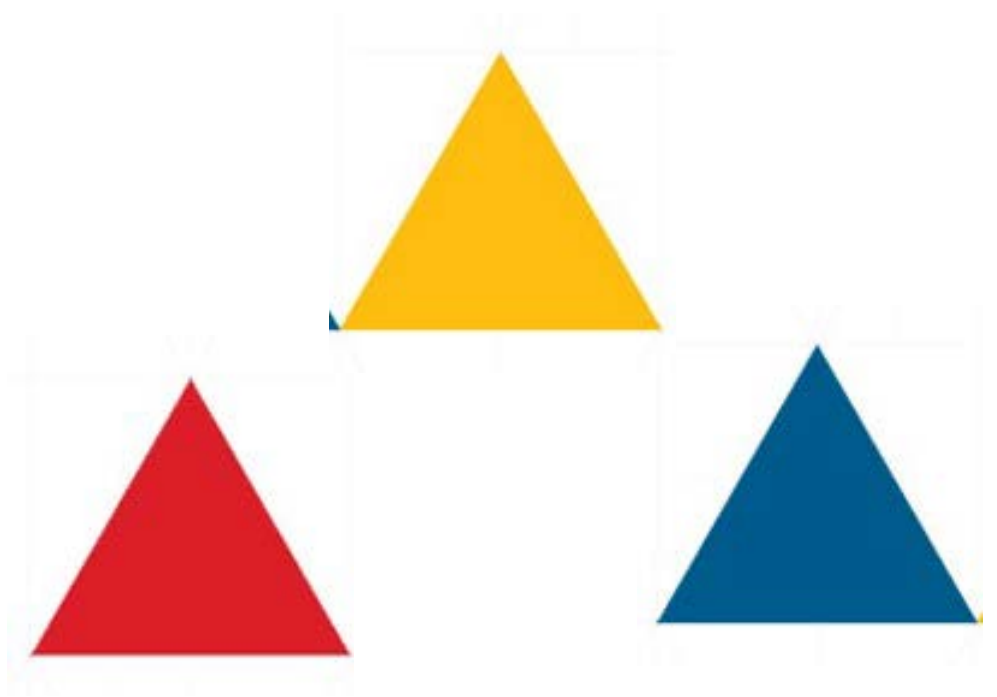


ART OF PARBOILING & MODERN INNOVATION IN INDIA



The Concept:

- Parboiling – An art
- India – The Mother Land of Paddy Rice Processing
- History of Parboiling in India
- Present Parboiling Practices in India
- New Designs in the Parboiling structure & process Engineering
- Recent papers published on paddy parboiling from CFTRI
- How IT can contribute in Paddy Rice Process Engineering

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Parboiling - An Art

Parboiling – An Art

- Parboiling is an art. Processed as per need & as per the demographic knowledge.

- Parboiling process is the native of Asia.

- Popular are
 - ▣ East Asian(Thailand, Philippines)
 - ▣ South East Asian(India, Bangladesh, Pakistan & SriLanka)

Parboiling – East Asian Art

- East Asian – Thailand process is the most popular.
 - Process is of 6hrs cycle.
 - Intakes 2.5TPH, clean & graded paddy.
 - Soaking bins hold 15T paddy each and filled in sequence.
 - Before filling of water($\sim 65^\circ$), vacuum is drawn to speedup the water penetration.
 - The tanks will be pressurized to reduce the soaking time to ~ 5 hrs.
 - For final gelatinizing the paddy, autoclave is used. Autoclave can contain 15T of paddy.
 - After filling, the steam is directly injected & the system is pressurized.

India Parboiling System

- Out of 10,000 varieties of paddy in the world, 4,000 of them are grown in India...
- The parboiling process varies region wise in India.
 - Upper Crest India.
 - North India
 - East India
 - Central India
 - South India
- Parboiling process varies region wise in India based on the type of grain being processed. The Short, Medium & the Long

Present Parboiling System

Labour Centric.....



Present Parboiling System



- A batch of paddy is cleaned and stored in the bins.
- Pre steamed in smaller tanks in batches.
- Soaked in bigger tanks. Manually, water temperature & soaking time is maintained. Observed regularly.
- Water is drained manually and final cooking is done.

