

High Temperature Creep and Stress Rupture Testing Machine

GWT Series

30kN-100kN

Introduction:

GWT Series high temperatures creep and stress rupture testing machine is mainly designed for measuring the creep and permanence property of various metal and alloy materials under high temperature condition by equipping with SANS new designed three-zone high temperature furnace. GWT series apply high precise lever and lockable counterbalance weight which provide constant load via real time adjustment during the test and carry out automatic control by using PLC control system. With high accuracy, long-term reliability and excellent qualities, this model dedicate to creep testing under extremely high temperatures till stress to rupture and Fatigue compression test under constant loading by providing a choice of capacities from 30kN to 100kN

Creep and Stress Rupture



Fig1. GWT Series high temperatures creep and stress rupture testing machine

Instruction & Configuration:

GWT Series have four chromium plated steel columns and solid upper and lower crossheads. The

load frame is supported by a completely enclosed robust base unit. The upper crosshead carries

the lever assembly which includes a lockable counterbalance weight. There are hardened knife-edges at all fulcrums. By means of this single lever arrangement, slotted incremental weights, carried by a weight pan/rod assembly, apply load through the test specimen. (The model GWT804&GWT105 utilizes a double lever arrangement). Accurate axial loading of the specimen is ensured by a co-planar knife-edged

coupling, located at each end of the loading string. The loading string and furnace are aligned to the centre of the two front columns. The three-zone open cylindrical furnace is attached to the front rotary columns of the load frame.

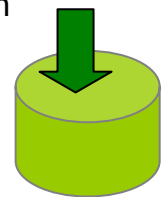
Fig2. GWT105 with standard PC and printer



Drive system:

The correct load is applied to the specimen when the lever is in the horizontal position. To reposition the lever manually, the loading string can be raised or lowered by rotating the chromium plated capstan handwheel at the rear of the base unit. Through a 100:1(40:1 and 50:1 applied in GWT304 and GWT504) ratio worm gearbox and drive shaft, the lead screw connected to the lower loading bar can be adjusted up to its full travel of 200 mm(150mm applied in GWT304 and GWT504). However, automatic lever leveling is highly recommended. An opposing pair

of photoelectric switches fixed to the lever detects movement of the lever from the horizontal plane, and then activates an electric motor which drives the lead screw to correct the position of the lever. In the event of furnace failure, the automatic lever leveling system will maintain the correct test load on the specimen as the furnace cools down. The drive system includes, over travel trips and an anti-torque bar assembly which prevents any torsional loading of the specimen during lever repositioning. The GWT Series lever calibrates to BS 1610 Grade



1/0.5 (applied load).

Typical features:

This machine was designed for the laboratory requiring a large number of test points within a limited floor area. It is compact but versatile in its operation and requires no special foundations. Four loading strings, each with a maximum load capacity of up to 100 kN, are placed inside one

furnace operating at temperatures up to 1200°C. Shock absorbers prevent vibrations being transmitted to other loading strings when a specimen failure occurs. In the event of a power or furnace failure, the system 'fails safe'.

High Temperature Furnace:

SANS new designed three-zone open cylindrical furnace features ceramic fiber insulation structure which is the first application in China. The heating elements are

and reliably continuous operation up to the specified maximum temperature. During the test the temperature is controlled directly by a thermocouple on the test



Fig3. Three -zone High temperature Furnace

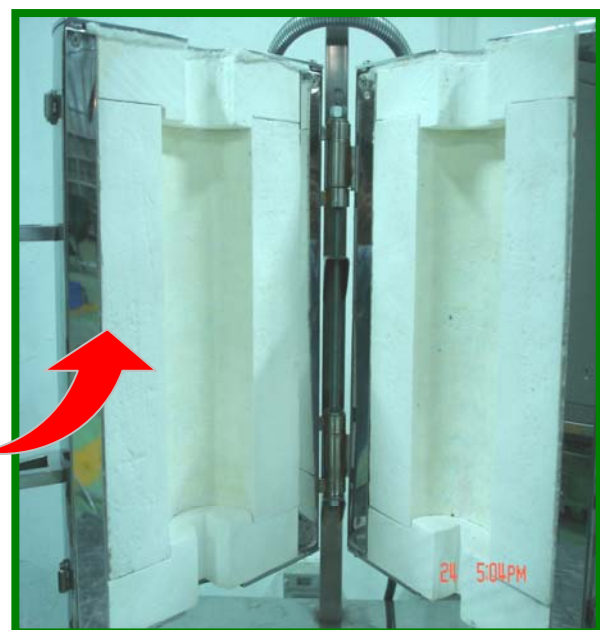


Fig4. Inner Configuration of High Temperature Furnace

individually take action on ceramic half tube sections, and provide three heat zones for excellent control of temperature gradients

0specimen. The three-zone controllers incorporate the microprocessor based instruments which give three-term control and

digital display. Proportional band, integral and derivative time constants, cut back and heat power limit are standard features. In addition, a range of test

chamber assemblies is available for use inside the high temperature furnaces, thus allowing creep studies under hostile atmospheric conditions.

Temperature Controller:

SANS temperature Control systems are designed for controlling the heat output of furnaces in testing of creep, stress-rupture, or hot tensile systems and others. The system is compatible with all furnace systems offered as new equipment and can be configured to operate nearly any furnace with any one of several different thermocouple types.

SANS can also provide a fully computerized supervision, monitoring and data logging system for both mechanical and electronic creep machines. This creep laboratory management

system is designed to monitor up to 101 individual machines or test points on a minute by minute basis. A complete laboratory status display keeps the supervisor constantly up to date with exactly what is happening at each test point. Errors and warnings are audible and visual, and are shown on the computer screen as well as recorded on a printout. Using the in-built databases of available equipment including: test point type, weights, furnaces, thermocouples and round ridged, round grooved and flat test specimens and are of twin transducer design.



Fig5. Temperature Controller for high temperature furnace

Technique Specifications:

Model	GWT304	GWT504	GWT804	GWT105
Load range	0.6kN-30kN	1kN-50kN	1kN-80kN	1kN-100kN
Accuracy	Grade 0.5/1			
Load measurement accuracy	≤±1% of indicating			
Load deflection	≤±1% of indicating			
Axiality	≤±10%			
Load resolution	1 N			
Lever arrangement	single	single	double	Double
Lever ratio	1:40	1:50	1:100	1:100
Lever self-leveling range	±0.10mm		±0.10mm	
Lower pull bar travel	150mm		200mm	
Lower pull bar speed	Slow speed (self leveling): 2.5mm/min			
	Fast speed: 50mm/min			
Leveling motor type	370W	550W	750W	1.1kW
Furnace type	Three zone open			
Temperature range	200-1100°C			
Medial temperature zone range	>150mm			
Temperature fluctuation & Temperature gradient	temperature	Temperature fluctuation	Temperature gradient	
	≤600	±2	2	
	600-900	±3	3	
	900-1100	±4	4	

Creep testing specification:

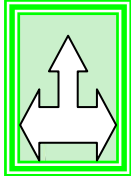
Deformation measurement range: depends on customers' requirement

Deformation measurement accuracy: $\leq 1\%FS$

Deformation measurement resolution: 0.001mm

Power: standard optional voltages 220/240 VAC, 50– 60 Hz; power must be free of spikes and surges exceeding 10% of the nominal voltage

Specifications subject to change without notice



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