

ADCOAT CO., LTD. **adpack®**

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3rd Edition

VCI Paper (adpack®)

Q & A



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You can use the search box by pressing "Ctrl + F" on your computer keyboard.
Using the "search box" is convenient when searching for the keyword(s) you are looking for.

We have technical reports for VCI Paper (adpack®).
If you ask us, "Do you have any data for XX?", we will submit the test data report if we have it.

VCI: Volatile Corrosion Inhibitor(s)

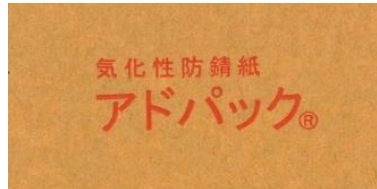
Note:
Some contents (sample provision, etc.) may not be supported by distributors in this file.

VCI paper (adpack®)

Q01. What is “adpack® (アドパック®)”?

A01. This is VCI Paper series name for made by ADCOAT CO., LTD.

“adpack® (アドパック®)” is NOT our company name.



Q02. What is VCI Paper?

A02. There is/are volatile corrosion inhibitor(s) (VCI) in the paper. The VCI vaporizes and adheres to metal surfaces, preventing rust/corrosion. However, since the amount of the VCI contained in the paper is limited, eventually the VCI will disappear from the paper.

Q03. What are the differences in logo printing colors?

A03. Colored by products type.



- “Red Printing Logo”
Impregnated type for Iron & Steel (adpack-G: AGK-7 (M), etc.)
Coated type for Iron & Steel long term storage
(adpack White: ATK-610 (M), etc.)



- “Blue Printing Logo”
Impregnated type for Ferrous & Non-ferrous (adpack-S: ASK-7 (M), etc.)



- “Green Printing Logo”
Impregnated type for Copper & Copper Alloy (adpack-C: ACK-6 (M), etc.)

When using these, keep printing “logo” side on outside. Wrapping for metal products, or include with these and VCI paper in a box.

Q04. Some kinds of the VCI paper “adpack®”, What are differences?

A04. Depending on the target metal products (steel, copper, etc.), it is necessary to change the type of VCI Paper (adpack®). This is because the types of the VCI agents that are effective differ depending on the metal. Negative effects (discoloration etc.) may occur if the wrong metal and VCI Paper (adpack®) are used in combination.

For Various Metals I

	Steel	Copper & Copper Alloy		
		Copper	Brass	Phosphor Bronze
adpack-G Impregnated type for Iron & Steel	◎	×	×	×
adpack White Coated type for Iron & Steel Long term storage	◎ (Long)	×	×	×
adpack-S Impregnated type for Ferrous & Non-Ferrous	○	◎	○	○
adpack-C Impregnated type for Copper & Copper Alloy	—	◎	◎	◎

For Various Metals II

	Plated Steel			
	Zinc	Tin	Chrome	Nickel
adpack-G Impregnated type for Iron & Steel	—	○	○	○
adpack White Coated type for Iron & Steel Long term storage	×	○	○	×
adpack-S Impregnated type for Ferrous & Non-Ferrous	○	○	○	○
adpack-C Impregnated type for Copper & Copper Alloy	—	○	○	○

◎: Very Effective ○: Effective —: No Effect ×: No Good (Not Recommendable)

Q05. Tell us the VCI agents (chemical substance name) used in the VCI Paper (adpack®).




A05. We do not disclose this information as they are the VCI agents that we have independently researched and developed. SDS (former name: MSDS) can be submitted. Please contact us.

Q06. Is VCI Paper (adpack®) products for businesses?

A06. These are used in a lot of car, steel and blade companies etc.
Products for companies, read the precautions carefully before use.

Q07. Difference of impregnated type for Iron & Steel type (adpack-G: AGK-7 (M) etc.) and coated type for Iron & Steel (adpack White: ATK-610 (M) etc.)?




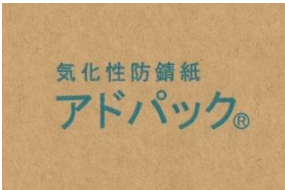
A07.