Present Parboiling System

- ❑ Batch processing, non continuous.
- ❑ Manual Processing.
- ❑ Labour centric & labour dependent.
- ❑ Quality depends upon the operator & varies batch to batch.
- ❑ Structure is conventional and lacks innovation.
- ❑ Operator holds the key on producing the quality of the parboiled rice.
- ❑ The secret of producing marker style parboiled rice is not with the owner.
- ❑ Unhygienic



Modern Innovations - BRIS

- BRIS has;
 - ▣ A comprehensive database based cloud operating rice intelligence processing system.
 - ▣ The system that identifies the paddy based upon the physical character, Short, Medium & Long grain
 - ▣ The system to process the paddy based on the desired quality. The texture, physical appearance, cooking characteristic, sticky, fluffy & semi-fluffy.

What is BRIS?

- BRIS is “Bhattacharya Rice Intelligence System”
- Dr. Bhattacharya is the father of modern parboiling.
- He has done an extensive research, and has authored many papers on parboiling.
- BRIS is a joint venture, comprising of CFTRI & SKF.
- BRIS offers a perfect package of the Innovative infrastructure perfect process engineering for Any kind of grain that grows Globally.

Simplification of PE.

- Globally consumers needs
- CHARACTER quotient .
- GLAMOUR quotient .

CHARACTER –points

Every Consumer Needs .

- Uniform Cooking.
- Natural taste .
- Good shelf life .
- Odor less .

GLAMOUR-Points .



Modern world consumers very fond of Glamour..

Texture according to demography .

Uniform shape and size .

Higher Glaziness index .

Free flowing .

HOW BRIS WORKS

- BRIS is Completely Database Driven Process engineering Operation System .
- More than 5000 Practical Process engineering parameters are compressed and Loaded to Embedded software system .
- User can Input his Desired Texture and Cooking Time (at Consumer Level).
- User must Load Grain Verity details , Like , GV,GT,GM.

HOW BRIS WORKS

- Based on Input values .. Processor can Choose
- WHITE
- HALF WHITE
- FAINT YELLOW
- DARK YELLOW
- GOLDEN YELLOW

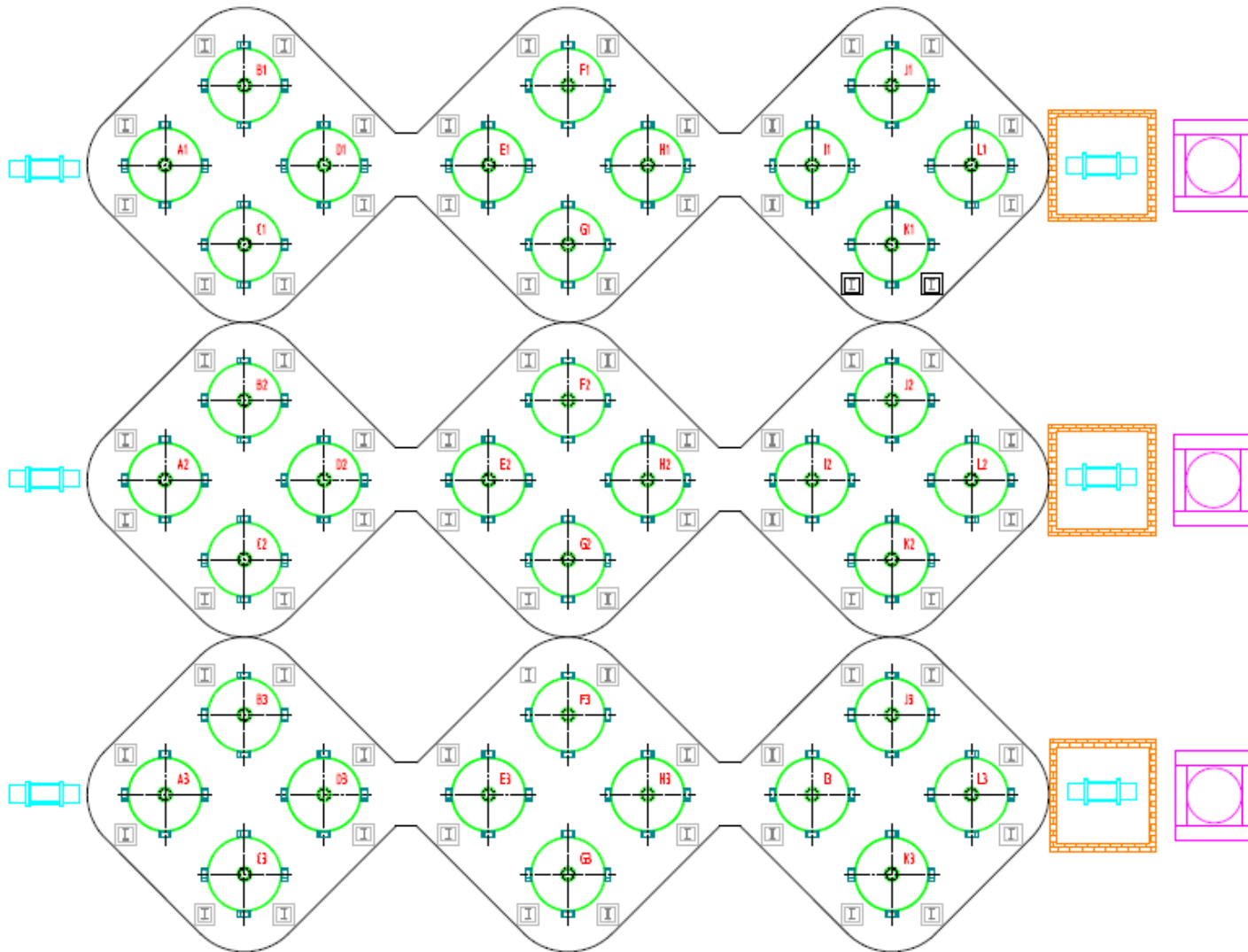
These are the most common texture accepted Globally.

