

# The Desmet Ballestra Group



*Science behind Technology*

Presentation for  
**SOPA**  
at  
Indore, 9<sup>th</sup> Oct 2019  
SEP for Soya



**desmet ballestra**



World leading  
**engineering**  
and **procurement**  
services

- ◀ Oils, Fats & Oleo technologies
- ◀ Detergents, Surfactants and Chemicals plants
- ◀ Oilseeds & Feedmill equipment



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## A world leader

■ The Desmet Ballestra Group is the world leader in the fields of engineering and supply of plants and equipment for:

- the Oils and Fats industries,
- the Detergents, Surfactants and related Chemical industries,
- the Oleochemical and Biodiesel industries

- Desmet Ballestra benefits from a worldwide reputation of excellence, thanks to over 70 years of unequalled experience, a strong R&D capacity and the most extensive customer base in the industry.



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## Desmet Ballestra core business

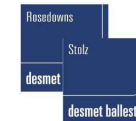
The Group is organized around 3 Business Divisions



OFO  
Oils, Fats & Oleo technologies



DSC  
Detergents, Surfactants & Chemicals plants



OSFE  
Oilseeds & Feedmill Equipment

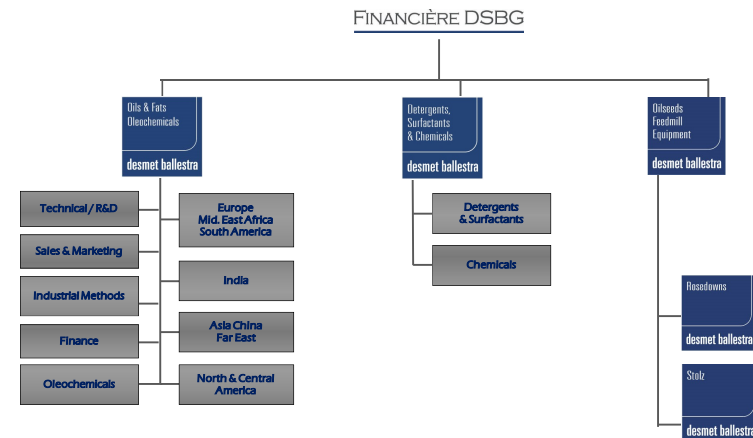
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## Key figures in India

|                   |                          |
|-------------------|--------------------------|
| <b>Creation</b>   | <b>: 1984</b>            |
| <b>Turnover</b>   | <b>: 25 M€</b>           |
| <b>Offices</b>    | <b>: Bangalore</b>       |
| <b>Employees</b>  | <b>: 225</b>             |
| <b>References</b> | <b>: &gt; 220 Plants</b> |

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## Group structure and organization



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## Worldwide presence next to our customers



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## Unique customer portfolio



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## Main technological partners



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## A vocation for innovation



■ Desmet Ballestra's R&D Team is composed of professionals specialized in Oils & Fats, oleochemical and chemical processes, using the most comprehensive set of technological resources and equipment:

- ✓ High level scientists
- ✓ Years of **practical experience** in the related industries
- ✓ Fully equipped analytical and research **laboratories**
- ✓ Flexible **pilot units**, including skid-mounted units available for testing at customer's facility
- ✓ **Collaboration agreements** with several Universities (Europe, Asia, USA...)



**Improvement  
of existing processes**

**New  
applications**

**Custom  
R&D**

**Pilot  
plants**

**Backup  
services**

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## A vocation for innovation



## Oils, Fats & Oleochemicals

### First class engineering

With its HQ in Brussels, Desmet Ballestra's Oils, Fats & Oleochemicals Division is the world specialist in oilseed and edible oil processing plants. It delivers tailor-made engineering and procurement services covering each step of the industry, from crop to final product:

