

**T&B**  
**FABRICATION, LLC.**



***THE ROTOCLAVE®***

22212 Prats Dairy Rd. ♦ Abita Springs, Louisiana 70420 ♦ 985-259-7212

# What is a Rotoclave®?

- ▶ The Rotoclave® system is a unique “rotating autoclave” system that utilizes a steam pressure vessel with a rotating internal drum to not merely decontaminate, or disinfect, but to “Fully Sterilize All waste materials”.
- ▶ The Rotoclave® is designed to accept a great diversity of waste materials, in open or unopened containers, and subject them to agitation, heat, and moisture.
- ▶ Pressurized steam is delivered to all the waste materials inside the vessel via the steam piping and automatic valve control system. Waste containers inside the vessel become soft, and during agitation, rupture and spill all their contents inside the rotating drum.
- ▶ This unique combination of steam and agitation ensures that all waste materials are “Completely Sterilized”.
- ▶ The combination of high temperature, pressure and moisture, in conjunction with the unique method of agitation, ensures all materials will contact the necessary sterilizing steam.
- ▶ Standard autoclaves cannot guarantee that the steam will interact with the entire waste stream. Thus, even after stationary autoclaving, some waste is still potentially infectious.
- ▶ The TBF Rotoclave® System can be custom designed to accommodate a wide range of treatment needs: Medical Waste, Municipal Solid Waste, International Port Waste, Separation and Recycling, Waste to Energy projects, and many more.
- ▶ We specialize in giving the customer what they want, at a price they can afford. Also, with low operations costs, while causing no harm to the environment, the Rotoclave® is the perfect system to meet all your processing needs!



Comparison Criteria	Rotoclave	Stationary Autoclave	Microwave Disinfection	Chemical Disinfection
• Microbial inactivation	Sterilize	Disinfect	Disinfect	Disinfect
• Unrecognizable end-product	Yes	Available	Yes	Yes
• Treatment before or after shredding/grinding	Before	Before	After	After
• Turbulence during treatment	Yes	No	Yes	Yes
• Ability to observe waste before shredding (i.e., remove objects that negatively impact shredding / grinding equipment)	Yes	No	No	No
• Approved to comingle treated waste with other waste in most states.	Yes	Yes	Yes	No
• Pressure Vessel	Yes	Yes	No	No
• Pre-vacuum	Yes	Available	No	No
• Post-vacuum	Yes	Available	No	No
• Includes closed circuit cooling equipment components to condense water vapors in the air vacuumed from the system.	Yes	No	No	No
• Control of potential pathogens in systems air discharge.	Steam Ejector	Steam Ejector Available	HEPA	HEPA
• Carbon Filter (for odor reduction)	Yes	Available	Yes	Available
• Incorporate combustion in process.	No	No	No	No
• Chemicals added to waste.	No	No	No	Yes
• Requires use of autoclave bags.	No	Yes	No	No
• Utilizes onsite physical plant steam.	Yes	Yes	No	No
• Level of microbial inactivation.	IV (Highest)	III	III	III

**We think you'll agree that the choice is clear.....The Rotoclave is the safest and most reliable System on the market today!**



