

# **Introduction to Toyo Tanso Carbon Brush Division:**

## **Outline of the manufacturing process, products, and market trend**

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# 1. Prolog

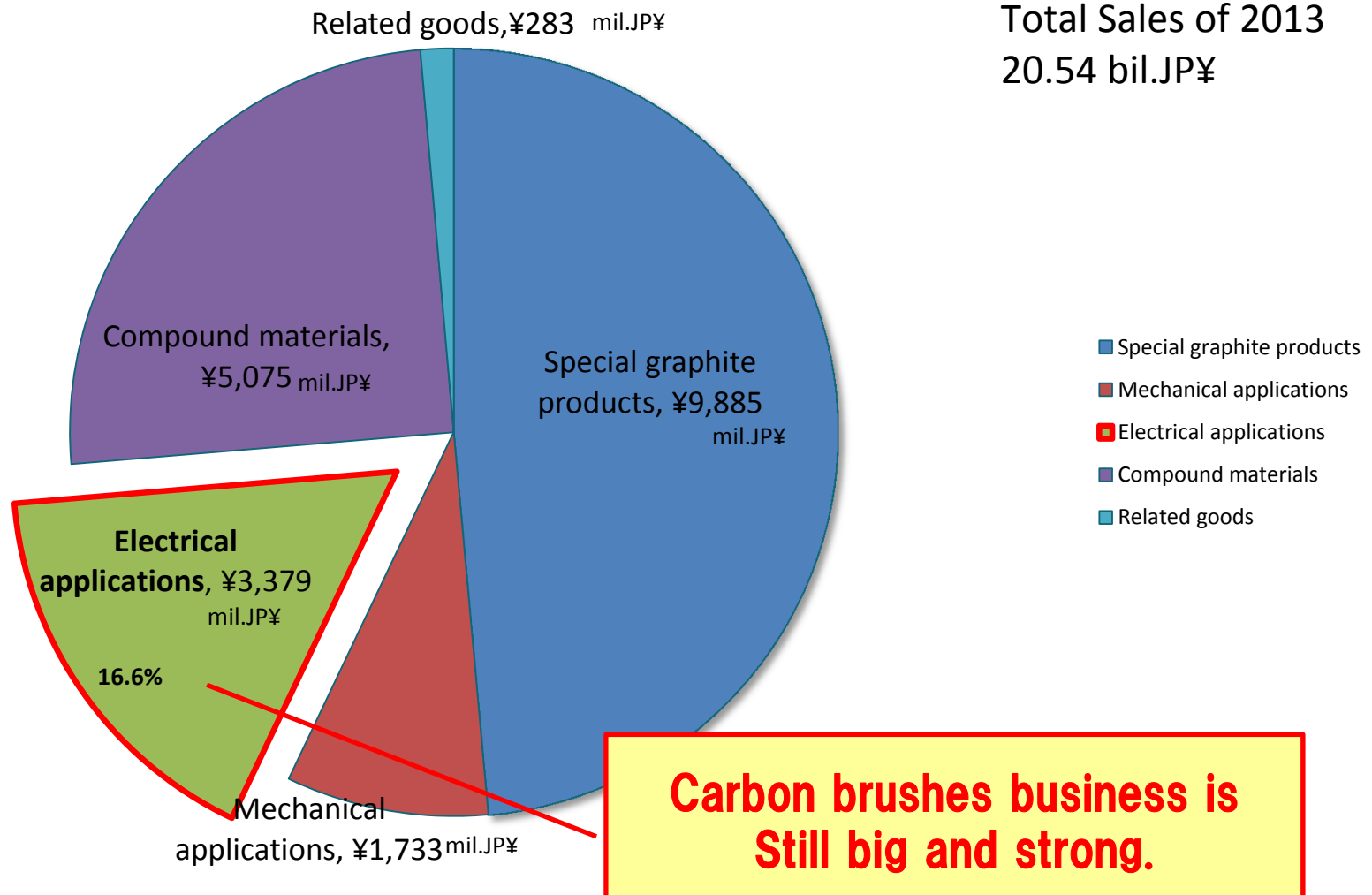
## Brush is a origin



Original factory in Osaka  
The photos were taken in 1940~50s.

# 2. Impact on total sales

## Orders by products category



# 3.TOYO TANSO's global location map

Cover the globe with our material plant, system of in-house production, sales offices and dealers.