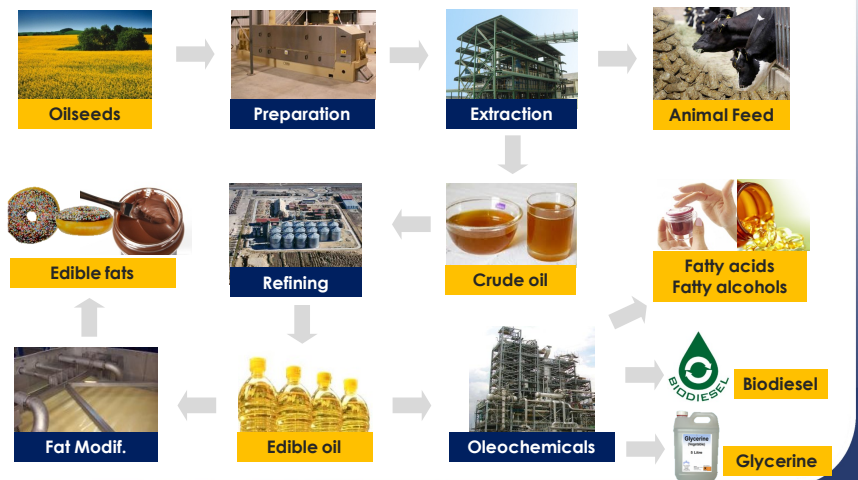


### 5 market segments

- |                    |  |
|--------------------|--|
| ✓ Seed preparation | Dehulling, Cracking, Cooking, Flaking, Expanding   |
| ✓ Extraction       | Mechanical and solvent extraction, Desolventising-toasting, Drying-cooling, Distillation, Solvent recovery |
| ✓ Refining         | Degumming, Neutralization, Bleaching, Winterising, Deodorizing   |
| ✓ Fat modification | Fractionation, Hydrogenation, Interesterification  |
| ✓ Oleochemicals    | Fatty Acids, Fatty Alcohols, Methyl esters, Glycerine, Biodiesel   |

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## Oils, Fats & Oleochemicals technology platform



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## Detergents, Surfactants & Chemicals

### A reference in the industry

Ballestra, undisputed leader in process plants for detergents, surfactants and related chemical industries, leads the Detergents, Surfactants & Chemicals Division of the Group, providing design and supply of production units for:



### Market segments

#### ✓ Detergents & Surfactants

- Detergents Powder (Spray Drying Tower processes, NTD processes) and Liquid (batch/continuous)
- Surfactants Anionics (Sulphonation/Sulphation, Vacuum neutralization, Drying), Non ionics (Ethoxylation/Propoxylation, Alkanolamides), Amphoteric and Cationics (Betaines, Esterquats, Aminoxides)

#### ✓ Chemicals

- Organic Linear Alkyl Benzene, Ethyl Alcohol, Starch & Yeast, Fatty Amines
- Inorganic Sodium Silicate, Sulphuric Acid, Sodium & Potassium Sulphate, Zeolite, Sodium Tripolyphosphate, Single & Triple Superphosphates, Phosphoric Acid, NPK, Poly Aluminium Chloride

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## Detergents, Surfactants & Chemicals technology platform

### Chemical Plants



Sulphuric Acid



Phosphoric Acid



Raw materials for Surfactants/De.



Fertilizers

### Detergents & Surfactants Plants



Sulphonation



Ethoxylation



Multipurpose



Detergents



Chemical industry



Oil refining



Ore processing



Personal care



Detergent bars



Liquid Detergents



Water treatment



Agriculture



Laundry Products



Powder Detergents

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## Oilseeds Equipment

### Rosedowns presses

World's leading supplier of mechanical extraction presses for oil processing, Rosedowns (U.K) is the design and manufacture center of the Desmet Ballestra for screw presses and replacement parts.

Rosedowns is at the forefront of pressing technology, continually setting new standards for press design and performance.

With a range of equipment with capacities from 40kg/hr to 800T/day, Rosedowns offers adapted solutions whatever the specific processing needs.



