

Tumbling and barrelling

Rocks, Stones, Glass,
Metals, and Jewellery

www.ukge.com

Important Notes

- When you first use your machine you may think the belt is too loose, this is not the case, it is essential that it runs as loose as possible (without slipping) Every machine has been carefully adjusted & tested. If you tighten the belt you will run the risk of damaging the motor and robbing your machine of power, the belt MUST be loose. We recommend replacing the belt once it starts showing signs of wear.
- You may also notice that the machine runs hot to the touch, again this is a design feature and providing you can comfortably hold your hand to it there is nothing amiss.
- DO NOT place the running machine inside a box, it is essential that air can flow around the machine when in operation. We advise placing the machine on a tray as this will protect surrounding surfaces. Whilst tumbling, the barrel will almost certainly move sideways along the rollers – this is nothing to worry about – you will see there are buffers in place which the barrel will gently roll against. DO NOT tilt the machine to stop this barrel movement.
- **The machine must be placed on as level surface as possible, we recommend using a spirit level to assist with this. Failure to do so, could result in leaks.**
- These machines will give you excellent results if used correctly. Patience is required! PLEASE read these instructions carefully and save them for future perusal.
- DO NOT use sharp instruments to open barrel lids, or to remove pressure rings.
- The 2lb tumbler model is designed to take a maximum load of 2lb of rocks. The 3lb models are much more powerful and can handle a total load including rocks, water, barrel and grits of around 6lb. If you find that your tumbler is not turning, check to ensure you haven't exceeded these weight limits.
- If you have purchased the starter kit, we provide enough grits for two lots of tumbling to get you going. Extra economy grit packs, providing around 10 tumbles, are available & can be purchased from our website.

From time to time, you may need to replace certain parts due to wear, such as plastic barrel end caps, drive belts etc. These can all be found at our website www.ukge.com



Identify your barrel

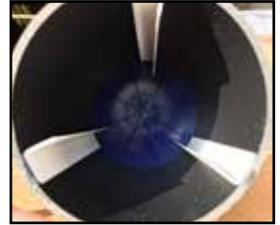


Plastic Barrels

To open, push either end cap off with your thumbs. If tight, immerse the end caps in warm/hot water, the plastic will expand & can be easily removed. When applying the end caps ensure you have all the surplus air out of the barrel, to do this lift one side of the cap with your fingers as you press the centre of the cap with your thumbs. Make absolutely sure the caps are tight on the barrel & are on securely

before tumbling. This is very important.

Barrels **WITHOUT** fins are used for stone tumbling, for metals & jewellery you will require a barrel **WITH** fins (see photo on right), metals may not tumble correctly due their shape/weight, so the fins help assist this action.



Rubber Barrels

There are three types of rubber barrels. The size options are 1.5lb (stone tumbling only), 3lb & 5lb. Rubber barrels run much quieter & last much longer than the plastic equivalent.



1

1. This type of barrel comes in 1.5lb & 3lb sizes, and is for **Stone tumbling**. You can identify this barrel by the metal lid.

Assemble in this order:

a) The **Inner Lid** pushes inside the barrel, resting on the rim.

b) The Rubber **Ring** pushes in and sits on top of the inner lid.

c) The **End Cap** sits on top of the barrel.

d) The **Washer** then fits over the screw, with the **Nut** screwed onto the screw (**DO NOT** overtighten).



2

2. Metal Smith Barrels are very different. Used for metals & jewellery only, the rubber lid simply pushes over the barrel end.



3

3. 5lb barrels come as stone or metal options. These barrels have a Pressure Ring to help secure the lid. This fits on the **OUTSIDE** of the barrel. Push the lid into the barrel first, then place the pressure ring into the outer groove. Squeezing one side of the barrel can assist when removing the lid.



3

Lid

Pressure Ring

Barrel

Stone Tumbling

Stage 1: Rounding the stones

Select stones that are generally 1 inch diameter or smaller, one or two larger stones may be polished in a load that consists primarily of smaller ones. You can also use glass to create a 'beach-look effect', if doing so you may want to ignore the final polishing stage if you are looking for a frosted glass effect.