HOW BRIS WORKS

- Based on The Texture and Other Inputs ,Software Picks Suitable PROCESS ENGINEERING parameters and it will transfer to Control panel .
- Entire Operation Will be Completely Automatic .
- Most Efficient and Foolproof STEAM ENGINEERING.
- No Human Interference Required thruout Complete Cycle .
- Advanced Embedded Process Software Sytem .

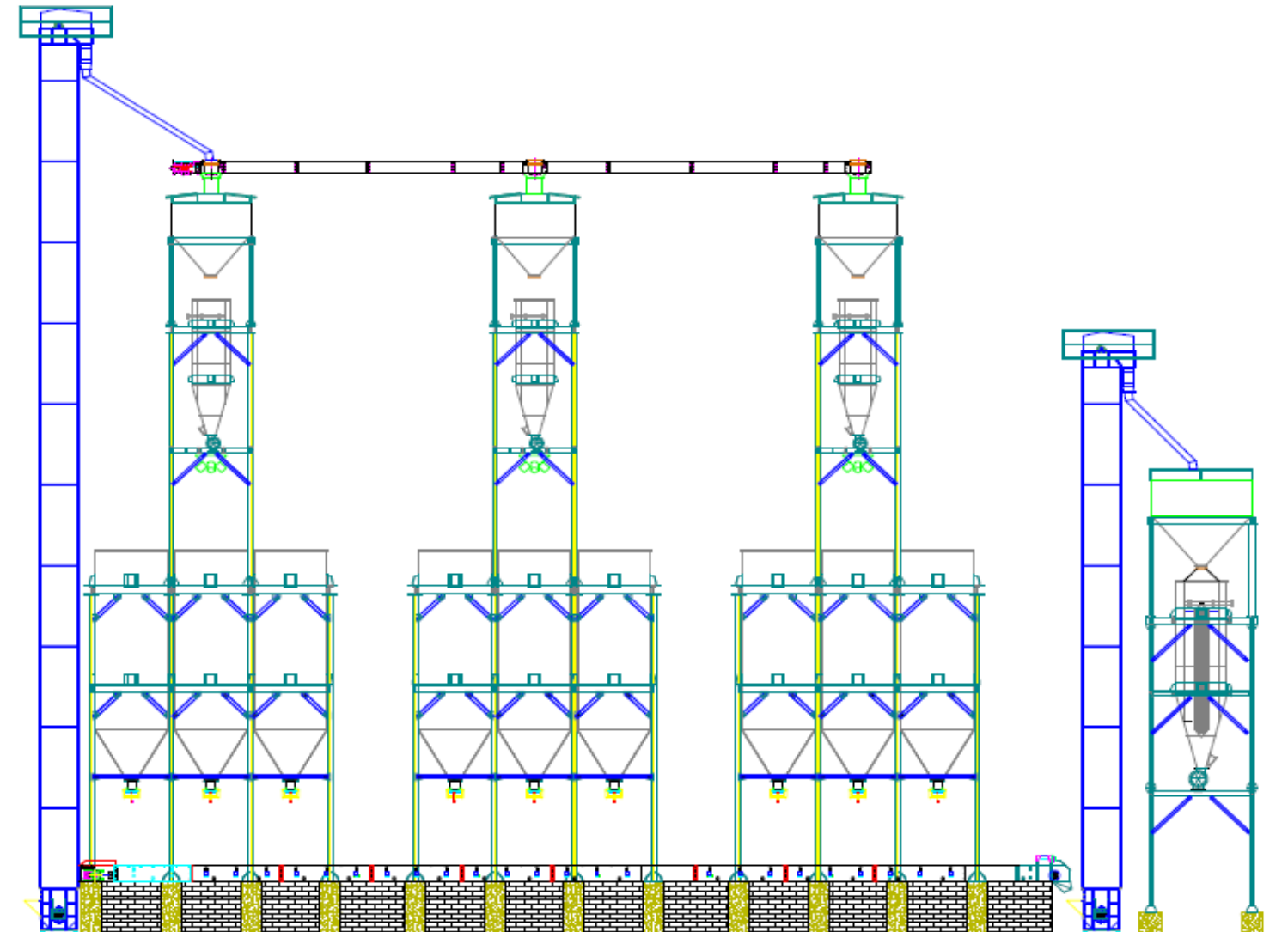
Developments in the Parboiling Infrastructure & Process Engineering

