AYVAZ

INDUSTRIAL SOLUTIONS

LAUNDRY

Rev.1219

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LAUNDRY

Energy is getting more important day by day. According to the diminishing of energy sources, industries searching for alternative sources for increasing the productivity.

In boilers, dryers, heat exchangers, iron heaters, washing machines or any other processes energy efficiency can be 25-30% higher according to application investments with low redemption times.

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

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 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.

STEAM USAGE IN LAUNDRY – WASHING MACHINE

WASHING MACHINE

OPERATING PROCESS
The solvent used in the washing machines must be heated before being sprayed onto the laundry. This process is costly when done with electricity. Steam is supplied to the solvent heating units of the washing machines. The condensate that will be formed from the solvent mixing steam of the washing machines cannot be reused. for this reason, only the entrances of the washing machines have a steam trap group.

STEAM USAGE
25-400 kg/h Steam Usage
1-7 BAR Working Pressure
120-140 C Working Temperature

EQUIPMENT NEEDS
Thermodynamic Steam Trap (main line)
Bellow Sealed Valve
Strainer
Checkvalve

WASHING MACHINE TYPES
Conventional textile washing and spinning machines barrier type hygienic washing and squeezing machines tunnel type washing and squeezing machines.

WATER DRAGGING IN STEAM LINES – DRYERS

DRYERS

OPERATING PROCESS
They are used for drying the laundry which does not need to be ironed or which needs to be pre-dried before ironing. Various capacities are available with single doors, separate loading and unloading doors or tilting models. They are electrically heated, steam or gas heated and their drums are stainless steel or galvanized. The working principles are the drying of the laundry by hot air circulation while the laundry rotates in the drum.

STEAM USAGE
25-400 kg/h Steam Usage
1-7 BAR working pressure
120-140 C Working Temperature

EQUIPMENT NEEDS
Thermodynamic Steam Trap (main line)
Float Type Steam Trap
Bellow Sealed Valve
Strainer
Checkvalve
Stainless Steel Flexible Metal Hoses

DRYER TYPES
Tumble Dryers
Tunnel Type Dryers
Cylndric Dryers

STEAM USAGE IN LAUNDRY – IRONING

IRONING

STEAM USAGE
25-35 kg/h Steam Usage
4-5 BAR working pressure
150-160 C Working Temperature

EQUIPMENT NEEDS
Thermodynamic Steam Trap
Bellow Sealed Valve
Strainer
Checkvalve

IRON TYPES
Cylinder Irons
Roller Folding Machines
Roller Folding / Ironing, Feeding Machines
Finishing Irons
Model Irons
Blowers
Iron Robots

CONDENSATION AMOUNT

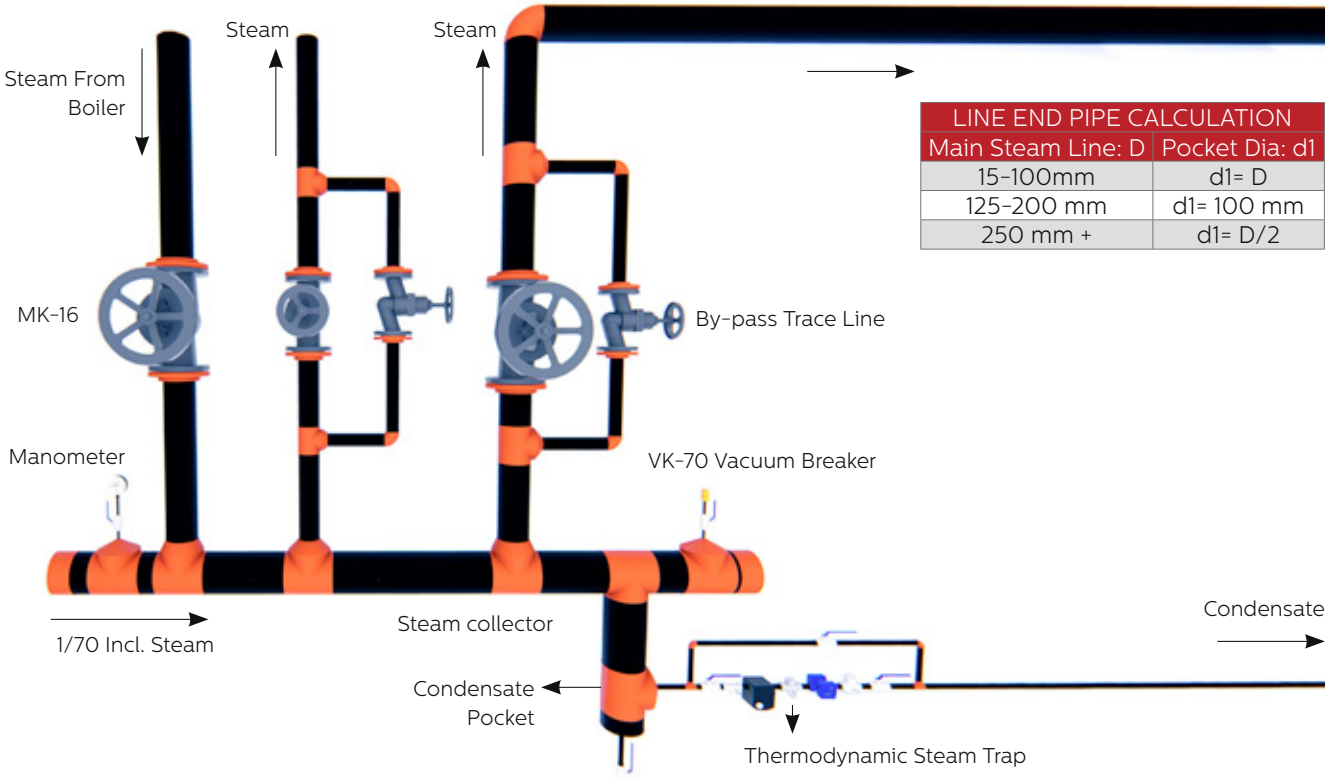
TEXTILE INDUSTRY STANDARD MACHINE INFORMATION				STEAM CONSUMPTION (kg/h)	
TYPE OF DEVICE OR PROCESS		STEAM PRESSURE (bar)	CAPACITY	CLOSED COND. SYSTEM	OPEN COND. SYSTEM
LAUNDRY MACHINES	Stain Removal Machine	4,0 - 5,0		5	
	Dry Cleaner		1 kg of Clothes		0,5
	Laundry		20 kg of Clothes	21	25
			40 kg of Clothes	30	35
			60 kg of Clothes	43	50
			100 kg of Clothes	68	80
			150 kg of Clothes	85	100
			300 kg of Clothes	102	120
DRYING MACHINES	Tumble Dryer		20 kg of Clothes	21	25
			30 kg of Clothes	30	35
			40 kg of Clothes	38	45
			60 kg of Clothes	55	65
			100 kg of Clothes	94	110
			150 kg of Clothes	136	160
			160 kg of Clothes	340	400
INDUSTRIEL IRONS	Steam Irons			5	
	Trousers Press			25	
	Robot Irons			30	
	Model Blower			30	
	Trousers Blower			35	
	Cylinder Iron		50 kg of Clothes	26	30
	Cylinder Iron		75 kg of Clothes	34	40
	Cylinder Iron			51	60
	Cylinder Iron			85	100

STEAM DISTRIBUTION

The system that distributes steam is called collector. Steam condensates in the collectors. The condensate is usually charged by thermodynamic steam traps from the collectors.

Steam collectors are the first stop in steam distribution. Saturated steam comes directly from boiler. MK-16 bellow seal valves are best option instead of globe valves at this installation.

