

## APPLICATION REPORT

# INTERNAL AND EXTERNAL COATING OF FLUE-GAS CHIMNEY



*AT*  
**ACC LIMITED, UNIT: CHAIBASA CEMENT WORKS,  
PO- JHINKAPNI, DIST-WEST SINGHBHUM (JHARKHAND)**

## **INTRODUCTION:-**

DIFFCOR division of DIFFUSION ENGINEERS LIMITED has successfully completed job work of INTERNAL AND EXTERNAL FLUE-GAS CHIMNEY COATING. This job work was carried out for our customer ACC LIMITED, CHAIBASA CEMENT WORKS. Our customer were facing problem of Internal and External corrosion in flue gas chimney. Coating was done with DIFFGLASS XTREME and DIFF-ALUMA.

A flue-gas stack also known as a smoke stack, chimney stack or simply as a stack, It is a type of chimney, a vertical pipe, channel or similar structure through which combustion product gases called flue gases are exhausted to the outside air.

Flue gases are produced when coal, oil, natural gas, wood or any other fuel is combusted in an industrial furnace, a power plant's steam-generating boiler, or other large combustion device. Flue gas is usually composed of carbon dioxide (CO<sub>2</sub>) and water vapour as well as nitrogen and excess oxygen remaining from the intake combustion air. It also contains a small percentage of pollutants such as particulate matter, carbon monoxide, nitrogen oxides and sulphur oxides. The flue gas stacks are often quite tall, up to 400 metres (1300 feet) or more, to increase the stack effect and dispersion of pollutants.

Most chimneys in cement plants are built using carbon steel or mild steel. In the past, internal corrosion was not a major issue but recently it has been getting much worse. The aggressive corrosion now observed seems to be related to three current trends: -

- More sulphur in the fuel,
- An increase in use of alternative fuels
- Better efficiency of the bag house filter

The combustion gases consist of acidic compounds like SO<sub>2</sub>, SO<sub>3</sub>, HCl and NO<sub>x</sub>, they also contain a large amount of moisture. The metal temperatures are, in most cases, below the acidic dew point temperature of these gases, especially towards the top of the chimney. Additionally, many chimneys do not have external insulation and these guarantees that there will be significant amounts of acid condensation on the internal walls. Due to which after few years there is significant loss of wall thickness and the chimney becomes structurally unsafe. In some cases chimneys fell down.

## **PROBLEMS:-**

Customer was facing severe corrosion of chimney Due to continuous flow of exhaust gases and abrasive particles from chimney; the internal area was getting wear and punctured. The flow of abrasive particles results in abrasion and biting. The external surface was totally exposed to atmosphere which resulted in corrosion and rusting of the chimney. In many cases, there is often significant chloride content in the alternative fuels as well as CO<sub>2</sub> and NO<sub>x</sub> emissions from the combustion process. The flue gas temperature in the chimney is lower than the acid dew point, and the flue gas condenses and condenses into acid liquid.

Corrosion causes plant shutdowns, a waste of valuable resources, loss or contamination of product, reduction in efficiency, costly maintenance & also causes investment in new chimney. Considering the overall investment for a new chimney, protection of existing chimney by coating is very cost effective to stop the corrosion and add more years to its useful life.



*Internal and External area corroded of chimney pipe*

**PRODUCT RECOMMENDED:-**

**A. INTERNAL COATING:-**

**DIFFGLASS XTREME:-**

DIFFGLASS XTREME , a heavy-duty lining system for concrete and steel substrates that offers unique combination of vinyl ester novolac resin with Glass flake reinforcement and inert mineral fillers produce a dimensionally stable coating with extremely low permeability and ideally suited for immersion service ,splash/spillage exposure of concentrated acids and aggressive solvents.

