

42  
STEPS  
OF  
CRAFT

**CUTLER AND GROSS**



IT TAKES  
42 STEPS AND 6 WEEKS  
TO HANDCRAFT  
A PAIR OF  
CUTLER AND GROSS  
FRAMES

Cutler and Gross was founded in 1969 by optometrists Graham Cutler and Tony Gross. Together they opened the current flagship store in Knightsbridge and began producing quality handmade bespoke Cutler and Gross frames.

Since then the brand has continued to develop and expand priding itself on creating functional, hardworking and timeless frames that are design-led. The Cutler and Gross customer has always been an individual, craving the feel of a bespoke pair of glasses, the tiny inaccuracies that give them character and make them unique to the wearer.

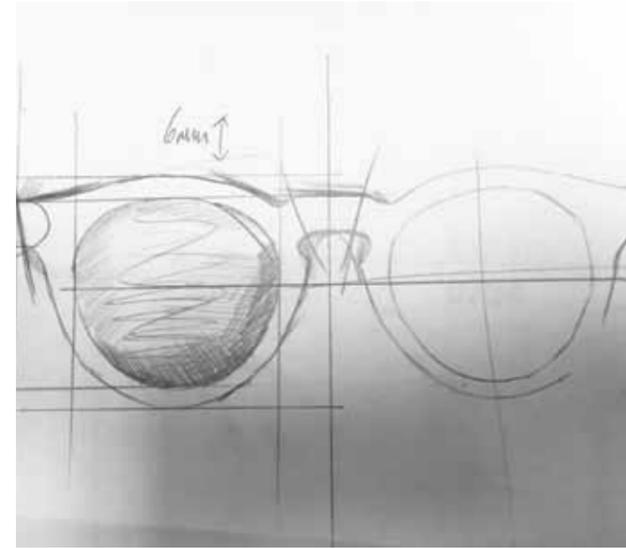
In the last twenty years, the production of each frame has moved from Knightsbridge to our own factory in the Cadore region of Northern Italy, where a highly skilled team of optical craftsmen carefully create each frame from scratch. The process of producing a single frame takes six weeks and includes 42 steps. Each step involves the knowledge and specialism of our factory workers who have been able to refine and adapt the Cutler and Gross aesthetic to combine traditional production techniques and beautiful material.

01  
CONCEPT



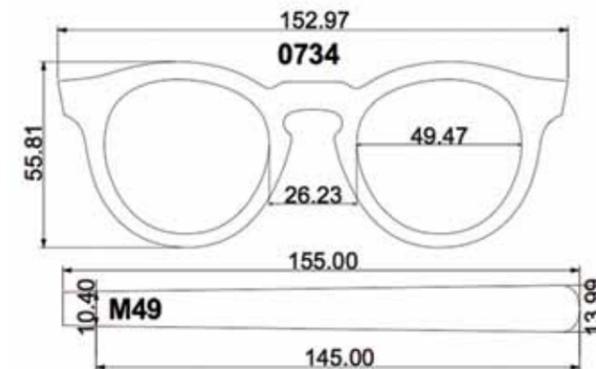
“MY IDEA OF DESIGN IS A BIT OLD FASHIONED IT SHOULD BE PRACTICAL, FUNCTIONAL, THEN LOOK GOOD – IN THAT ORDER”. *Graham Cutler*

“IT’S NICE IF GLASSES CAN BE SEXY AND MYSTERIOUS. PEOPLE WHO NEED GLASSES DON’T HAVE TO FEEL SEPARATED FROM GLAMOUR”. *Tony Gross*



Each season the collection is created based on research, trends, sales, and new techniques. Initial ideas are produced, edited, and discussed with all areas of the company. The Cutler and Gross aesthetic is constantly considered.

02  
DESIGN  
DEVELOPMENT



The London design team take the ideas and create the 2D technical drawings on Rhinoceros, a 3D CAD modelling program. Technical multiple projection view drawings of each are produced, which includes top and side views to show thickness and construction details. From these 2D drawings the final collection is picked.

03  
TECHNICAL  
DRAWING

04

ORDER  
ACETATE



Once a production order has been placed, the factory orders the acetate. Our main suppliers in Italy are Mazzuchelli and Laes. Longer lead times can cause delays in production.

Generally we buy in thicknesses of 8mm and 6mm for frontals and 4mm for temples. Acetate is produced in a variety of ways depending on the finish. Acetate is bought in kilograms with one kilogram generally yielding 10 frames. A block of 80kgs, later cut into strips, can produce around 800 frames and is usually the start of patterned and non-standard acetates.

05

CUT ACETATE  
INTO STRIPS



Once received, the strips are cut down to the specific size needed for the frame. Depending on the layout of the print and the width of the strips, the factory endeavours to minimise waste where possible.

06

REDUCE STRIPS  
WITH THICKNESS  
PLAINER



Once cut into strips, all acetates including thicknesses need to be reduced on the thickness plainer as they are not all even when they arrive. Thickness is also reduced when we need 6mm thickness for a frame but only 8mm thickness is available to order. However, since the acetate is ordered in kilograms this extra waste adds extra costs.

