IS: 14871

CM/L-6700059817

Ramco Industries Limited

RAMCO
GREENCOR
NEW AGE ROOFING

THE WORLD'S MOST ADVANCED INDUSTRIAL ROOFING SHEET

GREENCOR

The Future of Roofing

Gone are the times when roofing systems were only a simple part of a building. Roofing systems are increasingly trending towards saving money and energy, and providing vital environmental benefits.

When evaluating systems for your next commercial roofing project, you may want to ask yourself “Why go with Metal? Why not go with Greencor?

Why not reduce Urban Heat Islands with roofing that cools like Greencor.

Metal Roofing Sheets are not the alternative to Conventional Roofing Sheets

GREENCOR is the best for Industrial Roofs

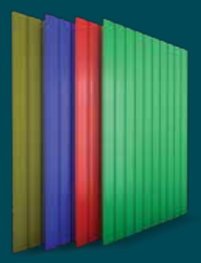
Ramco Greencor is a superior roofing product, manufactured using European Technology and specially developed new age Synthetic Fibres to give the world its first ideal industrial roofing.

SUSTAINABILITY

GREENCOR.
Consider it as a marvel of geo-engineering

Steven Chu
Former US President Barack Obama's
Energy Secretary & Nobel Prize Winner
pioneered the study of Urban Heat Islands (UHIs).

Some people believe that nuclear power is the answer to climate change, others have proposed green technologies such as wind or solar power, but Barack Obama's top man on global warming has suggested something far simpler – **White roofs / Grey roofs**



Not Green, Blue, Red
or Yellow Metal Sheets

Steven Chu, the US Secretary of Energy and a Nobel prize-winning scientist, said that making roofs white or natural grey shade would help to reduce global warming by both conserving energy and reflecting sunlight back into space

White and natural grey roofs have a dramatic impact on the amount of energy used to keep buildings comfortable, as well as directly offsetting global warming by increasing the reflectivity of the Earth.

"If that building is air-conditioned, it's going to be a lot cooler, it can use 10 or 15 % less electricity, You change the albedo of the Earth – and make it more reflective. So the sunlight comes down and it actually goes back up – there is no greenhouse effect." Steven Chu

Scan the QR codes
to hear
Steven Chu's
speech about
white roofs.

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LIFE CYCLE ANALYSIS (LCA)

Average temperature on a hot summer day will be 7°C warmer in urban areas than surrounding rural areas.

Roofing takes up a lot of surface area in urban areas, but roofing is not often considered a source of urban heat because it is "out of sight, out of mind." Yet colored roofing accounts for 38%, or almost 3°C, of the 7°C difference associated with UHIs*

Installation of Greencor roofing during initial construction or when re-roofing, offers immediate benefits, not only toward mitigation of UHIs* but also as energy savings.

A mainly financial Life Cycle Analysis (LCA) approach for comparing roof systems might consider the following:

- Installation – product cost, installation costs, tear-off costs, disposal costs, business disruption costs.
- Long Term Durability – routine maintenance costs, roof replacement costs.
- Repairs – roof repair costs, interior damage repair costs.
- Energy Savings – estimated savings, rebates and incentives.
- Warranty – cost premiums.

* Urban Heat Islands

Ramco Greencor conforms to
IS 14871:2000 & ISO 9933:1995(E)

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PRODUCT COMPARISON CHART

Properties	Metal Sheets	Greencor Sheets	Inference
Material	Galvanised Iron	**Cement, Fly Ash, Synthetic Fibre**	Greencor ensures zero maintenance Resistance to natural weathering / corrosion
Sound	High Noise Pollution	**Zero Noise Pollution**	Greencor ensures calm and quiet environment
Heat Difference (0°C)	Absorbs heat, hence warmer	**Keeps the interior 5°C* cooler in summer and warmer in winter**	Greencor reduces and keeps internal temperature cooler than ambient temperature.
Lightning and Power	Conducts & Affects	**Does not conduct and affect**	Greencor is unaffected by lightning and live power wire hence ensures a safe environment.
Thermal Conductivity (λ) (ASTM C177)	20 W/mK	**0.18 W/mK**	Greencor has very low thermal conductivity property which results in lower conductance of heat or cold. This results in better living environment.
Load Bearing Strength	--	**3300 N/m**	Greencor has excellent load bearing strength
Non-combustibility	Poor	**Excellent**	Greencor is non-combustible / Fire resistant
Life	8 Years	**50 Years**	Greencor is more durable when compared to all metal sheets Metal sheets tend to corrode and rust.
Chemical Resistance	Poor	**Excellent**	Greencor has excellent chemical resistance
Vapour Permeability	Poor	**Good**	Greencor prevents condensation because of breathability.
Deform Stability	Satisfactory	**Good**	Greencor has good dimensional stability

