



## Ready Reckoner- Application Overview

Use of Combirepel®™ in Railway Carriages

## C Tech Corporation

Product Specialization  
Group

Generic Requirements

**Combirepel®™** non toxic, non hazardous and environmentally friendly anti rodent and anti termite master batches

A brief overview on the use of use of Combirepel®™ in Railway Carriages

## TECHNICAL NOTE

### COMBIREPEL®™ FOR RAILWAY CARRIAGES

Combirepel®™ is a non-toxic, non-hazardous, environmentally safe additives specially developed for use as a master batch in polymeric applications as well as in coating applications.

Rodrepel®™ and Termirepel®™ do not kill but keeps the pests away by making use of the sensory mechanisms. They are products of Green Technology and are applicable for a variety of uses in a multitude of sectors.

They are broad spectrum aversives adept at repelling all species of rodent and termites as well as about 600 species of pests including rodent and termites, caterpillars, red and black ants, aphids, leafhoppers, beetles, mites, leaf borers and many more.

The rodent and termite menace is a serious problem in Railway Carriages is especially susceptible to damage from rodent and termites. Rodents infest railway carriages because of leftover food left behind by travelers and the presence of the pantry car which is an ample food source and also as it is a good nesting place. The seating and berths used in the carriages is a hotbed for termites, bedbugs, cockroaches and other insects as it provides a warm shelter as well as a source of food.



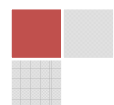
## ❖ LOSSES DUE TO RODENT AND TERMITE ATTACK IN RAILWAY CARRIAGES

The Indian Railways is the largest rail network in Asia and the world's second largest under one management, transporting 30 million passengers and more than 2 million tons of freight daily. The railways span the length and breadth of the country, covering 6,909 stations over a total route length of more than 65,000 kilometers. This major system which is the lifeline of transport in India faces a severe problem in the form of infestation by rodents, termites, bedbugs, cockroaches, lizards and other pests.



There have been numerous instances of rodents, termites and other insects infesting the railway carriages and being a nuisance to commuters. Apart from being a hindrance to commuters, they also spread diseases and can act as carriers. There have been numerous instances of the Railways trying to deal with the pest menace.

The Northern Railway in India roped in a pest control agency with contracts running up to 169000 INR to deal with the severe rodent menace. The Southern Railways also have had to face rodent problems. In some cases the rodents were undeterred by pest control measures and had to be chased away by the passengers themselves.



The rodents gnaw through the seating berths and infest the pantry cars.



Termites build nest in the seating due to their affinity to the polymeric seating. Bedbugs and cockroaches are a major problem especially in long distance sleeper coaches. Pantry cars are also vulnerable to cockroach and other insect infestation which can contaminate the food via droppings, wings etc. besides creating an unhygienic atmosphere.

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The current rodenticides, termiticides and other pest control measures used are toxic and do not effectively solve the rodent and insect problem. They are not effective when dealing with the growing menace of rodents on rolling stock trains. They are not effective, unhygienic and also because they are toxic they pose serious health hazards. Their use is restricted in pantry coaches which are used to make food for the passengers and which the most vulnerable to rodent and insect menace is.

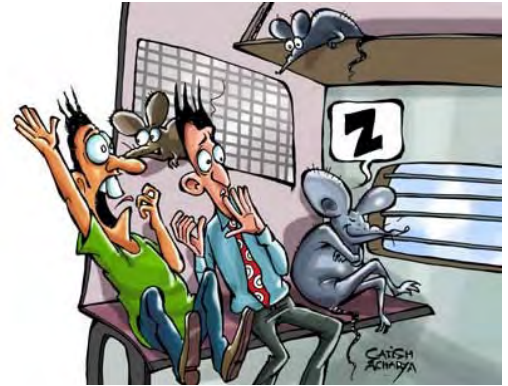


Hence there is a need for an effective solution that will solve the rodent and insect problem in railway coaches and root it out.



