KANSAI ALTAN

Neotect

Protective Coatings

1 Kansai Paint Co. Ltd.

Established in 1918, Kansai Paint Co., Ltd. has grown into Japan's largest paint manufacturer as well as one of the country's most progressive businesses. With a revenue about $3 billion and nearly 15,000 employees, the company enjoys a well-established position as one of the world's leading paint manufacturers.

The various products provided in a holistic approach by Kansai Paint and its group companies are highly valued around the world, by customers not only in Japan, but in Europe, the United States, and Asian countries such as China, and India as well, playing important roles in the protection and beautification of all types of products and merchandise.

With 650 people involved in R&D activities, 5 research institutes and 1 research centers, Kansai Paint's main objective is to utilize the achievements and knowledge earned through R&D to transform them into technology and products that correspond the market's expectations.

Kansai Paint / Amagasaki

2 Kansai Altan A.S.

Kansai Altan Boya Sanayi A.S. is a paint company with an annual production capacity of 80,000 tons, situated on a 100,000 m² land in Izmir and employing more than 750 employees.

The company manufactures a considerable share of its polymer requirement in its own polymer production facility which is located in the same site with 18,000 tons of production capacity per annum. In 2016, the company realized a turnover of around €135 millon with a production volume of above 62,000 tons.

With its high technological capabilities and passion for research, Kansai Altan allocates approximately 2,6 % of its annual turnover to Research and Development, which is in fact, an unusually high figure for the paint industry.

Kansai Altan A.S. aims to meet the customers with the technologies they need and support them to be competitive in their own fields both in terms of performance and cost. The technical assistance procedure starts with product guidence and also covers aftersales service to assure collective improvement and growth.

Kansai Altan / İzmir

3 Corrosion

Corrosion is a process by which materials (usually metals) are worn away by chemical reaction with their environment. Reconversion of steel back to iron ore is an example for corrosion.

How does corrosion occur?

With few exceptions (notably gold, silver, and platinum), metallic elements are found in nature in chemical combination with other elements.

For instance, iron is usually found in nature in the form of an ore, such as iron oxide. This combined form has low chemical energy content and is very stable.

Iron can be produced from iron ore by a high temperature smelting process. The heat added during smelting breaks the chemical bond between the iron and the oxygen. In addition, energy added during fabrication of end product retains within the metal. As a result, the iron and other metals that we use in structural applications have a higher energy content than they do in their original state, and are relatively unstable.

Corrosion is a natural process. Thus, iron and steel have a natural tendency to combine with other elements to return their lower energy states. In order to return to the lower energy state, iron and steel will frequently combine with oxygen, present in most natural environments, to form iron oxide, or “rust”.

In addition, green coloured patina on the copper or white coloured rust on zinc surfaces are also called corrosion products.

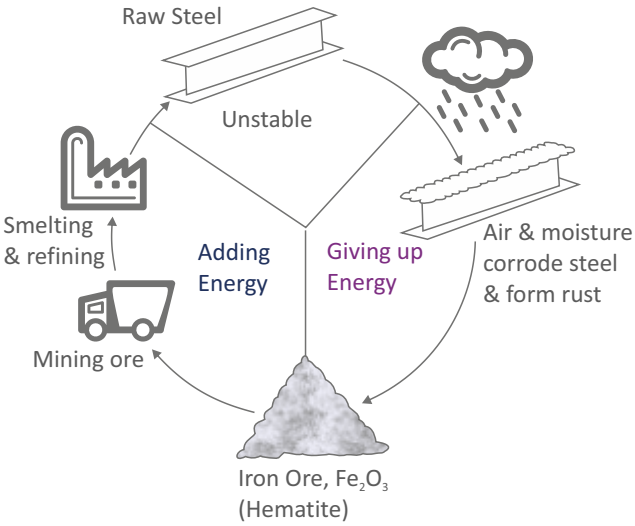
There are many kinds of steel, which corrode at different rates, depending on factors listed below:

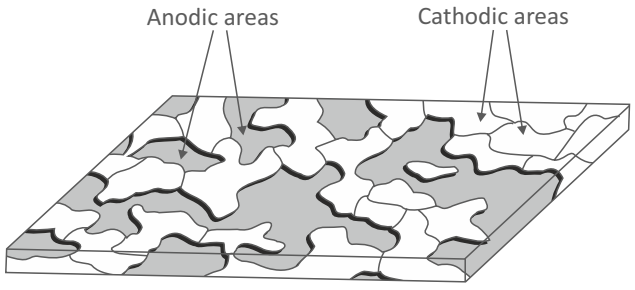
- Chemical composition of steel
- Surface pollution
- Presence of mechanical stress during fabrication (i.e., cold-rolled steel is generally more susceptible to corrosion than hot-rolled steel, cold rolled steel is widely used because it is stronger.)

There are certain conditions which must exist before a corrosion cell can function. Four essential elements of a corrosion cell:

- Anode (where corrosion takes place)
- Cathode
- Electrolyte (moisture and dissolved ions)
- Metallic pathway (connecting anode to cathode)

Once each of the four conditions have been met, an active corrosion cell is set in place.