	<p>Impregnated type for Iron & Steel (adpack-G)</p>  <p>The VCI agents are impregnated inside the paper (between the paper fibers, 1 layer structure).</p>	<p>Coated type for Iron & Steel Long term storage (adpack White)</p>  <p>Coated VCI agents on the surface of paper (2 layers structure).</p>
VCI agents	VCI agents are different type.	
Appearance	Brown: Both sides	Brown: Not VCI side White: VCI side
Rust-Proof Effective Time*	Short Term	Long Term
Rust-Proof Effect	High vaporizability	Extremely Low vaporizability
Others	<p>Discoloration of the VCI Paper will occur over time, but no difference in rust-proof effect.</p>  <p>Before</p> <p>After</p>	<p>In rare cases, fall white powder (VCI agents) from VCI Paper, adhere to the metal product surface. The powder can be easily removed by alcohols.</p>

* See Q02, 9 pages.

Q08. Difference of impregnated type for Iron & Steel type (adpack-G: AGK-7 (M) etc.) and impregnated type for Ferrous & Non-Ferrous (adpack-S: ASK-7 (M) etc.)?

A08.

	<p>Impregnated type for Iron & Steel (adpack-G)</p> 	<p>Impregnated type for Ferrous & Non-Ferrous (adpack-S)</p> 
VCI agents	VCI agents are different type.	
For Various Metals	Iron, Aluminum and Plating (a part)	Most metals except silver [Ag]
Effect on Iron & Steel	“Effective” than adpack-S	“Not effective” than adpack-S
Bad Effect	Discoloration: Copper & Copper Alloy	Nothing Special
Printing Color	<p>Red</p> 	<p>Blue</p> 

adpack-S (ASK-7 (M) etc., For Ferrous & Non-Ferrous) is little bad effect for plastics and rubbers. Refer “For Various Metals” and “Tarnish test report”

Q09. Are “ad sheet” and “adpack-G (AGK-7 (M)), For Iron & Steel” the same products?

- A09.
- ad sheet:
 - adpack-G: AGK-7 (M), A5 size etc.
 - ad film:
 - adpack-G: AGK-7 (M) + PE bag with zipper

We have not sell “ad sheet” and “ad film” of adpack-S etc.

Storage

Q01. How long is shelf life of VCI Paper (adpack®), unopened condition?

A01. Although it depends on storage conditions, the shelf life for unopened products is 3 years from the manufacture date. The manufacturing date is indicated on the label. Store in a cool place out of direct sunlight. Also, since it is a paper product, it is strictly prohibited to get it wet.

Q02. How method do storage of VCI Paper (adpack®) do, after opened wrapping?

A02. Store the left (unused) VCI Paper in a light-tight and airtight bag (container etc.) such as a PE bag or moisture-proof paper. We use moisture-proof paper for wrapping when shipped from our company. There is no problem in reusing this moisture-proof paper.

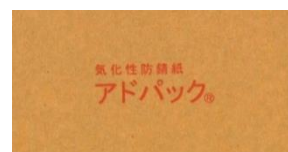
Q03. The color of VCI Paper (adpack®) is difference of the former purchase one.

A03. The color of VCI Paper (adpack®) may change over time. This is due to the VCI agents used. Discoloration may occur more quickly during the summer (hot) season. Even if discoloration occurs, it will not affect the rust (corrosion) prevention effect of the VCI Paper (adpack®).

Example (adpack-G)



Before



After

Q04. There is a chemical smell from VCI Paper (adpack®), but is it fine to inhale it?

A04. There is no problem if the VCI agents are inhaled during generally packaging work. When using the products, please refer to the SDS (former name: MSDS), the "Instruction Manual" enclosed with the products, or the "How to Use" on our website.

Q05. Do you have SDS (former name: MSDS) of the products?

A05. We can submit the SDS. Please contact us.

Q06. How to dispose of VCI Paper (adpack®)?

A06. Generally, it can be disposed of as combustible waste (paper waste) in Japan, but follow the laws/regulations of each local government.

Q07. Is it fine to put VCI Paper (adpack®) in my mouth?

A07. These products are not food, so not eat these.

