

PRODUCT KNOWLEDGE SEMINAR

ACC WEATHERING MEMBRANE

for a long lasting roof protection



**San Miguel Yamamura
Woven Products Sdn. Bhd.**



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Woven Products

Roof Needs Protection



SIRIM
Certified to MS ISO 9001:2015
Registration no. AR 0385



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Conventional Roof Coatings & Membranes



Degradation
by ultraviolet (UV) rays.

Corrosion
due to weathering elements.



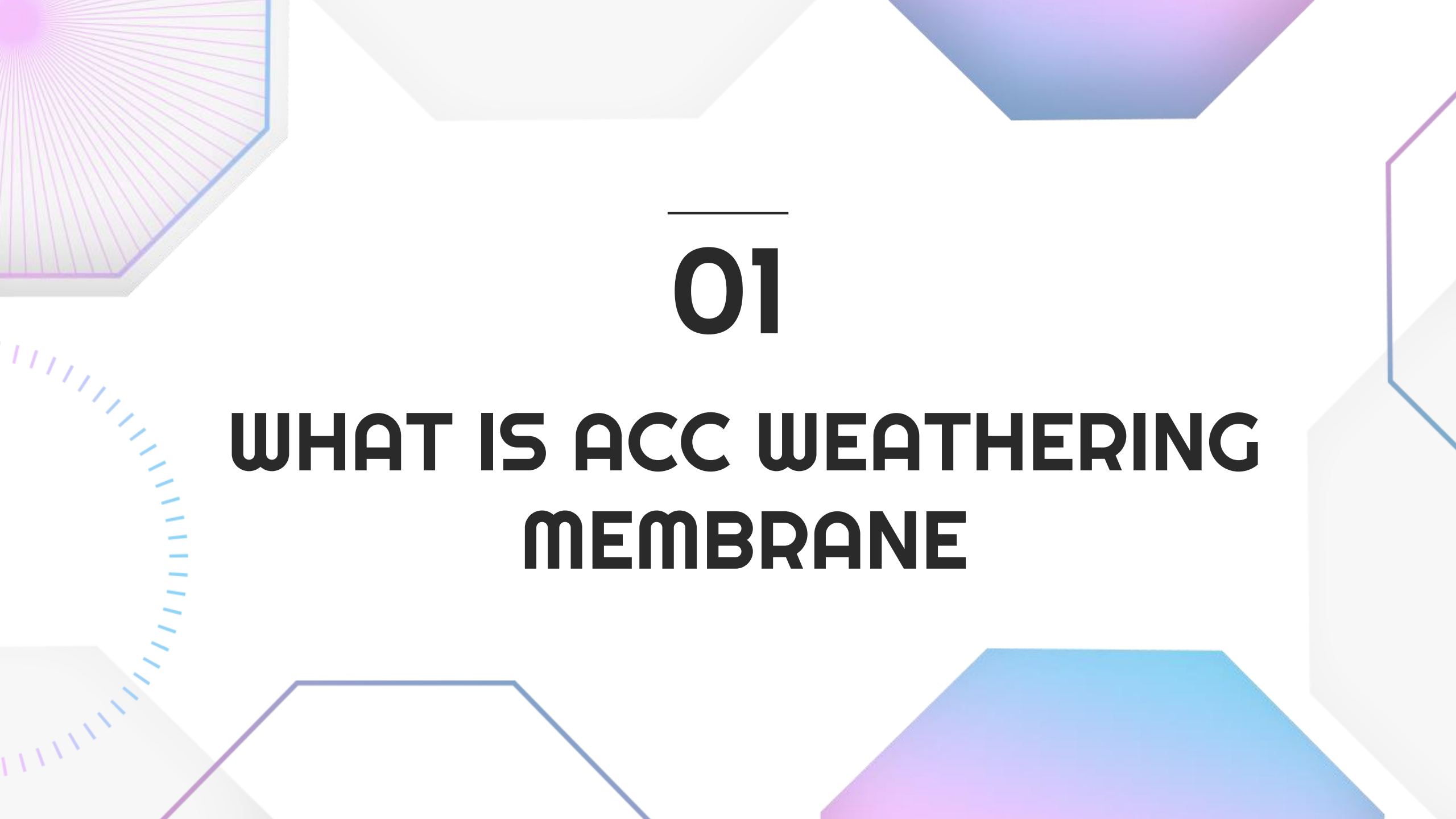


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ACC Weathering Membranes for Roof Protection



- ☐ Long Lasting Performance
- ☐ Waterproofing
- ☐ Cool Roofing
- ☐ Weatherproof
- ☐ Sound Dampening
- ☐ Repair Cracks
- ☐ Prevent Leaks
- ☐ Cover Rust



01

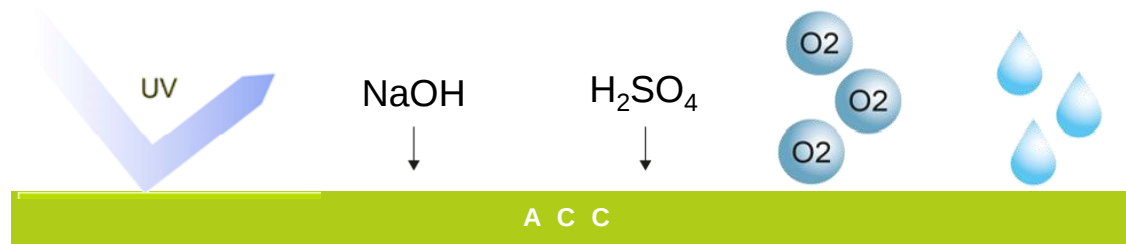
WHAT IS ACC WEATHERING MEMBRANE



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Features of Anti-Corrosion Coating (ACC)

1. Corrosion & Oxidation Protection



Material to protect (metal, wood, plastic...)

ACC coating is a proprietary polymeric film that prevents oxygen, water & chemicals to be in contact with the material underneath it.

ACC coating itself does not degrade with UV.
Hence it is able to provide long lasting protection.



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Features of Anti-Corrosion Coating (ACC)

2. Easy Cleaning

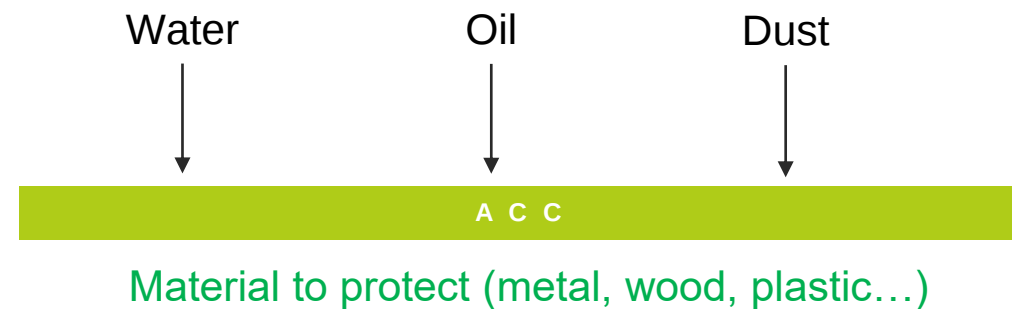
Testing results:

