Quality is more than a word

ESPEC

Thermal Shock Chamber Variants

Basic Lineup

Air to Air Damper Type

Model	Temp. range	Interior dimensions (mm)
TSA-43EL	Hot exposure: Ambient +50 to +200℃ Cold exposure: −65 to 0℃	W240 H460 D370
TSA-73EL		W410 H460 D370
TSA-103EL		W650 H460 D370
TSA-203EL		W650 H460 D670
TSA-303EL		W970 H460 D670
TSA-73ES	Hot exposure: +60 to +200℃ Low temp.: −70 to 0℃	W410 H460 D370
TSA-73EH		
TSA-103ES		W650 H460 D370
TSA-203ES		W650 H460 D670

＊Compliance with CE-Marking.

Air to Air Elevator Type

Model	Temp. range	Interior dimensions (mm)
TSD-101-W	Hot exposure: +60 to +205°C Cold exposure: −77 to 0°C	W710 H345 D410

＊Compliance with CE-Marking.

Air to Air Elevator Type

Model	Temp. range	Interior dimensions (mm)
TSE-11-A	Hot exposure: +60 to +200°C Cold exposure: −65 to 0°C	W320 H148 D230

＊Compliance with CE-Marking.

Liquid to Liquid

Model	Temp. range	Interior dimensions (mm)
TSB-21	Hot exposure: +70 to +200°C	W120 H150 D120
TSB-51	Cold exposure: −65 to 0°C	W150 H150 S200

＊Compliance with CE-Marking.

Max. Temp. Modified

Maximum temperature can be modified flexibly.
Up to 220ºC, 250ºC, 300ºC, & etc..

CE-marking option

Air to Air Damper Type

Air to Air Elevator Type

Air to Air Elevator Type

Model		TSA-203ES-W (300°C model)	TSD-101-W (300°C model)	TSE-11-A (300°C model)
System		2-zone or 3-zone test by damper switching	2-zone transition by elevator	2-zone transition by elevator
Test area	Hot exposure range	+60 to +300°C	+60 to +300°C	+60 to +300°C
	Cold exposure range	−70 to 0°C	−65 to 0°C	−65 to 0°C
	Temperature fluctuation	±1.0°C	±0.5°C	±0.5°C
Hot chamber	Max. pre-heat ing setting	+350°C	+305°C	+330°C
	Heat-up time	Ambient temp. to +350°C within 40 min.	Ambient temp. to +300°C within 100 min.	Ambient temp. to +300°C within 60 min.
Cold chamber	Max. pre-cool setting	−75°C	−77°C	−75°C
	Pull-down time	Ambient temp. to −75°C within 45 min.	Ambient temp. to −77°C within 90 min.	Ambient temp. to −65°C within 90 min.
Temp. recovery	Temp. recovery time	within 20 min.	within 5 min.	within 10 min.
	Condition	Hot exposure: +250°C 60 min. Cold exposure: −40°C 60 min. Sensor position: Upstream of specimen Specimen: No specimen	Hot exposure: +270°C 40 min. Cold exposure: −40°C 40 min. Sensor position: Upstream of specimen Specimen: Plastic molded ICs 5kg	Hot exposure: +300°C 30 min. Cold exposure: −45°C 30 min. Sensor position: Upstream of specimen Specimen: Plastic molded ICs 1kg
Interior dimensions		W650×H460×D670 mm	W710×H345×D410 mm	W320×H148×D230 mm

