

TWIN HCR CLEANER COMPARISON GUIDE

TWIN HCR v. UREA HYDROCHLORIDE v. HYDROCHLORIC ACID

Twin HCR Modified Acid Systems, based on Fluid USA's patented technology, are part of the "Environmentally Responsible" Modified Acid product line that minimizes the hazardous exposure levels, corrosion rates and negative HS&E properties of HCl while maintaining the positive aspects of solubilizing ability and reactivity rates.

BENEFITS

- Allows acid to be spotted across all perforation clusters
- Reduces frac spread pumping time as ball and acid are at perforations (15 - 30 mins/stage)
- Reduces water requirements (8000 - 13000 gallons per stage) - Hole Volume per stage
- Wireline compatible (PATENT PENDING PROCESS) - Custom blend allows spotting of acid with wireline and tools in hole
- Adjust concentrations on the fly for zones with tougher breakdowns
- High thermal stability up to 374°F (190°C)

See the benefits and advantages of Twin HCR		Twin HCR	Urea Hydrochloride	Hydrochloric Acid (HCl)
HS&E	TDG (Canada)	Class 8, PG III	Class 8, PG III	Class 8, PG II
	DOT (US)	Non-Regulated	Class 8, PG III	Class 8, PG II
	Skin Corrosion	Non-Corrosive	Corrosive (1B)	Corrosive (1)
	Skin Irritation (OECD 404)	Moderately Irritating	N/A (Corrosive)	N/A (Corrosive)
	Eye Damage/Irritation	2A (Irritant)	Category 1 (Eye Damage)	Category 1 (Eye Damage)
	Aquatic Acute Toxicity	Non-toxic	Non-toxic	Category 2
	Aquatic Chronic Toxicity	Non-toxic	Non-toxic	Category 3
Thermal Stability		374°F (190°C)	158°F (70°C)	Unknown
Precipitation		None	Yes	Unknown
Corrosion Protection at 194°F (90°C)	P110	42 hr: 0.017 lb/ft ² (33%)	24 hr: 0.104 lb/ft ² (20%)	Unknown
	Wireline	5 days: 1473 N (33%)	Unknown	Unknown
Hydrogen Embrittlement		Pass	Unknown	Unknown

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	TWIN HCR (MODIFIED ACID)	HYDROCHLORIC ACID (HCl)
HAZARD CLASSIFICATION	<ul style="list-style-type: none"> • Skin corrosion – None ref OECD 404* • Eye Irritation 2 • H319 Causes serious eye irritation 	<ul style="list-style-type: none"> • Skin corrosion 1B • Eye Irritation 1 • H314 Causes severe skin burns and eye damage
CORROSION	<ul style="list-style-type: none"> • Ultra-low corrosion on metals • N-80 Steel, 90°C/6 hours – 6.6 mm/year 	<ul style="list-style-type: none"> • Highly corrosive on metals • N-80 Steel, 90°C/6 hours – 383 mm/year
FUMING	<ul style="list-style-type: none"> • Low fuming 	<ul style="list-style-type: none"> • Exposure through inhalation can cause coughing, hoarseness, inflammation and ulceration of the respiratory tract, chest pain, and pulmonary edema (fluid in the lungs). The lethal dose, LC-50 for humans has been calculated at 1300 ppm.
DERMAL EXPOSURE RESULTS	 <p>© Fluid Energy Group Ltd.</p> <p>HCR Exposure at 100% Concentrate for 15 minutes. No damage to dermal tissue.</p>	 <p>© Fluid Energy Group Ltd.</p> <p>HCl Acid Burn from Splash Exposure</p>

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