Drying Process Solutions

Multicoil™ - the Multipurpose Industrial Dryer Unit

The NLI group of companies

NLI Products is part of the NLI group of companies, a complete supplier of engineering and fabrication services, technology products and process solutions to the oil & gas industry, as well as land based industry. NLI undertakes the complete responsibility from concept development to manufactured product.

Our goal is to make life easier for our customers. This goal can only be reached through continuous efforts in the areas of competence development, quality improvement, flexibility and punctuality. Our 850 qualified employees are our most important resource, and contribute to our annual revenue of 1,5 billion NOK (2010 forecast).

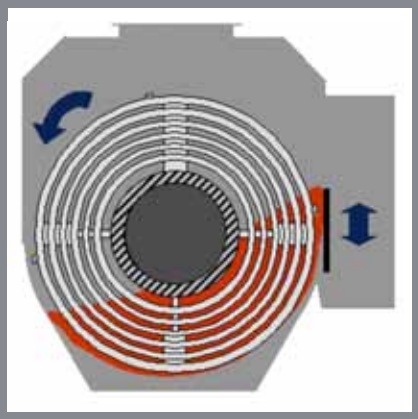
NLI Products

NLI Products in Norway is a global supplier of process dryers for the chemical and mineral industry. Our drying technology is applied in various industrial processes where there is a need for indirect drying, cooling, solvent recovery or vacuum drying.

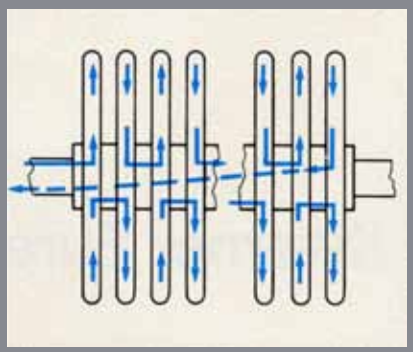
The coil technology has driven NLI Products to a leading position in a wide variety of industrial applications. This technology is concentrated on optimizing customer processes, reducing environmental pollution and maximising profits for our customers. Extensive application experience has made our products among the most versatile industrial processing units available.

MULTICOIL The Multipurpose

The Multicoil is a multipurpose industrial processing system. It is applicable as a contact dryer, heater or cooler, or as a combination. Systems may be designed for evaporation of water or solvents. All processes may be carried out under atmospheric, vacuum or overpressure conditions.



Product level is controlled by an adjustable weir. The condensate discharge from the coils is shown.



When using a liquid as energy medium, current or counter current flows are possible.

WORKING PRINCIPLE

The Multicoil unit consists of a rotor which forms the indirect contact heating/cooling surface, and a stationary shell or vessel. The rotor consists of a number of parallel coil sets arranged along a central shaft. Each coil set contains a number of concentric tubes. The heat transfer medium may be steam or liquid.

TAILORED SYSTEM DESIGN

Each application of the Multicoil system requires careful investigation of the processing characteristics of the actual product. On this basis, operating conditions and system design are selected. The scope of supply includes complete processing systems or just the Multicoil.

ADVANTAGES OF THE MULTICOIL PROCESS SYSTEM

GOOD ENERGY ECONOMY

The energy consumption of the Multicoil processing system is low compared to systems based on convective heat transfer.

SMALL EXHAUST GAS QUANTITIES

The Multicoil utilizes indirect energy transfer by means (steam, water, thermal fluids). Therefore, the process requires a low flow of air or inert gas only.

LOW TOTAL PROCESS INVESTMENTS

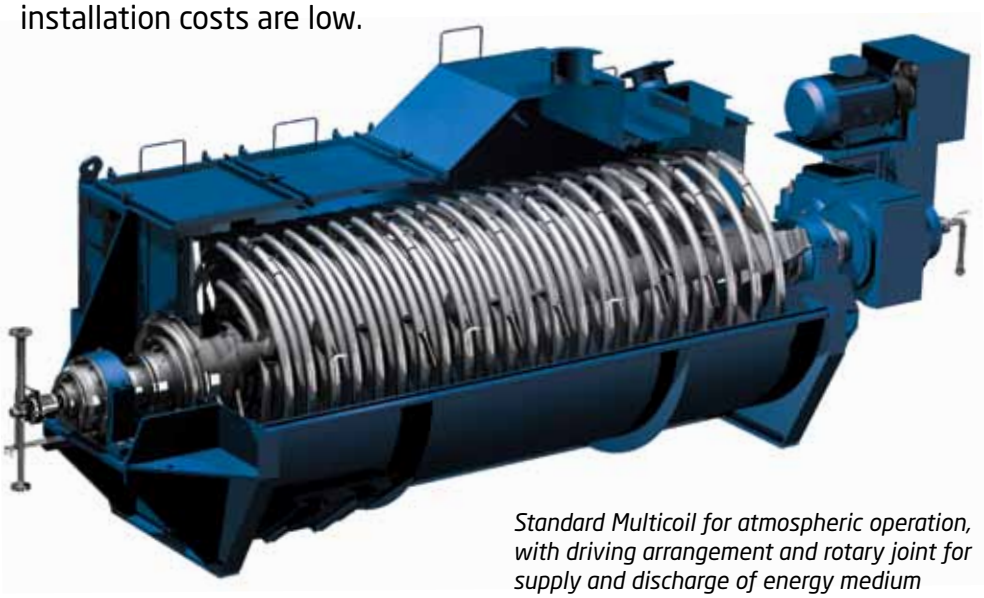
Due to the compact design of the Multicoil and the exhaust system, installation costs are low.

