MISSION STATEMENT

“Dedicated for Sustainable Environment Development to Unlock Perpetual Food and Energy Resources”
BACKGROUND

• Started as “Spray Engineering Devices” in 1992
• Incorporated as “Spray Engineering Devices Limited” in 2004
• In-house R & D recognition granted by Govt. of India
• Accredited by Govt. Agency ‘IREDA’ for promotion of SEDL “Energy Efficient Equipment”
• Indian company with a Global Outlook
• Head Office at Mohali, Punjab, India
• Three State of the Art Manufacturing Units at Baddi, HP, India
• R & D unit of 500 TCD with complete facilities at Bidar, Karnataka, India
CORE STRENGTH

We Offer -

• Innovative technological solutions for sugar & process Industries
  with specialization in Evaporation, Crystallization, Cooling &
  Condensing system
• Highly energy efficient solutions for sugar & process industries
• Detailed process design and engineering
• Consultancy & project management for Green Field establishments
• Modernization and revamping Brown Field projects
• Complete plant automation
• EPC solutions for highly energy efficient cane sugar processing plant
OFFICES & MANUFACTURING PLANT

BADDI

MOHALI

PUNE

BIDAR
TUBULAR FALLING FILM EVAPORATOR

- Low ΔT (4-6°C) operation
- Lesser thermal retention (< 20 seconds)
- Patented and improved juice distribution system
- Fully automatic intelligent control system with CIP
- Self-supporting structure with less foot print area
- Highly efficient entrainment separator
- Hinge operating assembly
- Configurations available with HSA ranging up to 7,000 m² in Single Unit
PROCESS FLOW DIAGRAM
DISTRIBUTOR DESIGN
INSTALLATIONS

TOTAL INSTALLATIONS: 137 (More than 4,25,000 m² HSA global installations)
PLATE FALLING FILM EVAPORATOR

- Lowest $\Delta T$ (1.0 to 4.0°C) operation
- Greater no. of effects can be accommodated in given $\Delta T$ & $\Delta P$
- Highest energy efficiency
- Highest heat transfer rate upto 5000 W/m²K
- Lowest residence time and consequently lesser inversion and colour formation
- Compact and modular design
- Patented distribution and process technology
- Fully automatic intelligent control system with CIP
- Compact and modular design
- Configurations available with Heating Surface Areas ranging up to 10,000 m² in Single Unit
INSTALLATIONS

TOTAL INSTALLATIONS: 18 (More than 85,000 m² HSA global installations)
SPRAY CONTINUOUS PAN (SCP®)

- All massecuite applications (Refined, Raw/A, B and C)
- Low ΔT (5-15°C) operation
- Reduced conglomeration and false grain formation
- Least colour inclusion
- Enhanced steam economy
- Honeycomb calandria with high pumping rate mechanical circulator
- Complete automatic operation and control through centralized DCS
- Minimizes the accessories like receiver, pumps, liquor storage tanks etc
- Minimizes the foot print requirement and suitable for outdoor installations
- Better exhaustion minimizes the recirculation and massecuite percent
- Drastically reduces the Capex of crystallization section
- Improves uniformity and luster of crystal
PROCESS FLOW DIAGRAM
## PERFORMANCE PARAMETERS

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total height of SCP®</td>
<td>25-35 m</td>
</tr>
<tr>
<td>Diameter of Calandria</td>
<td>&gt; 4 m</td>
</tr>
<tr>
<td>Heating Surface per chamber</td>
<td>250 - 1000 m²</td>
</tr>
<tr>
<td>No. of chambers</td>
<td>3-8 Nos.</td>
</tr>
<tr>
<td>Provision for graining</td>
<td>2 chambers</td>
</tr>
<tr>
<td>Total holding volume per chamber</td>
<td>&gt; 50 m³</td>
</tr>
<tr>
<td>Designed heating steam temperature/pressure</td>
<td>65-90°C / 25-70 kPaA</td>
</tr>
<tr>
<td>Designed outlet vapor temperature/pressure</td>
<td>40-60°C / 7.5-20 kPaA</td>
</tr>
<tr>
<td>Feed liquor concentration</td>
<td>60-80 % Total Solids</td>
</tr>
<tr>
<td>Effective temperature difference between boiling</td>
<td>5-20°C</td>
</tr>
<tr>
<td>Crystal content range</td>
<td>30-60%</td>
</tr>
<tr>
<td>Massecuite out</td>
<td>By gravity to pug mill</td>
</tr>
</tbody>
</table>
MECHANICAL CIRCULATOR

