

25. Vertical Extraction Unit Introduction

1. Working Principle

A vertical extraction unit is a piece of equipment used in the oil processing industry, primarily for extracting oils from oilseeds. Its working principle involves using a vertical extraction tank to extract oils from oilseeds using a solvent (such as hexane). The oilseeds come into full contact with the solvent in the extraction kettle, where the solvent dissolves the oils from the oilseeds, forming a mixed oil. Subsequently, the mixed oil undergoes evaporation and stripping processes to separate the solvent, yielding pure oil. This vertical structure enables single-kettle periodic continuous production operations, facilitating production coordination and organization, and is suitable for intermittent production.

II. Technical Features

Vertical extractors have the following technical features:

1. **Vertical structure:** Vertical extractors adopt a vertical structure, which better utilizes space and improves production efficiency.
2. **High-pressure operation:** In some applications, vertical extractors can adopt high-pressure operation to improve extraction efficiency.
3. **No Mechanical Agitation:** First-generation vertical extractors typically feature a design without mechanical agitation, reducing equipment complexity and maintenance costs.
4. **Multi-Stage Series Operation:** Vertical extractors can be operated in a multi-stage series configuration to further enhance extraction efficiency.
5. **Efficient solvent recovery:** Vertical extractors are equipped with efficient solvent recovery systems that separate solvents from mixed oils, enabling solvent recycling.

III. Application Areas

Vertical extractors are widely used in the oil processing industry for extracting oils from various oilseeds, such as palm kernel meal, soybeans, rapeseed, and peanuts. Additionally, vertical extractors are used in the high-pressure acid leaching process of laterite nickel ore to extract metals such as nickel and cobalt from the ore. In sugar beet production, vertical extractors are also used to extract sucrose from sugar beet cells.

IV. Equipment Selection

When selecting a vertical extractor, the following factors should be considered:

1. **Processing Capacity:** Select an appropriate processing capacity based on production scale.

2. **Solvent Consumption:** Choose equipment with low solvent consumption to reduce production costs.
3. **Steam Consumption:** Select equipment with low steam consumption to improve energy efficiency.
4. **Equipment Material:** Choose corrosion-resistant materials, such as steel-lined titanium composite materials, to extend equipment lifespan.

5. Advantages

Vertical leaching equipment offers the following advantages:

1. **High-efficiency leaching:** The vertical structure and high-pressure operation enhance leaching efficiency.
2. **Energy-saving and cost-effective:** An efficient solvent recovery system and low steam consumption design reduce production costs.
3. **Stable operation:** The absence of mechanical stirring reduces equipment complexity and maintenance costs.
4. **Safe and Reliable:** The equipment operates stably, minimizing safety hazards during production.

Vertical leaching equipment, with its efficient, energy-saving, and safe features, has become one of the mainstream devices in the oil processing and mineral leaching industries.

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