If ones get into your mouth, remove it immediately and gargle with water (tap water) several times, and you feel unwell, go to the hospital. If you are receiving treatment at a hospital, you may need an SDS (former name: MSDS), so contact us for the issuance of an SDS.

Usage

Q01. How to use VCI Paper (adpack®)?

A01. 2 types: "Wrapping" or "put metal products and VCI Paper (adpack®) in a box/bag"

1. Wrapping



- Printing side of the VCI Paper (adpack®) is on the outside (VCI agents is on the inside), and wrap with contact the metal products and VCI Paper (adpack®).
- Do not place any shield objects (plastic board etc.) between the VCI Paper (adpack®) and the metal products. If there are these, sufficient rust (corrosion) prevention effect may not be achieved.
- If you store the wrapped products in a PE bag/container etc., the rust (corrosion) prevention period will be extended.

2. Put in a box/bag



- Pack a PE bag/container with VCI Paper (adpack®) and metal products, and close the zipper/lid. Keep the distance between the VCI Paper (adpack®) and the metal products as close as possible. The distance between metal products and VCI Paper (adpack®) must be within 30 cm. As a guideline, VCI Paper (adpack®) should be 30×30 cm or more for a container of 30×30×30 cm.
- If metal product are in close contact with each other or with a container, the VCI agents will not adhere to the contact area, so the rust (corrosion) prevention effect of that area may decrease.

Q02. How long is VCI Paper (adpack®) rust-proof effective time?

A02. "Wrapping by VCI Paper (adpack®) Non-moisture-proof type"

adpack-G [AGK-7 (M), etc.] Impregnated type for Iron & Steel	about 6 - 12 months
adpack White [ATK-810 (M), etc.] Coated type for Iron & Steel Long term storage	about 10 - 14 months
adpack-S [ASK-7 (M), etc.] Impregnated type for Ferrous & Non-Ferrous	about 6 - 12 months
adpack-C [ACK-6 (M), etc.] Impregnated type for Copper & Copper Alloy	about 6 - 12 months

"In a PE bag/container" or "Wrapping by VCI Paper (adpack®) Moisture-proof type"

adpack-G [AGK-7 (M), AGP-7 (M), etc.] Impregnated type for Iron & Steel	about 12 - 36 months
adpack White [ATK-810 (M), ATP-810 (M), etc.] Coated type for Iron & Steel Long term storage	about 12 - 60 months
adpack-S [ASK-7 (M), ASP-7 (M) etc.] Impregnated type for Ferrous & Non-Ferrous	about 12 - 36 months
adpack-C [ACK-6 (M), etc.] Impregnated type for Copper & Copper Alloy	about 12 - 36 months

AGP-7 (M), ATP-810 (M), ASP-7 (M): one side PE laminated (moisture-proof) type

The rust (corrosion) prevention effective time will change the using environment, so this is a guideline above.

Q03. Can VCI Paper (adpack®) be used for import/export via sea transportation (container ship)?

A03. Yes, it can.

Car parts etc. in sea transportation, VCI Paper (adpack®) have been used for rust (corrosion) prevention.

Q04. Is it fine, use VCI Paper (adpack®) with dirty (not cleaning) metal products?

A04. Since "dirt = cause of rust/corrosion", so clean the metal surface as much as possible before use VCI Paper (adpack). If dirt is attached, sufficient rust (corrosion) prevention effect cannot be expected. If the products are contaminated, even if you use the rust (corrosion) prevention oil etc. (other rust (corrosion) prevention products), it may not be possible to expect sufficient rust (corrosion) prevention effects.

Q05. The PE bag containing the metal products and VCI Paper (adpack®) was broken, is this fine?

A05. If the bag is broken, repair the break or change it with a new one.

The VCI agents contained in the VCI Paper (adpack®) vaporizes and adheres to metal surfaces, displaying its rust (corrosion) prevention effect. Since the amount of the VCI agents are limited, there are a possibility that the VCI agents will be released from the holes to the outside of the bag, reducing the amount of the VCI agents inside the bag and reducing the rust (corrosion) prevention effect.