- Enhanced circulation capacity due to more number of blades
- Reduced boiling time
- Variable speed circulation compatible with crystallization rate trend
- Uniform circulation and better heat transfer rate
- Highest efficiency with inline Planetary drives
- Uniform and improved crystal size with sparking luster
- Fully automatic control system
BAGASSE DRYER

• “Bagasse Drying” is the necessity of the sugar industry in the current scenario. Typically bagasse contains 50% moisture by wt. which gives a low boiler efficiency of 68-70% only.

• “SEDL” has signed a license agreement with globally known company “Swiss-Combi” of Switzerland to manufacture Bagasse Dryer to dry the bagasse upto 10% moisture level.
ADVANTAGES

- Reduction of Bagasse moisture from 50% to 10%
- Use of low grade waste heat energy from process / turbine
- Reduction of final bagasse pol
- Increase in Bagasse calorific value
- No change required in Boiler design
- Boiler capacity increases by 20-25%
- Low Capex and Opex in terms of return
- High durability
- Low maintenance
- International design
- Easy operation

SPRAY ELECTRICAL DEHYDRATOR

- Mechanical Vapour Recompression using Turbo fan technology
- No requirement of any external heat source during operation
- Cheapest, independent, compact, most efficient substitute of conventional evaporation systems
- Operation at low ΔT
- Suitable for handling a wide variety of fluids
- Plug and play technology
INSTALLATIONS
LOW TEMPERATURE EVAPORATOR MODULE

- Operates at low pressure and temperature difference
- Uses rejected vapours of process for multiple effect evaporation
- Greater no. of effects can be accommodated in given $\Delta T$ & $\Delta P$
- 35-40% evaporation below 60°C
- Minimizes the colour formation, losses and heat injury during evaporation
- Offers highest energy efficiency
- Comparatively high heat transfer rate
- Compact and modular design
- Distributed HS that facilitates easy operation and maintenance
MILL ELECTRIFICATION & AUTOMATION

• Compact, neat & clean, highly efficient energy transmission solution for cane milling
• Combinations of AC - VFD with shaft mounted planetary drives offers finest control and wide range of capacity variation without compromising extraction efficiency
• Low footprint, minimal civil foundation and higher energy efficiency minimizes Capex and recurring Operational expenditure
• Complete DCS / PLC based automation
INSTALLATIONS
CONDENSATE FLASH VESSEL

- Centralized condensate removal and flashing system eliminates the requirement of individual pumps of heat exchangers
- A significant reduction in power consumption
- Improves the steam energy efficiency
- Single pump fulfills the complete plant hot water requirement
INSTALLATIONS
DIRECT CONTACT HEATER

- Closest approach temp. with higher turn down ratio
- Low approach temp. gives the advantage of using the heating vapours of subsequent effects improving the steam economy
- Consistent performance without cleaning throughout the season
- Rugged design and maintenance free operation
- Evacuation of dissolved air happens from the venting which improves clarification and settling
INSTALLATIONS
COOLING AND CONDENSING SYSTEM

- Highly energy efficient cooling and condensing system due to fine distribution of water in spray and jet stream through especially designed SED nozzles
- Swift vacuum generation minimizes the idle cycle
- Fully automatic system that further optimizes the power consumption with greater reliability & consistency of vacuum
POWER CONSUMPTION

POWER CONSUMPTION (kW) FOR 2500 TCD STANDARD SUGAR PLANT

- Conventional Cooling & Condensing System
- SED's Manual Cooling & Condensing System

