

# 1-9/16 in (40mm) Scalloped Hollow Carrier Gun

## 4 SPF (13 SPM) GUNFACTS®

|                               |   |
|-------------------------------|---|
| Gun Body Material:            | Heat treated, seamless steel tubing   |
| Gun Body Configuration:       | Bolted and scalloped, or threaded and scalloped                               |
| Charge Tube Type:             | Flat strip option (for 0° and 180° bolted gun) or round steel tube            |
| Mode of Fire:                 | Simultaneous or selective firing systems such as EBFire® and ControlFire®     |
| Type of Tandem Connection:    | Booster-to-booster (no splice)  |
| Initiation Point:             | Top or bottom fired options available for wireline and TCP                    |
| Recommended Detonating Cord:  | 40 grains/foot, FLAT RIBBON   |
| O-Ring Material:              | Nitrile – 90 Durometer (Viton – 95 Durometer for temperatures >325°F [163°C]) |
| O-Ring Size for Bolted Gun:   | 0111-214-090 / 0111-214-V95   |
| O-Ring Size for Threaded Gun: | 0111-215-090 / 0111-215-V95   |

| Phasing  | 0°   | 60°   | 90°   | 120°  | 180°   |
|--|--|---|---|---|--|
| Assembly Part Number                                 | 0320-A**-041 <sup>^†</sup><br>0220-A**-041 <sup>‡</sup><br>0520-A**-041 <sup>§</sup> | 0320-A**-046 <sup>†</sup><br>0220-A**-046 <sup>‡</sup><br>0520-A**-046 <sup>§</sup> | 0320-A**-044 <sup>†</sup><br>0220-A**-044 <sup>‡</sup><br>0520-A**-044 <sup>§</sup> | 0320-A**-043 <sup>†</sup><br>0220-A**-043 <sup>‡</sup><br>0520-A**-043 <sup>§</sup> | 0320-A**-042 <sup>^†</sup><br>0220-A**-042 <sup>‡</sup><br>0520-A**-042 <sup>§</sup> |
| Nominal O.D. (in)[mm]                                | 1.56 [40]  |   |   |   |  |
| Nominal Thickness (in)[mm]                           | 0.17 [4.3]   |   |   |   |  |
| Typical Gun Swell at Ambient Conditions (in)[mm]     |  |   |   |   |  |
| Ambient Liquid. 3.2g                                 | 1.68 [43] @ 3.2g   | 1.67 [42] @ 3.2g  | 1.69 [43] @ 3.2g  | 1.69 [43] @ 3.2g  | 1.70 [43] @ 3.2g   |
| Ambient Gas. 3.2g                                    | 1.70 [43] @ 3.2g   | 1.70 [43] @ 3.2g  | 1.71 [43] @ 3.2g  | 1.71 [43] @ 3.2g  | 1.72 [44] @ 3.2g   |
| Min. Recommended Restriction (in)[mm]                | 1.78 [45]  |   |   |   |  |
| Drift Gauge O.D. for Gun Body I.D. (in)[mm]          | 1.19 [30] using Gauge Length 12in [305]  |   |   |   |  |
| Min. Recommended Washover Pipe Clearance:            |  |   |   |   |  |
| Casing Drift I.D. to Nom. Washover O.D. (in)[mm]     | N/A  |   |   |   |  |
| Washover Drift I.D. to Nom. Gun O.D. (in)[mm]        | N/A  |   |   |   |  |
| Max. Hardware Temperature (°F)[°C]                   | 500 [260]  |   |   |   |  |
| Max. Pressure (psi)[MPa]                             | 19,000 [131]   |   | 20,000 [138]  |   |  |
| Min. Detonating Cord Velocity (ft/s)[m/s]            | 21,000 [6,400]   |   |   |   |  |
| Typical Length (ft)[m]                               |  |   |   |   |  |
| 4 ft (12 shots)                                      | 3.75 [1.14]  |   |   |   |  |
| 7 ft (24 shots)                                      | 6.75 [2.06]  |   |   |   |  |
| 11 ft (40 shots)                                     | 10.75 [3.28]   |   |   |   |  |
| 21 ft (80 shots)                                     | 20.75 [6.32]   |   |   |   |  |
| Gun End to Center of First Scallop Distance (in)[mm] | 6.00 [152]   |   |   |   |  |
| Approximate Weight Fully Loaded (lb/ft)[kg/m]        | 4.0 [5.9]  |   |   |   |  |
| Max. Tension (lbf)[kN]                               | 35,000 [156] <sup>†</sup> • 80,000 [356] <sup>§</sup>                                |   |   |   |  |
| Upper/Lower Head Connection                          | 1/4-20 UNC-2B <sup>†</sup> • 1-9/32" - 12 Stub Acme <sup>§</sup>                     |   |   |   |  |

