INDUSTRIAL SOLID PROPULSION Inc.

Product Portfolio

About ISP

INDUSTRIAL SOLID PROPULSION Inc.

ABOUT INDUSTRIAL SOLID PROPULSION INC.

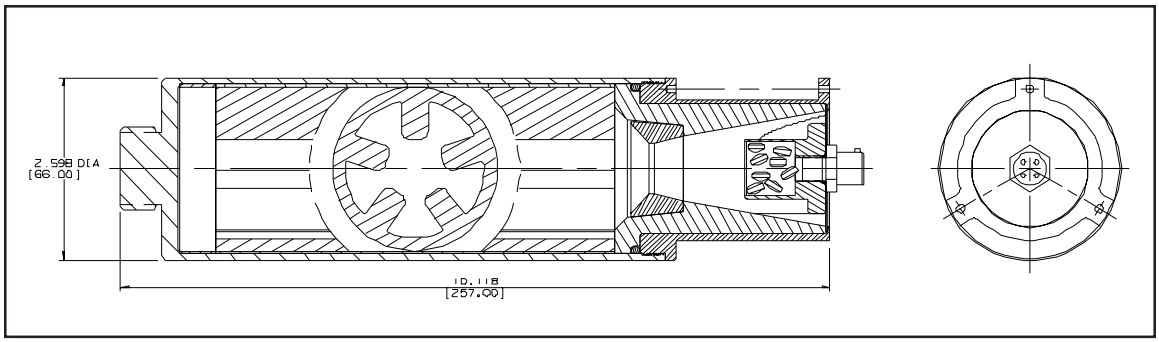
ISP is a small high-technology company specializing in the design and manufacture of rocket motors, solid rocket propellant, gas generators and specialty propulsion devices for space, commercial, industrial and military markets. The company also provides research and development services to various government contractors. The range of our products include guidance and control rockets, missile simulators, remotely piloted vehicle boost motors, parachute extraction motors, target propulsion motors, launch simulators and sounding rocket boosters. ISP also offers consulting services in the areas of propellant development, rocket motor design and analysis and regulatory issues. ISP Inc. has the capability to design, analyze, manufacture and static test rocket motors up to approximately 40,000 lb-sec total impulse. Computer aided design and computer aided manufacturing are used extensively in the design, analysis, development and manufacture of our products. ISP management has extensive experience in the propulsion industry and has been involved in engineering and propellant development and manufacturing efforts on various programs including Minuteman, Peacekeeper, Standard Missile, Sidewinder, HAWK, Small Missile and others. Please see our portfolio for details on the various products we have manufactured for our customers.

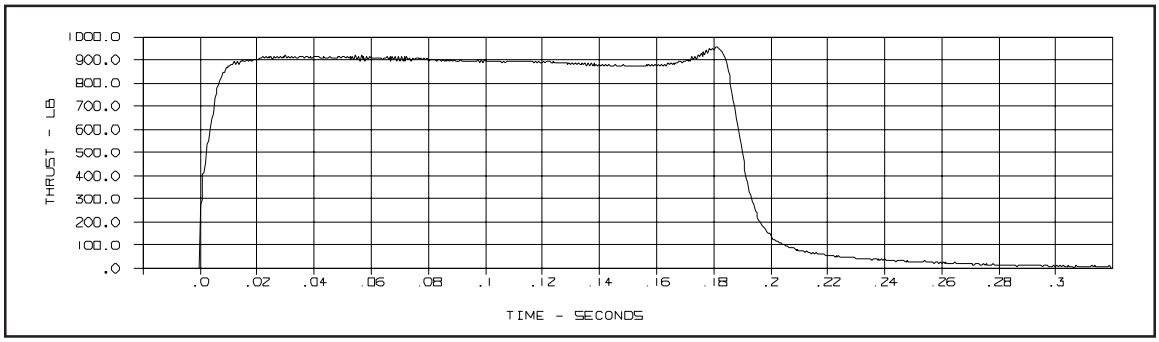
Vice President of Engineering
Industrial Solid Propulsion Inc.
1955 South Palm Street, Suite 6
Las Vegas, Nevada 89104
Telephone: (702) 641-5307
Facsimile: (702) 641-1883

755 Ns Motor

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: 755 Ns Motor
Application:
Prime Contractor: British Aerospace Defence Ltd.
ISP Part Number: 931173





PERFORMANCE

(Sea Level, Ambient Temperature)		
Total Impulse	171.0 lb-sec	760.7 Ns
Burn Time	0.194 sec	0.194 s
Average Thrust	834.5 lb	3712 N
Maximum Thrust	948 lb	4217 N
Average Pressure	1512 psi	10425 kPa
Maximum Pressure	1625 psi	11204 kPa

WEIGHTS & DIMENSIONS

Motor Mass	2.167 lb	983 g
Igniter Mass	0.099 lb	45 g
Propellant Mass	0.825 lb	374 g
Diameter	2.598 in	66.0 mm
Length	10.12 in	257 mm
Throat Area	0.407 in^2	2.627 cm^2
Expansion Ratio	4.60	4.60

PROPELLANT INFORMATION

Designation	ISP-P-8223AL
Propellant Type	82% Solids HTPB/AP/AL
Grain Type	Five Fin Dendrite
Rate @ 1000 psi (6895 kPa)	.867 in/sec (2.20 cm/s)
Density	.0593 lb/in^3 (1.642 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	237.6 lb-sec/lb (2330 m/s)
C*	4843 ft/sec
T_0	4290 °F (2639 °K)
Specific Heat Ratio	1.21

MISC. INFORMATION

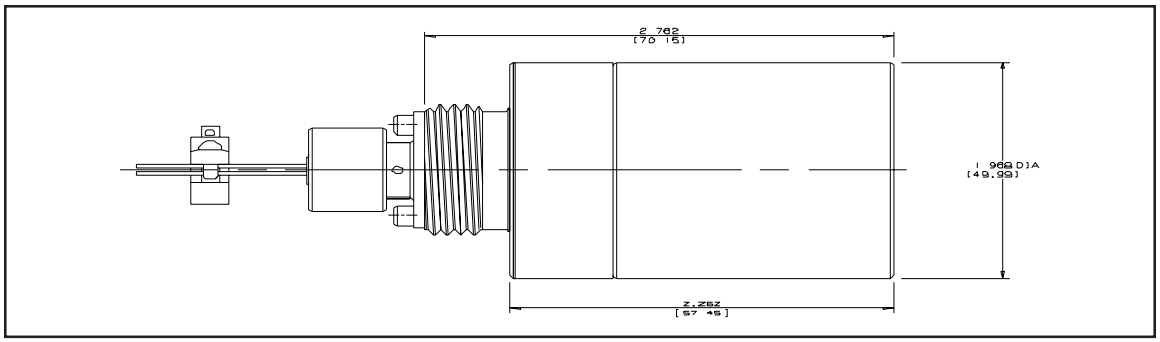
Development completed September 1993 in support of a British Aerospace development program. This motor has spin vanes in the nozzle exit which generate 3.86 in-lb (.436 Nm) average torque during motor burn.

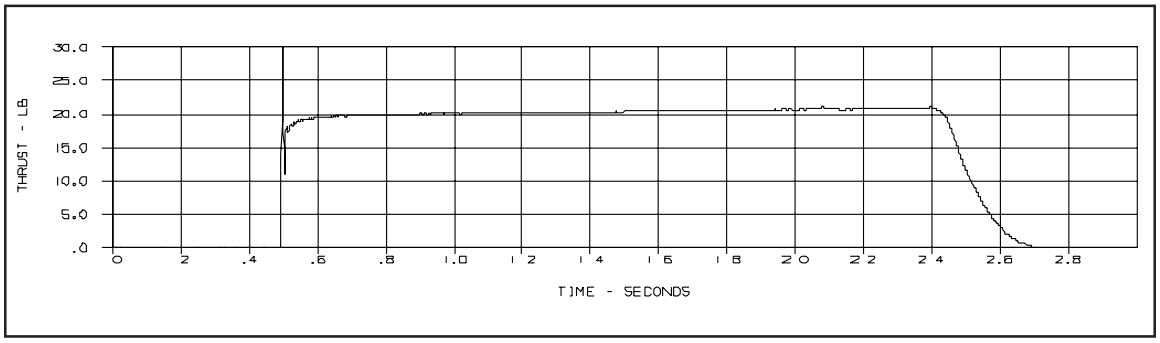
Operational limits are +32°F to +125°F (0°C to 52°C)

180 Ns Motor

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: 180 Ns Motor
Application:
Prime Contractor: British Aerospace Defence Ltd.
ISP Part Number: 930363





PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	43.56 lb-sec	183.7 Ns
Burn Time	1.913 sec	1.913 s
Average Thrust	20.46 lb	91.01 N
Maximum Thrust	20.97 lb	93.31 N
Average Pressure	600 psi	4137 kPa
Maximum Pressure	615 psi	4240 kPa

WEIGHTS & DIMENSIONS

Motor Mass	.466 lb	211.2 g
Igniter Mass	.033 lb	15.1 g
Propellant Mass	.188 lb	85.5 g
Diameter	1.97 in	50.0 mm
Length	2.26 in	57.5 mm
Throat Area	.023 in^2	.150 cm^2
Expansion Ratio	5.96	5.96

PROPELLANT INFORMATION

Designation	ISP-P-8223AL
Propellant Type	82% Solids HTPB/AP/AL
Grain Type	End-Burning
Rate @ 1000 psi (6895 kPa)	.867 in/sec (2.20 cm/s)
Density	.0593 lb/in^3 (1.642 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	237.6 lb-sec/lb (2330 m/s)
C^*	4843 ft/sec
T_0	4290 °F (2639 °K)
Specific Heat Ratio	1.21

MISC. INFORMATION

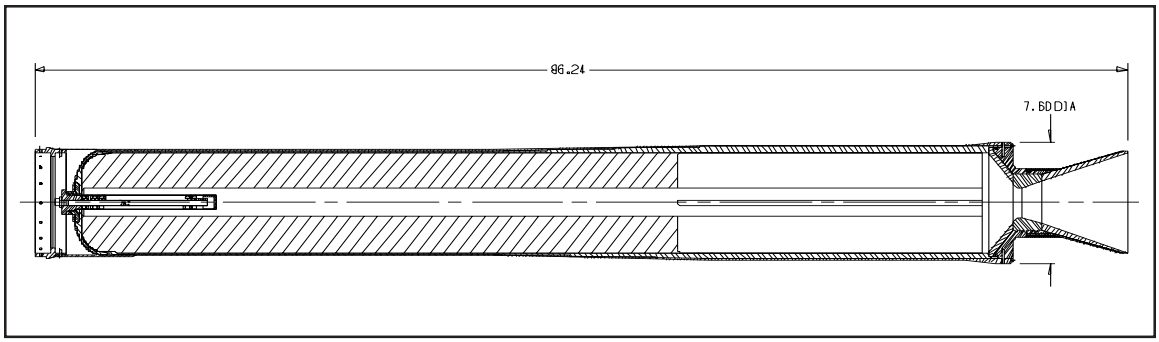
Concept development program was completed in September 1993 in support of a British Aerospace development program.

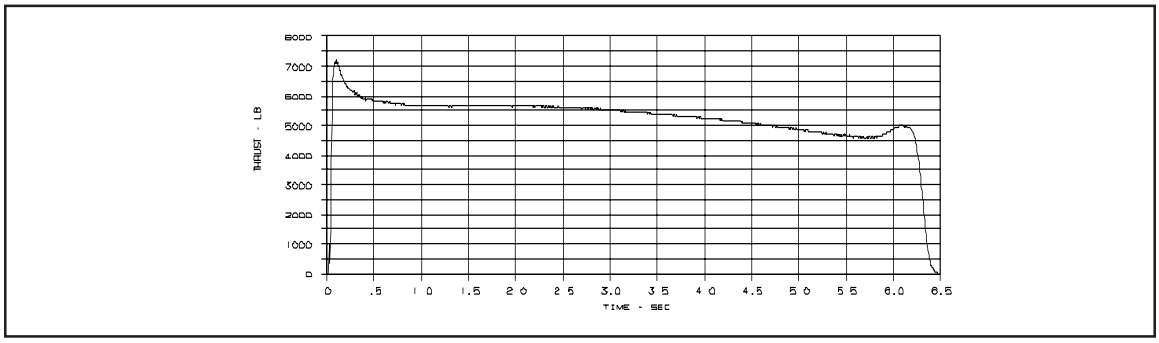
Operational limits are -65°F to +165°F (-53°C to +73°C)

Viper V

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: Viper V (Block-II Version)
Application: Sounding Rocket Booster
Prime Contractor:
ISP Part Number: 920481





PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	34207 lb-sec	152150 Ns
Burn Time	6.25 sec	6.25 s
Average Thrust	5473 lb	24344 N
Maximum Thrust	7150 lb	31800 N
Average Pressure	1327 psi	9149 kPa
Maximum Pressure	1703 psi	11741 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8843
Propellant Type	88% Solids HTPB/AP/Al
Grain Type	Slotted Tube
Rate @ 1000 psi (6895 kPa)	.355 in/sec (.901 cm/s)
Density	.0650 lb/in^3 (1.800 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	263.0 lb-sec/lb (2579 m/s)
C^*	5167 ft/sec
T_0	5926 °F (3548 °K)
Specific Heat Ratio	1.13

WEIGHTS & DIMENSIONS

Motor Mass	162.2 lb	73.57 kg
Igniter Mass	.64 lb	.29 kg
Propellant Mass	130.2 lb	59.06 kg
Diameter	7.60 in	193 mm
Length	86.24 in	2190 mm
Throat Area	2.573 in^2	16.60 cm^2
Expansion Ratio	12.01	12.01

MISC. INFORMATION

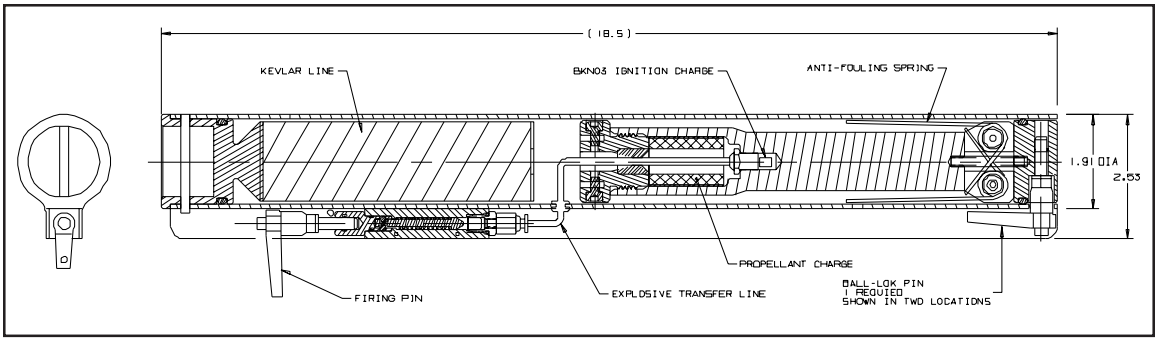
This motor is designed as a booster for an unpowered dart. It can also be used as a sounding rocket booster and will carry a 30 lb (13.6 kg) payload to 100 km altitude.

