



# Zinc Shopprimers for improved performance



# Zinc Shopprimers



A shopprimer may be described as a quick drying material applied as a thin film to a metal surface after blastcleaning to provide protection in the period before and after fabrication. They contribute towards increased efficiency, productivity and profitability for the customer.

## Forty years of shopprimer development and experience

For almost 50 years the steel industry has supplied blastcleaned steel with the benefit of the improved corrosion protection of shopprimers. For more than four decades Jotun shopprimers have been successfully used for the temporary protection of steel.

Zinc silicates were the first shopprimers to offer enormous savings through fewer refusals, fewer repairs and reduced damage resulting from fairing and mechanical handling.

## The challenges of shopprimer development

Factors which have challenged the coating industry in providing its customers with tailor-made options include:

- Varying climates and building speed
- Demands for increased productivity
- The adoption of automatic and semi-automatic high-speed welding and cutting techniques
- Concern for the environment

## A zinc shopprimer range designed to meet every need

Depending upon the customer's priorities the Jotun zinc shopprimer range can ensure improved productivity through higher welding and cutting speeds and long-lasting corrosion protection whilst meeting the increased demands for improved health and safety.

# The Zinc Shopprimer

MUKI Z WB-14 FW

## Optimum cutting and welding

- Optimum corrosion protection
- Patented water-borne technology
- Medium zinc content
- Two-pack water-borne inorganic silicate solution and zinc powder
- Self curing, fast to dry
- No solvents

## The benefits of world proven patented water-borne technology

The Jotun range of water-borne coatings has proven in industry, marine and offshore worldwide to provide speed, performance and economic benefits that are equal or better than high performance solvent-borne coatings.

The Jotun water-borne range offers improvements in health, safety and environmental issues. The solvent contents are low, they are not flammable and VOC emissions are minimal.

Water-borne inorganic Muki Z WB-14 FW shopprimer provides these advantages plus excellent cutting speeds, good protection against corrosion and resistance to damage.



Faster and better welding and cutting • Reduced distortion  
Excellent corrosion protection • Less environmental impact

range

### MUKI Z 2001

#### Optimum cutting and welding

- Good corrosion protection
- Low zinc content
- Two-pack ethyl silicate solution and zinc paste
- Contains a combination of heat resistant ceramics and zinc

### MUKI Z 3000

#### Excellent cutting and welding

- Good corrosion protection
- Medium zinc content
- Two-pack ethyl silicate solution and zinc paste





# Zinc Shopprimers

## The primary benefits

### Faster and better welding

They have excellent welding properties causing minimal porosity and blowholes.

### Reduced distortion

They resist high temperatures, substantially reduce distortion which is a typical consequence of fairing (straightening).

### Excellent corrosion protection

Excellent corrosion protection for required periods ranging from 6 to more than 14 months depending upon the type of shopprimer and environment.

### Less blasting

Requires minimal secondary surface preparation.

### Quick drying

Solvents and water are quickly released leading to reduced damage to the applied paint film by rotating rollers.

### Good workability

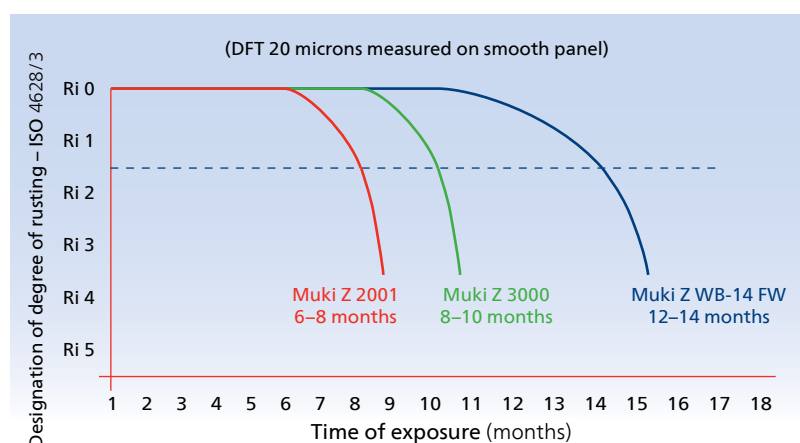
Clogged nozzle tips and jammed spray pump cylinders are almost eliminated. For Muki Z WB-14 FW the low pressure application reduces maintenance costs of painting equipment.

### Less environmental impact

Generally fewer fumes during welding and cutting. Muki Z WB-14 FW – no solvents. Zero VOC emissions.



