What is KENIFINE?

- KENIFINE™ is an original anti-bacterial coating technology developed by Kobe Steel.
- Its anti-bacterial effect is 10 times stronger and its anti-fungal effect is 50 times stronger than conventional anti-bacterial technologies.
- It has already been applied to food and drink processing facilities, medical and welfare facilities, air-conditioning and electrical applications, kitchen and grooming goods, fishery and agricultural equipment, coins for game machines, etc.
- Everyone can use KENIFINE and share its commercial applications.

<Note>
- Safety is verified by acute toxicity tests, skin patch tests, etc.
- Alumite (anodizing) treatment is available for aluminum parts.
- Powder is also developed. It is applied to paints, spray, prints, etc.
- We are open to licensing the technology to manufacturers that handle surface-treated products.

Proposal from KENIFINE!

1. Why not solve your bacterial trouble by KENIFINE?
2. Why not start your new business by KENIFINE?

Business Plans

Plan 1
Create new products!

Plan 2
Distribution/Sales!

Plan 3
Anti-bacterial engineering business!

Plan 4
★ Integrated KENIFINE business!

Any combination is OK!

All plans will be supported by Kobe Steel!

★ mark requires licensing

Contact: Materials Research Laboratory, Kobe Steel, Ltd

Information in this document such as values, photographs, evaluation is listed for the purpose of explaining the general features and performance of KENIFINE-applied products only, and it does not guarantee anything as a result. In addition, the information is subject to change without notice.
**High Anti-bacterial Properties**

KENIFINE is 10 times faster at controlling microorganisms than conventional anti-microbial products.

KENIFINE is effective over a long period of ten years.

**The antibacterial test covered with the film**

(laboratory test)

![Graph showing antibacterial test results](image)

**High Anti-bacterial Properties (2)**

- **Gram negative**
  - Eschelichia coli (IFO13500)
  - Eschelichia coli O157:H7
  - Enterobacter cloacae
  - Vibrio parahaemolyticus
  - Citrobacter freundii
  - Klebsiella pneumoniae
  - Campylobacter jejuni
  - Serratia marcescens
  - Shigella sonnei
  - Salmonella sp.Gr 9
  - Salmonella typhimurium
  - Pseudomonas aeruginosa
  - Neisseria gonorrhoeae
  - Legionella pneumophilla (ATCC33152)
  - Agrobacterium radiobacter

- **Gram positive**
  - Staphylococcus aureus
  - Streptococcus pyogenes
  - Streptococcus agalactiae
  - Enterococcus faecalis
  - Enterococcus fecium
  - Bacillus subtilis (ATCC6633)
  - Streptomyces azureus (ATCC14921)

**Results of antibacterial laboratory tests of KENIFINE**

Japan Food Research Laboratories Test
No.598070156-001,598070156-002
**High Anti-fungal and Anti-algal(waterweed) Properties**

KENIFINE can be used in applications that until now could not be achieved from conventional coatings.

**Anti-fungal lab tests**

- A.niger, 28°C, 48 hours later

Stainless Steel with Copper

**Anti-algal test by hydroponics plant bed**

- Japanese mustard
- spinach

(KENIFINE)

**Other microorganism groups that confirmed effects**

- **Fungus**
  - Aspergillus niger (IFO6341)
  - Penicillium chrysogenum (IFO4626)
  - Rhizopus orizae (IFO31005)
  - Cladosporium cladosporioides (IFO6348)
  - Chaetomium globosum (IFO6347)

- **Green algae**
  - Chlorella 226
  - Scenedesmus pyrenoidosa (NIES-96)

- **Bacteriophage**
  - T4
  - λ
  - MS2

**Virus**

- Influenza A type (A/PR/3/34(H1N1))
- Cow coronavirus (No.66/H)

**Effect on mouse coronavirus (MHV)**

(by Iwate University)

**Acute Toxicity & Skin Irritation**

- **Low Acute Toxicity** (=Mortality 0%)

<table>
<thead>
<tr>
<th></th>
<th>Mortality of rats taken powdered KENIFINE weighting 2000mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>After 1 day</td>
</tr>
<tr>
<td>Male</td>
<td>0%</td>
</tr>
<tr>
<td>Female</td>
<td>0%</td>
</tr>
</tbody>
</table>

Japan Food Research Laboratories, Test No.598070191-001

- **Low Metal Allergy** (=Ratio of irritated 0%)

<table>
<thead>
<tr>
<th></th>
<th>Ratio of irritated person after contacted with KENIFINE film for 48 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>men</td>
<td>0% / 13</td>
</tr>
<tr>
<td>women</td>
<td>0% / 7</td>
</tr>
</tbody>
</table>

Life Science Laboratory, Test No.01-XII-0501

KENIFINE’s safety has been verified by acute toxicity tests and skin patch tests conducted by external bodies.
## Application Examples of KENIFINE

### Developed Technologies

<table>
<thead>
<tr>
<th>1.</th>
<th>Plating processing</th>
<th>Application Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>① Standard type</strong> (as-KENIFINE plating)</td>
<td>Food shelf handle</td>
</tr>
<tr>
<td></td>
<td><strong>②~④ Multi-function type</strong></td>
<td>Waste pockets</td>
</tr>
<tr>
<td></td>
<td><strong>② Chromium specification</strong></td>
<td>Garden shears for horticulture</td>
</tr>
<tr>
<td></td>
<td><strong>③ Special silver specification</strong></td>
<td>Door handle in hospital</td>
</tr>
<tr>
<td></td>
<td><strong>④ Special gold specification</strong></td>
<td>Golf markers</td>
</tr>
</tbody>
</table>

### 2. Alumite (anodzing) treatment

<table>
<thead>
<tr>
<th>1.</th>
<th>Painting, Spraying</th>
<th>Spray cans</th>
<th>Door handle (baking finish)</th>
<th>Concrete wall</th>
<th>Interior wall and door</th>
<th>Plant wall and floor (Indoor-hydroponics factory)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Printing</td>
<td>T-shirt</td>
<td>Neck straps</td>
<td>Underwear</td>
<td>Picture Books</td>
<td>Clear File holder</td>
</tr>
<tr>
<td>3.</td>
<td>Powder</td>
<td>Tatami mats for nursing home</td>
<td>Mats for pets</td>
<td>Insole</td>
<td>Multi-purpose tape</td>
<td>Master batch</td>
</tr>
<tr>
<td></td>
<td>Others (Kneading...)</td>
<td>Tatami mats for Judo</td>
<td></td>
<td></td>
<td>Air-conditioner filters</td>
<td></td>
</tr>
</tbody>
</table>