

SCSI Harbor Thermal Testing

- **Purpose**

- characterize drive thermal performance in Harbor hardware
- determine flow requirements for drives in Harbor hardware
- enable simplified method for designing system-level Harbor drive cooling systems

- **Method**

- see <ftp://ftp.scsita.org/pub/harbor/99s003r1.pdf>
- additional characterization now performed with mechanical backplane

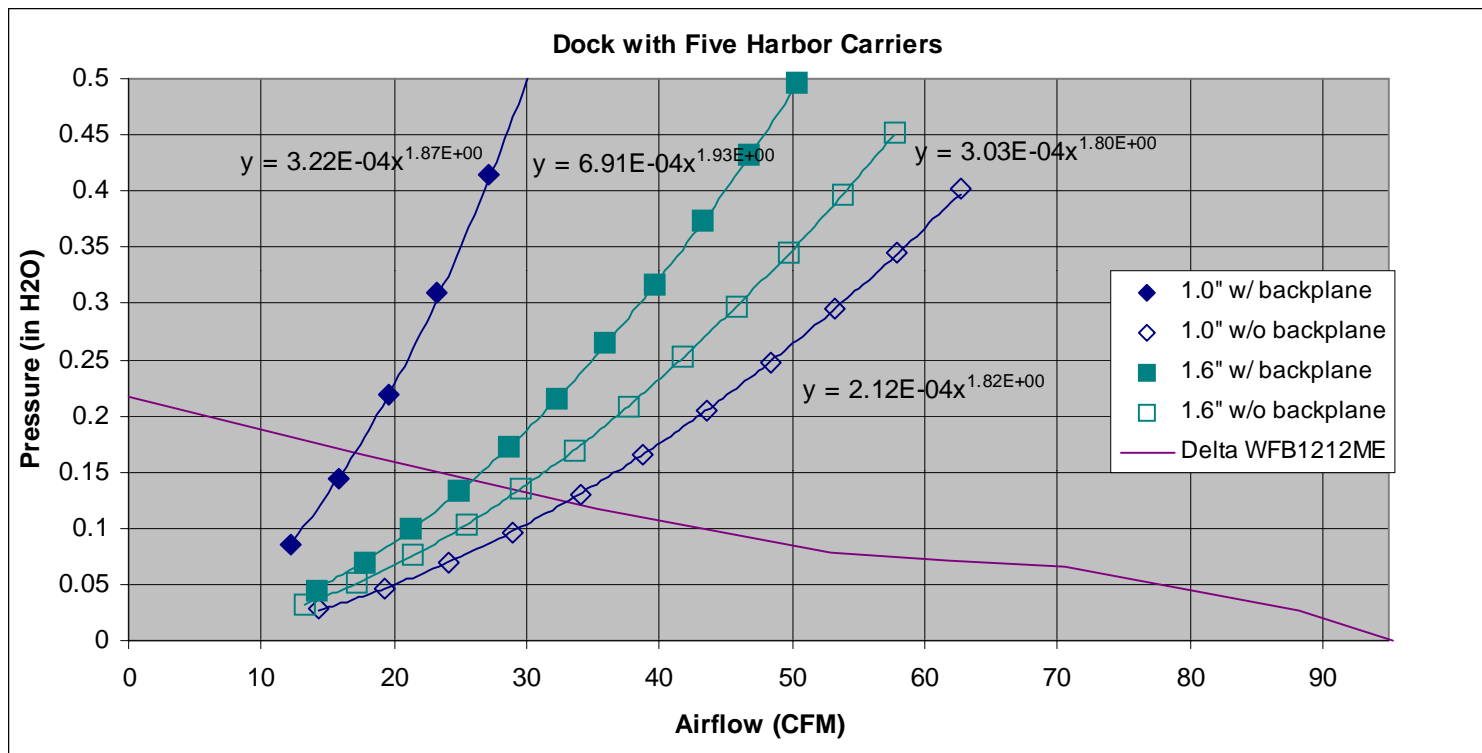
- **Drives tested thus far:**

- Seagate ST118202LW (1.6")
- Seagate ST318203LW (1.0")
- IBM ULTRASTAR 9LZX (1.6")
- IBM ULTRASTAR 36XP (1.6")
- Hitachi DK31AH-36LW (1.6")

SCSI Harbor Thermal Testing

- **Flow impedance**

- backplane severely restricts flow in 1" configuration
- example fan (Delta WFB1212ME - 120 X 38 mm) would deliver about 17 CFM to five 1.0" drives with a backplane as compared to 33 CFM to five 1.0" drives without a backplane
- 1.6" backplane is less restrictive (more open area available)



