

Report of experiments on the prevention and
removal of scale using “**Scalewatcher**TM”

1. The end-user

A chrysanthemum nursery in the Netherlands owned by Mr Den Brabander. Picture 1.



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2. The Process

Mr Den Brabander uses a Crone 1,000,000 kcal/h capacity steam boiler at his nursery. Water is drawn from a ditch and heated by a gas fired burner system. Heat is passed via a large primary steel tube and returned through a series of smaller tubes back to the boiler to effect maximum heat recovery. (See drawing 1 and picture 3). The fuel supply and the locking cover of the fire-tubes are clearly shown in picture 2. The nursery's boiler operates for approximately 8 hours a day but only during periods when the ground needs to be steamed to remove bacteria. Picture 4 shows the coil installation.



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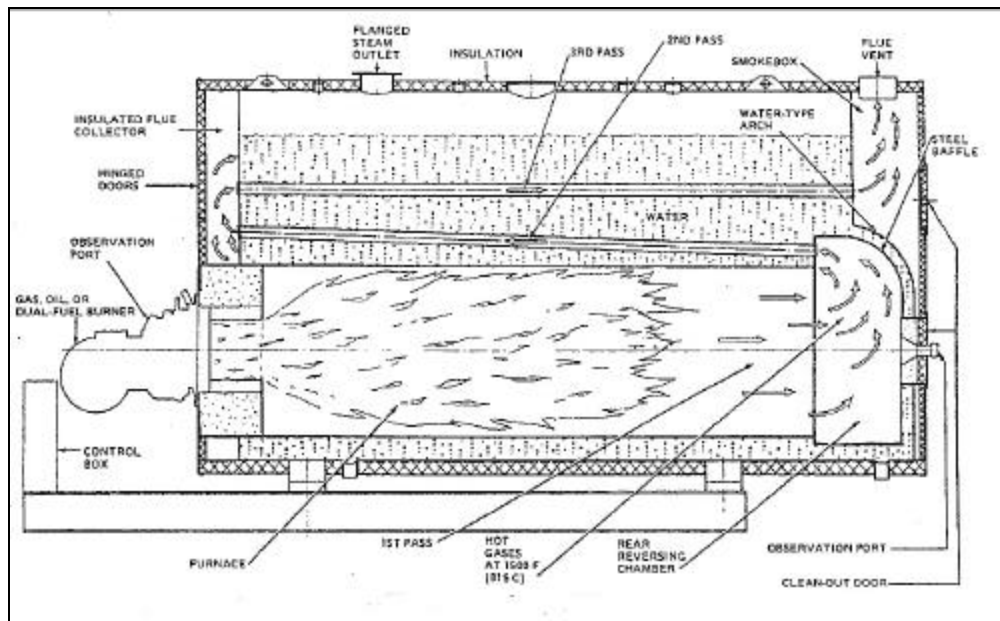
3. The Problem

The boiler's heat exchange capacity is optimized by the quantity of small diameter pipes transporting heat through the water. The analysis of the water taken from the ditch showed a high concentration of minerals. This meant that scale could easily adhere to the surface of the pipes, proving difficult to remove and reducing the life span of the tubes.

Analysis of the ditch water

Hardness	300 PPM
pH	8
p-alkalinity	6 mmol/l

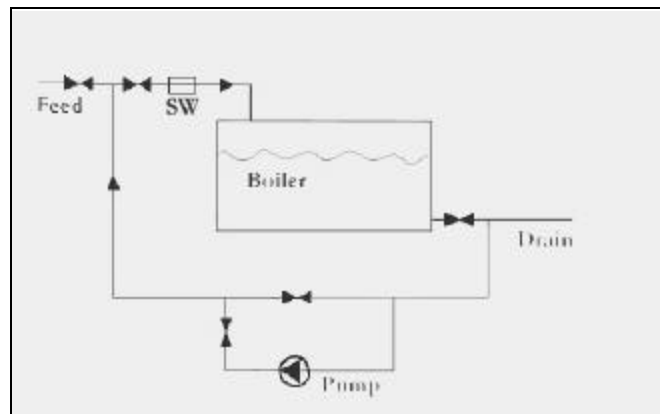
Mr Den Brabander spends approximately \$ 2,500 annually on repairs and acid cleaning. Every three years the pipes had to be renewed. Heat wastage caused by the build up of scale added an extra \$ 11,000 in additional gas consumption.



Drawing 1. Fire tube steam boiler.

4. The Experiment

In January 1995, Mr. Den Brabender installed an Industrial **Scalewatcher**[™] unit onto the water feed pipe to the boiler, and regularly inspected the tubes. After twelve months Mr Den Brabender contacted Scalewatcher NL BV for advice, as he was not satisfied with the **Scalewatcher**[™] results. During a subsequent meeting it was decided to create a circulation system. To avoid steam generation in the pipes, the systems pump only operates when the boiler is not used, as steam in the pipes could damage the system. (See drawing 2.) Several weeks after the installation of the circulation system it was noted that the scaled-up fire-tubes were noticeably cleaner. (Picture 3 shows the last inspection in January 1997).



Drawing 2. Circulation system.

5. Conclusion

The installation of an Industrial **Scalewatcher**[™] unit at the Den Brabender nursery in the Netherlands at first appeared not to work effectively as there was insufficient water flowing through the boiler. When this happens the **Scalewatcher**[™] cannot work effectively and the water structure returns to its previous state, enabling scale to adhere to the surfaces again. By incorporating a circulation system, the boiler is protected. Mr Den Brabender is very satisfied with the **Scalewatcher**[™], and recommends the system in conjunction with a circulation system to every owner of a fire-tube boiler. The **Scalewatcher**[™] and circulation system has provided pay-back in six months on maintenance and fuel savings alone. The boiler is now scale free, and working more efficiently. Gas consumption has been cut by 20% and the quality of the steam has greatly improved.

Source: Scalewatcher NL BV, Alphen a/d Rijn, The Netherlands

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