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MUD-OUT™ Mud Dispersant

TYPICAL PIPING SCHEMATIC

BALLAST SYSTEM WITH MUD-OUT™ SYSTEM

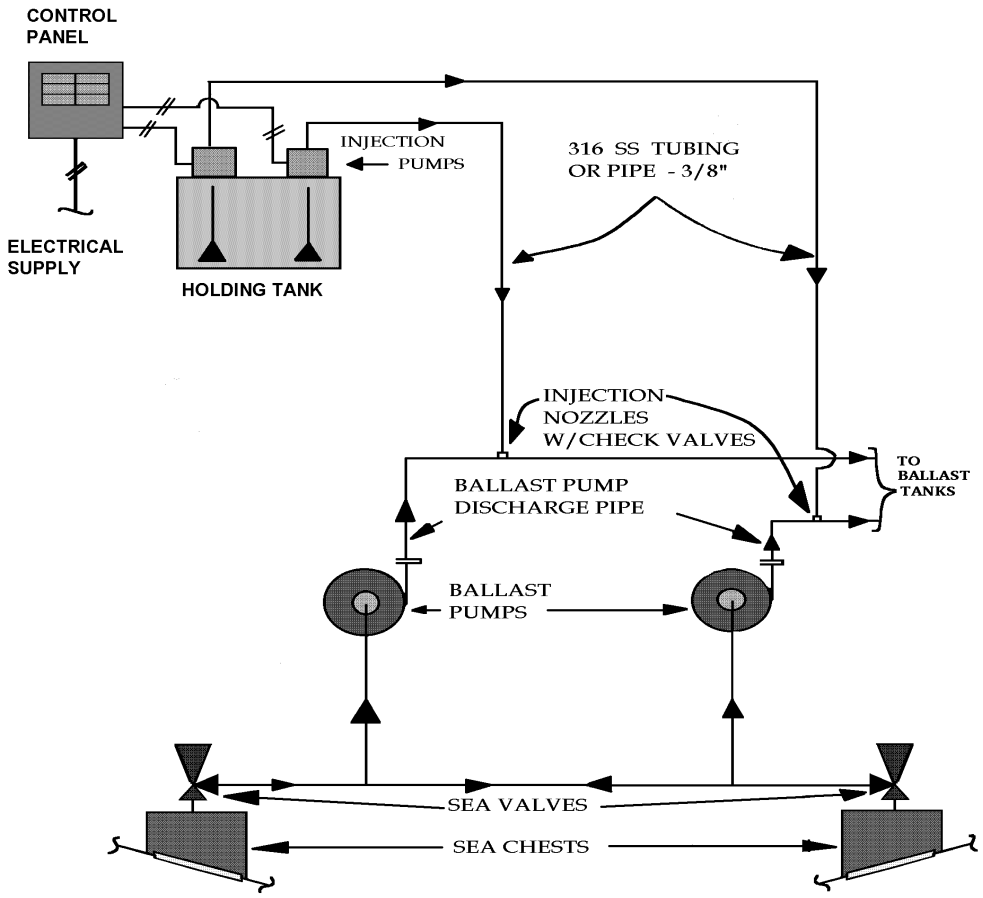

FIGURE 3

MUD-OUT™ Application – Figure 3

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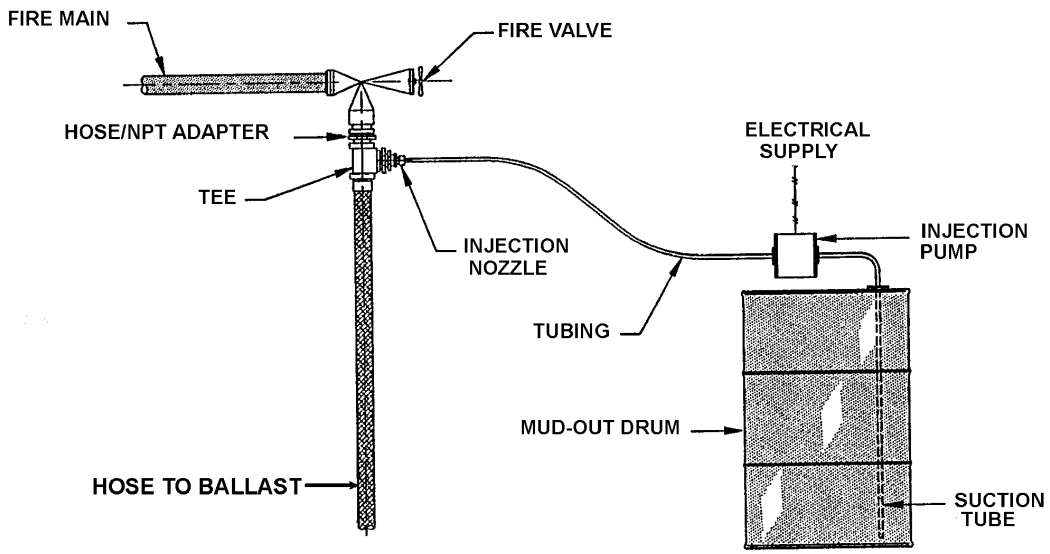

