

## Compression

### Compression Set Apparatus (Constant Strain)

The 'set' is the residual strain in a rubber test piece after it has been subjected to stress for a given time and then allowed to recover for a given time, the temperature being substantially constant during the test. 'Compression Set' is the residual compression strain after compression, (a) to a given compression strain, or (b) a given compression stress.

Wallace provide 2 models using the constant strain method of testing - the WAC3 model (ISO Standard) and the WAC4 model (ASTM Standard). Each model has 3 versions covering single, double and triple daylight.

#### Features

- Measures set at constant strain
- Machined to high quality
- One, two or three samples per fixture
- Circular cutters to prepare samples



#### Principle of Operation

Two or more circular steel plates, 12.5mm thick and 126mm diameter, are clamped together with three bolts. Spacers of the appropriate thickness in the form of rings around each bolt are placed between the plates to control the thickness of the test pieces whilst compressed. Loose stainless steel discs are interleaved between the main plates to provide a highly polished surface in contact with the test pieces. These discs may easily be replaced should they become scratched, pitted or damaged.

The apparatus is available with single daylight (2 plates), double (3 plates) and triple daylight (4 plates). It can also be supplied with spacers of the required thickness to meet the ISO (Model C3) or the ASTM (Model C4) specifications. When ordering please state whether ISO or ASTM model is required, and also the number of daylight (or the number of plates).

#### Test Procedure

Cylindrical test specimens are cut or moulded and then conditioned and their thickness measured as specified, using a Wallace Thickness Gauge (WAS4).

Test pieces of either 13mm diameter or 29mm diameter may be used. The two types of test pieces do not necessarily give the same values of compression set, and comparison of values from the two types should be avoided. The test pieces are placed between the plates of the apparatus and the bolts tightened uniformly until the plates are in contact with the spacers. After a predetermined period the load is removed and the test pieces allowed to recover. Their thickness is again measured. Compression set at constant strain is the difference between the original thickness of the test piece and that after recovery expressed as a percentage of the initially applied compression.

$$\text{Compression set at constant strain} = \frac{t_o - t_r}{t_o - t_s} \times 100$$

Where  $t_o$  = original thickness of test piece  
 $t_r$  = thickness of test piece after recovery  
 $t_s$  = thickness of the spacer

In order to measure the thickness, Wallace also supplies a Digital Bench Thickness Gauge.

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### Models

#### British Standard Model - WAC3

Single daylight (2 plate) WAC3/1  
Double daylight (3 plate) WAC3/2  
Triple daylight (4 plate) WAC3/3

#### ASTM Standard Model - WAC4

Single daylight (2 plate) WAC4/1  
Double daylight (3 plate) WAC4/2  
Triple daylight (4 plate) WAC4/3

**NOTE:** If you would like to undertake a compression stress test please refer to the WAC11/1 & WAC11/6 jigs.



### Specifications

Compression Set Apparatus - C3			
	C3/1 Single Daylight	C3/2 Double Daylight	C3/3 Triple Daylight
Part Number	WAC3/1	WAC3/2	WAC3/3
Dimensions (mm)	60 (h) x 126 (Ø)	80 (h) x 126 (Ø)	100 (h) x 126 (Ø)
Weight	3.2kg	4.5kg	6.3kg
Operating Temperature	10 to 500°C; Altitude 2000m maximum		
Humidity Range	10 to 80% RH non-condensing		

Compression Set Apparatus - C4			
	C4/1 Single Daylight	C4/2 Double Daylight	C4/3 Triple Daylight
Part Number	WAC4/1	WAC4/2	WAC4/3
Dimensions (mm)	60 (h) x 126 (Ø)	80 (h) x 126 (Ø)	100 (h) x 126 (Ø)
Weight	3.2kg	4.5kg	6.3kg
Operating Temperature	10 to 500°C; Altitude 2000m maximum		
Humidity Range	10 to 80% RH non-condensing		

### Standards

ISO 815, ASTM D395

