Product Portfolio
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
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

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/in³ (1.642 g/cm³)
Iₚ (Theoretical 1000/ 14.7) 237.6 lb-sec/lb (2330 m/s)
Cₜ 4843 ft/sec
T₀ 4290 °F (2639 °K)
Specific Heat Ratio 1.21

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 in² 2.627 cm²
Expansion Ratio 4.60

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)

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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 in² .150 cm²
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/in³ (1.642 g/cm³)
Iₚ (Theoretical 1000/14.7) 237.6 lb-sec/lb (2330 m/s)
Cₚ 4843 ft/sec
T₀ 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)

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

**PERFORMANCE**
(Sea Level, Ambient Temperature)

<table>
<thead>
<tr>
<th>Total Impulse</th>
<th>34207 lb-sec</th>
<th>152150 Ns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burn Time</td>
<td>6.25 sec</td>
<td>6.25 s</td>
</tr>
<tr>
<td>Average Thrust</td>
<td>5473 lb</td>
<td>24344 N</td>
</tr>
<tr>
<td>Maximum Thrust.</td>
<td>7150 lb</td>
<td>31800 N</td>
</tr>
<tr>
<td>Average Pressure</td>
<td>1327 psi</td>
<td>9149 kPa</td>
</tr>
<tr>
<td>Maximum Pressure</td>
<td>1703 psi</td>
<td>11741 kPa</td>
</tr>
</tbody>
</table>

**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/in³ (1.800 g/cm³)
- $I_p$ (Theoretical 1000/ 14.7): 263.0 lb-sec/lb (2579 m/s)
- $C_p$: 5167 ft/sec
- $T_0$: 5926 °F (3548 °K)
- Specific Heat Ratio: 1.13

**WEIGHTS & DIMENSIONS**

<table>
<thead>
<tr>
<th>Motor Mass</th>
<th>162.2 lb</th>
<th>73.57 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Igniter Mass</td>
<td>.64 lb</td>
<td>.29 kg</td>
</tr>
<tr>
<td>Propellant Mass</td>
<td>130.2 lb</td>
<td>59.06 kg</td>
</tr>
<tr>
<td>Diameter</td>
<td>7.60 in</td>
<td>193 mm</td>
</tr>
<tr>
<td>Length</td>
<td>86.24 in</td>
<td>2190 mm</td>
</tr>
<tr>
<td>Throat Area</td>
<td>2.573 in²</td>
<td>16.60 cm²</td>
</tr>
<tr>
<td>Expansion Ratio</td>
<td>12.01</td>
<td>12.01</td>
</tr>
</tbody>
</table>

**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)

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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

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_p (Theoretical 1000/ 14.7) 233.2 lb-sec/ lb (2287 m/ s)
C_0 4785 ft/ sec
T_0 4004 °F (2200 °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)

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**Performance**

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Torque Impulse</td>
<td>251 in-lb-sec</td>
</tr>
<tr>
<td>Burn Time</td>
<td>.463 sec</td>
</tr>
<tr>
<td>Average Torque</td>
<td>542 in-lb</td>
</tr>
<tr>
<td>Maximum Torque</td>
<td>646 in-lb</td>
</tr>
<tr>
<td>Average Pressure</td>
<td>1405 psi</td>
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<tr>
<td>Maximum Pressure</td>
<td>1772 psi</td>
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<tr>
<td><strong>Total Torque Impulse</strong></td>
<td>340.3 N-m-sec</td>
</tr>
<tr>
<td><strong>Burn Time</strong></td>
<td>.463 s</td>
</tr>
<tr>
<td><strong>Average Torque</strong></td>
<td>735 N-m</td>
</tr>
<tr>
<td><strong>Maximum Torque</strong></td>
<td>876 N-m</td>
</tr>
<tr>
<td><strong>Average Pressure</strong></td>
<td>9687 kPa</td>
</tr>
<tr>
<td><strong>Maximum Pressure</strong></td>
<td>12218 kPa</td>
</tr>
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</table>

