PHYWE	Rocket model	02679-00

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Operating instruction

Fig. 1: Rocket model 02679-00

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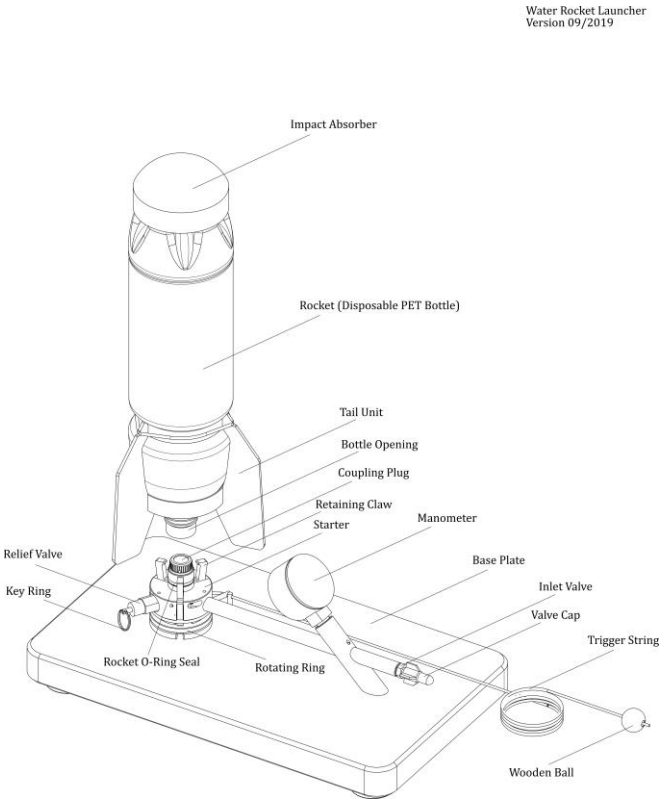
1 SAFETY INSTRUCTIONS

- 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 remedy 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 3 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. The rocket can reach its final speed after a height of just 1 metre.** 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. **The energy of a launching rocket should never be underestimated.**
- Make sure that falling rockets do not hit people or sensitive objects. There must be no danger posed by falling rocket.
- 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 inflating the water rocket base, a pressure of 4.0 bar must not be exceeded.** Inflation may only be carried out using a manual air pump**.**

- 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.

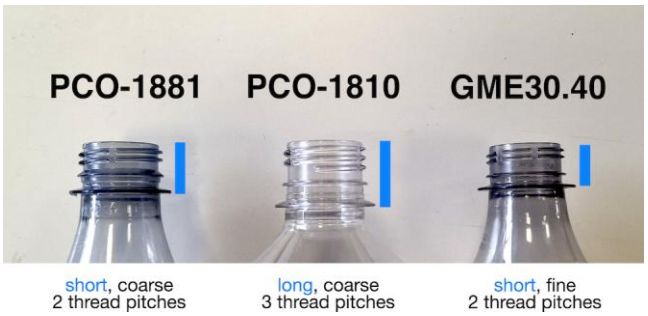
The two included rockets can be launched directly using the launcher. To do this, the rockets are placed onto the launcher, where they lock into place and are securely held by the retaining claws until launch. The retention mechanism consists of the retaining claws and the PET thread on the rocket. Only if both match will the rocket be held securely. The rockets provided have a long thread of the PCO-1810 standard, which fits the installed retaining claws.

You can also build your own rockets from commercially available disposable PET bottles. Please note that there are different thread standards, and the retaining claws on the launcher must match the standard used. The retaining claws can easily be replaced.

Shorter threads based on the material-saving GME30.40 standard are widely used. Retaining claws for this standard are included. If you wish to use disposable bottles with the PCO-1881 standard, suitable retaining claws can be ordered.

Before using a disposable bottle as a rocket, the cap ring must be removed, as the retaining claws latch on at that point.

Different bottle standards:



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 a little 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.

