



INDUSTRIAL SOLUTIONS

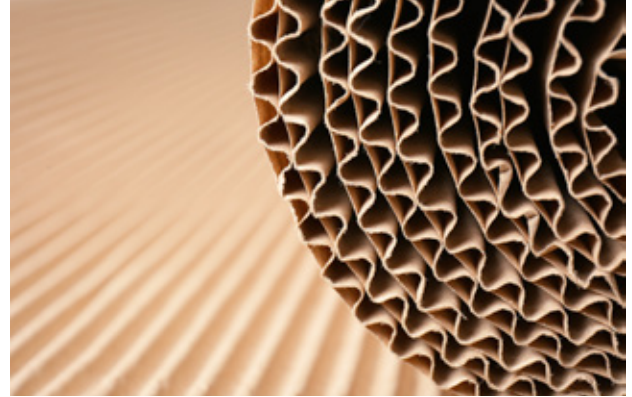
CORRUGATED CARDBOARD

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INDUSTRIAL SOLUTIONS

CORRUGATED
CARDBOARD



Energy is getting more important day by day. According to the diminishing of energy sources in production; industries are searching for alternative sources to increase the productivity.

In corrugated cardboard industries energy efficiency can be 25-30% higher according.

As Ayvaz, in this brochure we prepared for corrugated cardboard manufacturers, which is one of the leading sectors that use intensive steam; Why steam is used, the points to be considered at steam usage points and energy efficiency are mentioned.

Corrugated cardboard (coating) consists of two flat sheets called lining and the corrugated part called groove in the middle of these sheets are adhered to each other.

In this case steam getting more important. Trapping steam and more heat usage depends on the correct steam equipment selection. Although steam traps look simple and small, their mission is very complex.

CORRUGATED CARDBOARD INDUSTRIES

There are different types of corrugated board for use in different types of products which differ in terms of groove size and profile.

Corrugated cardboard can be folded and cut to an endless number of shapes and sizes for use as packaging. Corrugated cardboard is a high-performance packaging material designed to pack and protect various products.

Saving more energy is related to the right chosen steam equipment and sizes. Working principles should be known well for choosing the right steam equipment for the process. As Ayvaz, we are working for to produce best quality steam equipment in our factory in Istanbul in order to help our customers and the users to get the most efficiency from their steam systems. We aimed to explain our audit experiences and technical knowledge to partners and introduce different type of steam applications and all related products with details in this catalogue.

The product formed by the combination of these three layers has more power than the individual layers have. Its structure consisting of successive corrugations gives the corrugated board hardness and durability. The air circulation between the gutters acts as a sealant and plays a protective role against temperature changes.

STEAM USAGE

Corrugated board is produced by bonding a liner to a flap. The pleated portion, described as groove or corrugated, is obtained by a pair of steam exhausting cylinders. The steam used in the process is used to provide the heat required for the preparation and shaping by the machine and for bonding. To ensure that temperatures are accurately controlled, high quality dry steam must be supplied to the machine at the correct pressure.

Water droplets or non-condensed gases carried (dragged) in the steam installation reduce the temperature of the steam and affect the heat transfer rate. This will make it difficult to achieve the desired production temperatures and, in some cases, will not even be possible.

STEAM USAGE

As steam is faster and more efficient than other heat transfer fluids, it has been used in corrugated cardboard sector for many years as in many other sectors.

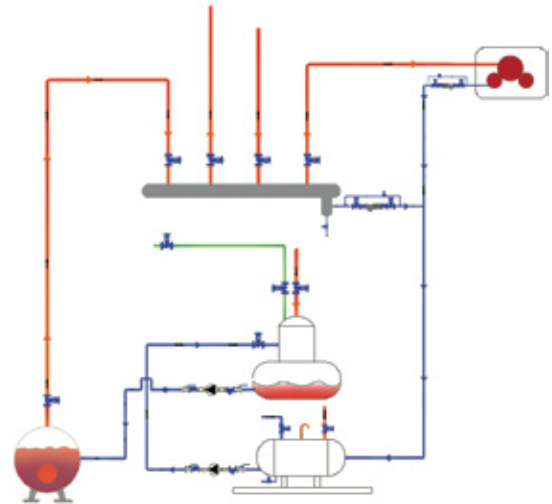
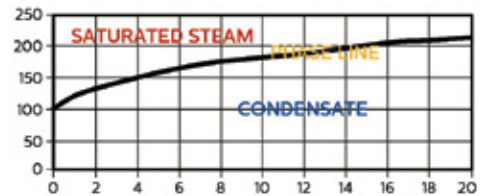
One of the properties of saturated steam is that its temperature is directly related to the pressure. Therefore, the temperature of the rollers and heating pans in the corrugated line can be adjusted accurately by controlling the pressure of the steam. The high-speed corrugated rollers operate at temperatures up to 190 ° C, ie they require a steam supply of 14 to 16 bar.

It is clear that for the production of high-quality corrugated board with low production costs, the corrugated machine must operate at the most efficient speed and efficiently use the heat available in the steam.

