

HAPTICS OF WONDER

αGEL[®]

 **Infratron[®]**
GmbH · Produktion und Vertrieb

What is HAPTICS OF WONDER?

Build around the very concept of haptics, Haptics of Wonder is a material sample kit consisting of 12 kinds of α GEL, Taica's silicone gel. As you compare the different textures of the gels in your hand, different haptic experiences will be had. This map, accompanying the gels, shows the different characteristics and features of each gel type, interpreting them as how we perceive varying degrees of 'softness'. By using the gels and the map, we hope you can have a better understanding of the gels, and how they can help your designs and innovations. Please do experience touching and comparing the gels.

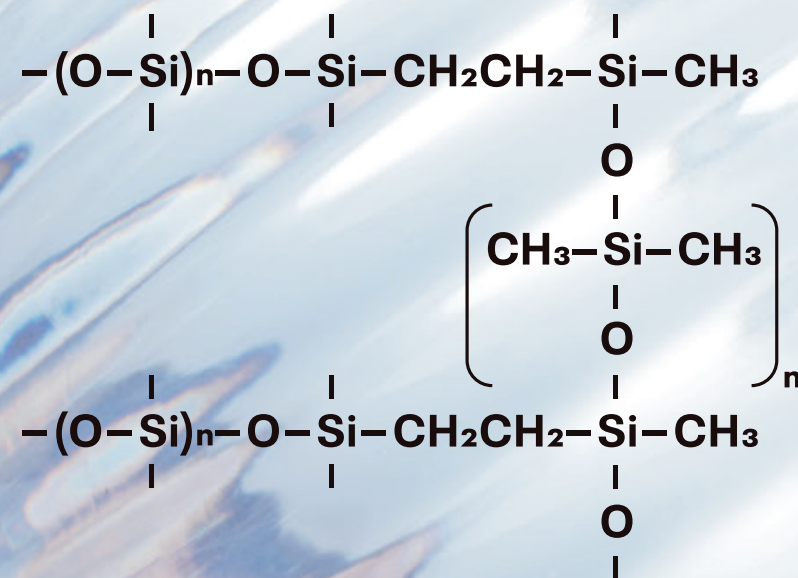
What is α GEL®?

α GEL is a soft gel material with superior shock absorption, heat dissipation, waterproofing, dust prevention and optical bonding capabilities. α GEL is widely used in sports, automotive, industrial equipment,

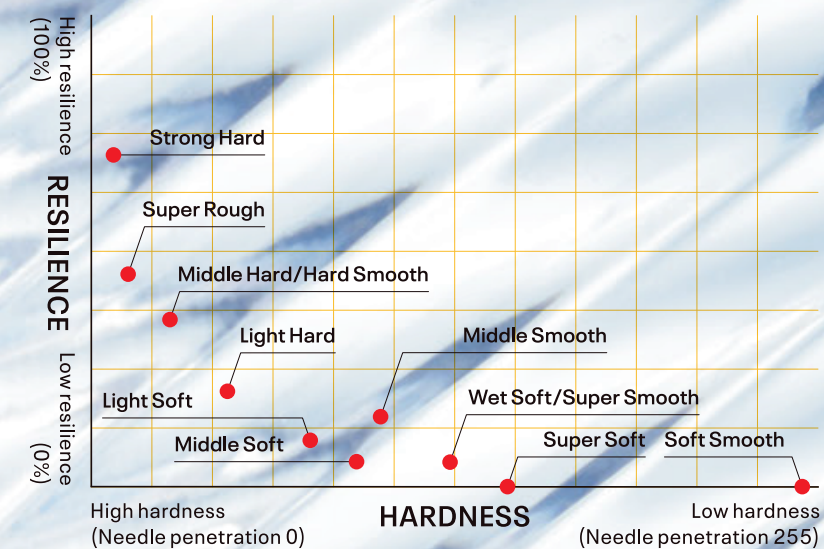
electronics and nursing care industries, and has even made its way into advanced technologies – such as AI, IoT and space exploration. α GEL has three main components: they are all polymers, cross-linked and include solvents.

Hardness is controlled by cross-linking density, the amount of solvent, and additives. Its resilience is controlled by various factors, such as molecular structure, the amount of solvent and additives.

