

R07802

Midi Ripple Tank

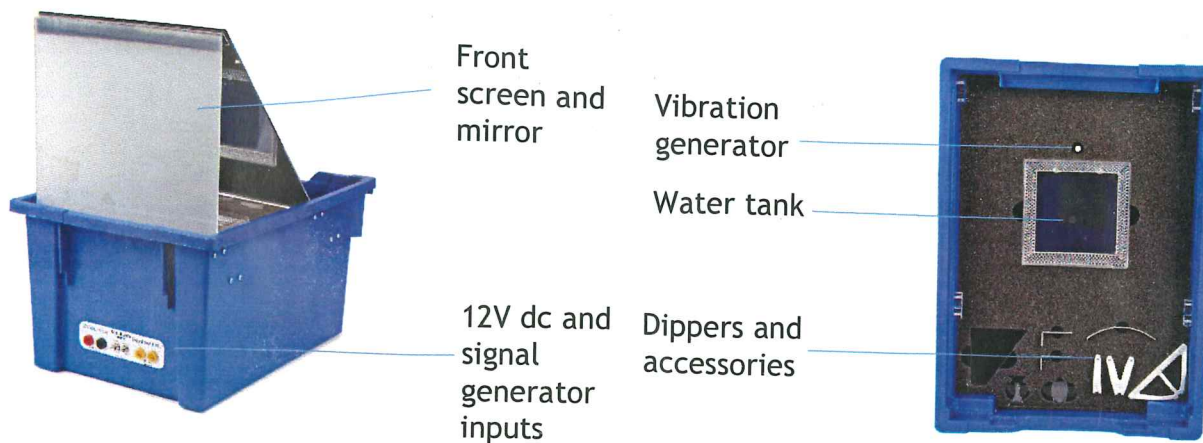
NFU 905



### Purpose

The Unilab Midi ripple tank provides a simple and effective method for students to investigate the properties of waves. The tank is completely self-contained, requiring minimal set-up compared to traditional equipment. Simply add water and connect to a power signal generator and a 12V dc power supply and you are ready to go. The Midi ripple tank incorporates a built-in LED stroboscope to provide perfectly stationary images and the large front facing screen makes this ripple tank ideal for demonstrations. The ripple tank comes complete with an extensive range of accessories, all housed in a custom foam insert, including three dippers and a selection of barrier shapes and lenses. The whole ripple tank is housed within a Grateknells tray for easy transport and storage.

### Apparatus Details



## Specification

input impedance	35 Ohm (Typ)
supply voltage	12Vdc (max)
Screen size	250 x 275mm

## Applications

- Properties of water waves
- Properties of waves in general
- Diffraction, refraction, reflection and interference

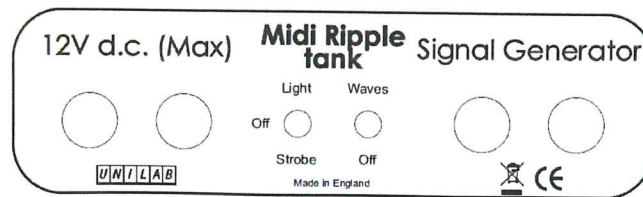
## Equipment required

- 12V dc power supply
- Power signal generator
- 4 x 4mm test leads
- Water and surfactant

## Operating Procedure

Waves are generated in a small, rectangular tank which is placed on a raised shelf over the internal illumination source. The wave generator is built into the body of the unit and has an electronic drive circuit which can be synchronised to the light source. Dippers can be attached to the generator by simply pushing them onto the stem. A mirror and screen are situated above the tank and images of the waves are projected on to the front screen for study. When access to the tank is required, the mirror and screen can be removed. The sides of the tank are specially designed to absorb waves thus avoiding multiple reflections which could cause confused patterns.

## Getting started



- Place the unit on a level bench and connect a 12V dc power to the 4mm sockets on the front using 4mm leads.
- Connect the power signal generator (low impedance output) to the signal generator inputs.
- Remove the tray lid and then the mirror and screen, to gain access to the wave generator.
- Half fill the tank with clean water (A small amount of surfactant can help to reduce the surface tension of the water).
- The dippers are a friction fit on the stem. Install the dipper of your choice onto the generator stem and adjust the height until the dipper just touches the surface of the water. Alternatively place the dipper on first and then add water slowly until a meniscus forms between the dipper and the water.



