

New Product Launch in Industrial Lubricants

ColaCor 232, ColaCor 232H, & ColaLube 3449

Steven Tang

Business Manager, Industrial Lubricants & Corrosion Inhibitors

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- **ColaCor 232 & 232H:** Amine Carboxylate Corrosion Inhibitors
- **ColaLube 3449:** An emulsifier & boundary Lubricant

ColaCor 232 & ColaCor 232H

Gap Analysis: Amine Carboxylates

Current Commercial Portfolio

Cola[®] Cor 200

Cola[®] Cor 300

Cola[®] Cor 400

Cola[®] Cor 500

Need the coverage on alkanolamine dibasic carboxylates for the market needs!

Cola[®]Cor 232 & ColaCor 232H

Chemistry

- ColaCor 232 is amine neutralized dibasic carboxylic acids (Corfree M1 type)
- ColaCor 232H is amine neutralized, mixed dibasic and mono-carboxylic acids
- Soluble in water and glycols

General Characteristics for ColaCor 232 & ColaCor 232H

ColaCor 232

PROPERTY	SPECIFICATION
APPEARANCE @25C	CLEAR LIQUID
pH (AS IS)	7.5 – 7.9
ACID VALUE, mgKOH/g	150 – 160
ALKALI VALUE, mgKOH/g	170 – 190

ColaCor 232H

PROPERTY	SPECIFICATION
APPEARANCE @25C	CLEAR AMBER LIQUID
pH (1% aq))	7.0 – 9.0
ACID VALUE, mgKOH/g	85.0 – 100.0
ALKALI VALUE, mgKOH/g	230.0 – 250.0
COLOR, GARDNER BYK	8 MAX

Regulatory Listings

	ColaCor 232	ColaCor 232H
USA (TSCA)	√	√
Canada (DSL)	√	√
New Zealand (NZIoC)	√	√
China (IECSC)	√	√
Korea (ECL)	√	√

Shake Foam Test

- 2 wt% solutions in South Pittsburg tap water (70-80 ppm)
- Vigorously shake for 30s
- Key Results
 - Initial foam height → foaming tendency
 - Time for foam to collapse → foam decay

	Liquid Height (mL)	Height @ t 0	Time to collapse (s)
ColaCor 232H	52	70	30
ColaCor 232	52	67	<30
Ref 1	52	80	<30
Ref 2	52	80	47

Ref 1: Competing technology for ColaCor 232H

Ref 2: a mainstream amine carboxylate corrosion inhibitor

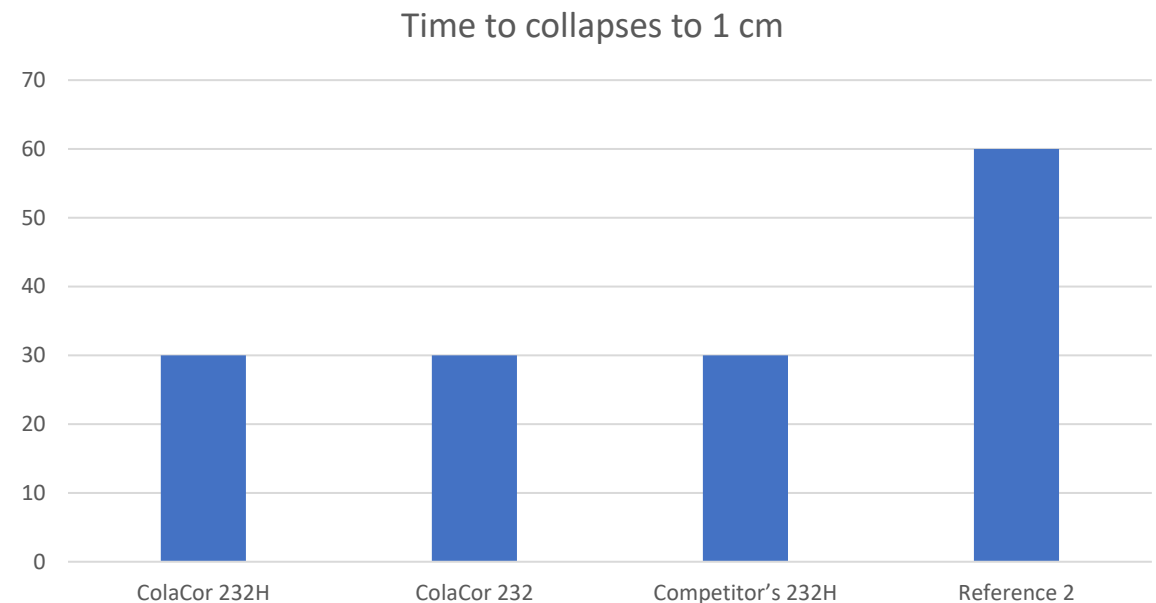
Low-foaming tendency with fast decay

Blender Foam Test (D3519)

- Foam formed under the high-shear force
- 1.0 wt% in tap water (70-80 ppm)
- ColaCor 232 and 232 H
 - On par with the ColaCor 232H industry standard (Ref 1) in foaming capability and foam decay
 - Decays faster than std technology (Ref 2)