Q06. Is it still effective even if the VCI Paper (adpack®) is broken?

A06. If it is included in the container/bag, there is no problem. However, if used in wrapping, the rust (corrosion) prevention effect may be reduced.

Q07. If I put a large size sheet of VCI Paper (adpack®) in a container/bag, will the effective period of the rust (corrosion) prevention effect be extended?

A07. Packaging with low airtightness will decrease the total amount of the VCI agents faster than packaging with high airtightness. By using a large size sheet of VCI Paper (adpack®), you can expect the rust (corrosion) prevention effect period to be extended, because of increase the total amount of VCI agents.

Q08. Is there a rust (corrosion) prevention effect even if it is not completely sealed?

A08. Complete sealing is preferable, but even just covering the container with a lid (incomplete) will have a rust prevention effect. Please conduct a preliminary test to confirm the actual rust (corrosion) prevention effect.

Q09. Is there a difference in effectiveness between wrapping metal parts with VCI Paper (adpack®), and enclosing them in a container/bag?

A09. You can expect a rust (corrosion) prevention effect just by including the VCI Paper (adpack®) in a container with a lid or bag with a zipper, but if the metal is easy to rust such as casting or the storage environment is harsh (high temperature and humidity), it is more effective to wrap it with the VCI Paper (adpack®).

Q10. Are there any precautions when using the VCI Paper (adpack®)?

A10. Please refer to the catalog, the "Instruction Manual" enclosed with the products, and the "How to Use" on our website.

Q11. Is there a way to check when the rust (corrosion) prevention effect of the VCI Paper (adpack®) has expired?

A11. Unfortunately, there is no such thing as an indicator agent (coloring/discoloration) and it cannot be confirmed visually.

Q12. Does the VCI Paper (adpack®) have the effect of rust (corrosion) remover agents?

A12. It has no the effect of rust (corrosion) remover agents. These are the paper products for rust (corrosion) prevention.

Q13. Is it possible to prevent rust (corrosion) by simply covering metal products with the VCI Paper (adpack®)?

A13. Although it has rust (corrosion) prevention effect, it is necessary to wrap the entire metal products in a bag etc.

Q14. How large size should we use for the VCI Paper (adpack®) to have rust (corrosion) prevention effect?

A14. A guideline: "VCI Paper (adpack®): over 30×30 cm" per "container size: 30×30×30 cm"

Q15. How far apart can the VCI Paper (adpack®) and the metal products be separated?

A15. When in a container/bag, a guideline is to keep it within 30 cm.

The closer it is, the more easily the VCI agents will adhere to the metal surface, providing sufficient rust (corrosion) prevention effect. If not in the container/bag, it will be more effective if the VCI Paper (adpack®) is contacted with the metal surface.

Q16. Can we reuse the VCI Paper (adpack®)?

A16. We do not recommend reusing the VCI Paper (adpack®).

The amount of the VCI agents contained in the VCI Paper (adpack®) is finite. When reused, they contain less the VCI agents than unused the VCI Paper (adpack®). Also, there is a possibility that dirt (corrosion factors) may be attached to the VCI Paper (adpack®).

Q17. After removal the VCI Paper (adpack®), keep the rust (corrosion) prevention effect on the metal products?

A17. The effect does not keep.

Q18. Is it fine, the combination of the VCI Paper (adpack®) and the rust (corrosion) prevention oil?

A18. Although it is possible to prevent rust (corrosion) by using the VCI Paper (adpack®) alone, there is generally no problem when used in combination with the rust (corrosion) prevention oil, but there are good or bad in compatibility. In rare cases, crystals may form as an adverse effect. The VCI Paper (adpack®) may absorb the rust (corrosion) prevention oil and may get in the way of the vaporization of the VCI agents.

Q19. Is it fine, the combination of the VCI Paper (adpack®) and the desiccant?

A19. The desiccant removes (absorbs) moisture, so it is effective to use it in combination with the VCI Paper (adpack®). However, the desiccant may also absorb the VCI agents, so please conduct a confirmation test in advance.