MUD-OUT™ Application – Figure 2

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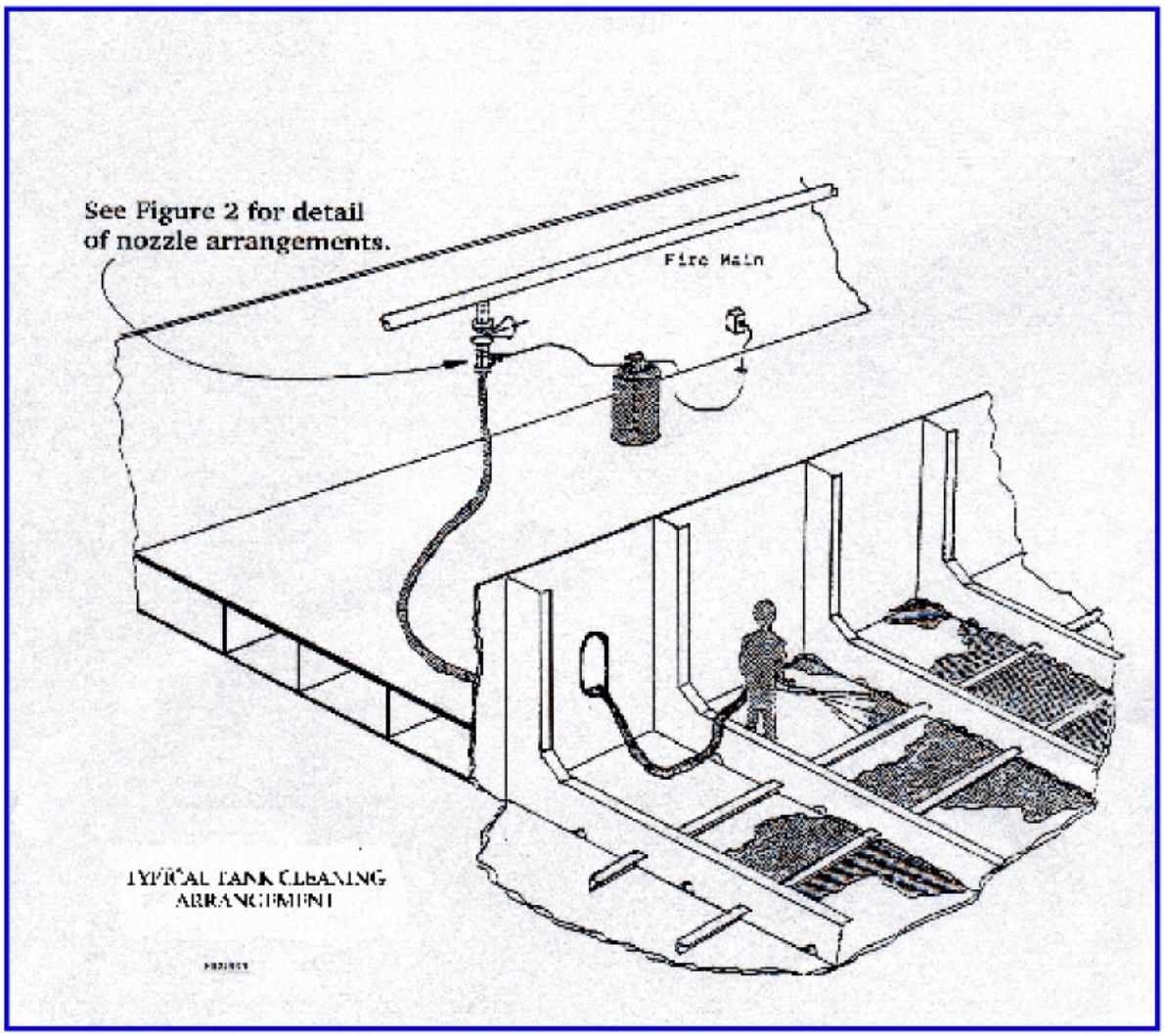

MUD-OUT™ Application – Figure 1

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PRODUCT DESCRIPTION

MUD-OUT is a very high molecular weight, cationic polymer in a liquid base. MUD-OUT is specifically formulated to help disperse and remove mud, even the heavy accumulations of mud sometimes found in a ship's ballast tanks or cooling systems. When used regularly, MUD-OUT will prevent further accumulations.

