

BLACK BRANT 5 ROCKET MOTOR

The Black Brant rocket motor, designed and developed at Magellan Aerospace, can be used as a single or multi-stage vehicle for placing scientific payloads into space, or as a ballistic missile target.

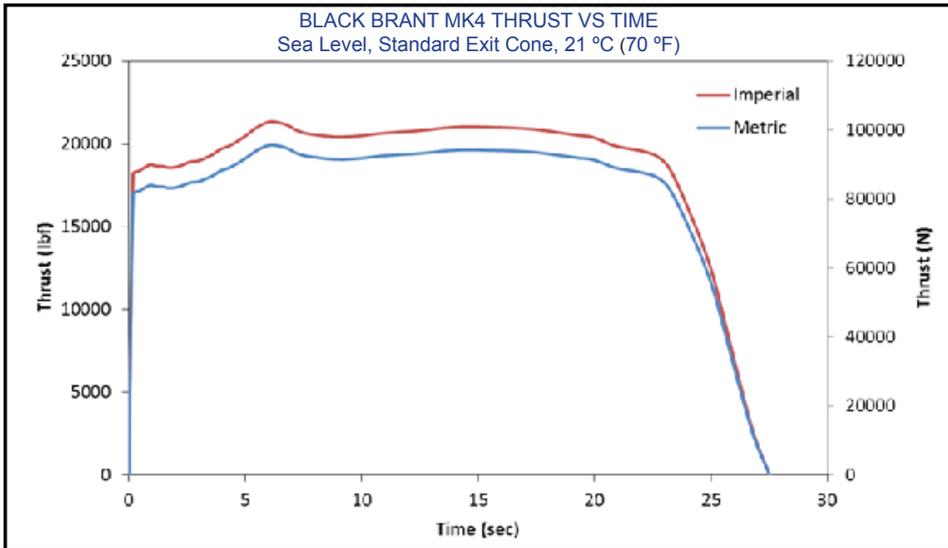
Since 1962, more than 1,000 Black Brant vehicles have been flown with an overall reliability exceeding 98%.



Photo © Wallops Imaging Lab

HIGH PERFORMING ROCKET • AFFORDABLE • RELIABLE





BLACK BRANT MOTOR MASS AND PERFORMANCE PROPERTIES

Units	Post-Fire	Pre-Fire	Property	Pre-Fire	Post-Fire	Units
lbm	-	2200	Propellant Mass	998	-	kg
lbm	426.6	2610	Motor Assembly	1184	194	kg
sec	-	25.2	Burn Time	25.2	-	sec
			Extended Exit Cone with 4 Fin Tail Assembly:			
lbm	604	2827	Vehicle Mass	1282	274	kg
in	148.4	104.9	X (ref. to head and tension joint)	2664	3769	mm
lb-ft ²	418	1014	Roll Moment of Inertia (about X location)	42.73	17.60	kg-m ²
lb-ft ²	111951	288588	Pitch Moment of Inertia (about X location)	12161	504	kg-m ²
in ²	-	3.69	Throat Area	2381.5	-	mm ²
in ²	-	15.86	Exit Area	10234.5	-	mm ²
lbf-sec	-	602570	Vacuum Total Impulse at 21 °C	2680	-	kN-sec
lbf	-	23000	Vacuum Average Thrust at 21 °C	102	-	kN
			Standard Exit Cone with 4 Fin Tail Assembly:			
lbm	563.4	2786.4	Vehicle Mass	1264	256	kg
in	131.9	100.9	X (ref. to head and tension joint)	2563	3350	mm
lb-ft ²	395.5	992.3	Roll Moment of Inertia (about X location)	41.82	16.67	kg-m ²
lb-ft ²	87101	263739	Pitch Moment of Inertia (about X location)	11114	3670	kg-m ²
in ²	-	3.69	Throat Area	2381.5	-	mm ²
in ²	-	10.33	Exit Area (Standard/Extended)	6667.3	-	mm ²
	-	511550	Sea Level Total Impulse at 21 °C	2275	-	kN-sec
lbf	-	19,620	Sea Level Average Thrust at 21 °C	87.27	-	kN
°F	-10 to 120		Operating/Storage Temperature Range	-23 to 49		°C

ABOUT MAGELLAN AEROSPACE

Magellan Aerospace is a global aerospace company that provides complex assemblies and systems solutions to aircraft and engine manufacturers, and defence and space agencies worldwide. Magellan designs and manufactures aeroengine and aerostructure assemblies and components for aerospace markets, advanced proprietary products for military and space markets, and provides engine and component repair and overhaul services worldwide. Magellan is a public company whose shares trade on the Toronto Stock Exchange (TSX: MAL), with operating units throughout North America, Europe, and India.

For more information contact:

Magellan Aerospace, Winnipeg • PO Box 874 • 660 Berry Street • Winnipeg, Manitoba • R3C 2S4 • Canada
 Phone: +1 (204) 775-8331
 Email: info@magellan.aero

Printed in Canada

PROPELLANT

The solid propellant is an aluminized hydroxyl-terminated polybutadiene (HTPB) propellant. The propellant grain configuration provides an approximately neutral pressure/thrust-time trace.

CASE INSULATION/LINER SYSTEM

The motor case insulation/liner system consists primarily of Kevlar fibre-filled EPDM rubber.

MOTOR CASE

The motor case is made from 4140 alloy steel and heat treated. Each motor case is hydrostatically proof pressure tested.

MOTOR TO VEHICLE INTERFACES

The Black Brant 5 igniter housing assembly is attached to the motor case head end through the forward tension joint, and the Black Brant 5 aft body assembly is attached to the motor case aft end through the aft tension joint. The four fins are then bolted to the aft body assembly.

NOZZLE AND EXIT CONE

The nozzle consists of a tape-wrapped graphite/phenolic entrance insulator, an ATJ graphite throat insert, and a tape-wrapped silica/phenolic throat back-up insulator, bonded into a heat treated steel housing. The exit cone consists of tape-wrapped carbon and silica/phenolic liners co-cured into a mild steel housing.

IGNITER

The igniter contains boron potassium nitrate (BPN) pyrotechnic main charge within a consumable plastic basket, and a booster charge.