

Project Metallica

Explorations into
Aluminium Finishes
and Technologies

PROJECT
METALLICA

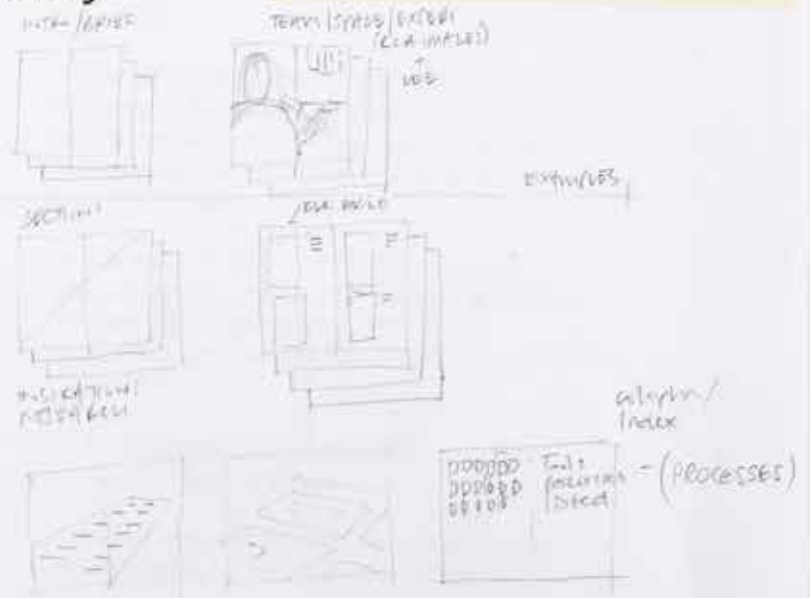
EMMA HAULDREN.

Project Metallica

2015—

**STUDY ON ALUMINIUM
MATERIAL FINISHES
AND POTENTIAL
TECHNOLOGIES**

Phase 1 Aluminium Study



Brief

WHAT IS
OUR POINT
OF VIEW ON
METAL?

The re-brand offers a timely opportunity to forge a new idea for Microsoft Phones.

- Address the feedback and findings from the 'Plan' Research document.
- Develop opportunities in aluminium metal surface finishes, colouration and detailing.
- Contribute to developing a 'Microsoft Mobile' premium design language with meaning and on brand messaging. (Add Nokia's character to Microsoft's relevance).
- Develop Microsoft Mobile's own unique approach to metal products that endure good taste and why these aesthetics and attention to detail appeal to people.
- Contribute to the evolution of the Fabula Design approach.
- What can we do with metal to make it recognisable and iconic for Microsoft?

Project Metadata

Our Consumer

WHO IS OUR CONSUMER?

WHAT DO THEY NEED?

DESIRE



The Microsoft vision
Help people and businesses throughout the world realize their full potential.



A meeting of the minds
Microsoft likes to help people and businesses do more and achieve more in a mobile first world.

Lumia smartphones have been engineered to provide the mobile experience that you want, intuitively, intelligently and easily. Together with making smartphones that will improve how people use digital technology, both at work and in their personal lives.



Our purpose
We give everyone the power to make things happen.



What's our emotional promise?
Celebrating the thrill of turning inspiration into reality.



The Lumia philosophy
Any Lumia phone is between the sun and the moon. Lumia phones are purely intentional. All Lumia smartphones are designed to give everyone the tools to light the path ahead. To become a beacon for those inspired people who want to make their dreams a reality.



Our insight
People are inspired every day. And they want to turn that inspiration into reality, whenever it strikes.



"The world needs dreamers and the world needs doers. But above all, the world needs dreamers who do."

— Sarah Bunick Jackson



What's our rational support?
A faster phone, we make it easier to do the things that are important to people in life and at work, wherever they are. We also give you more, at every price point, with a new high-quality beautifully designed hardware that delivers the most up-to-date software experiences.

Project Metadata

Inspired Doers



Inspired to make things happen
We love watching people realize their ambitions and celebrating their wins. Because we cherish people who turn inspiration into reality. "Inspired Doers".

There are people who take their idea and turn it into something great. It could be something as big as a brand new business. It could be something as simple as a new way to entertain the kids at the weekend. We want especially for them. We give them the power and the tools to start making things happen. Because they are the heroes who turn ideas into something amazing.



Audience
Who is our audience? "Inspired Doers". They are inspired by what's around them, but aren't satisfied in sitting around and hoping someone else will realize their dream for them. They are compelled to take action. They are energetic, resourceful, optimistic, and determined to make things happen.

What motivates them?
Achievement. Improving their skills, their lives and their reputations. Making a positive impact on others and making their own world a better place.

What do they rely on?
Technology that can help them build, develop and share.

How do they choose?
They know about technology and they know that the newest, the latest and the coolest aren't necessarily the best. They're not slaves to brands. They make up their own minds. But they're very smart.

What we make
Everything we make is built to make things happen. Lumia smart phones are designed with passion and intuition at their heart - from the top of our range right down to the most affordable. Everything works together to get things done. The latest operating system, Drive that works across any device, and renowned Microsoft experience make Lumia the ultimate tool for the "Inspired Doer".



Our personality
Motivated (challenging the status quo to see opportunities).

Inspired (motivating people to turn ideas into reality).

Encouraging (encouraging everyone to make things).

Inspired to make things happen.

Design Principles

Human

Our products turn smart devices we design them to complement people's needs and behaviors. People are our biggest source of inspiration and we strive to create truly meaningful experiences for them. To do this we combine ourselves in our customers' worlds with a mind as open as their shoes. We see what they are, think, feel and do as they live. By uncovering their human needs and behaviors our design decisions are influenced by this knowledge.

HUMAN IS...

Devices that are harmonious and feel in each other.
Forms and surfaces that invite a caress.
Transitions that create a seamless experience and inspire new ways of connecting.
Language that is approachable, not brutal or aggressive.
Behaviors and patterns that are familiar and welcome.
Providing choice and personalization.
Respecting people's cultures and differences.

HUMAN CAN BE...

EASY TO USE
In Nokia products, we lay things out so it's easy for people to find their way. We make sure things are intuitive and consistent across devices and interfaces - with a language that respects people and cultures.

NOT Changing with Nokia 95 speakers

USABILITY
We all recognize that people are getting more immersed in their devices. In Nokia products, we lay things out so it's easy for people to find their way and the people around them. As such we design how phones can be easily glanceable, able to go as well as through the moment and to respect human interaction and etiquette.

Giveable just when you need it. Designed for true mobility.

DEMOCRATIZATION

Breaking down the innovation. Bringing elements of our Flagship Lumia devices to more price points and therefore to more people.

Bringing elements of our high end Lumia flagship devices such as Near Field Communication to our lower price point phones such as the Lumia 620.

Automatically connecting the road between such as with the Lumia 920 and 920T cellphones.

IT FOR PURPOSE

People may be part of the same family and share the same values, but everyone has a unique personality and expectations. Our products respect this by providing choice and personalization so people can use themselves and the products become a reflection of people's individuality.

Lumia 920, 920T, 920T PureView

CRAFT

A Nokia product doesn't just go to the extent of having been assembled on a production line. It feels like someone has crafted it. They understand how it feels though they had never made it by hand.

Such as the crafting of the seamless music body protection key, the curved glass. These details re-ignite the idea of mass production.

Aesthetic design touches, which give the product a distinct character and feel in the hand.

PERSONALISATION AND CHOICE

People want to express themselves and so give the option to personalise their products, in very human ways. So we design our products with this in mind to give people options and choice.

Build approach to colour continues in our Gear offering encouraging personalisation with styling and finishing.

My Radio. Create a Mix. It's your personalise a playlist by selecting up to 3 artists, letting you discover new music.

The Windows 8 User Interface - the most personalisation smartphone experience on the market.

Advanced

Microsoft is, by nature, an innovative company. But when we introduce its new for the sake of a Microsoft innovation so that people have the best experience possible, experiences that are just right for them. Our innovations are advanced because they always push to the future so that our products and services are relevant in a fast-changing landscape. But it's also about finding a balance, leading experiences that are new but people familiar.

ADVANCED IS...

Not designing for today but for the future.
Mastering and technology achievements.
Inventing for tomorrow.

ADVANCED CAN BE...

Meaningfully Different
Whether we make big steps or small steps, we always try to give people things that they want or that they need so that they are fit for purpose.

Nokia 2012 portfolio

FUTURE FACTS

We strive in advancing design, by introducing new technologies, that points to the future.

Reducing energy because fingers can reach the edge of your finger.

Multi-touch interaction so anything can be used as a input.

DESIGNED INTO BEHAVIOUR

We strive to make things easy to use and sometimes inevitable. In other words, our designs fit so well with user needs and expectations that they "seem to be" designed with intuitive sensitivity that is beautifully natural and easy.

Wireless charging. Because life flows our way.

Augmented Reality

Nokia City Lens makes finding the best of what's around you in a single and natural way.

AGGREGATING DATA

Nokia's HERE Travel app makes planning your journey using public transportation easier and faster than ever before.

EXTREME PRODUCT MAKING

Pushing our level of product making to advanced. We build upon our strengths and expertise to deliver purity in our product making.

Such as the two part construction, curved glass, wireless colour, high glass surface without "fat edges" dual shot milled monocoques.

Design Principles

Pure

Pure epitomises the single, unified design approach we take to product making across our portfolio. We strive for simplicity and reduction in everything we do, and are committed to a process of continual refinement and improvement in the pursuit for perfection. This relentless delivers a superior experience for our consumers, but it gives our products and services an identity that is distinctly Nokia.

PURE IS...

Being colour back to its purest form.
Stripping away anything unnecessary.
Bold and confident use of typography in the user interface.
Being honest to the material.

PURE CAN BE...

LESS AND BETTER

What we put in is important as what we take out. What we think is this that we are conscious in our design making. It's not about packing as much technology into the product as we can, but only what is applicable and relevant to that product.

DESIGNING PRODUCT MAKING

Product making is about pushing the boundaries in all areas of the design process, whether in manufacturing techniques, material technology or interaction behaviour. We strive to deliver an experience that feels as progressive and unique as possible.

We use a single piece of injection moulded polycarbonate to create the mono-bodies of our devices to remove flash and split lines and create a structurally strong product.

MATERIALLED DESIGN

A material can lead a design and can be an inspiration point for products. We have over 20 years of experience working with polycarbonate giving us many new ways of manufacturing, finishing and infusing colour throughout. We see the innate beauty in materials and believe that should come through in our products, the material dictates the form. We treat materials honestly and craft them using techniques often associated with premium materials such as metal.

COLOR

Nokia has always recognised that colour allows us to stand out, evokes emotions and delivers choice to our consumers, and that's why colour has always had such a strong presence on our products. This continues with our bold new CAMO (Cyan, Magenta, Red and Black) approach to colour. By taking our palette up the previous colour model, we have taken colour back to its purest form, and created a platform for which a new and thoroughly modern look can be built for our products, giving a distinctly Nokia identity.

Built Better

Building better products is an iterative process and requires us to be critical of our work. How easy is it to use? Is it easy to learn? Is it fun? How can it be better? We ask ourselves these questions, and go through this process to create new and engaging experiences that build on Nokia's ability to keep making things better.

BUILT BETTER IS...

Attention to detail.
Reduction of parts.
Fixating on the smallest and making them beautiful.
Durability and reliability.
Refining and improving.

BUILT BETTER CAN BE...

DESIGNED FROM THE INSIDE OUT

What the inside is as often is a product based on a yearly trend, but the design is determined by the intelligent arrangements of the internal components that dictate the form of the product.

Internal architecture for Ear.

MAINTAIN ESSENTIALS

We focus on the two or three things people do with their phones hundreds of times every day, and making those experiences sing through continual, incremental improvement, we bring consistent joy and delight to those interactions.

For example the individually drilled holes on N20 gives the appearance of precision, which consequently adds value.

Double tap to wake, setting the alarm, swipe action to home and activity stream on the N9.

Speed browser compresses data, so you can do more whilst consuming less.

Beauty under the hood.

OUR DESIGN PRINCIPLES... TRANSLATED INTO A FINISH...

HOW CAN A FINISH BE PURE, HUMAN, BUILT BETTER + ADVANCED?

PROJECT METALLICA

How do you create a signature brand finish for Microsoft Phones?

Finish follows function

Each theme has its own unique design and aesthetic solution, which has been based upon its intended function or purpose and consumer need.

THEMES:

1. How can a finish become more beautiful with age?

The wear of a product can take on its own beauty through use. How do we take advantage of this and design a finish that becomes more beautiful with age?

2. How can you disguise the splits required because of the antenna?

The metal back requires to be split at the top and bottom of the device. Can we disguise the polycarbonate strap at either end?

3. How can you design a metal back that doesn't need to be covered up or protected?

As a brand, we are renowned for our durability and the tests we perform on our devices are the strictest compared to our competitors. Can we design a finish, which doesn't need to be protected?

4. How can a finish aid grip?

Can we treat the metal back at points of human contact? Can we focus on where the hand meets the device most commonly? Areas of attraction can be where the hand touches the device on the back or the buttons on the side of the device. Aiding the user through touch and visual effects.

5. How can a finish diffuse scratches?

Patterns help diffuse scratches. A highly polished object shows fewer scratches than a matt finish. Patterns can help draw the user to focus areas such as the camera detail, logo or aid the user to the location of the loss of physical keys on the sides of the device. Touch and visual cues.

Project Metallica

Themes

All finishes follow a function driven from a consumer need.

**FINISH
FOLLOWS
FUNCTION**

How can a finish...

- Aid grip?
- Diffuse scratches?
- Guide the user? + inform
- Disguise the antenna?
- Reduce heat?
- Avoid being covered up?
- Age beautifully?
- Be personalised?
- Be bespoke?
- Create desire?
- BE GESTURAL?
- BE CODED?



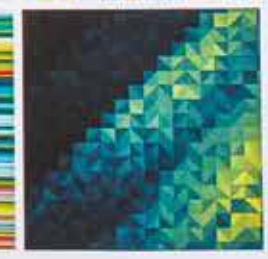
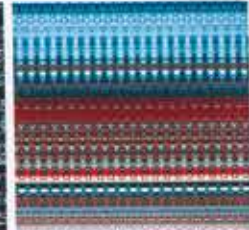
MATERIAL TRANSITIONS

CONCEPT: FUSION OF TWO MATERIALS
POLYCARBONATE + METAL.



CELEBRATING THAT WE NEED TO BREAK UP THE BACK PANEL SOMEHOW WITH A NON-CONDUCTIVE STRIP... LET'S MAKE IT BEAUTIFUL + PLAYFUL!

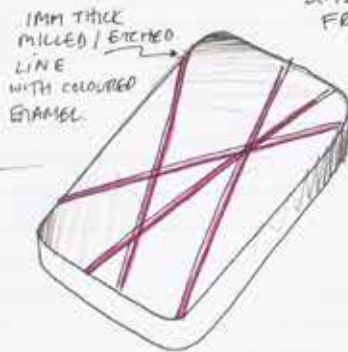
DISGUIISING THE ANTENNA



**SUBTLE
USE OF
COLOUR**

IN COMBINATION
WITH THE METAL.

AS PRODUCTS BECOME MORE
HIGH END.



1MM THICK
MILLED/ETCHED
LINE
WITH COLOURED
ENAMEL.

DIFFERENTIATING
FROM THE
LOWER
END
OF THE
PORTFOLIO.