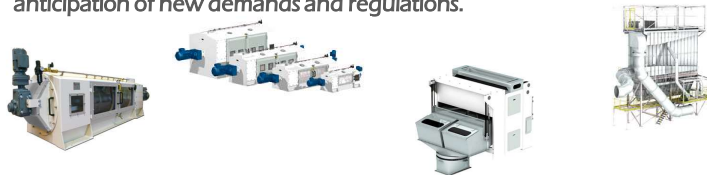
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## Feedmill Equipment

**Stolz**



Leader in powder and granules handling and processing within the feed and food field, Stolz (France) is Desmet Ballestra's product center in the field of **solids handling** and **animal feed** technologies. Capitalizing on its quality, performance and industry experience, benefiting from a dedicated R&D center, Stolz provides a wide range of expertise in solid processing: design and field testing of new techniques and processes, adaptation of existing equipment, conception of tailor-made machines and anticipation of new demands and regulations.



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## REFERENCES WORLD WIDE

|                             | Total | Last 10 years |
|-----------------------------|-------|---------------|
|                             | 8,643 | 2,496         |
| DB Oils & Fats Technologies | 8,320 | 2,343         |
| PREPARATION TECHNOLOGIES    | 276   | 115           |
| CRUSHING TECHNOLOGIES       | 3,759 | 580           |
| REFINING TECHNOLOGIES       | 3,593 | 1,330         |
| OIL & FATS MODIFICATION     | 692   | 318           |
| DB OLEO & BIODIESEL         | 323   | 153           |
| INDIA/ SRILANKA (TOTAL)     | 894   |               |

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## Solvent Extraction Plant

Soya Flakes / expandates

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## MODERN SOLVENT EXTRACTION PLANTS

- Accurate Process Control.
- + Consistent Quality Parameters.
- + Low Operating Cost.
- + No Unscheduled Breakdowns.

= **DESMET SEP**

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## Key features of DESMET SEP

**LM® Extractor**

**DiMAX® DTDC**

**OPTISIM Distillation & Solvent Recovery**

**Guaranteed Performance**

**Instrumentation**

**Desmet Quality Assurance**

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## THE DE SMET LM EXTRACTOR

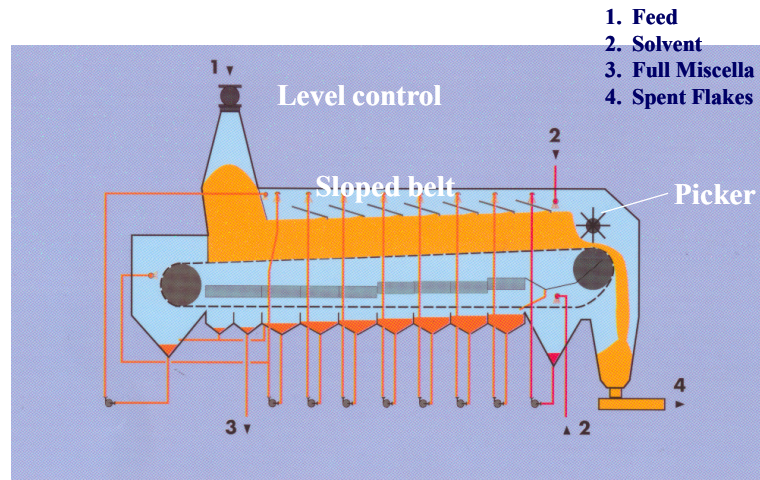


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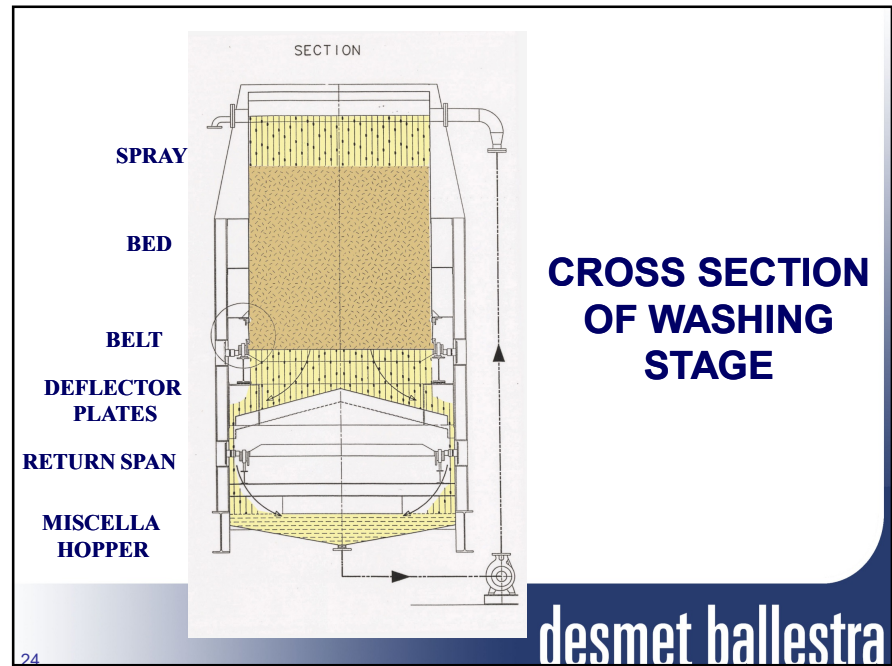