BRIS



Developments in the Parboiling Infrastructure & Process Engineering

BRIS

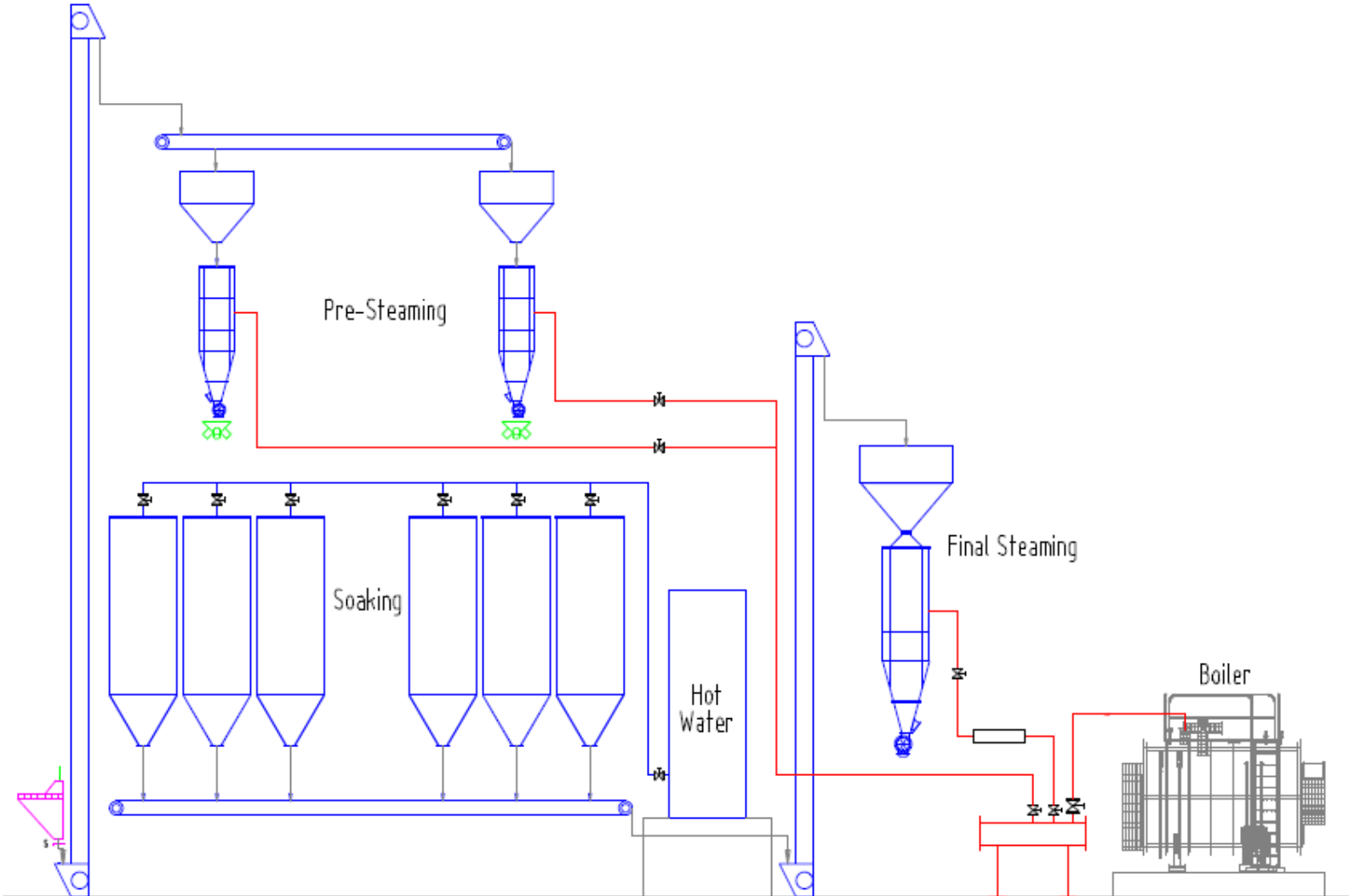


What BRIS offers?

- BRIS has more than 5,000 proven & practiced parboiling methods across the world in its database.
- Data can be picked-up instantly for processing with the predefined parameters.
- The process integration is done with the user friendly interface with the latest technology software.

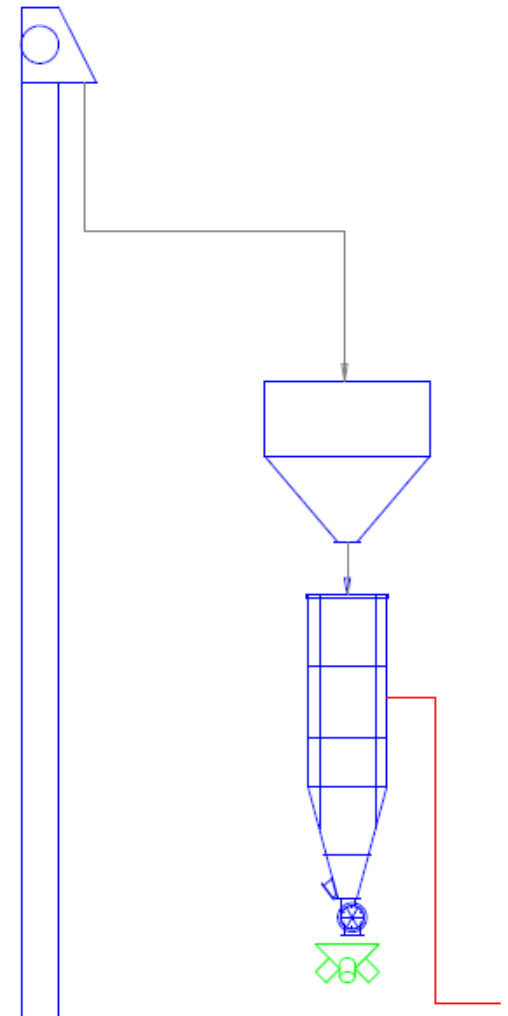
Process Flow Sheet

BRIS