- 1) Fill the barrel 3 quarters full with stones and shake to settle, **DO NOT USE LESS** it will not work as there is no tumbling action unless the barrel is filled sufficiently.
- 2) Add enough water to just about cover the top of the stones and add the following amount of F80 coarse grade grit depending on the barrel size you have. This is a rough guide, using more may speed up the process, and using less may slow down the process. Much depends on stone hardness, so some experimentation may be required to get the optimum efficiency.

Barrel size	1.5lb	2lb	3lb	5lb	6lb	6 litre	12 litre
heaped tablespoons	$\frac{3}{4}$	1	1½	3	4	10	25

- 3) Run the machine for a few days and nights while examining the stones once a day. This is also needed to release any trapped air in the barrel preventing the end caps popping off from pressure. Fairly smooth pebbles might only need about three days to become nicely rounded, while very rough jagged stones may need ten plus days running with the grit being topped up if needed to get the same effect – Seven days is a reasonable average.

(Optional): Removing minor pits

If your stones are pitted quite badly you can use a medium grit - F220 - to add a further stage between 1 and 2. Whilst this is certainly not needed for starting out, it will enable you to speed up the initial stage and prevent the stones from being rounded too small. To add this stage clean the stones, barrel & both end caps thoroughly after stage 1. Proceed as before in stage 1 but this time, using F220 silicon carbide. It should only be necessary to run this grade for about 5/6 days.

Stage 2: Smoothing the stones

- 1) Clean the stones, barrel & both end caps, thoroughly.
- 2) Proceed as before using the same proportions of grit and water as in stage 1 but this time use F300 – F400 grade silicon carbide grit (fine grade).
- 3) Please note this stage is very important, it is **VITAL** you do not cut this process short. Allow at least seven days running & **DO NOT** top up with fresh grit as this will re-roughen the stones. Once again examine the stones once a day, releasing any trapped air. Each day on this stage imparts a smoother finish as the grit breaks down and progressively smoothes the stones making it far simpler when proceeding with stage 3.

Stage 3: Polishing your stones

- 1) **Very, very thoroughly clean the stones barrel & end caps.** It may be useful to have one spare barrel to be used specifically for polishing only, due to the difficulty of cleaning ALL the grit completely from the barrel & end caps, even a small amount of grit left in the barrel or on the stones will result in the polishing stage failing to work correctly. Additional barrels can be purchased from our website.
- 2) Examine the stones carefully and make sure that they are very smooth. Discard any stones that are badly cracked or have jagged edges, they can be re-tumbled with your next load, or if using a twin barrel process, they can be tumbled in the second barrel.
- 3) Fill the barrel with your stones and shake to settle.
- 4) Add water to **JUST BELOW the top of the stones.**
- 5) Add the following amount of **heaped tablespoons** of polish depending on the barrel size you have and the type of polish being used. Pumice Powder is provided with all our starter packs. Cerium Oxide is the most efficient and gives the best shine. Much depends on stone hardness so some experimentation may be required.

	1.5lb	2lb	3lb	5lb	6lb	6 litre	12 litre	Time
Pumice Powder	1½	2½	3	5½	5	12	26	10-14 days
Zinc Oxide	2	3	4	7	8	18	40	10-14 days
Tin Oxide	1½	2	2½	4	4½	12	25	8-9 days
Cerium Oxide	1	1½	2	3½	4	10	22	7 days
*Plastic Pellets	1½	2	2½	3	3½	9	20	

6) If the barrel has been cleaned properly, and the previous steps carried out correctly, run for the number of days shown in the table above. Examine the stones once a day, which will also release any build up of trapped air.

*Tips: Cushioning the stones

If you are using fragile stones, or stones which can fracture easily such as Quartz, add Plastic Pellets to the final polishing stage using the quantities in the above table, you can purchase these from our UKGE website, www.ukge.com.

DO NOT put any of the resulting slurry down the sink, this will harden & could will block your drainage system with a costly repair.

If you stop your tumbler from running for too long the slurry will eventually turn solid, so empty it as soon as you switch it off. In addition, ZINC Oxide is harmful to the environment and should never be washed down the sink. Take it to your local refuse and recycling centre.

