

# ***How VCI Works***

## **VCI PROTECTION IS A FUNCTION OF:**

- Which Metals are in need of protection.
- Corrosion inhibiting chemicals used and their effectiveness on the metals.
- Ratio of chemicals in the formulation.
- Amount of VCI on the paper or in the film
- pH of the finished product.
- Water solubility and the effectiveness of the corrosion inhibitor in the presence of moisture and/or high humidity.
- Natural neutral kraft paper or polyethylene film used as the carrier for the VCI.
- The overall packaging design and the conditions expected during packing, shipping and storing.

# Packaging Design Criteria

- Type of metals in need of protection
- Length of protection required
- Domestic or export
- Climate conditions
- Size and weight of product
- Value of the product
- Current packaging requirements
  - Handling
  - Automatic or manual
- Chemical or oil residue on the metal
- Processing and cleaning methods
- Packing station location relative to other processes

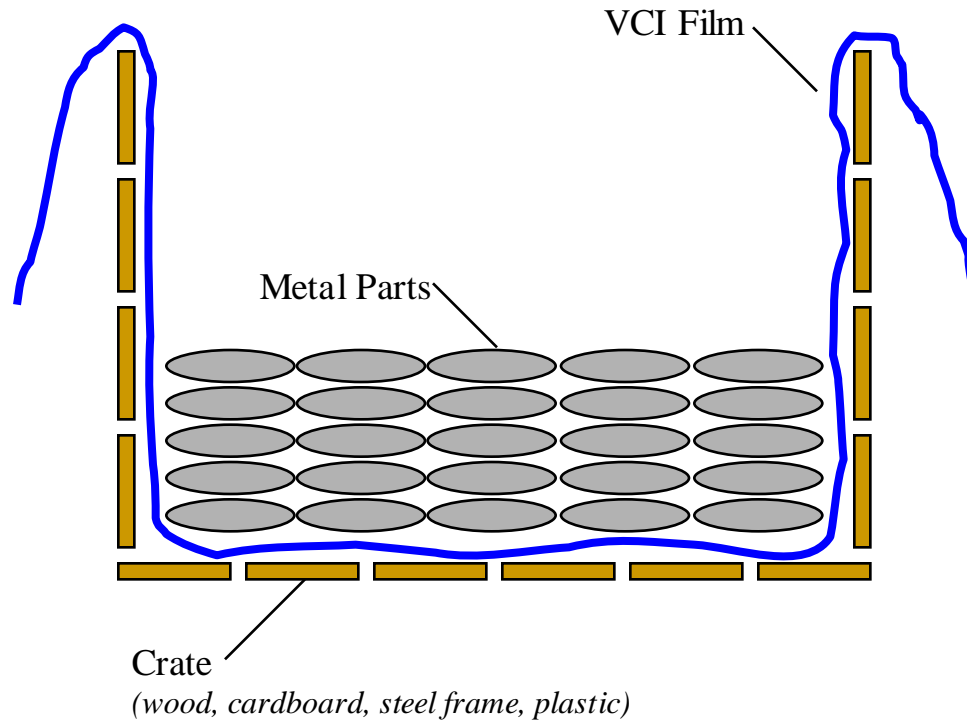


# Packaging Design Considerations

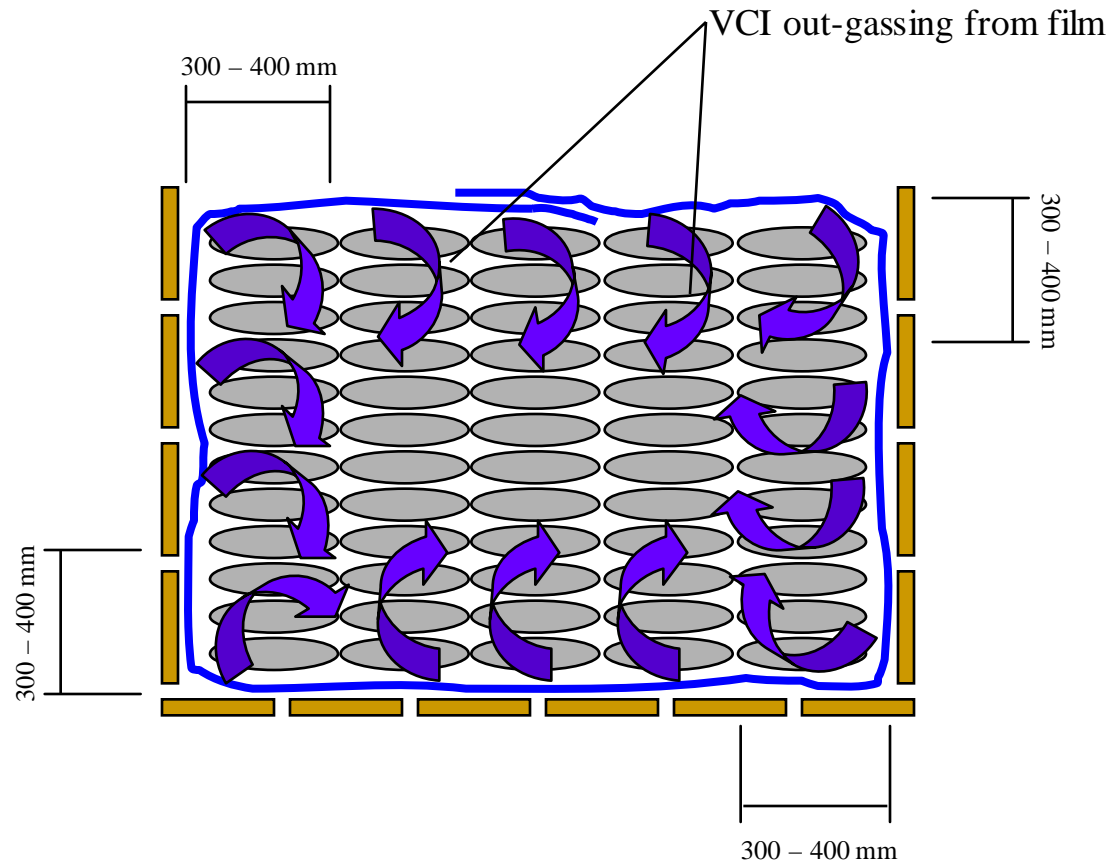
- Coverage
  - 1 square foot of paper or film for every 3 square feet of surface area
  - OR –
  - 1 square foot for every 1 cubic foot of packaging volume being protected
- Daubert VCI works well through water and humidity.
- An excellent compliment to R-P oils.
- Printing should face away from the metal

