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NADPOLYMER®
Che-Mystery

Advanced Unsaturated Polyester Resin Solutions
for Artificial Stone & Sanitaryware Applications

NADPOLYMER.COM

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Company Profile

Since the foundation of KOOLANCEL in 2008 as the first manufacturer of cellulose cooling pads in the Middle East، the Group has continuously expanded its industrial footprint through innovation، supply chain integration، and advanced chemical production technologies. Today، NADPOLYMER represents the Group's commitment to high-performance materials، technical excellence، and sustainable industrial growth.

NADPOLYMER

Established as part of the strategic growth vision initiated by KOOLANCEL، NADPOLYMER has become a leading manufacturer of specialty resins serving diverse industrial sectors across the Middle East and CIS countries. Backed by the strength of the Energy Holding Group and built upon vertically integrated manufacturing capabilities، NADPOLYMER delivers advanced polyester، phenolic، and acrylic resin solutions designed to meet the evolving demands of modern industries.

Engineering Performance Through Advanced Resin Technology

NADPOLYMER is a specialized manufacturer of high-performance Unsaturated Polyester Resins (UPR) developed for engineered stone، sanitary ware، solid surface، and composite sanitaryware industries. With extensive formulation expertise، advanced manufacturing infrastructure، and application-driven R&D، we provide tailored resin systems designed to optimize processing efficiency، mechanical performance، aesthetics، and long-term durability.

Our resin technologies support manufacturers producing:

- Artificial marble and engineered stone
- Quartz surfaces and decorative slabs
- Solid surface sheets and thermoformable products
- Sinks and washbasins
- Bathtubs and sanitary ware
- Gel-coated composite bath products
- Cultured marble products
- Decorative and architectural composite surfaces

Unsaturated Polyester Resins for the Sanitaryware Industry

Unsaturated Polyester Resins (UPR) play a vital role in the modern sanitaryware industry due to their excellent balance of cost efficiency, design flexibility, mechanical strength, and long-term durability. In sanitary applications, UPR systems are commonly combined with mineral fillers, pigments, reinforcements, and specialty additives to produce high-performance composite materials suitable for a wide range of products. These advanced composite systems are widely used in the production of sinks, washbasins, bathtubs, shower trays, vanity tops, spa components, and other sanitary products requiring excellent surface quality, water resistance, and structural performance.

Main Applications of Unsaturated Polyester Resins in Sanitaryware

Application Method	Typical Resin Type	Key Components	Primary Usage
Casting (Artificial Marble)	Orthophthalic, Isophthalic	UPR, ATH filler, Pigment	Solid surface sinks, washbasins, vanity tops, decorative sanitary products
Spray up, Hand Lay-up	Orthophthalic, Isophthalic , ISO/NPG	UPR, Glass Fiber, Gelcoat	Bathtubs, shower trays, spa shells, reinforced sanitary products
Sheet Molding Compounds (SMC)	Isophthalic, Vinyl Ester	UPR, Chopped Glass fiber, filler, Thickener	High strength bathtubs, industrial sanitary products, mass production systems
Backup for thermoformed Acrylic	Specialized low-shrinkage resins	Low - shrink UPR, filler, Glass fiber	Structural backing for thermoformed acrylic bathtubs

Selection Guide for Unsaturated Polyester Resins in Sanitaryware Applications

Different resin technologies are selected depending on the required balance of performance, durability, processing conditions, and cost efficiency. The most commonly used resin systems in sanitaryware manufacturing include Orthophthalic, Isophthalic, DCPD, ISO/NPG, and ISO/NPG/MMA modified resins.

1. Orthophthalic Polyester Resin (Ortho UPR)

Structure: Orthophthalic resins are produced using phthalic anhydride as the primary acid component.

KEY CHARACTERISTICS	TYPICAL APPLICATIONS
Economical and versatile resin system	Standard fiberglass sanitary products
Good general water and chemical resistance	Economical bathtub shells
Easy processing characteristics	General -purpose molded parts
Moderate mechanical strength	Water tanks with protective coatings
Lower heat resistance compared to premium resin systems	Basic composite components

Orthophthalic resins are widely used where cost efficiency and standard performance are the primary requirements

2. Isophthalic Polyester Resin (ISO UPR)

Structure: Manufactured using isophthalic acid, resulting in a more chemically stable polymer structure.

