Technical Process Bulletin

BONDERITE L-FM 235 ACHESON FORMING LUBRICANT

(KNOWN AS BONDERLUBE 235)

Issued
6/28/2013

1. Introduction:

BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) chemical, a cold forming lubricant with exceptionally high film strength, is used on zinc phosphate conversion coated surfaces for such forming operations as cold extrusion, cold heading, tube drawing, etc. It reacts with the coating, forming a lubricant layer which facilitates cold forming of the metal and offers superior corrosion resistance.

2. Operating Summary:

Chemical	Bath Preparation per 100 Gallons
BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235)	56 pounds
66° Bé Sulfuric Acid (96%)	0.4 pounds
Operation and Control	
Free Acid (Free Alkali)	0.5 to (0.3) points
Babcock Number	1.8 to 2.2 points
Temperature	160° to 190° Fahrenheit
Immersion Time	3 to 5 minutes

3. The Process:

The complete process for application of BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) normally consists of the following steps.

A. Conversion coating
B. Water rinsing
C. Neutralizing
D. Applying the BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) solution
E. Drying

4. Materials:

BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) Chemical
BONDERITE M-PT (known as PARCOLENE) (neutralizer)
Caustic Soda

Sulfuric Acid, 60° to 66° Bé
Testing Reagents and Apparatus

5. Equipment:

All equipment for use with the lubricant solution may be constructed of mild steel.

6. Surface Preparation:

Conversion Coating Treatment:
BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) is applied over a zinc phosphate conversion coating. A number of BONDERITE (conversion coating) processes are available and our representative will recommend the proper one for each installation. Processing information for conversion coating application is detailed in the Technical Process Bulletin for the specific BONDERITE treatment.

Water Rinsing:
After bonderizing the work should be thoroughly rinsed with cold water. The rinse should be continuously overflowed at a rate that keeps it free of scum and contamination.

Neutralizing:
The bonderized metal, wet from the water rinse is immersed for one minute in a hot, dilute PARCOLENE (neutralizing) solution to eliminate any residual acidity. The solution is generally heated to about the same temperature as the BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) process, but in some installations satisfactory results may be obtained by operating at lower temperatures. A number of BONDERITE M-PT (known as PARCOLENE) products are available and our representative will recommend the proper one for each installation.

7. Applying the BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235):

Buildup:
The concentration of the lubricant depends on the application. Extrusion operations generally require more concentrated solutions than tube drawing, but the best concentration for any particular application should be determined experimentally.

The usual concentration is 50 pounds of BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) chemical per 100 gallons (U.S.) of solution volume, and it is suggested that this amount be used for the original buildup.

Fill the tank half full with water. Add the required amount of the lubricant, with agitation, and heat to 180° to 190° Fahrenheit to facilitate solutioning of the BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235). After the lubricant has dissolved, add sufficient cold water to bring the solution up to the proper operating level. The addition of the cold water will reduce the temperature into the desired operating range. Then add, for every 56 pounds of BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) used for the buildup, 0.5 pounds of 60% Bé (78%) or 0.4 pounds of 66° Bé (96%) sulfuric acid. Dilute the sulfuric acid, by adding it to an equal volume of cold water before adding it to the BONDERLUBE bath.

Water quality will effect the performance of BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235). Softened or deionized water must be used in areas where water quality is suspect. Your representative should be consulted if water quality is unknown.

Operation:
Time: usually 3 to 5 minutes.

Temperature: 160° to 190° Fahrenheit.
Application: immersion.

Immerse the articles to be treated in the BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) bath for a sufficient length of time to permit the lubricant to penetrate and react with the coating.

The temperature must be established for each installation and is usually in the range of 160° to 190° Fahrenheit. The lubricant reacts better with the zinc phosphate conversion coating near the lower end of the temperature range. If drainage is a problem, the upper portion of the temperature range may be more desirable. The temperature at which the BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) solution is operated should not be allowed to vary more than ± 5° Fahrenheit.

To ensure the complete displacement of the rinse solution by the lubricant when tubing or tightly packed bundles are being treated, remove the articles shortly after immersing in the lubricant, drain briefly, and then immerse again.

If the work is being processed in tumbling barrels, the barrels should revolve at a very slow speed to minimize abrasion of the coating.

8. Testing and Control:

Never pipet by mouth, use a pipet filler.

Sampling:
A sample taken from the hot lubricant should be analyzed immediately. If allowed to cool, it will become thick and jelly-like, and must then be heated and mixed to a homogenous sample to permit analysis. The solution should be heated no longer than necessary, so as to avoid loss of solution by evaporation. Any sample sent for complete analysis should be placed in an 8 oz, wide-mouth, glass bottle. Polyethylene is not satisfactory.