# Packaging Design Considerations

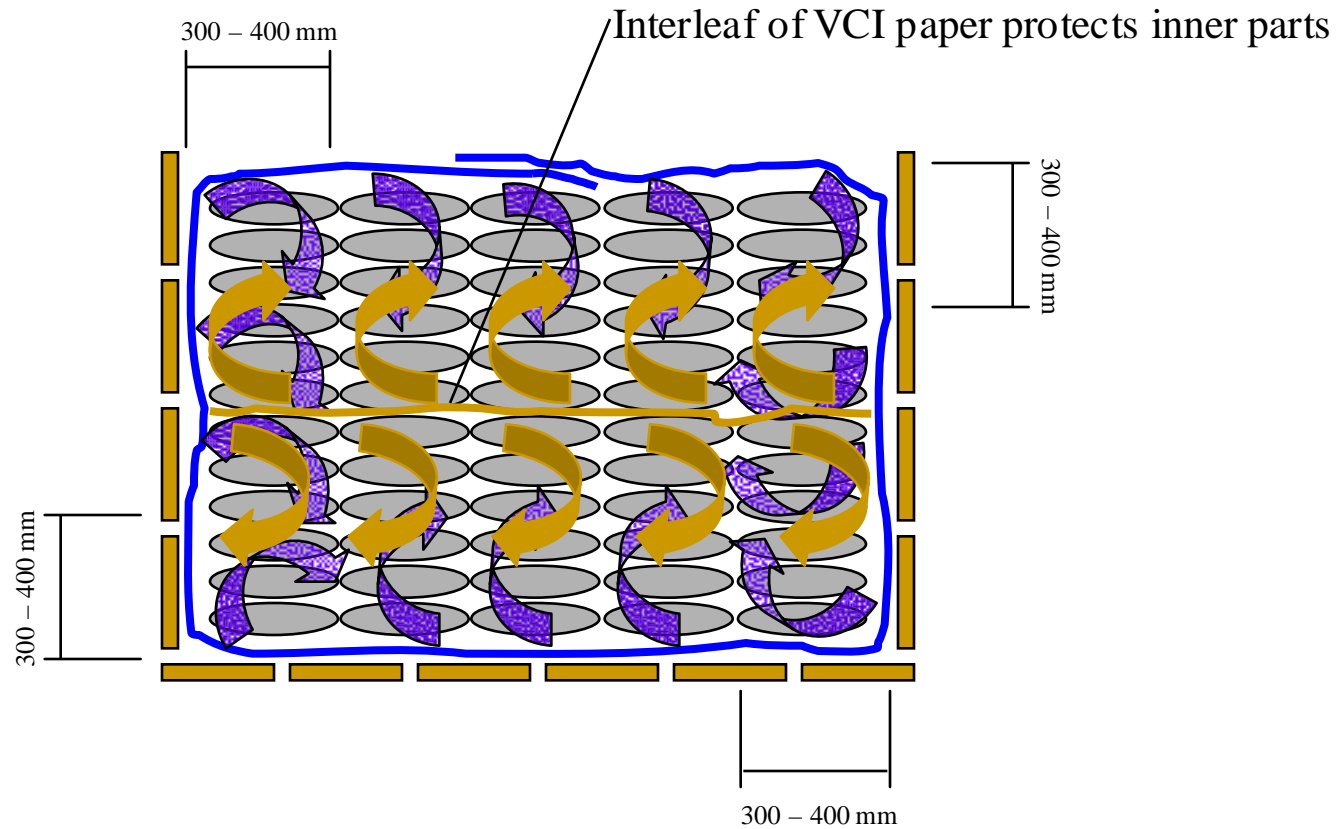
Example: Brake Discs or Clutch Plate Bulk Packaging



