

## SHIELDED MILD DETONATING CORD (SMDC)

Shielded Mild Detonating Cord (SMDC) assemblies are explosive transfer lines, consisting of a metal sheathed explosive core, covered with an extrusion, all contained within a thin wall stainless steel tube. The Mild Detonating Cord (MDC) most commonly used in SMDC is a Hexanitrostilbene (HNS) core. HNS per WS 5003 is a high temperature explosive which allows the MDC to withstand temperatures in excess of +425°F for short periods of time without any detrimental effect on the detonation characteristics.



### ESTIMATED WEIGHT

.068 lbs per linear foot

.012 lbs per each end fitting

### PERFORMANCE DATA

|                |                                                                        |
|----------------|------------------------------------------------------------------------|
| Hermetic Seal: | $\leq 10^{-5}$ cc/sec (air)                                            |
| Humidity:      | 100% of water or frost                                                 |
| Pressure:      | Operate in complete vacuum or under water to the tubing crush strength |
| Storage:       | 80°F to +200°F                                                         |
| Service:       | -65°F to +350°F, will withstand 425°F for periods of 5 minutes         |
| Vibration:     | 80 to 2000 cps +/- 20G                                                 |
| Shock:         | 3 shocks of 40G in any direction                                       |
| Acceleration:  | 40G in any direction                                                   |
| Drop Test:     | 6 foot drop – operational<br>40 foot drop - safe to handle             |

### APPLICATION

SMDC assemblies have numerous advantages due to the shielding capability of the stainless steel tube. A primary advantage of using SMDC can be realized when point-to-point initiation is necessary yet all fragments and by-products of the detonation must be contained. The key word is "contained" vs. "confined." When properly inserted in the port, the only detectable difference between an SMDC before and after functioning is a 15% increase in tubing diameter after firing.

#### Typical Systems Utilizing Pacific Scientific SMDC

|        |          |             |
|--------|----------|-------------|
| F-111  | S-3A     | TF-15       |
| F-14   | BGM-109D | C-17        |
| JAS 39 | AV-8B    | AH-1        |
| LAVI   | F/A-18   | Pershing II |
| B-1B   | F-15     | CASA 101    |
| Delta  | Harpoon  | X-Wing      |
| Star   | T-45     | AH-64       |
| Castor | RSRA     | Sea Lance   |

The donor/acceptor booster, welded to each end of the SMDC, has a nominal load of one grain (67 milligrams). This load is considered more than adequate to meet all performance and reliability requirements. This donor/acceptor charge is contained in a stainless steel shell. The threaded fitting or B-nut, provided on each end, is a 3/8-24 UNF-3A (standard), with provisions for lock wiring; other sizes are available. Other types of self-locking devices can be provided upon request. The outer tubing used to contain the MDC is made from stainless steel tubing with a .188 inch diameter. This tubing is generally formed to customer specifications and requirements with a standard bend radius of .75 inch, however, larger radii are available upon request. The tubing can be expected to expand approximately 15% when functioned. Normally 10 feet is the maximum length used. Single ended lines, generally referred to as SMDC Test Tips, are available for test purposes.

**PERFORMANCE**

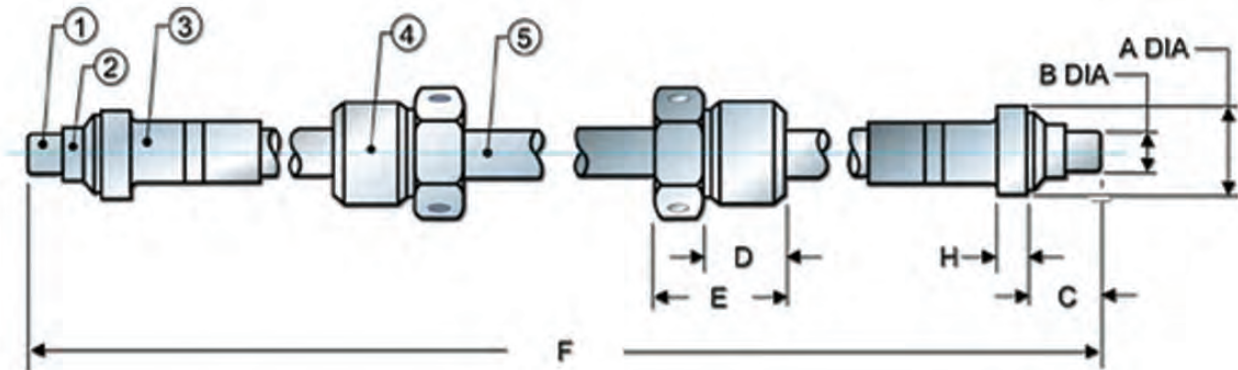
Four different types of tests are normally employed to measure efficiency or acceptance of the detonation output.

