



BAVIERA SPIRAL
(U.S.A. PATENT N° 5.044.392)

Spirals are robust stainless steel steam traps with absolutely no mobile parts, no maintenance needs and a very long life.

In Baviera Steam Systems, each steam chest in the Double Backer is provided with an individual Baviera spiral (or with a Hybrid Trap per Hot Plate Section).



Operation

Spirals are very versatile, in spite of having absolutely no mobile parts (much more flexible than the old 'orifice steam traps'), because of the different flow regimes that are established in its inner solenoid tube. Moreover, the fact that spirals break steam through a long pipe and not through a small orifice, allows a bigger diameter for condensate flow, thus, spirals are more reliable against blockage with dirt.

Spirals are specially designed to control a continuous drainage of produced condensate, together with a controlled blow through steam flow (about 1-2%). This combined flow (condensate and blowthrough steam) guarantees optimal non-condensable gases removal and, therefore, the highest temperature from heat transfer.

Spirals are very small, what for instance is a very big advantage for their installation. Spirals are prepared for easy and very precise condensate's temperature measurement (cavity in their upper part), a very big advantage for performance checking.

During steady production, spirals allow a continuous drainage of condensate along with a controlled amount of blowthrough steam. Condensate flows through an inner solenoid tube that is very long and small in diameter. As condensate flows through the inner tube, flash steam is generated, thus, increasing turbulence and acting as a controlled break.

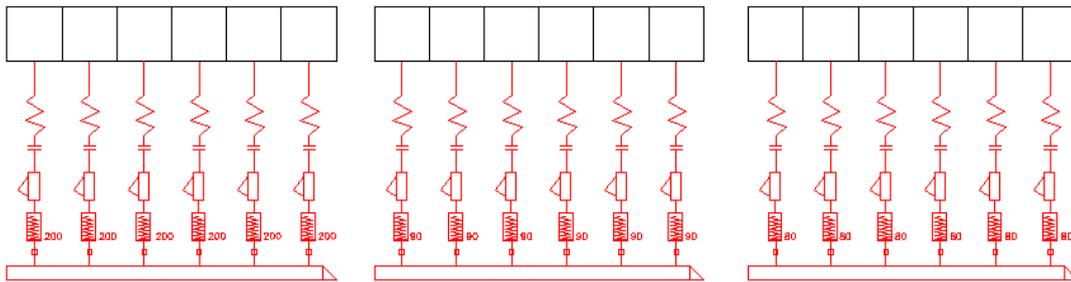
Larger flows of steam (over the desired blowthrough rate) are broken because of the great two-phase turbulence that condensate and steam generate inside the



solenoid tube (even with very little amounts of condensate) as they flow together, thus, acting as an efficient break for steam.

During machine startups/warmups the spiral's flexibility allows a much higher condensate flow rate than its design nominal flow rate for saturated condensate. The reason for this flexibility has to do with the fact that condensates generated during startups/warmups are undercooled (not saturated) and, therefore, do not flash through the inner solenoid, hence, allowing much bigger flow rates. Once condensate is saturated (machine is warm), condensate starts generating flash steam and the spiral reestablishes its nominal flow rate performance.

Although all spirals have the same external dimensions, there are spirals with different lengths and diameters, corresponding to different steam consumptions (spiral sizes).

