SEPARATION

RELIABLE TECHNOLOGY
FOR THE PALM OIL PROCESS

2- AND 3-PHASE
DECANTER CENTRIFUGES
Palm oil is one of the two most important vegetable oils in the world’s oil and fats market. Whatever the step in the palm oil milling process (clarification, POME, fertilizer, composting, biogas), a solid/liquid separation phase is needed to meet the requirements applying to the final product. The ANDRITZ decanter centrifuge is the right solution to meet the separation needs (two and three phases) of palm oil producers and users.
Specially designed 2- and 3-phase decanters for the palm oil miller

RELIABLE TECHNOLOGY BASED ON DETAILED KNOWLEDGE OF THE PROCESS
At ANDRITZ Separation, we know every process in the palm oil industry, and we pay attention to your every need: Each palm oil application has its own specially designed decanter centrifuge with specific features to achieve the best performance and meet all of your requirements.

ADJUSTABLE SKIMMER IN OPERATION
The liquid phase of the ANDRITZ decanter centrifuge is discharged under pressure (1.5 to 2 bar) in both 2- and 3-phase configurations by means of a skimmer (also named “pipette”) that can be adjusted at millimeter intervals during operation. The flexibility of the ANDRITZ pipette design allows the user to adjust removal of liquid phase instantly without having to stop the machine or loosen any nuts. This enables the palm oil mill operator to extract the best oil quality or to adapt to any change in process conditions. The system provides better separation and optimizes the yield.

BEST PROTECTION AGAINST WEAR FOR EXTENDED DECANTER LIFE CYCLE
The ANDRITZ decanter centrifuge offers the best combination of protection and moderate costs, enabling the customer to select the best fit from the wide range of options available. The different zones and elements in a decanter centrifuge that may be subject to higher wear are protected by a carefully composed selection of wear protection means. A variety of materials ensure that your operations are able to withstand high temperatures as well as heavy-duty and corrosive products.
- To protect the bowl, the inner surface has strips or grooves, depending on machine size and application. Bowl outlets are protected with easily replaceable bushings.
- To protect the screw conveyor, the inside of the feed chamber is coated with tungsten carbide spray or protected with TurboWISE polyurethane inserts. Feed chamber outlets are equipped with replaceable bushings, and the screw conveyor blade has replaceable tiles made of tungsten carbide. Good wear protection is a strategic, long-term investment with a guaranteed return.
- To protect the solids casing, the receiving surface has a thick stainless steel plate. Exchangeable wear parts mean fewer repairs and less downtime, both of which lead directly to reduced maintenance costs.

EASY DISMANTLING
While you are saving time in production, there is no need to lose time during maintenance! The inline design of the ANDRITZ decanter centrifuge allows easy dismantling (requiring only basic lifting equipment and an operator). This configuration saves expenses for maintenance and handling.

ANDRITZ decanter centrifuge F5000, installed at Malaysian’s mill
Advantages in various stages of the palm oil process with ANDRITZ decanter centrifuges

CONVENTIONAL/UNDERFLOW PROCESS
The unique design of ANDRITZ decanter centrifuges, such as the combination of open flight, TurboWISE, and adjustable feed port, results in gentle product feed and entirely eliminates shear force in the product. As a result, oil recovery is improved because there is less stress and turbulence. In addition, the pipette device makes it easier to adapt the required oil purity and keep oil losses in the heavy phase in check.

POME AND BIOGAS (DIGESTATE)
To dewater anaerobic pond of POME or digestate dewatering, the palm oil mill operator is looking for low energy consumption and low maintenance. The TurboJet system allows a 15 to 20% reduction in power consumption, and the ANDRITZ decanter centrifuge is maintenance-friendly as well, with very competitive maintenance costs. The high-performance open-flight conveyor contributes towards ensuring good dewatering behavior.

CRUDE OIL PROCESS
ANDRITZ uses the combination of a 3-phase decanter and nozzle separator to achieve a total oil loss of <0.4% to fresh fruit bunch (FFB). After skimming the oil, crude oil with an oil content of approximately 25% is fed to the decanter centrifuge, which splits the crude palm oil into oil with up to 95% purity and solid cake with a maximum oil loss of 4% w/w. The heavy phase, which still contains emulsion, is treated with an ANDRITZ nozzle separator. The high g-force of the nozzle separator (approx. 5,000 g) helps to break up of a portion of the emulsion and keep the oil loss at the nozzle discharge to between 0.6 and 0.8%.

ANDRITZ decanter and separator for the crude oil process
ADVANTAGES

- Pipette design to suit various palm oil processes, such as crude oil, underflow, and 2-phase
- Uneven wear protection to ensure longer life cycle
- Two motor drives to adjust machine speed during processing when the optimum process mode is achieved, thus always generating maximum yield
- Reduced speed of 2,750 rpm contributes towards reducing vibration as well as wear and tear
- Two frequency converters for speed control in energy regenerating mode
- TurboWISE (feed chamber accelerator) helps to ensure gentle feed and less shear force acting on the product, with no emulsion

- Deep pond depth allows optimum capacity and lower energy consumption
- Unique scroll design for lowest oil loss in the cake and open-flight scroll design for good dewatering behavior
- Easy maintenance of the bowl and scroll, i.e. balancing is possible on site
- Fully replaceable wear parts, even the tiles for scroll protection, for a fast and easy regenerative procedure with substantial cost savings
Our equipment range for efficient separation in the palm oil process

As the world’s leading separation specialist with the broadest technology portfolio, the ANDRITZ Separation equipment range includes additional solid/liquid separation equipment for palm oil processing, such as nozzle separators, screw presses, filter presses, and dryers.