Collector sizes can calculated with $D=\sqrt{(d_1^2+d_2^2+d_3^2...d_n^2)}$ formula. Steam trap's pocket size can select according to selection table below;



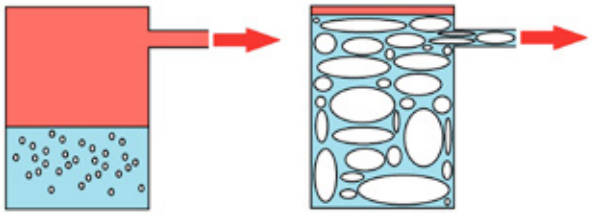
LINE END PIPE CALCULATION	
Main Steam Line: D	Pocket Dia: d1
15-100mm	d1= D
125-200 mm	d1= 100 mm
250 mm +	d1= D/2

WATER DRAGGING IN STEAM LINES

In some cases hot boiler water can mix with steam and may drag to the system. This gets steam wet and may caouse hugh water mass in system. This happens in that 3 case bellow;

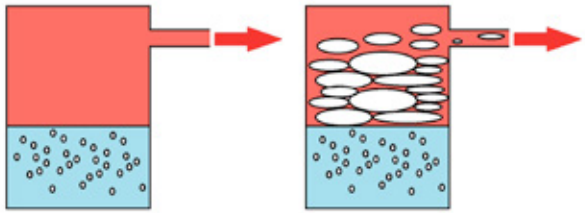
PEAK REQUESTS (PRIMING)

At the system startup, if all machines open in the same moment, boiler tank can not produce steam for request. It cause water dragging to the system and pressure loss in the steam boiler. When the pressure reduce suddenly, for balance the pressure, steam boiler start to boil and try to produce steam as fast as it can. This water steam mix drags to the system.



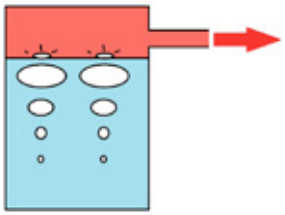
FOAMING

The components in the raw water which do not process properly process the water treatment process or the mixed condensate mixed with the condensate, cause the formation of bubbles in the cauldron. These foams fill the boiler and are dragged into the system due to the effect of steam. Foams contain water that is released when it explodes. This water damages the system.



BUBBLING

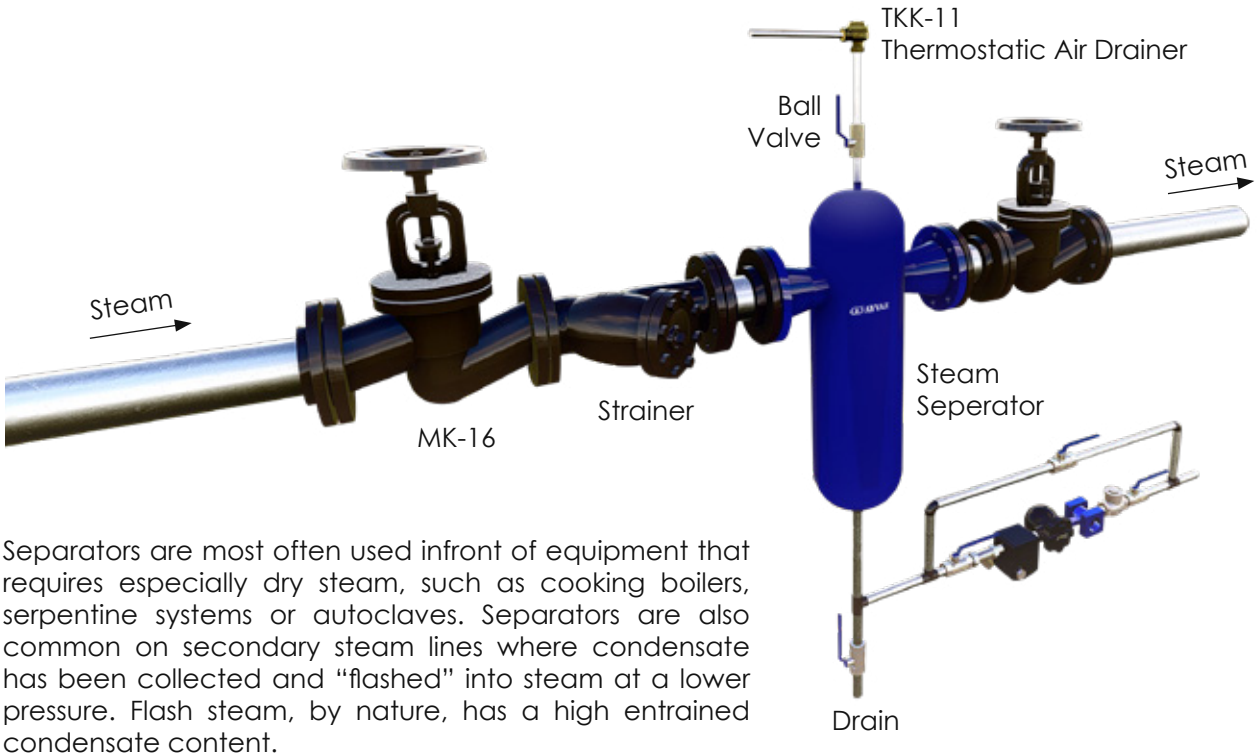
When water starts to boil on a metal heating surface, a steam bubble is formed in the water. This steam balloon rises rapidly and rises to the surface of the water. When the bubble breaks the surface of the water, some water is discharged from the surface. Discharged water continues to exist as mist at the same temperature as steam. It is usually discharged from the boiler together with the rapid flow of steam. The rest is suspended at the surface of the water since it is less dense than the density of water.



STEAM SEPARATOR SYSTEMS

In some cases, saturated steam may distribute directly with single line from boiler. That distribution may cause water draggings at system start up. To prevent that problem, separator systems must be installed directly to the steam lines.

In cases where dry and clean steam is required, branch line should be connected to the machine and process with a steam separator. This will help to collect the water at the bottom of the separator and to be discharged from the steam trap.



Separators are most often used infront of equipment that requires especially dry steam, such as cooking boilers, serpentine systems or autoclaves. Separators are also common on secondary steam lines where condensate has been collected and "flashed" into steam at a lower pressure. Flash steam, by nature, has a high entrained condensate content.

BLOWDOWN SYSTEMS

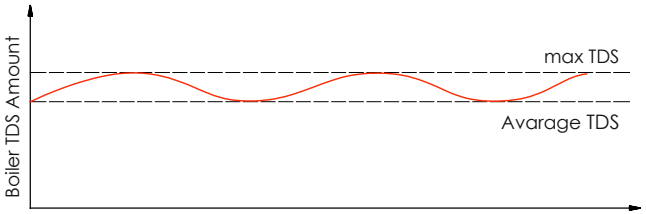
Surface blowdown and bottom blowdowns are required to ensure a continued safe transmission of the boiler. Sludge deposits are formed in the boiler and must be cleaned at regular intervals.

Sediments must be evacuated periodically to prevent the formation of the sludge layer. Bottom blowdown valves are used for this purpose. The bottom blowdown valve is opened and the pressurized boiler water is discharged from the lower zone of the boiler.

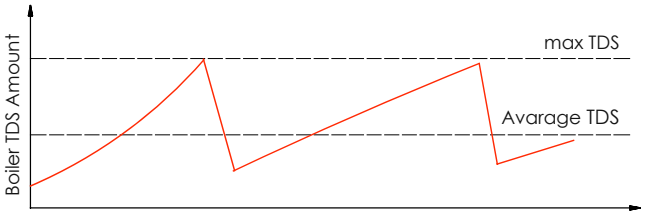
When the valve is opened, the sludge in the lower area of the boiler is effectively discharged by the high water velocity due to the pressure difference. Depending on the type of water preparation system and the dosing system, the steam boiler reaches salt and other foreign substances.

As a result of evaporation, the salinity in the boiler water increases. Salt concentration higher than the limit value causes the boiler stone, boiler corrosion and foam formation.

The foam can also reach the steam installation. Thus, the steam quality decreases and the accumulation of water forces the armatures.

