Honeywell Green Jet Fuel™

Sustainable fuels for cleaner skies

UOP
A Honeywell Company

Honeywell's UOP, a leader in refining technologies for nearly a century, is leading the path to new sources of energy and cleaner skies.

Worldwide economic expansion is rapidly driving energy consumption. Global demands for aviation fuel and regulations to reduce the industry's environmental footprint are on the rise. Historically, aviation leaders have turned to mechanical and technological enhancements to find ways to reduce fuel burn and greenhouse gas emissions. Now renewable jet fuels offer the industry an alternative carbon-reduction strategy with no aircraft or engine modifications required. Honeywell Green Jet Fuel has a tremendous capability to provide a sustainable solution to meet energy challenges today and tomorrow.

Meets All Flight Specifications

Originally developed under a U.S. Defense Advanced Research Projects Agency (DARPA) contract, UOP's Renewable Jet Fuel process produces high-quality, renewable jet fuel that performs just like petroleum fuels. Made from non-food, second-generation feedstocks like camelina, jatropha and algae, Honeywell Green Jet Fuel meets or exceeds all critical specifications for flight. At a 50-percent blend, it can be a drop-in replacement, requiring no changes to fleet technology or the fuel storage and delivery infrastructure.

Lower Emissions, Higher Efficiency

Honeywell Green Jet Fuel is a sustainable option that is also practical. It has shown high energy density in flight, meaning aircraft can fly the same distance with a given amount of fuel, and it is clean burning because it contains low levels of aromatics and sulfur. It offers a remarkable 65 to 85 percent reduction in greenhouse gas emissions relative to petroleum-based fuels. And as second-generation feedstocks are developed and become more commercially viable, sustainable biofuels will be priced competitively with current jet fuel.

Second Generation Feedstocks

Second-generation feedstocks are non-food natural materials that do not interfere with valuable food, land or water resources. They are exponentially more efficient and sustainable sources of energy. Examples include camelina, algae and jatropha.

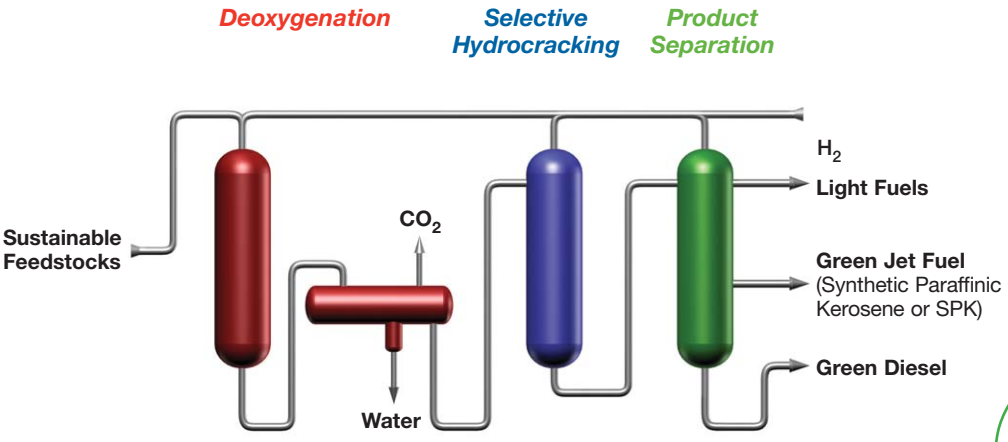
The UOP process successfully converts any of these inedible feedstocks and many others to produce on-spec jet fuel. This flexibility gives fuel producers the ability to choose the biofeedstock that best suits their location and operating goals.

Green Jet Fuel Properties

Properties	Jet A-1 specification	Honeywell Green Jet Fuel Bio-synthetic paraffinic kerosene (bio-SPK) made from camelina	50/50 Blend of camelina bio-SPK & Jet A-1
Flash point, °C	Min 38	45	46
Freeze point, °C	Max -47	-57	-57
Net heat of combustion, MJ/kg	Min 42.8	43.9	43.6
Thermal stability (JFTOT) • Filter pressure differential, mm Hg • Tube deposit rating (visual)	 Max 25 Max 3	 0.0 1	 0.0 1
Aromatics, % volume	Max 22	<0.3	8.5
Sulfur, % mass	Max 0.3	<0.001	0.05

UOP Renewable Jet Fuel Process Technology

The Renewable Jet Fuel process licensed by UOP is based on traditional refining hydroprocessing technology. It works by adding hydrogen to remove the oxygen from the feedstock and then further refining this product to meet the required specifications. The process produces a bio-synthetic paraffinic kerosene (bio-SPK) or Green Jet Fuel that is then blended with standard jet fuel for use in flight. The resulting fuel meets all of the jet fuel specifications set by qualifying agencies.



Flight-Proven

As the first company in the world to produce and demonstrate Green Jet Fuel, UOP is pioneering the way to make aviation biofuels a reality. UOP has partnered with multiple military and commercial aviation leaders including the U.S. Navy and Air Force, major global airlines such as KLM and Japan Airlines and aircraft OEM partners like Boeing and Airbus, to demonstrate the viability of Green Jet Fuel made using the UOP process. Since the first demonstration flight at the end of 2008, testing has proven that Honeywell Green Jet Fuel meets and even exceeds key specifications for flight, and the fuel was approved for commercial, passenger-bearing flights by ASTM International on July 1, 2011.

Honeywell Green Jet Fuel flights:

Air New Zealand - December 30, 2008
Continental Airlines - January 7, 2009
Japan Airlines - January 30, 2009
KLM - November 23, 2009
Air Force A-10 Thunderbolt - March 25, 2010
Navy F/A-18 Green Hornet - April 22, 2010
Royal Netherlands Airforce Apache Helicopter - June 16, 2010
Air Force C-17 Globemaster III - August 27, 2010
Navy Riverine Command Boat (RCB-X) - October 22, 2010
Air Force F-15 Eagle - October 22, 2010
TAM - November 23, 2010
Air Force F-22 Raptor - March 18, 2011
Interjet - April 1, 2011
Air Force F-15 Formation Flight - April 1, 2011
Air Force Thunderbirds F-16 - May 20, 2011
Gulfstream G450 Transatlantic Flight - June 17, 2011
Boeing 747-800 - June 19, 2011
Navy MH-60S Seahawk - June 21, 2011
Aero Mexico - August 1, 2011
Navy T-45 “Goshawk” - August 24, 2011

Toll Manufacturing Capabilities

To date, UOP has produced more than 700,000 gallons of Green Jet Fuel to support military and commercial application testing as well as efforts to certify the fuel for flight through ASTM International. UOP will continue to support these efforts to enable the success of large-scale refineries and drive commercial use of aviation biofuels.

Experience you trust

UOP is a recognized leader in process technology for the refining and petrochemicals industries, and it has continued to evolve to meet the needs of our changing world. UOP has developed technology to support every major change in the refining industry since 1914. In fact, 31 out of today's 36 foremost worldwide refining technologies were developed by UOP. Today a staggering 60 percent of the world's gasoline and 85 percent of biodegradable detergents are made using UOP technology.

As fuel regulations become more and more strict worldwide and the need for alternatives to traditional petroleum resources grows, UOP will remain the leader in developing methodology and technology to address the world's energy challenges.

Find out more

To learn more about how Honeywell Green Jet Fuel is making skies cleaner, please visit www.uop.com.

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