Enviromental Chambers

3119-600 Series

INSTRON®

3119 Series Environmental Chambers

Integration

3119-600 Series Environmental Chambers are designed to fit between the columns of a materials testing machine on a suitable mounting. Ports located in the upper and lower surfaces of the chamber allow pull rods to be inserted to which grips and fixtures are attached for operation within the chamber.

Both fixed and roller mountings are available for the Instron® range of Static and Dynamic Testing Machines. Chambers can also be fitted to other makes of testing machines, with custom mountings if desired.

Challenges in Non-Ambient Testing

How 3119-600 Series Chambers can Help You

Testing at non-ambient temperatures adds another layer of challenges to your testing laboratory. Ensuring you get accurate and stable temperatures is just part of the story. Practical considerations, such as testing productivity, cost of ownership, ease of use, and operator safety are all affected by the need to test at high and low temperatures.

How can Your Lab be More Efficient?

- Rapid heat-up and recovery times mean you can test more specimens per day
- Dual window heaters ensure optimum clarity at low temperatures giving more useful test time when using non-contacting extensometers or other optical devices
- Automated soak time control - via software - allows you to perform other tasks while the system reaches set-point
- Removable wedge-ports and roller mountings ensure simple and rapid changes of test configurations

How can My Lab Become Safer?

- Interlocks cut the heating/cooling and fan when the door is opened minimizing non-ambient air reaching the operator
- Front-mounted indicator clearly shows when mains power is enabled
- Air-cooled skin reduces external temperature
- Dedicated cryogen outlet allows waste gas to easily vent outside or to a suitable extraction system
- Interlock for water-cooled grips shuts chamber down if water supply fails (Floor Model Chambers only)

How can I Improve My Return on Investment?

- Energy-efficient design minimizes power and cryogen usage
- Rapid heat-up and recovery times lower cost per test
- Single-phase power means no expensive mains supply requirements
- No expensive annual maintenance requirements

How can I make Testing Easier for My Operators?

- Just enter the desired set-point and go
- Auto-tuning temperature controller gets you to set-point quickly without the need to adjust other parameters
- Integration with Bluehill® 3 (v3.xx and above), Bluehill Universal, and WaveMatrix™ Software programs allows the chamber to be controlled directly from the same PC as your testing system
- No need to manually re-enable after changing specimens; closing the chamber door automatically re-starts the fan and heating/cooling functions
- Instrumentation slot in the wedge-ports makes using additional devices, such as extensometers, simple

How can I Ensure the Accuracy of My Results?

- Accurate set-point, minimal overshoot, and excellent stability ensures confident results
- Temperature-compensated load cells used in Instron® systems minimize the effect of temperature on force measurements resulting from conduction along pull rods or convection from the chamber surface
- Forced-convection provides uniform air distribution within the chamber
- Fan speed can be adjusted to reduce turbulence effects with low force tests

