SAF-ACID

DESCRIPTION

SAF-ACID descaling compound is a special blend of sulfamic acid, wetting agent and color indicator. The wetting agent enhances the action of the sulfamic acid in removing deposits by its surface-active cleaning properties. The color indicator provides a simple means for determining whether the strength of the SAF-ACID solution is adequate for effective, efficient cleaning.

APPLICATION & USE

SAF-ACID is recommended for removing mineral scale deposits from evaporators, heat exchanger heat transfer surfaces, and boilers. It is also effective in removing iron deposits when used in combination with salt. SAF-ACID descaling compound is effective in removing shell growth from seawater heat exchangers.

Before using SAF-ACID, if there is organic matter (oil) in the deposits, the equipment should be cleaned with HDE-777, LAC or EDGE®. If the organic material is baked on, it may require an initial cleaning with DREWFRESH® 2000.

SAF-ACID must be dissolved in fresh water before adding to cleaning equipment. Always add SAF-ACID to water. Never add water to SAF-ACID.

When dissolved, SAF-ACID strength is monitored by a built-in color indicator. **A gold color indicates SAF-ACID solution is the appropriate strength for descaling.** As scale is dissolved and the acid strength becomes exhausted, the solution turns from gold to green. When this occurs, the solution is no longer sufficiently acidic to efficiently dissolve scale. The cleaning solution can be brought back to strength by the addition of approximately 25% of the initial dose of SAF-ACID. The additional SAF-ACID should turn the solution gold again while maintaining the cleaning solution temperature at 60-70° C. When equipment is very heavily scaled and large amounts of SAF-ACID descaling compound are required, the solution may become saturated and will remain gold in color because no additional scale can be dissolved. To avoid this, not more than two subsequent acid charges should be added. After the second addition of SAF-ACID, if the equipment is not clean, then properly discard the solution and repeat the cleaning procedure with a fresh acid solution.

After cleaning with SAF-ACID, drain and flush with fresh water and rinse with a 1% solution of GC concentrated alkaline liquid to neutralize any acid remaining on heat transfer surfaces.

IMPORTANT INFORMATION AND PRECAUTIONS

- Do not allow acid solution to remain in equipment for more than 24 hours.
- As with all acid cleaning, be sure to remove zinc plates and rods or other sacrificial anodes before cleaning.
- The acid cleaning process may generate flammable/hazardous gas, including hydrogen. Do not perform hot work when acid is in circulation.
- Always make sure that equipment has sufficient ventilation to prevent the accumulation of gases.

FEATURES

- **Free-flowing acid powder**
- **Contains a corrosion inhibitor**
- **Contains a wetting agent**
- **Contains a color indicator**

BENEFITS

- **Quick removal of scale.**
- **Easy to store.**
- **Easily soluble in water.**
- **Does not require equipment disassembly resulting in shorter down time.**
- **Minimizes metal attack during cleaning**
- **Can be used in most shipboard systems**
- **Penetrates light, organic film**
- **Easy determination of solution strength**
- **Does not require special test apparatus**

Contact your Drew Marine representative for more information

Continued on Page 2

For boiler cleaning:
- Do not acid clean a boiler with SAF-ACID when deposits contain significant amounts of copper or a high percentage of silica.
- Never fire the boiler while containing an acid solution.
- Vent to the outside.

For evaporator/heat exchanger cleaning:
- Do not add sodium chloride (ordinary salt) to the acid solution for removing iron oxide deposits if the equipment is made of stainless steel or titanium.

NOTE: Care should be taken to follow local treatment and disposal regulations with all waste water.

EQUIPMENT REQUIRED

Proper planning is essential to acid cleaning with SAF-ACID.

The following items are required:

1. Equipment for circulating the acid solution.
2. Vent pipe to carry any gases released during the cleaning to the outside.
3. Protective clothing for personnel performing the acid cleaning. This includes goggles or splash shield, rubber gloves and a rubber apron.

CLEANING COMPOUNDS REQUIRED AND DOSING CHART

Dosing Quantity Calculation

Capacity of equipment figured by the following:	*To obtain required dosage of SAF-ACID compound (10% concentration), multiply capacity of equipment by the following:*	
	Kgs.	Kgs.
Cubic meters (metric tons)	100	50 for titanium
For titanium alloy heat exchangers, reduce the dosage concentration of SAF-ACID to a 5% solution, and the temperature of the cleaning should not exceed 50°C.		
The dosage of GC concentrated alkaline liquid required for neutralization is listed below:		
Capacity of equipment figured by the following:	*To obtain a 1% solution of GC liquid, multiply capacity of equipment in tons by the following:*	
	Liters	
Cubic meters (metric tons)	10	

If deposits contain iron oxide, add sodium chloride (ordinary salt) to the acid solution. The amount of salt needed is equal to half the amount of SAF-ACID used. Remember, if the equipment is stainless steel, do not add salt.

PRETESTING FOR LEAKS

Before cleaning begins, equipment should be checked for leaks. Prepare the chemical cleaning equipment, fill the mix tank with water and turn on the circulation pump to fill the equipment to be cleaned. Maintain the level of water in the mix tank at half full. Circulate the water by means of the pump and check to be certain there are no leaks in the piping and that the equipment is functioning. If there are no leaks in the system, proceed with cleaning.

