

Working instructions and design possibilities of beads

1. Pulling test of glass thread

In the following part of the report a simple but easy, reliable, effective, efficient and necessary determination of the coefficient of expansion (COE) and thus of the compatibility of the single colored glass sticks is shown.



Picture 1



Picture 2

Both sticks to be tested are hold with one hand and put in the flame with their ends in such a way that they melt with each other (1, 2).



Picture 2a

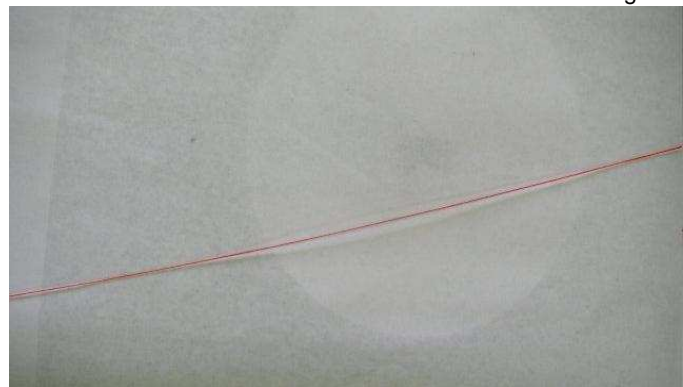


Picture 3

If you have enough soft material, grip this drop with pliers (2a) and pull it smoothly apart until it is evenly thin (3, 4), the fibre becomes very long. As soon as it is solidified the difference between the two rods can be seen (5).



Picture 4



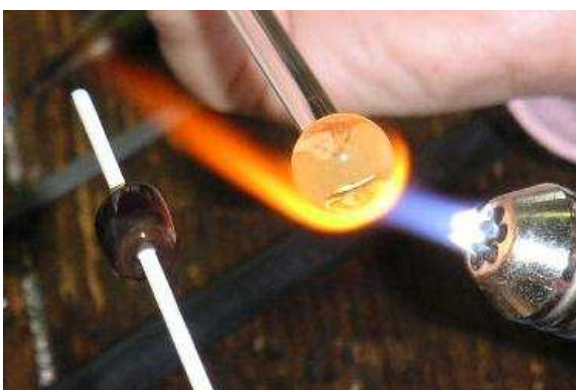
Picture 5

Picture 13 shows the procedure with **BEADMAKING 104**® clear 61026 and purple red, in Picture 5 opal orange reddish and **BEADMAKING 104**®, batch 60171, were joined and pulled apart. The result (only minimally curved glass fibre on a white piece of paper) shows that the COEs match and that the glasses are compatible. Once a real curve is forming, the difference is too big: theoretically, the difference of the COEs between the glasses which shall be used together should not exceed $7 \times 10^{-7}/K$.

2. Production of different beads with different clear and colored glass

2.1. Nap bead

Bead opal orange reddish with applied bahia blue points



Picture 6



Picture 7

First of all, an opal orange reddish basic bead was produced. This bead was shaped vaguely in the form of a rhomb (with the aid of coal tools), cooled down and overlaid with clear glass **BEADMAKING 104**®, batch-no. 60717 (6). The clear glass was well preheated and the bead was kept warm below the flame (6). Then the clear glass is winded round the basic bead at a stronger flame with the aid of gravity and even turning. During this process no air was enclosed.



Picture 8



Picture 9

As soon as the clear glass cover was solid enough, but not too cold, little points of bahia blue were put onto the product. The whole product was warmed through in the flame, but afterwards only put into a box filled with sand as holding material, meaning it cooled down without controlled cooling in granulate or a cooling furnace.

2.2. Flower bead

Overlaying with a big glass drop

Flower bahia blue with pea green spirals and opal orange reddish blossoms



Picture 10



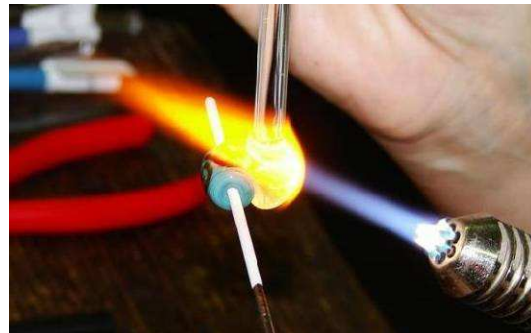
Picture 11

At this stage of the process the pattern and thus the method of operating becomes more complex. The spiral is combined with the points, which produces an additional stress situation because the bead is subject to permanent temperature fluctuations.