How They Work

Heating and Cooling

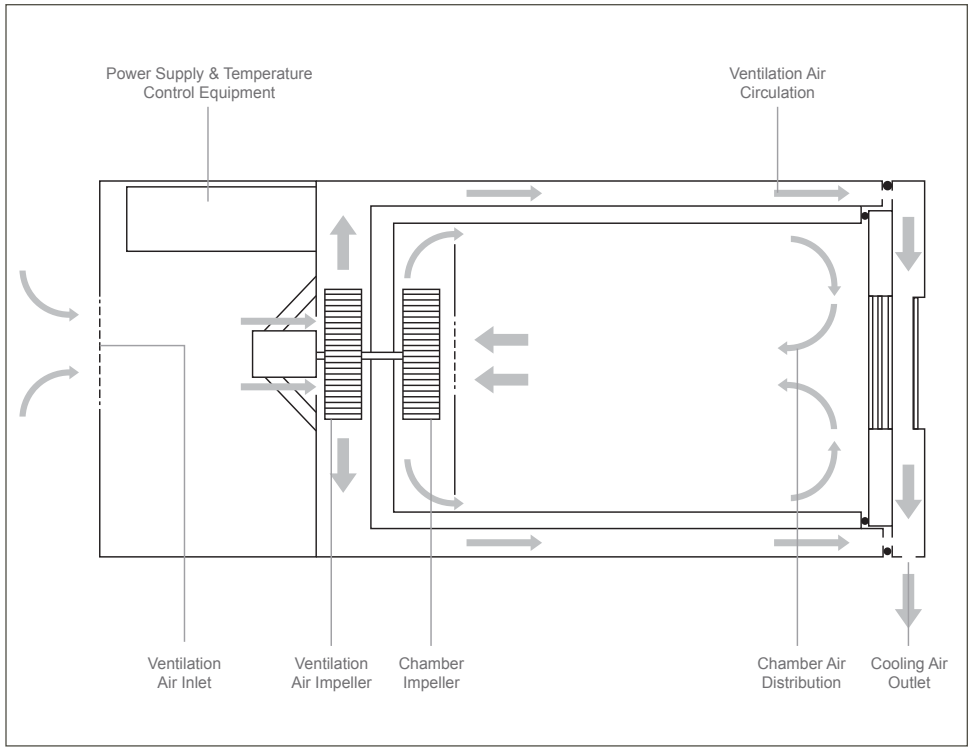
Heating is achieved by passing air over an electrically heated element. All chambers in the range come with heating as standard. Cooling is achieved by blowing cryogenic gas (either CO_2 or LN_2) into the chamber via an optional cooling valve. The cryogenic gas is normally stored in cylinders (liquid CO_2) or a self-pressurizing Dewar (liquid N_2). Waste cryogenic gas is exhausted to the rear of the chamber through a dedicated port to which a silicone rubber pipe can be attached and vented outside the laboratory environment.

Specimen Access

Access to the specimen and grips is via a left-hand hinged door that also contains a heated, optical-glass window. An internal light allows the inside of the chamber to be clearly seen if required.The chamber automatically turns off heating, cooling, and the fan when the door is opened, reducing the hot/cold air reaching the operator.

Temperature Control

A dedicated Eurotherm 3208 temperature controller mounted to the chamber is used to select the required set-point temperature. Temperature is monitored and controlled by a Type N thermocouple inside the chamber. The controller can be programmed with defined heating rates and dwell times (8 segments), as well as communicate with a PC via USB using compatible Instron software. It also features a 0-10V analog output of temperature for use by other devices, such as chart recorders.



Operating Principles

The chambers use a forced-convection principle in which hot or cold air is circulated around the specimen, grips, and pull rods to provide optimum heating/cooling rates, reduced thermal gradients, and good thermal stability.

Ambient temperature air is also passed from the rear of the chamber into the space between the insulation and the outer panels. This helps to keep the outer skin of the chamber cool. The selectable high/low fan speed allows delicate specimens to be tested by reducing the effect of air turbulence within the chamber.

Optional Accessories for a Complete Testing Solution

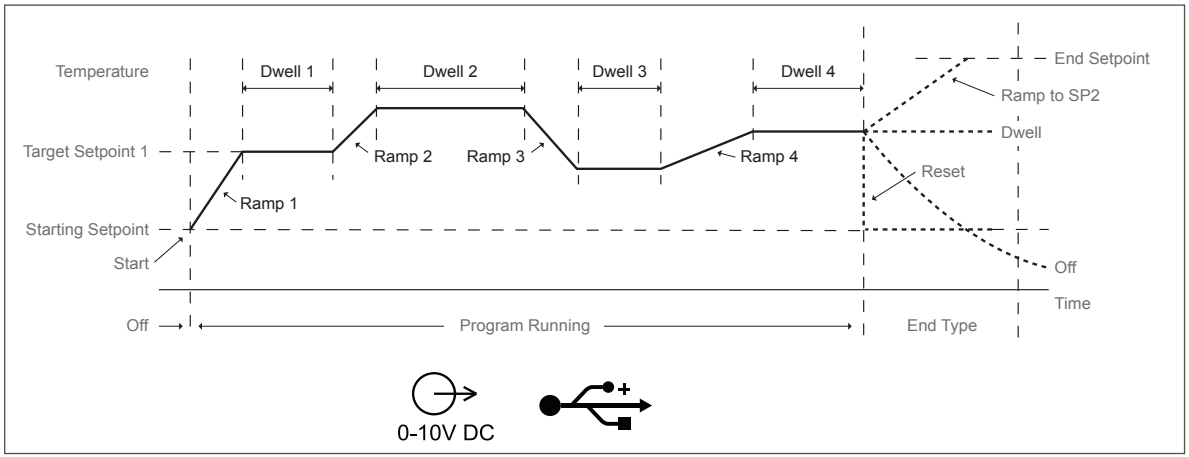
The 3119-600 chamber range provides reliable and enduring performance over a vast range of testing applications where non-ambient testing conditions are needed. However, a chamber alone is not sufficient. Instron® offers a comprehensive line of grips, fixtures, extensometers, and pull rods to ensure a complete solution to your test requirements.

