



## Advonex adheres to the Principles of Green Chemistry

1	<p><b>Prevention</b> It is better to prevent waste than to treat or clean up waste after it has been created.</p>	<ul style="list-style-type: none"> <li>The Advonex process uses catalytic chemistry that targets selective segments of the feedstock molecules. This minimizes the production of by-products.</li> </ul>
2	<p><b>Atom Economy</b> Synthetic methods should be designed to maximize the incorporation of all materials used in the process into the final product.</p>	<ul style="list-style-type: none"> <li>The selectivity of our process technology enables us to incorporate 84+ percent of the feedstock material into finished products.</li> </ul>
3	<p><b>Less Hazardous Chemical Syntheses</b> Wherever practicable, synthetic methods should be designed to use and generate substances that possess little or no toxicity to human health and the environment.</p>	<ul style="list-style-type: none"> <li>Our process eliminates the need for harsh or toxic chemicals or reagents.</li> </ul>
4	<p><b>Designing Safer Chemicals</b> Chemical products should be designed to affect their desired function while minimizing their toxicity.</p>	<ul style="list-style-type: none"> <li>Our products are hydrocarbons derived from biologically-sourced materials which do not contain the impurities and contamination that crude oil contains.</li> </ul>
5	<p><b>Safer Solvents and Auxiliaries</b> The use of auxiliary substances (e.g., solvents, separation agents, etc.) should be made unnecessary wherever possible and innocuous when used.</p>	<ul style="list-style-type: none"> <li>Use methanol, which is safer than many other solvents (i. e. hexane)</li> <li>No auxiliaries are used in our process</li> </ul>
6	<p><b>Design for Energy Efficiency</b> Energy requirements of chemical processes should be recognized for their environmental and economic impacts and should be minimized. If possible, synthetic methods should be conducted at ambient temperature and pressure.</p>	<ul style="list-style-type: none"> <li>Electrolysis is a highly selective process</li> <li>Our innovation focuses on reducing electrical energy use</li> <li>Hydrocarbon production occurs at close to ambient temperature and pressure</li> </ul>
7	<p><b>Use of Renewable Feedstocks</b> A raw material or feedstock should be renewable rather than depleting whenever technically and economically practicable.</p>	<ul style="list-style-type: none"> <li>Primary feedstock comes from sustainably-grown plants</li> <li>Process electricity can be sourced from wind or solar farms</li> <li>Hydrogen can be source from renewable source</li> </ul>
8	<p><b>Reduce Derivatives</b> Unnecessary derivatization (use of blocking groups, protection/deprotection, temporary modification of physical/chemical processes) should be minimized or avoided if possible, because such steps require additional reagents and can generate waste.</p>	<ul style="list-style-type: none"> <li>No derivatives are used in our process</li> </ul>
9	<p><b>Catalysis</b> Catalytic reagents (as selective as possible) are superior to stoichiometric reagents.</p>	<ul style="list-style-type: none"> <li>Advonex uses only catalytic reagents</li> </ul>
10	<p><b>Design for Degradation</b> Chemical products should be designed so that at the end of their function they break down into innocuous degradation products and do not persist in the environment.</p>	<ul style="list-style-type: none"> <li>Our products are designed to match industry standards for environmental degradation</li> </ul>
11	<p><b>Real-time analysis for Pollution Prevention</b> Analytical methodologies need to be further developed to allow for real-time, in-process monitoring and control prior to the formation of hazardous substances.</p>	<ul style="list-style-type: none"> <li>Automation and environmental monitoring will be standard practice for our production facilities.</li> </ul>
12	<p><b>Inherently Safer Chemistry for Accident Prevention</b> Substances and the form of a substance used in a chemical process should be chosen to minimize the potential for chemical accidents, including releases, explosions, and fires.</p>	<ul style="list-style-type: none"> <li>Our processes use steam, and alcohol in self-contained, oxygen-free environments to minimize chemical spill, explosion and/or fire potential.</li> </ul>