

Incident Summary (Reference #5622561)

SUPPORTING INFORMATION	Incident Date		June 15, 2017	
	Location		Burnaby	
	Regulated industry sector		Boilers, PV & Refrigeration	
	Impact	Injury	Qty injuries	None
			Injury description	None
			Injury rating	None
	Damage		Damage description	The refrigeration system lost its full refrigerant charge of Carbon Dioxide – CO ₂ .
			Damage rating	Major
Incident rating		Severe		
Incident overview		An L shaped pipe with compression fittings on each end is used to convey refrigerant gas from the suction manifold to the compressor inlet. The pipe blew off the suction manifold connection and allowed the full charge of CO ₂ refrigerant to be released into the refrigeration machine room. The pipe nearly struck the refrigeration technicians when it blew off.		
INVESTIGATION CONCLUSIONS	Site, system and components		Normal operation the pipe and its compression fittings are rigid and leak free when conveying the refrigerant gas from the suction manifold to the compressor inlet.	
	Failure scenario(s)		The connecting pipe that conveys the refrigerant gas needed to be rotated out of the way due to a failed compressor motor. The top of the pipe is fitted with an isolation valve that prevents the gas from flowing from the suction manifold when it is closed. With the isolation valve closed the pipe is still under 375 psi pressure from the suction manifold side. The technicians backed off the pipe bottom compression fitting 1/8 of a turn and disconnected the top of the pipe from the compressor inlet connection. They rotated the pipe out of the way to allow the compressor to be removed. The new compressor was installed 2 hours later and when they were trying to reconnect the top section of the pipe / flange assembly the pipe blew out from the suction manifold compression fitting. It appeared that the pipe had slipped past the ferrule.	
	Facts and evidence		The technicians were told by the manufacturer of the refrigeration plant that backing the compression fitting nut off by 1/8 of a full turn is acceptable with the pipe under pressure and they have used this procedure in the past. They assumed that the bottom compression fitting ferrule had been installed correctly and the pipe would not slide past the ferrule with the pipe under pressure. They disconnected the pipe at the top end from the compressor and rotated the L shaped pipe 90 degrees so this would allow them to remove the compressor and motor assembly. With the L shaped pipe still under 375 psi pressure from the CO ₂ gas the pipe slid past the ferrule and compression fitting nut almost striking the technicians and allowing the CO ₂ gas to discharge in to the room.	
	Causes and contributing factors		It is possible the ferrule may not of been adequately attached to the pipe during the initial installation. The L shaped pipe to the compressor inlet may have put stress on the lower compression fitting.	

Photos or diagrams