**B. EXTERNAL COATING:-**

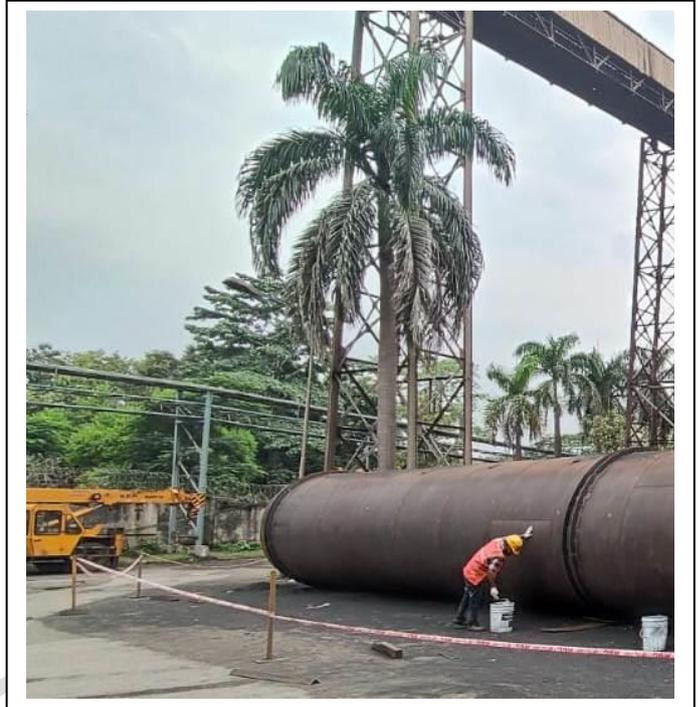
**DIFF-ALUMA:-**

DIFF-ALUMA is improved version of glass flake coating, being filled with highly corrosion resistant Glass flake & heat resistance fillers where high resistance to heat & corrosion in aggressive chemical environment is desired. DIFF-ALUMA is Multifunctional hybrid epoxy silicon cured system which can apply at 40°C.

**APPLICATION PROCEDURE:-**

**A.SURFACE PREPARATION:-**

1. Before application of any kind of coating surface preparation is must to activate the base metal so that coating will have better bonding.
2. After manual cleaning, Internal and External surface of chimney was cleaned by grit blasting to remove all the loose particles by used copper (Cu) slag.
3. As per ISO standard surface preparation of SA 2 1/2 by blasting with surface profile achieves of 70-90 microns.



*Surface Preparation done of Chimney pipe by Grit Blasting*

**B. PRODUCT APPLICATION:-**

**A. INTERNAL COATING:-**

1) After surface preparation priming and Top coat was done by **DIFFGLASS XTREME** by used Airless spray pump with coating gun, to give resistance against corrosion.



*Application of DIFFGLASS XTREME as a Priming and Top coat*

## B. EXTERNAL COATING:-

1) After surface preparation priming and Top coat was done by **DIFF-ALUMA** by used special designed coating Brush and Roller, to give the resistance against environment corrosion.

