





Hayabusa Wire

High-Speed & Ecology-Wire

From high-speed to eco-friendly

"Hayabusa wire" is a next-generation, ultra-high-speed wire electrode incorporating all the technology of Sodick, the manufacturer of EDM machines. It was developed as a wire dedicated to Sodick's SL machines, but it has now been improved to make it compatible with Sodick's existing machines.



- ① Good conductivity = Electrons can move freely = Cu(copper)
- 2 Strong ionization tendency = Strong electron emission characteristics = Zn(Zinc)



Comparison of Wire Feed Speeds and Wire Wear





* Conditions: Wire diameter of ϕ 0.2 mm, tensile strength fixed at 1.2 kg (WT120) (This is to maintain machining accuracy (straightness).)

Comparison of Wire Wear

A comparison of wire surfaces and diameters at various wire feed speeds (WS) was conducted on Hayabusa wire, and on Tsubame wire. * The initial wire diameter for each wire was ϕ 0.2 mm.

Results for Tsubame wire



Results for Hayabusa wire



Hayabusa wire doesn't wear to the same extent as Tsubame wire used at a wire feed speed (WS) of 90 even when its wire feed speed (WS) is slowed down to 45!

Machining Verification

- Each wire was used under the following conditions and the finish on the machined surfaces was verified.
 - Tsubame wire: Water5 conditions (WS = 130)
 - Hayabusa wire: Machining conditions (WS = 105)

Machining details



Photograph after machining



* The machining data is the data obtained when steel material 40 mm thick was machined with a ϕ 0.2-mm wire under conditions specified by Sodick.

Machining time and wire consumption at each number of cuts

Number of cuts	Machining mode	Machining speed (mm/min)	Voltage (V)	Current (A)	WS (m/min)	WT (x 10g)	Machining time	Wire consumption
1 ct	Standard (Tsubame)	3.2	23~26	13.3~14.2	130	120	15min.51sec.	206m
TSL	Hayabusa conditions (Hayabusa)	3.6 ~ 3.7	23~27	14.7 ~ 16.0	105	120	14min.27sec.	152m
Jud	Standard (Tsubame)	3.2 ~ 3.6	50~52	2.0 ~ 2.6	130	160	11min.04sec.	144m
ZHU	Hayabusa conditions (Hayabusa)	3.4 ~ 3.9	$50 \sim 54$	2.0 ~ 2.6	105	160	10min.13sec.	107m
ard	Standard (Tsubame)	5.9~6.2	38~39	1.5 ~ 2.0	130	160	6min.28sec.	84m
Siù	Hayabusa conditions (Hayabusa)	5.6~6.2	38~39	1.5 ~ 2.0	105	160	6min.18sec.	66m
4th	Standard (Tsubame)	3.4 ~ 4.0	7~8	0.4	130	160	11min.06sec.	144m
401	Hayabusa conditions (Hayabusa)	4.1 ~ 4.3	7~8	0.4	105	160	10min.37sec.	111m
	Standard (Tsubame)	Total fo	Total for e40 wire under Water5 conditions (upper rows above)					578m
TOTAL	Hayabusa conditions (Hayabusa)	Total WS	for standa value und (lowe	ard wire at t der Water5 o er rows abov	41min.35sec.	437m		

* The machining time and consumption vary depending on the machining.

Comparison of Surface Roughness and Geometrical Precision

Comparison of surface roughness under brass (Water5) conditions and Hayabusa (Eco) conditions

Wire	Miro	Machining conditions	FΡΔ	Surface roug	Parallelism			
diameter	vvire	Machining conditions	EFA	Тор	Middle	Bottom	Average	Middle
	Tsubame	Water5 (4 cuts)	0	6.866	7.570	8.514	7.650	7.512
0.2	Hayabusa	Hayabusa conditions (4 cuts)	+2	8.487	6.971	8.034	7.831	6.379



