PRODUCT DATA SHEET

Enviro-Syn® HCR-7000-WL®

Wireline Compatible Modified Acid™ System

Enviro-Syn® HCR-7000-WL® a Dorf Ketal Technology, is a strong Modified Acid™ that in concentrate has similar solubilizing abilities as 15% HCl. Fluid's proprietary patented method enables operators to spot acid with perforating bottom hole assemblies (BHA's), saving substantial amounts of water, and time in hydraulic fracturing operations.

APPLICATIONS

- Acid spearhead, stimulation and workover treatments
- Low to high temperature wellbore conditions
- Perforating in acid, compatible with most coated and uncoated wireline cables

PHYSICAL PROPERTIES

Specific Gravity:	1.105
Odor:	Slight
Freezing Point:	≈ -50°C (-58°F) at 100% 7000-WL ≈ -20°C (-4°F) at 33% 7000-WL
Boiling Point:	> 100°C (212°F)
pH:	< 1.0
Shelf Life:	6 months

SUPPORT HSE AND ESG GOALS

Non-corrosive to skin

Low-fuming*

Readily Biodegradable (OECD-301E)

Non-regulated for ground transport (USDOT)

*NOTE: Reduced immediate evolution of hydrogen chloride vapor at ambient temperature

FEATURES & BENEFITS

- Aggressive reaction rate (spend nature) versus typical modified or synthetic acid systems for spearhead treatments
- Wireline compatible – custom blend allows spotting of acid with wireline and tools in hole
- Reduces frac spread pumping time (average 10 – 15 min/stage depending on well design) as ball and acid are at perforations
- Reduces water requirements by one hole volume per stage (average 30 – 50 m^3/stage, 8,000 – 13,000 gal/stage depending on well design)
- Allows acid to be accurately spotted across all perforation clusters for optimal acid diversion and frac placement
- Adjust concentrations on the fly for zones with tougher breakdowns
- Minimal reprecipitation of scale at high pH levels
- Long-term casing and cable corrosion protection in case of delayed events
    - Iron coordinating effects of HCR-7000-WL reduces the precipitation issues prevalent with HCl
- No degradation of wireline coating or jacket
- Compatible with typical elastomers used in oil and gas (e.g., Viton, Nitrile and EPDM)
- High stability in solution
- Blends available up to 110°C (230°F)

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TOTAL SOLUBILITY

Table 1. Total solubility of Enviro-Syn HCR-7000-WL on a variety of scales.

Acid	Scale	Total Solubility (kg/m³)	Total Solubility (lb/gal)
15% HCl	$CaCO_3$	211	1.76
HCR-7000-WL Concentrate	$CaCO_3$	216	1.80
HCR-7000-WL Concentrate	$CaMg(CO_3)_2$	190	1.59
HCR-7000-WL Concentrate	FeS	170	1.42

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

CORROSION RATES

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

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

Blend (HCR:water)	Temp (°C /°F)	Coupon	Time (hr)	Corrosion (mm/yr)	Corrosion (lb/ft²)
1:2	110 / 230	316SS	6	10.413	0.011
1:2	110 / 230	P-110	6	1.557	0.002
1:2	110 / 230	L-80	6	2.199	0.002
1:2	110 / 230	J-55	6	1.398	0.002
1:2	110 / 230	QT-1100	6	3.724	0.002

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.

Table 3. Corrosion rates with a 1:2 (HCR:water) Enviro-Syn HCR-7000-WL blend on wireline coupons.

Blend (HCR:water)	Temp (°C /°F)	Coupon	Time (hr)	Weight Change (%)	Breaks in Strands
1:2	110 / 230	Triple Strand Wireline	4	2.94	0
1:2	110 / 230	Triple Strand Wireline	5	2.55	0
1:2	110 / 230	Greased Wireline	6	6.04	0
1:2	110 / 230	Greased Wireline	10	6.62	0
1:2	110 / 230	Greased Wireline	12	9.11	0
1:2	110 / 230	Greased Wireline	72	5.41	0

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.

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WIRELINE TESTING

Enviro-Syn HCR-7000-WL has been extensively tested with major wireline suppliers' equipment.

Table 4. Tensile breaking force of wireline treated with Enviro-Syn HCR-7000-WL blends.

Blend (HCR:water)	Coupon	Temp (°C /°F)	Time (hr)	Tensile Breaking Force (N / lbf)	% Retained (vs control)
Control	Greased Wireline	N/A	N/A	1777 / 399	N/A
Control	Exterior (Triple Strand)	N/A	N/A	1167 / 263	N/A
Control	Interior (Single Strand)	N/A	N/A	2442 / 549	N/A
1:2	Exterior (Triple Strand)	110 / 230	4	1097 / 247	94%
1:2	Interior (Single Strand)	110 / 230	4	2240 / 130	92%
1:2	Exterior (Triple Strand)	110 / 230	5	995 / 224	85%
1:2	Interior (Single Strand)	110 / 230	5	2395 / 538	98%
1:2	Greased Wireline	110 / 230	6	1669 / 375	94%
1:2	Greased Wireline	110 / 230	10	1544 / 347	87%
1:2	Greased Wireline	110 / 230	12	1622 / 365	91%

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 > 6 months; 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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