## ❖ SALIENT FEATURES

- Non-toxic
- Non- hazardous
- Environmentally safe
- Acts as an aversive
- Large life span of 5-40 years
- Thermally stable at temperatures as high as 1400 °C
- Does not leach into Groundwater and soil
- Does not volatilize
- No harmful fumes
- Available as a LDPE and EVA masterbatch
- Can be customized according to customer requirement
- Inert in the polymer matrix
- Does not degrade in soil
- Chemically Stable
- Hazardous polymerization not likely to occur
- Not harmful if accidentally inhaled or ingested
- Safe to add in pipes used for drinking water
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## ❖ PAINT COMPATIBILITY

Combirepel®™ can be provided in a paint compatible form. It is mainly mixed with paint thinner like kerosene and the same is then blended with the paint. Thus in a paint compatible form it can be used on a variety of surfaces easily. Thus a large number of hard to protect surfaces can be prevented from pest damage by using the paint solution of Combirepel®™.



❖ NON-TOXICITY

The paint based solution of Combirepel®™ is non-toxic and safe for use by workers. There are no noticeable fumes and it is not a deterrent to humans.

The Combirepel®™ remains effective as long as the paint lasts which is about 18 months.

❖ CRITICAL PARAMETERS

Sr. No.	Property	Test	Limits prescribed
1	Effectiveness	<ul style="list-style-type: none"> <li>- Testing for evaluating the bioefficacy of the finished coaches painted with Combirepel®™.</li> <li>- Entire body panel was painted to make it completely rodent proof.</li> <li>- Trials were conducted on the nominated coaches and on pantry coach and the same were revised subject to suggestions as advised by coordinators from the respective railways.</li> </ul>	<ul style="list-style-type: none"> <li>- Comparison of the coaches which had been painted with Combirepel®™ mixed in the paint mixture with another similar coach which has been treated with current chemicals/treatment methods which would be in running condition were undertaken.</li> <li>- The painted coaches as well as the non-coated coaches were monitored with respect to pests in the treated coaches.</li> <li>- Feedback was taken from the representatives, the attendants and personnel in the coaches</li> </ul>



2.	Non toxicity	Combirepel®™ in paint solution	No noticeable fumes
3.	Long life span	Efficacy of the painted coaches over a long span	The Combirepel®™ remains effective as long as the paint lasts for a span of about 18 months

❖ **APPLICATIONS:**

Combirepel®™ can be customized for use in the following ways

➤ **Ethanol based Combirepel®™ for the walls of the coaches**

A solution of Combirepel®™ in paint, in a pre-determined ratio is mixed and can be painted on the walls of the coaches. This is more effective than standard pest control measures like poisons, glue pads etc and also has the added benefit of non-toxicity



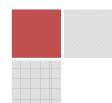
➤ **Lacquer based Combirepel®™ in kerosene for galvanised surfaces**

For galvanized surfaces, a paint based solution cannot be used and in this case a lacquer based solution of Combirepel®™ is used. It is a solution of Combirepel®™ in kerosene.

It is of utmost use to protect galvanized surfaces of the railway carriage , especially the pantry car.



➤ **Combirepel®™ for the under carriage**



➤ A method was developed by which Combirepel®™ was provided in paint compatible form (mainly mixed with paint thinner –kerosene) and the same was then blended with the paint in a specific ratio with which the under carriage of the coach was painted. It helps to protect all parts of the railway carriage from rodents and other pests.



#### ❖ SAFETY AND VERSATILITY

- Combirepel®™ is thermally stable and does not degrade on exposure to heat and light. It is soil stable and does not leach out to pollute the soil or air.
- It is completely inert in the paint solution apart from performing its main function of acting as an aversive.
- It is compatible with a solvents depending on the end application
- Combirepel®™ is RoHS and REACH compliant and FIFRA exempted.

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