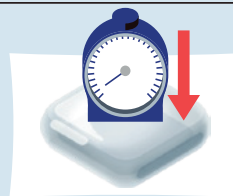
Molecular structure of silicone gel



Hardness and resilience of 12 haptics α GEL

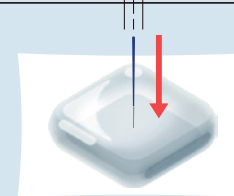


12 Haptics *αGEL*[®]



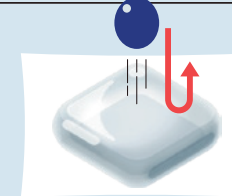
Asker C

Asker C is a measuring device to measure hardness of materials that are harder than those measured in a needle penetration test. Asker C: 1 indicates that the value measured with an Asker C hardness scale is 1, and larger numbers indicate a harder material.



Needle penetration

This is a value indicating the hardness of a material. A needle of fixed weight is entered vertically into a test piece to measure the length it entered. Needle penetration: 1 means 1/10 mm, and higher numbers mean that the material is softer.



Rebound resilience

This shows the ratio of rebound against the height an object falls from when a test piece is struck by a falling object with a given mass from a given height. A high number indicates that the object bounces back into the air. 0 indicates the object's fall is completely absorbed.

Glossy Bounce

[Strong Hard]



Hard and dry.
Rice cake before
baking

Asker C	51
Needle penetration	9
Rebound resilience	70

Snake Leather

[Super Rough]

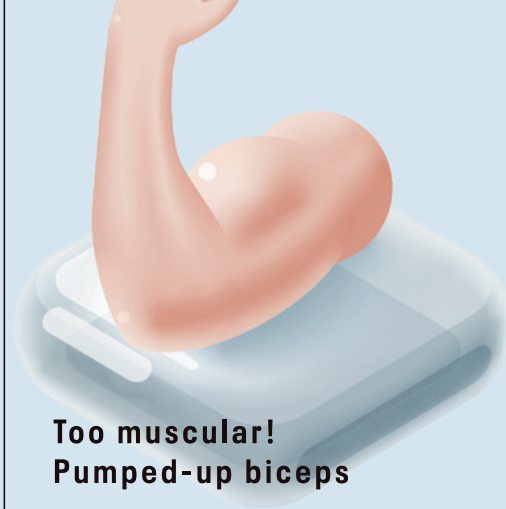


Exotic texture,
graceful snake leather

Asker C	32
Needle penetration	16
Rebound resilience	45

Pump Up

[Middle Hard]



Too muscular!
Pumped-up biceps

Asker C	20
Needle penetration	31
Rebound resilience	35

Vintage Eraser

[Hard Smooth]

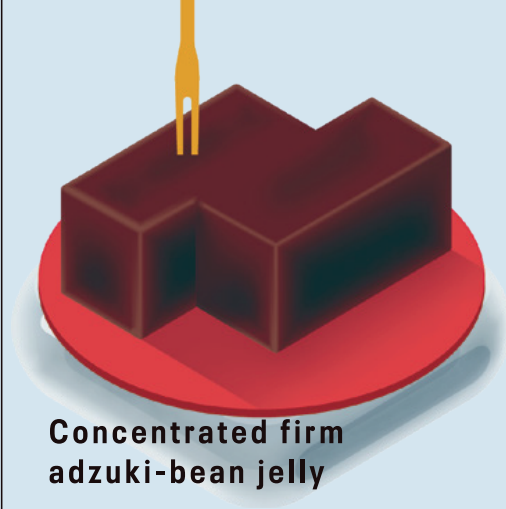


That eraser you used
in middle school

Asker C	20
Needle penetration	31
Rebound resilience	35

Filled Jelly

[Light Hard]



Concentrated firm
adzuki-bean jelly

Asker C	10
Needle penetration	51
Rebound resilience	20

Baby Hands

[Light Soft]



Sweaty baby's hand
grasping tightly

Asker C	0
Needle penetration	80
Rebound resilience	10

Raw Bread

[Middle Soft]



Soft and moldable.
Bread dough before
expanding

Asker C	0
Needle penetration	96
Rebound resilience	5

Rubbing Cheeks

[Middle Smooth]



Moist cheeks
of a man with little fat

Asker C	0
Needle penetration	105
Rebound resilience	15

Melty Caramel

[Wet Soft]



Freshly made caramel
with a wet texture

Asker C	0
Needle penetration	130
Rebound resilience	5

Perfect Skin

[Super Smooth]



Ideal beautiful skin with
smooth and tender feeling

Asker C	0
Needle penetration	130
Rebound resilience	5

Beauty's Lips

[Super Soft]



Beauteous
woman's soft lip

Asker C	0
Needle penetration	152
Rebound resilience	0

Fluffy Smooth

[Soft Smooth]



Soft gyuhi with fluffy
and smooth feeling

Asker C	0
Needle penetration	255
Rebound resilience	0

*gyuhi : a kind of rice cake made from glutinous rice flour

SOFT

12 HAPTICS αGEL® SAMPLE KIT

The parameters mapped are based on
the haptics felt when the gel is stroked horizontally
(along the horizontal axis)
and the haptics felt when the gel is pushed vertically
(along the vertical axis).