07

CUT STRIPS  
INTO TABLETS



The strips are then chopped into tablets specifically for the size of the frame.



08

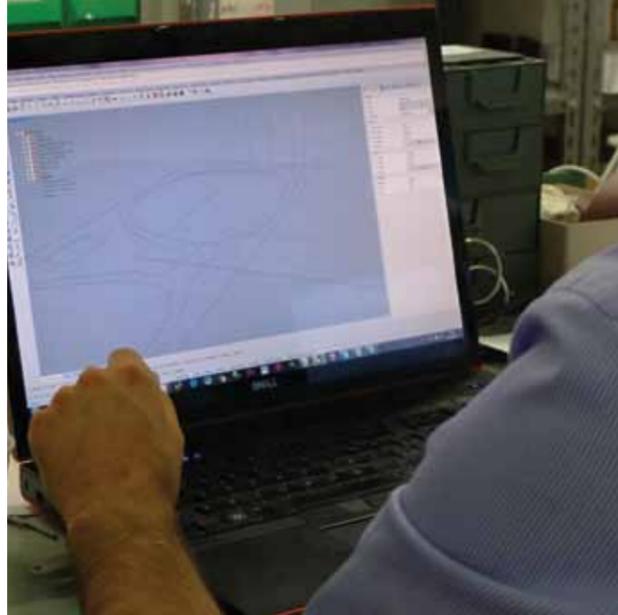
ADD NOSE BUMP  
TO FRONTALS



The tablets are then loaded into the nose bump machine. There are three different sizes of nose bumps available at our factory which are picked according to the bridge size of each frame. The machine works by first heating the tablet, this is then manually moved to the second step where the chosen shape is heat pressed into the acetate.

09

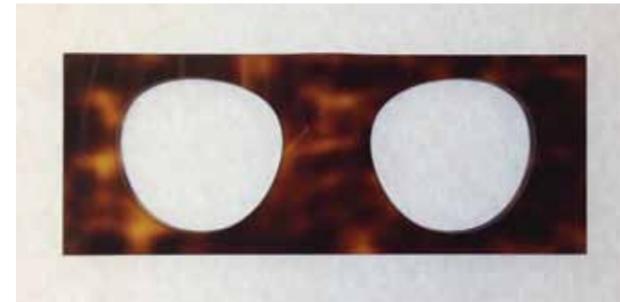
PROGRAM  
CNC MACHINE



Currently we have 6 CNC machines at the factory, each capable of various levels of complexity. Each machine has to be programmed with the Rhino drawing and tool path before it can be used. This is a lengthy and skilled process which has to occur each time a new frame has to be cut. The drawings are then uploaded on to Rhino NC (a CNC programming plug in for Rhino) where the milling path is set. This is then transferred and programmed onto the CNC machine. There are endless options on tool heads, these are carefully selected and placed into specific tool holders. Once the program has been tested the machine is loaded with the acetate.

10

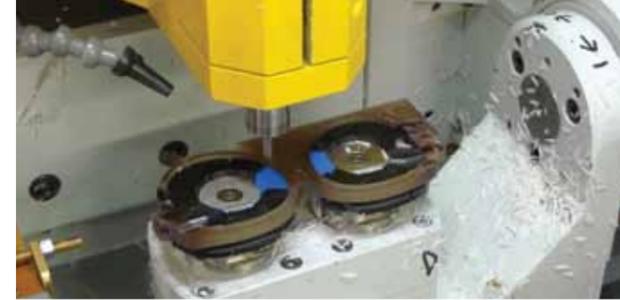
CUT EYE HOLES  
ON CNC MACHINE



The first step of the CNC cutting is the eyeholes. Then tailor made 'expandable mushroom' grips expand and clamp to the eyeholes to secure the acetate.

11

CUT FRONTALS  
ON CNC AND CLEAN



When the acetate is secured by the 'expandable mushrooms' the outside is cut along with any extra milling details. Depending on the detail this can take a number of minutes per frontal.

Once cut, the frontals have rough edges removed by being barrelled with PVC rhombus shaped chips.

12

INSERT  
HINGE



We offer two types of hinge, the first is the sunken hinge which does not require pins. The second is the traditional riveted hinge which is fastened using pins.

13

INSERT  
PINS



The sunken hinge is applied by heating and embedding the hinge into the acetate. The riveted hinge will have a grave milled out for it to sit in, then the pin is inserted and domed to seal the hinge.

14

FINISH AND  
DOME PINS



Hinges can either have a flat or a raised finish. Above are the six types of hinges we currently use.

15

BEND  
FRONTALS



The frontal is heated and then placed into the bending machine which creates the frontal shape using weight and pressure.

The base radius of the frontals are commonly B4 (Opticals) and B6 (Sunglasses). By dividing 523 with the number of the base, you can obtain the radius of the lens sphere that will be used in the frame. Sports glasses have toroidal bends, which means that they have a different base radius for horizontal and vertical axis.