<sup>†</sup> Wireline bolted gun      <sup>‡</sup> Threaded gun      <sup>§</sup> Threaded gun with booster-to-booster tandem transfer kit  
<sup>\*\*</sup> Gun length. Example: Use "07" for 7ft gun; etc.      <sup>^</sup> Use "T" for charge tube instead of charge strip

## CIRCULATING CHARGE PERFORMANCE WITH 1-9/16IN, 4 SPF GUN SYSTEM

| Charge Name | Charge Part Number <sup>†</sup> | Color Code               | Explosive Weight (g) | Shot Density (spf)[spm], Phasing | Entrance Hole (in)[mm] | L-80 Tubing/Casing Wall Thickness (in)[mm] | Penetration in Secondary String with 1/4" Water Clearance (in)[mm] |
|-------------|---------------------------------|--------------------------|----------------------|----------------------------------|------------------------|--|--|
| KnockOut    | CIR-1603-4T251                  | Brown with Green Stripe  | 3.0                  | 4 [13], 0°                       | 0.43 [11]              | 1/4 [6]                                    | 0.02 [0.51]  |
| KnockOut    | CIR-1603-4T381                  | Orange with Green Stripe | 3.5                  | 4 [13], 0°                       | 0.37 [9]               | 3/8 [10]                                   | 0.02 [0.51]  |
| KnockOut    | CIR-1603-4C501                  | Red with Green Stripe    | 3.2                  | 4 [13], 0°                       | 0.33 [8]               | 1/2 [13]                                   | 0.04 [1.02]  |
| KnockOut    | CIR-1603-4C631                  | Blue with Green Stripe   | 3.5                  | 4 [13], 0°                       | 0.22 [6]               | 5/8 [16]                                   | 0.03 [0.76]  |

## API PERFORMANCE OF CHARGES COMPATIBLE WITH 1-9/16IN, 4 SPF GUN SYSTEM

| Charge Name | Charge Type | Charge Part Number <sup>†</sup> | Explosive Weight (g) | Gun O.D. (in)[mm]  | Shot Density (spf)[spm], Phasing | Entrance Hole (in)[mm] | Penetration (in)[cm] | Burr Height (in)[cm] | Casing Size (in)[mm] | Target Strength (psi)[MPa] |
|-------------|-------------|---------------------------------|----------------------|--------------------|----------------------------------|------------------------|----------------------|----------------------|----------------------|----------------------------|
| PERFECTA    | SDP         | <b>RTG-1604-421T</b>            | <b>3.5</b>           | <b>1-9/16 [40]</b> | <b>6 [20], 0°</b>                | <b>0.23 [6]</b>        | <b>12.14 [30.84]</b> | <b>0.04 [0.10]</b>   | <b>2-3/8 [60]</b>    | <b>6,980 [48.1]</b>        |
| PERFECTA    | SDP         | <b>RTG-1604-421T</b>            | <b>3.5</b>           | <b>1-9/16 [40]</b> | <b>6 [20], 60°</b>               | <b>0.20[5]</b>         | <b>12.68 [32.21]</b> | <b>0.04 [0.10]</b>   | <b>2-3/8 [60]</b>    | <b>6,800 [46.9]</b>        |
| -           | DP          | <i>RTG-1603-300</i>             | 3.2                  | <i>1-9/16 [40]</i> | <i>4 [13], 180°</i>              | <i>0.23 [6]</i>        | <i>6.62 [16.81]</i>  | -                    | <i>2-3/8 [60]</i>    | <i>7,310 [50.4]</i>        |
| -           | DP          | <i>RTG-1603-400</i>             | 3.2                  | <i>1-9/16 [40]</i> | <i>6 [20], 60°</i>               | <i>0.24 [6]</i>        | <i>6.52 [16.56]</i>  | <i>0.04 [0.10]</i>   | <i>2-3/8 [60]</i>    | <i>6,630 [45.7]</i>        |
| Prospector  | BH          | <i>FLO-1603-410</i>             | 3.2                  | <i>1-9/16 [40]</i> | <i>6 [20], 0°</i>                | <i>0.41 [10]</i>       | <i>3.23 [82.00]</i>  | <i>0.04 [0.10]</i>   | <i>4-1/2 [114]</i>   | <i>7,825 [54.0]</i>        |