## PRINCIPLE



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## CROSS SECTION OF WASHING STAGE

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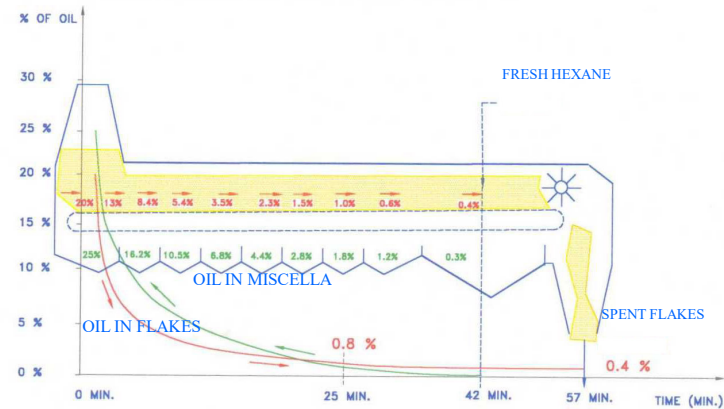
## How the LM works?

- Material enters trough an inlet hopper and is soon saturated with miscella.
- Extraction starts immediately
- Initial immersion followed be extended percolation
- Special Rakes Maintain Percolation
- Extended contact time/thicker flakes/efficiency

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## COUNTER CURRENT EXTRACTION



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## EVOLUTION OF LM EXTRACTOR

- Miscella hoppers are below the return path of the belt. Hopper capacity is enhanced.
- The belt is made up of wedge bar screens. Sealing between the wedge bar screens is by Stainless Steel nose plate.
- Roller bush in Erthalon.
- Side sealing by Erthalon.
- Sprockets of larger size: low rpm (<1 rpm).
- Belt tension adjustment is external.
- Belt cleaning by
  - 2 sets of high pressure hexane sprayers on return path.
  - 1 set of miscella sprayer on inlet side.

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## LM EXTRACTOR ADVANTAGES

- Zero break down machine. 24 hours 330 days operation.
- Only one inspection shutdown required.
- No spare parts consumption for 5 years.
- High quality moving parts.
  - Sprockets: special casting cnc machined and hardened
  - Chain elements: identical elements cnc machined and hardened
  - Erthalon bushes: low friction, and anti wearing.
  - Cadre frames: 0.5 mm rectangular tolerances.
  - Sealing between screens by ss nose plates: no fibre strips. No wear and tear.
- Precision assembly of drive and tension shafts in workshop. No site alignments.
- Easy external tension adjustment.
- Superior side sealing: erthalon.
- No underside accumulation of material.

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## LM EXTRACTOR ADVANTAGES

- Safety shear pin protection.
- No requirement of belt cleaning irrespective of seed quality variations. ( In older design, unpredictable shutdowns depending on seed quality)
  - Wedge bar screens: no chocking.
  - Effective belt cleaning by hexane and miscella sprays.
  - One belt cleaning shutdown 2 to 3 days: 2000 to 3000 litres hexane
- Easy operation
  - No miscella overflows in power failure. No pumping back of miscella.
  - Easy restart. In older designs stabilisation after power failure upto 1 hour.
  - 3 % slope. No hexane carry over to meal outlet hopper.
  - In case of excess miscella spray, excess flows in countercurrent direction. No effect on deoiling.

