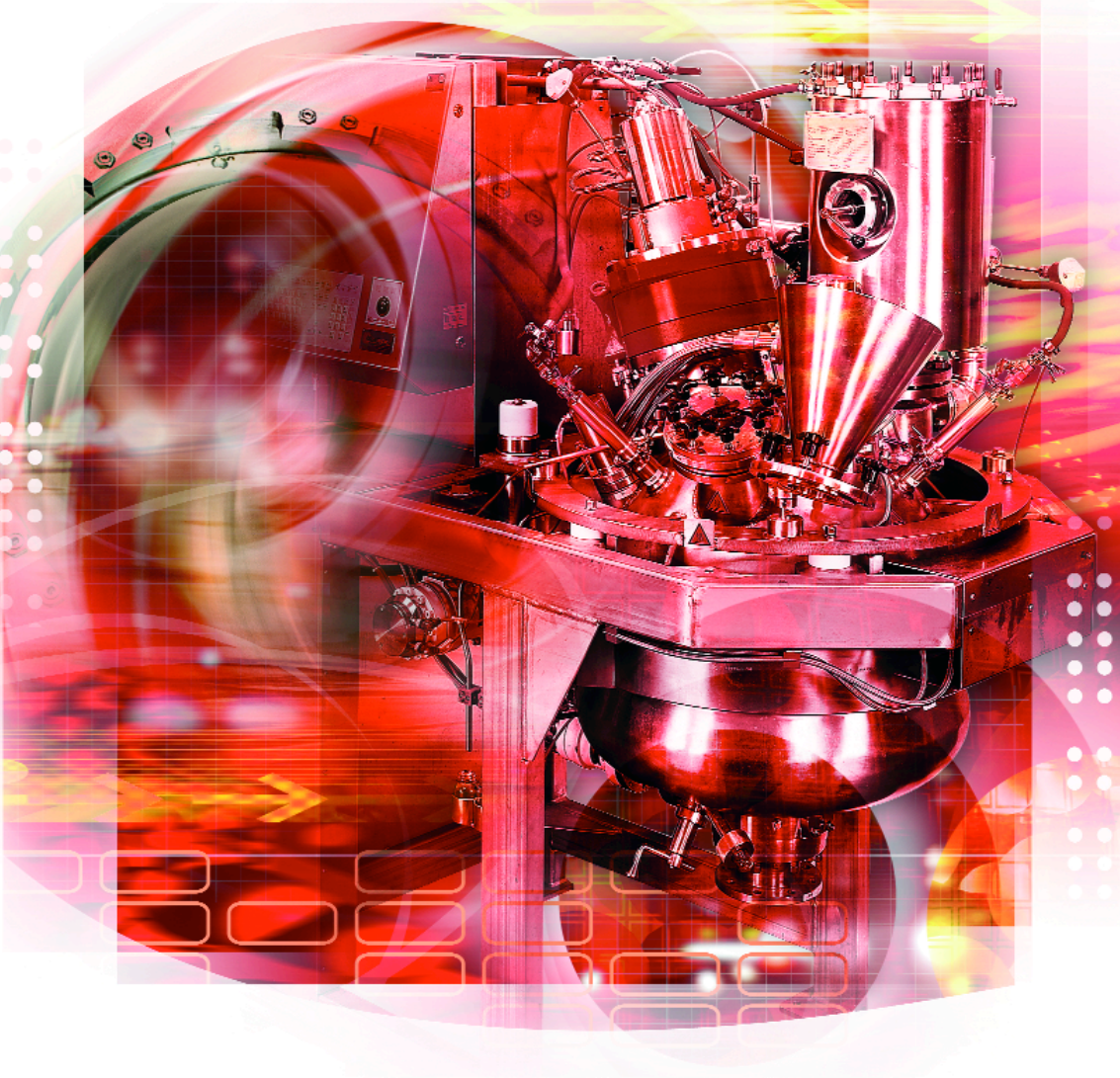


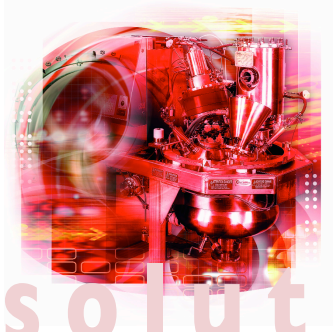
A S O L U T I O N A H E A D



drying technology S P H E R I C A L D R Y E R S

De Dietrich
PROCESS SYSTEMS



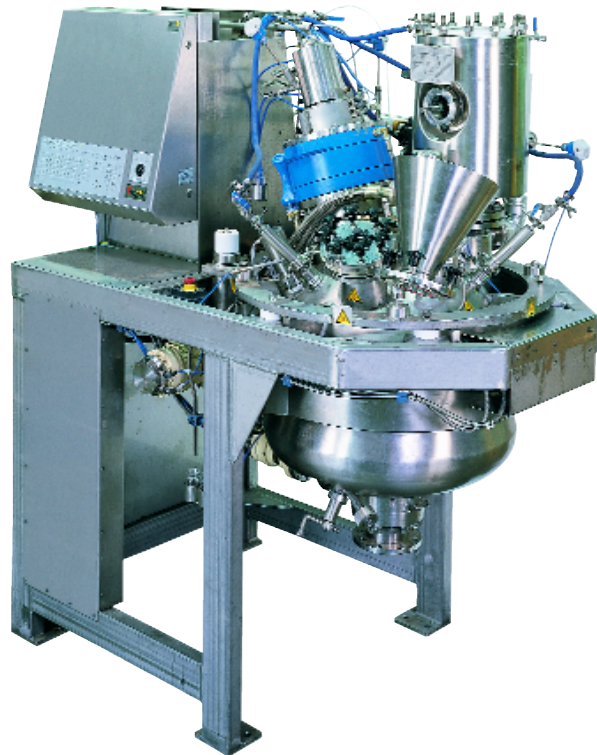


solutions for drying,

SPHERICAL DRYER ADVANTAGES

- Highly efficient
(Short drying times)
- Total product
discharge
- Easy inspection
- Fast and easy cleaning
(CIP/WIP)
- Can perform drying,
mixing and granulating
- Minimal fill
volume (15%)
- Minimize dust
explosion hazard
- Vertical chopper
(Lump breaker)
- Reproducible
drying results

*Photo Above: 100 L Top
Driven Spherical Dryer*



Configuration The Spherical Dryer can be provided in two unique configurations to meet your process needs. For dedicated bulk production, the bottom driven unit is recommended and is available up to a capacity of 6000 Liters. The design is to be used when frequent vessel inspections are not required. For installations requiring multiple products or frequent product changes, the top driven unit is recommended. This unit provides unequaled flexibility for vessel inspection and cleaning validation, and is available up to a capacity of 2000 Liters.

Total Discharge A critical issue in pharmaceutical and fine chemical production is low product yield. The primary factor contributing to low product yield is the inability to recover the product "heel" after normal discharge operations from traditional agitated contact dryers. The