

ARMSTRONG  
SOLUTIONS

FOR  
RICE INDUSTRY



**Armstrong®**



# THE RICE

Rice is one of the most important food crops in the world and remarkable that almost every culture has its own way of harvesting, processing and utilizing rice. In India, it is grown across the country.



The cultivated paddy is treated by a hydrothermal process called paraboiling followed by drying and milling, to improve its quality, nutritive value, cooking quality and storability. The process of paraboiling is done in three stages - Soaking, Steaming and drying.

**PARABOILING** - The process is done by steaming the unhusked rice to raise its temperature and then soaked in water at 20 - 30° C and maintained for 24-36 hrs. After soaking is done, secondary steaming is done for 20-30 minutes to heat up the grain to make it harder, followed by drying.

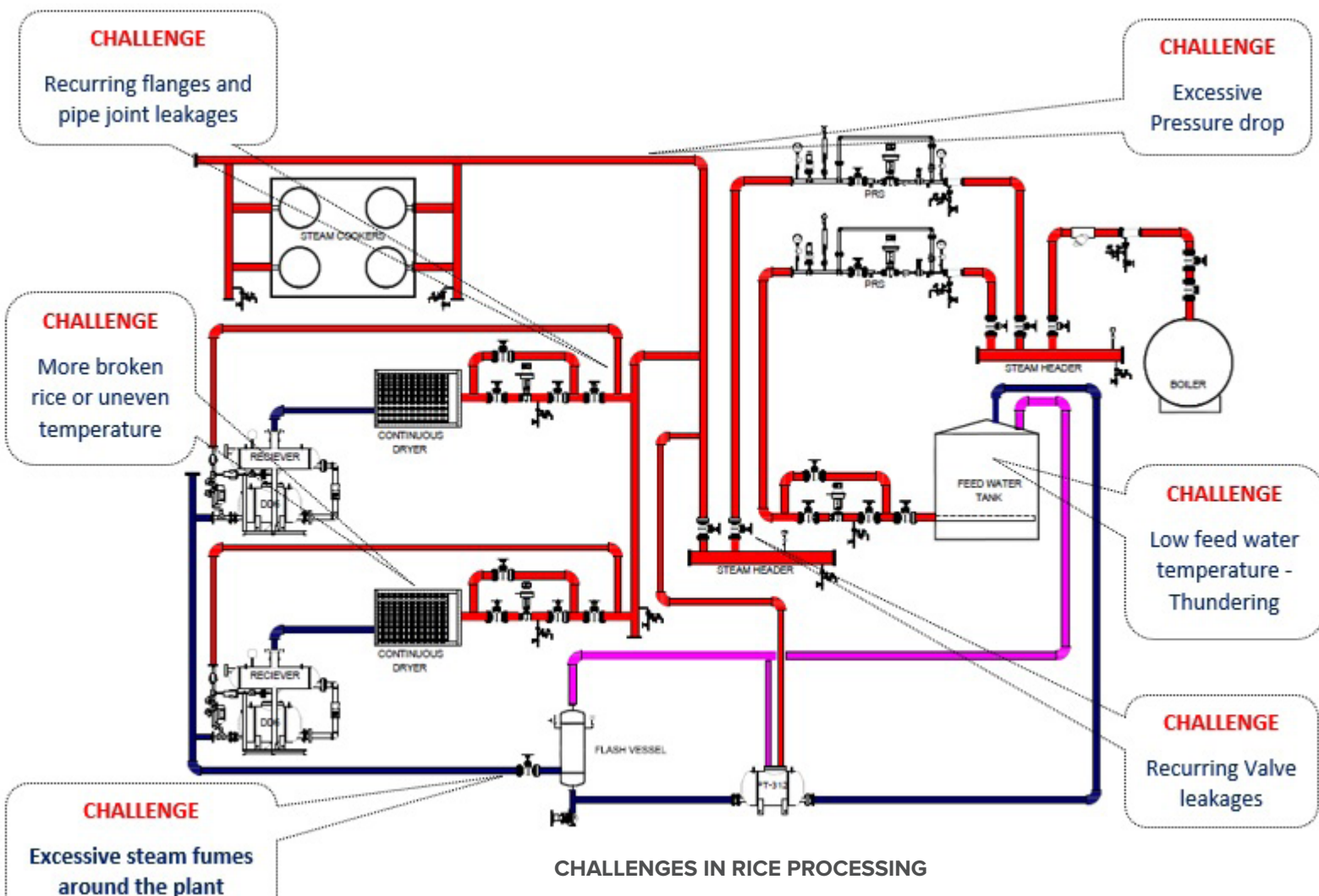
**DRYING** - Drying reduces the moisture content of the grain to an optimum level. Mechanical drying systems are used to remove water and moisture from wet grains by forcing them through heated air in a dryer. Heated air drying is stopped when desired moisture levels are achieved.