LOW COST OF EXHAUST GAS CLEANING

Small exhaust gas quantities result in small exhaust gas cleaning systems. As a consequence of the low gas velocities inside the shell, only small fractions of solids are entrained.

EFFICIENT ENERGY AND SOLVENT RECOVERY

Due to the low air/inert gas flow through the Multicoil unit, a significant part of the vapour in the exhaust gases is condensable, thus providing efficient energy and solvent recovery.

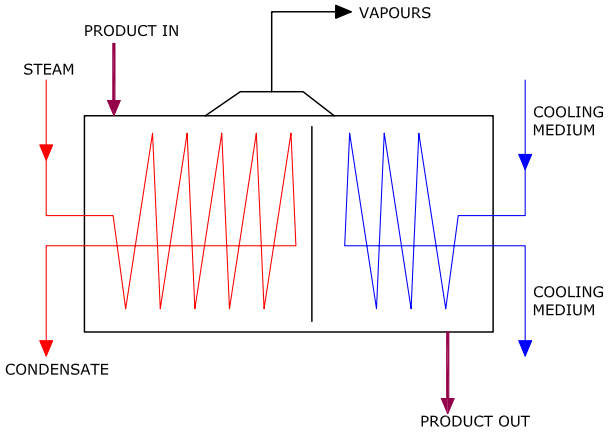


Standard Multicoil for atmospheric operation, with driving arrangement and rotary joint for supply and discharge of energy medium

Industrial Dryer Unit

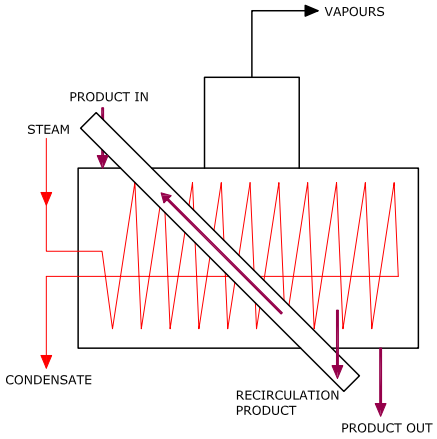
DRYER and COOLER - COMBINED

Most Multicoils are running either as dryers or coolers. In some cases a combined system is needed. A cost effective solution is to divide the Multicoil unit into a drying and a cooling section. The rotor is then sectioned in two parts, one for heating and one for cooling medium. To enhance cooling efficiency, the system is designed for counter-current flow of air and product.



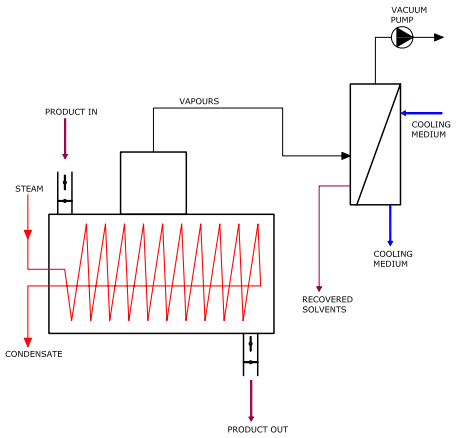
EXHAUST CLEANING AND PRODUCT RECIRCULATION

If a product consists of very small particles, or if the wet product is sticky, back-mixing of dried product is often required to promote product flowability in the first part of the Multicoil unit. The low gas flow through the Multicoil requires only a small bag filter or cyclone which can easily be placed on top of the dryer.



