

Optimized Shaped Charges for Frac Operations

ACHIEVING STRONG PERFORMANCE WITH MAXFORCE®-FRAC AND FRACJET RANGES OF PERFORATING CHARGES

OVERVIEW

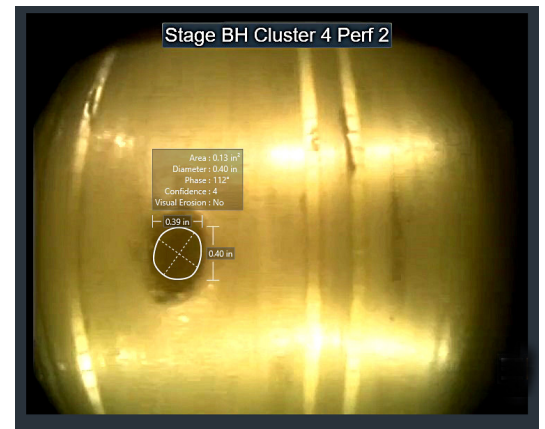
The Halliburton portfolio of frac optimized shaped charges deliver superior consistent holes by providing reduced variance from shot to shot, regardless of fluid clearance and decentralization. Achieving consistent holes on both the upper and lower sides of the well ensures that the initial reservoir breakdown has the greatest chance of creating the most efficient, evenly distributed fractures.

FEATURES

- » Unparalleled experience backed by the industry-leading testing and research team at Jet Research Center (JRC)
- » Qualification testing to the most rigorous standards in the industry
- » Field confirmed results, using downhole camera studies

BENEFITS

- » Improved fluid and proppant distribution
- » Increased likelihood of efficient fracture initiation
- » Reduced near-wellbore tortuosity
- » Greater stimulated reservoir volume



Surface Testing Represents Downhole Results

- » EHD within 2.5% of surface test
- » Better entrance hole variance (EHV) downhole compared to surface

RECOMMENDED PERFORATING CHARGES

Gun O.D. (in.)	Target Casing	Avg. EHD (in.)	EHV	QC Pen. (in.)	Charge Name	Part Number	Explosive Load	Explosive Type
2.75	4.5 in. 13.5#	0.35	2.40%	22.5	150-MaxForce-FRAC RDX	102745134	15 g	RDX
		0.35	2.40%	23.7	150-MaxForce-FRAC HMX	102740045	15 g	HMX
3.125	4.5 in. 11.6#	0.46	4.70%	14.4	210-MaxForce-FRAC RDX	102045430	21 g	RDX
		0.49	5.80%	17.8	210-MaxForce-FRAC HMX	102127122	21 g	HMX
	4.5 in. 13.5#	0.32	2.80%	22.6	FracJet 453532	103097018	21 g	RDX
		0.41	2.30%	31.6	230-MaxForce-FRAC RDX	102736069	23 g	RDX
		0.42	3.00%	36.2	230-MaxForce-FRAC HMX	102732983	23 g	HMX
		0.47	4.00%	17.8	FracJet 453547	102771488	21 g	PETN
	5 in. 18#	0.32	6.70%	21.3	FracJet 501832	103092925	18 g	RDX
		0.34	3.10%	24.8	FracJet 501834	103097742	21 g	RDX
		0.39	11.90%	23.5	FracJet 501839	103002358	21 g	RDX
		0.38	4.80%	31.6	230-MaxForce-FRAC RDX	102736069	23 g	RDX
		0.43	8.90%	14.4	210-MaxForce-FRAC RDX	102045430	21 g	RDX
	5.5 in. 20#	0.32	3.50%	22.6	FracJet 552032	103097018	21 g	RDX
		0.34	4.40%	21.3	FracJet 552034	103092925	18 g	RDX
		0.35	2.55%	23.5	FracJet 552035	103002358	21 g	RDX
		0.39	8.90%	31.6	230-MaxForce-FRAC RDX	102736069	23 g	RDX
		0.40	14.20%	14.4	210-MaxForce-FRAC RDX	102045430	21 g	RDX
		0.40	7.10%	36.2	230-MaxForce-FRAC HMX	102732983	23 g	HMX
	5.5 in. 23#	0.42	13.20%	17.8	210-MaxForce-FRAC HMX	102127122	21 g	HMX
		0.32	6.30%	22.6	FracJet 552032	103097018	21 g	RDX
		0.35	3.37%	23.5	FracJet 552335	103002358	21 g	RDX
		0.36	5.30%	25.5	FracJet 552336	103002357	21 g	HMX
		0.39	10.80%	17.8	FracJet 552339	102771488	21 g	PETN
		0.40	5.90%	31.6	230-MaxForce-FRAC RDX	102736069	23 g	RDX
		0.42	3.80%	36.2	230-MaxForce-FRAC HMX	102732983	23 g	HMX
		0.43	11.70%	14.4	210-MaxForce-FRAC RDX	102045430	21 g	RDX
	0.45	13.80%	17.8	210-MaxForce-FRAC HMX	102127122	21 g	HMX	
	6 in. 25#	0.36	17.40%	36.2	230-MaxForce-FRAC HMX	102732983	23 g	HMX
	3.375	5.5 in. 17#	0.43	13.10%	14.4	210-MaxForce-FRAC RDX	102045430	21 g
0.45			11.70%	17.8	210-MaxForce-FRAC HMX	102127122	21 g	HMX
5.5 in. 23#		0.40	3.50%	31.6	230-MaxForce-FRAC RDX	102736069	23 g	RDX
		0.40	4.30%	36.2	230-MaxForce-FRAC HMX	102732983	23 g	HMX
		0.42	11.24%	17.8	FracJet 552342	102771488	21 g	PETN

VELOCITY™ REVOLVE™ SHAPED CHARGES

Gun O.D. (in.)	Target Casing	Avg. EHD (in.)	EHV	QC Pen. (in.)	Charge Name	Part Number	Explosive Load	Explosive Type
3.125 in.	5.5 in. 23#	0.38	4.50%	26.2	FracJet 2103-S	103108333	21 g	RDX
		0.41	9.40%	27.3	FracJet 2300-S	102986369	23 g	HMX
		0.44	13.40%	20.0	FracJet 2100-S	103110311	21 g	RDX

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