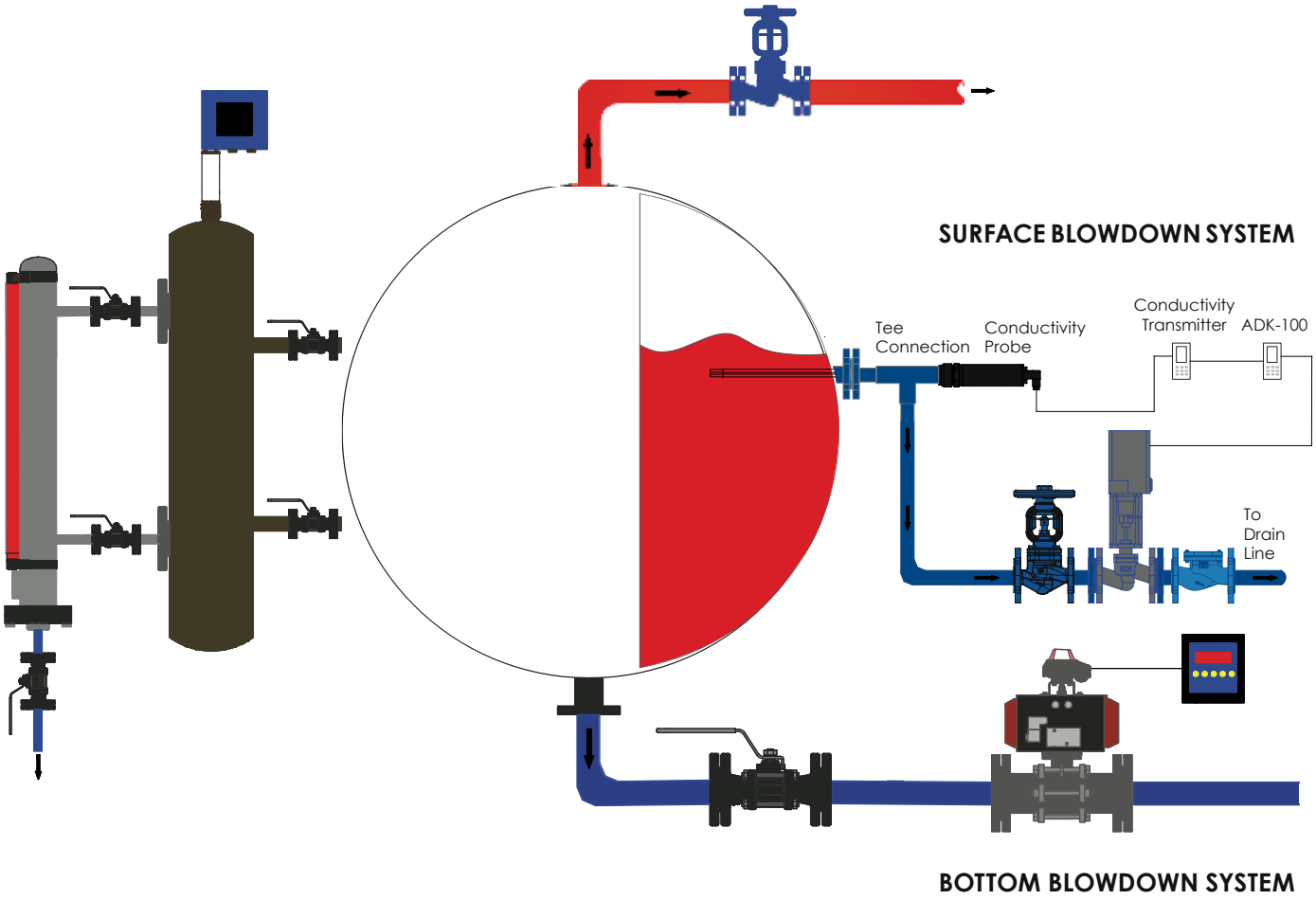


Automatic Blowdown System

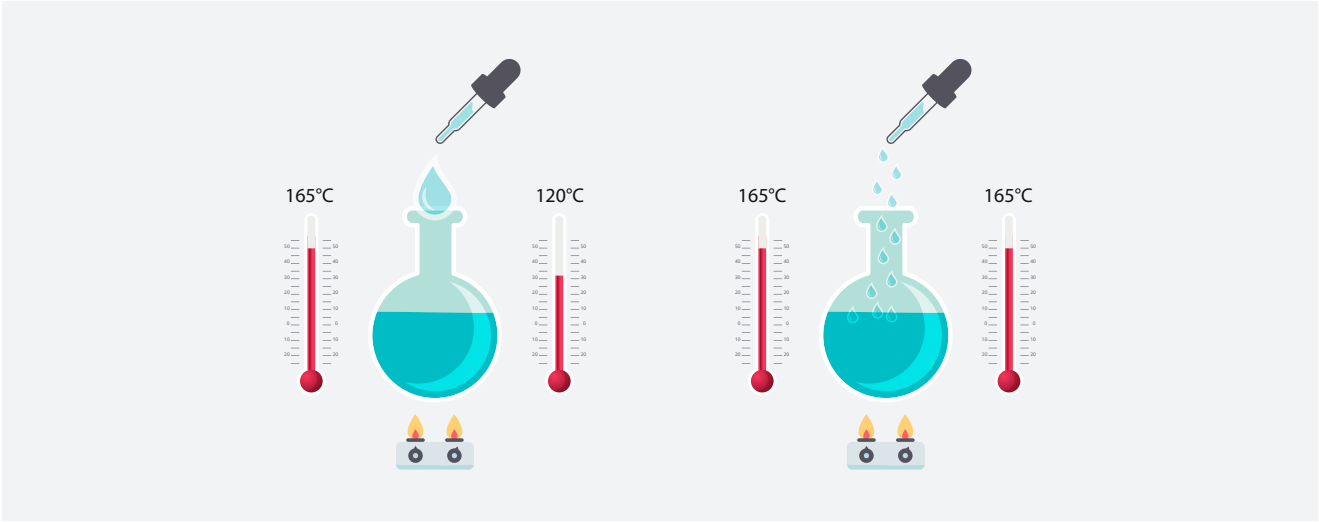


Manuel Blowdown System

APPLICATION EXAMPLE



FEED WATER SYSTEMS

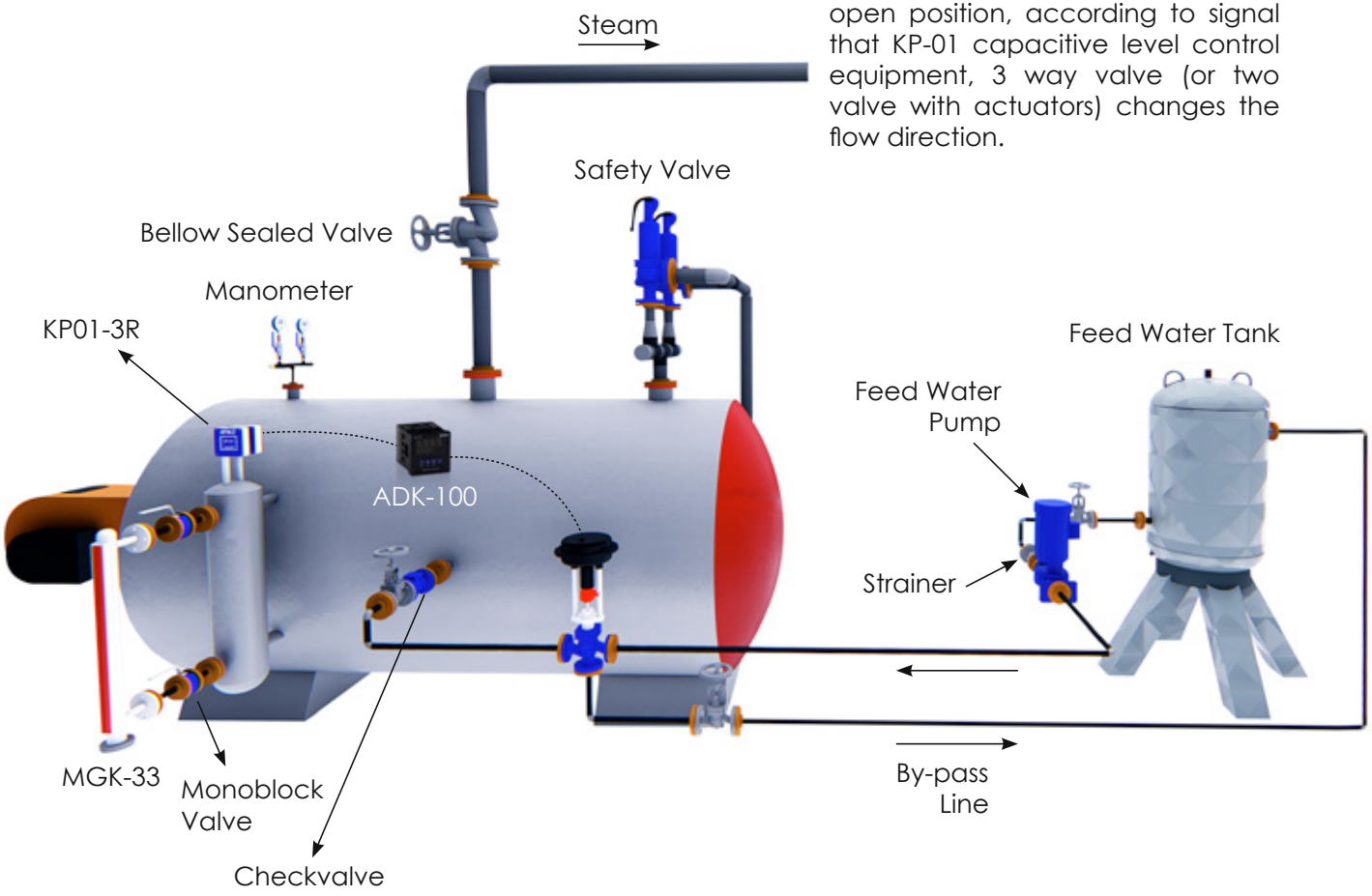


There are 2 general types of feed water system, such as; proportional and on-off. Main differences between proportional and on-off systems are;

- On-off systems are more economical than proportional systems.
- With proportional systems, pressure and temperature drops will be prevented.

