soldering

Soldering VMZINC consist of joining two sheets of VMZINC using an additional metal which is more fusible than zinc.

Guidelines
Presentation

Soldering VMZINC consist of joining two sheets of VMZINC using an additional metal which is more fusible than zinc. This metal is an alloy of lead and tin, 60/40.

This is a simple technique requiring the usual zincworker’s tools which must comply with the rules described below in order to make a completely reliable, strong and watertight soldered joint.

A perfect soldering

To obtain a good solder it is necessary to prepare correctly the materials to be assembled.

One important point here is to consider carefully the removal of the layers:
- either chemical, using chemical strippers
- or mechanical, using a special stripping brush on a grinder

This diagram shows the various steps that must be completed before you can start soldering correctly.

soldering material

1 - Soldering iron
2 - Tray with:
   ammonia stone
   brush
   container for stripper
3 - soldering stick
4 - Bottle of propane gas
5 - Marker
6 - zinc soldering products
7 - 3M™ Roloc™ - Bristle Disc
8 - products to strip the layers

other equipment

Important
- clean the solder iron
- use the right products
- clean the zinc carefully

Clean the solder iron

Use the right products

Clean the zinc carefully

Clean the soldering material

Important
### Chemical Stripping

1. **VMZINC® naturel**
   
   ![Image of DECALAQ] then ![Image of ZINN7] ⇒ soldering VMZINC®

2. **QUARTZ - ZINC® & ANTHRA - ZINC®**
   
   ![Image of DECALAQ] then ![Image of ZINN7] ⇒ soldering VMZINC®
   
   *use to remove the pre-weathered layer. Use ZINN7 two times if necessary

3. **VMZINC® bilaquered**
   
   ![Image of DECALAQ] then ![Image of ZINN7] ⇒ soldering VMZINC®

4. **VMZINC® PLUS**
   
   ![Image of DECALAQ] then ![Image of ZINN7] ⇒ soldering VMZINC®
   
   *only for QUARTZ-ZINC & ANTHRA-ZINC
   
   **only for QUARTZ-ZINC & ANTHRA-ZINC**

5. **PIGMENTO® (PLUS)**
   
   ![Image of DECALAQ] then ![Image of ZINN7] ⇒ soldering VMZINC®

### Mechanical Stripping

Can be used for all VMZINC® et VMZINC® PLUS surface aspects, except for the Naturel VMZINC®

![Image of mechanical stripping tool] ensuite ![Image of ZINN7] ⇒ soldering VMZINC®
The copper tip of the soldering iron must weigh at least 350 g. For soldering 1 mm thick VMZINC® or for soldering in bad weather 500 g. tip is preferable.

The rectangular wedge will measure from 5 to 6 mm in width and 30 mm in length. In order for the tip of the soldering iron to have a good profile, it must be cleaned before use. To keep it in good condition and obtain good heat transmission, we recommend cleaning the metal tip frequently.

Before beginning work, the rectangular tip and the sides of the tip must be filed. Once the tip is up to temperature, it is rubbed back and forward on an ammonia stone then a small amount of filler metal is added to it.

From time to time, the zinc worker must file the edge of the soldering iron tip to get rid of the layer of copper–tin alloy which has formed on it. The temperature of the metal to be soldered should reach 250°C. Therefore, care should be taken to use a very hot soldering iron the temperature of which must be between 400 and 450°C. If the iron is too hot the soldered joint will be too fluid. If it is too cold, the filler metal will melt too slowly and will remain soft.

The zinc worker checks that his iron is hot enough by rubbing it on an ammonia stone. Rubbing should cause dense white smoke to appear.

On the building site, cooling of the soldering iron by the wind or humidity must be avoided otherwise the required temperature will not be reached for the filler metal bead to correctly applied.

For new Natural VMZINC®
To solder new VMZINC® sheets or strips, the roofer must use ZINN7. This product, specially developed by Umicore is designed to clean the surfaces to be joined and remove slight oxidizing. It also ensures a good join between the filler metal and the VMZINC®.

The ZINN7 penetrates by capillary action between the 2 parts to be joined (see details page 10).

For preweathered and oxidised VMZINC®
Use only DECA-VMZINC®, a product specially developed by Umicore (see details page 11).

For bilacquered VMZINC®
The lacquer is removed using only the VM6037 (DECALAQ) stripper specially developed by Umicore.

Then, clean and solder the bare VMZINC®, the roofer uses ZINN7 (see details page 12).

For VMZINC PLUS
The roofer removes the layer of lacquer mechanically then uses the appropriate stripper depending on the type of VMZINC® (see details page 13).
Clause 1.7 of the NBN 283 states that, for soldering, the zinc worker must use a filler metal made up of an alloy of lead (60%) and tin (40%).