Condensing Station: 320 kW
   - Conventional: 200 kW
   - SED's: 160 kW

Cooling Station: 250 kW
   - Conventional: 132 kW
   - SED's: 90 kW

Cooling & Condensing Station: 500 kW
   - Conventional: 320 kW
   - SED's: 200 kW

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INSTALLATIONS

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SPRAY POND

- Highest temperature drop
- Low head spraying system
- Low civil cost
- Variable spraying capacity
- Least chocking
- Easy maintenance
POWER CONSUMPTION

POWER CONSUMPTION (kW) OF SPRAY POND

- COOLING TOWER
- CONVENTIONAL SPRAY POND
- SED’s AUTOMATED SYSTEM

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INSTALLATIONS
MOLASSES CONDITIONER

• Effective online system for complete dissolution of crystal in molasses with use of low pressure and temperature vapours
• Closest approach temp. with higher turn down ratio
• Rugged design and maintenance free operation
• No mechanical stirring is required
• Low approach temp. gives the advantages of using the heating vapours of subsequent effects to improve the steam economy
• Consistent performance without cleaning throughout the season
INSTALLATIONS
SUGAR MELTER

- Efficient sugar melting under vacuum offers better energy efficiency due to the use of subsequent effect vapours
- Horizontal stirring, uni-directional flow without short circuiting and dead pockets
- Automatic brix and flow control which minimizes the chances of the grain to carry over
INSTALLATIONS
SERVICES

Our main services are:

- Industrial / Plant Automation
- Process, Design & Engineering
- Operation & Maintenance
- Project Engineering and Management
- EPC Solution
- Equipment Design & Engineering
- Equipment Manufacturing
- After-Sales Services and Technical Support
- Customized Solutions & Consultancy Services
PROCESS PLANT LAYOUT

- Outdoor installation
- 60-70% less civil work
- 40% less area requirement
- Least equipment requirement
- Refined sugar production
- No massecuite pumping
- No storage of massecuite and molasses

Designed for:
- Steam % cane: 30% on cane
- Power generation: 140 kWh/Ton of cane
- Power export: 115 kWh/Ton of cane
- Fully plant automation

Gokul Mauli Sugars Ltd., Maharashtra
(4500TCD Plant with 15MW Co-gen)
MAJOR EXECUTED PROJECTS

African Region
- Metahara Sugar, Ethiopia
- White Nile, Sudan
- Golden Sugar Refinery, Nigeria
- Nzoia Sugar, Kenya etc.

Pakistan
- Madina Enterprises
- Ramzan Sugar
- Al-Abbas Sugar
- RYK Mills
- Kashmir Sugar etc.

India
- Gokul Mauli Sugars
- Venkatesh Krupa Sugar
- Vithhal Refined Sugar
- Jay Mahesh Sugar Ind.
- Dhanalakshmi Sugar
- NSL Sugar Group etc.

Brazil
- Cruz Alta
- Santos
- Usina Sao Jose

PT DUS Sugar Refinery, Indonesia

Al-Khaleej Sugar Co., Dubai

Lousiana Sugar Refinery, USA

Pfeifer & Langen Polska, SA, Poland

39 Countries
INTELLECTUAL ASSETS (GRANTED)

Patents granted in
- India
- USA
- Australia
- Japan
- China
- Russia
- EPO
- Cuba
- Pakistan
- Ukraine
- South Africa
- Thailand
- Vietnam etc.

- 32+ Innovation Patents
- 36+ Design Patents
- 14+ Trade marks
- 14+ Copyrights
INTELLECTUAL ASSETS (PENDING)

Patents pending in

- India
- Brazil
- Thailand
- Pakistan

12+ Innovation Patents
4+ Design Patents
11+ Trade marks
2+ Copyright

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ACCOLADES

Life Time Achievement Award

Haryana Rattan Award

Industry Excellence Award

Mangal Singh Gold Medal Award
BEST TECHNICAL EFFICIENCY AWARD TO OUR INSTALLED BOILING HOUSE PROJECT
THANK YOU

www.sprayengineering.com