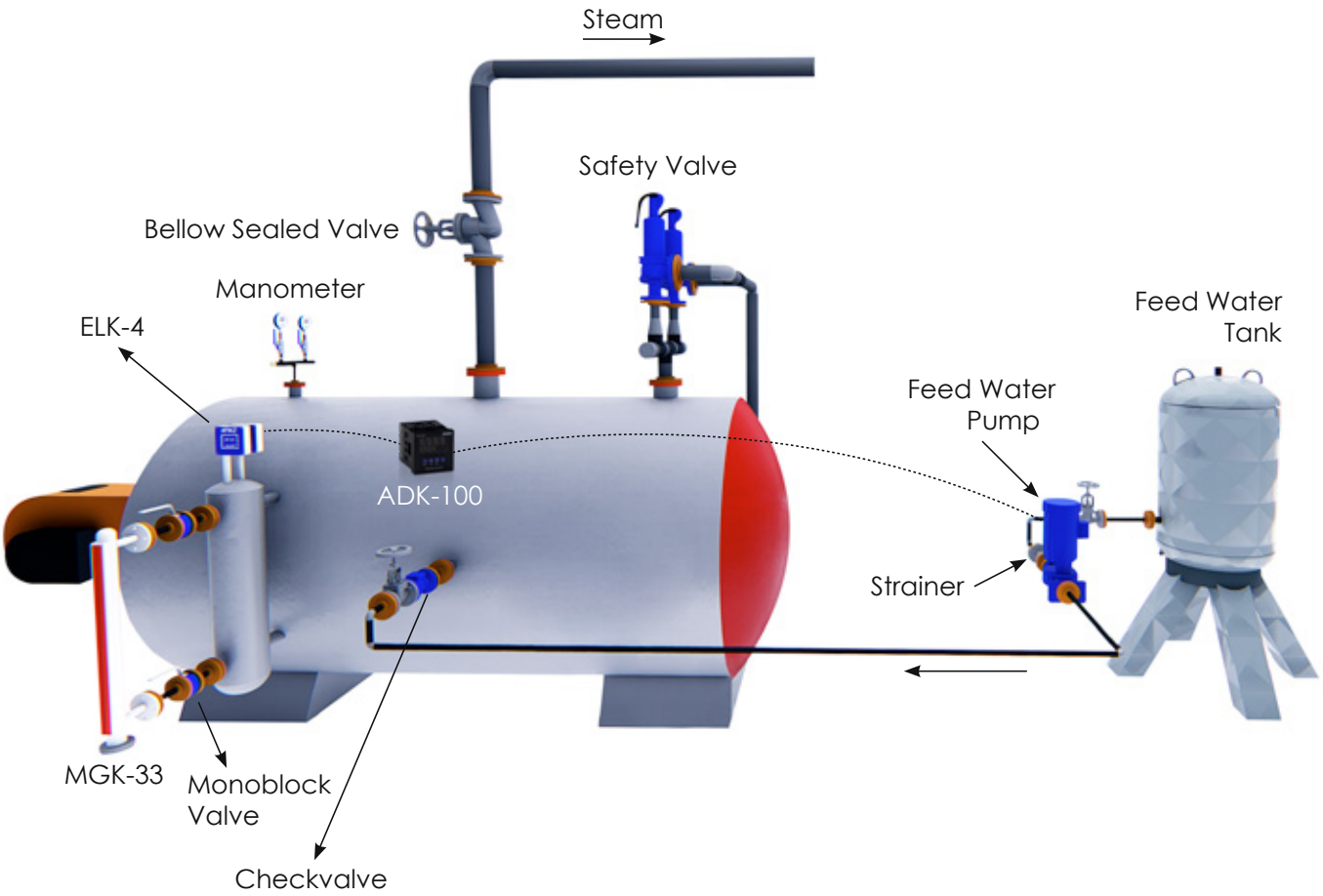
PROPORTIONAL FEED WATER SYSTEMS

Feed water pump is allways in open position, according to signal that KP-01 capacitive level control equipment, 3 way valve (or two valve with actuators) changes the flow direction.



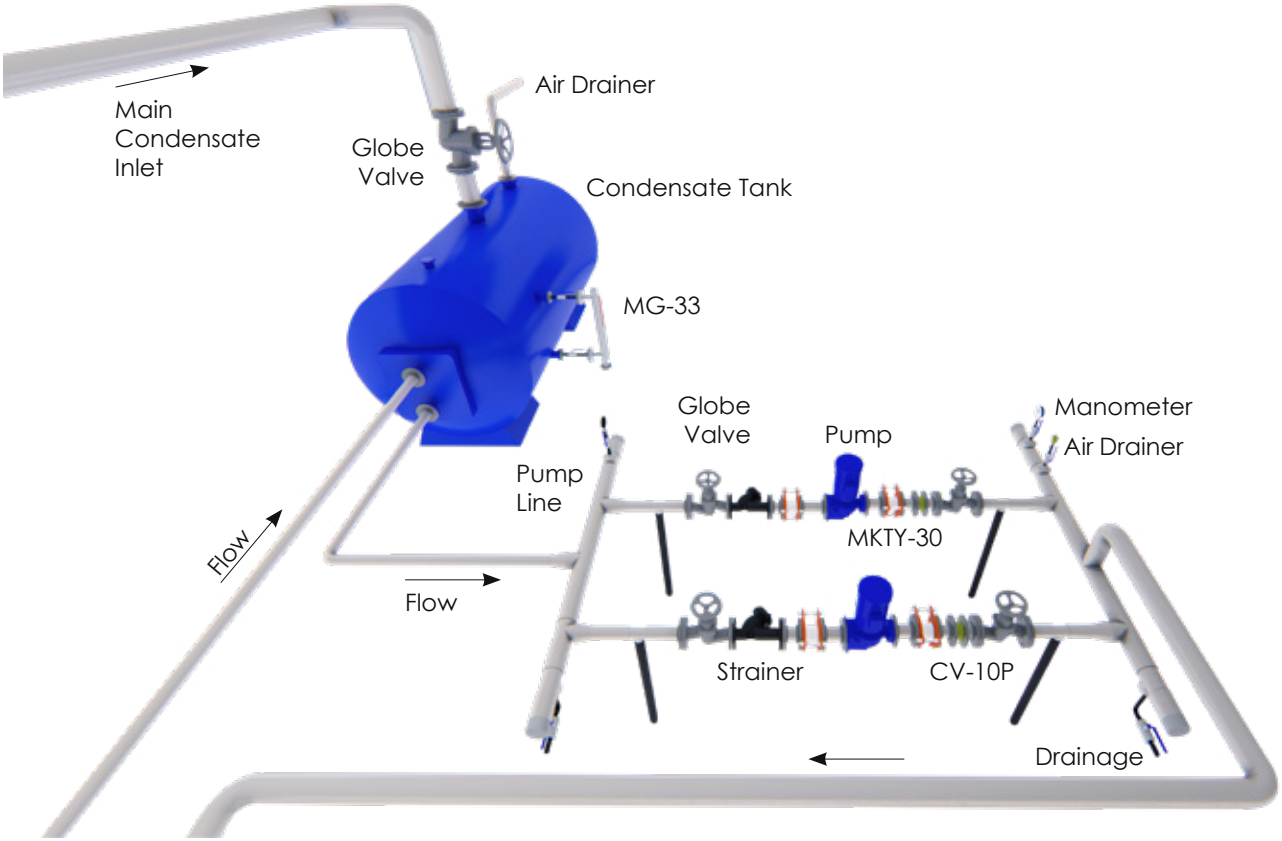
ON-OFF FEED WATER SYSTEMS

Feed water pump is opening and closing continously, according to signal that ELK-4 probe level control equipment, control valve changes the flow direction.



