



Registered Data Sheet Perforating System Evaluation, API RP 19B Section 1

API Form 19B-Section 1

Conforms to All Requirements of Section 1

Special Test - See Remarks/Exceptions below

Service Company BVT, JSC Explosive weight 27,7 gm, RDX powder, Case Material Steel  
 Gun OD & Trade Name 3,504" (89 mm) PK089-AT Max Temp, °F 302 (150 °C) 2 hr 284 (140 °C) 5hr 266 (130 °C) 12 hr 248 (120 °C) 30 hr 230 (110 °C) 72 hr  
 Charge Name ZPK89-AT-M-11 Maximum Pressure Rating 11603 (80 MPa) psi, Carrier Material Steel  
 Manufacturer Charge Part No. ZPK89-AT-M-11 Date of Manufacture 12 May, 2011 Shot Density Tested 6,1 (20 shots/m) Shots/ft \_\_\_\_\_  
 Gun Type Expendable Gun TCP/Wireline Recommended Minimum ID for Running 4,528 (115 mm) in.  
 Phasing Tested 60 degrees, Firing Order: \_\_\_\_\_ Top down X Bottom up Available Firing Mode: \_\_\_\_\_ Selective \_\_\_\_\_ Simultaneous \_\_\_\_\_  
 Debris Description N/A Debris Weight N/A gm/charge, Debris N/A In/charge \_\_\_\_\_  
 Remarks/Exceptions per Section 1.11 Casing used: 5,748" (146 mm) × 0,374" (9,5 mm) GRADE D, GOST 632-80  
 Casing Data 5,748" (146 mm) OD, Weight 21,37 (31,8 kg/m) lb/ft API Grade, \_\_\_\_\_ Date of Section 1 Test 14 June, 2011  
 Target Data 39,37" (1000 mm) OD, Amount of Cement 1861 (844 kg) lb, Amount of Sand 3722 (1688 kg) lb, Amount of Water 968 (439 kg) lb.  
 Date of Compressive Strength Test 14 June, 2011 Briquette Compressive Strength 6178,5 psi, Age of Target 33 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 (mm).....                        | <u>0.66 (16.8)</u>  | <u>0.78 (19.7)</u>  | <u>1.02 (25.9)</u>  | <u>1.15 (29.2)</u>  | <u>1.02 (25.9)</u>  | <u>0.78 (19.7)</u>  | <u>0.66 (16.8)</u>  | <u>0.78 (19.7)</u>  | <u>1.02 (25.9)</u>  | <u>1.15 (29.2)</u>  | <u>1.02 (25.9)</u>  |
| Casing Hole Diameter, Short Axis, in (mm) .... | <u>0.85 (21.62)</u> | <u>0.88 (22.42)</u> | <u>0.92 (23.28)</u> | <u>0.86 (21.79)</u> | <u>0.95 (24.24)</u> | <u>0.87 (21.25)</u> | <u>0.95 (24.08)</u> | <u>0.91 (23.08)</u> | <u>0.92 (23.42)</u> | <u>0.94 (23.89)</u> | <u>0.92 (23.39)</u> |
| Casing Hole Diameter, Long Axis, in (mm).....  | <u>0.87 (22.16)</u> | <u>0.95 (24.05)</u> | <u>0.95 (24)</u>    | <u>0.88 (22.29)</u> | <u>0.97 (24.54)</u> | <u>0.90 (22.93)</u> | <u>0.99 (25.2)</u>  | <u>0.98 (24.89)</u> | <u>0.94 (23.76)</u> | <u>0.95 (24.08)</u> | <u>0.95 (24.01)</u> |
| Average Casing Hole Diameter, in. (mm) .....   | <u>0.86 (21.89)</u> | <u>0.92 (23.24)</u> | <u>0.93 (23.64)</u> | <u>0.87 (22.04)</u> | <u>0.96 (24.39)</u> | <u>0.87 (22.09)</u> | <u>0.97 (24.64)</u> | <u>0.94 (23.99)</u> | <u>0.93 (23.59)</u> | <u>0.94 (23.99)</u> | <u>0.93 (23.7)</u>  |
| Total Depth, in (mm) .....                     | <u>4.9 (124.5)</u>  | <u>4.8 (122.5)</u>  | <u>4.9 (124.5)</u>  | <u>lost</u>         | <u>6.5 (165.5)</u>  | <u>5.8 (146.5)</u>  | <u>5.7 (143.5)</u>  | <u>4.9 (124.5)</u>  | <u>6.9 (174.5)</u>  | <u>5.2 (132.5)</u>  | <u>5.7 (144.5)</u>  |
| Burr Height, in (mm) .....                     | <u>0.11 (2.78)</u>  | <u>0.14 (3.47)</u>  | <u>0.06 (1.49)</u>  | <u>0.04 (1.05)</u>  | <u>0.12 (3.02)</u>  | <u>0.12 (3.14)</u>  | <u>0.11 (2.81)</u>  | <u>0.09 (2.32)</u>  | <u>0.09 (2.19)</u>  | <u>0.07 (1.65)</u>  | <u>0.09 (2.33)</u>  |