Note: All charges available with RDX, HMX and HNS. Table displays charges that have been API-19B or API RP-43 certified

**Bold indicates API-19B certification. Italics indicate API RP-43 certification**

<sup>†</sup> xxx-xxxx-3xxx for RDX, xxx-xxxx-4xxx for HMX, xxx-xxxx-5xxx for HNS

## 6 SPF (20 SPM) GUNFACTS®

|                               |   |
|-------------------------------|---|
| Gun Body Material:            | Heat treated, seamless steel tubing   |
| Gun Body Configuration:       | Bolted and scalloped, or threaded and scalloped                               |
| Charge Tube Type:             | Round steel tube  |
| Mode of Fire:                 | Simultaneous or selective firing systems such as EBFire® and ControlFire®     |
| Type of Tandem Connection:    | Booster-to-booster (no splice)  |
| Initiation Point:             | Top or bottom fired options available for wireline and TCP                    |
| Recommended Detonating Cord:  | 40 grains/foot, FLAT RIBBON   |
| O-Ring Material:              | Nitrile – 90 Durometer (Viton – 95 Durometer for temperatures >325°F [163°C]) |
| O-Ring Size for Bolted Gun:   | 0111-214-090 / 0111-214-V95   |
| O-Ring Size for Threaded Gun: | 0111-215-090 / 0111-215-V95   |

| Phasing  | 0°  | 60°   | 180°  |
|--|---|---|---|
| Assembly Part Number   | 0320-A**-061 <sup>†</sup><br>0220-A**-061 <sup>†</sup><br>0520-A**-061 <sup>§</sup> | 0320-A**-066 <sup>†</sup><br>0220-A**-066 <sup>†</sup><br>0520-A**-066 <sup>§</sup> | 0320-A**-062 <sup>†</sup><br>0220-A**-062 <sup>†</sup><br>0520-A**-062 <sup>§</sup> |
| Nominal O.D. (in)[mm]  | 1.56 [40]   |   |   |
| Nominal Thickness (in)[mm]   | 0.17 [4.3]  |   |   |
| Typical Gun Swell at Ambient Conditions (in)[mm]<br>Ambient Liquid. 3.2g<br>Ambient Gas  | 1.74 [44] @ 3.2g<br>Not Recommended   | 1.67 [43] @ 3.2g<br>Not Recommended   | 1.67 [43] @ 3.2g<br>Not Recommended   |
| Min. Recommended Restriction (in)[mm]  | 1.78 [45]   |   |   |
| Drift Gauge O.D. for Gun I.D. Body (in)[mm]  | 1.19 [30] using Gauge Length 12in [305]   |   |   |
| Min. Recommended Washover Pipe Clearance:<br>Casing Drift I.D. to Nom. Washover O.D. (in)[mm]<br>Washover Drift I.D. to Nom. Gun O.D. (in)[mm] | N/A<br>N/A  |   |   |
| Max. Hardware Temperature (°F)[°C]   | 500 [260]   |   |   |
| Max. Pressure (psi)[MPa]   | 15,000 [103]  | 20,000 [138]  | 18,000 [124]  |
| Min. Detonating Cord Velocity (ft/s)[m/s]  | 22,000 [6,700]  |   |   |
| Typical Length (ft)[m]<br>4 ft (18 shots)<br>7 ft (36 shots)<br>11 ft (60 shots)<br>21 ft (120 shots)  | 3.75 [1.14]<br>6.75 [2.06]<br>10.75 [3.28]<br>20.75 [6.32]                          |   |   |
| Gun End to Center of First Scalloped Distance (in)[mm]   | 5.50 [140]  |   |   |
| Approximate Weight Fully Loaded (lb/ft)[kg/m]  | 4.0 [5.9]   |   |   |
| Max. Tension (lb/ft)[kN]   | 35,000 [156] <sup>†</sup> • 80,000 [356] <sup>†§</sup>                              |   |   |
| Upper/Lower Head Connection  | 1/4-20 UNC-2B <sup>†</sup> • 1-9/32" - 12 Stub Acme <sup>§</sup>                    |   |   |

<sup>†</sup> Wireline bolted gun      <sup>†</sup> Threaded gun      <sup>§</sup> Threaded gun with booster-to-booster tandem transfer kit  
<sup>\*\*</sup> Gun length. Example: Use "07" for 7ft gun; etc.

