



# COMBER

Drying and Filtration Technology

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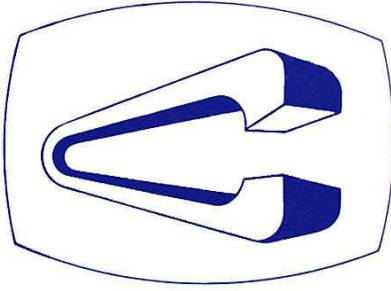
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## Condry®

# Agitated Vacuum Pan Dryer



TI 0123 E - 02/06



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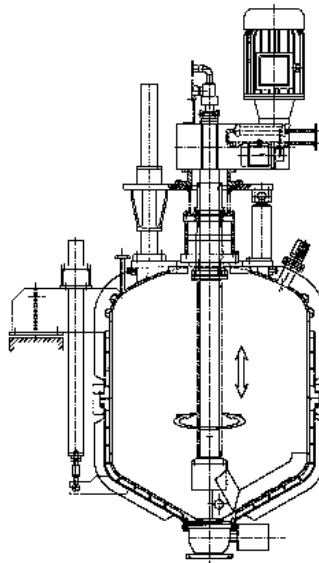
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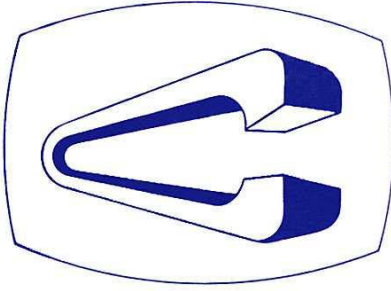
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## Condry® Agitated Vacuum Pan Dryers



### Condry® conical bottom agitated vacuum pan dryer

- **Shortest possible drying times**, suitable for the drying of sensitive, pasty, sticky and other "difficult" products such as those turning highly viscous during the drying process.
- **Excellent product discharge performance** with negligible product hold-up due to the conical vessel bottom, very close agitator to wall / bottom clearances and a unique agitator design.
- Simultaneous axial and radial agitator movements permit efficient and uniform mixing of the entire product mass, without the formation of lumps or balls. Therefore **no chopper is needed**. The slow rotation of the agitator minimizes the shear forces applied to the product, thus **limiting mechanical and thermal product degradation**, maintaining the products original crystal structure.
- The surface area for heat transfer is maximized for optimum performance and cycle times. Supplemental **microwave heating** is available as an option for the best possible drying performance.
- In compliance with **cGMP and FDA** guidelines:
  - Agitator supported by the top head, with the seal in contact with the vapors only.
  - Excellent cleanability using CIP Systems, with **simple validation** process.
- Double mechanical seal, dry running contacting or non contacting lift-off or liquid lubricated, externally interchangeable.
- Calculation, design and manufacture to **Pressure Equipment Directive 97/23/EC (PED)** and/or **ASME** pressure vessel code, Section VIII, with **U-Stamp**.



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## Condry® Agitated Vacuum Pan Dryers



**Condry® TDC 3500 dryer with lowered conical bottom**

The **Condry®** conical bottom agitated vacuum pan dryer has been developed to process a wide variety of products. The machines have proven to be particularly suited for the drying of difficult products such as agglomerating, sticky as well as heat sensitive products.

Simultaneous rotational and vertical agitator motions result in a very efficient and even mixing of the entire product mass and permit to overcome critical phases during the drying process.

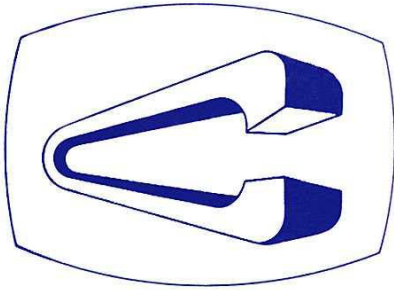
The conical bottom allows for **excellent product discharge characteristics**.

A unique agitator arm profile with teeth has been developed. Excessive pressure onto the product is avoided and thus prevents changes or damage to the crystal structure of the product and at the same time results in excellent mixing characteristics at the desirable low rotational speeds. The agitator design prevents the formation of agglomerates, thus **no choppers** (homogenizers, lump breakers) are **required**, which are highly undesirable due to their shear action causing damage to sensitive products in addition to the excessive dust being created in the final drying stages.

The agitator arms are designed to have large surfaces to obtain a comparatively large wetted surface area available for maximum possible heat transfer to heat and cool the product respectively.

Narrow tolerances between the agitator and the vessel walls prevent adhering of the product to the walls and thus result in a good heat transfer, good emptying characteristics and permit the use of the dryer with small product volumes.





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## CONDRIY® Agitated Vacuum Pan Dryers

### Standard Features:

- Calculation, design and manufacture in accordance with PED 97/23/EC or/and ASME pressure vessel code, Section VIII with U-Stamp as well as in compliance with cGMP and FDA guidelines.
- EC type examination certificate 03ATEX0245X per the 94/9/EC directive or with electrical components UL approved for operation in a Class 1, Division 1 or 2, Groups C & D environment.
- Conical bottom for improved dry product discharge
- Double mechanical seals, externally interchangeable, dry running contacting or non contacting lift-off type seals as well as liquid lubricated seals.
- Sample valve.
- Hydraulic pre-piping to manifolds, pre-wiring to terminal boxes, all in Stainless Steel.
- CIP System.

