

A horizontal bar with a dark grey background on the left and a black background on the right, containing the title text. The text "GUIDE TO" is in white on the grey part, and "MATERIAL DIVISION" is in white on the black part.

**GUIDE TO MATERIAL DIVISION**

# Material Division Supports NACHI Technology

Fujikoshi is a multifaceted machinery manufacturer that, "Contributes to the development of all aspects of the production world" with a complete fabrication system from materials to finished products.

Producing materials for manufacturing, Material Division uses special steel fabrication technology, metal forming technology, and surface treatment technology to provide a variety of products that are trusted and valued on the global market.

Our materials fabrication centers have high-level production lines and superior quality control to respond to the wide range of industrial needs with ever greater advances.



Robot



Aircraft



Automobile



Mold

Steel making  
Alloy designing  
technologies

Components  
Assembly  
technologies

Super-precision  
technologies

Materials  
business

Heat treatment  
Coating  
technologies

Inspection  
Process  
management  
technologies

Electronics  
Optics

Satellite

Railway Cars

Cutting Tools

Products

### High-grade special steels

- High-speed tool steels
- Alloy tool steels
- Bearing steels
- Martensitic stainless steels

### High added-value products

- Pre-hardened rods
- Pre-Shape
- Micron Hard
- Thin-sheet magnesium
- NAX Series Cermat alloys

