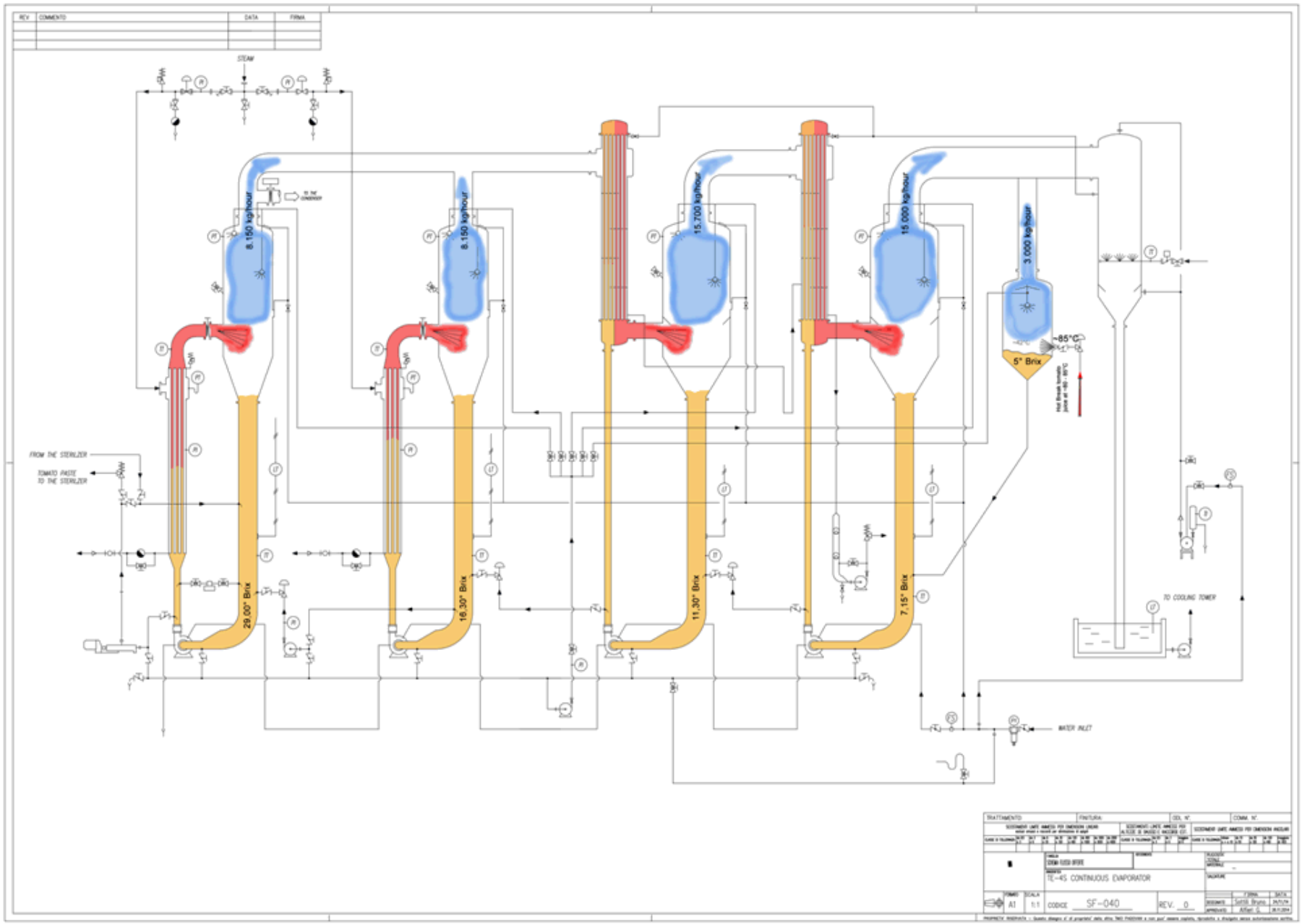
Evaporator ZEUS FC 350/4S


STEAM
TO THE CONDENSER
8.150 kg/hour
8.150 kg/hour
15.700 kg/hour
15.000 kg/hour
3.000 kg/hour
~85°C
5° Brix
Hot Break tomato juice at ~90° - 95°C
FROM THE STERILIZER
TOMATO PASTE TO THE STERILIZER
29,00° Brix
16,30° Brix
11,30° Brix
7,15° Brix
TO COOLING TOWER
WATER INLET

The concept of this evaporator is a “mix” of existing equipments in operation since many years .

The 1st Effect is divided in TWO STAGES : "pre-finisher" and "finisher" .

The main reason to “divide” the 1st Effect in TWO STAGES is to reduce considerably the size of the recirculation pump of the product through the tube nest heat exchanger meaning to reduce the installed electrical power that is required should the 1st Effect be equipped with ONE STAGE only .