Fluffy Smooth

[Soft Smooth]

Asker C	0
Needle penetration	255
Rebound resilience	0

Beauty's Lips

[Super Soft]

Asker C	0
Needle penetration	152
Rebound resilience	0

Perfect Skin

[Super Smooth]

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Rubbing Cheeks

[Middle Smooth]

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Needle penetration	96
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Melty Caramel

[Wet Soft]

Asker C	0
Needle penetration	130
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[Light Hard]

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Glossy Bounce

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How to touch



#01
**Lateral motion/
texture**
Stroke a surface with a few fingers.



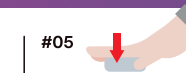
#02
**Unsupported holding/
weight**
Shake a gel up and down in the manner
of dipping it with your palms.



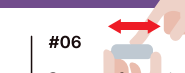
#03
**Pressure/
hardness**
Push a gel with a tip of your finger.



#04
**Enclosure/
global shape, volume**
Hold it tight.



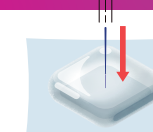
#05
**Static contact/
temperature**
Stick to your palm tightly.



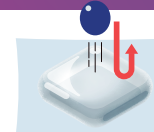
#06
**Contour following/
global shape, exact shape**
Stroke it with your finger while
moving an object.



Asker C
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hardness of materials that are harder than
those measured in a needle penetration test.
Asker C indicates that the value measured
with an Asker C hardness scale is 1, and larger
numbers indicate a harder material.



Needle penetration
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a material. A needle of fixed weight is entered
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length it entered. Needle penetration: 1
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Rebound resilience
This shows the ratio of rebound against the
height an object falls from when a test piece is
struck by a falling object with a given mass from
a given height. A high number indicates that the
object bounces back into the air. 0 indicates
the object's fall is completely absorbed.

SMOOTH

STICKY

HARD

Dr.Minamizawa, What is the potential of “HAPTICS OF WONDER”?



WE USUALLY ASSOCIATE ‘HAPTICS’ with touching or feeling things with one’s hands – but it can encompass a lot more than that. Haptics is a sensory relationship between us and everything external to us. It includes, for example, the feeling of texture when you touch an object, the actual feeling of pushing a switch and the emotions evoked when having physical contact, such as the feeling of trust one might establish through a handshake.

TRADITIONALLY, MOST OF THE RESEARCH that is carried out in the area of haptics study pertains to that of pressure and vibration, perceptions of temperature and quantification. But the way we think about “touch” is changing; in recent years, scientists and researchers have been expanding the field of haptics – such as studying the way humans perceive objects when given visual impressions, memories or experiences. By recognizing

the human senses as a complex, multifaceted system, we will be able to better utilize and understand haptics.

THINKING ABOUT THE CONTEXTS we take away, or imagine, from haptics is important. Seeing an image of nature or listening to quiet music when we want to relax is not so much a matter of “processing information” but rather, a “healing” sensory experience. For me, the future of haptics design lies within these interactions.

SOFTNESS’, THE BEST FEATURE of silicone gel, is difficult to quantify – especially in haptics study. At the same time, it’s the same ‘softness’ that we can recall from our childhoods as that which brought us comfort and tenderness. I believe that new possibilities in haptic design will come from being able to draw out these formative experiences and designing with context.

* Cross-modal (multisensory integration): Phenomenon where five senses interact

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Reference study

Tomohiko Hayakawa, Shigeru Matsui, Junji Watanabe, “Classification Method of Tactile Textures Using Onomatopoeias,” “Transactions of the Virtual Reality Society of Japan” 15(3), 2010.
Junji Watanabe, Arisa Kano, Yuichiro Shimizu and Maki Sakamoto, “Relationship between Judgments of Comfort and Phonemes of Onomatopoeias in Touch,” “Transactions of the Virtual Reality Society of Japan” 16(3), 2011.
Maki Sakamoto, Junji Watanabe. “Bouba/Kiki in Touch: Associations Between Tactile Perceptual Qualities and Japanese Phonemes”. Frontiers in Psychology, (9) 295,2018.