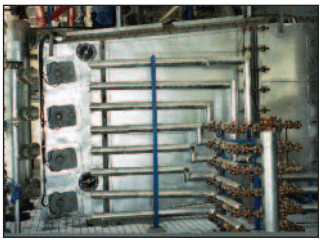
White Flake and Low Temperature Desolventization

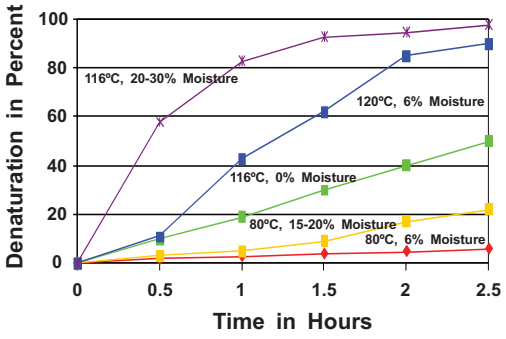
Crown Iron Works Company

A CPM Company

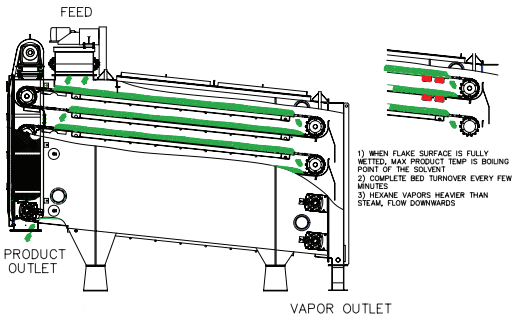




White Flake and Low Temperature Desolventization

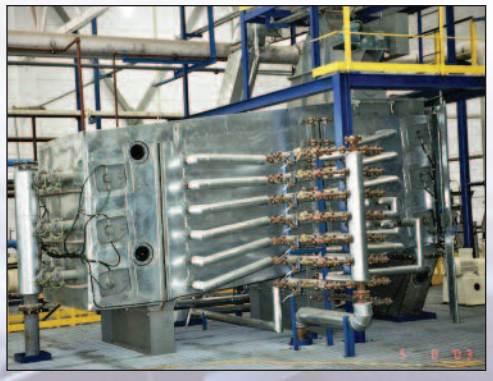
Low Temperature Desolventization is required to maintain the solubility and other functional properties of proteins and other temperature sensitive products



DRY HEATING/DESOLVENTIZATION



DOWN DRAFT
DESOLVENTIZER (DDD)



DOWN DRAFT STRIPPER (DDS)

Minimal heat treatment is required to maintain the solubility and other functional properties of proteins and other temperature sensitive products.

PROTEINS

Research has shown that dry heating/desolventization (H20 < 10-12%) has a reduced effect on protein denaturization, thereby preserving the solubility of the protein. The objective is to maintain product below the denaturization temperature for as long as possible. When the solvent boiling point is below the protein denaturization temperature, it is possible to evaporate the majority of the solvent at atmospheric pressure without damaging the protein.

An alternative approach is to quickly flash off the solvent to minimize time at higher temperatures. This is accomplished in a pneumatic conveying desolventizer using super heated solvent vapors where residence time is limited to a few seconds.

Once the majority of the solvent is gone, the product is no longer thermally protected by the solvent. To prevent denaturization it is necessary to operate under vacuum where final desolventization and stripping takes place. Overall reduction in PDI or NSI is generally less than 5 points for both approaches.

TWO APPROACHES FROM ONE SUPPLIER

Crown Iron Works can supply two Low Temperature Desolventization Systems that gently desolventize materials. The DDD can be used to preserve flake size for improved downstream processing. Alternatively, Crown can provide a FDS to quickly flash the solvent away from the product in a Pneumatic Conveying Desolventizer. Crown Iron Works can also supply the Vacuum Stripper necessary to obtain low residual hexane to ppm levels. Operating conditions in the Vacuum Stripper can be varied to adjust finished PDI to desired levels.

CROWN DOWN DRAFT DESOLVENTIZING SYSTEM (DDD/DDS)

The Down Draft Desolventizer is an Indirect Contact Dryer that gently moves the product over a series of heated trays to maintain flake integrity during desolventization. When the flakes reach the end of each tray they fall a short distance onto the tray below. This bed turnover ensures that no one side can overheat. The solvent vapors are scrubbed to remove the fines and can be sent to the First Stage Evaporator for heat recovery.

Larger flakes are often preferred for manufacturing Protein Concentrates. The gentle conveying motion of the mechanical conveyor uses minimal horsepower to move the solids.