Free Acid / Free Alkali:
Pour 200 ml of Reagent Solution 51 into a 250 ml beaker, then add 10 ml of the hot BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) bath into the beaker. Heating to boiling, and boil for 1 minute. (Longer boiling will cause change in titration and evaporation of Test Solution). The solution will be either colorless (acidic) or pink (alkaline). Remove from the hotplate.

If the solution is colorless titrate with Titrating Solution 11 to the development of a permanent, faint pink. The ml of Titrating Solution 11 used is the free acid value in points.

If the solution is pink, titrate with Titrating Solution 20 until one drop discharges the last of the pink color. The ml of Titrating Solution 20 used is the free alkali value in points.

NOTE: Reagent Solution 51 is carefully neutralized during its manufacture. For exceptionally close control of the lubricant, check its neutrality, and adjust if necessary. To do this, place 200 ml of Reagent Solution 51 in a 250 ml beaker, and heat to boiling. It will be either pink or colorless. If pink, add Titrating solution 20, dropwise, until one drop just removes the color. If colorless, add Titrating solution 11, dropwise, until one drop gives a faint pink. (Normally, not more than two drops of either Titrating Solution is required.) Then add the 10 ml BONDERLUBE sample and titrate. Be sure you have correct volume of Reagent Solution 51 before adding Bonderlube sample.

The free acid should be maintained between 0.3 free alkali and 0.5 free acid.

To decrease free acid 0.3 points for every 100 gallons of lubricant bath:

Add 1.5 ounces (42.5 grams) of dry caustic soda or 55 mls 50% liquid caustic soda dissolved in cool water. The caustic soda dry or liquid should be dissolved in cool water at a rate of 1.5 ounces or 55 mls per gallon of water before adding to the lubricating tank. This dilution will prevent shocking the bath and increase the speed of the neutralization process.

To increase free acid 0.1 points for every 100 gallons of lubricant bath:

Add 0.25 pounds of Parco Additive 700. This addition of Parco Additive 700 will increase the Babcock but only by 0.02 points.

After the addition of Parco Additive 700 or caustic soda, a free acid or free alkali titration should not be made for at least 1/2 hour in order to allow ample time for complete mixing and reaction.

The frequency with which the free acid or free alkali test should be made depends on the tank size and the amount of production, but should be made at least once each day.

Babcock Number:
The Babcock number is a measure of the concentration of the lubricant.
Pour 10 ml of Reagent Solution 51 into a 150 ml beaker. Pipet 10 ml of the hot BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) bath into the beaker and mix thoroughly. Filter through a paper filter onto a Babcock milk test bottle (graduated 0 to 8). Wash the beaker and filter paper with a second 10 ml portion of Reagent solution 51. Discard the filter paper. Place the Babcock bottle in a boiling water bath for at least 30 minutes to remove all the Reagent Solution 51. (The level of the water bath should be high enough to cover most of the neck of the Babcock bottle). Then add 20 ml of Reagent Solution 44. Swirl to mix and heat in the boiling water bath until a clear oily layer has formed. Then add sufficient hot boiled water to the test bottle to bring the clear oily layer into the graduated neck of the bottle. When the layer has separately sharply, take the readings of the upper and lower edges of the clear, oily column in the neck. The difference between these two readings is the Babcock number in points. The readings should be taken while the Babcock bottle is still in the hot water bath. If removed, rapid cooling and shrinking of the volume will make accurate readings impossible.

With some baths, the amount of sediment is so small that the filtration step can be eliminated. Transfer the beaker contents (the BONDERLUBE sample and the 10 ml of Reagent Solution 51) directly to a Babcock bottle, and place in a boiling water bath, then proceed as above.

Babcock Number range: 1.5 to 3 points.

To increase the value about 0.1 point: 2.8 lbs of BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) per 100 gallons of solution volume.

A lubricant prepared with 56 lbs of lubricant chemical per 100 gallons of solution should have a Babcock number of about 2 points.

As metal is treated through the lubricant bath, the active ingredients of the bath are gradually consumed and the Babcock number decreases. The Babcock number should be kept within ± 0.3 points of the value found most satisfactory for the particular forming operation.

BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) chemical dissolves rather slowly in the operating bath, and can be added by one of two methods described below.

A. A small mixing and circulating tank can be attached to the main tank, and additions of lubricant chemical may be made into this tank. This unit also gives better warm-up of a cold lubricant and keeps the solution well mixed. Prints of the unit may be obtained upon request.

B. Water may be heated in a steel drum to 190° to 200° Fahrenheit with a steam coil. The lubricant chemical will dissolve readily in this hot water and may then be transferred manually or by a pump to the main tank.

9. After Treatment:

Drying:
After the BONDERLUBE treatment, the work should be allowed to drain, and then be dried thoroughly. Failure to dry the articles completely will reduce the drawability, and in the case of tubes, may cause chattering.