KEY CHARACTERISTICS	TYPICAL APPLICATIONS
Improved hydrolysis resistance	Premium bathtubs and shower trays
Enhanced chemical and water resistance	High - quality washbasins
Higher mechanical strength	Industrial piping systems
Better thermal performance	Marine composites
Improved flexibility and toughness	Chemical - resistant composite structures
Superior long - term durability	

Isophthalic resins are preferred for sanitaryware products requiring improved durability and long-term performance under wet conditions

3. DCPD Polyester Resins (DCPD UPR)

Structure: DCPD (Dicyclopentadiene) modified resins are produced by incorporating DCPD into Orthophthalic or isophthalic polyester systems

KEY CHARACTERISTICS	TYPICAL APPLICATIONS
Excellent surface appearance	Luxury bathtubs
Improved gloss retention	Jacuzzi and spa systems
Good UV resistance	Shower cabins
Enhanced dimensional stability	Decorative composite parts
Lower shrinkage characteristics	High - gloss sanitary products
Good chemical and heat resistance	

DCPD - modified resins are commonly selected for applications requiring superior aesthetics and improved surface quality.

4. ISO/NPG POLYESTER RESINS

Structure: ISO/NPG resins are based on isophthalic acid combined with Neopentyl Glycol (NPG) in the polyester backbone.

KEY CHARACTERISTICS	TYPICAL APPLICATIONS
Exceptional water resistance	High - end bathtubs and sanitary ware
Superior hydrolysis resistance	Spa and wellness products
High surface gloss and hardness	Marine composite structures
Excellent chemical resistance	Chemical storage tanks
Outstanding UV and weather resistance	Exterior composite applications
Excellent color stability	
Balanced mechanical performance	

Due to their outstanding resistance to moisture, chemicals, and environmental exposure, ISO/NPG resins are among the preferred technologies for premium sanitaryware manufacturing.

5.ACRYLIC MODIFIED ISO/NPG POLYESTER RESINS

Structure :These advanced systems combine ISO/NPG polyester technology with acrylic modification to enhance surface and chemical performance.