BRIS Process – Pre-Steamming

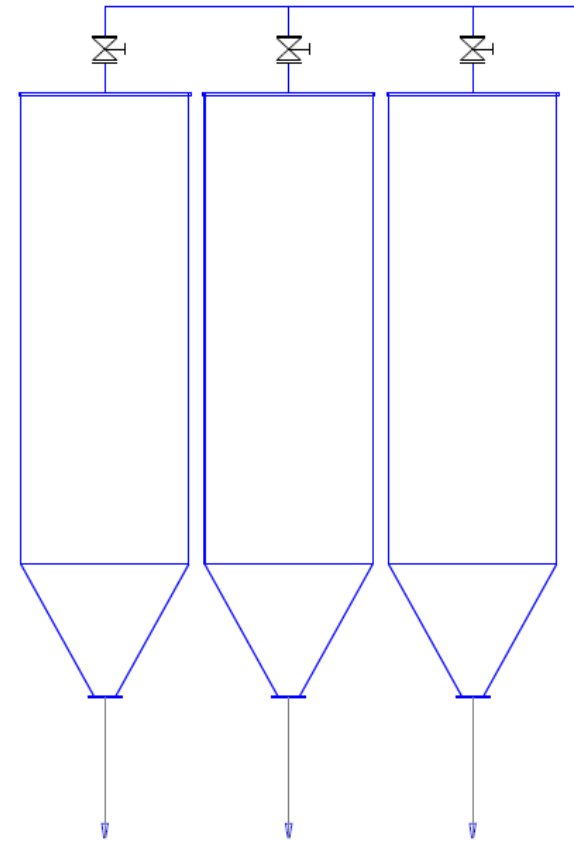
- Why Pre-Steamming
 - ▣ To improve the porosity of the paddy rice & to increase the gap between the rice kernel & the husk
 - ▣ Facilitates & accelerates the soaking process.
- Parameters:
 - ▣ Steam pressure & the temperature,
 - ▣ Advanced pre-steaming device,
 - ▣ Pressure/temperature regulating & controlling
 - ▣ All the process parameters are pre defined.
- Result of pre-steaming:
 - ▣ Porosity is increased.
 - ▣ Kernel & husk gap is defined



