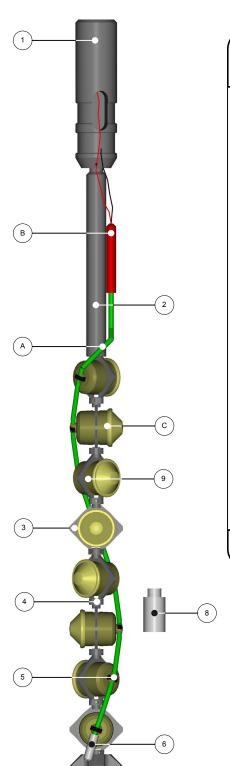
THROUGH TUBING GUN SYSTEM





1 11/16" & 2 1/8" Fully Expendable Through Tubing Gun 6 SPF 45°/60° - 4 SPF 90°

Revision Dic 2004 Page 1 of 2



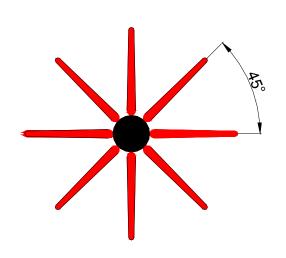
| ITEM | Part Nbr. | DESCRIPTION |
|--------|------------------------------|--|
| 1 | ETG-1688-001 | 1 11/16" & 2 1/8" Top Sub, Adapts to go Firing head. |
| 2 | ETG-1688-202 | 12" Extension |
| 3 | 3107-01 | 1 11/16" 6 SPF 45°/60° Low Debris Link |
| | 3007-01 | 2 1/8" 6 SPF 45°/60° Low Debris Link |
| 4 | 3008-01 | SS Connection Pin |
| 5 | 3009-00 | 1 11/16" Detonating Cord Clip |
| 0 | 3009-NG | 2 1/8" Next Generation Detonating Cord Clip |
| 6 | ETG-1688-046 ETG-1688-047 | 60 Detonating Cord End Cover 80 Detonating Cord End Cover |
| 7 | 3112-00 | 1 11/16" Expendable Bottom Nose |
| • | 3012-00 | 2 1/8" Expendable Bottom Nose |
| 8 | 3015-00 | 1 11/16" & 2 1/8" 4 SPF 90° Adapter |
| 9 | 3011-00 | 2 1/8" Retaining ring |
| | 3111-00 | 1 11/16" Retaining ring |
| Α | | 60 Grains HMX XHV Detonating Cord |
| D | | 80 Grains HMX XHV Detonating Cord Pressure resistant Detonator |
| B C | TG31HNG | 1 11/16" Piranha Next Generation HMX |
| O | TG30HNG | 2 1/8" Piranha Next Generation HMX |
| | TG30HNGBH | 2 1/8" Piranha Next Generation BH HMX |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | SYSTEM P | PRESSURE RATING 20,000 PSI |

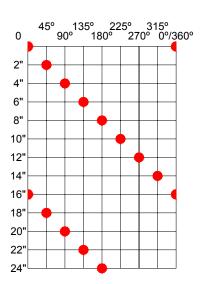
API RP 19B Certified

1 11/16" & 2 1/8" Fully Expendable Through Tubing Gun 6 SPF 45°/60° - 4 SPF 90°

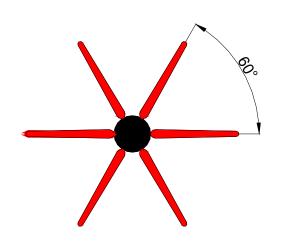
Revision Dic 2004 Page 2 of 2

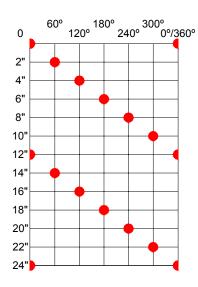




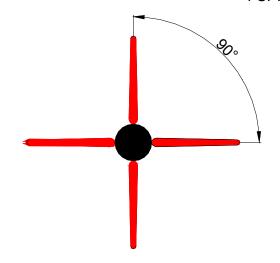


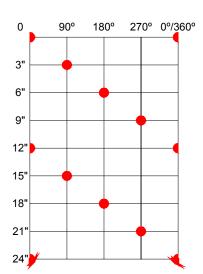
6 SPF 60°





4 SPF 90°

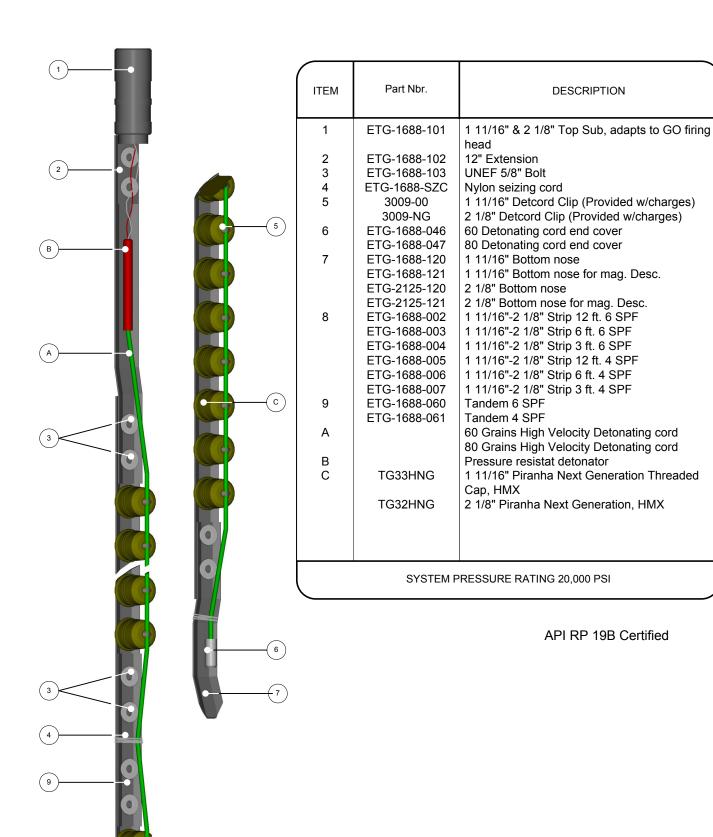






1 11/16" & 2 1/8" Semi Expendable Through Tubing Gun, 4 & 6 SPF 0°

Revision Dic 2004 Page 1 of 2



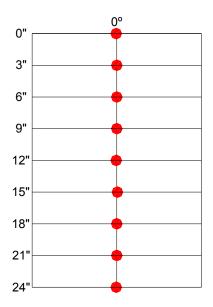


1 11/16" & 2 1/8" Semi Expendable Through Tubing Gun, 4 & 6 SPF 0°

Revision Dic 2004 Page 2 of 2

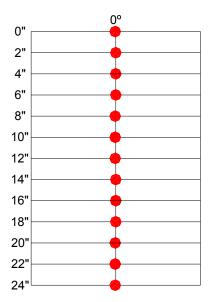
4 SPF 0°





6 SPF 0°

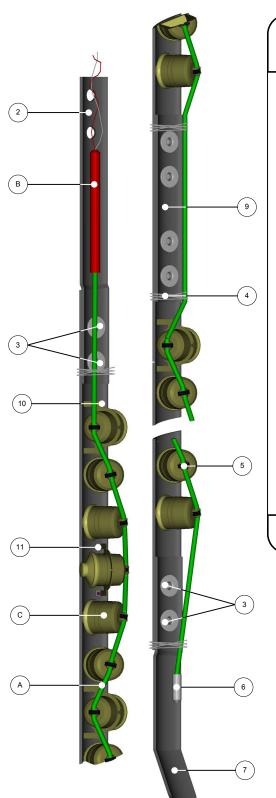






2 1/8" Semi Expendable Through Tubing Gun Zigzag 45° 6 SPF

Revision Dic 2004 Page 1 of 2



| ITEM | Part Nbr. | DESCRIPTION | | | | | | | | |
|---|---|--|--|--|--|--|--|--|--|--|
| 2 3 4 5 6 7 8 9 10 11 A B C | ETG-1688-102 ETG-1688-103 ETG-1688-SZC 3009-NG ETG-1688-046 ETG-1688-047 ETG-2125-120 ETG-2125-121 ETG-2125-008 ETG-2125-009 ETG-1688-060 ETG-2125-014 ETG-2125-015 | 12" Extension UNEF 5/8" Bolt Nylon seizing cord 2 1/8" NG Detcord Clip (Provided w/charges) 60 Detonating cord end cover 80 Detonating cord end cover 2 1/8" Bottom nose 2 1/8" Bottom nose for mag. Desc. 2 1/8" ZZ Strip 10 ft. 6 SPF 2 1/8" ZZ Strip 7 ft. 6 SPF Tandem 6 SPF 2 1/8" ZZ Retainer SS Pop Rivet 60 Grains High Velocity Detonating cord 80 Grains High Velocity Detonating cord Pressure resistat detonator 2 1/8" Piranha Next Generation Threaded cap | | | | | | | | |
| SYSTEM PRESSURE RATING 20,000 PSI | | | | | | | | | | |