**MILLING** - Milling is done to remove the husk and the bran layers, and produce an edible, white rice kernel that is sufficiently milled and free of impurities.

## STEAM IN RICE PROCESSING

Efficient steam consumption is essential for achieving optimum plant efficiency. This can be achieved by having a good heat recovery system in place. The heat recovery system needs to employ a condensate recovery equipment and return pipeline with drain lines, steam traps and discharge line from traps.

## SCHMATIC LAYOUT OF RICE PROCESSING UNIT



### CHALLENGES IN RICE PROCESSING

- Mainline Trapping - Wet steam
- Pressure Reducing station
- Dryer Application
- Heat Transfer
- Isolation Valve Technology
- Pressure and Temperature Control
- Hot Water System

## MAINLINE TRAPPING TECHNOLOGY

### CHALLENGE

In rice processing applications, steam pressure varies from 3.5 - 7.5 bar(g) and getting the right quality of steam with minimum pressure drop is essential for the total steam system. Due to absence of mainline traps at appropriate locations (30 Meters) and improper drip leg sizing may result in improper condensate removal from main steam line. This will result in water hammering and supply of wet steam to process. To handle this challenge, right selection of trap is important to ensure quick draining of the condensate formed.

### ARMSTRONG SOLUTION

Armstrong **INVERTED BUCKET STEAM TRAP - IB 2011C with TVS4000** connector provides an unprecedented performance and ease of operation with minimum maintenance. This inverted bucket technology ensures 100% condensate recovery from steam mainline without employing any additional equipment and above all it comes with **5-year guarantee**.



## ISOLATION VALVE TECHNOLOGY

### CHALLENGE

During the process of primary and secondary steaming for Kachi-Pakki process, steam is supplied to the system by manual operation of the valve in regular intervals. Due to this repeated activity combined with low seal quality and valve configuration, the valves tend to leak resulting in direct steam loss. There is also a higher probability of valve failures.

### ARMSTRONG SOLUTION

Armstrong's **BELLOW SEAL VALVES** are gland free valves which help in steam throttling without any leakages. It offers maintenance free operation and a higher life period.



## PRESSURE REDUCING STATION



### CHALLENGE

Steam supplied at varying and high pressures to the process and heat exchangers result in energy loss and reduced efficiency for the steam system.

### SOLUTION

Armstrong offers **PRESSURE REDUCING STATION (PRS)** optimized to ensure accurate consistent downstream reduced pressure irrespective of fluctuations at the inlet and provides more latent heat to the process resulting in lower fuel consumption.

## PRESSURE AND TEMPERATURE CONTROL

### CHALLENGE

Under manual operating conditions, the steam supply valves throttled by the operators result in improper temperature profile in the dryers. This may lead to grain cracking.

### ARMSTRONG SOLUTION

Control valves are key to pressure and temperature control applications. When accurate control is desired from your steam, air or water application, **ARMSTRONG PYTHON® 1500 SERIES CONTROL VALVE** will squeeze every bit of performance out of your system and deliver precise control.

Python® 1500 Series control valve is constructed and equipped with state-of-art materials in compliance with ASME, DIN, IBR, CRN and GB standards.

Available in carbon steel and stainless steel material, sizes ranging from 1/2" to 4" with end connections available in flange #150 and #300.

### OPERATING RANGE

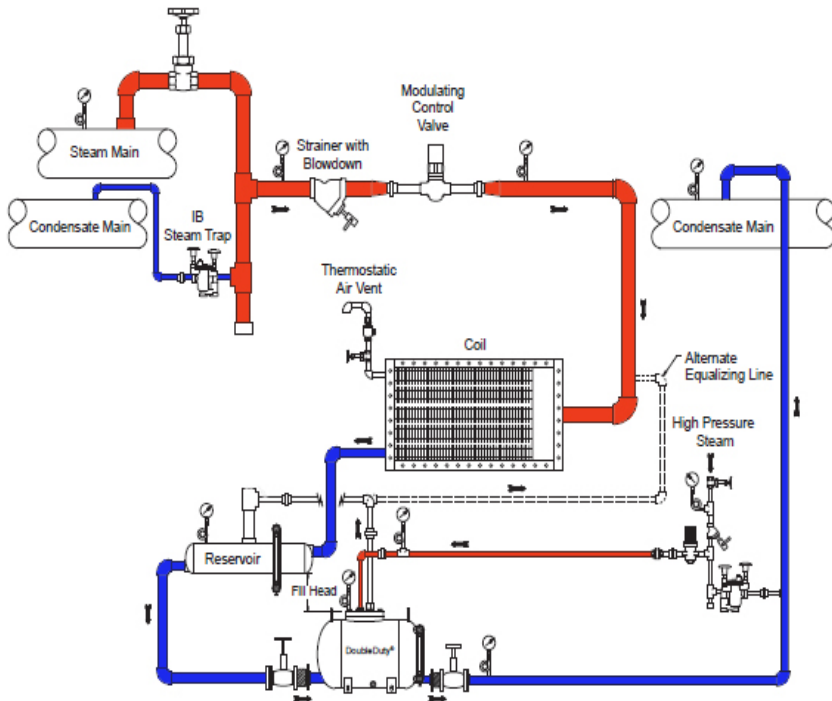
605 psig @ 500°F (41.4 bar g @ 260° C)