Beach stones

You can choose natural pebbles from the beach. This will speed up the tumbling stage as they have been naturally tumbled already, and you can skip the initial stage of 80-grit, and go straight to the 400 grade fine grit. Of course certain beach stones may not be as desirable as the kind of finishes that are produced when using purchased rough rock, or minerals, but they are a good opportunity for some trial runs!

Beach glass

You can tumble glass to create a 'beach-look effect', if doing so you may want to ignore the final polishing stage if you are looking for a frosted glass finish. For clear glass, add the polish! Use a variety of different glass colours for added effect!

Popular rocks

The most popular rocks and minerals to tumble are Jaspers, Agates, Aventurine, Amethyst, etc. These produce the vibrant colours & textures often seen in shop-displayed tumblestones. These rocks are not easily found and are often mined overseas & imported. Our online store has a wide range of rocks that we import from overseas for use as tumblestones. They are all broken up ready in the ideal size for tumbling, have been pre-washed & cleaned to produce great results.

Different rocks will give you very different results, & tumbling times depend on their hardness (see next page). If you have a wide range of rocks with different hardness ratings, then you may find some rocks are further ahead in the process than others. We do sell a pack of 'mixed rough rock' containing many of the popular rocks but with similar hardness ratings. All can be found at www.ukge.com



The Hardness of Stones

Each rock has a different hardness rating, and this will determine how long it takes to tumble the stones. A rock with a rating too low can result in the stone breaking apart or crumbling. A rating too high may never tumble to a desired finish or at all.

The Mohs scale of mineral hardness was developed in 1812 by the German mineralogist Friedrich Mohs. It is a scratch test with various minerals testing various levels of hardness.

You start with the lowest hardness scale and try to scratch the specimen you wish to test. If the test material cannot be scratched by this scale then work upwards, moving onto the next mineral up the chart (so from Calcite you would go to Fluorite)

When a true scratch is actually made, it is visible and is not just a mark that will rub off. The first pencil that marks a true scratch is the hardness rating of that scale.

Scale	Mineral	Chemical formula	Absolute hardness
1	Talc	$(\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2)$	1
2	Gypsum	$(\text{CaSO}_4 \cdot 2\text{H}_2\text{O})$	3
3	Calcite	(CaCO_3)	9
4	Fluorite	(CaF_2)	21
5	Apatite	$(\text{Ca}_5(\text{PO}_4)_3(\text{OH}, \text{Cl}, \text{F}))$	48
6	Orthoclase	$(\text{KA}_1\text{Si}_3\text{O}_8)$	72
7	Quartz	(SiO_2)	100
8	Topaz	$(\text{Al}_2\text{SiO}_4(\text{OH}, \text{F})_2)$	200
9	Corundum	(Al_2O_3)	400
10	Diamond	(C)	1600

Most rocks that are suitable for tumbling are in the range of 5.5 - 7.5, any softer or harder can be difficult to tumble. Agates, Jaspers, Amethyst, Aventurine are all roughly the same hardness as Quartz.

Rock / Mineral	Hardness Rating
Apatite, Chrome Diopside, Larimar	5
Obsidian, Turquoise, Lapis, Glass	5.5
Opal, Moonstone, Sodalite, Hematite, Labradorite	6
Spodumene, Garnet, Jade, Onyx, Carnelian	6.5
Quartz, Amethyst, Citrine, Agate, Aventurine, Jasper	7
Garnet, Tourmaline, Iolite	7.25
Beryl, Emerald, Aquamarine, Zircon	7.5

Jewellery Making Kit

If you have ordered the 2lb Jewellery Kit Tumbler package then your machine would have come with a special jewellery making kit. These kits can be purchased seperately as well as any individual jewellery findings or glues from our website www.ukge.com.

1. Select the polished stones that you would like to use in your jewellery together with all the parts needed for your creation. Some of these findings can be used on there own, for example the Flat Pad Cufflinks, Rings and Brooches.

With the pendants you will need a chain and a small split ring. The split ring will attach the pendant to the chain.

For the flat pad earrings you will also need small scroll studs.