### FM Alloy

- Functional component materials

**EXEO** Series

- Steel for precision molds

**DURO** Series

- Steel for plastic molds

**PROVA** Series

Construction  
Machinery

# Introduction to Materials Fabrication Center

## Overview and History

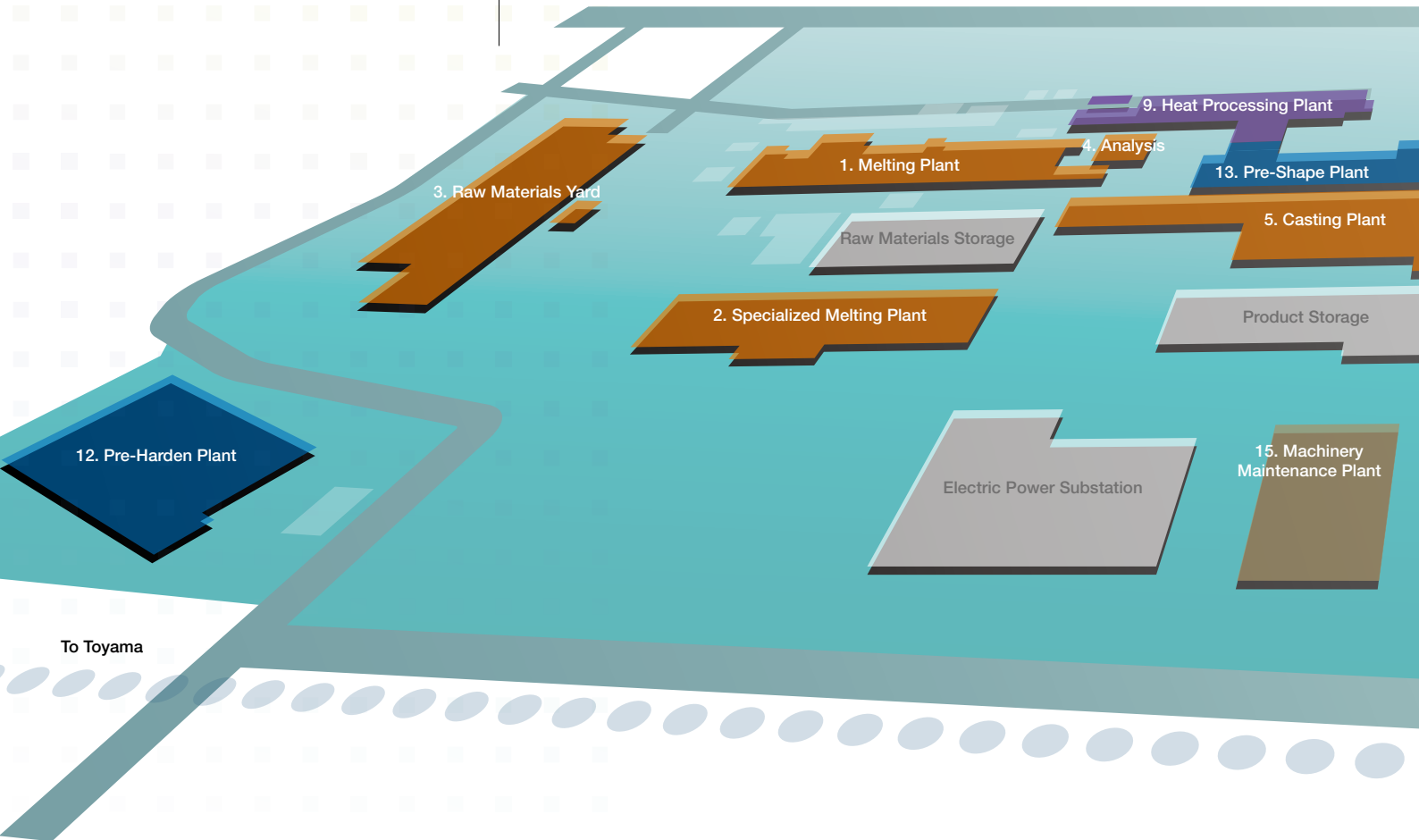
### Overview



Number of employees	Approximately 300
Total area	200,000 m <sup>2</sup>
Floor space	66,000 m <sup>2</sup>

### History

- 1938 Higashi Toyama Plant operations  
High-speed tool steel & alloy tool steel fabrication
- 1940 Bearing steel fabrication
- 1961 Steel rod rolling mill  
30-ton arc furnace completed
- 1962 Specialized smelter completed
- 1973 Specialized smelter completed (ESR furnace)
- 1975 Bi-metal saw blade material fabrication
- 1981 Plant for powderized steel fabrication completed
- 1982 Pre-Harden fabrication  
Cold formed flat steel fabrication
- 1986 Super-fine pre-hardened wire facilities installed
- 1989 Pre-Harden Plant completed
- 1991 Won Deming Prize
- 1996 ISO9002 certification  
Large-scale forge press (1650 tons) installed
- 1998 Pre-Harden facilities expanded
- 2000 Cold drawing line expanded  
Business partnership developed with Daido Steel  
Renamed Material Fabrication Center in December
- 2001 Fine Wire Plant completed
- 2002 Business partnership developed with ERASTEEL (France) and HSS Division
- 2003 ISO14001 certification
- 2005 Specialized Melting Plant completed (ESR and VIM furnaces)
- 2007 Joint development of magnesium alloy with Sankyo Tateyama Aluminium  
Materials R&D completed



## Layout

### Steel Fabrication Operations

1. Melting Plant  
Arc furnace (30 tons)
2. Specialized Melting Plant  
VIM furnace (vacuum induction melting) 3 tons  
ESR furnace (electroslag remelting) 3 tons  
Slag Welding Robot
3. Raw Materials Yard
4. Analysis
5. Casting Plant

### Hot Work Operations

6. Forging Plant  
Forge press (1650 tons)  
Forge press (650 tons) & heating furnace  
Forging ingots from 600 kg to 3 tons
7. Rolled Steel Plant  
Large-scale roller (600R)  
Middle-scale roller (400R), small-scale roller,  
smoothing furnace
8. Steel Plate Plant  
Lauth mill (3-high mill), pull-over mill

### Heat Treatment Process

9. Heat Processing Plant  
Batch type bogie hearth furnace and atmosphere furnace
10. Heat Treatment & Straightening  
Continuous draw furnace and atmosphere furnace

### Cold Work & Precision Components

11. Cold Rolling Plate Plant  
4-stage cold rolling and skin-pass rolling
12. Pre-Harden Plant
13. Pre-Shape Plant
14. Fine Wire Plant  
Atmosphere annealing furnace and vacuum annealing furnace  
Continuous surface processing equipment  
Wire drawing machines, centerless grinders,  
tandem rolling machines