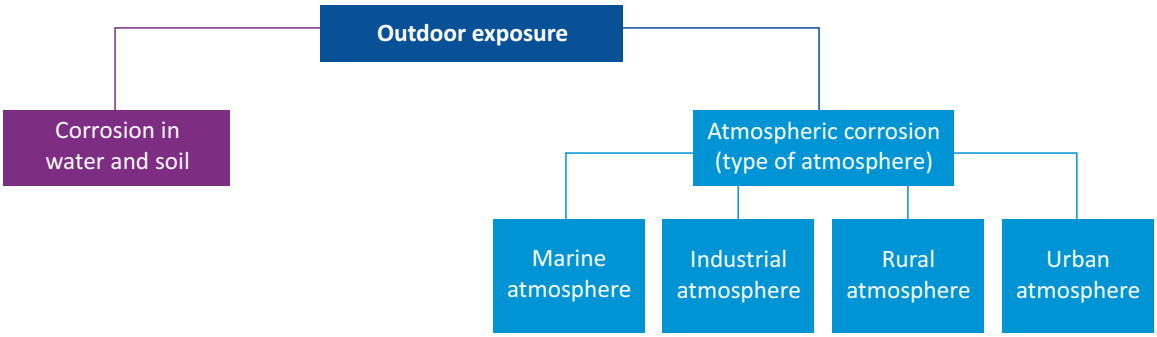
Steel surface has different chemical potentials

Preventing corrosion by organic coatings

In corrosion prevention by organic coatings, four main principles are employed, either alone, or in various combinations:

- Creating a barrier that keeps out charged ions and retards the penetration of water and oxygen
- Ensuring interface between coating and steel that maintains very high electrical resistance. Coating prevents access of soluble ions to metal.
- Modifying environment at the interface between coating and steel by introducing oxidizing or non-oxidizing passivating ions into the interfacial electrolyte (with anti-corrosive pigments)
- Ensuring metallic contact between steel and a less noble metal, such as zinc in the paint, which provides cathodic protection of the steel by utilizing the galvanic effect.

Classification of environments as per EN ISO 12944



Atmospheric corrosivity categories and examples of typical environments (EN ISO 12944-2)

Corrosivity Categories	Corrosivity Categories & Risk	Exterior	Interior
C1	Very low		Heated buildings with clean atmospheres, e.g. offices, shops, schools, hotels
C2	Low	Atmospheres with low level of pollution Mostly rural areas	Unheated buildings where condensation may occur, e.g. depots, sports halls
C3	Medium	Urban and industrial atmospheres, moderate sulphur dioxide pollution Coastal area with low salinity	Production rooms with high humidity and some air pollution e.g. food-processing plants, laundries, breweries, dairies
C4	High	Industrial areas and coastal areas with moderate salinity	Chemical plants, swimming pools, coastal, ship and boatyards
C5-I	Very high (Industrial)	Industrial areas with high humidity and aggressive atmosphere	Buildings or areas with almost permanent condensation and high pollution
C5-M	Very high (Marine)	Coastal and offshore areas with high salinity	Buildings or areas with almost permanent condensation and high pollution

Corrosivity categories for water and soil

Corrosivity categories according to EN ISO 12944-2 for water and soil

Corrosivity Categories	Environment	Typical Ambient Conditions
Im1	Fresh water	River installations, hydroelectric power plants
Im2	Sea or brackish water	Harbor areas with structures like sluice gates, locks, jetties; offshore structures
Im3	Soil	buried tanks, steel pile walls, steel pipes

The lifetime of a paint system is assumed to be the period of time which passes until maintenance is required for the first time after application. EN ISO 12944 specifies a range of three time spans to categorize durability:

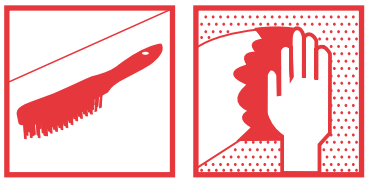
- Low / L / 2 to 5 years
- Medium / M / 5 to 15 years
- High / H / More than 15 years

4 Surface Preparation

The single most important function that can influence paint system performance is the quality of surface preparation. The importance of removing surface contaminants, rectifiying surface imperfections and making a surface profile cannot be over emphasised.

The performance of protective coatings applied to steel is significantly affected by the condition of the steel substrate immediately prior to painting. The principal factors affecting performance are:

- surface contamination: salts, oils, grease, drilling and cutting compounds.
- surface imperfections: mill scale, existing coating, corrosion (rust)
- surface profile.



Solvent cleaning (SSPC SP-1)

Prior to use any method of surface preparation, it is essential to remove all soluble salts, oil, grease, drilling and cutting compunds and other surface contaminants by solvent washing and followed by wiping dry with clean rags.

Prior to solvent cleaning, remove foreign matter (other than grease and oil) by one or a combination of the following:

- Brush with stiff fiber or wire brushes
- Abrade, scrape, or clean with solutions of appropriate cleaners and followed by a fresh water rinse.

Methods of solvent cleaning

- Wipe or scrub the surface with rags or brushes wetted with solvent. Use clean solvent and clean rags or brushes for the final wiping.
- Spray the surface with solvent. Use clean solvent for the final spraying.
- Immerse completely in a tank or tanks of solvent. For the last immersion, use solvent which does not contain detrimental amounts of contaminant.
- Emulsion or alkaline cleaners may be used. After treatment, wash the surface with fresh water or steam to remove detrimental residues.
- Steam clean, using detergents or cleaners and follow by steam or fresh water wash to remove detrimental residues.

After solvent cleaning, remove dirt, dust, and other contaminants from the surface prior to paint application. Acceptable methods include brushing, blow off with clean, dry air or vacuum cleaning.

