Desolventizer-Toaster

Crown Iron Works Company

Desolventizer-Toaster

The Crown/Schumacher DT-designed to meet your production requirements

The Crown Design:

In 1976 Crown became the first and only United States Company to obtain a license from Heinz Schumacher for the Desolventizer-Toaster-Dryer-Cooler (DTDC). Taking note that not every oil mill required a complete DTDC, Crown developed and designed a separate Desolventizer-Toaster (DT). This refinement of the DTDC has become extremely popular in vegetable oilseed plants over the years.

Points to Remember

- Over 300 Crown/Schumacher DTs or DTDCs have been installed by Crown throughout the world.
- Crown/Schumacher DTs are available for capacities over 9,000 MTPD.
- Crown DTs operate on soybeans, canola, rapeseed, sunflower, peanuts, corn germ, woodchips, cottonseed, palm kernel, and a wide variety of other products.

Features and Advantages:

- The Crown DT uses a significantly lower amount of steam, and leads to distinctly lower solvent losses. Reduced solvent losses can be attributed to the unique, counter-current flow as well as improvements to meal and vapor flow throughout the vessel.
- A greater degree of safety is obtained by stabilizing meal temperatures in the lower trays of the DT. Operational errors can create a drop in meal temperature in the top tray. Because the major flow of steam passes through all the major meal beds, temperature drop errors can be recovered more easily in the second or succeeding trays.
- Automatic level controls and special chutes, or variable speed rotary valves provide for smooth and efficient operation. This frees operators to focus attention in other areas of the plant so as to improve overall efficiency.
- Low horsepower per ton requirements.
- Using heavy duty steam chests and robust computer designed sweep arms virtually eliminates sweep arm breakage and bending.
- Pre-desolventizing meal with steam-heated trays reduces sparge steam requirements and meal moisture, resulting in reduced meal dryer steam usage.
- The pre-desolventizing trays are basket type, suspended in the dome. The large and carefully designed dome of the DT reduces the amount of fine dust-carried out of the DT with vapors.

Crown Desolventizer Toaster Operation

After all the oil has been removed from the oilseed flakes or cake, they leave the Crown Extractor with approximately 30 percent solvent (hexane) content. The Crown/Schumacher DT is the newest innovation in removing the hexane from the flakes and completing the toasting operation.

The solvent laden flakes enter the top of the DT and land on the steam heated pre-desolventizing tray(s) where they are evenly distributed by a sweep arm. The meal flows from one tray to the next through tray openings. These top trays are called pre-desolventizing trays because they use indirect heat from a hot tray surface to "flash" the vapor hexane from the white flakes without adding moisture.

The main (middle) trays are designed to provide both indirect heating and direct steam contact to remove the bulk of the solvent from the meal, and to add the correct amount of moisture for cooking of the meal. The combination of slightly elevated moisture and temperature provide the desired nutritional characteristics of the meal. Each of these trays have hollow stay bolts for venting vapors from one tray to the next. The quantity and position of these openings are carefully designed to allow near-optimum contact between vapors and meal. These vapors travel counter-current to the direction of meal travel. Meal levels in these trays are controlled by chutes, which convey the material down through the unit.

The bottom DT tray is called the Sparge Tray. The Sparge Tray contains a specially designed variable speed rotary valve to maintain a level in the unit. This bottom tray is perforated for direct sparge steam injection, which strips the final solvent from the meal and vents up through all the hollow staybolt trays and all the main meal beds above.

