









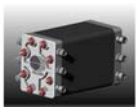










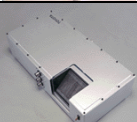




TRANSPORTATION FUEL CELLS – Operating Info.

Company Name	Product	Operating Temperature	Fuel Used	Fuel Consumption (Flow) Rate	Operating Power Consumption	Start Up Time	Noise	Life Span	Maintenance Expectation	Waste Heat/ Emissions	Picture
Acumentrics	Super Cell		Natural gas or propane								
Arotech (formerly Electric Fuel Corp.)	Large-scale zinc-air fuel cell stacks for heavy-duty electric vehicles including transit buses	-10°C – +65°C	Metallic zinc	1.06 gm/Wh typical	N/A	Millise conds	Slight blowe r noise	Up to 9000 operatin g hours, dependi ng on operatin g regime and conditio ns	EV cell stacks have replaceable zinc anode cassettes, which are replaced and regenerated when depleted. Oxygen reduction cathodes have working life of up to 9000 hours.	EV cell stacks are air-cooled to take out up to 40W of heat per cell at peak output	 Zinc Air Module
Asia Pacific Fuel Cell Technologies	3 kW stack		Hydrogen w/ in-house metal hydride system								
Asia Pacific Fuel CellsTechnologies	Fuel Cell Powered Scooter		H2 from APFCT made hydride canisters	1.6 gram hydrogen/km		"rapid"	78 db				
Astris Energi, Inc.	Model E6		Compress Hydrogen								
Astris Energi, Inc.	Fuel Cell Golf Cart		Compress ed hydrogen gas	Over three days of ordinary golf course driving per fill-up or 6 – 7 hours of contin. driving							
Ballard Power Systems	Mark 902 Fuel Cell Module	Fuel cell operating temperature: 80 degrees C (176 degrees F)	Gaseous hydrogen or reformate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Ballard Power Systems	Xcellsis™ HY-75 Fuel Cell Engine	Fuel cell operating temperature: 70 degrees C to 85 degrees C (158 degrees F to 185 degrees F) Ambient operating temperature: 5 to 40 degrees C	Gaseous hydrogen at ambient temperatu re	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

		(41 to 104 degrees F)										
Ballard Power Systems	Xcellsis™ ME-75 Fuel Cell Engine	Fuel cell operating temperature: 70 degrees C to 85 degrees C (158 degrees F to 185 degrees F) Ambient operating temperature -25 to 40 degrees C (-13 to 104 degrees F)	Pressure free liquid methanol at ambient temperature	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CO ₂	
Ballard Power Systems	Xcellsis™ HY-205 Fuel Cell Engine	Fuel cell operating temperature: 65 degrees C to 80 degrees C (149 degrees F to 176 degrees F) Ambient operating temperature: -20 to 40 degrees C (-4 to 104 degrees F)	Gaseous hydrogen at ambient temperature	5 g/s (120 SCFM)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Delphi Automotive Systems / BMW / Renault	Fuel Cell Auxiliary Power Unit		Reformed fuel (hydrogen and CO from gasoline, diesel or natural gas)									
Fuel Cell Technologies LTD	Portable APU		Diesel/gas fuelled									
Fuel Cell Technologies LTD	ALTEX AUV Power module		23 kg of Aluminum anodes		270 hours @ 300 W							
Fuel Cell Technologies LTD	ARCS 4 AUV Power module		36 kg of Aluminum		50 hours @ 2 kW per fill up							
Fuel Cell Technologies LTD	DH	10 degrees C			6 hours per fill up							
General Motors	GM 2001 Automotive Fuel Cell Stack		Hydrogen									
Manhattan Scientifics, Inc.	NovArs Mid-Range Fuel Cell											
Manhattan Scientifics, Inc. / Aprilia	Fuel Cell Bicycle											

Manhattan Scientifics, Inc. / Aprilia	Fuel Cell Scooter		Hydrogen								
Nuvera	PEM fuel cell										
Palcan	PEM fuel cell stack										
Palcan	Fuel Cell Bike / Scooter									 	
Paul Sherrer Institute (PSI)	PEM stacks		Hydrogen								
PowerZinc Electric Inc.	DQFC-24-3000		Zinc				Immediately		> 5 years		 <small>the New DQFC series</small>
PowerZinc Electric Inc.	Scooter prototype		Zinc				Immediately				
Proton Motor GmbH	G-Series	50 to 60 degrees C (max = 70 degrees C)									
Proton Motor GmbH	H-Series	70 to 80 degrees C (max = 90 degrees C)									
Schatz Energy Research Center (SERC)	Neighborhood vehicle	50 – 65 degrees C (120 – 150 degrees F)	Hydrogen								
Schatz Energy Research Center (SERC)	Golf Cart	50 – 60 degrees C (120 – 140 degrees F)	Hydrogen								
Siemens	Fuel cell bus system		Hydrogen								
Toyota	Fuel cell stack for use in their FCV										
UTC Fuel Cells	Fuel Cell APU		Liquid Hydrogen								
UTC Fuel Cells	Series 300 ambient pressure fuel cell		Compress Hydrogen								

UTC Fuel Cells	Space Program Fuel Cell		Liquid hydrogen								
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Notice: For additional information or comments on Fuel Cells 2000's charts, contact Jennifer Gangi at: jennifer@fuelcells.org.