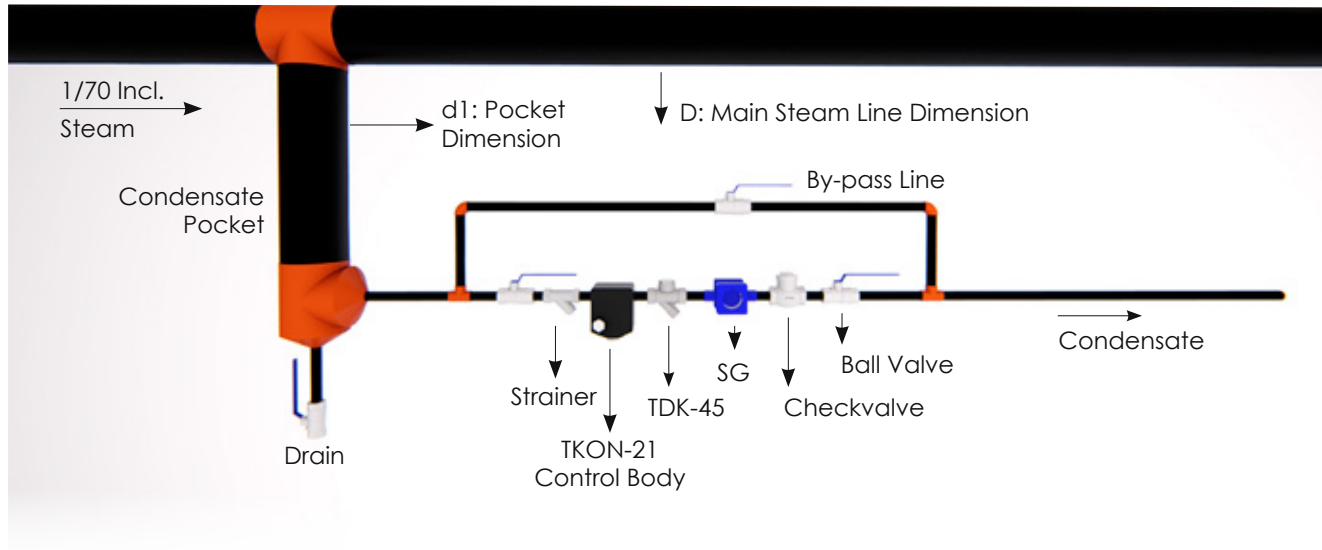
In order to achieve this, it is necessary to consider the design and operation of the complete steam and condensate system, taking into account the type of corrugated board, its speed and the different types of corrugated produced.

Steam from the boiler room should contain as little moisture and condensed gas as possible. The steam produced in the boiler should not contain water.

Separating water from the boiler will minimize the risk of pipeline damage due to ram impacts. If water is being dragged from your boiler, there are several possible causes. AYVAZ® engineers will detect problems in your boiler room.



STEAM LINE APPLICATIONS



Steam from the boiler room is transported to the corrugated cardboard machine through the steam pipeline distribution system. The steam must be present at the right pressure, in sufficient quantity and in the best possible condition in cylinders and pans.

The correct diameter of the pipelines carrying steam from the boiler to the corrugated machine is very important. The steam velocity must be within the limits and the pressure drop must be kept to a minimum. AYVAZ® will be happy to advise you on your distribution pipeline sizing.



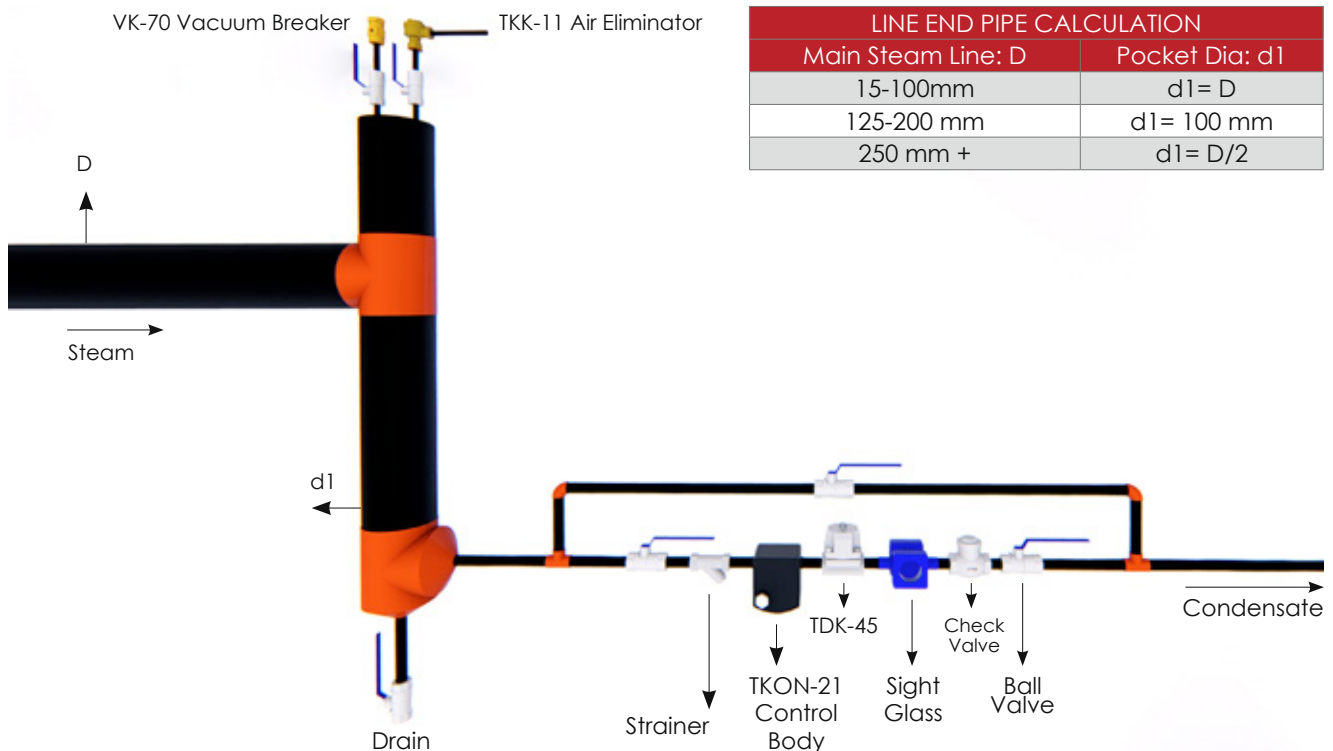
Installing the right steam metering equipment allows you to monitor corrugated cardboard performance, assist in energy management, and provide information to help correct costing of corrugated production. This is particularly important if a corrugating machine makes different types of corrugations.

You can make safe and accurate measurements with AYVAZ®, Vortex type steam meters.