**Weights & Dimensions**

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Mass</td>
<td>1.76 lb</td>
</tr>
<tr>
<td>Igniter Mass</td>
<td>.055 lb</td>
</tr>
<tr>
<td>Propellant Mass</td>
<td>.342 lb</td>
</tr>
<tr>
<td>Diameter</td>
<td>1.50 in</td>
</tr>
<tr>
<td>Length</td>
<td>7.25 in</td>
</tr>
<tr>
<td>Throat Area</td>
<td>.028 in²</td>
</tr>
<tr>
<td>Expansion Ratio</td>
<td>6.30</td>
</tr>
<tr>
<td><strong>Motor Mass</strong></td>
<td>799 g</td>
</tr>
<tr>
<td><strong>Igniter Mass</strong></td>
<td>25 g</td>
</tr>
<tr>
<td><strong>Propellant Mass</strong></td>
<td>155 g</td>
</tr>
<tr>
<td><strong>Diameter</strong></td>
<td>38.1 mm</td>
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<tr>
<td><strong>Length</strong></td>
<td>184 mm</td>
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<tr>
<td><strong>Throat Area</strong></td>
<td>.181 cm²</td>
</tr>
<tr>
<td><strong>Expansion Ratio</strong></td>
<td>6.30</td>
</tr>
</tbody>
</table>

**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/in³ (1.642 g/cm³)
- **Iₚ (Theoretical 1000/14.7)**: 237.6 lb-sec/lb (2330 m/s)
- **C₀**: 4843 ft/sec
- **T₀**: 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)

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Device Name: Two Nozzle Motor
Application: Launcher Evaluation
Prime Contractor: Westinghouse Marine Systems Division, 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

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/ in3 (1.642 g/ cm3)
Isp (Theoretical 1000/ 14.7) 237.6 lb-sec/ lb (2330 m/ s)
C0 4843 ft/ sec
T0 4290 °F (2639 °K)
Specific Heat Ratio 1.21

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 in2 2.239 cm2
Expansion Ratio 10.18 10.18

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.

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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

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/in³ (1.781 g/cm³)
Iₚ (Theoretical 1000/14.7) 262.2 lb·sec/lb (2571 m/s)
Cₚ 5141 ft/sec
T₀ 5644 °F (3391 °K)
Specific Heat Ratio 1.172

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 in² 21.3 cm²
Expansion Ratio 10.47

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 established.

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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 in² 33.70 cm²
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/in³ (1.781 g/cm³)
Iₚ / (Theoretical 1000/ 14.7) 262.2 lb-sec/lb (2571 m/s)
Cₗ₀ 5141 ft/sec
T₀ 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.

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Gas Generator

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 1.20s
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

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/in³ (1.647 g/cm³)
Iₚ (Theoretical 1000/14.7) 235.6 lb-sec/lb (2310 m/s)
C* 4817 ft/sec
T₀ 4188 oF (2582 oK)
Specific Heat Ratio 1.21

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 in² .277 cm²

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)

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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/ in³ (1.622 g/ cm³)
Iₚₜ (Theoretical 1000/ 14.7)
Cₚ 233.2 lb-sec/ lb (2287 m/ s)
T₀ 4004 °F (2287 °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 in² 0.317 cm²
Expansion Ratio 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)

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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 in² 1.42 cm²  
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/in³ (1.631 g/cm³)  
Iₚ₀ₚ (Theoretical 1000/14.7) 235.5 lb·sec/lb (2309 m/s)  
Cₚ 4816 ft/sec  
T₀ 4157 °F (2292 °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)  
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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/ in³ (1.647 g/ cm³)
- $I_p$ (Theoretical 1000/ 14.7): 235.6 lb-sec/lb (2310 m/ s)
- $C_p$: 4817 ft/ sec
- $T_0$: 4188 l F (2582 l 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 in², 2.50 cm²
- Expansion Ratio: 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)

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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/in³ (1.647 g/cm³)
Isp (Theoretical 1000/ 14.7) 235.6 lb-sec/lb (2310 m/s)
Cʰ 4817 ft/ sec
T₀ 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 in² 2.85 cm²
Expansion Ratio 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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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.
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

