



# AMBIENT APPLICATION CONDITIONS FOR METAL

Air Temperature, Substrate Temperature, Relative Humidity, Dew Point

## PURPOSE

This section provides information on the relationships between air temperature, substrate temperature, relative humidity and dew point and their relevance to successful painting.

## INTRODUCTION

In general, paints must be applied to dry surfaces and should not be subjected to condensing humidity until sufficiently cured. To allow a safety margin, normally the substrate temperature must be at least 3°C above the dew point. The dew point is the temperature of a given air-water vapour mixture at which condensation starts, since at that temperature the maximum water content of the air is reached. Paint is usually applied at temperatures between about 10°C and 35°C. Most coatings prefer dry conditions and have an upper limit of 85% relative humidity. Coatings also generally require movement of air across the surface to aid in the evaporation of solvents or water, this will ensure proper film formation.

## DEW POINT DETERMINATION

Using dry bulb and wet bulb temperatures.

Example: A sling psychrometer was used to obtain a wet bulb reading of 17°C and a dry bulb reading of 21°C. The substrate temperature is 19°C. Is the substrate greater or equal to 3°C above the dew point?

$$\begin{aligned} \text{Depression of wet bulb temperature} &= \text{dry bulb temperature minus wet bulb temperature} \\ &= 21 - 17 = 4^\circ\text{C} \end{aligned}$$

From the chart, given a dry bulb temperature of 21°C and a depression of wet bulb temperature of 4°C the dew point is 15°C.

The substrate temperature is 19°C and the dew point is 15°C (i.e. 4°C higher) therefore conditions are acceptable to paint.

## DEW POINT DETERMINATION

Using dry bulb temperature and relative humidity.

Example: The ambient temperature is 16°C, at 71% relative humidity and the substrate temperature is 13°C. Are the conditions suitable for painting?

From the chart given a dry bulb temperature of 16°C and a relative humidity of 71% the dew point is therefore 11°C

Given the substrate temperature of 13°C a dew point of 11°C, painting should not proceed as the substrate temperature is only 2°C above the dew point.