### Research, Development, Maintenance and Sintering

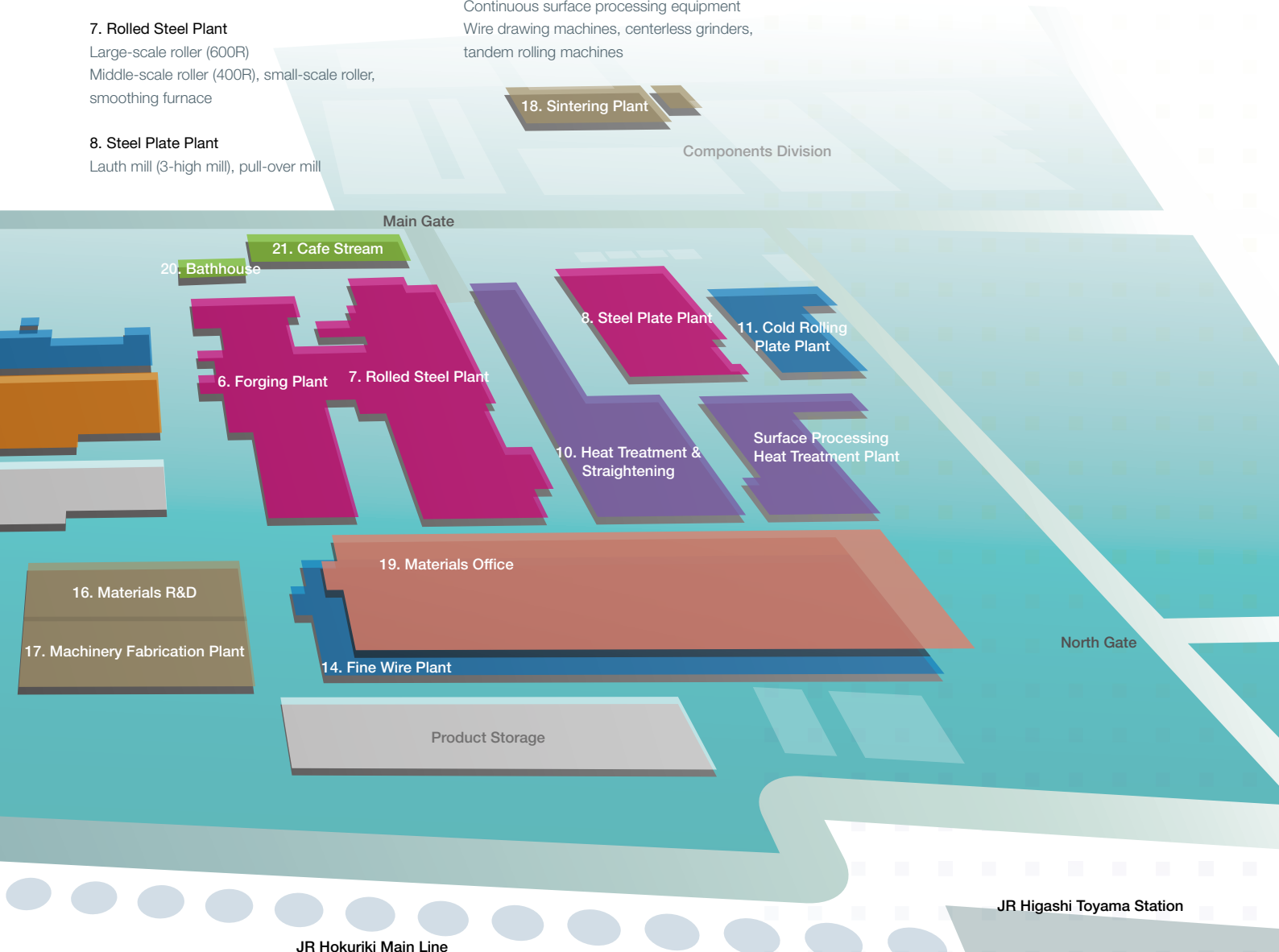
15. Machinery Maintenance Plant
16. Materials R&D
17. Machinery Fabrication Plant
18. Sintering Plant

