

# ROTO CUBE

HIGH SHEAR GRANULATOR AND SINGLE-POT PROCESSOR

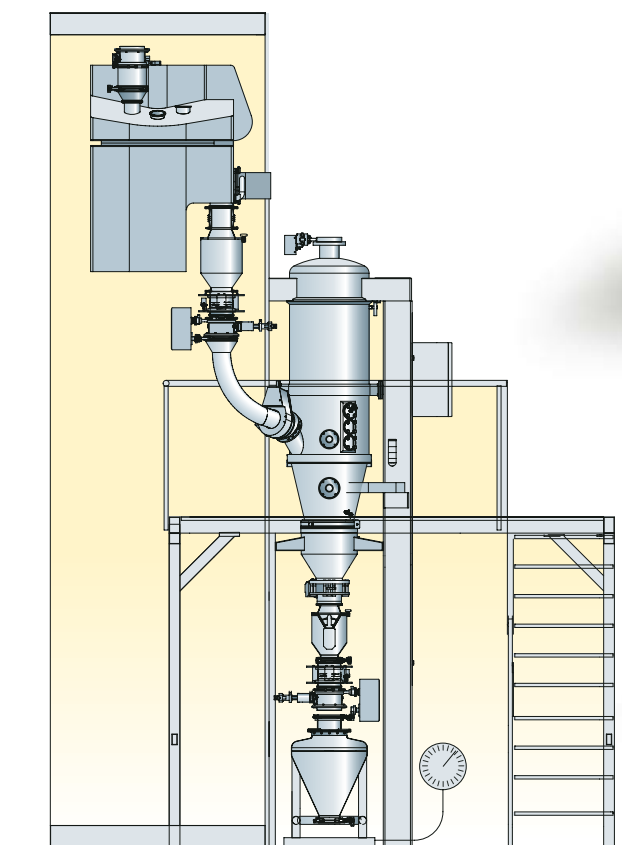


# ROTO CUBE

Developed in 1984, as a contained solution for the processing of highly active pharmaceutical products, Zanchetta Roto technology became the benchmark for high shear granulation.

Roto Cube allows the entire process of any type of product, from the loading of raw materials to the discharge of dry granules, to be carried out in a single, contained bowl, thus eliminating contact between product, operator and the environment.

Roto Cube in HSMG (High Shear Mixer Granulator) configuration can be easily integrated with the Ghibli fluid bed dryer.



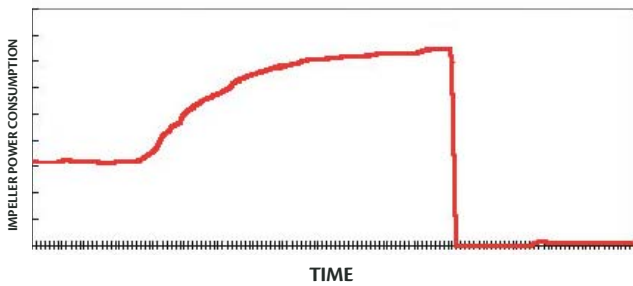
Roto Cube high shear mixer granulator connected to Ghibli fluid bed dryer

- DUST FREE PRODUCTION
- MAXIMIZED PRODUCT YIELDS
- REDUCED RISK OF CROSS CONTAMINATION
- REDUCED MANPOWER, SPACE AND ENERGY REQUIREMENTS
- RELIABLE MONITORING OF DRYING
- ACCURATE DETECTION OF THE GRANULATION END-POINT

	Mixer Granulator + Tray Oven	Static One-Step	One-Step Microwave Dryer	Tilting Roto
H <sub>2</sub> O Based	✓	✓	✓	✓
Alcohol Based	✓	✓	✓	✓
O <sub>2</sub> Sensitive	✓	✓	✓	✓
Heat Sensitive	✓	✓		✓
Moisture Sensitives	✓	✓	✓	✓
Melt Granulated		✓	✓	✓
One-Step Pelletised				✓
One-Step Effervescent	✓	✓		✓
Mech. Stress Sensitive	✓			✓



