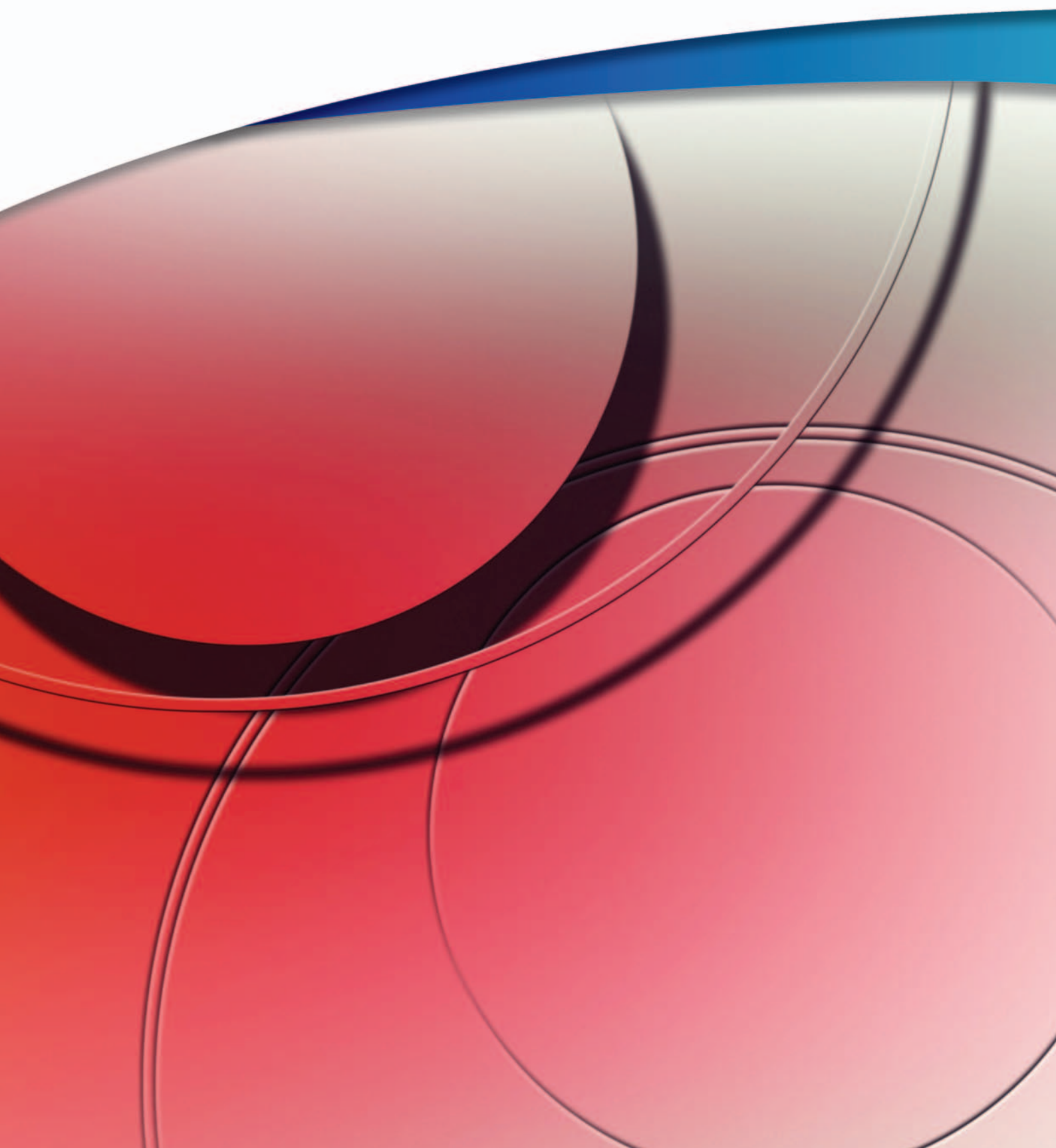
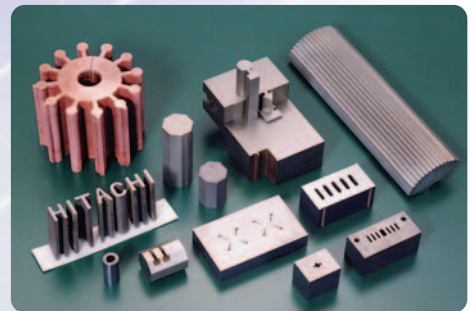