# Packaging Design Considerations

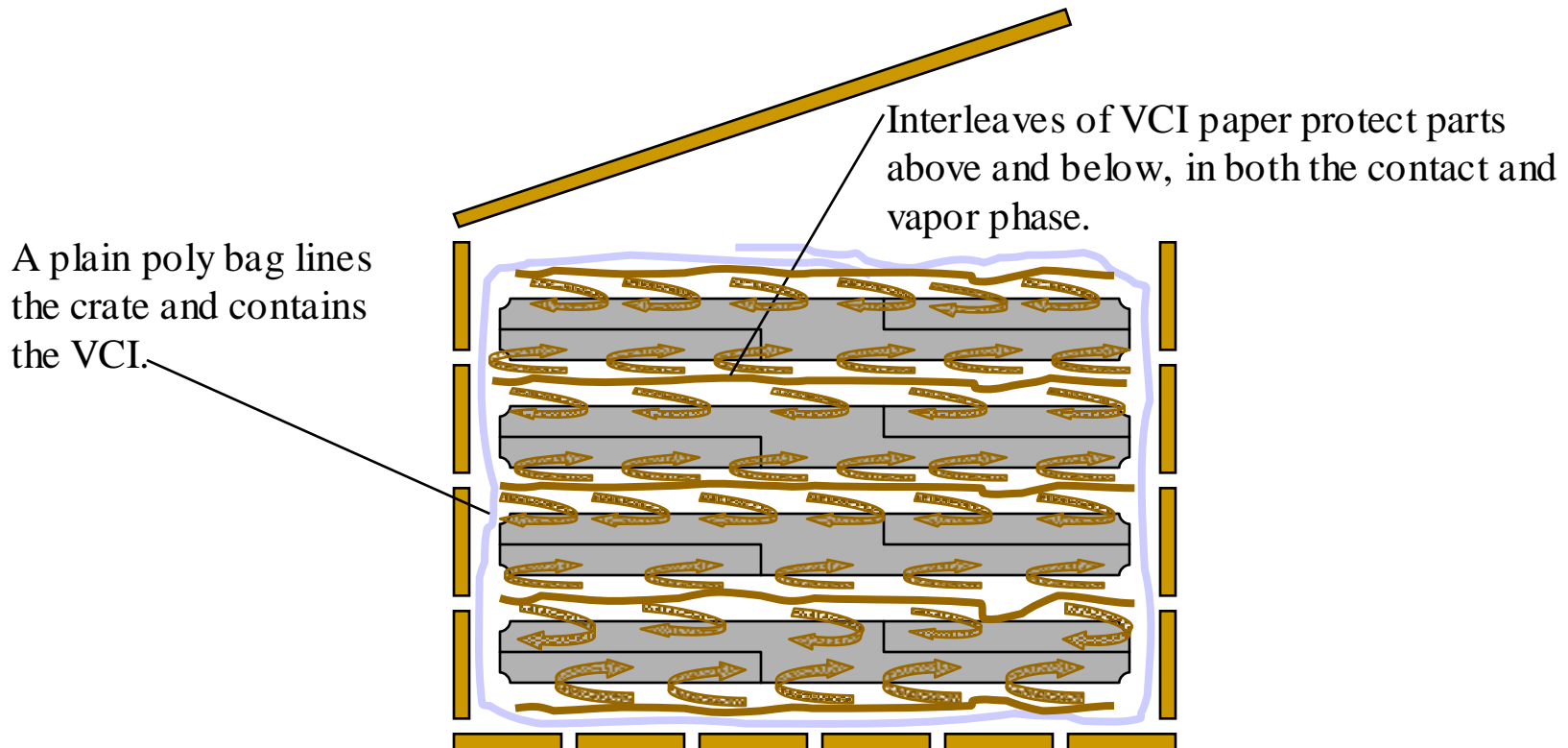


# Packaging Design Considerations



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Example: Packaging of large stampings