# AMBIENT APPLICATION CONDITIONS FOR METAL

Air Temperature, Substrate Temperature, Relative Humidity, Dew Point

## CHART FOR DETERMINATION OF RELATIVE HUMIDITY & DEW POINT

| Dry Bulb Temp | Depression of Wet Bulb Temperature<br>(Dry Bulb Temperature minus Wet Bulb Temperature) |    |     |    |     |    |     |    |     |    |     |    |     |    |     |    |     |    |      |    |
|---------------|---|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|------|----|
|               | 1°C   |    | 2°C |    | 3°C |    | 4°C |    | 5°C |    | 6°C |    | 7°C |    | 8°C |    | 9°C |    | 10°C |    |
|               | %RH   | DP | %RH | DP | %RH | DP | %RH | DP | %RH | DP | %RH | DP | %RH | DP | %RH | DP | %RH | DP | %RH  | DP |
| 5°C           | 86  | 3  | 72  | 0  | 58  | -  | 45  | -  |     |    |     |    |     |    |     |    |     |    |      |    |
| 6°C           | 86  | 4  | 73  | 1  | 60  | -  | 47  | -  |     |    |     |    |     |    |     |    |     |    |      |    |
| 7°C           | 87  | 5  | 74  | 3  | 61  | 0  | 49  | -  |     |    |     |    |     |    |     |    |     |    |      |    |
| 8°C           | 87  | 6  | 75  | 4  | 63  | 1  | 51  | -  |     |    |     |    |     |    |     |    |     |    |      |    |
| 9°C           | 88  | 7  | 76  | 5  | 64  | 3  | 53  | 0  |     |    |     |    |     |    |     |    |     |    |      |    |
| 10°C          | 88  | 8  | 77  | 6  | 65  | 4  | 54  | 1  | 43  | -  |     |    |     |    |     |    |     |    |      |    |
| 11°C          | 88  | 9  | 77  | 7  | 66  | 5  | 56  | 3  | 46  | -  | 36  | -  |     |    |     |    |     |    |      |    |
| 12°C          | 89  | 10 | 78  | 8  | 68  | 6  | 57  | 4  | 48  | 1  | 37  | -  |     |    |     |    |     |    |      |    |
| 13°C          | 89  | 11 | 79  | 9  | 69  | 7  | 59  | 5  | 49  | 3  | 39  | 0  |     |    |     |    |     |    |      |    |
| 14°C          | 90  | 12 | 79  | 10 | 70  | 8  | 60  | 6  | 51  | 4  | 41  | 1  | 32  | -  |     |    |     |    |      |    |
| 15°C          | 90  | 13 | 80  | 12 | 71  | 10 | 62  | 8  | 52  | 5  | 43  | 3  | 35  | 0  |     |    |     |    |      |    |
| 16°C          | 90  | 14 | 81  | 13 | 71  | 11 | 62  | 9  | 54  | 7  | 46  | 4  | 38  | 2  |     |    |     |    |      |    |
| 17°C          | 90  | 15 | 81  | 14 | 72  | 12 | 64  | 10 | 55  | 8  | 47  | 6  | 39  | 3  | 32  | 0  |     |    |      |    |
| 18°C          | 91  | 16 | 82  | 15 | 73  | 13 | 65  | 11 | 56  | 9  | 49  | 7  | 41  | 5  | 34  | 2  |     |    |      |    |
| 19°C          | 91  | 17 | 82  | 16 | 74  | 14 | 65  | 12 | 58  | 10 | 50  | 8  | 43  | 6  | 35  | 3  | 28  | 0  |      |    |
| 20°C          | 91  | 18 | 83  | 17 | 74  | 15 | 66  | 13 | 59  | 12 | 51  | 10 | 44  | 7  | 37  | 5  | 30  | 2  |      |    |
| 21°C          | 91  | 19 | 83  | 18 | 75  | 16 | 67  | 15 | 60  | 13 | 52  | 11 | 46  | 9  | 39  | 6  | 32  | 4  |      |    |
| 22°C          | 92  | 21 | 83  | 19 | 76  | 17 | 68  | 16 | 61  | 14 | 54  | 12 | 47  | 10 | 40  | 8  | 33  | 6  |      |    |
| 23°C          | 92  | 22 | 84  | 20 | 76  | 19 | 69  | 17 | 62  | 15 | 55  | 13 | 48  | 11 | 42  | 9  | 36  | 7  |      |    |
| 24°C          | 92  | 23 | 84  | 21 | 77  | 20 | 69  | 18 | 62  | 16 | 56  | 15 | 49  | 13 | 43  | 11 | 37  | 10 |      |    |
| 25°C          | 92  | 24 | 84  | 22 | 77  | 21 | 70  | 19 | 63  | 17 | 57  | 16 | 50  | 14 | 44  | 12 | 38  | 10 | 33   | 8  |
| 26°C          | 92  | 25 | 85  | 23 | 78  | 22 | 71  | 20 | 64  | 19 | 58  | 17 | 51  | 15 | 46  | 13 | 40  | 11 | 35   | 9  |
| 27°C          | 92  | 26 | 85  | 24 | 78  | 23 | 71  | 21 | 65  | 20 | 59  | 18 | 52  | 16 | 47  | 15 | 41  | 13 | 36   | 11 |
| 28°C          | 93  | 27 | 85  | 25 | 79  | 24 | 72  | 22 | 65  | 21 | 59  | 19 | 53  | 18 | 48  | 16 | 42  | 14 | 37   | 12 |
| 29°C          | 93  | 28 | 86  | 26 | 79  | 25 | 72  | 23 | 66  | 22 | 60  | 20 | 55  | 19 | 49  | 17 | 43  | 15 | 38   | 13 |
| 30°C          | 93  | 29 | 86  | 27 | 79  | 26 | 73  | 25 | 67  | 23 | 61  | 22 | 56  | 20 | 50  | 18 | 44  | 17 | 39   | 15 |
| 31°C          | 93  | 30 | 86  | 28 | 80  | 27 | 73  | 26 | 67  | 24 | 62  | 23 | 57  | 21 | 51  | 20 | 45  | 18 | 41   | 16 |
| 32°C          | 93  | 31 | 86  | 29 | 80  | 28 | 74  | 27 | 68  | 25 | 62  | 24 | 57  | 22 | 52  | 21 | 46  | 19 | 42   | 17 |
| 33°C          | 93  | 32 | 87  | 30 | 80  | 29 | 74  | 28 | 69  | 26 | 63  | 25 | 58  | 23 | 52  | 22 | 47  | 20 | 43   | 19 |
| 34°C          | 93  | 33 | 87  | 31 | 81  | 30 | 75  | 29 | 69  | 27 | 64  | 26 | 58  | 25 | 53  | 23 | 48  | 21 | 44   | 20 |
| 35°C          | 93  | 34 | 87  | 32 | 81  | 31 | 75  | 30 | 70  | 30 | 65  | 28 | 60  | 27 | 55  | 24 | 50  | 23 | 45   | 21 |
| 36°C          | 94  | 35 | 87  | 33 | 81  | 32 | 76  | 31 | 70  | 30 | 65  | 28 | 60  | 27 | 55  | 25 | 51  | 24 | 46   | 22 |
| 37°C          | 94  | 36 | 87  | 35 | 82  | 33 | 76  | 32 | 70  | 31 | 65  | 29 | 60  | 28 | 55  | 27 | 51  | 25 | 46   | 23 |
| 38°C          | 94  | 37 | 88  | 36 | 82  | 34 | 76  | 33 | 71  | 32 | 66  | 30 | 61  | 29 | 56  | 28 | 51  | 26 | 47   | 25 |
| 39°C          | 94  | 38 | 88  | 37 | 82  | 35 | 77  | 34 | 71  | 33 | 66  | 31 | 61  | 30 | 57  | 29 | 52  | 27 | 48   | 26 |
| 40°C          | 94  | 39 | 88  | 38 | 82  | 36 | 77  | 35 | 72  | 34 | 67  | 33 | 62  | 31 | 57  | 30 | 53  | 28 | 48   | 27 |