Comparison of geometric precision under brass (Water5) conditions and Hayabusa (Eco) conditions										
Wire	Mire	Machining conditions	EDA	X dimension (mm)			Y dimension (mm)			Variability
diameter	vvire		EPA	Тор	Middle	Bottom	Тор	Middle	Bottom	(μm)
	Tsubame	Water5 (4 cuts)	0	10.005	10.005	10.005	10.004	10.004	10.004	$+4 \sim +5$
0.2	Hayabusa	Hayabusa conditions (4 cuts)	+2	10.005	10.006	10.005	10.005	10.006	10.005	$+5 \sim +6$

Difference in variability of around 0 to 1μ m



With the Hayabusa (Eco) conditions, there is no change in machining dimensions and surface roughness when compared to the highest brass conditions! Hayabusa (eco) conditions

Highest brass conditions



Corners and edges have the same quality of finish!

Cost Reduction

You will be able to reduce Wire consumption such as approximately 30% of Cost Reduction with HAYABUSA brand Wire.

Cost comparison image

Hayab	Hayabu busa wire ————————————————————————————————————	sa wire . cost	
	approx -30% rec	imately duction!	ame wire
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Hayabusa even reduces costs that are hard to see!

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Actual Machining Example (1)

Machining details

Machining 10 mm squ	uare punches
Machine model used	: AP250L LN1W
Option	: For water use
Dielectric fluid	: Water
Workpiece material	: Steel
Workpiece thickness	: 60.0 mm
Used wire diameter	: Φ 0.2 mm
Wire product name	: Tsubame (Water5, 5cuts)
	: Hayabusa (Water5, 5cuts, EPA+2)
	: Hayabusa (Hayabusa conditions, 5cuts, EPA+2)
	: Hayabusa (Water5, 5cuts, EPA0)

(Sodick products)

Photograph after machining



* The approach and cutoff times are not included in the machining time.
* This is close-contact machining.
* Conforms to JIS_B0601:' 01 and ISO4287:' 97/ISO1302:' 02.

Surface roughness

	Surface roughness	Top (μm)	Middle (μ m)	Bottom (μ m)	Result	
Tsubama (Matare Esuts)	Ra	0.3569	0.3571	0.4177		
TSuballie (Walers, Sculs)	Rz	2.9116	3.0488	3.5208	(4)	
Havaburg (Matore Equite EDA+2)	Ra	0.3498	0.3598	0.381		
Hayabusa (Walers, Sculs, EPA+2)	Rz	2.9896	2.9416	3.0036		
Havabusa (Havabusa conditions Equits EDA+2)	Ra	0.3597	0.3506	0.3926		
nayadusa (nayadusa conultions, scuts, EPA+2)	Rz	2.6712	2.8968	3.3868	4	
Havaburg (MatorE Equite EDAO)	Ra	0.3764	0.3479	0.4024		
nayabusa (vvalero, oculs, EPAU)	Rz	3.1972	2.892	3.0216	9	

Machining Dimensions

	Top (mm)	Middle (mm)	Bottom (mm)	Result
Tsubame (Water5, 5cuts)	10.001	9.999	10.001	4
Hayabusa (Water5, 5cuts, EPA+2)	9.999	10.001	10.000	2
Hayabusa (Hayabusa conditions, 5cuts, EPA+2)	10.001	10.000	10.000	1
Hayabusa (Water5, 5cuts, EPA0)	10.001	10.000	10.001	2

Machining time

		Pocult		
	1st	Finish	TOTAL	Result
Tsubame (Water5, 5cuts)	24min.40sec.	42min.48sec.	1hr.07min.28sec.	4
Hayabusa (Water5, 5cuts, EPA+2)	21min.18sec.	39min.33sec.	1hr.00min.51sec.	1
Hayabusa (Hayabusa conditions, 5cuts, EPA+2)	21min.24sec.	42min.33sec.	1hr.03min.57sec.	3
Hayabusa (Water5, 5cuts, EPA0)	23min.08sec.	40min.31sec.	1hr.03min.39sec.	2