### Materials Office

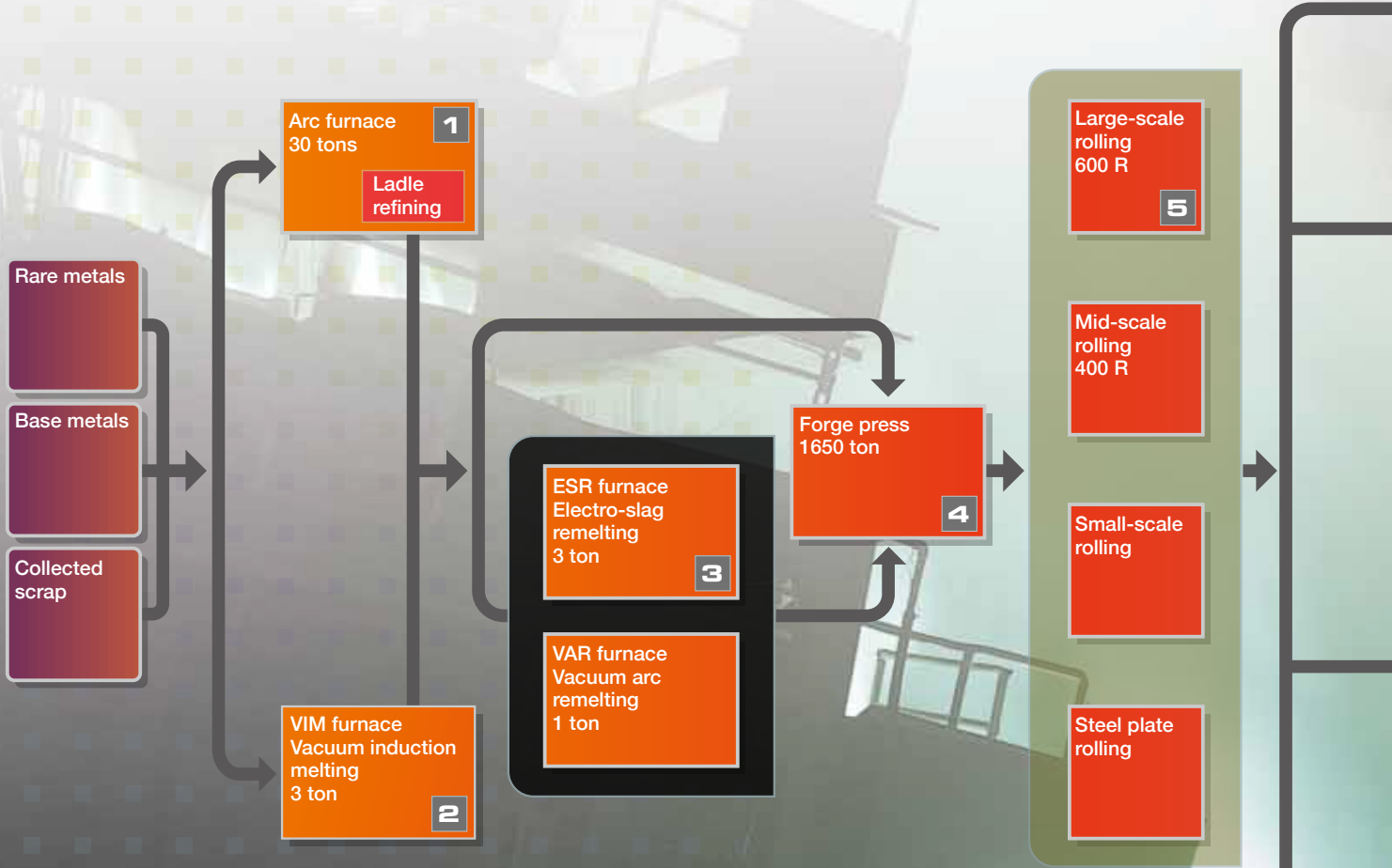
19. Materials Office  
Operations, Technical Department, Fabrication Department, Reception Rooms for Staff, Tele-conference Room, and various meeting rooms