MSFT Colour Palette/OS Accents

| | | | | | | | |
|---|---|---|--|---|---|---|---|
| Yellow HEX: F1C40F RGB: 249, 196, 15 | Orange HEX: E67E22 RGB: 231, 127, 34 | Red HEX: E74C3C RGB: 231, 76, 60 | Magenta HEX: 9B59B6 RGB: 155, 89, 182 | Purple HEX: 8E44AD RGB: 142, 69, 173 | Blue HEX: 3498DB RGB: 52, 152, 235 | Teal HEX: 2ECC71 RGB: 46, 204, 113 | Green HEX: 27AE60 RGB: 39, 175, 96 |
|---|---|---|--|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Light Orange HEX: F1C40F RGB: 249, 196, 15 | Light Purple HEX: 9B59B6 RGB: 155, 89, 182 | Light Blue HEX: 5dade2 RGB: 47, 162, 225 | Light Teal HEX: 2ECC71 RGB: 46, 204, 113 | Light Green HEX: 27AE60 RGB: 39, 175, 96 | Light Yellow HEX: F1C40F RGB: 249, 196, 15 |
|---|---|---|---|---|---|

| | | | | | |
|--|---|--|--|--|--|
| Dark Red HEX: E74C3C RGB: 231, 76, 60 | Dark Magenta HEX: 9B59B6 RGB: 155, 89, 182 | Dark Purple HEX: 8E44AD RGB: 142, 69, 173 | Dark Blue HEX: 3498DB RGB: 52, 152, 235 | Dark Teal HEX: 2ECC71 RGB: 46, 204, 113 | Dark Green HEX: 27AE60 RGB: 39, 175, 96 |
|--|---|--|--|--|--|

| | | | | |
|---|--|--|---|--|
| White HEX: F3F3F3 RGB: 243, 243, 243 | Light Grey HEX: BDBDBD RGB: 189, 189, 189 | Mid Grey HEX: 959595 RGB: 149, 149, 149 | Dark Grey HEX: 7F7F7F RGB: 127, 127, 127 | Black HEX: 333333 RGB: 51, 51, 51 |
|---|--|--|---|--|



COLOUR ———
CAN WE USE COLOUR
IN A MORE DISCREET
WAY AS IT BECOMES
MORE HIGH END?

EG. 1MM THICK MILLED LINE
WITH COLOURED ENAMEL
AS A HIGHLIGHT?



AUDIO

DIAMOND DRAG
"KISSING" THE
SURFACE



MICRO
PERFORATIONS

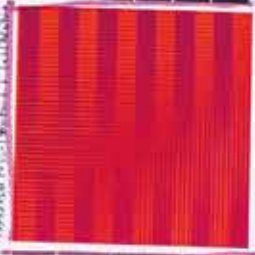
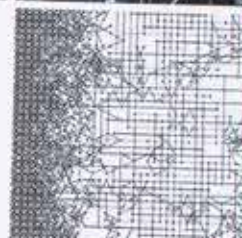
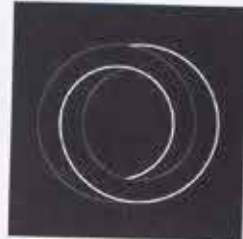


THEN...
INLAY GROOVES
WITH COLD
ENAMEL

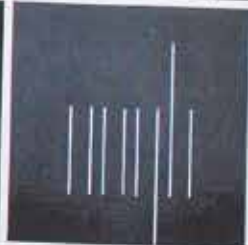


DISGUISED THE ANTENNA

METAL/PLASTIC INTEGRATION



PERFORATED
SPEAKER
DRIVER





DRIFT



EXPERIMENTING WITH THICKNESS OF LINE AND SHAPE OF THE TOOLS / CUTTERS

- EXPERIMENT WITH PATTERN.
- MATT FINISHES SHOW SCRATCHES
- POLISHED FINISHES MAKE THE SCRATCHES LOOK SMALLER.

DIAMOND DRAG
3MM END DRILL "KISS" THE SURFACE

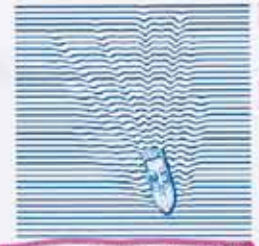
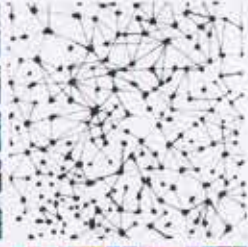
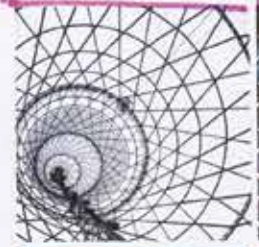
PATTERNS DIFFUSE SCRATCHES

ATTRACTION -
LINES CHANGE AROUND
FEATURES EG. CAMERA DETAIL
AND LOGO.

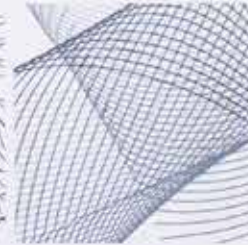
DISGUIISING THE ANTENNA

ANTI-
SCRATCH

DIAMOND DRAG
GRIP AND AUDIO



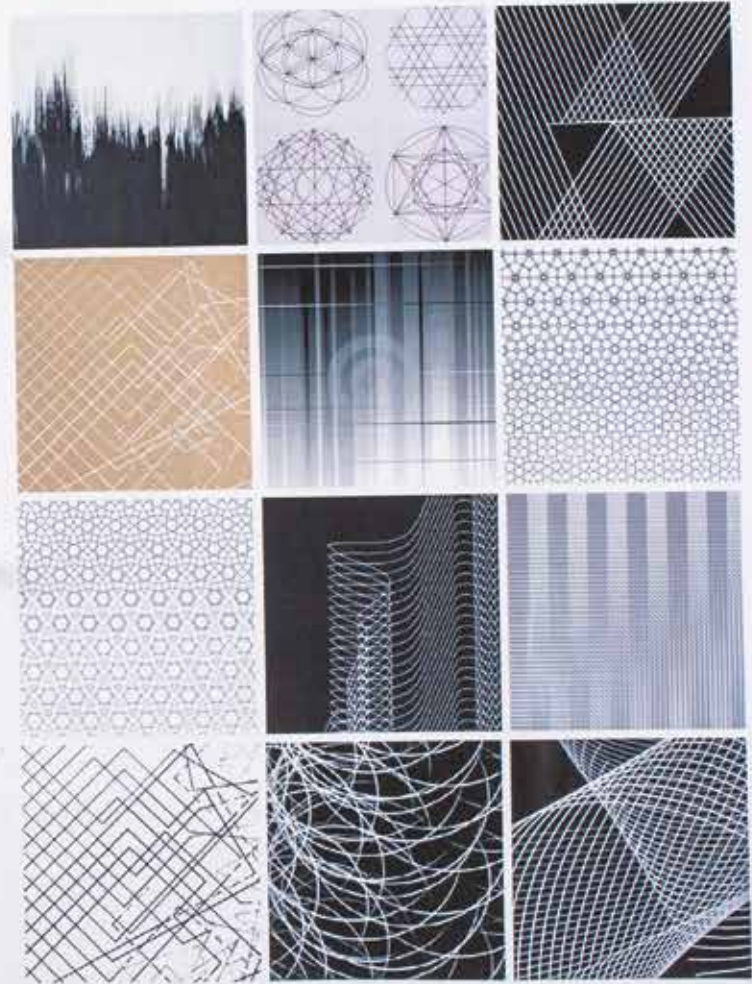
"BAMBOO"



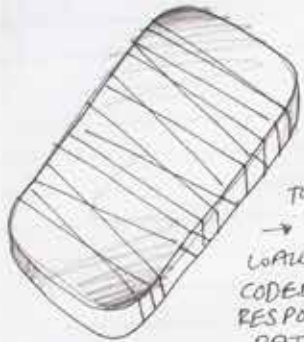
DISGUISED THE ANTENNA

DIAMOND DEK

MICRO -
PERFORATIONS + AUDIO



DESIGNING THE MATERIAL

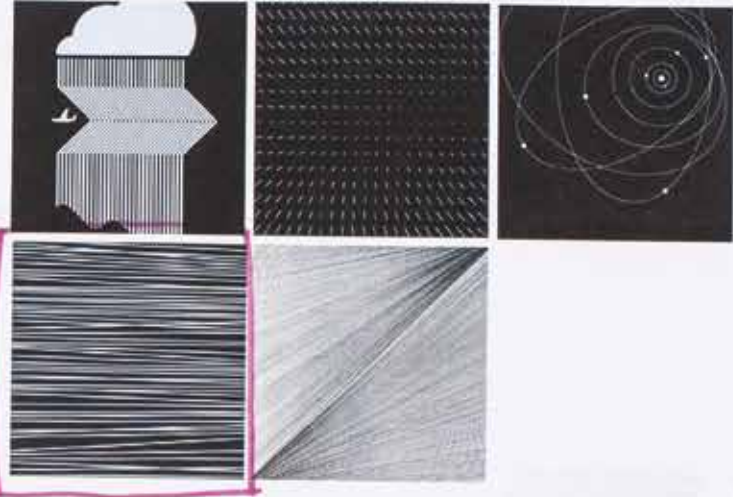


ETCHED LINES
← ON THE
BACK
MOVE ACCESS
TO THE SIDES
→ THEN THE
WALLPAPER IS
CODED TO
RESPOND TO THIS
PATTERN

PHYSICAL +
DIGITAL
HARMONY



DIFFUSE SCRATCHES



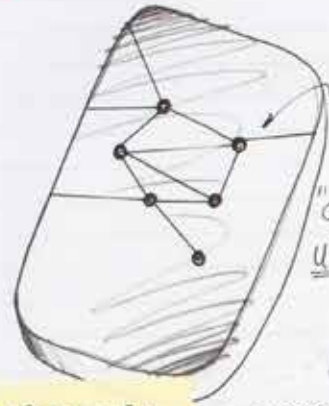
'STRING'

- SURFACE ETCH

PHYSICAL + DIGITAL HARMONY

(THE STRING LOOKS LIKE IT IS WRAPPING
AROUND THE PRODUCT)

- BESPOKE? - PERSONALISED STRING?



CAN THE USER BE NOTIFIED VIA THE BACK PANEL?

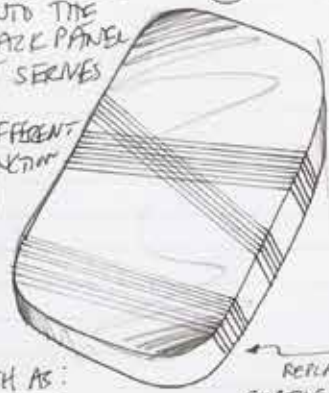
SET DIAMONDS IN BACK... THESE COULD BE CODED TO TELL THE USER CERTAIN FUNCTIONS. EG NOTIFICATIONS (HIERARCHY) LOW BATTERY

UNLOCK



CONCEPT THAT ON THE SIDE THE FINISH SERVES ONE FUNCTION - THEN AS THE GRAPHIC MOVES ACROSS ONTO THE BACK PANEL IT SERVES A DIFFERENT FUNCTION

BACK PANEL (2) ← SIDE KEYS (1)



SUCH AS:

- AUDIO
- DISGUISED THE ANTENNA
- DIFFUSING SCRATCHES
- AIDING GRIP

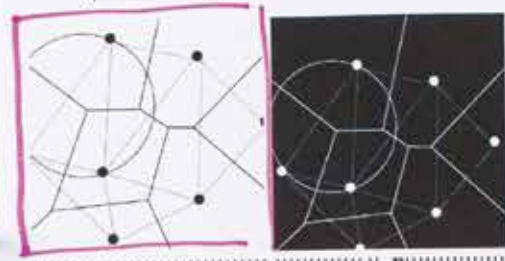
KEYS REPLACED WITH SUBTLE GROOVES MADE IN THE ALUMINIUM SURFACE

217

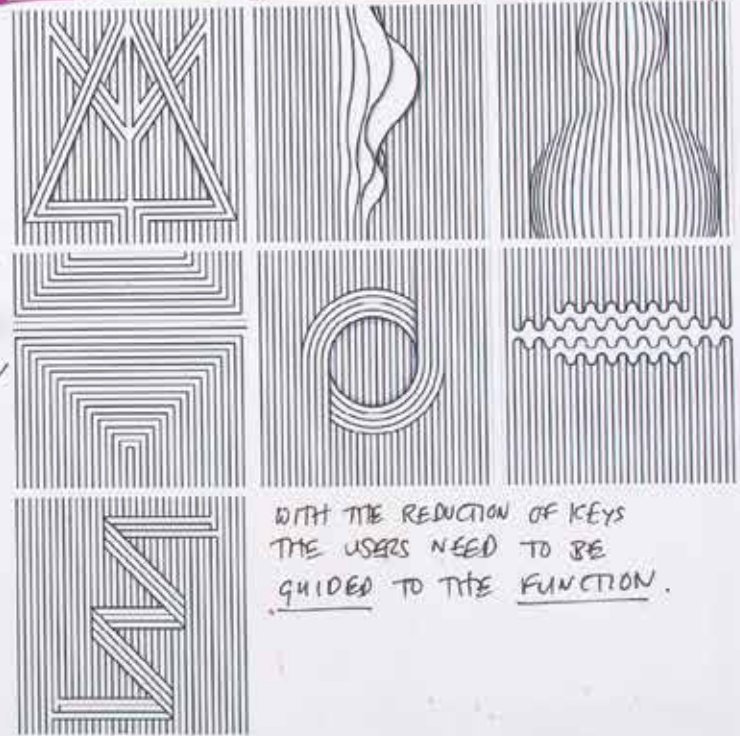
217

GUIDING THE USER

OPTICAL ILLUSIONS - SIDE KEYS



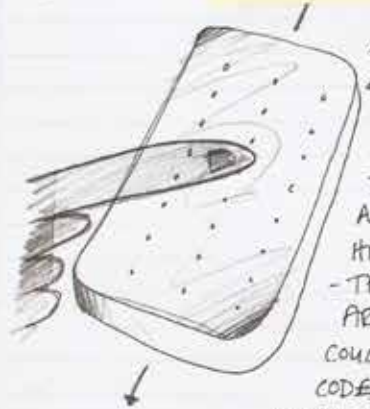
OPTICAL ILLUSIONS - FLAT SURFACES BECOME 3-DIMENSIONAL WITH SIGHT AND TOUCH



WITH THE REDUCTION OF KEYS THE USERS NEED TO BE GUIDED TO THE FUNCTION.

