Volatile Corrosion Inhibitor Treated Paper

adpack®

Eliminate Rust with adpack!

ADCOAT CO., LTD.

Corporate philosophy

Sanpoyoshi

Good as Seller
We must go on together with employes for many years.

Good for Buyers
We must supply confident products & serve for our Customers satisfaction.

Good for Society
We must correspond to environmental issues & chemical regulations to contribute for everybody.

I myself have taken the meaning in good part as our company, though this is the old management philosophy carried by Japanese merchants.

Adcoat Co., Ltd. was started and established in 1968 at Higashi-Osaka, famous city for "Monozukuri" Products Manufacturing.

Volatile corrosion inhibitor treated paper, produced by our company, has been widely applied among the major steel mills, car manufacturers and blade producers etc. since 40 years ago. However, the visibility with the public is very low, because our products have been mainly used as their export packaging.

Hot humid climate in Asia including Japan causes big trouble in the form of rusting. We do hope adpack, volatile corrosion inhibitor treated paper, can be easily helpful to protect from rusting for everybody.

President
Motoshi Goto

adpack®

Switched to the reliable adpack VCI messy oils or toxic chemicals.

adpack-G
Impregnated type for Iron & Steel

Reliability accumulated over 30 years of experience.
Approved by the test specified in JIS Z1535.

VCI* Paper(Anti-corrosion Paper) impregnated volatile corrosion inhibitor into kraft paper, mainly for iron & steel products, car parts and apparatus parts etc. Accumulated over 30 years of Experiences for various customers.

adpack White
Coated type for Iron & Steel Term protection

All time best seller Reliability accumulated over 40 years of experience
Approved by the test specified in JIS Z1535.

VCI* Paper(Anti-corrosion Paper) coated volatile corrosion inhibitor on kraft paper in order to protect the target for longer periods, storage, mainly for blades such as cutters and knives,steel, cars, various devices and so many applications. We have over 40 years experience and we can proudly say this type is our enduring bestseller.

*VCI=Volatile Corrosion Inhibitor

adpack Production Line

ADCOAT Satisfying customers' requirements quality and great flexibility.

Coation VCI

High speed dryer

Products portfolio

treated paper, Eliminates the need for

Further improve work efficiency!

adpack-S
(Impregnated type for Ferrous & Non-Ferrous)

This type has passed the test specified by JIS Z0321 Used for metallic Composite and galvanized products.

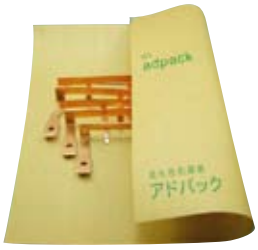
The great performance of corrosion-proof for Iron & Non-ferrous Materials (Copper, Brass, Phosphorous Bronze and Tin-plated) and Plated materials(Zinc, Chrome & Nickel) as well as for plastics due to less negative effect.

adpack-ZV
(For packing of Galvanized / Iron & Steel-KD)

Proven performance for packaging of Knockdown cases

Rapid-acting volatile corrosion inhibitor treated paper, Uses very high volatile inhibitor characteristics. Developed mainly for car press parts & engines, Remarkable performance for knockdown packing applications.

adpack-C
(Impregnated type for Copper & Copper Alloy)



Dedicatad for copper products.
This type has passed the test specified by JIS Z0321

This type is made by impregnating corrosion inhibitor into kraft paper, therefore can be used for electronic parts and widely employed for copper wires, copper sheets and copper tubes etc.