The desiccant releases moisture (water) depending on the environment. In addition, calcium chloride (desiccant) has deliquescent properties (a phenomenon in which it absorbs moisture and becomes an aqueous solution) and can cause rust (corrosion) if it comes into contact with the metal products.

Q20. Is it fine to store with the VCI Paper (adpack®) and the metal products in a cardboard box?

A20. It is important to avoid contact between the metal products and cardboard.

General cardboard is often made of acidic paper (including corrosive factors), which can cause rust (corrosion) if the metal products come into contact with it. Therefore, either place the VCI Paper (adpack®) between the cardboard and the metal products, or use in a PE bag, etc., with the metal products and the VCI Paper (adpack®).

Q21. Can we cut the VCI Paper (adpack®) to any size ourselves?

A21. Yes, can. Since it is made of kraft paper (brown paper such as envelopes), it can be easily cut with a scissors or a cutter.

Q22. Do you have any technical data (reports) regarding the VCI Paper (adpack®)?

A22. We can submit technical data (reports) such as those conducted using our own testing methods and JIS (Japan Industrial Standards). Please inquire about what kind of data (reports) you require.

Q23. Can the VCI Paper (adpack®) be used outdoors?

A23. The VCI Paper (adpack®) is not weather resistant. This products are intended for indoor use.

Q24. After rust (corrosion) removal on the metal surface, is there any rust (corrosion) prevention effect of the metal products even if we use the VCI Paper (adpack®)?

A24. Yes, it has rust (corrosion) prevention effect. Please thoroughly remove rust (corrosion) and clean the metal surface before use them.

Q25. Is it fine, the VCI Paper (adpack®) is curled (not flat) after open packing?

A25. The VCI Paper (adpack®) may curl the due habit (store roll condition) or humidity, but this does not affect the rust prevention effect.

How to Choose of VCI Paper (adpack®) Type

For Various Metals I

	Steel	Copper & Copper Alloy		
		Copper	Brass	Phosphor Bronze
adpack-G Impregnated type for Iron & Steel	◎	×	×	×
adpack White Coated type for Iron & Steel Long term storage	◎ (Long)	×	×	×
adpack-S Impregnated type for Ferrous & Non-Ferrous	○	◎	○	○
adpack-C Impregnated type for Copper & Copper Alloy	—	◎	◎	◎

For Various Metals II

	Plated Steel			
	Zinc	Tin	Chrome	Nickel
adpack-G Impregnated type for Iron & Steel	—	○	○	○
adpack White Coated type for Iron & Steel Long term storage	×	○	○	×
adpack-S Impregnated type for Ferrous & Non-Ferrous	○	○	○	○
adpack-C Impregnated type for Copper & Copper Alloy	—	○	○	○

◎: Very Effective ○: Effective —: No Effect ×: No Good (Not Recommendable)

Q01. We used the Impregnated type for Iron & Steel (adpack-G: AGK-7 (M), etc.) for copper or/and copper alloy, but are there any problems?

A01. Copper or/and copper alloys may discolor. The VCI Paper (adpack®) changes the VCI agents depending on the kind of metal. If the combination of the VCI Paper (adpack®) and metals are not correct, problems such as discoloration may occur.

Q02. Do you have the VCI Paper (adpack®) for silver products?

A02. We do not have the VCI Paper (adpack®) for silver products.

Silver discolors due to sulfur compounds such as sulfur dioxide gas in the air. It may be possible to suppress discoloration simply by wrapping the product in a PE bag or the like to block out sulfur dioxide gas, etc.

Q03. Do you have the VCI Paper (adpack®) for aluminum alloy products?

A03. The impregnated type for Iron & Steel (adpack-G: AGK-7 (M), etc.) is compatible with the aluminum alloy products. We had tested confirmation tests for A5052 (Al-Mg alloy) and A7075 (Al-Zn-Mg alloy/Al-Zn-Mg-Cu alloy).

Q04. If there are plastic or/and rubber parts in a container/bag, which VCI Paper (adpack®) should we use?

A04. The impregnated type for Ferrous & Non-ferrous (adpack-S: ASK-7 (M), etc.) is better than other VCI Paper (adpack®), because of little negative impact on plastic or/and rubber parts. Please refer "Tarnish test report" on our website. Also, check to negative impact before using VCI Paper (adpack®) by test.