It is essential that this alloy be free of impurities particularly antimony (maximum content of antimony 0.5%) When the temperature of antimony reaches melting point, it is transformed into crystals which weaken the solder and reduce the strength of the joint, compromising watertightness.

False economies such as using poor quality filler metal with an insufficient amount of tin (Sn) must be avoided.

It is the tin which gives the alloy its fluidity and lowers its melting point appreciably (235°C).

Umicore has developed special touch-up paints for reconditioning soldered joints. These paints are close to the VMZINC® colour used.

For preweathered ANTHRA-ZINC®:
CURASZINC, in 1 kg pots, is used to touch up ANTHRA-ZINC®.

For bilacquered VMZINC®:
Paint sold in 250 g. pots is used to touch up Bilacquered VMZINC® (6 colours).

For QUARTZ-ZINC® and Natural VMZINC®:
Reconditioning paint is not required for QUARTZ-ZINC® and Natural VMZINC®.
**General rules**

**preparation**
To produce perfect soldering, the pieces to be soldered must overlap sufficiently.

**Clause 1.7 of the NBN 283** states that the overlap of the 2 pieces to be soldered must be 20 mm. Contact between these 2 pieces must be straight and as uniform as possible so that good capillarity can be achieved.

If the space between the two pieces to be joined is greater than 0.5 mm, the effect of the capillary forces is destroyed, penetration is irregular and the solder is fragile.

**cleaning**
To obtain perfect solder joint, the overlapping pieces must be properly cleaned and degreased.

The quality of the soldering does not depend on the quantity of filler metal but on the capillary penetration and its adherence to the pieces to be joined. Stripping, cleaning and degreasing are very important and absolutely necessary for obtaining a good solder.

**stipping**
The zinc worker cleans and strips ± 40 mm of the parts which come in contact with eachother. That is, the top surface of the lower element (1) and the top (3) and bottom (2) surfaces of the upper element.

See the following pages for how to proceed for the different VMZINC® surfaces.
**Pre-tinning** When the VMZINC® to be soldered is over 0.8 mm thick, it is essential that the zinc worker pre-tin the two pieces of VMZINC® to be joined.

**Soldering** Note! The zinc worker must melt the filler metal on the VMZINC® and not on the tip of the soldering iron. The tip of his soldering iron must be rubbed frequently on the ammonia stone to make the melted drop of filler metal less adhesive and to slow down its penetration into the tip of the soldering iron. The entire surface of the tip of the soldering iron is laid on the pieces to be joined until the pieces to be joined reach the fusion temperature of the soldering metal.

Melt the filler metal making sure to press the pieces to be joined against each other to obtain excellent capillary penetration. Maintain pressure using the soldering rod until the solder cools down.

**Penetration** The solder is satisfactory if the filler metal penetrates to a minimum of:
- 10 mm for a horizontal joint
- 5 mm minimum for a vertical joint.

**Cleaning the finished solder** Rolled zinc-copper-titanium VMZINC® contains copper. Thus, when it is stripped, the metal darkens but this in no way damages the capillary penetration of the filler metal or the solidity of the solder. Rubbing the solder with a clean, damp cloth immediately following its application, restores the bright finish.

**Reconditioning soldered joints** Umicore has developed special touch-up paints for reconditioning soldered joints (see page 5).

For QUARTZ-ZINC® and natural VMZINC®, reconditioning paint is not necessary.
Types of soldering

flat soldering

Flat soldering is used for light horizontal or vertical joints on pieces which are not subject to stress from expansion (e.g. stop-ends) or for preparatory joints to be reinforced later.

reinforced soldering

Reinforced soldering is horizontal soldering with 30 to 50 mm long reinforcement.
Corner soldering

Some elements such as chimney stacks, the front of bases, gutters and box gutters, etc. require lapped corner soldering:

Interior corner

Exterior corner

Ribbed soldering
This is done to consolidate oblique or vertical joints and is done in 15 to 20 mm steps.

The soldering is done in 3 stages:
- after spot soldering, tack the sheets by spot soldering. This avoids movements during the soldering.
- light (flat) soldering is done in such a way as to obtain good capillary penetration between the two pieces to be joined,
- after a second cleaning with ZINN7, a second layer of filler metal is laid over the first from bottom to top in ± 20 to 30 mm bars.
The finished layer can be removed with the 3M Roloc - Bristle disc. The manufacturer allows a maximum rotation speed of 15000 RPM.

Fitting the 3M Roloc bristle disc to the grinder

Mark the overlap measurements

Use a metal corner to delineate the area to be worked on and eliminate topcoats using the brush

Use the brush to eliminate topcoats

Strip surfaces 1, 2 and 3 using ZINN 7

Tacking

Carry out soldering along approximately 4cm in a single movement. Stay pushing with the soldering stick on the zinc to create capillarity between the sheets.
Mechanical stripping VMZINC PLUS

The finished layer can be removed with the 3M Roloc - Bristle disc. This is not necessary for the Natural VMZINC. The manufacturer allows a maximum rotation speed of 15000 RPM of the . Also the VMZINC PLUS layer can be removed with the The finished layer can be removed with the 3M Roloc - Bristle disc.