Moisture-proof packing (Shelf Life of up to 3 years-Unopened condition)

Delivery form (Roll type & Sheet type)

Roll Type

Sheet Type

by short lead time, competitive price, high

ISO9001 Approved and Certified factory

Automatic winder

Bobbin slitter

Packaging

Shipping

Roll form

Kraft paper base
(Coated type TK, white side effective)

Kraft paper base with PE
laminated (GP/TP/SP/ZVP)

Moisture-proof paper
packing (3 years shelf life)

Type	Form	Specifications	Corrosion-proof effective period
adpack-G Impregnated for Iron & Steel VCI adpack	GK-7 (M) 1000mm×100m	75g kraft for rust-proof paper Roll dia φ135mm, Weight 9kg	6～12months
	GP-7 (M) 1000mm×100m	75g kraft for rust-proof paper + PE laminated Roll dia φ145mm, Weight 11kg	12～36months
adpack White Coated for long term Iron & Steel VCI adpack	TK-610 (M) 1000mm×100m	60g kraft for rust-proof paper Roll dia φ125mm, Weight 8kg	10～14months
	TK-810 (M) 1000mm×100m	75g kraft for rust-proof paper Roll dia φ135mm, Weight 10kg	10～14months
	TP-810 (M) 1000mm×100m	75g kraft for rust-proof paper + PE laminated Roll dia φ145mm, Weight 12kg	12～60months
adpack-S for Iron & Non-ferrous VCI adpack	SK-7 (M) 1000mm×100m	75g kraft for rust-proof paper Roll dia φ135mm, Weight 9kg	6～12months
	SP-7 (M) 1000mm×100m	75g kraft for rust-proof paper + PE laminated Roll dia φ145mm, Weight 11kg	12～36months
adpack-C Impregnated for Copper & Copper Alloy VCI adpack	CK-6 (M) 1000mm×100m	60g kraft for rust-proof paper Roll dia φ115mm, Weight 7kg	6～12months
adpack-ZV for Galvanized sheets・Steel KD VCI adpack	ZVP-7(M) 1000mm×100m	75g kraft for rust-proof paper Roll dia φ145mm , Weight 11kg	12～36months

■ NOTE
The above corrosion-proof effective periods are for reference only. Actual condition may varies. Effective periods can be extended for up to 36-60 months if stored in air-tide condition.

Sheet form

Kraft paper base
(Coated type TK, white side effective)

Kraft paper base with PE
laminated (GP/TP/SP)

Moisture-proof paper
packing (Expiration 3 years)

Type	Form	Specifications	Corrosion-proof effective period
adpack-G Impregnated for Iron & Steel VCI adpack	GK-7(M) (A)mm×(B)mm	75g kraft for rust-proof paper Weight 90g/m²	6～12months
	GP-7(M) (A)mm×(B)mm	75g kraft for rust-proof paper Weight 110g/m² + PE laminated	12～36months
adpack White Coated for long term Iron & Steel VCI adpack	TK-610(M) (A)mm×(B)mm	60g kraft for rust-proof paper Weight 90g/m²	10～14months
	TK-810(M) (A)mm×(B)mm	75g kraft for rust-proof paper Weight 100g/m²	10～14months
	TP-810(M) (A)mm×(B)mm	75g kraft for rust-proof paper Weight 120g/m² + PE laminated	12～60months
adpack-S for Iron & Non-ferrous VCI adpack	SK-7(M) (A)mm×(B)mm	75g kraft for rust-proof paper Weight 90g/m²	6～12months
	SP-7(M) (A)mm×(B)mm	75g kraft for rust-proof paper + PE laminated Weight 110g/m²	12～36months
adpack-C Impregnated for Copper & Copper Alloy VCI adpack	CK-6(M) (A)mm×(B)mm	60g kraft for rust-proof paper Weight 70g/m²	6～12months

■ NOTE

The above corrosion-proof effective periods are for reference only. Actual condition may varies. Effective periods can be extended for up to 36-60 months if stored in air-tide condition.

On the VCI paper, the side impregnated with active VCI is without the adpack logo.