Q05. Do you have the VCI Paper (adpack®) for copper and copper alloy products?

A05. The impregnated type for Ferrous & Non-ferrous (adpack-S: ASK-7 (M), etc.) and The impregnated type for Copper & Copper Alloy (adpack-C: ACK-6 (M), etc.) are compatible with the copper and copper alloy products.

Q06. Do you have the VCI Paper (adpack®) for steel products?

A06. The impregnated type for Iron & Steel (adpack-G: AGK-7 (M), etc.), the coated type for Iron & Steel long term storage (adpack White: ATK-610 (M), etc.) and the impregnated type for Ferrous & Non-ferrous (adpack-S: ASK-7 (M), etc.) are compatible with the steel products. adpack-S is less effective for steel than adpack-G and adpack White. If you wanted to use VCI Paper (adpack®) to steel (only), we recommend adpack-G or adpack White.

Q07. Do you have the VCI Paper (adpack®) for plated products?

A07. The impregnated type for Ferrous & Non-ferrous (adpack-S: ASK-7 (M), etc.) is compatible with the plated products. adpack-S is more of effective for plated products than the other VCI Paper (adpack®: adpack-G etc.).

Regulation / Rule regarding with regard to VCI Paper (adpack®)

Q01. We are considering using the VCI Paper (adpack®) for import/export. Is it compliant with the regulations/laws?

A01. Compatible with the "REACH" and "RoHS" in EU, "PRTR" and "Export Trade Control Order" in Japan. Please contact us for more information.

Q02. Is it fine the VCI Paper (adpack®) to import/export to countries with strict environmental standards (regulations/laws)?

A02. We are available documents according to the regulations/laws, so please contact us if you have any questions. In particular, it complies with the chemical substance regulations in EU, such as the RoHS (including RoHS2) and REACH.

Q03. Have it cleared standards of "RoHS (including RoHS2)"?

A03. Yes, please contact us regarding the required documents.

The "RoHS (including RoHS2)" is the chemical substance regulation in EU. This regulation stipulates that lead, etc. must not be contained above a threshold value.

Q04. Have it cleared standards of "REACH"?

A04. Yes, please contact us regarding the required documents.

The "REACH" is the chemical substance regulation in EU. This is a law to convey accurate information about chemical substances to consumers in EU. This is not a Japanese law, so this does not apply within Japan. However, this does apply when exporting to EU. There are regulations such as the Chemical Substances Control Law in Japan.

Q05. Is it "Not applicable" for "PRTR"?

A05. It is "Not applicable".

"PRTR" is "Pollutant Release and Transfer Register" (a regulation in Japan). This is a system to understand, compile, and publish data on the "source", "amount released into the environment" and "amount in waste" of regulated chemical substances in Japan.

Purchase / Samples / Catalog

Q01. Do you have a catalog or/and samples book (cut samples) for the VCI Paper (adpack®)?

A01. Yes, both Japanese and English edition of a catalog. The PDF file is on our website.

A samples book (cut samples) is not able to use for evaluation test. If you used the VCI Paper (adpack®) for evaluation test, we are able to supply some new samples for test.

Q02. Do you have some samples of the VCI Paper (adpack®)?

A02. Yes, there are samples for evaluation test.

If you used them, please contact us.

Q03. Can we buy the VCI Paper (adpack®) online?

A03. When you want to buy our products, check the distributors list in our website (English edition).

Q04. Are we able to buy some arbitrary sizes or envelope type of VCI Paper (adpack®)?

A04. Please contact us, check your desired size and type of the VCI Paper (adpack®). There is a minimum lot (total area) when arbitrary sizes.

Q05. Can we buy the VCI Paper (adpack®) at DIY store(s)?

A05. We are not sold them at DIY stores. When you want to buy our products, check the distributors list in our website (English edition).

Differences of other Anti-Rust (Anti-Corrosion) Products

Q01. Differences in usage between "VCI Paper" and "rust (corrosion) prevention oil"

A01. VCI Paper: Include with the metal products in bag/box, or wrap, and not need to wash in next work process.

