


# IronBird | PowerBox







**stand-alone power supply fuelled by hydrogen from six H2Tank2Go<sup>®</sup>**

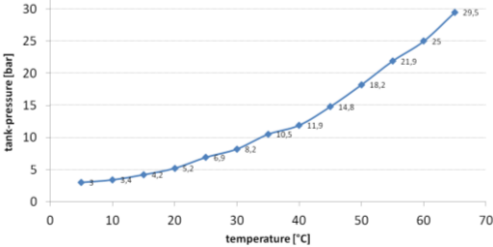
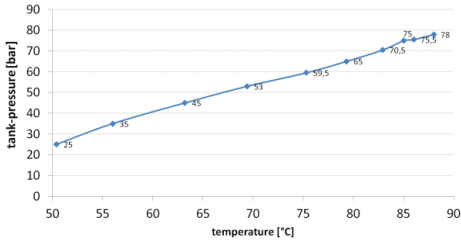
e. g. converts any ZEV (battery) into a hydrogen driven vehicle (interurban)

**refueling at home or replacing at any home-depot / tank vending machine**

Nanostructures for Zero Emission Future Transportation & Energy

IronBird   PowerBox	at a glance
	<ul style="list-style-type: none"> <li>stand alone fuelcell system (PEMFC) powered by solid-state absorber tanks H2Tank2Go<sup>®</sup></li> <li>replacing tanks in seconds by “click'n'go system”</li> <li>refueling within seconds by replacing tanks</li> <li>the trunk of ZEV, glider, boat, camping, APU</li> <li>utilizing renewable power - P2G2F<sup>®</sup></li> <li>virtually pressure-less, safe, clean, long lifetime</li> <li>flexible multi-tank-operation, brilliantly simple</li> </ul>

technical data		handling & application
H <sub>2</sub> -capacity (6 tanks) (300 g guaranteed; future target 600 g)	300 g, 3.336 NL, 10,02 kWh	  
max. power output	~ 2 kW	
operating temperature	0 - 80°C	
REC tank charging   max. pressure	15 bar   30 bar	
operating pressure	< 10 bar	
dimensions	500 x 400 x 150 mm	
total weight	45 kg	
O <sub>2</sub> - supply and cooling	ambient air	
burst pressure tolerance	84 - 96 bar (at 20°C) 78 - 90 bar (at 85°C)	
material tank valves	brass	
material casing & tank vessels	stainless steel	  
metal hydride material	Hydrolium <sup>®</sup>	
storage capacity (Hydrolium <sup>®</sup> )	ca. 1,8 wt%	
REC H <sub>2</sub> quality for charging	3.0 (or better)	
lifetime (proper handling assumed)	> 7 years	

pressure curve without “on-top pressure”	pressure curve with “on-top pressure” of 15 bar																																														
 <table border="1"> <caption>Data for pressure curve without on-top pressure</caption> <thead> <tr> <th>Temperature [°C]</th> <th>Tank Pressure [bar]</th> </tr> </thead> <tbody> <tr><td>10</td><td>3.5</td></tr> <tr><td>15</td><td>4.2</td></tr> <tr><td>20</td><td>5.2</td></tr> <tr><td>25</td><td>6.5</td></tr> <tr><td>30</td><td>8.2</td></tr> <tr><td>35</td><td>10.5</td></tr> <tr><td>40</td><td>11.9</td></tr> <tr><td>45</td><td>14.8</td></tr> <tr><td>50</td><td>18.2</td></tr> <tr><td>55</td><td>21.9</td></tr> <tr><td>60</td><td>25</td></tr> <tr><td>65</td><td>29.5</td></tr> </tbody> </table>	Temperature [°C]	Tank Pressure [bar]	10	3.5	15	4.2	20	5.2	25	6.5	30	8.2	35	10.5	40	11.9	45	14.8	50	18.2	55	21.9	60	25	65	29.5	 <table border="1"> <caption>Data for pressure curve with 15 bar on-top pressure</caption> <thead> <tr> <th>Temperature [°C]</th> <th>Tank Pressure [bar]</th> </tr> </thead> <tbody> <tr><td>50</td><td>25</td></tr> <tr><td>55</td><td>35</td></tr> <tr><td>60</td><td>45</td></tr> <tr><td>65</td><td>53</td></tr> <tr><td>70</td><td>59.5</td></tr> <tr><td>75</td><td>65</td></tr> <tr><td>80</td><td>70.5</td></tr> <tr><td>85</td><td>75.5</td></tr> <tr><td>90</td><td>78</td></tr> </tbody> </table>	Temperature [°C]	Tank Pressure [bar]	50	25	55	35	60	45	65	53	70	59.5	75	65	80	70.5	85	75.5	90	78
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charging with hydrogen, heat-removal, on-top pressure release
Charging is recommended at 15 bar hydrogen pressure. For heat removal during the same, keeping the H2Tank2Go <sup>®</sup> in a water bath is sufficient. It is advised to remove the 15 bar “on-top-pressure” right after charging in order to guarantee better handling of the quick connector (click'n'go). The waste heat of the fuel cell is used to keep H <sub>2</sub> -desorption constant (tank shell temp. > 50°C).