SCIENTICO INDIA
Manufacturer & Exporter · Ambala, Haryana, India

PRODUCT DATA SHEET
Catalogue reference for product evaluation

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Three Hinged Arch Apparatus | FortiTestX - 26

Category: Scientico · **Country of Origin:** India

Product Overview

Three Hinged Arch Apparatus FortiTestX 26 is a benchtop strength of materials lab equipment unit for investigating statically determinate three-hinged arch behaviour under point loads, distributed loads, and moving loads. The apparatus uses three aluminium arch segments (2 x 480 mm long, 1 x 230 mm short) to form symmetrical (960 mm) and asymmetrical (710 mm) arch configurations, both 245 mm in height. Three hinges, one crown hinge at the centre and two abutment hinges at the bearing points, render the system statically determinate. Four calibrated weight sets compensate for abutment support reactions, enabling direct comparison of calculated and measured values. Seven defined experiments cover horizontal thrust investigation, influence line determination, and bearing force calculation under static and moving loads. All components are stored in a dedicated storage system within the frame. Optional LabVIEW-based software (FX-26) enables data logging on Windows. This three hinged arch apparatus strength of materials lab equipment unit is manufactured by SCIENTICO to ISO 9001:2015 standards; CE marked.

View this product online: https://scienticoindia.com/product/three-hinged-arch-apparatus-fortitestx-26/



Request a model-specific quotation
Include quantity and delivery country.

Technical Specifications

Three Hinged Arch Apparatus FortiTestX 26 - Technical Specifications

Field	Details
Product Name	Three Hinged Arch Apparatus FortiTestX 26
Model Reference	FortiTestX 26
Product Category	Strength of Materials Lab Equipment
Apparatus Type	Benchtop three-hinged arch investigation unit
Arch Material	Aluminium
Long Arch Segments	2 x 480 mm (symmetrical total length 960 mm)
Short Arch Segment	1 x 230 mm (asymmetrical total length 710 mm with one long segment)
Arch Height	245 mm
Hinge Configuration	1 crown hinge, 2 abutment hinges
Arch Configurations	Symmetrical (2 long), asymmetrical (1 long, 1 short)
Load Types	Point load, distributed load, moving load
Weight Sets	4 sets for support reaction compensation
Moving Load	6 x 5 N

Field	Details
Storage	Dedicated storage system within frame
Optional Software	FX-26 (LabVIEW-based DAQ, Windows compatible)
Manufacturer	SCIENTICO, Ambala Cantt, India
Certifications	ISO 9001:2015, CE Marked

Technical Data, Arch Segments

Segment	Length	Quantity
Long arch segment	480 mm	2
Short arch segment	230 mm	1
Symmetrical total arch length	960 mm	1 configuration
Asymmetrical total arch length	710 mm	1 configuration
Arch height	245 mm	All configurations

Technical Data, Weights

Item	Quantity
0.5 N (hanger)	4
0.1 N	20
0.5 N	8
1 N	8
2 N	8
5 N	8
5 N (moving load)	6

Key Features

Key Features

- **Complete Unit:** Three hinged arch apparatus strength of materials lab equipment unit with frame, 3 arch segments, 4 weight sets, storage system, and instruction manual all supplied
- **Arch Segments:** 3 aluminium segments: 2 x 480 mm long, 1 x 230 mm short
- **Configurations:** Symmetrical arch (960 mm total) and asymmetrical arch (710 mm total), both 245 mm height
- **Hinges:** 3 total: 1 crown hinge at centre, 2 abutment hinges at bearing points
- **Static Determinacy:** Crown hinge renders the full system statically determinate
- **Abutment Hinges:** Absorb both vertical and horizontal forces at the bearing points
- **Load Types:** Point load, distributed load, and moving load all supported
- **Support Reaction Compensation:** 4 weight sets compensate abutment hinge support reactions for calculated versus measured comparison
- **Influence Lines:** Moving load set (6 x 5 N) for determination of influence lines at the supports
- **Storage:** All components neatly organised in dedicated storage system within the frame
- **Optional Software (FX-26):** LabVIEW-based, Windows compatible, data logging and results processing
- **Certifications:** ISO 9001:2015 certified; CE marked

