

# 9. Precautions When Using Magnet Wire

## 9-1. Precautions during Magnet Wire Storage

- (1) Store inside a well-ventilated room. Avoid places with direct sunlight, especially high temperatures and high humidity.  
Do not place directly on the floor. Create a space of around 10cm such as by using a pallet.
- (2) Keep the wire away from specialty gases (chlorine gas, organic solvents, acids, or alkali chemicals), dust, and all types of metal powder.
- (3) Do not throw, drop or roll the wire.
- (4) Winding wire can be used for long periods of time if they are properly stored. It is recommended that checks be conducted on the characteristics of products that have been stored for two or more years before using them.

Condensation might occur in the winding-wire surface, resulting in characteristic deterioration.

There is a possibility where spool breaks, causing scratches on the flange and winding wire.

## 9-2. Precautions during Wire Winding

- (1) **Check the wire appearance.**  
Although the products have been inspected before delivery, damages might occur during transportation or storage. Please check again before using.
- (2) **Minimize stretching of the wire during winding.**  
When winding wires are stretched, the film becomes thinner, and this results in deterioration of their electrical and mechanical characteristics.  
Minimize the tension during wire winding as much as possible. Refer to the page on winding wire safety tension (item 7).  
The elongation rate of wound coil wires can be calculated as follows:  
$$\text{Elongation rate due to winding of winding wire (\%)} = \left\{ \left( \frac{\text{Conductor diameter before winding}}{\text{Conductor diameter after winding}} \right)^2 - 1 \right\} \times 100$$
- (3) **Pay careful attention to the flying of wire end.**  
When there is no more winding wire on the spool, the wire head which is rotating at a high speed may fly out. Therefore, take safety precautions such as by installing automatic stop devices.
- (4) **Pay attention to surface of wire after winding.**  
Sometimes pinholes occur due to wire winding.  
When pinholes occur, check for pinholes again by removing a sample of wire from spool.  
Handle the wires carefully during winding to avoid damaging the film.
- (5) **Pay attention not to spill releasing agents.**  
When using chemical release agents for wire head treatment, be extremely careful not to allow the release agent to attach to portions other than the peeled area of the coil. Release agent on the peeled area should also be wiped away thoroughly.  
Also, pay attention to safety by strictly following the handling instructions of the release agent manufacturer, such as wearing protective glasses during peeling operation.
- (6) **Make sure workers do not inhale decomposition gas from the film during soldering by providing proper ventilation.**

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## 9-3. Precautions during Impregnating Varnish Treatment

- (1) **Examine the selection of impregnated varnish carefully.**  
When performing impregnated varnish treatment for protection of the coil after wire winding, examine the compatibility of the winding wire and the varnish carefully.
- (2) **Perform preheating before varnish treatment.**  
Performing varnish treatment immediately after wire winding may result in crazing of the wire. Therefore, make sure to perform preheating.
- (3) **Do not form coil after varnish treatment.**  
Be careful as bending the winding wire after the varnish treatment may cause the impregnating varnish to crack as it is not as flexible as the winding wire film. In addition, cracks may also occur on the film as adhesion of the varnish to the film is very strong.

## 9-4. Wire End Treatment of Magnet Wire

The following insulation film removal methods are available for connecting or soldering the coil ends. The most appropriate method must be adopted according to the requirements.

| Method   | Types  | Content, Usage Condition, etc  | Product |     |       |       |         |     |       |       |     |         |     |     |     |
|--|--|--|---------|-----|-------|-------|---------|-----|-------|-------|-----|---------|-----|-----|-----|
|  |  |  | PVF     | UEW | UEW-N | SMPEW | SMPEW-N | PEW | PEW-N | SMHEW | EIW | ATZ-300 | UTZ | AIW | PIW |
| Mechanical removal<br>(method to shave off film)   | Knife (file)   | —  | ○       | ○   | ○     | ○     | ○       | ○   | ○     | ○     | ○   | ○       | ○   | ○   | ○   |
|  | Sandpaper  | —  | ○       | ○   | ○     | ○     | ○       | ○   | ○     | ○     | ○   | ○       | ○   | ○   | ○   |
|  | Wire brush, *specialty stripper (*: ABISOFIX, wire stripper) | Toothbrush or blade type rotator   | ○       | ○   | ○     | ○     | ○       | ○   | ○     | ○     | ○   | ○       | ○   | ○   | ○   |
| Pyrolytic removal<br>(method to burn off film)   | Gas burner   | (It is important to quench the burner into aqueous ethanol solution to prevent conductor oxidation.) | ○       | ○   | ○     | ○     | ○       | ○   | ○     | ○     | ○   | ○       | ○   | ○   | ○   |
|  | Alcohol lamp   |  | ○       | ○   | ○     | ○     | ○       | ○   | ○     | ○     | ○   | ○       | ○   | ○   | ○   |
| Chemical removal<br>(Method to chemically dissolve film with acid, alkali, or other chemicals) | Solcort  | Used in common temperature   | ○       |     |       |       | ○       | ○   | ○     |       |     |         |     |     |     |
|  | Depent   |  | ○       |     |       |       |         | ○   | ○     |       |     |         |     |     |     |
|  | Fuji pellet, Neorever  | Used at 400°C (within 30 sec)  | ○       | ○   | ○     | ○     | ○       | ○   | ○     | ○     | ○   | ○       | ○   | ○   | ○   |
| Direct soldering   |  | (used in solder bath temperature of 350°C to 450°C)  | ×       | ○   | ○     | ○     | ○       | ○   | ×     | ×     | ○   | ×       | ×   | ×   | ×   |
| Fusing   | Fusing machine   | Direct welding method  | ○       | ○   | ○     | ○     | ○       | ○   | ○     | ○     | ○   | ○       | ○   | ○   | ○   |
| Spot welding   | Spot welding machine   |  | ○       | ○   | ○     | ○     | ○       | ○   | ○     | ○     | ○   | ○       | ○   | ○   | ○   |
|  | Water welder   |  | ○       | ○   | ○     | ○     | ○       | ○   | ○     | ○     | ○   | ○       | ○   | ○   | ○   |

○ : Applicable    × : Not applicable    (Blank: Applicable but not recommended)