Surface imperfections

Imperfections on the surface should be rectified prior to coating. Such corrections form part of the surface preparation and should always be carried out before coating application. Apart from the steel surface imperfections listed below, imperfections on other types of surfaces (e.g., laitance on concrete, zinc salts on galvanized steel) should also be rectified prior to coating.

Mill Scale: A layer of ferric oxide formed on the surface of steel during hot rolling. Adherent mill scale should be removed by abrasive blasting or power tool cleaning . Hand and power tool methods can be effective on loosely adherent mill scale.

Existing Coating: Removal by abrasive blasting is the most effective; hand and power tool cleaning methods are also possible but much more labor intensive and best suited to small areas.

Corrosion (rust): Should ideally be removed by abrasive blasting . Hand and power tool methods are also possible but these methods are more labor intensive and best suited to small areas.

Hand tool cleaning (ISO 8504-3)

Hand tool cleaning is a method of preparing steel surfaces by the use of non-power hand tools. Hand tool cleaning removes all loose mill scale, rust, existing coating and other loose detrimental foreign matter. It is not intended that adherent (cannot be removed by lifting with a dull putty knife) mill scale, rust, and existing coating be removed by this process.

Impact hand tools should be used to remove stratified rust (rust scale) and weld slag. Hand tool cleaning includes hand wire brushing, hand abrading, hand scraping, or other similar non-impact methods. Feathering the edges of remaining existing coating so that the repainted surface can have a reasonably smooth appearance is important.

Hand tool cleaning methods are incomplete and always leave a layer of tightly adhering rust on the steel surface. Methods are described in SSPC-SP2, Hand Tool Cleaning and typically the level of preparation should be to ISO 8501-1:2007 grade St2-B, C or D.

Power tool cleaning (SSPC-SP3 & ISO 8504-3)

Generally power tool cleaning (electrical or pneumatic) is more effective and less laborious than hand tool cleaning for the removal of loosely adhering mill scale, existing coating and rust. However, tightly adhering rust and mill scale will not be removed by power tool cleaning.

Stratified rust, weld slags could be removed by power wire brushing, power abrading, power impact, or other power rotary tools. Care should be taken, particularly with power wire brushes, not to polish the metal surface as this will reduce the key for the subsequent paint layers. Power tools must be operated in a manner that prevents the formation of burrs, sharp ridges, and sharp cuts.

Methods are described in SSPC-SP3, Power Tool Cleaning, SSPC-SP11, Power Tool Cleaning to Bare Metal and SSPC-SP15, Commercial Grade Power Tool Cleaning and typically the level of preparation should be to ISO 8501-1:2007 grade St3-B, C or D. SSPC-SP11 and SSPC-SP15 describe a degree of surface profile which can be achieved by power tool cleaning.

Abrasive blast cleaning (ISO 8504-2)

Blast cleaning is based on the principle of an abrasive jet of particles (such as sand, grit or shot) in a compressed air stream impinging on the surface, removing impurities, mill scale, rust and existing coating. Abrasive blast cleaning is the most thorough and widely used method of surface preparation.

Different degrees of surface cleanliness are possible and depend partly on the surface condition prior to treatment and also to the length of time for which the surface is exposed to abrasive jet. In addition to cleaning the surface, the abrasive particles will impart a surface roughness to the steel and produce an anchor pattern for the paint. Blast cleaning also increases the surface area of the steel.

Prior to blasting, steelwork should be degreased . If salt, grease or oil is present on the surface it will appear to be removed by the blasting process, but this is not the case. Although not visible, the contamination will still be present as a thin layer and will affect the adhesion of subsequent coatings. Any presence of salts on (blast) cleaned surface can be checked by methods described in (ISO 8502-6 & ISO 8502-9).

Weld seams and sharp edges revealed after blasting should be ground down since newly applied wet coatings tend to run away from sharp edges, resulting in thin dry film thickness and reduced protection.

Weld spatter is almost impossible to coat evenly and is often loosely adherent. If present on the surface before coating, it is a common cause of premature failure. Therefore all weld spatter should be removed.

5 Initial Condition of Steel

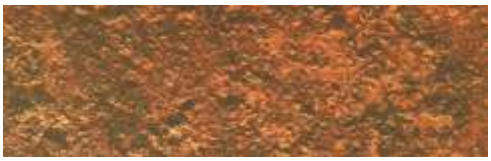
Pictorial examples of initial condition of steel as per EN ISO 8501-01

Rust grade A
Steel surface largely covered with adhering mill scale, but little if any rust.

Rust grade B
Steel surface which has begun to rust and from which mill scale has begun to flake.

Rust grade C
Steel surface on which the mill scale has rusted away or from which it can be scraped, but with slight pitting under normal vision.