Water repellent: 8/8 or 5/5 with IWS TM 258 /ISO 4920

Oil repellent: 6-7/8 with IWS TM 258/ISO 14419

Soil release grade : 1.0

Abrasion resistance (Rubs) : > 20000



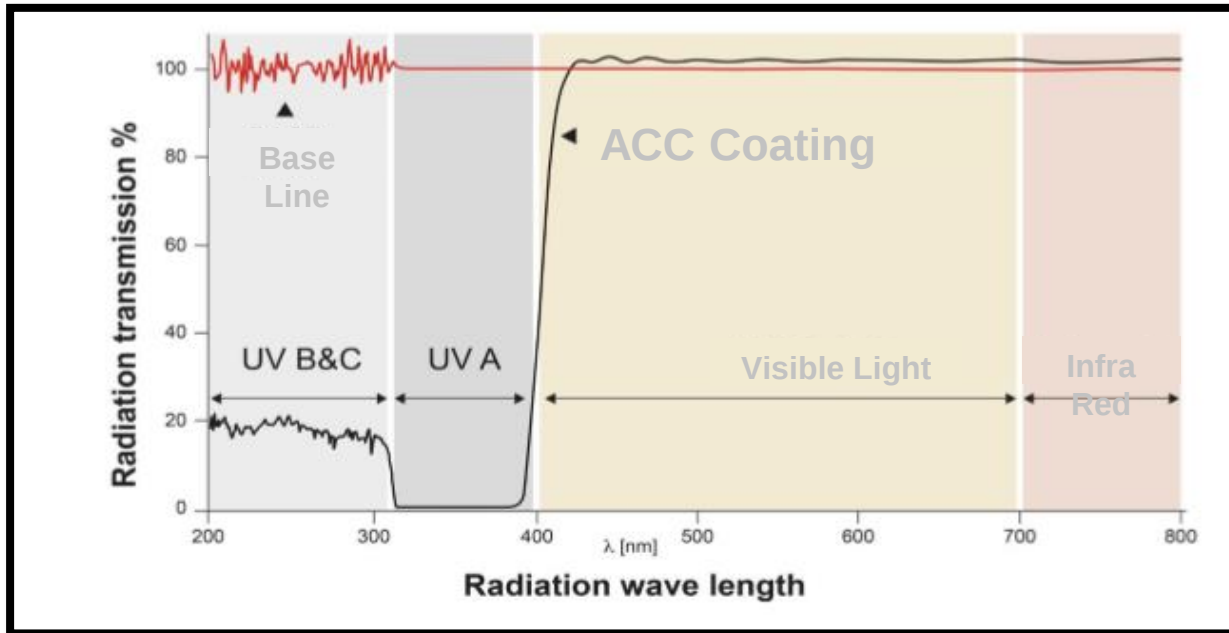
ACC coating has properties of water, oil & dirt repellence, making the surface easy for cleaning.



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Features of Anti-Corrosion Coating (ACC)

3. Highly Transparent



ACC coating is transparent to radiation wave length for visible light and infra red.

Does not affect the solar reflectance property of aluminium surface when coated with ACC

ACC WEATHERING MEMBRANE PRODUCT PROPERTIES

Solar Reflectance $\geq 80\%$
– Reduce roof temperature

WE PROVIDE **10** YEARS
WARRANTY
(*Terms and Condition Apply)



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ACC WEATHERING MEMBRANE PRODUCT PROPERTIES

R&D Services
P.O. Box 2400
Cookeville, Tennessee 38502-2400
Phone: 931-372-8871
Fax: 931-525-3896

Solar Reflectance Test Report

Test Number: RD181981SR Date of Test: August 13, 2018
Specimen Number: 1541180807-44 Date of Manufacture: Unknown
Description of Test Specimen: Anti-Corrosion Coating Surface
Test Method: ASTM C1549-16, "Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer."
Report Prepared For: San Miguel Yamamura Woven Products Sdn.Bhd. / Ms. Teh Khar San

Procedure
The measurement of solar reflectance in accordance with ASTM C1549-16 was completed using a solar reflectometer built by Devices and Services Company. The reflectometer was calibrated using standards with reflectance 0.0 and reflectance 0.868 prior to use. The solar reflectance measurements were made in a conditioned laboratory space. The solar reflectance was measured at air mass 1.5. Unless otherwise stated, all test surfaces were cleaned to remove dirt or any other blemishes prior to testing.

Results
Test Temperature: 69 °F
Test Humidity: 50 %RH

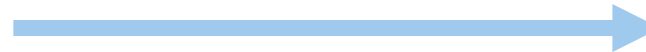
R&D Identification	Specimen Description	Average Reflectance	Standard Deviation
1541180807-44	Reflective Film	0.84	0.00

Note: The average reflectance of each product is based on three measurements.

Shawn King
Reviewed By: 8/24/18
Date:

Page 2 of 3
Report No. RD18587-R1

Solar Reflectance (ASTM C1549)
before and after 5,000hrs
of QUV weathering



R&D Services
209 Tennessee Blvd.
Watertown, Tennessee 37184
Phone: 931-372-8871
Fax: 931-525-3896
www.rdservices.com

TEST METHOD PROCEDURE

The measurement of solar reflectance in accordance with ASTM C1549 was completed using a solar reflectometer built by Devices and Services Company. The reflectometer was calibrated prior to use. The solar reflectance measurements were made in a conditioned laboratory space. Unless otherwise stated, all test surfaces were cleaned to remove dirt or any other blemishes prior to testing.

TEST RESULTS

High Reflectance Calibration	0.866
Blackbody Calibration	0.000
Air Mass Value	1.5 E
Temperature (°C)	22.2
Relative Humidity (%)	50

Specimen Description	1	2	3	Average	Standard Deviation
WF501C-PTRR 2566	0.84	0.85	0.85	0.85	0.003

UNCERTAINTY

The average 95% repeatability & reproducibility over the range of specimens measured in an interlaboratory study is given in Section 9 of ASTM C1549-16. The 95% repeatability is 0.04 and the 95% reproducibility is 0.01.

Shawn King
Reviewed By: July 14, 2022
Date:

Page 3 of 4
Report No. RD22664

ACC WEATHERING MEMBRANE PRODUCT PROPERTIES

Solar Reflectance $\geq 80\%$

- Reduce roof temperature

Tensile Strength drop $\leq 30\%$ After 5000hrs of QUV

- Withstand up to 5 years of outdoor exposure

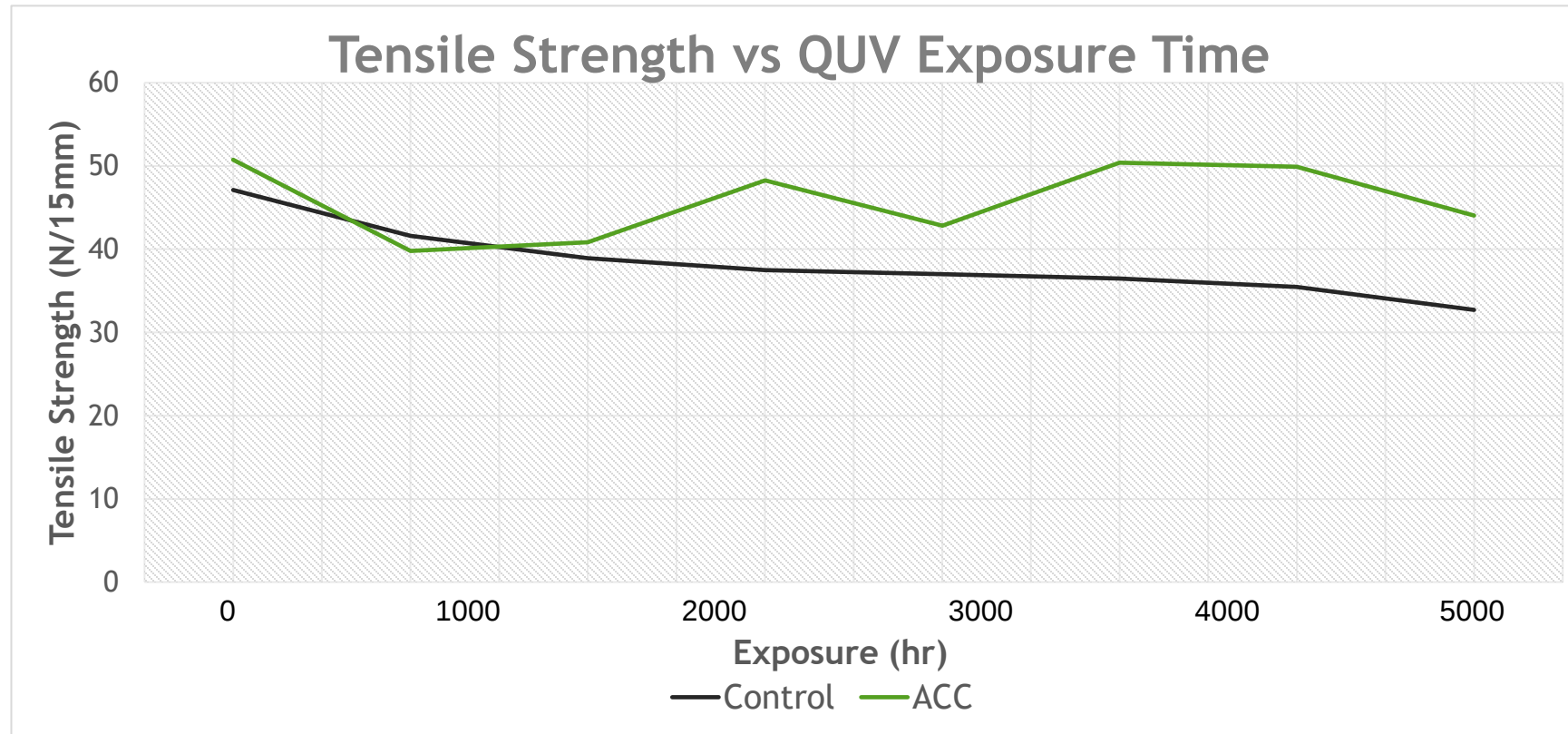
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ACC WEATHERING MEMBRANE PRODUCT PROPERTIES