CONDENSATION RECOVERY LINE

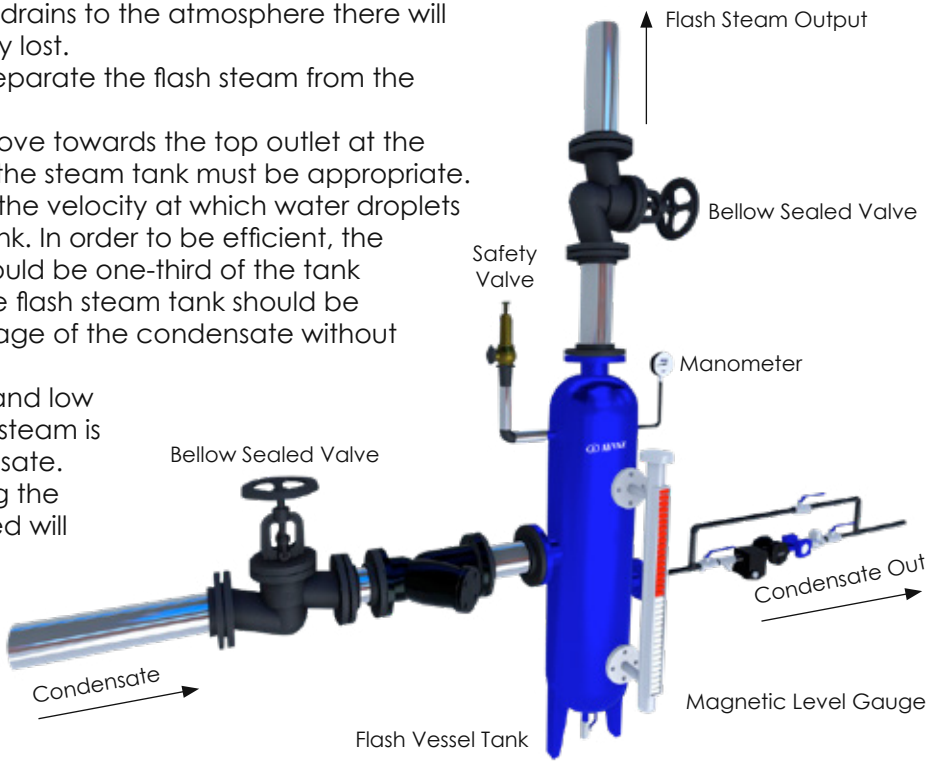
After process, saturated steam will transfer the energy and condensation will collect with steam traps to the condensate tanks. Condensate will mix with water supply in feed water tank by pumps, like the diagram below.



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.

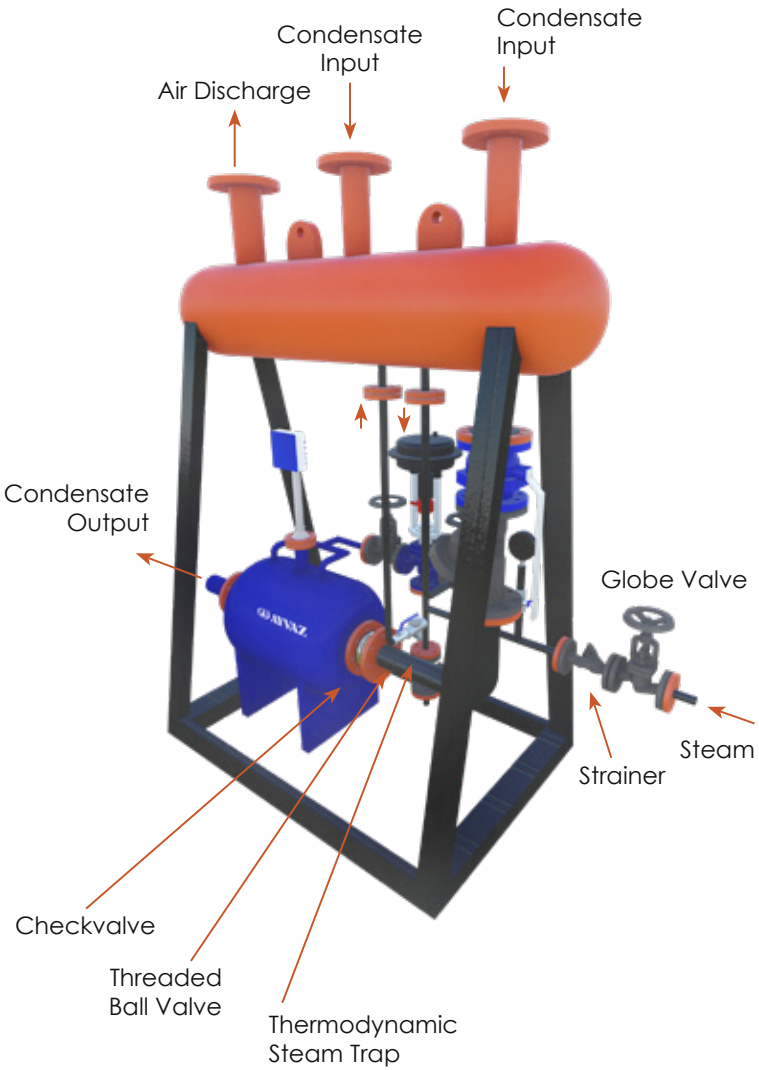
Why Flash Steam is Important?
It includes too much energy and it can be mount to different installation areas. If Flash Steam drains to the atmosphere there will be waste energy and effeciency lost.
Flash Steam Tanks are used to separate the flash steam from the condensate water.
In order for the flash 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 condesate 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 ocur. Steam is occurs the condensate discharging with entering the body, which have more pressure than the opposite pressure. When the condensate limit is gettin 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.



HEAT EXCHANGERS

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.

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.

PRESSURE REDUCING SYSTEM

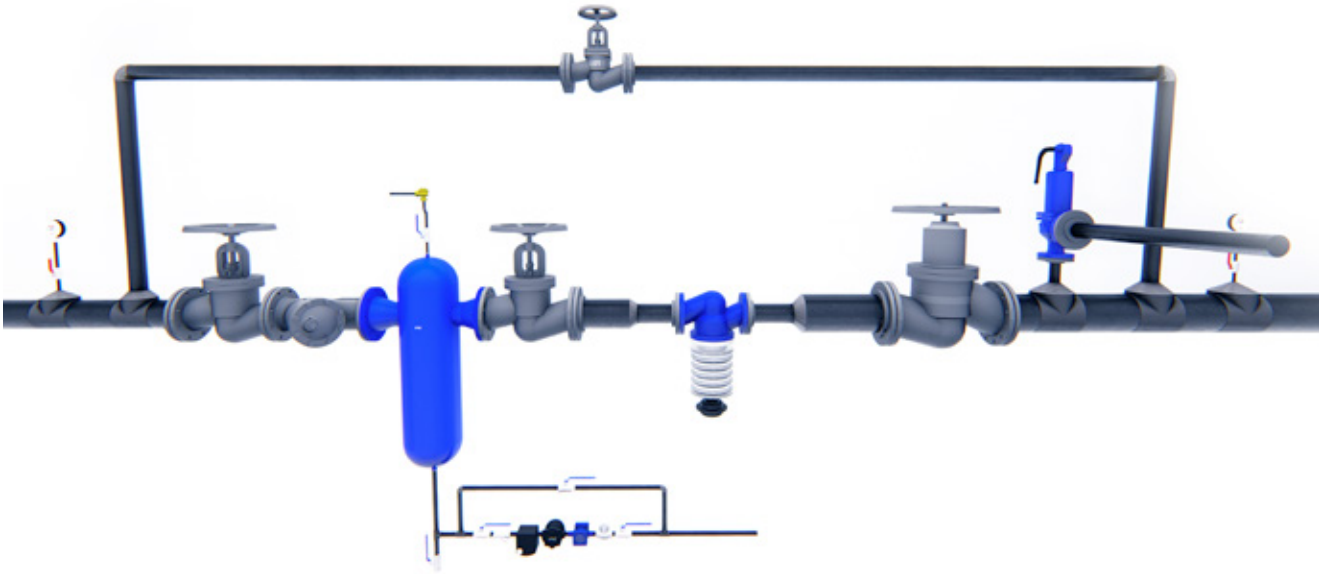
It requires a primary steam pressure of up to 7 bar for older-style machines in laundry lines and up to 16 bar for new high-speed machines.