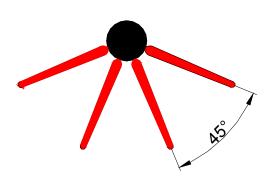
API RP 19B Certified

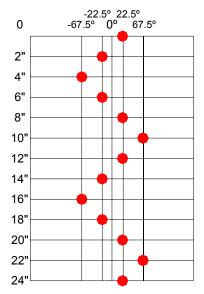


2 1/8" Semi Expendable Through Tubing Gun Zigzag 45° 6 SPF

Revision Dic 2004 Page 2 of 2

6 SPF 45° Zig Zag









| Service Company Available to ALL | Design Number | E | xplosive Weight | 9 | gm, _ | HMX | _powder, (| Case Material | Stee | <u>əl</u> | | | |
|--|-----------------------------|-------------------------|--------------------------|---|----------------|----------------|-----------------|------------------------|---------------|--------------------------|--|--|--|
| Gun OD & Trade Name1_11/16" Low [| Debris Link | | Max. Tem | p, °F <u>365</u> | 1 hr | 3 hr | 24 | hr | 100 hr | 200 hr | | | |
| Charge Name1 11/16" Piranha Next Ge | neration, HMX (DSC 02- | 09-03) | Maximum | Pressure Ratio | ng <u>20.0</u> | 00ps | i, Carrier Ma | aterial | Steel | | | | |
| Manufacturer Charge Part No. TG31HNG | Date of Manufactu | re <u>Sept 3rd 2002</u> | Shot Den: | sity Tested | | | 6 | | | Shots/ft | | | |
| Gun Type Fully Expendable Trough Tubii | ng, Low Debris Link 45° | 6 SPF | Recomme | Recommended Minimum ID for Running 1.78 | | | | | | | | | |
| Phasing Tested 45 degrees, Firin | | | Jp Available | Firing Mode | | | Selective, _ | X | Si | multaneous | | | |
| Debris Description Steel chips | | Debris Weig | ıht | 110 | | gm/charge, | Debris | | • | _in ³ /charge | | | |
| • | | 075 | | | | | | | | | | | |
| Remarks * Debris fill in 4 ½" 11,6#, 5 ½" 17# casing is 0.113, 0.075 SECTION 1 - CONCRETE TARGET | | | | | | | | | | | | | |
| | | | | | | | | N. 40ff | | | | | |
| Casing Data 4 1/2" OD, | Weight11.6 | ib/ft, | L-80 | API Grade, | Dat | e of Section | 1 Test | | | | | | |
| Target Data 56.25" OD, | Amount of Cement_ | 3780 | <u>lb</u> ., Amoun | t of Sand | 756 | <u> </u> | b., Amou | ınt of Water_ | 196 | 65lb. | | | |
| Date of Compressive Strength Test No | v 12 th 2002 , B | riquette Compressiv | e Strength | <u>7837</u> | psi, | Age o | f Target | 3 | 6 | days | | | |
| Shot No. | No. 1 No. 2 | No. 3 No | . 4 No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 | | | | |
| Clearance, in. | 0 0.164 | 0.788 1.799 | 2.313 | 1.799 | 0.788 | 0.164 | 0 | 0.164 | 0.788 | | | | |
| Casing Hole Diameter, Short Axis, in | 0.240 0.219 | 0.232 0.212 | 0.245 | 0.194 | 0.190 | 0.215 | 0.222 | 0.205 | 0.226 | | | | |
| Casing Hole Diameter, Long Axis, in | 0.245 0.255 | 0.258 0.265 | 0.273 | 0.200 | 0.205 | 0.215 | 0.225 | 0.214 | 0.226 | | | | |
| Average Casing Hole Diameter, in | 0.243 0.237 | 0.245 0.239 | 0.259 | 0.197 | 0.198 | 0.215 | 0.224 | 0.210 | 0.226 | | | | |
| Total Depth, in | 15.270 17.270 | 14.520 15.77 | <u>70 18.270 </u> | <u>17.645</u> | 17.520 | LOST | 17.270 | <u>16.770</u> | <u>17.645</u> | | | | |
| Burr Height, in | 0.030 0.015 | 0.040 0.067 | 0.045 | 0.013 | 0.050 | 0.030 | 0.013 | 0.070 | 0:011 | | | | |
| Shot No. | No. 12 No. 13 | No. 14 No. | 15 No. 16 | No. 17 | No. 18 | No. 19 | No. 20 | No. 21 | No. 22 | Average | | | |
| Clearance, in. | 1.799 2.313 | 1.799 0.788 | 0.164 | 0 | 0.164 | 0.788 | 1.799 | | | 0.909 | | | |
| Casing Hole Diameter, Short Axis, in | 0.220 0.190 | 0.184 0.17 | | 0.195 | 0.228 | 0.228 | 0.219 | | | 0.211 | | | |
| Casing Hole Diameter, Long Axis, in | 0.222 0.201 | 0.192 0.195 | | 0.206 | 0.240 | 0.232 | 0.230 | | | 0.225 | | | |
| Average Casing Hole Diameter, in | 0.221 0.196 | 0.188 0.185 | | 0.201 | 0.234 | 0.230 | 0.225 | | | 0.218 | | | |
| Total Depth, in. | | 16.270 17.02 | | 16.270 | 15.770 | 17.270 | 16.270 | | | 16.513 | | | |
| Burr Height, in | 0.013 0.010 | 0.019 0.028 | | 0.025 | 0.028 | 0.013 | 0.017 | | | 0.029 | | | |
| | | WITH | IESSING INFOR | MATION | | | | | <u></u> | | | | |
| Date of Notice of Intent to Test: April | 22th 2002 | | Witnessed by: | | adares | | | | | | | | |
| | | paration Tes | • | | | Samples T | aken: Concr | rete Y C | asing X | | | | |
| Other Activities Witnessed: Target Pouring | J Briquette. Pre | paration res | Build Y | eigni ivicasure | illelits X | | aken. Conci | ete_X_ O | | | | | |
| Λ\. | | | CERTIFICATIO | | | | | | | | | | |
| I certify that these tests were made accord | ding to the procedures as | s outlined in API RP | 19B: Recommen | ded Practices f | or Evaluatio | n of Well Pe | rforators, Firs | st Edition, N o | vember 2000 | . All of the | | | |
| and do de la lacation de la constant de la lacation de lacation de lacation de la lacation de lacation de lacation de lacation de la lacation de lacation | a bura, ist sharasa datai | notor cord ata was | etandard equipm | ent with our co | mnany for ti | na ilea in tha | aun heina te | eted and was | not change | d in anv | | | |
| manner for the test. Furthermore, the dou | Applinent was chosen at ra | andom from stock an | d therefore will be | e substantially | the same as | the equipme | ent, which wo | ould be furnis | hed to perfor | ate a well | | | |
| manner for the test. Furthermore, the equipment of the test. Furthermore, the equipment of any operator. The American Petroleum | n institute neither endors | ses these test results | nor recommend | s the use of the | perforator s | system desci | ribed. | | | | | | |
| x CERTIFIED BY | Perforation Pr | ojects Manager No | ov 15 th 2002 | | E.T.A. S.A | ١. | R | luta 25 Km 13 | Pilar Bs. As | . Argentina | | | |
| | * | (Title) | (Date) | | (Company | | | | (Address) | | | | |
| | The stricture | (1.00) | () | | , | , | | | , | | | | |