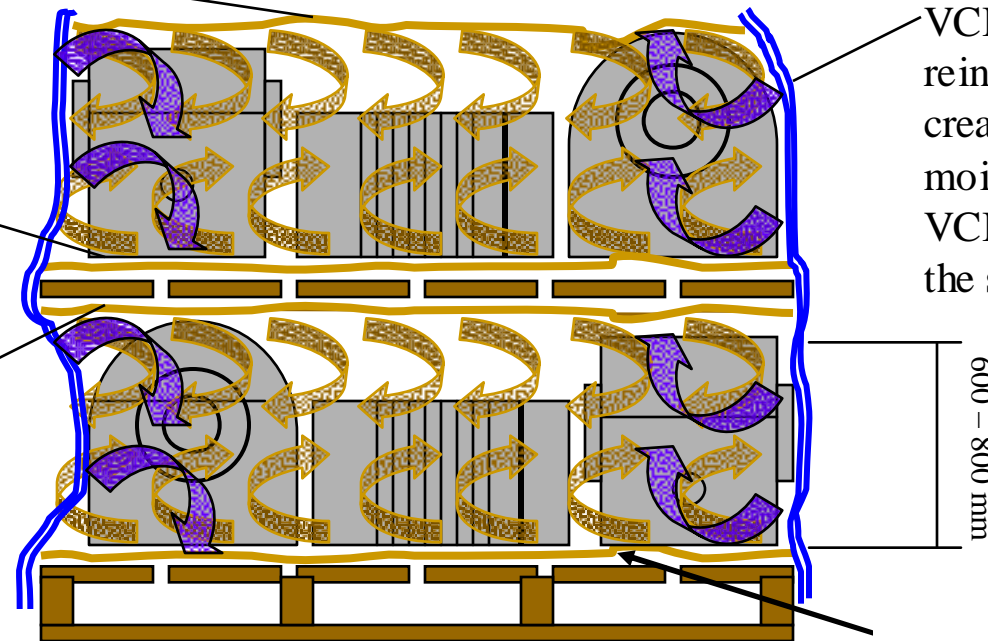


# Packaging Design Considerations

## Example: Electric Motor Housings and Assemblies

Poly coated VCI paper sheds moisture and keeps the metal below from corroding.

Poly coated VCI paper separates the metal parts from the wooden pallet and protects the metal above and below. VCI protects in both the contact and vapor phase.

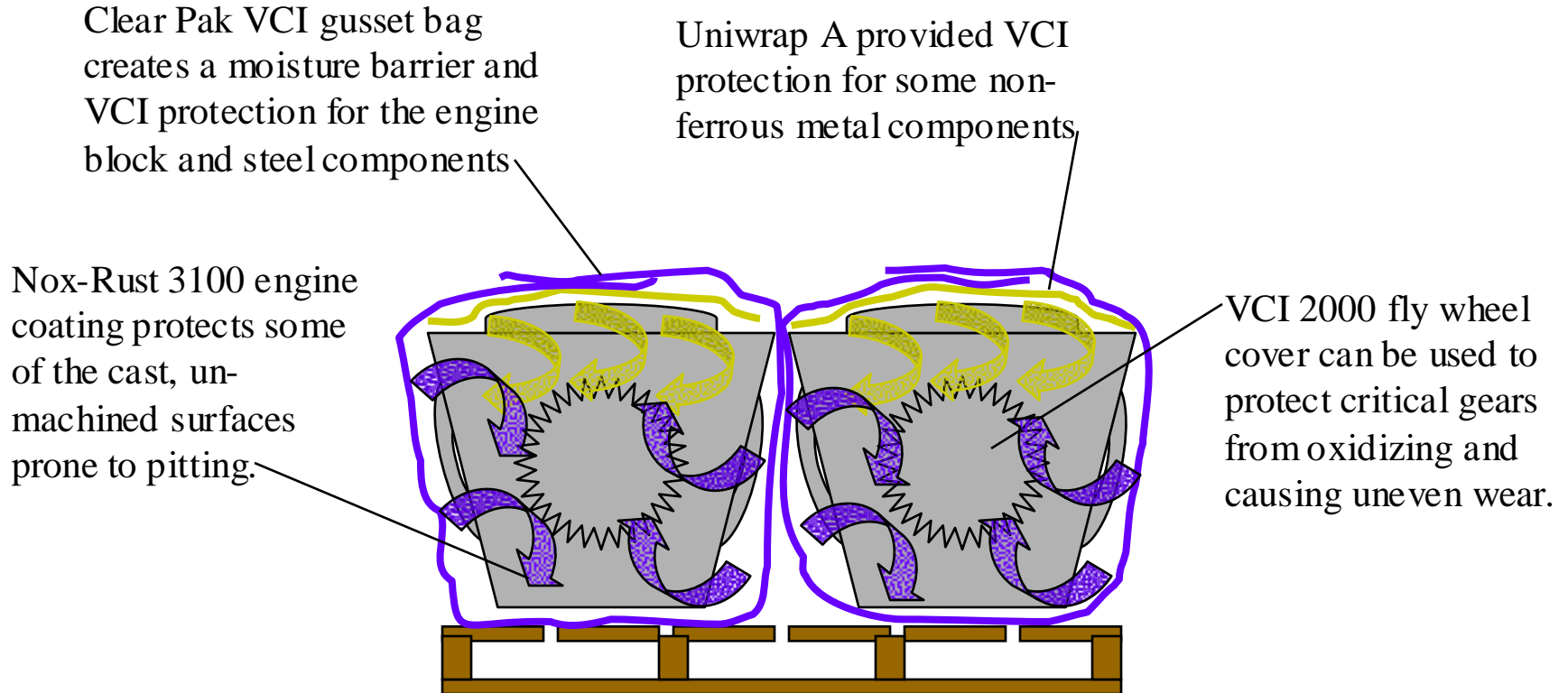


VCI stretch film reinforces the stack, creates a barrier to moisture and provides VCI protection from the sides.

