



Reducing  
your GWP  
impact



# Wabtec Green Air Solution

## R290 technology



### The ideal natural refrigerant solution

Wabtec Green Air Solution are HVAC units using R290 refrigerant. It is an ideal environmentally friendly alternative to synthetic refrigerant solutions

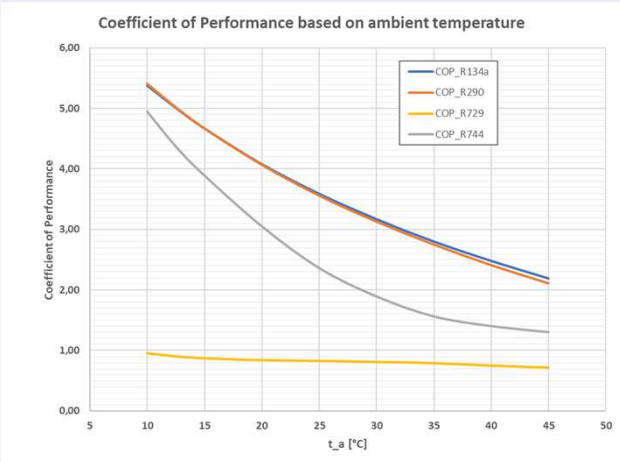
- For all climatic zones
- For most types of railway vehicles
- Available for new builds, as well as aftermarket applications
- Efficient heat pump option available
- Similar cooling performance as existing synthetic refrigerant-based solutions with same train power supply

### CUSTOMERS BENEFITS:

- + **Dramatically reduces the Global Warming Impact vs standard synthetic solutions**
- + **High-energy efficient natural refrigerant solution**
- + **Cost efficient**
- + **Easy-to-switch technology** (from other existing standard synthetic solution)
- + **No obsolescence risk**
- + **Technology proven**





Topic	Technical Specificities																																													
GWP and Obsolescence	<p>+ Low GWP vs synthetic alternatives</p> <table border="1"> <thead> <tr> <th>Refrigerant</th> <th>GWP</th> </tr> </thead> <tbody> <tr> <td>R22</td> <td>1810</td> </tr> <tr> <td>R134a</td> <td>1430</td> </tr> <tr> <td>R513a</td> <td>631</td> </tr> <tr> <td><b>R290</b></td> <td><b>3</b></td> </tr> </tbody> </table>	Refrigerant	GWP	R22	1810	R134a	1430	R513a	631	<b>R290</b>	<b>3</b>																																			
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Cost Efficiency	<p>+ 10% weight savings (80kg/unit) measured vs CO2 on regional train application</p> <p>+ Lower filling charge (for R290 reduction of approx. 50 % expected vs. R134a)</p> <p>+ R290 predictable sourcing price</p>																																													
Technology Switching aspects	<p>+ Similar pressure level in cooling circuit vs synthetic solutions</p> <p>+ Similar train Auxiliary Power Supply needed vs synthetic solutions</p> <p>+ For most applications identical mechanical interfaces work for R290 and synthetic with same capacity</p>																																													
Energy Efficiency	<p>+ Coefficient of performance (COP) over ambient temperature for a theoretical unit: similar performance vs R134a and better than CO2 (R744) and Air-cycle (R729)</p>  <table border="1"> <caption>Coefficient of Performance based on ambient temperature</caption> <thead> <tr> <th>t<sub>a</sub> [°C]</th> <th>COP_R134a</th> <th>COP_R290</th> <th>COP_R729</th> <th>COP_R744</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>5.5</td> <td>5.5</td> <td>1.0</td> <td>5.0</td> </tr> <tr> <td>15</td> <td>4.8</td> <td>4.8</td> <td>0.9</td> <td>4.0</td> </tr> <tr> <td>20</td> <td>4.2</td> <td>4.2</td> <td>0.85</td> <td>3.2</td> </tr> <tr> <td>25</td> <td>3.8</td> <td>3.8</td> <td>0.8</td> <td>2.6</td> </tr> <tr> <td>30</td> <td>3.4</td> <td>3.4</td> <td>0.78</td> <td>2.2</td> </tr> <tr> <td>35</td> <td>3.1</td> <td>3.1</td> <td>0.75</td> <td>1.9</td> </tr> <tr> <td>40</td> <td>2.8</td> <td>2.8</td> <td>0.72</td> <td>1.7</td> </tr> <tr> <td>45</td> <td>2.5</td> <td>2.5</td> <td>0.7</td> <td>1.5</td> </tr> </tbody> </table>	t <sub>a</sub> [°C]	COP_R134a	COP_R290	COP_R729	COP_R744	10	5.5	5.5	1.0	5.0	15	4.8	4.8	0.9	4.0	20	4.2	4.2	0.85	3.2	25	3.8	3.8	0.8	2.6	30	3.4	3.4	0.78	2.2	35	3.1	3.1	0.75	1.9	40	2.8	2.8	0.72	1.7	45	2.5	2.5	0.7	1.5
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Technology Proven	<p>+ Checked and tested by internal and external experts (e.g. BAM/TÜV)</p> <p>+ Units running in daily passenger operations since July 2020 with the Deutsche Bahn</p>																																													

**To have more information about all our HVAC solutions, please contact us at:**

Faiveley Transport – a Wabtec company

Faiveley Transport Leipzig GmbH & Co. KG – Schkeuditz – Germany

[www.wabteccorp.com](http://www.wabteccorp.com)