*Tested at RIL R&D lab under specific conditions

TYPE	A	
PRODUCT CATEGORY	C	
CLASS	7	
PARAMETER	**STANDARD**	**TOLERANCE (mm)**
Length (m)	1.5, 1.75, 2.0, 2.25, 2.50, 2.75, 3.0	+10, -5
Width (mm)	1050	+10, -5
Laid Width (half corrugation)	1010	+10, -5
Pitch (mm)	146	+6, -2
Depth (mm)	48	+3, -5
Thickness (mm)	6	± 10%
Out of squareness of sheets	Less than 10 mm	Less than 10 mm
Number of corrugation	7	Nil
	Weight of 100 sq.m as Laid*	
a) With 3 m sheet	1.25 Tonnes	
b) With 1.5 m sheet	1.33 Tonnes	
*Sheet weight (Kg)	11.5 kg per meter length	---

BENEFITS

Urban

Cities can be 2°C to 8°C warmer than surrounding areas because they absorb the sun's light energy as heat during the day and release it at night as heat. This phenomenon prevents air from cooling down at night and results in higher temperatures being maintained longer. By immediately reflecting solar radiation back into the atmosphere and re-emitting some portion of it as infrared light, Roofs like Greencor result in cooler air temperatures for urban environments.

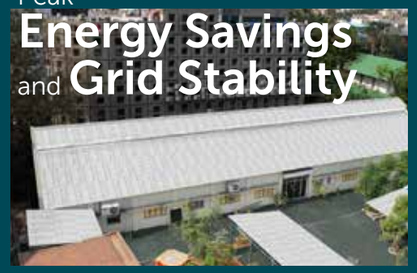
Reduced

Greencor roofs, through mitigation of the urban heat island effect reduce ambient air temperatures, and improve air quality. Smog is created by photochemical reactions of air pollutants and these reactions increase at higher temperatures. Therefore, by reducing the air temperature, Greencor roofs decrease the rate of smog formation.

Public

Lower ambient air temperatures and the subsequent improved air quality also results in a reduction in heat-related and smog-related health issues, including heat stroke and asthma and worker productivity.

Peak



Because Greencor Roofs reduce air-conditioning use during the day's hottest periods, the associated energy savings occur when the demand for electricity is at its peak. Therefore, Greencor roofs reduce stress on the energy grid during hot summer months and help avoid shortages that can cause blackouts or brownouts.

Secondary

Greencor roofs directly reduce air conditioning use for buildings by reducing heat gain in the building below, but they also indirectly reduce air conditioning use in urban areas by helping lower ambient air temperatures. Cooler daytime temperatures mean that buildings use less air conditioning. In turn, this results in a reduction in the CO_2 emissions from electricity generating power plants.