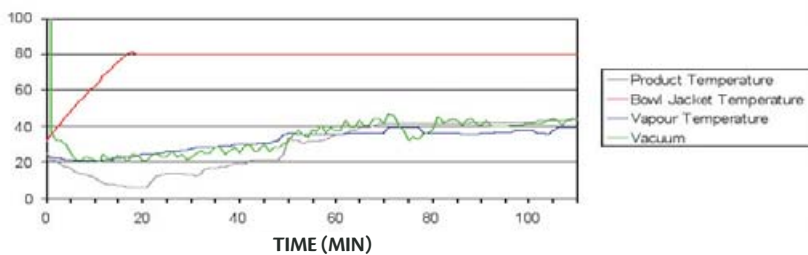
## THE BENCHMARK FOR HIGH SHEAR GRANULATION



Monitoring and detection of granulation end-point by means of oil pressure of the hydraulic drive

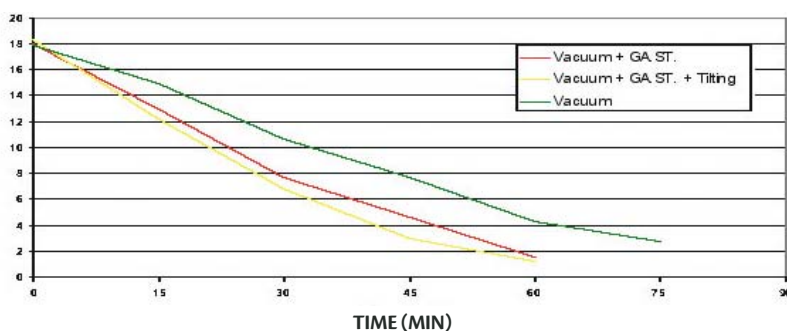
The control of granulation end-point is carried out by the continuous monitoring of the oil pressure in the impeller hydraulic motor. The accuracy of this system is much higher compared to the conventional way of checking the absorbed power in the electrical motor, as the oil pressure variation range is wider than that of absorbed electric power.

Drying parameters



Typical diagrams: vacuum, product jacket, vapour temperature

With the data acquisition option or with the SCADA system it is possible to print out critical parameter information.



Advantages of drying time with GA.ST. and tilting

Tilting the bowl during the drying phase offers two major advantages. The first is significantly shorter drying times due to the increased surface available for heat exchange; the second is the gentle drying action which allows a unique degree of flexibility, processing stress sensitive products and pelletising in one step. For a given drying time, tilting gives the best granule quality. For a given granule quality, tilting gives the shortest drying time.