Experiments

- Familiarisation with three-hinged arches: symmetrical and asymmetrical configurations
- Application of the method of sections and conditions of equilibrium to calculate bearing forces under point load

- Application of the method of sections and conditions of equilibrium to calculate bearing forces under distributed load
- Application of the method of sections and conditions of equilibrium to calculate bearing forces under moving load
- Investigation of the influence of load on horizontal thrust in the supports
- Determination of lines of influence for supports under moving load
- Comparison of calculated and measured support reactions for static and moving load

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Construction and Design

Three Hinged Arch Apparatus FortiTestX 26 is constructed as a rigid benchtop strength of materials lab equipment unit with the complete arch assembly mounted within a structural frame. Three aluminium arch segments connect via hinged joints: two long segments (480 mm each) form the symmetrical arch with a total length of 960 mm, while one long and one short segment (230 mm) form the asymmetrical arch with a total length of 710 mm. Arch height is 245 mm in both configurations. The crown hinge at the centre and two abutment hinges at the bearing points create the three-hinge system that renders the structure statically determinate. Abutment hinges resist both vertical and horizontal forces at the supports, producing the characteristic horizontal thrust of the arch form. Loads are applied using calibrated weight sets for point and distributed loading, and a dedicated moving load set of 6 x 5 N weights for influence line experiments. Four weight sets compensate for abutment hinge support reactions, allowing direct numerical comparison of calculated and measured values. All components of this three hinged arch apparatus are neatly organised and stored in a dedicated storage system within the frame. All construction and materials conform to ISO 9001:2015 quality standards and meet CE marking requirements.

Software - FX-26 (Optional)

Customised software designed in the National Instruments LabVIEW environment for data logging and results processing. Compatible with any Windows-based operating system. The software is optional and selected independently of the base unit.

Scope of Delivery

- 1 x Experimental unit (Three Hinged Arch Apparatus FortiTestX 26)
- 3 x Arch segments (2 x long 480 mm, 1 x short 230 mm)
- 4 x Sets of weights
- 1 x Thread
- 1 x Instruction manual

Ordering & Delivery

- Send the product name, quantity, delivery country and destination with your enquiry.
- Production schedule, freight, payment terms and export documents are confirmed in the written quotation.

Frequently Asked Questions

Q1: What arch configurations are possible with the Three Hinged Arch Apparatus FortiTestX 26?
Two configurations are possible. The symmetrical arch uses both long segments (480 mm each) for a total arch length of 960 mm. The asymmetrical arch uses one long segment and the short segment (230 mm) for a total arch length of 710 mm. Both configurations share the same arch height of 245 mm.

Q2: Why is the crown hinge important in the FortiTestX 26?
The crown hinge at the centre of the arch, combined with the two abutment hinges at the bearing points, creates the three-hinge system that renders the entire structure statically determinate. Without the crown hinge, the arch would be statically indeterminate and the support reactions could not be calculated using equilibrium conditions alone.

Q3: How are support reactions measured and verified in the FortiTestX 26?
Four sets of calibrated weights compensate for the support reactions at the abutment hinges. The weight values required to achieve equilibrium at each support correspond directly to the measured support reaction forces, which are then compared against values calculated using the method of sections and equilibrium conditions.

Q4: What load types can be applied to the Three Hinged Arch Apparatus FortiTestX 26?
Three load types are supported: point loads and distributed loads applied using the static weight sets (0.1 N, 0.5 N, 1 N, 2 N, and 5 N weights), and moving loads applied using the dedicated moving load set of 6 x 5 N weights for influence line determination experiments.

Q5: What is the significance of horizontal thrust in the three-hinged arch experiments?
Horizontal thrust is the inward horizontal force generated at the abutment supports as a result of the arch form under vertical loading. It

is the key structural characteristic of arch construction: by introducing horizontal thrust, the arch substantially reduces bending moments in the structure compared to a straight beam of equivalent span, allowing longer spans with lower material stress.