PHYWE	Rocket model	02679-00

PHYWE Systems GmbH & Co. KG
Robert Bosch width 10
D-37079 Goettingen, Germany

Phone+ 49 (0) 551 604-0
fax +49 (0) 551 604–107
E-mailinfo@phywe.de
Internetwww.phywe.de

Operating instruction

Fig. 1: Rocket model 02679-00

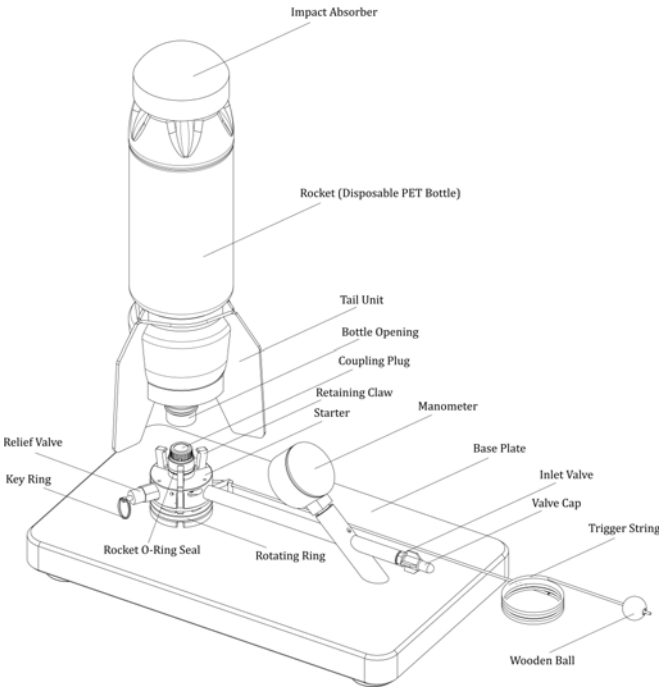
TABLE OF CONTENTS

1 SAFETY INSTRUCTIONS

- The water rocket base (synonymously used in this text are "launch pad" and "rocket model") is not a toy. Children under the age of 14 should only operate the water rocket base under adult supervision.
- Any irregularities in the operation of the water rocket base may only be remedied by PHYWE itself. Otherwise any warranty expires.
- Any unauthorized modification, repair or manipulation - deviating from the instructions for use - will result in the exclusion of any liability.
- The pressure relief valve must not be adjusted. Operation of the water rocket base without a pressure relief valve is not permitted. The mechanical function of the pressure relief valve must be checked before each operation by briefly pulling the key ring.
- Protective measures: When launching the rocket, a safety distance of 4 meters must be maintained. The trigger string has exactly this length. When the system and rocket are under pressure - indicated by the pressure gauge - never hold your head, torso, hands, arms or any other part of your body over the rocket. If the rocket gets stuck after the release, wait until the pressure has been released by the internal safety valve. You can recognize this by the fact that a jet of water shoots out of the side of the starter, which slowly dries up.
- Once under pressure, the rocket should be launched quickly and must not be moved - e.g. carried around - under any circumstances.
- Make sure that falling rockets do not hit people or sensitive objects.
- Discard rockets or PET bottles that show visible wear, such as creases, white spots, abrasion or the like.
- Rockets with a defective shock absorber or a defective tail unit may no longer be used.
- **When pumping up the water rocket base, a pressure of 4.0 bar must not be exceeded.**
- The water rocket base should only be operated by one person. For example, one person should not inflate while another is already holding the trigger cord.
- This user manual must be kept in a safe place.

2 PURPOSE AND PROPERTIES

With the water rocket base, PET bottles converted into rockets can be fired into the air. Air and water under pressure serve as fuel.



With this experimental set-up, the principles of a rocket (impulse, actio = reactio) and pneumatics can be covered and quantitative evaluations can be made depending on pressure, water quantity, aerodynamic design and weight (impact absorber).

The water rocket base should preferably be operated outdoors. You can also launch rockets without water - i.e. only with air. This allows you to also use the water rocket base indoors.

All disposable PET beverage bottles with the closure standard PCO-1810 are suitable as rockets. These are almost all non-returnable bottles, with the exception of bottles from the Coca-Cola Company. These are manufactured according to the PCO-1881 standard.