# 16

## CLEAN FRONTAL AND COVER HINGES



Frontals are next cleaned with a brush drill and an acetone bath. Then, before the tumbling process begins the hinges of each frame are capped with plastic hoods to ensure they are not damaged during the process.

# 17

## BARREL STEP 1

*(Unique to Cutler and Gross)*



There are four different stages to tumbling. These stages are affected by the type of acetate, thickness of acetate and desired effect.

The standard process is: Barrel Step 1: SGROSSATURA is 12 hours tumbling with fibreglass rhombi chips, oil and pumice stone powder.

# 18

## BARREL STEP 2&3

*(Unique to Cutler and Gross)*



Barrel Step 2: SGROSSATURA roughing is 24 hours of tumbling in beechwood pieces and oil.

Barrel Step 3: LUCIDATURA roughing is 48 hours of tumbling in beechwood pieces and pink abrasive cream.

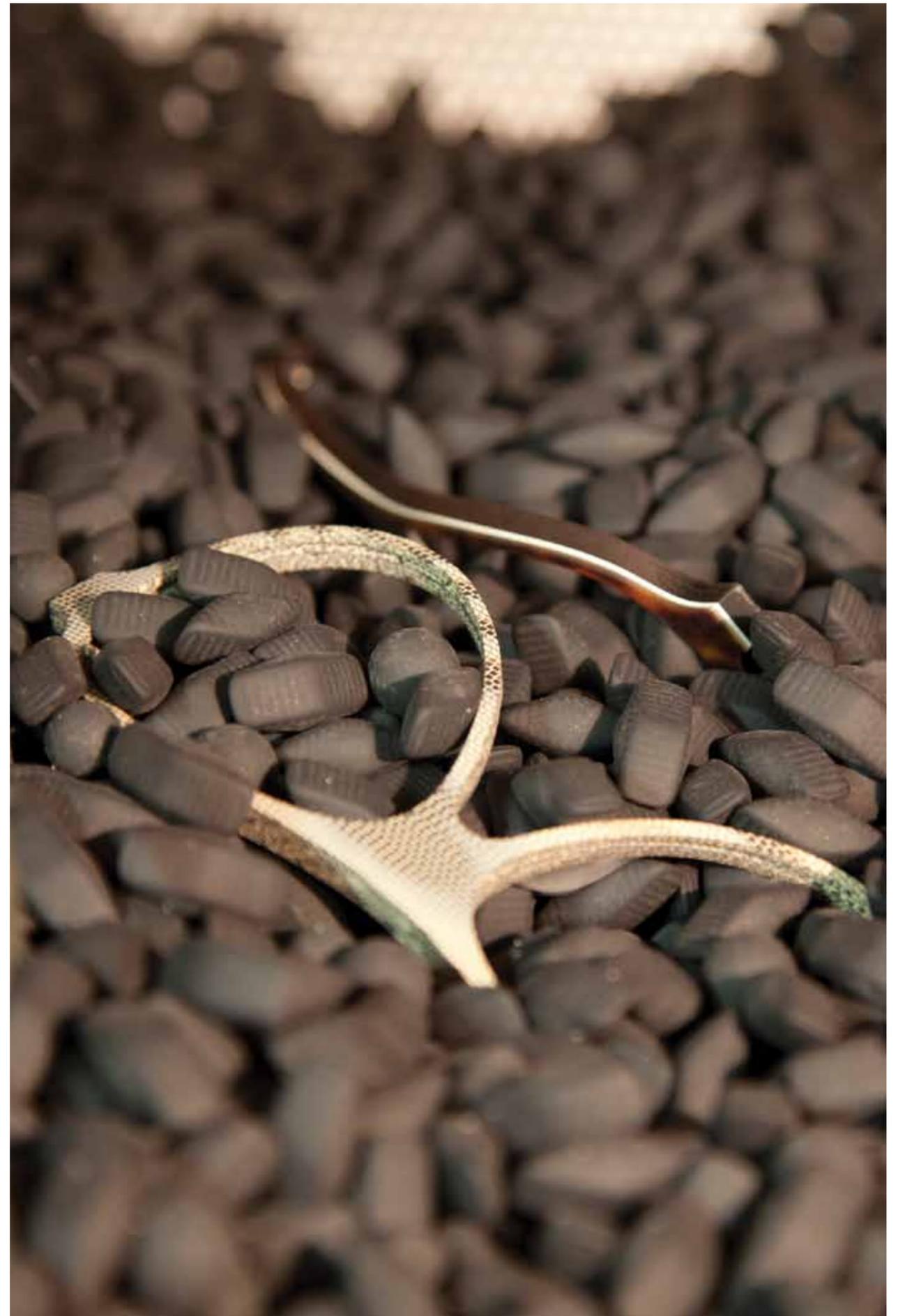
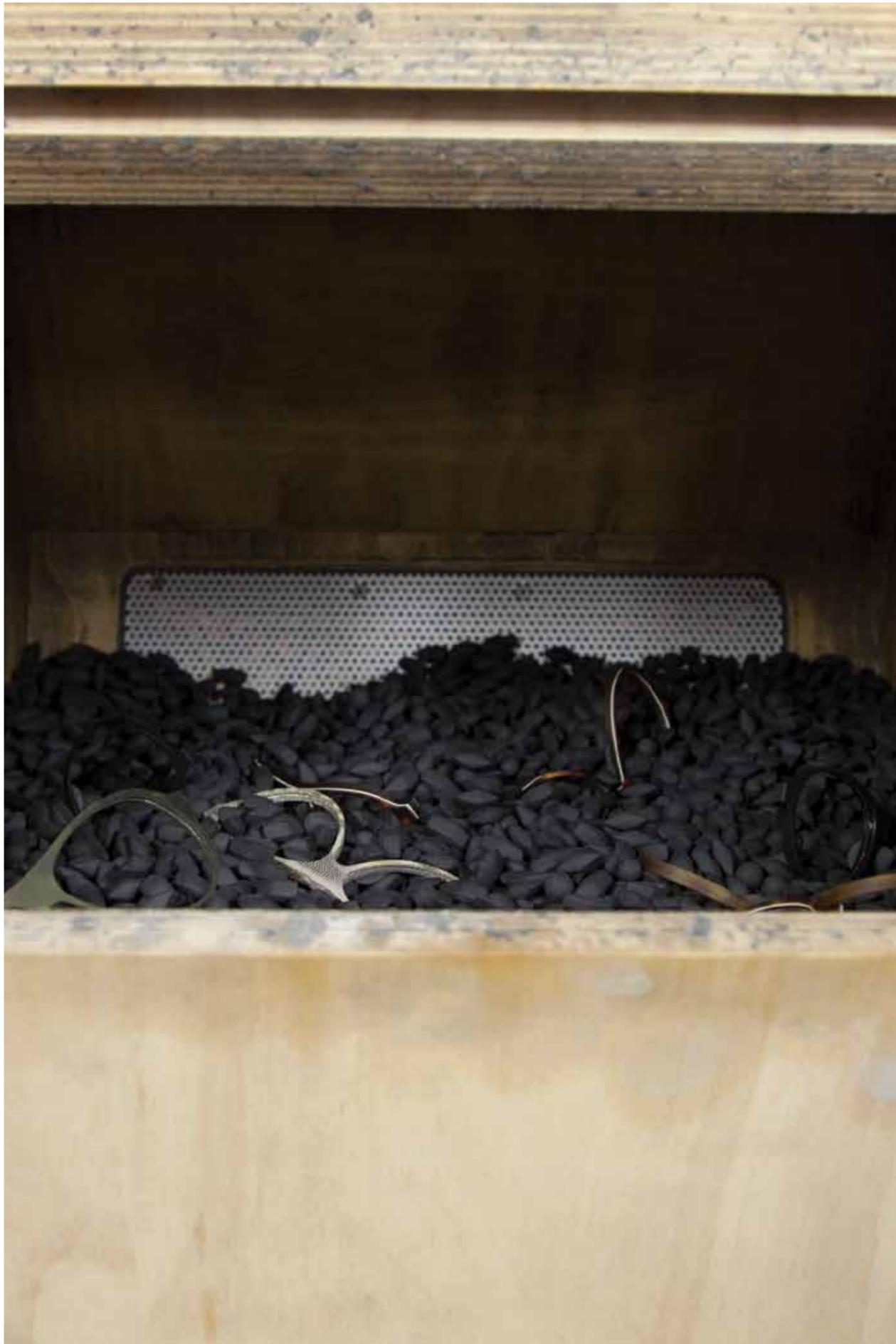
# 19