GESTURAL

"BRAIL"

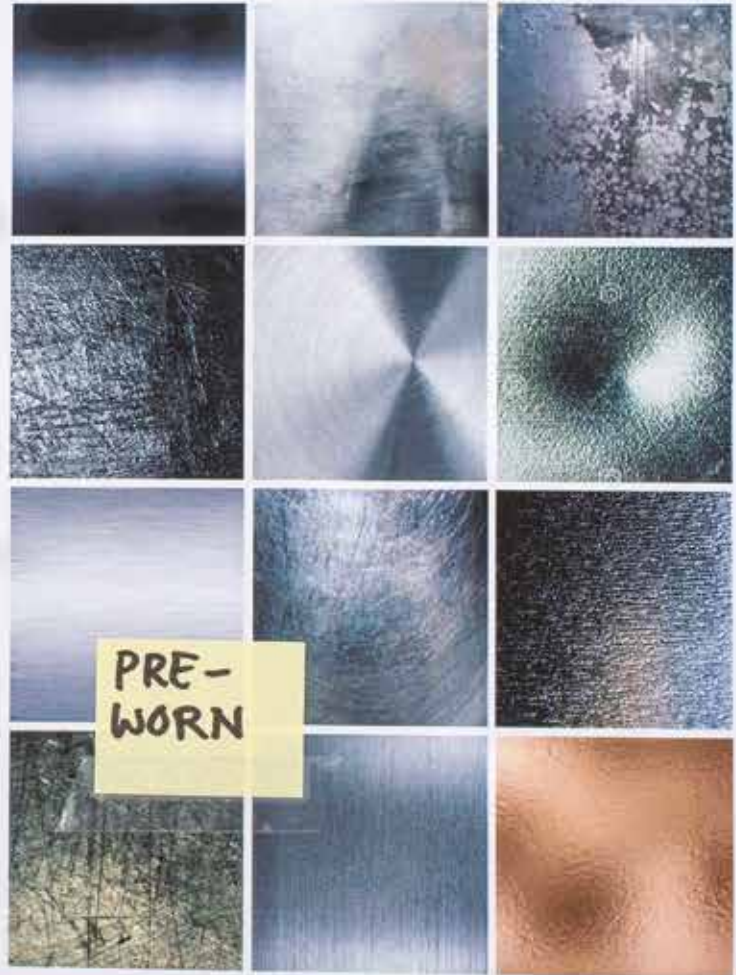


CENTRE-
PUNCH
THE
SURFACE
TO CREATE
A SUBTLE
HIGH POINT-
-THESE
AREAS
COULD BE
CODED TO
REACT TO
GESTURES SUCH
AS VOLUME
UP / DOWN



DIFFERENT SPATIALS

Research



PRE-
WORN

"CONDENSATION"



TIN PLUS
FLUX
HEATED UP
AT A
45° ANGLE
SO THAT
THE TIN
MELTS
AND ROLS
DOWN THE
SURFACE
LIKE WATER
ON GLASS...

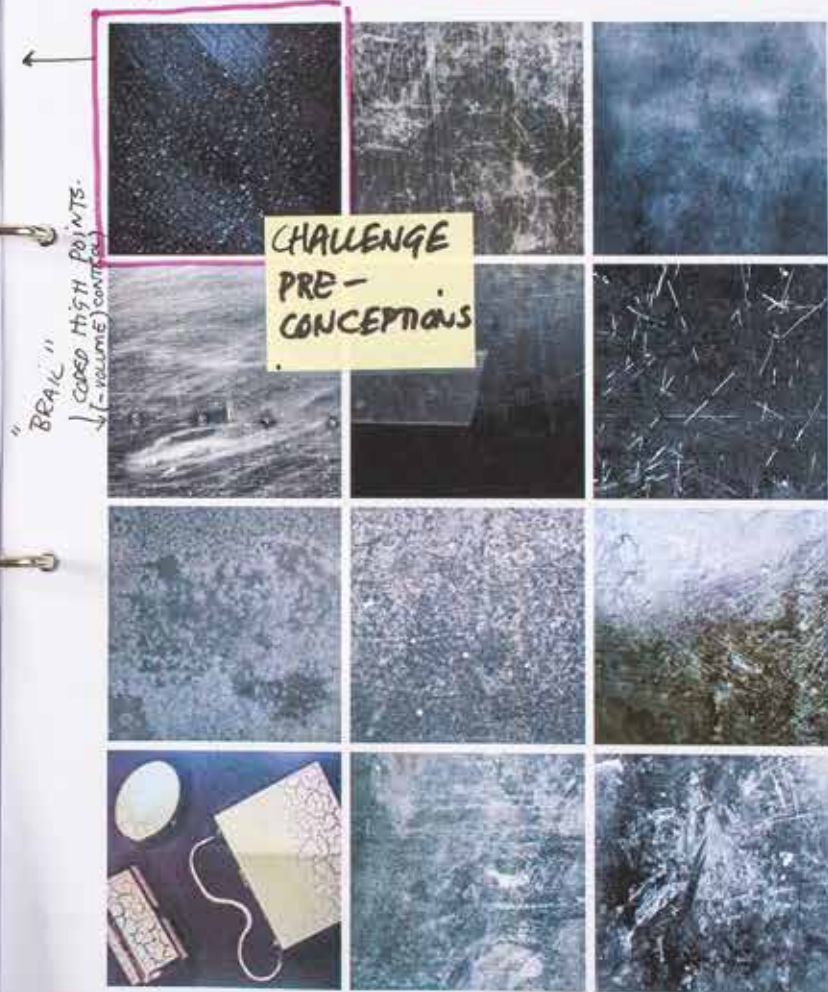
- UNEXPECTED
COMBINATIONS.

- BREAK PRE-CONCEPTIONS
WITH WHAT FINISH
CAN BE ON THE BACK



DIFFUSE SCRATCHES

(SCRATCHES CAN BE BEAUTIFUL)



"BRILL"
↓ COATED HIGH POINTS
↓ (- volume) contrast

CHALLENGE
PRE-
CONCEPTIONS

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(writing)

CONCEPT:
 HAMMERING ON THE SURFACE AIDS
 GRIP BUT
 AS WE
 MOVE
 INTO
 LOSING
 KEYS



THE HAMMERING CAN BE
 MORE INTENSE AT ONE END
 OF THE DEVICE TO AID
 THE USER FOR ORIENTATION

INTENSE
 - HAMMERING ALSO AT
 POINTS OF CONTACT WITH THE
 HAND - MAYBE NOT NECESSARY
 IN ALL AREAS?

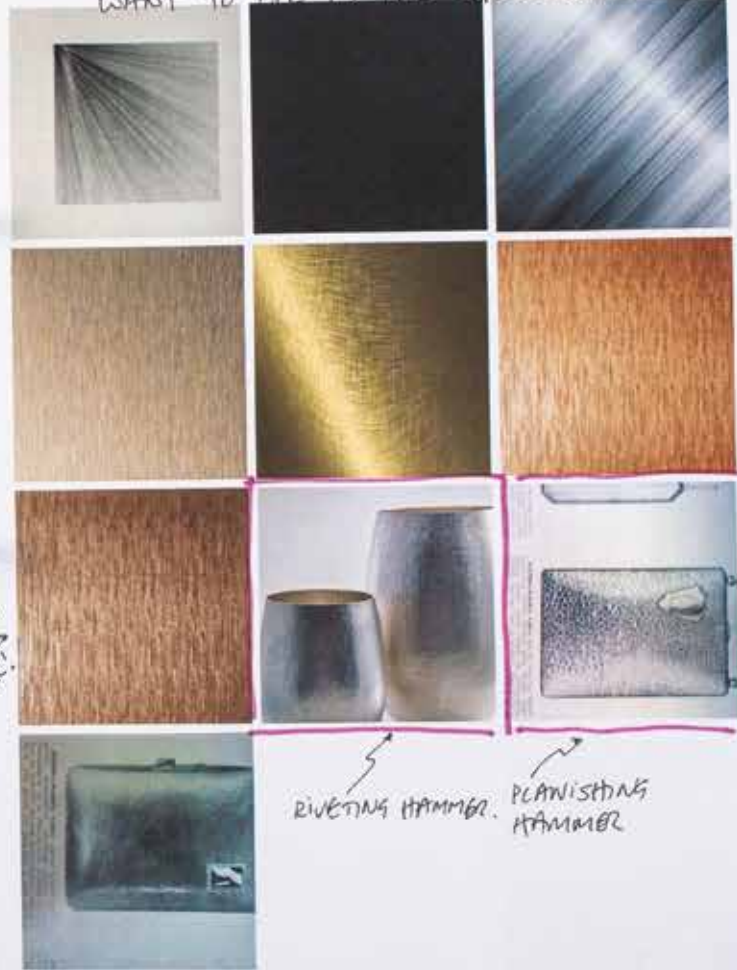
- CAN WE BUILD A MACHINE
 WHICH CREATES HAMMER
 MARKS?

- COULD THIS BE A WAY TO
 COMMUNICATE HIGH END?
 OR

MORE HAMMERING / LONGER MACHINE
 TIME MEANS MORE PREMIUM?

Aid GRIP

- AMBITION: TO SHOW THE DIVERSE RANGE OF POSSIBLE HAMMER MARKS.
- SHOW THE RANGE SO MICROSOFT PHONES CAN HAVE A POINT OF VIEW WITH WHERE WE WANT TO LIE IN THE SPECTRUM.



SLEDGE
 HAMMER?

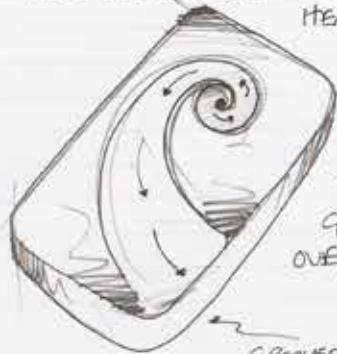
RIVETING HAMMER

PLANISHING
 HAMMER

9/19/07

HEAT MANAGEMENT

CONCEPT IS THERE A WAY THAT THE BACK COULD MOVE THE HEAT AWAY FROM THE AREAS THAT GET OVERHEATED?



GROOVES MILLED INTO THE BACK PANEL.

REDUCES HEAT

- 3-D FORM ON THE BACK.



REDUCE HEAT
- 3D FORM ON THE BACK.



REDUCE HEAT



REDUCE HEAT

REDUCE HEAT

- AID GRIP



SAMPLE TEXT

Abstract background

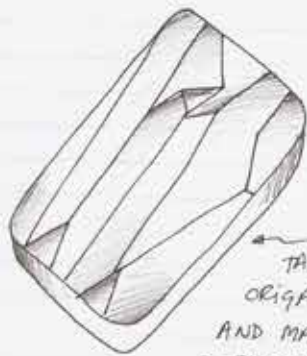
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REDUCE HEAT



REDUCE HEAT

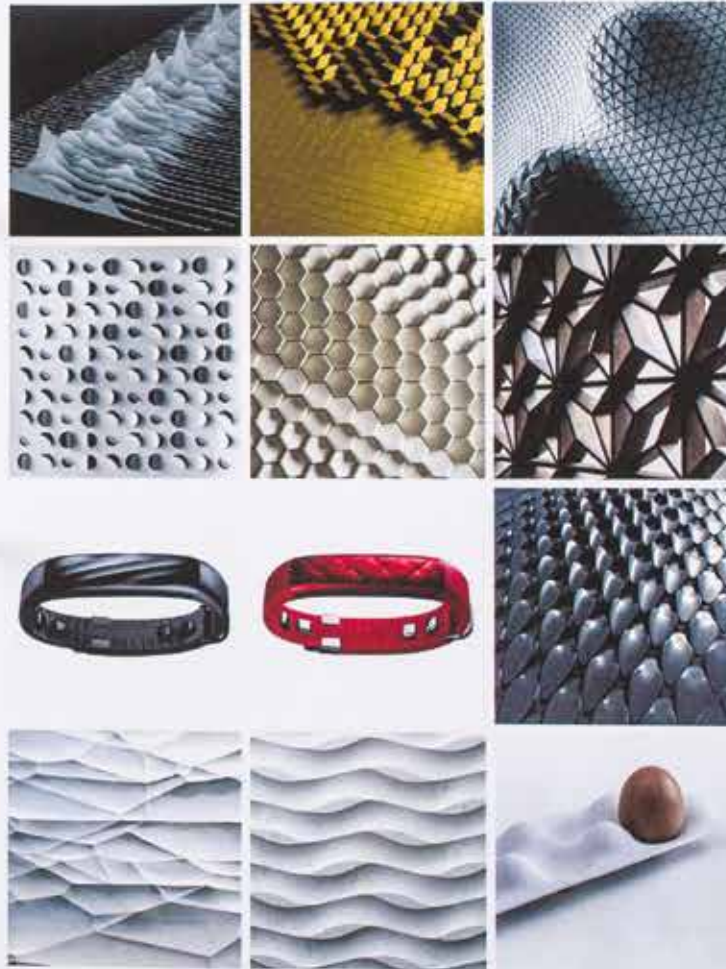
ACCOMODATING ARCHITECTURE
"ORIGAMI"
PLACEMENT



TAKING THE ORIGAMI GRAPHIC AND MAKING IT 3-DIMENSIONAL TO REDUCE HEAT

- THE INTERNAL ARCHITECTURE ACCOMODATES TO THE 3-DIMENSIONAL SHAPE

AID GRIP



Handwritten text in red ink: "Handwritten text"

Handwritten text in red ink: "AD GRIP"



"RAIN"

UNIQUE
PATTERN



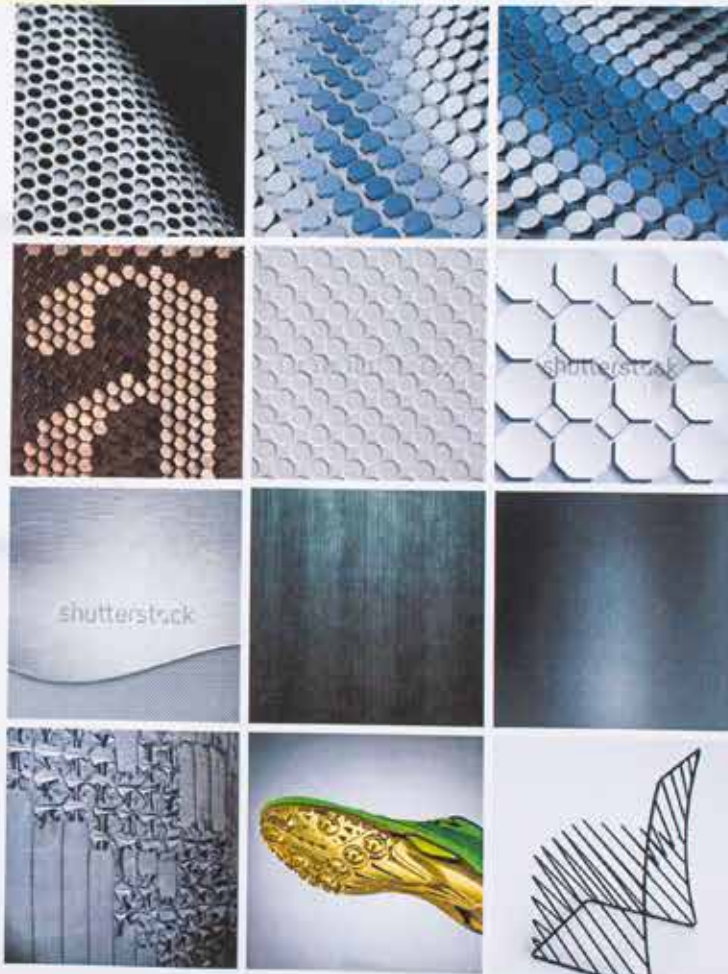
PERFORATING
THE SURFACE
WITH DIFFERENT
SIZED HOLES.

LED
NOTIFICATION

THE BACK SURFACE
CAN BE CODED TO
COMMUNICATE TO
THE USER CERTAIN
NOTIFICATIONS.
EG. LOW BATTERY

ADD GRIP

- DIFFUSE SCRATCHES
- REDUCE HEAT





PRE-WORN

THE SURFACE IS ALREADY SCRATCHED.



AGES BEAUTIFULLY

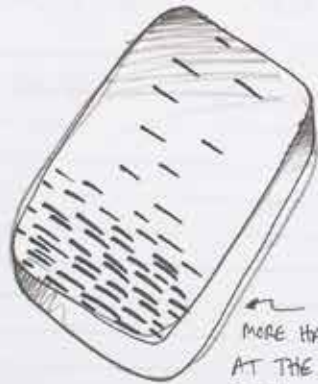


BOAST ALUMINIUM WITH HEAT TO DESTROY SURFACE

- OVERHEAT SURFACE TO DISTRESS THE METAL.