Before using such a bottle, please remove the cap ring which remains under the thread after opening the bottle:

3 HANDLING

3.1 Rocket model

Caution!

(1) When choosing the launch location, make sure that there are no uninvolved persons, cars, etc. in the vicinity that could be injured or damaged when the rocket lands. Ideally, the school sports field is a good place as long as you can't estimate how high and far the rocket will fly. Especially when propelled with water, only operate the rocket when there is no wind. Before using the rocket indoors (in this case the rocket is to be operated with air only, never with water!), first gather outdoor experience.

(2) Place the water rocket base on the ground and ensure that the base plate is leveled. If necessary, the water rocket base can be secured against slipping with a herring. Use the fold-out anchor eye on the back of the water rocket base.

(3) Remove the valve cap and connect an air pump to the inlet valve. An air pump for bicycles, as shown in the illustration, is absolutely recommended as an air pump. An air pump of any kind is not included in the scope of delivery of the water rocket base.

(4) Fill a rocket to about half with water.

(5) Turn the rocket upside down and turn the bottle neck over the coupling plug with a quick movement. Press the rocket down vertically with light pressure until the three retaining claws audibly engage.

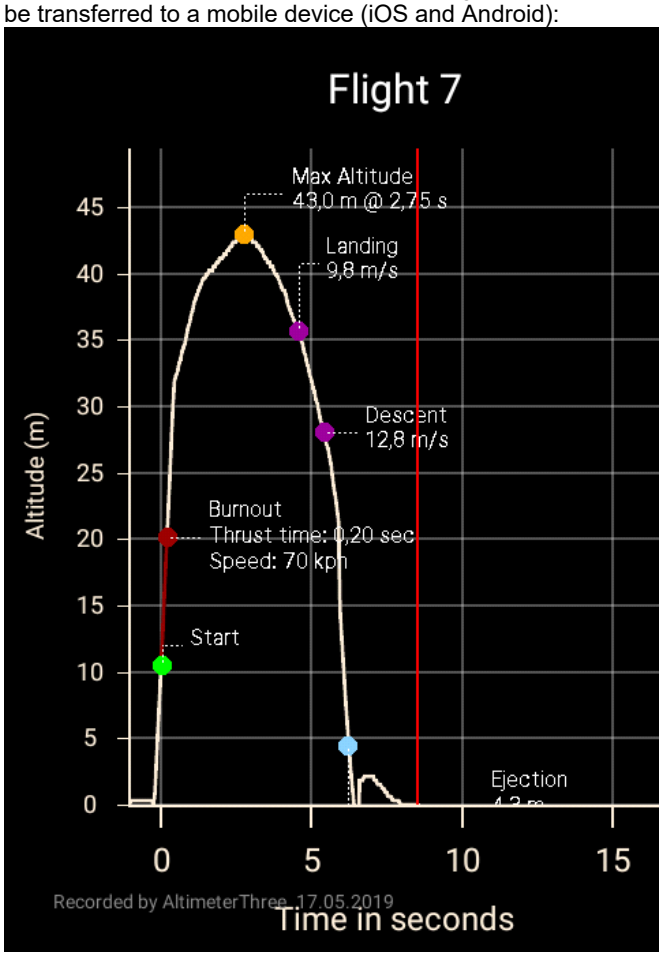
(6) Pump air into the water rocket base until the desired pressure is reached. Perform the first rocket launches at a low pressure.

(7) Take the wooden ball of the trigger string in your hand and move away from the water rocket base until the safety distance of 4 meters is reached, i.e. the trigger line is slightly tightened.

(8) Pull the trigger string with a slight jerk.

(9) If you launch a rocket only with air, i.e. without water, it makes sense to slightly moisten the bottle opening beforehand.