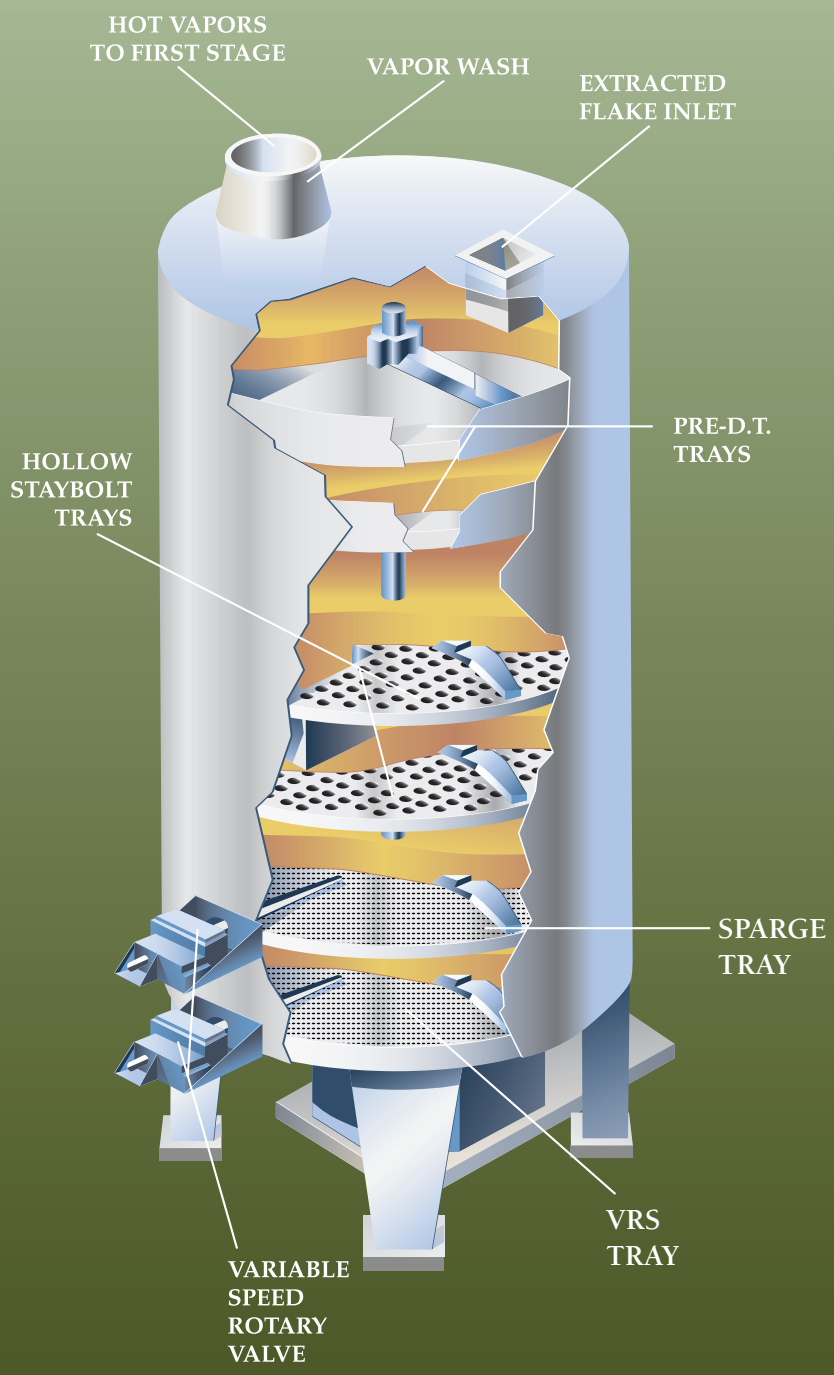
The quantity of trays and their positions are carefully designed to allow maximum contact between vapors and meal, and the proper meal moisture at each stage of the process. Counter-current desolventization is achieved, previously unavailable in DTs. The result is a uniquely low solvent content in desolventized meal, and significantly reduced solvent losses.

For certain light and dusty products such as cottonseed, other special features may be added or substituted. For example, venting may be obtained by a specially designed side vent which draws the water vapors from above the meal beds and vents them to the atmosphere. In special types of DTs, sparge steam is often added through a specially designed sweep arm in the top tray.

Vapor Recovery System

The Vapor Recovery System (VRS) is a patented system designed to reduce steam use, solvent consumption, and hexane emissions in a solvent extraction plant. The VRS was designed to be added to a modern counter flow (or Schumacher-type) desolventizer toaster. Plants using a VRS are capable of recovering almost all of any sparge steam leakage, and efficiently using it to provide desolventizing energy and recover trace amounts of hexane.

CROWN/SCHUMACHER DESOLVENTIZER-TOASTER



The VRS consists of an added tray below the sparge tray, preferably with a second rotary valve. This chamber is maintained just above ambient pressure to virtually eliminate leakage or flashing of steam from the outlet of the final rotary valve.

An important advantage of using a VRS is the recovery of almost all the vapors, even in the case of a slightly worn rotary valve. Means to directly measure the effect a VRS has on solvent loss have not yet been devised. However, recent calculations show for a typical new system, the VRS is estimated to reduce total plant solvent consumption by about 10 percent. The VRS is a simple, logical way to directly improve efficiency and emissions with almost no side effects on other systems.

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