**PERFORMANCE**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Impulse</td>
<td>224 lb·sec</td>
<td>996 Ns</td>
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<tr>
<td>Burn Time</td>
<td>27 sec</td>
<td>27 s</td>
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<tr>
<td>Average Thrust</td>
<td>8.3 lb</td>
<td>36.9 N</td>
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<tr>
<td>Maximum Thrust</td>
<td>15.0 lb</td>
<td>66.7 N</td>
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<tr>
<td>Average Pressure</td>
<td>350 psi</td>
<td>2413 kPa</td>
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<tr>
<td>Maximum Pressure</td>
<td>215 psi</td>
<td>1482 kPa</td>
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**PROPELLANT INFORMATION**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation</td>
<td>ISP-P-8024</td>
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</tr>
<tr>
<td>Propellant Type</td>
<td>80% Solids HTPB/ AP</td>
<td></td>
</tr>
<tr>
<td>Grain Type</td>
<td>End burning</td>
<td></td>
</tr>
<tr>
<td>Rate @ 1000 psi (6895 kPa)</td>
<td>.465 in/ sec</td>
<td>(1.18 cm/s)</td>
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<tr>
<td>Density</td>
<td>.0586 lb/ in³</td>
<td>(1.622 g/ cm³)</td>
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<tr>
<td>Iₚₜₚ (Theoretical 1000/ 14.7)</td>
<td>249.4 lb·sec/lb</td>
<td>(2446 m/s)</td>
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<tr>
<td>Cₚ</td>
<td>5025 ft/ sec</td>
<td></td>
</tr>
<tr>
<td>Tₚ</td>
<td>4672 °F (2851 °K)</td>
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<tr>
<td>Specific Heat Ratio</td>
<td>1.16</td>
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**WEIGHTS & DIMENSIONS**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>Unit</th>
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</thead>
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<tr>
<td>Motor Mass</td>
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<td>950 g</td>
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<td>Propellant Mass</td>
<td>1.20 lb</td>
<td>544 g</td>
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<tr>
<td>Diameter</td>
<td>2.25 in</td>
<td>57.2 mm</td>
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<tr>
<td>Length</td>
<td>9.81 in</td>
<td>249 mm</td>
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<tr>
<td>Throat Area</td>
<td>.0317 in²</td>
<td>.205 cm²</td>
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<tr>
<td>Expansion Ratio</td>
<td>6.19</td>
<td>6.19</td>
</tr>
</tbody>
</table>

**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.

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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): 0.489 in/sec (1.24 cm/s)
- Density: 0.0595 lb/in\(^3\) (1.647 g/cm\(^3\))
- \(I_\infty\) (Theoretical 1000/14.7): 235.6 lb-sec/lb (2310 m/s)
- \(C^*\): 4817 ft/sec
- \(T_0\): 4188 °F (2382 °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

**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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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 7448 kPa

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 in² .117 cm²
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)

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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/in³ (1.647 g/cm³)
Iₚ (Theoretical 1000/14.7) 235.6 lb-sec/lb (2310 m/s)
Cₚ 4817 ft/sec
T₀ 4188 °F (2310 °C)
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 in² .204 cm²
Expansion Ratio 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)

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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

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 in² .277 cm²
Expansion Ratio 8.64

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/in³ (1.647 g/cm³)
Iₚ (Theoretical 1000/14.7) 235.6 lb-sec/lb (2310 m/s)
Cₚ 4817 ft²/sec
T₀ 4188 °F (2310 °K)
Specific Heat Ratio 1.21

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)

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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/ in3 (1.647 g/ cm3)
Iₚ (Theoretical 1000/ 14.7) 235.6 lb-sec/ lb (2310 m/ s)
Cₚ 4817 ft/ sec
T₀ 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 in² .447 cm²
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)

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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

WEIGHTS & DIMENSIONS
Motor Mass: 1.35 lb, 614 g
Propellant Mass: 0.448 lb, 203 g
Diameter: 1.75 in, 44.5 mm
Length: 7.76 in, 197 mm
Throat Area: 0.0693 in², 0.447 cm²
Expansion Ratio: 5.37

PROPELLANT INFORMATION
Designation: ISP-P-8222
Propellant Type: 82% Solids HTPB/AP
Grain Type: Center-Perforated
Rate @ 1000 psi (6895 kPa): 0.489 in/sec (1.24 cm/s)
Density: 0.0595 lb/in³ (1.647 g/cm³)
Iₚ (Theoretical 1000/14.7): 235.6 lb-sec/lb (2310 m/s)
Cₚ: 4817 ft/sec
T₀: 4188 °F (2348 °K)
Specific Heat Ratio: 1.21