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

Folding machine's rollers, small pre-heaters, press irons and cylinder irons usually operate at the highest temperature.

They require high pressure steam within 4±0.3 bar (± 2°C).

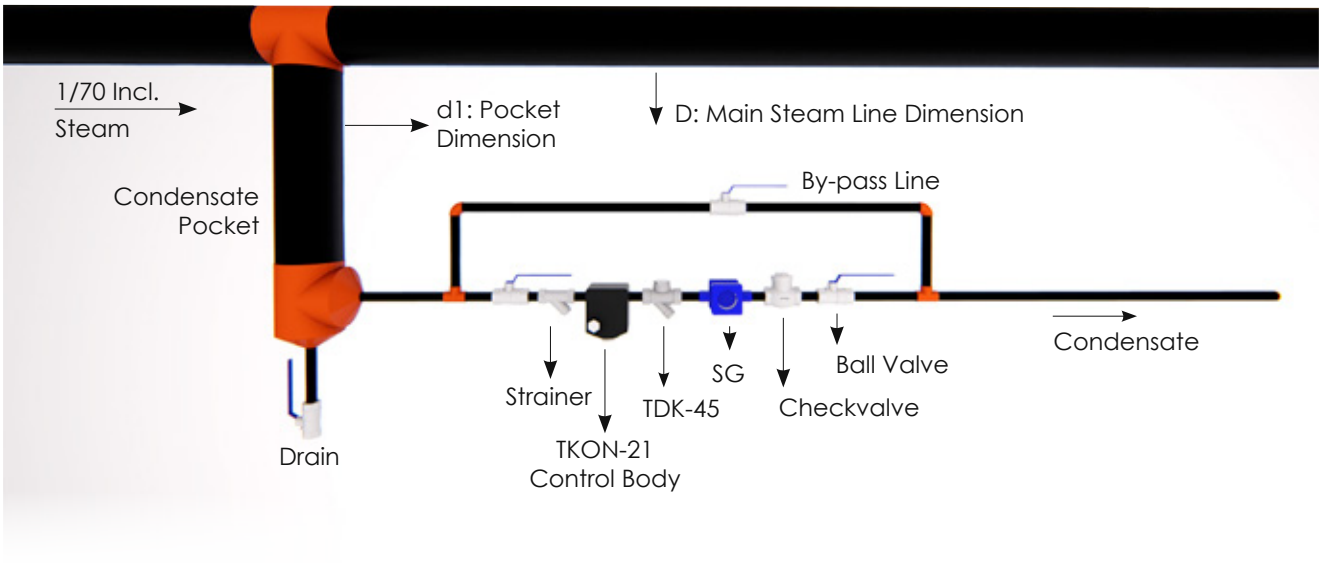
The choice of the main pressure reducing valve must depend on the needs of the system. In a folding machine where the same pressure is always required in high temperature cylinders with a very stable demand throughout the process, a direct effective pressure reducing valve of the correct size can be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



STEAM LINE APPLICATIONS

MAIN STEAM LINE APPLICATION

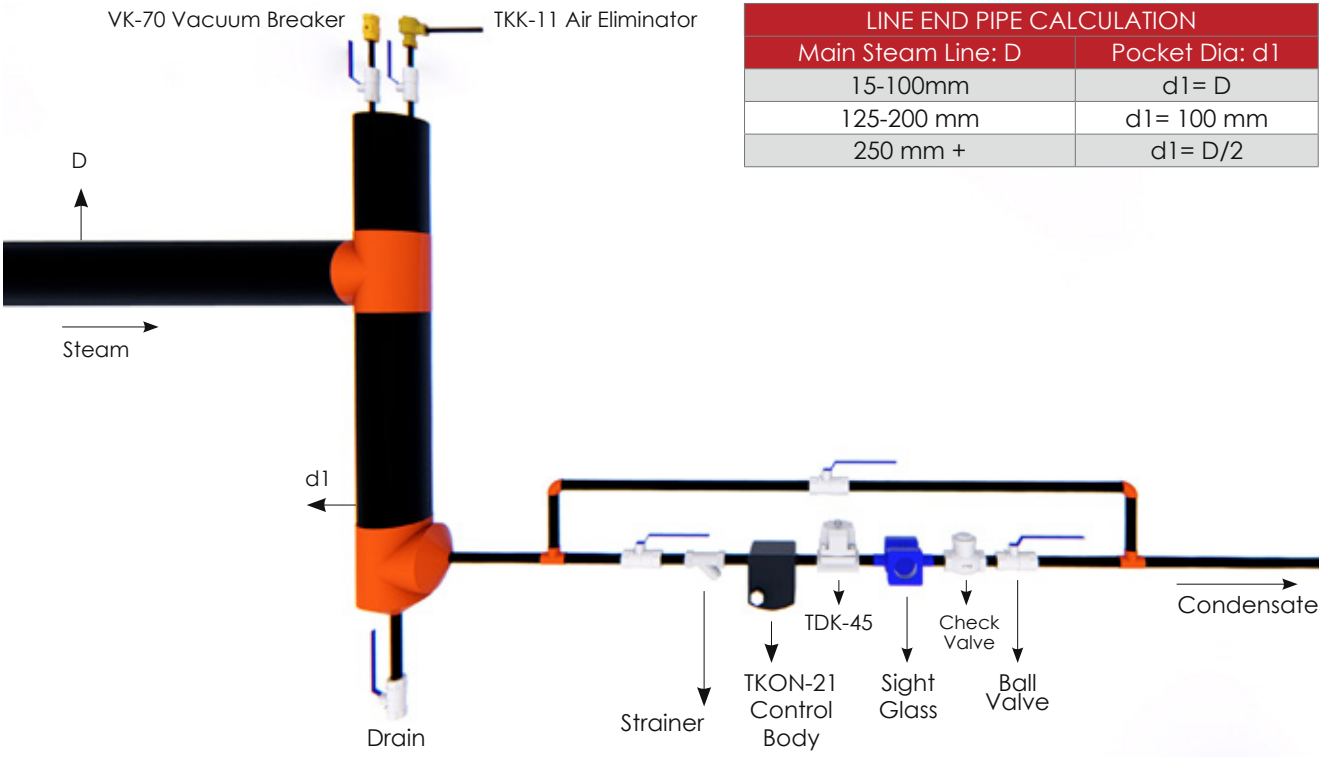
Condensate discharge unit should be placed in main steam lines in every 50 meters if the line is indoor and insulated or in every 30 meters if the line is outdoor and insulated. If any equipment like pressure reducer, pressure holder or proportional valve is installed in the line, a condensate discharge unit must be placed before these equipment.