Tensile Strength vs QUV Weathering Exposure Time



Results:

Drop by **12%** only

ACC WEATHERING MEMBRANE PRODUCT PROPERTIES

Solar Reflectance $\geq 80\%$

– Reduce roof temperature

Tensile Strength drop $\leq 30\%$ After 5000hrs of QUV

– Withstand up to 5 years of outdoor exposure

No Corrosion for Acid Rain





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ACC WEATHERING MEMBRANE PRODUCT PROPERTIES

Acid Rain Test - pH 3.15 (ASTM D7356)

ACC	Uncoated
	
No corrosion	Corroded

ACC WEATHERING MEMBRANE PRODUCT PROPERTIES

Solar Reflectance $\geq 80\%$

– Reduce roof temperature

Tensile Strength drop $\leq 30\%$ After 5000hrs of QUV

– Withstand up to 5 years of outdoor exposure

No Corrosion for Acid Rain

Passed for pH2 and pH12 Solutions Exposure Tests

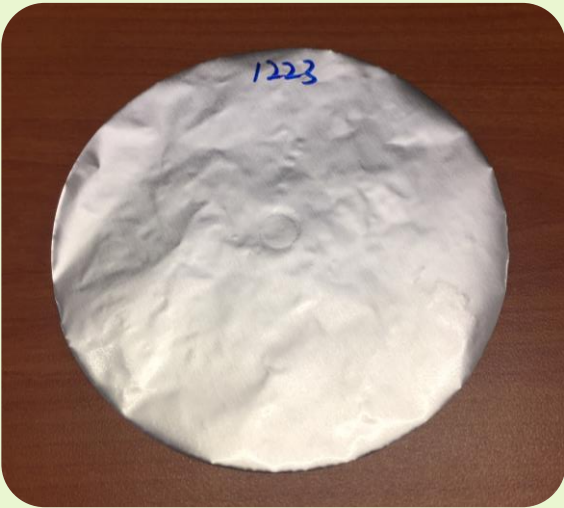




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ACC WEATHERING MEMBRANE PRODUCT PROPERTIES

Acid / Alkali Corrosion Test

Acid (pH2)		Alkali (pH12)	
ACC	Uncoated	ACC	Uncoated
			
No corrosion	Corroded	No corrosion	Corroded

ACC WEATHERING MEMBRANE PRODUCT PROPERTIES

Solar Reflectance $\geq 80\%$

– Reduce roof temperature

Tensile Strength drop $\leq 30\%$ After 5000hrs of QUV

– Withstand up to 5 years of outdoor exposure

No Corrosion for Acid Rain

Passed for pH2 and pH12 Solutions Exposure Tests

Easy Cleaning

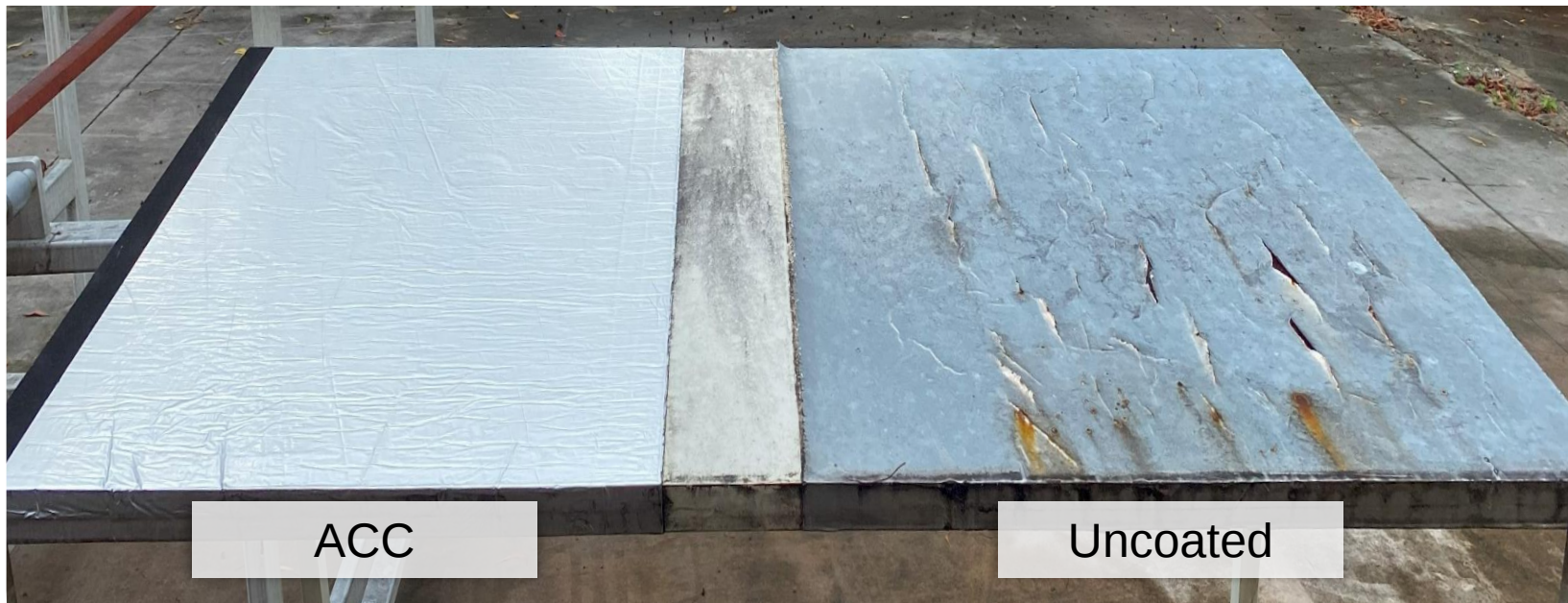




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ACC WEATHERING MEMBRANE PRODUCT PROPERTIES

Clean appearance and no corrosion after 5 years of outdoor exposure



Uncoated sample:

- Oxidation spots
- Holes
- Cracks
- Fractures



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ACC WEATHERING MEMBRANE APPLICATION TEST

Actual roof installation



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ACC WEATHERING MEMBRANE APPLICATION TEST

After 5 years of installation, ACC surface is still in good condition.



