Metal vs. Plastic Quick Disconnects in Direct Liquid Cooling Systems

Quick Disconnects (QDs) are key components in Direct Liquid Cooling systems. The design of QDs enables fast and simple service with hot-swappable servers. This allows for easily-arranged, flexible server configurations inside racks. An investment in metal QDs ensures both higher quality and reliability than that of plastic counterparts. This superior performance is an important consideration when installing liquid cooling in very expensive, high-density servers designed for HPC loads.

CoolIT Systems uses 100% non-drip Stäubli metal Quick Disconnects.

Feature	Stäubli Metal Quick Disconnects	Plastic or Plastic/Metal Combination Quick Disconnects
Structural Integrity	All metal construction holds structural integrity extremely well. Stäubli QDs are constructed of brass and stainless steel, with specialized aluminum coatings to avoid corrosion.	Creep can occur with plastic material. Dimensional changes can create difficulties connecting and/or disconnecting, which can lead to leakage. Environmental parameters, such as humidity, ultra-violet exposure, and high or low temperatures, can also affect the stability and dimensions of plastic parts.
Connection Cycles	Metal QDs are capable of over 5,000 connection cycles due to the wear resistance of metal.	The number is manufacturer-dependent, but is generally in the low hundreds.
QD Material Degradation	None.	Material aging is much quicker for plastics than metal, resulting in lower life expectancy of plastic connectors.
Fluid Loss	Stäubli CGD, SCG and SPT are true flush face connectors. The volume loss is limited to a “mist” adhering to the face when disconnecting.	Plastic QDs are less durable than metal QDs and will potentially fall out of tolerance, allowing drips to occur.
Heritage of Development	Stäubli QDs were initially derived for critical sealing industrial applications, such as fuel lines.	Plastic QDs were developed for the medical industry as single use, disposable items.
Cost of QDs	Metal QDs are generally more expensive than plastic QDs; however, metal QDs provide for a reliable and safe connection at a critical point in the system and still make up less than 0.5% of the IT system capital costs.	Plastics are a lower cost component which can initially save a few hundred dollars per rack.

Learn more about CoolIT’s liquid cooling solutions for data centers, servers and desktops at www.coolitsystems.com.