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DATE : 22 Dec 2010
ATTN : SINGLE SOURCE TECHNOLOGIES CONSUMABLES GROUP

SUBMISSION OF PRODUCT SPECIFICATION FOR APPROVAL

With reference to the above matter, we hereby are submitting the following specification for your approval.

REF NO.	NO. OF COPIES	SPECIFICATION DESCRIPTION	
SP-EDM-010 ISSUE 1	2	Class	Symbol
		Hardened BZ-MU / BZ-K wire	HBZ-MU / HBZ-K
		Soft BZ wire	ABZ
		Ultra Soft BZ wire	ABZ-A



KINDLY ACKNOWLEDGE BY RETURN FAX (PAGE 1 ONLY).
(Fax no. 607-598 9089)

Thank you.

Yours faithfully,

Acknowledgement of

Receipt and Acceptance

AZRI BIN ABD SAMAT
EDM PRODUCTION ENGINEER

Signature _____
(Name)

Company stamp

1. Objective

The objective of this Product Specifications is to provide specifications of EDM Wire.

2. Scope

This Product Specification is applies to the following EDM wire described in Table 1, which is used for Wire-cut Electrical Discharge Machine (Wire EDM).

3. Products

The wires are classified according to Table 1 as shown below:

Table 1 : Product variation.

Type	Product Name	Description	Size, (in)
H	BZ-MU	Hard + Paraffin	0.004 ~ 0.012
	BZ-K	Hard + Non Paraffin	0.004 ~ 0.012
A	BZ	Soft + Paraffin	0.008 ~ 0.012
	BZ-A	Ultra Soft + Paraffin	0.008 ~ 0.012

4. Materials and Appearance

4.1 Material

The material shall be yellow brass wire electrode specified in JIS C2800 (H-Type) or JIS C2700 (A-Type).

4.2 Appearance

The appearance shall show no flaw, smooth surface and free from irregularities.

5. Technical Specifications and Review

5.1 Technical specifications of all products are shown as in Table 2 below:

Table 2 : Product's technical specification

Type	Product Name	Size, in	Wire Tolerance (in)	Tensile Strength				Elongation (%)
				Mpa		Klbf/in ²		
H	BZ-MU	0.004 ~ 0.012	± 0.00004	≥ 980	≥ 932	≥ 142	≥ 135	≥ 0.4
	BZ-K			(0.004~0.008in)	(0.010~0.012in)	(0.010~0.012in)	(0.010~0.012in)	
A	BZ	0.008 ~ 0.012		≥ 441	≥ 64	≥ 15		
	BZ-A	0.008 ~ 0.012		≤ 441	≤ 64	≥ 25		

5.2 Shelf Life

The quality of the wire is assured for 6 months after date of delivery under storage condition of $25 \pm 10^0\text{C}$ with relative humidity $65 \pm 20\%$. In the case where the assured term has expired, re-inspection and verification of the product by the wire maker shall be required to ensure no deterioration of assured properties.

6. Inspection

6.1 Diameter

Measure the 3 points (approximate 120^0) with well-adjusted laser micrometer of 0.0001 mm precision and calculate the average value.

6.2 Tensile Strength

Measured by load graph and described in MPa unit. The pulling speed should be in the range of 50 ~ 70 mm/min.

6.3 Elongation

Measured by using Universal Testing Machine, AI-7200-S and described in percentage (%).

$$\text{Elongation} = \frac{(L_2 - L_1)}{L_1} \times 100$$

L_1 = Length of test wire before Tensile Strength test

L_2 = Length of test wire after Tensile Strength test

6.4 Straightness

Consist of width (W) and peak (S) of wire to be measure as shown in Figure 1.