Electrical Discharge Machining Wire <EDM wire>



Electrical Discharge Machining Wire

We satisfy customer demands by implementing integrated production from casting to processing.



Guideline for selecting products

● Positioning of each wire type	2
● Cutting application of each wire type	2
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● Advantages of non-paraffin wire	3

General-purpose of EDM wire

● BZ-U wire (Standard brass: Equivalent to JIS C 2800)	4
● BZ-MU wire (Standard brass: Equivalent to JIS C 2700)	4

Special EDM wire

● BZ-B wire (Special brass: Zinc content increased)	5
● TF wire (Alloy brass: Special metallic-element added)	5
● BZ-AT wire (Extra-soft brass: For taper cutting)	6
● OFC wire (Oxygen free copper)	6

Plated EDM wire

● HIH wire (Zinc-plated type: For improvement of surface accuracy)	7
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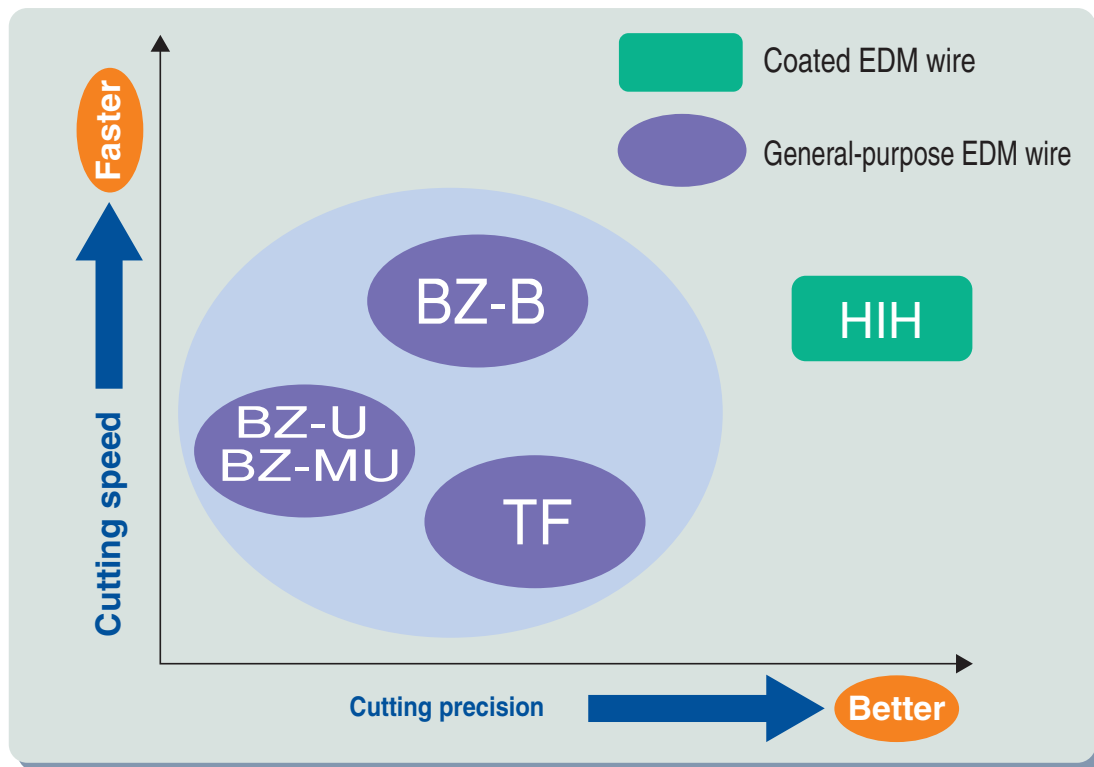
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Positioning of each wire type