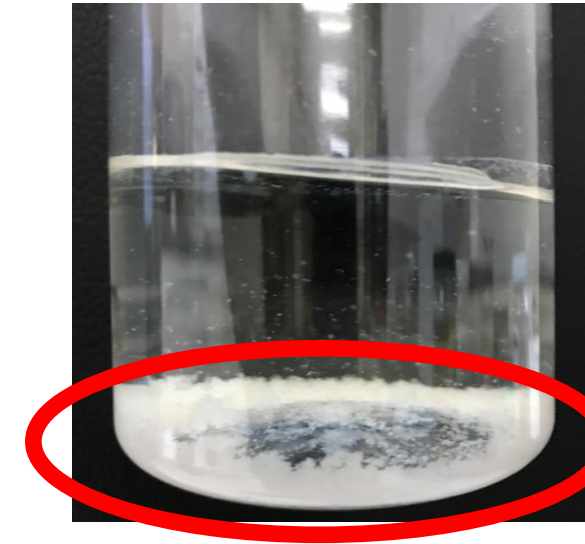
Low foam with fast decay

	Rest. Hgt. (mm)	Int. Hgt. (mm)
ColaCor 232H	41	65
ColaCor 232	41	58
Ref 1	41	60
Ref 2	41	68

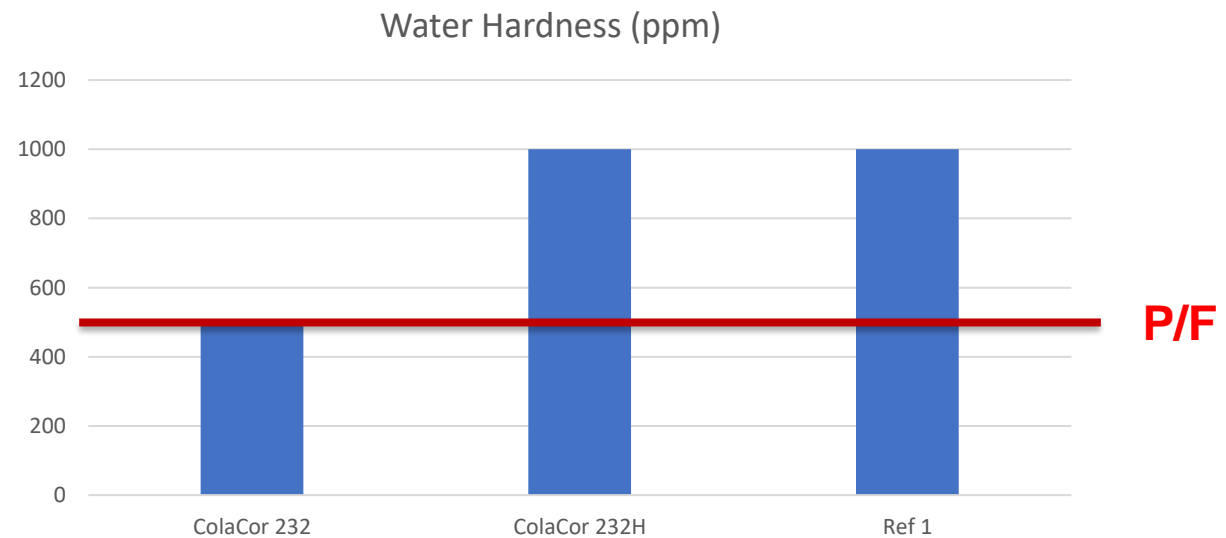


Hard Water Tolerance

- Test Method
 - 2% solution in the hard water at the designed concentration of CaCl_2 .
 - Pass/Fail Test @ 500 ppm Hardness
 - No flakes observed after 24 hrs → Pass
 - Flakes observed in 24 hrs → Fail
 - Hard Water Tolerance Limit
 - The max conc. of CaCl_2 yielding no flakes in 24 hrs
- Both ColaCor 232 and ColaCor 232H pass the hard water test
- As designed ColaCor 232H shows better hard water tolerance than ColaCor 232.

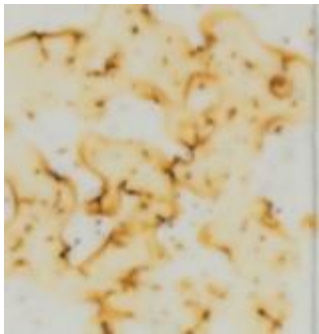


Fail

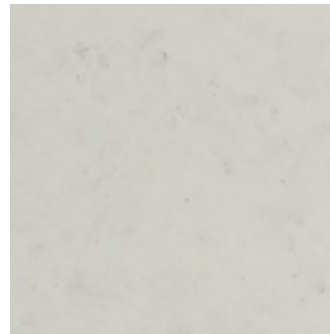


Corrosion Inhibition Performance

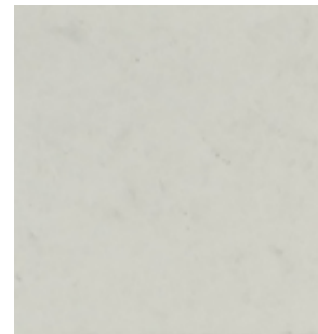
At 0.5 wt% in South Pittsburg Water (70-80 ppm hardness)