## Corrosion performance



## Designation of degree of rusting

| Degree of rusting and area |               | Correlation between ISO & European rust scales | Approx. correlation between ISO & European rust scales |
|----------------------------|---------------|--|--|
| ISO rust scale             | Area rusted % | European rust scales                           | ASTM D 610   |
| Ri 0                       | 0             | Re 0   | 10   |
| Ri 1                       | 0.05          | Re 1   | 9  |
| Ri 2                       | 0.5           | Re 2   | 7  |
| Ri 3                       | 1             | Re 3   | 6  |
| Ri 4                       | 8             | Re 5   | 4  |
| Ri 5                       | 40/50         | Re 7   | 1 to 2   |



## Welding

|                         | Muki Z 3000 |     | Muki Z 2001 |      | Muki Z WB-14 FW |       |
|-------------------------|-------------|-----|-------------|------|-----------------|-------|
| Dry film thickness (µm) | 15          | 20  | 15          | 20   | 15              | 20    |
| Welding speed**mm/min   |             |     |             |      |                 |       |
| FCAW (double fillet)    | 525         | 450 | 650         | 550  | 700             | 600   |
| SAW (double fillet)     | 750         | 650 | 1100        | 1000 | 1200            | 1100  |
| Porosity                | <2%         | <2% | <1%         | <1%  | <0.5%           | <0.5% |
| Health & Safety         | ++          | +   | ++          | ++   | ++              | +     |

\* Basis 16 mm steel \*\* Basis 12mm steel

## The impact of heat on welding

One challenge for a shopprimer is to combine corrosion protection and welding. The corrosion protection properties of zinc pigments are well known.

If the paint film is too thick then welding will be slowed down and in some cases the shopprimer has to be removed.

Added energy from the electric arc, expressed as kJ/mm:

$$\frac{\text{Current (A)} \times \text{Volt} \times 60\text{sec}}{\text{Welding speed (cm/min)} \times 10000}$$

The heat build-up in the steel is linear with the speed of welding. Slow speed gives high temperatures and the possibility of damage to the shopprimer on the opposite side of the steel. High speed produces less damage.

## Burning/Cutting speeds

|                 | DFT µm | mm/min |     |     |     |     |     |
|-----------------|--------|--------|-----|-----|-----|-----|-----|
|                 |        | 300    | 400 | 500 | 600 | 700 | 800 |
| Muki Z 3000     | 10-13  |        |     |     |     |     |     |
|                 | 13-17  |        |     |     |     |     |     |
|                 | 17-20  |        |     |     |     |     |     |
| Muki Z 2001     | 10-13  |        |     |     |     |     |     |
|                 | 13-17  |        |     |     |     |     |     |
|                 | 17-20  |        |     |     |     |     |     |
| Muki Z WB-14 FW | 10-13* |        |     |     |     |     |     |
|                 | 13-17  |        |     |     |     |     |     |
|                 | 17-20  |        |     |     |     |     |     |

\* Based on theoretical calculation

Testing condition:

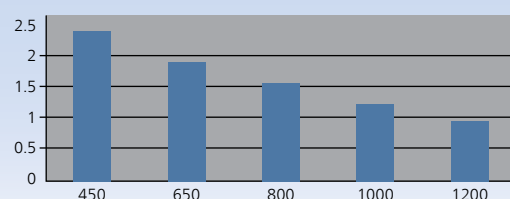
1. Gas – propane/oxygen (0.5/3.0Kg/m<sup>3</sup>)

2. Plate – mild steel of 16mm thickness

Parameters may vary and figures shown should be considered as guidelines only

Heat build-up at different welding speeds

| Welding speed mm/min | 450  | 650  | 800  | 1000 | 1200 |
|----------------------|------|------|------|------|------|
| Added energy kJ/mm   | 2.34 | 1.84 | 1.52 | 1.22 | 0.94 |





# Zinc Shopprimers

## Muki Z WB-14 FW

This two-pack, self curing, inorganic, water-borne zinc shopprimer provides a number of benefits.

Meets the needs of the latest welding technology

It is designed to take advantage of the high levels of productivity which can be achieved with advanced MIG/MAG/G-FCAW/SAW welding technology.

High volume solids

High volume solids mean it is more economical to transport, store, mix and apply. There is less consumption of shopprimer because the spreading rate is higher than typical solvent-borne shopprimers and higher than other known water-borne zinc shopprimers.

