

Enviro-Syn[®] HCR-6000[®] is part of the proprietary, eco-friendly Modified Acid[™] product portfolio that minimizes the hazardous exposure levels, corrosion rates and negative HSE properties of hydrochloric acid (HCl), while maintaining the positive aspects of solubilizing ability with a controlled reaction rate. Enviro-Syn HCR-6000 is a strong modified acid that in concentrate has similar solubilizing abilities as 15% HCl and can be enhanced through the addition of conventional oilfield chemistry.

Enviro-Syn HCR-6000 provides a highly effective solution for stimulation or workover treatments with optimal acid flux and wormholing performance for superior formation penetration at lower injection rates compared with retarded or emulsified HCl systems. Ultra-high thermal stability and corrosion inhibitor packages make Enviro-Syn HCR-6000 ideal for steam assisted gravity drainage (SAGD) and cyclic steam stimulation (CSS) scale treatments.

High spent pH stability, and the calcium- and iron-coordinating effects of Enviro-Syn HCR-6000 reduces the precipitation issues prevalent with HCl. This will minimize or eliminate formation damage that can occur when using HCl as a spearhead acid and assist with effluent management.

APPLICATIONS

- ✓ Optimal matrix stimulation / acid fracturing of carbonate formations
- ✓ Ideal for SAGD and CSS scale treatments
- ✓ Effective, broad-range scale removal and prevention

FEATURES & BENEFITS

- ✓ Methodical and comprehensive reaction rate (spend nature) and acid flux performance compared with 15% HCl for superior formation penetration
- ✓ Optimal acid flux and wormholing performance at lower injection rates
- ✓ Adjust concentrations on the fly for zones with tougher breakdowns
- ✓ Minimal reprecipitation of scale at high pH levels
- ✓ Ultra-low, long-term corrosion effects
- ✓ Compatible with typical elastomers used in oil and gas (e.g., Viton, Nitrile and EPDM)
- ✓ High stability in solution
- ✓ Blends available up to 220°C (428°F)

PHYSICAL PROPERTIES

Appearance:	Amber liquid
Specific Gravity:	1.15
Freezing Point:	≈ -45°C (-49°F)
Boiling Point:	> 100°C (212°F)
pH:	< 1.0
Salinity:	≈ 48%
Solubility:	Soluble in water
Shelf Life:	> 1 year

Outstanding HSE profile

- Non-corrosive to skin
- Low fuming
- Biodegradable
- Non-regulated for ground transport (USDOT)

TOTAL SOLUBILITY

Table 1. Total solubility of Enviro-Syn HCR-6000 on a variety of scales.

Acid	Scale	Total Solubility (kg/m ³)	Total Solubility (lb/gal)
15% HCl	CaCO ₃	211	1.76
HCR-6000 Concentrate	CaCO ₃	220	1.84
HCR-6000 1:1	CaCO ₃	130	1.08
HCR-6000 9:1	Dolomite	148	1.24
HCR-6000 Concentrate	FeS	130	1.08
HCR-6000 1:1	FeS	70	0.58

NOTE: High temperature corrosion inhibitor loadings can alter total solubilizing ability.

REACTION RATES

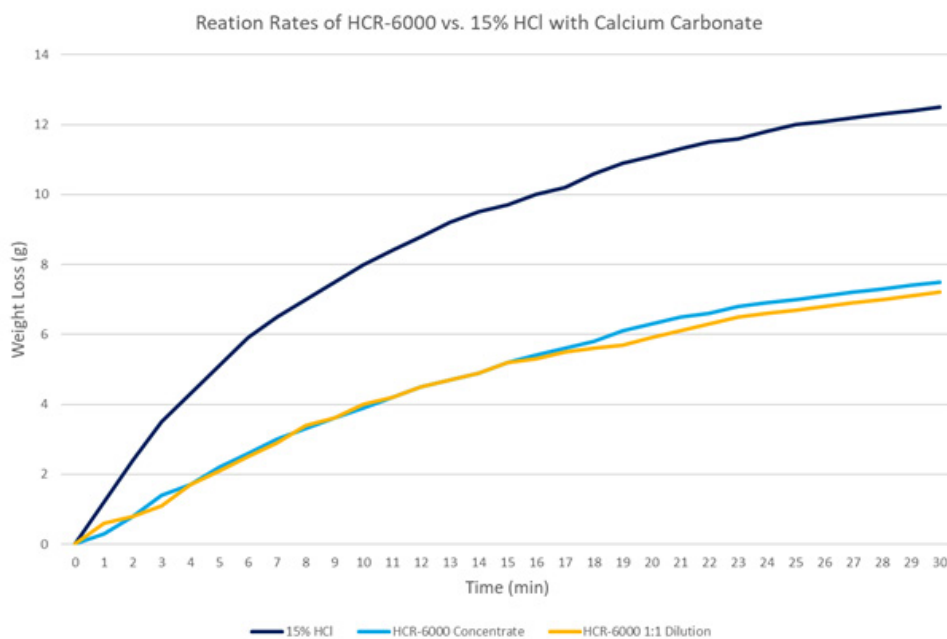


Figure 1. Reaction rate comparison of HCR-6000 concentrate versus 15% HCl with calcium carbonate. Due to the modified nature of the HCR-6000, the reaction rate is more controlled compared to 15% HCl. This reduces the injection rate required for stimulation and improves the wormholing efficiency for deeper formation penetration. Testing was performed at 20°C (68°F).

CORROSION RATES

With ultra-low metal corrosion properties, Enviro-Syn HCR-6000 has corrosion rates well below oilfield industry accepted values on typical oilfield alloys.

Table 2. Corrosion rates of Enviro-Syn HCR-6000 blends.

Blend (HCR:water)	Temp (°C / °F)	Coupon	Time (hr)	Corrosion (mm/yr)	Corrosion (lb/ft ²)
1:1	110 / 230	N-80	6	13.187	0.014
1:1	110 / 230	J-55	6	9.735	0.011
1:1	180 / 356	QT-900	2	29.197	0.011
1:1	180 / 356	J-55	2	10.912	0.004
9:1	150 / 300	L-80	4	25.956	0.019
1:1	180 / 356	L-80	2	26.701	0.010
1:1	60 / 140	316SS	6	4.071	0.005
1:1	90 / 194	1018CS	6	4.458	0.005

NOTE: Oilfield industry typically accepts a corrosion rate less than 0.050 lb/ft² at 6 hours. Coiled tubing typically accepts a corrosion rate less than 0.020 lb/ft² at 6 hours.

SAFETY, STORAGE & HANDLING

- ✓ Stored in sealed containers, such as plastic pails, lined drums and HDPE IBC totes
- ✓ Fittings and valves should be HDPE, brass or stainless steel
- ✓ If heating, use a stainless-steel heat exchanger or tank steam coils, keeping the temperature below 65°C (150°F)
- ✓ Shelf life of > 1 year; confirm corrosion if product sits for > 60 days
- ✓ Consult SDS for additional information and PPE requirements

Talk to us today about our revolutionary products available globally.
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