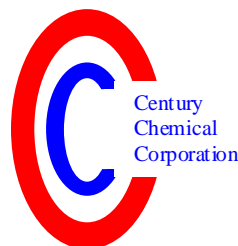


Zinc - Free Extrusion System

C-Lube EX15

Exceptional Cold Forming Polymer Lubrication



CENTURY CHEMICAL CORPORATION

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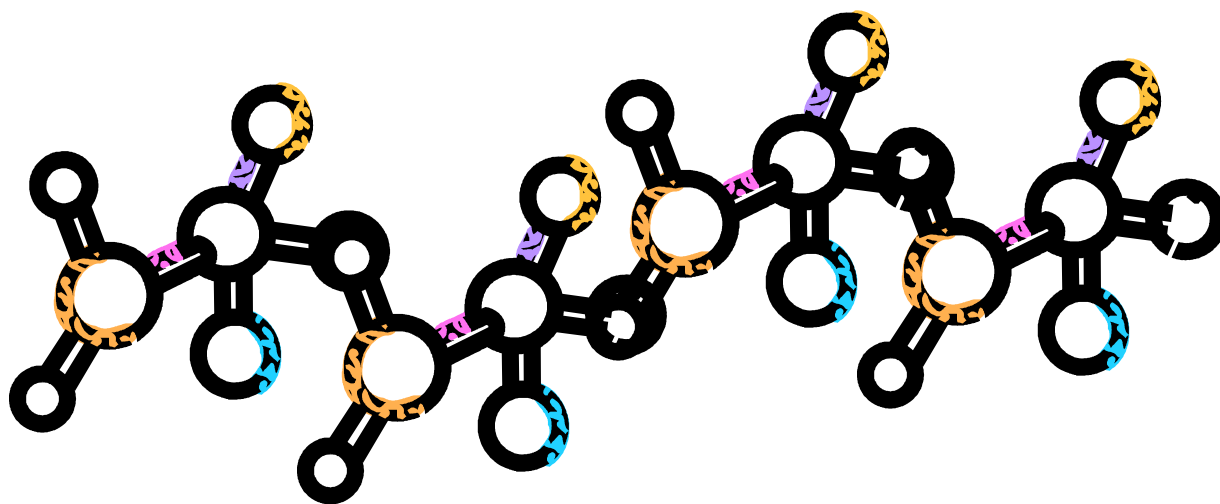
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Polymer Chemistry

C-Lube EX15 is a water base co-polymer emulsion. Its unique and exceptional lubrication properties are based upon a sophisticated manufacturing process whereby a monomer and several secondary polymers are combined to form a single, high molecular weight massive chemical compound. Unlike a conventional solvent based polymer system, this technology utilizes an internally stabilized system which becomes part of the finished polymer itself. The resultant product is a totally water-base, stable emulsion structure bearing a co-polymer of immeasurable weight and length.



This colossal polymeric compound is then augmented with an organic rust-inhibition system to prevent oxidation during drying, a secondary pH buffer to maintain its desirable operating alkalinity as well a surface control agent to minimize skinning. As “stand alone” chemistry, this blend provides durable lubrication in the dried, hardened film through its achieved elasticity as the metal temperature rises during part deformation. The film is capable of sustaining its lubrication layer even during multi-blow extrusions and multi-pass drawing.

Polymer Application and Advantages

The C-Lube EX15 process enables the cold forming industry to eliminate zinc phosphate completely from the pickle line and stop phosphate de-sludging; reduce waste treatment costs, eliminate airborne zinc dust on the shop floor; decrease process time and improve the capabilities and consistency of the coating and its performance; and dramatically enhance the surface finish of the drawn steel surface.

Since its inception in the earlier forties, the cold forming industry has relied on conventional zinc phosphate and reactive stearate soaps for the cold drawing, heading and extrusion of steel. After acid pickling, the parts are required to be repeatedly immersed in a zinc phosphate solution, water rinsed, alkaline neutralized and lastly coated with a reactive lubricant. These solutions are chemically incompatible with each other, require copious quantities of rinse water in between process stages, dictate water treatment of zinc and nickel and ultimately have short process lives before decanting or disposal is required.

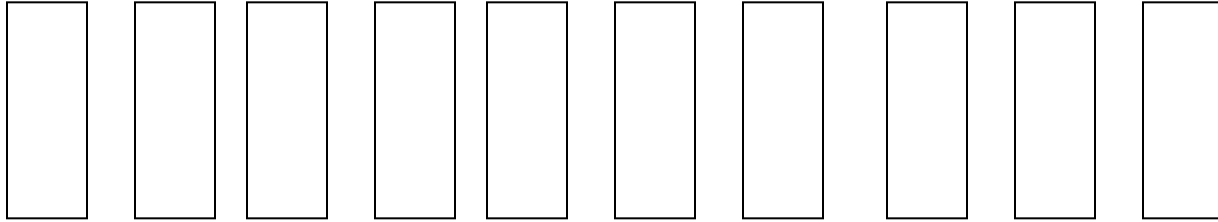
Polymer Pre-Coat: C-Conditioner 66RN

The C-Lube EX15 polymer process utilizes an intermediate “conditioning” step, which provides additional flushing of the parts after acid pickling and provides a base for the non-reactive polymer film. The sequence contains only one overflowing water rinse between acid pickle and conditioning step, which is of course absent of heavy metal compounds and mineral acids. The overall chemical sequence is essentially cut by 50%.

