Baroid Industrial Drilling Products

Firm Foam / Stiff Foam / Gel Foam Requirements

Description

Firm Foam is generated by injecting a water/AQF-2 mix (0.5% to 1% AQF-2 by volume) directly into the air line prior to the stand pipe. Initial ratio of this combination is 99.5% Air to 0.5% water/AQF-2 mix, slight adjustments (water/AQF-2 can range from 0.5% to +1%) will be made to compensate for geology and any formation water encountered. This method is used when drilling consolidated rock or other competent formations especially if loss of circulation is expected.

Stiff Foam is generated by injecting a mixture of water/EZ-MUD GOLD (0.25 lb to 1 lb per 100 gallons of water/ and AQF-2 (0.5% to 1% by volume) directly into the air line prior to the stand pipe. Initial ratio is the same as for Firm Foam generation. This method is used when greater hole stability and or clay inhibition is required.

Gel Foam is generated by injecting a mixture of water / 12 to 15 lb of QUIK-GEL per 100 gallons of water / and AQF-2 (0.5% to 1% by volume) directly into the air line prior to the stand pipe. Initial ratio is the same as for Firm Foam generation. This method gives the greatest hole stability and can be enhanced further with addition of QUIK-TROL LV at 0.5 lb to 2 lb per 100 gallons of water.

NOTE: Always mix QUIK-GEL then any polymer in a mixing tank then transfer to second tank and stir AQF-2 into mix when using Stiff Foam or Gel Foam.

NOTE: Proper bit selection and jetting the bit is critical to the success of all drilling operations. If you need advice CALL !

Annular Velocity Required (FPM)

The Annular Velocity needed when using each of these three methods is only **40 to 200 feet per minute** depending on geology and formation water. This is significantly lower than **3000 to 5000 feet per minute** required for normal Air drilling.

CFM of Air / GPM of Injection mixture Required

The amount of air and rate of injection of the three mixtures to obtain a target annular velocity (40 to 200 FPM) can be calculated using the following formulas.

$CFM = FPM / \{ 183.4 / (Diam. Hole^2 – Diam. Pipe^2) \}$

$GPM = CFM \times .005 \times 7.48$

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Product Service Line, Halliburton

Example for an annular velocity of 100 FPM in a 10" hole with 4.5" drill pipe

CFM = 100 / { 183.4 / ($10^2 - 4.5^2$) }
CFM = 43.6
GPM = 43.6 x .005 x 7.48
GPM = 1.6

Controlling CFM with 6" Choke Nipple

A 6" Choke Nipple is simply a 6" long pipe (usually 2" threaded on both ends) with a small hole though the full length.

NOTE: Choke Nipple must be installed in the air line prior to injection fluid. Also a relief valve should be installed upstream of the Choke Nipple to prevent overheating the compressor.

CFM = [{ (C P / 18)(1000) } / 24] / 60

Where C = Choke Coef. And P = upstream pressure

		CFM				
Choke (inch)	C	@100 psi	@150 psi	@200 psi	@250 psi	@300 psi
1/8	6.25	24.1	36.2	48.2	60.3	72.3
3/16	14.44	55.7	83.5	111.4	139.2	167.1
1/4	26.51	102.3	153.4	204.5	255.7	306.8
5/16	43.64	168.3	252.5	336.7	420.9	505.1
3/8	61.21	236.1	354.2	472.3	590.4	708.4
7/16	85.13	328.4	492.6	656.9	821.1	985.3
1/2	112.72	434.8	652.3	869.7	1087.2	1304.6

Use of Foam Mist with DTH Hammer can be accomplished using a water/AQF-2 mix (0.5% to 2% by volume) injected directly into the air line prior to the stand pipe. Injection rate can be reduced from normal water injection rates when drilling with DTH Hammers. This method is used to help prevent balling of clays (more effective with the addition of EZ-MUD GOLD), to improve hole cleaning and to reduce hydrostatic pressure after water has been encountered.

- Note: DTH Hammers operate on pressure differential so the lower hydrostatic pressure in the annulus the better the DTH Hammer will work.
- Note: Although AQF-2 is **NON-COROSIVE** it will wash the oil off internal parts of your DTH Hammer and it is necessary to **always oil your hammer after use to protect it from rust due to exposure to air.**

Although AQF-2 is NSF approved the foam generated should be contained and is not advised to let the foam in water ways or streams.

BAROID ALLWAYS PROMOTES PERSONAL AND ENVIRONMENTAL SAFTY.