Cutting application of each wire type

Cutting application		Standard EDM wire		Special EDM wire				Coated EDM wire
		HBZ-U	HBZ-MU	HBZ-B	HTF	ABZ-AT	OFC *	HIH
Cutting purpose	Standard cutting	○	○	○	◎	—	—	◎
	Taper cutting	◎	◎	◎	◎	★	◎	◎
	Rough cutting	◎	◎	○	◎	—	—	◎
	High accuracy shape cutting	◎	◎	○	○	—	—	★
	Thick material cutting	◎	◎	◎	○	—	—	◎
	High surface accuracy cutting	◎	◎	◎	○	—	—	★
	High-speed cutting	◎	◎	○	◎	—	—	◎
	Automatic threading	★	★	◎	◎	—	—	○
	Poor jet flow cutting	◎	◎	◎	○	—	—	◎
	Copper adhesion less cutting	◎	◎	○	★	—	—	★
	Brass powder less cutting	○	★	◎	◎	◎	—	◎
Steel product	Aluminium	◎	◎	○	◎	—	—	◎
	Graphite	◎	◎	◎	◎	—	★	○
	Poly crystalline diamond (PCD)	◎	◎	◎	◎	—	—	★
	Tungsten carbide	◎	◎	○	◎	—	—	★
	Stainless steel	◎	◎	◎	◎	—	—	○
	Low conductivity materials	◎	◎	◎	◎	—	★	○
EDM machine	Agie-Charmilles (formerly Agie)	○	○	◎	◎	—	—	★
	Agie-Charmilles (formerly Charmilles)	○	○	◎	◎	★	—	○
	Seibu	◎	◎	○	○	○	○	◎
	Sodick	○	○	○	○	—	—	○
	Fanuc	★	○	○	○	★	—	★
	Makino	○	○	◎	◎	—	—	○
	Mitsubishi	○	★	○	○	—	—	◎

★ : Excellent ◎ : Better ○ : Good

*OFC (Oxygen-Free Copper)

Table: Equipment availability of wire with without paraffin

EDM machines		EDM wire		Note
Maker	Model	Paraffin	Non-paraffin	
Agie-Charmilles (formerly Agie)	100D	—	○	Non-paraffin products can be used for all models, regardless of size.
	200D	—	○	
	Evolution	—	○	
Agie-Charmilles (formerly Charmilles)	Robofil®	—	○	
Seibu	EW	—	○	
	MS	—	○	
	MA	—	○	
Sodick	A	○	—	For wire of 0.15 mmφ or less, non-paraffin products improve positioning and accuracy.
	AP	○	—	
	AQ	○	—	
Fanuc	α	—	○	Non-paraffin products can be used for new models, α series or thereafter.
	Tape Cut	○	—	
Makino	EE	○	—	For wire of 0.15 mmφ or less, non-paraffin products improve positioning and accuracy.
	EQH	○	—	
	EC	○	—	
Mitsubishi	F A	—	○	Non-paraffin products can be used for all models, regardless of size.
	R A	—	○	
	Q A	○	—	For wire of 0.15 mmφ or less, non-paraffin products improve positioning and accuracy.
	F X - K	○	—	
	F X	○	—	
	CX,SX	○	—	
	DWC®	○	—	

Advantages of non-paraffin wire

If wire has excessive paraffin or contamination

- Wire may easily slip on a roller part, etc.
- Extraneous matter may remain on a roller part, etc.