Just like for the other beads, a basic bead is produced and vaguely shaped ovally, in this case bahia blue. The clear glass is preheated, the half finished bead is kept warm in the lower flame area and the clear glass is put onto the bead as one drop.



Picture 12



Picture 13

After cooling down the bead as far as possible, it is decorated with a fine pea green stringer with spirals (12). In doing so no danger of bursting occurred – a good eye for temperature is quite helpful! When the patterns have been melted point by point with a pointed little flame, the entire bead is slowly brought to the same temperature at all areas. After this the bead is overlaid with lots of clear glass, batch 61026 of **BEADMAKING 104®** (13) and adjusted on its sides by pulling.

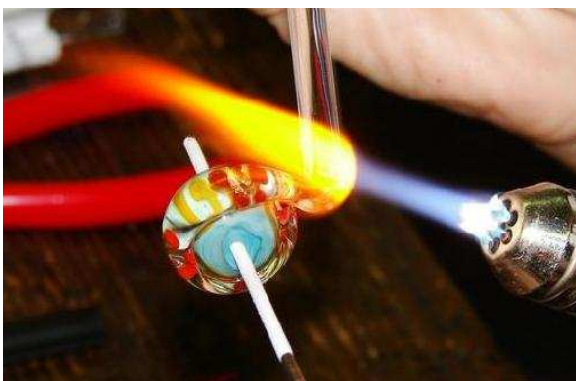


Picture 14

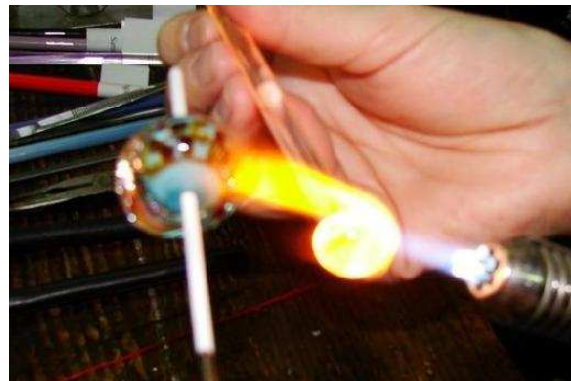


Picture 15

After warming through, the bead is cooled down so far that it does not burst. The self-pulled fine opal orange reddish stringer paints little points on the bead (14) so that little circles are produced. After warming up the artist sticks into the middle of the circles using a graphite pen and thus produces little holes, which will later be the flower centres – in the form of enclosed air.



Picture 16

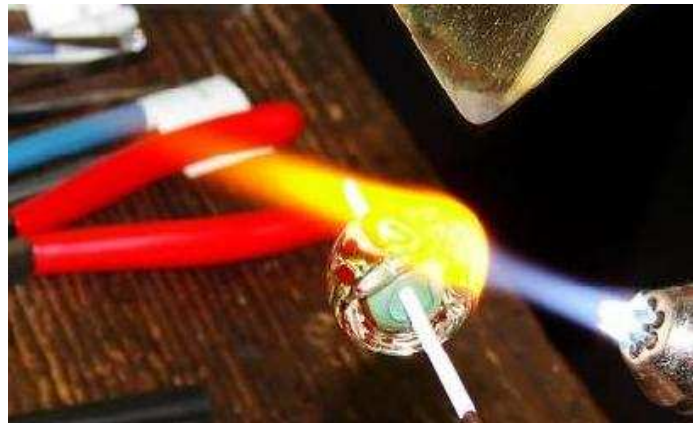


Picture 33

For that purpose, the bead is kept warm below the flame (the points do not melt) and the clear glass **BEADMAKING 104**® clear, batch 61026, is melted into a big drop (16), which is laid over the bead (17). The edges are overlaid with clear glass as well to get a side flattened bead (17a).