BRIS Process – Soaking

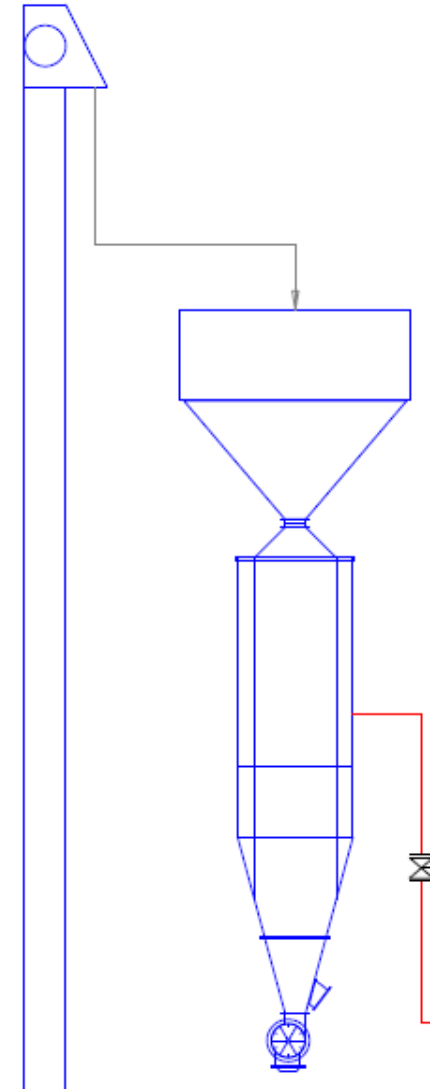
BRIS

- Why Soaking
 - ▣ Process of soaking paddy in hot/cold water
 - ▣ Soaking duration varies from 2-5hrs.
 - ▣ Water temperature varies from ambient to 74°C
- Parameters:
 - ▣ Water temperature
 - ▣ Quality of water defined by the BRIS system for the best soaking.
- Result of Soaking:
 - ▣ Homogeneous paddy mass
 - ▣ Ready for complete gelatinization



BRIS Process – Final Steaming

- Why Final Steaming
 - ▣ To complete the gelatinization of the grain.
 - ▣ Attain the desired cooking time expected at the consumer level.
- Parameters:
 - ▣ Steam pressure & the temperature,
 - ▣ Advanced final-steaming device,
 - ▣ Pressure/temperature regulating & controlling
- Result of final steaming:
 - ▣ To attain the desired cooking time
 - ▣ To influence the texture considerably of the grain in milling.



Drying & Milling

- Controlling the constant parameters in drying & in de-bran(Whitening & Polishing) process.
- This reduces the stress on the color sorter.
- The working load will be nominal on the color sorter as rice will be homogeneous in color.
- The result of the parboiled rice data can be saved & the data can be replicated with the same parameters for the next process when desired.

What BRIS Promises

- The performance guarantee of the BRIS with 96% process uniformity Character & Uniform texture.
- Least Process Dis-coloration grains. With Perfect steam Engineering .
- Cooking time can be defined by the Processor based on the Limits .(AL)
- To implement parameters to achieve best shelf life.
- Desired rice texture code can be applied.
- Most hygienic process & completely human independent
- Can be operated remotely as well, with an hand held device under a cloud environment.

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Q&A Session