charge under request)
  - **ATEX**: area CE eX II 2 GD ck T3
  - Material certification: **EN10204 3.1b**
- Marine certifications
  - **ABS, BV, DNV, LLOYD, RINA, CCS, RS, GL, KR, NK**
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