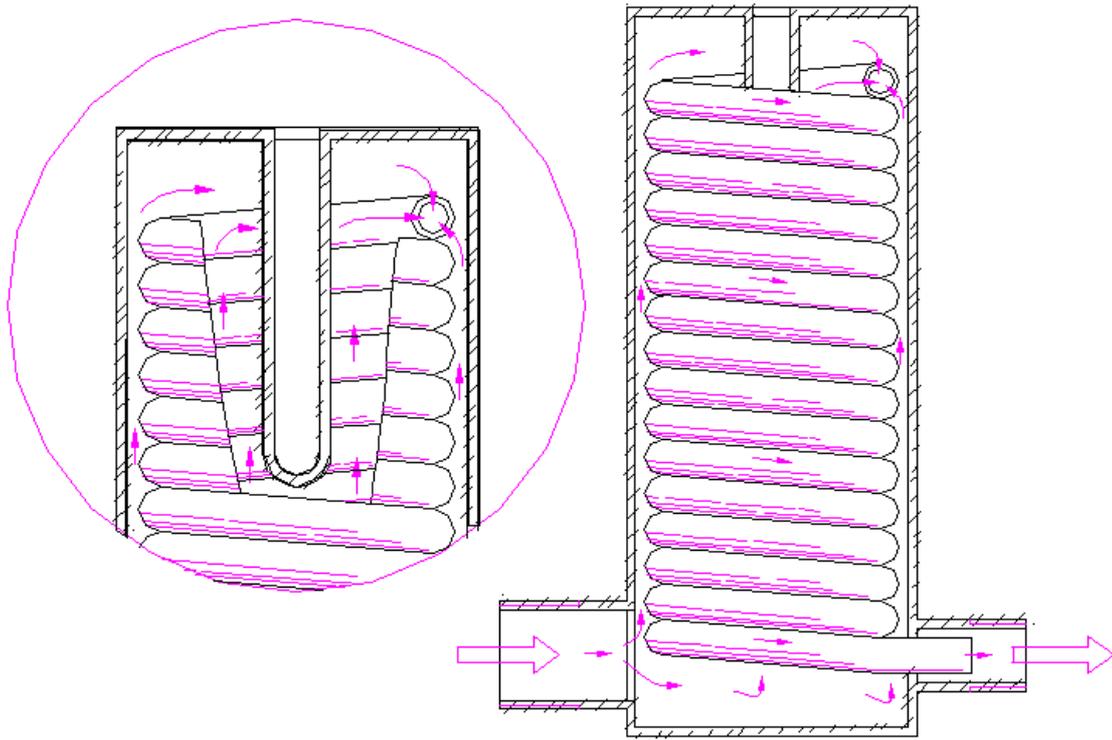


(Example of BAVIERA SPIRALS configuration in Double Backer)

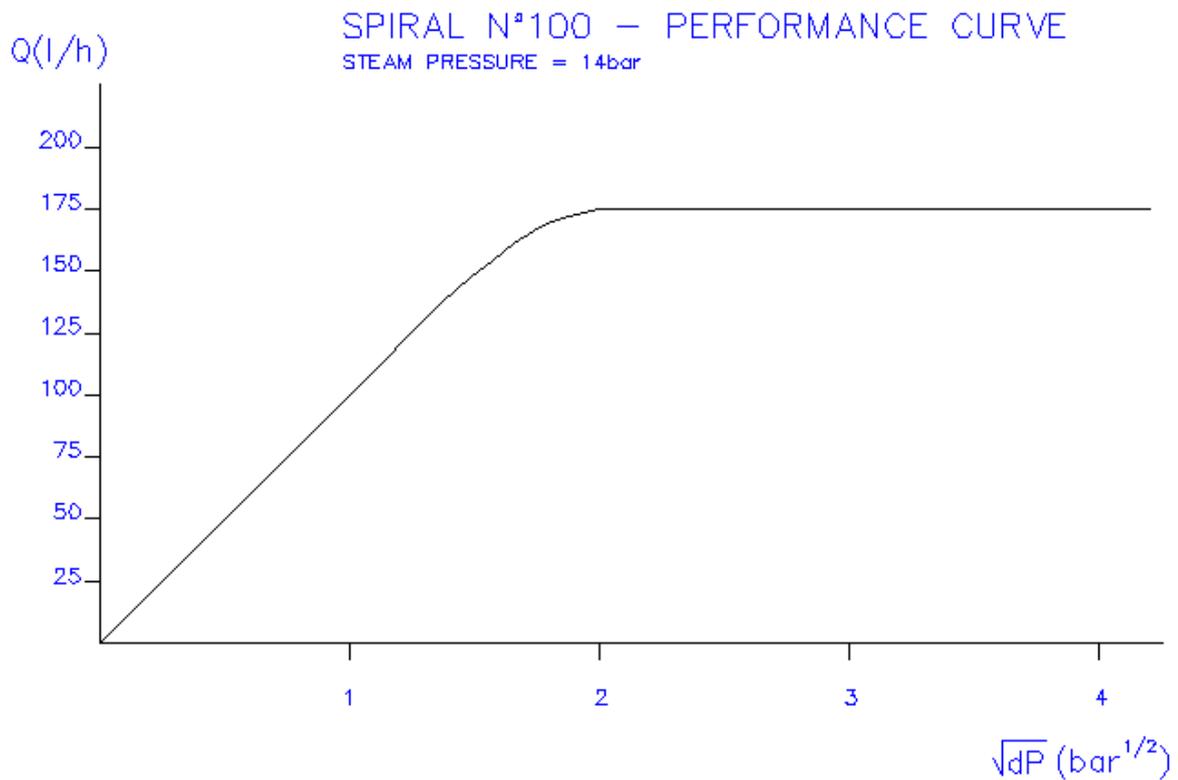


(BAVIERA SPIRALS - Double Backer in Italy)