PRODUCT SPECIFICATIONS

Appearance:	Clear to hazy white liquid
Specific gravity:	.995 (8.3 lbs/gallon)
Viscosity:	525 cps @37.5° C
Solubility in water:	Complete
Stability:	5° C–50° C
Flash point:	95° C
ph NEAT	10.0 – 10.5
10% solution	9.0 – 9.5
Freeze/thaw:	Thaw and re-mix *slowly*
Odor:	Distinctive *amine* odor

PRODUCT FEATURES

- Very cost effective – There is no easier way to remove mud.
- Extremely concentrated – Can be used in dosages as low as one part per million (ppm).
- Ready-to-use formula – Requires no mixing or aging before use.
- Safe, non-hazardous – Nontoxic, biodegradable and safe for overboard discharge.

PRODUCT ADVANTAGES

- Aids in removal of existing mud.
- Prevents further mud build up when used regularly.
- Inexpensive alternative to mucking.
- Reduces labor costs because work is done faster.
- Improves tank coating performance and reduces corrosion by keeping the steel clean.
- Easier tank inspections by owners and/or regulatory bodies.
- Can dramatically increase cargo carrying capacity.
- Can reduce deadweight tonnage which can reduce fuel costs.
- Makes cleaning of hard-to-get-at areas like pipe runs and heat exchangers fast and simple.

TYPICAL APPLICATIONS

MUD-OUT has been proven in dozens of different applications in a wide variety of industries. Some of the more popular uses are: cooling systems and cooling towers of industrial plants; once through cooling systems on ships, all types of ballast tanks, potable water tanks and floating dry docks. Portable injections systems are available, or various manual means can be employed to clean out existing mud deposits.

HOW TO USE

To maximize the possible benefits from MUD-OUT, it is important that it be used properly. It can be used full strength or diluted to suit the application. Both manual techniques and automatic systems can be employed when using MUD-OUT. Detailed application instructions are available from NETSCO for using MUD-OUT on board ship to clean existing mud deposits. These instructions also contain technical information about the various manual and automatic systems used with MUD-OUT and lists typical dosage and usage rates. Your NETSCO representative will assist you with recommendations for the specific technique and equipment that each different application may require.

SAFETY AND TOXICITY

As when handling, storing or using any chemical, safety is the best policy. Although MUD-OUT is considered non-toxic and non-hazardous, care should be taken to prevent eye or skin contact. If contact occurs, flush with large amounts of water and consult a physician if signs of a reaction are present. Gloves, goggles and splash aprons are recommended.

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While MUD-OUT™ is used in many industrial and commercial applications, its marine uses present some unique problems and situations not found in other areas. The following pages present some detailed information and recommendations for using MUD-OUT™ correctly to gain its maximum benefits. While these instructions are not a substitute for the advice of a NETSCO engineer, they will be helpful to you in understanding some of the basic methods of application.

When reviewing various treatment methods, and trying to pick one that suits your requirements, it is important to understand exactly how MUD-OUT™ works. The following key points should be remembered:

a) MUD-OUT™ is not self dispersant; that is, if MUD-OUT™ is poured into a tankful of water, its molecules will not disperse equally to every part of the tank without help. Since MUD-OUT™ is extremely concentrated, as little as one[1] gallon of MUD-OUT™ can treat 1,000,000 gallons of water. Given this low dosage rate (1ppm) it's not hard to understand why it is imperative to assure complete dispersion of MUD-OUT™. We will discuss how later.

b) The reaction between MUD-OUT™ and the mud particles is a physical reaction, not a chemical reaction. Therefore, MUD-OUT™ only works on mud particles brought into direct contact with it and, since each molecule of MUD-OUT™ can flocculate (gather together) about 10,000 mud particles, it is important that some means be employed to bring as many mud particles as possible into contact with the MUD-OUT™. This is done with agitation. This will also be discussed later.

c) Once the mud has been chemically treated, it needs to be removed from the tank. Since the MUD-OUT™ treatment changes the mud into a fluffy, fluid like slurry, flow of the mud back to the suction bell mouth in the after end of the tank is made much easier. However, plugged or non-existent limber holes, or a tank design which inhibits forward-aft water flow, or using pumps with insufficient stripping capabilities; will not be of much help removing the mud. Care should be taken to promote the best possible water flow to the pump suction, and to strip the tank as absolutely dry as possible. Remember - the mud is always the last to go.