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## LM<sup>®</sup> Extractor Highlights

### 1. EFFICIENT

- Systematic counter-current extraction
- Generously sized for maximum extraction
- Raked bed surface: no need to turn bed
- Saves steam in DT :
  - long dripping time
  - Continuous meal discharge
- Produces clear miscella: no friction over bottom
- Gentle on fragile materials
- Low power consumption: chain rolls, not pulled
- Deep bed : Less energy in preparation

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## LM® Extractor Highlights

### 2. USER FRIENDLY, FORGIVING and FLEXIBLE

- Easy to install: often delivered in one piece
- Easy to understand
- Excellent vision of internal parts
- Excellent access to mechanical parts
- Barely affected by upset conditions
- Self tensioning belt, maintained clean
- Adjustable to changing conditions

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## LM® Extractor Highlights

### 3. SAFE and BUILT FOR LONG LIFE

- Free rolling, low speed rolls, low traction power
- Free turning tension sprockets: point of highest wear if absent
- Fully reliable mechanically
- Air and solvent tight, welded construction
- No discontinuous or shaking mechanism
- No product on metal friction, no metal on metal friction
- Corrosion resistant steel
- Can be fully drained, purged, opened and cleaned: no dead spot.

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### Stainless Steel Wedge Bars



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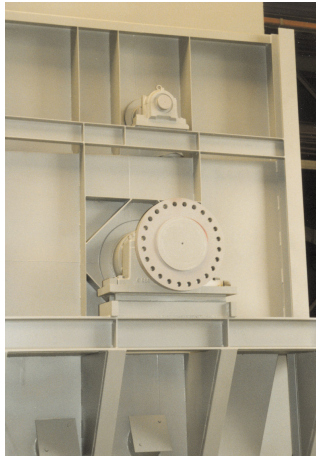
### Chain Components



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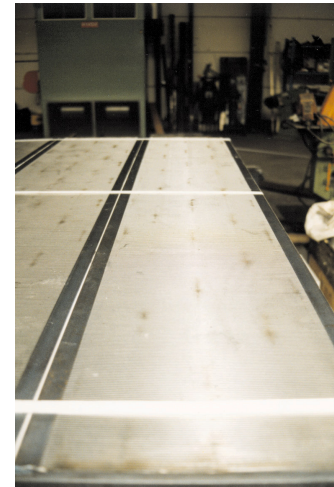
### Zero Speed Detector Arrangement



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### FLUSH BELT



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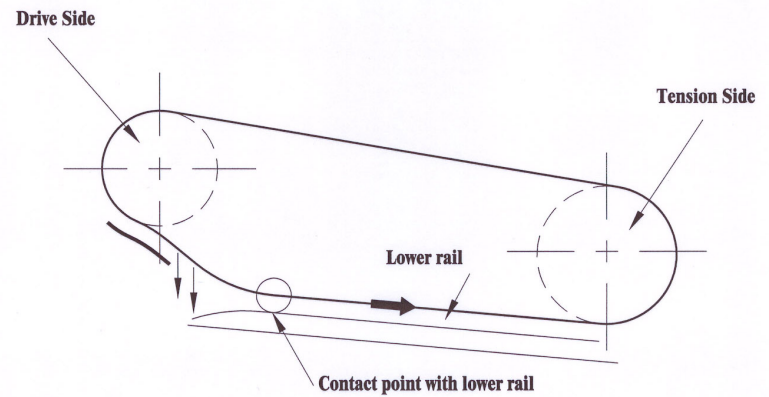
Inside view towards discharge end