Special order items & others

Order form　Cloth processed goods

(Example)

G	K	X	6	P	–	8**	(N)	Size
Application	Kraft paper	Cloth	Size	Poly		Weight/m²	Mark	

- **G** Application
  - G: Impregnated type for Iron & Steel
  - T: Coated for long term Iron & Steel
  - S: Impregnated type for Ferrous & Non-Ferrous
  - C: Impregnated type for Copper & Copper Alloy
  - ZV: Packing of Galvanized / Iron & Steel-KD
  - SN: Impregnated type for Tin-plated product
  - ZP: Impregnated type for Galvanized sheets
- **K X 6** Kraft paper Cloth Size
  - 4: 4 strings x 3 strings / square inch
  - 6: 6 strings x 6 strings / square inch
  - 8: 8 strings x 8 strings / square inch
  - ※Hard-to-tear by cloth-processed, best choice for heavy loads etc.
- **P** Poly
  - P: With Without
- **8**** Weight/m²
  - 6: 60g
  - 7: 75g
  - 8: 75g
  - 610: 60g for T-type
  - 810: 75g for T-type
- **(N)** Mark
  - (N) : Nil
  - (M) : Adcoat or Customer's logo
- **Size**
  - Roll: W(mm) x L(mm)
  - Slit product: A(mm) x B(mm)

Cloth pasted for heavy products

Roll shaped (slitted)

Bag shaped

Big flat sheet

Order form　Cloth processed goods

(Example)

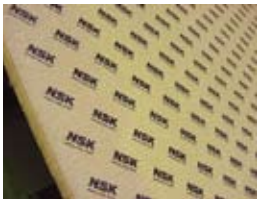
G	I	C	P	–	2	*	(N)	Size
Application	Paper with yarn	Crepe	Poly		2 sheets pasted	Weight/m²	Mark	

- **G** Application
  - G: Impregnated type for Iron & Steel
  - T: Coated for long term Iron & Steel
  - S: Impregnated type for Ferrous & Non-Ferrous
  - C: Impregnated type for Copper & Copper Alloy
- **I** Paper with yarn
  - I: With Without
- **P** Poly
  - P: With Without
- ***** Weight/m²
  - 5: 50g+50g
  - 6: 60g+60g
- **(N)** Mark
  - (N) : Nil
  - (M) : Adcoat or Customer's logo
- **Size**
  - Roll: W(mm) x L(mm)
  - Slit product: A(mm) x B(mm)

Bobbin slitter

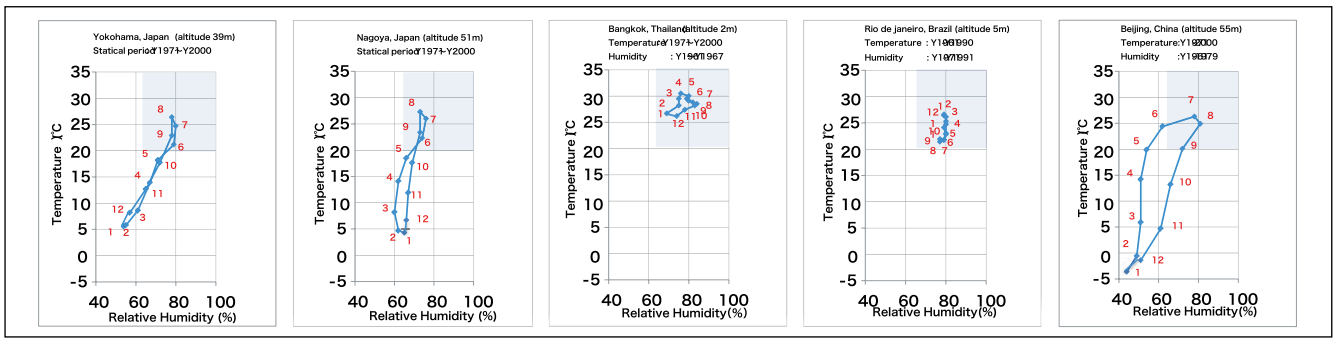
Rolled product (Slitted)

Small rolls for packing by hands



Customer's logo printed

<Clime graph>



Range of the relative humidity is Over 65% and temperature is overe 20°C. The numer is each month.
This data from National Astronomical Observatory "Science chronology Y2009" and Maruzen (Y2008).

