



Quick Reference Card

Typical Steam Distribution System Optimizations

Symptom	Resulting Problem	Potential Cause	Optimizations
Decrease in Steam Pressure and/or Steam Temperature	Improperly Sized Pipework	Unnecessarily long distribution line	Shorten the lines as much as possible
		Oversized distribution line (radiation losses)	Follow proper pipe sizing practices
		Undersized steam distribution lines (friction)	
	Undersized Ancillaries	Excessive steam pressure drop resulting from too much restriction to flow	Review and properly size the PRVs, valves, strainers, etc.
Decrease in Steam Quality	Damaged Pipeline	Corrosion and Erosion	See why there is excessive condensate in the pipeline
			Optimize piping layout avoiding low points which can accumulate condensate
			Avoid sharp flow direction changes (elbows)
			Add a drip leg at every low point on the steam line
			Make sure the slope of the steam line is correct, in flow direction down towards the drain point.
	Water Hammer	Condensate sitting in the distribution pipe	Add a properly sized drip leg at every low point on the steam line
			Ensure the pipe is sized correctly
			Ensure the pipe is sloped correctly
			Ensure the steam traps are not plugged
		Sudden valve opening (too fast start up) or closing, or change of flow direction	Open and close valves slowly
			Substitute silent or non-slam check valves for swing checks
			Install shock arrestors
		Incorrectly located drip legs	Make sure the drip legs are placed every 300-500 ft (91-152 m)
		Improper Steam Trapping	Make sure the steam trap is properly sized
			Apply the correct steam trap technology
			Make sure the correct trap is selected for the application
Incorrectly designed drip legs	Drip leg diameters should be the same size as the steam main or branch line it services up to 4" (10.16 cm). Above 4" (10.16 cm), the drip leg diameter should be half of the pipe size, but never less than 4" (10.16 cm).		

Quick Reference Card

Typical Steam Distribution System Optimizations

Symptom	Resulting Problem	Potential Cause	Optimizations
Decrease in Steam Quality	Condensate Slugs	Improper maintenance	Check for blocked steam traps and strainers on drip legs
		Layout of steam system	Consider the possibility that the flow direction could change or that there are no flow zones
		Wet steam or carry over from the boilers	Assure that steam demand does not exceed boiler capacity, install back pressure regulator
			Check the sizing, piping, and trapping of the boiler header
			Add a steam separator
			Have the water treatment experts examine the water treatment procedures
		Heat loss	Check the insulation. Ensure that the piping design is correct
			Indoor piping: PVC jacket may be used
			Calcium Silicate Insulation: Recommended for food applications
			Properly insulate valves and other ancillary equipment
Mechanical Stress	Damaged pipeline, rupture, leaking gaskets	Thermal expansion	Determine the reason for the thermal stress
			Check for condensate in the pipe (temperature differential between top and bottom)?
			Compensate using expansion elbows and/or expansion bellows
			Check the support of the line
	Design pressure and/or pressure exceeded	Reduce the pressure	
		Add a safety valve	
		Check PRV's and steam pressure control valves. Check if they work correctly and are not oversized	
		Not enough straight pipe after control and pressure sensor (need 20x pipe diameter after the PRV)	

Armstrong provides intelligent system solutions that improve utility performance, lower energy consumption, and reduce environmental emissions while providing an “enjoyable experience.”



Armstrong International
 North America • Latin America • India • Europe / Middle East / Africa • China • Pacific Rim
armstronginternational.com