In summary - disperse the MUD-OUT™ as best as possible; agitate it to break up the mud and allow the chemical to work; and try to get the best possible flow of the treated mud to the suction. Your results will be much better. These instruction methods incorporate these points well.

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Method 1 - Manual applications of MUD-OUT

Manual application of MUD-OUT™ is almost exclusively used when dealing with tanks or vessels already laden with mud deposits. Manual application provides the fastest, most cost effective means of removing existing mud from the tanks.

When considering manual applications, consideration must be given as to whether cleaning personnel will be allowed in the tanks, as this will effect how easy or difficult it will be to treat the mud. Using the methods described below for manual application, method (1a) should be considered the most difficult, and method (1b) the easiest.

Method 1a - Manual application *without* entering the tank:

Generally speaking, this method should only be used when the mud levels in the tank are expected to be 6 inches or less. Higher mud levels than 6 inches would tend to make dispersion, agitation, and flow difficult, it not impossible, to achieve.

To begin the manual treatment, it is necessary to introduce the MUD-OUT™ into the tank via sounding tubes, vent pipes, manhole covers, etc. The chemical can be poured in, then flushed around with a water hose to help disperse it into the rest of the tank. It is helpful if the MUD-OUT™ is put into the tank in as many different places as possible to assure maximum distribution. This distribution can be further enhanced by diluting the MUD-OUT™ with water prior to putting it into the tank; four[4] parts water to one[1] part MUD-OUT™ is usually sufficient.

Dosage rates for this type of treatment are difficult to determine, at best. The depth of the mud, condition of the mud, the expected turbulence and the method of dispersion all play a part in determining a good starting point for the dosage rate. As a general rule of thumb, however, using this method of application, (the least efficient of the methods described here) use one[1] gallon of MUD-OUT™ per 5,000 gallons of tank capacity as a starting point. If after several treatments, a noticeable improvement as been made, then care should be taken to guarantee better dispersion, agitation, and flow before increasing the dosage rate. Better still, we would recommend that *Method 1b* be used, as this is much more efficient and effective.

Once the MUD-OUT™ is in the tank and dispersed as best as possible, pump in 1-2 feet of water above the level of the mud. Allow this water to stand in the tank for at least 8-10 hours. The rolling motion of the ship in the sea will be extremely helpful, especially in moderate to heavy seas, and will generally furnish enough agitation to clean the tank, if the entire process is repeated several times. Any other form of agitation that can be used will be helpful, such as air lances or fire hoses. While the ship is still rolling, pump the tank as dry as possible.

It may be necessary to prime the pumps with the sea cock to maintain good suction. Typically, each treatment, depending on the agitation and dispersion of MUD-OUT™, will remove 1-2 inches of mud.

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Method 1b - Manual applications where entry in to the tanks is possible:

This method can be used with the mud at any depth, and is the recommended method for de-mudding tanks, as it is the fastest, and most effective, and uses the MUD-OUT™ to its maximum advantage.

After entering the tank, pour small amounts (4-8 ounces) of the neat MUD-OUT™, or an equivalent amount of the 4:1 dilution mixture discussed in (1a) on to the mud. Then, using small (1 inch or so) hoses, spray the water onto the chemical and mud, breaking up the mud, and allowing the MUD-OUT™ to work. The "flocculation" reaction will be noticed immediately. Continue on in the tank, treating each trouble area or pile of mud as you go.

This method can best be maximized by using a chemical metering pump to inject the MUD-OUT™ directly into the water line up on the deck. This serves three[3] purposes:

1) It makes the job easier in the tanks, as there are no buckets, etc. to keep refilling;

2) Much better dispersion occurs, since the MUD-OUT™ is dispersed in the water line due to the agitation of the water in the hose;

3) and, last, since the dispersion is so much better, the chemical usage can be drastically reduced. We normally use metering pumps which can pump at 1.0 GPH. When injecting into a typical shipboard fire main, this means we're getting about 100-200 ppm.