  

| 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 (mm).....                        | <u>0.78 (19.7)</u>  | <u>0.66 (16.8)</u>  | <u>0.78 (19.7)</u>  | <u>1.02 (25.9)</u>  | <u>1.15 (29.2)</u>  | <u>1.02 (25.9)</u>  | <u>0.78 (19.7)</u>  | <u>0.66 (16.8)</u>  | <u>0.78 (19.7)</u>  |       |       | <u>xxxxxxxxxxxx</u> |
| Casing Hole Diameter, Short Axis, in (mm) .... | <u>0.97 (24.7)</u>  | <u>0.91 (23.1)</u>  | <u>0.86 (21.89)</u> | <u>0.90 (22.92)</u> | <u>0.90 (22.89)</u> | <u>0.96 (24.34)</u> | <u>0.93 (23.56)</u> | <u>0.88 (22.39)</u> | <u>0.85 (21.61)</u> |       |       | <u>0.91 (23.0)</u>  |
| Casing Hole Diameter, Long Axis, in (mm) ..... | <u>0.10 (25.35)</u> | <u>0.95 (24.23)</u> | <u>0.89 (22.47)</u> | <u>0.93 (23.62)</u> | <u>0.96 (24.38)</u> | <u>0.98 (24.82)</u> | <u>0.97 (24.59)</u> | <u>1.04 (26.49)</u> | <u>0.88 (22.22)</u> |       |       | <u>0.95 (24.0)</u>  |
| Average Casing Hole Diameter, in (mm) .....    | <u>0.99 (25.03)</u> | <u>0.93 (23.67)</u> | <u>0.87 (22.18)</u> | <u>0.92 (23.27)</u> | <u>0.93 (23.64)</u> | <u>0.97 (24.58)</u> | <u>0.95 (24.08)</u> | <u>0.96 (24.44)</u> | <u>0.86 (21.92)</u> |       |       | <u>0.93 (23.5)</u>  |
| Total Depth, in (mm) .....                     | <u>6.0 (152.5)</u>  | <u>5.2 (131.5)</u>  | <u>5.3 (134.5)</u>  | <u>6.1 (154.5)</u>  | <u>5.3 (134.5)</u>  | <u>5.9 (149.5)</u>  | <u>6.5 (164.5)</u>  | <u>6.9 (174.5)</u>  | <u>5.7 (144.5)</u>  |       |       | <u>5.7 (144.4)</u>  |
| Burr Height in (mm).....                       | <u>0.10 (2.51)</u>  | <u>0.14 (3.58)</u>  | <u>0.11 (2.77)</u>  | <u>0.09 (2.34)</u>  | <u>0.09 (2.26)</u>  | <u>0.12 (2.98)</u>  | <u>0.11 (2.66)</u>  | <u>0.11 (2.73)</u>  | <u>0.15 (3.71)</u>  |       |       | <u>0.10 (2.6)</u>   |

Remarks The gun can be used in gas wells. Penetration normalized to 5000 psi by method of SPE 27424 (approx. 3.8% / 1000psi) = 6,0" (150,9mm)

Manufacturer's Certification

Type of Certification: \_\_\_\_\_ X \_\_\_\_\_ Self \_\_\_\_\_ Third Party

I certify that these tests were made according to the procedures as outlined in API 19B: Recommended Practice for Evaluation of Well Perforators, Second Edition, September 2006. All of the equipment used in these tests, such as the guns, jet charges detonator cord, etc., was standard equipment with our company for the use in the gun being tested and was not changed in any manner for the test. Furthermore, the equipment was chosen at random from stock and therefore will be substantially the same as the equipment that would be furnished to perforate a well for any operator. API neither endorses these tests nor recommends the use of the perforator system described.

API Witness A. Tovmachenko 17 June, 2011  
 (Date)  
 X CERTIFIED BY A. Yakuba 17 June, 2011 BVT, JSC 224 Leninskaya St., Samara, 443001, Russian Federation  
 RECERTIFIED (Company Official) (Title) (Date) (Company) (Address)

Name of test as it should appear on website: ZPK89-AT-11

Name of test as it appears on application and application date: ZPK89-AT-M-11