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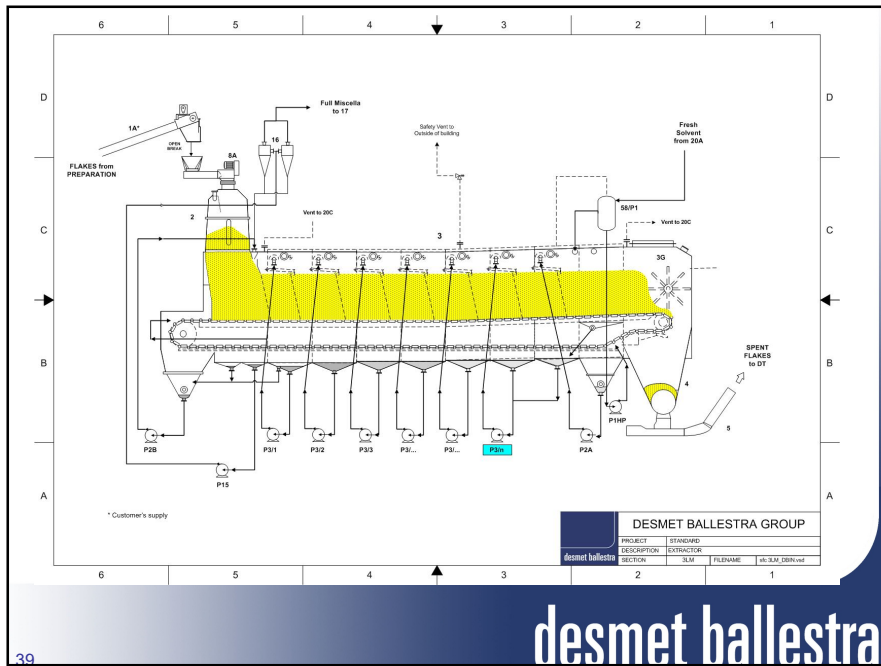
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## SELF-TENSIONING BELT



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## DIMAX® DTDC PRINCIPAL FEATURES

- Optimised Open Area On Double Bottom DT Trays by slotted screen.
- Superior Boiler Grade Material For Double Bottom.  
IS 2062 Not Suitable Above 140 °C.
- Floating Double Bottom.
- Low Vent Temperature 75 °C.
- Rotary valve in all DT stages.
- Pneumatic On/Off And Modulating Flaps For drying stages.
- Shaft Assembly With
  - Self Lubricating Graphited Bronze Bearings
  - Hardened Sleeves For Gland Packing
  - Couplings Cast From High Tensile Alloy Casting.
  - Geared Coupling Designed For Vertical Load.
- Intergrated Cooler

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## DIMAX® DTDC ADVANTAGES

Efficient countercurrent contact of steam to meal in all the DT stages.

Superior steam to meal contact.

- Good steam distribution due to optimised open area.
- Good level control

Optimum steam consumption.

Superior desolventisation: 250 ppm hexane in soymeal.

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## DIMAX® DTDC ADVANTAGES

**No breakdown machine.**

**Reliable shaft assembly.**

- Self lubricating graphited bronze bearings.
- Hardened sleeves for gland packing
- Couplings cast from high tensile alloy casting.
- Geared coupling designed for vertical load.

**Alignment done in workshop. No site alignment.**

**No mechanical problems in meal discharge or level control systems due to perfect design of the rotary valves**

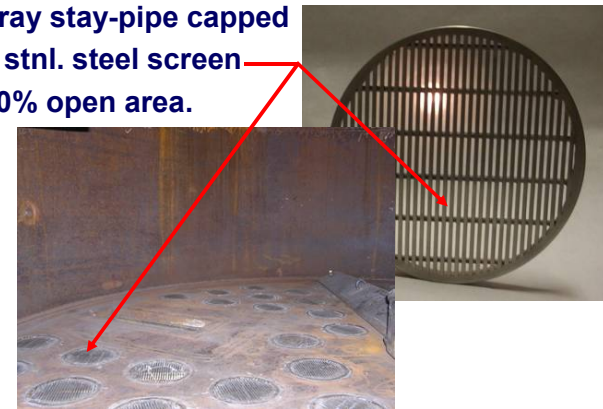
**Conventional mechanical gates are high wear systems.**

**Meal discharged at ambient temperature. No corrosion of meal conveyor.**

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## DIMAX® DTDC

**each tray stay-pipe capped with a stnl. steel screen with 30% open area.**



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## DIMAX® DTDC



aerodynamic sweeps reduce vapor pocket & steam short circuiting on trailing edge of sweep