Poly coated VCI paper separates the metal parts from the wooden pallet and provides protection from below.

# Packaging Design Considerations

## 10 year Engine Lay-up and Storage



# Packaging Design Considerations

## Export Packing of CKD motorcycles in India

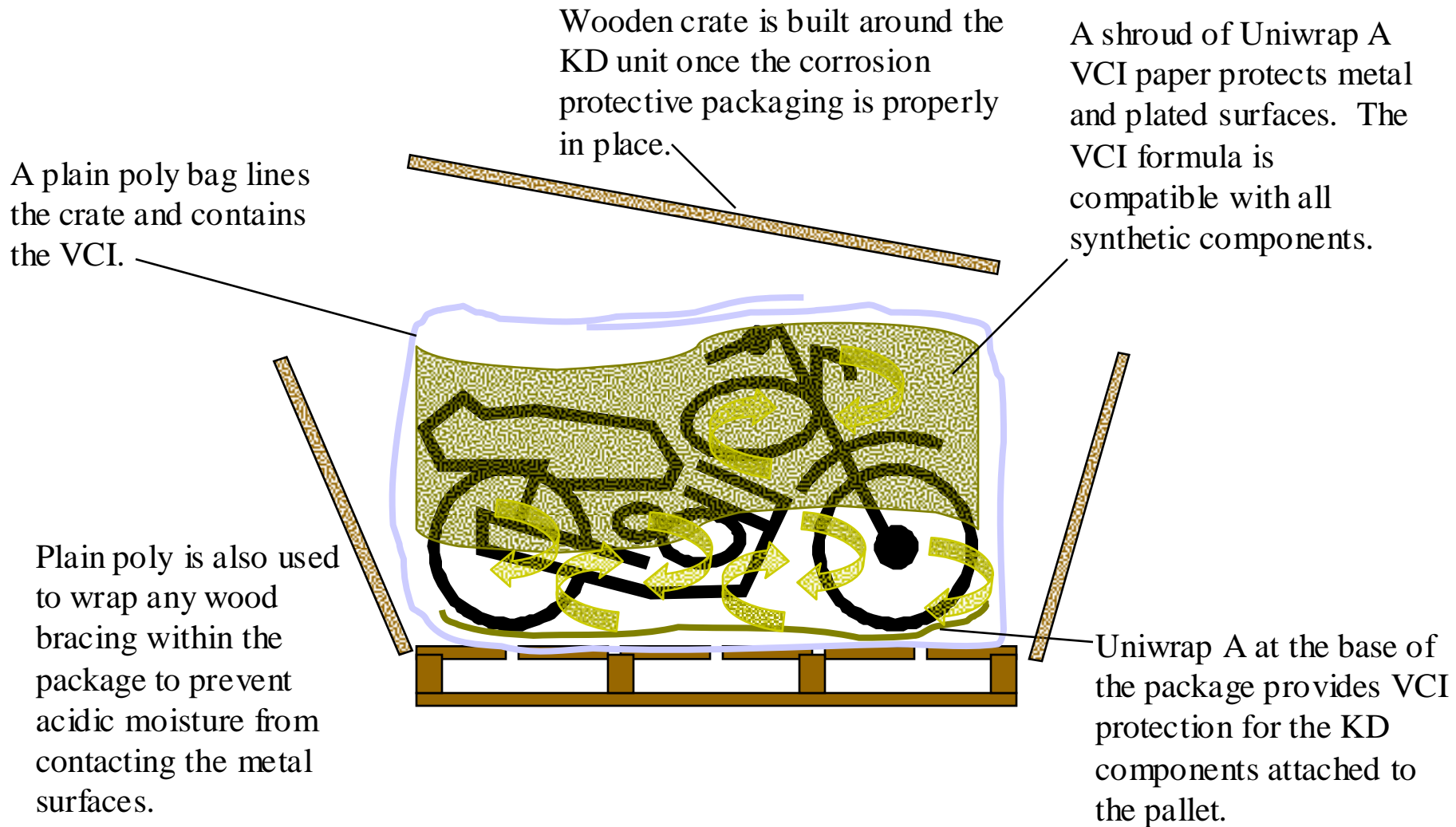
A shroud of Uniwrap A VCI paper protects metal and plated surfaces. The VCI formula is compatible with all synthetic components.