DURABILITY

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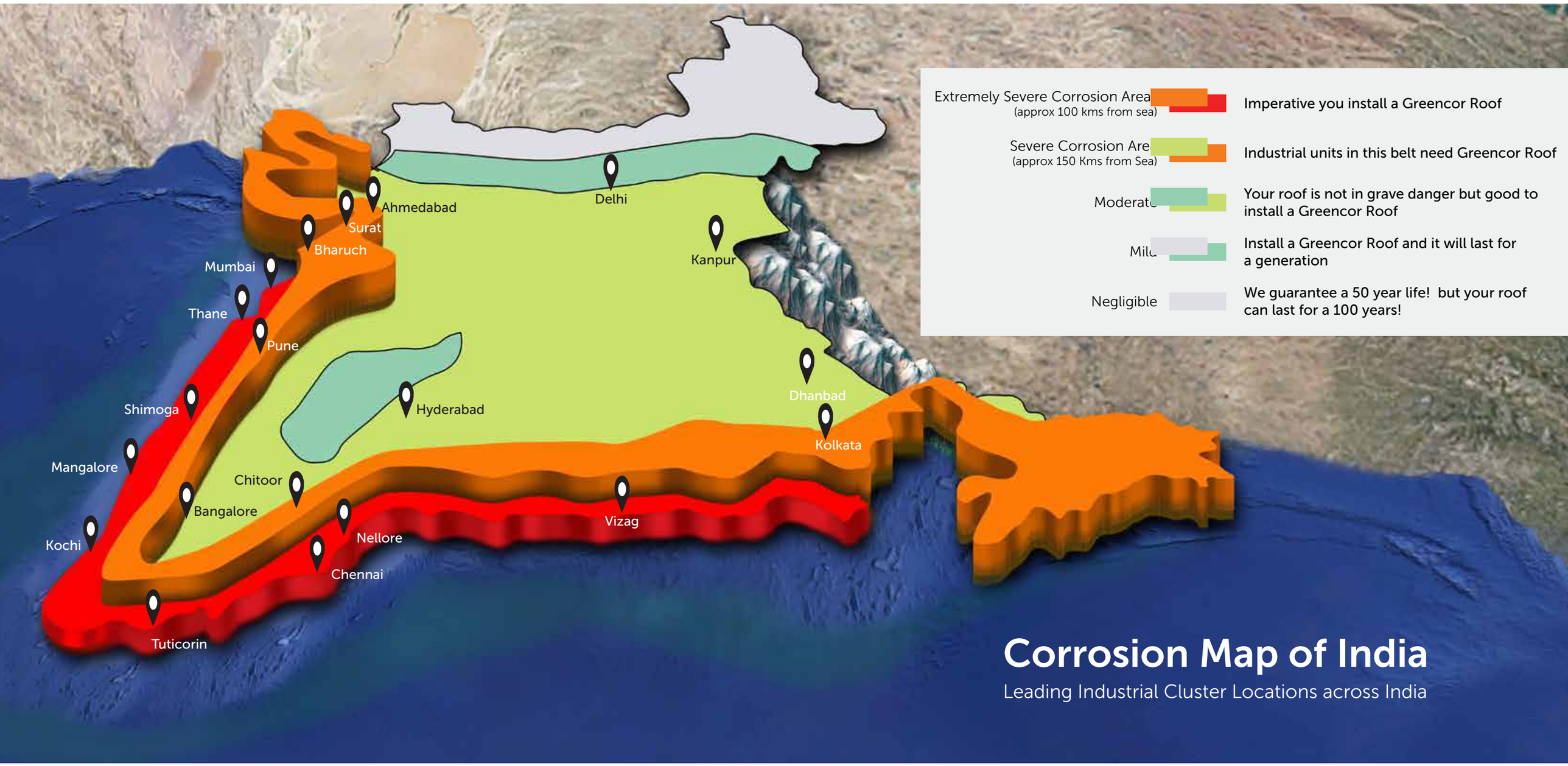


Corrosion Map of India

Leading Industrial Cluster Locations across India

INDIA IS CORROSION PRONE

India is one of the fastest growing economies with greater attendant emissions

India's carbon emission per year – 2.096 billion tonnes (2015)

India contributed 6.3% of all global CO_2 emissions (2015)

Surrounded by sea on three sides, sea breeze has high salinity with moisture content

The tropical climate with good sunshine and rainfall every year

INDIA IS CORROSION PRONE AND SO ARE METAL ROOFING SHEETS

An European study states that the life time of a galvanized steel sheet is 8 years under Indian climate conditions.

The increasing pollutions levels and bad climatic conditions can decrease their life further.

Metal roofing sheets corrode hence less durable leading to periodical maintenance and high replacement costs.

Industrial units with high humidity content and chemical fumes emission in their manufacturing process are prone to faster corrosion. Fertilizers, Chemicals, Petroleum, Food, Paper and Pulp, Textiles and Pharma.

GREENCOR IS CORROSION-PROOF

Made of cement and PVA fiber, Greencor does not corrode. On the contrary it strengthens over time and becomes more durable.

They have a long life of upto 50 years and are trouble-free and maintenance-free.

