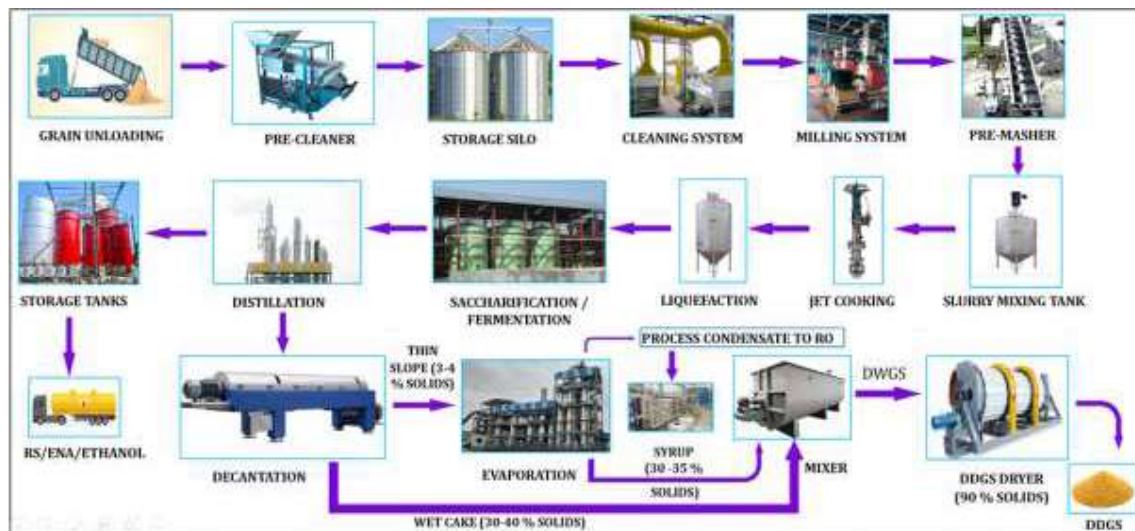




PROMISING STEPS TOWARDS BIOENERGY

# UNIVERSAL FORCES INDUSTRIES PVT. LTD.

## PICTORIAL PRESENTATION FOR GRAIN BASED DISTILLERY PLANT



### PRE-CLEANING AND STORAGE

- » Grain received in the factory contains foreign material like dust, straw, stem residues and jute. It is very important to clean the grain prior to storage and consumption in process.
- » **STORAGE SILO** - Grain is stored in silo made up of galvanized iron. Silo is equipped with blowers for aeration and sweep auger for unloading from silo.

### MILLING

The grain is fed to hammer mill in controlled manner. In milling grains are crushed to flour of uniform size.

### LIQUEFACTION

Slurry from pre-masher is taken to slurry & liquefaction tank where both steam & liquefying enzyme are added. The mixture of slurry and steam is provided with the desired retention time. The cooking process, converts the slurry into a hydrated, sterilized which is susceptible to enzyme for liquefaction. Liquefied mash is cooled in slurry cooler and transferred to fermentation section.

### FERMENTATION

The purpose of fermentation is to convert the fermentable substrate into alcohol. To prepare the mash for fermentation, it may have to be diluted with water. The pH of the mash is adjusted to about 4.5 accomplished primarily by recycled slops and by the addition of nutrients. Yeast is available in sufficient quantity to initiate fermentation rapidly and complete it in 54 to 60 hours. Significant heat release takes place during fermentation. This is removed by forced circulation cooling in external heat exchangers to maintain an optimum temperature of 32–34 C°. The re-circulating pumps also serve to empty the fermenters into beer well. After the fermenters are emptied, they are cleaned with water and caustic solutions and sterilized for the next batch. The carbon dioxide evolved during the process is scrubbed to prevent ethanol emissions by process water, which is taken to beer well.

## DISTILLATION

RS distillation –  
ENA distillation -

## MSDH ETHANOL PLANT

- » Molecular sieve technology works on the principle of pressure swing adsorption by using synthetic Zeolites typically 3 Angstrom Zeolites. This material has strong affinity for water.
- » During dehydration of ethanol, the water of hydrolysis fills the cavities or pores in the molecular sieve.
- » Ethanol obtained of purity 99.8% v/v from the sieve column and is cooled.



## DECANTATION

- » Stillage / Spent wash which comes out from analyser column contains 7– 9 % solids. It is passed through Decanter centrifuge to separate the suspended solids present in spent wash. Separating wet cake having moisturizer content of 70% w/w. Thin slope is taken to evaporator for further concentration.

## EVAPORATION

- » Thin slope containing solids approximate 3-5% is taken to Multiple effect evaporator to concentrate up to 32 – 35% w/w.
- » UFI technology uses alcohol vapors from analyser column from DDGS dryer are been used to evaporator to minimize steam requirement. The thin slope is being concentrated up to 30 % solids termed as thick syrup is fed to dryer as DWGS.
- » Process condensate obtained from MEE (Multiple Effect Evaporator) is re-used in process or cooling water make up after necessary treatment.

## DWGS DRYER

- » Wet cake obtained from decanter and thick syrup from Evaporator are mixed with each other in a Ribbonmixture and fed in to Dryer in the form of DWGS to reduce the moisture.
- » DDGS comes out of Dryer which contain 8-10 % moisture.
- » We use rotary tube bundle dryers are TO DRY DWGS, where dry & concentrated steam is used as heating

## CONDENSATE POLISHING UNIT

- » Condensate obtained from evaporator contains following parameters – pH – 3.8 to 4.0, C.O.D. 3000 to 4000 PPM, BOD – 150 to 200 PPM, TDS – 150 to 200 PM, Volatile Acids –350 PPM
- » RO based Treatment system is used to treat & reuse this waste stream as process water & cooling water.

## UNIVERSALFORCES INDUSTRIES PVT. LTD.

Turnkey Eco Smart Distillery Solution



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