



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, CJSC
 Gun OD & Trade Name: 2.87" (73 mm) PKO73-AT
 Charge Name: ZPK73-AT-M-04
 Manufacturer Charge Part No.: ZPK73-AT-M-04 Date of Manufacture: January 10-13, 2014
 Gun Type: Expendable Gun TCP/Wireline
 Phasing Test: 60 degrees, Firing Order: Top Down X Bottom up
 Debris Description: N/A

Explosive Weight: 19 gm, RDX powder, Case Material: Steel
 Max Temp. °F: 302(150°C) 2hr 284(140°C) 5hr 266(130°C) 12hr 248(120°C) 30hr 230(110°C) 72hr
 Maximum Pressure Rating: 11603 (80 MPa) psi, Carrier Material: Steel
 Shot Density Tested: 6.1 (20 shots/m) shots/ft
 Recommended Minimum ID for Running: 3.74 (95 mm) in.
 Available Firing Mode: Selective X Simultaneous
 Debris Weight: N/A gm/charge, Debris: N/A in/charge

Remarks/Exceptions per Section 1.11: Casing used: 4.49" (114 mm)x0.29"(7.4 mm) GRADE D, GOST 632-80; Gun shot with water
 Casing Data: 4.49" (114 mm) OD, Weight 13.07 (19.45 kg/m) lb/ft, API Grade: _____, Date of Section 1 Test: May 19, 2014
 Target Data: 78.74" (2000 mm) OD, Amount of Cement 7566 (3432 kg) lb, Amount of Sand 15132 (6864 kg) lb, Amount of Water 3934.32 (1784.64 kg) lb.
 Date of Compressive Strength Test: May 19, 2014 Briquette Compressive Strength: 7541.7 (52.00 MPa) psi, Age of Target: 32 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) | 0.39 (9.8) | 0.48 (12.1) | 0.66 (16.8) | 0.76 (19.4) | 0.66 (16.8) | 0.48 (12.1) | 0.39 (9.8) | 0.48 (12.1) | 0.66 (16.8) | 0.76 (19.4) | 0.66 (16.8) |
| Casing Hole Diameter, Short Axis, in (mm) | 0.37 (9.40) | 0.34 (8.60) | 0.35 (9.00) | 0.35 (9.00) | 0.37 (9.40) | 0.36 (9.10) | 0.37 (9.30) | 0.36 (9.10) | 0.35 (9.00) | 0.36 (9.20) | 0.35 (9.00) |
| Casing Hole Diameter, Long Axis, in (mm) | 0.38 (9.60) | 0.39 (9.80) | 0.38 (9.70) | 0.36 (9.10) | 0.37 (9.50) | 0.37 (9.30) | 0.38 (9.60) | 0.36 (9.10) | 0.36 (9.20) | 0.38 (9.60) | 0.37 (9.30) |
| Average Casing Hole Diameter, in (mm) | 0.37 (9.50) | 0.36 (9.20) | 0.37 (9.35) | 0.36 (9.05) | 0.37 (9.45) | 0.36 (9.20) | 0.37 (9.45) | 0.36 (9.10) | 0.36 (9.10) | 0.37 (9.40) | 0.36 (9.15) |
| Total Depth, in (mm) | 28.6 (727) | 28.1 (713) | 27.4 (696) | 28.4 (722) | 27.8 (707) | 29.5 (750) | 29.2 (742) | 28.2 (717) | 29.4 (747) | 27.2 (692) | 28.8 (732) |
| Burr Height, in (mm) | 0.04 (1.10) | 0.04 (1.00) | 0.04 (1.00) | 0.06 (1.40) | 0.05 (1.30) | 0.06 (1.60) | 0.05 (1.20) | 0.04 (1.00) | 0.04 (0.90) | 0.05 (1.30) | 0.06 (1.50) |

| 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) | 0.48 (12.1) | 0.39 (9.8) | 0.48 (12.1) | 0.66 (16.8) | 0.76 (19.4) | 0.66 (16.8) | 0.48 (12.1) | 0.39 (9.8) | 0.48 (12.1) | | | xxxxx xxxxxx |
| Casing Hole Diameter, Short Axis, in (mm) | 0.36 (9.20) | 0.36 (9.10) | 0.37 (9.40) | 0.35 (9.00) | 0.38 (9.70) | 0.35 (8.80) | 0.35 (9.00) | 0.39 (10.00) | 0.38 (9.60) | | | 0.36 (9.20) |
| Casing Hole Diameter, Long Axis, in (mm) | 0.36 (9.20) | 0.36 (9.10) | 0.42 (10.60) | 0.37 (9.30) | 0.39 (9.90) | 0.40 (10.20) | 0.41 (10.50) | 0.43 (11.00) | 0.39 (9.80) | | | 0.38 (9.67) |
| Average Casing Hole Diameter, in (mm) | 0.36 (9.20) | 0.36 (9.10) | 0.39 (10.00) | 0.36 (9.15) | 0.39 (9.80) | 0.37 (9.50) | 0.38 (9.75) | 0.41 (10.50) | 0.38 (9.70) | | | 0.37 (9.43) |
| Total Depth, in (mm) | 28.9 (734) | 25.1 (637) | 25.6 (650) | 28.3 (718) | 30.0 (763) | 27.8 (707) | 27.6 (702) | 30.2 (767) | 27.2 (692) | | | 28.2 (716) |
| Burr Height, in (mm) | 0.04 (1.00) | 0.06 (1.60) | 0.04 (1.10) | 0.06 (1.50) | 0.08 (2.00) | 0.04 (1.10) | 0.04 (1.10) | 0.05 (1.30) | 0.04 (1.10) | | | 0.05 (1.26) |

Remarks: The gun can be used in gas wells. Penetration normalized to 5000 psi by method of SPE 27424 (approx. 3.8% / 1000psi) = 30.9" (785 mm)

Manufacturer's Certification

Type of Certification: 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 describes.

API Witness A. Tovmachenko  May 22, 2014 (Date)

CERTIFIED BY A. Yakuba Technical Director May 22, 2014 BVT, CJSC 41 Rabochaya St., Samara, 443041, Russian Federation
 RECERTIFIED BY (Company Official) (Title) (Date) (Company) (Address)

Name of test as it should appear on website: PKO73-AT / ZPK73-AT-M-04

Name of test as it should appear on application and application date: ZPK73-AT-M-04 / PKO73-AT April 04, 2014