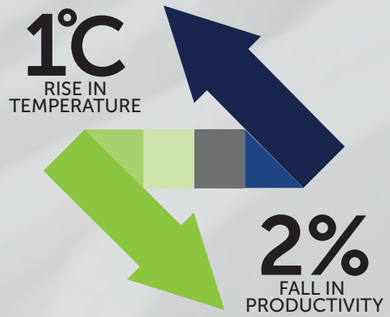
CORROSION CATEGORY

CORROSION CATEGORY	EXAMPLE OF TYPICAL CORROSION ENVIRONMENTS
C1 Very low	Heated buildings with clean atmospheres, e.g. offices, shops, schools, hotels.
C2 Low	Unheated buildings where condensation may occur, e.g. depots, sports halls. Atmospheres with low level of pollution. Mostly rural areas.
C3 Middle	Production rooms with high humidity and some air pollution e.g. food-processing plants, laundries, breweries and dairies. Urban and industrial atmospheres, moderate sulfur dioxide pollution. Coastal areas with low salinity.
C4 High	Chemical plant, swimming pools, coastal ship and boatyards. Industrial areas and coastal areas with moderate salinity.
C5 (I+M) Very high	Buildings or areas with almost permanent condensation and with high pollution. Coastal and offshore areas with high salinity.

THE LIFE IN YEARS FOR GALVANIZED COATINGS USED IN CORROSION CATEGORIES C1 -C5.

COATING THICKNESSES ACCORDING TO EN ISO 1461		LIFE TIME OF ZINC COATING IN DIFFERENT CORROSION CATEGORIES (IN YEARS)				
Steel thickness mm	Local coating thickness (mean thickness) µm	C1	C2	C3	C4	C5
Steel < 1,5 mm	Steel < 1,5 mm	100+	50-100+	17-50	8-17	4-8

PRODUCTIVITY



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The Economics Impacts of Temperature on Industrial Productivity

Surface temperatures broadly influence economic output through their impact on worker's productivity.

Plant level manufacturing output responds negatively to high temperatures

The magnitude of losses is economically significant - of the order of 2% of daily output per degree celsius

Body

Heat Mechanism

The physics of how temperatures affects human beings is well known. The physical exchange of heat between the human body and the surrounding air is fundamentally related to health because in order to maintain normal body temperatures, the human body must dissipate the heat it generates internally to the ambient atmosphere. When energy is expended while working, internal heat generation increases and correspondingly greater rates of heat loss become necessary. When this balance cannot be maintained during normal activity levels then it becomes necessary, for safety reasons to reduce the rate at which energy is consumed or to suffer the adverse consequence of over-heating, including heat stroke.

Worker discomfort

Worker attrition

Decreased attractiveness of the job

The magnitude of costs imposed by heat stress effects is significant

There is empirical evidence from the manufacturing sector in India to suggest that manufacturing output decreases significantly as temperatures increase.

This impact is likely to be similar in manufacturing sectors in countries other than India.

The effect of temperature on worker productivity is much more important than is generally recognized.

Verticals

Warehousing

The roof is a warehouse's first line of defense from natural hazards such as wind, rain, fire and heat. It is also the most vulnerable part of your warehouse. Every day, your roof is exposed to weather and other elements that may contribute to decay and deterioration, increasing the risk of damage to the roof itself and the contents within.

Ideally, a warehouse roof should be strong, durable, weather-proof and most importantly a good insulator of heat. Heat is a detrimental factor in climate-controlled warehouses. Metal roofs conduct heat rapidly but strains on the power required to operate these climate-controlled facilities.

Delicate products, such as perishable produce or flowers require a humidity-controlled environment to keep them fresh. The moisture buildup on the roofs promotes fungal growth* which spoils the perishable goods. Humidity causes metal roofs to rust and weaken rapidly. A rusted metal roof can be very damaging to a clean facility required for handling highly sensitive computer products. These are just a few instances where metal roofs fail miserably.

As a warehouse owner, it is important to store all your clients merchandise in acceptable condition before being dispatched to their final destinations.

Do you want the world's most versatile roof that does not rust, stays cool and saves money in the long run?