CLEANING PROCEDURE

1. Boilers
Install vent piping from a top opening in the boiler to the outside.

Disconnect the bottom blow down piping and install a "tee." Run a line from one end of the tee to waste water collection tank. Install a shut-off valve in this line. Run a line from the circulating pump discharge to the other end of the tee. Run a line from the bottom of the mix tank to the suction side of the circulating pump. Run another line from the top of the boiler to the top of the mix tank. Set all valves properly. Fill the boiler with water to the bottom of the gauge glass as well as the mix tank, pump and hoses. Fire the boiler using a low fire until the temperature of the water reaches 65° C.

Start the circulating pump and regulate the flow of solution so that the pump removes water from the mix tank at the same rate it is added. Circulation will be from the bottom to the top of the boiler. Refer to Diagram 1 for circulation through the boiler.

Slowly add the proper amount of SAF-ACID to the mix tank. A 10% by weight solution will be required. Refer to the dosage chart to determine the required amount of SAF-ACID to add to the mix tank to make a 10% by weight solution relative to the size of the boiler.

Continued on Page 3

When the acid cleaning solution is exhausted, it turns from a gold to a green color. If this occurs, add approximately 25% of the initial dose of SAF-ACID. Cleaning is complete when the strength of SAF-ACID holds steady for at least two (2) hours as indicated by a steady gold color. After two (2) hours, stop the acid pump, drain and flush the boiler.

After the boiler is flushed, fill the boiler with water and add the required amount of GC to obtain a 1% solution. Refer to the dosage chart to determine the required amount of GC to make a 1% solution. This will neutralize any acid remaining in the equipment. Circulate the neutralizing solution for a minimum of two (2) hours.

Once the solution is neutralized, drain and inspect the boiler. If necessary, flush with a high-pressure hose to remove any loose matter. If the results are satisfactory, return the boiler to normal operating condition by disconnecting the vent pipe and tee and reconnecting the blowdown line, etc.

If not returned to service, the boiler must be passivated. Check with your local Drew Marine representative for passivation procedures.

2. Evaporators/Heat Exchangers
Add SAF-ACID slowly to the tank of water, stirring if necessary until the desired quantity of acid is dissolved. Refer to the dosage chart for the amount of acid required.

Circulate the acid cleaning solution at a temperature of 60-70° C. The solution may be heated by either the introduction of steam or the use of an immersion heater. If the equipment is badly scaled, it may be necessary to discard the cleaning solution and make a fresh batch. Cleaning is complete when the SAF-ACID strength holds constant for at least half an hour as indicated by a steady gold color. Cleaning is generally accomplished in 2-6 hours.

Drain the cleaning solution and flush the system. Refill with water and add the required amount of GC concentrated alkaline liquid. Refer to the dosage chart for making a 1% neutralizing rinse solution. Circulate for 1/2 to 1-1/2 hours, then drain the system. Inspect the system and return to service.

TYPICAL PHYSICAL PROPERTIES

Appearance:	Green, granular powder
Solubility in Water:	20% at 16° C
pH of 10% Solution:	0.7
Flash Point (PMCC):	N/A

NOTE: Always wear the appropriate personal protective equipment when using this product.

PACKAGING

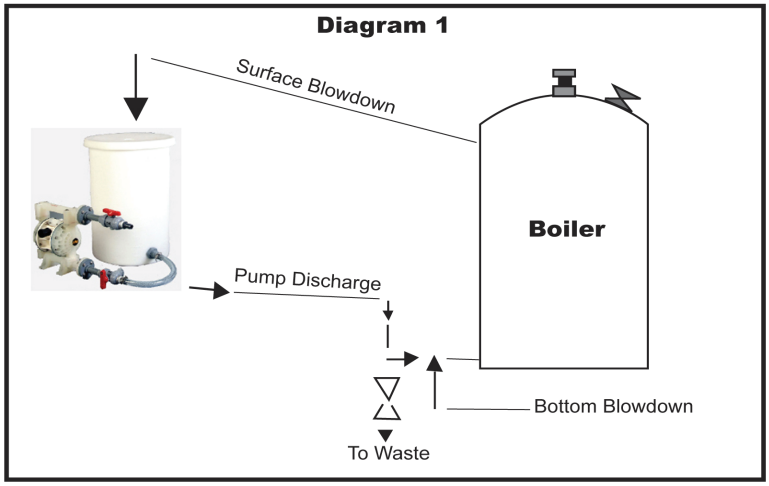
SAF-ACID descaling compound is available in 25-kg containers (PCN 0062349).

IMPORTANT INFORMATION

Drew Marine maintains Safety Data Sheets on all of its products. Safety Data Sheets contain health and safety information for your development of appropriate product handling procedures to protect your employees.

Our Safety Data Sheets should be read and understood by all of your supervisory personnel and employees before using Drew Marine products.

Diagram 1



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Continued on Page 4

Drew Marine maintains Safety Data Sheets on all of its products. These documents contain health and safety information for the development of appropriate product handling procedures to protect your employees. Safety Data Sheets should be read and understood by all of your supervisory personnel and employees before using Drew Marine products.

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