<table>
<thead>
<tr>
<th>Model</th>
<th>Mill capacity</th>
<th>Sludge flow rate</th>
<th>Main motor</th>
<th>Gearbox</th>
<th>Liquid discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>F5000 for crude oil process</td>
<td>30 tons FFB/h</td>
<td>12 m³/h</td>
<td>75 kW, inverter-driven</td>
<td>7,960 Nm</td>
<td>Pipette for liquid or heavy phase</td>
</tr>
<tr>
<td>F4000 for diluted underflow sludge</td>
<td>25 tons FFB/h</td>
<td>12 m³/h</td>
<td>37 kW, inverter-driven</td>
<td>5,000 Nm</td>
<td>Gravity</td>
</tr>
<tr>
<td>F5000 for diluted underflow sludge</td>
<td>60 tons FFB/h</td>
<td>27 m³/h</td>
<td>75 kW, inverter-driven</td>
<td>7,960 Nm</td>
<td>Pipette for liquid or heavy phase</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Mill capacity</th>
<th>Sludge quantity</th>
<th>Solids concentration</th>
<th>Liquid discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>D4LL for digestate</td>
<td>30 tons FFB/h</td>
<td>600 kg DS/h</td>
<td>2.5-3 % w/w as SS</td>
<td>TurboJet</td>
</tr>
<tr>
<td>D5LX for digestate</td>
<td>60 tons FFB/h</td>
<td>1,200 kg DS/h</td>
<td>2.5-3 % w/w as SS</td>
<td>TurboJet</td>
</tr>
<tr>
<td>D5L for POME</td>
<td>30 tons FFB/h</td>
<td>900 kg DS/h</td>
<td>2.5-3 % w/w as SS</td>
<td>TurboJet</td>
</tr>
<tr>
<td>D6L for POME</td>
<td>60 tons FFB/h</td>
<td>1,800 kg DS/h</td>
<td>2.5-3 % w/w as SS</td>
<td>TurboJet</td>
</tr>
</tbody>
</table>

ANDRITZ belt drying system BDS for biomass
ANDRITZ C-press
ANDRITZ separator CNZ 601 for crude oil process
ANDRITZ filter press
With ANDRITZ Separation, you gain access to one of the world’s largest OEM manufacturers for solid/liquid separation systems, including such well-known brands as 3Sys Technologies, Bird, Delkor Capital Equipment (Pty) Ltd., Escher Wyss dryers, Frautech, Guinard Centrifugation, KHD Humboldt Wedag, Krauss-Maffei centrifuges, dryers, and filters, Lenser, Netzsch Filtration, Rittershaus & Blecher, Royal GMF Gouda, Sprout Bauer, and Vandenbroek.

Whether you need spare parts, rentals, local service, repairs, upgrades, or modernization of your equipment, ANDRITZ Separation is your true full-service provider. From initial consulting through to service agreements, process optimization, and training programs, we are always looking for ways to minimize downtime and increase predictability in operations while raising your overall production efficiency. Wherever you operate, our network of 550 service specialists and global service centers ensures we’ll always be there to support you for many life cycles to come. Let’s sit down and see how we could take your operations to the next level.

**Your full-service provider**

**OEM SPARE PARTS**
Filter cloths, spare and wear parts from OEMs or with OEM level quality, all readily available

**LOCAL SUPPORT**
Responsive local service centers and field service technicians

**REPAIRS & UPGRADES**
Optimization of machine and process performance, repair work, retrofitting, and modernization

**SECOND-HAND & RENTALS**
Certified second-hand and rental machines

**TRAINING**
Operator training and tailored seminars for operating and maintenance personnel

**SERVICE AGREEMENTS**
Preventive maintenance, contracts for spare parts, maintenance, inspections, repairs, upgrades, operation, and equipment monitoring

**PROCESS OPTIMIZATION**
Automation tools and process expertise to boost your profit

**LAB AND ON-SITE TESTS**
Lab and testing capabilities for process optimization and machine upgrades
WHAT'S YOUR SEPARATION CHALLENGE?

ANDRITZ Separation is the world's leading separation specialist with the broadest technology portfolio and more than 2,000 specialists in 40 countries. For more than 150 years, we have been a driving force in the evolution of separation solutions and services for industries ranging from environment to food, chemicals, and mining & minerals. As the OEM for many of the world's leading brands, we have the solutions and services to transform your business to meet tomorrow's changing demands – wherever you are and whatever your separation challenge. **Ask your separation specialist!**

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