innovative vessel design of the Rosenmund Spherical Dryer eliminates product heel, therefore maximizing product yield. The specially shaped spherical vessel and the contoured discharge valve at the vessel's lowest point, promote total discharge and minimum product holdup during drying operations. When working with high value products, every gram counts!

mixing and granulating

THE INNOVATIVE AND PROVEN DESIGN OF THE TOP OR BOTTOM DRIVEN SPHERICAL DRYERS ACHIEVES THE HIGHEST PERFORMANCE STANDARDS. A VERSATILE SOLUTION FOR DRYING, MIXING AND GRANULATING.

MECHANICAL FEATURES

- Units up to 6000 Liters
- ASME code rated vessels
- Rated up to 150 psig/FV
- Fabricated in 316L and C-22 (Special alloys on request)
- Top or bottom entry drives
- Dry or wet running seals
- Metal-to-metal sealing discharge valve
- Dust filter
- Fully jacketed vessel
- Heated agitator
- Machined vessel internals (Close agitator-to-sidewall tolerance)
- Full CIP/WIP options
- Various mounting configurations

High Efficiency with Aggressive Agitation

For increased efficiency during drying, effective mixing is critical. The combination of the Spherical Dryer's close agitator-to-sidewall tolerances, the specially shaped agitator, and the vessel geometry provide an unequaled environment for product mixing and rapid drying. Effective mixing promotes homogeneous heat input and reduces the probability of product agglomeration, thereby speeding up the drying process.

