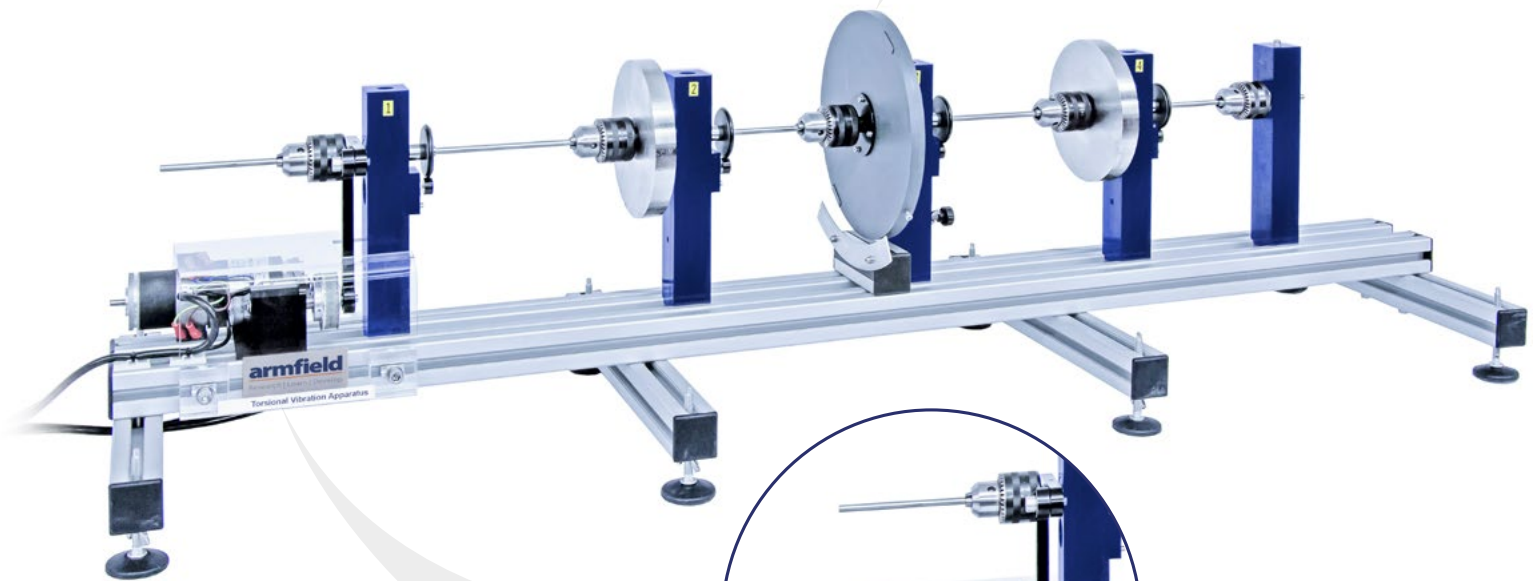


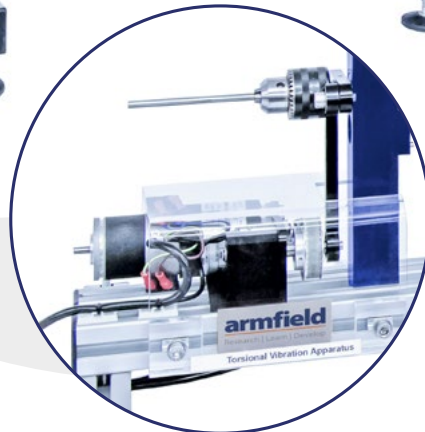
This benchtop mounted unit is used to study torsion and torsional vibration. Also supplied with the apparatus is a manual torsion arrangement, which allows a known angular twist to be applied to the specimen. A cord is wrapped around one of the large discs and a load is applied via a hanger and weights set. The angle of twist for incremental loading is recorded and the modulus of rigidity can be calculated. Oscillations sensors are mounted integrally with each mass.

**BENCH TOP UNIT DESIGNED TO STUDY TORSION AND TORSIONAL VIBRATION**

SD3 Manual Twist of specimen using set of weights and hanger



SD3 Torsional Vibration Apparatus



SD3 Fully guarded motor

**Experimental content**

- ▶ Determination of the torsional stiffness of a torsion bar
- ▶ Determination of the mass moment of inertia
- ▶ Decay behaviour of torsional vibration
- ▶ Forced torsional vibration and resonance
- ▶ Torsional vibration system with three weights allowing single, two and three mass torsional vibration to be investigated
- ▶ Demonstration of the effect of frictional damping

UK office - email: [sales@armfield.co.uk](mailto:sales@armfield.co.uk) tel: +44 (0) 1425 478781 (for ROW)  
USA office - email: [info@armfield.inc](mailto:info@armfield.inc) tel: +1 (609) 208-2800 (USA only)

Issue: 1

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Applications

ME CE IP

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## Description

This benchtop mounted unit is used to study torsion and torsional vibration. The apparatus is constructed around a profiled aluminium base with levelling feet, onto which is mounted 4 vertical chuck pillars.

