



BY JOHNSON CONTROLS

SMALL TONNAGE CHILLERS MINIMUM WATER VOLUME RECOMMENDATIONS

ENGINEERING SUPPLEMENT

Supersedes: 050.40-ES7 (703)

Form 050.40-ES7 (111)

Historically, Johnson Controls has not published recommendations for minimum system water volume requirements, since most systems inherently have had adequate water volume, which resulted in satisfactory water temperature control.

Small tonnage chillers continue to grow in popularity and are being considered for more diverse applications. Some have short water loops with less water, which can result in less stable temperature control. Thus, there has been increased customer interest in the recommended minimum water volume for these chillers. Here is what we would recommend.

Application Duty	Effective Loop U.S. Gallons/Ton & Liters/Cooling kW			
	Minimum		Preferred	
	Gal/Ton	(Liters/kW)	Gal/Ton	(Liters/kW)
Air Conditioning	3	3.3	5.0 to 8.0	5.4 to 8.6*
Process	6	6.5	7.0 to 11.0	7.6 to 11.9*

* or more

Example: 150 Ton Chiller (for air conditioning duty) = 150 X 3 = 450 U.S. Gallons minimum

It is always good practice to include as much water volume as possible. This increases the thermal mass and “flywheel” effect within the system (i.e. the more, the better). This promotes stable water temperature control and increases reliability by reducing compressor cycling.

The above should be satisfactory guidelines for most applications. However, Johnson Controls will not be responsible for any resulting operation abnormalities, due to unique or unplanned application matters. If you have any questions or doubt about a particular applications water volume needs, contact your local Johnson Controls Sales Office.