Rust grade D
Steel surface on which the mill scale has rusted away and on which general pitting is visible under normal vision



Different qualities in surface preparation

ISO 8501-1 designation	Description
St 2	**Thorough hand and power tool cleaning** When viewed without magnification, the surfaces shall be free from visible oil, grease and dirt, and from poorly adhering mill scale, rust, paint coatings and foreign matter.
St 3	**Very thorough hand and power tool cleaning** When viewed without magnification, the surfaces shall be free from visible oil, grease and dirt, and from poorly adhering mill scale, rust, paint coatings and foreign matter. Similar to St2 but the surface must appear very thoroughly treated to give a metallic sheen arising from the steel surface.
Sa1	**Light blast-cleaning** When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from poorly adhering mill scale, rust, paint coatings and foreign matter[1].
Sa2	**Thorough blast-cleaning** When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from most of the mill scale, rust, paint coatings and foreign matter[1]. Any residual contamination shall be firmly adhering[2].
Sa2½	**Very thorough blast-cleaning** When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from mill scale, rust, paint coatings and foreign matter[1]. Any remaining traces of contamination shall show only as slight stains in the form of spots or stripes.
Sa3	**Blast-cleaning to visually clean steel** When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and shall be free from mill scale, rust, paint coatings and foreign matter[1]. It shall have a uniform metallic color.

[1] The term "foreign matter" may include water-soluble salts and welding residues.
[2] Mill scale, rust or a existing coating are considered to be poorly adhering if they can be removed by lifting with a blunt putty knife.

Pictorial examples of surface preparation

Cleaning standard	Initial steel condition: Rust grade A	Rust grade B	Rust grade C	Rust grade D
				
St 2	Not applicable			
St 3	Not applicable			
Sa1	Not applicable			
Sa2	Not applicable			
Sa2½				
Sa3				

Surface Profile (ISO 8503)

Surface profile indicates the roughness of blast cleaned surface. Surface profile is an independent factor and has no relation to the surface cleanliness. The surface profile obtained during blasting is important and will depend on the abrasive used, the air pressure and the technique of blasting. **Rz, Rmax and Ra values are used to specify degree of surface roughness.**

Rz The average value of the absolute values of heights of five maximum profile peaks and the depths of five maximum profile valleys.

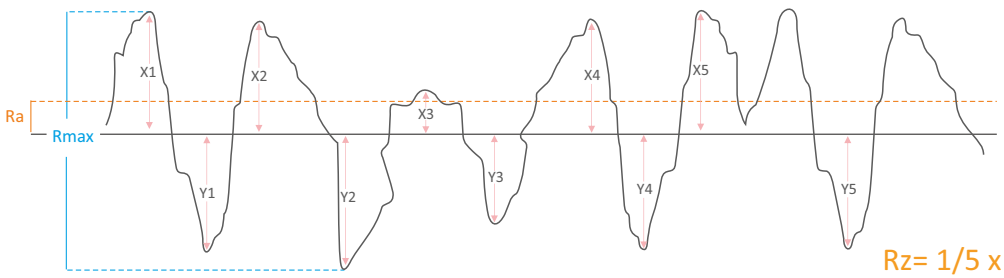
Rmax The distance between the highest point and the lowest point on the profile.

Ra The arithmetical mean of the absolute values of the profile departures within the sampling length. (Used on the RUGOTEST).

Generally, Rz is approx. 4-6 times Ra and Rz-value is also referred to as blasting profile.

Generally the profile height of steel should be in between ½ and 2.5 mils and not more than one third of the total dry film thickness of the coating system.

Too high surface profile will result in uneven coverage of high sharp profile peaks and possibly leading to premature coating failure. Too low surface profile may not provide a sufficient anchor for subsequent coating layers.



Rz= 1/5 x (X1+X2..+X5+Y1+Y2..Y5)

6

C2 Paint systems for low-alloy carbon steel for corrosively category C2

ISO12944: **C2**,C3,C4,C5-I,C5-M

System No.	Suggested Application	PRIMING COAT		TOPCOAT		Total NDFT* (µm)	Expected Durability**		
		Generic Name Coating System Seri No	NDFT* (µm)	Generic Name Coating System Seri No	NDFT* (µm)		LOW	MED	HIGH
1	indoor	Alkyd KA01/KA300	40	Alkyd KS82/KS24/KS03	40	80			
2	indoor	Alkyd KS03	40	Alkyd KS03	40	80			
3	indoor	Alkyd KA01/KA300	80	Alkyd KS82/KS24/KS03	40	120			
4	indoor	Epoxy BA900/BA095/BA124	80	Epoxy, Polyurethane BA011/BS867/BS865/BS869	40	120			
5	outdoor	Epoxy BA900/BA095/BA124	80	Polyurethane BS867/BS865/BS869	40	120			
6	indoor	Epoxy BA900/BA095/BA124	100	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	160			
7	outdoor	Epoxy BA900/BA095/BA124	100	Polyurethane BS867/BS865/BS869	60	160			

NOTE
***NDFT**: Nominal dry film thickness,
****: KANSI ALTAN's recommendation of paint system for expected durability, if other systems are required, please ask Kansai Altan representative.

C3 Paint systems for low-alloy carbon steel for corrosively category C3

ISO12944: C2,**C3**,C4,C5-I,C5-M

System No.	Suggested Application	PRIMING COAT 1		APRIMING COAT 2		TOPCOAT		Total NKFK* (µm)	Expected Durability**		
		Generic Name Coating System Seri No	NDFT* (µm)	Generic Name Coating System Seri No	NDFT* (µm)	Generic Name Coating System Seri No	NDFT* (µm)		LOW	MED	HIGH
3	indoor	Alkyd KA01/KA300	80			Alkyd KS82/KS24/KS03	40	120			
4	indoor	Epoxy BA900/BA095/BA124	80			Epoxy, Polyurethane BA011/BS867/BS865/BS869	40	120			
5	outdoor	Epoxy BA900/BA095/BA124	80			Polyurethane BS867/BS865/BS869	40	120			
6	indoor	Epoxy BA900/BA095/BA124	100			Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	160			
7	outdoor	Epoxy BA900/BA095/BA124	100			Polyurethane BS867/BS865/BS869	60	160			
8	indoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	50	Epoxy, Polyurethane BA011/BS867/BS865/BS869	50	160			
9	outdoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	50	Polyurethane BS867/BS865/BS869	50	160			
10	indoor	Epoxy BA900/BA095/BA124	140			Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	200			
11	outdoor	Epoxy BA900/BA095/BA124	140			Polyurethane BS867/BS865/BS869	60	200			

NOTE
***NDFT**: Nominal dry film thickness,
****: KANSI ALTAN's recommendation of paint system for expected durability, if other systems are required, please ask Kansai Altan representative.