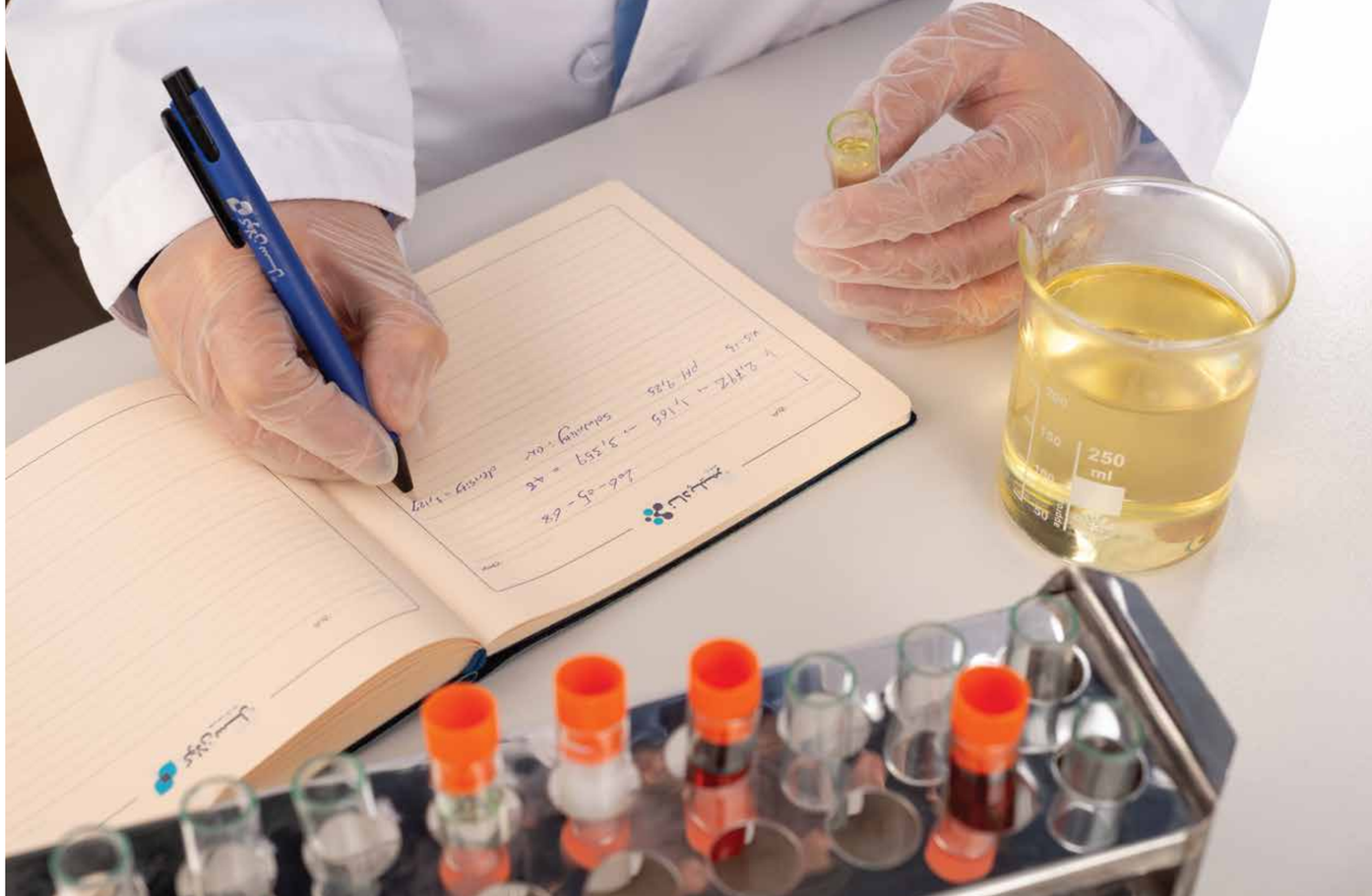
KEY CHARACTERISTICS

- Excellent chemical and water resistance
- Extremely low water absorption
- Superior scratch and abrasion resistance
- Enhanced thermal stability
- High - gloss premium surface finish
- Improved surface hardness
- Excellent long - term durability
- Potential for low - VOC formulations

TYPICAL APPLICATIONS

- Premium sanitary ware gelcoats
- Luxury bathtubs and sinks
- Spa shells and wellness systems
- Corrosion - resistant linings
- High - performance composite surfaces

Acrylic modified ISO/NPG systems are typically used in premium sanitary applications where exceptional appearance, durability, and chemical resistance are required.



RESIN SELECTION SUMMARY

RESIN TYPE	MAIN ADVANTAGES	TYPICAL POSITIONING
Orthophthalic UPR	Cost - effective, easy processing	Standard applications
Isophthalic UPR	Improved durability and chemical resistance	Medium to high-performance applications
DCPD Resin	Excellent surface quality and gloss	Decorative and luxury applications
ISO/NPG UPR	Superior water, chemical, and UV resistance	Premium sanitaryware
ISO/NPG/MMA Systems	Maximum durability and surface performance	High-end and specialty applications

PRODUCT PORTFOLIO

AS Series: Artificial Stone Resins

Artificial Marble & Engineered Stone Resins

The AS Series is specifically engineered for artificial marble and decorative stone production processes requiring:

- Excellent filler wetting
- Low shrinkage characteristics
- Superior mechanical strength
- Outstanding surface gloss
- Controlled curing profile
- Enhanced pigment compatibility
- High calcium carbonate loading capability

	NAD - 1111	NAD - 1111HV	NAD - 1111UHV	NAD - 1120	NAD - 1121	NAD - 1201
Resin base	Ortho	Ortho	Ortho	Ortho	Ortho	ISO
Appearance	Clear,slightly yellow	Clear,slightly yellow	Clear,slightly yellow	Clear,slightly yellow	Clear,slightly yellow	Clear,slightly yellow
Viscosity, 25 °C, mPa.s	350-450	600-700	800-900	350-470	280-300	600-700
Density, 20 ·°C	1.10-1.14	1.10-1.20	1.10-1.20	1.10-1.14	1.10-1.14	1.10-1.13
Acid Value, mg KOH/g Resin	20-30	20-30	20-30	20-30	15-25	15-22
Solid Content, wt.%	60-65	65-70	65-70	60-65	64-68	65-70
Gel time, 25 °C, min	10-20	8-10	10-20	10-20	5-10	10-12
Peak time, 25 ·C, min	20-40	15-30	20-40	20-40	10-30	15-30
Peak Temp. 25 ·C, °C	165 ±20	165 ±20	165 ±20	170±10	120±10	170±20
B/A (Cure/Gel time)	1.4-2.0	1.6-2.2	1.6-2.2	>1.8	>2.5	>2.0
Tensile Strength , MPa	70±5	70±5	70±5	65±5	20±10	70±5
Flexural Strength, MPa	120±10	120±10	120±10	110±10	-	115±5
HDT, °C	60±2	60±5	60±5	55±5	30-35	70±5
Barcol Hardness	40-45	40-45	40-45	40-45	>20	40-45

- **Reactivity determined with 1.5 g MEKP A60 Catalyst and 0.1 g Cobalt (10%) to 100 g Resin.**
- **Gel time and viscosity can be tailored to meet specific customer requirements.**
- **NAD-1121 is specially designed as a highly flexible resin for Marble sheet production.**

KEY FEATURES

- Excellent chemical and water resistance
- Extremely low water absorption
- Superior scratch and abrasion resistance
- Enhanced thermal stability
- High - gloss premium surface finish
- Improved surface hardness
- Excellent long - term durability
- Potential for low - VOC formulations

TYPICAL APPLICATIONS

- Premium sanitary ware gelcoats
- Luxury bathtubs and sinks
- Spa shells and wellness systems
- Corrosion - resistant linings
- High - performance composite surfaces

RECOMMENDED PRODUCTION PROCESSES

- Vacuum vibro-compression
- Casting technology
- Continuous slab production
- Compression molding
- Block casting systems

ARTIFICIAL STONE MANUFACTURING PROCESS

1. RAW MATERIAL PREPARATION

The manufacturing process begins with the precise preparation of raw materials.