E. T. A. S. A.

DARIO E. LATTANZIO GERENTE PRODUCTO Y SISTEMAS 'ERFORATINA PROJECTS MANAGER





| Service Company Available to ALL | Design Number | | Evolonius | Weight | | 1.15.457 | | | | |
|--|--|---------------------------------------|-----------------|-------------------------------------|----------------|--------------|---------------------------------------|-----------------|--|-------------------------|
| Gun OD & Trade Name1 11/6" Pira | | · · · · · · · · · · · · · · · · · · · | | | | | | Case Materia | | eel |
| Charge Name 1 11/16" Piranha Next | | 02-09-03) | | np, °F <u>365</u> • Pressure Rat | | | | | _100 hr | 200 hr |
| Manufacturer Charge Part No. TG33HN | | | | | mg | <u> </u> | si, Carrier M | laterial | Steel | |
| | | are Sept 3rd 2002 | | Shot Density Tested 6 | | | | | | Shots/ft |
| Gun Type Trough Tubing Retrievable S | | | | ended Minimur | | 1.78 | | in. | | |
| Phasing Tested O degrees, Firi | | vn,Bottom Up | Available | Firing Mode | | | Selective, | X | s | multaneous |
| Debris Description Steel chips, Caps R | etrieved With Strip | | Debris W | eight | 66 | gm/char | ge, Debris | • | | in ³ /charge |
| Remarks * Debris fill in 4 ½" 11.6#, | 5 ½" 17# casing is 0.07 | 5, 0.050 Respective | ly per charge | | | | | | · | , |
| | | | - CONCRET | E TARGET | | ····· | · · · · · · · · · · · · · · · · · · · | | ······································ | |
| Casing Data <u>4 1/2"</u> OD, | Weight 11.6 | lb/ft, | L-80 | API Grade, | Dat | e of Section | 1 Test | Nov 13th | 2002 | |
| Target Data 35.375" OD, | Amount of Cement | 1530 lb. | . Amoun | t of Sand | 306 | | | | | |
| Date of Compressive Strength Test | Nov 12 th 2002 , Bri | | | 8796 | psi, | · | f Target_ | int of Water_ | 79 6 | |
| Shot No. | No. 1 No. 2 | No. 3 No. 4 | | No. 6 | · | | - | | ······································ | days |
| Clearance, in | _ 0 0 | 0 0 | 0 | NO. 6 | No. 7 O | No. 8 O | No. 9 O | No. 10 | No. 11 | |
| Casing Hole Diameter, Short Axis, in | 0.210 0.225 | 0,220 0.2 | | | 0.212 | 0.219 | 0.230 | 0.230 | 0.230 | |
| Casing Hole Diameter, Long Axis, in | 0.220 0.225 | 0.240 0.24 | 0.235 | 0.228 | 0.220 | 0.220 | 0.250 | 0.243 | 0.240 | |
| Average Casing Hole Diameter, in | <u>0.215</u> <u>0.225</u> | 0.230 0.23 | 2 0.228 | 0.224 | 0.216 | 0.220 | 0.240 | 0.237 | 0.235 | |
| Total Depth, in. | 20.143 16.268 | <u>16.518</u> <u>16.70</u> | 8 19.268 | 17.018 | 17.768 | 18.018 | 17.768 | 18.768 | 19.268 | |
| Burr Height, in | <u>0.012</u> <u>0.005</u> | 0.020 0.01 | 8 0.010 | 0.018 | 0.012 | 0.008 | 0.030 | 0.030 | 0.050 | |
| Shot No. | No. 12 No. 13 | No. 14 No. 15 | No. 16 | No. 17 | No. 18 | No. 19 | No. 20 | No. 21 | No. 22 | Average |
| Clearance, in | 0 0 | 0 0 | o | 0 | 0 | 0 | 0 | | 140. 22 | O |
| Casing Hole Diameter, Short Axis, in | 0.220 0.217 | 0.220 0.21 | 5 0.230 | 0.223 | 0.215 | 0.220 | 0.234 | | | 0.222 |
| Casing Hole Diameter, Long Axis, in | 0.225 0.221 | 0.225 0.23 | 0 0.240 | 0.223 | 0.230 | 0.225 | 0.237 | | | 0.231 |
| Average Casing Hole Diameter, in | <u>0.223</u> <u>0.219</u> | 0.223 0.22 | 3 0.235 | 0.223 | 0.223 | 0.223 | 0.236 | | | 0.227 |
| Total Depth, in. | <u>20.268</u> <u>19.768</u> | <u>17.268</u> <u>18.26</u> | <u>8 19.768</u> | 18.768 | 18.018 | 17.518 | 16.768 | | | 18,199 |
| Burr Height, in | 0.015 0.019 | 0.020 0.03 | 0 0.012 | 0.014 | 0.008 | 0.010 | 0.000 | | | 0.017 |
| | | WITNES | SING INFORM | ATION | ······ | | | | | |
| Date of Notice of Intent to Test: A | pril 22th 2002 | Win | nessed by: | Juan C. Vallac | dares | | | | | |
| Other Activities Witnessed: Target Pourir | g Briquette: Pre | paration Test | ng_X Burr (| leight Measur | ements X | Sample | s Taken: Co | ncrete X | Casing_ | x I |
| | | | ERTIFICATION | | | | | | | <u> </u> |
| Certify that these tests were made asse | | | | | | | | | | |
| I certify that these tests were made according the equipment used in these tests | such as the superiot cha | as outlined in API RP | 19B: Recomm | ended Practic | es for Evalu | ation of Wel | ll Perforators | s, First Editio | n, Novembe | r 2000. |
| | | | | | | | | | | |
| not changed in any manner for the test. furnished to perforate a well for any oper | i di uloninole, die eubibli | IONE WAS CHOSEN AT F | andom trom ei | AAL BAA tharai | toro sesill be | | . AL | | | |
| _ X CERTIFIED BY | | | 15th 2002 | | | | | | | 1 |
| | Perforating Project Perforating Project Perforating Project Project Project Perforating Project Projec | | | | E.T.A. S.A. | | Ruta | 25 Km 13 F | | Argentina |
| (comp | any Officially (11) | tie) (Da | 10/ | | (Company) | | | (A | ddress) | |