### Options:

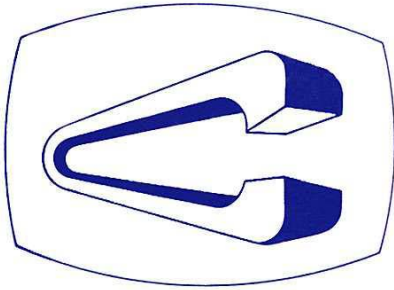
- Supplemental microwave heating to reduce time required for drying.
- Pressure proof versions, aseptic versions, DQ, IQ, OQ qualification.
- PLC controls, autonomous or slaved to DCS, MCC.

Technical Data: (small units)	TDC 100	TDC 250	TDC 400	TDC 700	TDC 1000	TDC 1500
Vessel internal diameter:	500	710	800	970	1140	1270 mm
Vessel cylindrical height:	500	700	800	900	1000	1200 mm
Total internal volume:	125	365	530	900	1400	2050 l
Usable volume:	100	280	410	680	1050	1550 l
Agitated volume:	85	200	310	500	850	1090 l
Bottom opening stroke:	500	500	500	500	800	800 mm
Heated area, wetted:	1.3	2.6	3.4	4.7	6.3	8.2 m <sup>2</sup>
Discharge valve ID:	80	100	125	125	150	150 mm
Agitator RPM:	9 - 90	7 - 65	6 - 60	5 - 50	4 - 42	4 - 37 RPM
Agitator drive:	5.5	7.5	11	15	18.5	22 kW
Agitator vertical stroke:	300	300	400	400	500	500 mm
Agitator up/down speed:	50	50	50	40	40	40 mm/min
Dust filter elements:	1	1	1	1	2	2 pcs.
Filter surface:	0.2	0.3	0.4	0.4	0.8	0.8 m <sup>2</sup>
Nitrogen vessel volume:	6	6	6	6	6	6 l

Design pressure: Vessel: Full vacuum / 0.45 barg Jacket: Full vacuum / 4 barg  
 Design temperature: - 10 / + 151° C  
 Finish: Interior: mirror polish gr. 240 ( Ra 0.38 µm ) Exterior: satined gr. 180 ( Ra 0.76 µm )

Note: The technical data listed above are for the standard machine version. Machines with other pressure and temperature ratings and other specifications are available and can be quoted on request.

TI 0022 E - 02/06



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## Condry® Agitated Vacuum Pan Dryers

### Standard Features:

- Calculation, design and manufacture in accordance with PED 97/23/EC or/and ASME pressure vessel code, Section VIII with U-Stamp as well as in compliance with cGMP and FDA guidelines.
- EC type examination certificate 03ATEX0245X per the 94/9/EC directive or with electrical components UL approved for operation in a Class 1, Division 1 or 2, Groups C & D environment.
- Conical bottom for improved dry product discharge.
- Double mechanical seals, externally interchangeable, dry running contacting or non contacting lift-off type seals as well as liquid lubricated seals.
- Sample valve.
- Hydraulic pre-piping to manifolds, pre-wiring to terminal boxes, all in Stainless Steel.
- CIP System.

### Options:

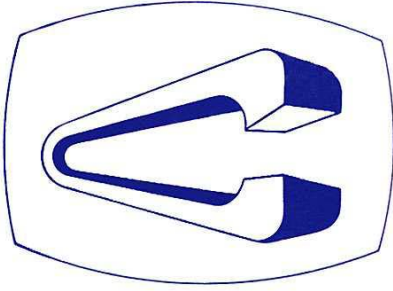
- Supplemental microwave heating to reduce time required for drying.
- Pressure proof versions, aseptic versions, DQ, IQ, OQ qualification.
- PLC controls, autonomous or slaved to DCS, MCC.

Technical Data: (larger units)	TDC 2100	TDC 2700	TDC 3500	TDC 4200	TDC 5500	TDC 7000
Vessel internal diameter:	1460	1650	1850	2000	2250	2500 mm
Vessel cylindrical height:	1200	1200	1200	1200	1200	1200 mm
Total internal volume:	2800	3650	4850	5800	7700	9900 l
Usable volume:	2100	2750	3550	4250	5500	7000 l
Agitated volume:	1650	2250	2900	3500	4600	5900 l
Bottom opening stroke:	800	800	800	800	800	800 mm
Heated area, wetted:	10.0	12.0	14.2	16.0	19.2	22.6 m <sup>2</sup>
Discharge valve ID:	200	200	250	250	250	300 mm
Agitator RPM:	3 - 33	3 - 29	3 - 26	3 - 24	2 - 21	2 - 19 RPM
Agitator drive:	30	37	45	55	75	90 kW
Agitator vertical stroke:	600	600	600	600	600	600 mm
Agitator up/down speed:	30	30	20	20	20	20 mm/min
Dust filter elements:	3	4	4	4	5	6 pcs.
Filter surface:	1.2	1.6	1.6	1.6	2.0	2.4 m <sup>2</sup>
Nitrogen vessel volume:	12	12	12	12	24	24 l

Design pressure: Vessel: Full vacuum / 0.45 barg Jacket: Full vacuum / 4 barg  
 Design temperature: - 10 / + 151° C  
 Finish: Interior: mirror polish gr. 240 ( Ra 0.38 µm ) Exterior: satined gr. 180 ( Ra 0.76 µm )

Note: The technical data listed above are for the standard machine version. Machines with other pressure and temperature ratings and other specifications are available and can be quoted on request.

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**Agitated Vacuum Pan Dryer Type Condry® TDC 3500 exhibited at Achema 2006**

Foto: Dechema / Helmut Stettin

[http://www.achema.de/Teil\\_3.html](http://www.achema.de/Teil_3.html)