Rust (corrosion) prevention oil: Coat oil on the metal surface, remove oil and wash the metal in next work process.

Q02. Difference of "VCI Paper" and "VCI film"

A02.

	VCI film (kneading type)	VCI Paper
Base	film (mainly PE)	paper
VCI amount (General)	under 2 g/m ² The VCI agents inhibit film formation, so be not able to include too much them (the content is about 2%). If the thickness is 100 μm (0.1 mm), it is 2 g/m ² .	about 10 g/m ² Common manufacturing method: Coat the VCI agents' aqueous solution to base paper and let it dry. It is possible to coat the VCI agents more than 10 g/m ² .
Characteristic	Because the film formation process involves high temperatures (about 180°C), the VCI agents are used that do not vaporize at low temperatures.	Because the temperature rises only about 100°C during the drying process, the VCI agents that vaporize at low temperatures can be used.
JIS (Standards)	JIS Z 1542:2015	JIS Z 1535:2014

Q03. Difference of "VCI Paper" and "oil paper"

A03. The common rust (corrosion) prevent product paper type is the "VCI Paper".

"Oil paper" is paper impregnated with oil and has a moisture-proofing effect. (oil ≠ the VCI agents)

VCI Paper: Not need to touch metal surface directly.

Oil paper: Need to touch metal surface directly.

Q04. How is it different from other companies' the VCI Paper?

A04. For example: popular VCI Paper for Iron & Steel

- a. Kind of VCI agents (These are difference of effective)
- b. VCI amount [g/m²]
- c. Base paper weight/thickness

The above differs depending on each company.

Term

Q01. Rust

A01. "Rust" is meaning of "Corrosion of ferrous". Not used for non-ferrous (copper alloy etc.).

Iron is chemically stable in nature in its oxidized state (oxide). As an example, the parts where the polished surface (remove oxide layer) is exposed due to polishing etc. will oxidize in an attempt to reach a stable state. When this oxidation has progressed significantly, it is called "rust".

Q02. Corrosion

A02. "Corrosion" can be used on all metal types, including ferrous.

When metal is exposed to the environment, bumpy/discolored on the metal surface, by some chemical reactions and resulting in a loss of metallic luster (such as the verdigris of copper).

Q03. Corrosive Agent(s)

A03. "Corrosive agent(s)" is/are substance that accelerates the corrosion of metals. These include sea salt particles (sodium chloride, etc.), air pollutants (SO_x, etc.), road antifreeze agents, etc.

Q04. SDS (former name: MSDS)

A04. SDS is an abbreviated word of "Safety Data Sheet". Former name is MSDS: Material Safety Data Sheet. This is a document containing the information necessary to safely handle chemicals.

Q05. What does "impregnated" in the impregnated type mean?

A05. It dissolves VCI agents in water or organic solvent, and let it to soak into the paper (into the gaps between the paper fibers). This type does not have the problem of the VCI agents powder falling off the VCI Paper.

Q06. What does "coated" in the coated type mean?

A06. A mixture liquid of the VCI agents and adhesives is coated and dry to a base paper, so becoming a two-layer structure: a layer of the VCI agents and a layer of paper. This type does have the problem of the VCI agents powder falling off the VCI Paper sometime.

Q07. Critical Humidity

A07. Generally, the higher the relative humidity [%RH], the faster corrosion progresses. If the relative humidity exceeds a certain value, rust will occur rapidly. This value (humidity: %RH) is called "critical humidity".

Critical humidity varies depending on the type of metal and environmental conditions, but is said to be 60-65%.

Q08. Steel plate thickness name

A08. Steel plates have different names depending on their thickness in Japan.

(English notation unknown)

極厚板: $150 \text{ mm} \leq$

厚板: $6 \text{ mm} \leq x < 150 \text{ mm}$

中板: $3 \text{ mm} \leq x < 6 \text{ mm}$

薄板: $< 3 \text{ mm}$

Q09. Crepe Paper

A09. This is paper with wrinkled process. It has good adhesion due to its stretch. It is also used for wrapping flowers.