The coating deposited by the C-Lube EX15 polymer is non-reactive (there is no intermediate chemical compound formation) with the steel or the conditioned steel surface. This is a purely physical accumulation of polymer lubricant unto the steel whose quantity is increased with a pretreatment of the surface conditioning product C-Conditioner 66RN. The C-Conditioner 66RN is a liquid concentrate diluted with water and used in an immersion step prior to the C-Conditioner 66RN. This treatment “conditions” the steel by the chemical conversion of the steel surface to an inorganic layer consistently primarily of a mixture of iron phosphate and iron oxide. This layer affords a greater quantity of subsequent C-Lube EX15 to be deposited as well as to provide a mild barrier between the actual steel surface being deformed and the tooling.

Zinc Phosphate Process Line vs. Polymer Process Line

zinc phosphate process



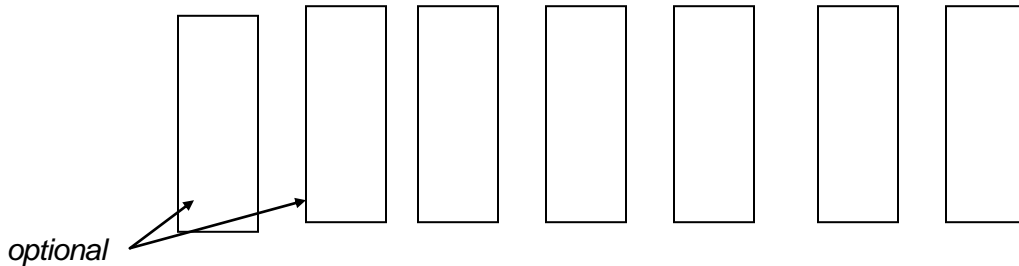
1	2	3	4	5	6	7	8	9	10
Alkaline Clean	Hot water rinse	Sulfuric acid pickle	Cold water rinse	Hot water rinse	Zinc phosphate	Cold water rinse	Alkaline Neutralize	Reactive lube	Forced hot air dry
8 min	2 min	10 min	2 min	2 min	8 min	2 min	2 min	6 min	
190°F	r.t.	150°F	r.t.	170°F	180°F	r.t.	170°F	170°F	

optional

- 9 process steps totaling 42 minutes
 - 6 heated tanks averaging 170°F,
- 4 overflowing water rinse averaging 2- 5 gallons minute
- 16,800 gallons water usage per 8 hour production shift

vs.

polymer process



1	2	3	4	5	6	7
Alkaline clean	Hot water rinse	Sulfuric acid pickle	Cold water rinse	Conditioner 66RN	Polymer C-Lube EX15	Forced hot air dry
8 min	2 min	10 min	2 min	6 min	3 min	
190°F	r.t.	150°F	r.t.	165°F	100°F	

- 6 process steps totaling 31 minutes
 - 4 heated tanks averaging 150°F,
- 1 overflowing water rinse averaging 2- 5 gallons minute
- 4,200 gallons water usage per 8 hour production shift

Polymer and Conditioner Solution Control

C-Conditioner 66RN

The Conditioner 66RN process solution is controlled by a standard acid/base titration to determine total phenolphthalein acidity. In addition to the total acid concentration, a daily solution pH check is also required. On a 10 ml sample against 0.1N Sodium Hydroxide reagent, the recommended concentration range is from 25 to 35 points. Our pH operating range is from 3.5 to 5.0.

An external additive, C-Additive N, can be added to the Conditioner 66RN process solution for coating deposition acceleration once or twice per shift to maximize conditioner coating weight.

Century will provide solution control data sheets on process and testing solutions, along with MSDS sheets

C-Lube EX15

The C-Lube EX15 concentration is controlled by a total solids check determined by a series of weight loss checks before and after water evaporation. A known and weighed volume of the C-Lube EX15 is placed in a disposable weigh tray and heated in a laboratory oven or hot plate until the water content is driven off and only solids remain. After cooling, a final weight is taken and a weight difference and percent solids is calculated. Depending on application, solids content from 10 to 20% is acceptable.

An additional solution pH check is also taken on the polymer solution. Our desired pH range is typically from 8.5 to 10.5 and an organic pH control additive, C-Additive RPS, is used for this purpose.

Century will provide solution control data sheets on process and testing solutions, along with MSDS sheets

Work Sheet Summary of Cost Savings

Century can assist your purchasing and engineering departments in developing annual specific cost savings in these categories.

Energy Savings

Costs have been shown to be reduced by 40 to 60% of the monthly natural gas and electric bills. Boiler capacity is likewise greatly enhanced.

Waste Treatment Savings

The alkali precipitation system is essentially converted to a neutralization system. The cost to treat a gallon of water is reduced by 50 to 70%. In addition there are no compliance issues with regulatory agencies or the risk of fines and penalties.

Process Time Savings

On average 25% more production can be achieved through the pickle house, so five days of production can be achieved in four. Production numbers can be further increased as the need for re-pickle and lubing orders decreases.

Overall Savings

The actual dollar savings for some extrusion mills has been calculated in the millions of dollars over the course of a business year. Helping to create a hazard free, productive working atmosphere that is always environmentally compliant is something that can't necessarily be accurately quantified. It will certainly ensure that your manufacturing process extends well into the new Century.