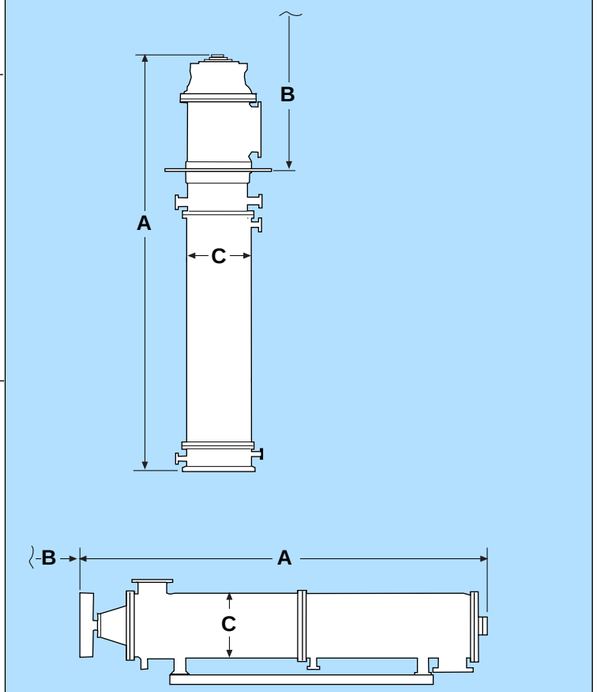
THIN-FILM DRYING

DIMENSIONAL INFORMATION (APPROXIMATE)

	Area (m^2)	A Overall Length (mm)	B Rotor Withdrawal (mm)	C Diameter (mm)
VERTICAL	0.5	1860	2000	254
	1	2325	3150	295
	2	3080	4000	403
	4	4335	5400	569
	5	4745	5950	685
	6	5245	6450	685
	8	5735	7100	791
	12	6870	8400	940
	18	9580	9800	1090
	24	10765	11090	1300
	32	12400	12570	1500
	40	13650	13500	1815
	48	15400	12400	2140
	60	17500	14500	2140
HORIZONTAL	1	2440	2360	254
	3.5	3880	3460	480
	5	4460	3950	570
	8	6090	5600	685
	14	6530	5950	940
	20	7350	6600	1090
	30	9550	8300	1500
	40	11000	9500	1815
	50	12600	11100	1815
	60	13000	11500	2120
	70	15000	13500	2120
	80	16600	15100	2120
	90	16000	14200	2540
	100	17300	15500	2540
	110	18800	17000	2540
	130	20500	18000	2960
	150	22800	20300	2960



LCI Support: Before, During, & After the Sale

LCI's Preliminary Evaluation Service (PES) will quickly and inexpensively determine if our technologies meet the requirements of your application.

Prior to shipment, LCI engineers fully inspect all systems we build.

After shipment, LCI continues to support your equipment with technical advice, troubleshooting in the field, or promptly supplied replacement parts.

LCI Corporation
PO Box 16348
Charlotte NC 28297-8804

704-394-8341 • fax 704-392-8507
info@lcicorp.com
www.lcicorp.com

Thin-film Drying

Catalyst recovery

Salt drying

Glycerin recovery

Solvent recovery

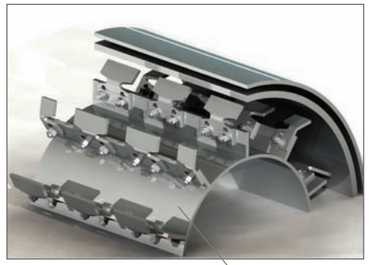
Biodiesel

LCI thin-film dryers are widely used throughout the process industries to convert liquids, slurries, and pastes to free-flowing solids in continuous, single-pass operation. LCI Thin-film Dryers have a short residence time and are very effective in processing heat sensitive products, due to low "hold-up" and self-cleaning heating surfaces.

LCI supplies two types of thin-film dryers — Vertical or Horizontal. For some applications, the two are combined in the Combi Dryer™. Both types are indirectly heated, either by steam or hot oil. Both can be operated either semi-batchwise or continuously, at atmospheric pressure or under vacuum. LCI drying systems are compact as a result of very high heat transfer rates.

Why Use LCI Thin-film Drying Technology?

- Ideal for processing heat sensitive products
- Short residence time
- Low product "hold up"
- Heated surface fully self-cleaning
- Heating and cooling available in single system



Bolt-on rotor blades configurable to optimize residence time, heat transfer, and final moisture levels

Zero clearance pendulum blade designed specifically for thin-film drying

Quality Standards

LCI thin-film drying technology is offered through our teaming partnership with Buss-SMS-Canzler GmbH. Systems are manufactured in ISO 9001:2000 quality certified facilities. Welding, design, and fabrication processes are employed according to ASME Section VIII, Div. 1 (U-Stamp), European vessel certification (PED), or other required national codes.

Vertical Dryer

Features

- Dilute feed materials dry to free-flowing solids in a single pass — a one-step operation that eliminates several process steps
- Thermal degradation of heat sensitive or hazardous products minimized by low residence time "indirect contact" drying
- Fouling of the thermal surface eliminated by agitating action of specially designed pendulum blades
- Fully enclosed design to treat reactive, toxic and hazardous substances
- Complete recovery of solvents

Operation

Moving hinged blades spread the wet feed product evenly over a heated wall. A highly agitated bow wave is formed in front of the pendulum blades. The turbulence increases as the product passes through the clearance before entering a calming zone situated behind the blades. The volatile component evaporates continuously. The product layer is only millimeters in thickness. The hinged pendulum blades are designed to give a minimum clearance with the dryer wall to prevent fouling of the heating surface by product. The blades are not required to contact the heated wall.

Horizontal Dryer

Features

- Continuous, fully enclosed processing
- Short residence time
- Low residual volatiles in final powder
- Superior mixing efficiency
- Self-cleaning of heating surface
- Low energy consumption
- Flexible through exchangeable rotor elements
- Minimal product hold-up

Operation

Wet product fed through the inlet nozzle is conveyed steadily by the rotor blades along the heated dryer wall in a thin film, normally several millimeters thick, preventing buildup and continuously exposing every particle of the product to the heated surface. Vapors pass countercurrently to the product flow and exit the dryer through the feed nozzle, as configured above. Moisture levels from a few tenths of a percent up to 5%+ can be achieved. Residence time is typically controlled between four and fifteen minutes.

Sample Applications

- Penicillin
- Acetaminophen and other pharmaceuticals
- Acetoacetanilide
- Caffeine
- Cyanuric acid
- Waste sludges
- Sodium lauryl sulfate
- Organic pigments
- Solvent recovery from presscakes and pigments
- Fine chemicals
- Polypropylene
- Thermoplastic resins
- Herbicides
- Agrochemicals (Atrazine etc.)
- Wastewater and spent liquors
- Chlorides, bromides, sulfates
- Silane drying
- Benzosulfonic acid
- Chemical intermediates
- Solvent recovery from waste
- Carbonates, phosphates
- Silicon, silicon carbide
- Xanthates
- Dyes and pigments
- Glycerin recovery from salt
- Sodium formiate
- Boron carbide, boron nitride
- Caffeine, condiments