

HOW THE "STEAM BOIL" MANUAL VERNIER STEAM VALVE WORKS

APPLICABILITY: All non-pressure dye machines

The machine is equipped with a "steam boil" valve with a manually adjusted vernier (throttling) valve to limit the maximum steam flow rate into the machine when "steam boil" is commanded. Steam boil is commanded for a bath by programming a bath temperature that is equal to or higher than the Pressure/Boil Temp that is programmed in Configure decision "N". (See "CONFIGURING THE DYE MACHINE" elsewhere in the technical manual. Referring to Figure 1, when such a temperature is achieved, the main steam valve closes and the Automatic Steam Boil Valve opens and stays open the remainder of the bath. All steam now enters only through the vernier valve. If the actual temperature remains hotter than 5°F below the programmed temperature for 2 minutes after the commanded temperature is first achieved, the Main Steam Valve will remain off for the rest of this bath.

The manual vernier valve must be adjusted to deliver just enough steam to provide a "rolling boil" in the dye liquor. Too much steam will cause the liquor to boil too rapidly and perhaps even boil all the dye liquor out of the machine. Too little steam will obviously not create a vigorous enough "rolling boil".

Here is why it is absolutely necessary to have such a manual valve on an otherwise microprocessor-controlled machine:

It is impossible to use temperature to recognize when a "rolling boil" is occurring because for a given atmospheric pressure, boiling water and steam both have exactly the same temperature. Moreover, the atmospheric pressure can change from day to day - even from hour to hour. Thus it is impossible to establish a fixed temperature that is "near the rolling boil temperature" because when the atmospheric pressure is lower, at a

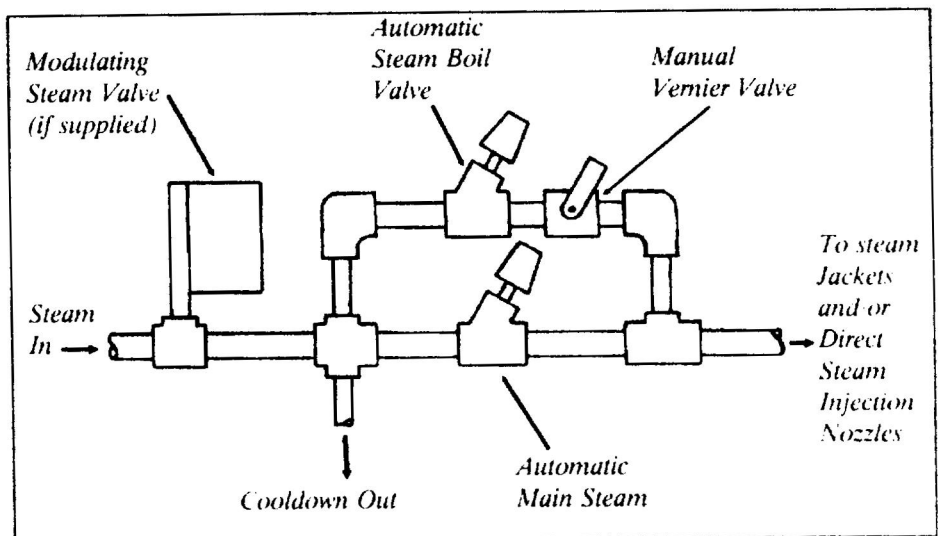


Figure 1 (MSSM0D04AE)
Steam Inlet With Steam Boil Valves

certain temperature all the water may boil out of the machine, even though that same temperature would be perfectly acceptable at higher atmospheric pressures. Furthermore, certain dye bath additives cause the bath to boil at an even lower temperature and/or with greater or lesser vigor.

All of the above explains why the maximum commanded temperature in the microprocessor is several degrees below boiling and thus why it is necessary to raise the temperature in the bath to a rolling boil by means of the steam boil valve which has a manually adjusted vernier valve.

CAUTION: The sample port is interlocked to assure that steam is shut off before the port can be opened. However residual boiling might cause hot bath liquor to spew out. Always stand aside and open the port carefully.