Many heavy gauge articles will dry satisfactorily from their own heat. Others may be dried before a fan blowing heated air, or a drying unit with temperatures up to 350° Fahrenheit may be used. Short drying times should be used with the higher temperatures. The metal should never be in the dryer longer enough to heat it to the temperature where its characteristics would be adversely affected. During drying, tubes should be sloped with the open ends low and toward the fan.

Removal of the BONDERLUBE Coating:
Where removal of the lubricant after drawing is necessary, the use of a PARCO CLEANER especially formulated for lubricant removal is recommended.
Our representative can recommend the proper cleaner.

10. Storage Requirements:

BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) is a powdered chemical and need not be protected from freezing.

11. Waste Disposal Information:

Should it ever be necessary to discard a BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) solution, the bath should first be allowed to cool to room temperature at which time it will become thick and jellylike. Or, if preferred, the solution is boiled until concentrated to half its normal volume, then cooled. The material may then be shoveled into containers and hauled away by an approved, professional waste disposal service.

BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) chemical, a high titer soap solution, can be pumped if maintained above 165° Fahrenheit. Otherwise, it will jell, clogging pipes and associated transfer equipment.

Fluidizing Bonderite Solution:
Upon fluidizing, Bonderite is converted to a suspended metal soap that stays fluid and is pumpable when at room temperature. For information on how to fluidize Bonderlube solutions, please refer to Technical Bulletin 235449 for BONDERITE M-AD 172 (known as ACCELERATOR 172) or 230004 for BONDERITE M-AD 171 (known as ACCELERATOR 171). The preferred product for fluidizing Bonderlubes is BONDERITE M-AD 172 (known as ACCELERATOR 172) due to cleanliness and of ease of use.

Before rebuilding the BONDERITE bath, be sure the tank is well cleaned.

12. Precautionary Information:

Fine particulate dust particles of BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) may be irritating to the eyes, nose, and throat. When handling the chemical in the form as supplied, the precautionary, first aid and handling recommendations on the Material Safety Data Sheet for the product should be read understood and followed.

BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235) solution, as prepared, is a hot soap solution which can result in thermal burns. Do not get in eyes and avoid contact with hot solution. Use chemical goggles or face shield. In case of contact with the hot solution, treat as a thermal burn.

Caution: Sulfuric acid and caustic soda can be harmful on contact. Consult your supplier literature for precautionary information relating to these materials.

Testing Reagents and Apparatus
(Order only those items which are not already on hand)

Code	Quantity	Item
598639	2*	Babcock Milk Test Bottle
592462	2*	Beaker, 150 ml
592463	3*	Beaker, 250 ml
592477	2	Buret Assembly, 25 ml Automatic
595168	1 pkg	Filter Paper, Whatman 541
592485	3*	Graduated Cylinder, 100 ml
592499	1	Pitcher, Graduated, Plastic
593846	5 pt	Reagent Solution 44 (50% H_2SO_4)
592439	1 gal	Reagent Solution 51 (isopropyl alcohol)
595337	2*	Stirring rod
594334	1	Thermometer, Floating
592427	1 gal	Titrating Solution 11
592430	1 gal	Titrating Solution 20
**	1	Acid Dispensing Assembly
**	2*	Beaker, 1000 ml
**	2*	Funnel, Glass, 65 mm
**	2*	Graduated, Conical, 50 ml
**	1	Hotplate, Electric

* Includes one more than actually required, to allow for possible breakage
** Can be purchased from a local chemical supply house such as VWR or Fisher Scientific.

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BONDERITE L-FM 235 ACHESON FORMING LUBRICANT

(KNOWN AS BONDERLUBE 235)

Company _____ Technical Process Bulletin No. 230029
Plant _____ Unit _____
Henkel Surface Technologies Representative_____
Telephone _____ Sales Office Telephone _____

BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235)

Tank	Tank No. _____. Working Volume _____ gallons. _____ gallons per inch.
Buildup (Section 7)	_____ pounds of BONDERITE L-FM 235 ACHESON (known as BONDERLUBE 235)
Operation (Section 7)	Time: _____ minutes _____ seconds. Temperature: _____° to _____ ° Fahrenheit.
Testing and Control (Section 8)	Free Acid or Free Alkali: Test every _____. 10 ml sample, 200 ml Reagent Solution 51, heat to boiling. Titrating Solution 11 to a pink color or Titrating Solution 20 until colorless. Range: _____ free alkali to _____ free acid. To lower free acid _____ point, add _____ pounds _____ ounces of caustic soda. To lower free alkali _____ point, add _____ pounds _____ ounces of _____ Bé sulfuric acid. Babcock Number: Test every _____. 10 ml sample, 10 ml Reagent Solution 51. Filter into a Babcock test bottle; wash filter with 10 ml Reagent Solution 51. 10 ml Reagent Solution 44, place in hot water bath. Add hot water to bring oily layer into neck. Range: _____ to _____. To raise Babcock _____ point: _____ pounds

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