### Health and Relaxation Facilities

20. Bathhouse
21. Cafe Stream



# Fabrication lines configured through the latest facilities and technologies



Specialized Melting Plant



Arc furnace 30 tons



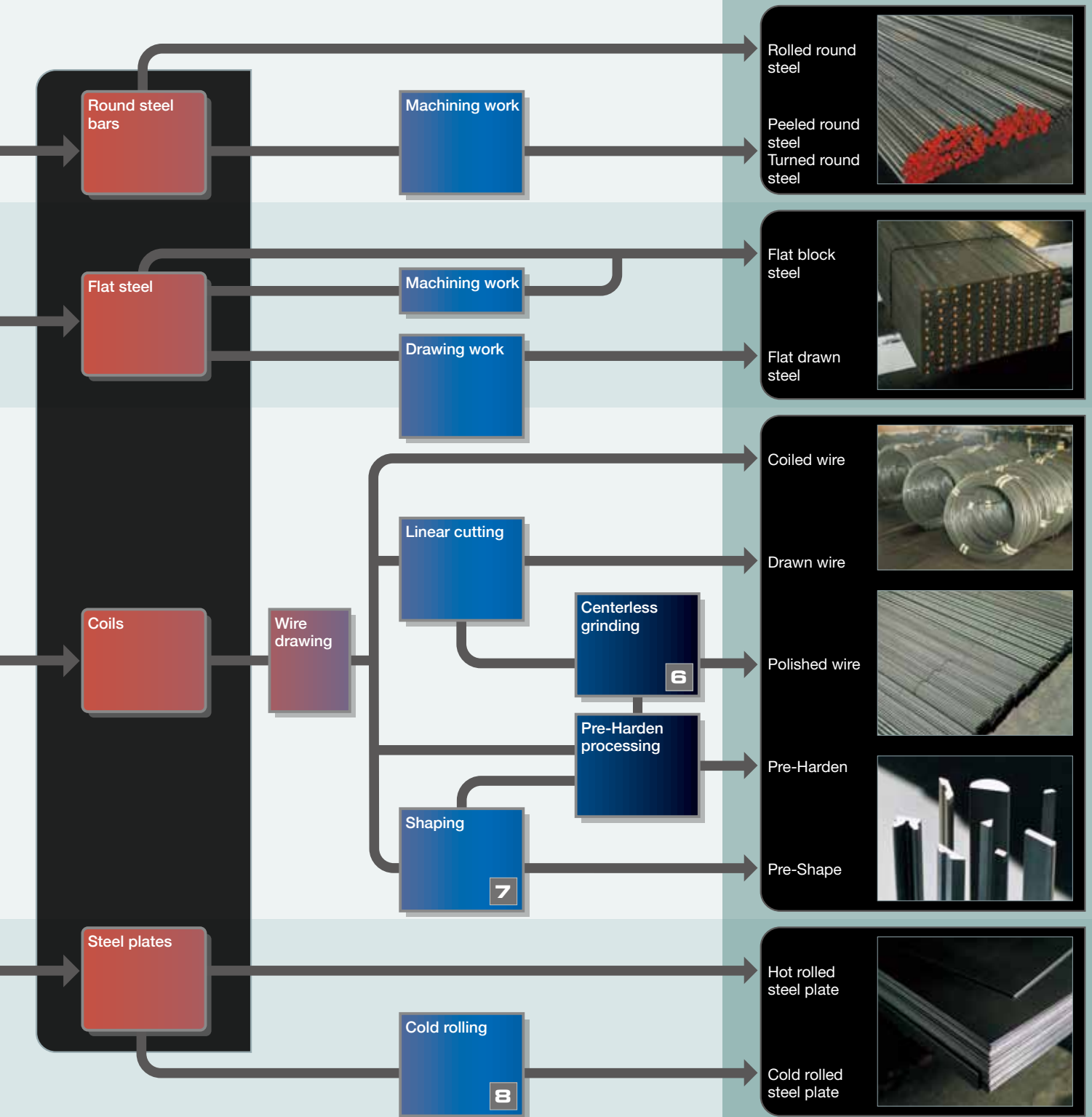
VIM furnace (vacuum induction melting) 3 tons



ESR furnace (electroslag remelting) 3 tons



Forge press 1650 tons



Large-scale rolling



Centerless grinding



Shaping



Cold rolling

# High-performance materials to support manufacturing and meet the demand of customers around the globe.

## Materials products



**Drill and endmill materials**  
Top level cutting tool materials proved by Fujikoshi, the top maker of high-speed steel tools.



**Broach and gear cutting tool materials**  
Providing wear resistance, heat resistance, and toughness to support the most accurate machining in the world.



**High-quality bearing materials**  
Using the best materials developed by our Materials Division.

## High added-value products



**Pre-hardened rods**  
Eliminating problems and inconsistency from heat processing. High-performance hardened wire-rod developed with NACHI's proprietary technology and experience.



**Pre-Shape**  
Pre-shaped materials produced to most finished shapes using high-quality specialized steels make it possible to improve productivity and reduce total costs. They can provide products in pre-hardened steels.



**Micron Hard**  
High-carbide ultra-fine tempered wire provided at the world's smallest diameter of 0.04 mm.

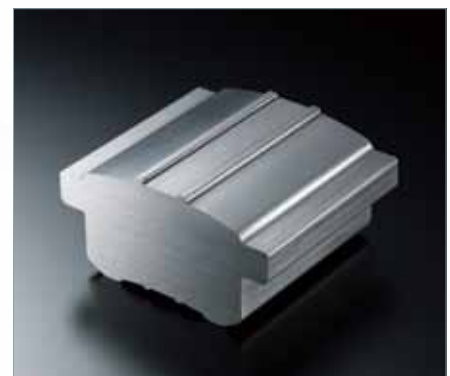
## FM Alloy



**PROVA** for molds for mobile phone casings  
Super-pure materials emphasize mirror finish and abrasion-resistance for molds for aspherical lenses and light guide plates.



**DURO** for fine blanking molds  
High quality and high performance material for molds created based on Fujikoshi's proprietary melting technology.