# ROTO CUBE



## MACHINE DESIGN

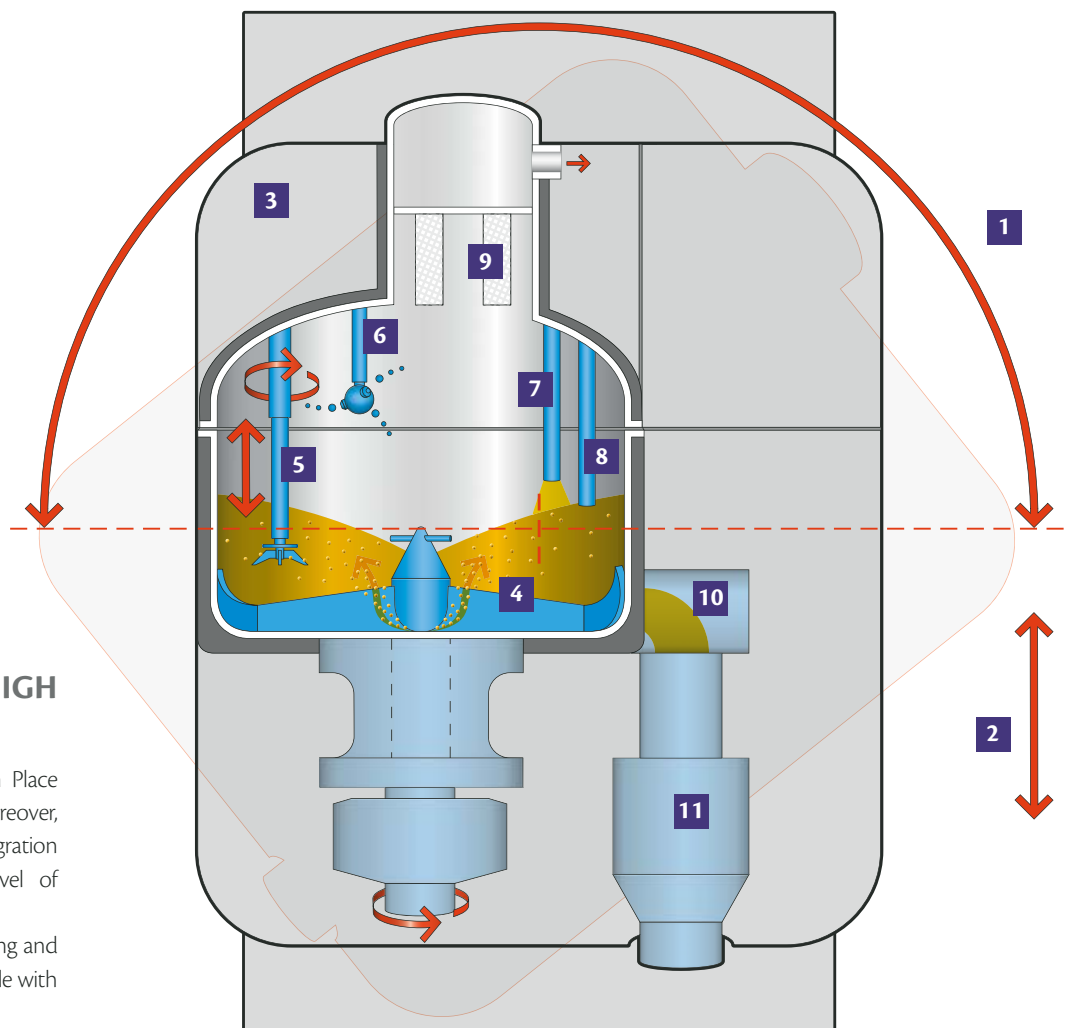
THE ROTO CUBE IS AN ALL IN ONE GRANULATION SOLUTION, WITH ALL PERIPHERAL FUNCTIONS AND CONNECTIONS BUILT INTO THE SAME HOUSING:

- LOADING PORT
- SIGHT-GLASS
- PROCESSING BOWL
- FILTERS
- PRODUCT TEMPERATURE PROBE
- DISCHARGE VALVE
- MILL (OPTION)
- HEAVY DUTY COMPONENTS

HAVING MAIN FRAME INSTALLED THROUGH THE WALL, ONLY THE CUBE IS LOCATED IN THE PROCESSING AREA, MINIMIZING THE FLOOR SPACE REQUIRED. LATERAL OPENING OF THE LID ELIMINATES ANY CLEARANCE REQUIREMENT BEHIND THE CUBE.

## ALL IN ONE CUBE

1. TILTING BOWL FOR THE GENTLE MOVEMENT OF THE GRANULES AND TO SHORTEN THE DRYING TIME.
2. LIFTING BOWL TO ADJUST THE HEIGHT OF THE DISCHARGE AND FOR MAXIMUM ACCESSIBILITY DURING MAINTENANCE AND CLEANING WITHOUT THE NEED OF WORKING PLATFORMS.
3. 90° LID OPENING FOR EASY ACCESS TO THE BOWL.
4. G.A.S.T. SYSTEM TO REDUCE DRYING TIME BY UP TO 50%.
5. TELESCOPIC CHOPPER FOR MAXIMUM BATCH SIZE FLEXIBILITY.
6. CLEAN IN PLACE SYSTEM FOR ACCURATE CLEANING
7. BINDER SOLUTION SPRAYING FOR HOMOGENEOUS LIQUID DISTRIBUTION.
8. LOADING OF RAW MATERIAL BY MEANS OF VACUUM OR GRAVITY.
9. FILTERS ARE PROVIDED TO MAXIMIZE THE FINAL PRODUCT YIELD.
10. LATERAL WALL UNLOADING VALVE FOR MATERIAL DISCHARGE.
11. MILLING SYSTEM FOR IN-LINE CALIBRATION DURING THE DISCHARGING PHASE.