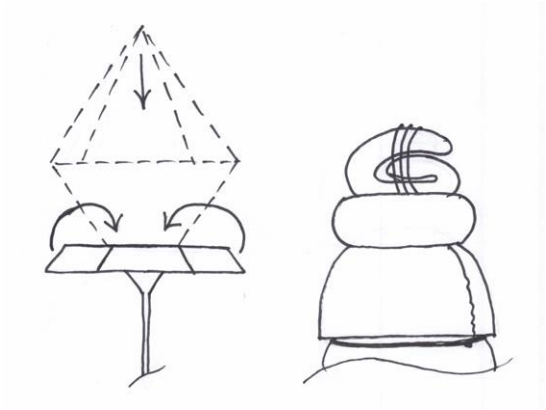
(3) Remove the valve cap and connect an air pump to the inlet valve. An air pump for bicycles, as shown in the illustration, is absolutely recommended as an air pump. An air pump of any kind is not included in the scope of delivery of the water rocket base.

(4) Fill the rocket with approx. 500 ml of 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. With a little practice, only a very small amount of water is lost during this process.
(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 3 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. Tip: Glycerine is very suitable for this.
(10) Data logging of flight data:
The flight data can be recorded using the altimeter from Jolly Logic (not included in the scope of delivery). The altimeter can be plugged into a special sensor rocket.

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.

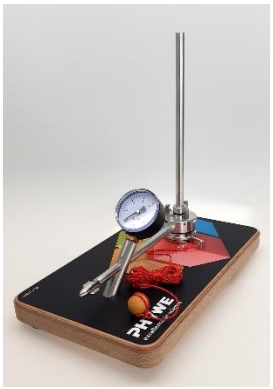
Fold the parachute:
The parachute should be folded just before the rocket is launched, when the rocket is already on the launcher and locked in place. Caution: At this point, the rocket must not yet be pressurised!
The following folding diagram shows how the parachute must be folded. It should not be 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 crosswinds.

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

Stick the nozzle into the bottle
The nozzle is inserted into the bottle through the neck. Hold it sideways to the bottle opening and push it in with a bit of force. This works because the bottle neck slightly expands and the nozzle compresses a bit, taking on a slightly oval shape.

Hold the bottle neck facing downward and let the nozzle drop into the neck with the narrow side first. Shake it gently and use your finger to help it along if needed. Then, use your finger to pull the nozzle into place until it sits firmly and as parallel to the bottle rim as possible.
Finally, turn the bottle upside down and apply 2–3 drops of superglue into the gap between the nozzle and the bottle. Let it dry for 10 minutes.

Gluing the Bottle to the Dome
Using a hot glue gun, apply approximately one-third of a glue stick onto the dome, specifically where the counterweight (the washer) is located. Do not apply the glue directly to the bottle. Allow the glue to cool for about 10 seconds, then press the bottle—neck down—into the dome. Let it cool for at least 10 minutes.
To perfectly align the dome on the bottle, you can build a small jig for this step. For example, use a suitable ring to rest the dome on with the rounded side facing down, and a construction that keeps the bottle upright while the glue sets.

Assembling the Tail Unit
Slide the fins into the slots on the wider side of the red tail ring until they click into place. The surfaces of the fin and the ring facing the bottle should form a flat, even plane. On the underside of the ring, a 2 mm deep notch in the fin must remain visible.

Attaching the Tail Unit to the Bottle
To attach the tail unit to the bottle, first place the fin O-ring. Simply roll it over the bottle neck until it rests at the bottle's "waist." Then slide the assembled tail unit over the bottle neck. Gently bend two fins outward so they can fit over the bottle rim, where they will then rest. Finally, pull the fin O-ring up over the notches on the fins to secure everything in plac

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.
Always operate the launcher only with the black sealing cap in place — exception: when the launch tube is screwed in. Otherwise, dirt particles could enter the interior and cause the safety valve to leak.
(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) If you don't plan to use the launcher for an extended period, blow it out as well.
(4) If the launcher becomes harder to operate over time, you can lubricate it with a few drops of silicone oil. WD-40 or similar products are not suitable, as they may cause the seals to swell. Always use the same lubricant for maintenance.
(5) 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.
(6) The water rocket base is cleaned with clear drinking water. After contact with salt water, the water rocket base must always be cleaned. The launch base must never be used with salt water.
(7) 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 with nozzles,
3 holding claws for the GME30.40 bottle standard

Specifications:
Rocket length: 380 mm
Adjustable pressure: up to 4 bar
Altitude: up to 70 m (water), up to 25 m (air)
Stick up to 45 m (air + launch tube) into the bottle
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
Sensor rocket	02679-03

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.

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