740 psig @ 100°F (51.1 bar g @ 38° C)



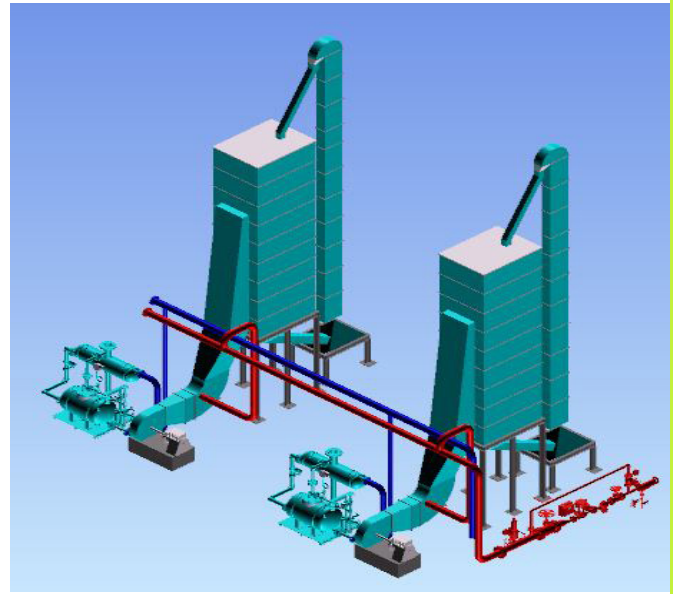
## DRYER APPLICATION

### SCHEMATIC DIAGRAM OF PROCESS LAYOUT



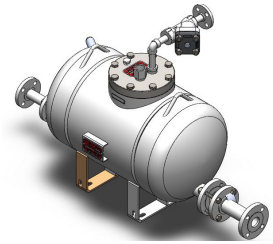
### CHALLENGES

- Uneven drying temperature
- Recurring dryer failure
- Condensate draining trenching due to stalling conditions
- Heavy percentage of broken rice



### ARMSTRONG SOLUTION

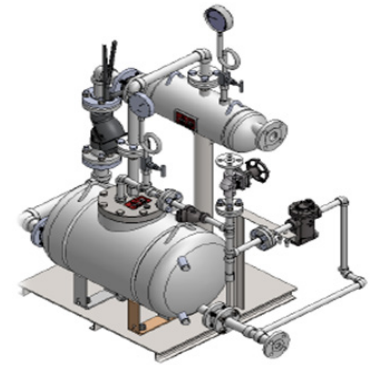
Above referred challenges can be addressed with proper incorporation of DD6/SDD6 with your dryers, which can take care of stalling conditions, timely evacuation of condensate and keep dryer coils free from condensate accumulation giving longer life to exchanger and reduces the percentage of broken rice.



Closed Loop Condensate Recovery system

Recovering the condensate at right temperature and pressure and make it reach to destination w/o any waste of Kcals. Total Heat Mass Balancing also helps on take care of feed water with customized solutions.

Armstrong can provide complete engineered condensate pumping system solutions, allowing you to take advantage of this fundamental energy management practices. Single pump capacities range from 350 lb/hr to 73000 lb/hr (158 kg/hr to 33112 kg/hr), depending on application conditions. You may also depend on Armstrong for complete custom pre-piped packages, ASME packages, mechanical and electric pumps, and accessories.



SDD6 PUMP TRAP PACKAGE

## HOT WATER SYSTEM

### CHALLENGE

Soaking requirement of rice while processing golden color wherein right temp of water has to be maintained for entire soaking time and giving right quality of rice cooking.

### ARMSTRONG SOLUTION

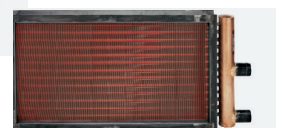
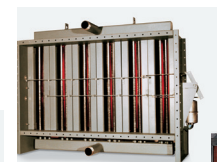
Armstrong is a global provider of innovative hot water generation and control solutions for, Industrial process applications. We can provide solutions for hot water generation, operation and maintenance to optimize performance and user safety.

- Water heaters
- Water temperature controls and
- Hose stations.