C4 Paint systems for low-alloy carbon steel for corrosively category C4

ISO12944: C2,C3,**C4**,C5-I,C5-M

System No.	Suggested Application	PRIMING COAT 1		APRIMING COAT 2		TOPCOAT		Total NKFK* (µm)	Expected Durability**		
		Generic Name Coating System Seri No	NDFT* (µm)	Generic Name Coating System Seri No	NDFT* (µm)	Generic Name Coating System Seri No	NDFT* (µm)		LOW	MED	HIGH
8	indoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	50	Epoxy, Polyurethane BA011/BS867/BS865/BS869	50	160			
9	outdoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	50	Polyurethane BS867/BS865/BS869	50	160			
10	indoor	Epoxy BA900/BA095/BA124	140			Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	200			
11	outdoor	Epoxy BA900/BA095/BA124	140			Polyurethane BS867/BS865/BS869	60	200			
12	indoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	80	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	200			
13	outdoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	80	Polyurethane BS867/BS865/BS869	60	200			
14	indoor	Epoxy BA900/BA095/BA124	180			Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	240			
15	outdoor	Epoxy BA900/BA095/BA124	180			Polyurethane BS867/BS865/BS869	60	240			
16	indoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	120	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	240			
17	outdoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	120	Polyurethane BS867/BS865/BS869	60	240			
18	indoor	Epoxy BA900/BA095/BA124	110	Epoxy BA900/BA095/BA124	110	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	280			
19	outdoor	Epoxy BA900/BA095/BA124	110	Epoxy BA900/BA095/BA124	110	Polyurethane BS867/BS865/BS869	60	280			

NOTE
***NDFT**: Nominal dry film thickness,
****: KANSI ALTAN's recommendation of paint system for expected durability, if other systems are required, please ask Kansai Altan representative.

C5-I Paint systems for low-alloy carbon steel for corrosively category C5-I

ISO12944: C2,C3,C4,**C5-I**,C5-M

System No.	Suggested Application	PRIMING COAT 1		APRIMING COAT 2		TOPCOAT		Total NKFK* (µm)	Expected Durability**		
		Generic Name Coating System Seri No	NDFT* (µm)	Generic Name Coating System Seri No	NDFT* (µm)	Generic Name Coating System Seri No	NDFT* (µm)		LOW	MED	HIGH
16	indoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	120	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	240			
17	outdoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	120	Polyurethane BS867/BS865/BS869	60	240			
18	indoor	Epoxy BA900/BA095/BA124	110	Epoxy BA900/BA095/BA124	110	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	280			
19	outdoor	Epoxy BA900/BA095/BA124	110	Epoxy BA900/BA095/BA124	110	Polyurethane BS867/BS865/BS869	60	280			
20	indoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124	200	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	320			
21	outdoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124	200	Polyurethane BS867/BS865/BS869	60	320			
22	indoor	Epoxy BA900/BA095/BA124	150	Epoxy BA900/BA095/BA124	150	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	360			
23	outdoor	Epoxy BA900/BA095/BA124	150	Epoxy BA900/BA095/BA124	150	Polyurethane BS867/BS865/BS869	60	360			

NOTE
***NDFT**: Nominal dry film thickness,
****: KANSI ALTAN's recommendation of paint system for expected durability, if other systems are required, please ask Kansai Altan representative.

C5-M Paint systems for low-alloy carbon steel for corrosively category C5-M

ISO12944: C2,C3,C4,C5-I,**C5-M**

System No.	Suggested Application	PRIMING COAT 1		APRIMING COAT 2		TOPCOAT		Total NKFK* (µm)	Expected Durability**		
		Generic Name Coating System Seri No	NDFT* (µm)	Generic Name Coating System Seri No	NDFT* (µm)	Generic Name Coating System Seri No	NDFT* (µm)		LOW	MED	HIGH
16	indoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	120	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	240			
17	outdoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	120	Polyurethane BS867/BS865/BS869	60	240			
18	indoor	Epoxy BA900/BA095/BA124	110	Epoxy BA900/BA095/BA124	110	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	280			
19	outdoor	Epoxy BA900/BA095/BA124	110	Epoxy BA900/BA095/BA124	110	Polyurethane BS867/BS865/BS869	60	280			
20	indoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	200	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	320			
21	outdoor	Epoxy Zinc Rich BA69	60	Epoxy BA900/BA095/BA124/BA260	200	Polyurethane BS867/BS865/BS869	60	320			
22	indoor	Epoxy BA900/BA095/BA124	150	Epoxy BA900/BA095/BA124	150	Epoxy, Polyurethane BA011/BS867/BS865/BS869	60	360			
23	outdoor	Epoxy BA900/BA095/BA124	150	Epoxy BA900/BA095/BA124	150	Polyurethane BS867/BS865/BS869	60	360			