In the "pre-finisher" stage it is achieved the evaporation of , plus or minus , 50%=8150lt/hr of the total evaporacion required in the 1st Effect =16300lt/hr to achieve the total evaporation of the Evaporator =50000lt/hr

The product circulating in the "pre-finisher" gets upto a concentration of plus or minus 16,30brix

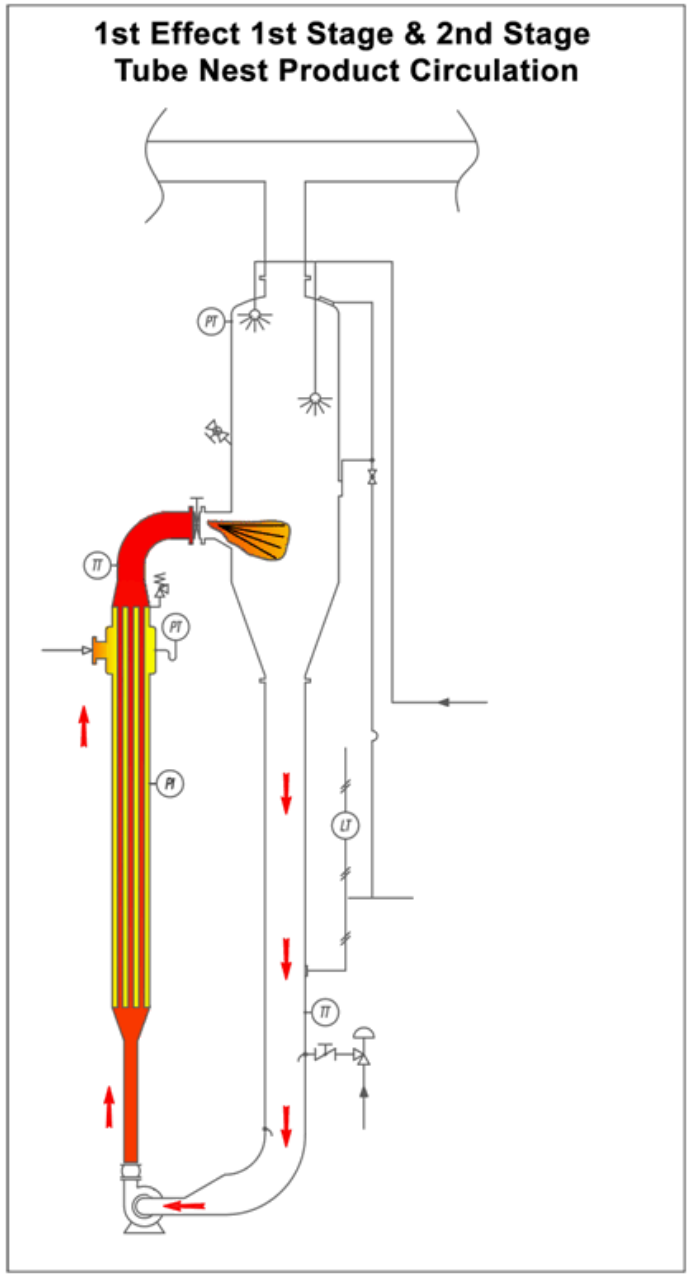
In the "finisher" stage it is also achieved the evaporation of , plus or minus , 50%=8150lt/h of the total evaporation required in the 1st Effect =16300lt/h to achieve the total evaporation of the Evaporator =50000lt/hr

EVAPORADOR TRIPLE EFECTO capacidad de evaporacion 50000lt/hr = 1500ton/dia de tomate				
Entrada HOT BREAK	3° Efecto 32% de 47000lt/hr	2° Efecto 33,33% de 47000lt/hr	1° Efecto 1° Etapa 17,335% de 47000lt/hr	1° Efecto 2° Etapa 17,335% de 47000lt/hr
3000lt/hr de evaporacion	15000lt/hr de evaporacion	15700lt/hr de evaporacion	8150lt/hr de evaporacion	8150lt/hr de evaporacion
	Concentracion del jugo	Concentacion del jugo	Concentracion del jugo	Concentracion del tomate
	7,15brix	**11,30brix**	**16,30brix**	**29,00brix**
Entrada HOT BREAK	3° Efecto 32% de 47000lt/hr	2° Efecto 33,33% de 47000lt/hr		1° Efecto 34,67% de 47000lt/hr
3000lt/hr de evaporacion	15000lt/hr de evaporacion	15700lt/hr de evaporacion		16300lt/hr de evaporacion
	Concentracion del jugo	Concentracion del jugo		Concentracion del tomate
	7,15brix	**11,30brix**		**29,00brix**