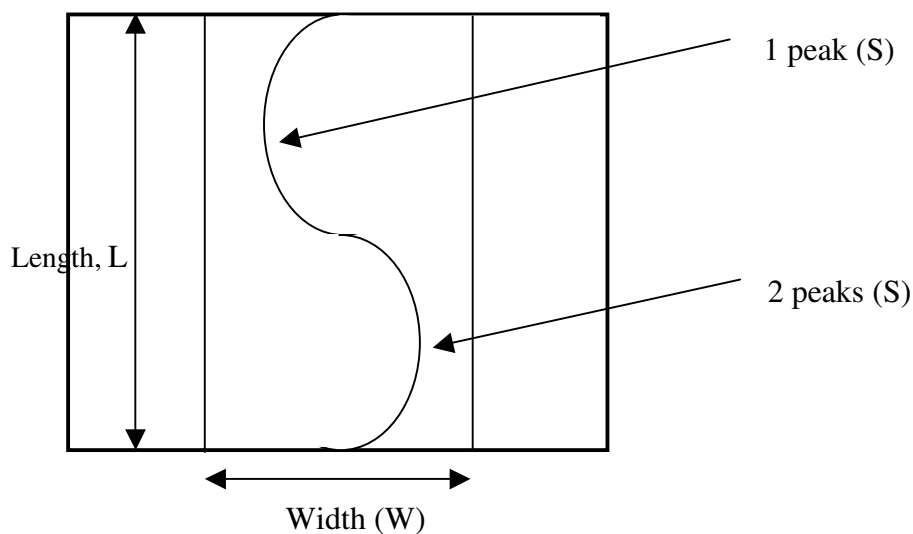


Figure 1

7. Spool Packing Specification

7.1 Spooling Direction

The spooling direction is as shown in Figure 2 for the customer to confirm easily.

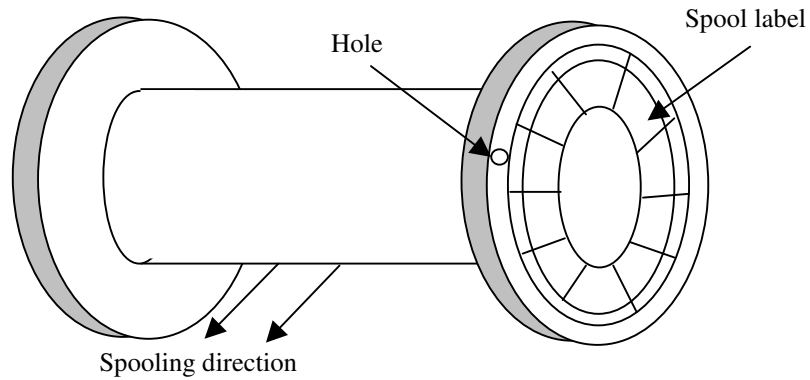


Figure 2

7.2 Spooling condition

To supply EDM wire stably, set the spooling tension and traverse as regulated in manufacturing standard correctly.

7.3 Spool packing

Each spool must be packed completely/thoroughly to avoid discoloring and dust/dirtiness as shown in Figure 3.

