Velaro Novo delivers on all targets with its key qualities

... make infrastructure intelligent

... increase value sustainably over the entire lifecycle

... enhance passenger experience

... guarantee availability

Reduced total costs

Intelligent motion

Aerodynamic excellence

Variable train

Proven technology
Aerodynamic excellence

- Bogie housing
- Streamlined intercar gangway
- Housed pantograph
- Covered high voltage roof equipment
Aerodynamic drag is one major driver for energy consumption in high-speed trains.

**Effect on energy consumption**

**Bogie housing**

-15%
Aerodynamic drag is one major driver for energy consumption in high-speed trains.

Effect on energy consumption

Streamlined vehicle roof

-10%

Common vehicle roof design

Optimized vehicle roof
Reduced total costs

**Mass**
- Advanced car body profile design and friction stir welding
- Auxiliary converter with silicium carbide

**Maintenance**
- High-performance electrical brake with brake resistors

**Energy**
- Permanent magnetic synchronous motor
Velaro Novo conserves resources - 30% lower energy consumption

- **30% energy savings** compared to Velaro
- This reduces carbon dioxide emissions by 1,375 tons per train and year

Train performance simulation on Cologne – Frankfurt high-speed line
Mass
Bogie with inbound bearings

Energy
Flexible, innovative drive system
New permanent magnet motor (PMM) drive enables pure electrical braking during normal operation

PMM 12-month field testing results in Russia: -5%

- Traction power +10%
- Braking power +70%
- Efficiency +5%
The empty tube concept offers a perfect balance of flexibility and economic efficiency

- Elimination of technical equipment that adversely influences interior flexibility
- Standardized fixations for interior fittings

**Available space +10%**

<table>
<thead>
<tr>
<th>Train</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Velaro Turkey</td>
<td>Underseat container, Electrical cabinets</td>
</tr>
<tr>
<td>ICE 4</td>
<td>Underseat container, Electrical cabinets</td>
</tr>
<tr>
<td>Velaro Novo</td>
<td>Ceiling mounted electrical cabinet, Rear wall electrical cabinets</td>
</tr>
</tbody>
</table>
Velaro Novo – Maximum interior width facilitates higher capacity without compromising on comfort

Variable train

Velaro

Aisle width increased by

+11 mm

Velaro Novo

Higher comfort by increased interior width
Velaro Novo – Interior Flexibility

- from economy…
Velaro Novo – Interior Flexibility

- from economy… to premium…
Velaro Novo – Interior Flexibility

- from economy… to premium… from present to future
#seeitnovo testcar on track since April 2018

2 billion kilometer experience

Global reference projects
The #seeitnovo testcar takes its first test run
Stringent validation program to mitigate project risks and ensure reliability

Aerodynamics Pantograph
Acoustics roof
Dynamic car body behavior
New aluminum Extrusions/FSW welding
Brake Resistor incl. Flaps
Lightweight solutions

Sanitary system
Ballast/Snow protection
Full bogie housing
Running behavior
Tread brake
Bogie diagnosis

Door pressure tightness
Fire protection gangway
Lead with experience
Recently reached 331km/h in the ICE S
The Velaro platform –
Proven track record with 1 million km experience per day!

Operational experience is the key to innovation: 2 billion km in operation and never stopping.
Note: Compared to Velaro at 320 km/h

Flexible speed: 250 - 360 km/h

- Invest: -20%
- Maintenance: -30%
- Energy consumption: -30%
- Capacity: +10%
- Mass: -15%
Thank you

#seeitnovo