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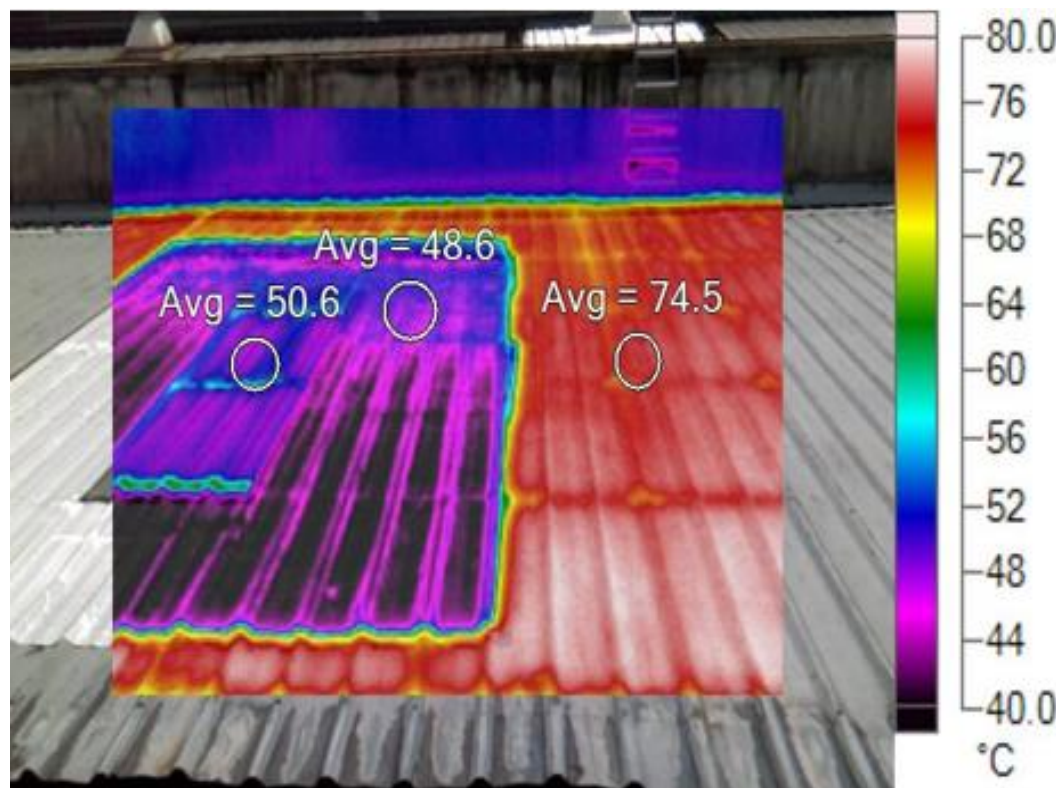




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ACC WEATHERING MEMBRANE APPLICATION TEST

Roof surface temperature comparison.



Surface	Temperature (°C)
ACC	48.6
Metal	74.5
Variance	25.9



02

RECOMMENDED INSTALLATION GUIDE



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RECOMMENDED INSTALLATION GUIDE

Step 1: Roof Surface Preparation



Cleaning



Dusting



Primer Coating
(optional)



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RECOMMENDED INSTALLATION GUIDE

Step 2: Gutter Surface Preparation



Cleaning



Trimming



Clean & Dry Surface



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RECOMMENDED INSTALLATION GUIDE

Step 3: Installation onto Gutter



Seal the Intersections between roof and gutter



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RECOMMENDED INSTALLATION GUIDE

Step 4: Installation Onto Roof Surface



Apply ACC Membrane



Sealing the Ridge



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RECOMMENDED INSTALLATION GUIDE

Installation time by skilled labour



Roof area of **22,000m²** was fully installed within **60 man-days**.



03

**ACC REDUCES
INDOOR TEMPERATURE**



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ACTUAL APPLICATION STUDY



Problem:

High indoor temperature during summer affects,

1. Storage goods quality
2. Uncomfortable working condition

Solution:

Install ACC Weathering Membrane for one warehouse.



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ACTUAL APPLICATION STUDY

Roof area of 22,000m² was fully installed.



Before



After

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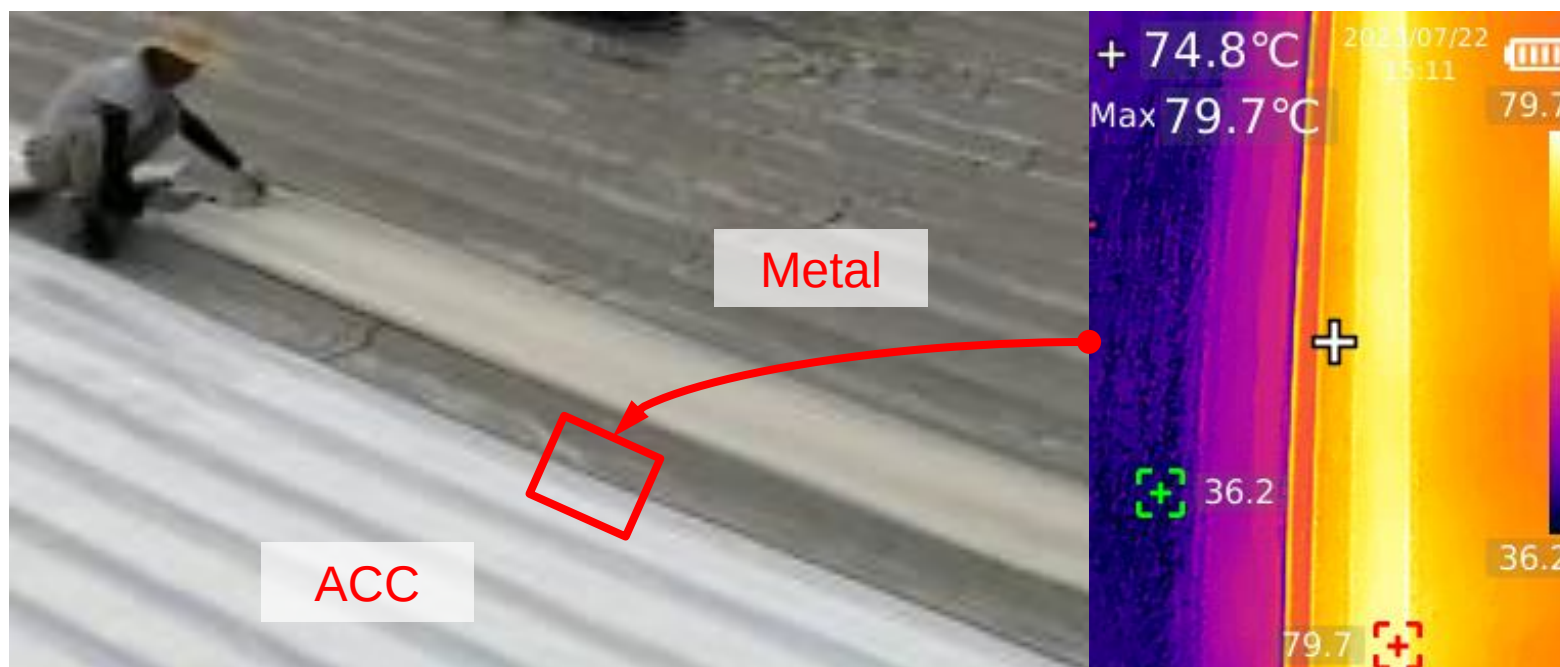