Uniwrap A at the base of the package provides VCI protection for the KD components attached to the pallet.

# Packaging Design Considerations

## Export Packing of CKD motorcycles in India

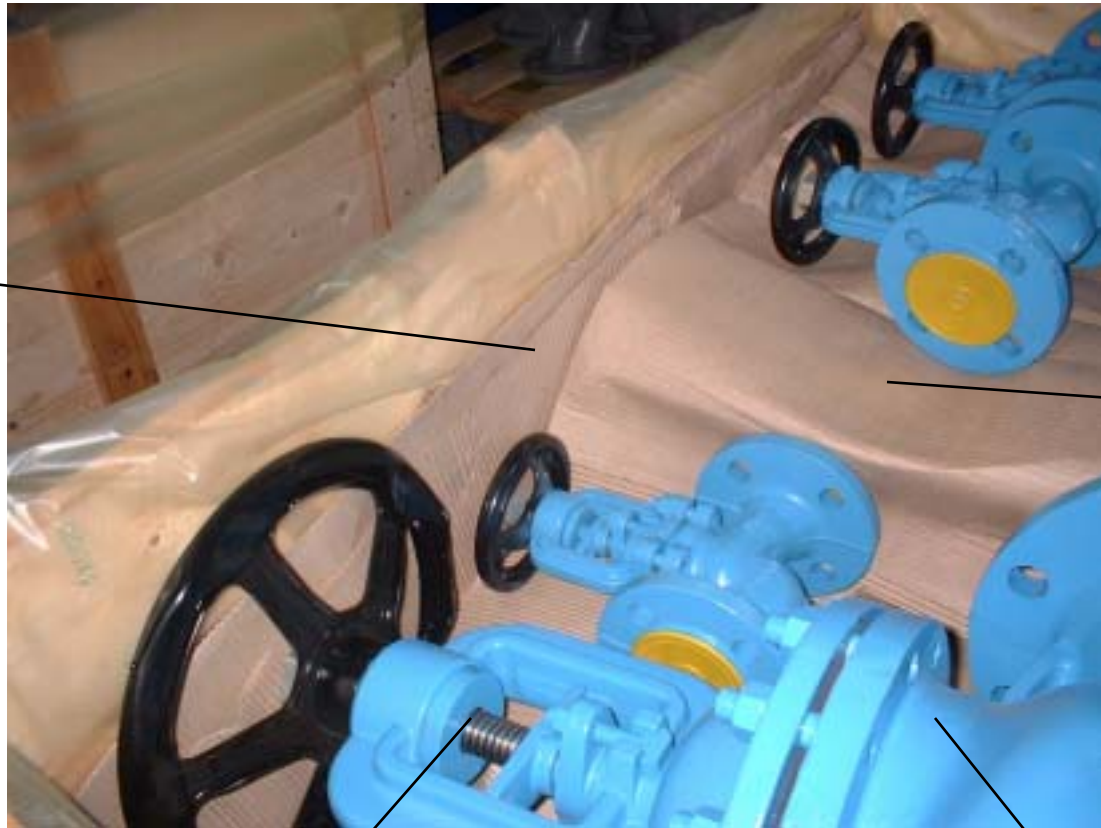


# Packaging Design Considerations

## Mechanical and Corrosion Protection of Pumps and Valves

### Example of INCORRECT Packaging

In this design VCI is **prevented** from reaching the metal surface by the corrugated separator.