Operational limits are +50°F to +125°F (+10°C to +52°C)

Extended Range Grapnel

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: Extended Range Grapnel
Application: Clearing Tripwires in Minefields
Prime Contractor: Radian Inc. for U.S. Army Countermine Program, Ft. Belvoir, VA
ISP Part Number: ERG Mod. A



Thrust Curve Not Available

PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	9.91 lb-sec	44.08 Ns
Burn Time	0.40 sec	0.40 s
Average Thrust	25.0 lb	111.2 N
Maximum Thrust	26.0 lb	115.6 N
Average Pressure	834 psi	5750 kPa
Maximum Pressure	860 psi	5929 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8121
Propellant Type	81% Solids HTPB/AP/AL
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.435 in/sec (1.106 cm/s)
Density	.0586 lb/in^3 (1.622 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	233.2 lb-sec/lb (2287 m/s)
C^*	4785 ft/sec
T_0	4004 °F (2480 °K)
Specific Heat Ratio	1.223

WEIGHTS & DIMENSIONS

Unit Total Mass	3.20 lb	1451 g
Grapnel Motor Mass	1.31 lb	594 g
Propellant Mass	.047 lb	21.4 g
Grapnel Diameter	1.79 in	45.5 mm
Grapnel Length	9.78 in	248 mm

MISC. INFORMATION

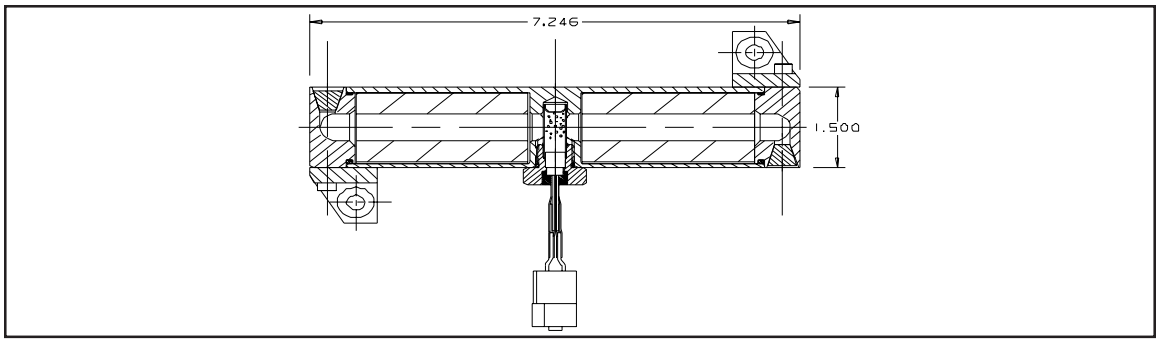
Development program was completed in March of 1993. This device is a hand-fired, self-contained rocket deployed grapnel with an anti-fouling head. It deploys 130 meters of Kevlar line which is used to reel in the grapnel to snag trip wires in an anti-personnel minefield. The grapnel and line are packaged in a sealed container/launch tube which is designed to be resistant to NBC contamination.

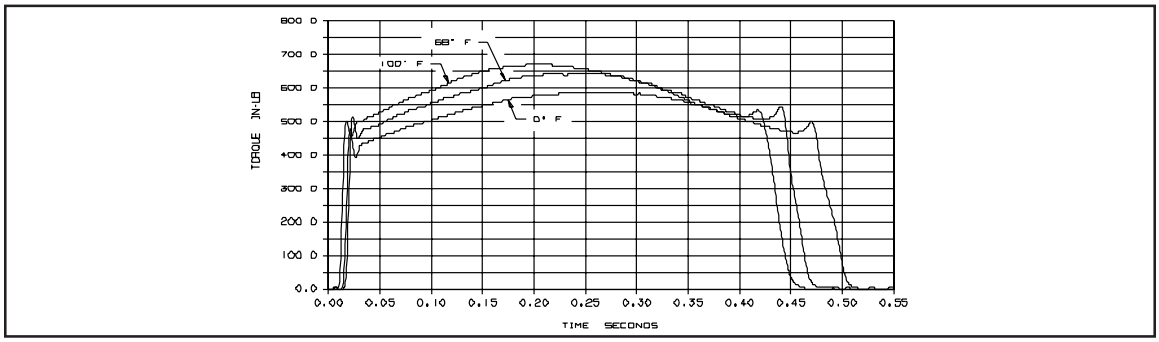
Operational limits are -65°F to +165°F (-53°C to +73°C)

Damocles Spin Motor

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: Damocles Spin Motor
Application: Submunition Spin Motor
Prime Contractor: Textron Defense Systems, Wilmington, MA
ISP Part Number: 883437





PERFORMANCE

(Sea Level, Ambient Temperature)

Total Torque Impulse	251 in-lb-sec	340.3 N-m-s
Burn Time	.463 sec	.463 s
Average Torque	542 in-lb	735 N-m
Maximum Torque	646 in-lb	876 N-m
Average Pressure	1405 psi	9687 kPa
Maximum Pressure	1772 psi	12218 kPa

WEIGHTS & DIMENSIONS

Motor Mass	1.76 lb	799 g
Igniter Mass	.055 lb	25 g
Propellant Mass	.342 lb	155 g
Diameter	1.50 in	38.1 mm
Length	7.25 in	184 mm
Throat Area	.028 in^2	.181 cm^2
Expansion Ratio	6.30	6.30

PROPELLANT INFORMATION

Designation	ISP-P-8223AL
Propellant Type	82% Solids HTPB/AP/AL
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.867 in/sec (2.20 cm/s)
Density	.0593 lb/in^3 (1.642 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	237.6 lb-sec/lb (2330 m/s)
C^*	4843 ft/sec
T_0	4290 °F (2639 °K)
Specific Heat Ratio	1.21

MISC. INFORMATION

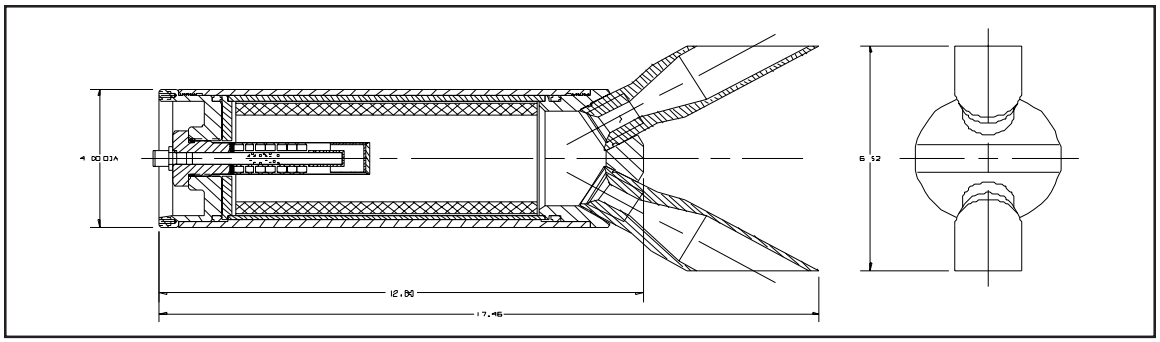
Development program was completed in February of 1989. This motor was developed to spin stabilize a sub-munition on the Damocles Program.

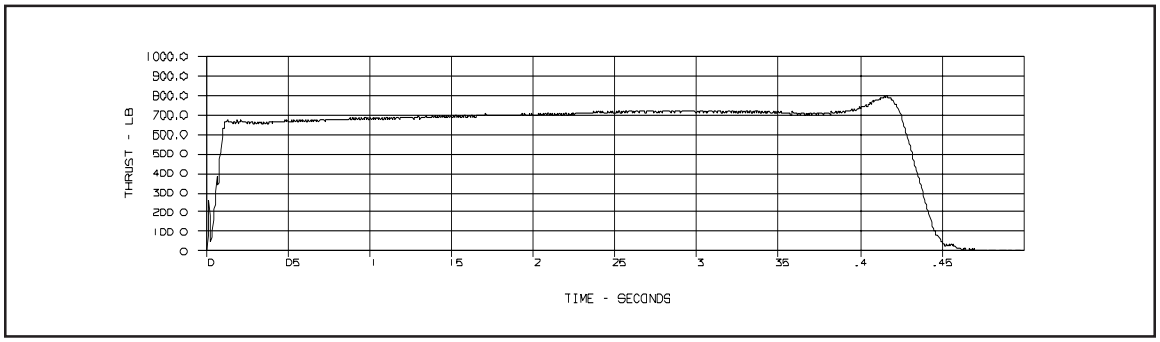
Operational limits are 0°F to +100°F (-17°C to +38°C)

Two Nozzle Motor

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: Two Nozzle Motor
Application: Launcher Evaluation
Prime Contractor: Westinghouse Marine Systems Divison, Sunnyvale, CA
ISP Part Number: 930321





PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	302.4 lb-sec	1345 Ns
Burn Time	0.414 sec	.414 s
Average Thrust	731.5 lb	3253 N
Maximum Thrust	780.0 lb	3469 N
Average Pressure	1206 psi	8315 kPa
Maximum Pressure	1352 psi	9322 kPa

WEIGHTS & DIMENSIONS

Motor Mass	15.29 lb	6935 g
Igniter Mass	0.33 lb	150 g
Propellant Mass	1.32 lb	599 g
Diameter	4.00 in	101.6 mm
Length	17.43 in	442.7 mm
Throat Area	0.347 in^2	2.239 cm^2
Expansion Ratio	10.18	10.18

PROPELLANT INFORMATION

Designation	ISP-P-8223AL
Propellant Type	82% Solids HTPB/AP/AL
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.867 in/sec (2.20 cm/s)
Density	.0593 lb/in^3 (1.642 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	237.6 lb-sec/lb (2330 m/s)
C^*	4843 ft/sec
T_0	4290 °F (2639 °K)
Specific Heat Ratio	1.21

MISC. INFORMATION

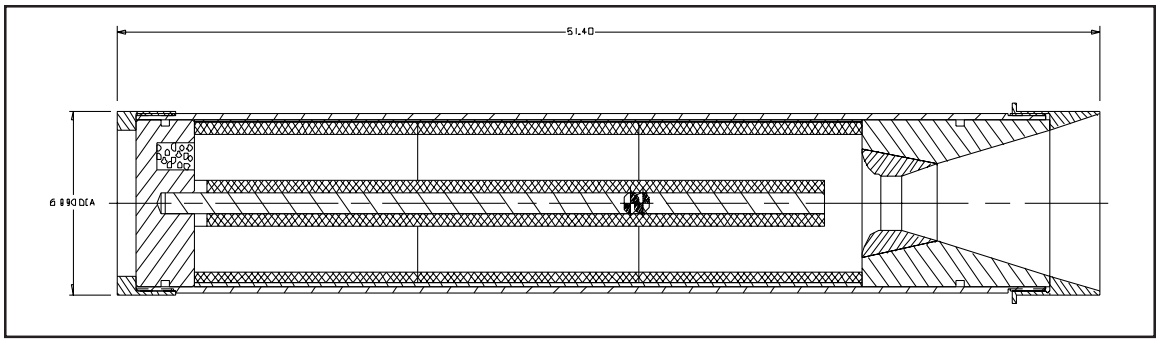
Test program was completed in March of 1993. This motor was developed to match the thrust profile of an existing missile for use in the evaluation of launch tube loads.

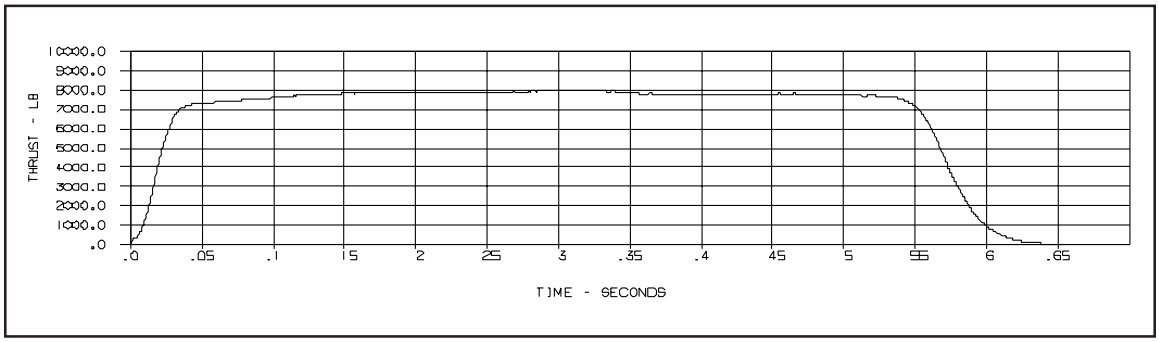
Operational temperature limits have not been established.