| Service Company Available to all | Design Nu | mber | | Explosive | Weight14 | 1.5 gm, | НМХ | powder, | Case Materia | al <u>S</u> i | teel |
|---|--------------------------------------|--|---------------------------|----------------------------------|---|---------------|----------------|---------------|------------------|-----------------------------|-------------------------|
| Gun OD & Trade Name 2 1/8" Fully E | xpendable Low [| Debris Link, BH HMX | <u> </u> | Max. Tem | p, °F <u>400</u> | 1 hr | 3 hr | 24 | hr | 100 hr | 200 hr |
| Charge Name 2 1/8" Piranha Next Gene | ration BH HMX | (DSC 04-07-41) | | Maximum | Pressure Rat | ing 20.0 | 000 ps | i, Carrier N | faterial | Steel | |
| Manufacturer Charge Part No. TG 30HI | NGBH_Date of M | anufacture <u>July 2</u> | 9 th 2004 | Shot Dens | ity Tested | | | 6 | | | Shots/ft |
| Gun Type Retrievable Trough Tubing Gui | n. 6 SPF 45° | | | Recomme | Recommended Minimum ID for Running 2.25 | | | | | | |
| Phasing Tested 45 degrees, Firi | ng Order X | Top Down, | Bottom Up | Available I | Firing Mode | | | Selective, | | | Simultaneous |
| Debris DescriptionCase & Link:small stee | l chips: Steel car | breaks in two or thi | ree parts | Debris We | ight | 165 | gm/char | ge, Debris | 3 | * | in ³ /charge |
| Remarks * Debris fill in 4 ½" 11.6#; 5 | ½" 17#: 7" 32# ca | asing is 0.172". 0.11 | 5". 0.074" Re | | - | | | | | | |
| | | | SECTION 1 | | | | | * | | | |
| Casing Data 4 1/2" OD, | Weight | 11.6 lb/fi | t, | L-80 | API Grade, | Da | te of Section | 1 Test | August 3 | 0 th 2004 | |
| Target Data 40" OD, | Amount of C | ement190 | 00lb., | Amount | of Sand | 38 | 00 I | b., Amo | unt of Water | 990 | lb. |
| Date of Compressive Strength Test_Aug | ust 31th 2004 | , Briquette Cor | npressive Sti | rength | 6356 | psi, | Age o | f Target | ; | 31 | days |
| Shot No. | No. 1 | No. 2 No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 | |
| Clearance, in | | 162 0.704 | 1.487 | 1.875 | 1.487 | 0.704 | 0.162 | 0.00 | 0.162 | 0.704 | |
| Casing Hole Diameter, Short Axis, in | 0.60 0. | .59 0.53 | 0.52 | 0.51 | 0.50 | 0.52 | 0.58 | 0.50 | 0.60 | 0.57 | _ |
| Casing Hole Diameter, Long Axis, in | 0.63 0. | .61 0.56 | 0.60 | 0.52 | 0.52 | 0.58 | 0.60 | 0.55 | 0.63 | 0.60 | <u>.</u> _ |
| Average Casing Hole Diameter, in | 0.615 0.6 | 600 0,545 | 0.560 | 0.515 | 0.510 | 0.550 | 0.590 | 0.525 | 0.615 | 0.585 | • |
| Total Depth, in | 6.501 8. | 751 8.251 | 7.001 | 7.251 | 7.001 | 6.001 | 8.501 | 8.001 | 6.501 | 7.501 | • |
| Burr Height, in | 0.036 0.0 | 0.052 | 0.049 | 0.028 | 0.052 | 0.065 | 0.080 | 0.040 | 0.058 | 0.062 | • |
| Shot No. | No. 12 | No. 13 No. 14 | No. 15 | No. 16 | No. 17 | No. 18 | No. 19 | No. 20 | No. 21 | No. 22 | - Average |
| Clearance, in | 1.487 1.8 | 875 <u>1.487</u> | | | | | | | | | 0.878 |
| Casing Hole Diameter, Short Axis, in | 0.64 0. | .53 0.52 | | | | | | | | | 0.551 |
| Casing Hole Diameter, Long Axis, in | 0.66 0. | .60 0.56 | | | | | | | | | 0.587 |
| Average Casing Hole Diameter, in | 0.65 0.5 | 565 0.540 | | | | | | | | | 0.569 |
| Total Depth, in. | 7.251 8.0 | 001 5.571 | | | | | | | | | 7.305 |
| Burr Height, in | | 0,079 | | • | | | | <i></i> | | | 0.055 |
| | | | WITNESS | ING INFORM | IATION | | 1// | / | 1/ | | |
| Date of Notice of Intent to Te | est: | July 27 th 20 | 04 | Witne | essed by: | | TOSU | (iluo) | 1/2. | J. Smirnoff (| API Certified) |
| Other Activities Witnessed: Target Pouring | a Brique | ette: Preparation | Testing | X Burr Heid | ht Measurem | nent X S | mplee Take | n: Conocete | | | |
| | | | | | | | | | | · 8 | |
| I certify that these tests were made accord | ding to the proces | duran an autlined in | | RTIFICATION | - | San Evalvatia | 634/-# Do- | former Fig | at Falkian Ala | | 0 44 -645 - |
| equipment used in these tests, such as the | aing to the proces | es detonator cord e | MFIRF 190. Ic was stan | dard equipme | ed Practices | or Evaluatio | n of vvell Per | torators, Fir | st Edition, No | vember 200 P. not chance | U. All of the |
| manner for the test. Furthermore, the equ | e guns, jet charg rinment was cho | es delonator cord, e sen at random from : | etock and the | uaiu equiprile refere will be | eubetantially | the same as | the equipme | gun being u | ould be furnis | had to parfo | rate a well |
| for any operator. The American Perpegu | n institute neithe | r endorses these tes | st results nor | recommends | the use of the | perforator | system descr | ibed. | valu be lullille | mou to perio | IGLE & WEH |
| | | | | | | - | • | | | | |
| X CERTIFIED BY | 0.7. | ating Projects Mana | | | plosivos Tecn | | | | Ruta 25Km.13 | | s. Argentina |
| RECERTIFIED DARIES EO | R any anzio ⁱ⁾ | (Title) | (Dat | (e) | | (Company | <i>(</i>) | | | (Address) | |

PERFORATING PROJECTS MANAGER





| Service Company Available to all | Design | Number | | | Explosive V | Veight14 | .5 gm, | нмх | powder, C | lase Materia | l Stee | ام | |
|--|-----------------|--------------------------|---|--------------------|--|-----------------------|---------------|--|---------------|-------------------|--------------|--------------------------|--|
| Gun OD & Trade Name 2 1/8" Retrieva | able Zig Zag | Strip Gun | | | | o, °F <u>375</u> | | | | hr | | 200 hr | |
| Charge Name 2 1/8" Piranha Next Gene | | | C 03-02-21) |] | Maximum Pressure Rating 20.000 psi, Carrier Material Steel | | | | | | | | |
| Manufacturer Charge Part No. TG32HNC | | | | | | Shot Density Tested 6 | | | | | | | |
| Gun Type Semi Expendable Trough Tubi | | | | | | | | | | | | | |
| | | | | | | | | | | | | in. | |
| Phasing Tested 45° degrees, Firing | | | n,Bot | .tom Up | Available F | iring Mode | | s | elective, _ | | Sir | multaneous | |
| Debris Description Case : Steel chips; Ca | aps Retrieved | w/Strip | | | Debris Wei | ght | 110 | gm/char | ge, Debris | | £ | _in ³ /charge | |
| Remarks * Debris fill in 4 ½ " 11.6#, | 5 ½" 17# and | d 7" 32# Ca | sing is 0.10 | <u>7", 0.073",</u> | 0.048" Resp | ectively per | charge. | | | | | | |
| SECTION 1 - CONCRETE TARGET | | | | | | | | | | | | | |
| Casing Data 5 ½" OD, Weight 17 lb/ft, L-80 API Grade, Date of Section 1 Test March 10 th 2003 Target Data 70" OD, Amount of Cement 5780 lb., Amount of Sand 11560 lb., Amount of Water 3006 lb. | | | | | | | | | | | | | |
| Target Data 70" OD, Amount | Amour | nt of Sand | 11560 | lb., | Δ | Amount of W | ater | 300 |)6 lb. | | | | |
| Date of Compressive Strength Test <u>March 10th 2003</u> , Briquette Compressive St | | | | | ength | 5379 | psi, | Age o | f Target | 3 | 1 | days | |
| Shot No. | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 | | |
| Clearance, in | 0.043 | 0.043 | 0.432 | 0.043 | 0.043 | 0.432 | 0.043 | 0.043 | 0.432 | 0.043 | 0.043 | | |
| Casing Hole Diameter, Short Axis, in | 0.305 | 0.306 | 0.330 | 0.290 | 0.295 | 0.290 | 0.301 | 0.292 | 0.276 | 0.294 | 0.308 | | |
| Casing Hole Diameter, Long Axis, in | 0.316 | 0.308 | 0.332 | 0.302 | 0.306 | 0.308 | 0.316 | 0.326 | 0.281 | 0.296 | 0.311 | | |
| Average Casing Hole Diameter, in | 0.311 | 0.307 | 0.331 | 0.296 | 0.301 | 0.299 | 0.309 | 0.309 | 0.279 | 0.295 | 0.310 | | |
| Total Depth, in | 31.567 | 34.567 | 31.067 | 34.200 | 31.817 | 29.692 | 31.067 | 34.317 | 29.567 | 32.067 | 31.442 | | |
| | 0.021 | 0.039 | 0.048 | 0.049 | 0.028 | 0.054 | 0.041 | 0.034 | 0.040 | 0.046 | 0.072 | | |
| Shot No. | No. 12 | No. 13 | No. 14 | No. 15 | No. 16 | No. 17 | No. 18 | No. 19 | No. 20 | No. 21 | No. 22 | Average | |
| Clearance, in | 0.432 | 0.043 | 0.043 | 0.432 | 0.043 | 0.043 | 0.432 | 0.043 | 0.043 | | | 0.160 | |
| Casing Hole Diameter, Short Axis, in | 0.310 | 0.304 | 0.300 | 0.266 | 0.323 | 0.321 | 0.288 | 0.294 | 0.319 | | | 0.301 | |
| Casing Hole Diameter, Long Axis, in | 0.330 | 0.306 | 0.329 | 0.292 | 0.324 | 0.323 | 0.304 | 0.302 | 0.327 | | | 0.312 | |
| Average Casing Hole Diameter, in | 0.320 | 0.305 | 0.315 | 0.279 | 0.324 | 0.322 | 0.296 | 0.298 | 0.323 | | | 0.306 | |
| Total Depth, in. | | 32.442 | 29.817 | 30.504 | 31.567 | 32.817 | 30.442 | 30.692 | 30.567 | | | 31.389 | |
| Burr Height, in | 0.035 | 0.033 | 0.083 | 0.034 | 0.055 | 0.057 | 0.013 | 0.017 | 9.057 | | | 0.043 | |
| | | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | WITNESSIN | NG INFORMA | TION | | <u> </u> | 11 | 11 | | | |
| Date of Notice of Intent to Test: | J; | an 03 rd 2003 | 3 | Witne | essed by: | | | The state of the s | ghum | <i>2// 3</i> J. § | Smirnoff (AP | 1 Certified) | |
| Other Activities Witnessed: Target Pourir | ng B | riquette: Pre | paration | Testing | X Burr He | eight Measur | ement X | Samples] | Laken: Conc | rete X | Casing X | | |
| | | | | CERT | TIFICATION | | | | | | | N.F | |
| I certify that these tests were made acco | ordina to the | procedures | as outlined in | n API RP 19 | R. Recomm | ended Practic | nee for Evalu | ntion of We | II Dorforstor | - Eisat Editis | - Novembr | 2000 | |
| All of the equipment used in these tests, | , such as the (| guns, jet cha | arges detona | ator cord, etc | tc was stan | ndard equipm | ent with our | r company f | or the use in | the gun heir | na tastad an | nd wae | |
| not changed in any manner foll the last. | \Fukrthermore, | , the equipm | nent was cho | osen at rand | dom from sto | ock and there | efore will be | substantially | v the same a | as the equipm | ment which | would be | |
| furnished to perforate a well for any tope | The A | merican Pet | roleum Instit | ute neither | endorses the | ese test resul | ts nor recon | mends the | use of the p | erforator svs | stem describ | ed. | |
| X CERTIFIED BY DARIO | | | | | | | | | | | | | |
| RECERTIFIED SERVING TO | D.Y. SASTEMAS | | itle) | (Date) | | xplosivos Tec | | | .A. Ruta | a 25Km.13 P | | Argentina | |
| RECERTIFIED SERENTE PORTO | TO THE MANAGEN | 110 | ue) | (Date) | | | (Company) | | | (A | Address) | | |