LINE END APPLICATION

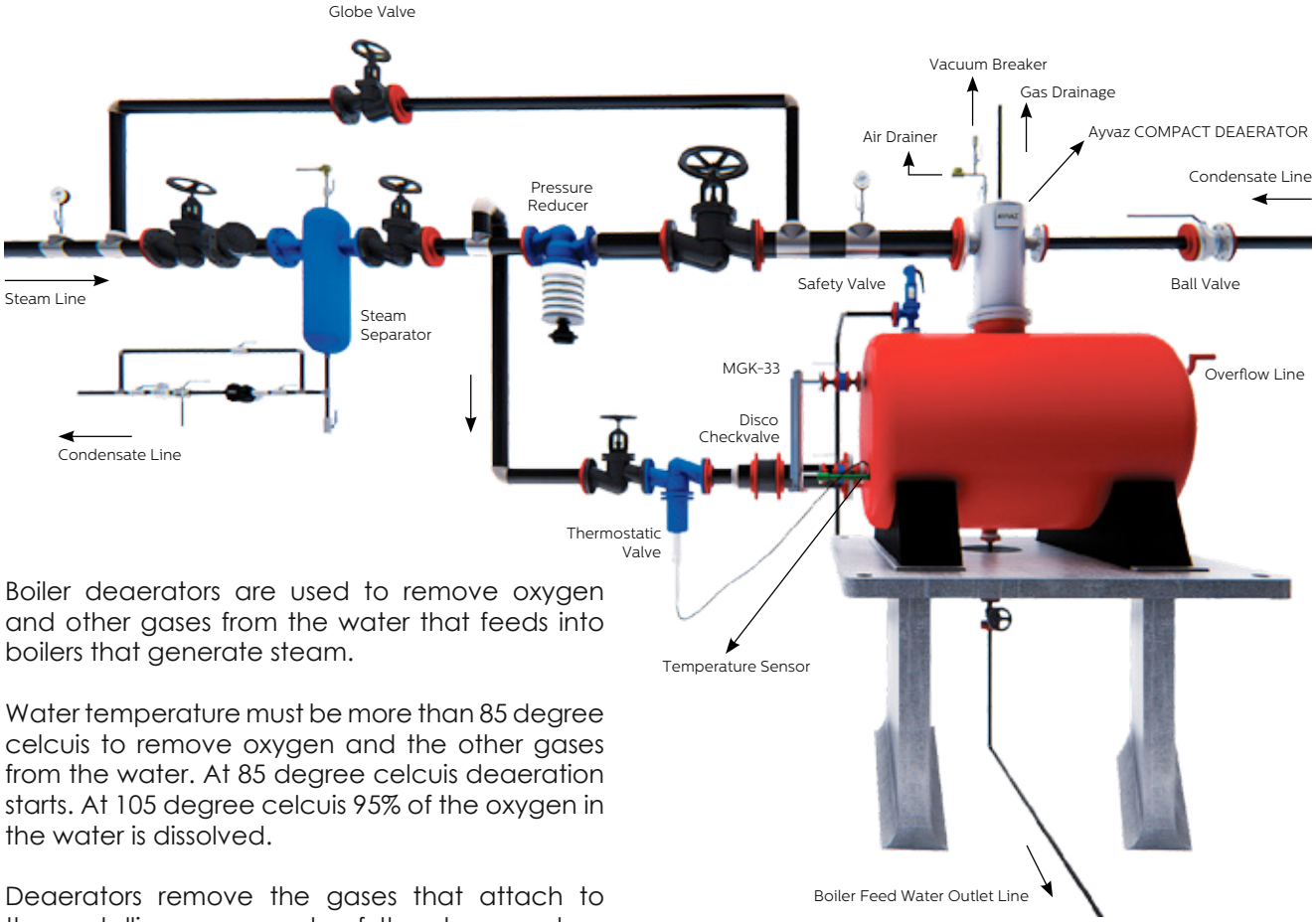
If the steam systems are closed by the process, the steam will turn to condensation until it is turned on again. The volume difference will be filled with air. When the system is switched on again, the air must be evacuated to allow the steam to easily fill the line. This is only possible with "End of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



LINE END PIPE CALCULATION	
Main Steam Line: D	Pocket Dia: d1
15-100mm	d1= D
125-200 mm	d1= 100 mm
250 mm +	d1= D/2

DEAERATORS



Boiler deaerators are used to remove oxygen and other gases from the water that feeds into boilers that generate steam.

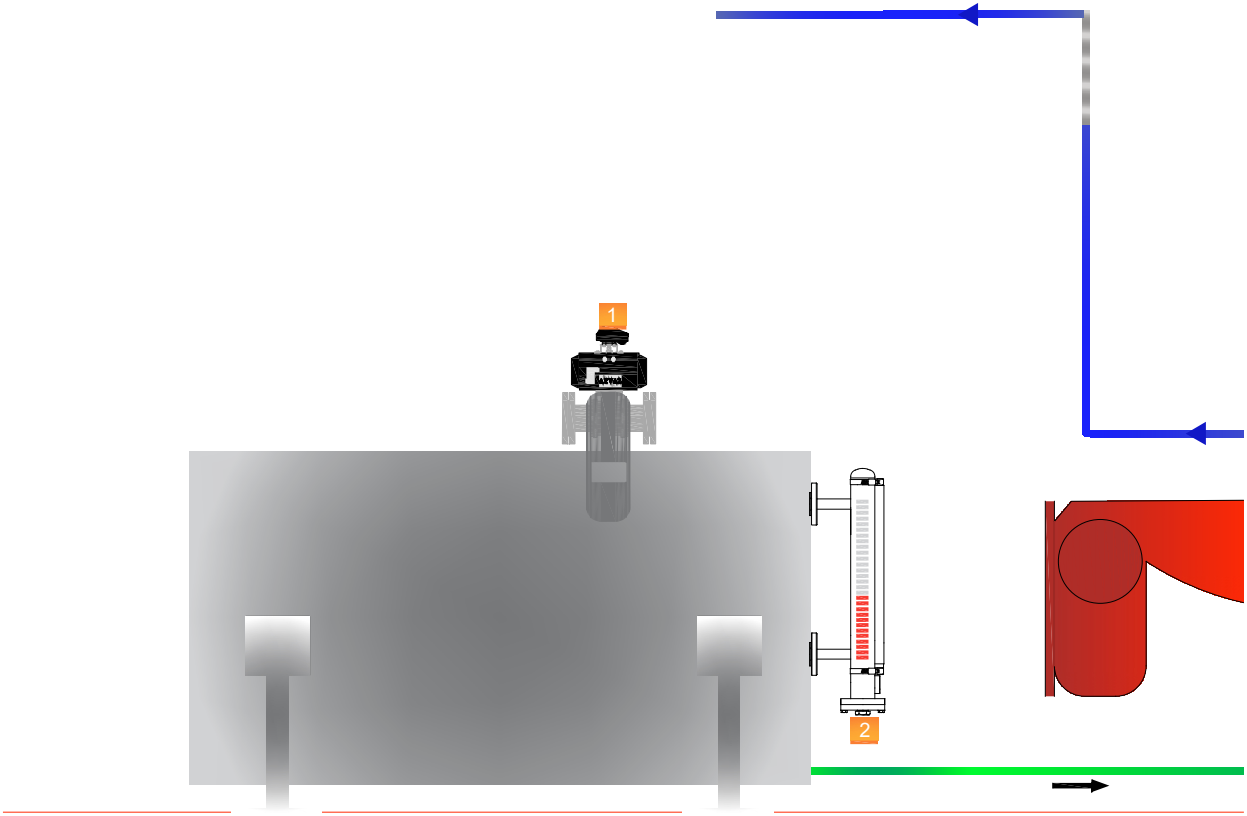
Water temperature must be more than 85 degree celcuis to remove oxygen and the other gases from the water. At 85 degree celcuis deaeration starts. At 105 degree celcuis 95% of the oxygen in the water is dissolved.

Deaerators remove the gases that attach to the metallic components of the steam system and cause corrosion by forming oxides, or rust. Oxygen and carbon dioxide are responsible for corrosion(pitting). There are two types of boiler deaerators: Tank model or compact deaerators.

BOILER ROOM

TANK SECTION (FEED WATER, DEAERATOR, CONDENSATE RECOVERY)

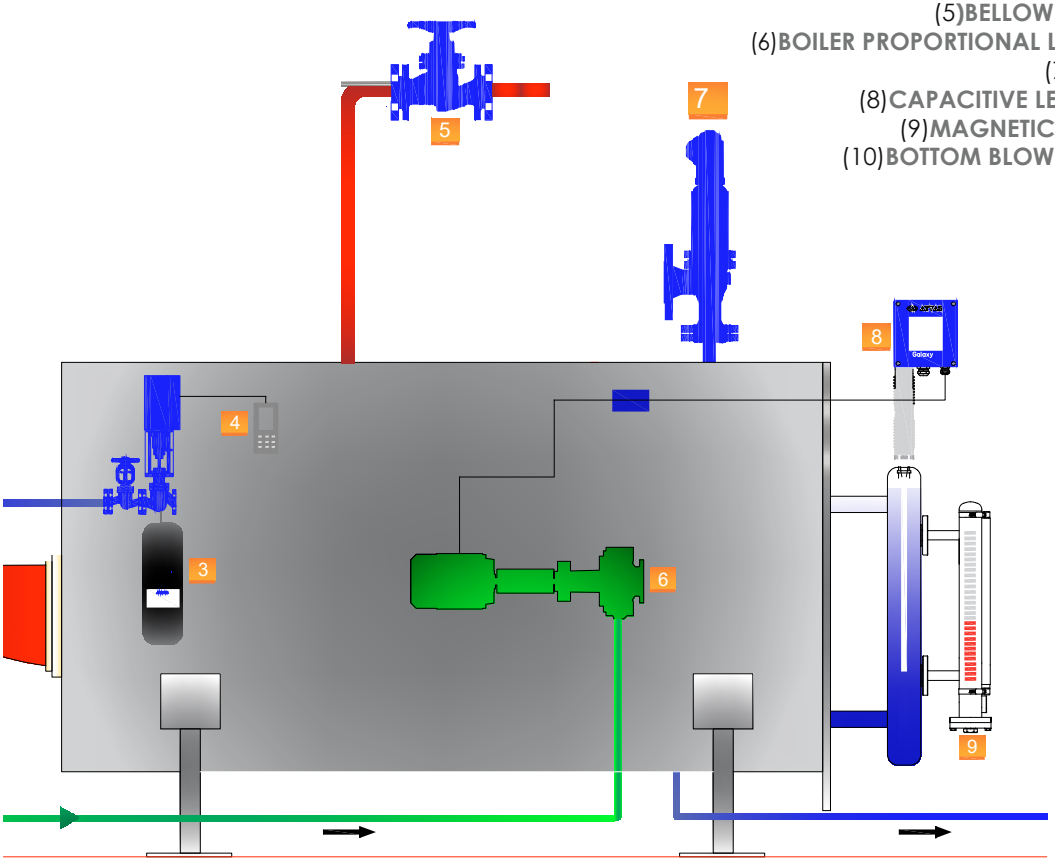
(1) **DEAERATOR**▶ASD
(2)**MAGNETIC LEVEL GAUGE**▶MG-33S