Humidity Control

Air to Air Damper Type

CE-marking option

Model			TSA-102D-W	TSA-202D-W
System			2 or 3-zone test by damper switching	
Performance	Test area	Hot exposure range	Thermal cycle test +70°C to +150°C, Dew cycle test −10°C to +100°C	
		Cold exposure range	Thermal cycle test −70°C to +10°C, Dew cycle test −40°C to +10°C	
		Temp. fluctuation	±1°C	
		Humidity fluctuation	±5% rh	
	Hot chamber	Max. pre-heating setting	+150°C	
		Humidity range	40 to 95%rh (Dew cycle test)	
		Heat-up time	−10°C to +100°C, within 30 min.	
		Pull-down time	+20°C to −10°C, within 60 min.	
	Cold chamber	Max. pre-cooling setting	−75°C	
		Heat-up time	−75°C to +10°C, within 30 min.	
		Pull-down time	Ambient temp. to −75°C, within 60 min.	
Temp. changing time	Thermal cycle test	Temp. changing time	Ambient temp. to +150°C & ambient temp. to −65°C Within 10 min.	Within 16 min.
		Conditions	Three zones: Hot exposure: +150°C, 30 min. Ambient exposure: 10 min. Cold exposure: −65°C, 30 min. Sensor position: upstream of specimen Specimen: plastic mold IC 5kg	Specimen: plastic mold IC 10kg
	Dew cycle test	Temp. Changing time	−30°C to +25°C 95% Within 5 min. +25°C 95%rh to −30°C Within 5 min.	
		Conditions	Two zones : Cold exposure: −30°C, 60 min. Hot exposure: +25°C 95%, 60 min. Pre-heating temp. 25°C 95% Sensor position: upstream of specimen No specimen	
Specimen basket load capacity			5kg (Equally distributed load)	17kg (Equally distributed load)
Interior dimensions			W650×H460×D370 mm	W650×H460×D670 mm
Exterior dimensions			W1670×H1900×D1570 mm	W1670×H1900×D1870 mm
Weight			1300 kg	1550 kg

Large Capacity

Air to Air Damper Type

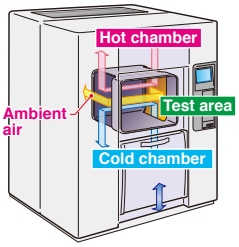
Inner volume can be customized for your application.

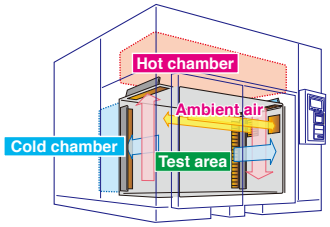
CE-marking option

TSA-503EL-W

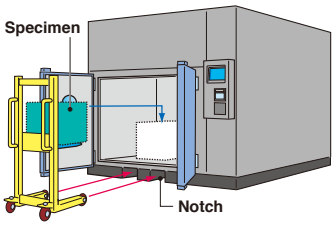
TSA-1100/1650 S/H-W

Air flow





Specimen carry-in



Model	TSA-503EL-W	TSA-1100S-W	TSA-1650S-W	TSA-1100H-W	TSA-1650H-W
System	2 or 3-zone test by damper switching	2-zone test by damper switching (3-zone test optional)			
Hot exposure range	+65 to +150°C	+60 to +150°C		+60 to +180°C	
Cold exposure range	−50 to 0°C	−50 to −10°C		−60 to −10°C	
Hot chamber max. pre-heating setting	+200°C	+180°C		+200°C	
Hot chamber heat-up time	Ambient temp. to +200°C within 30 min.	Ambient temp. to +180°C within 40 min.		Ambient temp. to +200°C within 30 min.	
Cold chamber min. pre-cool setting	−70°C	−65°C		−75°C	
Cold chamber pull-down time	Ambient temp. to −70°C within 90 min.	Ambient temp. to −65°C within 150 min.		Ambient temp. to −75°C within 150 min.	Ambient temp. to −75°C within 80 min.
Temp. recovery time	2-zone Hot exposure: +65°C 40 min. Cold exposure: −35°C 30 min. Sensor position: Upstream of specimen Temp. recovery time: within 10 min.	2-zone Hot exposure: +85°C 30 min. Cold exposure: −40°C 30 min. Sensor position: Upstream of specimen Temp. recovery time: within 10 min.		2-zone Hot exposure: +150°C 60 min. Cold exposure: −50°C 60 min. Sensor position: Upstream of specimen Temp. recovery time: within 10 min.	
	Specimen: Plastic molded ICs 50 kg	Specimen: Iron 50 kg	Specimen: Iron 100 kg	Specimen: Iron 50 kg	Specimen: Iron 100 kg
Interior dimensions	W1200 mm H670 mm D750 mm	W1000 mm H1100 mm D1000 mm	W1500 mm H1100 mm D1000 mm	W1000 mm H1100 mm D1000 mm	W1500 mm H1100 mm D1000 mm
Exterior dimensions	W2100 mm H2215 mm D1750 mm	W2120 mm H1990 mm D2883 mm	W2620 mm H1990 mm D2883 mm	W2120 mm H1990 mm D2883 mm	W2620 mm H1990 mm D2883 mm
Weight	1700 kg	3400 kg	3700 kg	3500 kg	4200 kg

Liquid to Liquid

More direct thermal shock than "air to air."