FLASH DESOLVENTIZATION SYSTEM

CROWN FLASH DESOLVENTIZATION SYSTEM

The FDS is a Direct Contact Pneumatic Conveying Dryer that brings the product into direct and intimate contact with superheated solvent vapors. All of the heat required for evaporation is provided during the initial mixing thereby flashing the vast majority of the solvent off the flakes in a matter of seconds. The desolventized product is separated from the vapors in a High Efficiency Cyclone Separator and then fed to the Vacuum Stripper. The product is conveyed at high velocity so a higher degree of flake breakage occurs than in the DDD.

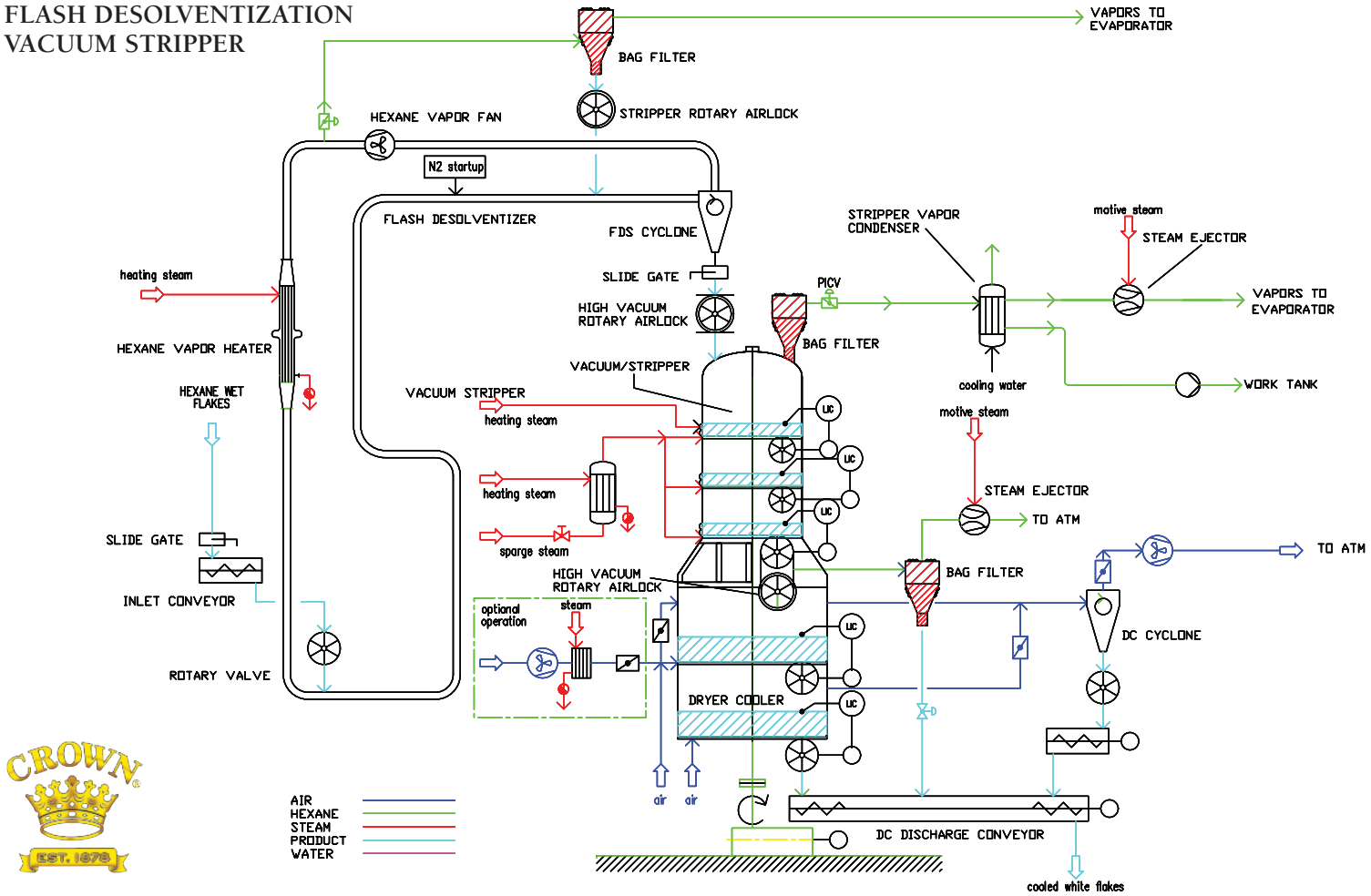
VACUUM STRIPPER/COOLER

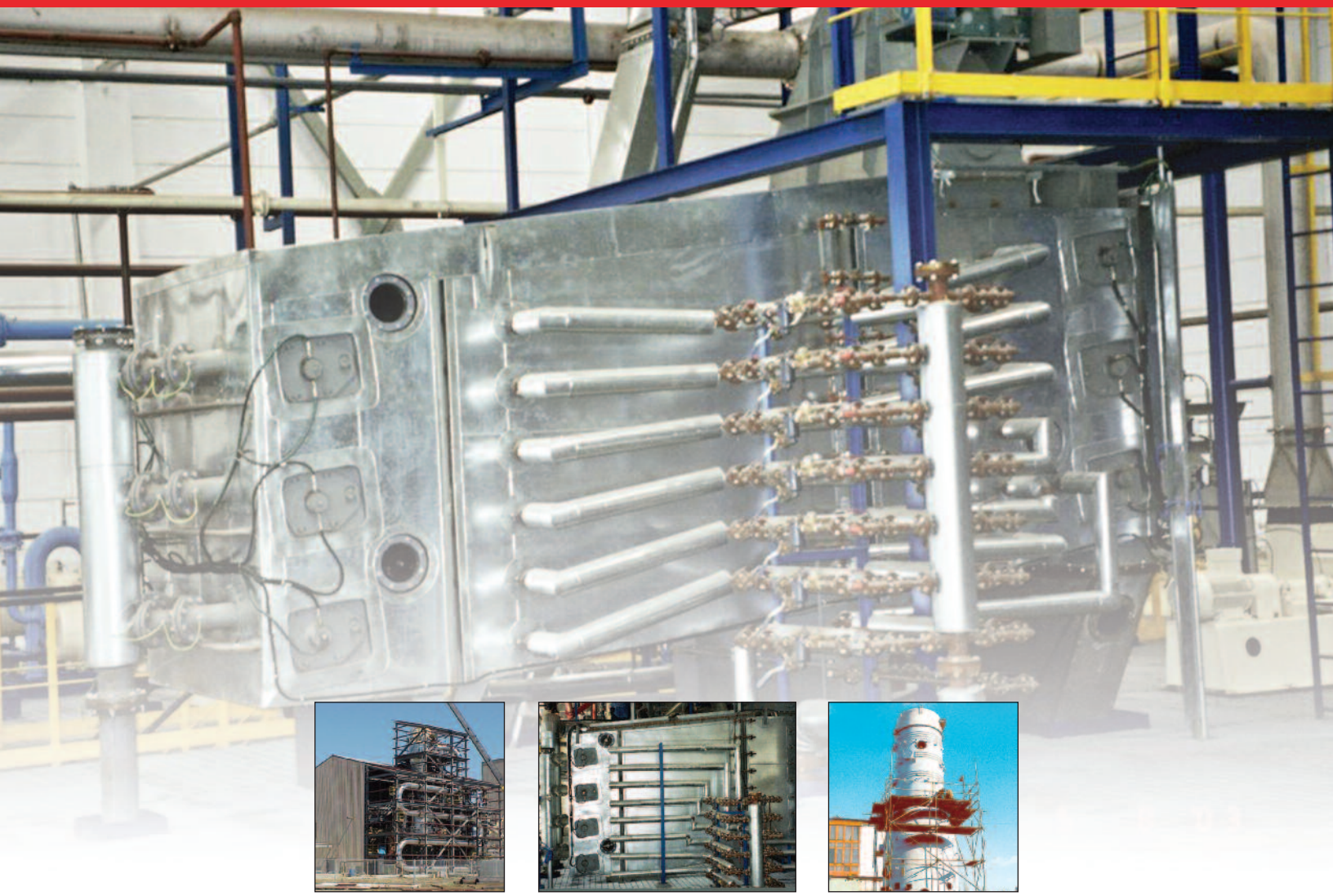
VACUUM STRIPPER/COOLER

The Vacuum Stripper is a vertically oriented vessel that operates under a strong vacuum to reduce solvent boiling point. A precise amount of superheated steam is added to strip the remaining solvent away from the product and to fill the void space between the particles. Past history has shown that both TIME and **VACUUM** are required to deliver high PDI and **Low Hexane Losses**.

Often times, the product from the Vacuum Stripper is pneumatically cooled and conveyed or goes direct to further processing. Should cooling or further drying be desired, an air operated Drying Cooling Section can be provided.

FLASH DESOLVENTIZATION VACUUM STRIPPER





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