Major applications:

NAD-1121 is specially designed and recommended for use in marble sheets and other flexible sheets and panels by different fabrication processes such as Hand lay-up, Spray-up, casting and so on.

PRODUCT SPECIFICATIONS UPON DELIVERY

Property	Range	Unit	TM
Color	< 2.0	Gardner	ASTM D1544
Appearance	Clear, slightly yellow	-	-
Acid value	15 - 25	mg KOH/g Resin	ISO 2114
Viscosity, 25 ˚C	280 - 300	mPa.s	ISO 2555
Density, 20 ˚C	1.10 – 1.14	g/cm3	ASTM D1475
Solid Content	64 - 68	Wt.%	ISO 3251
Gel time, 25 ˚C	5 – 10	min.	ISO 2535
Peak time, 25 ˚C	10 – 30	min.	ISO 2535
B/A (Cure/Gel time)	> 2.5	-	ISO 2535
Peak Temp. 25 ˚C	120 ± 10	˚C	ISO 2535

- Reactivity determined with 1.5 g MEKP A60 Catalyst and 0.1 g Cobalt (10%) to 100 g Resin
- Gel time and viscosity can be tailored to meet specific customer requirements

TYPICAL PROPERTIES OF CAST UNFILLED RESIN

Property	Value	Unit	TM
Tensile Strength	20 ± 10	MPa	ISO 527-2
Elongation at Break	35 ± 5	%	ISO 527-2
HDT	30 - 35	˚C	ISO 75-2
Barcol Hardness	< 20		ASTM D 2583
Linear Shrinkage	< 1.0	%	ASTM D2566
Water absorption	0.5 – 1.0	%	ISO 62

- Curing the resin involves adding 1.5 g MEKP A60 Catalyst and 0.1 g Cobalt (10%) to 100 g Resin

ARTIFICIAL STONE MANUFACTURING PROCESS

1. Raw Material Preparation

The manufacturing process begins with the precise preparation of raw materials.

MATERIAL	TYPICAL WT.%	RESIN REQUIREMENTS
Calcium Carbonate Fillers	70-80%	High filler acceptance
Unsaturated Polyester Resin	15-25%	Controlled exotherm, Minimal shrinkage
Pigments & Additives	1-5%	Excellent dispersion capability
Catalysts & Accelerators	As required	Proper curing behavior

2. Vacuum Mixing Technology

Vacuum mixing technology is critical for eliminating entrapped air and minimizing porosity.

Process Advantages

- Reduced air bubbles
- Improved surface smoothness
- Enhanced mechanical strength
- Better transparency
- Improved consistency

3. Vibro-Compression Technology

Vibro-compression under vacuum combines vibration and compaction to achieve high-density composite structures.

Process Benefits

- High compactness
- Uniform density distribution
- Superior mechanical performance
- Enhanced visual appearance
- Reduced defect rates

4. Curing & Polymerization

Controlled curing ensures optimal polymer crosslinking and dimensional stability.

Critical Parameters

- Temperature control
- Catalyst concentration
- Gel time optimization
- Demolding timing
- Post-curing cycles

5. Surface Finishing

Final surface finishing includes:

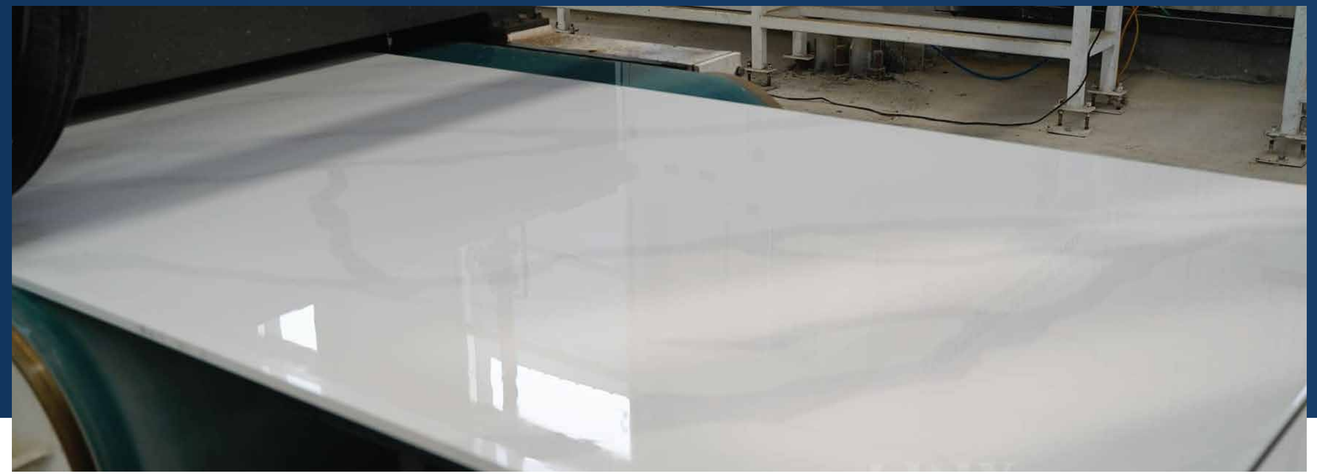
- Calibration
- Grinding
- Polishing
- Edge profiling
- Quality inspection