Corrugated cardboard separators used as cushioning can be a significant source of corrosion.

**Exposed metal components susceptible to corrosion.**

Painted surfaces don't require VCI protection and the VCI does not affect them.

# Packaging Design Considerations

Mechanical and Corrosion Protection of Pumps and Valves

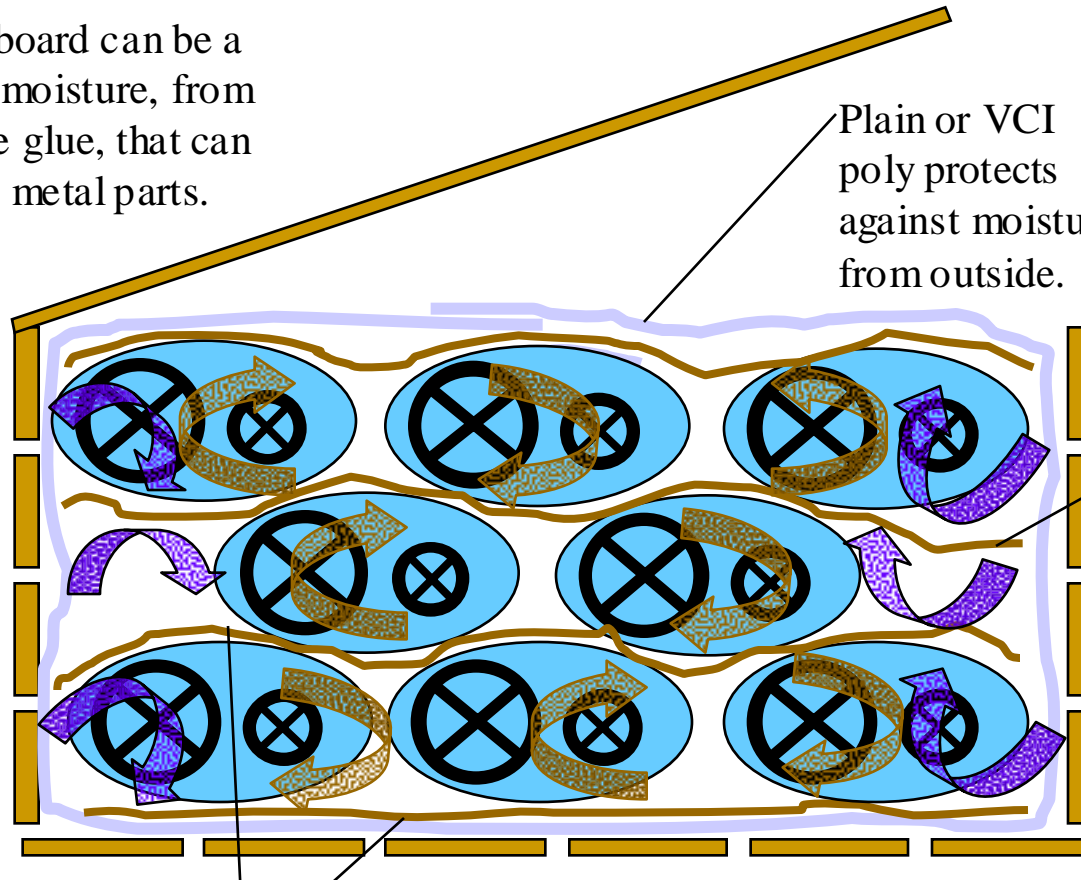
## Example of CORRECT Packaging

Corrugated cardboard can be a source of acidic moisture, from the paper and the glue, that can attack unpainted metal parts.

Plain or VCI poly protects against moisture from outside.

Use VCI paper or foam as a separator. Provides mechanical protection and the VCI has free access to the metal.

Water soluble VCI can provide protection against condensation that forms inside the bag.



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