- Replace the mirror and screen. Ensure the mirror and screen interlock with the support blocks properly, the mirror supports are angled to hold the mirror at exactly the right angle.
- Switch on the power supply, switch Waves to OFF and set the Light/Strobe switch to the LIGHT position. The Tank will now be continuously illuminated. Using a finger, gently tap the dipper to generate a wave so the students can understand that moving the dipper up and down generates ripples in the tank.
- Place a reflector in the tank, or use the barriers to form a slit and tap the dipper again. Show the students how the ripples are behaving like light waves.
- Set the power signal generator to around 40 Hz and select the sine wave output. Turn the amplitude to zero and set the Waves/Off switch to Waves. Adjust the amplitude and frequency until a suitable ripple is achieved. Explain to the students that the waves are now being generated automatically.
- Finally explain that the strobe is synchronized to the wave generator. Set the strobe/light switch to STROBE and adjust the amplitude and frequency controls so that a stable image is obtained.

## Investigations

The various accessories allow different wave effects to be studied. Higher frequencies give shorter wavelengths with the waves closer together. In all cases certain wavelengths will give the better results than others – adjust the wave frequency and amplitude to best demonstrate the phenomenon in question.

**The best waves are generated when the dipper just touches the water surface. This can be achieved by adjusting the dipper height or the water depth.**

If you require further assistance, please contact our technical team using the details below.

## Reflection

Use a plane wave dipper and metal L-plate in the tank. Observe the incident and reflected wave directions. Vary the plate angle to see the effect. The curved reflector can be used to demonstrate converging and diverging waves. A single point dipper generates circular waves and the reflection of these can also be studied.

## Diffraction

Use a plane wave dipper and metal L-plate parallel to the waves. Diffraction around and behind the plate will be seen. If two L-plates are used with a narrow gap between them, circular waves will be seen generated at the gap.

## Interference

Use the twin point dipper with nothing else in the tank. Constructive and destructive interference will be seen where the two sets of circular waves meet.

## Refraction

This effect relies on the different speeds of water waves in different depths of water. The effects are only seen when there is a significant difference in the depths. To achieve this one of the transparent shapes is submerged in the tank and the level of the water is reduced until there is just a film over the shape (a syringe will prove invaluable throughout for this purpose). We then have about 0.5mm depth above the shape and 8mm depth elsewhere, i.e. a ratio of about 16:1.

1. Place the 5-sided block at the back of the tank so that it presents an angle to plane waves. As the waves slow-down in the shallow water they are refracted towards the normal.
2. Place the convex or concave lens shape in the tank. Again, adjust the water depth until there is a thin film over the shape. With plane waves there is a converging or diverging effect respectively.

## Warnings

For your safety, this product should be used in accordance with these instructions, otherwise the protection provided may be impaired.

**OBSERVE ALL NECESSARY PRECAUTIONS FOR STROBE ILLUMINATION!** Take care to ensure that no user, or observer of the apparatus is adversely affected by stroboscopic light.

## Cleaning

At the end of the session carefully lift the tank from the unit, pour away the water and dry the tank with a soft tissue. Use non-abrasive cloths to clean mirror, screen and any of the tank surfaces



### Disposal of Waste Electrical and Electronic Equipment (WEEE)

#### Do not dispose of this product with household waste

- For the proper treatment, recovery and recycling please take this product to an appropriate collection point.
- If you are unsure where this is, contact your Local Authority
- By disposing of this product correctly you will be providing positive help to the environment.

## Warranty, repairs and spare parts

The Midi ripple tank is guaranteed for a period of one year from the date of delivery to the customer. This warranty does not apply to defects resulting from the action of a user such as misuse, improper wiring, any operations outside of its specification, improper maintenance or repair, or unauthorized modification.

Our liability is limited to repair or replacement of the product. Any failure during the warranty period should be referred to Customer Services or [techsupport@unilab.co.uk](mailto:techsupport@unilab.co.uk)

## Instructions for authorized service technicians

Please refer to the detailed service procedures, safe servicing and continued safety – contact [techsupport@unilab.co.uk](mailto:techsupport@unilab.co.uk) for advice.

Please refer to product specific risks that may affect service personnel, the protective measures and verification of the safe state after repair.

## Supplier details

Philip Harris Education, 2 Gregory Street, Hyde, Cheshire, SK14 4TH

### Orders and Information:

Tel: 0345 120 4521

Fax: 0800 138 8881

### Repairs:

Tel: 01978 853555

E-mail : [sales@techlabltd.co.uk](mailto:sales@techlabltd.co.uk)

### Technical Support:

E-mail: [techsupport@unilab.co.uk](mailto:techsupport@unilab.co.uk)

[www.unilab.co.uk](http://www.unilab.co.uk)