1. If extraneous matter or oil content may remain:

- Resulting unstable wire run may degrade the surface accuracy of the machined object.
- Automatic threading trouble and EDM machine stop may be triggered by blockage of guide dies.

Deteriorated surface accuracy



Normal surface accuracy



If paraffin wire is used on the EDM machine that is specifically calibrated for non-paraffin wire, the characteristics of electrical discharge machining may be adversely affected since the wire run system will become unstable due to sliding, etc. As cutting line wire marks occur frequently, particularly on the cutting surface, great care is needed for wire selection.

2. If insulation material remains on wire surface:

- Accuracy of tactile sense and positioning may deteriorate.
- Unstable to feeble electrical discharge is generated and feeding dies life is shortened.

General-purpose
EDM wire

BZ-U wire

Standard brass

〔JIS C 2800
equivalent〕

Capable of automatic threading

For hard material

- Hitachi Metal's standard brass wire
- High cutting speed due to its zinc-rich constitution
- Improved automatic threading capability due to its characteristic straightness
- Can be used in any company's EDM machine with automatic threading function

General characteristics of BZ-U wire

Type	Product name	Size (ϕ mm)	Wire Tolerance (mm)	Tensile strength		Elongation (%)
				(MPa)	(kgf/mm ²)	
H (Hard)	BZ-U	0.10~0.33	± 0.001	980 over	100 over	0.4 over

Note: 1. Please contact us for the production of special sizes (0.10 mm less, or 0.33 mm over).
2. This wire is manufactured for only H (hard) type.

General-purpose
EDM wire

BZ-MU wire

Standard brass

〔JIS C 2700
equivalent〕

Reduction of brass powder

Capable of automatic threading

For hard material

For soft material

- Significant reduction of brass powder
- Improved automatic threading capability due to its excellent straightness
- Can be used in all models of EDM machines equipped with automatic threading device in the form of pipe, jet or annealed systems.

General characteristics of BZ-MU wire

Type	Product name	Size (ϕ mm)	Wire Tolerance (mm)	Tensile strength		Elongation (%)
				(MPa)	(kgf/mm ²)	
H (Hard)	BZ-MU	0.10~0.33	± 0.001	980 over	100 over	0.4 over
A (Soft)	BZ			445 over	50 over	15 over

Note: 1. Please contact us for the production of special sizes (0.10 mm less, or 0.33 mm over).
2. In case of A (Soft) type, the product name is ABZ.

Special
EDM wire

BZ-B wire

Special brass

Zinc content
increased

High-speed cutting

Reduction of brass powder

Improvement in surface accuracy

For hard material

For soft material

- More Zinc-rich than BZ-U
- Improvement in cutting speed and surface accuracy

General characteristics of BZ-B wire

Type	Product name	Size (ϕ mm)	Wire Tolerance (mm)	Tensile strength		Elongation (%)
				(MPa)	(kgf/mm ²)	
H (Hard)	BZ-B	0.10~0.33	± 0.001	980 over	100 over	0.4 over
A (Soft)				445 over	50 over	15 over

Note: 1. Please contact us for the production of special sizes (0.10 mm less, or 0.33 mm over).

Special
EDM wire

TF wire

Alloy brass

Special metallic-
element added

Breaking protection

Avoiding of brass adhesion

For hard material

For soft material

- For cutting thick objects
(can be used for material thickness of 100 mm or more)
- Significant reduction of brass adhering to cutting surface

General characteristics of TF wire

Type	Product name	Size (ϕ mm)	Wire Tolerance (mm)	Tensile strength		Elongation (%)
				(MPa)	(kgf/mm ²)	
H (Hard)	TF	0.10~0.33	± 0.001	980 over	100 over	0.4 over
A (Soft)				445 over	50 over	10 over

Note: 1. Please contact us for the production of special sizes (0.10 mm less, or 0.33 mm over).

Special
EDM wire

BZ-AT wire

Ultra-soft brass

Taper cutting

For ultra-soft material

- For taper cutting
- Stress is specifically demonstrated for wide-angle (20~45) taper cutting.