LINE END APPLICATION

If the steam systems are closed by the process, the steam will turn to condensation until it is turned on again. The volume difference will be filled with air. When the system is switched on again, the air must be evacuated to allow the steam to easily fill the line. This is only possible with "End of Line Application".

The occurred air and condensate around connection areas in the pipelines are dragged to the end of the line. If that air and condensate are not discharged, they may block the steam flow. In such cases, formed air and condensate are discharged with a line end application shown below. The steam trap kind must be thermodynamic.



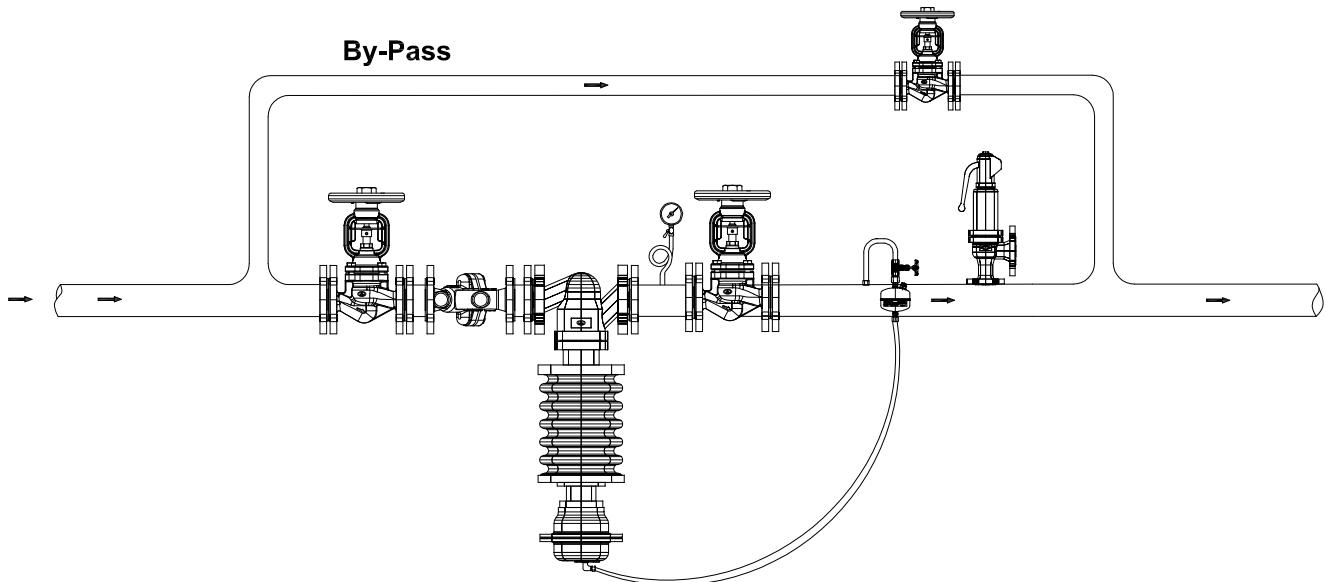
PRV APPLICATION

It requires a primary vapor pressure of up to 7 bar for older-style machines in corrugated lines and up to 16 bar for new high-speed machines.

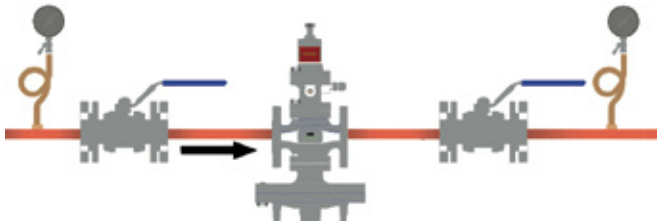
Regardless of the type of steam or condensate management system, the primary vapor pressure on the corrugated board should be accurate and balanced.

Corrugated rollers, small pre-heaters, press rollers and the first part of the double backer usually operate at the highest temperature. They require high pressure steam within ± 0.3 bar ($\pm 2^\circ\text{C}$).

The choice of the main pressure reducing valve must depend on the needs of the corrugated machine. In a corrugated machine where the same pressure is always required in high temperature cylinders with a very stable demand throughout the process, a direct effective pressure reducing valve of the correct size can be safely used.



PRV APPLICATION



In the AYVAZ® product range, there are different types of “pressure reducing valves from simple directacting pressure reducing valves to more flexible pneumatic valves and electro-pneumatic positioner combinations.

remote adjustment can be utilized with the supply pressure set from a single controller or a central control panel.

AYVAZ® can supply many different types of steam pressure control systems and make the best choice for your application.

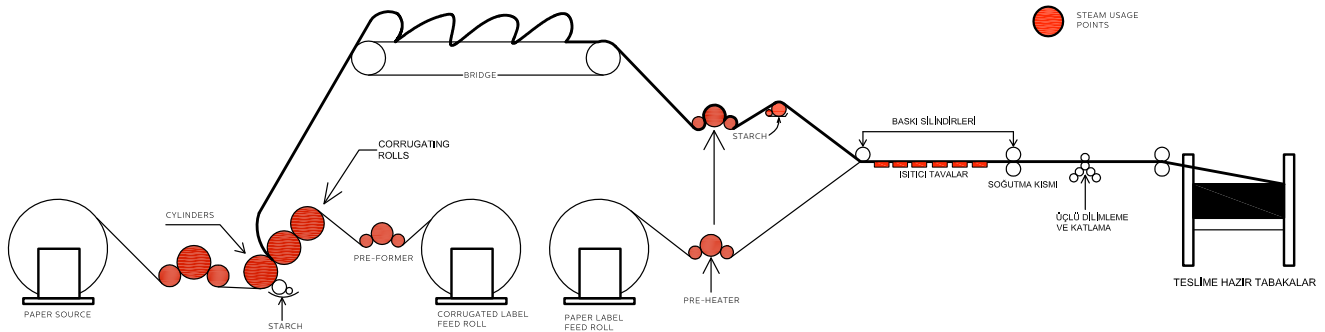
INSULATION JACKETS



The steam distribution system must be insulated to ensure that radiation losses are kept to a minimum.