AGES BEAUTIFULLY - ANODISE SURFACE THEN REVEAL HIGH POINTS WHICH BECOME HIGHLY POLISHED THROUGH TIME...

ORIENTATION
DURABLE



MORE HAMMERING
AT THE
BOTTOM OF THE
DEVICE CAN
COMMUNICATE THE
CORRECT ORIENTATION

REDUCE HEAT / GRIP

- APPLYING TEXTURE AT POINTS OF
CONTACT WITH THE HAND.



MILL SURFACE TO CREATE 3D SURFACE

AFTER REFINISHING
 — SAYS HOW YOU COME FROM
 — OUR PRODUCTS NEED TO EXUDE EXQUISITE
 TASTE!



EXUDES
 EXQUISITE TASTE
 COMBINATION
 ROUGH / SMOOTH
 RAW LEATHER
 TASTE
 + TIME NEW





FROM MATERIAL
TO FORM
COMPARING AND CONTRASTING WITH
: PROMISE NOTE

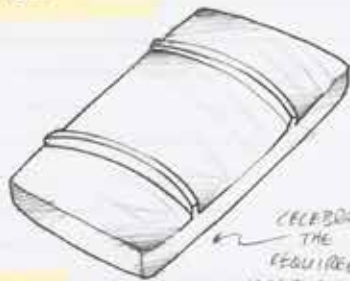
GRADIENTS - FROM ONE MATERIAL TO ANOTHER.



- DETAILING
CONTRASTS

DESIGNING FROM THE INSIDE - OUT

BREAKING THROUGH THE RIBS



PREVENTS SCRATCHES

BRING THIS TO THE OUTSIDE -
(NOT ONLY PROTECTS THE BACK FROM SCRATCHES BUT GIVES STRENGTH TO THE BACK COMPONENT)

CELEBRATING THE REQUIRED INTERNAL STRUCTURE

RELATIONSHIP OF STRUCTURE AND FORM - BRINGING THE INSIDE TO THE OUTSIDE

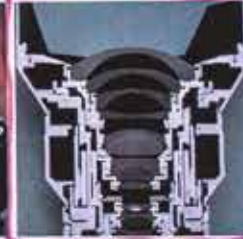
AGES BEAUTIFULLY



AGES BEAUTIFULLY

AGES BEAUTIFULLY

AVOID
COVERING
UP



Apprentice

Combining hand-craft skills with industrial processes.

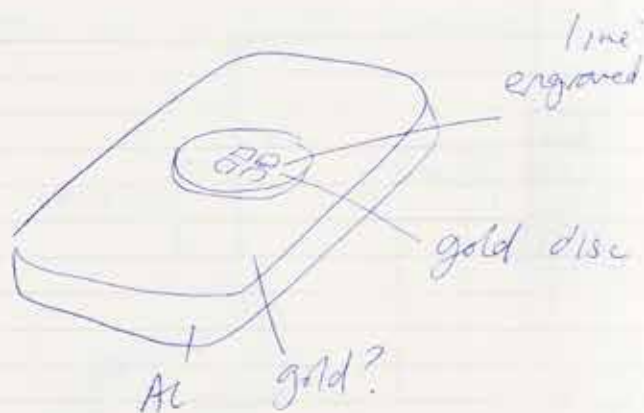
ALUMINIUM

Industrial Techniques

- Anodising ✓
- Bamboo-veneer ✓
- Bare plating ✓
- Blackening and bluing ✓
- Bronze plating ✓
- Cadmium plating ✓
- Chemical rolling ✓
- Chromating ✓
- Snick chrome ✓
- Chromium black plating ✓
- Electrocoat ✓
- Delta tone ✓
- Dial plating ✓
- Dial printing ✓
- Diamond drag ✓
- Engraving ✓
- Electro-coating ✓
- Chemical engraving ✓
- Draining ✓
- Hot dip tinning ✓
- Indium plating ✓
- Iron plating ✓
- Laminating pin ✓
- Lead plating ✓
- Mechanical plating ✓
- Metal colouring ✓
- Molding ✓
- Nickel plating ✓
- Nickel-Cadmium ✓
- Fluorising ✓
- Pearl nickel-chrome ✓
- Phosphating ✓
- Printing and engraving ✓
- Rhodium plating ✓
- Shot blasting ✓
- Shot peening ✓
- Sik anamming ✓
- Isolating ✓
- Osse enamelling ✓
- Fin plating ✓
- Ironback plating ✓
- Ironhead plating ✓
- Trichloro plating ✓
- Tyrosol plating ✓
- Titanium nitride plating ✓
- Titanium plating ✓
- Titanium treatment ✓
- Vacuum metalizing ✓
- Vapour etching ✓
- Vibratory polishing ✓
- De-burring ✓
- Zinc plating ✓
- Zinc nickel alloy plating ✓
- Dye plating ✓

Craft Techniques

- Rough filing ✓
- Tin loading - water effect ✓
- Powder coating ✓
- Flaming ✓
- Enamelling ✓
- Scoring, scoring, bending, flattening ✓
- Distressing metal through bending ✓
- Distressing metal through heat ✓
- Gold leaf ✓
- Applying Ammonium polysulphide ✓
- Sandblasting ✓
- Fill metal with zinc sand back ✓
- Casting ✓
- Highly polished silverbacked ✓
- Weaving ✓
- Repair ✓
- Paper inlay ✓
- Runching ✓
- Etching ✓
- Engraving ✓
- Engraving ✓
- Knurling ✓
- Knurling ✓
- Silver stretched plating ✓
- Chemical enamel ✓
- Electroforming ✓



NAME:

CONCEPT:

HOW WAS MADE:

PROJECT METALLICA "HAIL"

① MILLED SURFACE, RANDOM PATTERN
SATIN FINISH

"MOON"
② RETICULATED SURFACE,
SPRAYED BLACK.

③ "STEALTH"
(BAMBOO 3D DIMENSIONISED).

MILLED
BRASS BRUSH FINISH
BURNISHED EDGES

"BAMBOO SERIES"
④ HAMMERED WITH TEXTURE
HAMMER, MILLED 'BAMBOO'
GRAPHIC INTO SURFACE,
HIGH POLISHED.

"SOLF BALL" SPIRALLY
⑤ HEXAGONAL PATTERN RADIALLY
MILLED ONTO SURFACE.
RAW FINISH STRAIGHT OFF
MILLING MACHINE.

⑥ TEXTURE HAMMER, POLISHED

⑦ POLISHED SURFACE THEN
PLANISHED WITH PLANISHING
HAMMER

"RAIN"
⑧ MILLED HOLES AT AN ANGLE
TO MAKE OVAL EFFECT.

(9) "GRASS"
MILLED "BAMBOO" GRAPHIC
3MM DRILL BIT, END MILL,
- OVER POLISHED!

(10) HORIZONTAL
TEXTURE HAMMER.
SPRAYED BLACK PAINT

(11) HORIZONTAL
TEXTURED HAMMER, MORE
INTENSE.

(12) HORIZONTAL
TEXTURED HAMMER
SPRAYED GOLD.

(13) VERTICAL TEXTURED HAMMER
SATIN FINISH

(14) "FISH NET STOCKINGS"
~~ROLLED TIGHT~~
~~TIGHT~~ PRESS TEXTURE.
TIGHTS ROLLED THROUGH
ROLLERS.

(15) MILLED WITH 1MM END MILL
ATTRACTOR
~~HIGH~~ DISGUISED, ANTENNA.

(16) "CONDENSATION" - LIGHT.
TIN MELTED WITH FLUX ON
COPPER SURFACE

(17) "CONDENSATION" - LIGHT.
TIN MELTED WITH FLUX ON
COPPER SURFACE.
SPRAYED BLACK.

(18) "CONDENSATION" - DENSE
(NOT SPRAYED BLACK. REPEAT.

(19) MATT SURFACE
SLEDGE HAMMER MARKS.

(20) SLEDGE HAMMER MARKS,
SPRAYED GOLD.

(21) HIGH TONNE PRESS
250 TONNES
WASHERS IMPRINT
EMBOSSED INTO SURFACE
GOLD SPRAY. BLACK ANODISED FORM.

(22) LASER ENGRAVED WITH
"BAMBOO" GRAPHIC, THEN
HAND ENGRAVED LINES.

(23) ↑ || SILVER ANODISED FORM.
REPEAT

(24) "BAMBOO" GRAPHIC
MILLED WITH 1MM END MILL
BLACK COLD ENAMEL, SATIN
FINISH

(25) MILLED FLAT
DIAMOND PRAGGED 'BAMBOO'
GRAPHIC ON SURFACE
SATIN FINISH

(26) ~~MILLED~~
0.5 MM END MILL
WITH 'BAMBOO' GRAPHIC
BLACK OIL ENAMEL.

(27) CENTRE PUNCHED FROM
BEHIND.
FINE EMERY POINTS

(28) BLACK ANODISED
FORM RIVETTED
FINE EMERY POINTS.

(29) RADIAL MILL "INSIDE OUT"
3MM END CUTTER MILL
LEAVING 2 AREAS PROUD
SATIN FINISH

(30) " "
REPEAT ~~BE~~ DEEPER GROOVE.

(31) REPEAT - SPRAYED BLACK.

(32) REPEAT - SPRAYED GOLD.
BURNISHED ^{PROUD} EDGES.

(33) SPIRAL MILL
3MM END MILL
SURFACE LEFT.

(34) "007"
SPIRAL MILLED.
SATIN FINISH.

(35) "007"
HIGHLY POLISHED

(36) "007"
SPRAYED GOLD.

(37) "STRING"
LASER ~~ETCHED~~ ENGRAVED
HANDS ENGRAVED.

(38) "STRING"
LASER ~~ETCHED~~ ENGRAVED
SIDES ENGRAVED.

(39) "STRING"
LASER ~~ETCHED~~ ENGRAVED.
SIDES ENGRAVED.

(40) "STRING"
LASER ENGRAVED.

(41) "HINDING THE ANTENNA A"
LASER ENGRAVED

(42) SATIN FINISH ^{CARTRIDGE TOUGH}
DIAMOND DRAGG ON
SIDES AS WELL

(43) SATIN FINISH
DIAMOND DRAGG PLUS SIDES
- COLD ENAMEL IN LINES.

(44) → SAME -
SPRAMEL BLACK.

(45) HIGHLY POLISHED SURFACE
DIAMOND DRAGG.

(46) MILLED FLAT ~~WITH~~
~~DIAMOND~~ ENGRAVING CUTTER.
BLACK COLD ENAMEL.
SATIN FINISH.

(47) LABEL ENGRAVED
- DIAMOND SETTINGS.
"CONSTELLATION"

(48) LABEL ETCHED.

(49) CENTRE PUNCHED PATTERN

(1)

(A)

- who will have usability
to these pages.
as we need to approve
what would be in the list -

Pete who copy
org chart
image (in.nokia.com)
url for related links. ↑



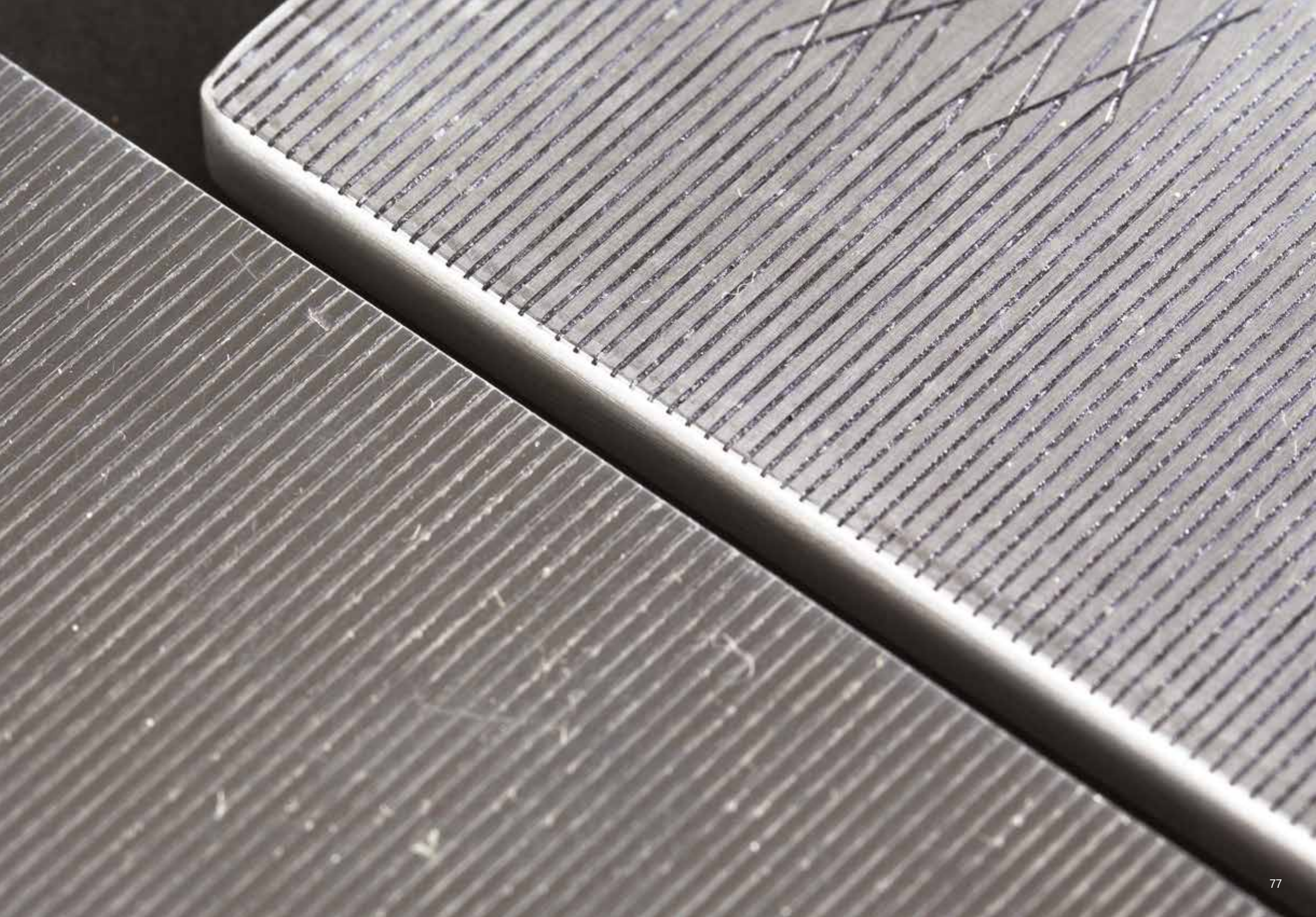
46.



- ANTENNA
- MICRO PERFORATION
- AUDIO

45.

