Heard about DPEX perforating?

Independent flow test verifies: DPEX hole size and perforating channel are superior to other commercially available DP charges

Recently various SPE papers have been written in regards to the performance of shaped charges using reactive liners. DYNAenergetics, being a manufacturer of reactive liner shaped charges, is promoting this technology as having an application in cleaning out the crushed zone of the perforating channel, resulting in an increase in perforating channel diameter. This in return will enhance production or, in the instance of a hydraulic frac, decrease the formation break down pressure.

The best results are anticipated in overbalanced and equal balanced wellbore conditions. In underbalanced conditions the reaction taking place in the perforating channel is not anticipated to have a big advantage due to the already existing pressure differential.

Unfortunately DYNAenergetics has to date only been able to conduct surface tests in atmospheric pressure conditions, but field tests and the growing demand for DYNAenergetics DPEX reactive liner shaped charges in North America have proven to be advantageous for the operators.

The discussions with regards to this reactive liner technology have been very diversified. The most recently published SPE paper (SPE 125752) is actually the first paper that publishes **results of flow tests conducted with reactive liner shaped charges** presently commercially available in the oil field. The tests were carried out under controlled conditions in an API RP 19B Section 4 Perforation Flow Laboratory.

Three 3 3/8″ commercially available reactive liner shaped charges were tested and compared to a 3 3/8″ 25g HMX shaped charge using a non-reactive liner. Even though using a non-reactive liner this shaped charge was flow optimized. These flow optimized shaped charges have shown productivity increases of over 10% over benchmark conventional shaped charges.

One of the reactive liner shaped charges was the **DYNAenergetics 26g RDX DPEX**. The other two reactive liner shaped charges were 25g HMX manufactured by a third party.

As advertised by DYNAenergetics the paper shows that the DPEX hole size and perforating channel diameter are superior to the other tested charges in all borehole conditions. This includes both of the competing reactive liner shaped charges.

A look at the perforating channel data shows that the DYNAenergetics DPEX charge is also leading with an average open perforating channel depth of 98%.

In regards to the average production ratio the paper shows that the DPEX reactive liner shaped charge outperforms both the competing reactive liner shaped charges and the flow optimized DP charge in overbalanced wellbore conditions. With flow optimized shaped charges having shown productivity increases of over 10% over standard DP shaped charges you can imagine the increase in productivity using the DYNAenergetics DPEX shaped charge.

The tests were conducted in Berea Sandstone targets with mineral-oil flow, to simulate a typical oil bearing formation. Balanced, 1.000psi underbalanced and 1.000psi overbalanced conditions were simulated. For statistical validity the test for each borehole condition was repeated three times for each charge. All tests were independently witnessed. The average compressive strength of the rock was 8.600psi. The pore pressure was 3.600psi.

The acquired data included, but was not limited to, depth of open perforation tunnel, depth of total perforation penetration, perforation geometry, hole diameter in casing and cement and flow performance.
A copy of the SPE paper 125752 that contains details of all test parameters, results and a discussion of the results with conclusions and observations can be downloaded from the SPE website for members or otherwise from the OnePetro website.

DYNAenergetics is trying to get more detailed information on the tests and the results. As soon as these are available to DYNAenergetics they will be published and we will inform you.

The SPE paper mentions that additional flow tests, with the same charges, conducted in a low-permeability gas bearing formation using Carbon Tan Sandstone with nitrogen as pore fluid are underway. The results will be published in the near future. We are anxious to see the results and will keep you informed.

For more information on the DYNAenergetics DPEX reactive liner shaped charge technology please contact your DYNAenergetics representative or email us at dynawell@dynaenergetics.com.

All above data referencing to the flow tests are taken from the SPE paper 125752 (http://www.onepetro.org/mslib/app/Preview.do?paperNumber=SPE-125752-MS&societyCode=SPE).

Channel Width Comparison between Dynawell DP & DPEX Charges - Surface Test Results

Charge Name	Channel Depth [mm]	50	100	200	300	400	500	600	700	800	900	"EHD [mm]"	"Compressed Targets Mean TTP [mm]"	"Surface of Channel wall [mm^2]"	"Increase to DP Charge [%]"	"Volume of Channel [mm^3]"	"Increase to DP Charge [%]"
DW 6,5g DPEX St/RDX	Width [mm]	7,09	6,05	4,03	3,75	x	x	x	x	x	x	7,15	315	5159	16,46%	7053	42,95%
DW 6,5g DP St/RDX		6,31	4,42	3,5	2,97	x	x	x	x	x	x	5,65	355	4430		4934	
DW 15g DPEX St/RDX	Width [mm]	12,6	9,52	6,6	6,21	x	x	x	x	x	x	9,85	455	10000	15,42%	20690	38,49%
DW 15g DP St/RDX		10,5	8,62	5,58	4,64	3,07	x	x	x	x	x	8,7	505	8664		14940	
DW 23g DPEX St/RDX	Width [mm]	14,1	12,95	8,8	6,7	6,05	5,5	x	x	x	x	10,75	575	14710	8,96%	34430	27,19%
DW 23g DP St/RDX		13,5	10,85	7,55	5,75	4,9	4,8	3,15	x	x	x	9,5	640	13500		27070	
DW 26g DPEX St/RDX	Width [mm]	14,57	12,12	9,15	7,54	5,9	5,6	4,4	x	x	x	12,45	625	16140	23,02%	37450	53,11%
DW 26g DP St/RDX		11,02	10,05	8,23	5,92	4,98	3,84	2,97	x	x	x	9,9	675	13120		24460	
DW 32g DPEX St/RDX	Width [mm]	14,75	12,5	10,45	7,8	6,05	5,66	5,15	4,8	4,2	x	11,95	820	19850	12,59%	44460	39,11%
DW 32g DP St/RDX		12,56	11,06	8,3	6,9	5,71	4,17	4,05	3,4	2,95	2,7	10,3	960	17630		31960	
DW 39g DPEX St/RDX	Width [mm]	15,99	15,08	11,6	9,95	7,98	6,81	5,65	4,85	4,65	4,5	12,95	940	24560	37,59%	60800	82,47%
DW 39g DP St/RDX		13,9	10,26	8,85	6,68	5,85	4,4	3,63	3,52	3,3	2,85	10,05	>1010	17850		33320	