

OPERATING INSTRUCTIONS

Ripple Tank Apparatus No. 72702-01

1. Introduction

The ripple tank is an ideal apparatus for use in studies of wave behavior. With it, students can examine simple water waves to learn about wave behavior or as a precursor to studies of light. As supplied and with the addition of accessories, a variety of waveforms may be generated and displayed for students.

2. Description

This ripple tank has a large, flat plate glass bottom, 43cm square, which projects distortion-free images onto the included white plastic screen. The molded-plastic tank is 63cm square overall. The tank is supported by four removable wooden legs that are fitted with adjustable leveling feet. Four angled foam dampers are supplied for reducing reflection off the sides of the tank.

A rippler bar, complete with hangers, is also included with this apparatus, as is a light source support rod. The rippler bar is supplied with required accessories, including a 1.5 VDC motor with leads and mount; two rods with poppet beads; and two rubber bands. Accessories for reflecting and diverting waves are supplied as well. These include a parabolic reflector and four paraffin blocks for use as barriers.

Not included, but required for operation, are a variable low voltage power supply giving 0-6 V, 0-1 A; an appropriate light source; two hand stroboscopes; a stopclock or a watch with a sweep second hand; a meter stick; and an adjustable phase wave generator. See section 5, "Accessories," for recommendations.

3. Operation

Before assembling the apparatus, clean both surfaces of the plate glass bottom well. For effective viewing, these surfaces must be cleaned each time the apparatus is assembled. For an example of proper assembly, see Fig. 1.

Loosen the leveling feet at the bottom of the wooden legs, turning each foot the same number of turns as the others. This will make it easy to level the apparatus. Screw the legs into the brackets on the underside of the tank. Place the viewing screen on a smooth, level surface, such as the floor or a low bench or table, with the glossy side down. Position the tank directly above the screen.

Level the tank with the leveling feet. A carpenter's level may be used to check the tank's position, if one is available. If not, fill the tank with 5-7mm of water, and measure the depth of the water at all four corners. When the four measurements are equal, the tank is level. Tighten the hex nuts above the feet, turning them counterclockwise, to secure them in position.

Thread the wooden light source support rod into the hole at the center of the top back edge of the tank. Clamp the light source near the top of the rod. Adjust the light source bulb so that a point

source of light is produced.

Holes in the top sides of the tank are provided for attaching the rippler bar support. Insert one of the steel support brackets into each of these holes and secure it.

To use the ripple tank, wet the four foam dampers under running water, squeezing them to ensure that they are thoroughly wet. Place one damper along each side of the ripple tank, with the mitered ends together. Fill the tank with clean water to a depth of 5-7mm, which is sufficient for all experiments unless otherwise noted.

Suspend the rippler bar from its hangers with rubber bands and twine so that it is balanced, using the screwhooks at each end of the bar as attachment points. The bar should be used alone for the production of straight waves; for circular waves, insert one of the beaded rods into each of the holes drilled in the bar. The bar should be suspended so that it is slightly immersed if straight waves are to be generated, or so that the beads only are immersed for circular waves.

Connect the rippler bar motor to the DC power supply. For low- frequency waves, set the power supply control so that the motor runs just above its stalling point. The direction in which the motor rotates should be counter to the desired direction of the waves — that is, if the side on which the motor is running is considered the front, then the motor should be rotating toward the front edge of the tank. The adjustment screw on the motor's flywheel can be used to control the amplitude of the waves.

With a little practice, students should now be able to generate waves at desired frequencies. The hand stroboscope is a convenient way to gauge the frequencies of the waves, and its use should also be practiced before experiments are begun.

Before beginning, check the focus of the light source. A 1.5cm strip of $_+_$ -wide masking tape attached to the bottom of the tank is a convenient focusing reference. Adjust the height of the light source to give the sharpest image of the focusing strip on the viewing screen. The focusing strip is also a handy guide to calculating the actual wavelength of the water waves generated in the ripple tank; the ratio of the actual wavelength to the measured wavelength is equal to the ratio of the actual length of the focusing strip to the measured length of the strip's image on the viewing screen.

When experiments call for barriers, the paraffin blocks may be used. They can be cut to a variety of sizes using an ordinary knife. The ends of each block should be cut smoothly at a 45° angle.

The Ripple Tank and its accessories are now ready for the experiments in the PSSC Laboratory Guide and for many other experiments in different laboratory programs. The PSSC Laboratory Guide and other lab manuals contain the details on interesting, informative ripple tank procedures.

4. Maintenance

The Ripple Tank Apparatus needs no special maintenance. If any difficulty develops, contact Central Scientific Company, giving all details of the problem. Do not return this apparatus without written authorization from Central Scientific Company.

5. Accessories

<u>Description</u>	<u>Cat. No.</u>
6 VAC/DC Low Voltage Power Supply	31382
High Power Light Source	72701-2
Hand Stroboscope	72702-02
Quartz Stop Clock.....	30232
Adjustable Phase Wave Generator	72703-13

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