Each pillar contains a central shaft running in precision bearings with a chuck at one end which grips a torsion specimen. Each chuck also contains a large disc of varying mass and inertia. With these chucks it is possible to assemble a torsion specimen with up to 3 masses.

Vibrations are transmitted into the torsion specimen by means of an exciter, which is electronically speed controlled from the main control unit. To change the end conditions of the apparatus a fifth chuck houses a chuck which rigidly clamps the end of the torsion specimen to achieve a fixed end.

Also supplied with the apparatus is a manual torsion arrangement, which allows a known angular twist to be applied to the specimen. A cord is wrapped around one of the large discs and a load is applied via a hanger and weights set.

The angle of twist for incremental loading is recorded and the modulus of rigidity can be calculated. Oscillations sensors are mounted integrally with each mass pillar and provide signals of the amplitude of vibration.

The control unit conditions these signals and makes them available to an oscilloscope (not supplied) for vibration analysis.

## Ordering specification

- ▶ 1 x SD3 Torsional Vibration Apparatus
- ▶ 1 x Control console
- ▶ 1 x Power lead
- ▶ 5 x Spare fuse
- ▶ 4 x BNC cable
- ▶ 1 x Spare timing belt
- ▶ 1 x Tape measure
- ▶ 1 x Stop watch
- ▶ 1 x Load hanger
- ▶ 1 x Hex wrench set
- ▶ Instruction manual
- ▶ Packing list
- ▶ Test sheet

## Technical specification

- ▶ **Stainless steel torsion specimen:** 1300mm long x  $\varnothing$ 6mm
- ▶ **Crank offset:** 0.15mm
- ▶ Up to 20Hz excitation frequency
- ▶ 20mm thick x  $\varnothing$ 150mm inertia disc (2 off) – Steel
- ▶ 15mm thick x  $\varnothing$ 228mm inertia disc (1 off) – Plastic
- ▶ 6 x 5N Weights

## Overall dimensions

Length	1.400m
Width	0.410m
Height	0.400m

## Packed and crated shipping specifications

Volume	0.52m <sup>3</sup>
Gross weight	70kg

## Related laws

- ▶ Torsion
- ▶ Torsional stiffness
- ▶ Resonance
- ▶ Multi-mass torsional systems

## Requirements

## Scale



**Electrical supply:** 110/120V, 60Hz or 220/240V, 50Hz

- ▶ PC with a USB port, running Windows 7 or above

## Essential accessories/equipment

- ▶ **AIU:** Armfield Interface Unit (Sold separately)

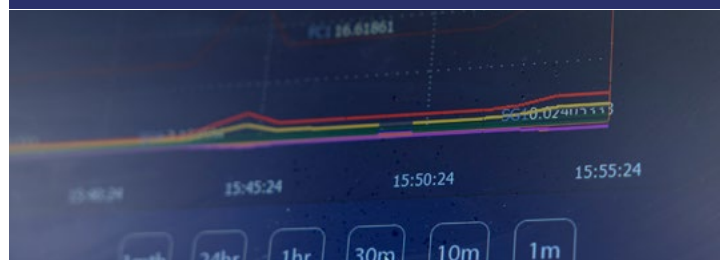
## Recommended accessories / equipment

- ▶ **INST063:** PC USB Oscilloscope

## Features / benefits

- ▶ Very visual demonstration of torsional vibration
- ▶ Fully guarded motor
- ▶ Free and fixed end conditions
- ▶ Oscillation speed digitally controlled and displayed
- ▶ Manual twist of specimen using set of weights and hanger
- ▶ Mechanical damping supplied
- ▶ Optional digital oscilloscope (INST063)
- ▶ Supplied with software

## Graphing detail



## Operational conditions

- ▶ **Storage temperature:** -10°C to +70°C
- ▶ **Operating temperature range:** +10°C to +50°C
- ▶ **Operating relative humidity range:** 0 to 95%, non-condensing

## Ordering codes

- ▶ **SD3:** Torsional Vibration Apparatus
- ▶ **AIU:** Armfield Interface Unit (Sold separately)
- ▶ **INST063:** PC USB Oscilloscope

Armfield standard warranty applies with this product

## Knowledge base

- > 28 years expertise in research & development technology
- > 50 years providing engaging engineering teaching equipment

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## Aftercare

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Commissioning  
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