|                        |                                                                                                                                        |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Energy Sensor Tests:   | Minimum of 200 in-lbs across the temperature range                                                                                     |
| Orifice Transfer Test: | Must fire across a .50 inch air gap and through a .09 orifice to initiate the in-line SMDC acceptor                                    |
| Plate Dent Test:       | At zero gap, must indent a steel or aluminum block as follows:<br>1020 Steel<br>6051-T6<br>.10 in. minimum<br>Aluminum .04 in. minimum |
| Witness Cap Expansion: | Must swell an aluminum witness cap by 15%                                                                                              |

**OTHER ADVANTAGES OF SMDC INCLUDE:**

- SMDC assemblies are considerably smaller in diameter than other contained or confined detonation transmission systems and occupy less area.
- Fewer installation brackets are required because of its rigidity. The SMDC resists vibration and offsets "whipping" of cord during detonation.
- A demonstrated high reliability and confidence level .
- Being a completely sealed unit, the SMDC is not susceptible to environmental conditions as are other types of transfer lines.
- This type configuration has been qualified to both government and aerospace industry specifications. SMDC assemblies are currently in service on the most advanced aircraft, as well as on the very sophisticated missile and satellite launch vehicle systems.

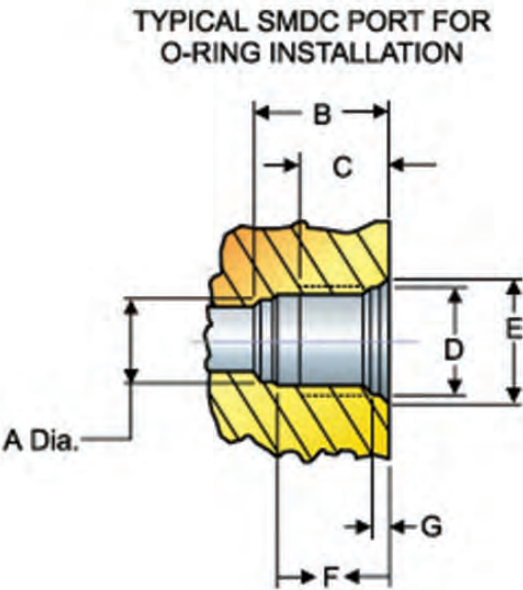
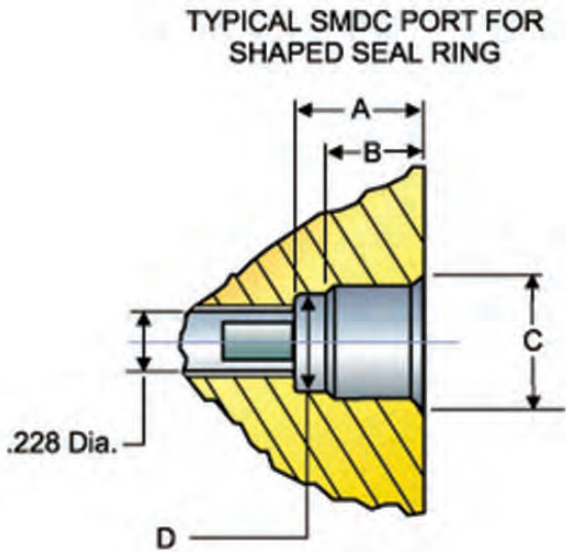
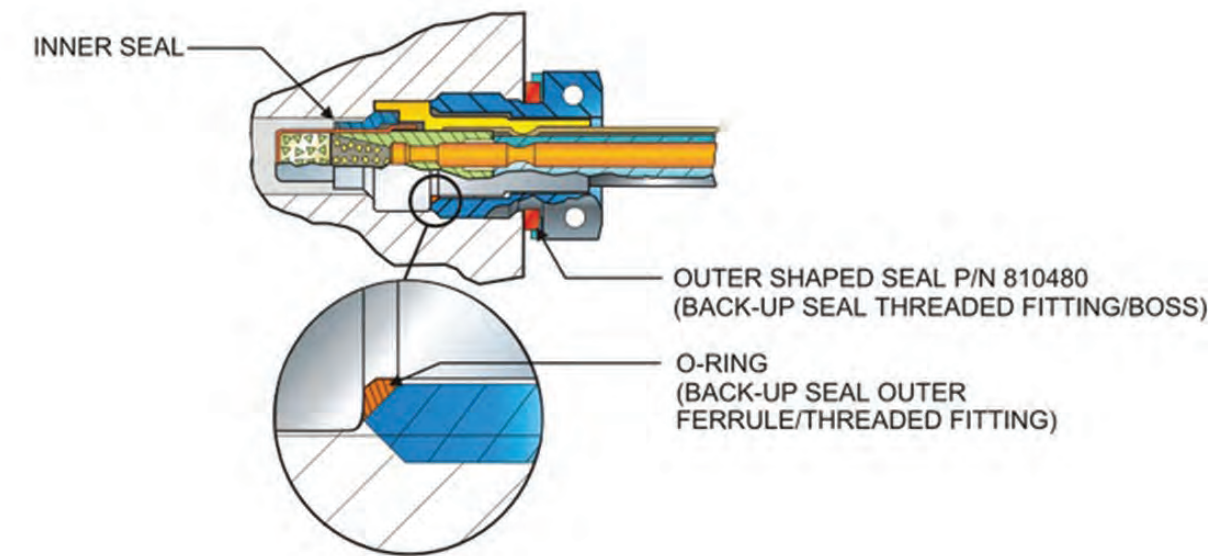
ENVELOPE & DIMENSIONS



