



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 Available to all from Titan Specialties Ltd. Explosive weight 22.7 gm, HMX powder, Case Material Zinc

Gun OD & Trade Name 4-5/8" EXP Gun, 16 SPF 140/20 Degree Max Temp, °F 400 1 hr 3 hr 24 hr 100 hr 200 hr

Charge Name 4-5/8" 22.7 Gm HMX BH Maximum Pressure Rating 21,500 psi, Carrier Material H.T. Steel

Manufacturer Charge Part No. FLO-4623-411CFZ Date of Manufacture 10 August 2009 Shot Density Tested 16 Shots/ft 16

Gun Type Hollow Steel Carrier, Expendable (HC, E) Recommended Minimum ID for Running 5.00 in.

Phasing Tested 140/20 degrees, Firing Order:  Top down  Bottom up Available Firing Mode:  Selective  Simultaneous

Debris Description Acid soluble zinc powder Debris Weight n/a gm/charge, Debris n/a in<sup>3</sup>/charge

Remarks/Exceptions per Section 1.11 \_\_\_\_\_

Casing Data 7" OD, Weight 32 lb/ft, API Grade, L-80 Date of Section 1 Test 21 September 2009

Target Data 60" OD, Amount of Cement 4,136 lb, Amount of Sand 8,272 lb, Amount of Water 2,160 lb.

Date of Compressive Strength Test 21 September 2009 Briquette Compressive Strength 6,070 psi, Age of Target 28 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. ....	0.56	0.86	0.70	0.64	0.90	0.57	0.82	0.76	0.60	0.91	0.60
Casing Hole Diameter, Short Axis, in. ....	0.80	0.69	0.77	0.77	0.75	0.74	0.72	0.72	0.75	0.70	0.77
Casing Hole Diameter, Long Axis, in. ....	0.82	0.73	0.78	0.77	0.76	0.77	0.74	0.81	0.79	0.73	0.81
Average Casing Hole Diameter, in. ....	0.81	0.71	0.78	0.77	0.76	0.76	0.73	0.77	0.77	0.72	0.79
Total Depth, in. ....	5.83	7.70	5.95	5.20	5.45	6.33	6.45	5.20	6.58	9.00	5.95
Burr Height, in. ....	0.05	0.04	0.04	0.06	0.05	0.07	0.03	0.04	0.05	0.05	0.04

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. ....	0.76	0.82	0.57	0.90	0.64	0.70	0.86					XXXXXX
Casing Hole Diameter, Short Axis, in. ....	0.70	0.70	0.71	0.77	0.79	0.70	0.75					0.74
Casing Hole Diameter, Long Axis, in. ....	0.72	0.75	0.75	0.77	0.79	0.72	0.76					0.77
Average Casing Hole Diameter, in. ....	0.71	0.73	0.73	0.77	0.79	0.71	0.76					0.75
Total Depth, in. ....	5.33	5.45	5.85	6.20	5.45	5.95	6.08					6.11
Burr Height, in. ....	0.06	0.07	0.05	0.05	0.06	0.04	0.05					0.05

Remarks \_\_\_\_\_

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 described.

CERTIFIED BY Kenneth E. Brown CEO 05 January 2010 Titan Specialties Ltd. 143 HCR 4361, Milford, TX 76670

RECERTIFIED (Company Official) (Title) (Date) (Company) (Address)

Name of test as it should appear on website: 4.63-in. EXP 16 SPF w/ BH FLO-4623-411CFZ

Name of test as it appears on application and application date: \_\_\_\_\_