Even when isolated, some steam condensation and condensation in the pipeline may cause some heat losses. It is very important to drain this condensate so that the steam coming into the machine is as dry as possible. It is also necessary to remove condensate from the distribution pipe to prevent damage from ram impacts. This pushes the condensate deposits along the pipeline at steam velocity.

APPLICATIONS

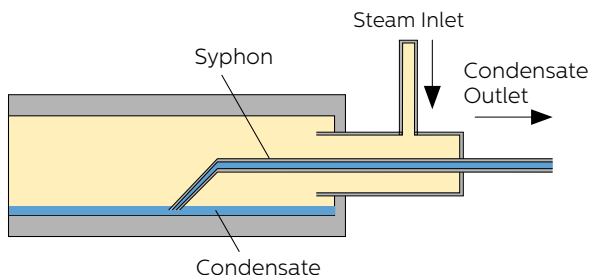


The double-skinned sheet producing a typical corrugated board consists of two single sealing units with double supporting sections using steam at various pressures.

In addition, the finishing sections may include slicers, shooters, cutters, on-line printers, etc., which do not require steam for operation, but only need steam for space heating and humidification. It contains.

STATIC CYLINDERS

In some corrugated machines, static rollers are used as preheaters. Depending on the required temperature, steam is supplied at pressures ranging from 3 bar to 16 bar. As they are inert, the vapor inside condenses and forms a puddle at the bottom.

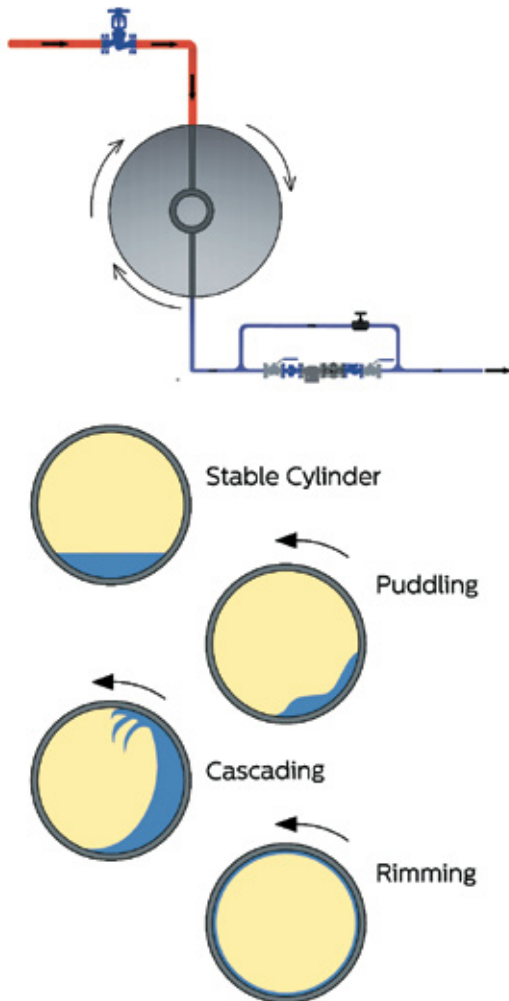


A siphon pipe is installed in the cylinder, and the pressure difference between the steam inlet and the condensate outlet must allow condensation to flow upwards into the siphon pipe and exit the cylinder.

However, this is often not possible.

The correct choice of the trap for this application should be of the float type with an internal air vent and a **needle valve** that can open the steam lock.

APPLICATIONS



Space heating and humidification requirements must be taken into account to ensure optimal conditions for the preparation and storage of corrugated board sheets. AYVAZ® has extensive experience in this field and can advise on your heating and humidification systems.

The steam lock inhibiting valve will allow the condensate to discharge in the siphon pipe, which may cause the trap to close. Thus, it enables the cylinder to be discharged from the moment condensation occurs and allows the noncondensable gases to pass through the thermostatic air vent to make maximum heat transfer through the cylinder wall.

HEATED ROTATE CYLINDERS

Most of the steam-heated rollers in the corrugated cardboard line rotate. The steam enters the cylinders and the condensate flows out through a rotating connection. The condensate is normally drawn from a fixed siphon.

To maintain the correct cylinder surface temperature, the steam pressure must be checked correctly and removed immediately after condensate condensation has formed. Condensate build-up is influenced by many factors such as how the cylinder rotates, cylinder diameter, machine speed, condensation rate, and condensation rim depth in the cylinder.

Depending on these various factors, either 'puddling', 'cascading' or 'rimming' condensate will form.

In order to determine the most effective and economical method of condensate evacuation process, it is necessary to know which of the three condensates are located. For this, it is necessary to know what is happening at the actual machine operating speeds. Cylinder temperatures will be decisive as a result of evaluations with operators.

APPLICATIONS

If the set temperature can not be achieved in the cylinders, if the by-pass valves of the traps have to be opened, or if the steam heads explode and steam leaks, the condensate remain in the cylinders. The first choice in the decision will be the siphon. Given the necessary data, experts in this field can advise on the correct type and size. Different siphon structure methods can be used to discharge the condensate from the cylinder. There is no single siphon selection as operating conditions vary from machine to machine and from cylinder to cylinder.

For low-speed cylinders where no agglomeration occurs, a float trap will be sufficient to prevent vapor lock. However, if it is known that Stacking will occur; Usually a new generation of machine speeds is available, it may be necessary to provide a sweeping / blowing system with a trap / valve combination.

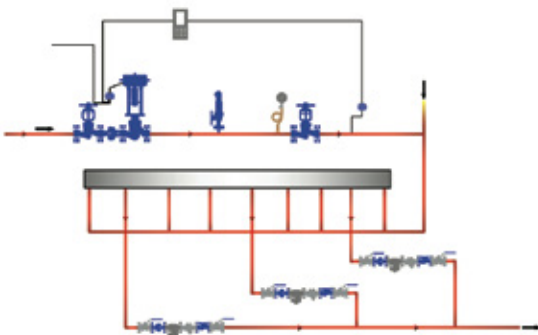
A centrifugal force of about 3 g (three times the gravitational acceleration) or more acts on the condensate in a rotating cylinder and causes adhesion against its inner edge. For condensate discharge, the condensate must exceed the centrifugal force, first through the top of the siphon and then through the rotating steam nozzle.