## BARREL STEP 4

*(Unique to Cutler and Gross)*



Barrel step 4: BRILLANTATURA shining is 12 hours of tumbling in beechwood pieces and white polishing cream.



20

ULTRASONIC  
CLEANING



Once the third stage of tumbling is complete the frames are all removed and counted. They are then placed in an ultrasonic bath for three minutes at 30° and then left to air dry.

21

STAMP OUT  
TEMPLES



Temples are stamped out of 4mm acetate. A fustella, which is a cutter, is created like a cutter and using heat slices the temples out of the acetate. We currently have over 60 fustellas.

22

SHOOT TEMPLES



The temple is put into a vice to keep fastened in place for the shooting of the metal core. The central section of the temple is heated and then the metal anima is shot into place.

If the temple design does not include pins the anima has a hinge attached already. An anima traditionally will have a thicker flat section at the lug with a textured pattern, this is to create a grip and prevent it from coming loose. The end is a thin point which easily bends when forming the tip.

23

REDUCE THICKNESS  
OF TEMPLE



Once the temple has been shot it has its thickness reduced. As with the frontals we may only have 6mm acetate instead of 4mm which would be too thick and heavy to wear.

24  
SMOOTH  
EDGES



The edges of the templates are shaved down to remove harsh edges.



26  
INSERT PIN



25  
INSERT HINGE

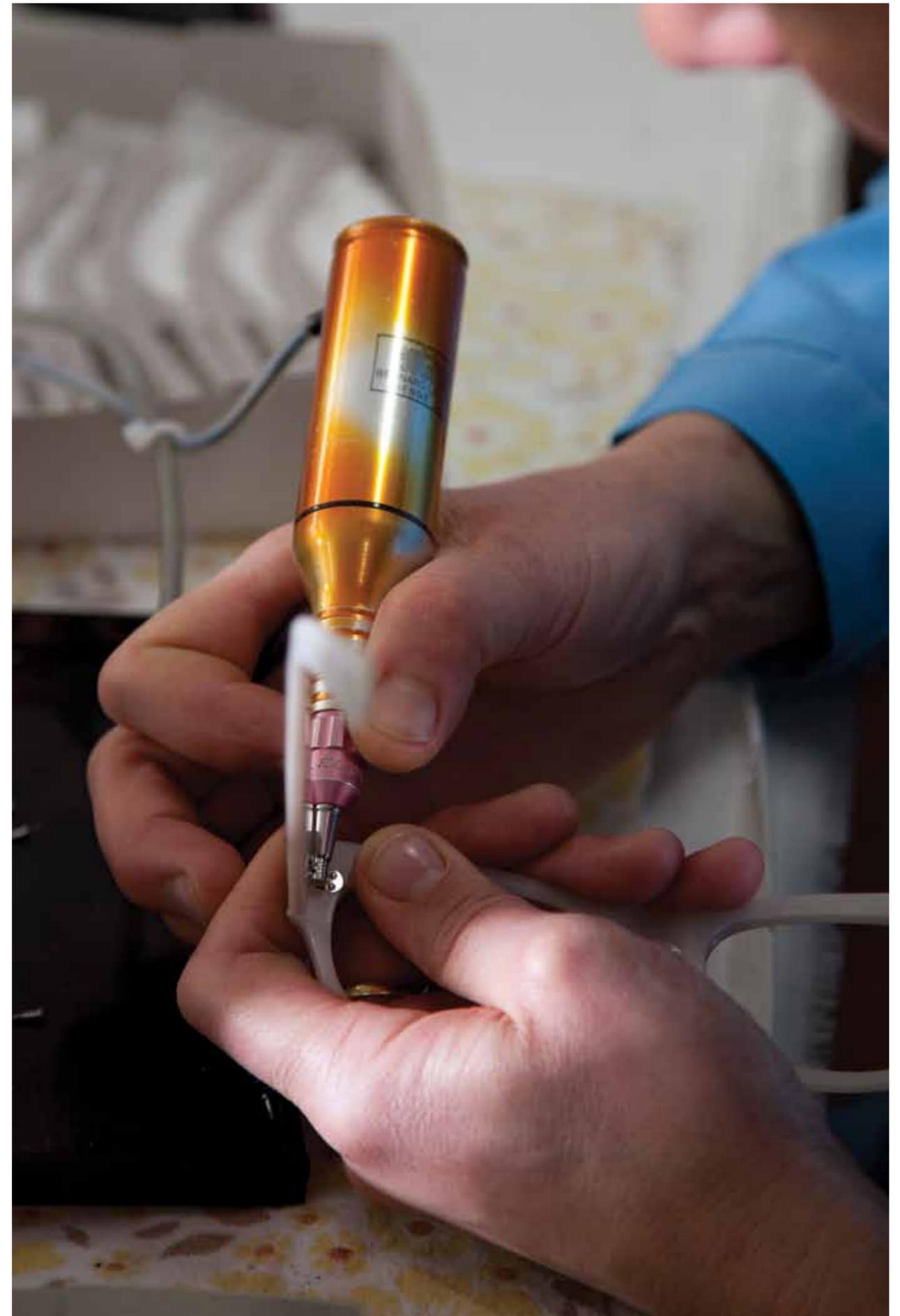
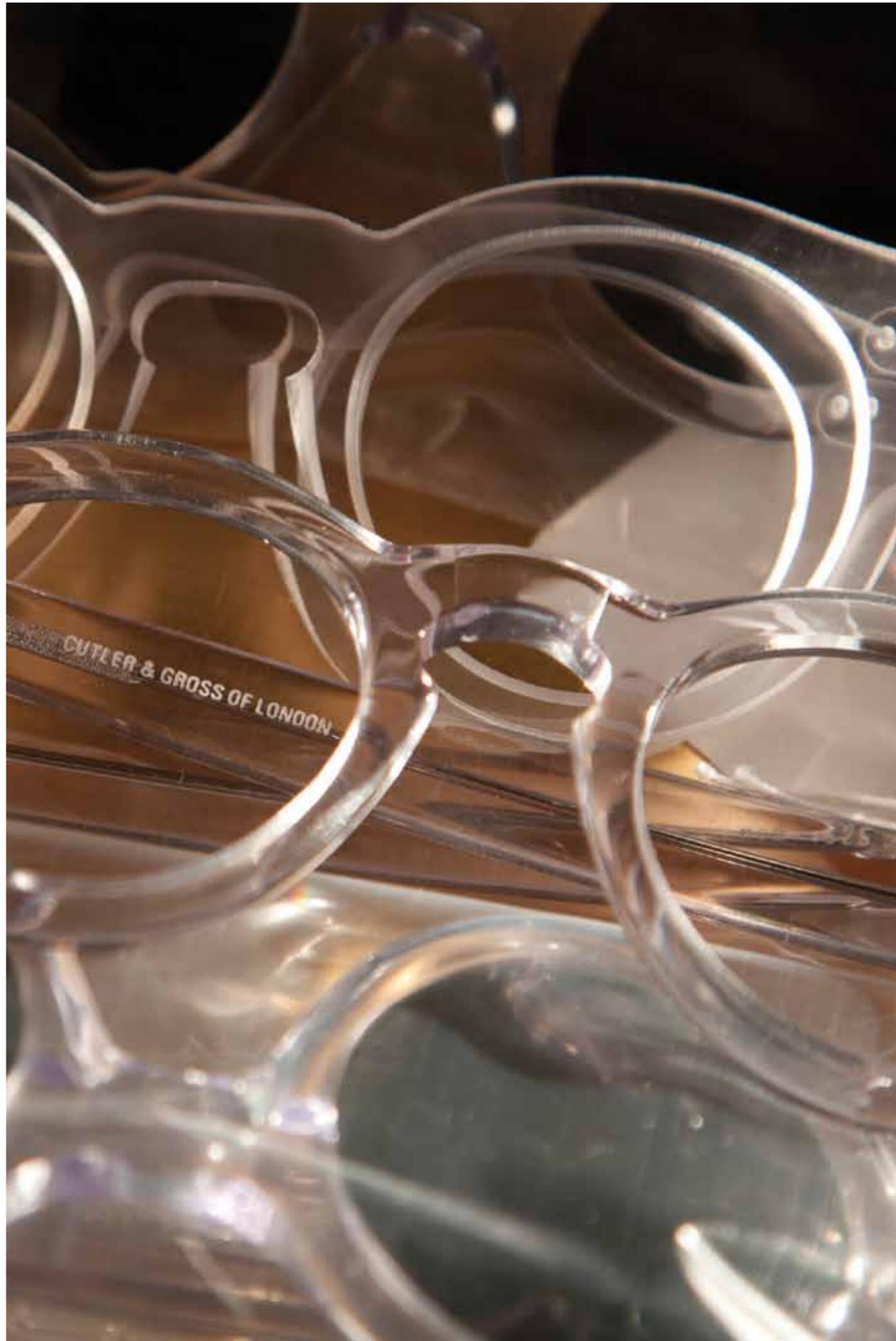