Picture 17a



Picture 18

When the bead is well melted (18) and all areas have the same temperature, the bead is put into the sand-filled box for cooling down.



Picture 19



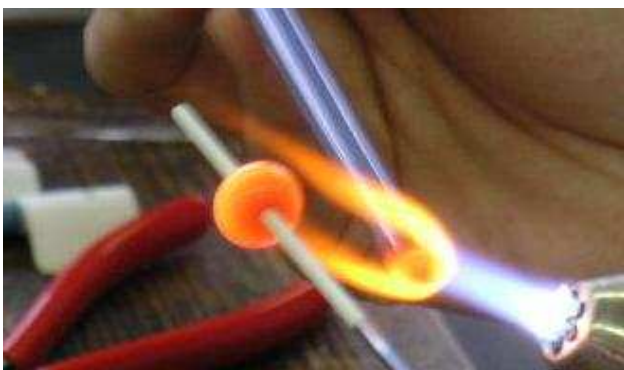
Picture 20

The edges are warmed through or adjusted with a tool (18). An appropriate warming through of the entire bead ensures the sinking in and closing of the side holes to an even surface (19). Picture 20 shows the finished bead three days after cooling down.

Overlaying with overlapping strips

Flower bead: Purple red with opal orange reddish spirals and pea green leaves

The purple red is well warmed and a basic bead of several layers is wined (21). On top of that, the opal orange reddish spirals are painted and warmed through point by point.



Picture 21

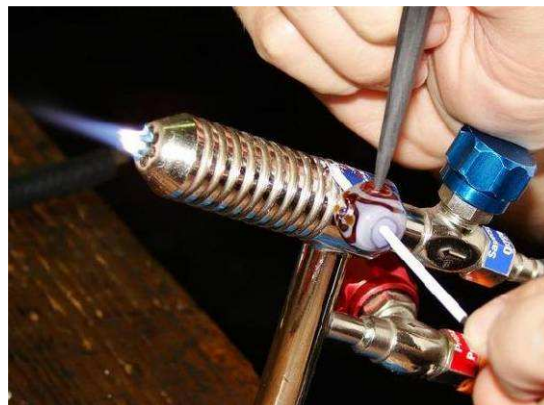


Picture 22

Using a relatively thin clear glass stick **BEADMAKING 104®** clear, batch 61024, overlapping strips are slowly wrapped around the cooled down bead to get a thin cover. After the surface has cooled down a bit, the points of pea green for the flower leaves are spotted on the cover using a thin self pulled stringer (22).



Picture 23



Picture 24

After heating up the bead (the points do not melt), a string **BEADMAKING 104®** clear, batch 61024, is wined around it and the entire product well warmed through. When the surface is even and soft, the flower centres are pricked into the bead (24). After the surface has cooled down, a final clear glass layer is laid on it in overlapping patterns.

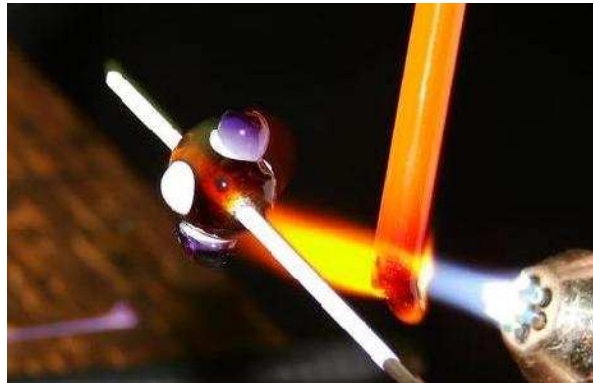


Picture 25

2.4. Winding a twister bead



Picture 26



Picture 27

As transparent overlaying dark grass green (Moretti) is wound around a velvet basic bead (Moretti). After a short and only partial cooling down of the bead, four big spots are placed all around the bead with a white stick (Vetrofond). The stick must be placed vertically on the surface (26). The spots are almost completely melted into the bead. When these points have become more solid on the surface, ink blue (Moretti handpulled 104) is put directly on the white surface. The same is happening with transparent orange (Moretti) (27).

The spots are not exactly in the middle of the point below but slightly displaced to the one set before. Opal orange reddish from **BEADMAKING 104**® is spotted in points alternately on each side. In the end, they look like fine thorns (30).



