

Enviro-Syn<sup>®</sup> HCR-3000<sup>®</sup> is a proprietary, eco-friendly Synthetic Acid<sup>™</sup> product 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-3000 is a strong, halogen-free synthetic acid that in concentrate has similar solubilizing abilities as 20% HCl and can be enhanced through the addition of conventional oilfield chemistry.

Ultra-high thermal stability and corrosion inhibitor packages make Enviro-Syn HCR-3000 ideal for high temperature applications. Enviro-Syn HCR-3000 is compatible with exotic metal alloys (e.g., aluminium, copper, brass and chrome) and is non-regulated for air, sea and land transport.

#### APPLICATIONS

- ✓ Effective, broad-range scale removal and prevention
- ✓ Acid spearhead, stimulation and workover treatments
- ✓ Ideal for applications where a strong acid is required and high temperatures or exotic metals are exposed (e.g., chrome-plated bottom hole assemblies and downhole pumps)

#### FEATURES & BENEFITS

- ✓ Non-chloride, synthetic acid system
- ✓ Free of nitrogen, phosphorous, and halogens
- ✓ Immediate and comprehensive reaction rate (spend nature) for effective 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 including aluminum, copper, brass and chrome / chrome plating
- ✓ 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 (430°F)

#### PHYSICAL PROPERTIES

Appearance:	Clear amber liquid
Specific Gravity:	1.2
Freezing Point:	≈ -30°C (-22°F)
Boiling Point:	> 100°C (212°F)
pH:	< 1.0
Solubility:	Soluble in water
Shelf Life:	> 1 year

#### 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

#### Outstanding HSE profile

- Non-corrosive to skin
- Low fuming
- Biodegradable
- Non-regulated for air, land and sea transport

## TOTAL SOLUBILITY

Table 1. Total solubility of Enviro-Syn HCR-3000 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-3000 Concentrate	CaCO <sub>3</sub>	280	2.3
HCR-3000 Concentrate	CaMg(CO <sub>3</sub> ) <sub>2</sub>	190	1.6
HCR-3000 Concentrate	FeS	170	1.42

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

## REACTION RATES

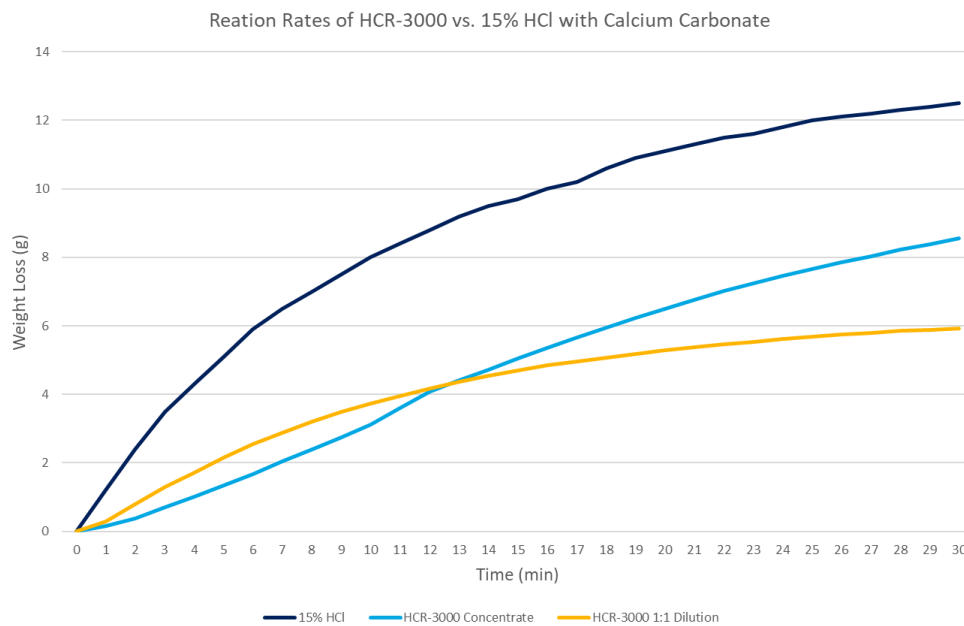


Figure 1. Reaction rate comparison of HCR-3000 versus 15% HCl with calcium carbonate. The reaction rate of HCR-3000 is more controlled compared to 15% HCl. Testing was performed at 20°C (68°F).

## CORROSION RATES

With ultra-low metal corrosion properties, Enviro-Syn HCR-3000 has corrosion rates that are well below oilfield industry accepted values on typical oilfield alloys.

**Table 2. Corrosion rates of Enviro-Syn HCR-3000 blends on oilfield alloys.**

Blend (HCR:water)	Temp (°C /°F)	Coupon	Time (hr)	Corrosion (mm/yr)	Corrosion (lb/ft <sup>2</sup> )
Concentrate	90 / 195	N-80	6	0.584	0.001
Concentrate	90 / 195	QT-800	6	0.851	0.001
1:1	130 / 256	N-80	6	2.464	0.003
Concentrate	130 / 256	QT-800	6	12.392	0.014
1:1	90 / 195	N-80	6	2.692	0.003
1:1	90 / 195	QT-800	6	4.772	0.005
1:1	130 / 256	N-80	6	5.577	0.006
1:1	180 / 355	J-55	4	11.939	0.003
1:1	160 / 320	QT-900	3	28.321	0.019
1:1	150 / 302	L80	4	9.724	0.007

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.

**Table 3. Corrosion rates of Enviro-Syn HCR-3000 blends on chrome alloys.**

Blend (HCR:water)	Temp (°C /°F)	Coupon	Time (hr)	Corrosion (mm/yr)	Corrosion (lb/ft <sup>2</sup> )
Concentrate	60 / 140	Chrome plated 1018CS	6	0.360	0.000
Concentrate	90 / 195	Chrome plated 1018CS	6	0.291	0.000
1:1	110 / 230	Super Duplex 2507	6	0.0038	0.000
1:1	110 / 230	Duplex 2205	6	1.022	0.001
1:1	200 / 392	Duplex 2205	3	24.821	0.014

**Talk to us today about our revolutionary products available globally.**

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