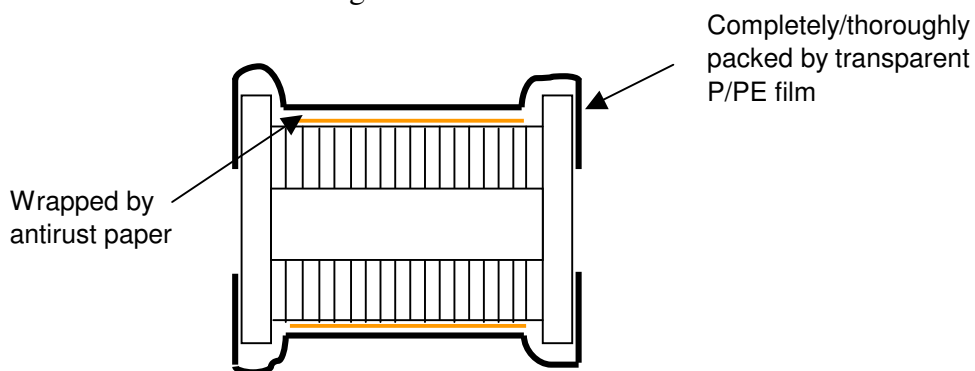


Figure 3

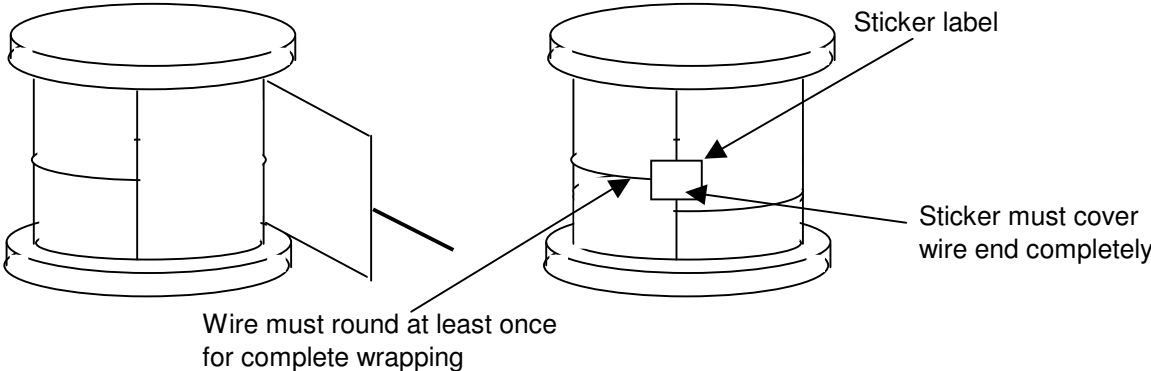
7.4 Wire end position

Wire end must be fixed in the way shown in Figure 4

7.4.1 At a start of spool

Automatic rewinding machine equipment will fix the wire end on the spool barrel without the use of tape.

7.4.1 At end of spool



* Customer can take out off wire & antirust paper together
 Figure 4

7.5 Spool

A. Material

To ensure spool strength, spool must be made from ABS (Acrylonitrile-Butadiene-Styrene) or HIPS. The material is all from synthetic resin, which has no adverse effect on wire.

B. Dimensions

Details specification is shown in Table 3.

Table 3. Spool name and dimensions (in & lb)

Spool Name	Flange diameter, D	Barrel diameter, d	Outer width, L	Flange thickness, a	Arbor hole diameter, h	Standard winding volume, (lbs/pcs)	Spool dimensions
P-3RT	5.20	3.20	4.40	0.40	0.80	6.60	
K-125	5.00	3.20	5.00	0.50	0.64	6.60	
P-5RT	6.40	3.60	4.56	0.48	0.80	11.00	
K-160	6.40	4.00	6.40	0.64	0.88	13.20	
P-10	8.00	3.60	5.36	0.48	1.00	22.00	
K-200	8.00	5.00	8.00	0.80	0.88	33.00	
P-15L	10.00	4.40	5.60	0.60	1.36	44.00	
P-30	11.20	8.00	8.80	0.80	2.92	66.00	

7.6 Wrapping paper

EDM wire spool should be completely wrapped by antirust paper to avoid any discoloring and dirtiness to the wire.

7.7 Product Label

Put spool label as shown in Figure 5 in a position shown in Figure 2. On label includes following item:

- *Size
- *Product name & type
- *Net weight
- *Spool no.
- *Item ID

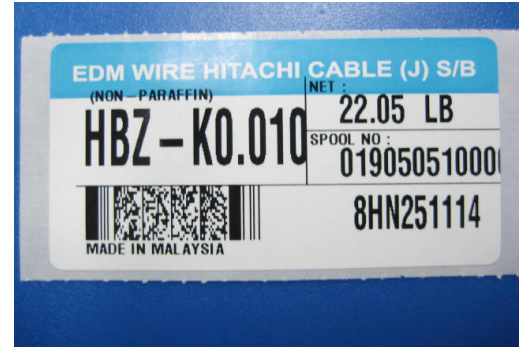


Figure 5

8. Standard Packing

The wire shall be wound, without slackness or tangle, on a spool of suitable size according to the customer requirement, and properly packed into carton box to avoid damage during shipment and transportation.

8.1 Quantity

Products must be packed in a carton box in each quantity per box as shown in Table 4.