* Greencor with approved fungicidal treatment ensures microbial safety standards

THE IDEAL ROOF FOR WAREHOUSING

- Designed to keep interiors cool by as much as 5% compared to metal roofs
- Designed to be corrosion-free to increase the longevity of roofs
- Designed to allow reliable and effective inspection
- Designed for easy maintenance

Plus, it is non-combustible, noise resistant and a non-conductor of electricity and lightning.

Verticals

Railways

Railway stations have one of the largest congregation of people waiting to commute under their roofs. The heavy downpours during monsoons and the sun beating down during the summer makes problem acute for passengers. The problems are usually compounded if it is a metal roof.

Metal roofing sheets become flying missiles in cyclones endangering the life of commuters. The weather worn metal roofs are prone to rust that eat into the sheets. This produces gaping holes which results in water seepages and leaks.

Metal roofs also conduct heat rapidly increasing the ambient temperature under it and causing inconvenience to commuters especially during hot season. You might have installed more fans which increases the power consumption to mitigate the discomfort.

It would be prudent to install a roof that is weather-proof, good insulator of heat, does not rust and has 5x longer life compared to metal sheets.

- Designed to keep ambient temperature cool by as much as 5% compared to metal roofs
- Designed to be corrosion free to increase the longevity of roofs

- Designed to allow reliable & effective inspection
- Designed for easy maintenance
- Designed to resist environment assisted cracking and atmospheric aggression

Plus, it is non-combustible, noise resistant and a non-conductor of electricity and lightning.

THE IDEAL ROOF FOR RAILWAYS

Verticals

Dairy Farming

Dairy Farming is becoming more evolved and is oriented towards care management. This has a bearing on the yield, quality of milk and well-being of the cattle

Heat is a detrimental factor in cattle care and heat stress causes the largest economical loss in the world's diary sector. Water sprinklers and mechanical ventilation keep the cattle cool but did you know that the heat can be curtailed by replacing your current metal roof?

A practical roofing solution that has low thermal conductivity will keep the cattle cool, increase their well-being, feed efficiency and increased productivity levels.

As a dairy owner, the well-being of your cattle is important and it all starts with the roof. The roof should be strong, durable, weather proof, sound proof and most importantly a bad conductor of heat. Metal roofs fail miserably in all these aspects. Moreover, ammonia, manure gases and water vapor inherent in cattle sheds cause metal roofs to rust and fail in no time incurring replacement costs.

Do you want 'cool cows' for increased productivity?

- Designed to keep interiors cool by as much as 5% compared to metal roofs
- Designed to be corrosion free to increase the longevity of roofs

- Gives a support structure resistant to failure
- Designed to allow reliable & effective inspection
- Designed for maintainability
- Designed to resist ammonia and greenhouse gases.

Plus, it is non-combustible, noise resistant and a non-conductor of electricity and lightning.

THE IDEAL ROOF FOR DAIRY FARMING

Verticals

Poultry Farming

Poultry Farming is a temperature sensitive operation. Temperature rise can lead to drop in feed consumption and heat stress resulting in reduction of egg production. Temperature raise above 38°C can even cause mortalities

Roofing plays an important part in regulating the temperature inside the poultry house. Chances are your metal roof is playing the villain. An ideal poultry house roof should be strong, durable, weather proof and most importantly a bad conductor of heat. Metal roofs fail miserably in all these aspects. Moreover, ammonia present in the poultry house cause metal roofs to rust and fail in no time incurring replacement costs.

Mechanical ventilation keeps the flock cool but there are measures that can be taken to keep the hens healthy and producing eggs. We would like to make a radical suggestion. Imagine if you could decrease the temperature by 5% just by changing your metal roof.

Do you want a happy flock for increased productivity?

- Designed to keep interiors cool by as much as 5% compared to metal roofs
- Designed to be corrosion free to increase the longevity of roofs

THE IDEAL ROOF FOR POULTRY FARMS

- Gives a support structure resistant to failure
- Designed to allow reliable & effective inspection
- Designed for maintainability
- Designed to resist ammonia and greenhouse gases.

Plus, it is non-combustible, noise resistant and a non-conductor of electricity and lightning.

Verticals

Oil Refining Industry

Oil Refining is a high hazard industry processing millions of barrels of flammable toxic substances. As a sector which uses state-of-the-art machineries, it is imperative to counter the high degree of corrosion.