At many steel mills

adpack® are greatly appreciated by so many customers with actual application reference indicated here.

At car manufacturers

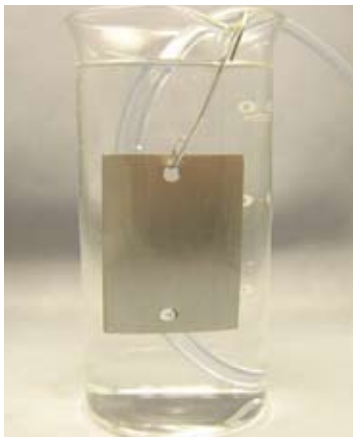
At machine parts manufacturers

Supplying VCI paper to more than 2500 satisfied customers over a period of more than 40 years in various industries.

Technical Information

Why does iron rust?

Iron ore, which is the raw material of iron, is a stable oxide mainly composed of iron and oxygen in its natural state. Iron, reduced from iron ore by removing oxygen, is chemically unstable. Therefore the iron attempts to go back, under the influence of temperature and humidity, to the original stable oxide. This oxide is usually called as the rust. In other words, both oxygen and water are indispensable for iron rusting. The lack of water is the reason why iron do not rust. (keeping them in dried air).
The lack of oxygen is also the reason why iron do not rust even in oxygen depleted water.



The gloss does not disappear even if the iron piece was placed in the pure water not contained the

When the air (Oxygen) is browed into the pure water, the iron piece gets rust and the gloss on the surface will

The chemical formulas to show the rusting phenomena are as follow:

$Fe \rightarrow Fe^{2+} + 2e^{-}$ ・・・・・・・・・・・・・・・・・・・・・・・・ (1)

(The iron solves into water by ionizing)

$^{1}/_{2}O_2 + H_2O + 2e^{-} \rightarrow 2OH^{-}$ ・・・・・・・・・・・・・・・・ (2)

(The oxygen, contained in the water, catches a electron and changes to hydroxide ion (OH^{-})).

$Fe^{2+} + 2OH^{-} \rightarrow Fe(OH)_2$ ・・・・・・・・・・・・・・・・・ (3)

(The iron ion and the hydroxide iron react each other, then make the white turbidity of iron(Ⅱ) hydroxide).

$2Fe(OH)_2 + H_2O + {}^{1}/_{2}O_2 \rightarrow FeO(OH) \cdot nH_2O$ ・・・・・ (4)

(By oxidization further, the iron is settled out with reddish brown precipitation of iron(Ⅲ) hydroxide(red rust)).

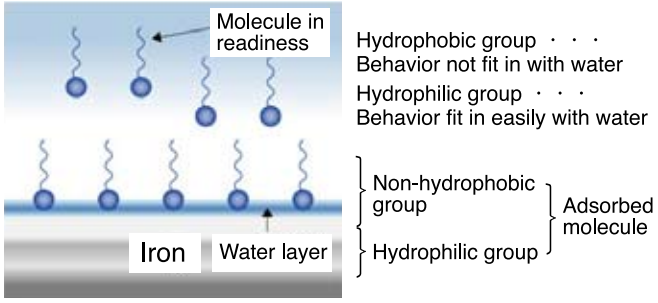
Iron (Fe) will be solved into the water, as the above formula (1) indicates, by being ionized (Fe^{2+}) when contacts with the water, and discharging the electron (e^{-}). The electrons discharged from the iron contribute to create hydroxide ion (OH^{-}) being consumed by dissolved oxygen in the water, as shown the formula (2).

This hydroxide becomes white turbidity of iron(Ⅱ) hydroxide($Fe(OH)_2$) by reacting with iron ion as shown the above formula (3), and then further being oxidized, as shown the formula (4), to be settled out with reddish brown precipitation of iron(Ⅲ) hydroxide ($FeO(OH) \cdot nH_2O$). The deposition is so called red rust, which is occurred on the iron surface in the very porous form and therefore protective action is poor for the basic iron, will be successively advancing as far as the oxygen and water are available.