## CIRCULATING CHARGE PERFORMANCE WITH 1-9/16IN, 6 SPF GUN SYSTEM

| Charge Name | Charge Part Number <sup>†</sup> | Color Code               | Explosive Weight (g) | Shot Density (spf)[spm], Phasing | Entrance Hole (in)[mm] | L-80 Tubing/Casing Wall Thickness (in)[mm] | Penetration in Secondary String with 1/4" Water Clearance (in)[mm] |
|-------------|---------------------------------|--------------------------|----------------------|----------------------------------|------------------------|--|--|
| KnockOut    | CIR-1603-4T251                  | Brown with Green Stripe  | 3.0                  | 6 [20], 0°                       | 0.43 [11]              | 1/4 [6]                                    | 0.02 [0.51]  |
| KnockOut    | CIR-1603-4T381                  | Orange with Green Stripe | 3.5                  | 6 [20], 0°                       | 0.37 [9]               | 3/8 [10]                                   | 0.02 [0.51]  |
| KnockOut    | CIR-1603-4C501                  | Red with Green Stripe    | 3.2                  | 6 [20], 0°                       | 0.33 [8]               | 1/2 [13]                                   | 0.04 [1.01]  |
| KnockOut    | CIR-1603-4C631                  | Blue with Green Stripe   | 3.5                  | 6 [20], 0°                       | 0.22 [6]               | 5/8 [16]                                   | 0.03 [0.76]  |

## API PERFORMANCE OF CHARGES COMPATIBLE WITH 1-9/16IN, 6 SPF GUN SYSTEM

| Charge Name | Charge Type | Charge Part Number <sup>†</sup> | Explosive Weight (g) | Gun O.D. (in)[mm]  | Shot Density (spf)[spm], Phasing | Entrance Hole (in)[mm] | Penetration (in)[cm] | Burr Height (in)[cm] | Casing Size (in)[mm] | Target Strength (psi)[MPa] |
|-------------|-------------|---------------------------------|----------------------|--------------------|----------------------------------|------------------------|----------------------|----------------------|----------------------|----------------------------|
| PERFECTA    | SDP         | <b>RTG-1604-421T</b>            | <b>3.5</b>           | <b>1-9/16 [40]</b> | <b>6 [20], 0°</b>                | <b>0.23 [6]</b>        | <b>12.14 [30.84]</b> | <b>0.04 [0.10]</b>   | <b>2-3/8 [60]</b>    | <b>6,980 [48.1]</b>        |
| PERFECTA    | SDP         | <b>RTG-1604-421T</b>            | <b>3.5</b>           | <b>1-9/16 [40]</b> | <b>6 [20], 60°</b>               | <b>0.20[5]</b>         | <b>12.68 [32.21]</b> | <b>0.04 [0.10]</b>   | <b>2-3/8 [60]</b>    | <b>6,800 [46.9]</b>        |
| -           | DP          | <i>RTG-1603-300</i>             | <i>3.2</i>           | <i>1-9/16 [40]</i> | <i>4 [13], 180°</i>              | <i>0.23 [6]</i>        | <i>6.62 [16.81]</i>  | -                    | <i>2-3/8 [60]</i>    | <i>7,310 [50.4]</i>        |
| -           | DP          | <i>RTG-1603-400</i>             | <i>3.2</i>           | <i>1-9/16 [40]</i> | <i>6 [20], 60°</i>               | <i>0.24 [6]</i>        | <i>6.52 [16.56]</i>  | <i>0.04 [0.10]</i>   | <i>2-3/8 [60]</i>    | <i>6,630 [45.7]</i>        |
| Prospector  | BH          | <i>FLO-1603-410</i>             | <i>3.2</i>           | <i>1-9/16 [40]</i> | <i>6 [20], 0°</i>                | <i>0.41 [10]</i>       | <i>3.23 [82.00]</i>  | <i>0.04 [0.10]</i>   | <i>4-1/2 [114]</i>   | <i>7,825 [54.0]</i>        |

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