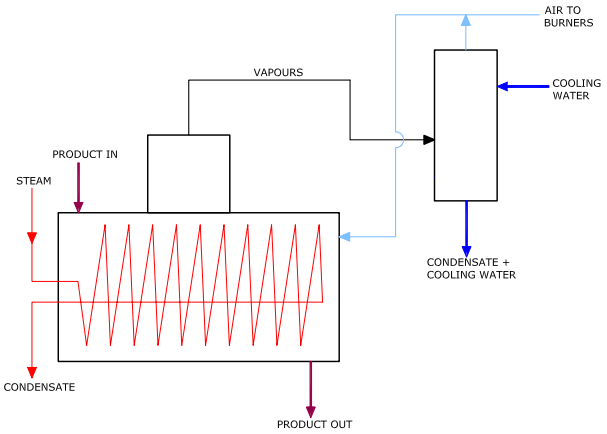
SOLVENT RECOVERY

The system is kept inert during start-up, operation and shut down periods by a small purge of inert gas, most often nitrogen. During operation the purge is reduced to a minimum. Evaporated solvent is recovered in a condenser. Once-through or recirculation inert gas systems are available.



DEODORIZATION OF EXHAUST GAS

Odour control from drying sewage sludge, fish meal, meat etc. can be achieved by operating the Multicoil unit at a slight underpressure (air flow) end by Incineration or scrubbing of non-condensables.



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EXAMPLES OF PRODUCTS WHICH CAN BE PROCESSED IN A MULTICOIL DRYER

Technical data

Construction material
- Mild steel, stainless steels and other weldable materials.

Heat transfer medium
- Steam, liquid, thermal fluids.

Maximum pressure in rotor
- 20 barg

Maximum heating surface temp.
Approx. 340°C.

Vacuum in drum:
- Batch operation: 97%
- Continuous operation: 80%

Rotor speed
- 3-30 rpm

Heat transfer area
- 3-600 m^2.

Heat transfer coefficient
- 60-160 $W/m^2/°C$

Energy consumption
- 0,8-0,9 kWh/kg evaporated water for a dryer.

These values are only intended as a guidance, other values may be obtained for special design.

CHEMICAL INDUSTRY
Aluminium Fluoride, Potassium Chloride, Sodium Sulphate, Calcium Carbonate.

PETROCHEMICAL INDUSTRY
Polyvinyl Chloride, HD-Poly-ethylene, Melamine, Polyester.

MINING
Metal Concentrates, Calcium Tungstate, Powdered Coal, Tungsten Oxide, Coal Metallic Silicon.

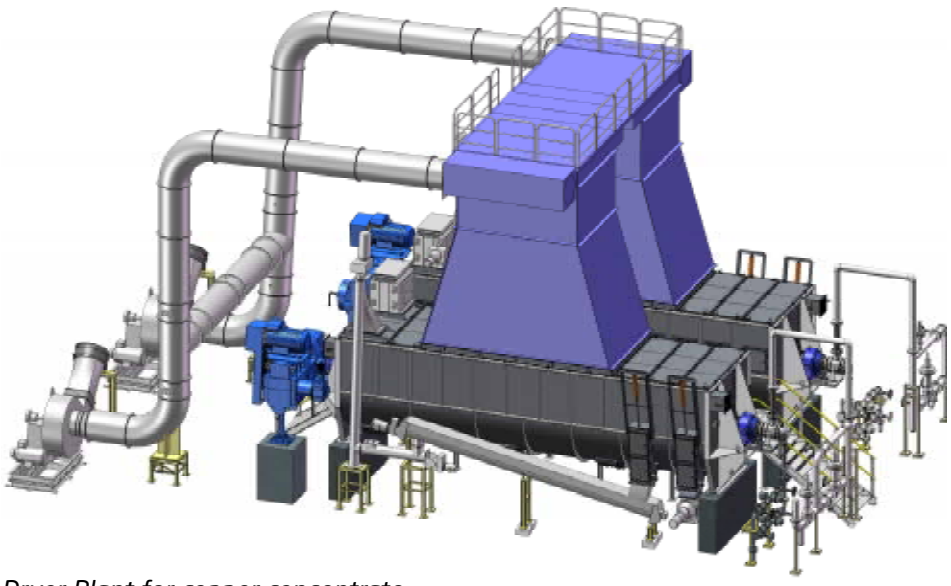
WOOD PROCESSING
Wood chips, Wall board fibres.

BREWERIES AND DISTILLERIES
Spent grain, Dark grain.

FOOD INDUSTRY
Meat meal, Fish meal, Soya flour, Starch.

PHARMACEUTICAL INDUSTRY
Penicillin sludge, Enzyme sludge, Granular enzyme, Solvent recovery from waste.

MISCELLANIOUS
Pigments, Carbon Black, Peat. Gypsum, CMC.



Dryer Plant for copper concentrate.

TEST FACILITIES
In the test laboratory it is possible to run batch tests where 200 litres of product is needed pr. batch. For tests at customers' plant, rental test units for continuous operation are available.

Unique competence - unique solutions

02/10 - www.tlr.no