NOTE
***NDFT**: Nominal dry film thickness,
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Neotect
Protective Coatings

System No.	Suggested Application	PRIMING COAT 1		APRIMING COAT 2		TOPCOAT		Total NKFK* (µm)	Expected Durability**		
		Generic Name Coating System Seri No	NDFT* (µm)	Generic Name Coating System Seri No	NDFT* (µm)	Generic Name Coating System Seri No	NDFT* (µm)		LOW	MED	HIGH
Paint systems for steel structures buried in soil											
24	tank outdoor	Epoxy Zinc Rich BA69	60	Epoxy BA124	300			360			
25	tank outdoor	Epoxy BA960	250	Epoxy BA960	250			500			
Paint systems for storage of petrochemical products											
26	tank indoor	Phenolic Epoxy BA140	150	Phenolic Epoxy BA140	150			300			
27	tank indoor	Epoxy Epomarine Primer PC	40	Epoxy Epomarine PC100 Primer + Epomarine PC100 Undercoat	200	Epomarine PC100 Topcoat	100	340			
Tank lining for storage of potable water											
28	tank indoor	Epoxy BA144	150	Epoxy BA144	150			300			
29	tank indoor	Epoxy BA146	150	Epoxy BA146	150			300			

NOTE
***NDFT**: Nominal dry film thickness,
****: KANSI ALTAN's recommendation of paint system for expected durability, if other systems are required, please ask Kansai Altan representative.

7 Generic Types of Paints

Epoxy Based Primers & Topcoats	Volume Solids, %	Mixing Ratio By Weight	Mixing Ratio By Volume	Description
BA09-EPOTAN HS PRIMER	80±2	12/1 BB09Z006 (STD) 10/1 BB09Z007 (fast)	6.5/1 BB09Z006 (STD) 5.5/1 BB09Z007 (fast)	Two component, high volume solids, matt epoxy paint which dries fast at low temperatures. It contains zinc phosphate as anticorrosive pigment. It is used as a primer or intermediate coat for protection of steel structures where high film build and short drying time are preferred.
BA010-EPOTAN HB COATING	64±2	9/1 BB010Z001 (STD) BB010Z002 (WG)	5/1 BB010Z001 (STD) BB010Z002 (WG)	Two component, epoxy resin based, anticorrosive coating with zinc phosphate pigment. Developed for excellent adhesion, high build primer and topcoat demands of metal industry.
BA011-EPOTAN STEELPROTECT HB	74±2	5/1 BB011Z001 (STD) BB011Z002 (WG)	3/1 BB011Z001 STD) BB011Z002 (WG)	Two component, high volume solids, semi matt epoxy paint used for protection of steel structures. Pigmented with zinc phosphate. BA011 forms a hard and tough coating in mild to severe corrosive environments.
BA095-EPOTAN SHB PRIMER	85±2	7/1 BB095Z001	4/1 BB095Z001	Two component, zinc phosphate pigmented, high solids, matt epoxy primer used for protection of steel structures. It is a fast drying and super high build (SHB) product. EPOTAN SHB PRIMER is suitable for structural steel to be exposed to corrosive environments.
BA124-EPOTAN HS MASTIC	85±2	10/1 BB124Z001 (STD) BB124Z004 (WG)	6/1 BB124Z001 (STD) BB124Z004 (WG)	Two component, high volume solids, high build and surface tolerant semi matt epoxy paint used for protection of steel structures. It can be applied directly on shop primed substrate as a primer or on zinc rich primers as a tiecoat or as a finishing coat.
BA124MG-EPOTAN HS MASTIC ALU	82±2	5.4/1 BB124Z005	4/1 BB124Z005	Two component, high volume solids, surface tolerant, polyamine adduct cured epoxy mastic used for protection of steel structures. Pigmented with aluminium for improved barrier protection. BA124MG can be applied directly on shop primed substrate as a primer or on epoxy or ethyl silicate zinc rich primers as an intermediate coat.
BA260-EPOTAN HS MIO PRIMER	80±2	7/1 BB260Z001	4/1 BB260Z001	Two component, micaceous iron oxide (MIO) pigmented, high solids, matt epoxy primer used for protection of steel structures. It is a fast drying and high build product. EPOTAN HS MIO PRIMER could be used as primer or as a mid coat on steel structure and could be applied at low temperatures.

**WG stands for Winter Grade (rapid hardener)*

Epoxy Based Primers & Topcoats	Volume Solids, %	Mixing Ratio By Weight	Mixing Ratio By Volume	Description
BA900-EPOTAN HS PRIMER	80±2	2/1 BB900Z001	2/1 BB900Z001	Two component, zinc phosphate pigmented, high solids, matt epoxy primer/intermediate coat used for protection of steel structures.
BA960-EPOTAN BARRIER PRIMER	%85±2	6.5/1 BB960Z001	4/1 BB960Z001	Two component, high volume solids, modified epoxy primer It is recommended in wide variety of environments including offshore structures, harbors, bridges and piers that are intermittently contacted with water.