A high-performance roofing solution that resists the corrosion is required to keep everything on the floor level ship shape.

As a Corrosion Engineer, you are an expert in the risk management of critical equipment. The same chemical substances released during the refining process corrode metal roofs as well. Most of the chemical and acidic particulates and fumes like naphthenic fumes, sulphur compounds, carbon dioxide eats into metal roofs.

Plus, tropical climatic conditions, air pollution and the coastal proximity of majority of the refineries cause stress, pitting and galvanic corrosion which results in drastic corrosion of the roof, exposing critical machinery to the elements causing downtime and eventually replacement costs.

Do you want Greencor roofs to be a part of your risk management strategy as well?

- Designed to minimize corrosion damage to safety and critical items
- Gives a support structure resistant to failure when subjected to wash down.
- Designed to allow reliable & effective inspection
- Designed for maintainability
- Designed to resist melting in fires
- Designed for hot work sites
- Designed to resist combustible vapors.

Plus, it is non-combustible, noise resistant and a non-conductor of electricity and lightning.

THE IDEAL ROOF FOR OIL REFINERIES

Verticals

Textile Industry

Corrosion is the single biggest factor causing a loss of over 3.5% of a nation's GNP. Corroded metal roofs fail prematurely affecting productivity, safety and environment.

Textile units have a humid production environment and you use techniques like inchromizing, borizing and vanadizing of the machinery to protect them from corrosion. But how are you protecting your roof? Even a small leak in the roof can cause machine downtime. You can give your machines a hard chrome surface treatment but you can't do this to your metal roof.

Steaming is one of the most important processes in textile finishing. You use steam coolers but have you thought of a roof that works as a cooler? Are you thinking that a water proofing solution will do the job? Greencor will do it better and give your roof resistance against aging, atmospheric aggression and resistance to UV rays.

- Designed to keep interiors cool by as much as 5% compared to metal roofs
- Designed to be corrosion free to increase the longevity of roofs
- Gives a support structure resistant to failure

- Designed to allow reliable & effective inspection
- Designed for maintainability
- Designed to resist environment assisted cracking and atmospheric aggression

Plus, it is non-combustible, noise resistant and a non-conductor of electricity and lightning.

THE IDEAL ROOF FOR TEXTILE UNITS

Verticals

Pulp and Paper Industry

Pulp and paper mill owners are constantly on guard against corrosion in their facilities. Every step of the process must be free from corrosion. You run the risks of polluting the paper, damaging the machinery and compromising worker safety.

Fire suppression, roof leakage sealing, heat absorption reduction and warehousing are very important. The supporting structure matters in acid fume areas. Bleaching chemicals, chlorine dioxide, sulphur and NOX emissions - they all affect not just your machinery but also your metal roofs. You understand all this and have invested in a resilient line of anti-corrosion coatings. Considering these risks, It would be prudent to install Greencor Roof.

You may also be looking for increased energy efficiency, ambient temperature services and techniques for noise reduction?

We would like to add a Greencor Roof for consideration in your QC/QA plan. It is the roof that protects the equipment that drives your business. It's BAT (Best Available Technique) for Paper Industry.

- Designed to keep interiors cool by as much as 5% compared to metal roofs
- Designed to be corrosion free to increase the longevity of roofs

- Gives a support structure resistant to failure
- Designed to allow reliable & effective inspection
- Designed for maintainability
- Designed to resist environment assisted cracking and atmospheric aggression

Plus, it is non-combustible, noise resistant and a non-conductor of electricity and lightning.

THE IDEAL ROOF FOR PAPER & PULP UNITS

Verticals

Pharma Industry

The drug industry faces the critical challenge of corrosion of process plant equipment. The arduous chemical environment demands constant attention.

You have been successfully ensuring protection for equipment facilities, chemical storage tanks, floors subjected to mechanical and thermal stress. If you have a metal roof, have you extended this attention to your roof which is also subjected to corrosive and thermal stress.

Corrosion prevention is non- negotiable in the pharmaceutical industry. Corroding roofs can contaminate pharma products causing rejection of entire production batches resulting in an enormous financial loss.