General characteristics of BZ-AT wire

Type	Product name	Size (ϕ mm)	Wire Tolerance (mm)	Tensile strength		Elongation (%)
				(MPa)	(kgf/mm ²)	
A (Soft)	BZ-AT	0.20~0.30	± 0.001	445 less	45 less	30 over

Note: 1. Please contact us for the production of special sizes (0.20 mm less, or 0.30 mm over).
2. This wire is manufactured for only A (Soft) type.

Special
EDM wire

OFC* wire

Oxygen free
copper

[99.9% or more]

Copper wire

For hard material

For soft material

- This wire is effective for sintered materials (Graphite, etc) and vacuum cutting, such as with the old model of EDM machine.

General characteristics of OFC wire

Type	Product name	Size (ϕ mm)	Wire Tolerance (mm)	Tensile strength		Elongation (%)
				(MPa)	(kgf/mm ²)	
H (Hard)	1OFC	0.20~0.30	± 0.001	445 over	50 over	0.4 over
A (Soft)				294 less	30 less	15 over

Note: 1. Please contact us for the production of special sizes (0.20 mm less, or 0.30 mm over).

*OFC (Oxygen-Free Copper)

Coated
EDM wire

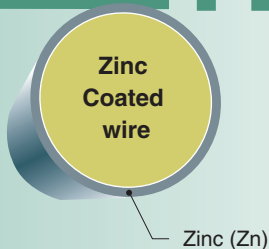
HIH wire

Improvement in surface accuracy

Reduction of zinc powder

Capable of automatic threading

For hard material



- For cutting focused on surface and shape accuracy
- Zinc (Zn) coating by electroplating method
- Reduction of heat-affected layer of the cutting surface, increased life of the press mold

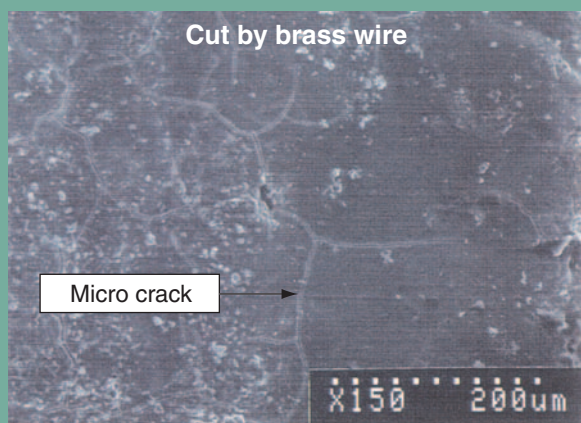
General characteristics of HIH wire

Type	Product name	Size (ϕ mm)	Wire Tolerance (mm)	Tensile strength		Elongation (%)
				(MPa)	(kgf/mm ²)	
H (Hard)	IH	0.10~0.30	± 0.001	980 over	100 over	0.4 over

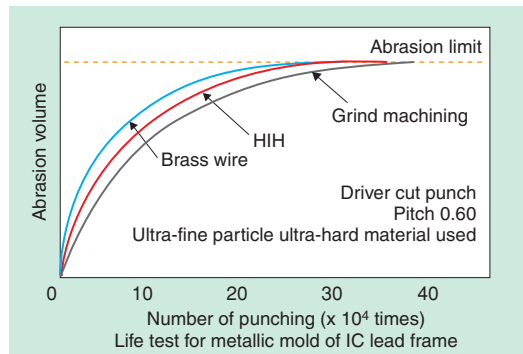
Note: 1. Please contact us for the production of special sizes (0.10 mm less, or 0.30 mm over).
2. This wire is manufactured for only H (Hard) type.