SS SERIES: SOLID SURFACE RESINS

Premium Resins for Solid Surface Manufacturing

1. Raw Material Preparation

The SS Series is designed for high-performance solid surface applications requiring superior thermoformability, durability, and aesthetic consistency.



	NAD-1206	NAD-1204
Resin base	Iso	Iso
Appearance	Clear, slightly yellow	Clear, slightly yellow
Viscosity, 25 °C, mPa.s	900 - 1100	600 - 700
Density, 20 °°C	1.0 - 1.12	1.10– 1.12
Acid Value, mg KOH/g Resin	20 - 30	20 - 30
Solid Content, wt.%	65 - 70	65 - 70
Gel time, 25 °C, min	10 - 12	10 - 20
Peak time, 25 °C, min	15 - 50	15 - 50
Peak Temp. 25 °C, °C	165 ± 20	135 ± 20
B/A (Cure/Gel time)	< 2.0	1.8 – 2.5
Tensile Strength, MPa	60 ± 5	60 ± 5
Flexural Strength, MPa	130 ± 5	130 ± 5
HDT, °C	65 ± 5	65 ± 5
Barcol Hardness	40 - 45	40 - 45

- Reactivity determined with 1.5 g MEKP A60 Catalyst and 0.1 g Cobalt (10%) to 100 g Resin
- Gel time and viscosity can be tailored to meet specific customer requirements

KEY FEATURES
Exceptional thermoforming capability
Excellent UV resistance
Superior impact resistance
Low VOC formulation options
Excellent pigment dispersion
Seamless joint performance
Enhanced chemical resistance

KEY FEATURES
Solid surface countertops
Laboratory surfaces
Healthcare surfaces
Commercial interiors
Reception desks
Bathroom vanity tops
Decorative wall systems

PROCESSING COMPATIBILITY
Sheet casting lines
Batch casting systems
Continuous casting systems
Vacuum processing technology
CNC machining compatibility

SOLID SURFACE MANUFACTURING PROCESS

Continuous Casting Technology

Continuous casting systems enable high-volume production of uniform solid surface sheets.

Process Flow

1. Resin and filler formulation
2. Pigment dispersion
3. Vacuum deaeration
4. Sheet casting
5. Thermal curing
6. Cooling and trimming
7. Surface finishing

Advantages

- High production efficiency
- Excellent thickness consistency
- Reduced material waste
- Superior surface quality
- Automated process control

Batch Casting Systems

Batch casting technology offers flexibility for customized solid surface production.

Benefits

- Small production batches
- Custom color flexibility
- Specialty design capability
- Reduced tooling investment
- Rapid product development

Thermoforming Technology

Solid surface materials manufactured with advanced SS Series resins can be thermoformed into complex geometries.

Thermoforming Advantages

- Seamless curved designs
- Integrated sink fabrication
- Advanced architectural shapes
- Reduced joint visibility
- Enhanced design freedom

Key Resin Properties

- Controlled flexibility
- Thermal stability
- Crack resistance
- Shape retention

BW SERIES: BATHTUB & SANITARY WARE RESINS

Specialized Resin Systems for Bathtub Manufacturing

The BW Series delivers superior hydrolytic stability, mechanical durability, and surface quality for sanitary applications.