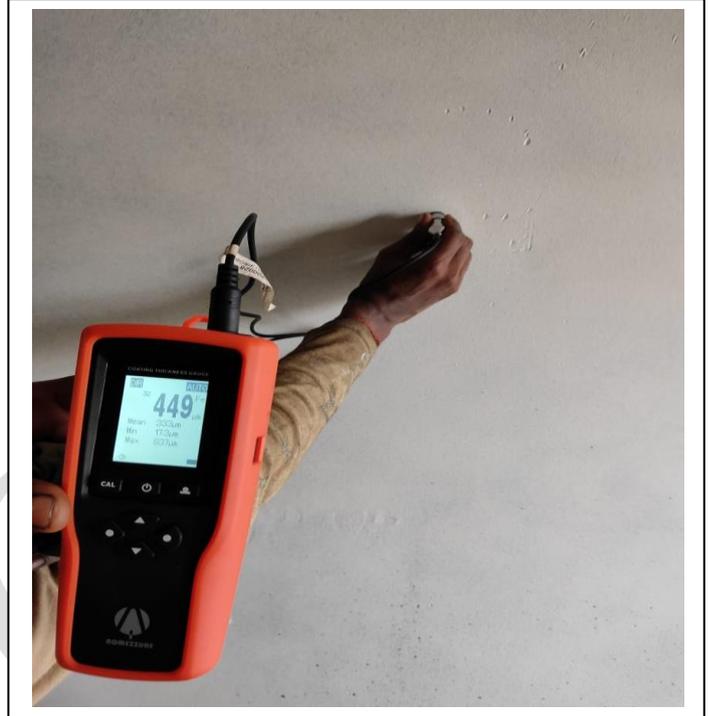


*Application of DIFF -ALUMA as a Priming and Top coat*

**COATING INSPECTION:-**

**A. INTERNAL COATING:-**

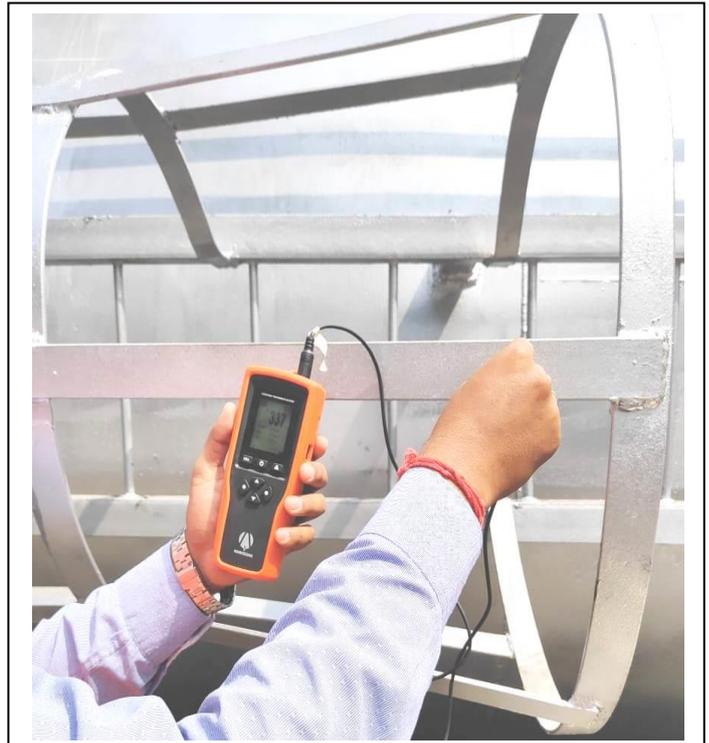
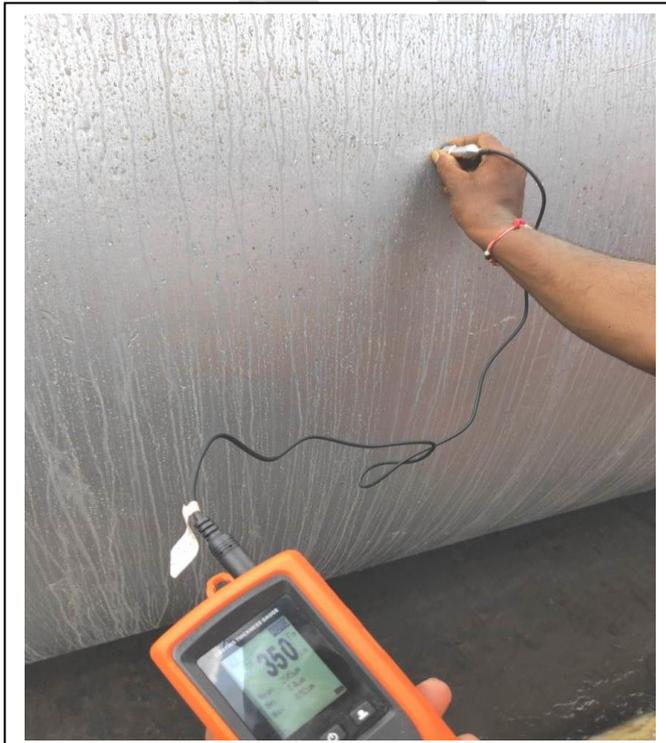
**DRY FILM THICKNESS (DFT): - Range: 400-500 (Micron)**



*DFT inspection of DIFFGLASS XTREME TOP coat*

**B. EXTERNAL COATING:-**

**DRY FILM THICKNESS (DFT): - Range: 300-400 (Micron)**



*DFT inspection of DIFF-ALUMA TOP coat*

**FINAL VIEW OF COATING:-**



**ACKNOWLEDGEMENT:-**

**SITE ENGINEER:-**

Mr. Tushar Das (Sales Engineer)

**AREA ENGINEER: -**

Mr. Dipankar Bhattacharya (Area Manager)

**AGENCIES INVOLVED: -**

Mr. Taposh Bose (Apex Enterprise, Hooghly, West Bengal)

**APPLICATION TEAM: -**

Mr. Budhram Bukuru & Mr. Ramakant Sahu Contractor Team.



**DIFFUSION ENGINEERS LIMITED**

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