



P-PFS

PAGE 1 OF 4

CEMENTING SERVICE BULLETIN

04/18/96

P-PFS (PETROCHEM-PLUG FLOW SPACER)

TECHNICAL DATA

P-PFS is a water-based plug flow spacer fluid designed to be pumped ahead of a cement slurry. The spacer separates the cement slurry from the drilling fluid and is designed to be compatible with both the slurry and the water-based drilling fluid. When oil-based drilling fluids are encountered, P-NSL (Petrochem non-ionic surfactant) is added at a concentration between 1 % to 10 % by volume of mix water, to render the spacer compatible with the oil-base mud.

P-PFS is flexible in design and must be tailored to the specific mud and cement slurry system. Ideally, the spacer is designed to be more dense and have a higher viscosity than the drilling mud. The spacer may be easily moved in plug flow, effectively displacing the drilling fluid.

Even though P-PFS is compatible with almost every cement additive, it must not be used with any cementing system which contains borax as erratic retardation will result.

P-PFS is compatible with most water-based muds. However, compatibility tests with the mud and cement are recommended prior to the job. If the P-PFS is to be used with oil based mud, the addition of P-NSL surfactant is recommended.

PROPERTIES

PRODUCT	FORM	SP.GR.	PACKAGING
P-PFS	White Powder	2.23	50 Lb/Sack.

SAFETY

If the product gets in the eyes flush the eyes with water for at least 15 minutes, and get medical attention. If exposed to the skin, flush skin with water and then wash with soap and water. Inhalation. Move to open air, if irritation persists, get medical attention.



CEMENTING SERVICE BULLETIN

04/18/96

P-PFS is very effective in displacing drilling fluids, particularly in washed-out sections of the hole. Under dynamic conditions P-PFS behaves as a power law fluid.

One of the major advantage of P-PFS spacer, is the fluid-loss properties it exhibits, as it lays down a thin, dense filter cake that helps to limit formation damage that might be caused by fluid leak off, plus it enhances the fluid-loss of the cement slurry that follows the spacer.

PREPARATION

P-PFS is prepared by adding 50 pounds of P-PFS to 39.3 gallons of Ph 6-8 fresh water (However, sea water has been used but the hydration rate is a little slower) which will produce one barrel of 9.0 ppg. spacer fluid, then if needed, add the weighting agent and/or loss-circulation material. Alternatively, P-PFS may be dry blended with the weighting agent, loss circulation material and salt (if needed for compatibility with salt based muds) at the blending plant, do not add additional P-PFS to the final mix as lumping will result.

A minimum of 500 feet of annular fill or 10 barrels of spacer, whichever is greater is recommended. A good guideline to use is 2 barrels per foot of depth. Increased temperature will thin the spacer fluid but will not cause the gel structure to break, subsequently, the system will continue to support solids at elevated temperatures.

When weighting up the spacer use a course grind material to avoid excess viscosity, but at densities above 18 ppg. consider using Hematite or a mixture of barite and ilmenite. Table No. 1 gives the material needed to make one barrel of P-PFS spacer.

To calculate the amount of weighting material needed use the following.

$$P = \frac{42D - 378}{1-DV}$$

WHERE: P = LBS. OF MATERIAL TO WEIGHT UP A 8.98 PPG SPACER FLUID.

D = DESIRED DENSITY IN PPG.

V = ABSOLUTE VOLUME OF WEIGHTING AGENT.

To calculate the yield of the spacer use:

$$YIELD = \frac{42+VP}{42}$$

To double check the density of the spacer use:

$$D = \frac{P + 378}{42 + VP}$$



CEMENTING SERVICE BULLETIN

04/ 18/96

Table No. 1

Density ppg.	Water gal.	P-PFS Lb.	Barite Lb.	Ilmenite Lb.	Density ppg.	Water gal.	P-PFS Lb.	Barite Lb.	Ilmenite Lb.
9.0	39.3	50.0	.....	.....	13.5	32.8	41.7	251.7	...
9.1	39.2	49.8	7.1.....	.....	13.6	32.6	41.5	257.2	...
9.2	39.0	49.6	14.2.....	.....	13.7	32.5	41.3	262.7	...
9.3	39.0	49.6	21.2.....	.....	13.8	32.3	41.1	268.1	...
9.4	38.7	49.3	26.3.....	.....	13.9	32.2	40.9	273.6	...
9.5	38.6	49.1	35.4.....	.....	14.0	32.0	40.7	279.1	...
9.6	38.4	48.9	39.5.....	.....	14.1	31.8	40.5	284.9	...
9.7	38.3	48.7	43.6.....	.....	14.2	31.7	40.3	290.7	...
9.8	38.1	48.5	47.6.....	.....	14.3	31.5	40.1	296.5	...
9.9	38.0	48.3	51.7.....	.....	14.4	31.4	39.9	302.3	...
10.0	37.8	48.1	55.8.....	.....	14.5	31.2	39.7	308.1	...
10.1	37.6	47.9	61.8.....	.....	14.6	31.1	39.6	313.2	...
10.2	37.5	47.7	67.8.....	.....	14.7	31.0	39.4	318.3	...
10.3	37.3	47.5	73.8.....	.....	14.8	30.8	39.3	323.3	...
10.4	37.2	47.3	79.8.....	.....	14.9	30.7	39.1	328.4	...
10.5	37.0	47.1	85.8.....	.....	15.0	30.6	39.0	333.5	...
10.6	36.9	46.9	91.4.....	.....	15.1	30.4	38.8	340.8	...
10.7	36.8	46.8	97.0.....	.....	15.2	30.3	38.6	348.1	...
10.8	36.6	46.6	102.6.....	.....	15.3	30.1	38.3	355.4	...
10.9	36.5	46.5	108.2.....	.....	15.4	30.0	38.1	362.7	...
11.0	36.4	46.3	113.8.....	.....	15.5	29.8	37.9	370.0	...
11.1	36.2	46.1	119.5.....	.....	15.6	29.7	37.7	374.3	...
11.2	36.1	45.9	125.1.....	.....	15.7	29.5	37.6	378.5	...
11.3	35.9	45.6	130.8.....	.....	15.8	29.4	37.4	382.8	...
11.4	35.8	45.4	136.4.....	.....	15.9	29.2	37.3	387.0	...
11.5	35.6	45.2	142.1.....	.....	16.0	29.1	37.1	391.3	...
11.6	35.4	45.0	147.7.....	.....	16.1	29.0	36.9	389.3	7.9
11.7	35.3	44.8	153.3.....	.....	16.2	28.8	36.7	387.2	15.7
11.8	35.1	44.7	159.0.....	.....	16.3	28.7	36.6	385.4	23.6
11.9	35.0	44.5	164.6.....	.....	16.4	28.5	36.4	383.4	31.4
12.0	34.8	44.3	170.2.....	.....	16.5	28.4	36.2	381.4	39.3
12.1	34.7	44.1	175.7.....	.....	16.6	28.3	36.0	379.5	46.7
12.2	34.5	43.9	181.2.....	.....	16.7	28.1	35.8	377.7	54.2
12.3	34.4	43.8	186.7.....	.....	16.8	28.0	35.7	375.8	61.4
12.4	34.2	43.6	192.2.....	.....	16.9	27.8	35.5	374.0	68.8
12.5	34.1	43.4	197.7.....	.....	17.0	27.7	35.3	372.1	76.2
12.6	34.0	43.4	202.9.....	.....	17.1	27.6	35.1	370.3	83.5
12.7	33.9	43.1	208.2.....	.....	17.2	27.4	34.9	368.4	91.0
12.8	33.7	42.9	213.4.....	.....	17.3	27.3	34.8	366.6	98.3
12.9	33.6	42.8	218.7.....	.....	17.4	27.1	34.6	364.7	105.7
13.0	33.5	42.6	223.9.....	.....	17.5	27.0	34.4	362.9	113.1
13.1	33.4	42.4	229.5.....	.....	17.6	26.9	34.2	361.0	120.5
13.2	33.2	42.2	235.0.....	.....	17.7	26.7	34.0	359.2	127.9
13.3	33.1	42.1	240.6.....	.....	17.8	26.6	33.9	357.3	135.2
13.4	32.9	41.9	246.1.....	.....	17.9	26.4	33.7	355.5	142.0



CEMENTING SERVICE BULLETIN

04/ 18/96

Table No. 1 (continued)

Density ppg.	Water gal.	P-PFS Lb.	Barite Lb.	Ilmenite Lb.	Density ppg.	Water gal.	P-PFS Lb.	Barite Lb.	Ilmenite Lb.
18.0	26.3	33.5	353.6	150.0	20.0	23.5	30.0	316.4	297.7
18.1	26.2	33.3	351.7	157.4	20.1	23.4	29.8	314.5	305.1
18.2	26.0	33.1	349.9	164.2	20.2	23.3	29.6	312.7	312.5
18.3	25.9	33.0	348.0	172.1	20.3	23.1	29.5	310.9	319.8
18.4	25.7	32.8	346.2	179.5	20.4	23.0	29.3	310.0	327.2
18.5	25.6	32.6	344.3	186.9	20.5	22.8	29.1	307.1	334.6
18.6	25.5	32.5	342.4	194.3	20.6	22.7	28.9	305.3	342.0
18.7	25.3	32.3	340.6	201.7	20.7	22.6	28.8	303.4	349.4
18.8	25.2	32.1	338.7	209.1	20.8	22.4	28.6	301.6	356.7
18.9	25.1	31.9	336.8	216.5	20.9	22.3	28.4	299.7	364.1
19.0	24.9	31.8	335.0	223.9	21.0	22.1	28.2	297.8	371.5
19.1	24.8	31.6	331.1	231.2	21.1	22.0	28.1	296.0	378.9
19.2	24.6	31.4	331.3	238.6	21.2	21.9	27.9	294.1	386.3
19.3	24.5	31.2	329.4	246.0	21.3	21.7	27.7	292.3	393.7
19.4	24.4	31.1	327.6	253.4	21.4	21.6	27.5	290.4	401.0
19.5	24.2	30.9	325.7	260.8	21.5	21.5	27.4	288.6	408.4
19.6	24.1	30.7	323.8	268.1	21.6	21.3	27.2	286.7	415.8
19.7	23.9	30.5	322.0	275.5	21.7	21.2	27.0	284.9	423.2
19.8	23.8	30.4	320.1	282.9	21.8	21.0	26.8	283.0	430.6
19.9	23.7	30.2	318.3	296.3	21.9	20.9	26.7	281.1	438.0
					22.0	20.8	26.5	279.3	445.4