In most cases, the use of stationary siphons and high differential pressures between the cylinders on the cylinder are sufficient to overcome this force.

If this is not the case, however, 'sweeping / blowing steam / may need to be added to aid evacuation of the condensate.

Steam passing through the needle valve on the steam trap is steam entering the cylinder but not condensing. Because at this point there is no effect to form the heat transfer and steam does not condense.

With this needle valve, the sweeping / blowing amount of the steam condensate mixture in a corrugated cardboard cylinder can normally be controlled.

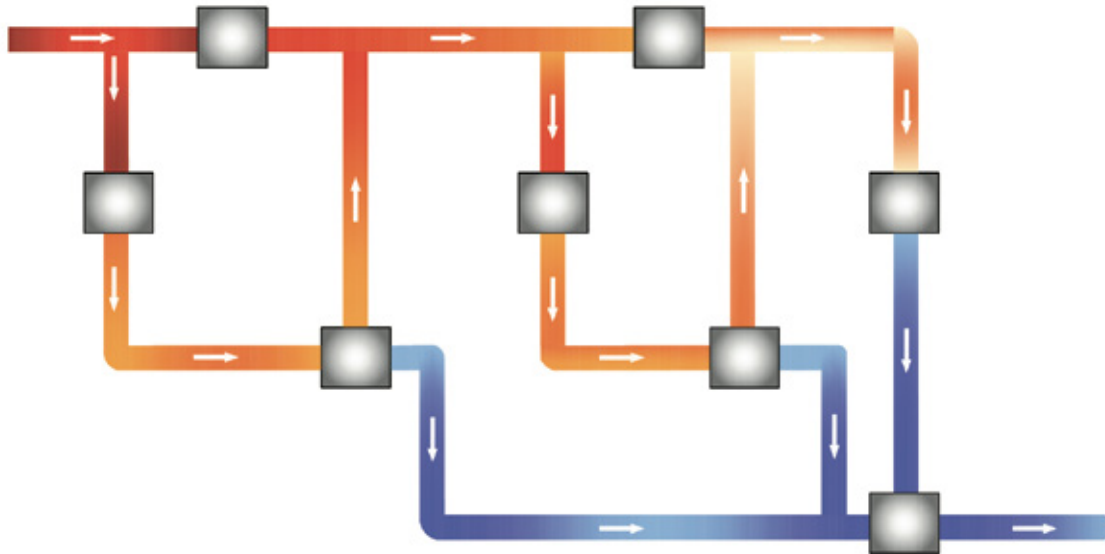


Steam-heated pan groups provide final conditioning to corrugated board prior to finishing. The heating pan process is normally divided into three parts.

In a normal corrugated cardboard operation, it requires high pressure steam to provide high temperature to the first section.

CASCADE SYSTEMS

If a cascade type flash steam system is installed for pans, most of the demand in medium and low pressure pans can be met by the flash steam exiting the high pressure sections of the gutter. In cases where the flash steam cannot meet all the demand, a set of pressure reducing valves will be required to provide live (make-up) steam.



A method for recovering and using the vapor of flash and steam is a cascading type of condensate management system. A corrugated cardboard machine requires steam at various pressures and can utilize high-pressure condensate flash steam to meet a portion of the steam demand.

AYVAZ® Flash Steam Tank Systems can be used to deliver the flash steam separated from the high pressure condensate for energy recovery to the sections requiring lower temperature in the process.

FLASH STEAM RECOVERY SYSTEMS

The most important components in a cascade system are the Flash Steam Tank Systems which separate the flash vapor from the condensate where the flash and the sweep / blow steam are located. A common mistake in enterprises is called "separator". It is important that the condensate is drained effectively and not allowed to accumulate in the separators. They can be emptied with a steam trap, an electrically driven pump / level control device, or a steam-driven pump system with a lower choice of both investment costs and operating costs.

Why Flash Steam is Important?

It includes too much energy and it can be mount to different installation areas. If Flash Steam drains to the atmosphere there will be waste energy and efficiency lost.

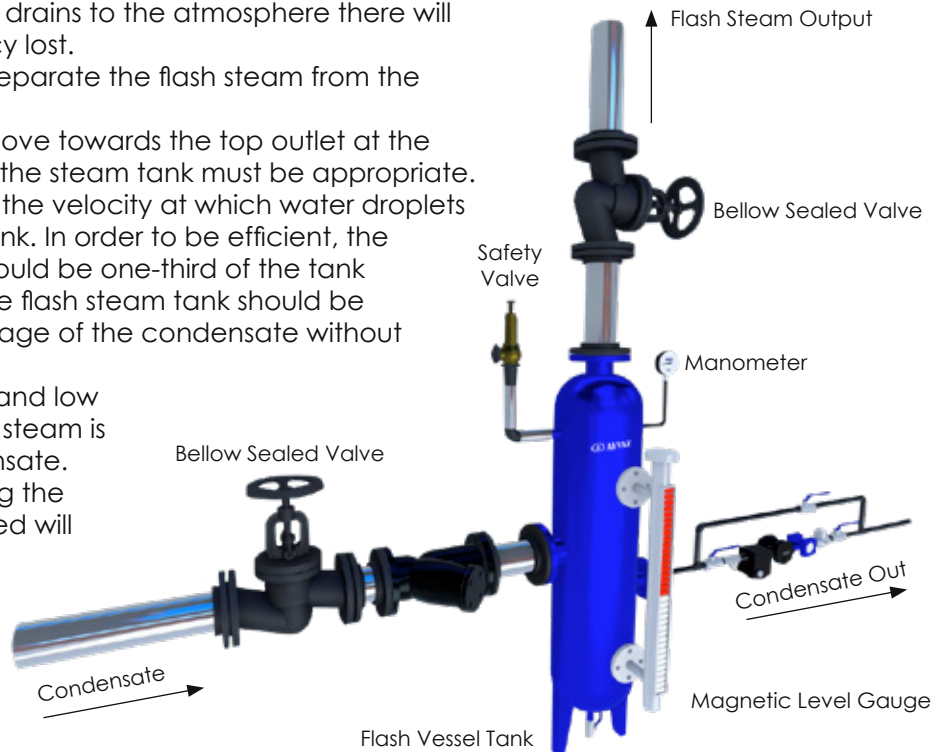
Flash Steam Tanks are used to separate the flash steam from the condensate water.