SHOTL Booster

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: SHOTL Booster
Application: THAAD Launcher Evaluation
Prime Contractor: Westinghouse Marine Systems Division, Sunnyvale, CA
ISP Part Number: 930843





PERFORMANCE

(Sea Level, Ambient Temperature)		
Total Impulse	4321 lb-sec	19220 Ns
Burn Time	0.535 sec	0.535 s
Average Thrust	7590 lb	33760 N
Maximum Thrust	8001 lb	35588 N
Average Pressure	1454 psi	10025 kPa
Maximum Pressure	1526 psi	10521 kPa

WEIGHTS & DIMENSIONS

Motor Mass	187.9 lb	85.4 kg
Igniter Mass	0.22 lb	99.8 g
Propellant Mass	17.21 lb	7.82 kg
Diameter	6.75 in	172 mm
Length	51.40 in	1306 mm
Throat Area	3.307 in^2	21.3 cm^2
Expansion Ratio	10.47	10.47

PROPELLANT INFORMATION

Designation	ISP-P-8521
Propellant Type	85% Solids HTPB/AP/AL
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.706 in/sec (1.79 cm/s)
Density	.0643 lb/in^3 (1.781 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	262.2 lb-sec/lb (2571 m/s)
C^*	5141 ft/sec
T_0	5644 °F (3391 °K)
Specific Heat Ratio	1.172

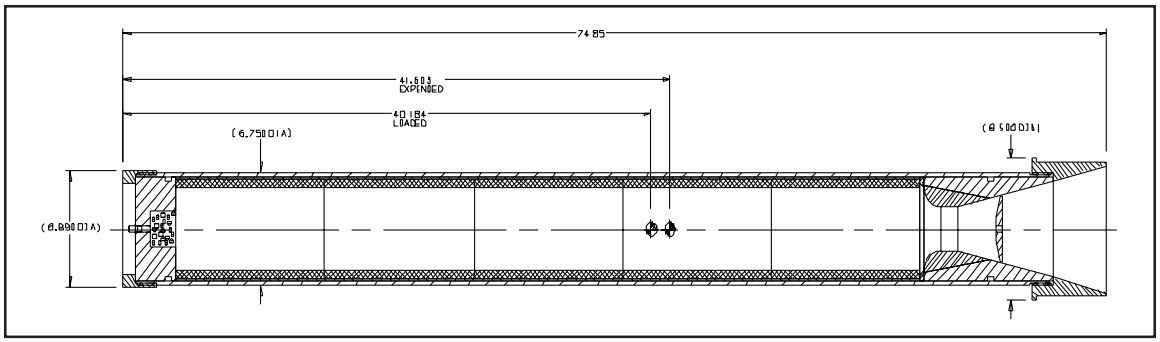
MISC. INFORMATION

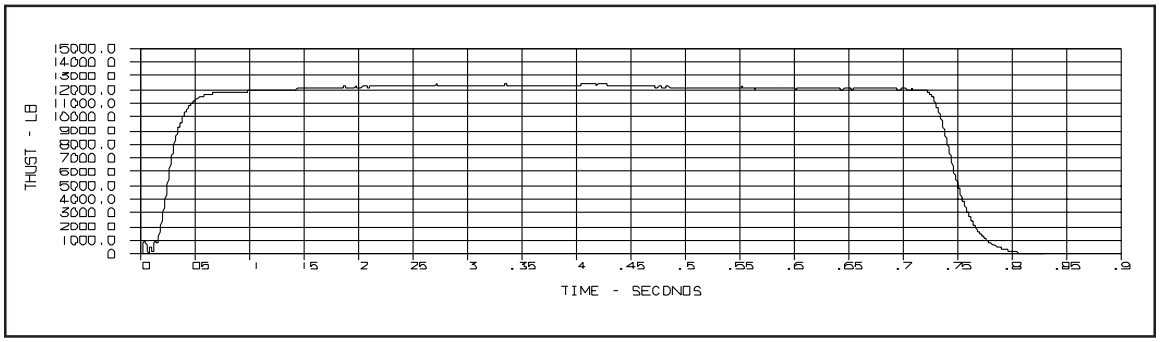
These motors were loaded for Westinghouse Marine Systems Division using an ISP developed propellant in order to evaluate the structural and thermal loads on the Theater Air Defense Missile launcher. Only four of these motors were built. No operational temperature limits have been estabished.

SHOTL-II Booster

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: SHOTL-II Booster
Application: THAAD Launcher Evaluation
Prime Contractor: Westinghouse Marine Systems Division, Sunnyvale, CA
ISP Part Number: 932523-1





PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	8763 lb-sec	38978 Ns
Burn Time	.681 sec	.681 s
Average Thrust	12132 lb	53963 N
Maximum Thrust	12401 lb	55160 N
Average Pressure	1614 psi	11128 kPa
Maximum Pressure	1640 psi	11307 kPa

WEIGHTS & DIMENSIONS

Motor Mass	237.0 lb	107.7 kg
Igniter Mass	0.298 lb	135.0 g
Propellant Mass	35.02 lb	15.92 kg
Diameter	6.75 in	171.5 mm
Length	74.85 in	1901 mm
Throat Area	5.224 in^2	33.70 cm^2
Expansion Ratio	8.70	8.70

PROPELLANT INFORMATION

Designation	ISP-P-8521
Propellant Type	85% Solids HTPB/AP/AL
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.706 in/sec (1.79 cm/s)
Density	.0643 lb/in^3 (1.781 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	262.2 lb-sec/lb (2571 m/s)
C^*	5141 ft/sec
T_0	5644 °F (3391 °K)
Specific Heat Ratio	1.172

MISC. INFORMATION

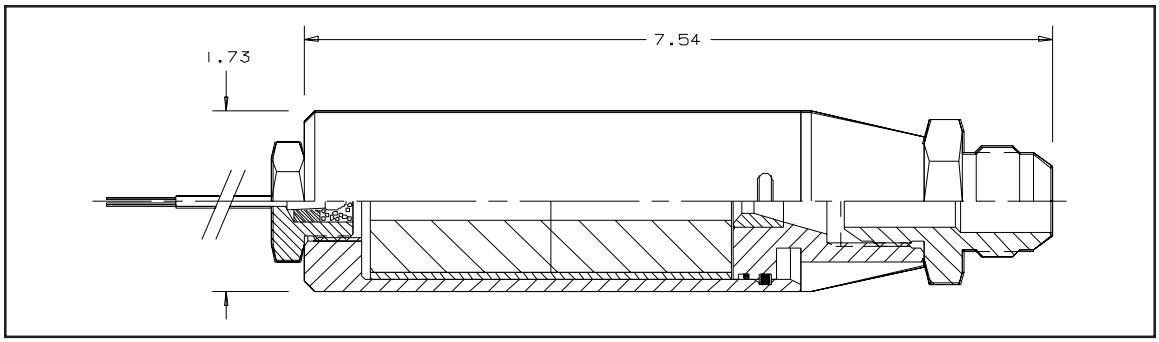
These motors were loaded for Westinghouse Marine Systems Division using an ISP developed propellant. The motor is used to evaluate the structural, thermal and blast loads on the Theater Air Defense Missile launcher. Only three of these motors were built.

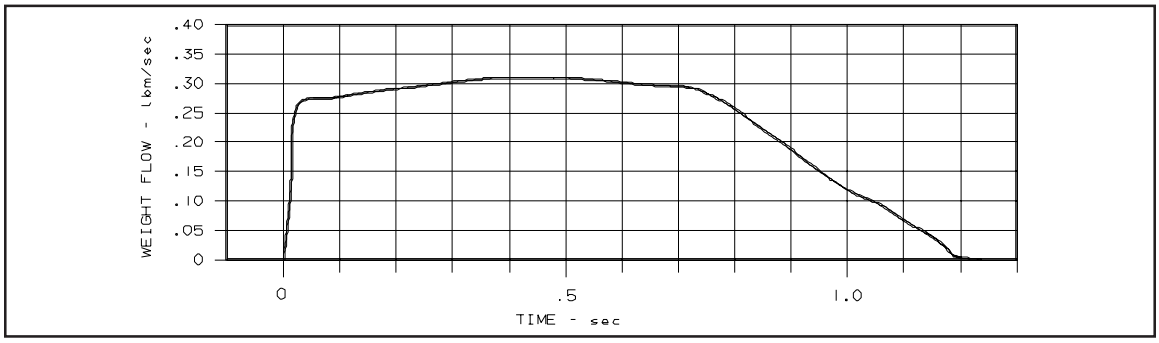
No operational temperature limits have been established.

Gas Generator

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: Gas Generator
Application: Launch Eject Simulator
Prime Contractor: Westinghouse Marine Systems Division, Sunnyvale, CA
ISP Part Number: 880221-1





PERFORMANCE

(Sea Level, Ambient Temperature)		
Burn Time	1.20 sec	1.20 s
Average Weight Flow	0.23 lb/sec	0.107 kg/s
Maximum Weight Flow	0.31 lb/sec	0.141 kg/s
Average Pressure	750 psi	5171 kPa
Maximum Pressure	950 psi	6550 kPa

WEIGHTS & DIMENSIONS

Motor Mass	1.28 lb	581 g
Igniter Mass	.046 lb	21 g
Propellant Mass	.283 lb	128 g
Diameter	1.75 in	45 mm
Length	7.54 in	191 mm
Throat Area	.043 in^2	.277 cm^2

PROPELLANT INFORMATION

Designation	ISP-P-8222
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.489 in/sec (1.24 cm/s)
Density	.0595 lb/in^3 (1.647 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	235.6 lb-sec/lb (2310 m/s)
C^*	4817 ft/sec
T_0	4188 °F (2582 °K)
Specific Heat Ratio	1.21

MISC. INFORMATION

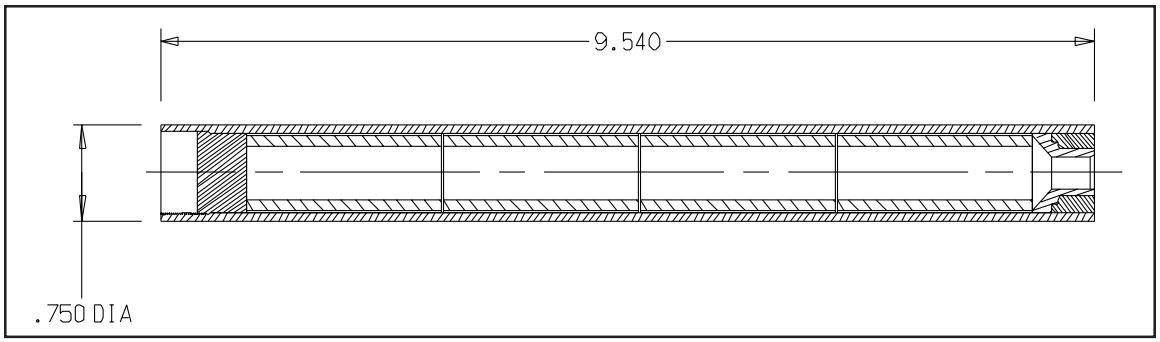
Development completed January 1988. This motor is a modified RDS-285 fitted with a head end igniter and nozzle fitting. It is used as the gas generator for the Tomahawk Launch Eject Simulator.

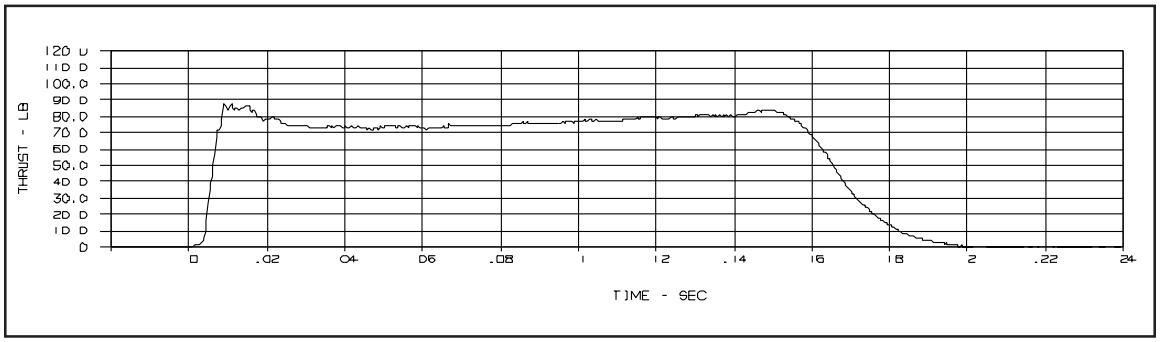
Operational limits are -65°F to +165°F (-53°C to 73°C)

HSUM Booster

INDUSTRIAL SOLID PROPULSION Inc.

Device Name:HSUM Booster
Application: Underwater Missile Experiments
Prime Contractor: PDA Engineering, Costa Mesa, CA
ISP Part Number: 920601





PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	13.19 lb-sec	58.67 Ns
Burn Time	0.22 sec	0.22 s
Average Thrust	59.0 lb	262.4 N
Maximum Thrust	67.8 lb	301.6 N
Average Pressure	939 psi	6474 kPa
Maximum Pressure	1076 psi	7419 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8121
Propellant Type	81% Solids HTPB/AP/AL
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.435 in/sec (1.106 cm/s)
Density	.0586 lb/in^3 (1.622 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	233.2 lb-sec/lb (2287 m/s)
C^*	4785 ft/sec
T_0	4004 °F (2480 °K)
Specific Heat Ratio	1.223

WEIGHTS & DIMENSIONS

Motor Mass	.211 lb	95.71 g
Propellant Mass	.067 lb	30.39 g
Diameter	.750 in	19.05 mm
Length	9.54 in	242.3 mm
Throat Area	.049 in^2	0.317 cm^2
Expansion Ratio	1.184	1.184

MISC. INFORMATION

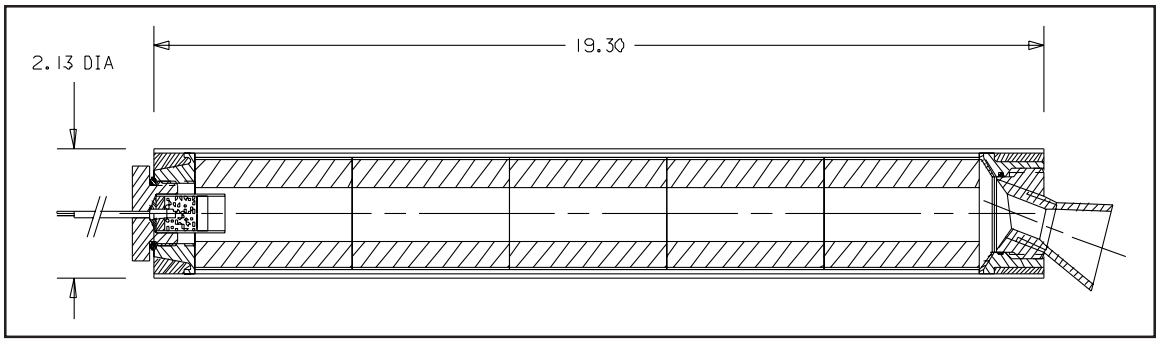
This motor was designed to power a small projectile at velocities greater than 600 ft/sec (183 m/s) underwater. It was used in evaluating concepts to be applied to high speed underwater munitions for the Naval Undersea Weapons Center.