	NAD-1111	NAD-1111HV	NAD-1111UHV	NAD-1105	NAD-1120	NAD-1201	NAD-1204
Resin base	Ortho	Ortho	Ortho	Ortho	Ortho	Iso	ISO/NPG
Appearance	Clear, slightly yellow	Hazy, slightly yellow	Clear, slightly yellow	Clear, slightly yellow	Clear, slightly yellow	Hazy, slightly yellow	Clear, slightly yellow
Viscosity, 25 °C, mPa.s	70 - 100	750 – 850	350 – 470	660 - 710	800 - 900	750 – 850	70 - 100
Density, 20 °°C	1.0 – 1.12	1.10 – 1.14	1.10 – 1.14	1.10 - 1.13	1.10 - 1.20	1.10 – 1.14	1.0 – 1.12
Acid Value, mg KOH/g Resin	< 40	20 - 30	20 - 30	18 - 25	20 - 30	20 - 30	< 40
Solid Content, wt.%	52 - 58	60 - 65	60 - 65	64 - 68	65 - 70	60 - 65	52 - 58
Gel time, 25 °C, min	7 - 13	10 - 20	10 - 20	4 - 6	10 - 20	10 - 20	7 - 13
Peak time, 25 °C, min	15 - 40	20 – 40	20 – 40	10 - 20	20 - 40	20 – 40	15 - 40
Peak Temp. 25 °C, °C	165 ± 20	170 ± 10	170 ± 10	160 ± 10	165 ± 20	170 ± 10	165 ± 20
B/A (Cure/Gel time)	2.0 – 4.0	< 1.8	< 1.8	2 - 3	1.6 - 2.2	< 1.8	2.0 – 4.0
Tensile Strength, MPa	50 ± 5	65 ± 5	65 ± 5	50 ± 5	70 ± 5	65 ± 5	50 ± 5
Flexural Strength, MPa	90 ± 10	110 ± 10	110 ± 10	100 ± 10	120 ± 10	110 ± 10	90 ± 10
HDT, °C	50 ± 3	55 ± 5	55 ± 5	50 ± 5	60 ± 5	55 ± 5	50 ± 3
Barcol Hardness	35 - 40	40 - 45	40 - 45	40 - 45	40 - 45	40 - 45	35 - 40

- Reactivity determined with 1.5 g MEKP A60 Catalyst and 0.1 g Cobalt (10%) to 100 g Resin
- Gel time and viscosity can be tailored to meet specific customer requirements
- NAD-1114/1T is thixotropic grade.

KEY FEATURES

- Excellent hydrolysis resistance
- Superior water resistance
- Enhanced impact performance
- High gloss retention
- Excellent bonding with gelcoat systems
- Thermal shock resistance
- Long-term dimensional stability

TYPICAL APPLICATIONS

- Bathtubs
- Shower trays
- Washbasins
- Composite sinks
- Spa components
- Jacuzzi systems
- Sanitary ware products

MANUFACTURING COMPATIBILITY

- Spray-up systems
- Hand lay-up processes
- Resin transfer molding (RTM)
- Vacuum infusion
- Compression molding
- Solid casting systems

SANITARYWARE ACRYLIC BACK UP RESIN

Product description:

NAD-1106 is an unsaturated polyester resin derived from Orthophthalic acid and standard glycols dissolved in Styrene. NAD-1106 is of very low viscosity and low reactivity with good adhesion to PMMA Sheets and controlled shrinkage during the cure process.

Major applications:

NAD-1106 is especially recommended for use as an acrylic-back-up resin used for the manufacturing of bathtubs, vanities and shower trays. The resin in non-accelerated, non-thixotropic unsaturated polyester resin designed to be applied by spray or hand lay-up.

PRODUCT SPECIFICATIONS UPON DELIVERY

Property	Range	Unit	TM
Color	< 2	Gardner	ASTM D1544
Appearance	Clear, slightly yellow	-	-
Acid value	< 40	mg KOH/g Resin	ISO 2114
Viscosity, 20 ·C	70 - 100	mPa.s	ISO 2555
Density, 20 ·C	1.0 – 1.12	g/cm3	ASTM D1475
Solid Content	52 - 58	Wt.%	ISO 3251
Gel time, 30 ·C	7 – 13	min.	ISO 2535
Peak time, 30 ·C	15 – 40	min.	ISO 2535
B/A (Cure/Gel time)	2.0 – 4.0	-	ISO 2535
Peak Temp. 30 ·C	165 ± 20	·C	ISO 2535

- Reactivity determined with 2.0 g MEKP A60 Catalyst and 0.2 g Cobalt (10%) to 100 g Resin
- Gel time and viscosity can be tailored to meet specific customer requirements

TYPICAL PROPERTIES OF CAST UNFILLED RESIN

Property	Value	Unit	TM
Tensile Strength	50 ± 5	MPa	ISO 527-2
Tensile Modulus	2.5 ± 0.3	GPa	ISO 527-2
Elongation at Break	> 3.0	%	ISO 527-2
Flexural Strength	90 ± 10	MPa	ISO 178
Flexural Modulus	2.5 ± 0.3	GPa	ISO 178
HDT	50 ± 3	·C	ISO 75-2
Barcol Hardness	35 - 40	-	ASTM D2583
Linear Shrinkage	≤ 1	%	ASTM D2566
Water absorption	0.25 – 0.35	%	ISO 62

- Curing the resin involves adding 2.0 g MEKP A60 Catalyst and 0.2 g Cobalt (10%) to 100 g Resin

Post Curing Note:

- For optimum chemical, water- and heat-resistant properties, molded parts should be post-cured before being put into service.
- Mature molded specimens for 24 hours at room temperature. Post-cure in an 80°C oven for 3 hours, then keep them in room temperature for one more 24-hours. Immediate post-curing after maturation is most effective.
- Post curing for the HDT test is carried out at 105 ·C for 5 hours.