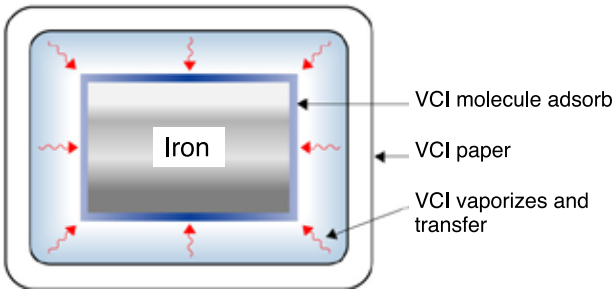
The mechanism of the VCI paper (volatile corrosion inhibitor treated paper) work effectively.

The VCI(volatile corrosion inhibitor), impregnated in the VCI paper, will be vaporized and directly absorbed onto the metal surface or absorbed by the water layer on the metal surface. Depending on the terms and storage conditions, the anti-corrosion effects can be expected for several years. The action is advanced on the molecular level, and in the nanoscopic invisible world.

The adsorption mechanism of volatile corrosion inhibitor to the iron surface



Formation of the anti-corrosion layer on the iron surface



Summary of "JIS Z 1535" (Volatile corrosion inhibitor treated paper)

adpack®

VIA test

This testing method is to evaluate the capability of the VCI paper on steel.
Keeping the steel test piece without contact to"VCI paper", the steel is forced to get rust by dew condensation. In other words, it is the test to make sure whether the VCI contained in the VCI paper has the capability to protect the steel from rusting.

In this testing method, the extraordinary heavy dew condensation will occurs due to steel being rapidly cooled under high humidity condition. In this way, the test is carried out in the toughest condition. This is to reaffirm the capability of the VCI paper under extreme condensation condition. Using the water solution of glycerol as shown in Figure(1), the steel test piece with and Without VCI paper are separately tested in a wide-mouth glass jar that is subjected with a humidity of 90% and a temperature of 20 degrees C. After a definite period of time, cold water (2 degrees C) is poured from the upper side of the aluminium tube to the hole previously gouged on the test piece to induced condensation. After 3 hours, the capability of the VCI paper will be evaluated by checking the test piece for rust effect.