Picture 28



Picture 29

The respective stick ends were pulled off at the end to remove small bubbles (28). Now the points are melted down at a small pointed flame (28). With the aid of a thick stringer pulled from clear (Lauscha), the places between the spots are strongly whirled through. The resulting product is not melted down evenly (29). The clear glass of **BEADMAKING 104**® batch 61024 is now heated up. In the meantime the bead is kept warm at the edge of the flame (29), below the flame! The whole clear glass is spread over the bead all at once.



Picture 29a



Picture 30

After that, a second clear glass layer was heated – **BEADMAKING 104**®, batch 60717 – and wrapped around the first clear glass layer. At last the whole bead was warmed through and put down under the rest staircase to cool it slowly down.

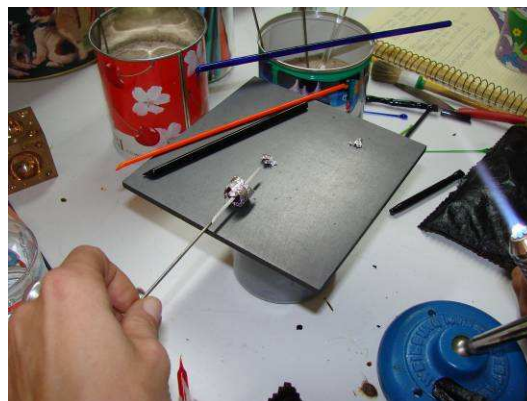
3. Silver beads

In the studio of Ms Merkel beads with silver film were produced (31 – 36), the clear glass was made by **BEADMAKING 104®**, the colors by Vetrofond, Moretti and Lauscha.

1) Twister bead – Silver on cobalt blue

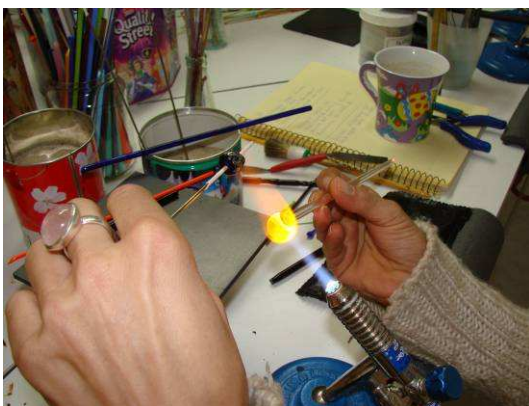


Picture 31



Picture 32

Silver sheet is but on a cobalt blue transparent basic bead (Moretti) (31), well rolled in (32), whirled through and warmed through (33). The kept-warm bead is overlaid with a large drop of clear glass **BEADMAKING 104®** clear, batch 61026, in one single step.

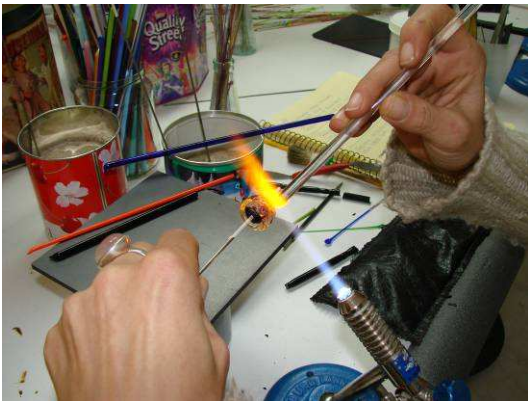


Picture 33



Picture 34

In a second step more clear glass is applied to the sides, which forms the side of the bead. Picture 36 shows the finished bead.