The evaporation in the "finisher" of the ZEUS FC 350/4S is exactly the same of an evaporator capacity 750ton/day as in the diagram added below : the 1st Effect evaporation capacity is 8150lt/hr exactly as in the 1st Effect 2nd Stage “finisher” of the evaporator capacity 1500ton/day

EVAPORADOR TRIPLE EFECTO capacidad de evaporacion 25000lt/hr = 750ton/dia de tomate				
Entrada HOT BREAK	3° Efecto 32% de 23500lt/hr	2° Efecto 33,33% de 23500lt/hr		1° Efecto 34,67% de 23500lt/hr
1500lt/hr de evaporacion	7500lt/hr de evaporacion	7850lt/hr de evaporacion		8150lt/hr de evaporacion
	Concentracion del jugo	Concentacion del jugo		Concentracion del tomate
	7,15brix	**11,30brix**		**29,00brix**

The product circulation in the tube nests of the 1st Effect “1st Stage pre-finisher” and “2nd Stage finisher” is FORCED exactly as the units manufactured since long time : the flow is “down - up” to avoid in case of electricity cut-offs that the product in the pipes circulating at 80°C is “burned” by the live steam at plus or minus 110°C condensation .

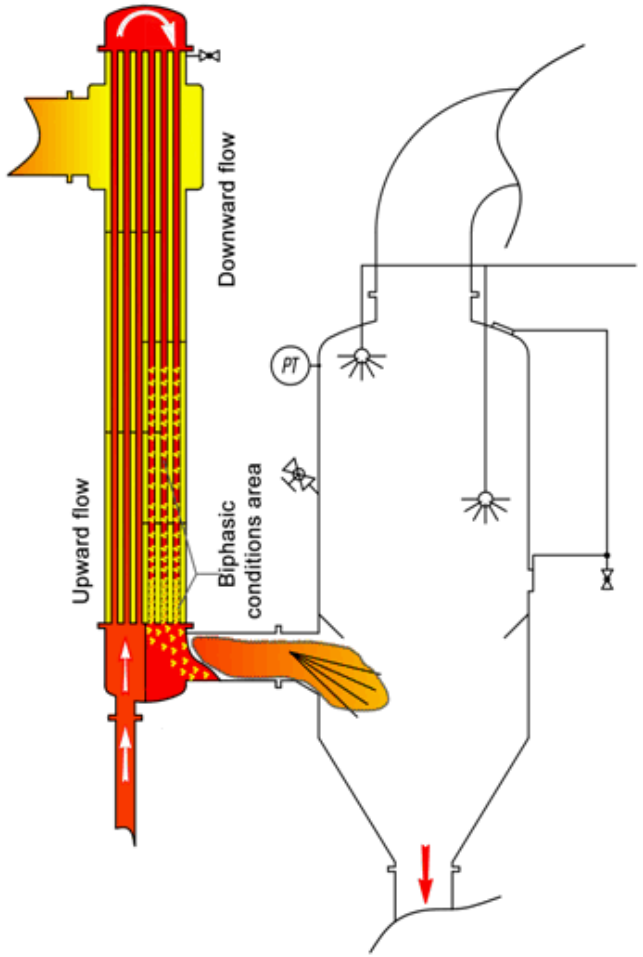

1st Effect 1st Stage & 2nd Stage
Tube Nest Product Circulation
PT
TT
PT
PI
LT
TT

The product circulation in the the 2nd Effect and 3rd Effect tube nests is SEMI-FORCED : “down to up” and “up to down” .

In this arrangment the water evaporation starts in the section of the piping where the product is flowing “up to down” : the heat exchange between the product flowing down and the vapours arriving from the previous effect will increase considerably due to the water evaporation happening in the piping .