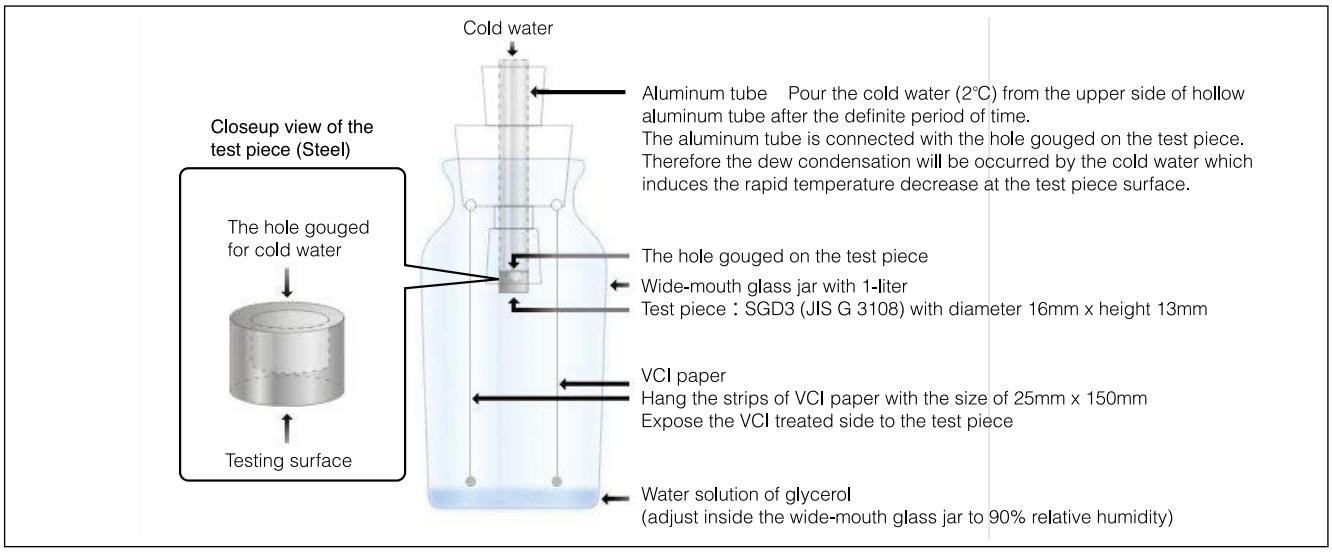


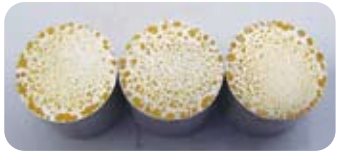
Figure (1) Figuration of VIA Test

H-type・・No rust is discerned on the steel test piece even after 1 hour by making the piece have the dew condensation.
L-type・・No rust is discerned on the steel test piece even after 20 hours by making the piece have the dew condensation.
So, H-type VCI paper has rapid-acting property.

The test pieces (Steel) after the VIA test

H-type test
(dew condensation after 1 hour)

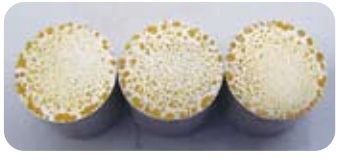
ADPACK GK-7 used



Blank (without VCI paper)

L-type test
(dew condensation after 20 hour)

ADPACK TK-610 used



Blank (without VCI paper)

Technical Information

Recommendable Types for Various Metal Products

adpack(VCI paper)		Iron Steel	Various plated materials				Copper, Copper Alloys		
			Zinc*	Tin	Chrome	Nickel	Coppper	Brass	Phosphor Bronze
Impregnated type for Iron & Steel	adpack-G	◎	–	○	○	○	×	×	×
Coated for long term Iron & Steel	adpack White	◎ Long term	×	○	○	×	×	×	×
Impregnated type for Ferrous & Non-Ferrous	adopack-S	○	○	○	○	○	◎	○	○
Impregnated type for Copper & Copper Alloy	adopack-C	–	–	○	○	○	◎	◎	◎
Packing of Galvanized/ Iron & Steel-KD	adopack-ZV	◎	◎ Vapor	–	○	○	–	–	–

Note: It is necessary to pay your special attention for the galvanized prodcts, because the effect may be different depending on their surface treatment variations.

◎: Very superior effect ○: Effective –: No effect ×: No good (Non usable)

Characters Comparison : "adpack"(VCI paper) vs. VCI Film vs. Rust Preventive Oil

	adpack(VCI paper)		VCI Film		Rust Preventive Oil	
	Strengths	Limitations	Strengths	Limitations	Strengths	Limitations
Working Process	■ Easy-to-use ■ Helpful for areas clean ■ Usable soon after unpacking	■ Less distributor	■ Easy-to-use ■ Helpful for areas clean ■ Usable soon after unpacking	■ Less distributor	■ Versatility ■ Easily obtainable	■ Troublesome in application / removal ■ Backset for areas clean
		■ No heat-sealable ■ Paper powder by chance	■ Heat-sealable ■ No chance of paper powde			
		■ Pack with moisture-proof material as needed basis	■ No need to pack with moisture-proof material			■ Pack with grease-proof barrier material
	■ Effect in every hole and corner even for complicated shape metal products can be expected					■ Difficult to apply or remove in complicated shape metal products cases
Anti-Corrosion Property	■ Rapid acting ■ Effect: High ■ Effective even "adpack" and metal products are put together into plastic bag etc. ■ Effective even used as liner in tote box ■ "adpack" can absorbe dew of condensation water		■ Depending mainly on Moisture-proof of the film	■ Slow acting ■ In active dew condensation case,the water cannotbe absorbed, but may cause rusting	■ Fast acting ■ Effect: High	■ In active dew condensation case, the water cannot be absorbed, but may cause rusting
Target Metals	■ Various metal products	■ Use proper grade by target metal products	■ Various metal products	■ Use proper grade by target metal products	■ Various metal products	
Safety & Environment	■ Few chemicals is used ■ Disposable easily as paper dust	■ Necessary to separate when using together with moisture-proof material (plastic bags etc)	■ Few chemicals is used ■ Disposable as single material			■ Environment deterioration at the working areas ■ When removing, solvent must be used (VOC rules)
Packing methods under JIS Z 0303	RP1-K1・RP1-K2・RP2-K・RP3-K		RP1-F		RP1-P1・RP1-P2・RP2-P・RP3-P	