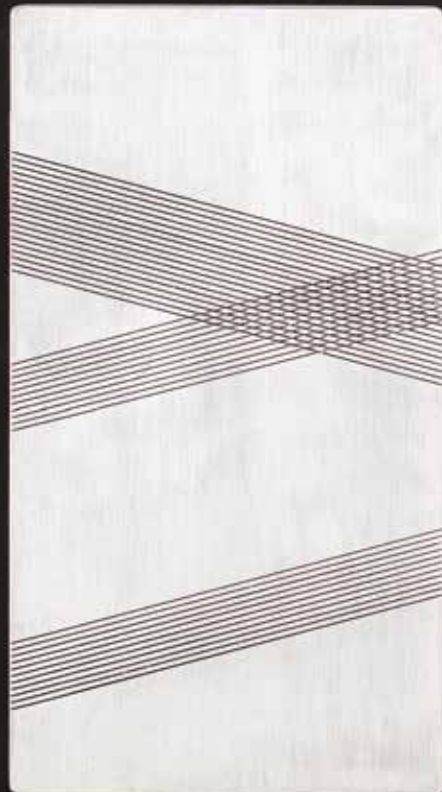




42.



43.



- SIDE KEYS
- ANTENNA
- AUDIO



44.



"BAMBOO"

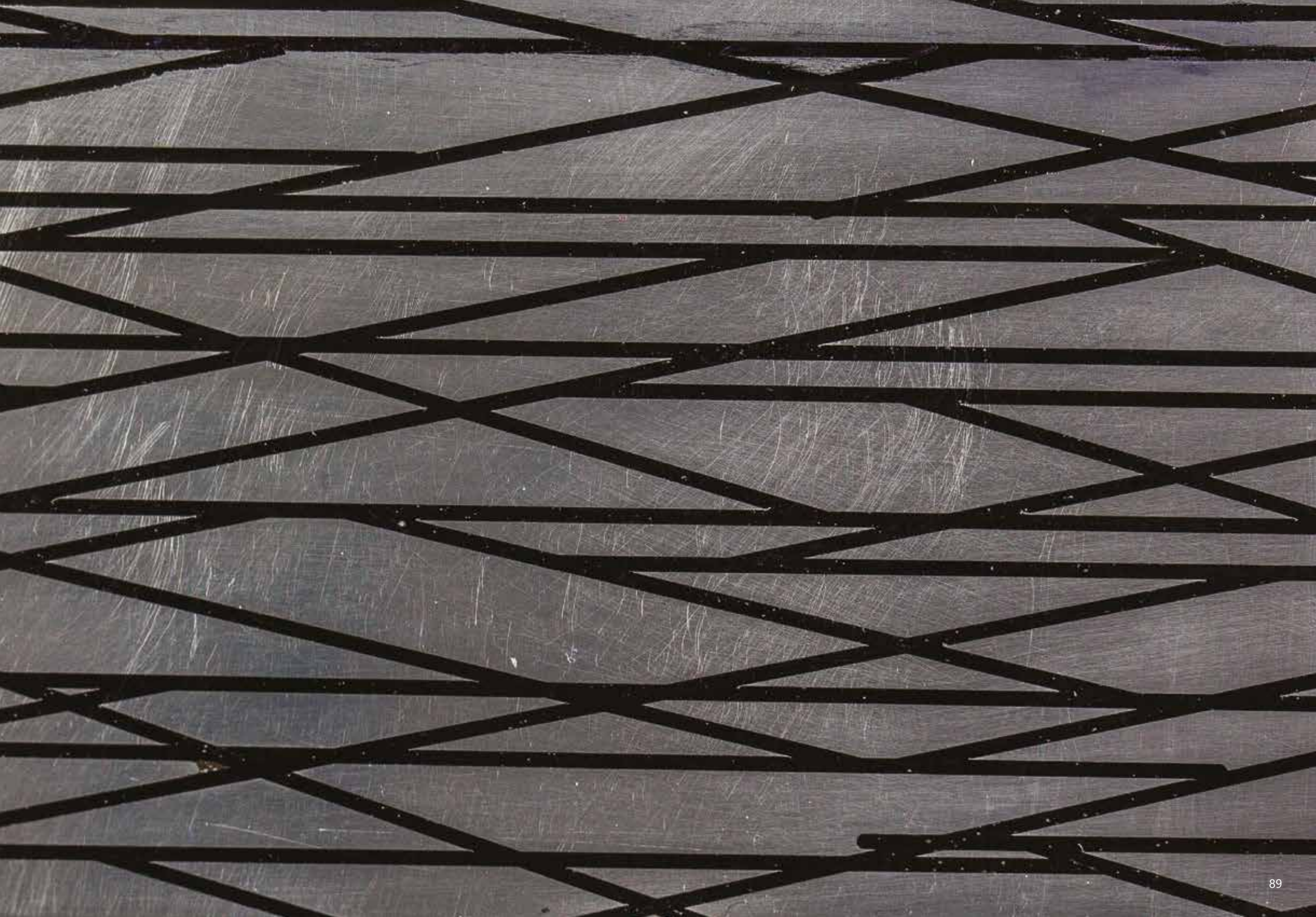
24.



- ANTENNA
- AUDIO







" SCORED "

22.



25.









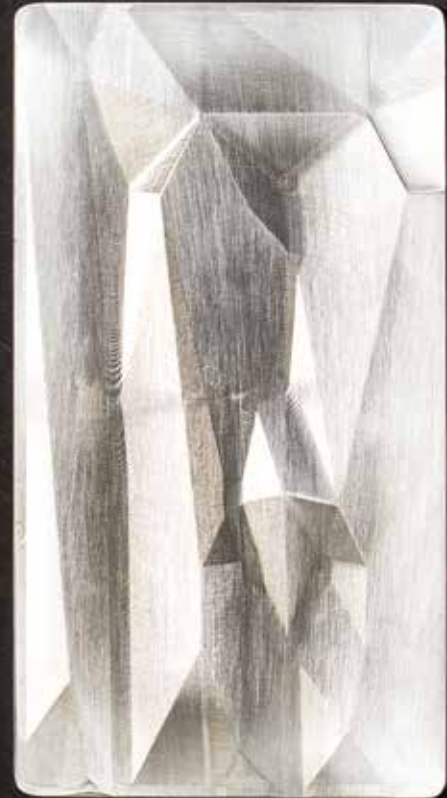
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- ANTI-SCRATCH
- ANTENNA

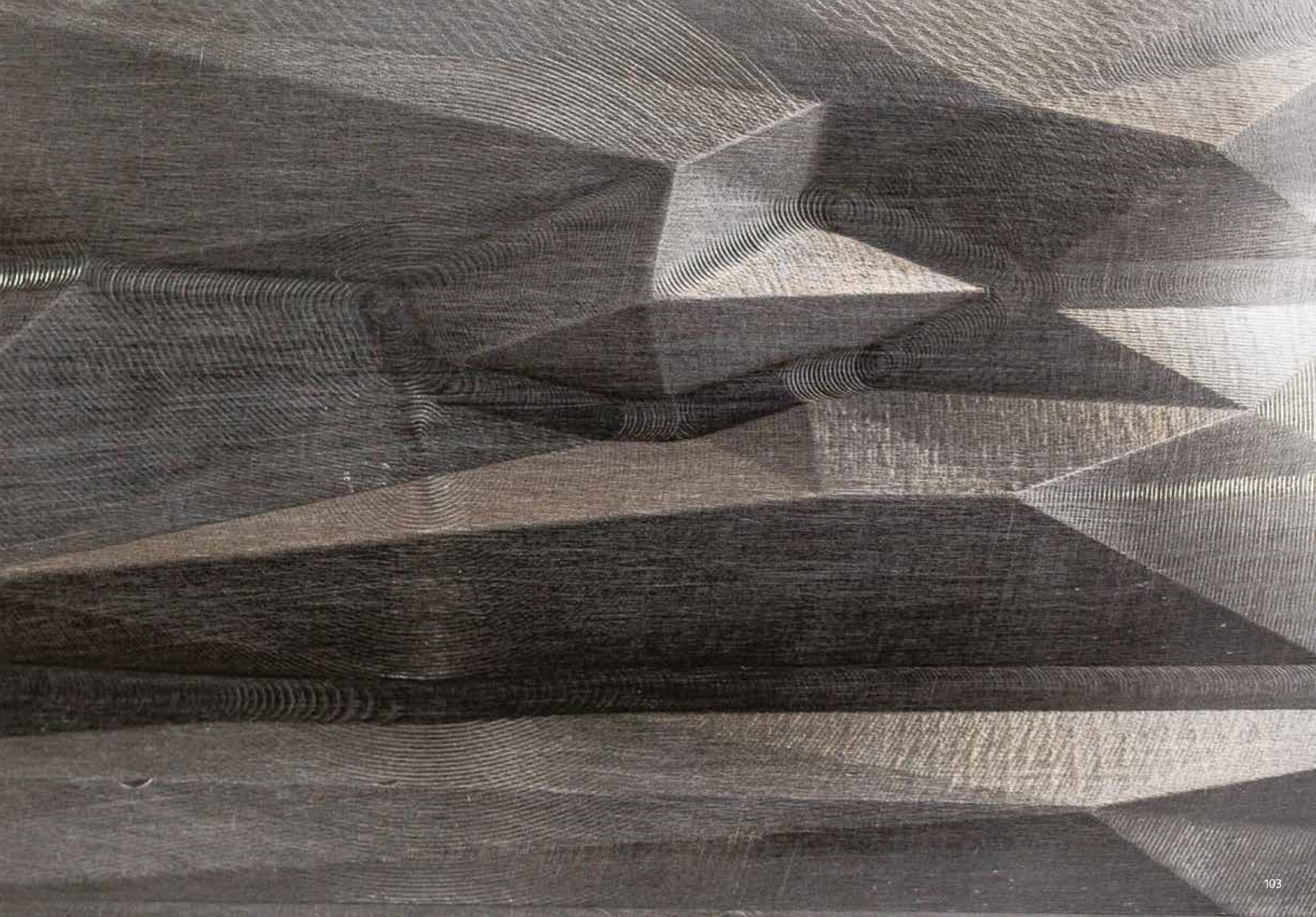
"ORIGAMI"

3.



- ACCOMMODATING ARCHITECTURE
PLACEMENT
- REDUCING HEAT





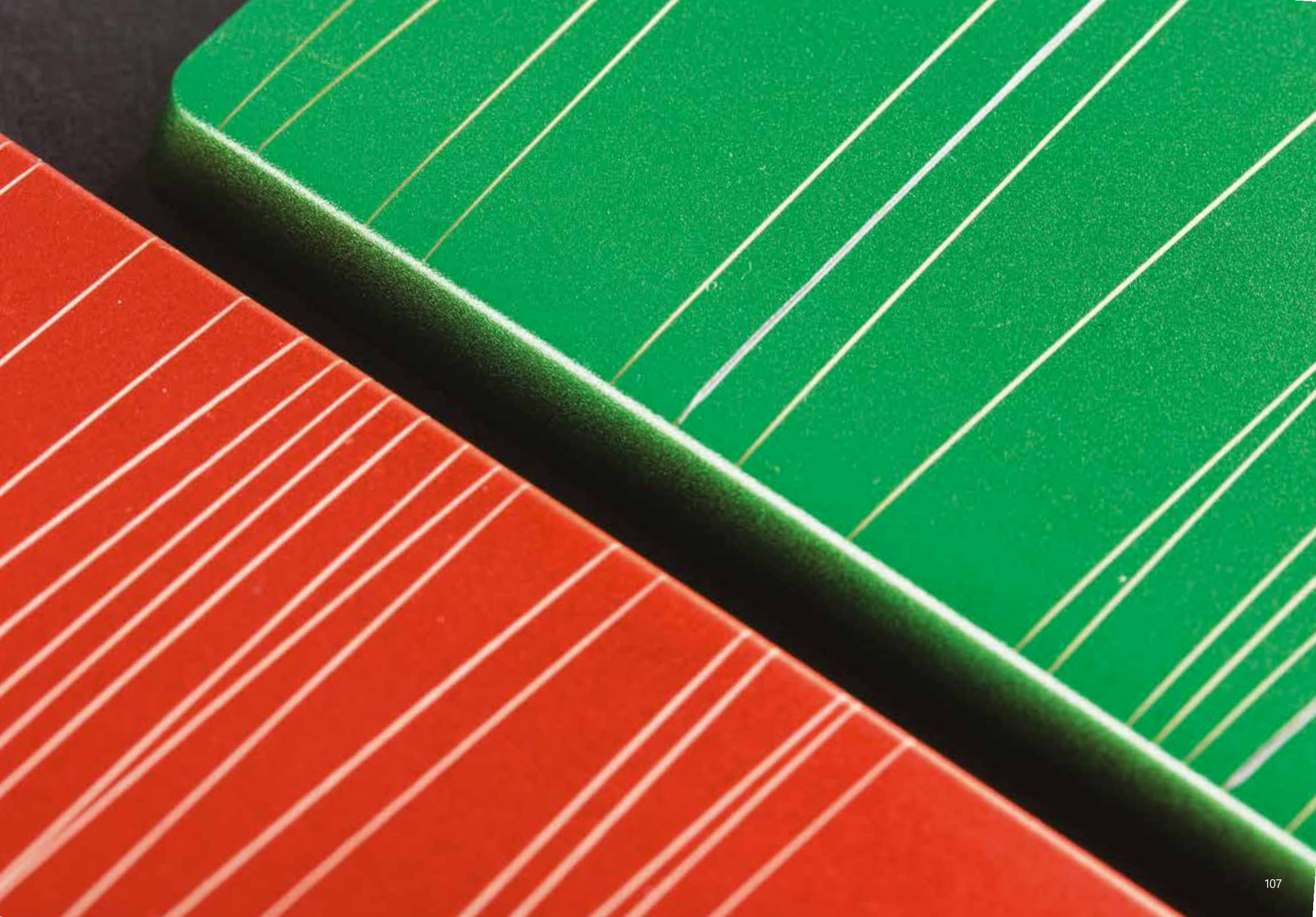
37.



- BESPOKE

39.





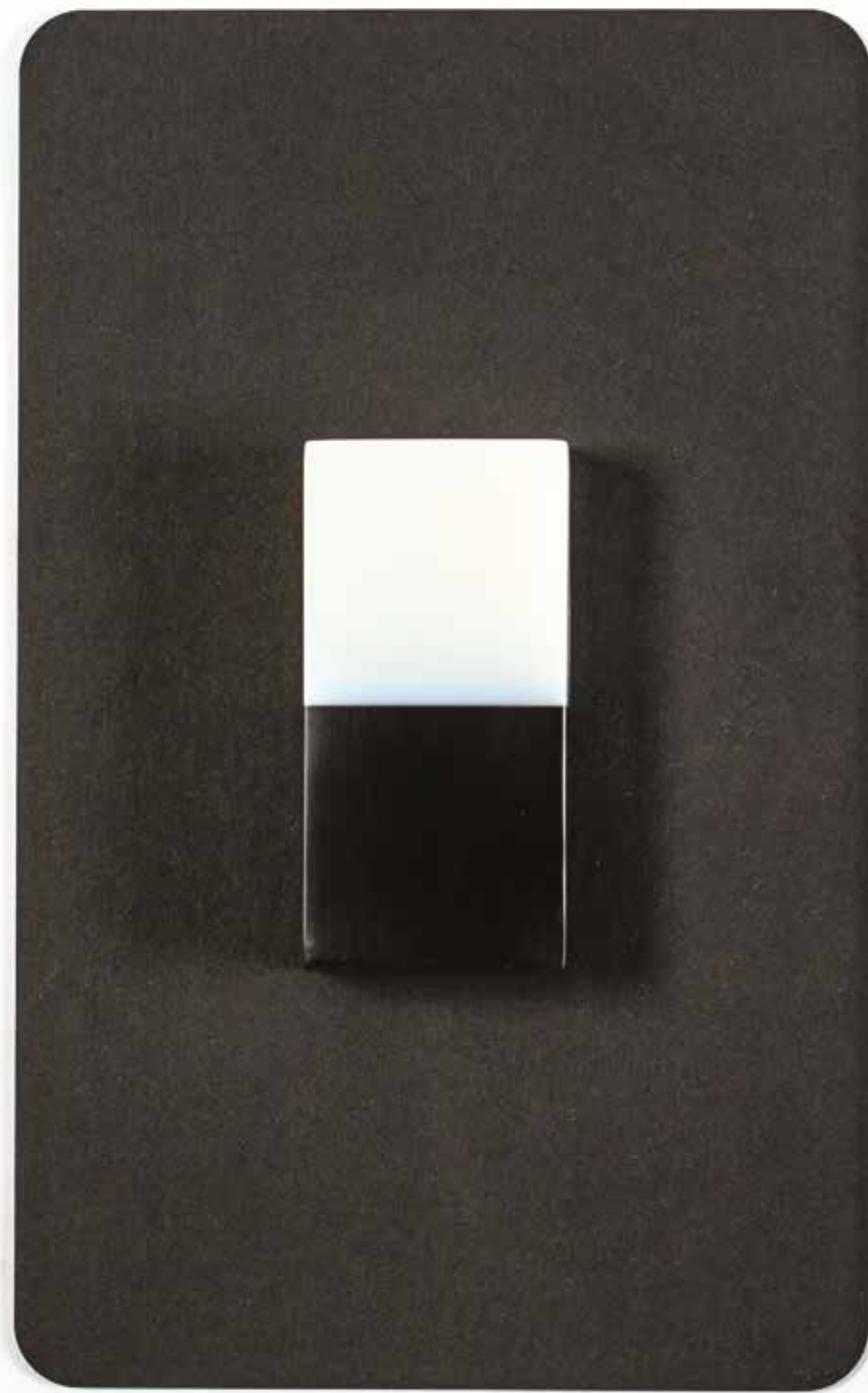
38.