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ACTUAL APPLICATION STUDY

Roof surface temperature comparison



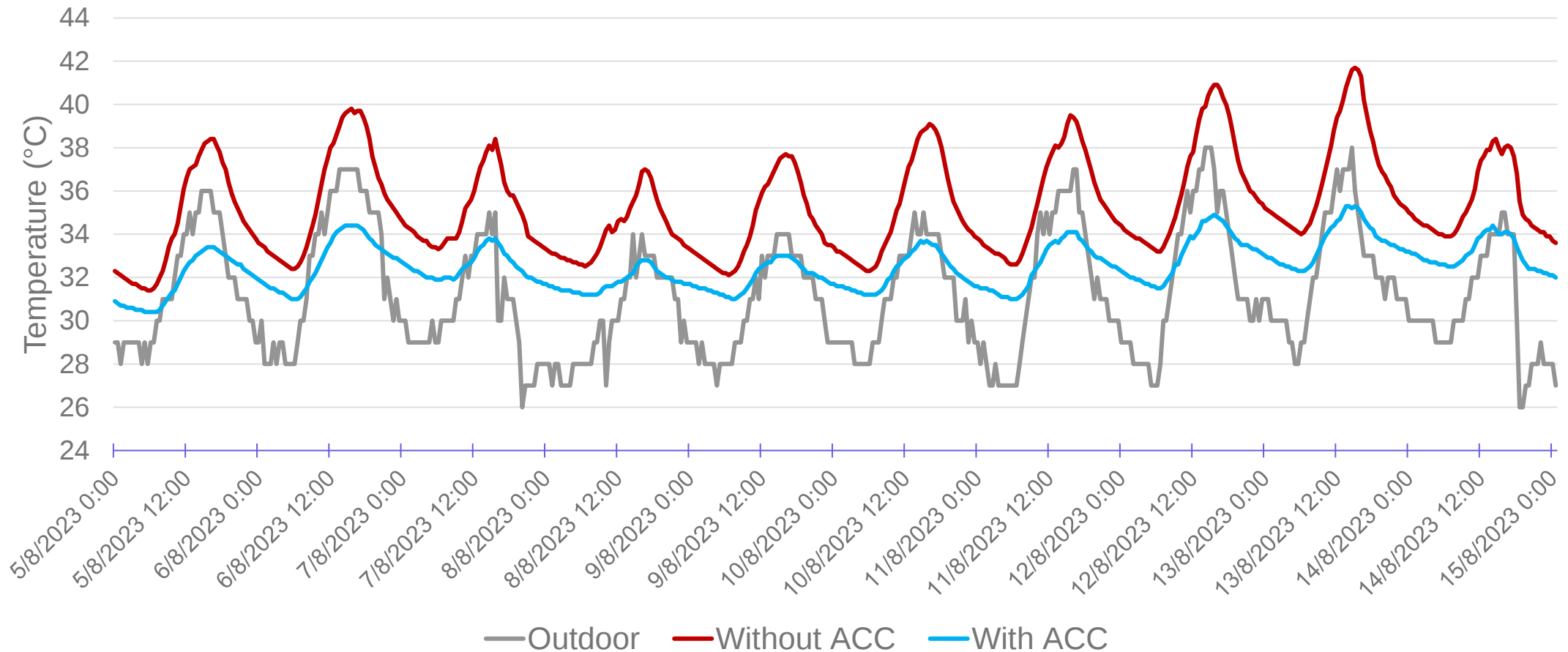
Surface	Temperature (°C)
ACC	36.2
Metal	74.8
Variance	38.6



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ACTUAL APPLICATION STUDY

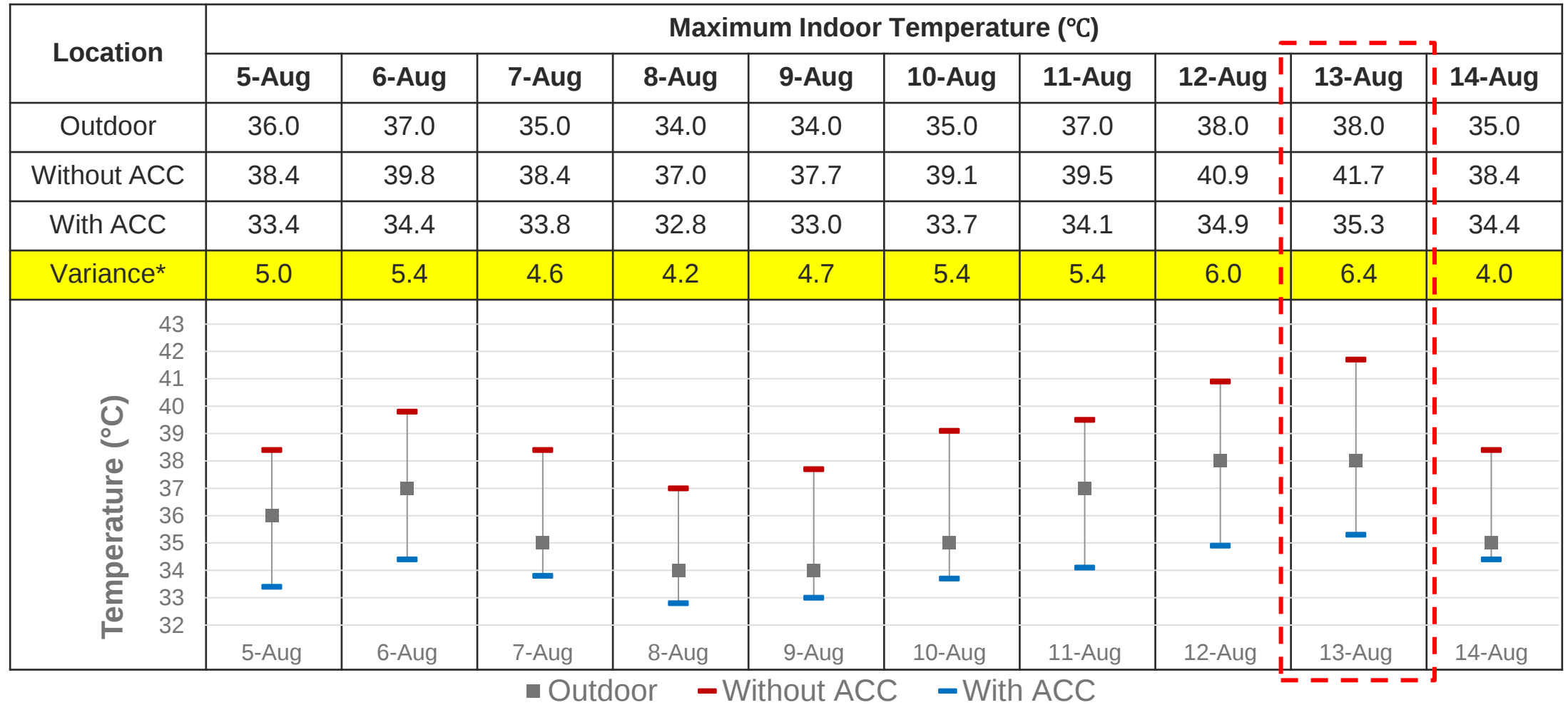
Room Temperature Comparison Between With and Without ACC





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ACTUAL APPLICATION STUDY





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ACTUAL APPLICATION STUDY



Project Results:

Roof Surface ↓ 38.6°C

Indoor Temp. ↓ 6.4°C

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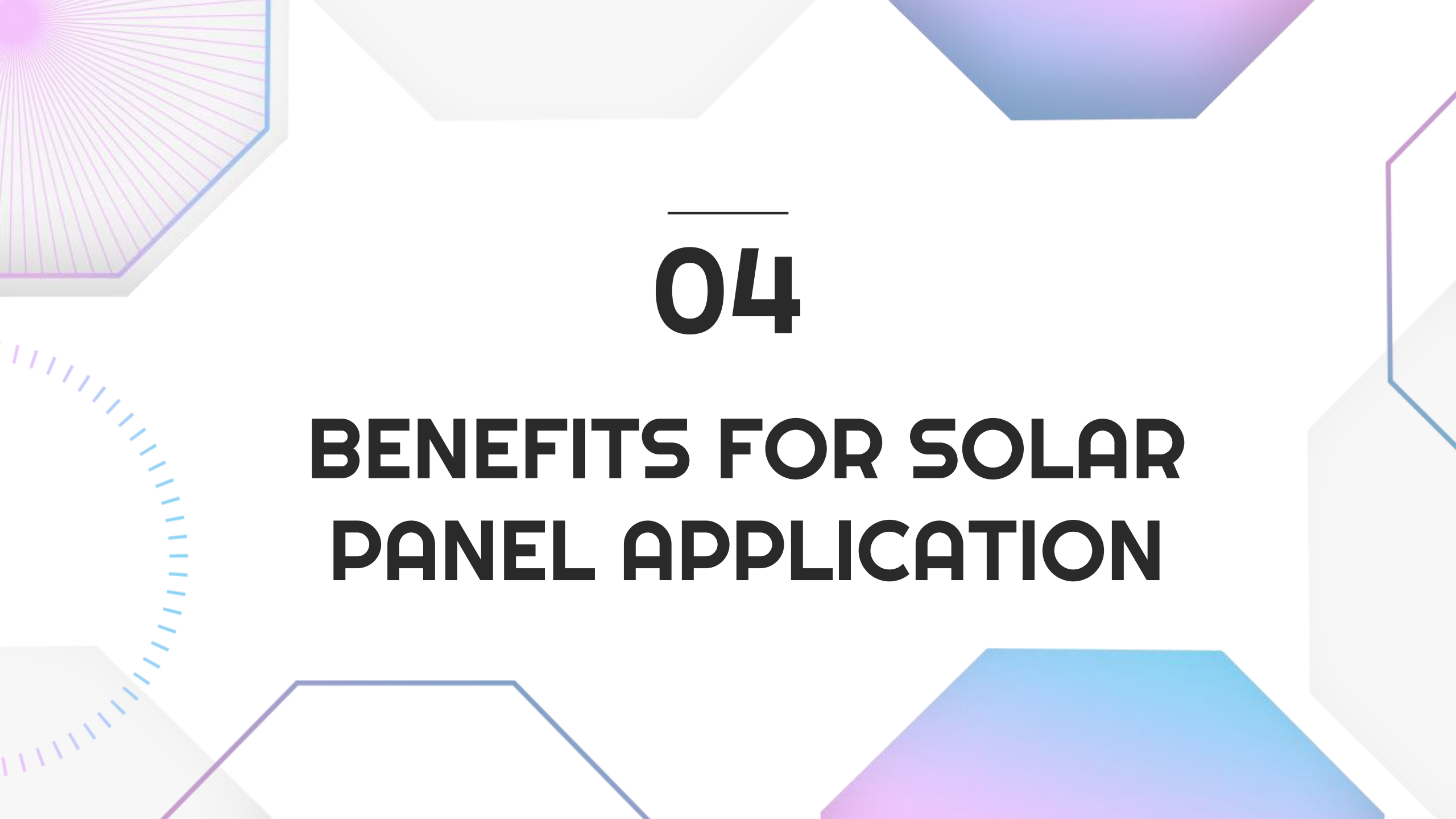
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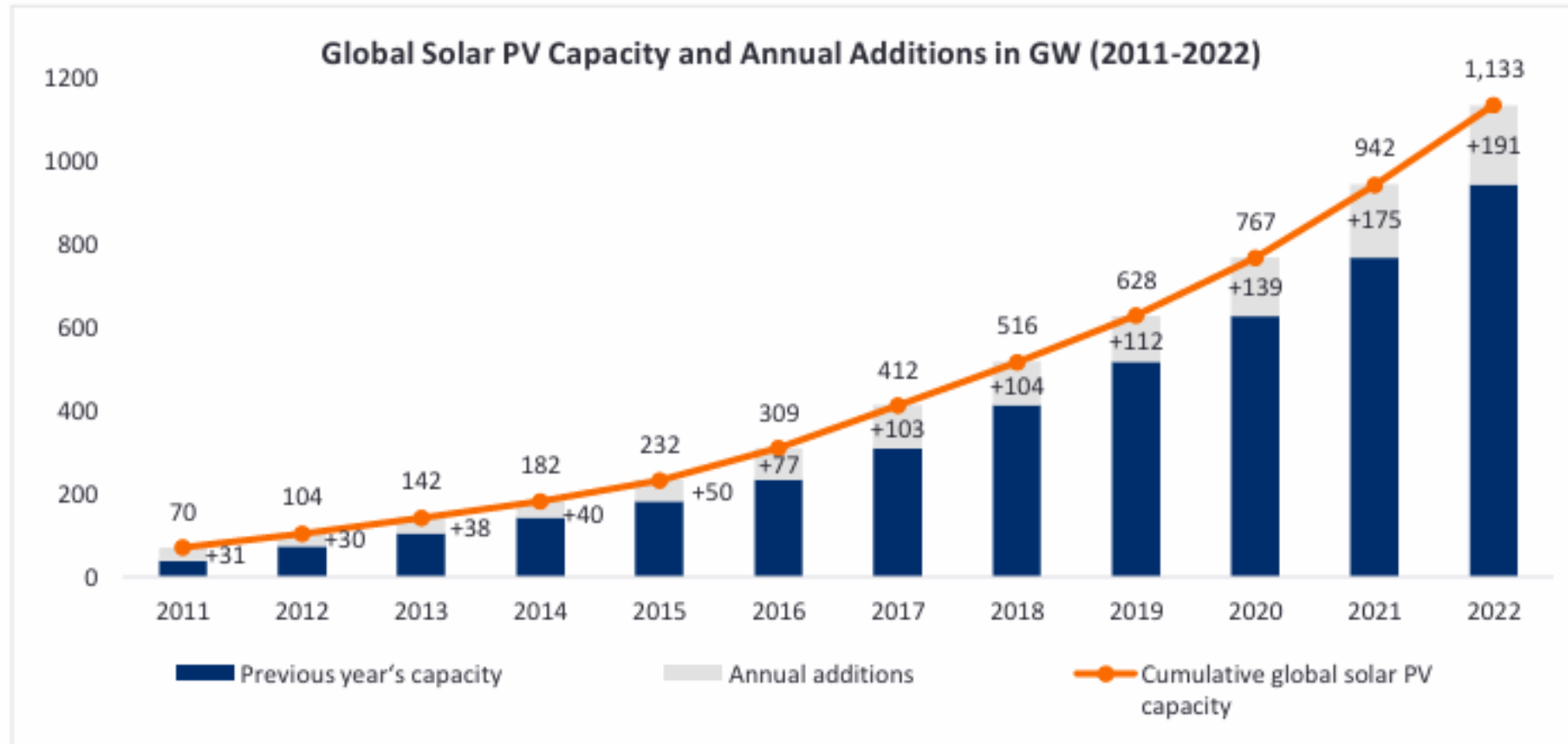
04

BENEFITS FOR SOLAR PANEL APPLICATION



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ACC IN SOLAR PANEL APPLICATION



Source: Global Trends in Solar Power 2023 by EY



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ACC IN SOLAR PANEL APPLICATION



Rooftop distributed photovoltaic power generation on metal roof faces long term risk of,

1. rust
2. waterproofing issues



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ACC IN SOLAR PANEL APPLICATION

Types and mechanisms of corrosion of steel structures

01 Atmospheric Corrosion



02 Localized Corrosion





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ACC IN SOLAR PANEL APPLICATION