**DURO** for fine blanking molds  
Carbide volume and size are controlled to get a superior balance of toughness and wear resistance to match each application.



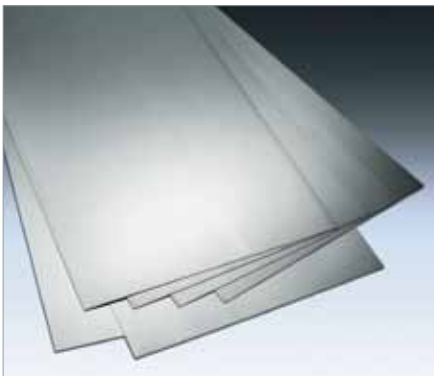
**Vane material for air conditioners**  
 Providing high-speed steel and other difficult to handle materials in most finished shapes to reduce costs.



**Pins for dot printers**  
 Wear-resistant High-speed Micron Hard and highly rigid Carbide Micron Hard, two types available.



**Pre-shaped materials for linear rails**  
 Pre-shaped materials produced to most finished shapes using pre-heat treated materials make it possible to improve productivity and reduce total costs.



**Thin magnesium alloy sheets**  
 Magnesium alloys have many applications as they have superior characteristics such as strength, magnetic shielding, and low weight.



**Thin magnesium alloy coils**  
 Thin coil material 350 mm wide developed using proprietary rolling technology. This improves productivity and makes more accurate continuous press molding possible.



**NAX Series Cermet alloys**  
 Cermet materials are used for cutting tools developed with proprietary sintering technology and traditional tool making expertise.



**EXEO injection screws**  
 Providing injection screws as finished products produced using proprietary machining and heat treatment technologies we developed in-house.



**EXEO functional components for high-speed spindles**  
 High-quality materials with low-thermal expansion and high-performance developed with the newest machine and materials technology.



**EXEO resin runner nozzle components**  
 High-performance materials were developed for and provided with the wear-resistance and toughness needed for mold parts.

It takes the know-how from handling jobs from materials to finished products, like at Fujikoshi, to create materials technologies that look to the next generation.

**Materials R&D**



“Materials R&D” the new center for research and development of materials

Materials R&D is the new center for taking on the work in researching and developing materials.

In response to the demand for a variety of materials with various applications, which will increase as manufacturing industries evolve in the future, we are pushing forward with the development of new materials like magnesium alloys, advancing new applications, and developing and marketing new functional components.

We are developing new methods of materials business with an eye on the next generation by using the full power of the synergy of our in-house technologies.

**Analysis, inspection, and evaluation services.**

Our Materials R&D uses the latest measuring equipment to do consignment analysis and inspection services, such as qualitative and quantitative analysis of the chemical makeup of the surface of materials, enlargement of images of the material surfaces, and other analyses.

On top of that, we also provide seminars and consulting on materials to help our customers solve their problems.

**Scrap collection and recycling services.**

In consideration of problems related to the environment and natural resources, we are collecting used tools, setting up boxes for recycling, collecting and separating oily cutting scraps and then classifying them and remelting them back to resources.



EPMA (Field-emission electron gun)



Test equipment to evaluate heat workability of materials



Heated tensile strength testing machine



Thermal expansion measuring apparatus (horizontal differential detector)



Emission spectrophotometer (Quantvac)



Carbon & sulfur analyzer

# Guide to Toyama



Higashi Toyama Plant



Toyama Plants



Namerikawa Plant



Kenka Yama Festival



Tonami Tulips



Gokayama Gassho Architecture



Firefly Squid



Tateyama Mountains



Etchu Owara Kazeno Bon Dance

# NACHI

**NACHI-FUJIKOSHI CORP.**

[www.nachi-fujikoshi.co.jp](http://www.nachi-fujikoshi.co.jp)

**Material Division** 3-1-1 Yoneda-machi, Toyama 931-8511

**Tokyo Head Office** Shiodome Sumitomo Bldg. 17F, 1-9-2 Higashi-Shinbashi, Minato-ku, Tokyo 105-0021

**Toyama Head Office** 1-1-1 Fujikoshi-Honmachi, Toyama 930-8511

Tel: +81-(0)76-438-4411 Fax: +81-(0)76-438-6313

Tel: +81-(0)3-5568-5242 Fax: +81-(0)3-5568-5236

Tel: +81-(0)76-423-5111 Fax: +81-(0)76-493-5211

**CATALOG NO. S4010E-2**

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