SINK & WASHBASIN MANUFACTURING TECHNOLOGIES

Composite Sink Production

Composite sinks combine mineral fillers and advanced resin systems to deliver durability and aesthetics.

1. Mold Preparation

- Mold cleaning
- Release agent application
- Gelcoat application (optional)

2. Material Preparation

- Resin formulation
- Filler incorporation
- Pigment addition
- Catalyst blending

3. Casting & Molding

- Mold filling
- Vacuum compaction
- Vibration processing
- Controlled curing

4. Demolding & Finishing

- Demolding operations
- Edge trimming
- Surface polishing
- Dimensional inspection

Gelcoat Composite Technology

Gelcoat technology provides premium aesthetic surfaces combined with structural composite reinforcement.

Advantages

- Premium gloss finish
- Enhanced durability
- Chemical resistance
- Easy cleaning

Composite Bathtub Production

Advanced composite bathtubs combine lightweight construction with high mechanical performance.

Manufacturing Methods

1.Spray-Up Technology

Spray-up systems provide efficient reinforcement distribution for large bathtub components.

Process Advantages

- High productivity
- Complex geometry capability
- Reduced labor requirements
- Consistent laminate structure

2.Resin Transfer Molding (RTM)

RTM technology delivers precise laminate control and premium surface quality.

Advantages

- Closed mold processing
- Reduced emissions
- Excellent dimensional accuracy
- Improved repeatability

3.Vacuum Infusion Technology

Vacuum infusion improves fiber wet-out and minimizes void formation.

Key Advantages

- Lower emissions
- High laminate quality
- Reduced resin consumption
- Improved structural properties

Acrylic-Backed Composite Systems

Many premium bathtubs combine acrylic sheets with polyester composite reinforcement.

System Benefits

- High gloss decorative surface
- Structural reinforcement
- Thermal insulation
- Improved rigidity

Resin Requirements

The reinforcement resin system must provide:

- Excellent adhesion to acrylic
- Low shrinkage
- Controlled exotherm
- Good impact resistance

Gelcoat Resins

NAD-1204

Product description:

NAD-1204 is an Acrylic Modified unsaturated polyester resin derived from Isophthalic acid and Neopentyl glycol dissolved in Styrene (ISO/NPG). NAD-1204 is of medium viscosity and reactivity with demonstrated weathering, UV and corrosion resistance features.

Major applications:

NAD-1204 is especially recommended for use in the Gelcoat and Topcoat productions for use in different industries such as Resin Sinks, Washbasins, Bathtubs, artificial Stones and solid surface.

PROPERTY	RANGE	UNIT	TM
Color	1	Gardner	ASTM D1544
Appearance	Clear, slightly yellow	-	-
Acid value	20 - 30	mg KOH/g Resin	ISO 2114
Viscosity, 25 °C	600 - 700	mPa.s	ISO 2555
Density, 20 °C	1.10– 1.12	g/cm3	ASTM D1475
Solid Content	67 ± 3	Wt.%	ISO 3251
Gel time, 25 °C	10 – 20	min.	ISO 2535
Peak time, 25 °C	15 – 50	min.	ISO 2535
B/A (Cure/Gel time)	1.8 – 2.5	-	ISO 2535
Peak Temp. 25 °C	135 ± 20	°C	ISO 2535

- Reactivity determined with 1.5 g MEKP A60 Catalyst and 0.1 g Cobalt (10%) to 100 g Resin
- Gel time and viscosity can be tailored to meet specific customer requirements

PROPERTY	VALUE	UNIT	TM
Tensile Strength	60 ± 5	MPa	ISO 527-2
Tensile Modulus	3.3 ± 0.25	GPa	ISO 527-2
Elongation at Break	> 3.0	%	ISO 527-2
Flexural Strength	130 ± 5	MPa	ISO 178
Flexural Modulus	3.5 ± 0.5	GPa	ISO 178
HDT	65 ± 5	°C	ISO 75-2
Barcol Hardness	40 - 45	-	ASTM D2583
Linear Shrinkage	< 1.5	%	ASTM D2566
Water absorption	0.1 – 0.25	%	ISO 62

- Curing the resin involves adding 1.5 g MEKP A60 Catalyst and 0.1 g Cobalt (10%) to 100 g Resin

Post Curing Note:

- For optimum chemical, water- and heat-resistant properties, molded parts should be post-cured before being put into service.
- Mature molded specimens for 24 hours at room temperature. Post-cure in an 80°C oven for 3 hours, then keep them in room temperature for one more 24-hours. Immediate post-curing after maturation is most effective.
- Post curing for the HDT test is carried out at 105 °C for 5 hours.