Technical data



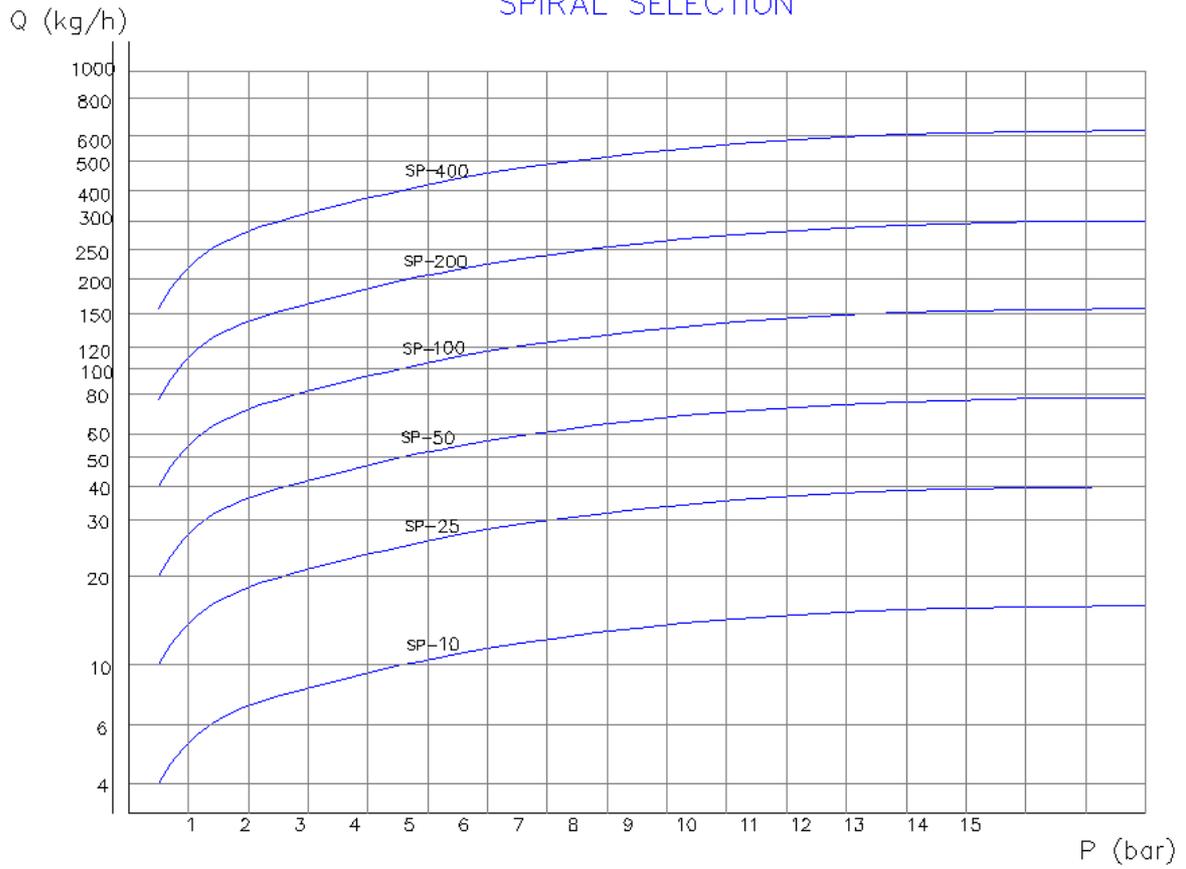
(BAVIERA SPIRAL - internal design)



(BAVIERA SPIRAL performance curve example. SPIRAL N° 100)



SPIRAL SELECTION



(BAVIERA SPIRAL – different SPIRAL numbers' performance curves)



(BAVIERA SPIRALS - Double Backer in Spain)