If the temple has been designed without pins then a hinge will be attached to the anima. Otherwise the hinge is placed in a milled grave and secured with pins like the frontal.



27  
MILL GRAVE  
FOR LOGO  
*(Unique to Cutler and Gross)*

A grave is milled in the arm of the frame so that the logo can then be placed inside.



28

LASER CUT  
CUTLER AND GROSS  
IN GOLD FOIL

*(Unique to Cutler and Gross)*



Our foil logos are laser cut out of metal and hand placed into the grave of each frame.

29

INSERT FOIL  
AND FILL  
IN GRAVE

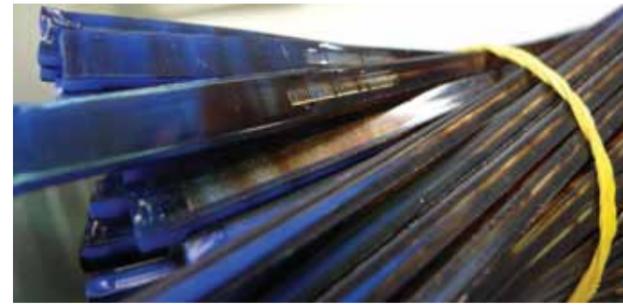
*(Unique to Cutler and Gross)*



Resin is used to seal the logo within the grave, and then finally this is cleaned up by smoothing the excess resin away with a sanding belt.

30

POLISH  
AND TUMBLE



Following the shaving of the edges the process is followed by the same tumbling process as used on the frontals.

31

CUT MITOR  
PANTOSCOPIC  
ANGLE



Before joining the frontal to the temple an angle called the pantoscopic angle needs to be cut on both so they perfectly join. This creates the neat finish to the hinge and ensures the correct angle and fit to the frame.

32

TEST  
PANTOSCOPIC  
ANGLE



The pantoscopic angle is tested and checked, this is an important part of the quality control.

33

JOIN HINGE



Using an electronic drill the hinges are joined together with specific screws.

34

BEND TEMPLES



To bend the temple by hand a mould is created which ensures the correct angle is created on each temple. The temples are heated and then bent by hand.