| Item Number | Description      |
|-------------|------------------|
| 1           | Booster Shell    |
| 2           | Seal             |
| 3           | Outer Furrule    |
| 4           | Threaded Fitting |
| 5           | Tubing           |

| DIMENSIONS | 3/8-24       | 7/16-20      | 1/2-20       |
|------------|--------------|--------------|--------------|
| A          | .320 to .325 | .372 to .377 | .435 to .440 |
| B          | .150 to .156 | .150 to .156 | .150 to .156 |
| C          | .275 to .295 | .275 to .295 | .275 to .295 |
| D          | .319 to .323 | .368 to .389 | .368 to .389 |
| E          | .498 to .508 | .583 to .593 | .583 to .593 |
| F          | As Required  | As Required  | As Required  |
| G          | .621 to .625 | .621 to .625 | .621 to .625 |
| H          | .160 to .156 | .160 to .156 | .160 to .156 |

SMDC SEALING DESIGN FOR LEAK PROOF INSTALLATION



SEAL INSTALLATION (AF)

PORT CONFIGURATION

| Thread Size | A    | B    | C    | D    | Thread Size   | A Dia<br>± .002 | A<br>+.000, -.002 | C    | D Dia<br>+.005, -.000 | E Dia<br>+.015, -.000 | F Dia<br>MAX | G<br>+.015, -.000 |
|-------------|------|------|------|------|---------------|-----------------|-------------------|------|-----------------------|-----------------------|--------------|-------------------|
| 3/8-24      | .431 | .325 | .440 | .330 | 3/8-24 UNF-3  | .330            | .473              | .325 | .390                  | .500                  | .410         | .063              |
| 7/16-20     | .490 | .384 | .502 | .383 | 7/16-20 UNF-3 | .385            | .532              | .400 | .454                  | .562                  | .475         | .075              |
| 1/2-20      | .490 | .384 | .565 | .446 | 1/2-20 UNF-3  | .453            | .532              | .400 | .517                  | .625                  | .475         | .075              |