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## DIMAX® DTDC

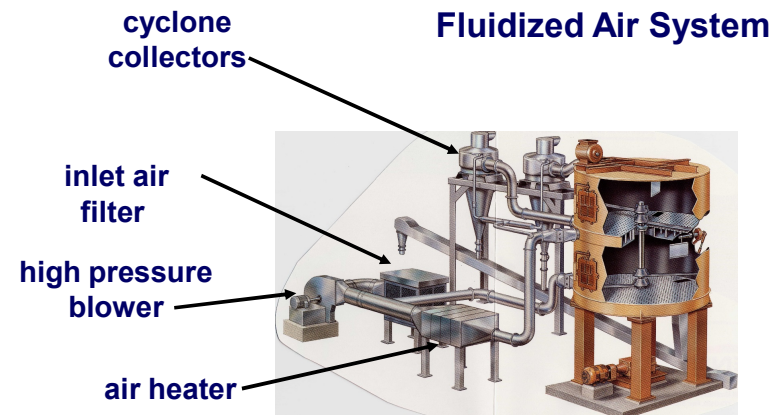
All DT tray is being equipped with rotary valve and temperature switch to reduce solvent loss and provide level control flexibility.



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## Drying and Cooling



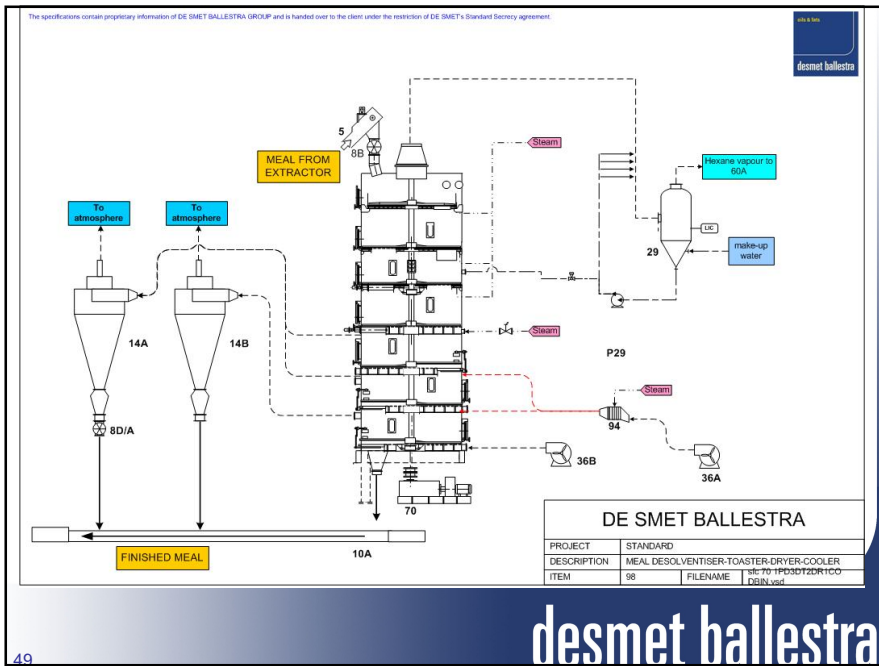
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## Importance of the DTDC

In the SEP, the DTDC represents:

- 35% of the capital cost
- 75% of the steam consumption
- 75 % of the power consumption

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## OPTISIM DISTILLATION

**Distillation at low temperature 100 °C max. No thermal degradation of oil.**

**Efficient hexane stripping.**

→HEXANE IN OIL LESS THAN 50 ppm.

**Efficient mineral absorption system.**

→HEXANE LOSS LESS THAN 10 g/m<sup>3</sup> IN AIR.