| Service Company Exclusively for Schlur | mberger | Design Nu | umber | | Explosive We | aight 14 | l.5 gm, | НМХ | nowder / | Case Material | .l C+, | -al | |
|--|------------------------------------|-----------------------|---|---------------------------------------|------------------------|------------------------|---|------------------------|------------------------|---------------------|---------------|---------------------------|--|
| Gun OD & Trade Name 2 1/8" Low D | | | | - | • | p, °F <u>375</u> | | | | hr | | | |
| Charge Name 2 1/8" Cerámica, HMX | | 2-20) | | | | Pressure Rati | | | | | | 200 hr | |
| Manufacturer Charge Part No. H44761 | | | Dag 17th | 2002 | | | .ng <u>20.0</u> | OO ha | • | laterial | | | |
| | | | | 2002 | | ity Tested | | | | | | Shots/ft | |
| Gun Type Fully Expendable Trough Tub | | | | | Recommer | nded Minimur | n ID for Run | ıning | | 2.25 | | in. | |
| Phasing Tested 45 degrees, Firin | | | | ttom Up | Available F | Firing Mode _ | | £ | Selective, | X | Si | imultaneous | |
| Debris Description Case and Link: Stee | l chips; Cera | <u>ımic cap: Fin</u> | e granules | ····· | Debris Wei | ight | 155 | gm/char | rge, Debris | • | * | in ³ /charge | |
| Remarks * Debris fill in 4 ½" 11.6#, 5 | 5 ½" 17# an | ıd 7" 32# Ca | ısing is 0.145 | 5", 0.098" | | | | | | | | #*** * **** ** | |
| SECTION 1 - CONCRETE TARGET | | | | | | | | | | | | | |
| Casing Data 5 ½" OD, | Weight | 17 | lb/ft, | | L-80 | API Grade, | Dat | e of Section | 1 Teet | Jan 21st | , 3003 | | |
| Target Data74" OD, | Data 74" OD, Amount of Cement 5710 | | | | | of Sand | | | | | | | |
| Date of Compressive Strength Test | | | | , | | 7212 | 114 | | | int of Water_ | | 59 lb. | |
| | | | quette Compr | | | | psi, | Age of | of Target | 37 | 12 | days | |
| Shot No. | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 | | |
| Clearance, in | 0.00 | 0.201 | 0.955 | 2.159 | | 2.159 | 0.955 | 0.201 | 0.00 | 0.201 | 0.955 | | |
| Casing Hole Diameter, Short Axis, in | 0.26 | 0.30 | 0.268 | 0,223 | | 0.318 | 0.297 | 0.301 | 0.286 | 0.245 | 0.236 | | |
| Average Casing Hole Diameter, in | 0.27 | 0.30 | <u>0.277</u> 0.273 | 0.243 | | 0.332 | 0.310 | 0.345 | 0.288 | 0.294 | 0.240 | | |
| Total Depth, in. | 28.675 | 29.800 | 27.300 | 30.300 | | <u>0.325</u> 27.050 | 0.304 | 0.323 | 0.287 | 0.270 | 0.238 | | |
| Burr Height, in | 0.008 | 0.063 | 0.077 | 0.075 | | 0.090 | <u>29.425</u> 0.029 | <u>27.550</u> 0.070 | <u>29.050</u> 0.086 | 31,300 | 28.800 | | |
| Shot No. | | | *************************************** | | | | | | | 0.020 | 0.059 | | |
| Clearance, in | No. 12 | No. 13 | No. 14 | No. 15 | No. 16 | No. 17 | No. 18 | No. 19 | No. 20 | No. 21 | No. 22 | Average | |
| Casing Hole Diameter, Short Axis, in | 2,159 0,250 | 2.769 | 2.159 | 0.955 | 0.201 | 0 | 0.201 | 0.955 | 2.159 | | | 1.106 | |
| Casing Hole Diameter, Short Axis, in | 0.250 | <u>0.327</u> 0.368 | 0.322 | 0.302 | | 0.262 | 0.238 | 0.258 | 0.301 | | | 0.275 | |
| Average Casing Hole Diameter, in | 0.262 | 0.348 | 0.347 | 0.304 | 0.310 | 0.281 | 0.250 | 0.263 | 0.330 | | | 0.294 | |
| Total Depth, in. | 29.050 | 27.050 | 30.300 | 28.300 | <u>0.300</u> 28.800 | <u>0.272</u> 25.300 | 0.244 | 0.261 | 0.315 | | | 0.284 | |
| Burr Height, in | 0.063 | 0.068 | 0.046 | 0.070 | 0.062 | 0.081 | <u>31.050</u> 0.048 | 27.550 0.058 | 23.800 | | | 28.363 | |
| | | | | | | | | <u> </u> | J''// | | | 0.058 | |
| | | | 1 | WITNESSI | ING INFORMA | ATION | | | XI | 11 | | | |
| Date of Notice of Intent to Test: | A | April 22th 200 | 02 | Witn | essed by: | | | 7 | Mun | int/ de | Smirnoff (API | 가 Cartified) | |
| Other Activities Witnessed: Target Pourin | ng B | riquette: Pre | paration | | X Burr He | eight Measur | ement X | Samples T | 777 | | | Corumou | |
| | | | | · · · · · · · · · · · · · · · · · · · | | "Mile initials." | /// // // // // // // // // // // // // | Запиров . | aken. Com | - | Casing X | | |
| A mark of the same | ÷ | | | | RTIFICATION | | | | | | _ | | |
| I certify that these tests were made acco | rding to the | procedures r | as outlined in | API RP 19 | 9B: Recomme | anded Practic | es for Evalu | ation of We | II Perforator | s, First Editio | n, Novembe | ır 2000. | |
| w or the equipment used in These tests, | sucry as the g | guns, let cha | ardes detonat | itor cord. a | itc. was stan | idard equinma | ent with our | r aamaanu fa | for the use in | | | | |
| mor changed in any mainer left file test. | Tukinermore, | i, the equipm | ient was chos | osen at rand | dom from sto | ack and there | sfore will be | pubetantially | with a same a | | | | |
| furnished to perforate a well for any oper | | | | | | | | | | erforator sys | tem describe | ed. | |
| X CERTIFIED BY | Perfo | rating Projec | cts Manager | | | xplosivos Tec | nologicos A | rgentinos S | .A. Rut | a 25Km. <u>13 F</u> | ∂ilar- Bs.As. | Argentina | |
| RECERTIFIED (Contains Official) (Title) (Date) (Explosivos Tecnologicos Argentinos S.A. Recentinos S.A. Recentinos S.A. (Address) (Address) | | | | | | | | | | | | | |