2. Once you have selected the stones & findings, roughen the area of the stone you wish to glue by using abrasive paper (sandpaper will be fine) & a little water.

3. Ensure the stones & fittings are not greasy by washing them in warm water with a little detergent and drying them thoroughly.

4. If required, fittings or stones can be supported in plasticine while glue is setting.

5. Use only 2 part glues such as araldite or super epoxy. Your kit will come with a Double Bubble 2 Part Glue pack.

Once you become confident there are endless possibilities of findings and tools you can use to make your own stunning jewellery.



Zodiac Birthstones

A birthstone is a precious gem traditionally associated with various qualities that symbolises the month of birth in the Gregorian Calendar.

Aquarius	Jan 21 - Feb 19
Pisces	Feb 20 - Mar 20
Aries	Mar 21 - Apr 20
Taurus	Apr 21 - May 20
Gemini	May 21 - Jun 21
Cancer	Jun 22 - Jul 22
Leo	Jul 23 - Aug 23
Virgo	Aug 4 - Sep 23
Libra	Sep 24 - Oct 23
Scorpio	Oct 24 - Nov 22
Sagittarius	Nov 23 - Dec 21
Capricorn	Dec 21 - Jan 20

Garnet
Amethyst
Bloodstone
Sapphire
Agate
Emerald
Onyx
Carnelian
Peridot
Beryl
Topaz
Ruby



Healing Crystals

Healing stones, crystals and semi-precious gemstones come from one core source – the Earth. Created from the magma from the Earth’s inner core, these stones have been heated, cooled, and are often amongst the most ancient objects on the planet. It is no wonder healing crystals are becoming so popular. Tumblestones make perfect gifts, and are easy to carry around in your pocket, or to be made into jewellery.

Turquoise - Protection, wisdom, positive thoughts, balance, courage, friendship, healing, luck, love

Amethyst - Clarity of thought, relief from grief, protection, wisdom

Blue Topaz - Good fortune, communication, wisdom, truth, abundance, honesty, relaxation, forgiveness

Crystal Quartz - Protection, healing, harmony, energy, clarity, calmness

Moonstone - Love, abundance, good luck, happiness, psychic abilities, feminine energies

Onyx - Support, strength, stamina, protection

Rose Quartz - Love: romantic love, self love, platonic love, unconditional love, deep care, compassion, happiness, forgiveness friendship

Citrine - Prosperity, courage, confidence, strength, warmth, happiness, creativity, joy of life, protection, self-esteem, opens the mind to new thoughts, optimism

Amazonite - Truth, self-love, communication, trust, clarity, patience, tolerance

Ruby - Vitality, energy, zest of life, passion, courage, love, healing

Metals & Barrelling

These are the instructions needed for use with a Metal Tumbling Machine. If you have purchased a stone tumbler all you would need to do is purchase a barrel with fins to be able to use your machine for metal tumbling such as jewellery, or even coins!

Barrelling Compounds: - The items to be tumbled are rotated in the barrel in a controlled mixture to give the desired results. Selection of the best compound is to some extent aided by practical tests, the following notes are intended as an initial guide ONLY. The most used compounds supplied for these machines are -

Ceramic Shapes: These are small angular ceramic type media. Mix with water and **Cutting powder** for deburring and removing sharp edges & surface scratches. This will also produce a Matt finish. Use in conjunction with **Barrelbrite** to reduce rate of grinding, and to avoid a Matt finish. After this stage polishing can be actioned using the method below.

Steel Media: These are a mixture of small stainless steel pins and various specially formed small steel media that are probably the most useful of all the barrelling compounds. Mix with water and **Barrelbrite** for thorough cleaning & polishing on intricate metal work. Cleans brass fittings, silver & gold. 10 grams of Barrelbrite per 1kg of mixed shot. Contains rust inhibitor.

Walnut Shells: Used as an alternative soft cleaning method. Will give a bright finish.

Maize/Corn: Complements the walnut shells, contains Raytech proprietary polish. Cleaner to use leaving no stains.

When lifting barrels filled with compounds etc. vertically ALWAYS hold the bottom cap securely as a heavy load could force the bottom cap off with obvious results!