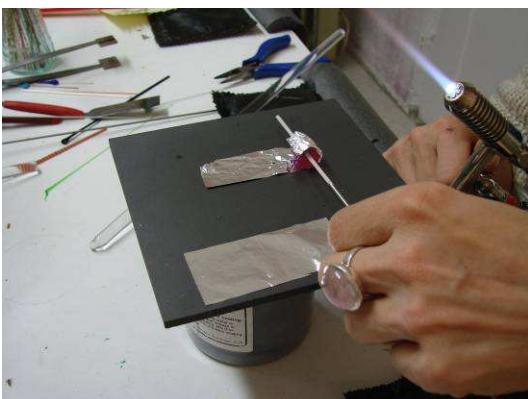


Picture 35



Picture 36

2) Meander bead blue green

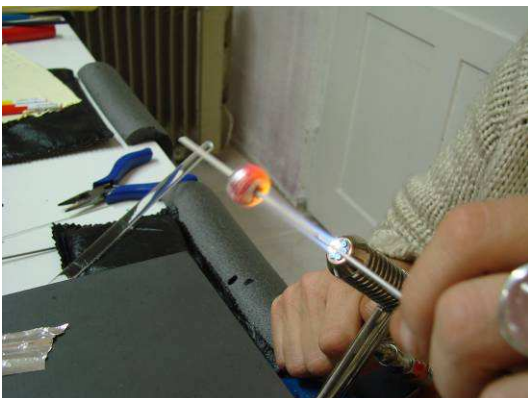


Picture 37

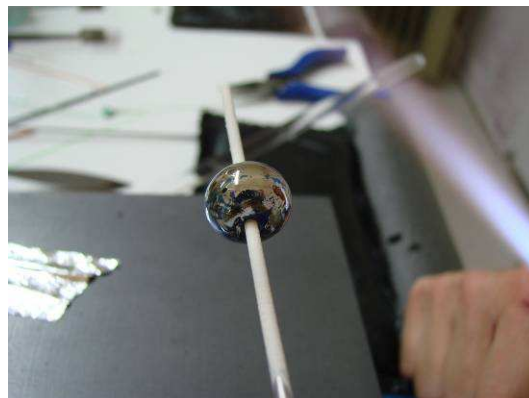


Picture 38

Silver sheet is put on a basic bead lapis blue (Moretti) (37) and is wrapped around the whole bead with the aid of a graphite tool (38).

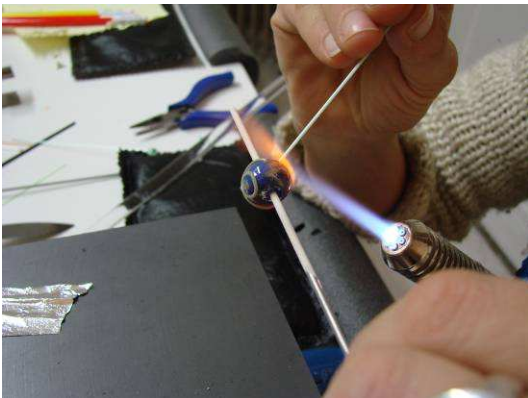


Picture 39

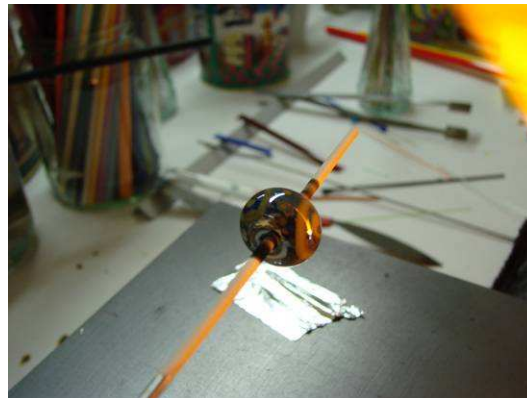


Picture 40

The silver sheet is completely reduced (82) until it shines in dark grey (39). With the aid of a copper green stringer (Moretti) meander-like patterns are painted on the silver surface (41) and melted down with a pointed hot flame (42).

