

Enviro-Syn<sup>®</sup> HCR-7000<sup>®</sup> is part of the proprietary, eco-friendly Modified Acid<sup>™</sup> 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 and reactivity rates. Enviro-Syn HCR-7000 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.

High spent pH stability, and the calcium- and iron-coordinating effects of Enviro-Syn HCR-7000 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

- ✓ Acid spearhead, stimulation and workover treatments
- ✓ Removal of downhole formation, scale, cement or mineral deposits
- ✓ Low to high temperature wellbore conditions

## FEATURES & BENEFITS

- ✓ Aggressive reaction rate (spend nature) versus typical modified or synthetic acid systems for spearheads, stimulations and workovers
- ✓ 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 180°C (356°F)

## PHYSICAL PROPERTIES

Appearance:	Amber liquid
Specific Gravity:	1.1
Odor:	Slight
Freezing Point:	≈ -52°C (-61.6°F) ≈ -16°C (3.2°F) at 1:2 (HCR:water)
Boiling Point:	> 100°C (212°F)
pH:	< 1.0
Salinity:	≈ 32%
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-7000 on a variety of scales.

Acid	Scale	Total Solubility (kg/m <sup>3</sup> )	Total Solubility (lb/gal)
15% HCl	CaCO <sub>3</sub>	211	1.76
HCR-7000 Concentrate	CaCO <sub>3</sub>	216	1.80
HCR-7000 Concentrate	CaMg(CO <sub>3</sub> ) <sub>2</sub>	190	1.59
HCR-7000 Concentrate	FeS	170	1.42

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

## REACTION RATES

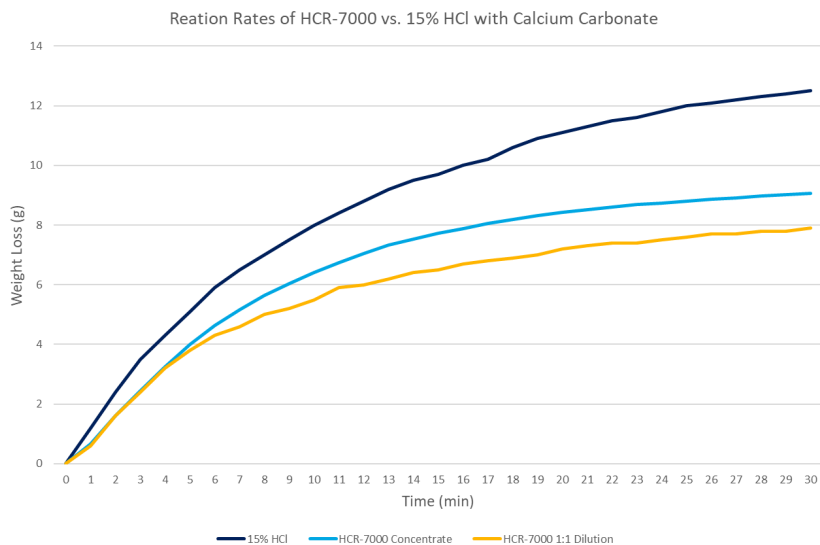


Figure 1. Reaction rate comparison of HCR-7000 concentrate versus 15% HCl with calcium carbonate. Due to the modified nature of HCR-7000, the reaction rate is more controlled compared to 15% HCl. Testing was performed at 20°C (68°F).

## CORROSION RATES

With ultra-low metal corrosion properties, Enviro-Syn HCR-7000 has corrosion rates well below oilfield industry accepted values on typical oilfield alloys.

Table 2. Corrosion rates of Enviro-Syn HCR-7000 blends.

Blend (HCR:water)	Temp (°C /°F)	Coupon	Time (hr)	Corrosion (mm/yr)	Corrosion (lb/ft <sup>2</sup> )
1:1	90 / 195	L-80	6	6.255	0.007
1:1	90 / 195	N-80	6	6.015	0.007
1:1	90 / 195	J-55	6	3.465	0.005
1:1	90 / 195	P-110	6	11.792	0.013
1:1	110 / 230	QT-900	6	8.520	0.009
1:1	90 / 195	1018CS	6	6.531	0.007
1:2	120 / 250	L-80	6	17.906	0.020
1:1	120 / 250	P-110	6	27.880	0.031
1:1	150 / 300	L-80	4	37.183	0.027
1:1	180 / 355	L-80	2	12.282	0.004

NOTE: Oilfield industry typically accepts a corrosion rate less than 0.050 lb/ft<sup>2</sup> at 6 hours. Coiled tubing typically accepts a corrosion rate less than 0.020 lb/ft<sup>2</sup> 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.**

**[info@fluidenergygroup.com](mailto:info@fluidenergygroup.com) or [www.fluidenergygroup.com](http://www.fluidenergygroup.com)**