



# Environmental Solutions



Technical Bulletin

## FMC's patent pending activation chemistries provide unrivaled power and performance in the subsurface for ISCO applications

**Klozur™** sodium persulfate upon activation generates the sulfate radical ( $SO_4^{\bullet-}$ ), a very strong oxidant capable of oxidizing a broad range of recalcitrant compounds of concern (CoC's). Although heat or Fe(II) salts can be used to activate persulfate, heat activation may not be a practical solution, and the performance of Fe(II) may be hindered by availability in the groundwater. FMC has tested certain chemical activators, which in combination with **Klozur™** persulfate destroy many of the most recalcitrant compounds. FMC has patents pending for use of combinations of these chemical activators with persulfate. These activator chemistries for **Klozur™** persulfate include:

- **Chelated Metal Activators**      Improved transportability
- **H<sub>2</sub>O<sub>2</sub> Activation**              Dual oxidant combination for oxidation of recalcitrant CoC's
- **Alkaline Activation**              pH control for the formation of energetic persulfate radicals

Choosing the right chemical activator for use with **Klozur™** persulfate is a function of several factors, including the effectiveness against CoC's and subsurface conditions. Table 1 shows the general effectiveness of the activated persulfate chemistries for various classes of CoC's, as determined in aqueous solutions under laboratory conditions (heat and Fe(II) activation methods also included).

Chemistry	BTEX	chlorinated ethenes	chlorinated ethanes	MTBE	PCB	1,4-dioxane
Un-activated Sodium Persulfate	Y	N	N	N	N	N
Sodium Persulfate + Fe(II)	Y	Y	N	Y	?	Y
Sodium Persulfate + Heat	Y	Y	Y	Y	Y	Y
<b>Klozur™</b> Activated Persulfate with Chelated Metals	Y	Y	N	Y	?	Y
<b>Klozur™</b> Activated Persulfate with Hydrogen Peroxide Activation	Y	Y	Y	Y	?	?
<b>Klozur™</b> Activated Persulfate with Alkaline Activation	Y	Y	Y	Y	Y	Y

**Table 1: General Effectiveness of "Klozur™ Persulfate" Activator Chemistries for Broad Classes of Contaminants of Concern (Y – generally effective, N – generally not effective, ? – data not yet available).**



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