SPECIFICATION

1 Scope

1.1 Content

The specification defines the performance requirements for liquid cooling quick disconnects (Universal Quick Disconnect, UQD). UQD is a high-performance fluid line connector specifically designed for advanced electronic equipment utilizing non-combustible single-phase (water/glycol) liquid cooling systems.
This document details the product's key features and durability requirements to ensure seamless integration into diverse cooling systems. Additionally, the specification includes operational guidelines, safety standards, and material compatibility to meet the rigorous demands of modern data centers and electronic cooling systems.

本規範定義了水冷快速接頭 (Universal Quick Disconnect, UQD) 的性能需求。UQD 為高效能的流體管路接頭，專為先進電子設備中的非可燃單相（水/乙二醇）液冷系統設計。
本文件詳述了產品的關鍵特性及耐用性需求，確保能無縫整合至多元化的冷卻系統。同時，本規範亦涵蓋操作規範、安全標準及材料相容性，滿足現代數據中心及電子冷卻系統的嚴格要求。

2 Applicable Document

2.1 Standards for Primary Reference

The design and specification of this product are primarily based on the OCP Universal Quick Disconnect (UQD) Specification. This standard outlines the technical, dimensional, and performance requirements for universal quick disconnect connectors, ensuring interoperability, reliability, and safety in liquid cooling systems.
Our product follows this reference standard closely, adapting its specifications to align with the requirements set forth, including interface dimensions, pressure ratings, flow characteristics, and material compatibility. The adherence to this standard ensures consistency and compatibility across systems, making it a reliable solution for modern electronic cooling applications.

本產品的設計與規範主要參照 OCP Universal Quick Disconnect (UQD) Specification Rev 標準。該標準詳細規範了水冷快速接頭在技術、尺寸及性能上的需求，確保其在液冷系統中的互通性、可靠性及安全性。我們的產品嚴格遵循此標準，並根據其規定進行調整，包括接口尺寸、壓力規格、流量特性及材料相容性。基於此標準的設計可確保系統的一致性與兼容性，為現代電子冷卻應用提供可靠的解決方案。

2.2 Standards for Related Applications

IEC 60512: Connectors for electronic equipment - Tests and measurements
EIA-364-18: Visual and Dimensional Inspection Procedure for Electrical Connectors and Sockets
EIA-364-13: Mating and Unmating Force Test Procedure for Electrical Connectors and Sockets
EIA-364-26: Humidity Test Procedure for Electrical Connectors and Sockets
ISO 18869: Hydraulic fluid power — Test methods for couplings actuated with or without tools
IEC 60068-2-11: Environmental Testing - Test Ka: Salt Mist

IEC 60512: 電子設備連接器 - 測試與測量
EIA-364-18: 電氣連接器和插座的視覺和尺寸檢查程序
EIA-364-13: 電氣連接器和插座的插拔力測試程序
EIA-364-26: 電氣連接器和插座的濕度測試程序
ISO 18869: 液壓傳動 — 工具操作或非工具操作接頭的測試方法
IEC 60068-2-11: 環境測試 - 試驗 Ka：鹽霧

3 Requirements

3.1 Design and Construction

The design and construction strictly comply with the requirements outlined in the OCP Universal Quick Disconnect (UQD) Specification. All products are developed and manufactured in accordance with the design, structure, and physical dimensions specified in the technical drawings.

產品設計與結構嚴格遵循 OCP Universal Quick Disconnect (UQD) Specification 的規範要求。所有產品均依照技術圖紙所載明的設計、結構及物理尺寸進行開發與生產。

3.2 Materials

Parts / 零件	Material / 材質
Body / 本體	SUS316
Clamp Body / 尾夾本體	SUS316
Lock / 扣件	SUS316
Valve / 閥門	SUS316
O-ring / O 型環	EPDM
Spring / 彈簧	SUS316
Cap / 保護蓋	PE

3.3 Performance Requirements

Item / 項目	UQD04
Durability	5000 Cycles Min.
Mating Coupling Force	3.0 kgf ~6.0 kgf
Operating Pressure	100 psi Max.
Brust Pressure	300 psi Max.
Fluid Loss	0.020 ml Max.
Flow Rate	Cv=0.8 Min. (1.7GPM)
Operating Temperature Range	17°C~65°C

4 Test Requirements

Item / 項目	Test Condition / 測試條件	Requirement / 測試需求
Visual Inspection 外觀檢驗	IEC 60512, Test 1a Product and dimensions meet drawing, no damage. 產品外觀與尺寸需符合圖面要求，不得有任何損壞。	No defects shall affect product operation. 不得存在任何影響產品正常運行的缺陷。
Durability 耐久性	IEC 60512, Test 9a Connect plug and socket with no pressure. Test speed: 25.4 mm/min. 無壓力的情況下進行插頭與插座連接。 測試速度：25.4 mm/分鐘	a. 5000 Cycles. b. No physical damage. a. 5000 次循環。 b. 無物理損壞。
Mating Coupling Force 插拔力	IEC 60512, Test 13a Connect plug and socket with no pressure, test connection force. Test speed: 25.4 mm/min. 無壓力的情況下進行插頭與插座連接。 測試連接的力量。 測試速度：25.4 mm/分鐘	3.0 kgf ~6.0 kgf

Universal Quick Disconnect (UQD)

Maximum Operating Pressure Test 最大操作壓力測試	Run at 100 psi water pressure for 1 hour each with 17°C and 75°C. 在 17°C 及 75°C 溫度情況下，以 100 psi 的水壓各運行 1 小時。	No leakage is permissible. 不得有洩漏情形。
Minimum Burst Pressure Test 最小破壞壓力測試	Run at least 300 psi water pressure for 5 minutes. If no leakage or failure occurs, continue increasing the pressure until leakage or failure. 以至少 300 psi 的水壓運行 5 分鐘，如果沒有洩漏或破壞，繼續增加壓力，直到出現洩漏或破壞。	a. Water pressure at least 300 psi. b. No leakage is permissible. c. No failure is permissible. a. 水壓至少 300 psi。 b. 不得有洩漏情形。 c. 不得有破壞情形。
Fluid Loss Test 液體滲漏測試	Measure the maximum fluid loss per couple/decouple cycle at 0 psi. 測量在 0 psi 下，連接/斷開循環的最大液體損失。	Maximum 0.025 ml 不得超過 0.025ml 滲漏量。
Flow Rate Test 水流量測試	Run by 17°C and 75°C at a fixed flow rate for 5 minutes. Measure the inlet and outlet pressure to calculate the Cv value. 在 17 度及 75 度 C 的水在固定流量下運行 5 分鐘，取得入口及出口的壓力值，計算 Cv 值。	Flow rate: 1.7 GPM, Cv > 0.80 水流量 1.7GPM，Cv > 0.80
Salt Spray Test 鹽霧測試	IEC 60068-2-11 5% salt solution for 240 hours 5%鹽水溶液，持續 240 小時	No oxidation on the surface. 表面不得有氧化情形發生。

5 Product Qualification Test Sequence

Test or Examination	Test Group					
	A	B	C	D	E	F
Visual Inspection	1, 7	1, 3	1, 3	1, 3	1, 3	1, 3
Durability	3					
Mating Coupling Force	2, 4					
Maximum Operating Pressure Test		2				
Minimum Burst Pressure Test	6		2			
Fluid Loss Test	5			2		
Flow Rate Test					2	
Salt Spray Test						2