41.



- METAL PLASTIC INTEGRATION
(MATERIAL TRANSITIONS)



"SLEDGE HAMMER"

19.



-GRIP

20.









"INSIDE-OUT"

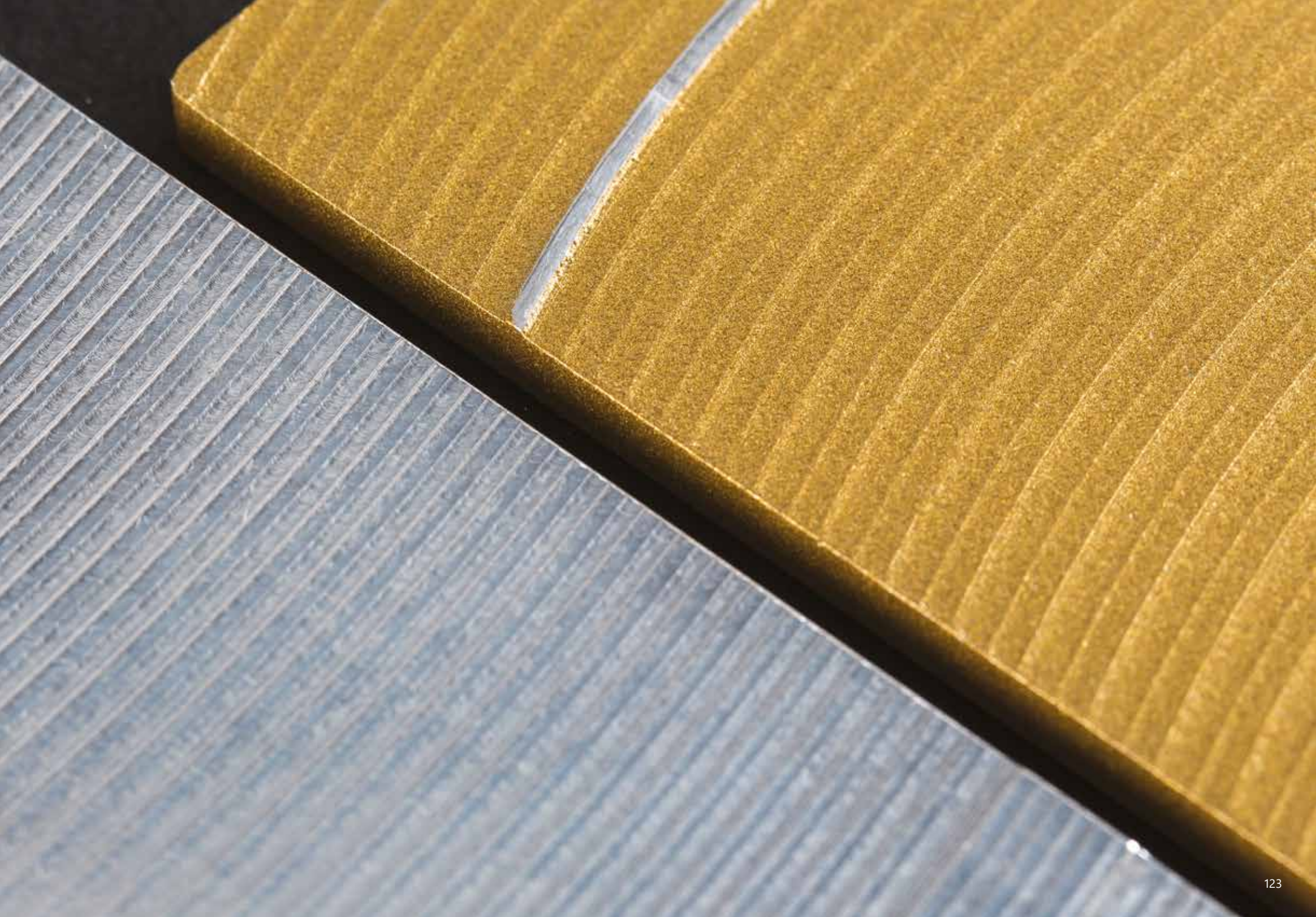
32.

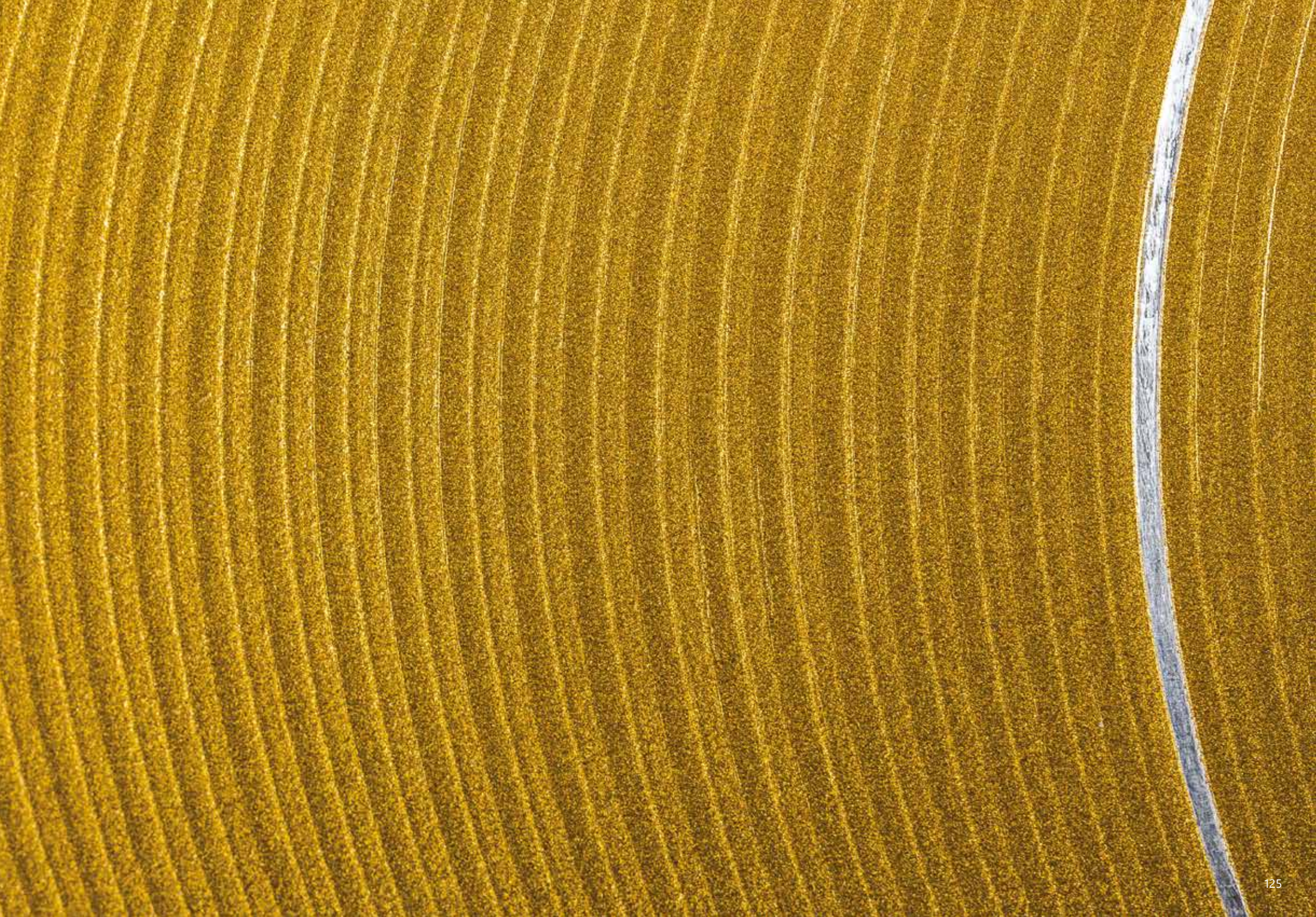


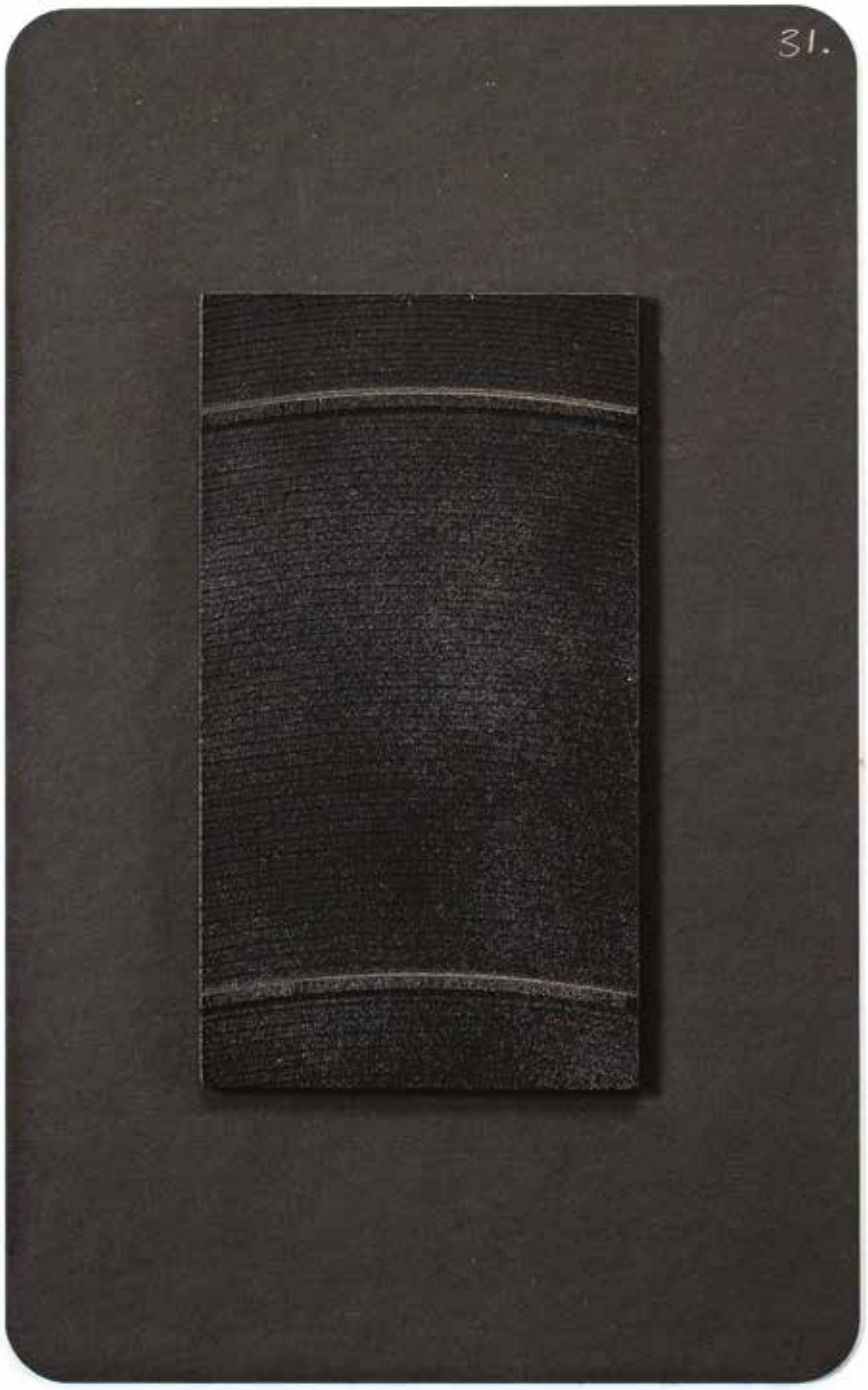
BREAKING THROUGH THE RIBS

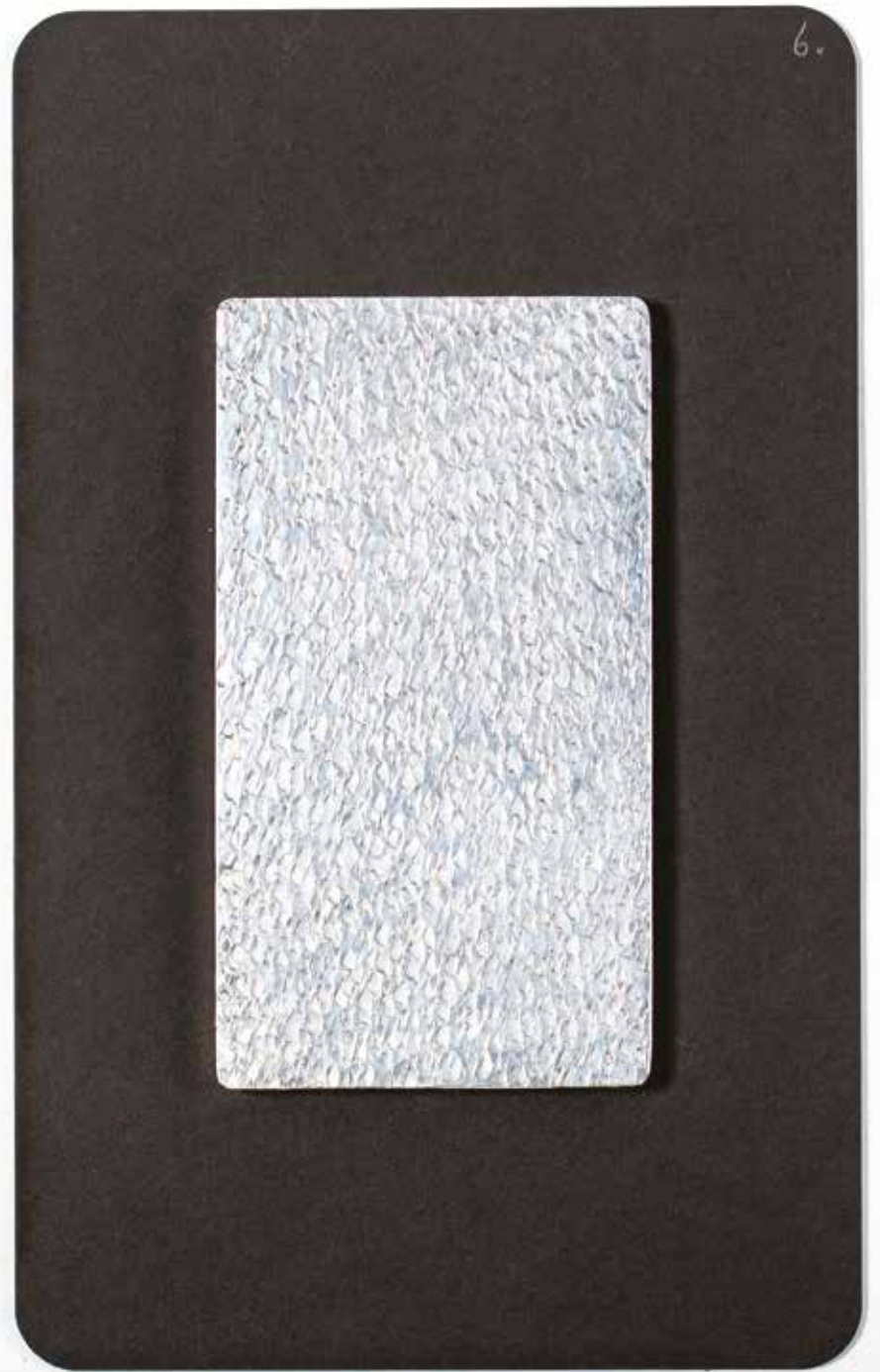
29.