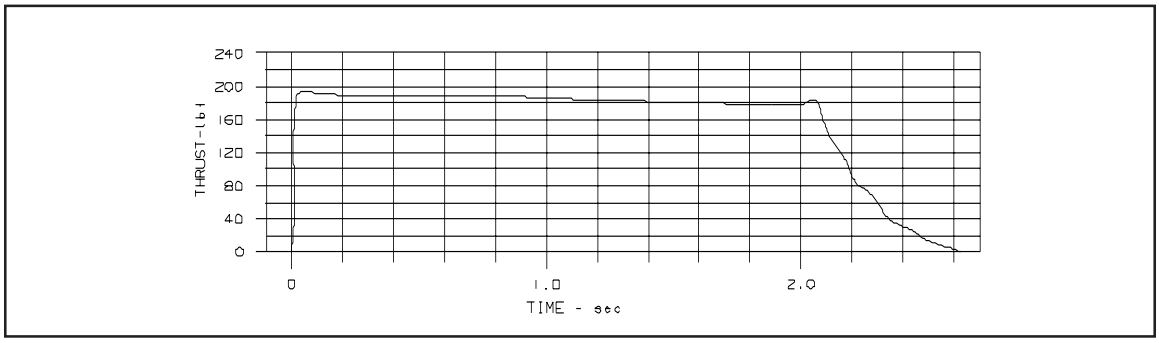
Operational limits are 32°F to +125°F (0°C to 52°C)

K-900

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: K-900
Application: RPV Boost Motor
Prime Contractor: AAI Corporation, Baltimore, MD
ISP Part Number: 873089





PERFORMANCE

(Sea Level, Ambient Temperature)		
Total Impulse	416 lb-sec	1850 Ns
Burn Time	2.63 sec	2.63 s
Average Thrust	158 lb	702 N
Maximum Thrust	195 lb	867 N
Average Pressure	560 psi	3861 kPa
Maximum Pressure	590 psi	4067 kPa

WEIGHTS & DIMENSIONS

Motor Mass	3.59 lb	1628 g
Igniter Mass	.11 lb	50 g
Propellant Mass	1.95 lb	883 g
Diameter	2.13 in	54 mm
Length	19.3 in	490 mm
Throat Area	.221 in^2	1.42 cm^2
Expansion Ratio	5.54	5.54

PROPELLANT INFORMATION

Designation	ISP-P-8243
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.247 in/sec (.63 cm/s)
Density	.0589 lb/in^3 (1.631 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	235.5 lb-sec/lb (2309 m/s)
C*	4816 ft/sec
T_0	4157 °F (2565 °K)
Specific Heat Ratio	1.22

MISC. INFORMATION

Development program completed December 1987. This motor is used as a booster for a small classified remotely-piloted vehicle.

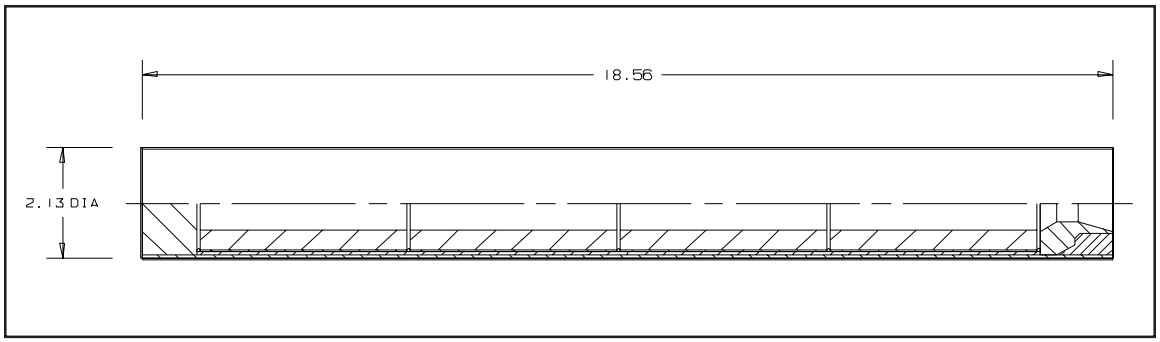
Operational limits are +32°F to +120°F (0°C to 49°C)

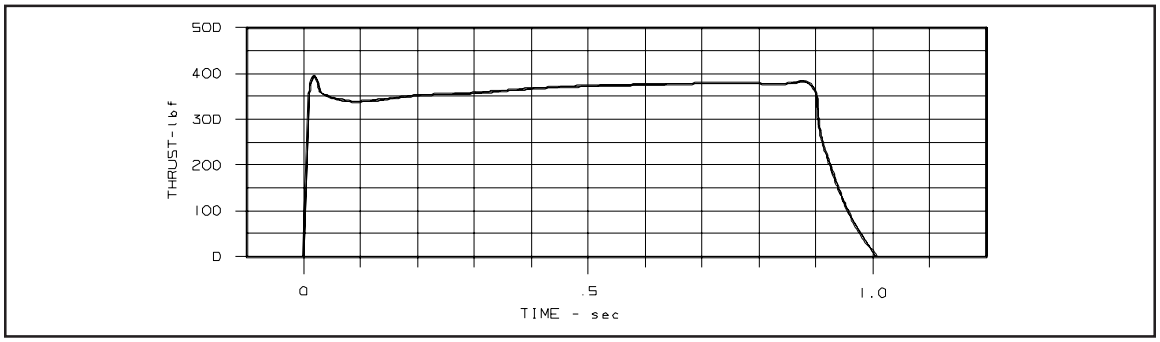
Information represents typical values and is believed to be correct, however no warranty is expressed or implied as to the accuracy of any of the information contained herein nor is any warranty implied as to the fitness of the device described herein for any particular application. This document is not to be used for design or specification purposes. This document is uncontrolled and all information on this document is subject to change without notice or obligation.

K-1500

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: K-1500
Application: RPV Boost Motor
Prime Contractor: AAI Corporation, Baltimore, MD
ISP Part Number: 861341





PERFORMANCE

(Sea Level, Ambient Temperature)		
Total Impulse	340 lb-sec	1512 Ns
Burn Time	1.02 sec	1.02 s
Average Thrust	333 lb	1481 N
Maximum Thrust	375 lb	1668 N
Average Pressure	600 psi	4136 kPa
Maximum Pressure	670 psi	4619 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8222
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.489 in/sec (1.24 cm/s)
Density	.0595 lb/in^3 (1.647 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	235.6 lb-sec/lb (2310 m/s)
C*	4817 ft/sec
T_0	4188 I_{sp}F (2582 I_{sp}K)
Specific Heat Ratio	1.21

WEIGHTS & DIMENSIONS

Motor Mass	2.95 lb	1339 g
Propellant Mass	1.66 lb	753 g
Diameter	2.13 in	54 mm
Length	18.56 in	471 mm
Throat Area	0.388 in^2	2.50 cm^2
Expansion Ratio	2.28	2.28

MISC. INFORMATION

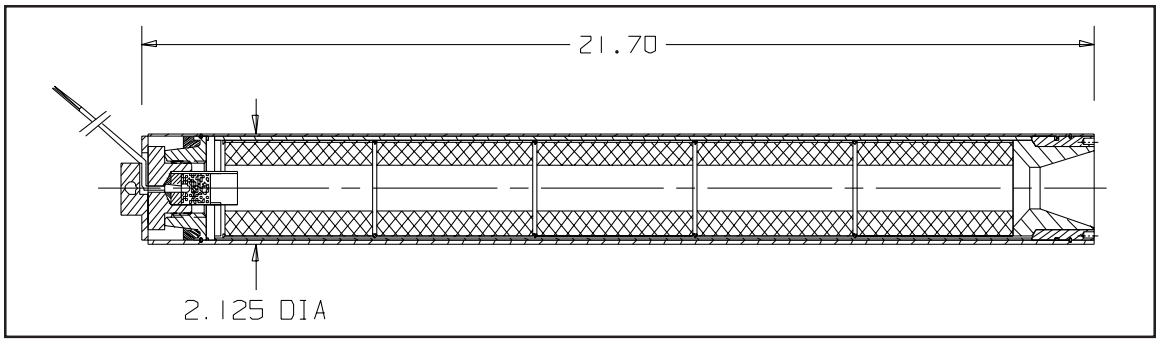
Development completed April 1986. This motor is used as a booster for a small remotely-piloted vehicle.

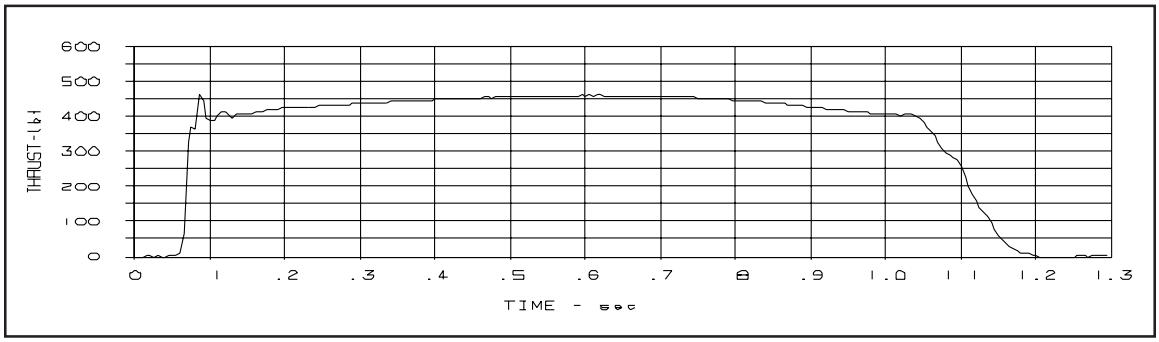
Operational limits are 32°F to +120°F (0°C to 49°C)

K-1800

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: K-1800
Application: RPV Boost Motor
Prime Contractor: S-TEC Corporation, Mineral Wells, Texas
ISP Part Number: 900661





PERFORMANCE

(Sea Level, Ambient Temperature)		
Total Impulse	454 lb-sec	2019 Ns
Burn Time	0.96 sec	0.96 s
Average Thrust	439 lb	1952 N
Maximum Thrust	460 lb	2046 N
Average Pressure	683 psi	4709 kPa
Maximum Pressure	715 psi	4930 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8222
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.489 in/sec (1.24 cm/s)
Density	.0595 lb/in^3 (1.647 g/cm^3)
Isp (Theoretical 1000/14.7)	235.6 lb-sec/lb (2310 m/s)
C*	4817 ft/sec
T_0	4188 °F (2582 °K)
Specific Heat Ratio	1.21

WEIGHTS & DIMENSIONS

Motor Mass	3.58 lb	1625 g
Igniter Mass	0.23 lb	106 g
Propellant Mass	2.05 lb	930 g
Diameter	2.13 in	54 mm
Length	21.7 in	551 mm
Throat Area	.442 in^2	2.85 cm^2
Expansion RatiO	4.00	4.00

MISC. INFORMATION

Development was completed in April 1990. This motor is used as a booster for a small remotely-piloted vehicle. A motor version with 400 lb (1780 N) average thrust is also available.