- Full range of pull rods, push rods, extensometers, grips, and fixtures for use at high and low temperatures
- Cooling modules for CO_2 and LN_2
- Hoses for CO_2 and LN_2 cooling modules
- 60 and 120 liter self-pressurizing Dewar flasks (3119-102A and 3119-102)
- Rigid or roller bracket mounting options

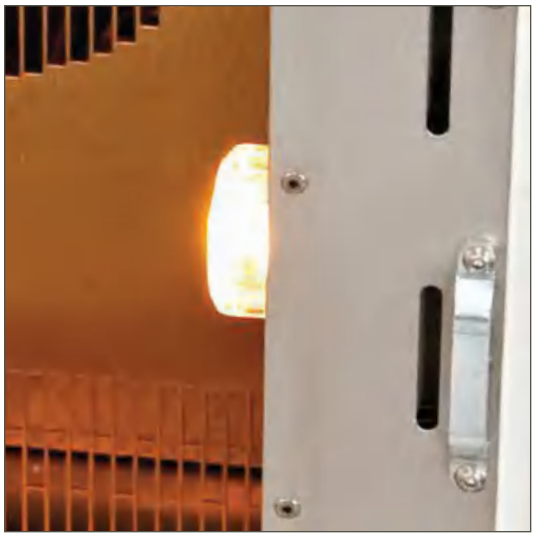
Request an Accessories Catalog for a full list of accessories

Great Features with Real Benefits

Enhance Ease of Use, Safety, and Applications Coverage



Advanced functions include 8-segment Ramp/Dwell, USB interface, and Analog DC output capability



Internal light makes test area easily visible when the door is closed.

Removable wedge ports provide quick and easy loadstring setup and incorporate instrumentation cut-outs for extensometer cables without interfering with the pull rods.

Dedicated cryogen exhaust port makes safe venting simple.

- Full 3-term PID temperature controller with auto-tune combines simplicity and flexibility to cover a range of testing requirements.
- Selectable slow fan speed improves testing of delicate specimens at low forces by reducing air turbulence.
- Interlock switch on floor model chambers for water-cooled grips shuts chamber down automatically if water flow is interrupted.

Triple-pane, optical quality borosilicate glass window with twin cartridge heaters for minimizing frosting and misting when testing at low temperatures.

Fully compatible with Instron® non-contacting video extensometers for testing delicate specimens or where contacting devices cannot be used due to extreme temperatures.

Optional roller mounting allows the chamber to be easily removed from the test space.