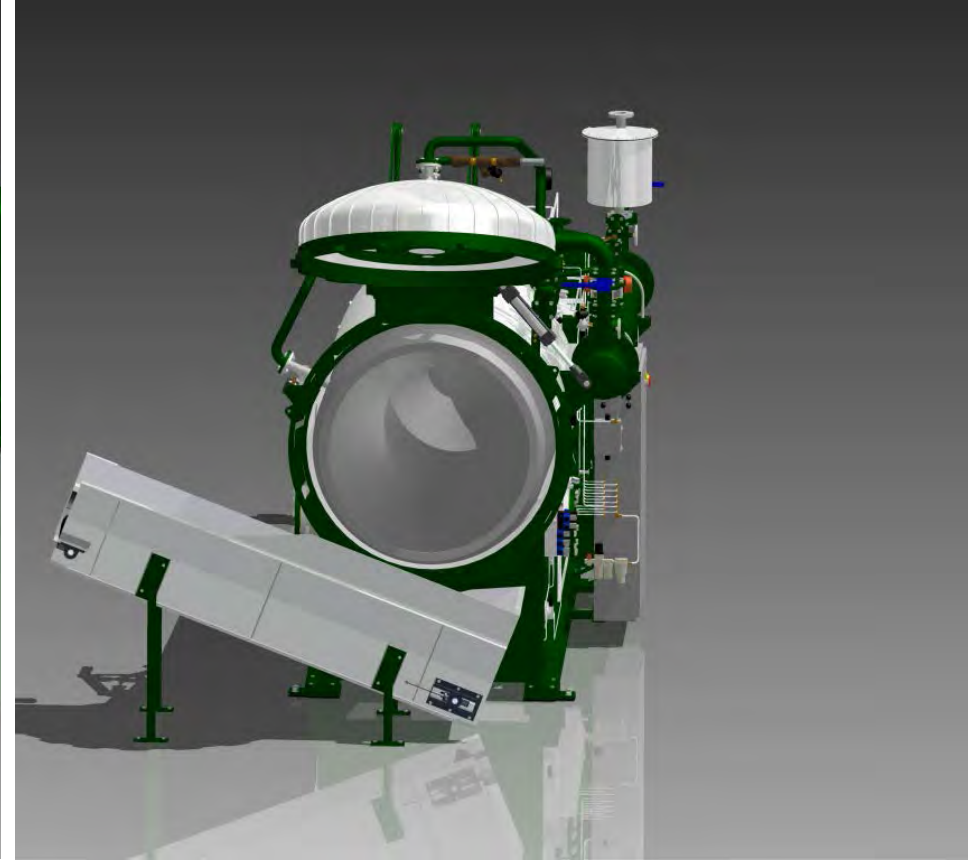
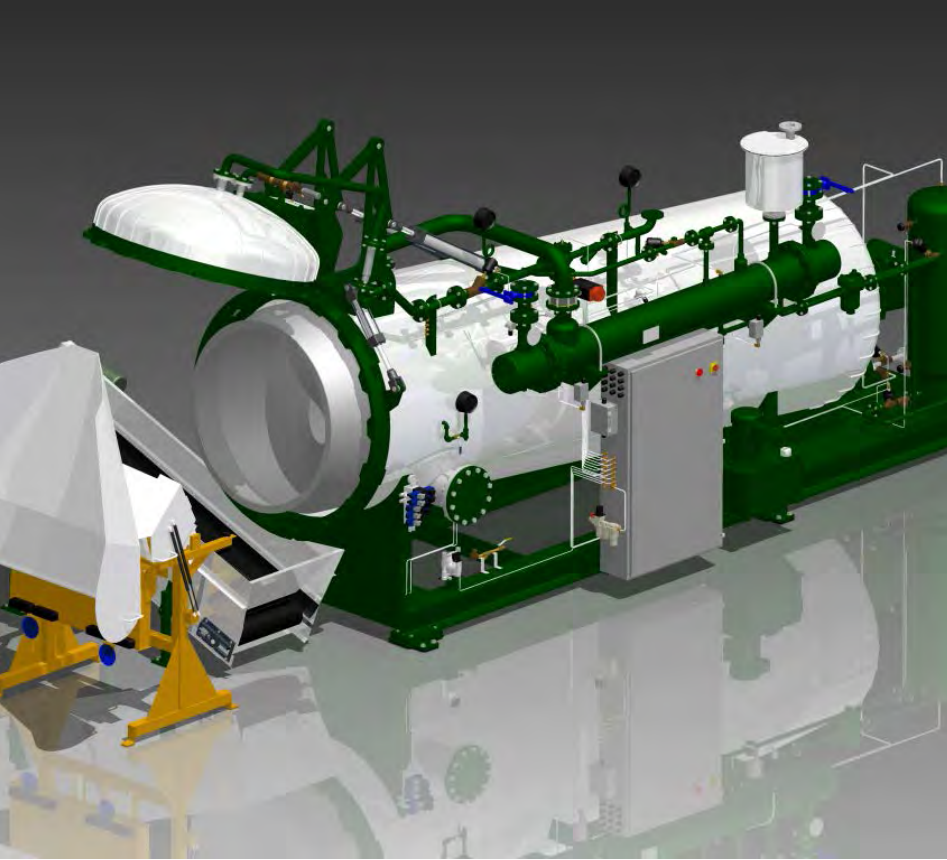
From 27 cubic feet, up to 3200 cubic feet, we can meet all size requirements.



## Rotoclave Volume Capacity Comparison

Vessel Size	Model Number	Cycle Times in Min.	IMPERIAL SYSTEM						METRIC SYSTEM				
			Drum Volumes in Cubic Feet		Cycle Capacity at various Densities in Lbs/ cu. ft.			Drum Volumes in Cubic Meters		Cycle Capacity at various Densities in Kgs/ m <sup>3</sup>			
			100%	75%	3.5	6	12.5	100%	75%	70	100	226	
3x4.5	0.1KC	50	27.8	20.8	73	125	260	0.8	0.6	41	59	133	
4x10	0.5KC	60	116	87.3	306	524	1,092	3.3	2.5	173	247	559	
5x13.5	1KC	60	247	185.5	649	1,113	2,319	7.0	5.3	368	525	1,187	
6x15	1.8KC	60	398	298.5	1,045	1,791	3,731	11.3	8.5	592	845	1,910	
7x17.5	3KC	90	642	481.3	1,685	2,888	6,017	18.17	13.6	954	1,363	3,080	
8x20	4KC	90	959	719.1	2,517	4,314	8,988	27.1	20.4	1,425	2,036	4,602	
9x22.5	6KC	90	1372	1029.3	3,602	6,176	12,866	38.9	29.1	2,040	2,915	6,587	
9x45	11K	90	2591	1943.4	6,802	11,660	24,293	73.4	55.0	3,852	5,503	12,437	
10x25	8.5KC	95	1891	1417.9	4,963	8,508	17,724	53.5	40.2	2,811	4,015	9,074	
11.2x28	12KC	95	2651	1988.1	6,959	11,929	24,852	75.1	56.3	3,941	5,630	12,723	
12x30	15KC	110	3288	2465.8	8,630	14,795	30,822	93.1	69.8	4,888	6,982	15,780	

These are only a few of the sizes we offer.