| | | | | | | 1111 1000 | FOLIGIA | * | and the second distriction of the second dis | Name and Address of the State o |
|---|-----------------------------------|-------------------------------|---|---------------------------------------|---------------------------------------|---------------|---------------|----------------------|--|--|
| Service Company SCHLUMBER | SER Design Number | | Explosive 1 | Weight14 | .5 am | нмх | Dowdor | Case Materia | -l G: | |
| Gun OD & Trade Name 2 1/8" EZ4 | Strip Gun | | | o, °F <u>365</u> | | | | hr | | eel |
| Charge Name 2 1/8" Cerámica, HMX | (DSC 02-08-44) | | | Pressure Rati | | | | | | 200 hr |
| Manufacturer Charge Part No. H44761 | 9 Date of Manufact | ure Aug 30th 2002 | | | | <u>оо</u> рз | | faterial | Steel | |
| Gun Type Fully Expendable Trough Tu | | | Shot Density Tested 4 Shot Recommended Minimum ID for Running 2.25 | | | | | | | |
| Phasing Tested O degrees, Firi | | VD. Bottom Un | | Available Firing ModeSelective, X | | | | | | |
| Debris Description Case: Steel chips; C | | | | | | | - | | s | imultaneous |
| Remarks *Debris fill in 4 ½" 11.6#, | | | | ght | | gm/char | ge, Debris | | * | _in ³ /charge |
| | | | - CONCRETE | | rge | | | | | - <u>u</u> |
| Casing Data 5 1/2" OD, | Weight 17 | lb/ft, | L-80 | | | | | | | |
| Target Data 51.25" OD. | Amount of Cement | | | _API Grade, | | e of Section | 1 Test | Nov 11 th | 2002 | |
| Date of Compressive Strength TestN | | 3126 lb., | Amount | | 625 | O It | o., Amou | int of Water_ | 16: | 25lb. |
| Shot No. | | iquette Compressive S | rength | 7274 | psi, | Age of | f Target | 3 | 4 | days |
| Clearence, in | No. 1 No. 2 | No. 3 No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 | |
| Casing Hole Diameter, Short Axis, in | | 0 0 | 0 | 0 | 0 | 0 | 0 | o | 0 | |
| Casing Hole Diameter, Long Axis, in | | 0.280 0.270 | | 0.280 | 0.300 | 0.290 | 0.294 | 0.292 | 0.320 | |
| Average Casing Hole Diameter, in | | 0.310 0.280 | | 0.280 | 0.300 | 0.310 | 0.300 | 0.296 | 0.320 | |
| Total Depth, in. | | 0.295 0.275 | | 0.280 | 0.300 | 0.300 | 0.297 | 0.294 | 0.320 | |
| Burr Height, in | | <u>29.068</u> <u>26.443</u> | | 27.568 | 24.318 | 26.068 | 25.568 | 28.443 | 25.943 | |
| | 0.020 0.020 | 0.025 0.018 | 0.042 | 0.030 | 0.022 | 0.012 | 0.024 | 0.038 | 0.033 | |
| Shot No. | No. 12 No. 13 | No. 14 No. 15 | No. 16 | No. 17 | No. 18 | No. 19 | No. 20 | No. 21 | No. 22 | Average |
| Clearance, in | 0 0 | | | | | | | | 140. 22 | - 1 |
| Casing Hole Diameter, Short Axis, in | 0.293 0.288 | 0.295 | | | | | | | | 0 |
| Casing Hole Diameter, Long Axis, in | 0.303 0.292 | 0.320 | | | | | | | | 0.288 |
| Average Casing Hole Diameter, in | 0.298 0.290 | 0.308 | | | | | | | | 0,300 |
| Total Depth, in. | 30.818 29.068 | 28.068 | | | | | | | | 0.294 |
| Burr Height, in | 0.042 0.050 | 0.018 | *************************************** | | · · · · · · · · · · · · · · · · · · · | | | | | 27.231 |
| Shot #1 is not considered for the average, distance be | stween this shot and the top of t | he target was smaller than 12 | , | | | | | | | 0.028 |
| | | WITNESS | NG INFORMA | TION | | | | | | |
| Date of Notice of Intent to Test: | pril 22th 2002 | Witne | essed by: <u>Ju</u> | uan C. Vallad | lares | | | | | |
| Other Activities Witnessed: Target Pouris | ng Briquette: Pre | paration Testing | X Burr | Height Meas | urement > | (Sample | es Taken: C | oncrete X | Casing | x |
| | | CFI | RTIFICATION | | | | | | | |
| I certify that these tests were made soon | ording to the procedure: | | | | | | | | | f |
| I certify that these tests were made according the equipment used in these tests. | numy to the procedures | as outlined in API RP 1 | 9B: Recomme | nded Practice | es for Evalua | ation of Well | Perforators | s, First Editio | n, Novembe | r 2000. |
| | | | | | | | | | | |
| | | | | | | | | | | |
| 1, 11, 18 | The Parising III | olouin institute nettiel | endorses the | se test result | s nor recom | mends the u | use of the po | erforator sys | tem describ | ed. |
| X CERTIFIED BY | Perforating Proje | cts Manager 15711 NO | 1 2002 | | E.T.A. S.A. | | | | | |
| RECERTIFIED (Comp | | tie) (Date |) | | (Company) | | nuta | 25 Km 13 I | ddress) | Argentina |
| X 1 | | | | · · · · · · · · · · · · · · · · · · · | / | | | (A | uur 628) | 1 |