Alkyd Based Primers & Topcoats	Volume Solids, %	Description
KA01-ANTICORROSIVE PRIMER	%44±2	Air-drying anticorrosive primer based on modified alkyd resins. Meets the demands of metal industry for high corrosion resistance and quick drying property.
KA300-ALKYTAN HB PRIMER	%56±2	High build, one component, air-drying, zinc phosphate containing anticorrosive matt primer based on modified alkyd resins. KA300 Alkytan HB Primer is used as an anti corrosive primer for protection of steel in urban and industrial atmospheres.
KS03-ANTICORROSIVE TOPCOAT (semi matt)	%40±2	Air-drying matt topcoat based on modified alkyd resins. It was developed for high corrosion resistance and fast drying property demands of metal industry.
KS24-SENTEPOL ENAMEL (semi gloss, topcoat)	%45±2	Air-drying topcoat based on modified alkyd resins. Developed for good exterior durability and semi gloss property requirements of general industry.
KS82-SENTEPOL ENAMEL (semi matt, topcoat)	%45±2	Air-drying topcoat based on modified alkyd resins. Meets the demands of general industry for fast drying, high build, matt topcoat.

Acrylic Pur Topcoat	Volume Solids, %	Mixing Ratio By Weight	Mixing Ratio By Volume	Description
BS80M-TETRAPUR TOPCOAT (metallic sheen)	%40±2	4/1 BB80Z001 (STD)	4/1 BB80Z001 (STD)	Two pack, metallic topcoat based on Acrylic-Polyisocyanate resins. Recommended as a topcoat where high mechanical durability and chemical resistance requirements are combined with aesthetic expectations. Outdoor durability is excellent.
BS86-PUR ACRYLIC HIGH SOLID TOPCOAT (semi gloss)	%59±2	8.5/1 BB85Z001 (STD) BB85Z100 (WG)	6/1 BB85Z001 (STD) BB85Z100 (WG)	Two pack, high solid (HS), semi-gloss topcoat based on Acrylic-Polyisocyanate resin. Recommended as a semi gloss topcoat where high mechanical durability and chemical resistance requirements are combined with excellent outdoor durability.
BS865-HS ACRYLIC PUR TOPCOAT SG (semi gloss)	%65±2	10/1 BB867Z001	9/1 BB867Z001	Two component, semi gloss, high volume solid polyurethane topcoat based on acrylic polyols and aliphatic polyisocyanate resins. High mechanical durability combined with chemical resistance, and excellent outdoor durability are the main characteristics of BS865 series.
BS867-HS ACRYLIC PUR TOPCOAT (gloss)	%69±2	10/1 BB867Z001	9/1 BB867Z001	Two component, high volume solid, glossy polyurethane topcoat based on acrylic polyols and aliphatic polyisocyanate resins. High mechanical durability combined with chemical resistance, and excellent outdoor durability are the main characteristics of BS867 series.
BS869-HS ACRYLIC PUR TOPCOAT HG (high gloss)	%67±2	10/1 BB867Z001	9/1 BB867Z001	Two component, high gloss, high volume solid polyurethane topcoat based on acrylic polyols and aliphatic polyisocyanate resins. High mechanical durability combined with chemical resistance, and excellent outdoor durability are the main characteristics of BS869 series.

**WG stands for Winter Grade (rapid hardener) Please consult Kansai Altan technical representatives for PUR Acrylic systems with special effects (e.g., metallic, textured) used in various architectural projects.*

Fhenolic Epoxy Primer	Volume Solids, %	Mixing Ratio By Weight	Mixing Ratio By Volume	Description
BA140-EPOTAN TANK LINING	%70±2	13/1 BB140Z001	7/1 BB140Z001	Two component, high volume solids, amine adduct cured phenolic epoxy (Novolac) primer with high resistance to a wide range of petrochemicals and solvents.

Solvent Free Epoxy Primers	Volume Solids, %	Mixing Ratio By Weight	Mixing Ratio By Volume	Description
BA144-EPOTAN TANK LINING SF	%100±2	3.2/1 BB144Z001	1.8/1 BB144Z001	Two component, high volume solids, polyamine cured solvent free epoxy primer with excellent water, chemical and solvent resistance and mechanical properties. It can be applied high film thicknesses.
BA146-EPOTAN TANK LINING DI	%100±2	5/1 BB146Z001	3.7/1 BB146Z001	Two component, high volume solids, polyamine cured solvent free epoxy primer with excellent water, chemical, solvent and abrasion resistance and mechanical properties. It can be applied high film thicknesses. It is suitable for potable water and does not contain benzyl alcohol.