In order for the flash steam to move towards the top outlet at the correct speed, the diameter of the steam tank must be appropriate. This speed is about 3-5 m/s and the velocity at which water droplets can reach the bottom of the tank. In order to be efficient, the condensate inlet to the tank should be one-third of the tank neck below. The diameter of the flash steam tank should be a diameter that allows the passage of the condensate without coming into turbulence.

If the difference between high and low pressure is small. The amount of steam is less than the amount of condensate.

Flash steam outlet pipe selecting the diameter according to the speed will cause the tank to remain small.

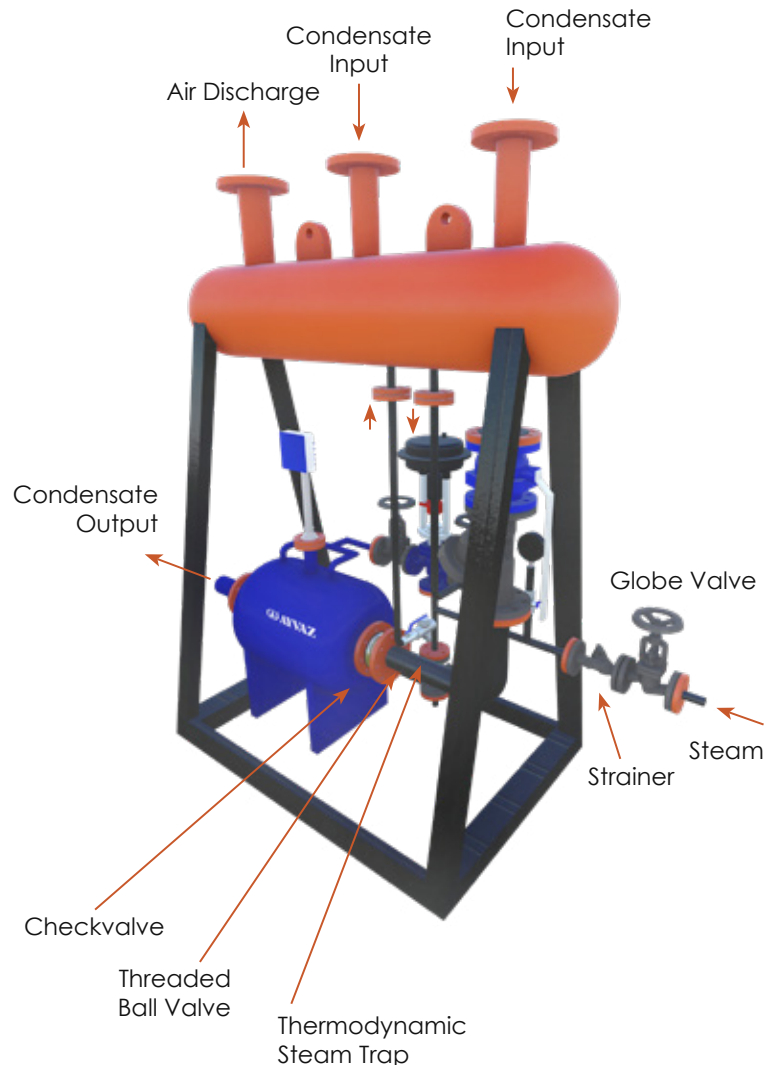
In which case the tank must be selected to be two diameters larger.



CONDENSATE PUMP SYSTEM

Condensate comes from the input collector and goes on internal pipe and access check valve than enter in condensate pump body so tank is getting full. In tank when the condensate comes on the upper limit, ELK-2 level gauge check the conductivity and change it to electrical signal and send it to 3 way pneumatic valve for the giving contact which is on the steam line than allows it to be opened. In normally steam has more high pressure than the condensate pressure. When 3 way valve is close, system discharge condensate from the system with thermodynamic steam trap.

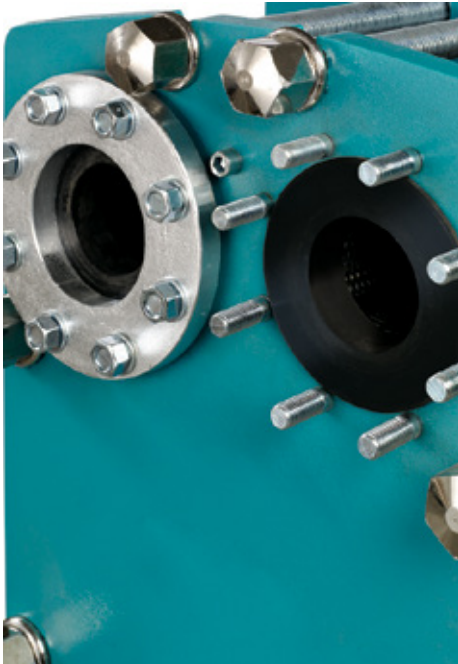
When the condensate pressure is smaller than the opposite pressure in condensate pump, discharge operation do not occur. Steam is occurs the condensate discharging with entering the body, which have more pressure than the opposite pressure. When the condensate limit is getting bottom limit of the tank, ELK-2 level gauge send electrical signal to 3-way pneumatic valve for close the system for entering steam. After that condens enter again and getting full tank. This operation frequency is connect between the condensate quantity. If the users want they can be follow the condensate quantity, from contoller.