Types and mechanisms of corrosion of steel structures

03 Stress Corrosion



04 High Temperature Corrosion



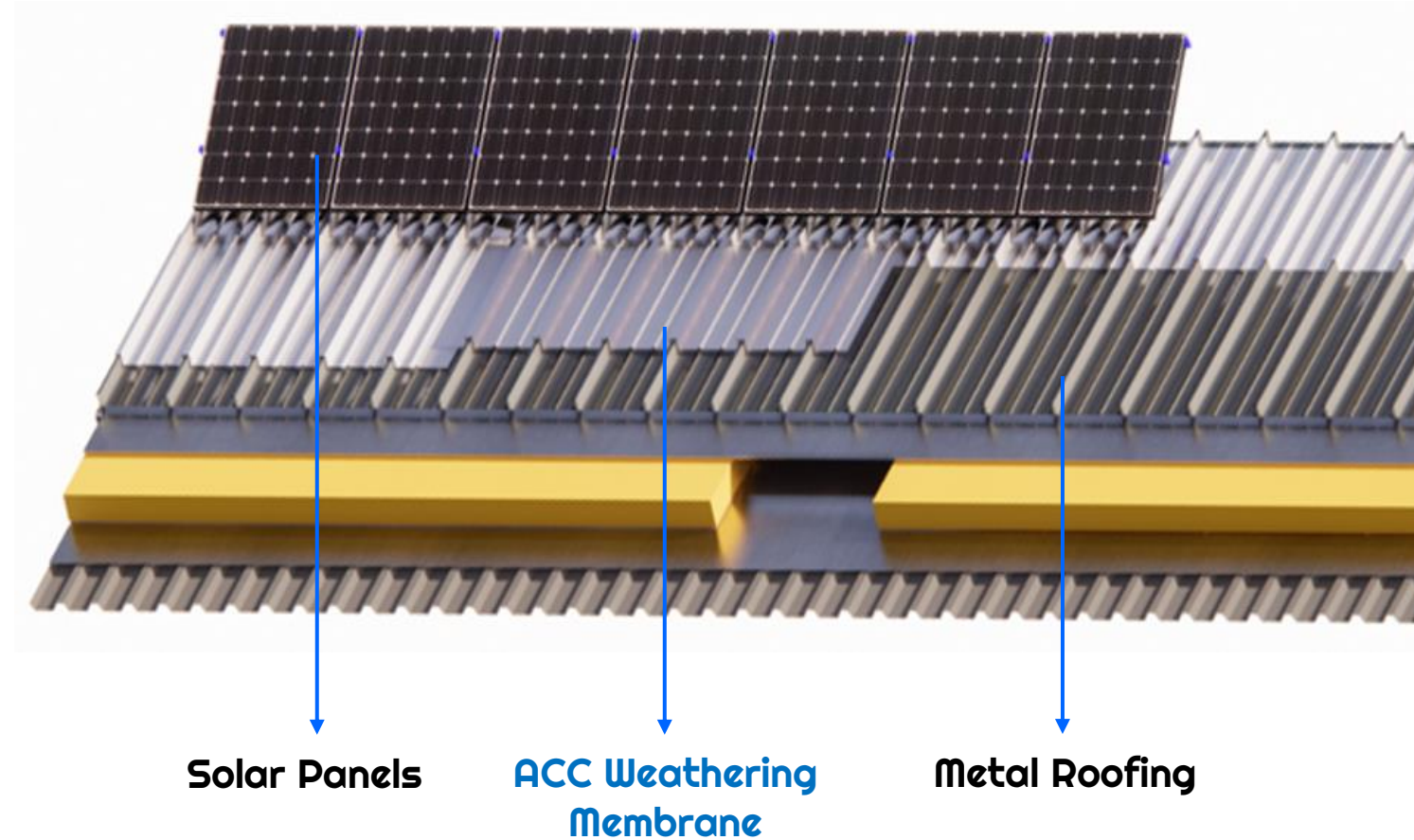


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ACC IN SOLAR PANEL APPLICATION

A) Benefits to the Roof:

- **High UV and corrosion resistance** providing long-term corrosion protection.
- **Can use ordinary metal roof panels** without alloy or corrosion-resistant coating to reduce costs.
- **Convenient and fast installation** can greatly reduce labor costs.
- **Excellent hydrophobic properties** keeping the roof clean and maintain high solar reflectance.





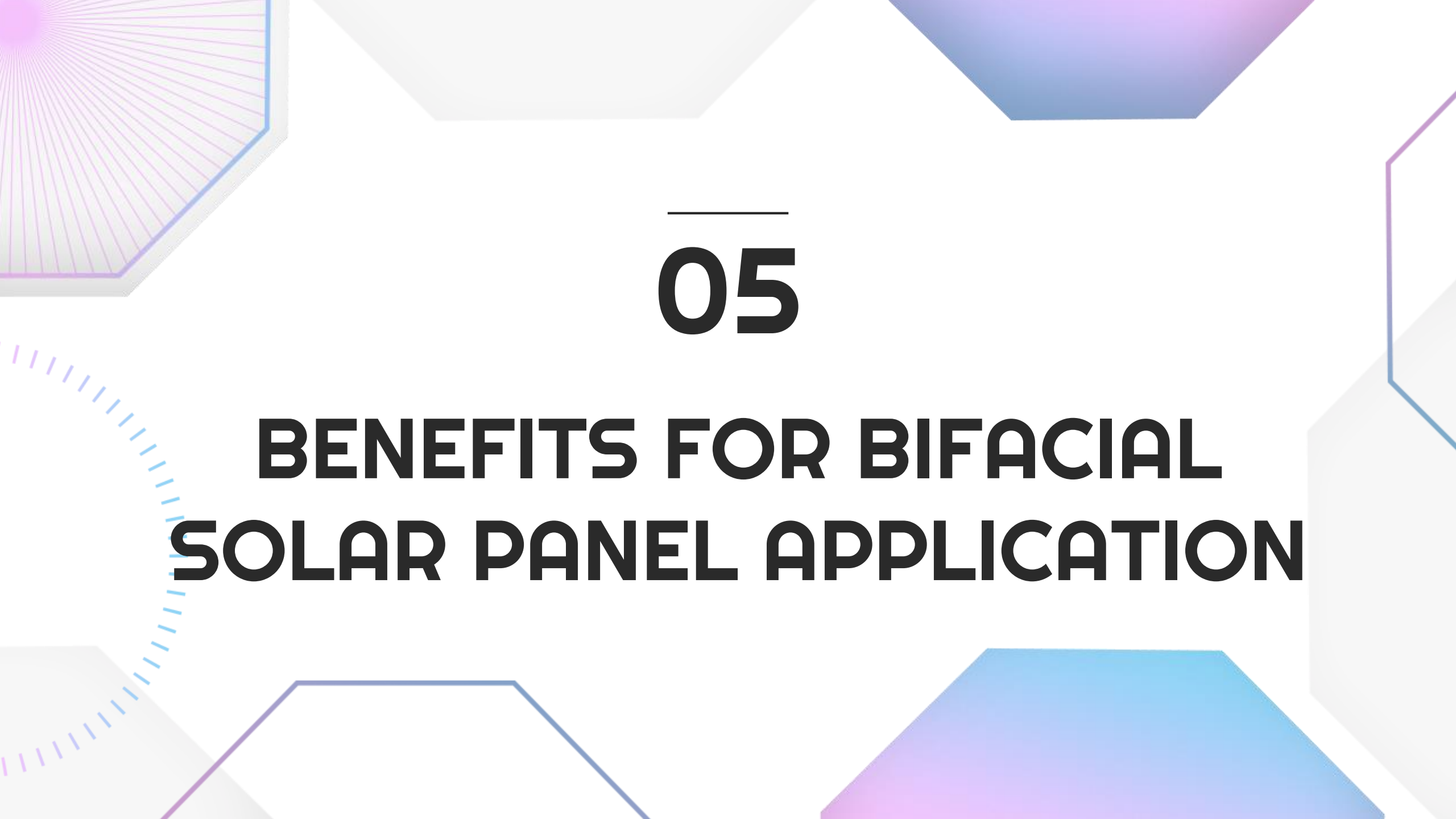
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ACC IN SOLAR PANEL APPLICATION



B) Benefits to the Solar Panels:

- **Improves** power generation efficiency of solar panels
- **Extend** service lifespan of solar panels