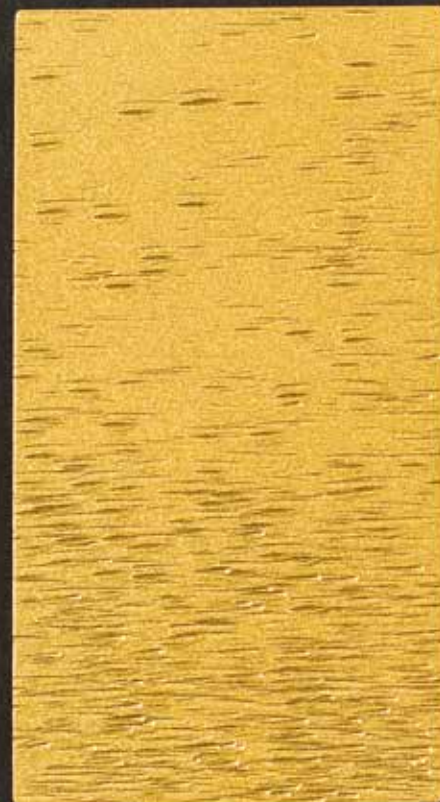


"Birch"

10



12.



- ORIENTATION

21.





"METEORITE"

2.



- AGES BEAUTIFULLY
(THE HIGH POINTS REVEAL THE
RAW ALUMINIUM AND BECOME
POLISHED WITH TIME)

"CODE"

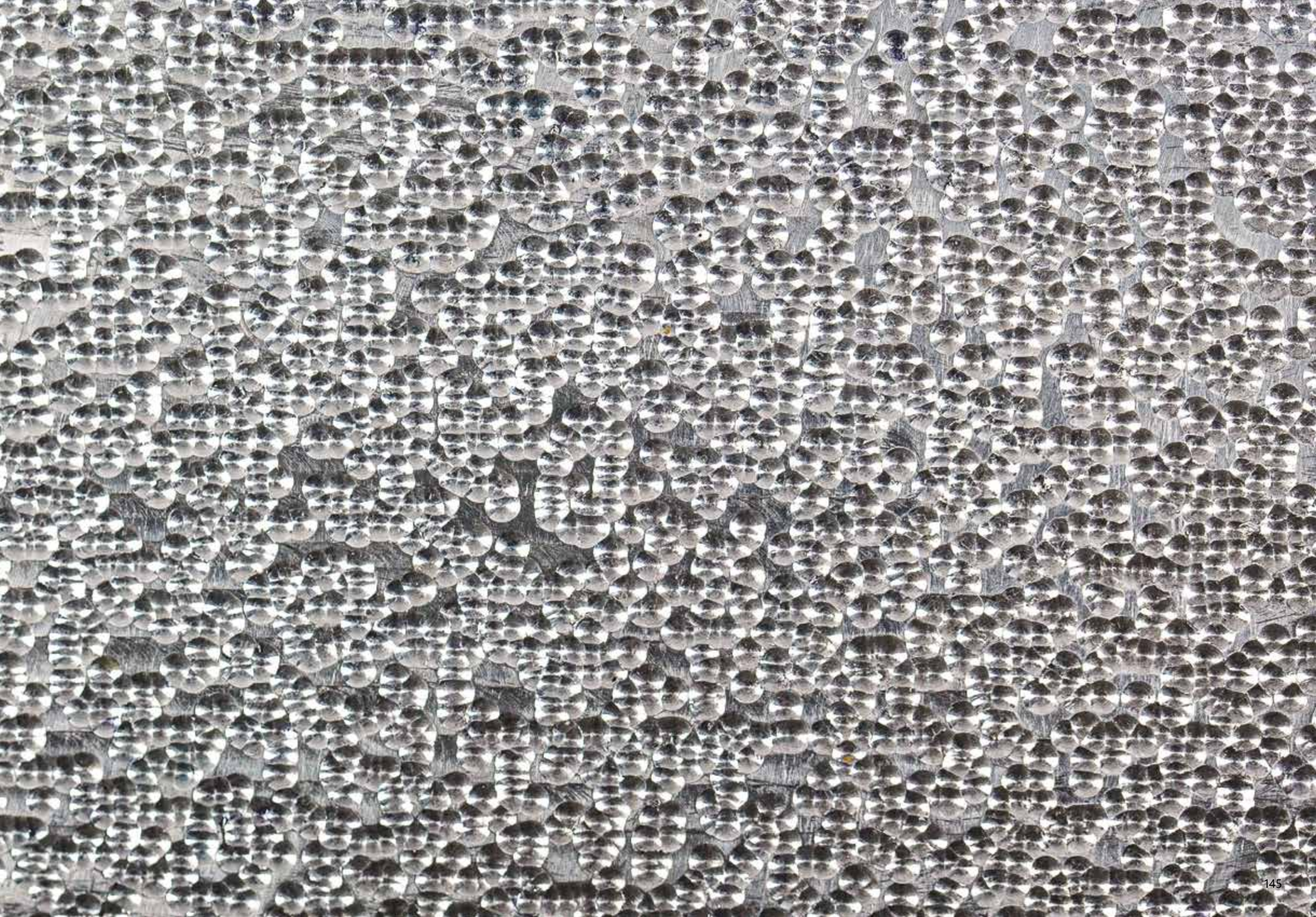
1.



- REDUCING HEAT





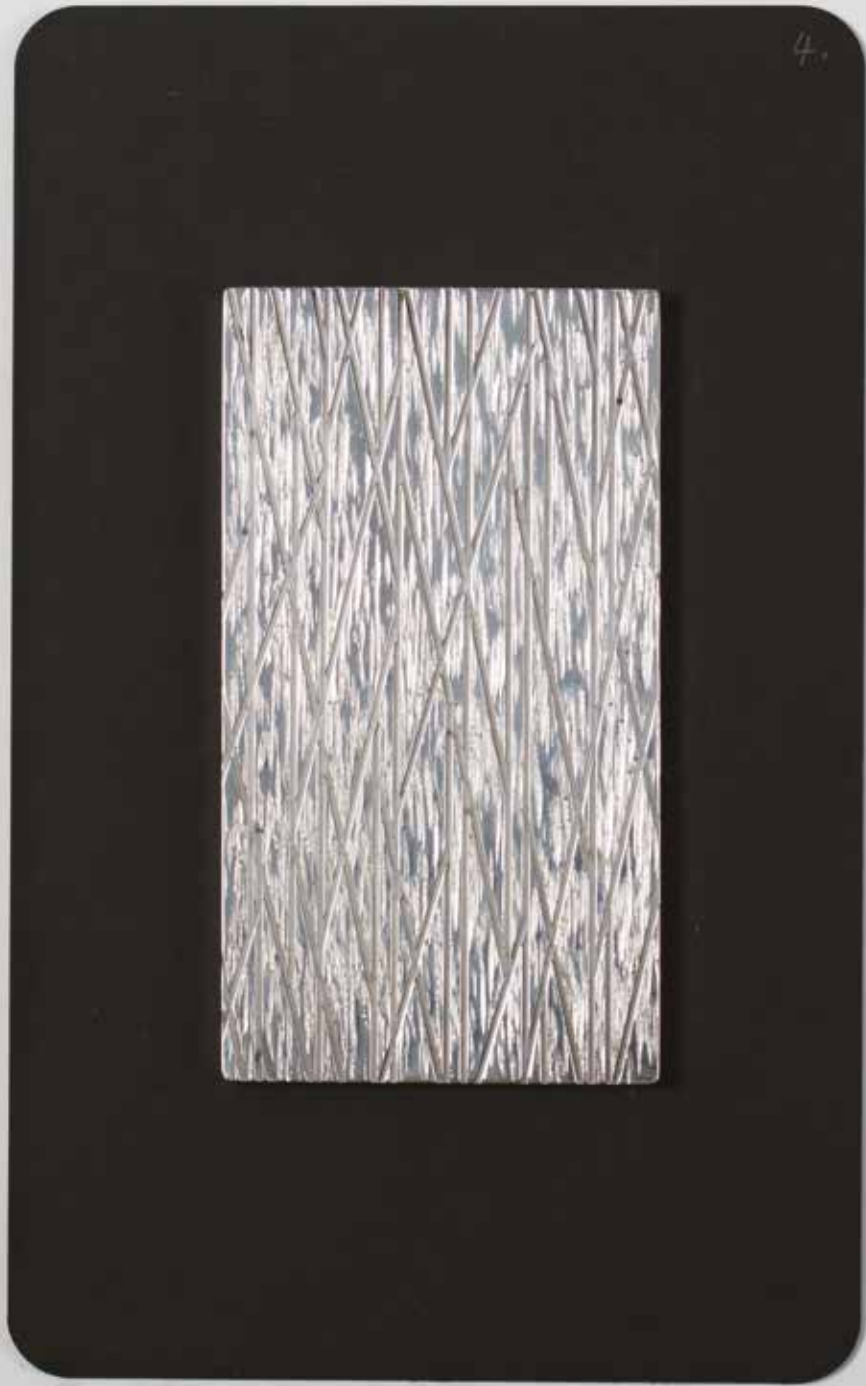


5.



33.





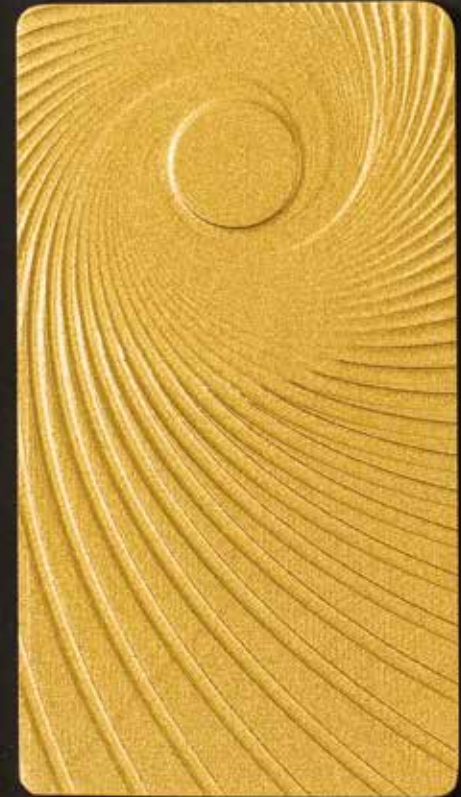


34



"GOLDEN EYE"

36.



- HEAT MANAGEMENT
(SURFACE TRANSFERS HEAT)

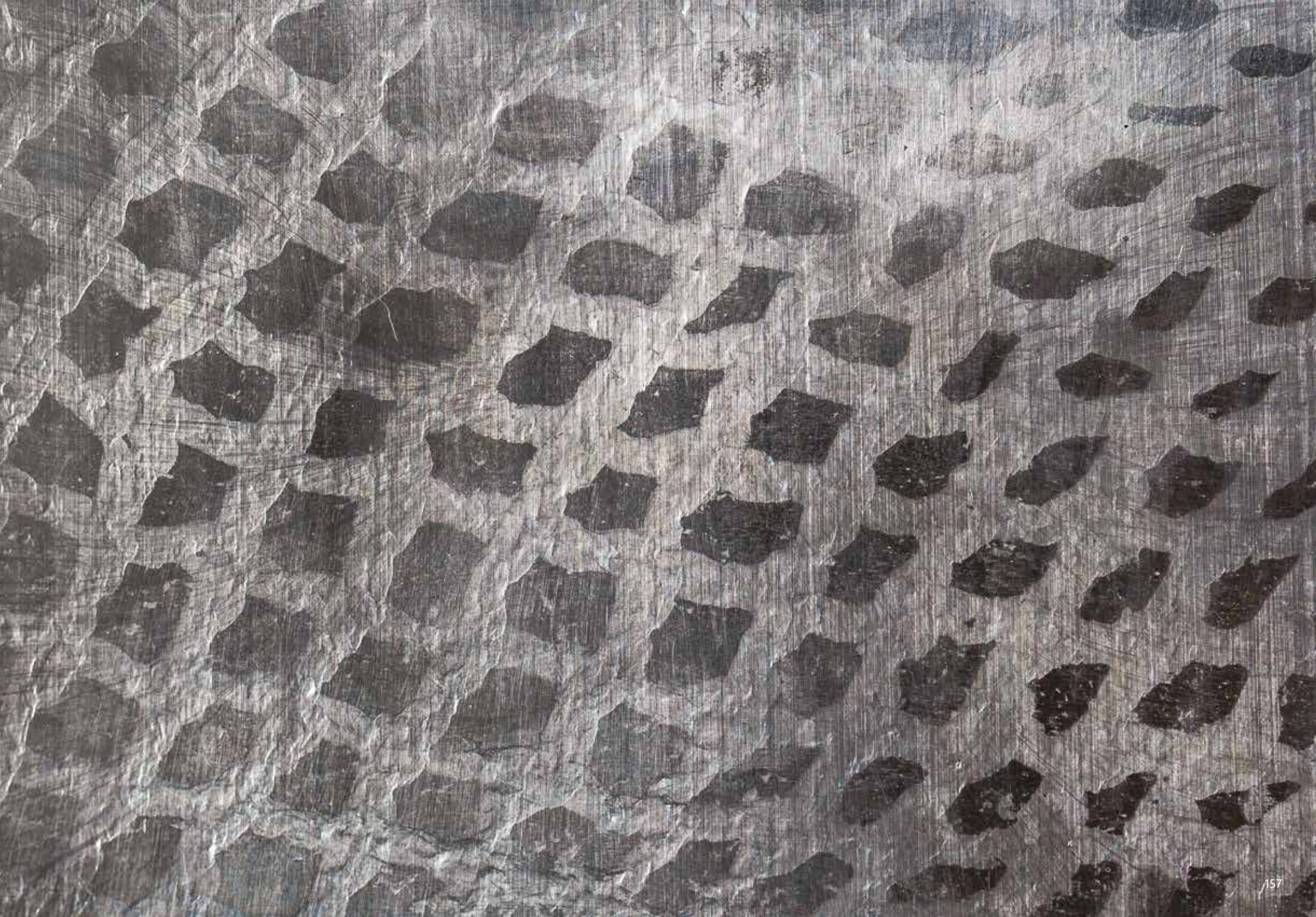
35.