Object Size / Quantity / Processing Time: - Highest efficiency is obtained when the proportion of compound and work items are correctly balanced. Maximum size should be around 30% of barrel volume. As the range of items that can be processed is so large we can only suggest a starting point. For instance, for a selection of intricate coin sized objects in brass, steel, or alloy try about ten items or less using steel pins and burnishing soap. Expect a processing time of between 4 to 12 hours. Finish can be varied by altering water content - more water gives a gentler action. If items are very dirty, wash out the barrel thoroughly and replace burnishing soap – items will not clean properly in dirty compounds. If extended processing times are used check barrel for gas build-up, this is very unlikely as normally a negative pressure is obtained when working and there is a slight inrush of air when the end caps are removed. However a gas build up could push the end caps off, so be alert to this and check by lifting the side of the cap to reduce pressure.

Work Items with Holes / Threads / Assemblies: - Many of the items you may be cleaning will have holes and crevices in them that the compounds will explore when in use. If any of the items have blind holes the compounds (steel pins are especially prone to this) will work their way into these parts and may be very difficult to remove. Insert a plug in the hole if you expect problems. If the item is threaded it is possible that the thread form may be altered very slightly, if the work is close tolerance protect vulnerable parts as necessary. If you put an assembled item in the barrel it will almost certainly be dismantled by the tumbling action.

Maintenance

The machine is oiled when it leaves the workshop and can be used immediately. However, it will need lubrication while in use. Proceed as follows:-

Every Week: - Apply one drop of oil to the steel shafts on the rollers where they pass through the plastic bearing blocks.

Every Month: - Apply one drop of oil to the motor shaft where it protrudes through the side of the machine – this will run into the motor bearing. Also if the barrel seems to be rubbing rather hard against the stop at either end of the machine, apply one drop.

Type of Oil - As you will appreciate this machine does a lot of hard work and it needs fairly substantial oil. We advise the type used in car engines as it is more able to cope with the bearing loads. However, if you have only the thinner cycle or sewing machine oils these can be used for short runs.

Problems with Your Machine - The tumbler is tested and should be trouble free, but to ensure successful operation you must ensure the rollers turn absolutely freely. Never use less stones, if the tumbler appears hesitant to run, check all the bearings, a too light load may glaze the rollers and barrel through slippage. If using the 2 or 3lb plastic barrels, you may need to use elastic bands around the end caps to create tread. Try not to get oil on the rollers! Excessive belt wear can be caused by a faulty belt (beyond our control) or pulleys knocked out of alignment, the pulleys can be gently prised into line. Always realise that although the machine has ample power it can not operate if the bearings are locked solid with grit – **KEEP IT CLEAN** – remove plug from mains when cleaning.

Remember – The most common problem is the tumbler that has had its cogs tightened so the belt is not running slack, which will result in the rollers not spinning freely – if either roller is tight it is equivalent to driving a car with the hand brake on.

If the barrel does not rotate;

- Dry rollers & barrel(s) thoroughly
- If glazed, use elastic bands around the end caps (or rub lightly with sandpaper, this would void a return policy)
- Ensure no oil on rollers or barrel
- Check barrel is not under or over loaded.

If belt slips:-

- Remove, wash, de-grease, dry thoroughly and replace
- Replace if worn, do not try to tighten

If barrels are overloaded or very irregular shaped items are being processed it is possible the heavy items will catch on the internal paddles when the barrel rotates, the load on one side will unbalance the barrel and it will not rotate properly. Either reduce the work load or if it is essential that the item is processed it may be worth trying a rubber barrel.

Some models may come with additional maintenance guidelines specific to your model

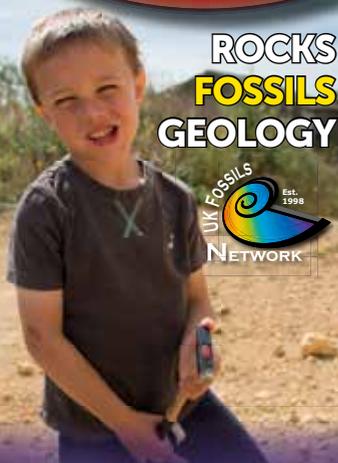
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