SCSI Harbor Thermal Testing

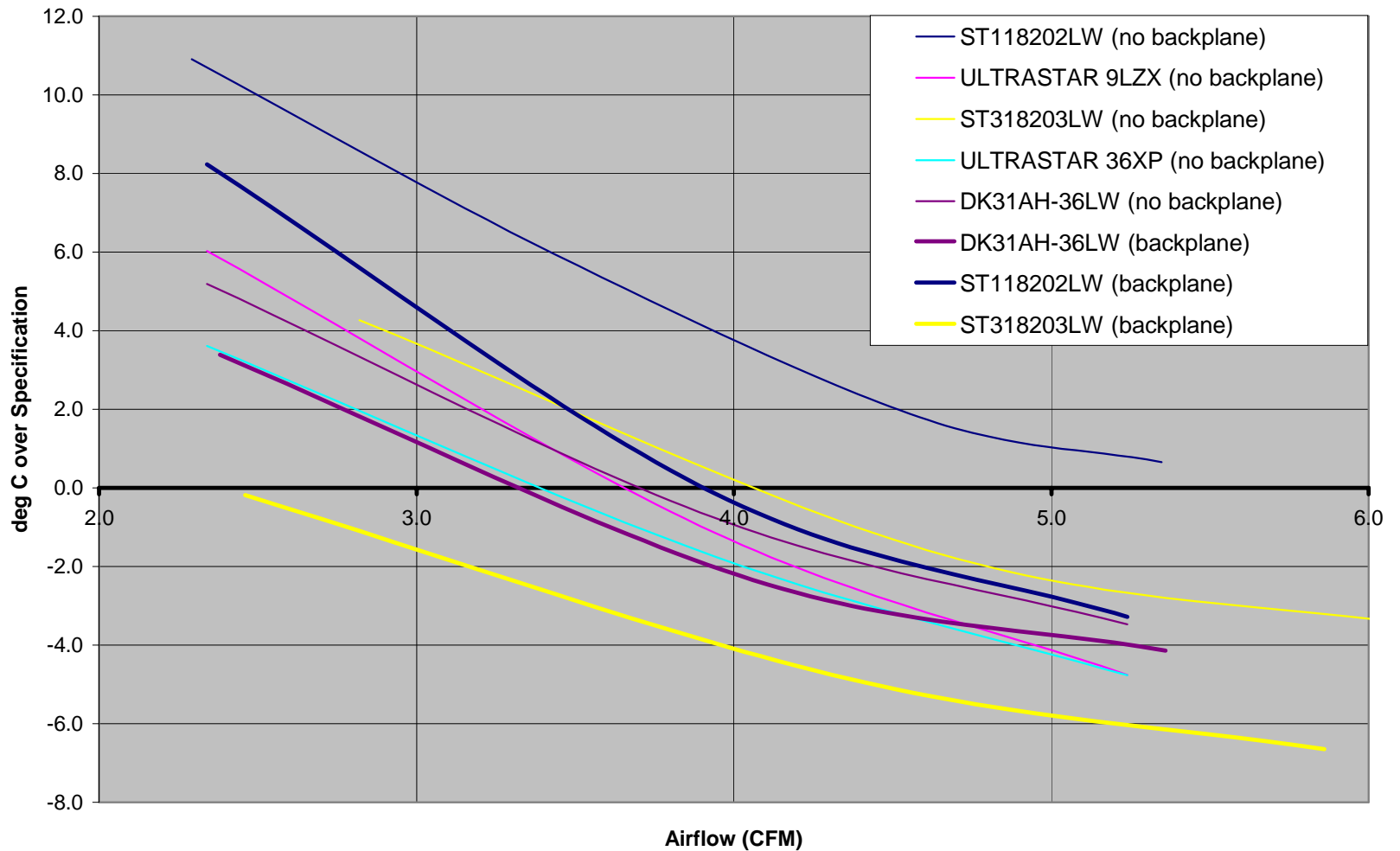
- **Data Summary -**
 - **airflow (in CFM/drive) required to cool tested drives**
 - **based on component closest to specification**
 - **in all cases disk enclosure temperature is critical component**

Vendor	Model	Size (in)	Backplane	Ambient Temperature (°C)		
				35	40	45
Seagate	ST118202LW	1.6	No	2.5	3.7	~6.0
			Yes	~2.0	2.9	3.9
	ST318203LW	1.0	No	<2.0	~2.6	4.1
			Yes	<2.0	<2.0	2.5
IBM	ULTRASTAR 9LZX	1.6	No	<2.0	2.6	3.7
	ULTRASTAR 36XP	1.6	No	<2.0	~2.0	3.4
Hitachi	DK31AH-36LW	1.6	No	<2.0	2.4	3.7
			Yes	<2.0	2.6	3.3

- **flow required is lower with a backplane for all drives tested with a backplane thus far**

SCSI Harbor Thermal Testing

Airflow (per drive) Required to Meet Drive Specifications - 45 C Ambient



SCSI Harbor Thermal Testing

- **Plans**
 - Complete drive characterization with backplane
 - Characterize airflow impedance with functional backplane and Harbor hardware
- **Future usage of data**
 - enable sizing of cooling systems for Harbor drives in docks
 - assist in backplane design (hole locations and openings required)