Table 4 : Carton box packing specifications

Carton Box Type	Product Spool	Quantity per Carton Box		
		No. of spools (pcs)	Std. Weight (kg)	Std. Weight (lb)
P-3R	P-3RS	6	9.00	19.84
	P-3RT		18.00	39.68
	P-3RX		24.00	52.91
K-125	K-125	6	18.00	39.68
	K-125X		21.00	46.30
P-5R	P-5RT	4	20.00	44.09
	P-5RX		24.00	52.91
	P-5		24.00	52.91
	P-5X		27.28	60.14
K-160	K-160	2	14.00	30.86
	K-160X		15.90	35.05
P-10	P-10	1	10.00	22.05
K-200	K-200	1	15.00	33.07
	K-200X		15.91	35.08
P-15L	P-15L	1	20.00	44.09
P-30	P-30	1	30.00	66.14

8.2 Carton box dimensions

Details of carton box dimensions are shown in Table 5.

Table 5 : Carton box dimensions specification

Carton Box Type	Quantity/Box (pcs/box)	Carton Box Dimesions L x W x H (in)
P-3R	6	14.80 x 11.60 x 8.00
K-125	6	14.80 x 11.60 x 8.00
P-5R	4	14.80 x 11.60 x 8.00
K-160	2	14.80 x 11.60 x 8.00
P-10	1	12.00 x 8.40 x 11.60
K-200	1	12.00 x 8.40 x 11.60
P-15L	1	12.00 x 8.40 x 11.60
P-30	1	12.00 x 11.00 x 12.80

8.3 Carton box sealing

Every carton box must be sealed by tape on the top to prevent product from damaged during transportation and warehousing.

8.4 Carton box label

Carton box label as shown in Figure 6 includes following items:

*Lot No. *Carton No. *Item ID *Net Weight *Spool Type & Quantity



Figure 6

9. Palletizing

9.1 Standard pallet dimension is shown as in Table 6a and 6b.

Table 6a : Standard pallet dimension for P-3R, P-5R, K-125, K-160 and P-30.

Type	Inner Dimension	Tare (kg)	No of carton (Carton/pallet)	Net Weight/Pallet (kg)				
	L x W x H (mm)			P-3R	P-5R	K-125	K-160	P-30
DP5-9	1140 x 900 x 200	25	9	162	180	108	126	270
DP5-18	1140 x 900 x 390	28	18	324	360	216	252	-
DP5-27	1140 x 900 x 590	29	27	486	540	324	378	-
DP5-36	1140 x 900 x 780	31	36	648	720	432	504	-

Table 6b : Standard pallet dimension for P-15L and K-200.

Type	Inner Dimension	Tare (kg)	No of carton (Carton/pallet)	Net	
	L x W x H (mm)			P-15L	K-200
DP15-12	920 x 870 x 290	18	12	240	190.9
DP15-24	920 x 870 x 580	20	24	480	381.8
DP15-36	920 x 870 x 870	21	36	720	572.8

10. Marking

The spool or container shall be marked at a suitable place with the following items:

- 10.1 Product class and size
- 10.2 Lot number
- 10.3 Net weight
- 10.4 Manufacturer's name

11. Material

- 11.1 Materials used for this EDM brass wire are all listed in 'Existing Chemical Material List' that is legally authorized by the government.
- 11.2 This EDM brass wire does not contain any ozone depleting substances (ODS). ODS is also not used in the process of manufacturing the product.
- 11.3 This EDM brass wire does not contain any flammable Solid Substance.

12. EDM Brass Wire Disposal

- 12.1 Scrap EDM brass wire can be recycled. It is classified as solid residue containing copper. A licensed or legally authorized toxic industrial waste collector should handle the treatment and disposal of this material. The storage, processing, treatment and disposal of the EDM brass wire should be carried out at a legally authorized facility as specified by the scrap collector.
- 12.2 The plastic spools for EDM brass wire can be reused or recycled. The carton box and wooden case (if any) used in the packaging of the wire can also be recycled. A waste collector who is authorized to carry out reprocessing or treatment of plastic or paper waste should carry out disposal of these materials.