VCI = Volatile Corrosion Inhibitor

Application consideration of VCI treated papers

adpack®

< When using for wrapping >

- Remove fingerprint and dirt on the metallic products prior to wrapping. Wrap the products after cleaning as soon as possible.
- Wrap the products with VCI treated side of the paper. (Without the ADPACK logo)
- Do not put anything between VCI paper and the product. If there is anything between them, VCI cannot be performed.
- The effect of VCI can be increased if product is tightly sealed.
- Refer to JIS Z 0303 (General rule for rust preventive packaging method) for details.

< When using in the enclosed vessel>
(the method to put both VCI paper and the metallic products put in the enclosed vessel together)

- In order to remove fingerprint and dirt etc, make the metallic products clean prior to wrapping. Wrap the products after cleaning as soon as possible.
- Put in both VCI paper and the metallic products together in plastic bag or in the tightly sealed and or non-perforated container. And, try to keep the metallic surface to be protected and VCI paper as close as possible, keep within 30cm as a guide. As a guide, use VCI paper with 30cm x 30cm or more for the enclosed vessel size with 30cm x 30cm x 30cm.
- In this application, it is neccessary that the wrapping should be tightly sealed.
- In case of the metallic products being in contact with each other. The VCI protection cannot be expected on the contacting surface.
- When the metallic products are closely-attached to poly-bag, the capability of VCI paper cannot be expected to the contacted surface.
- Refer to JIS Z 0303 (General rule for rust preventive packaging method) for the details.

<Change in color over time>

VCI papers are characteristically liable to variation in color over time.
This phenomenon is happened because the corrosion inhibitor contained in the VCI paper is becoming oxidized as well as paper itself discolored over time.
The color will be gradually changed 3 ~ 6 months after the produced date.
High temperature will also increase the rate of discolouration. However, please be assured that this will not have any effect on the performance of the VCI paper.

Before

After

<Storage>

Although adpack VCI paper are packed in moisture proof paper, avoid contacting VCI paper with water. Always stored in cool and dry places away from direct sunlight.
The estimated shelf life of the product is about 3 years after production date, depending on the storage condition.

<Application considerations>

1) Avoid using in enclosed places. Ensure proper ventilation.
2) In High temperature circumstances, rapid vaporization may occur.
3) Special care to be taken for people with sensitive or allergy.
4) Contact health-care professional if experience discomfort after usage.
5) Wash affected area with clean water immediately when itch or rash occurs after usage. Contact health-care professional if necessary.

(Conformed to Japan Association of Corrosion Control (JACC))

adpack® is good for the environment.

Agency

UNOPAL Private Limited
8, Ubi Road 2, #06-20, Zervex
Singapore 408538
Tel: +65-6747 0083
Fax: +65-6747 6041
E-mail: jansen@unopal.com.sg
Website:www.unopal.com.sg

Company

ADCOAT CO., LTD.

ISO9001：2008

No.2515-ISO9001

Head office

25-14,Hishie 1-Chome,Higashi-Osaka-City,Osaka,578-0984 Japan
TEL:+(81)72-963-3848 FAX:+(81)72-964-0794

Tokyo office

2197-10,Matoba,Kawagoe-City,Saitama,350-1101 Japan

http://www.adpack.jp

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