Fast to dry

Because it dries fast – in just 20 to 30 seconds – the steel can be handled almost immediately after application and it can be stacked outside – even in rainy weather.

No curing time

It is self curing and the steel can be cut or welded immediately after drying.

Reduced backburning

High welding speed and the resistance to high temperatures means there is very little backburning and secondary surface preparation is reduced.

Better for health

Muki Z WB-14 FW contains no solvents. Compared to traditional solvent-borne shopprimers it removes the exposure of solvents for operators and the surroundings.

Better for safety

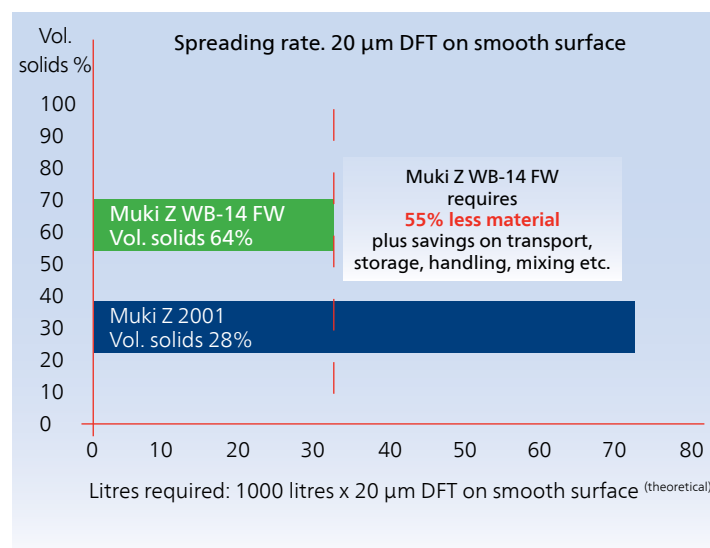
It is better for safety – it is not flammable. No risk of explosion resulting from solvent emissions. High volume – low pressure application.

No solvents

It's an improvement for the environment as there are virtually zero emissions into the atmosphere.

The disposal of hazardous waste is minimised. It can be thinned with water. Cleaning up is easy and simple. The added cost of solvents and cleaners is avoided, further reducing costs when compared with solvent-borne cleaners.

## Coverage – economy





### Cost effective equipment

Applied with HVLP (high volume/low pressure) equipment means shorter stops for maintenance, fewer moving parts to be changed and fewer spare parts to be stocked.

### Excellent cutting properties

Excellent gas and plasma cutting properties, including plasma cutting underwater with very high cutting speeds being achievable.

### Excellent welding properties

Very high welding speeds can be achieved at high film thicknesses up to 30 microns. It is compatible with all types of welding.

### Overcoating

A wide variety of coating systems can be applied – acrylic, epoxy and most of the water-borne coatings. A complete 'green' system can therefore be achieved.

Note: For safe overcoating ensure that the surface pH is less than 8 compared to the fixed scale by using Universal indicator paper pH 0–14. Normal weathering conditions (outdoor storage) will normally bring down pH to an acceptable limit, however, indoor dry storage will require necessary pre-treatment. For use in underwater areas the content of salts at the surface must be less than 50 mg/m<sup>2</sup> by using the Bresle Method (ISO 8502-6 and ISO 8502-9).



# Jotun Shopprimers

| PRODUCT   | Muki PVB  | Muki EPS  | Muki AC   | Muki Z 2001       | Muki Z 3000          | Muki Z WB-14FW       |
|---|-----------|-----------|-----------|-------------------|----------------------|----------------------|
| Generic type                                    | PVB       | Epoxy     | Acrylic   | Low zinc silicate | Medium zinc silicate | Medium zinc silicate |
| Volume solids %                                 | 13        | 25        | 40        | 28                | 28                   | 62                   |
| VOC g/l   | 710       | 610       | 57        | 660               | 600                  | 0                    |
| Protection time – months                        | 3–5       | 3–5       | 3–5       | 6–8               | 8–10                 | 12–14                |
| Recommended DFT on smooth plate – $\mu\text{m}$ | 20–30     | 15–50     | 20–30     | 15–20             | 15–20                | 15–25                |
| Colours   | Red       | Red Grey  | Red Grey  | Green Red Grey    | Green Red Grey       | Grey                 |
| Weldability                                     | Fair      | Good      | Good      | Excellent         | Good                 | Optimum              |
| Cutability                                      | Excellent | Excellent | Excellent | Excellent         | Good                 | Optimum              |

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Jotun Protects Property