Operational limits are 0°F to +135°F (-17°C to 57°C)

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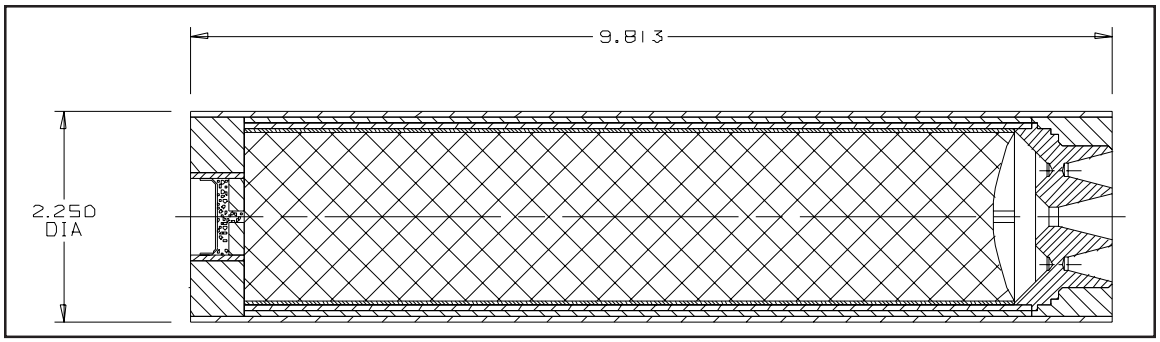
30 sec. motor

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: 30 second duration motor
Application: Optical target
Prime Contractor: Phillips Laboratory, Kirtland Air Force Base, New Mexico
ISP Part Number: 8024-30-1000



Thrust Curve Not Available

PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	224 lb-sec	996 Ns
Burn Time	27 sec	27 s
Average Thrust	8.3 lb	36.9 N
Maximum Thrust	15.0 lb	66.7 N
Average Pressure	350 psi	2413 kPa
Maximum Pressure	215 psi	1482 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8024
Propellant Type	80% Solids HTPB/AP
Grain Type	End burning
Rate @ 1000 psi (6895 kPa)	.465 in/sec (1.18 cm/s)
Density	.0586 lb/in^3 (1.622 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	249.4 lb-sec/lb (2446 m/s)
C^*	5025 ft/sec
T_0	4672 °F (2851 °K)
Specific Heat Ratio	1.16

WEIGHTS & DIMENSIONS

Motor Mass	2.10 lb	950 g
Propellant Mass	1.20 lb	544 g
Diameter	2.25 in	57.2 mm
Length	9.81 in	249 mm
Throat Area	.0317 in^2	.205 cm^2
Expansion Ratio	6.19	6.19

MISC. INFORMATION

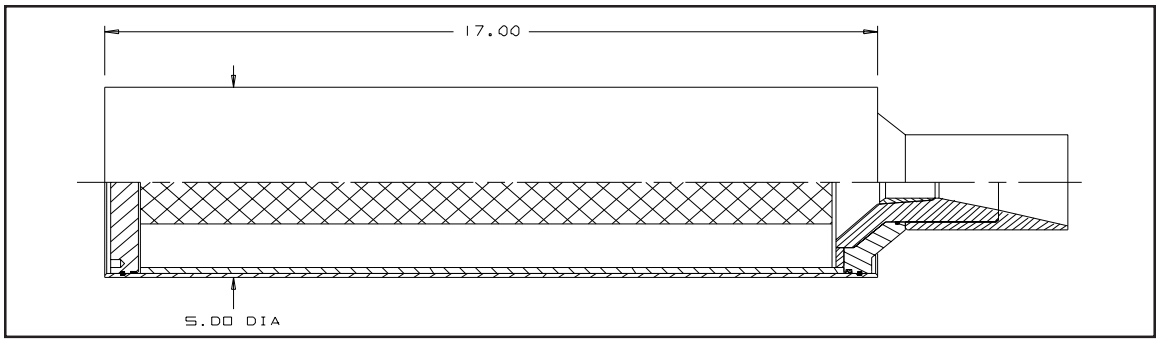
This rocket motor is used as an optical target at Kirtland AFB on the HABE program. The propellant has an enhanced signature in the visible and IR ranges.

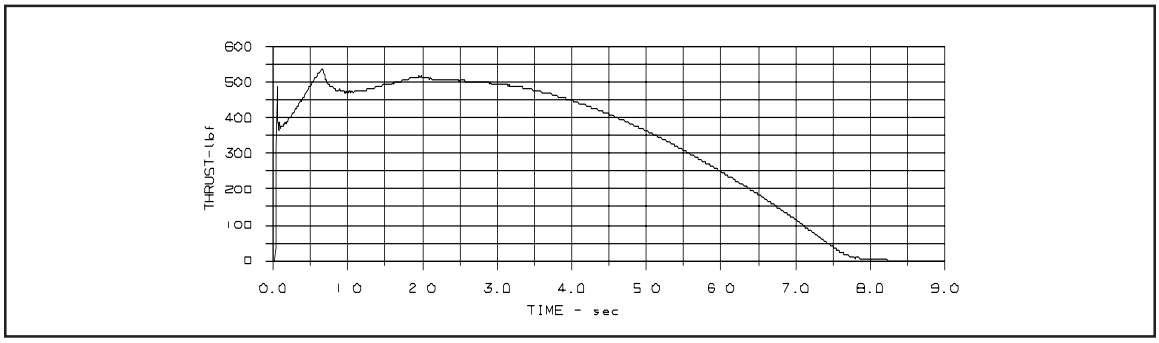
Operational temperature limits have not been established.

N-1600

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: N-1600
Application: Video Surveillance System Booster Motor
Prime Contractor:
ISP Part Number:





PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	2867 lb-sec	12752 Ns
Burn Time	7.95 sec	7.95 s
Average Thrust	361 lb	1605 N
Maximum Thrust	540 lb	2401 N
Average Pressure	547 psi	3771 kPa
Maximum Pressure	820 psi	5653 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8222
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated, Offset
Rate @ 1000 psi (6895 kPa)	.489 in/sec (1.24 cm/s)
Density	.0595 lb/in^3 (1.647 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	235.6 lb-sec/lb (2310 m/s)
C^*	4817 ft/sec
T_0	4188 °F (2582 °K)
Specific Heat Ratio	1.21

WEIGHTS & DIMENSIONS

Motor Mass	21.15 lb	9593 g
Propellant Mass	13.59 lb	6164 g
Diameter	5.00 in	127 mm
Length	21.23 in	539 mm
Throat Area	0.442 in^2	2.85 cm^2
Expansion Ratio	9.25	9.25

MISC. INFORMATION

Development completed August 1989. This motor is used to launch a video surveillance instrument package.

Operational limits are 0°F to +125°F (-17°C to 52°C)

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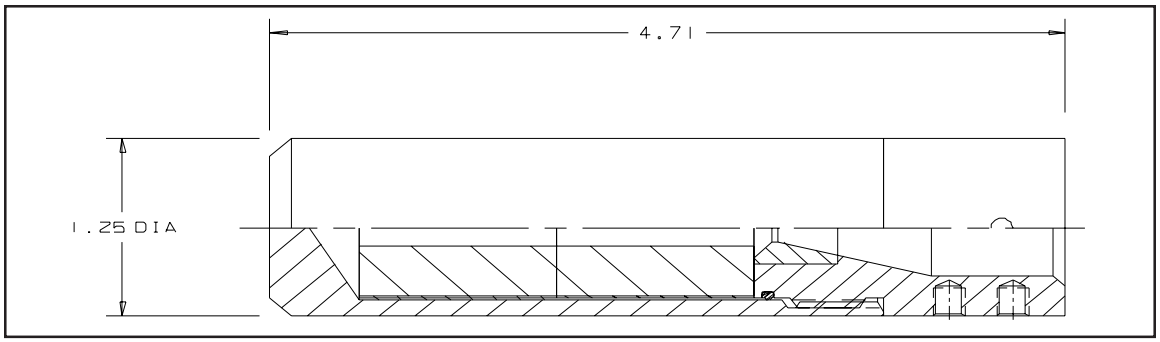
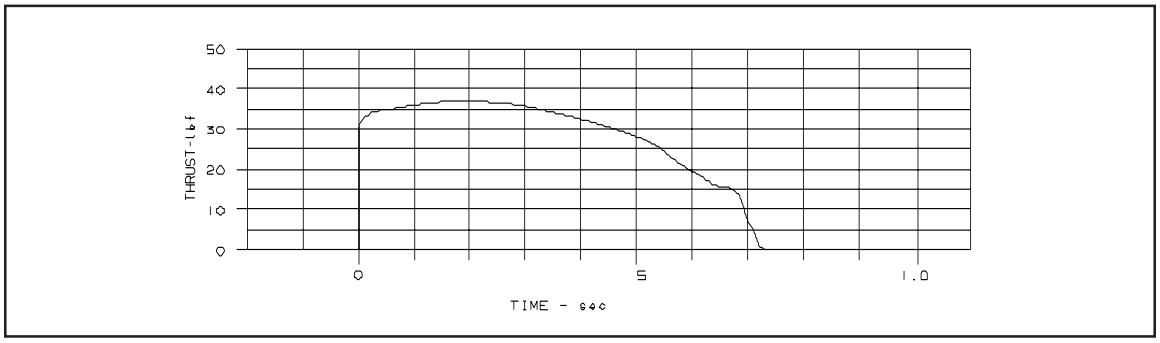
RDS-80

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: RDS-80
Application: Parachute Extraction or Line Throwing
Prime Contractor: ISP Inc.
ISP Part Number: RDS-80





PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	17.6 lb-sec	78.3 Ns
Burn Time	0.72 sec	0.72 s
Average Thrust	24 lb	107 N
Maximum Thrust	30 lb	133 N
Average Pressure	870 psi	5998 kPa
Maximum Pressure	1080 psi	7446 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8222
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.489 in/sec (1.24 cm/s)
Density	.0595 lb/in^3 (1.647 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	235.6 lb-sec/lb (2310 m/s)
C^*	4817 ft/sec
T_0	4188 °F (2582 °K)
Specific Heat Ratio	1.21

WEIGHTS & DIMENSIONS

Motor Mass	.421 lb	191 g
Propellant Mass	.091 lb	41.3 g
Diameter	1.25 in	31.8 mm
Length	4.71 in	119 mm
Throat Area	.018 in^2	.117 cm^2
Expansion Ratio	20.49	20.49

MISC. INFORMATION

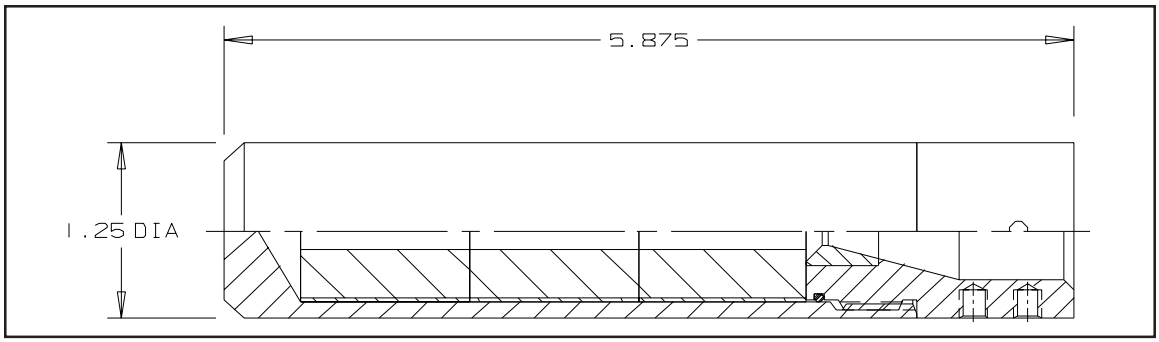
Development was completed in October 1987. This rocket motor has been used for deploying small light-weight parachutes or for line throwing. It can also be ordered with either a percussion initiated or electrical firing unit installed (see firing unit data sheets). Lines can be attached to both sides of the nozzle by use of #10 screws.

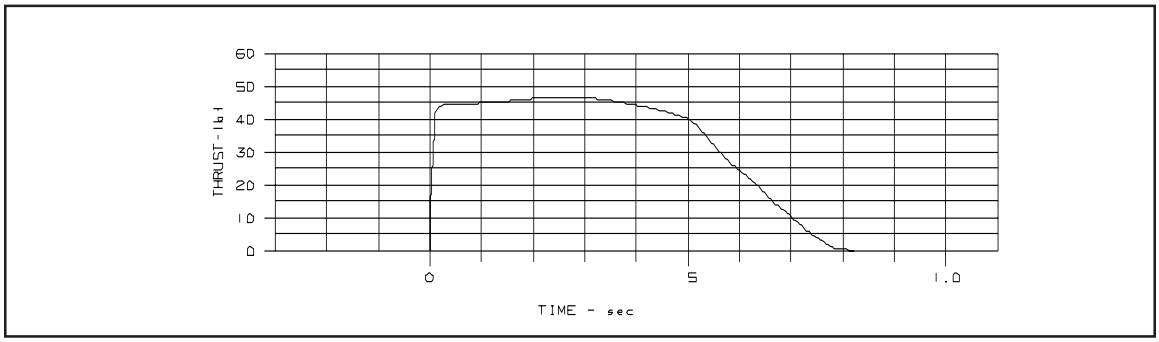
Operational limits are -65°F to +160°F (-53°C to 71°C)

RDS-133

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: RDS-133
Application: Parachute Deployment or Line Throwing
Prime Contractor: ISP Inc.
ISP Part Number: RDS-133





PERFORMANCE

(Sea Level, Ambient Temperature)		
Total Impulse	30 lb-sec	133 Ns
Burn Time	0.84 sec	0.84 s
Average Thrust	35 lb	156 N
Maximum Thrust	49 lb	218 N
Average Pressure	720 psi	4964 kPa
Maximum Pressure	1060 psi	7308 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8222
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.489 in/sec (1.24 cm/s)
Density	.0595 lb/in^3 (1.647 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	235.6 lb-sec/lb (2310 m/s)
C^*	4817 ft/sec
T_0	4188 °F (2582 °K)
Specific Heat Ratio	1.21

WEIGHTS & DIMENSIONS

Motor Mass	.518 lb	235 g
Propellant Mass	.137 lb	62.1 g
Diameter	1.25 in	31.8 mm
Length	5.88 in	149 mm
Throat Area	.032 in^2	.204 cm^2
Expansion Ratio	11.72	11.72

MISC. INFORMATION

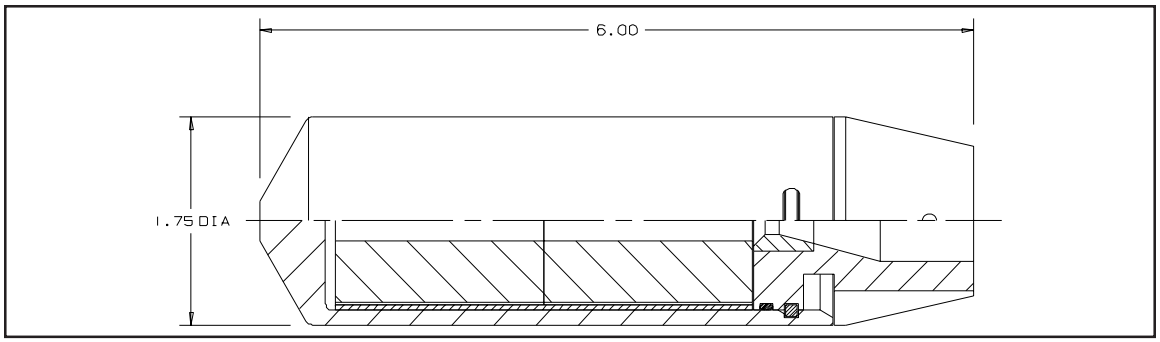
Development program completed April 1987. This motor is used for parachute extraction or line throwing. It has been used on the Self Propelled Line Charge Program to tow 100 meters of detonating cord for minefield clearing. It has also been used to deploy aircraft anti-spin parachutes.