The map shows Toyo Tanso's global presence with callouts to several key locations:

- TOYO TANSO GRAFIT VE KARBON URUNLERI SAN. VE TIC. A.S. (Turkey)**: Located in Europe, marked with purple stars and orange triangles.
- Yongjing Toyo Tanso.**: Located in China, marked with a red star and orange triangle.
- Head office**: Located in Japan, marked with a red circle and orange triangle. An inset map of Japan shows various regional offices marked with colored triangles.
- Shanghai Toyo Tanso Industrial co.,LTD.**: Located in China, marked with a green square and orange triangle.
- TOYO TANSO EUROPE Srl.**: Located in Europe, marked with a red star and orange triangle.
- TAKUMA Plant**: Located in Japan, marked with a blue triangle and orange triangle.
- TOTAN KAKO & SAITA Div.**: Located in Japan, marked with a blue triangle and orange triangle.

# 4. Applications

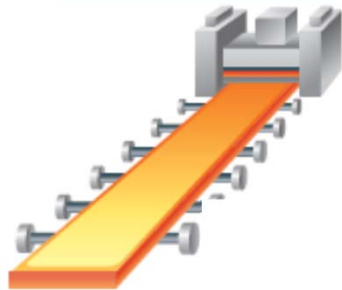
Micro-motor



Power Tool



Industrial



Juicers



Vacuum Cleaner



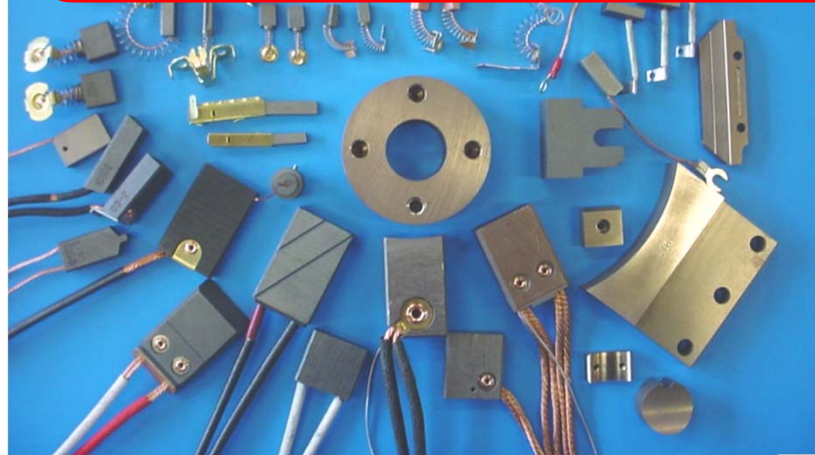
Washing Machine



Automotive



High share at power tools and home appliances



Generator

Earthing

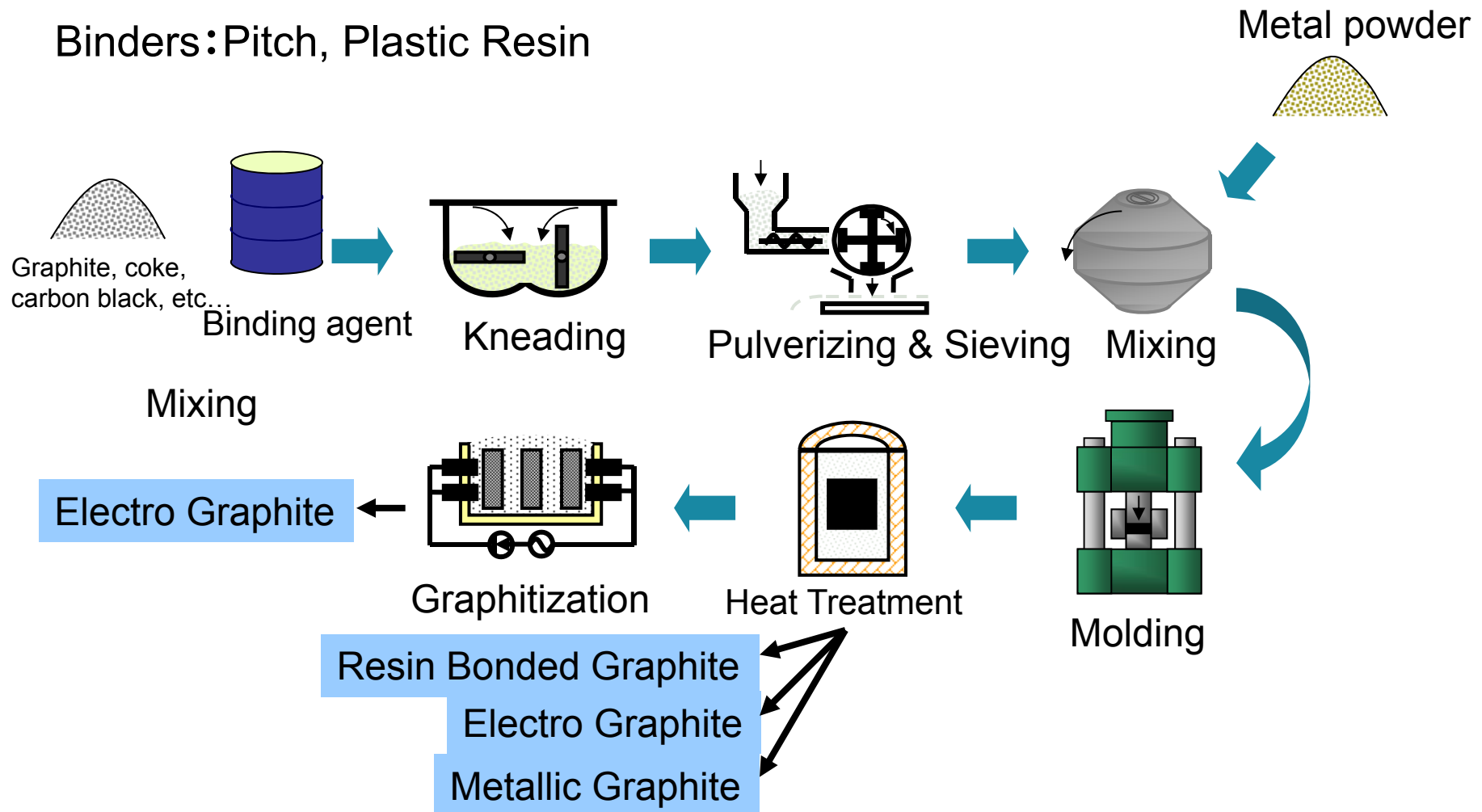


# 5. Production Process

Graphite raw material: Graphite, Coke, Carbon Black etc...

Metallic Raw Material: Copper Powder, Silver Powder etc...