"FISH-NET"

14.





"CONDENSATION"

18.



-GRIP

17.







16.



13.



-GRIP



"CODE-BREAKER"

47.



PROGRAMMABLE POINTS

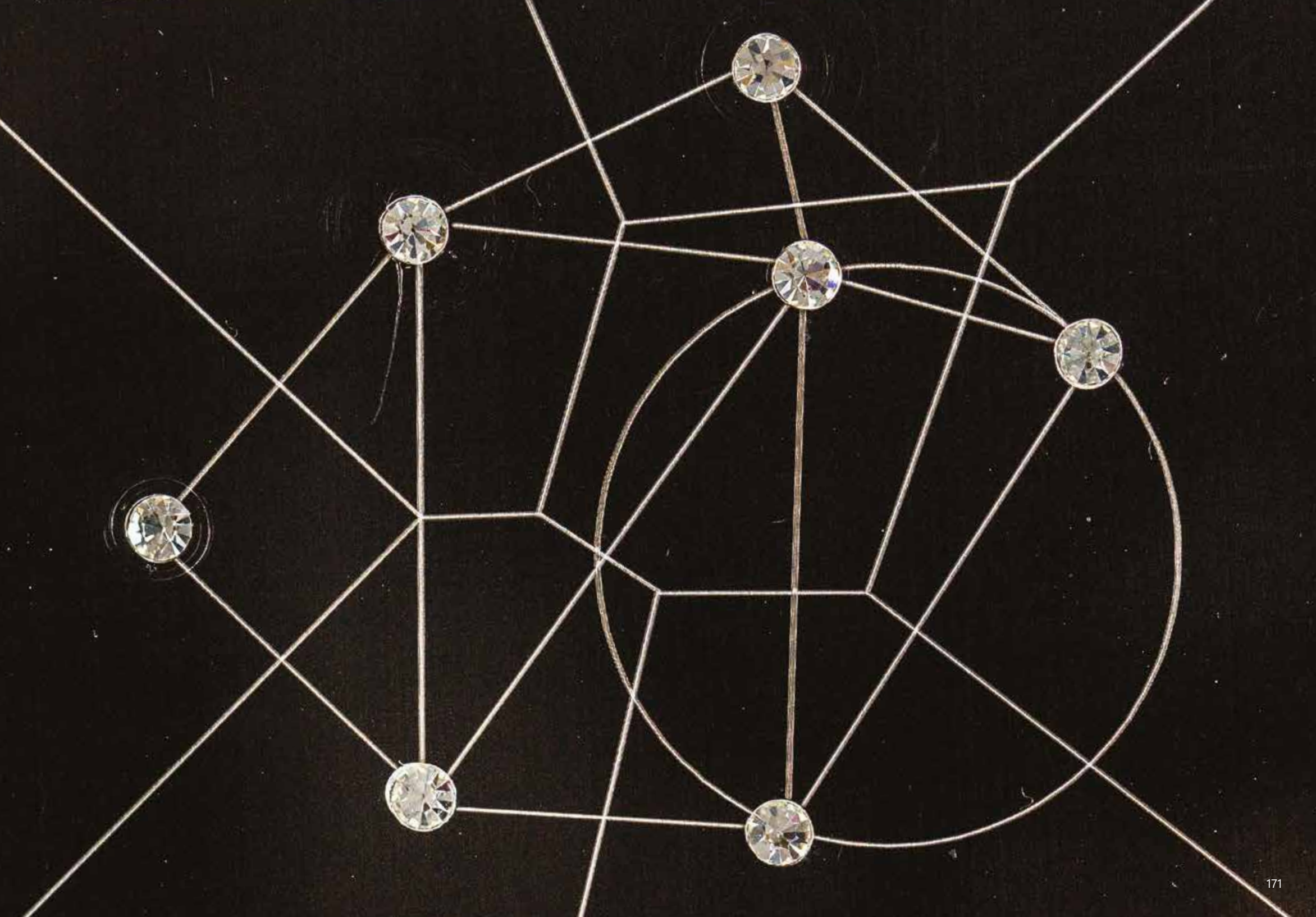
- UNLOCK
- NOTIFICATIONS

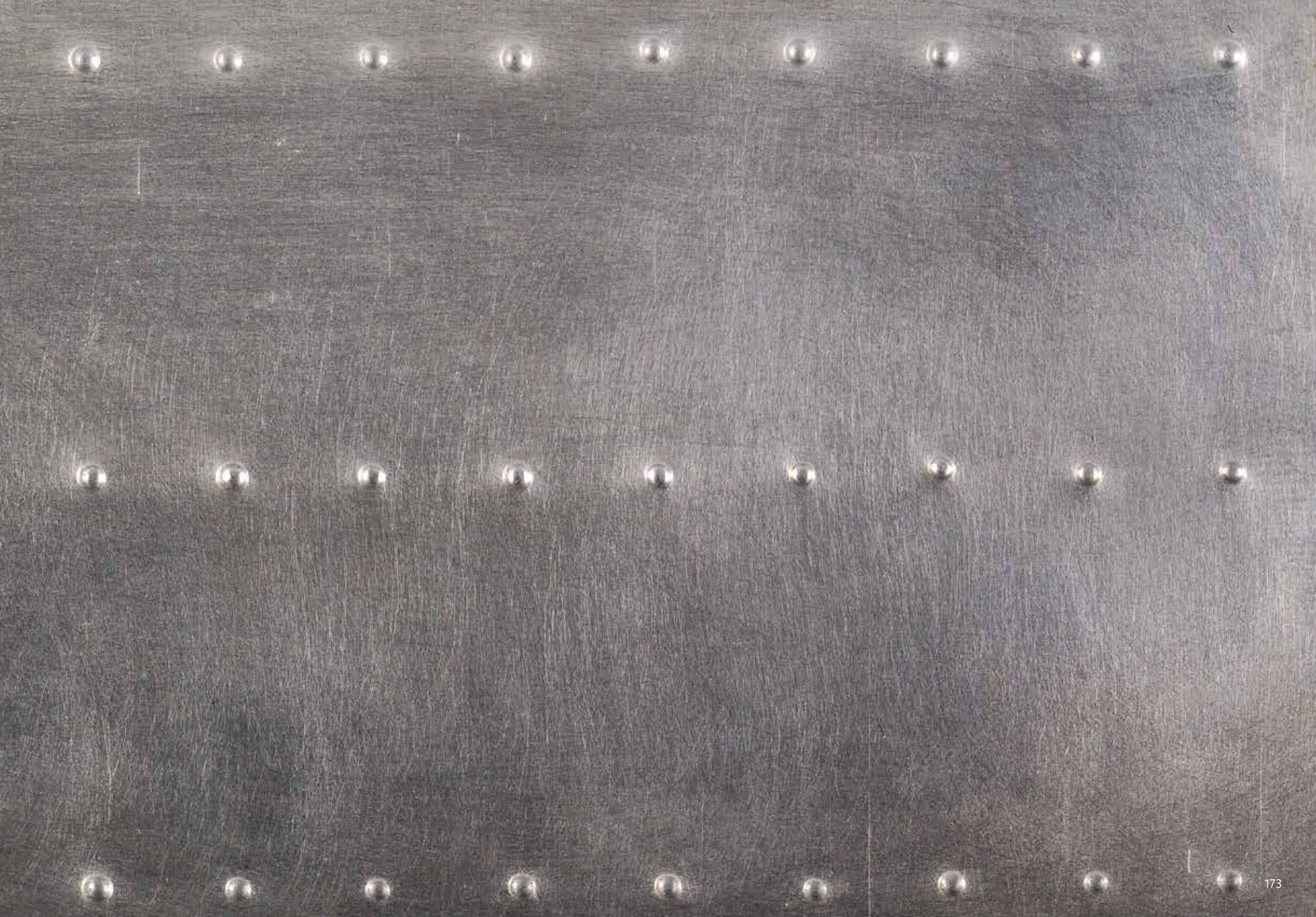
"BRAIL"

49.

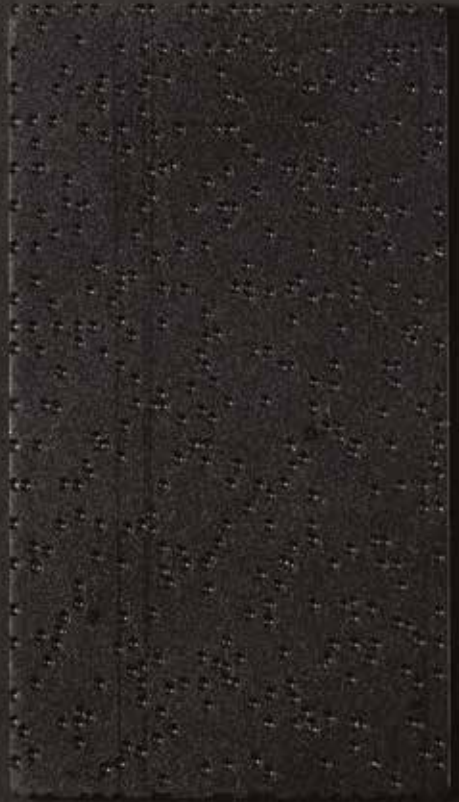


- FUNCTIONAL INTERACTIONS



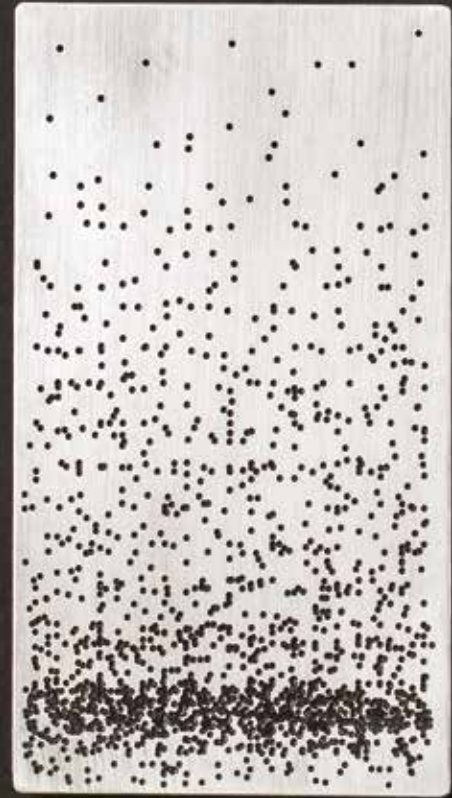


8.



"RAIN"

15.



- Unique pattern.
- ANTENNA
- AUDIO
- LED NOTIFICATION



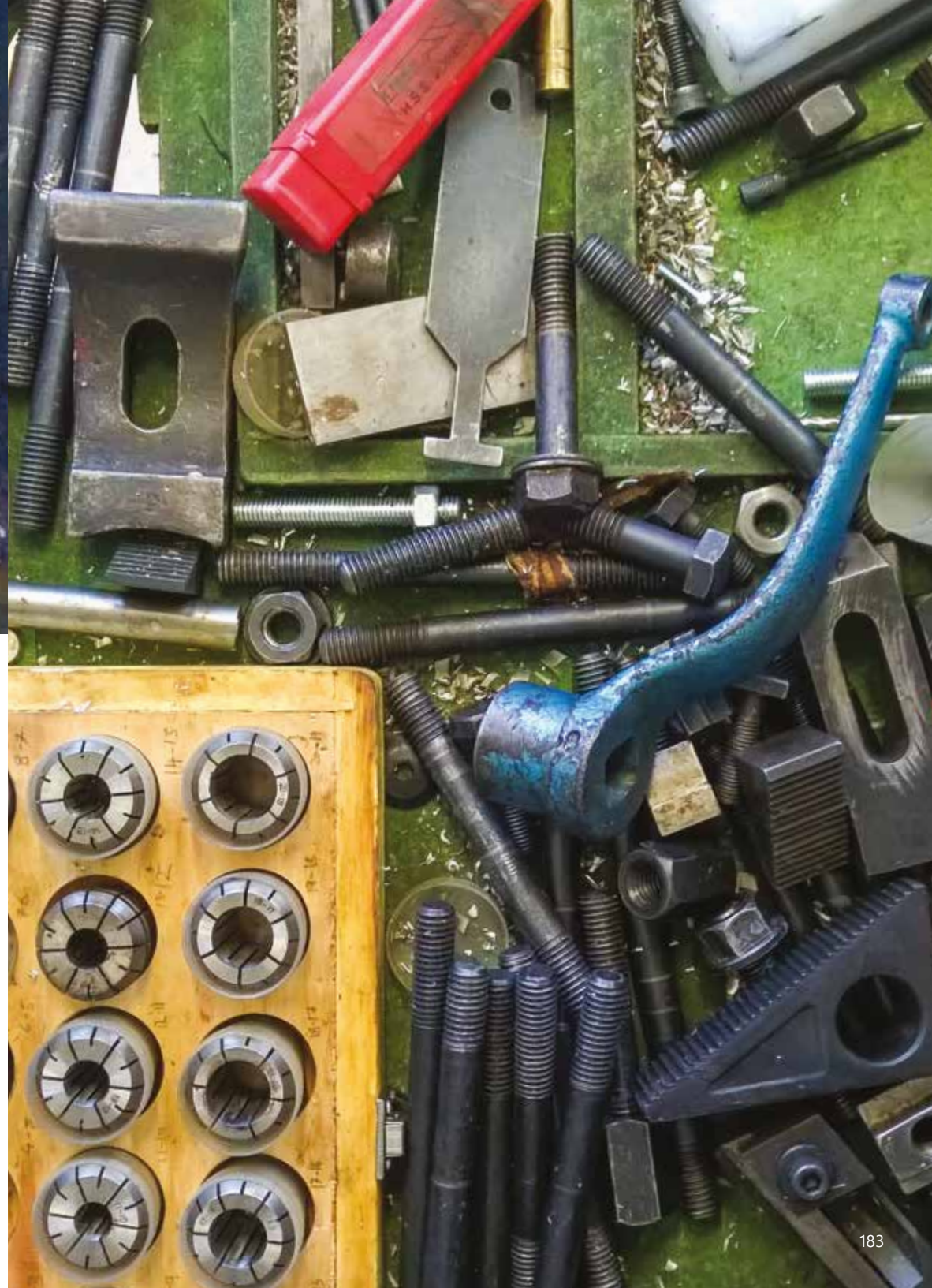


Left
View from the workshop.
The Royal College of Art
Kensington Gore, London.

Following page
Professor Hans
Stofer's studio.



Top
Silversmithing hearth.



Right
Workshop milling tools.

Following page
Hammering studio.



Eye protection must be worn in this area

Ear protection must be worn in this area



Left
Milling machine.



Top
Work bench with
hand tools.

This book has been compiled to help capture the thought process and share the results of the explorations.

Many thanks to Professor Hans Stofer and Michael Rowe at The Royal College of Art, for granting us access to the Goldsmithing and Silversmithing workshop where we made this collection.

Many thanks to Antje Illner and Peter Musson for their contribution to the work.

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