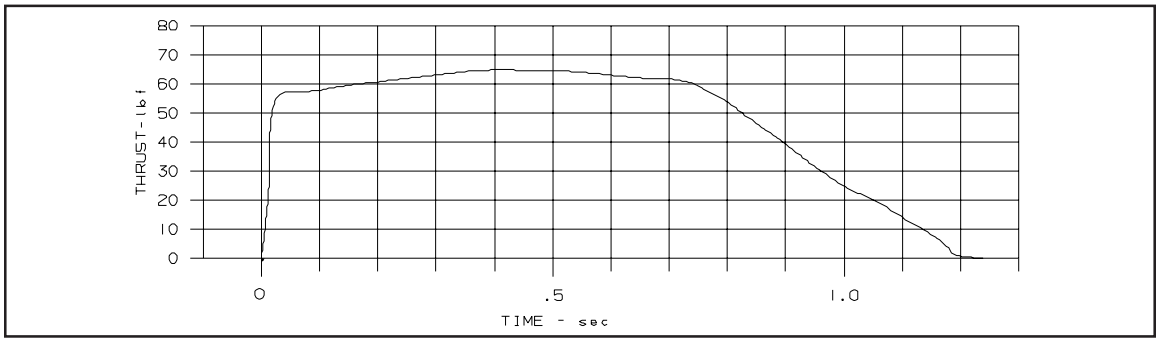
Operational limits are -65°F to +165°F (-53°C to 71°C)

RDS-285

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: RDS-285
Application: Parachute Extraction, Line Throwing
Prime Contractor: ISP Inc.
ISP Part Number: RDS-285





PERFORMANCE

(Sea Level, Ambient Temperature)		
Total Impulse	61 lb-sec	271 Ns
Burn Time	1.20 sec	1.20 s
Average Thrust	51 lb	227 N
Maximum Thrust	65 lb	289 N
Average Pressure	750 psi	5171 kPa
Maximum Pressure	950 psi	6550 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8222
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.489 in/sec (1.24 cm/s)
Density	.0595 lb/in^3 (1.647 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	235.6 lb-sec/lb (2310 m/s)
C^*	4817 ft/sec
T_0	4188 °F (2582 °K)
Specific Heat Ratio	1.21

WEIGHTS & DIMENSIONS

Motor Mass	1.049 lb	475 g
Propellant Mass	.283 lb	128 g
Diameter	1.75 in	44.5 mm
Length	6.00 in	152 mm
Throat Area	.043 in^2	.277 cm^2
Expansion Ratio	8.64	8.64

MISC. INFORMATION

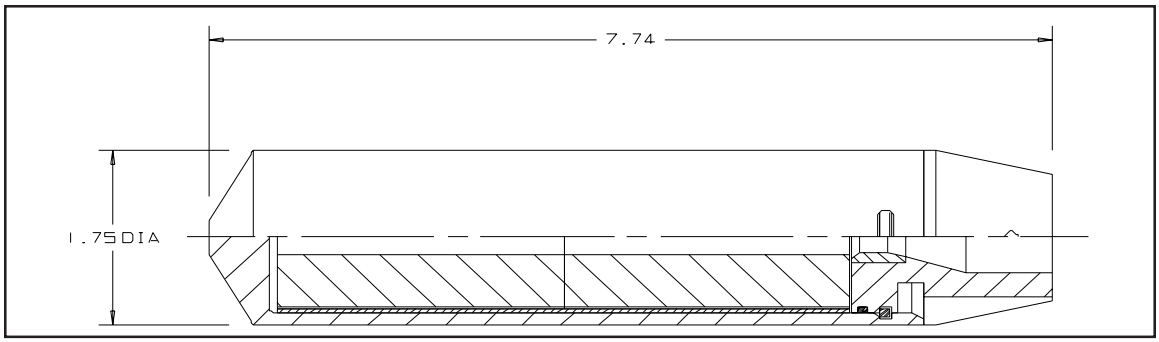
Development program was completed May 1986. This motor is used for parachute extraction or for line throwing. It includes an insulated stainless steel harness for line attachment. This unit may be fitted with either an electrical or percussion initiated igniter.

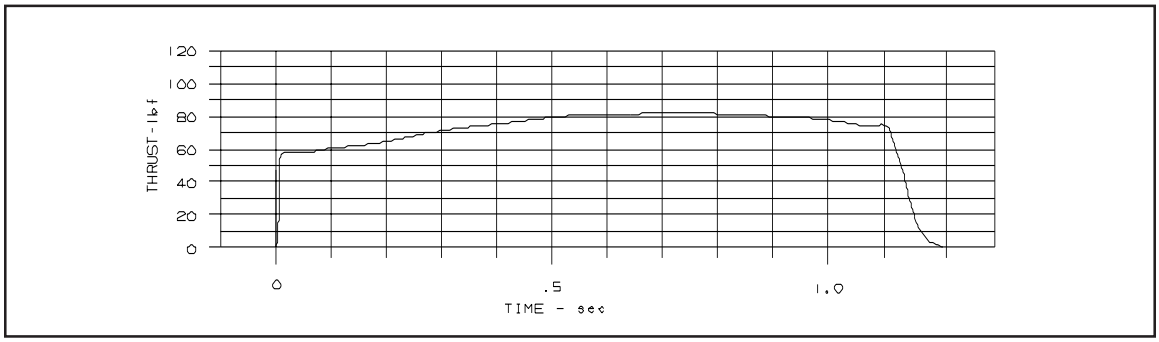
Operational limits are -65°F to +160°F (-53°C to +71°C)

RDS-420-2

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: RDS-420-2
Application: Parachute Extraction / Line Throwing
Prime Contractor: ISP Inc.
ISP Part Number: RDS-420-2





PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	92 lb-sec	409 Ns
Burn Time	1.21 sec	1.21 s
Average Thrust	76 lb	338 N
Maximum Thrust	84 lb	373 N
Average Pressure	720 psi	4964 kPa
Maximum Pressure	790 psi	5446 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8222
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.489 in/sec (1.24 cm/s)
Density	.0595 lb/in^3 (1.647 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	235.6 lb-sec/lb (2310 m/s)
C^*	4817 ft/sec
T_0	4188 °F (2582 °K)
Specific Heat Ratio	1.21

WEIGHTS & DIMENSIONS

Motor Mass	1.37 lb	622 g
Propellant Mass	.468 lb	212 g
Diameter	1.75 in	44.5 mm
Length	7.76 in	197 mm
Throat Area	.0693 in^2	.447 cm^2
Expansion Ratio	5.37	5.37

MISC. INFORMATION

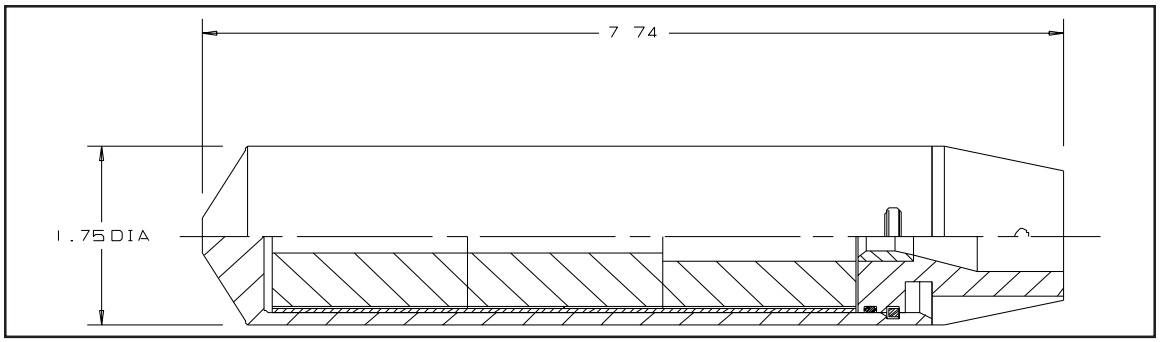
Development completed January 1987. This motor is used for parachute extraction and line throwing applications. It can be fitted with either electrical or percussion initiated firing units (see firing unit data sheets). This motor has an insulated stainless steel harness for line attachment.

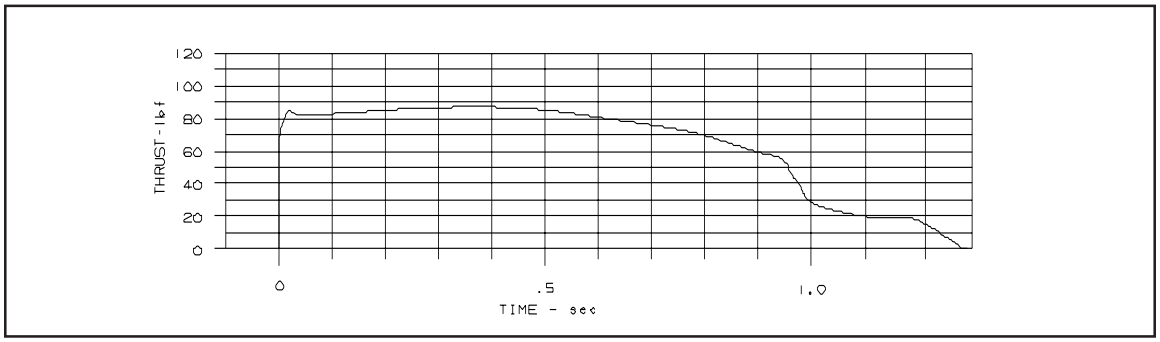
Operational limits are -65°F to +160°F (-53°C to 71°C)

RDS-420-3

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: RDS-420-3
Application: Parachute Extraction / Line Throwing
Prime Contractor: ISP Inc.
ISP Part Number: RDS-420-3





PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	87 lb-sec	387 Ns
Burn Time	1.32 sec	1.32 s
Average Thrust	67 lb	298 N
Maximum Thrust	88 lb	391 N
Average Pressure	640 psi	4413 kPa
Maximum Pressure	820 psi	5654 kPa

PROPELLANT INFORMATION

Designation	ISP-P-8222
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.489 in/sec (1.24 cm/s)
Density	.0595 lb/in^3 (1.647 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	235.6 lb-sec/lb (2310 m/s)
C^*	4817 ft/sec
T_0	4188 °F (2582 °K)
Specific Heat Ratio	1.21

WEIGHTS & DIMENSIONS

Motor Mass	1.35 lb	614 g
Propellant Mass	.448 lb	203 g
Diameter	1.75 in	44.5 mm
Length	7.76 in	197 mm
Throat Area	.0693 in^2	.447 cm^2
Expansion Ratio	5.37	5.37

MISC. INFORMATION

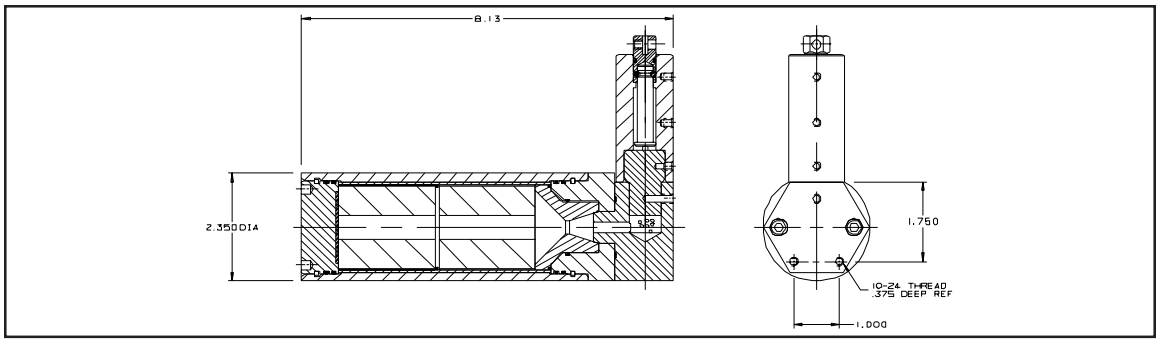
Development completed January 1987. This motor is used for parachute extraction and line throwing applications. It can be fitted with either electrical or percussion initiated firing units (see firing unit data sheets). This motor has an insulated stainless steel harness for line attachment.

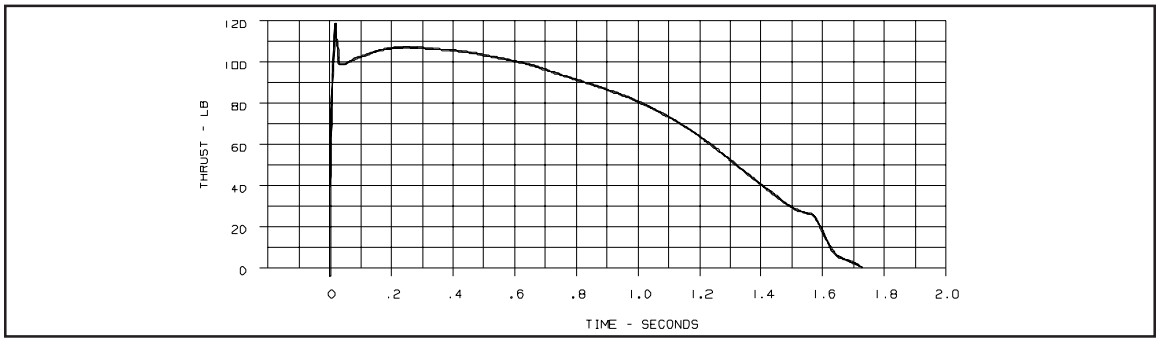
Operational limits are -65°F to +160°F (-53°C to 71°C)

RDS-575

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: RDS-575
Application: Parachute Extraction
Prime Contractor: BRS Incorporated, South St. Paul, MN
ISP Part Number: RDS-575





PERFORMANCE

(Sea Level, Ambient Temperature)		
Total Impulse	129.3 lb-sec	575.1 Ns
Burn Time	1.71 sec	1.71 s
Average Thrust	75.6 lb	336 N
Maximum Thrust	108.6 lb	483 N
Average Pressure	652 psi	4495 kPa
Maximum Pressure	1000 psi	6895 kPa

WEIGHTS & DIMENSIONS

Motor Mass	2.11 lb	958 g
Igniter Mass	0.83 lb	375 g
Propellant Mass	0.61 lb	278 g
Diameter	2.35 in	59.7 mm
Length	8.13 in	206.5 mm
Throat Area	.0755 in^2	.487 cm^2
Expansion Ratio	5.24	5.24

PROPELLANT INFORMATION

Designation	ISP-P-8222
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.489 in/sec (1.24 cm/s)
Density	.0595 lb/in^3 (1.647 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	235.6 lb-sec/lb (2310 m/s)
C^*	4817 ft/sec
T_0	4188 °F (2582 °K)
Specific Heat Ratio	1.21

MISC. INFORMATION

This motor was developed for BRS Inc. for parachute recovery systems for light civil aircraft. Orders for this motor should be referred to BRS Inc. This motor has received FAA approval as part of the General Aviation Recovery Device (GARD) under STC SA64CH.

