

## Test Report

Report No : TUV(I)/1479/24-25/0042406349  
Date : 05 Jun 2024

**Name & Address of Customer** : Hindalco Industries Ltd  
One Unity Centre, Tower- 4, 21st Floor, Prabhadevi, Near Prabhadevi  
Railway Station, Senapati Bapat Marg, Mumbai,  
Mumbai, Pincode-400013

**Name of the Sample** : Aluminium Foil - Freshwrap - 11 Micron

**Name of the Test** : Pathogen Penetration Test

**CA No.** : 0042406349

**Date of sample receipt** : 25/04/2024

**Date(s) of analysis** : 6/05/2024-31/05/2024

**Objectives of Test** : To detect the penetration of the pathogenic  
Bacteria, Fungus and yeast into packets of  
foils over a period of time.

*W. H. H.*

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## Procedure

Contact time: 36 hours and 48 hours.

## Test Microorganism

1. Escherichia coli.
2. Staphylococcus aureus.
3. Salmonella typhimurium.
4. Aspergillus Niger.
5. Candida Albicans.

## Summary of Test Method

1. Freshly growing broth cultures of pathogenic bacteria namely *Escherichia coli*, *Staphylococcus aureus*, *Salmonella typhimurium*, fungus *Aspergillus Niger* and yeast *Candida Albicans* were used.
2. Sterile 10 gm food samples were packed in the aluminum foil under test.
3. In vitro studies were done using sterile food material to avoid contamination while handling packets and further analysis.
4. These packets were individually placed in sterile petri plates and 2 ml of the freshly growing broth culture of each test organism individually was put onto the packets and kept at room temperature
5. Penetration of the test organism over a contact period of 36 hours and 48 hours was studied using the food and our observations are given below.
6. A negative control was prepared to exhibit the absence of the pathogen in the food by itself.
7. A positive control (food inoculated with the 2 ml of the freshly growing broth culture of each test organism individually was put inside the packets at room temperature) was incubated along with the test samples to show that the food product supported the growth of the pathogens and was not inhibitory to them.

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**Result and Observations:**

DATE Of Analysis 21/5/2024

Contact Time/Controls	<i>Escherichia coli</i> (CFU/ml)	<i>Staphylococcus aureus</i> (CFU/ml)	<i>Salmonella typhimurium</i> (CFU/ml)	<i>Aspergillus niger</i> (CFU/ml)	<i>Candida albicans</i> (CFU/ml)
Original count (TVC)	8.5 x 10 <sup>8</sup>	8.2 x 10 <sup>8</sup>	8.7 x 10 <sup>8</sup>	1.3 x 10 <sup>7</sup>	1.5 x 10 <sup>7</sup>
Negative Control	<10	<10	<10	<10	<10
Positive Control	510000000	690000000	58000000	6200000	2300000

Sample Name : Aluminium Foil - Freshwrap - 11 Micron			CA Number 0042406349		
36 hrs.	<10	<10	<10	<10	<10
48 hrs.	<10	<10	<10	<10	<10

**Conclusion:**

From the above experiment we can conclude that

1. Aluminium Foil - Freshwrap - 11 Micron

under test conditions did not permit the penetration of concentrated broth culture of standard microorganisms e.g. *Escherichia coli*, *Staphylococcus aureus*, *Salmonella typhimurium*, *Aspergillus Niger* and *Candida albicans* into the packet up to a contact period of 48 hrs.

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Authorized by



Shaine Premkumar  
Sr. Manager – Microbiology

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-- End of Report --

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Mumbai, Pincode-400013

**Name of the Sample** : Aluminium Foil - Freshwrap International - 18 Micron

**Name of the Test** : Pathogen Penetration Test

**CA No.** : 0042406350

**Date of sample receipt** : 25/04/2024

**Date(s) of analysis** : 6/05/2024-31/05/2024

**Objectives of Test** : To detect the penetration of the pathogenic  
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## Procedure

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**Result and Observations:**

DATE Of Analysis 21/5/2024

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**Conclusion:**

From the above experiment we can conclude that

- Aluminium Foil - Freshwrap International - 18 Micron under test conditions did not permit the penetration of concentrated broth culture of standard microorganisms e.g. *Escherichia coli*, *Staphylococcus aureus*, *Salmonella typhimurium*, *Aspergillus Niger* and *Candida albicans* into the packet up to a contact period of 48 hrs.

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