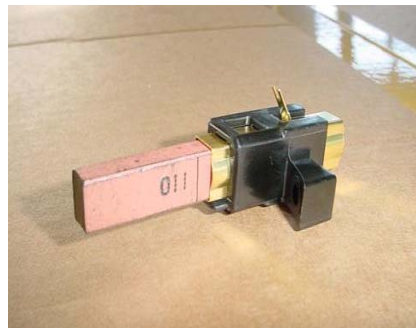
Binders: Pitch, Plastic Resin





# Finished Goods

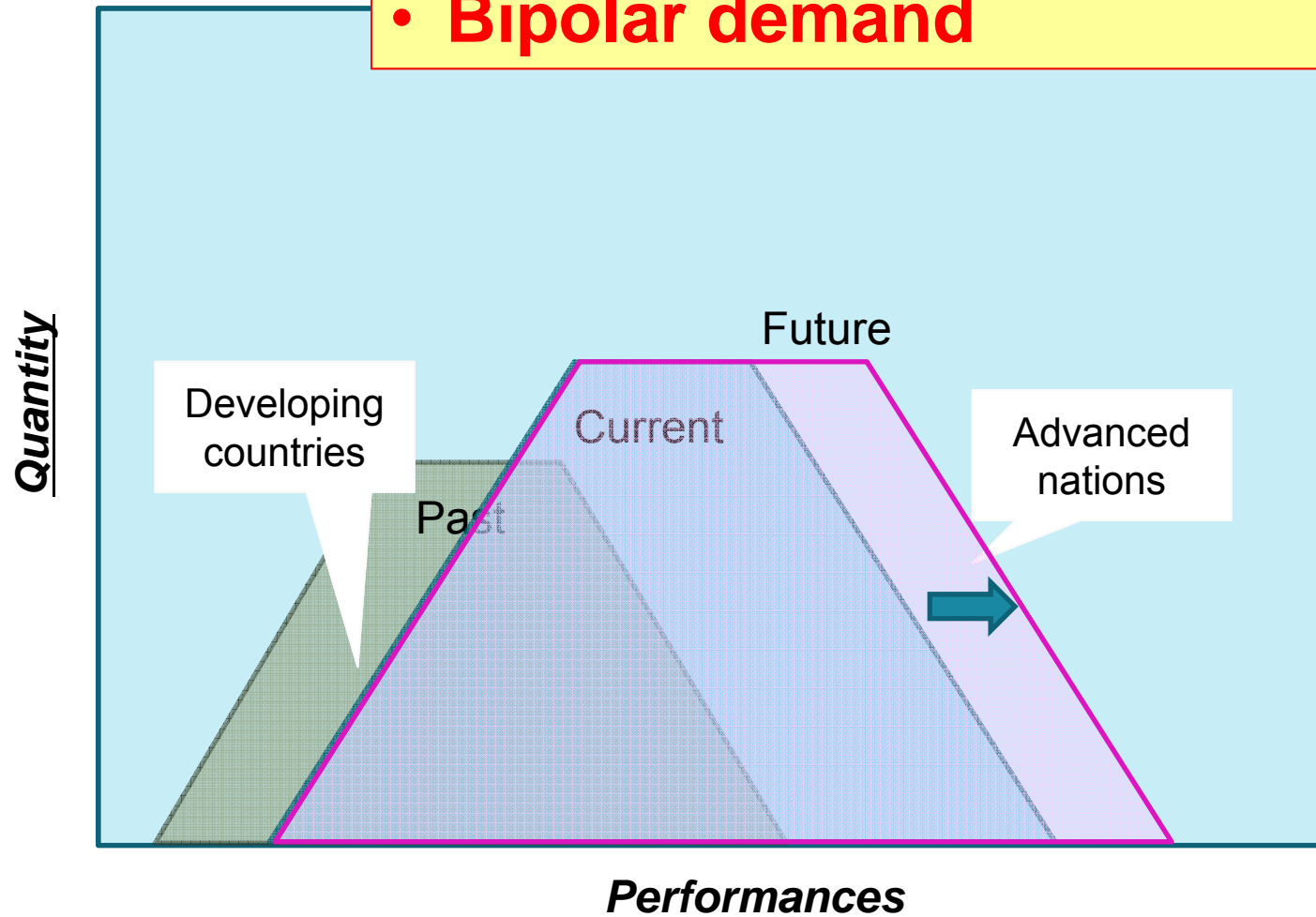
We can offer brush holder assembly products consisting brushes, molded plastics, and metal stamping parts.





# 6. Carbon brush market trends

- Continuously growing production
- Bipolar demand





## COMMISSION REGULATION (EU) No 666/2013 of 8 July 2013

Ecodesign requirements

1. Specific Ecodesign requirements

Vacuum cleaners shall comply with the following requirements:

(a) From 1 September 2014:

- annual energy consumption shall be less than 62,0 kWh/year,
- rated input power shall be less than 1 600 W,
- dust pick up on carpet ( $dpu_c$ ) shall be greater than or equal to 0,70. This limit shall not apply to hard floor vacuum cleaners,
- dust pick up on hard floor ( $dpu_{hf}$ ) shall be greater than or equal to 0,95. This limit shall not apply to carpet vacuum cleaners.

|   |           |           |
|---|-----------|-----------|
| Before                                      | from 2014 | from 2017 |
| Input >1600W                                | <1600W    | <900W     |
| Eco design requirements for vacuum cleaners |           |           |

**Needs:**

Cleaner

Motor

Carbon Brush



**Low input  
High performance**

Light weight

High efficiency  
(Suction power)