CE-marking option

Model	TSB-10	TSB-15	TSB-30
System	Two-zone transition		
Hot chamber temperature range	+60 to +150°C		
Cold chamber temperature range	−65 to 0°C		
Chamber transferring time	15 seconds or less	20 seconds or less	25 seconds or less
Specimen basket dimensions	W175×H175×D300 mm	W215×H195×D350 mm	W300×H220×D450 mm
Specimen basket load capacity (equally distributed load)	5 kg	10 kg	10 kg
Exterior dimensions	W1410×H2100×D1520 mm	W1610×H2310×D1520 mm	W2871×H2185×D1846 mm
Weight	1100 kg	1150 kg	2500 kg

Highly Accelerated

Air to Air Damper Type

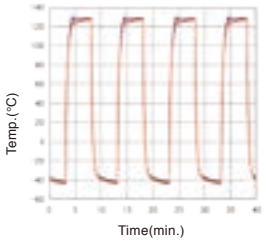
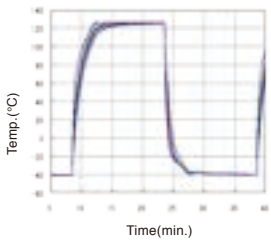
1/3 testing time of standard thermal shock chamber
Save your time and electricity

Highly Accelerated
Air Thermal Shock Chamber
"HAATS"

CE-marking option

Model		TSH-13-W
System		2 or 3-zone test by damper switching
Performance	Hot exposure range	+60 to +200°C
	Cold exposure range	−70 to 0°C
	Temp. recovery time (accelerated)	Hot exposure: +125°C 5 min. Cold exposure: −40°C 5 min. Specimen: PCB with epoxy resin 1.36kg Temp. recovery time. within 5 min.
Capacity		12 L
Interior dimensions		W300×H200×D200 mm
Exterior dimensions		W1430×H1900×D1370 mm
Weight		1070 kg

Example of Highly Accelerated Test -making testing time 1/3 of standard chamber

	Highly Accelerated			Standard		
Temp. range	−40°C to +125°C (Δt=165°C)					
Exposure time	5 min.			15 min.		
Temperature profile						
		Hot (≧ +123°C)	Cold (≦ −38°C)		Hot (≧ +123°C)	Cold (≦ −38°C)
	Substrate temp. recovery time	1.1 to 1.3 min.	1.5 to 2.5 min.	Substrate temp. recovery time	3.4 to 7.9 min.	3.7 to 6.2 min.
	Substrate temp. hold time	3.7 to 3.9 min.	3.5 to 2.5 min.	Substrate temp. hold time	7.1 to 11.6 min.	8.8 to 11.3 min.

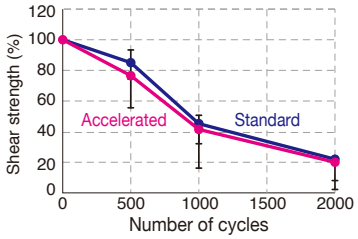
Results

Cross Section Crack development is similar

Highly Accelerated Air Thermal Shock

Standard Air Thermal Shock

Strength Test No big differences in joint



Air to Liquid

Air to Liquid Elevator Type

Hot air ⇔ Cold water
Suitable for automotive parts: heated by engine while rapidly cooled down by water splash.

CE-marking option

Model			TSAB-50
System			Two-zone transition by elevator
Performance	Hot air chamber	Temp. range	+60°C to +270°C
		Heat-up time	Ambient to +270°C, within 150 min.
		Temp. fluctuation	±0.5°C
	Cold water chamber	Temp. range	+2°C to +20°C
		Pull-down time	+20°C to +2°C, within 150 min.
		Temp. fluctuation	±2°C (reference value)
Chamber transferring time			5 seconds, from air chamber to water chamber 10 seconds, from water chamber to air chamber
Interior dimensions			W400×H160×D400mm
Exterior dimensions			W1600×H1892×D1500mm
Water volume in chamber			250 L
Supplied water quality			Tap water
Max. load in chamber			10kg
Specimen basket dimensions			W400×H50×D400mm, 2 levels
Weight			720 kg (without water)

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LEAF NO.20160704 TT7B28L005 (July, 2016)