| Service Company Available to all | | | | | | ZVALOAI | IOIT, ALI | NF 130 3 | ECHON | | | J. |
|---|-----------------|--------------|---------------|------------------------|--------------|---|--------------|---|----------------------|---------------|--------------|--------------------------|
| | | Number | | | Explosive \ | Weight <u>14</u> | l.5 gm, | _HMX | powder, | Case Materia | ıl Ste | امما |
| Gun OD & Trade Name 2 1/8" Low [| | | | - | Max. Tem | p, °F <u>375</u> | 1 hr | | | hr | | 200 hr |
| Charge Name 2 1/8" Piranha Next Ge | neration, HMX | <u> </u> | (DSC 0 | <u>2-12-22)</u> | | Pressure Rat | | | | | | 200 111 |
| Manufacturer Charge Part No. TG30HM | IGDate of | Manufactu | | | | ity Tested | | ,00ps | | laterial | | |
| Gun Type Fully Expendable Trough Tu | bing Gun, Link | 6 SPF 45 | 0 | | | | | | | | | Shots/ft |
| Phasing Tested 45 degrees, Firi | | | | ttom Un | | | | | 2.25 _Selective,X | | | in. |
| Debris Description Case and Link: Stee | chips Caps: E | Breaks in tv | vo ore three | narte | | | | | | | | imultaneous |
| Remarks * Debris fill in 4 ½" 11.6#, | 5 ½" 17# and | 7" 32# Ca | sing is 0.17 | 2" 0 115" | 0 074" Page | ght | 165 | gm/char | ge, Debris | * | • | _in ³ /charge |
| | | | SE | CTION 1 - | CONCRETE | TARGET | charge. | | | | | |
| Casing Data 5 ½" OD, | Weight | 17 | lb/ft, | | -80 | API Grade, | Dat | | 4- | | | |
| Target DataOD, | Amount of | Cement | | | | | | e of Section | | Jan 21st | 2003 | |
| Date of Compressive Strength TestJa | | | | | | of Sand | 114 | <u>20 </u> | o., Amou | nt of Water_ | 296 | <u>89</u> lb. |
| Shot No. | | | quette Comp | ressive Stre | ength | <u>7132 </u> | psi, | Age o | Target | 32 | 2 | days |
| Clearance, in | No. 1 0.00 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 | |
| Casing Hole Diameter, Short Axis, in | 0.285 | 0.201 | 0.955 | <u>2.159</u> | <u>2.769</u> | 2.159 | 0.955 | 0.201 | 0.00 | 0.201 | 0.955 | |
| Casing Hole Diameter, Long Axis, in | 0.288 | 0.317 | 0.267 | 0.241 | 0.269 | 0.275 | 0.327 | 0.325 | 0.304 | 0.272 | 0.222 | |
| Average Casing Hole Diameter, in | 0.287 | 0.330 | 0.268 | 0.268 | 0.269 | 0.300 | 0.366 | 0.360 | 0.323 | 0.284 | 0.256 | |
| Total Depth, in. | | 0.324 | 0.268 | <u> </u> | 0.269 | 0.288 | 0.347 | 0.343 | 0.314 | 0.278 | 0.239 | |
| Burr Height, in | 25.050 | 28.800 | 29.050 | 28.800 | 31.425 | 26.175 | 24.675 | 29.050 | 26.050 | 20.050 | 26.550 | |
| | 0.019 | 0.048 | <u> </u> | 0.061 | 0.053 | 0.076 | 0.045 | 0.018 | 0.066 | 0.068 | 0.043 | |
| Shot No. | No. 12 | No. 13 | No. 14 | No. 15 | No. 16 | No. 17 | No. 18 | No. 19 | | | | |
| Clearance, in | 2.159 | 2.769 | 2,159 | 0.955 | 0.201 | 0.00 | | | No. 20 | No. 21 | No. 22 | Average |
| Casing Hole Diameter, Short Axis, in | 0.269 | 0.320 | 0.320 | 0.315 | 0.278 | 0.203 | 0.201 | 0.955 | <u>2.159</u> | | | 1.106 |
| Casing Hole Diameter, Long Axis, in | 0.270 | 0.328 | 0.324 | 0.336 | 0.289 | 0.232 | 0.244 | 0.270 | 0.328 | | | 0.285 |
| Average Casing Hole Diameter, in | 0.270 | 0.324 | 0.322 | 0.326 | 0.284 | | 0.248 | 0.273 | 0.330 | | | 0.295 |
| Total Depth, in | 28.050 | 26.800 | 28.550 | 28.300 | 25.050 | <u>0.218</u> 20.800 | 0.246 | 0.272 | 0.329 | | | 0.290 |
| Burr Height, in | 0.038 | 0.051 | 0.047 | 0.032 | 0.081 | 0.058 | 28.300 | 26.300 | 24.800 | | | 26.631 |
| | | | | | <u> </u> | | 0.053 | 0.080 | 0.053 | <i></i> | | 0.052 |
| | | | , | WITNESSIN | G INFORMA | TION | | | 41 | // | <i></i> | |
| Date of Notice of Intent to Test: | Apr | il 22th 200 |)2 | \A/i+n o. | | | | | -71/h | // | | |
| Other Activities Misses 1 | | | | | ssed by: | | | | James | Muoffe | mirnoff (API | Certified) |
| Other Activities Witnessed: Target Pourin | gBriq | quette: Prep | paration | Testing | X Burr Hei | ight Measure | ment X | Samples T | al do Comm | | | |
| | | | | | | | | - Cumpios i | Dillo Control | ara 1/2 C | Casing X | |
| certify that these tests were made | ** | | | CERT | FICATION | | | | | | | |
| I certify that these tests were made according the equipment used in these tests, | ding to the pro | ocedures a | s outlined in | API RP 198 | 3: Recomme | nded Practice | s for Evalua | ation of Well | Perforators | First Edition | . Navamaka. | . 2000 |
| All of the equipment used in these tests, not changed in any manner for the test. | such as the gu | ins, jet cha | rges detonat | or cord, etc | ., was stand | dard equipme | nt with our | company fo | r the use in | the gun bein | , November | 2000, |
| not changed in any manner for the tast. furnished to perforate a well for any oper | Turingrmore, ti | ne equipm | ent was cho | sen at rando | om from stoo | k and theref | ore will be | substantially | the same as | s the equipm | ant which | ı was |
| 31 // 18/ | Ine Ame | erican Petro | pieum Institu | te neither e | ndorses the | se test results | s nor recom | mends the u | se of the pe | rforator svet | em describe | Would be |
| | VA Lettora | ting Projec | ts Manager | Jan 31 st 2 | 003 ==- | alosivos Tarr | | | | | 40001106 | <u>~</u> |
| RECERTIFIED (Opm) | Official) | (Titl | | (Date) | <u> </u> | olosivos Tecn | Company | gentinos S. | A. Ruta | 25Km.13 Pi | ar- Bs.As. / | Argentina |
| | (| | | (50.0) | | (| Company) | | | (Ad | idress) | |





| Service Compony Assistant II | | | | | | TVALUA | TON, AFT | NF 136 3 | SECTION ' | 7.00 | | |
|---|-------------------------|--------------|------------------------------|-------------------------------|--|----------------------------------|---------------|---------------------------------------|-----------------|----------------------|---------------|---------------------------------------|
| Service Company <u>Available to all</u> | | n Number | | | Explosive \ | Weight 14 | 1.5 am | нмх | possides : | Case Materia | | |
| Gun OD & Trade Name 2 1/8" Piran | | | | | | p, °F <u>375</u> | | | | | | eel |
| Charge Name 2 1/8" Piranha Next Ge | neration Thr | eaded Cap, | HMX (DSC C | 2-12-21) | | Pressure Rat | | | | hr | | 200 hr |
| Manufacturer Charge Part No. TG32H | NG Date | of Manufact | ure Dec 17 ^t | 2002 | | | | | | aterial | Steel | · · · · · · · · · · · · · · · · · · · |
| Gun Type Semi Expendable Trough Tu | bina Strip Gu | ın. 6 SPF O | o | 2002 | Shot Density Tested 6 Shots/ Recommended Minimum ID for Running 2.25 | | | | | | | |
| Phasing Tested O degrees, Fir | | | | | | | | | | | | |
| Debris Description Case: Steel Chips, (| ane Betriev | ad M/Carin | WII,B | ottom Up | Available F | Available Firing ModeSelective,X | | | | | | imultaneous |
| Remarks * Debris fill in 4 1/2" 11 6# | 5 14" 17# av | -d 7" 20# 0 | | | Debris We | ght | 113.5 | gm/char | ge, Debris | | • | _in ³ /charge |
| Remarks <u>* Debris fill in 4 ½" 11.6#,</u> | 3 /2 1/# ar | 10 / 32# C | asing is 0.11 | 3", 0.076", | 0.049" Resp | ectively per | charge. | | | | | |
| Continue But | | | S | ECTION 1 - | CONCRETE | TARGET | | | | | | |
| Casing Data 5 ½" OD, | Weight_ | 17 | lb/ft, | | -80 | _API Grade, | Dat | e of Section | 1 Test | Jan 20 th | 2002 | |
| Target Data 51.375" OD, | | of Cement_ | 2913 | ib., | Amount | of Sand | 582 | | | | | |
| Date of Compressive Strength TestJa | n 20 th 2003 | , Bri | iquette Com | oressive Stre | | 6989 | | · · · · · · · · · · · · · · · · · · · | | nt of Water_ | 15 | 15lb. |
| Shot No. | No. 1 | No. 2 | No. 3 | | | | psi, | Age o | f Target | 3 | 1 | days |
| Clearance, in | 0 | 0 | | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 | |
| Casing Hole Diameter, Short Axis, in | 0.300 | | 0 | | 0 | 0 | O | 0 | 0 | 0 | 0 | |
| Casing Hole Diameter, Long Axis, in | 0.352 | 0.330 | 0.310 | 0.330 | 0.305 | 0.340 | 0.347 | 0.344 | 0.338 | 0,368 | | |
| Average Casing Hole Diameter, in | | 0.383 | 0.340 | 0.350 | 0.386 | 0.380 | 0.362 | 0.391 | 0.353 | 0.375 | 0.300 | |
| Total Depth, in | 0.326 | 0.356 | 0.325 | 0.340 | 0.345 | 0.360 | 0.354 | 0.367 | 0.345 | | 0.349 | |
| Burr Height in | 31.426 | 32.050 | 31.551 | 32.301 | 31.051 | 31.301 | 32.426 | 31.051 | | 0.371 | 0.324 | |
| Burr Height, in | 0.060 | 0.080 | 0.051 | 0.069 | 0.051 | 0.085 | 0.053 | | 33.926 | <u>29.051</u> | <u>31.176</u> | |
| Shot No. | No. 12 | No. 13 | No. 14 | No. 15 | | | | 0.047 | 0.032 | 0.035 | 0.054 | |
| Clearance, in | 0 | 0 | | No. 15 | No. 16 | No. 17 | No. 18 | No. 19 | No. 20 | No. 21 | No. 22 | Average |
| Casing Hole Diameter, Short Axis, in | 0.304 | | 0 | | 0 | 0 | _ 0 | 0 | 0 | | | Average |
| Casing Hole Diameter, Long Axis, in | 0.318 | 0.320 | 0.350 | 0.294 | 0.300 | 0.310 | 0.347 | 0.310 | 0.310 | | | |
| Average Casing Hole Diameter, in | | 0.355 | 0.355 | 0.298 | 0.360 | 0.330 | 0.350 | 0.340 | 0.330 | | | 0.323 |
| Total Depth, in. | 0.311 | 0.337 | 0.352 | 0.296 | 0.330 | 0.320 | 0.348 | 0.325 | 0.320 | | | <u>0.353</u> |
| Burr Height, in | 29.426 | 30.801 | 29.801 | 30.801 | 30.051 | 31.301 | 33.426 | 31,301 | 28.051 | | | 0.338 |
| | 0.029 | 0.033 | 0.042 | 0.021 | 0.033 | 0.052 | 0.058 | 0.065 | 0.029 | | | 31.113 |
| | | | | WITNESSIN | O INFORMA | | | | 1 // | | | 0.049 |
| Date of Notice of Intent to Test: | Δ, | pril 22th 20 | | | G INFORMA | TION | | لد | 11/ | | | |
| | | | | | ssed by: | | | | Allun | 10 / Jrs | mirnoff (AP | Certified\ |
| Other Activities Witnessed: Target Pourin | g Br | iquette: Pre | paration | _ Testing _ | X Burr Hei | ght Measure | ment X | Samples T | okani Cana | | | i Ceruneu/ |
| | | | | | | | | Odi 11003 11 | ANGIL A-OHET | 7 <u> </u> | asing X | |
| I certify that these tests were made acco | rding to the - | 3*000d | | | IFICATION | | | | | | - | |
| I certify that these tests were made acco All of the equipment used in these tests, not changed in any manner for the test. | Such as the o | JUDG int cha | is outlined in | API RP 19 | 3: Recomme | nded Practice | s for Evalua | tion of Well | Perforators | First Edition | Novamba | - 2000 |
| TIVE VIIGHTEE III AHV MANNAF TORREASTACE | | 41. | | | | oda(b(1)0 | IIL WILLI OUI | CUIDDANV TO | r tha ilea in i | ho oun bain | 4 4 - 5 | |
| not changed in any manner for the test. furnished to perforate a well for any open X CERTIFIED BY | to. The An | nerican Petr | ent was cho oleum institu | sen at rando Ite neither e | om from stoc | k and theref | ore will be s | ubstantially | the same as | the equipme | ent, which | was would be |
| X CERTIFIED BY | N . | | | | | | 10001111 | nonus trie u | se or the be | rrorator syste | em describe | ed. |
| | official) | aung Projec | ts Manager | Jan 31 st 2 | 003 Exp | olosivos Tecr | ologicos Ar | gentinos S. A | A. Ruts | 25Km 12 Pi | au Da A | |
| Comp | V Chricial) | (Tit | le) | (Date) | | (| Company) | | ·· nuta | | ar- DS.As. | Argentina |
| | K | | | | | | | | | (Ad | dress) | |