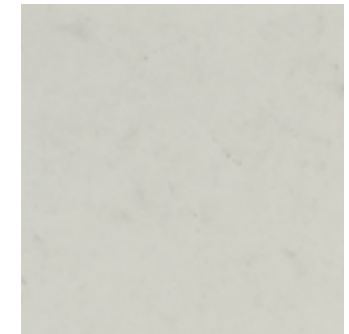
Control
(SP Tap water)



ColaCor 232



ColaCor 232H



Ref 1

Highly effective for rust prevention - sufficient protection for ferrous metal at 0.5 wt%

ColaCor 232 & ColaCor 232H

- Low-foaming and high effective corrosion inhibitor for the ferrous material protection under aqueous conditions.
- Hard water stable
- Leave no residual tacky film.

ColaCor 232 vs. ColaCor 232H: User's Guidelines

- Interchangeable in many formulations
- But each has discrete application cases
- Different in hard water tolerance
 - ColaCor 232: 500 ppm
 - ColaCor 232H: 1000 ppm

ColaCor 232 & ColaCor 232H: Applications

- **Semi-/synthetic metalworking fluids**

ColaCor 232/H	20%
ColaLube 3440/ UCON™ EPML483/ ADDCO® MLB-10X	30%
TEA	10 - 20%
Water	Balance

- Need to be diluted at varied concentrations per machining process
- Suitable for heavy duty cutting and grinding

- **Alkaline cleaners**

- **Circulating cooling systems**

Competitive Landscape & Business Opportunities

Competitive Landscape

	ColaCor 232	ColaCor 232H
Alox	Aqualox 232	Aqualox 232H
ACC	TAS COR 215A (upon salting)	
PCC Chemax	MAXHIB AC-5000	

Business Opportunities

- Wherever the competing technology exists
- Wherever the Corfree M1 type of dibasic acid is used
 - Cathay PureMix II
 - Emerox 1199
 - Metal Chemie MC-103

ColaCor 232 & ColaCor 232H

- Based on dibasic and mono- carboxylic acids
- Low-foaming and high effective corrosion inhibitor for the ferrous material protection under aqueous conditions.
- Hard water stable
- Leave no residual tacky film.
- Can be used alone or co-applied with other type of corrosion inhibitors.
- Suitable for metalworking and metal cleaning

ColaLube 3449

ColaLube 3449

- AMP-based alkanolamides
- The process improved version of ColaLube 3429
- Manufactured under the same production recipe as ColaLube 3429 and shares its specifications.
- Analytically identical to ColaLube 3429.
- More cost-effective than ColaLube 3429.

SPECIFICATIONS

Appearance @ 25°C	Clear Liquid
Alkali Value	150
Acid Value	41.0
pH (10% aqueous)	9.5
Color, Gardner'98	11 Max.

Ester Contents in ColaLube 3429 and ColaLube 3449

Determined by IR Analysis

	ColaLube 3429	ColaLube 3449
%Ester	4.3	5.8

The improved process for ColaLube 3449 does not cause shift on the ester content

Emulsification Performance Evaluation

High Oil Semi-Synthetic Fluids (conc.)

Ingredient	% of formula
ColaLube 3449	5.0
Rest	95.0
	100.0

Emulsion Stability Testing

Duration (hrs)	T (°C)	Result
24	50	Pass
168	50	Pass
	4	Pass
	-20	Pass

Pass = No phase separation

Other Performance Evaluation

- Good ferrous protection @ 2 wt% by CIC
- Good Four-Ball Wear (ASTM D4172B) performance in bar and chain lube

Key Performance Attributes

	ColaLube 3449
Foaming	Moderate
Non-staining on Aluminum	√
Non-staining on Copper	√
Enhance Formulation Bioresistance	√
Easily Waste-treatable	√
Diethanolamine-free	√
Corrosion Inhibition	√
Lubricity Additive	√
Detergent / Surfactant	√
Emulsification	√

Applications

- MWF
 - Semisynthetic Fluids
 - Microemulsion coolants
 - Machining and grinding gray iron
 - Machining fluids for titanium alloys
- Alkaline metal cleaners
- Bar and chain oil
- Generator or hydraulic lubricant

- Suggested Formula for Chain Lube

- ColaLube 3449	28.0%
- Propylene Glycol	10.0%
- Isopropyl Alcohol	4.8%
- EDTA	4.8%
- Water	52.4%

100%

Recommended dilution: 0.5 – 2.0 wt% in water

ColaLube 3449

- Presents comprehensive performance profile
 - Emulsification
 - Lubricity
 - Corrosion protection
 - Bioresistance
 - Detergency
- Colonial's current go-to option for alkanolamide-based emulsifier and boundary lubricants
- Enables biocide-free metalworking fluid formulation
- Used in the metalworking fluids for the machining processes for certain specialty high-strength alloys.

Thank You!

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Welcome any comments on any additional data to generate!!!

Steven Tang: steven.tang@colonialchem.com