Aggressive environment imposes very high demands on roofing materials and a wrong choice of material influences product life. We can help in the material selection process for the roof.

Make a judicious selection of the roof. Achieve a long service life with the correct choice of roofing material

- Designed to keep interiors cool by as much as 5% compared to metal roofs
- Designed to be corrosion free to increase the longevity of roofs
- Gives a support structure resistant to failure
- Designed to allow reliable & effective inspection
- Designed for maintainability
- Designed to resist environment assisted cracking and atmospheric aggression
- Conforms to legal and occupational health and safety guidelines

- Designed to protect your machinery from the destructive forces of a leaking roof
- Designed to withstand alkaline, acidic environment as well as to oxidizers
- Does not require VPCI (Vapor Phase Corrosion Inhibitors) to protect the roof
- World class product
- World class customer service

Plus, it is non-combustible, noise resistant and a non-conductor of electricity and lightning.

THE IDEAL ROOF FOR PHARMA INDUSTRY

Verticals

Food Industry

In the food processing industry, corrosion prevention must be accomplished using materials that meet strict requirements for direct or indirect food contact. The food processing environment is highly corrosive due to the extensive requirements for cleaning and sanitation.

High-pressure water and steam, often in combination with various corrosive agents (alkaline, acidic, oxidizing, and reducing chemicals), for cleaning purposes is one of the leading causes of corrosion in food processing facilities. Your metal roof will be affected by these processes and can corrode very easily.

Corrosion can lead to equipment failures and thus costly downtime. Also, the use of powerful corrosion inhibitors is heavily restricted and, in many cases, not permitted in food processing plants for safety and health reasons. Greencor is the only roof with fungus resistance ensuring food safety standards. You adhere to the GMPs (Good Manufacturing Practices) that keep the food supply safe and abide by the regulations governing the food and beverage industry. Your metal roof cannot be a part of the GMP because it simply rusts.

Make a judicious selection of the roof. Achieve safe and long service life with the correct choice of roofing material

- Designed to withstand alkaline, acidic environment as well as to oxidizers
- Designed to be corrosion free to keep the food supply safe and increase the ongevity of roofs
- Designed to keep interiors cool by as much as 5% compared to metal roofs
- Designed to allow reliable & effective inspection
- Designed for maintainability

- Designed to resist environment assisted cracking and atmospheric aggression
- Conforms to legal and occupational health and safety guidelines
- Designed to protect your machinery from the destructive forces of a leaking roof
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THE IDEAL ROOF FOR FOOD INDUSTRY

Verticals

Educational Institutions

Most formative years of students happen under the roofs of educational institutions. Better class rooms ensure great learning experiences.

Heat, noise and water leakages seriously hamper the learning process and this is what happens when the class room has metal roofing sheets. Metal roofing sheets are conductors of heat and this is radiated into the class room causing major discomfort to the students.

During monsoons, the rains on metal roofing can amplify the sound to intolerable levels distracting the concentration of the students. The rusted metal roof aggravates the problem with water seepages and leakages further causing trouble for the students.

In the light of these problems with metal roofing sheets It would be prudent to install a roof that is weather-proof, good insulator of heat, does not rust and has five times longer life, compared to metal sheets.

In a study conducted by Cornell University, students in a school that suffered from constant noise pollution generated by a nearby airport did not learn as well as students in a quieter neighborhood.

The classroom itself plays a big role in a student's educational experience — so thought must go into the construction and design of the walls, floors and ceilings. Background noise can impact a student's ability to perform so we must improve classroom acoustics.

Attention to detail isn't often paid to the auditory environment in the classroom. A loud learning environment can also negatively impact the health of the teacher.

- Designed to keep ambient temperature cool by as much as 5% compared to metal roofs
- Designed to be corrosion free to increase the longevity of roofs
- Designed to allow reliable & effective inspection
- Designed for easy maintenance

Plus, it is non-combustible, noise resistant and a non-conductor of electricity and lightning.

THE IDEAL ROOF FOR EDUCATIONAL INSTITUTIONS

Some of our Marquee Clients

GUJARAT STATE FERTILIZERS & CHEMICALS LTD.

LARSEN & TOUBRO

CPCL

AGROCEL INDUSTRIES PVT LTD

sudarsanam FABRICS

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