APPLICATIONS

Heat Recovery Systems

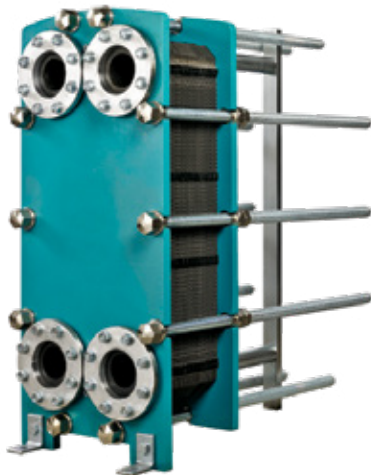
In today's conditions, where energy is getting more expensive day by day, there is no need to waste energy in industry or individual use. The budgets allocated to energy in industrial establishments have increased by 20% -40% in recent years and they are at the top of the expenses section. Taking all these points into account, the recovery of energy has become very important. Ayvaz plate heat exchangers prevent the waste of your thermal energy with wide variety of plate and gaskets suitable for each system.



APPLICATIONS

Waste Heat Recovery

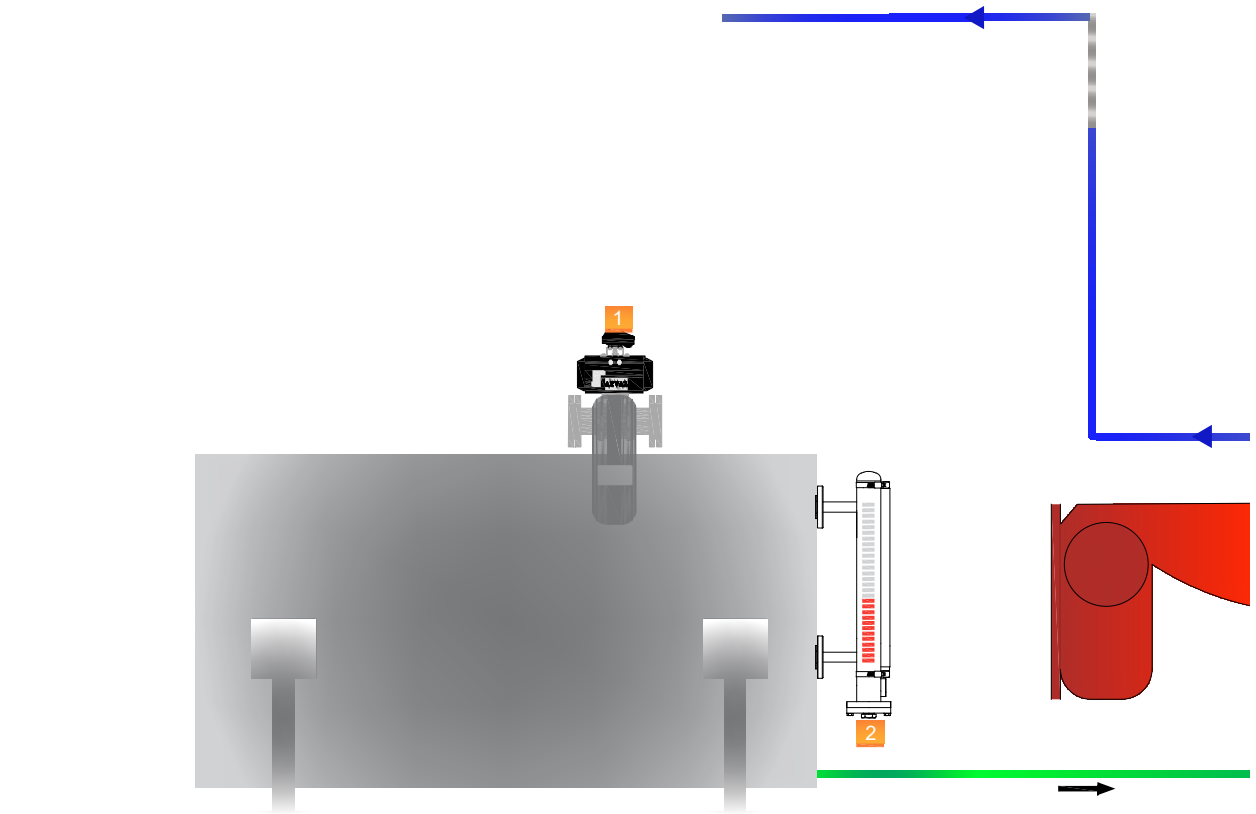
Industrial facilities have many wasted heat sources such as rotten steam and hot water returning from fabric washing. At the same time, there are applications that require heat, such as domestic hot water production and office heating. With the Ayvaz plate heat exchanger you will use to transfer heat from existing heat sources to the part that needs heat, you do not waste your heat and you need to save extra heat for the heat requirement. Nowadays, the most important factor that will relax businesses is to reduce costs. Energy expenses, one of the biggest factor in expenses, are now worth the gold for everyone and cannot be ignored. A heat exchanger to be used for heat recovery with a rough calculation now pays off in 3-6 months and starts to add value to the operation in a short time.



