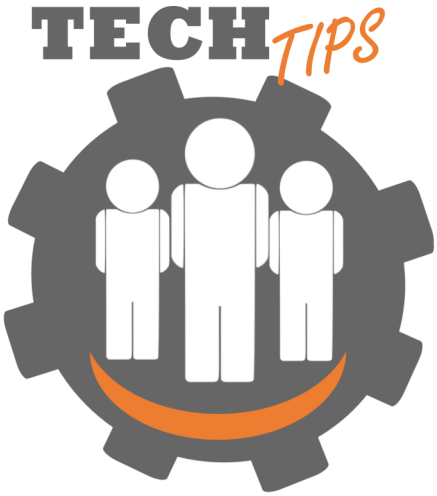
Autoclaving



Under certain operating conditions, autoclaves can often be the cause of shell cracking problems. R&R recommends adhering to the following autoclave operating procedures to prevent or minimize shell cracking in your foundry:

1. Preheat the autoclave by running it through a complete operating cycle before dewaxing any shells.

2. After the preheat cycle, check the time it takes for the autoclave to get up to dry steam pressure. It should typically take no more than 10 seconds to reach 80 psi (5.5 bars) from the time the valve is quickly opened.

3. It is recommended that the autoclave be operated to at least 100 psi. The temperature inside the autoclave will be about 340°F (171°C). Comparing the pressure and temperature readings will let you know that both are functioning properly.

Pressure (psi)	Temperature
60	308°F (153°C)
70	316°F (158°C)
80	324°F (162°C)
90	332°F (167°C)
100	340°F (171°C)
110	345°F (174°C)
120	350°F (177°C)

4. Release pressure gradually after the cycle has been completed. A minimum of 2 minutes should be taken to let pressure down to 20 psi. At 20 psi, the pressure can be released immediately.

5. Check for dry steam — the autoclave should only accumulate a certain amount of water during a complete cycle. If more water than allowed is being accumulated, the steam source (boiler or accumulator) is too close to the autoclave. This excess water will be deposited on the shells which will prevent the steam from reaching them properly and cause the wax to heat too slowly. The wax will then expand, causing a higher incidence of shell cracking. Refer to the Pounds of Steam vs. Autoclave Pressure graph and Standard Autoclave Sizes and Steam Capacities table on page 2.

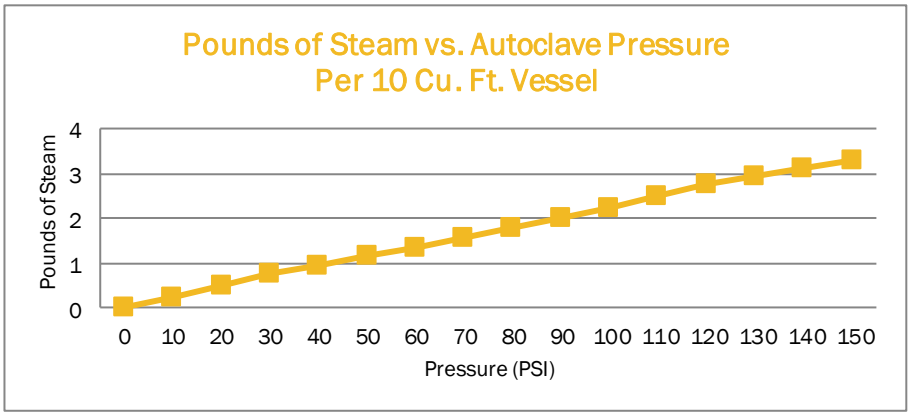
Ransom & Randolph

3535 Briarfield Boulevard | Maumee, OH 43537 USA
800.800.7496 | 419.865.9497 | 419.865.9997 (FAX)
www.ransom-randolph.com

Ransom & Randolph GmbH
Leipziger Straße 40 | 04571 Rötha Germany
+49 342 06373999

Autoclaving

The Pounds of Steam vs. Autoclave Pressure graph below shows the expected amount of water to be accumulated in various sized autoclaves.



Standard Autoclave Sizes and Steam Capacities

The Standard Autoclave Sizes and Steam Capacities table provides the necessary information and uses pressures of 100 and 120 psi as examples.

Diameter (in)	Length (in)	Straight Vessel Volume (FT^3)	Volume of STD ASTM Domes	Total Volume (FT^3)	Accum. Water (lbs at 100 PSI)	Accum. Water (lbs at 120 PSI)
24	36	9.4	2.0	11.4	2.6	3.1
30	36	14.7	4.0	18.7	4.2	5.1
36	36	21.7	7.0	28.4	6.4	7.7
36	48	31.4	7.0	38.4	8.7	10.4
42	48	38.5	11.5	50.0	11.3	13.6
48	48	50.3	16.5	66.8	15.1	18.1
48	60	62.8	16.5	79.3	17.9	21.5
48	66	69.1	16.5	85.6	19.4	23.2
48	72	75.4	16.5	91.9	20.8	24.9
54	72	95.4	24.0	119.4	27.0	32.4
60	60	98.2	32.0	130.2	29.5	35.3
60	72	117.8	32.0	149.8	33.9	40.6
72	72	169.6	56.0	225.6	51.0	61.1

Graph and table data: Shell Cracking, American Foundrymen's Society, 1987.

Ransom & Randolph

3535 Briarfield Boulevard | Maumee, OH 43537 USA
800.800.7496 | 419.865.9497 | 419.865.9997 (FAX)
www.ransom-randolph.com

Ransom & Randolph GmbH
Leipziger Straße 40 | 04571 Rötha Germany
+49 342 06373999

Issue Date: October 16, 2023

Investing with Innovation™