## CLEAN IN PLACE AND HIGH CONTAINMENT

Roto Cube is fitted with a Clean In Place system that is very easy to validate. Moreover, the machine is designed for simple integration into plants where a maximum level of containment is required. Raw material loading, granule unloading and sizing in full containment is also possible with the use of the TwinValve.

# ROTO CUBE



## TILTING, GA.ST. AND MICROWAVE ASSISTED DRYING

The machine tilting system during the drying phase guarantees a final particle size distribution and offers a lot of advantages. With the main impeller off during tilting in the drying phase the granules are gently moved, preventing stress of sensitive products, while the drying time is shortened due to the increased surface area available for heat exchange. Additionally this feature improves accessibility to all parts of the machine and enhances Clean In Place without operator intervention.

In order to further accelerate the product drying time, the G.A.S.T. system was introduced in 1989. This system injects inert gas through the product mass to enhance evaporation and allows a safe and efficient vacuum drying, reducing drying time up to 50%.

In addition to the already existing advantages of tilting and G.A.S.T. a microwave assisted drying is now available.



## BOWL LIFTING SYSTEM

The Roto Cube features a lifting system to optimize its height to the task. During process, maintenance and inspection the machine can be lowered for easy access to the sight glass, to the strategically located panels and to the bowl, without the need of working platforms. When the product is ready for discharge the machine can be positioned for correct alignment of the unloading valve to the IBC or the fluid bed dryer, thus improving installation layout.



# ROTO CUBE LAB



Roto Cube Lab 30



Roto Cube Lab 12 with optional isolator

Four Roto Cube Lab models are available for small batch production and R&D applications: 3, 6, 12 and 30 litre capacity. The equipment has the same characteristics as the production models to ensure good scale-up. Lab models are provided with wheels for portable operations.

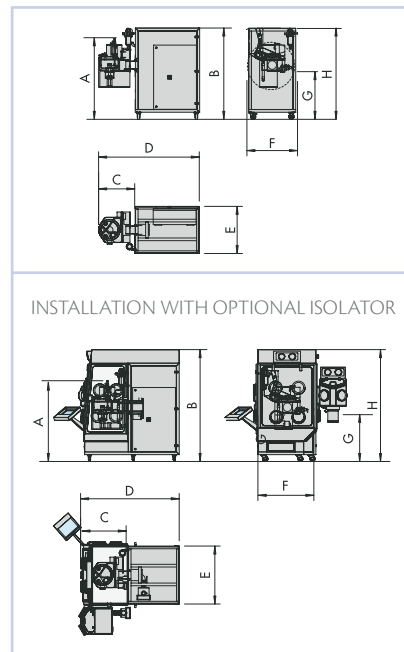
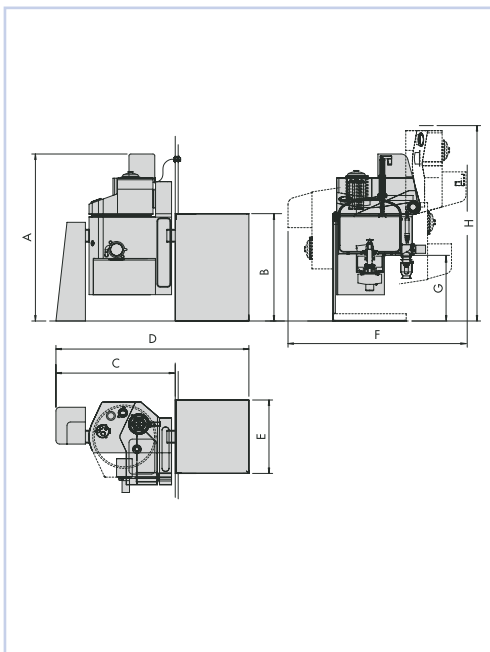
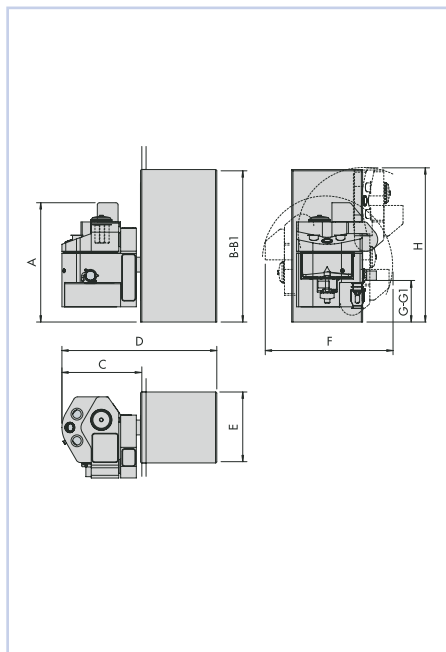
# ROTO CUBE TECHNICAL DATA