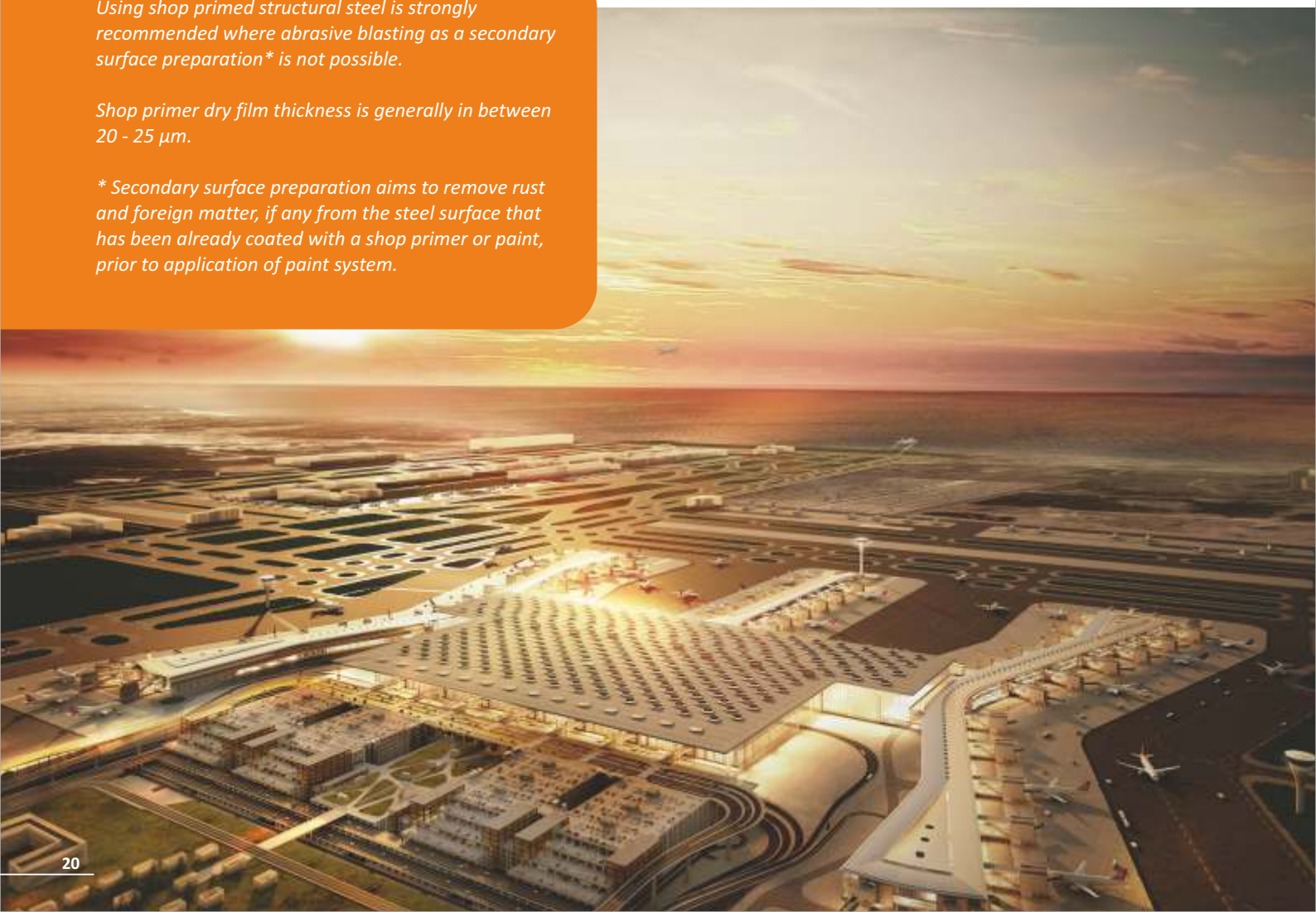
Zinc Rich Primers	Volume Solids, %	Mixing Ratio By Weight	Mixing Ratio By Volume	Description
BA69MG994 EPOTAN ZINC RICH PRIMER	%71±2	14/1 BB05Z007	4/1 BB05Z007	An organic zinc rich, high build, two pack protective primer based on epoxy-polyamide resin and zinc powder. Contains minimum 80% zinc by weight in the dry film. Conforms to SSPC Paint 20 Level 2.
BA920 ZINCTECT 1500 QD	%44±2	3 (liquid) / 8 (paste) BB920Z001		Inorganic zinc rich paint based on alkyl silicate resin and zinc powder. Recommended for steel structure at marine or industrial severe corrosive environment. Excellent continuous heat resistance up to 400°C and excellent water, sea water, oil and organic solvent resistance is combined with excellent anti-corrosive performance.

Pre-fabrication Primers (Shop Primer)	Volume Solids, %	Mixing Ratio By Weight	Mixing Ratio By Volume	Description
BA507 SHOP PRIMER	%26±2	14/1 BB507Z001	2/1 BB507Z001	Epoxy based, two component protective pre-construction primer that contains zinc phosphate rust-inhibiting pigment.
BA570 SHOP PRIMER	%36±2	14/1 BB071Z002	9/1 BB071Z002	Epoxy based, fast drying, 2K protective pre-construction primer (shop primer) that contains zinc phosphate as rust-inhibiting pigment. It is used for temporary protection of steel surfaces against corrosion, during fabrication, storage and transportation. Designed for good welding and cutting speed and reduced weld porosity.
BA910 ZINCTECT 1000HA(S) SHOP PRIMER	%52±2	3 (liquid) / 7 (powder)	3 (liquid) / 5 (powder)	Inorganic zinc rich pre-construction primer (shop primer) for steel sheets and various structural steel shapes, based on alkyl silicate resin and zinc powder. Recommended for steel structure at marine or industrial severe corrosive environment. Excellent shop-coat line applicability, quick drying, excellent anti-corrosive performance, excellent resistance to weathering, resistance to oil and resistance to organic solvents and heat resistance, conforms to JIS K 5552 Type 1.

Using shop primed structural steel is strongly recommended where abrasive blasting as a secondary surface preparation is not possible.*

Shop primer dry film thickness is generally in between 20 - 25 µm.

** Secondary surface preparation aims to remove rust and foreign matter, if any from the steel surface that has been already coated with a shop primer or paint, prior to application of paint system.*



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