Wire consumption

	١	Pocult		
	1st	Finish	TOTAL	Result
(Water5, 5cuts) Tsubame Wire consumption : 13m/min	319.80	556.40	876.20	4
Hayabusa ^(Water5, 5cuts, EPA+2) Wire consumption : 13m/min	276.90	514.15	791.05	2
(Hayabusa conditions, 5cuts, EPA+2) Wire consumption : 10.9m/min	233.26	463.79	697.05	1
Hayabusa ^(Water5, 5cuts, EPA0) Wire consumption : 13m/min	300.04	527.41	827.45	3

* Order of determination of results

Determine surface roughness and machining dimensions in order starting from the best among the average values for each machining.
 Determine the machining time and wire consumption in order starting from the greatest percentage reduction, taking the result with Tsubame wire as the reference.

Actual Machining Example (2)

Machining comparison between Hayabusa wire and brass wire

The "product machined with Hayabusa wire" and "product machined with brass wire" were measured using a VideoCheck manufactured by Werth Messtechnik.



Example of actual machining under Hayabusa conditions

The "product machined with Hayabusa wire", machined under Hayabusa conditions with the electrode wire speed constrained was measured using a VideoCheck manufactured by Werth Messtechnik.



Even over the entire top and bottom faces: \rightarrow Dimensional error within ±3 µm Customers who are not in a hurry but want to keep the quantity of wire used low

Customers who want to emphasize economic use of wire electrode when there is some leeway with time, for example in nighttime automated operation

Method of Use of Hayabusa Wire

- ① Use the Hayabusa conditions! (SL machines)
- ② On machines that feature EPA (AG and AQ machines), use EPA conditions.
- ③ On older machines, extra speed can also be achieved by using brass conditions.

How to Use EPA

The first cut standard brass wire (brass electrode) conditions such as Water and Water5 can be adjusted for use with Hayabusa. To adjust them, just input +1 or +2 for the machining condition parameter EPA.





Click the EPA button to input "+1" or "+2". "+2" gives a higher speed than "+1".

- * The EPA value is updated when the SOURCE switch is shut off and the system is restarted.
- * To return the EPA value to 0, input 0 for EPA.
- * Care is required because, depending on the condition of the flushing and the type of workpiece, setting a high EPA value may increase the likelihood of wire breaks.

How to Install the Hayabusa Wire Database (for LP/WS power supply units)

① Inserting the USB memory stick

Insert a USB memory stick containing the wire database into the USB slot in the keyboard unit, then install the database in accordance with the following procedure.



* The photo shows the AG400L-LP2W.

- Installation
 As shown in Fig. 1, Press () Setting, (2) Disk and (3) Data Restore, in the numbered order.
- 2. Proceed to the next screen, select EXT Memory, then select OK.

3. Proceed to the next screen, check the box at ☑0310_HYBS-ECO_10[00], then select OK.

 Proceed to the next screen, check the box at Ø Sodick DataBase (The Kantan, ECO, HECW, Reference Data), then select add and OK. This comoletes installation.



[Fig.1]

3 Checking installation

The display will return to the screen as shown in Fig.2. Select Edit.

1. The edit screen will be displayed. Call up the program to be used for machining and select Condition Search.



 As shown in Fig.3, HAYABUSA has been added to the "Wire Material" entry in the Sodick database for condition searches.



[[] Fig.3]

Product lineup

Hayabusa	wire				
kg (1 spool)	0.1 <i>¢</i>	0.15 <i>¢</i>	0.2 <i>¢</i>	0.25 <i>¢</i>	0.3 <i>¢</i>
3kg			—	—	—
5kg	-	-			
20kg	_	-			

Tsubame wire

Distributor

kg (1 spool)	0.1φ	0.15 <i>¢</i>	0.2Φ	0.25φ	0.3Φ
3kg			_	_	_
5kg					
6kg	—	—			
8kg	—	—	—		
10kg	—	—			
20kg	—	—			
30kg	_				

Dealer	

URL:http://www.sodick.co.jp/ E-mail:edm@sodick.co.jp

Specifications are subject to change without prior notice due to our program of constant research.
 The information in this catalog is correct as of April 2014.