Difference of ultra-hard (Wc-Co) cutting surface

Cutting surface of ultra-hard material (Wc-Co)



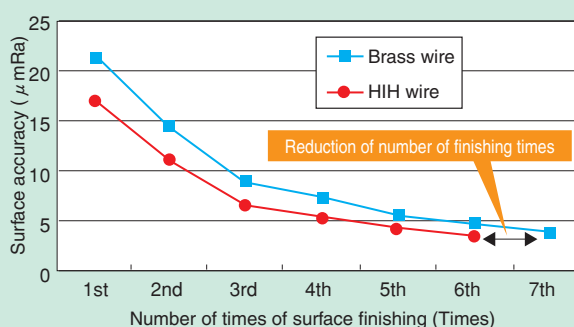
Longer life of metallic mold



The electrical discharge heat caused by cutting is dispersed by the surface coating of zinc. This reduces the heat-affected layer of the cutting surface, thus prolonging the life of the press metallic mold including IC lead frame.

※Especially in ultra-hard machining with general-purpose EDM wire, the hardness of the machining surface will fall and the press life will be shortened by melting of Co (cobalt), which is the binder.

Reduction of finishing times



Conventionally, metallic molds achieved a surface accuracy by performing surface finishing many times. Now, however, it is possible to acquire the same surface accuracy by using HIH wire, while reducing the number of times of surface finishing, thus also reducing the machining time.

※This wire is effective for high-accuracy metallic mold cutting, etc. including plastic molds.

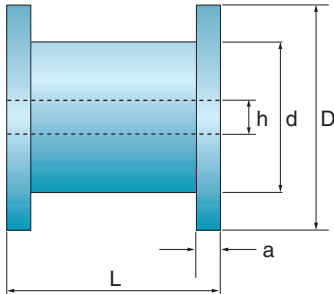
Definition of description of product, others

Product specifications

Product category	Type	Product name	Standard size (φ mm)	Wire tolerance (φ mm)	Tensile strength (MPa)	Elongation (%)	Conductivity (%)
General-purpose EDM wire	H (hard)	BZ-U	0.10~0.33	±0.001	980 over	0.4 over	20 over
	H (hard)	BZ-MU					
	A (soft)	BZ			445 over	15 over	
Special EDM wire	H (hard)	BZ-B			980 over	0.4 over	20 over
	A (soft)				445 over	15 over	
	H (hard)	TF			980 over	0.4 over	17 over
	A (soft)				445 over	10 over	
	A (ultra-soft)	BZ-AT	0.20~0.30		445 over	30 over	20 over
	H (hard)	1OFC	0.20~0.30		445 over	0.4 over	90 over
	A (soft)			294 over	15 over		
Coated EDM wire	H (hard)	IH	0.20~0.30	±0.001	980 over	0.4 over	20 over

Bobbin name and dimensions

(mm)

Bobbin name	Flange diameter: D	Barrel diameter: d	Outer width: L	Flange thickness: a	Arbor hole diameter: h	Standard winding volume (kg)	Bobbin dimensions
P-1JT	140	70	39	4.5	12.5	1.5	
P-1FT	140	70	39	4.5	46	1.5	
P-3RT	130	80	110	10	20	3	
P-5RT	160	90	114	12	20	5	
P-10TW	200	110	134	12	25	10	
P-15L	250	125	140	15	34	20	
P-30	280	200	220	20	73	30	
P-50	320	162	217	20	34	50	
K-125	125	80	125	12.5	16	3	
K-160	160	100	160	16	22	6	
K-200	200	125	200	20	32	15	

Packaging method

Bobbin name	Standard winding volume (kg)	Boxed number (pcs/box)	Cardboard box size L x W x H (mm)
P-1JT	1.5	10	370×290×200
P-1FT	1.5		
P-3RT	3	6	
P-5RT	5	4	
P-10TW	10	2	300×210×290
P-15L	20	1	
P-30	30		310×250×320
P-50	50		475×325×405
K-125	3	4	370×290×200
K-160	6	2	
K-200	15	1	300×210×290