| Service Company Available to all | Design Number | | | Explosive | Weight2 | 7 <u> </u> | нмх | powder, | Case Materia | ISte | el |
|---|-----------------------------|----------------------------------|-------------|----------------|---|--|-------------------------|----------------|----------------|----------------|--------------------------|
| Gun OD & Trade Name 2 1/2" Through Tub | oing Gun DP HMX | | | Max. Tem | p, °F <u>375</u> | 1 hr | 3 hr | 24 | hr | 100 hr | 200 hr |
| Charge Name 2 1/2" Piranha Next Gen | | i-01-30) | | Maximum | Pressure Rati | ng <u>15.0</u> | 00 ps | i, Carrier M | aterial | Steel | |
| Manufacturer Charge Part NoTG51HNG | Date of Manufactu | ire <u>Jan 14th 2</u> | 2006 | Shot Dens | ity Tested | | | 5 | | | Shots/ft |
| Gun TypeThrough Tubing Gun. Low Debr | is Link 5 SPF 60° | | | Recomme | Recommended Minimum ID for Running 2.75 | | | | | | |
| | Order X Top Dov | wn. Bo | ttom Up | | Firing Mode | | | | X | Si | multaneous |
| Debris Description Steel Chips | <u> </u> | | | | ight | | | ge, Debris | | | _in ³ /charge |
| • | | | | | | | | | | | _ • |
| Remarks | | | CTION 4 | CONCRET | E TARGET | ······································ | | | | | |
| | | | | | | | | | | th occo | |
| Casing Data 4 ½" OD, | Weight 11.6 | lb/ft, | | L-80 | API Grade, | Dat | e of Section | 1 est | June 05 | | |
| Target DataOD, | Amount of Cement_ | 9400 | ib., | Amount | of Sand | 187 | 95 l | b., Amou | ınt of Water_ | 489 | <u>10</u> |
| Date of Compressive Strength TestJu | ne 06 th 2006, B | riquette Compr | ressive Str | ength | 6606 | psi, | Age o | f Target | 3 | 35 | days |
| Shot No. | No. 1 No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 | |
| | .000 0.267 | 1.017 | 1.500 | 1.017 | 0.267 | 0.000 | 0.267 | 1.017 | 1.500 | 1.017 | |
| | .380 0.370 | 0.360 | 0.340 | 0.380 | 0.350 | 0.340 | 0.390 | 0.420 | 0.390 | 0.360 | |
| | .390 0.390 | 0.380 | 0.360 | 0.400 | 0.400 | 0.360 | 0.410 | 0.430 | 0,410 | 0.380 | |
| | .385 0.380 | 0.370 | 0.350 | 0.390 | 0.375 | 0.350 | 0.400 | 0.425 | 0.400 | 0.370 | |
| | 0,255 39,005 | 37,255 | 41.005 | 34.255 | <u>35,755</u> | 33.505 | 37.005 | 32.505 | 33.755 | 39,755 | |
| | .030 0.050 | 0.015 | 0.037 | 0.014 | 0.019 | 0.030 | 0.025 | 0.018 | 0.021 | 0.028 | |
| Shot No. | No. 12 No. 13 | No. 14 | No. 15 | No. 16 | No. 17 | No. 18 | No. 19 | No. 20 | No. 21 | No. 22 | Average |
| Clearance, in <u>0</u> | .267 0.000 | 0.267 | | | | | | | | | 0.600 |
| | <u>.410 0.360 </u> | 0.370 | | | | | | | | | 0.373 |
| | <u>.430 0.380 </u> | 0.370 | | | | | | | | | 0.392 |
| | <u>.420 0.370 </u> | 0.370 | | | | | | | | | 0,383 35,926 |
| _ · · | <u>6.255</u> <u>34.505</u> | 38.005 | | | | | | | | | |
| Burr Height, in <u>0</u> | <u>.031 0.016</u> | 0.012 | | | | | | | | | 0.025 |
| | | | WITNESS | ING INFORM | MATION | | 4/ | 1 | 1 | | |
| Date of Notice of Intent to Test: | | May 2 nd 2006 | | Witn | essed by: _ | | THU | mo T | | J. Smirnoff (A | Pl Certified) |
| Other Activities Witnessed: Target Pouring _ | Briquette: Pre | eparation | Testing | X Burr Hei | ght Measurem | ent X | ampl es Take | n: Concrete | X Casin | g _X | |
| | | | CE | RTIFICATIO | N | | | | | | |
| I certify that these tests were made according | g to the procedures as | s outlined in AF | PI RP 19B: | Recommend | led Practices f | or Evaluation | n of Well Per | forators, Firs | st Edition, No | vember 2000 | . All of the |
| equipment used in these tests such as the o | uns, jet charges detor | nator cord. etc. | was stand | dard equipme | ent with our co | mpany for th | e use in the | aun being te | ested and was | s not changed | in any |
| manner for the test. Further that equipr | ment was chosen at ra | andom from sto | ck and the | refore will be | substantially | the same as | the equipme | ent, which wo | ould be furnis | hed to perfor | ate a well |
| manner for the test. Furthernore the equipment of any operator. The American had observed | nstitute neither endors | ses these test r | esults nor | recommends | the use of the | e perforator s | system descr | ibed. | | | |
| X CERTIFIED BY | Perforation Pr | ojects Manage | r June 0 | 3th 2006 | Explosivos T | ecnologicos | Argentinos S | S.A. F | Ruta 25Km.13 | Pilar- Bs.As | Argentina |
| | | (Title) | Dat (Dat | | | (Company | | | | (Address) | |