Operational limits are -65°F to +165°F (-53°C to 73°C)

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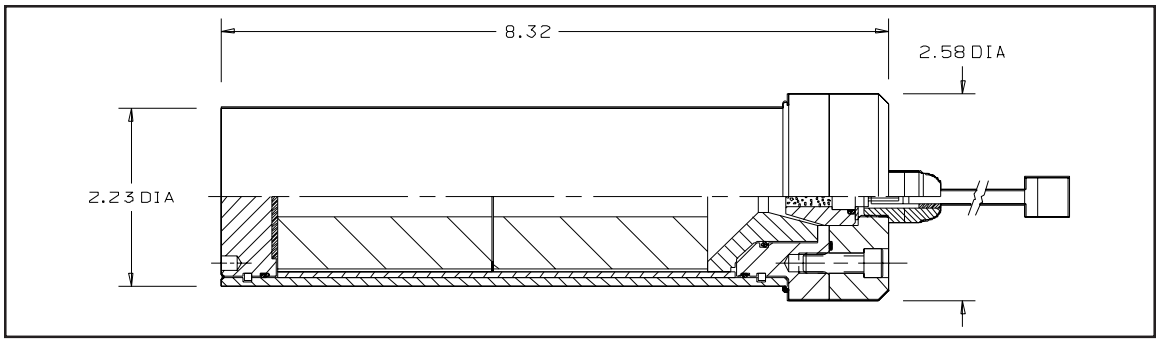
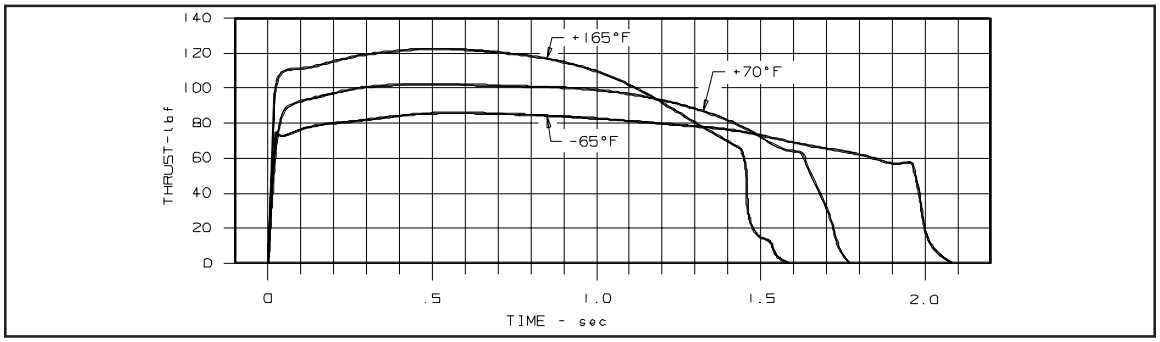
RDS-700

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: RDS-700
Application: Parachute Extraction
Prime Contractor: Developmental Sciences Corporation, Ontario, CA
ISP Part Number: 872662





PERFORMANCE

(Sea Level, Ambient Temperature)

Total Impulse	160 lb-sec	711 Ns
Burn Time	1.78 sec	1.78 s
Average Thrust	90 lb	400 N
Maximum Thrust	103 lb	458 N
Average Pressure	560 psi	3861 kPa
Maximum Pressure	630 psi	4343 kPa

WEIGHTS & DIMENSIONS

Motor Mass	2.43 lb	1103 g
Igniter Mass	.42 lb	188 g
Propellant Mass	.74 lb	335 g
Diameter	2.23 in	56.6 mm
Length	8.32 in	211 mm
Throat Area	.110 in^2	.710 cm^2
Expansion Ratio	3.58	3.58

PROPELLANT INFORMATION

Designation	ISP-P-8222
Propellant Type	82% Solids HTPB/AP
Grain Type	Center-Perforated
Rate @ 1000 psi (6895 kPa)	.489 in/sec (1.24 cm/s)
Density	.0595 lb/in^3 (1.647 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	235.6 lb-sec/lb (2310 m/s)
C^*	4817 ft/sec
T_0	4188 °F (2582 °K)
Specific Heat Ratio	1.21

MISC. INFORMATION

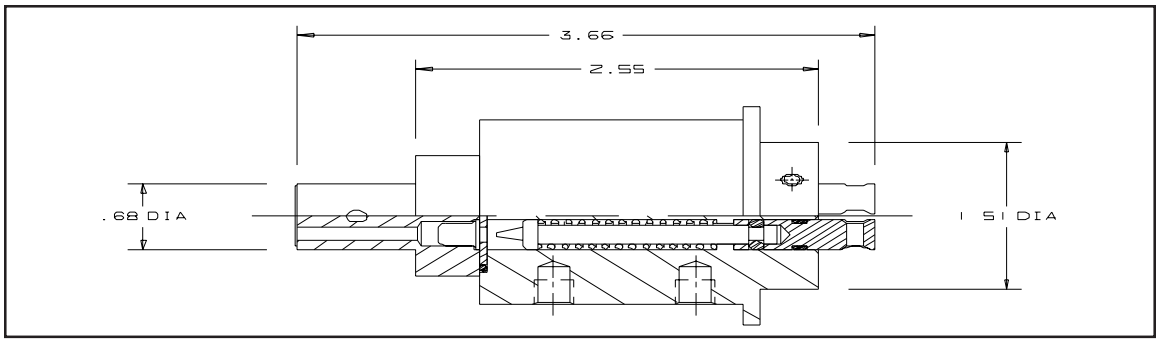
Development program completed January 1988. This motor is used to extract a 30 lb (13.6 kg) parachute from the Developmental Sciences R4-E40 Skyeye remotely-piloted vehicle. This motor can also be fitted with a percussion igniter.

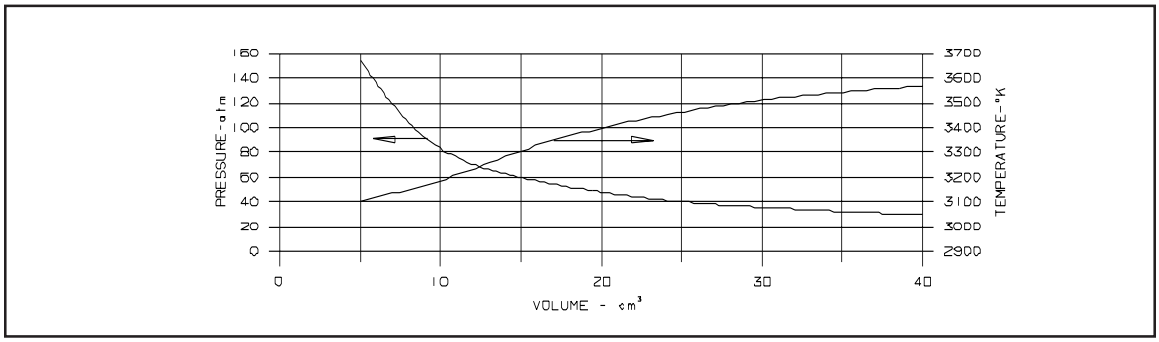
Operational limits are -65°F to +165°F (-53°C to 73°C)

MII-01

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: MII-01
Application: Igniter for RDS-80, RDS-133, RDS-285, RDS-420
Prime Contractor: ISP Inc.
ISP Part Number: MII-01





PERFORMANCE

See chart above.

PYROTECHNIC INFORMATION

Pyrotechnic Type	Lead Styphante/Tetracene/Al
Booster	Mg
Gas Constant	28.5 ft-lb/lbmoR
Specific Heat Ratio	1.12

WEIGHTS & DIMENSIONS

Igniter Mass	.719 lb	326 g
Propellant Mass	2.66 grains	.172 g
Diameter	1.99 in	50.5 mm
Length	3.66 in	92.9 mm
Actuation Force	15 lb	67 N
Actuation Distance	.450 in (min.)	11.4 mm

MISC. INFORMATION

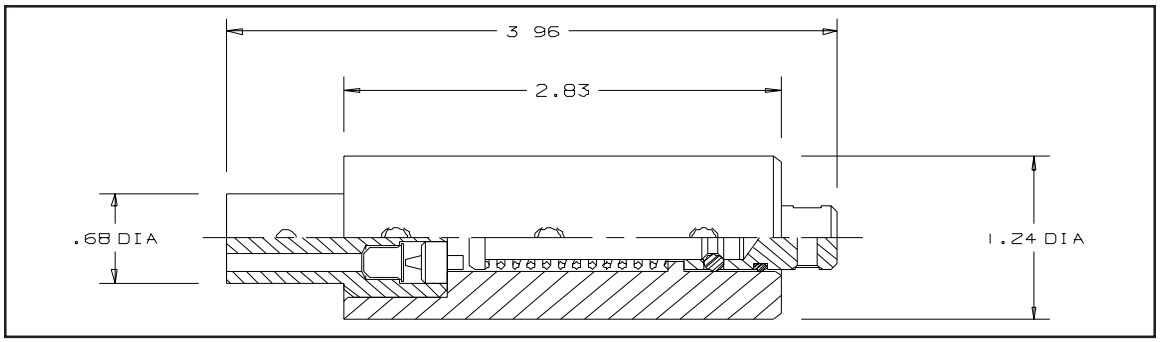
Development completed July 1986. Actuation force is approximately 15 lb per pull pin. This unit is available on special order only.

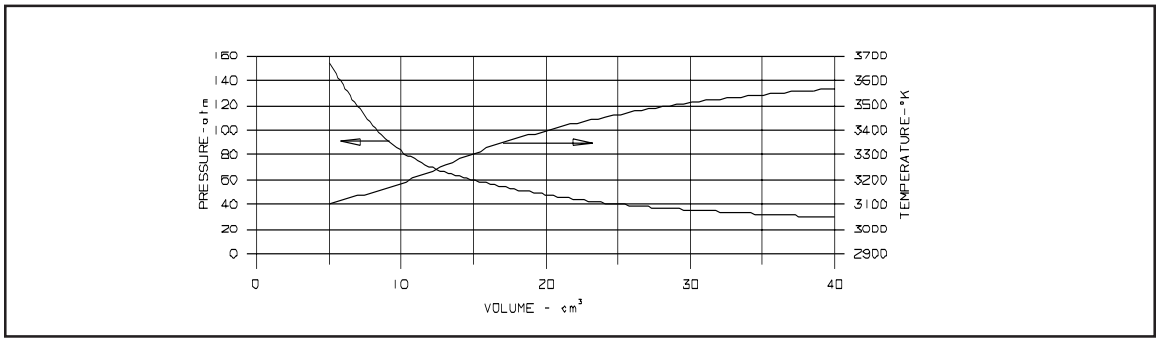
Operational limits are -65°F to +160°F (-53°C to +71°C)

MII-02

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: MII-02
Application: Igniter for RDS-80, RDS-133, RDS-285, RDS-420
Prime Contractor: ISP Inc.
ISP Part Number: MII-02





PERFORMANCE

See chart above.

PYROTECHNIC INFORMATION

Pyrotechnic Type	Lead Styphnate/Tetracene/Al
Booster	Mg
Gas Constant	28.5 ft-lb/lbmoR
Specific Heat Ratio	1.12

WEIGHTS & DIMENSIONS

Igniter Mass	.350 lb	159 g
Propellant Mass	2.66 grains	.172 g
Diameter	1.25 in	31.8 mm
Length	3.96 in	100.6 mm
Actuation Force	30 lb	133 N
Actuation Distance	.500 in (min.)	12.7 mm

MISC. INFORMATION

Development completed April 1987. Actuation force is approximately 30 lb on pull pin. Unit is mounted using two #10 screws.

Operational limits are -65°F to +160°F (-53°C to +71°C)

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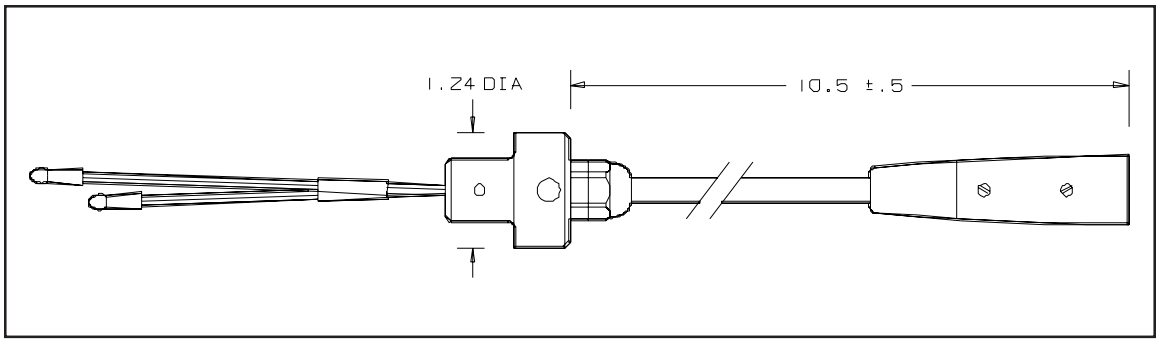
EII-01

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: EII-01
Application: Igniter for RDS-133, RDS-285, RDS-420
Prime Contractor: ISP Inc.
ISP Part Number: EII-01



Thrust Curve Not Available

PERFORMANCE

Resistance	1.3 ±0.3 Ω
No Fire Current	.20 Amperes
All Fire Current	.36 Amperes
Recommended Fire Current	>.90 Amperes

PYROTECHNIC INFORMATION

Pyrotechnic Type	NC/KP/AL	
Booster	None	
Gas Constant	31.76 ft-lb/lbmoR	
Specific Heat Ratio	1.08	
T0 (1 Atm.)	3540°F	2222°C

WEIGHTS & DIMENSIONS

Igniter Mass	.198 lb	90 g
Propellant Mass	5.5 grains	.360 g
Diameter	1.25 in	31.8 mm
Cable Length	10.5 in	267 mm

MISC. INFORMATION

This igniter is a dual electric match coated with a special pyrotechnic. Standard connector is a Switchcraft A4-M or Neutrik NC4 connector. Other connectors and cable lengths are available on request. This igniter is not to be used in critical reliability applications.