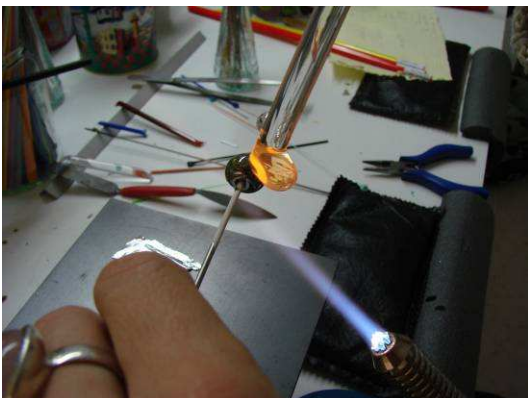


Picture 41

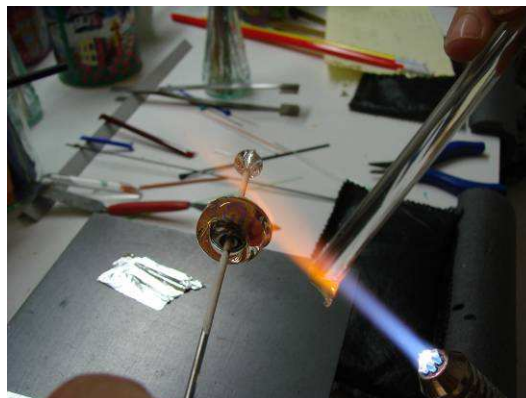


Picture 42

The bead was overlaid with a large drop of clear glass of **BEADMAKING 104®**, batch 61021 (the stick end was melted away to avoid the stress of the interface) (43), and the sides were covered in a separate step (44). Finally the bead is melted through and well glowed through and through.



Picture 43



Picture 44



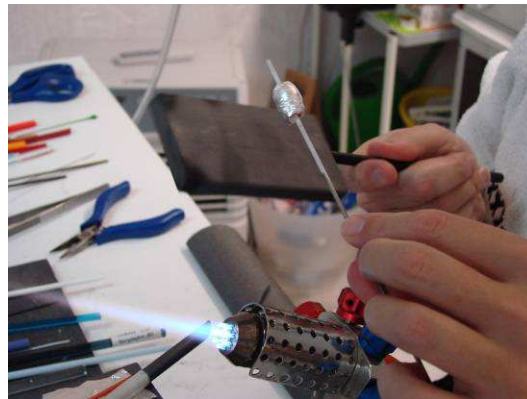
Picture 45 shows the finished bead.

Picture 45

3) Whirl bead colored

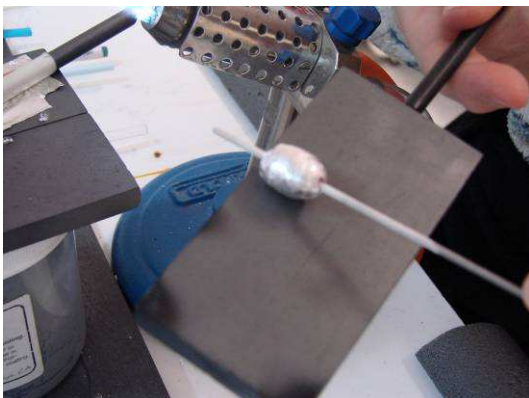


Picture 46

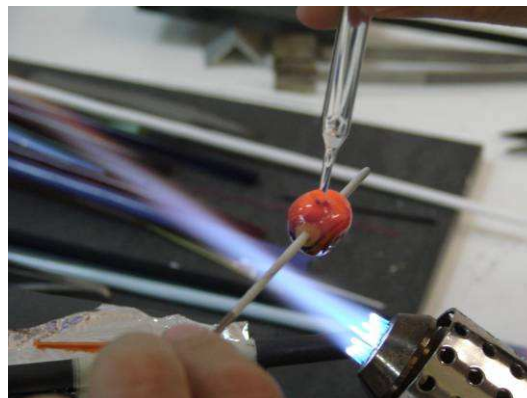


Picture 47

Silver film is wrapped around the basic bead made of pink opaque (Moretti) (46) and laid completely around the bead with a graphite tool (47, 48).



Picture 48



Picture 49

Now it is laid over with Ink blue hp (Moretti) and spotted with the following spot rows: on white a spot row of orange transparent, green, aqua, rubino, oro is spotted, in between dabs of black and red are placed (all by Moretti). These are whirled up with a clear glass stringer Lauscha (49, 50) and overlaid with a large drop **BEADMAKING 104®** clear glass, batch 61027 (51, 52), the sides again separately (53, 54).



Picture 50



Picture 51



Picture 52



Picture 53



Picture 54



Picture 55

Picture 55 shows the finished bead with the silver and the different colors.

