

BHT-100

Hall Effect Thruster

Highly efficient in a compact package.

**Magnetically shielded for longer lifetime.
A significant step towards a more compact thruster.**

The BHT-100 builds on our experience building small thrusters with the BHT-200. Designed with state of the art magnetic shielding that focuses ions away from the channel walls, the BHT-100 is predicted to have a lifetime of 10,000 hours or more.

Additional system and mission advantages are gained by fueling the long lifetime, low power Hall thruster with iodine instead of xenon. Testing with the BHT-200 and other Busek Hall thrusters indicates that thruster efficiency with iodine fuel is almost the same as with xenon fuel, while being a much more compact propellant.

The BHT-100 paired with space-efficient iodine tanks is the perfect propulsion solution for CubeSats and small satellites.

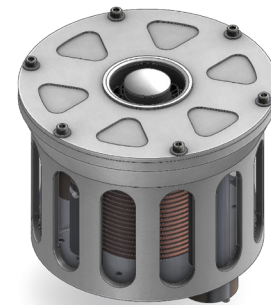


Table: Standard Specifications

Discharge Power:	100 W	Thruster Mass:	1.16 kg
Voltage:	200 VDC	Diameter:	8 cm
Thrust:	7 mN	Length:	5.5 cm
Specific Impulse:	1000 seconds	Demonstrated Impulse:	45.36 kN-s
Propellants:	Xenon, Iodine	Predicted Total Impulse:	> 250 kN-s

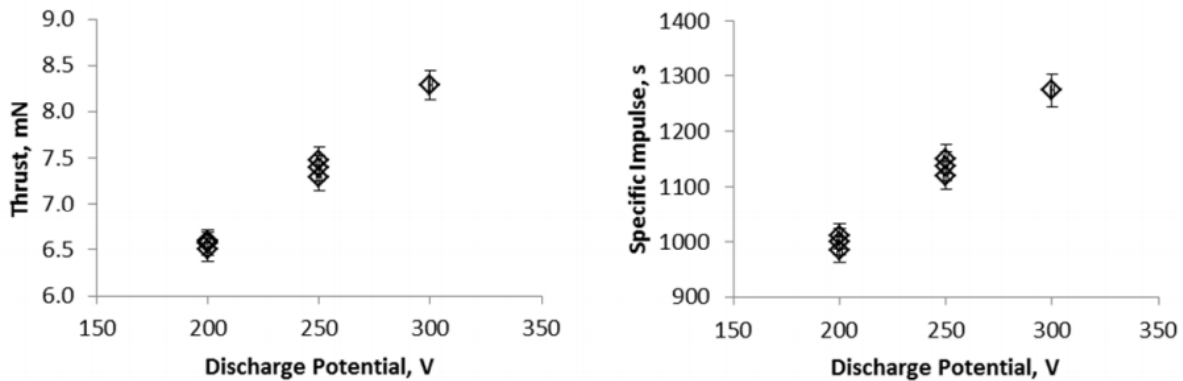
Busek provides complete and fully integrated Hall Effect thruster systems that work with the BHT-100, including cathode, power processing unit, digital control unit, and propellant management systems.

Thruster Performance Details

Thruster testing was performed at Busek's T6 facility to determine performance and the operating efficiency at various operating points. In general, efficiency increased with discharge power and mass flow rate. The optimal solenoid current changed slightly with the discharge voltage and mass flow rate.

Measured thruster and specific impulse increased with discharge potential. Representative operating points are showed in table below:

Anode Flow Rate [mg/s]	Total Flow Rate [mg/s]	Anode Discharge Voltage [V]	Anode Discharge Current [A]	Solenoid Current [A]	Cathode Floating Voltage [V]	Test Facility Pressure [Torr]	Discharge Power [W]	Total Power [W]	Measured Thrust [mN]	Total Specific Impulse [s]	Thrust to Total Power [mN/kW]	Anode Thruster Efficiency [%]
0.624	0.663	200	0.50	1.35	-12.3	2.2E-06	100	109	6.50	1000	59.9	33.9
0.624	0.663	200	0.50	1.45	-13.0	2.2E-06	100	109	6.57	1010	60.5	34.6
0.624	0.683	200	0.49	1.61	-13.7	2.4E-06	98	107	6.59	985	61.9	35.6
0.649	0.688	200	0.53	1.35	-12.4	2.3E-06	106	115	6.68	990	58.3	32.4
0.649	0.688	200	0.52	1.36	-12.3	2.3E-06	104	113	6.82	1011	60.6	34.5
0.653	0.693	200	0.53	1.35	-12.3	2.8E-06	106	114	6.97	1027	61.2	35.1
0.653	0.693	200	0.54	1.35	-11.6	2.5E-06	108	116	6.95	1023	60.2	34.2
0.653	0.693	200	0.54	1.35	-13.2	2.3E-06	108	117	6.91	1017	59.3	33.8
0.653	0.693	200	0.51	1.35	-13.2	5.1E-06	102	111	7.25	1067	65.6	39.5
0.653	0.693	200	0.52	1.35	-12.8	2.3E-06	104	113	6.91	1017	61.4	35.1
0.653	0.693	200	0.53	1.40	-12.0	2.4E-06	106	114	6.43	947	56.4	29.9
0.653	0.693	200	0.52	1.40	-13.5	2.5E-06	104	113	6.91	1017	61.4	35.1
0.653	0.693	200	0.52	1.40	-13.5	2.4E-07	104	113	6.96	1025	61.9	35.7
0.624	0.663	250	0.50	1.15	-11.5	2.4E-06	125	133	7.29	1120	54.8	34.0
0.624	0.663	250	0.51	1.35	-11.5	2.3E-06	128	136	7.48	1150	55.0	35.1
0.624	0.663	250	0.50	1.35	-11.5	2.4E-06	125	133	7.39	1137	55.6	35.0
0.732	0.771	250	0.59	1.40	-11.7	3.0E-06	148	156	9.11	1203	58.5	38.4
0.732	0.801	250	0.60	1.65	-10.7	3.1E-06	150	157	9.40	1197	59.9	40.2
0.747	0.786	250	0.60	1.51	-12.2	2.8E-06	150	158	9.19	1192	58.1	37.7
0.624	0.663	300	0.50	1.50	-11.5	2.5E-06	150	158	8.29	1274	52.4	36.7



A full writeup of the characterization of the BHT-100 is available at the following paper:

Szabo, J., Tedrake, R., Metivier, E., Paintal, S., and Taillefer, Z., "Characterization of a One Hundred Watt, Long Life-time Hall Effect Thruster for Small Spacecraft", 53rd AIAA/SAE/ASEE Joint Propulsion Conference, 2017.

<https://doi.org/10.2514/6.2017-4728>