

A GUIDE TO FLUID-LOSS ADDITIVES

The selection of a fluid loss additive for a particular application is based not only on the desired fluid loss control but also on:

- the effects the fluid loss additive will have on other cement properties
- the compatibility of the fluid loss additive with other additives selected
- the performance efficiency (cost effectiveness) of the fluid loss additive
- In some cases, the fluid loss additives which are physically available.

Therefore, only general guidelines for Fluid-Loss selection are presented in this manual section.

For temperature range applications, a preferred range is presented in table 2. This range reflects the temperatures for typical slurry designs at which the desired fluid loss control can be achieved while the other slurry properties normally remain acceptable.

A usable range (the preferred range extended by solid lines) is included in both tables. This range represents the temperature range over which the fluid loss additive can be used, irrespective of the resulting cement properties or performance efficiency of the fluid loss additive. Therefore, fluid loss additive selection outside of the preferred temperature range may result in, for example, very long thickening times at the low end of the temperature range, or unacceptable fluid loss control and/or excessive concentrations at the high end of the temperature range.

TABLE 1. FLUID-LOSS ADDITIVE APPLICATIONS				
FLUID-LOSS ADDITIVES	USABLE RANGE (BHCT)	TYPICAL CONCENTRATION RANGE	MIX-WATER COMPATIBILITY	SPECIAL PROPERTIES / CONSIDERATIONS
P-LTFL	40 to 130°F (4 to 54°C)	0.3 to 1.5% BWOC.	Fresh water, seawater and NaCl up to 5% BWOW.	Non retarding. Exhibits a threshold effect: a critical concentration is required to obtain acceptable fluid-loss control. Can be used with calcium chloride.
P-LMFL	77 to 185°F (25 to 85°C).	0.2 to 0.7% BWOC	Fresh water, seawater and NaCl up to 10% BWOW.	Candidate for low-density slurry applications (as low as 12.5 lbm/gal). Exhibits non-retarding effect.
P-GF1	77 to 185°F (25 to 85°C).	0.5 to 1.0% BWOC	Fresh water, seawater and NaCl up to 37% BWOW.	Optimum temperature 122°F. Non-retarding.
P-GF7	77 to 203°F (25 to 95°C).	0.5 to 1.0% BWOC	Fresh water, seawater and NaCl up to 37% BWOW.	Optimum temperature 150°F. Has a retarding effect.
P-FLP	60 to 195°F (16 to 91°C)	0.1 to 0.5% BWOC.	Dependent on fluid-loss additive used in conjunction with P-LP.	Fluid-loss additive performance enhancer.
P-FLA	40 to 200oF (4 to 93oC).	0.5 to 1.5% BWOC	Fresh water or seawater.	Candidate for turbulent-flow system design.
P-LF2	40- 200oF (4 to 93oC).	0.5 to 1.5% BWOC	Fresh water up to 5% BWOW.	Non-retarding, compatible with CaCl ₂ , KCl and P-LTR, P-HTR but is not compatible with conventional dispersants P-DIS. However it is compatible with P-LTD dispersants.
P-FLA/S	40 to 200oF (4 to 93oC). With CaCl ₂ down to 100oF (38oC).	0.5 to 1.0% BWOC	Fresh water, seawater and NaCl up to 37% BWOW.	Strong viscosifier. Above 15% BWOW NaCl, high concentrations required for acceptable fluid-loss control, resulting in excessive retardation.
P-FLE	40 to 200oF (4 to 93oC)	0.5 to 3.0% BWOC.	Fresh water, seawater and NaCl up to 37% BWOW.	Candidate for low-density slurry applications (11.0 to 14.5 lbm/gal). Strong viscosifier.
P-300	77 to 200oF (25 to 93oC).	0.2 to 0.6% BWOC	Fresh water, seawater and NaCl up to 6% BWOW.	Incorporating P-500 may extend upper limit. Favors turbulent-flow slurry design.