Q10. Zinc-Coated Steel Plate

A10. Steel plate plated with zinc or zinc alloy.

The galvanizing prevents iron from rust (corrosion) by corroding instead of the base iron. Galvanized steel sheets include "hot-dip galvanized steel sheets," and surface treatment is often coated on the plated. Compatibility with the VCI Paper (adpack®) changes depending on the treatment method, also, check to negative impact before using VCI Paper (adpack®) by test. The impregnated type for Ferrous & Non-ferrous (adpack-S: ASK-7 (M), etc.) is compatible with the zinc-coated steel plate products.

Q11. Tin Plate

A11. A steel plate plated with tin.

Tin is less likely to corrode than base iron, so it prevents iron from rust (corrosion). Its main use is as a material for making food cans, beverage containers, 18-liter (5-gallon) cans, etc., but due to the depletion of tin as a resource, it has been replaced by TFS (tin-free steel).

The impregnated type for Iron & Steel (adpack-G: AGK-7 (M), etc.) is compatible with the tin plate products.

Q12. Stainless Steel

A12. It is an alloy of chromium [Cr] 10% over and nickel [Ni] mixed with iron [Fe], making it resistant to corrosion.

The reason it is resistant to corrosion is because it has an extremely thin anti-rust film. Stainless steel is sometimes referred to as a rustless steel, but rust (corrosion) may occur in environments where the anti-rust film is destroyed (such as at the seaside).

The impregnated type for Iron & Steel (adpack-G: AGK-7 (M), etc.) and the coated type for Iron & Steel long term storage (adpack White: ATK-610 (M), etc.) are compatible with the stainless steel products.

Q13. Oil Staining

A13. A stain (discoloration) that forms on an oiled metal surface. It is called "oil stain". It is difficult to remove with normal degreasing processes.

Q14. Dew Formation

A14. There is a limit value for the amount of water vapor (moisture content in the air) relative to a temperature. As the temperature rises, limit value for the amount of the water vapor also rises.

This limit value of the amount of water vapor is called the "saturated amount of water vapor."

When you place a solid substance $y^{\circ}\text{C}$ ($< x^{\circ}\text{C}$) whose temperature lower than at a place $x^{\circ}\text{C}$, the temperature of the air around that substance will decrease lower than $x^{\circ}\text{C}$. As the temperature of the air decreases, the amount of saturated water vapor around the substance also decreases. When the saturated water vapor amount at $y^{\circ}\text{C}$ is lower than the water vapor amount, the difference between "water vapor amount ($x^{\circ}\text{C}$) - saturated water vapor amount ($y^{\circ}\text{C}$)" becomes water droplets (liquid). This is "dew formation" and causes rust (corrosion).

Dew formation often occurs during the rainy season and summer. And it also occurs due to high humidity and large temperature differences between day and night in early spring in snowy regions. Dew formation may occur due to dirt on the metal surface even if the humidity is not high.

Q15. Water-Soluble Corrosion Inhibitor

A15. It is an aqueous solution in which VCI agents are dissolved or dispersed (emulsified) in water. Used for cleaning metals or for short-term rust (corrosion) prevention.

Q16. Polyethylene (PE) Laminated Paper

A16. It is made by coating kraft paper with polyethylene (PE) to make it moisture-proof. Also called PE coating.

Q17. VCI Film

A17. A film made by kneading VCI agent(s) into resin (mainly polyethylene) (one-layer structure), or a film with VCI agent(s) coated on the surface of the film (two-layer structure).

About Strengths/Weakness of VCI Paper, Rust (Corrosion) Prevention Oil and VCI Film refer "Characters Comparison: "adpack®" (VCI paper) vs. VCI Film vs. Rust Preventive Oil" on our website.

Q18. Climograph

A18. This is a line chart of a particular region where the vertical axis is the temperature [°C] and the horizontal axis is the relative humidity [%RH], and the monthly average values are connected by lines in monthly order. Hythergraphs that use temperature and precipitation are also commonly used and are called climograph.

Q19. VCI

A19. VCI is an abbreviated word of "Volatile Corrosion Inhibitor". adpack® is the VCI Paper.