Operational limits are -65°F to +160°F (-53°C to +71°C)

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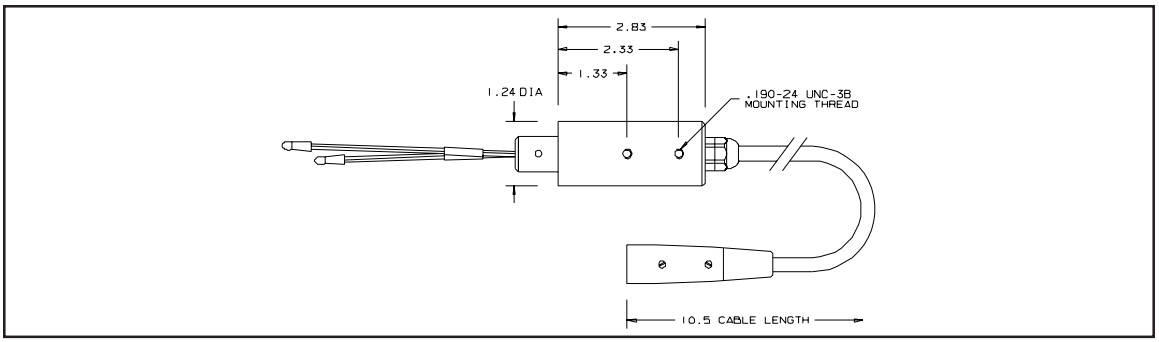
EII-02

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: EII-02
Application: Igniter for RDS-133, RDS-285, RDS-420
Prime Contractor: ISP Inc.
ISP Part Number: EII-02



Thrust Curve Not Available

PERFORMANCE

Resistance	1.3 ±0.3 Ω
No Fire Current	.20 Amperes
All Fire Current	.36 Amperes
Recommended Fire Current	>.90 Amperes

WEIGHTS & DIMENSIONS

Igniter Mass	xxxx lb	xxxx g
Propellant Mass	5.5 grains	.360 g
Diameter	1.25 in	31.8 mm
Cable Length	10.5 in	267 mm

PYROTECHNIC INFORMATION

Pyrotechnic Type	NC/KP/AL	
Booster	None	
Gas Constant	31.76 ft-lb/lbmoR	
Specific Heat Ratio	1.08	
T_0 (1 Atm.)	3540°F	2222°C

MISC. INFORMATION

This igniter is a dual electric match coated with a special pyrotechnic. Standard connector is a Switchcraft A4-M or Neutrik NC4 connector. Other connectors and cable lengths are available on request. This igniter is not to be used in critical reliability applications.

Operational limits are -65°F to +160°F (-53°C to +71°C)

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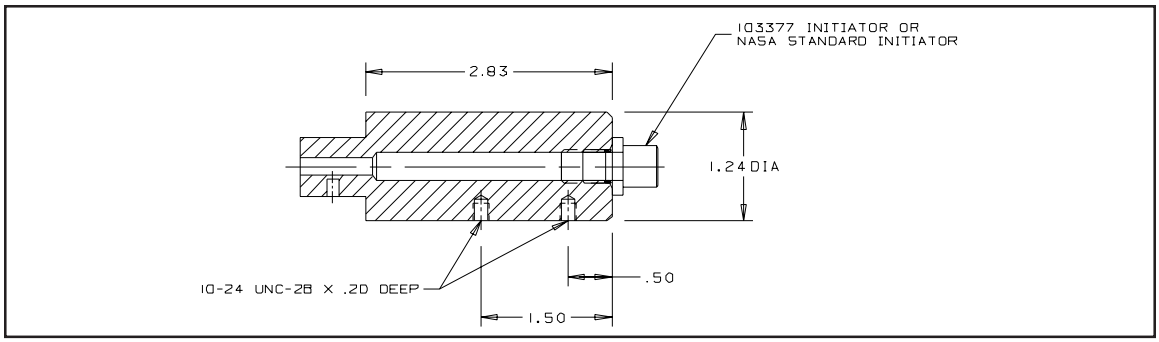
EII-03

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: EII-03
Application: Igniter for RDS-80, RDS-133, RDS-285, RDS-420
Prime Contractor: ISP Inc.
ISP Part Number: EII-03



Thrust Curve Not Available

PERFORMANCE

Resistance	Depends on initiator.
No Fire Current	1A, 1W
All Fire Current	Depends on initiator.
Recommended Fire Current	Depends on initiator.

PYROTECHNIC INFORMATION

Pyrotechnic Type	Depends on initiator.

WEIGHTS & DIMENSIONS

Igniter Mass	.344 lb	156 g
Propellant Mass	Depends on igniter.	
Diameter	1.25 in	31.8 mm
Length	2.83 in	71.9 mm

MISC. INFORMATION

This adapter is designed to allow either a NASA Standard Initiator (NSI) or Special Devices 103377-3 initiator to be used to ignite an ISP Inc. RDS motor. The NSI and 103377 initiators are less sensitive to accidental ignition by stray current and ESD. These initiators are also more reliable than the electric match type although they are considerably more expensive. Operational temperature limits are the same as the limits on the initiator.

SABRE Motor

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: SABRE Motor
Application:
Prime Contractor: Orbital Sciences Corporation Space Data Division, Chandler, AZ
ISP Part Number: 890244

Graphic Not Available

Thrust Curve Not Available

PERFORMANCE
(Sea Level, Ambient Temperature)
Total Impulse
Burn Time
Average Thrust
Maximum Thrust
Average Pressure
Maximum Pressure

PROPELLANT INFORMATION
Designation
Propellant Type
Grain Type
Rate @ 1000 psi (6895 kPa)
Density
I_{sp} (Theoretical 1000/14.7)
C^*
T_0
Specific Heat Ratio

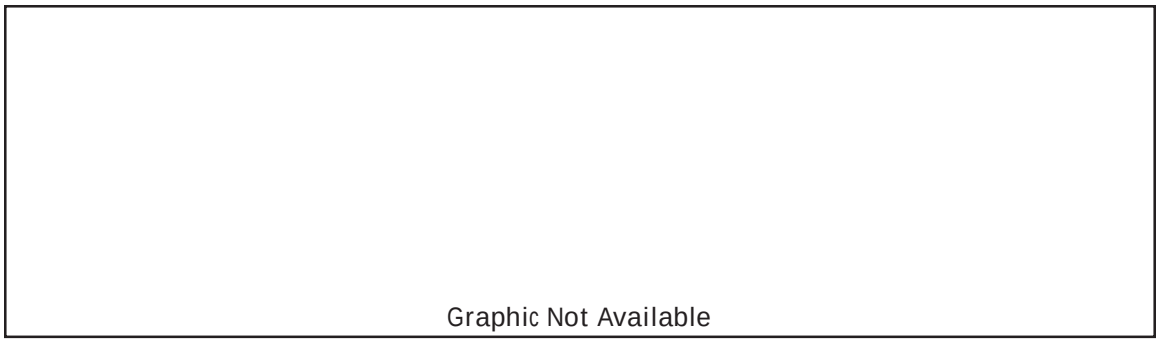
WEIGHTS & DIMENSIONS
Motor Mass
Igniter Mass
Propellant Mass
Diameter
Length
Throat Area
Expansion Ratio

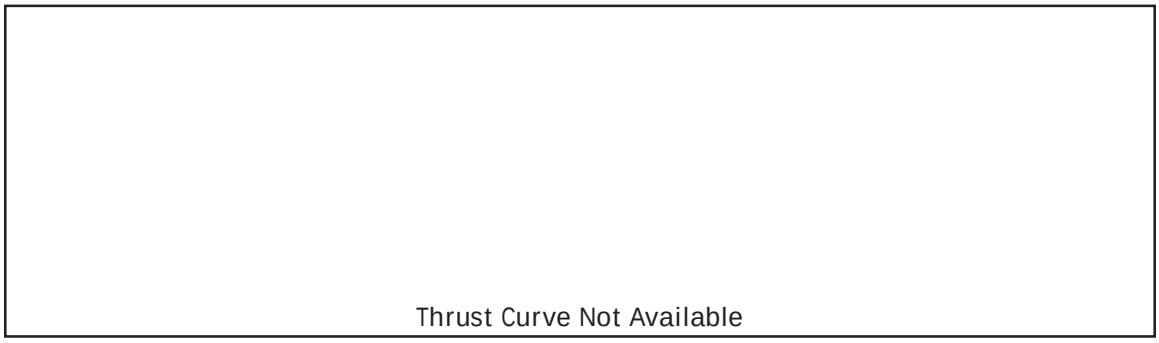
MISC. INFORMATION
This motor was developed by ISP Inc. for Orbital Sciences Corporation Space Data Division. Development completed in September 1989. All inquiries concerning this motor may be directed to Orbital Sciences Corporation Space Data Division, 3380 South Price Road, Chandler Arizona, 85248. The motor is about 5" diameter and has approximately 4000 lb-sec vacuum total impulse.

Viper V

INDUSTRIAL SOLID PROPULSION Inc.

Device Name: Viper V
Application: LEAP Target Propulsion Motor
Prime Contractor: Orbital Sciences Corporation Space Data Division, Chandler, AZ
ISP Part Number: 903232





PERFORMANCE

(Sea Level, Ambient Temperature)
Total Impulse
Burn Time
Average Thrust
Maximum Thrust
Average Pressure
Maximum Pressure

WEIGHTS & DIMENSIONS

Motor Mass
Igniter Mass
Propellant Mass
Diameter
Length
Throat Area
Expansion Ratio

PROPELLANT INFORMATION

Designation	ISP-P-8746
Propellant Type	87% Solids HTPB/AP/AL
Grain Type	
Rate @ 1000 psi (6895 kPa)	.369 in/sec (0.94 cm/s)
Density	.062 lb/in^3 (1.72 g/cm^3)
I_{sp} (Theoretical 1000/14.7)	253.3 lb-sec/lb (2848 m/s)
C^*	5086 ft/sec
T_0	5152 ^oF (3118 ^oK)
Specific Heat Ratio	1.15

MISC. INFORMATION

This motor was developed by ISP Inc. for Orbital Sciences Corporation Space Data Division. Development Completed January 1992. All inquiries for technical data on this motor may be directed to Orbital Sciences Corporation Space Data Division, 3380 South Price Road, Chandler Arizona, 85248. The motor is about 7" diameter and has approximately 30,000 lb-sec vacum total impulse.

Propellant Formulations

Several production propellant formulations are widely used in our products. Information on these propellants is given in the tables and charts which follow. Custom propellants can be developed and evaluated should your application require special properties or performance not obtainable with one of the production formulations. In addition to the mechanical and ballistic characterization, ISP has the capability to characterize the hazard characteristics per the DOD Explosive Hazard Classification Procedures. All of the production propellant formulations have been tested and are non-detonable (zero cards). All the production propellants have an explosive classification of 1.3C (old DOT Class B).

Material safety data sheets on ISP propellants can be made available if requested.

Additional thermal and transport properties of propellant gasses are available if required for your evaluation. Please contact our engineering department for additional information.

Custom formulations can be developed and cast into special configurations to meet customer needs. ISP has fabricated special propellants and grain cartridges for several customers including:

Organization	Application
The Pennsylvania State University High Pressure Combustion Laboratory	Driver cartridges for erosive burning test fixture Titan-4 restrictor evaluation.
International Technical Associates/ Allied Signal Corporation	Measurement of dielectric strength of propellant gas.
New England Ordnance/ Lockheed Corporation	Driver grains for pyrophoric liquid flare.
Wyle Laboratories/ Phillips Laboratory	Test grains for calibration of IR sensors for LEAP hover test instrumentation.
The Core Group Inc.	Enhanced optical signature propellant.
Naval Weapons Center, China Lake	Enhanced optical signature propellant, optical calibration propellant.

Should you have an application which requires a special propellant, please contact our engineering department for an evaluation of your requirements.

Designation	8021D	8024	8121	8222	8223AL	8243	8322	8521	8746	8843
%Solids / %Metal	80/40	80/15	81/4	82/0	82/1	82/0	83/10	85/20	87/4	88/18
Binder Type	HTPB	HTPB	HTPB	HTPB	HTPB	HTPB	HTPB	HTPB	HTPB	HTPB
I_{sp} (1000/14.7)	154.1	249.4	233.2	235.6	237.6	235.5	224.4	262.2	253.3	263
C* (ft/sec)	3024	5025	4785	4817	4843	4816	4568	5141	5068	5167
Density (lb/in)	0.0766	0.0573	0.0586	0.0589	0.0593	0.0586	0.0618	0.0643	0.0621	0.065
T0 (°R)	2390	5132	4464	4648	4750	4617	4273	6104	5612	6386
Gamma	1.16	1.16	1.22	1.22	1.21	1.22	1.23	1.13	1.15	1.13
Molecular Weight	31.67	24.53	23.33	23.33	23.7	23.17	24.03	28.44	26.51	29.51
Rate coefficient	0.0798	0.06	0.0474	0.0687	0.123	0.0214	0.0387	0.067	0.0132	0.0163
Pressure exponent	0.056	0.296	0.321	0.284	0.287	0.357	0.314	0.341	0.481	0.446