TABLE 1. FLUID-LOSS ADDITIVE APPLICATIONS, CONTINUED

FLUID-LOSS ADDITIVES	USABLE RANGE (BHCT)	TYPICAL CONCENTRATION RANGE	MIX-WATER COMPATIBILITY	SPECIAL PROPERTIES / CONSIDERATIONS
P-1000	77 to 200°F (25 to 93°C).	0.5 to 2.0 gal/sk.	Fresh water, seawater and NaCl up to 6% BWOW.	Incorporating P-500 may extend upper limit. Favors turbulent-flow slurry design.
P-200D	75 to 210°F (24 to 99°C).	0.5 to 2.0% BWOC.	Fresh water and seawater up to 10% BWOW.	Non-retarding. Non-accelerating and compatible with most Petrochem additives.
P-200	75 to 210°F (24 to 99°C).	0.5 to 2.0% BWOC.	Fresh water and seawater. Up to 10% BWOW.	Non-retarding. Non-accelerating and compatible with most Petrochem additives. Non-compatible with regular dispersants such as P-DIS or P-DISL but is compatible with P-LTD.
P-F45	50 to 230°F (10 to 110°C).	0.5 to 1.5% BWOC.	Fresh water, seawater and NaCl up to 15% BWOW.	Non-retarding. 12.5 to 18.0 lbm/gal slurry-density applications.
P-F45L	50 to 230°F (10 to 110°C).	0.3 to 0.7 gal/sk.	Fresh water, seawater and NaCl up to 15% BWOW.	Non-retarding. 12.5 to 18.0 lbm/gal slurry-density applications.
P-FLAL	77 to 300°F (25 to 149°C).	0.1 to 0.25 gal/sk.	Fresh water, seawater and NaCl up to 37% BWOW.	Used in conjunction with P-DISL or P-EDISL. Ability to control free water and sedimentation.
P-300/P-500	77 to 350oF (25 to 177oC).	0.6 to 1.5% BWOC.	Fresh water, seawater and NaCl up to 6% BWOW.	Incorporating P-500 may extend upper limit. Favors turbulent-flow slurry design).
P-1000/P-500	77 to 350oF (25 to 177oC).	0.5 to 2.0 gal/sk.	Fresh water, seawater and NaCl up to 6% BWOW.	Incorporating P-500 may extend upper limit. Favors turbulent-flow slurry design).
P-2000	250 to 350oF (121 to 177oC)	0.5 to 2.0 gal/sk.	Fresh water, seawater and NaCl up to 6% BWOW.	Always requires the use of P-500. Favors turbulent-flow slurry design.
P-HTFL2	125 to 450oF (52 to 232oC)	0.05 to 0.7 gal/sk. 50% active	0 to 15% BWOW NaCl.	Same as P-HTFL except higher percentage of active component (0.15 gal/sk. P-HTFL is equivalent to 0.1 gal/sk. P-HTFL2).
P-HTFL	125 to 450oF (52 to 232oC)	0.1 to 1.0 gal/sk. 30% active.	0 to 15% BWOW NaCl.	No effect on thickening time, compressive strength or rheology of the system. Use of dispersant is required. High tendency for settling.
P-MTRF	185 to 450oF (85 to 232oC).	0.5 to 1.0% BWOC		
P-F401	180 to 500oF (82 to 260oC)	0.3 to 1.5% BWOC.	Fresh water, seawater and NaCl UP TO 37% BWOW.	Retarders and dispersants affect fluid-loss control.
P-F401L	180 to 500oF (82 to 260oC).	0.2 to 1.0 gal/sk.	Fresh water, seawater and NaCl up to 37% BWOW.	Liquid version of P-F401 (0.7 gal/sk. P-F401L is an active matter content equivalent to about 1.0% BWOC P-F401).

TABLE 2. FLUID-LOSS ADDITIVE SUMMARY

	BHCT RANGE					MIX WATER							
						F r e s h	S e a	5%	10%	15%	18%	37%	
								N a C l	N a C l	N a C l	N a C l	N a C l	
	100°F (38°C)	200°F (93°C)	300°F (149°C)	400°F (204°C)	500°F (260°C)								
P-LTFL	40°F	130°F				X	X	X					
P-LMFL	77°F	185°F				X	X	X	X	X			
P-GF1	77°F	185°F				X	X	X	X	X	X	X	
P-FLP	60°F	195°F				FLUID LOSS ADDITIVE DEPENDENT							
P-FLA	40°F	170°F	200°F			X	X						
P-FLA/S	40°F	140°F	200°F			X	X	X	X	X	X	X	
P-FLE	40°F		200°F			X	X	X	X	X	X	X	
P-1000	77°F	150°F	200°F			X	X	X					
P-GF7	77°F		203°F			X	X	X	X	X	X	X	
P-F45/P-F45L	50°F		230°F			X	X	X	X	X			
P-FLAL	77°F	150°F	220°F	300°F		X	X	X	X	X	X	X	
P-1000	77°F	150°F	200°F			X	X	X					
P-500	77°F		312°F	350°F		X	X	X					
P-2000			250°F	350°F		X	X	X					
P-HTFL P-HTFL2		125°F	250°F	450°F		X	X	X	X	X			
P-MTRF		185°F		450°F		X	X	X	X	X	X	X	
P-F401/ P-F401L		180°F		400°F	500°F	X	X	X	X	X	X	X	

←————→ MAXIMUM RANGE

←-----→ RECOMMENDED RANGE