35

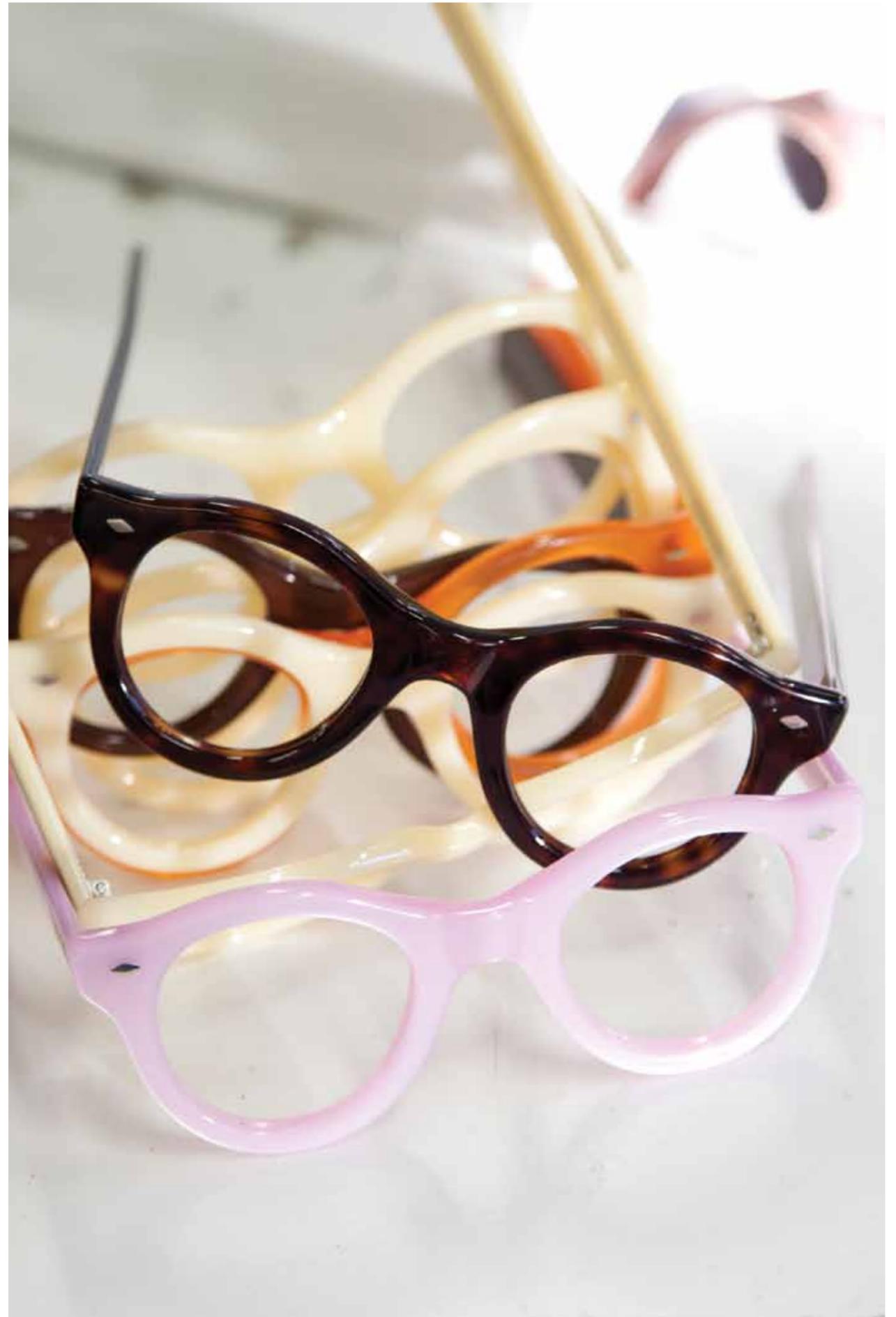
POLISHING

*(Unique to Cutler and Gross)*



The frames are washed ultrasonically and once dried the frames are taken to the polishing room where a four step process of polishing begins.

- 1st Wheel – Flattening the temple to the lug.
- 2nd Wheel – Remove scratch and bumps on acetate
- 3rd Wheel – Polishing
- 4th Wheel – Shining and finishing



## 36

### LASER FRAME DETAILS



On the left temple of each Cutler and Gross frame the product information is lasered on. This includes frame number, colour code, lens size, distance between lenses, frame width and 'Hand made in Italy by C&G CE'.

## 37

### GOLD FILL DETAILS



Once these details have been lasered onto the frame the graves are filled with gold ink and carefully polished to highlight the details.

## 38

### CUT LENSES



The main companies we currently use to glaze our frames are Zeiss, Dalloz and Intercast. It is very important to select lenses which are compatible with acetate as some materials such as polycarbonate can react with and crack the acetate when placed in one of our frames.

Lens types:

CR39: Will work with acetate and some metals but not supra wires or screw through lens construction.