1. Fitting the 3M Roloc bristle disc to the grinder
2. Side covered with protective film: mark the overlap measurements and remove the protective film from the overlaps
3. Use a metal corner to delineate the area to be worked on and eliminate topcoats using the brush
4. VMZINC PLUS side: mark the overlap measurements
5. Use the brush to eliminate topcoats
6. Strip surfaces 1, 2 and 3 using ZINN 7
7. Tack weld the elements to be joined
   Tip: for a nice capillary effect between the two elements, hold the two overlapping parts well down, one on top of the other, using a good soldering stick.
8. Carry out soldering along approximately 4cm in a single movement

Surface aspects
**New Natural VMZINC®**

**Preparation**  The Naturel VMZINC does not need chemical or mechanical removal of the top layer. It’s absolutely necessary to prepare the joint (overlap between the 2 soldering pieces) with ZINN7.

**Important:** Depending on the age and the state of the already placed Natural zinc, the zinc should be treated as pre-weathered zinc.

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1. **Marking the overlapping areas**
2. **Stripping the pieces to be soldered using ZINN7**
3. **Tinning the soldering iron on the ammonia stone. Spot soldering the pieces and flat soldering**
4. **Flat soldering**
5. **Reinforced soldering on flat soldering**

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6. **Cleaning the finished solder**
Preweathered VMZINC

1. Marking the overlapping areas
2. First stripping with DECA-VMZINC®
3. Removal of preweathered / weathered layer
4. Second stripping with DECA-VMZINC® (if necessary)
5. Spot soldering the pieces to be soldered
6. Soldering the pieces (ribbed soldering)
7. Cleaning the finished solder
**Important**
- Please clean and degrease the pieces before soldering
- Clean up paint for PIGMENTO does not exist

**Surface aspects**

1. Essential preparation of material
2. Marking the overlapping areas
3. Stripping the pigmented layer with DECALAQ
4. Wait for bubbles to appear on the entire area treated
5. Clean the area to be soldered with a dry cloth
6. First stripping of the grey preweathered layer with DECA-VMZINC®
7. Removal of preweathered layer with a dry cloth
8. Stripping the underside of the upper piece
9. Second stripping with DECA-VMZINC® (do not wipe)
10. Spot soldering the pieces to be soldered
11. Soldering the pieces
12. Cleaning the finished solder
Bilacquered VMZINC

1. Marking the overlapping areas
2. Removal of the surface aspect by chemical stripping
3. Stripping the pieces with ZINN7
4. Spot soldering the pieces to be soldered
5. Soldering the pieces (flat soldering)
6. Cleaning the finished solder
7. Reconditioning with touch-up paint
Subject
This document is intended for specifiers (building project architects and design teams) and users (companies responsible for installation on the building site) of the designated product or system.

Its purpose is to provide the main information, text and diagrams, relating to specification and installation (including supporting structures) and flashing installation.

Any use or specification outside the area of use and/or specifications contained in this manual requires specific consultation with the Umicore technical departments. This does not commit the latter to any responsibility with regard to the feasibility of the design or implementation of these projects.

Countries of application
This document applies exclusively to the specification and installation of the designated products or systems on building sites in United Kingdom and the Republic of Ireland.

Qualifications and reference documents
Please note that the correct use of this manual requires knowledge of VMZINC® materials and of the zinc-roofing profession.

While construction is underway all standards in force must be respected, including:

• British Standard Code of Practice for control of condensation in buildings, BS5250:2002.
• BS 5250: 2002: Code of practice for control of condensation in buildings.
• BS EN 501: Roofing products from metal sheet. Specifications for fully supported roofing products of zinc sheet.
• BS EN 988: Zinc and zinc alloys. Specification for rolled flat products for building.

Furthermore, Umicore offers training courses specifically for professionals.

Responsibility
The specification and installation of VMZINC® products manufactured by Umicore are the sole responsibility of the architects and building professionals who must ensure these products are used in a way suited to the end purpose of the construction and that they are compatible with other products and techniques used.

The specification and installation of the products implies respecting the standards in force and the manufacturer’s recommendations. In this regard, Umicore publishes and regularly updates specification and installation manuals for specific geographic areas and provides training courses.

All the information on the latter can be obtained from the local VMZINC team.

Unless otherwise agreed in writing, Umicore cannot be held responsible for any damages resulting from a specification or installation that does not respect all of Umicore’s specifications and the above standards and practices.