Typical Rotoclave® setup with Side Mounted Piping  
and Controls  
(Skid Mounted Piping and Controls Also Available)

# All Controls Systems meet or exceed UL and CE requirements



- ▶ We only use top quality components that are available Worldwide. This allows our customers to purchase most spare and replacement parts locally.

- ▶ Sterilization in an autoclave depends upon steam coming in direct contact with the contaminated material or raising the temperature of a liquid or semi-liquid mass to at least 250 ° F. Dry heat requires a much higher temperature and longer incubation time to affect sterilization, hence thermal conduction of heat to a solid object without steam contact does not readily lead to sterilization. Sterilization is also time-dependent; usually 15-20 minutes at 250° F suffices.
- ▶ Since steam sterilization requires that the steam directly contact the contaminated material, it is crucial that all the air in the vessel be replaced by steam, and that the containers within the vessel be open to the steam. Air pockets result in "cold spots", which is to say, in steam that is at a lower temperature than expected for the pressure attained. Two research reports suggest that the contents of sealed polypropylene bags, i.e. Red Bags, do not reach 250 ° F during a 50 min cycle. Thus, in a stationary autoclave, Red Bag contents most likely are not rendered sterile. Stationary autoclaves also suffer from air pockets ("cold spots") that are a function of the geometry of the introduced load.
- ▶ The "cold spots" result from the vessel's contents interfering with the evacuation of air and efficient circulation of the introduced steam, resulting in pockets of trapped air. Objects within these "cold spots" often are not sterilized. Furthermore, the volume of a liquid or semi-solid mass greatly influences the time required to raise the mass to a temperature required for sterilization. Thus, in addition to the problem of inadequate steam penetration, the mass within a Red Bag may preclude sterilization of its contents within a standard operating time.
- ▶ The Rotoclave® solves these problems by physically disrupting the integrity of sealed containers. That is, Red Bags are ruptured, and their contents uniformly distributed throughout the Rotoclave® vessel. The vanes in the processor have been designed so that the vessel's rotation forces a near random mixing of all the material in the vessel. Should there be "cold spots", the constant rotation and displacement of materials will ensure that the entire contents will reach the desired temperature for a time sufficient to guarantee sterilization. Thus, neither load geometry nor volume affect the ability of a Rotoclave® to achieve sterilization.
- ▶ To achieve a result with a stationary autoclave similar to that of the Rotoclave®, the Red Bags would, at the least, have to be opened before treatment. This procedure would place the operator at risk due to aerosolization of the Red Bag contents. Additionally, opening of Red Bags would introduce potential pathogens into the hospital environment, both directly into the atmosphere and indirectly via the operator's clothing. In any case, given the volume within most Red Bags, it is not clear that simply opening them would guarantee sterilization of their contents due to the mass of the material involved. The final product of an autoclave, therefore, is likely to contain pathogens. This places the downstream handlers at risk, including truckers and landfill operators. Furthermore, since the wastes most likely will spend some time in a dumpster before hauling, it is likely that contaminated leachate will escape the dumpster and re enter the hospital via foot traffic and aerosolization. The risk of release of pathogens from non-sterile Red Bag contents is exacerbated if the contents are shredded before disposal.
- ▶ Results from placing spore vials in an autoclave outside of Red Bags will overestimate the apparent ability of the autoclave to sterilize the Red Bag contents since, as discussed, Red Bags trap air producing a "cold spot". The opening of Red Bags to place spore samples inside is an undesirable operation for reasons of operator safety. However, not to do so will lead to the dangerous conclusion that autoclaving results in the uniform sterilization of medical waste, when this is not the case.

# The Big Difference Between the Rotoclave® and an Autoclave



# Benefits of the Rotoclave® System

- ▶ Improvement on Universally accepted Autoclave Principles
- ▶ Safe, Easy, and Automated Operation
- ▶ Unique rotating internal Drum exposes All Waste to Direct Sterilizing Steam Contact
- ▶ Complete Sterilization of Waste (No Cold Spots)
- ▶ 8 Log (10) or Greater "Kill Rate"
- ▶ Extremely Low Operating Cost - Approximately \$0.025 per pound
- ▶ Steam-Jet Vacuum & Condensate System Eliminates Venting of Steam to Atmosphere
- ▶ Friendly to the environment
- ▶ No foul odors or harmful emissions
- ▶ Sterile and harmless end-product
- ▶ Acceptable at landfills



The Rotoclave® can be used for numerous types of waste, including:

- ▶ RMW
- ▶ MSW
- ▶ Lab Waste
- ▶ Port Waste
- ▶ Recycling
- ▶ Mixing





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