4) Some more design possibilities



Picture 56



Picture 57

- (56): White is spotted on a cobalt transparent (Moretti) basic bead. On top of that, orange transparent (Moretti) or green transparent (Lauscha) is spotted displacedly. Then it is overlaid with **BEADMAKING 104®** clear, batch 60717.
- (57): The basic bead is made of transparent green and treated silver film. Then it is overlaid with Tricolor green (Lauscha) and painted with line (with stringer) stringers in the colors green, black and transparent green (Moretti). Now white spots are placed on the bead (flower leaves) and on top of that transparent orange points (both Moretti). After pricking in (creates air bubbles for depth effect) it is overlaid with clear glass (Vetrofond).



Picture 58



Picture 59

- (58): Basic bead made of Moretti black with applied dots of yellow (Moretti). Transparent red (Lauscha) is applied point by point to the yellow and overlaid with **BEADMAKING 104®**, batch 61026.
- (59): A basic bead is made of black (Vetrofond). Then the flowers of green (Moretti) are applied. Finally the whole bead is overlaid with **BEADMAKING 104®** clear, batch 61026.



Picture 60



Picture 61

- (61): Under the overlaying of **BEADMAKING 104**®, batch 60721, a basic bead was made of dark red- becomes lighter- (Moretti) with a stringer of copper green (Moretti).
- (61): Big turquoise, black and copper green (all Moretti) dots as well as **BEADMAKING 104**® clear glass batch 61024 are applied to the yellow (Ornela) basic bead, in between little dots of copper green (Moretti).



Picture 62



Picture 63

- (62): Stringer SIS (Moretti) and yellow as well as transparent red (Lauscha) as stripes are painted on a black basic bead (Vetrofond) and whirled up to be overlaid by **BEADMAKING 104**® clear, batch 60721, in the end.
- (63): Copper green (Moretti) and **BEADMAKING 104**® clear glass batch 61026 as stripes are alternately applied to a twister of Moretti orange transparent, warmed through and finally encased with batch 60717 of **BEADMAKING 104**®.

4. Cooling conditions:

Cool down slowly either in a cooling furnace or with the aid of cooling granulate.

5. Finishing process

We recommend soaking up the beads a few minutes in water to loosen the bonding agent. With the aid of pliers – holding the rod tightly– they are pulled off manually, cleaned under running water from bonding agent adhered to the hole, as well as afterwards dried.

6. Room conditions - material

There shall be no draught inside the room (no open door or window or no air conditioner). The used burners shall be double gas burners equipped with a pressure regulator and an oxygen concentrator. Since the oxygen flame absorbs too much oxygen from the environment, place the concentrator outside of the room and connect it by a long cable. Do not forget to close the door to prevent draught. The tools used for winding should be steel thorns and different tools for forming of graphite or braze.

7. General notes:

The pictures are only served for illustration the **BEADMAKING 104®**.

The type of burners and their setups or the used type of gas play a not unimportant role for making beads. City gas has a lower calorific value compared to bottled gas. As a result it supplies less energy to the glass and on this account the flame has a lower temperature.

General instructions:

- There shall be no draught inside the room (close doors and windows!).
- Work **slowly**.
- The temperature shall neither be too cold (gas flows badly) nor too hot (smoke traces occur which show on every glass as foam or stripes).
- Do not apply too much clear glass.
- Warm the pearls trough from all sides or do not let the surface get cold until the next step.
- Glow finished pearls from all sides in the flame as the final step and **cool them well** in the cooling furnace or granulate.
Thick and hollow pearls: in the cooling box with granulate or in the cooling furnace
Small to medium pearls: leave fixed on the stick in the sand and cool down a few days
- The sticks **BEADMAKING 104®** can be used with small products of COE 33 (borosilicate glass) / 93 -96 (**KUGLER COLORS®**, Gaffer®, Ornela, Moretti, Vetrofond etc.)!
- **Before usage, the colors of BEADMAKING 104® have to be tested by the artists for compatibility with other suppliers (pulling test of glass fibre) because we do not offer guarantee for such a case.**
- **We will only deal with and accept complaints if the customer or the representative is able to definitely prove that the product in question is a product of Friedrich Farblashütte GmbH.**
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