In addition to the specially shaped agitator, a high speed chopper can be introduced to further increase mixing. The chopper reduces product agglomeration during drying. It is fully effective even with a minimum fill volume, and it enables the Spherical Dryer to achieve consistent drying results regardless of the fill volume.

Cleanability is Key When doing product changeover, time is money. Minimizing equipment down time during cleaning is a must. The Spherical Dryer performs CIP/WIP operations using spray balls or special ARD (Automatic Retracting Device) nozzles for efficient supply of cleaning fluid to internal surfaces of the

dryer. The spherical geometry and the low point drain allow cleaning fluid and dissolved product residue to be removed quickly and efficiently from the vessel. The product discharge valve has a contoured ball that is specifically designed to reduce product holdup and to enhance the cleanability of the unit.

Inspection made Easy Some production operations require vessel inspection after cleaning. The top-driven Spherical Dryer allows for quick and trouble free inspection. The unit incorporates a main body flange with an optional hydraulic quick-opening bayonet. During the inspection phase, the automated bayonet and hinge assembly allow for the vessel to be opened, accessed, and closed within a matter of seconds. When compared to the time required to remove manual c-clamps or bolts, the Spherical Dryer's quick access minimizes equipment down time.

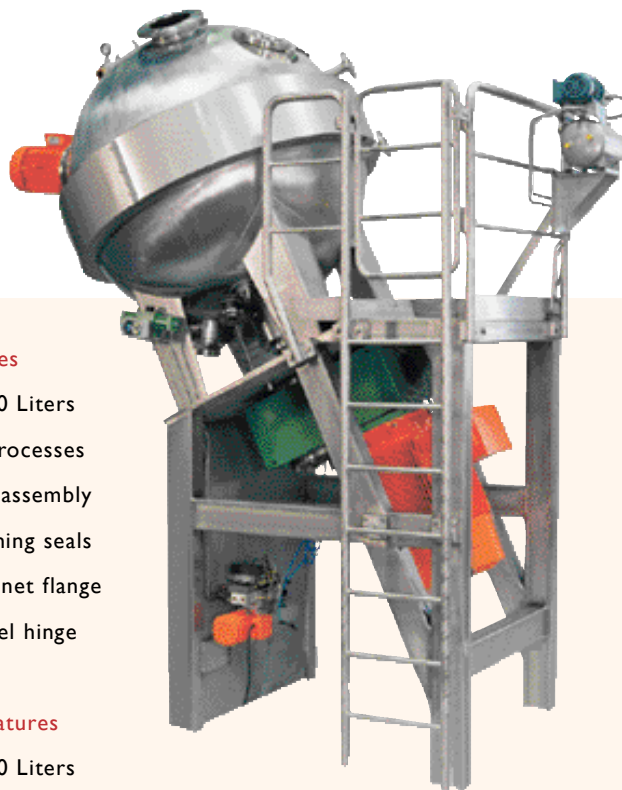
Dust Explosion Hazard Minimized

Agitated contact dryers generally operate under vacuum conditions. Based on this criterion, dryers are usually designed for vacuum service only. With low vessel pressure ratings, a vessel rupture due to

Photo Left: Full vessel access with top driven design.

Photo Right: 1,000 L Top Driven Spherical Dryer installation





Top Driven Features

- Units up to 2000 Liters
- Multi-purpose processes
- Top entry drive assembly
- Dry or wet running seals
- Automated bayonet flange
- Automated vessel hinge

Bottom Driven Features

- Units up to 6000 Liters
- Dedicated processes
- Bottom entry drive assembly
- Wet running seals only
- Higher torque capabilities

Photo Above: 1,000 L Bottom Driven Spherical Dryer

Photo Left: Specially shaped three arm agitator for Bottom Driven Design.