Appendix A – Production Process Troubleshooting

Artificial Stone & Sanitaryware Production Troubleshooting Guide

This troubleshooting guide provides a quick reference for identifying and resolving common processing issues encountered during the manufacturing of artificial stone, solid surface products, sinks, washbasins, and bathtubs.

1. Air Bubbles & Porosity

POSSIBLE CAUSES	RECOMMENDED SOLUTIONS
Insufficient vacuum mixing	Increase vacuum efficiency and mixing time
Excessive mixing speed	Optimize mixer RPM to minimize air entrapment
High resin viscosity	Adjust viscosity using recommended reactive diluents
Improper filler drying	Ensure fillers are dry before processing
Poor mold venting	Improve mold venting design

PREVENTION TIPS
Use proper vacuum deaeration systems
Maintain controlled material temperatures
Optimize filler particle distribution
Avoid excessive turbulence during mixing

2. Surface Cracking

POSSIBLE CAUSES	RECOMMENDED SOLUTIONS
Excessive curing exotherm	Reduce catalyst level or casting thickness
High internal stress	Use low-shrink resin systems
Inadequate post-curing	Optimize curing cycle and temperature profile
Improper filler/resin ratio	Adjust formulation balance

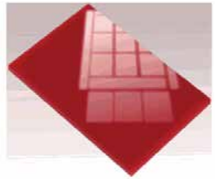
PREVENTION TIPS
Control curing temperature carefully
Avoid rapid cooling after curing
Use recommended resin systems for thick sections

3. Poor Surface Gloss

POSSIBLE CAUSES	RECOMMENDED SOLUTIONS
Mold contamination	Clean and polish mold surfaces regularly
Incorrect gelcoat curing	Optimize catalyst and curing conditions
Moisture contamination	Control humidity and dry raw materials
Insufficient polishing	Improve finishing and polishing process

PREVENTION TIPS

- Maintain mold quality standards
- Store raw materials under controlled conditions
- Ensure proper gelcoat thickness uniformity



4. Poor Demolding Performance

POSSIBLE CAUSES	RECOMMENDED SOLUTIONS
Insufficient mold release agent	Apply suitable release system properly
Under-cured laminate	Increase curing time or catalyst level
Excessive shrinkage	Select low-shrink resin systems
Mold surface defects	Repair and polish mold surface

PREVENTION TIPS

- Follow proper mold maintenance procedures
- Monitor curing consistency
- Use compatible release agents

5. Yellowing or Color Instability

POSSIBLE CAUSES	RECOMMENDED SOLUTIONS
UV exposure	Use UV-stabilized resin systems
Excessive curing temperature	Reduce exotherm and curing temperature
Poor pigment compatibility	Use recommended pigment systems
Oxidation during storage	Improve storage conditions

PREVENTION TIPS

- Store products away from direct sunlight
- Use UV-resistant gelcoat systems
- Follow recommended catalyst ratios

6. Fiber Print-Through in Composite Bath-wares

POSSIBLE CAUSES	RECOMMENDED SOLUTIONS
Excessive laminate shrinkage	Use low-profile or low-shrink additives
Insufficient skin coat thickness	Increase resin-rich surface layer
Improper curing cycle	Optimize cure profile
Incorrect reinforcement positioning	Improve laminate structure design

PREVENTION TIPS

- Use controlled curing systems
- Optimize laminate construction
- Use premium surface resin systems

7. Weak Adhesion Between Acrylic Sheet & Composite Backing

POSSIBLE CAUSES	RECOMMENDED SOLUTIONS
Surface contamination	Clean acrylic surface thoroughly
Incorrect backing resin	Use acrylic-compatible resin systems
Excessive shrinkage stress	Use low-shrink formulations
Poor curing conditions	Optimize curing profile

PREVENTION TIPS
Ensure proper acrylic surface preparation
Use recommended reinforcement systems
Control processing temperatures carefully

General Processing Recommendations

Raw Material Handling

- Store resins in cool, dry, and ventilated areas
- Protect materials from direct sunlight and moisture
- Follow recommended storage temperatures
- Mix materials thoroughly before use

Catalyst & Accelerator Control

- Always follow recommended addition ratios
- Avoid direct contact between catalyst and accelerator
- Use calibrated dosing equipment
- Maintain consistent processing temperatures

Production Environment

- Maintain stable ambient temperature and humidity
- Ensure adequate ventilation
- Minimize dust contamination
- Follow proper safety procedures during handling and processing