SCIENTICO INDIA
Manufacturer & Exporter · Ambala, Haryana, India

PRODUCT DATA SHEET
Catalogue reference for product evaluation

Phone: +91 7015865225 **Email:** info@scienticoindia.com **Web:** scienticoindia.com **Address:** #71, Industrial Area, Ambala Cantt, Haryana, India

Equilibrium of Parallel Forces Apparatus | FrixoDynamics FX-525

Category: Forces and Friction · **Order Code:** FX-525 · **Country of Origin:** India

Product Overview

The SCIENTICO Equilibrium of Parallel Forces Apparatus is a frame-mounted experimental unit for the verification of equilibrium conditions for sets of parallel coplanar forces acting on a rigid body. Made by Scientico India, ISO 9001:2015 certified, and supplied with a calibration certificate and operation manual.

View this product online: https://scienticoindia.com/product/equilibrium-of-parallel-forces-apparatus-frixodynamics-fx-525/



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

Technical Specifications

Parameter	Specification
Model	FrixoDynamics FX-525
Mounting	Universal Frame and Stand
Truss Models	2 acrylic models, Warren truss, N-truss (engraved)
Circular Disc	Perspex, 12 peripheral attachment points
Counterbalancing	Each acrylic model fitted with counterbalancing weight
Force Application	Nylon cords, dead weights on hangers, double pulleys
Force Recording	Cord lines transferred to A1 paper on force board
Weight Set	5 x 0.5 N hangers, 10 x 5 N, 10 x 2 N, 10 x 1 N, 10 x 0.5 N
Rings	2
A1 Paper	Not supplied
Scope of Delivery	1 experimental unit, 5 sets of weights, 2 rings, 1 thread, 1 instructional manual

Key Features

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- Two acrylic truss models, Warren and N-type, engraved with structural geometry for realistic parallel force loading scenarios

- Each acrylic model counterbalanced to render it effectively weightless, isolating the deliberately applied forces as the sole variables in the experiment
- Circular Perspex disc with 12 peripheral attachment points for systematic couple equilibrium experiments across a range of couple arm positions
- Double pulleys redirect cord directions, allowing both downward loads and upward reactions to be applied using hanging weights throughout
- Force lines transferable directly onto A1 paper clipped to the force board for permanent graphical record and link polygon construction
- Large, comprehensive weight set, 10 pieces each of 5 N, 2 N, 1 N, and 0.5 N, supports a wide range of load combinations across all experiment configurations
- Supports graphical verification of link polygon (ΣM = 0) and algebraic verification of vertical force equilibrium (ΣFv = 0)
- All assembly and operational tools provided with the unit

Applications

- Experimental verification of the conditions ΣFv = 0 and ΣM = 0 for sets of parallel coplanar forces on a rigid body
- Investigation of the special case of a couple, equal, opposite, and non-collinear parallel forces acting on a body
- Verification of the equilibrium of opposing couples using the 12-point circular Perspex disc
- Graphical verification of the link polygon for parallel force systems
- Application of parallel force equilibrium principles to Warren truss and N-truss structural geometries
- Study of the relationship between applied loads, reactions, and moment equilibrium in simply supported structural models
- Undergraduate laboratory practicals in statics, structural mechanics, applied mechanics, and civil and mechanical engineering

Construction and System Design

The FX-525 is mounted in a Universal Frame and Stand that holds the force board in a fixed upright position. The force board provides a flat, stable surface to which A1 paper is clipped for recording cord lines during experiments. The two acrylic models are attached to the force board in turn, with the counterbalancing weights ensuring that each model contributes no net force or moment to the system beyond those intentionally applied through the cords.

Nylon cords are attached to the model's load and reaction points and routed over double pulleys fixed to the frame. The pulleys redirect the cord directions as needed, ensuring that all forces, including upward support reactions, are generated by hanging dead weights rather than by spring or mechanical loading mechanisms. This approach maintains the simplicity and accuracy of the force application, and ensures that every force in the system is precisely known from the hanging weight value.

The circular Perspex disc is fixed to the force board at its centre for the couple experiments. Twelve equally spaced attachment points around the perimeter allow cords to be attached at any combination of positions. Opposing couples are formed by applying equal and opposite forces at symmetrically selected points, and the equilibrium condition is verified by confirming that the net moment about the disc centre is zero. The two rings provided are used for cord attachment at the model's node points and disc periphery attachment positions.

The comprehensive weight set, with 10 pieces each of 5 N, 2 N, 1 N, and 0.5 N across five hangers, provides sufficient range and resolution to construct multiple distinct load configurations on the same model within a single session, supporting both introductory parallel force experiments and more complex multi-load moment verification exercises.

Export and Supply Capability

The SCIENTICO FrixoDynamics FX-525 is available for supply to engineering colleges, technical universities, civil and mechanical engineering departments, research institutions, and industrial training centres. SCIENTICO manufactures and exports laboratory equipment to institutions and distributors across multiple regions. Standard packaging is suitable for international shipment. Bulk orders, customised configurations, and institutional procurement enquiries are welcomed. Please contact SCIENTICO directly for pricing, lead times, and shipping terms.

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 is the equilibrium of parallel forces apparatus used for?

The FX-525 is used to verify the conditions for equilibrium of parallel coplanar forces acting on a rigid body, specifically that the algebraic sum of all vertical forces equals zero (ΣFv = 0) and the algebraic sum of all moments about any point equals zero (ΣM = 0). Students apply controlled loads and reactions to acrylic truss models using cords and hanging weights, record the force lines on paper, and verify equilibrium using both algebraic calculation and graphical link polygon construction.

Q2: What is a couple, and how does the FX-525 demonstrate couple equilibrium?

A couple consists of two equal, opposite, and non-collinear parallel forces acting on a body. The net force of a couple is zero, but the net moment is non-zero and equal to the product of one force and the perpendicular distance between the two force lines. The FX-525 demonstrates couple equilibrium using the 12-point Perspex disc, where opposing couples are applied at different peripheral attachment points. Equilibrium requires the two couple moments to be equal and opposite, verified by confirming ΣM = 0 about the disc centre.

Q3: Why are the acrylic truss models counterbalanced?

The counterbalancing weights render each acrylic model effectively weightless in the experimental setup. Without counterbalancing, the model's own weight would act as an additional downward force in the system, complicating the force balance and introducing an uncontrolled variable. By neutralising the model's self-weight, the counterbalancing ensures that only the deliberately applied cord loads and reactions contribute to the force system, making the experimental conditions consistent with the theoretical parallel force equilibrium problem.

Q4: What is the link polygon method, and how is it verified using the FX-525?

The link polygon is a graphical method for verifying moment equilibrium in a parallel force system. It involves constructing a force polygon from the known vertical forces and then drawing a series of rays from a chosen pole point, generating link lines that form a closed polygon when the system is in moment equilibrium. The FX-525 supports link polygon construction by allowing students to transfer cord lines onto A1 paper on the force board, providing an accurate graphical record of the force positions and magnitudes from which the polygon is constructed and closure verified.

Q5: What is included in the scope of delivery for the FX-525?

The FX-525 is supplied as a complete experimental kit including: one parallel forces experimental unit with Universal Frame and Stand, force board, two counterbalanced acrylic truss models (Warren and N-type), Perspex circular disc with 12 attachment points, double pulleys, and nylon cords; five sets of calibrated weights (5 x 0.5 N hangers, 10 x 5 N, 10 x 2 N, 10 x 1 N, 10 x 0.5 N); two rings; one thread; and one comprehensive instructional manual covering assembly, experimental procedures, example results, and graphical verification methods. A1 paper for the force board is not supplied.

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