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)

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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

**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/in³ (1.647 g/cm³)  
- Iₚ (Theoretical 1000/14.7): 235.6 lb-sec/lb (2310 m/s)  
- C: 4817 ft/sec  
- T₀: 4188 °F (2322 °K)  
- Specific Heat Ratio: 1.21

**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 in², .487 cm²  
- Expansion Ratio: 5.24

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

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**PERFORMANCE**
(Sea Level, Ambient Temperature)
- **Total Impulse:** 160 lb-sec  
- **Burn Time:** 1.78 sec  
- **Average Thrust:** 90 lb  
- **Maximum Thrust:** 103 lb  
- **Average Pressure:** 560 psi  
- **Maximum Pressure:** 630 psi

**WEIGHTS & DIMENSIONS**
- **Motor Mass:** 2.43 lb  
- **Igniter Mass:** .42 lb  
- **Propellant Mass:** .74 lb  
- **Diameter:** 2.23 in  
- **Length:** 8.32 in  
- **Throat Area:** .110 in²  
- **Expansion Ratio:** 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/ in³ (1.647 g/ cm³)  
- **Iₚ (Theoretical 1000/ 14.7):** 235.6 lb-sec/ lb (2310 m²/ s)  
- **Cₚ:** 4817 ft²/ sec  
- **T₀:** 4188 °F (2310 °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 Skyeve 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)

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**MII-01**

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)

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

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

PERFORMANCE
Resistance: 1.3 ±0.3 Ω
No Fire Current: 0.20 Amperes
All Fire Current: 0.36 Amperes
Recommended Fire Current: >0.90 Amperes

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

WEIGHTS & DIMENSIONS
Igniter Mass: xxxx lb, xxxx g
Propellant Mass: 5.5 grains, 0.360 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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Device Name: EII-03
Application: Igniter for RDS-80, RDS-133, RDS-285, RDS-420
Prime Contractor: ISP Inc.
ISP Part Number: EII-03

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.

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

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
Propellant Type
Grain Type
Rate @ 1000 psi (6895 kPa)
Density
I_{sp} (Theoretical 1000/14.7)
C^2
T_0
Specific Heat 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.

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

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 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\(_p\) (Theoretical 1000/ 14.7) 253.3 lb-sec/ lb (2848 m/s)
C\(_p\) 5086 ft/sec
T\(_0\) 5152 \(^\circ\)F (3118 \(^\circ\)K)
Specific Heat Ratio 1.15

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 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 vacuum 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:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Pennsylvania State University</td>
<td>Driver cartridges for erosive burning test fixture</td>
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<tr>
<td>High Pressure Combustion Laboratory</td>
<td>Titan-4 restrictor evaluation.</td>
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<td>Allied Signal Corporation</td>
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<tr>
<td>New England Ordnance/</td>
<td>Driver grains for pyrophoric liquid flare.</td>
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<td>Lockheed Corporation</td>
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<td>Wyle Laboratories/</td>
<td>Test grains for calibration of IR sensors for LEAP hover test instrumentation.</td>
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<td>Phillips Laboratory</td>
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<tr>
<td>The Core Group Inc.</td>
<td>Enhanced optical signature propellant.</td>
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<tr>
<td>Naval Weapons Center, China Lake</td>
<td>Enhanced optical signature propellant, optical calibration propellant.</td>
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</table>

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

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<tr>
<th>Designation</th>
<th>8021D</th>
<th>8024</th>
<th>8121</th>
<th>8222</th>
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<td>%Solids / %Metal</td>
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<td>80/15</td>
<td>81/4</td>
<td>82/0</td>
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<td>83/10</td>
<td>85/20</td>
<td>87/4</td>
<td>88/18</td>
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<td>Binder Type</td>
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<td>$I_p$ (1000/14.7)</td>
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<td>249.4</td>
<td>233.2</td>
<td>235.6</td>
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<td>235.5</td>
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<td>$C^*$ (ft/ sec)</td>
<td>3024</td>
<td>5025</td>
<td>4785</td>
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<td>4843</td>
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<td>Density (lb/ in)</td>
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<td>$T_0$ (°R)</td>
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