

# APPLICATION NOTE

## Heat Exchanger Leakage

### Introduction

Steam is used throughout the world as a means of producing energy. This steam is converted back to water in condensers and further cooled in *Heat Exchangers*. Wherever there is steam, there is a process liquid to be cooled. Since steam is used to produce energy, corrosion of the heat exchanger is a constant maintenance problem. The use of corrosion-resistant metals and improved methods of water treatment have minimized the effects of corrosion on the steam side of the heat exchanger, but corrosion on the process side remains a serious problem.

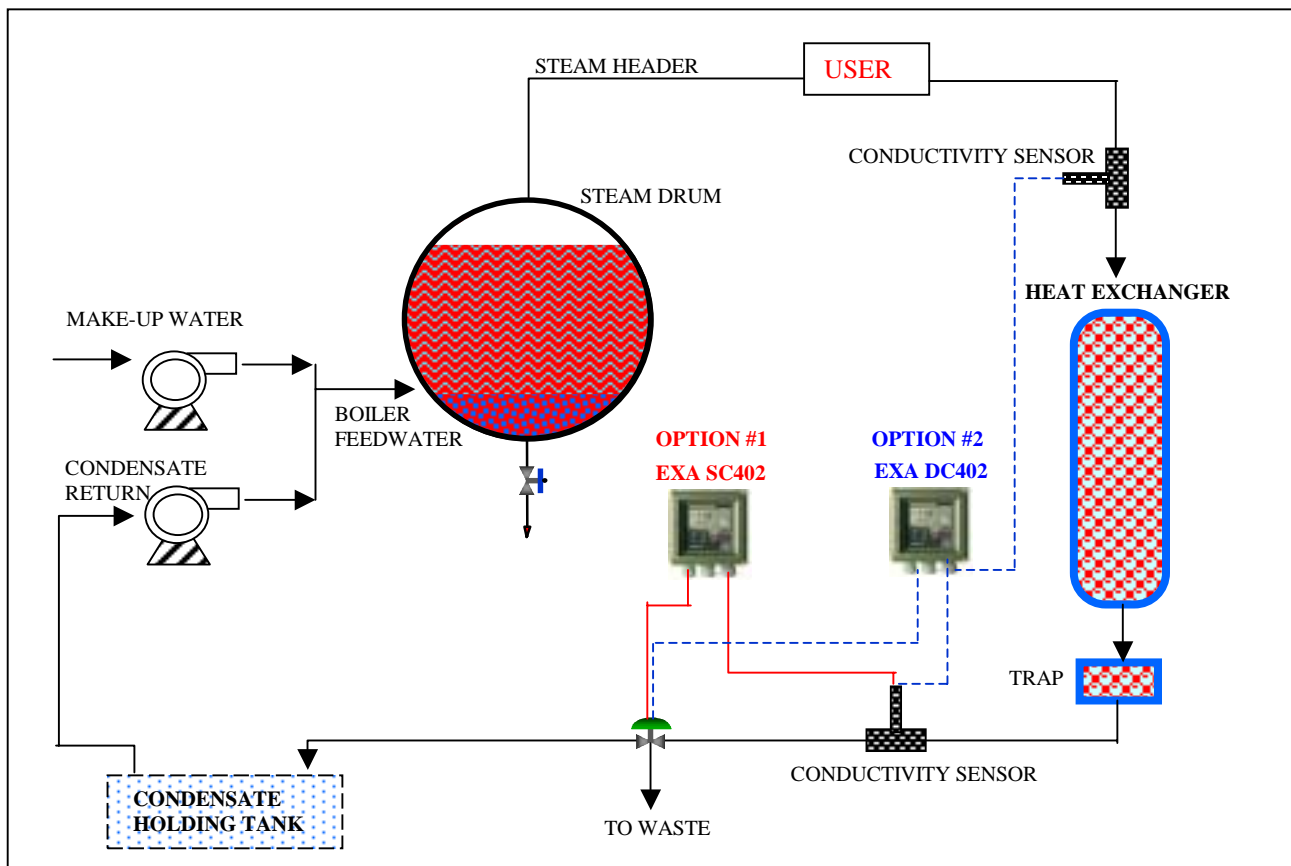
### Exchanger Leakage

Corrosion on the process side causes the heat exchanger tubing to mechanically fail, allowing process fluid to leak into the condensate return line. This can cause serious damage to the boiler. Therefore, it is necessary to monitor the condensate downstream of the heat exchanger and to dump the condensate as soon as it shows signs of contamination.

An excellent indication of contamination is obtained by measuring the conductivity of the condensate. Pure condensate has a very low conductivity value (1 to 10 S), while the contaminants

(typically salts, acids or alkalis) that are introduced when leakage occurs have significantly higher conductivity values. Any marked increase in the conductivity of the condensate indicates that leakage is present, and the condensate should be sent to drain.

As shown in the simplified diagram below, the conductivity instrument can be utilized to directly control the dumping of contaminated condensate. A single point conductivity analyzer (EXA SC402) can be located downstream of the heat exchanger, and utilize a high alarm relay to actuate the valve. Another option is to use a dual input conductivity analyzer



(EXA DC402) with one sensor upstream of the heat exchanger and one downstream. The built-in *deviation* calculation of the analyzer can be used to alarm, or actuate a valve, when the downstream conductivity deviates significantly from the upstream conductivity. This method compensates for any variance in the condensate conductivity.

### Summary

Measurement and control of Heat Exchanger Leakage can help prevent costly maintenance, repair and downtime. The simple, essentially maintenance-free measurement of condensate conductivity will give the operator information necessary (or provide automatic control) to prevent severe damage to the boiler should a breakthrough of the heat exchanger occur.

## Recommended Products:

### Transmitters:

SC202 two-wire Conductivity Transmitter

### Converters:

SC402 four-wire Conductivity Converter

DC402 four-wire Dual Channel Conductivity Converter

SC150 four-wire ¼ DIN Panel Mount Conductivity Converter

### Sensors:

SC42-SP34 Large-Bore Conductivity Sensor (fittings available for Flow-Thru, Insertion, or Immersion installations)

SC4A Conductivity Sensor (fittings available for Insertion, Sanitary, or Retractable installations.)