High Speed

Low power loss

Long life

- >50,000rpm
- Low friction
- Special coat
- Low resistivity
- Good commutation

# Specially coated brush

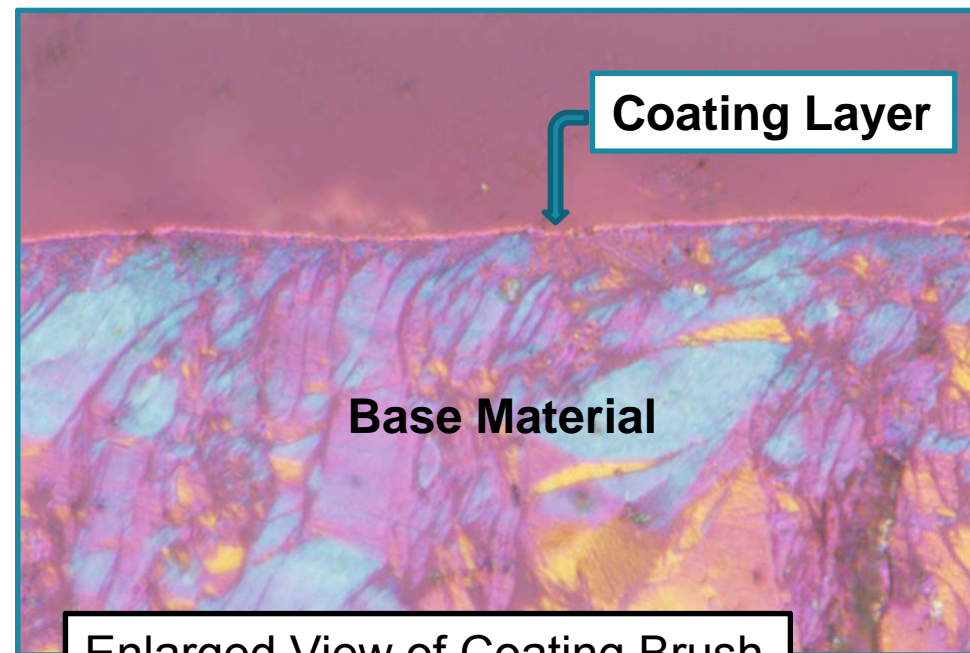
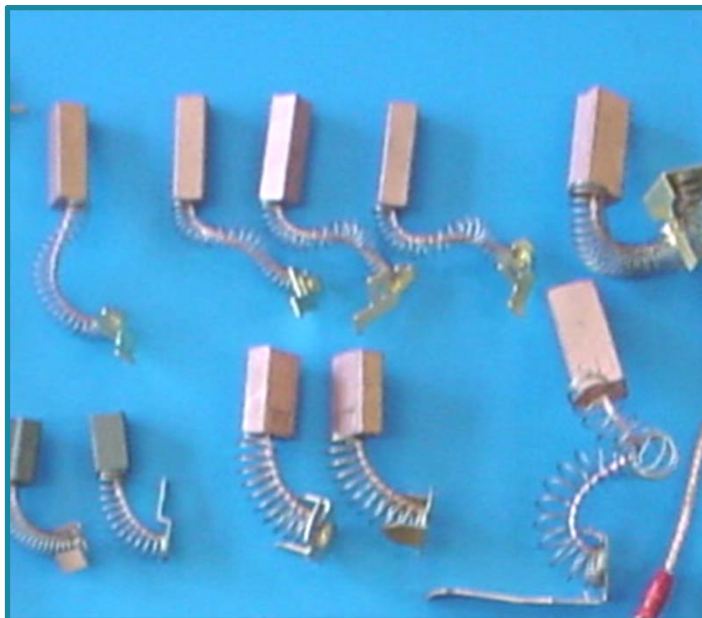
Brush with a thin layer of copper coating.

Low electrical resistance (high efficiency)

