

Typical Marcellus Well (Halliburton)

				Volume per well	
Product Name	Additive	Purpose	Use and Dilution	(10 stages)	Overall %
Water	Carrier Fluid	Creates fracture network in shale and carry sand to the formation	Approximately 4 million gallons per well	4,127,000 gal	95.5297%
Sand	Sand	Enables fractures to remain open and allow gas to escape into the wellbore	Approximately 4 million pounds per well	182,446 gal	4.2232%
FR	Friction Reducer	Reduces friction between pipe and fluid	Diluted at one gallon per 1,000 gallons of water	4,127 gal	0.0955%
Biocide	Antimicrobial Agent	Eliminates bacteria in water sources	Diluted at one-half gallon per 1,000 gallons of water	2,137 gai	0.0495%
Scale Inhibitor	Scale Inhibitor	Prevents scale deposits	Diluted at one gallon per 1,000 gallons of water	1,142 gał	0.0264%
15% HCL	Acid	Dissolves cement and minerals in the perforations (non-diluted)	250 gallons per stage (non- diluted chemicals)	2,503 gal	0.0579%
Gelling Agent	Viscosifier	Creates viscosity to ensure sand is transported into the fractures	Diluted at five gallons per 1,000 gallons of water	720 gal	0.0167%
Oxidizing Breaker	Breaker	Adds viscosity to the fluid	Diluted at one-quarter gallon per 1,000 gallons of water	31 gal	0.0007%
Enzyme Breaker	Breaker	Reduces viscosity of the fluid	Diluted at one-quarter gallon per 1,000 gallons of water	15 gal	0.0004%





Common Name & Supplier Chemical Common Supplier Name Description		Hazardous Component listed	Purpose	Hazardous Component Weight	Component loading	Gal Hazardous Component /	s Concentration Hazardous Component of Total Stage Fluid				
			-	on MSDS		% of Chemical	gal/1000 gal	stage	by % Vol	by % Weight	ppm
	15% HCI Mixture	28% HCL	HCI Acid	Hydrochloric Acid	Dissolves cement and minerals in the perforations	28%	442	247.52	0.0571%	0.0671%	671
	(Halliburton)	HAI-OS	Corrosion Inhibitor	Propargyl Alcohol Methanol	Protects casing	10%	7	0.4	0.0001%	0.0001% 0.0007%	1 7
	*Total 15% HCl system volume is 2,000 gallons per frac stage				π			TOTAL	0.0577%	0.0679%	679
ton	Friction Reducer (Halliburton)	FR-66	Friction Reducer	Hydrotreated light petroleum distillate (non- diesel, BTEX free)	Reduces friction between pipe and fluid	30%		120 TOTAL	0.0277% 0.0277%	0.0293% 0.0293%	293 293
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allib	Bacteriacide (Halliburton)	BE-9	Biocide	Tributyl tetradecyl phosphonium chloride	Eliminates bacteria in water	10%	0.5	20 TOTAL	0.0046%	0.0045%	45 45
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	Scale Inhibitor (Halliburton)	LP-65	Scale Inhibitor	Ammonium chloride	Prevents scale deposits	10%	0.25	10 TOTAL	0.0023% 0.0023%	0.0027% 0.0027%	27 27
	WaterFrac G System (Halliburton)	LGC-35 CBM	Gelling Agent	Polysaccharide	Adds viscosity to fluid	30%	4.89	22	0.0050%	0.0051%	51
				Paraffinic Solvent		30%	4.89	22	0.0050%	0.0051%	51
		Breaker	Oxidizing Breaker	Sodium Persulfate	Reduces viscosity of the	100%	0.02	0.3	0.0001%	0.0001%	1
		GBW-30	Enzyme Breaker	Hemicellulase Enzyme	fluid	15%	0.04	0.1	0.00002%	0.00002%	0.2
	*Total WaterFrac G system volume is 14,700 gallons per frac stage								0.0100%	0.0104%	104