BOILER ROOM

BOILER

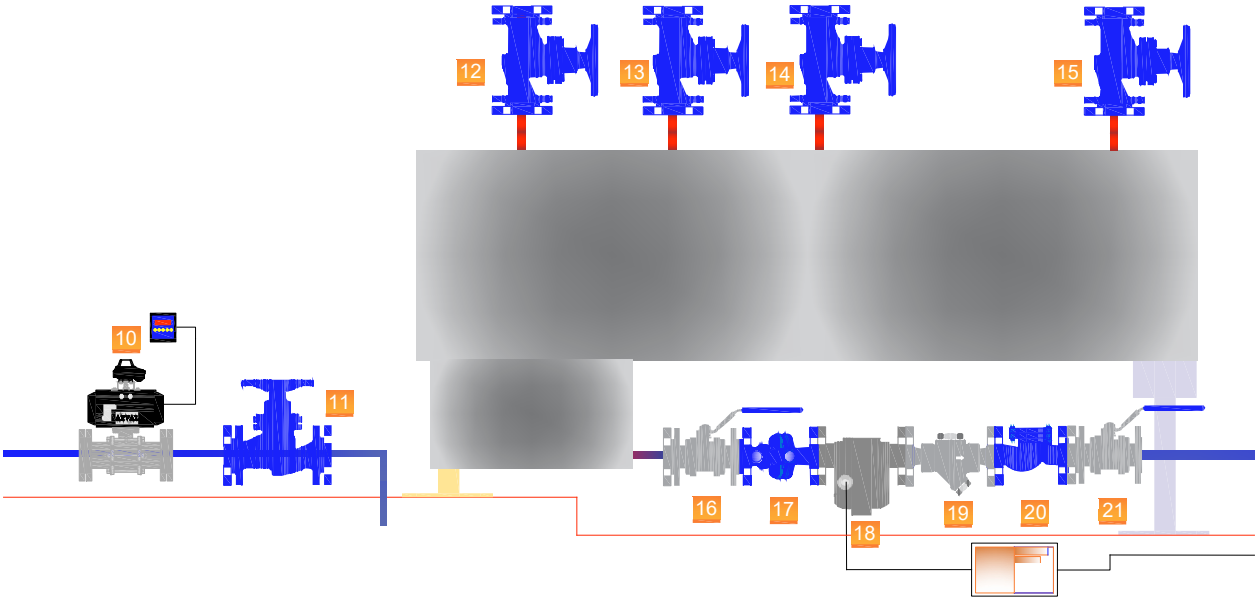
(3)BOILER WATER SAMPLING GASKETINER▶NK-16
(4)SURFACE BLOWDOWN SYSTEM▶YBS-10
(5)BELLOW SEALED VALVE▶MK-16
(6)BOILER PROPORTIONAL LEVEL CONTROL SYSTEM
(7)SAFETY VALVE▶L9-BP
(8)CAPACITIVE LEVEL ELECTRODE▶KP-01
(9)MAGNETIC LEVEL GAUGE▶MG-33
(10)BOTTOM BLOWDOWN VALVE▶DBV-10

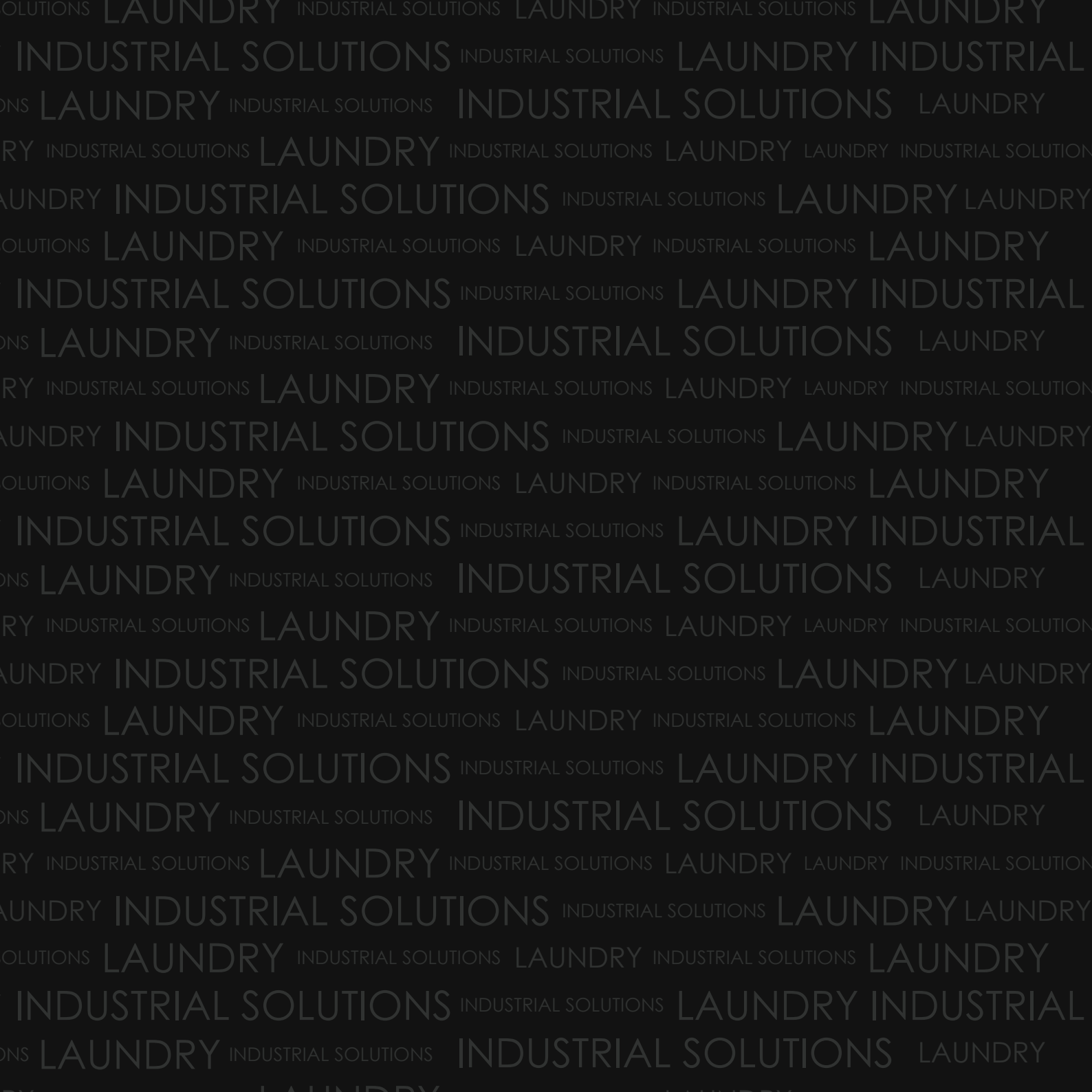


BOILER ROOM

COLLECTOR (HEADER)

(12-13-14-15)**BELLOW 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 LAUNDRY

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