DP=dew point (°C), %RM=% relative humidity

For the most up to date information contact Wattyl Customer Service Hotline or visit the Wattyl Website.

CUSTOMER SERVICE HOTLINE  
WEBSITE

Australia  
132 101  
<http://www.wattyl.com.au>

New Zealand  
0800 735 551  
<http://www.wattyl.co.nz>

Wattyl is a registered trademark of Wattyl Australia Pty Ltd.

1. This information is important to ensure that the listed Wattyl product(s) perform according to the stated application and uses and must be followed to meet Wattyl's warranties express and implied. Wattyl advises that you (a) review the Technical Data Sheets (TDS) and Material Safety Data Sheets (MSDS) before you use or handle the product; (b) ensure that the product be used only in accordance with the information provided by Wattyl and the product(s) be transported, stored and handled in accordance with the information on the MSDS and relevant TDS; and (c) thoroughly test the product, using the recommended application method on a sample of intended substrate, before using the product. 2. While Wattyl endeavours to update this information and maintain the accuracy and currency of its contents, Wattyl does not warrant that the information provided is current when the product is used or is wholly comprehensive. 3. For all product and non-product related information, Wattyl recommends that you conduct such additional investigations as may be necessary to satisfy yourself of the accuracy, currency and comprehensiveness of the information on which you rely in using and handling the product. If you require further information please contact your nearest Wattyl office before using the product(s). 4. To the full extent permitted by law, Wattyl's liability for breach of a condition or warranty implied into the contract for sale between Wattyl and you by law is limited at Wattyl's election to: (a) the replacement of the product; or (b) payment of the cost of replacing the product. If coating rectification is required Wattyl Technical Services shall be contacted prior to commencement.