ROTO CUBE 60 - 1500

ROTO CUBE 2000 - 3000

ROTO CUBE LAB

SIMPLE INSTALLATION



	ROTO CUBE LAB				ROTO CUBE								
Model	3	6	12	30	60	120	300	600	900	1,200	1,500	2,000	3,000
Bowl capacity (l)	3	6	12	30	60	120	300	600	900	1,200	1,500	2,000	3,000
Product quantity (l)	1-2	2-4	4-8	10-20	20-40	40-80	100-200	200-400	300-600	400-800	500-1,000	650-1,350	1,000-2,000
Bowl diameter (mm)	200	250	320	440	550	690	930	1,170	1,340	1,470	1,570	1,740	1,990
Bowl height (mm)	100	125	160	220	275	345	465	585	670	735	785	870	995
A - Chopper height - lifting bowl (mm)	-	-	-	-	-	3,400	3,870	4,450	-	-	-	-	-
B - Basement height (mm)	600	2,050		2,100			2,750		3,330				
B1 - Basement height with lifting bowl (mm)	-	-	-	-	-	3,300	3,600	-	-	-	-	-	-
C - Processing area (mm)	350	580	690	805	1,180	1,325	1,450	1,860	2,150	2,220	2,360	3,700	4,000
D - Machine depth (mm)	1,100	2,080	2,170	2,290	2,880	3,005	3,150	3,650	4,150	4,220	4,360	5,650	5,950
E - Basement width (mm)	400	880		1,450		1,700	1,900			2,250			
F - Tilting width (mm)	720	750	1,080	1,300	1,650	2,110	2,650	2,800	3,350	3,400	3,500	4,400	5,400
G - Discharge valve height (mm)	-	900	880	820	1,200			1,050	1,200	1,350		1,500	
G1 - Discharge valve height - lifting bowl (mm)	-	-	-	-	-	950-2,200		950-2,450	-	-	-	-	-
H - Machine height with opened lid (mm)	850	1,570	1,730	2,000	2,660	2,990	3,370	3,785	4,570	4,650	4,790	5,100	6,000
Impeller speed (rpm)	20-955	20-764	20-597	20-434	20-347	10-277	10-205	10-163	10-142	10-130	10-122	5-110	5-96
Chopper speed (rpm)	700-1,500												
Installed power (kW)	3	4	8	11	19	22	37	55	75	90	110	132	160
Machine weight (kg)	125	180	800	900	2,200	2,700	4,700	5,400	6,500	7,300	9,800	10,900	11,600
Machine weight - lifting system (kg)	-	-	-	-	-	3,300	5,500	6,200	-	-	-	-	-

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