05

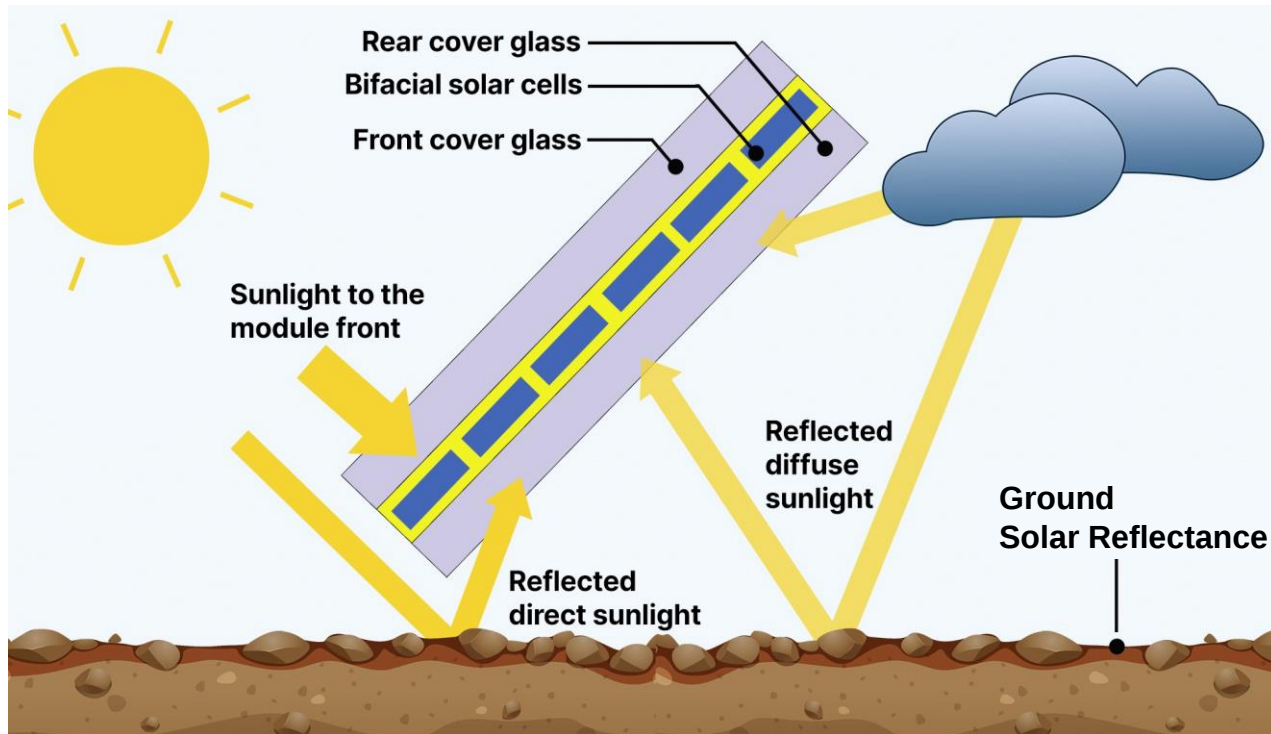
BENEFITS FOR BIFACIAL SOLAR PANEL APPLICATION



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ACC IN BIFACIAL SOLAR PANEL APPLICATION

Bifacial solar panel uses reflected light to increase power generation



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ACC IN BIFACIAL SOLAR PANEL APPLICATION

Bifacial solar panel power generation

		SURFACE TYPE					
		concrete	green field	white gravel	sand	white roofing metal sheet	bright white roofing foil
		SOLAR REFLECTANCE					
		16%	23%	27%	40%	56%	80%
INSTALLATION HEIGHT (m)	0.0	1.20 %	1.70 %	2.00 %	3.00 %	4.20 %	6.00 %
	0.1	2.30 %	3.30 %	3.90 %	5.80 %	8.10 %	11.60 %
	0.2	3.10 %	4.40 %	5.20 %	7.70 %	10.80 %	15.50 %
	0.3	3.60 %	5.20 %	6.10 %	9.10 %	12.80 %	18.20 %
	0.4	4.00 %	5.80 %	6.80 %	10.10 %	14.10 %	20.20 %
	0.5	4.30 %	6.20 %	7.30 %	10.80 %	15.10 %	21.50 %

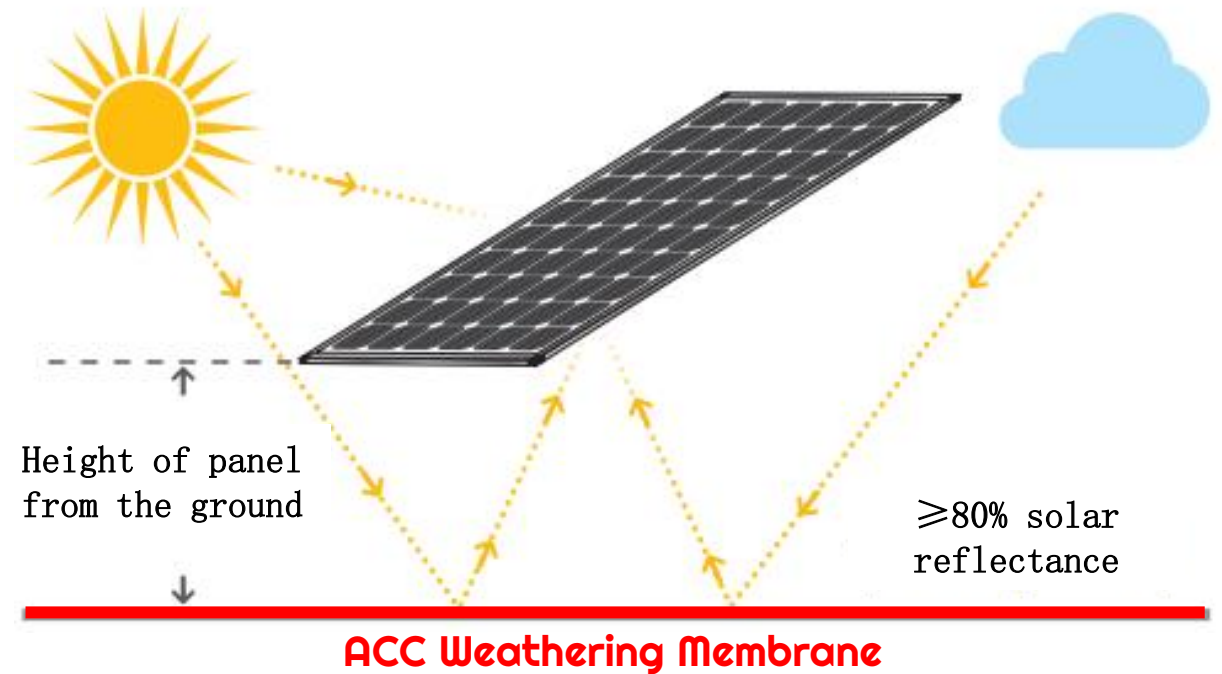


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ACC IN BIFACIAL SOLAR PANEL APPLICATION



➤ 20% additional power generated than single panel





06

PROJECT REFERENCES



Rusty Roof



ACC Protected



Install Solar Panels

Zhejiang Aoqi Electronics Factory
Waterproofing for Solar Panel
China



Zhejiang Aoqi Electronics Factory

Waterproofing for Solar Panel

China



Norvatis Medical Warehouse
Waterproofing for Solar Panel
China



VX Logistics Warehouse
Waterproofing Membrane
China



Guangzhou International Bio Island Conference Hall

Waterproofing Maintenance

China



Hangzhou Yile Chuangfu Building
Waterproofing Maintenance
China



Sanya EMU Station
Waterproofing Maintenance
China



Wuhan Station
Waterproofing Maintenance
China



5G communication Base Station Cabinet

Waterproofing Maintenance

Hangzhou @ China



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Waterproofing Maintenance

Melaka @ Malaysia

The background features several large, light gray hexagonal shapes. Some of these hexagons have internal patterns: one in the top-left has purple radial lines, one in the top-right has a blue-to-purple gradient, one in the bottom-left has a blue-to-purple gradient, and one in the bottom-right has purple radial lines. A dashed purple line forms a partial circle on the right side of the slide.

**END
OF
PRESENTATION**