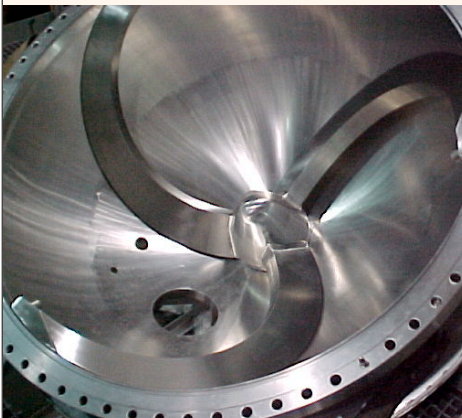
Photo Right: Specially shaped three arm agitator for Top Driven Design.

thermal decomposition of the product or dust explosion becomes a major concern. The Spherical Dryer minimizes the possibility of vessel rupture during a dust explosion with its simple spherical vessel. This vessel geometry maximizes volume while minimizing surface area. Therefore, the vessel can be easily fabricated to meet rigorous pressure retaining requirements. The standard spherical dryer is rated for 90 psig and full vacuum.

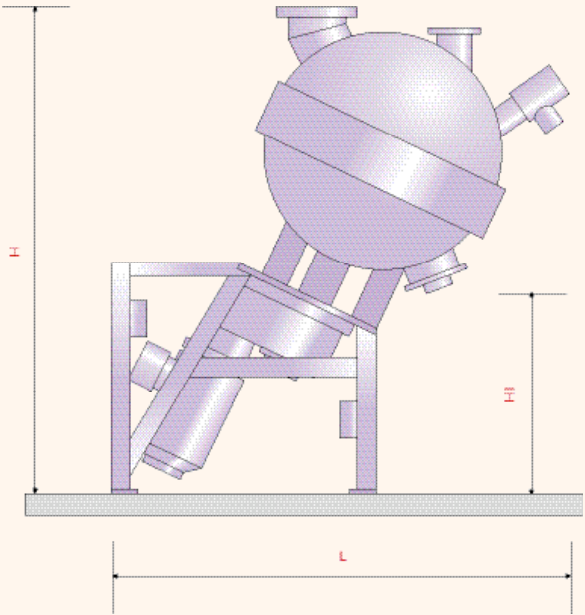
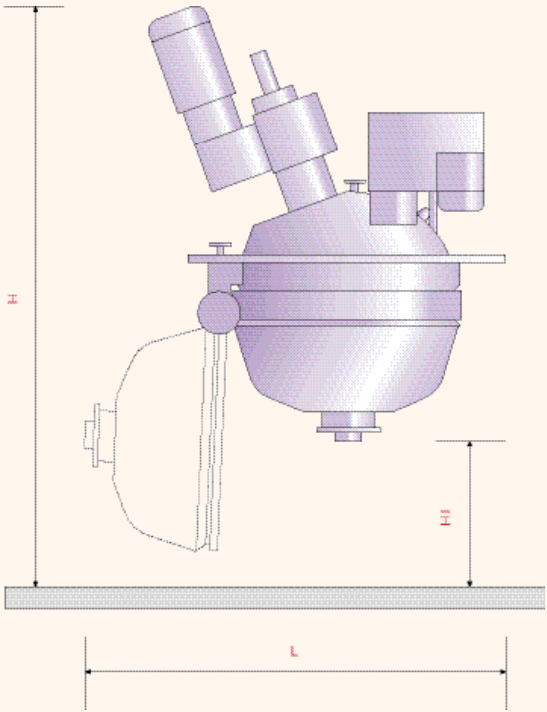
Containment Product containment and isolation are critical in the pharmaceutical industry. DDPS offers a full range of

solutions with the Spherical Dryer for contained charging, discharging, sampling, and product transfer. The solutions are designed to minimize the risk of operator exposure and product contamination.