Nylon: Will work with acetate and most metals including supra wire.

Polycarbonate: Does not work with acetate but will with most metals but not supra wire.

We glaze our production frames in Italy but also re-glaze frames in our shop and in our West London atelier. Lenses are mostly cut using a water jet, the frame eye hole or another lens is traced and then the machine recreates it onto the lens.

All of our optical frames have demo lenses inserted at the factory which can be replaced with prescription lenses at our shops.

Some sun lenses such as graduated lenses have to be arranged so the dark half is always at the top and are level with each other.

39

INSERT  
LENSES



Once cut each lens is inserted by hand into our frames.

41

BALANCING



Each pair is carefully and skillfully balanced to ensure they can be displayed and presented properly. Uneven temples can create an uncomfortable fit and will not fit well and appear uneven.

40

CLEAN  
GLASSES



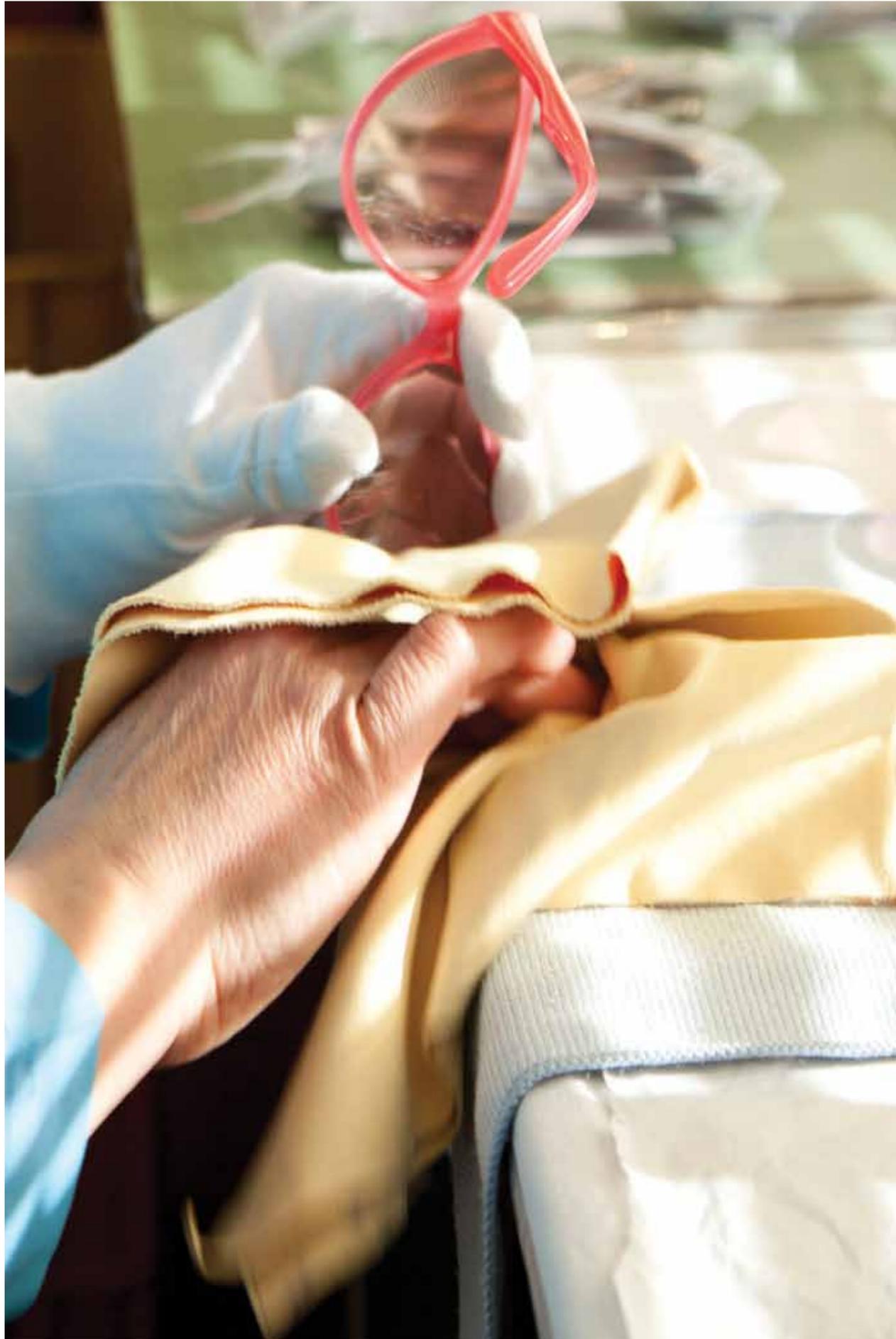
Once complete the glasses are carefully cleaned to remove any dirt left on them from the factory.

42

QUALITY  
CHECK



Throughout the final steps there is a visual checking of each frame for scratches, mistakes or faulty components. It is always important that the high Cutler and Gross standards are maintained.



# **CUTLER AND GROSS**

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