

ALKALINE BOIL-OUT PROCEDURE

A new boiler generally contains a considerable quantity of oil, grease or other undesirable substances. The interior of a boiler is sometimes covered with an oil film to avoid corrosion during storage or transport. Lubricating grease is used when the tubes are rolled in the shell, cutting oils are used during manufacture, cleaners and rust inhibitors also employed; a special powder is used finally for the assembly of piping. The excesses of all these products remain inside the boiler. Moreover, scale, wood, paper, rags and any kind of debris remain in the boiler. It is obvious that the elimination of these materials is necessary in order to not infringe on good operation conditions.

The condition which follows is also recommended when a boiler already in service is contaminated by oils, greases or other saponifiable materials.

PRELIMINARY STAGES

1. The interior of the boiler must be checked in order to remove any remains. Inaccessible places should be reached by using water or air under pressure.
2. Replace the glass level gauge by a temporary gauge for the duration of the treatment.
3. Close the boiler. Fill the boiler with good quality feed water. In order to avoid any thermal shock, the temperature of water should be within a maximum of 10°C (22°F) with the temperature of the top of the boiler water drum.
4. Determine the quantity of water added to the boiler and add a sufficient quantity of Melrose Chemicals, Ltd A-420 or F-685 for the treatment in progress. Refer to the Technical Bulletin of the product used to know its solubility. When the necessary quantity of A-420 or F-685 is added, alkalinity "M" will be 3000 to 4000 ppm.
5. A concentrated solution of the cleaner can be added proportionally to the feed water while filling of the boiler. If there is an economiser in the system, the concentrated solution must be added to there directly. In the case of small boilers or when the conditions allow it, the concentrated solution can be added through a manhole or any other opening located at the top of the boiler. Do not add solids to a boiler. The use of A-420 liquid for an alkaline boil-out eliminates any problem from deposits incurred by the use of solid chemicals.
6. Read and follow closely the instructions of the manufacturer of the boiler concerning the firing stages and the evacuation of the vapours during an alkaline boil-out.
7. In the case of new boilers, the drying of refractory materials can be combined with the alkaline boil-out. Light a fire with wood to dry the boiler lining. Leave the chimney open until vapour appears - then close. If wood cannot be used, use oil. In installations where the oil is pulverized, it is often necessary to use a more easily controllable fuel.

The temperature of the furnace during the preliminary stages of boil-out must be low - in order to obtain uniform drying - then can be gradually increased by varying the rate of fuel addition or firing period to maintain the minimum pressure necessary during the boil-out. The suggested maximum pressure is approximately 50% of the limit of pressure for the valve operating with the lowest pressure. This pressure will create sufficient circulation in boilers having a waterwall and a network of complicated internal piping.

For very old boilers where a saponifiable contaminant is removed, the same procedure is recommended. Detailed attention should however be given to a schedule of blow-downs. It is possible to determine the internal state of the boiler by comparing the samples taken with each one of these blow-downs.

8. It is difficult to precisely determine the optimal duration of an alkaline boiling. Experience shows that 1 to 3 days are generally necessary for the internal cleaning of a boiler. One prolonged period is better if drying of refractory materials is also carried out. The state and the appearance of the blowdown water of the boiler are the best indication in knowing if the treatment should be continued or stopped.

9. For the duration of the boiling, all the safety measures must be observed with regard to the superheaters, the economisers, etc. in order to avoid any damage with the equipment. The superheaters and the economisers should be operated in the same way as when the system is operating. Detailed attention should be given to the economisers to make sure that they do not produce vapour. The superheaters and the other units of the same kind also require a detailed attention at the time of the boiling. A continuous release of the vapour through the superheaters is necessary in order to avoid overheating. This also helps with the internal circulation of the boiler.

10. For the duration of the boiling each drain opening and each valve should be purged at least every 8 hours. The total quantity of water removed from all these points should be roughly a quarter of the level indicated on the gauge, this quantity being also divided between the various drains and the continuous blowdown. First drain the continuous blowdown, then progressing toward the drains on lower level of the boiler. Following this operation, the water level in the boiler should be restored by using water containing the alkaline cleaner, so that the concentration of the cleaner in the boiler is not reduced by these regular purges.

11 At the end of the boiling, cool the boiler gradually, then drain and flush the system by using a water under high pressure. Check the cleanliness of the system and make sure that there are no remaining oils or greases. Experience showed that if this procedure is followed, internal surfaces of the boiler will be free of all oils or greases.