Peripheral Equipment The most efficient dryer is only successful if the peripheral equipment supporting the unit functions adequately. In addition to the Spherical Dryer, we can supply custom designed heat transfer modules, vacuum systems, and integrated controls systems to complete the dryer installation and insure peak performance of the dryer.



THE ROSENMUND SPHERICAL DRYER IS ONE OF THE MOST INNOVATIVE BATCH DRYERS ON THE MARKET. IT IS A HIGHLY ENGINEERED AND PRECISION FABRICATED VACUUM DRYER DESIGNED TO UTILIZE HEAT INPUT, EFFECTIVE MIXING AND VACUUM FOR PRODUCT DRYING. IT CAN BE USED FOR DEDICATED OR MULTI-PURPOSE APPLICATIONS AND IT PROVIDES THE BEST IN PRODUCT QUALITY, TOTAL DISCHARGE, cGMP PRODUCTION, CLEANABILITY AND LIMITED OPERATOR EXPOSURE.



Nominal volume (L)	Total volume (L)	Drive power (Hp)	Empty weight approx. (Kg)	Vessel Diameter (mm)	H (mm)	L (mm)	HI (mm)	Nominal volume (L)	Total volume (L)	Drive power (Hp)	Empty weight approx. (Kg)	Vessel Diameter (mm)	H (mm)	L (mm)	HI (mm)
TOP DRIVE								BOTTOM DRIVE							
25	25	7.5	500	400	2500	1200	900	50	58	10	800	495	2000	1285	300
50	47	15	1200	495	2600	1350	900	100	155	15	1300	695	2455	1700	895
100	131	20	1500	695	2700	1500	900	200	230	25	1600	805	3050	1860	1115
200	204	30	1800	805	2800	1650	900	300	320	30	1800	898	3150	2020	1225
300	283	30	1800	898	2900	1950	900	400	457	50	2800	1030	3610	2115	1390
400	427	40	3000	1030	3450	2000	900	600	722	60	3500	1200	3890	2222	1425
600	675	50	4000	1200	3850	2225	1050	1000	1079	75	4400	1372	4165	2330	1460
1000	1009	60	6000	1372	4900	2700	1400	2000	1929	100	7500	1665	4595	2790	1535
2000	1804	75	8500	1665	5900	3250	1700	4000	3733	125	9500	2075	5640	3230	1900
								6000	5598	150	12500	2375	6435	3760	2265



UNITED STATES

908 686 4900
704 587 0440

FRANCE

33 3 88 53 23 00

SWITZERLAND

41 61 925 11 11

GERMANY

49 61 31 97 04 0

GREAT BRITAIN

44 1785 609 900

IRELAND

353 61 366925

SOUTH AFRICA

27 11 918 4131

BELGIUM

32 16 40 5000

NETHERLANDS

31 765 42 15 44

SPAIN

34 93 29 20 520

SINGAPORE

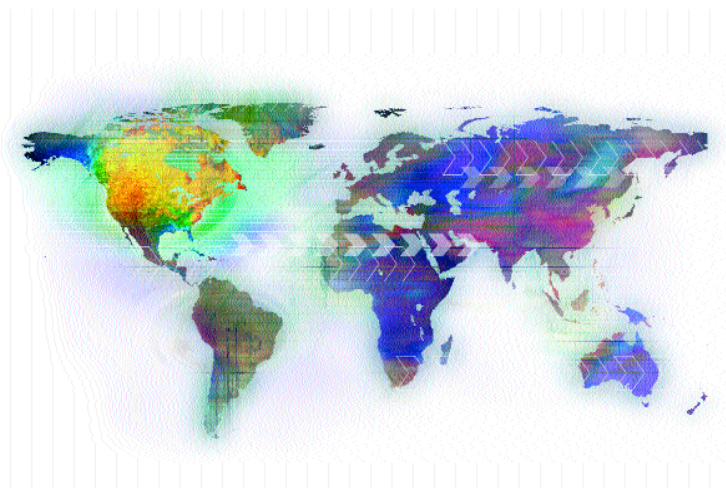
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CHINA

86 21 5351 1817

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55 11 6703 7380



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