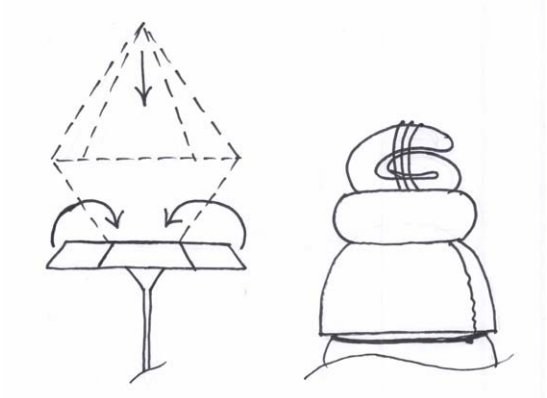
(10) Data logging of flight data:
With the Jolly Logic altimeter (not part of the scope of delivery) the flight data can be recorded. The altimeter can be installed in the impact absorber. A special impact absorber is available on request. With the AltimeterThree the flight data can even be transferred to a mobile device (iOS and Android):



3.2 Parachute 02679-01

Attaching the parachute to the rocket:
The black rubber ring is pulled over the yellow dome. The rubber ring then sits in the gap between the rocket and the dome.

Fold the parachute:
The parachute should be folded just before the rocket is launched, when the rocket is already on the launcher and locked in place. Caution: At this point, the rocket must not yet be pressurised!
The following folding diagram shows how the parachute must be folded. It should not be folded too tightly so that it can open more easily later.



Once the parachute has been folded, wrap the ribbon loosely around the resulting parcel. Place the parachute with the polystyrene ring on the rocket dome. The sanded side of the polystyrene ring lies on the dome of the rocket.
It is not recommended to use the parachute in strong cross-winds.

3.3 Launch tube for rocket 02679-02

The launch tube is used to reach higher altitudes. The launch tube also enables high flights if the rocket is only operated with compressed air.
In the first flight phase, the rocket is accelerated on the launch tube with almost no pressure loss and can therefore utilise the fuel better.

Installing the starter tube
The screw plug is removed. The starter tube is then screwed into the starter. When the starter tube is removed, please screw the screw plug back in. It protects the starter from dirt.

3.4 Class set rocket construction 02679-30

First apply the hot glue to the impact absorber (dome) (approx. 1/4 to 1/2 stick), allow to cool briefly and then glue the rocket into the dome from above. The rocket is guided onto the dome from above. Then leave the glue to cool for at least 5 minutes. If necessary, a fixture can be made to support the rocket (e.g. paper tube).
The nozzles are glued into the neck of the bottle with a few drops of superglue.

4 MAINTENANCE/ CARE / CLEANING / WARRANTY

(1) Ensure that there is no sand or similar on the coupling plug, on the edges of the bottle opening or in the rocket itself.

(2) Blow out the pump: After experimenting, remove the pump from the water rocket base and operate it a few times to remove any ingress of water.

(3) The starter is pretreated with wax lubricant. This ensures a smooth run. Waxing is a clean and environmentally friendly form of lubrication. From time to time a little waxing should be performed, namly in the following places: on the retaining claws and on the rotating ring. Lubrication should always be carried out with the same lubricant.

(4) Proper functioning of the water rocket base shall only be ensured if the rocket seal O-ring is undamaged and the surrounding sealing surfaces are undamaged as well. Even small scratches can lead to leaks. Therefore, the O-ring of the rocket seal and the adjacent surfaces should be checked regularly.

(5) The water rocket base is cleaned with clear drinking water. After contact with salt water, the water rocket base must always be cleaned.

(6) This model is intended exclusively for the function described above. We reserve the right to make technical changes.

5 TECHNICAL DATA

Scope of delivery:
Launch pad with manometer, 2 rockets

Specifications:
Rocket length: 380 mm
Adjustable pressure: up to 4 bar
Altitude: up to 70 m (water), up to 25 m (air)
Dimensions without rocket (H x W x L): 360 mm x 210 mm x 155 mm
Weight without rocket: 2.0 kg

6 ACCESSORIES

Replacement rocket for rocket model	02679-10
Parachutes for rocket model, 3 pcs..	02679-01
Launch tube with nozzles	02679-02
Air pump for modell rocket	02679-20
Class set rocket building	02679-30

7 DISPOSAL

The packaging consists predominately of environmentally compatible materials that can be passed on for disposal by the local recycling service.

Should you no longer require this product, do not dispose of it with the household refuse.
Please return it to the address below for proper waste disposal.

PHYWE Systeme GmbH & Co. KG
Abteilung Kundendienst (Customer Service)
Robert-Bosch-Breite 10
D-37079 Göttingen

Phone +49 (0) 551 604-0
Fax +49 (0) 551 604-107