## HEAT TRANSFER COILS

At Armstrong, we welcome the opportunity to offer advice early in the planning stages of your projects. Our specialists provide expert design services and manufacturing capabilities for extended heat transfer equipment, and we have the manufacturing flexibility necessary to design and build equipment according to your exact needs, for all forms of air and gas treatment. Armstrong offers a line of steam/liquid and cooling coils in heavy-duty finned tube and lightweight plate fin configurations.





## FLOW MEASUREMENT

Measuring the flow of fluids accurately is vitally important in many institutional and industry operations. Armstrong's VERIS flow measurement solutions provide outstanding flow measurement technology to meet the critical needs of your environment.



## STRAINERS

Armstrong's Y-type, T-type and Fabricated Basket Pipe Strainers are available in a wide choice of sizes and materials to meet the majority of all pipeline straining requirements.



## AIR VENTS



Armstrong's Float-Operated Air Vent Relief Traps are designed to remove gases from liquids down to 0.40 specific gravity, and thermostatic devices are available to evacuate gases from steam systems.

## LIQUID DRAINERS



Armstrong's Float-Operated Drain Traps are designed for draining heavy liquids from gases or light liquids (dual gravity drainers).

These liquid drainers can operate to 1800 psig / 255 barg or specific gravity down to 0.40.

## CLIENT REFERENCE LIST

CUSTOMER	YEAR OF SUPPLY	PRODUCT
KM International, Karnal	2017	Detail Engineering of new plant, Main line steam traps, PRS, Steam traps on dryers, Condensate Recovery System, Air Vents
Satyam Rice Mill, Kaithal	2017	Condensate Recovery System & Steam Traps
Rajesh Industries, Karnal	2017	Condensate Recovery Systems
Batra Rice Mill, Karnal	2017	Double Duty Pumping Traps on Dryers
Sagar Nutriments, Bhopal	2016	Detail Engineering of new plant, Main line steam traps, Double Duty Pumping Traps on Dryers, Condensate Recovery System, Air Vents
RS Foods, Karnal	2016	Condensate Recovery System
RL Foods, Karnal	2016	Double Duty Pumping Traps on Dryers
DS Agri Foods, Phillibit	2016	Double Duty Pumping Traps on Dryers
Paramount Rice, Bundi	2016	Double Duty Pumping Traps on Dryers
DD International, Karnal	2015	Main line steam traps, Steam traps on dryers, Condensate Recovery System, Air Vents
Tirupati Rice Mills, Karnal	2015	Main line steam traps, Double Duty Pumping Traps on Dryers, Condensate Recovery System, Air Vents
New Haryana Rice Mill, Ambala	2015	Double Duty Pumping Traps on Dryers
Santosh Overseas Ltd, Bulandsagar	2015	Double Duty Pumping Traps on Dryers
Haribhog Foods, Karnal	2015	Main line Inverted Bucket SS Steam traps
BB International, Karnal	2014	Mainline Inverted Bucket SS Traps, Double Duty Pumping Traps on Dryers, Bellow Seal Valves
Shree Jagdamba Agro, Karnal	2014	Double Duty Pumping Traps on Dryers
AMDD Foods, Amristar	2014	Detail Engineering of new plant, Main line steam traps, PRS, Steam traps on dryers, Condensate Recovery System, Air Vents
Aroma Agro, Karnal	2014	Double Duty Pumping Traps on Dryers
SS Rice Mill, Karnal	2014	Double Duty Pumping Traps on Dryers
BD Agro, Kaithal	2013	Condensate Recovery System
Mansa Devi (MD) Agro, Karnal	2013	Process Steam Traps on Dryers
Tarachand Rice Mills, Karnal	2012	Process Steam Traps on Dryers
Shri Harihar Foods	2012	Process Steam Traps on Dryers
T.C. Agro, Karnal	2011	Steam Traps for Rice Dryers, Condensate Recovery Systems
Dunar Rice, Karnal	2011	Energy Audit
Selladiamman Rice Mill, Madurai	2011	Double Duty Pumping Traps on Dryers
Maruthi Rice Mill, Shimoga	2008	Condensate Recovery System & Steam Traps
Santhosh Rice Mill, Bhadravati	2008	Condensate Recovery System, Steam Traps and Flow Metering
Santosh Enterprises, Anandapura	2008	Pressure Reducing Station

Armstrong provides intelligent system solutions that improve utility performance, lower energy consumption, and reduce environmental emissions while providing an “enjoyable experience”



Armstrong International | INTELLIGENT SOLUTIONS IN STEAM, AIR AND HOT WATER

P 46, Eighth Avenue, Mahindra World City, Chengalpattu, Tamil Nadu 603 002

Phone +91-44-37474444, E mail: [sales@armstronginternational.in](mailto:sales@armstronginternational.in)

[armstronginternational.in](http://armstronginternational.in)

© 2018 Armstrong International. Inc.