Specifications

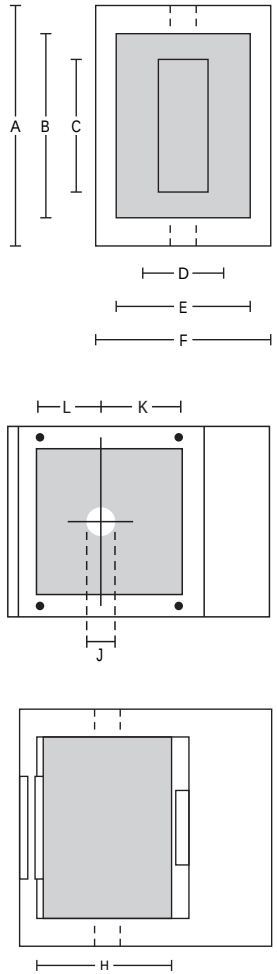
	TABLE MODELS		FLOOR MODELS				
	3119-605/-606/-609	3119-615	3119-607/-610	3119-608	3119-616	3119-617	3119-618
Maximum Temperature	**+350°C (660°F)**	**+350°C (660°F)**	**+350°C (660°F)**	**+600°C (1112°F)**	**+350°C (+660°F)**	**+350°C (+660°F)**	**+350°C (+660°F)**
Minimum Temperature (Requires Cooling Option)	-100°C (-150°F) - LN_2 -70°C (-95 °F) - CO_2	-100°C (-150°F) - LN_2 -70°C (-95 °F) - CO_2	-150°C (-238°F) - LN_2 -70°C (-95 °F) - CO_2	-150°C (-238°F) - LN_2 -70°C (-95 °F) - CO_2	-80°C (-112°F) - LN_2	-80°C (-112°F) - LN_2	-80°C (-112°F) - LN_2
Heat-Up Time to Maximum or Stated Temperature from Ambient Including Typical Load String	Better than 50 Minutes (120/240V) Better than 100 Minutes (100/200V)	Better than 50 Minutes (120/240V) Better than 100 Minutes (100/200V)	Better than 25 Minutes (240V) Better than 35 Minutes (200V)	Better than 60 Minutes (240V)	Typically 120 Minutes to 250°C (Depending on load string)	Typically 120 Minutes to 250°C (Depending on load string)	Typically 120 Minutes to 250°C (Depending on load string)
Heating Method	Forced Convection	Forced Convection	Forced Convection	Forced Convection	Forced Convection	Forced Convection	Forced Convection
Cool Down Time to Minimum or Stated Temperature from Ambient Including Typical Load String	Better than 20 Minutes (LN_2 to -100°C) Better than 15 Minutes (CO_2 to -70°C)	Better than 20 Minutes (LN_2 to -100°C) Better than 15 Minutes (CO_2 to -70°C)	Better than 40 Minutes (LN_2 to -150°C) Better than 30 Minutes (CO_2 to -70°C)	Better than 40 Minutes (LN_2 to -150°C) Better than 30 Minutes (CO_2 to -70°C)	Typically 120 Minutes to -70°C (Depending on load string)	Typically 120 Minutes to -70°C (Depending on load string)	Typically 120 Minutes to -70°C (Depending on load string)
Typical LN_2 Consumption to Achieve Specified Temperature at Grip from Ambient	3 Liters to -30°C (-22°F) 7 Liters/Hr Steady State 7 Liters to -100°C (-150°F) 12 Liters/Hr Steady State[1]	3 Liters to -30°C (-22°F) 7 Liters/Hr Steady State 7 Liters to -100°C (-150°F) 12 Liters/Hr Steady State[1]	7 Liters to -30°C (-22°F) 10 Liters/Hr Steady State 25 Liters to -150°C (-238°F) 20 Liters/Hr Steady State[2]	7 Liters to -30°C (-22°F) 10 Liters/Hr Steady State 25 Liters to -150°C (-238°F) 20 Liters/Hr Steady State[2]	See note 4	See note 4	See note 4
Temperature Stability	±2°C (±3.6°F)	±2°C (±3.6°F)	±2°C (±3.6°F)	±2°C (±3.6°F)	±2°C (±3.6°F)	±2°C (±3.6°F)	±2°C (±3.6°F)
Temperature Gradient	±1% of Set Point after 10 Minutes Stability Time, or ±2°C (±3.6°F) Whichever is Greater[3]	±1% of Set Point after 10 Minutes Stability Time, or ±2°C (±3.6°F) Whichever is Greater[3]	±1% of Set Point after 10 Minutes Stability Time, or ±2°C (±3.6°F) Whichever is Greater[3]	±1% of Set Point after 10 Minutes Stability Time, or ±2°C (±3.6°F) Whichever is Greater[3]	±1% of Set Point after 10 Minutes Stability Time, or ±2°C (±3.6°F) Whichever is Greater[3]	±1% of Set Point after 10 Minutes Stability Time, or ±2°C (±3.6°F) Whichever is Greater[3]	±1% of Set Point after 10 Minutes Stability Time, or ±2°C (±3.6°F) Whichever is Greater[3]
Max Temperature Overshoot	2°C (3.6°F)	2°C (3.6°F)	2°C (3.6°F)	2°C (3.6°F)	2°C (3.6°F)	2°C (3.6°F)	2°C (3.6°F)
Power Requirements	100-120V (30A) or 200-240V (16A) 50/60Hz Single Phase	200 - 240V 50/60Hz Single Phase	200-240V (30A) 50/60Hz Single Phase	240V (30A) 50/60Hz Single Phase	200 - 240V (30A) 50/60Hz Single Phase	200 - 240V (30A) 50/60Hz Single Phase	200 - 240V (30A) 50/60Hz Single Phase