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## OPTISIM DISTILLATION

**Maximum heat recovery:**

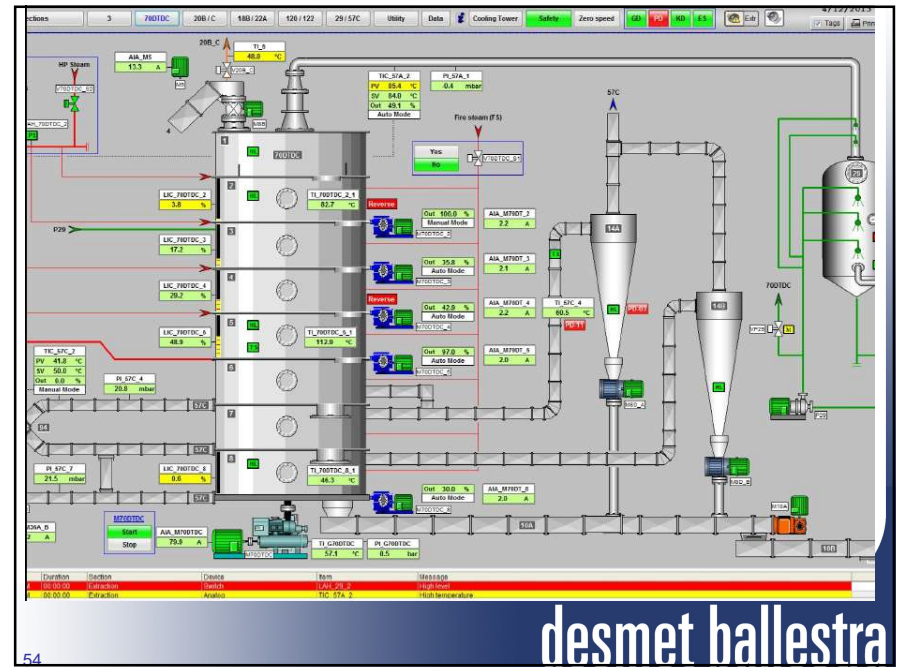
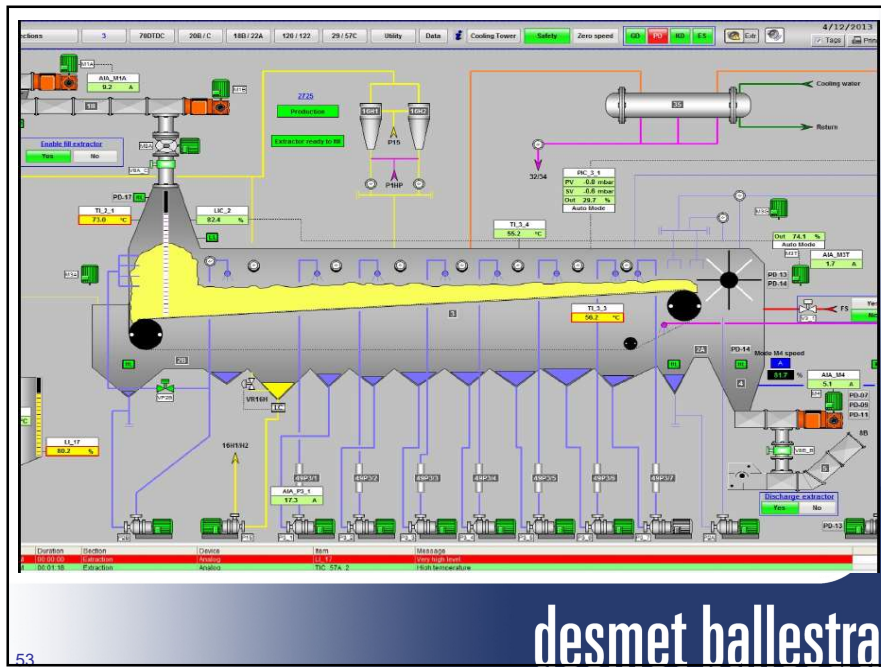
**23A : Stripper vent vapors to heat hexane to extractor**

**46/70 : DT condensate flash steam used in miscella evaporator 18A.**

**181A : heat rich absorption oil with lean absorption oil**

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## GUARANTEED PERFORMANCE

Consumptions per ton of Soya Expandates

Steam : 230 kg/ton of Soya Expandates

:

Power : 19 Kwh/ton of Soya Expamdates

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## NEW SOYBEAN CRUSH PLANT: 15,000 TPD (MOLINOS)



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## ONLY EFFICIENCY PAYS



Terminal 6 Facility (Argentina)

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