Less temperature increase

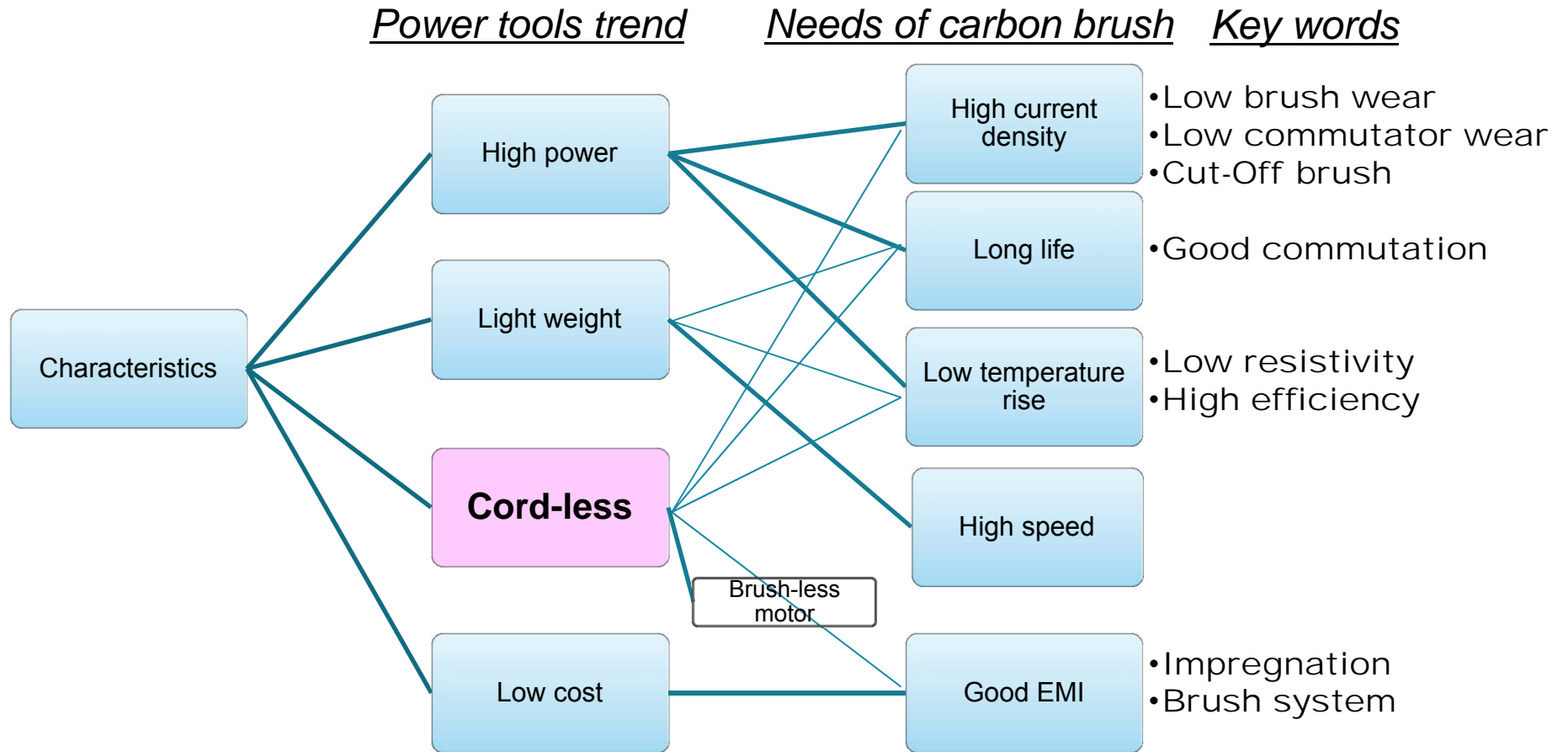
Long brush life time

for high speed motors: cleaner etc.



Enlarged View of Coating Brush

# Market trend Power tools



# 7. Main product lineup

| Composition           | Grade  | Resistivity ( $\mu\Omega\cdot m$ ) | Flexural Strength (MPa) | Applications                            |
|-----------------------|--------|------------------------------------|-------------------------|---|
| Resin Bonded Graphite | X-03   | 200                                | 15                      | AC 100-120V cleaners                    |
|                       | X-78   | 370                                | 22                      | AC 100-240V high input motors           |
|                       | X-94   | 1,200                              | 17                      | AC 200-240V cleaners                    |
| Carbon Graphite       | 105S   | 390                                | 24                      | AC power tools and cleaners             |
|                       | 114    | 900                                | 20                      | AC 200-240V power tools                 |
|                       | 124    | 790                                | 26                      | 200-240V washing machines               |
| Copper Graphite       | M-2B   | 0.28                               | 31                      | Motors, Heavy machines, Slip ring       |
|                       | MF-203 | 30.0                               | 23                      | DC cleaners                             |
|                       | MF-701 | 10.0                               | 30                      | DC power tools                          |
| Electro Graphite      | 321    | 34                                 | 31                      | Traction motors                         |
|                       | 351A   | 47                                 | 22                      | Medium capacity DC and universal motors |

**These are part of our brush grades. We can offer suitable grades for applications!**

# 8. Postscript

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May our products be useful for everyone!  
Thank you for your attention.