**TYPICAL PROGRAMS USING PACIFIC SCIENTIFIC SMDC**

| PROGRAM                                                  | CUSTOMER &<br>MSI PART NO. | SMDC TYPE CORD/<br>END BOOSTER       | CUSTOMER                                                                                                | APPROX.<br>QUANTITY MANF'D | QUALIFICATION                                               |
|----------------------------------------------------------|----------------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------|
| F-111                                                    | CK04151<br>811915          | Silver-Dipam MDC<br>HNS End Boosters | McDonnell Douglas<br>ZK04151, A.F. Kit A<br>P/N 7027296                                                 | 2,000,000                  | Qualified by Air Force<br>QTR 811915                        |
| F-15/TF-15                                               | 812503                     | Silver-Dipam MDC<br>HNS End Boosters | McDonnell Douglas<br>PS 68-710072                                                                       | 250,000                    | QTR H15609                                                  |
| AH-1G, -1J,<br>-1S, -1T                                  | 813475                     | Silver HNS MDC<br>HNS End Boosters   | Navy 857AS100<br>BHC 100009 Bell Qualified<br>to MIL-D-21625E Type III<br>Release and<br>MIL-D-23615(A) | 150,000                    | QTR 890013-18, QTR<br>817237 and QTR 100009                 |
| B-1 Capsule<br>B01 Seats                                 | 812480<br>816739           | Aluminum HNS MDC<br>HNS End Boosters | Rockwell L325C2002                                                                                      | 1,000,000                  | QTR 7060-1090 and<br>7886-012/3                             |
| Harpoon                                                  | 815258                     | Silver Dipam MDC<br>HNS End Boosters | McDonnell Douglas<br>ZK04151                                                                            | 4000                       | QTR C-84-1073-171                                           |
| Skynet                                                   | 812651                     | Silver HNS MDC<br>HNS End Boosters   | Philco-Ford SP-DB 1953                                                                                  | 100                        | QTR 7055                                                    |
| RSRA                                                     | 815612                     | Silver HNS MDC<br>HNS End Boosters   | Sikorsky/NASA SES<br>721002                                                                             | 1800                       | QTR 7607-015                                                |
| B-1B, Receptor/<br>Detonator                             | 813337                     | Silver-Dipam MDC<br>HNS End Boosters | Northrop-Norwood 67352                                                                                  | 250                        | QTR 17227                                                   |
| Model-301<br>Tilt Rotor                                  | 813475                     | Silver HNS MDC<br>HNS End Boosters   | Rockwell-Tulsa<br>BHC 10009                                                                             | 200                        | QTR 890013-18 and<br>QTR 817237                             |
| Apogee Boost<br>Motor                                    | 814306                     | Silver HNS MDCHNS<br>End Boosters    | Thiokol Corp. SE-257A                                                                                   | 5000                       | QTR 7760                                                    |
| Aircraft<br>Emergency<br>Survival<br>Equipment<br>Egress | 811915                     | Silver HNS MDC<br>HNS End Boosters   | Wright Patterson AFB<br>NR412A-07878-55003                                                              | 500,000                    | QTR 8119815                                                 |
| Upstage                                                  | 813979                     | Silver-Dipam MDC<br>HNS End Boosters | Douglas, Santa Monica<br>1B91785                                                                        | 25                         | H16818                                                      |
| Delta 3rd<br>Stage Pam/<br>Delta/<br>SGS-II              | 817586<br>819004<br>819252 | Silver HNS MDC<br>HNS End Boosters   | Douglas, Huntington Beach<br>1B99651 and 1D23016                                                        | 10,000                     | USR 1005, 1630, 1529,<br>819242; QTR<br>819242 and 1005-102 |
| TA-7C<br>A-7K                                            | 817435                     | Silver HNS MDC<br>HNS End Boosters   | LTV, Grand Prairie, Navy<br>848AS150, LTV 204-20-23G                                                    | 10,000                     | QTR 7759-206                                                |
| Tomahawk                                                 | 817473<br>818450           | Silver HNS MDC<br>CH-6 End Boosters  | General Dynamics,<br>Convair Div., San Diego<br>76Z2742                                                 | 20,000                     | DQTR 1406-026 and QTR<br>1053-506                           |
| F-14                                                     | 818926                     | Silver HNS MDC<br>HNS End Boosters   | NSPCC Mechanicsburg,<br>841AS425                                                                        | 1,000,000                  | Qualified by Navy, NOS,<br>Indian Head,<br>QTR IHTR 671     |
| F-18<br>F/A-18                                           | 820773                     | Silver HNS MDC<br>HNS End Boosters   | McDonnell Douglas                                                                                       | 50,000                     | Qualified by McAir,<br>SCD 74B808225                        |