The injection point should be at the main water connection where the hose that's being used in the tank is connected. Using a "T" arrangement, have the chemical and water connections on the top side of the “T” and the hose connection for the tank hose on the middle common connection. High flows and pressures are not required, as the chemical is doing the work. A minimum of 30 GPM and 40-50 PSI should be adequate. The ability to use higher flows and pressures will be dependent on how fast the water is removed from the tank. Since this method optimizes dispersion and agitation, all that's left is flow - how to get the treated mud out of the tank. The ship’s ballast pump is one option, although the difficulty of keeping suction with such a low level in the tank sometimes precludes using it. If the ship’s ballast pump is used, it is often helpful to flood the tank to 8-10 feet, then begin pumping out. This will help maintain the suction. Remember to try to settle the ship down in the stern to facilitate flow of the mud to the suction bell mouth.

Even better than the ship’s ballast pump would be to use smaller sludge pumps or air diaphragm pumps (like the Wilden M-8 or M-15). These pumps can pump slurries with high solids content, and will give you the necessary TDH to get the mud up and over the side. They generally would be pumping out faster than you are putting water in during the cleaning, so the mud can be sucked out as quickly as it is treated.

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Many other methods of removal have also been used, like vacuum trucks, eductors, etc. The selection of a method will be dependent on each situation.

Using these methods, tank cleaning can be done by a minimal size crew (2-3 men) in a relatively fast time (8-12 hours per tank. These figures are not even remotely possible using traditional cleaning procedures, and not nearly as effective.

Method 2

On-going maintenance usage of MUD-OUT™ to keep tanks clean is the next logical step once the tanks have been cleaned, or for new vessels. This on-going usage is best done by installing a MUD-OUT™ Mud Dispersal System (see Product Data Sheet). This system consists of a metering pump and a supply tank, to inject MUD-OUT™ into each ballast pump discharge during the ballasting procedure. There, new mud which is being pumped in is treated, and allows the mud to be easily pumped out during de-ballasting. Since the chemical is injected at the pump, dispersion and agitation are adequate, and clean tanks assure us of maximum flow capabilities in the tank. Since we are only treating new mud, the dosage rates with this method range from 1-5 ppm. This makes MUD-OUT™ the most cost effective, efficient means of keeping mud out of your ship's ballast tanks.

When a ship is using MUD-OUT™ for the first time, the first thing that is noticed is the sounding rod the deckhands use will have some fluffy mud clinging to the bottom. If you feel this mud it is most unusual because it isn't sticky or hard to clean off. This is why MUD-OUT™ is so effective; it removes the stickiness from the mud and it will not stick to itself or to the steel in a ship.

The next thing that you will notice is that the water runs back to the pump suction faster because the limber holes are clear. Near the end of the pumping out, discoloration may be seen, particularly if the tanks are pumped dry. This is the mud being pumped out.

After a ship has had most of the mud removed, it is an unusual experience to go into the tanks. The first thing that is noticed is that there is no foul odor. The odor of decaying fish and other organic material has been removed.

There is also no slime or slippery feeling to the structure. You will next see a lot of rust and scale on the bottom (this is particularly true on older ships) because the mud and slime that holds the scale against the steel are not there. Last and probably the most outstanding thing of all is that you will not find any active corrosion. With the mud, decaying matter, and slime gone, and since the scale holding these corrosive agents against the steel falls to the bottom; you will find clean dry steel.

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You should also notice that any mud that is left in the tank is very soft and fluffy, easily removed from your boots, and therefore easily flushed out. Generally, a few more ballast/de-ballast sequences will clean that up, especially when done in rolling seas.

If the tank shows little or no progress of mud removal, look for one of these possible problems:

1) There may be poor chemical distribution. See what can be done to insure better chemical distribution.

2) Not enough treatment in "rolling seas." This procedure cannot be emphasized enough. If little or no rolling is encountered during sailing, agitation with a fire hose may be necessary.

3) Not enough limber holes in the tanks, or else the limber holes are clogged with scale. The chemical must be able to reach the mud in order to be effective. If a tank has little or no flow, there will not be any mud removed.

Conclusion

We trust that the above instructions will be of some help to you. If you would like further information about specific pumps or injection systems, or wish to discuss your situation with us personally, please let us know. We offer complete services, from inspection to cleaning. Thank you for your interest in MUD-OUT™.

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