



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 Oiltech Services Pte. Ltd. Explosive weight 45 gm, HMX powder, Case Material Steel

Gun OD & Trade Name 7" 12 SPF 135° Phase Carrier Max Temp, °F 400 1 hr 3 hr 24 hr 100 hr 200 hr

Charge Name HSD 51C 45g HMX BH Maximum Pressure Rating 13,000 psi, Carrier Material Steel

Manufacturer Charge Part No. OT60721 Date of Manufacture 29 March 2010 Shot Density Tested 12 Shots/ft _____

Gun Type TCP, Wireline, Retrievable Tubular Carrier Recommended Minimum ID for Running _____ in.

Phasing Tested 135 / 45 degrees, Firing Order: Top down Bottom up Available Firing Mode: _____ Selective Simultaneous

Debris Description Steel Chips Debris Weight N/A gm/charge, Debris N/A in³/charge

Remarks/Exceptions per Section 1.11 _____

Casing Data 9-5/8" OD, Weight 47 lb/ft, API Grade, L-80 Date of Section 1 Test 5 May 2010

Target Data 34" OD, Amount of Cement 1,823 lb, Amount of Sand 3,690 lb, Amount of Water 948 lb.

Date of Compressive Strength Test 4 May 2010 Briquette Compressive Strength 6,607 psi, Age of Target 30 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	1.35	0.74	0.20	1.63	1.35	0.74	1.35	0.00	1.35	0.79
Casing Hole Diameter, Short Axis, in.	1.18	1.03	1.10	0.99	0.91	1.13	1.13	1.07	1.03	1.05	1.11
Casing Hole Diameter, Long Axis, in.	1.20	1.07	1.13	1.04	0.93	1.18	1.17	1.13	1.07	1.10	1.20
Average Casing Hole Diameter, in.	1.19	1.05	1.12	1.02	0.92	1.16	1.15	1.10	1.05	1.08	1.16
Total Depth, in.	loss	8.47	4.97	4.97	8.97	6.47	loss	6.47	loss	6.47	6.47
Burr Height, in.	0.13	0.05	0.17	0.13	0.09	0.17	0.09	0.11	0.14	0.11	0.13

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.	0.20	1.63	0.20	0.74	1.35							XXXXXX
Casing Hole Diameter, Short Axis, in.	1.11	1.01	1.08	1.11	1.01							1.07
Casing Hole Diameter, Long Axis, in.	1.14	1.07	1.17	1.16	1.07							1.11
Average Casing Hole Diameter, in.	1.13	1.04	1.13	1.14	1.04							1.09
Total Depth, in.	6.47	6.47	5.47	loss	6.47							6.51
Burr Height, in.	0.14	0.07	0.17	0.13	0.14							0.12

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 John J. Blair Managing Director 7 May 2010 Oiltech Services Pte. Ltd 25 Pandan Crescent, TIC Tech Centre #06-12, Singapore 128477

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

Name of test as it should appear on website: 7", HSD 51C 45g HMX BH, 135° Phasing, 12 SPF

Name of test as it appears on application and application date: Charge: HSD 51C 45g HMX BH, Gun: 7", 12 SPF, 135° Phase Carrier

GUN DEBRIS DATA SHEET FOR HOLLOW CARRIER PERFORATING SYSTEMS, PER API RP 19B SECTION 5

Hardware Description				Charge Description	
Service Company <u>Oiltech Services Pte. Ltd.</u>				Charge Name <u>HSD 51C 45g HMX BH</u>	
Gun OD & Trade Name <u>Carrier / Tube, 7.00" HSD, 12 / 135° - 45°, 5 ft</u>				Charge Part No. <u>OT60721</u>	
Gun Type <u>TCP and Wireline Hollow Carrier, Non-reuseable</u>		Gun Assy Part No. <u>H428597 / OT37029</u>		Explosive Type <u>HMX</u> Grams per Chg <u>45</u>	
Shots per Foot <u>12</u> Phasing <u>135° / 45°</u>		Total Shot Positions in Gun <u>61</u>		Total Chgs Tested <u>30</u> Case Mat. <u>Steel</u>	

Test Configuration: Casing O.D. 9-5/8 in. Casing wt. per Foot 47 lbs.

Debris Quantities and Description

5.2.3 - Net Pre Test Weight of Loaded Gun Assembly (less explosives and any other consumables) -----	199.41	kg
5.2.5 - Dry Weight of Expended Gun Assembly (before rolling procedure) -----	195.40	kg
5.2.7 - Weight of Debris Lost per Linear Foot of Perforations at Time of Detonation -----	1,604	gm
5.2.8 - Volume of Debris Lost per Linear Foot of Perforations at Time of Detonation -----	246	cc
5.3.2 - Weight of Debris Rolled From Gun per Linear Foot of Perforations (after 100 revolutions) -----	183	gm
5.3.4 - Volume of Debris Rolled From Gun per Linear Foot of Perforations (after 100 revolutions) -----	28	cc
5.3.5 - Average weight of gun debris per cc -----	6.5	gm/cc
5.3.7 - Total Volume of Debris Lost per Linear Foot of Perforations -----	274	cc
5.3.8 - Total Weight of Debris Lost per Linear Foot of Perforations -----	1,787	gm

5.3.9 -	No.	U S Sieve Size	% by Wt.Retained	Debris Description Including Type of Material
	1	12.70 mm (.500 in)	15.26	Steel Fragments
	2	9.53 mm (.375 in.)	28.02	Steel Fragments
	3	6.35 mm (.250 in.)	23.30	Steel Fragments
	4	4.75 mm (.187 in.) # 4	8.44	Small Steel Fragments
	5	2.36 mm (.094 in.) # 8	9.98	Small Steel Fragments
	6	Through # 8 sieve	15.00	Steel Powder

5.3.10 - Avg Exit Hole Size in Gun 0.68 in. Test Date 6 May 2010

Remarks: _____

MANUFACTURER'S CERTIFICATION

I certify that these tests were made according to the procedures as outlined in API RP 19B: Recommended Practices 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 other than what is specified in Section 5. Furthermore, the equipment was chosen at random from stock and therefore will be substantially the same as the equipment, which would be furnished to perforate a well for any operator. This test is designed for comparative purposes only, and should not be used to determine the amount of debris that will be left in any given well bore. API neither endorses these test results nor recommends the use of the perforator system described.

COMPANY <u>Oiltech Services Pte. Ltd.</u>	ADDRESS: <u>25 Pandan Crescent, TIC Tech Centre #06-12, Singapore 128477</u>
<input checked="" type="checkbox"/> CERTIFIED BY: <u>John T. Blair</u>	Managing Director <u>7 May 2010</u>
____ RECERTIFIED BY: _____	Company Official Title Date

Name of test as it should appear on website: 7", HSD 51C 45g HMX BH, 135° Phasing, 12 SPF
 Name of test as it appears on application and application date: Charge: HSD 51C 45g HMX BH, Gun: 7", 12 SPF, 135° Phase Carrier