BOILER ROOM

**TANK SECTION (FEED WATER,
DEAERATOR, CONDENSATE RECOVERY)**

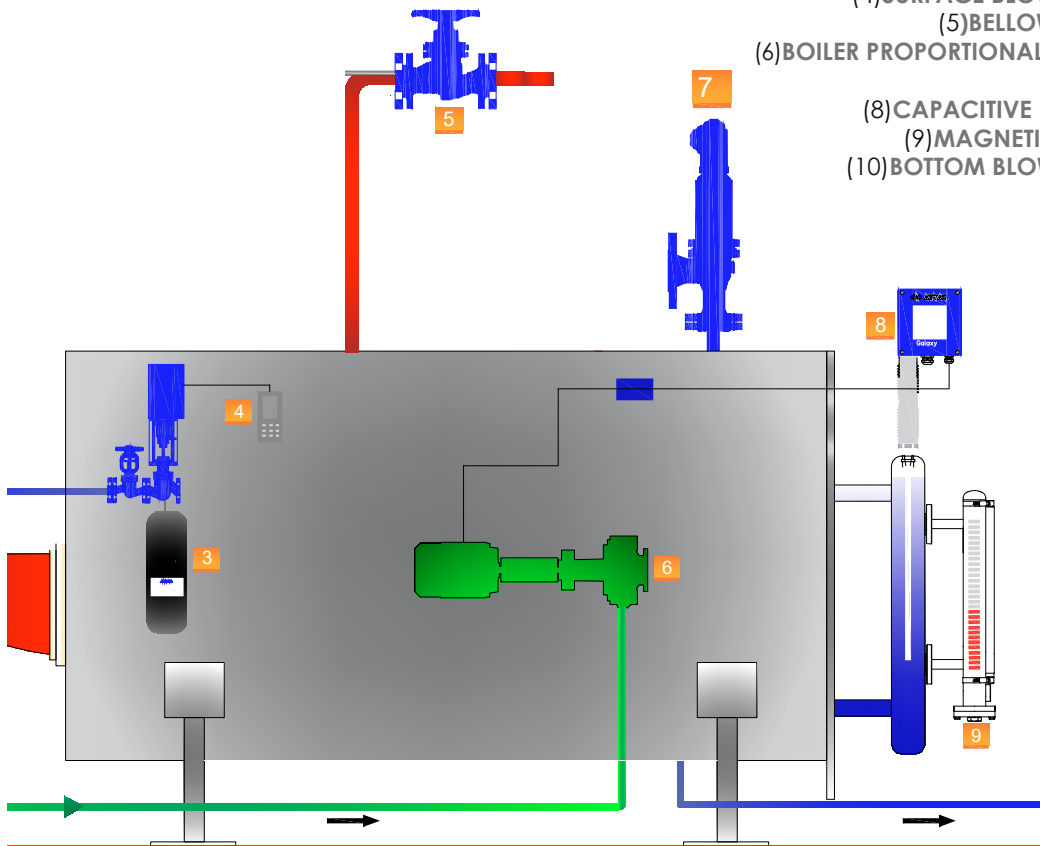
- (1) DEAERATOR ▶ ASD
- (2) MAGNETIC LEVEL GAUGE ▶ MG-33S



BOILER ROOM

BOILER

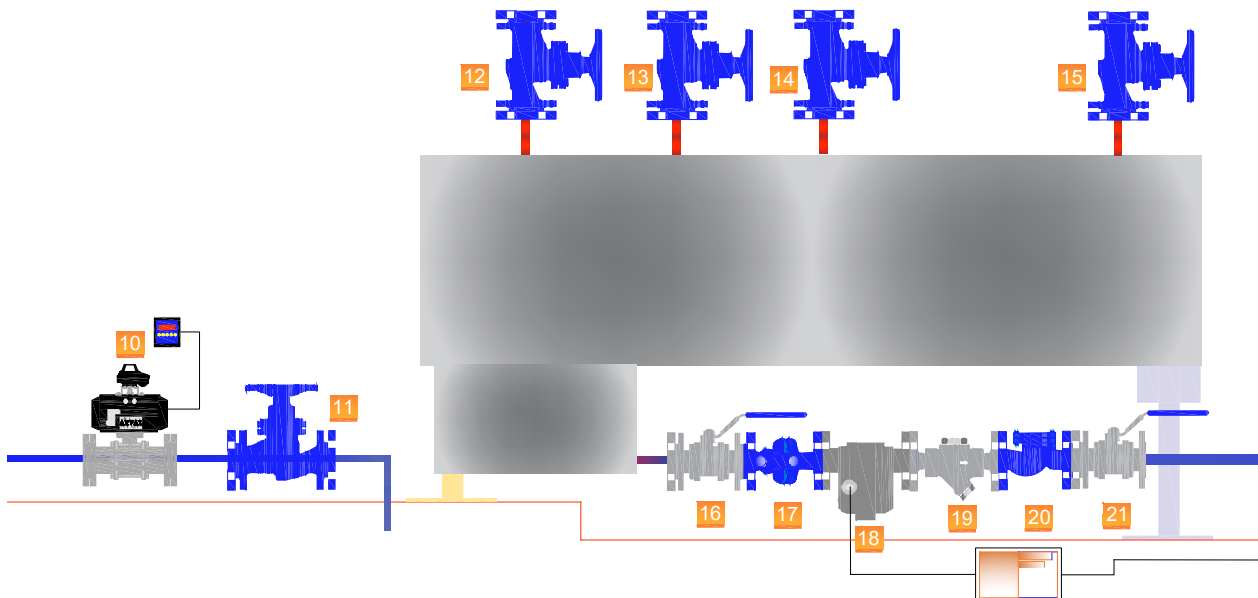
- (3) BOILER WATER SAMPLING GASKETINER ▶ NK-16
- (4) SURFACE BLOWDOWN SYSTEM ▶ YBS-10
- (5) BELLOW SEALED VALVE ▶ MK-16
- (6) BOILER PROPORTIONAL LEVEL CONTROL SYSTEM
- (7) SAFETY VALVE ▶ L9-BP
- (8) CAPACITIVE LEVEL ELECTRODE ▶ KP-01
- (9) MAGNETIC LEVEL GAUGE ▶ MG-33
- (10) BOTTOM BLOWDOWN VALVE ▶ DBV-10



BOILER ROOM

COLLECTOR (HEADER)

- (12-13-14-15) BELLOWS SEALED VALVE ▶ MK-16
- (16-21) STAINLESS STEEL BALL VALVE ▶ V3-F
- (17) STRAINERS ▶ PTY-40
- (18) STEAM TRAP CONTROLLING UNIT ▶ TKON
- (19) THERMODYNAMIC STEAM TRAP ▶ TDK-45
- (20) CHECK VALVE ▶ CLV-50



INDUSTRIAL SOLUTIONS

CORRUGATED CARDBOARD



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