Notes:
1. Based on chamber containing typical 12 kg grips and pull rods such as 2732-008. Total gas consumption will be affected by the duration and frequency of door opening. It will also vary according to the size of the load string and specimen.
2. Based on chamber containing typical 25 kg grips and pull rods such as 2716-002. Total gas consumption will be affected by the duration and frequency of door opening. It will also vary according to the size of the load string and specimen.
3. Temperature measured at the specimen (steel) over a 50 mm (2 in) gauge length. Not applicable within 15°C of ambient.
4. LN2 consumption will be dramatically affected by the load string and testing conditions. Consumption is likely to be at least twice that of 3119-610.

Cryogenic fittings:
Liquid Nitrogen (LN_2) – Pipe thread 1/2 inch BSP male.
Carbon Dioxide (CO_2) - Pipe thread 3/8 inch BSP male.
Instron® reserves the right to change specifications without notice.

We are also able to supply custom variants of our chambers; please contact us if our standard chambers do not meet your requirements.

			TABLE MODELS				FLOOR MODELS					
			3119-605	3119-606	3119-609	3119-615	3119-607	3119-608	3119-610	3119-616	3119-617	3119-618
External Height	A	mm	635	710	810	1010	710	710	810	1050	910	1150
		in	25.0	27.9	31.9	39.8	27.9	27.9	31.9	41.3	35.8	45.3
Internal Height	B	mm	485	560	660	860	560	560	660	900	760	1000
		in	19.1	22.0	26.0	33.9	22.0	22.0	26.0	35.4	29.9	39.4
External Width	F	mm	350	350	350	350	550	550	550	550	550	550
		in	13.8	13.8	13.8	13.8	21.7	21.7	21.7	21.7	21.7	21.7
Internal Width	E	mm	240	240	240	240	400	400	400	400	400	400
		in	9.4	9.4	9.4	9.4	15.7	15.7	15.7	15.7	15.7	15.7
External Depth	G	mm	590	590	590	590	930	930	930	855	855	855
		in	23.2	23.2	23.2	23.2	36.6	36.6	36.6	33.7	33.7	33.7
Internal Depth	H	mm	230	230	230	230	400	400	400	400	400	400
		in	9.0	9.0	9.0	9.0	15.7	15.7	15.7	15.7	15.7	15.7
Pull Rod Port Diameter	J	mm	67	67	67	67	90[1]	90[1]	90[1]	90[1]	135	135
		in	2.6	2.6	2.6	2.6	3.5	3.5	3.5	3.5	5.3	5.3
Pull Rod Port Center to Inside Rear	K	mm	120	120	120	120	200	200	200	200	200	200
		in	4.7	4.7	4.7	4.7	7.8	7.8	7.8	7.8	7.8	7.8
Pull Rod Port Center to Inside Front	L	mm	110	110	110	110	200	200	200	200	200	200
		in	4.3	4.3	4.3	4.3	7.8	7.8	7.8	7.8	7.8	7.8
Window Height	C	mm	350	350	460	640	350	350	460	460	460	460
		in	13.8	13.8	18.1	25.2	13.8	13.8	18.1	18.1	18.1	18.1
Window Width	D	mm	125	125	125	125	125	125	125	125	125	125
		in	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Weight	-	kg	65	65	75	85	135	165	165	165	150	173
		lb	143	143	165	187	297	363	363	363	330	382



Notes:
1. Includes reducer to 67 mm

Overall System Accuracy

Temperature	°C	-150	-100	-40	+200	+350	+600
	°F	-240	-150	-40	+390	+660	+1110
Accuracy	°C	±5.5	±5.0	±4.5	±3.5	±4.5	±5.5
	°F	±10.0	±9.0	±8.1	±6.5	±8.1	±10.0

INSTRON®

"True innovation occurs when product designers and developers show relentless curiosity towards the needs of their customers. This builds an understanding that allows them to anticipate and create a new suite of solutions that are Simpler, Smarter, and Safer."

Yahya Gharagozlou

Group President
ITW Test & Measurement

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