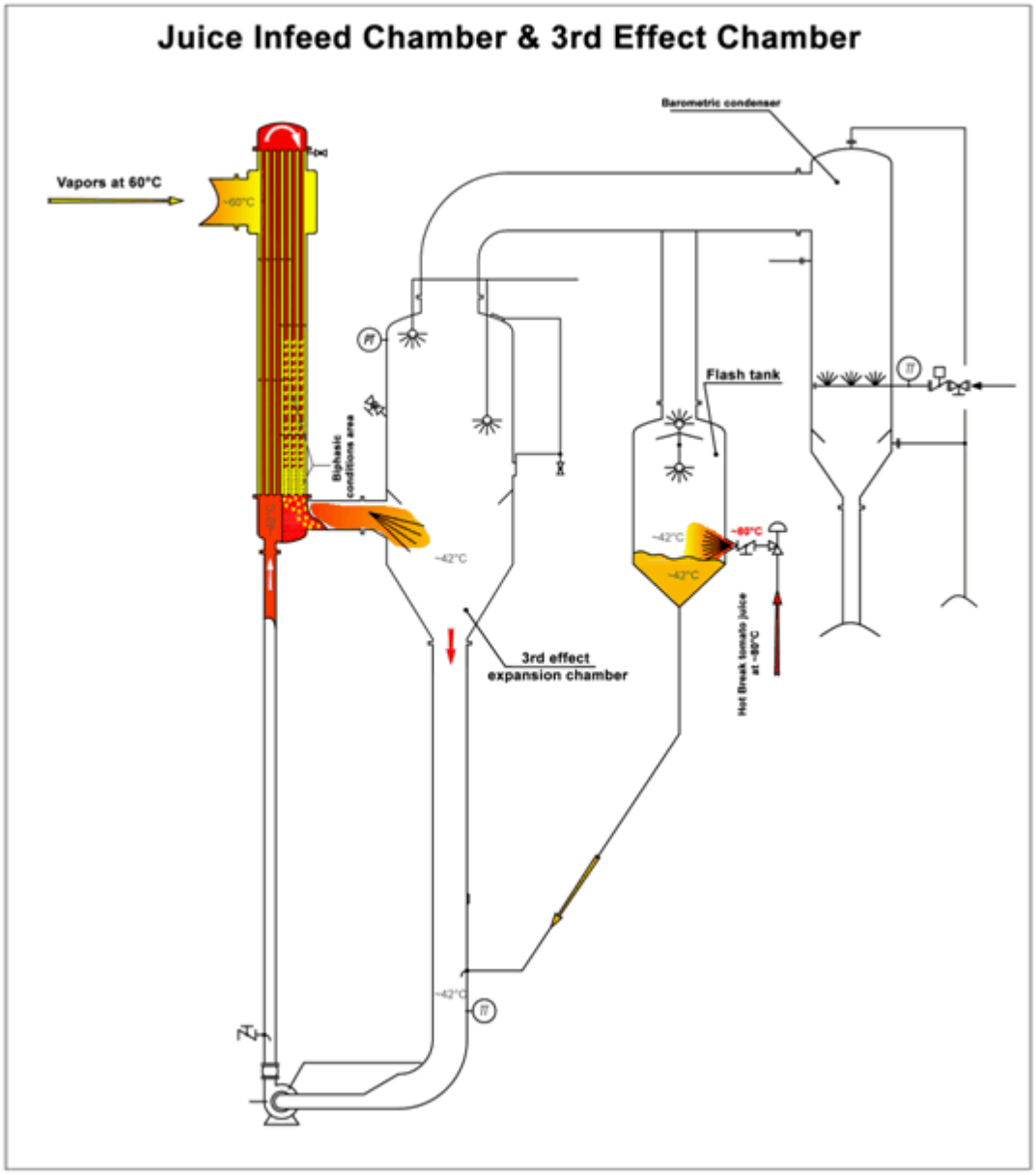
In addition to the above the product speed in the piping is increasing a lot cause the vapours developing in the piping are “sucked” by the vacuum in the expansion chamber : the effect is called “thermo-acceleration” .

2nd & 3rd Effect Tube Nest Product Circulation



The last point is referred to the Expansion Chamber in which is getting in the Evaporator ZEUS FC 350/4S the HOT BREAK (or the COLD BREAK) tomato juice .

Juice Infeed Chamber & 3rd Effect Chamber



To avoid the “tomato juice carry over” into the condenser of the Evaporatos ZEUS having capacity above 1200ton/day , corresponding to 40000lt/hr of evaporated water , we add the Expansion Chamber receiving the HOT BREAK tomato juice at 80°C or more .

In this chambre the tomato juice is “flash cooled down” to 42°C that is the 3rd Effect working temperature : in the unit capacity 1500ton/day it means an "autoevaporation" of 3000lt/hr=50lt/min=almost 1lt/sec .

In this way in our evaporators we mix 5brix juice at the infeed of the recirculation pump at the same temperature of the product at 7,15brix that is being recirculated in the 3rd Effect tune nest .

In the Evaporators that are not equipe with suchJuice Infeed Expansion Chamber it is mixed 5brix juice at 80°C or more with the product at 7,15brix that is being recirculated in the 3rd Effect at 42°C : the temperature increase of the “mix” is “reducing” the heat exchange in the 3rd Effect Tube Nest that is getting the vapours at 60°C coming from the 2nd Effect .

The thermic efficiency of the 3rd Effect of the Evaporator ZEUS FC 350/4S is higher than all the evaporators that are not equipe with the above Expansion Chamber for the HOT BREAK juice infeed at 80°C or more .