Road Science®

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Division of ArrMaz

EMULSIFIER AND EMULSION PERFORMANCE-IMPROVING ADDITIVE CHEMISTRY

ARRMULS[®] | ARRTEKK[®] | ACRA | AD-HERE[®]



CHEMISTRY FOR SUCCESS

Smarter Emulsifiers and Additives Backed by Industry Leading Support

Road Science manufactures emulsifier and additive chemistry for top emulsion quality and performance, enabling you to exceed customer performance expectations and differentiate yourself from the competition.

We lead the industry in delivering responsive, comprehensive and dependable customer support, focused on helping our customers succeed. We specialize in customized chemistry solutions to meet the most challenging performance needs.

Through our experienced staff of professionals and world-class AASHTO Materials Reference Laboratory (AMRL) accredited laboratory, we work alongside our customers helping to:

- Improve emulsion product quality and consistency
- Improve product performance
- Bring new products to market
- Solve product problems
- Increase profitability and operational efficiency

CHEMISTRY FOR ALL APPLICATIONS

ArrMuls®

Anionic emulsifiers and performanceimproving additives for new pavement construction, preventative maintenance and industrial applications.

ArrTekk®

Cationic emulsifiers and performanceimproving additives for new pavement construction, preventative maintenance and recycling applications.

ACRA

Refined coal tar emulsifiers for pavement sealer applications.

AD-here®

Performance-improving additives for better emulsion coating and adhesion for a variety of applications.

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REACTOR 3



ARRMULS®

Products and Applications

ArrMuls 201 – Anionic Rapid-Set (RS) and Medium-Set (MS) Emulsifier

- Chip Seal/Surface Dressing
- Open-Graded Cold Mix

ArrMuls 1315 – Anionic Slow-Set (SS) Emulsifier

- Tack Coat
- Fog Seal
- Prime Coat
- Asphalt-Based Pavement Sealer
- Dense-Graded Cold Mix

ArrMuls 3015 – Anionic Slow-Set (SS) Emulsifier

- Asphalt-Based Pavement Sealer
- Industrial Coatings

ArrMuls 5012 – Anionic Slow-Set (SS) Emulsifier

Asphalt-Based Pavement SealerIndustrial Coatings

ArrMuls 220 – Performance-Improving Additive

- Chip Seal/Surface Dressing
- Micro-Surfacing

ArrMuls D-Tekk – Performance-Improving Additive

 Asphalt and Coal Tar-Based Pavement Sealers

ArrMuls Tack Technology

• Non-Tracking Tack Coat

ARRMULS® Anionic Asphalt Emulsifiers

ArrMuls 201

ArrMuls 201 is a rapid-setting emulsifier for chip seal and opengraded cold mix. The chemistry is engineered to deliver stable emulsion viscosity through prolonged storage and greater asphalt film thickness coating on all types of aggregate, yielding better chip retention and improved aggregate coating in cold mixes.

ArrMuls 5012

ArrMuls 5012 is a slow-setting, resin-based emulsifier for asphaltbased pavement sealer and industrial coating products. The chemistry easily emulsifies low-penetration asphalts, and provides extreme emulsion shear stability during the compounding process and after pumping. Pavement sealers and coatings made with ArrMuls 5012 dry and cure faster than those made with other slow-set emulsifiers, are not susceptible to re-emulsification even while shear stress is applied in the presence of water, and have greater wear resistance versus competing emulsifiers.

Benefits

- Eliminates wasted time and costs spent on emulsion and cold mix reprocessing
- Longer lasting chip seals and cold mix-paved roads

- Easier emulsification of hard asphalts and better emulsion stability for operational ease and efficiency
- Faster traffic return
- Longer-lasting sealers and coatings

ArrMuls 3015

ArrMuls 3015 is the same chemistry as ArrMuls 5012, but is a lower viscosity, easier-to-handle liquid.

Benefits

- Easy-to-handle liquid for operational ease and efficiency
- Easier emulsification of hard asphalts and better emulsion stability for operational ease and efficiency
- Faster traffic return
- Longer-lasting sealers and coatings

ArrMuls Tack Technology

ArrMuls Tack Technology is a simple to use, two-part chemical kit for producing non-tracking tack coat using typical paving-grade asphalt. ArrMuls Tack Part A and ArrMuls Tack Part B chemicals work in conjunction to eliminate tire pick-up and tracking away of tack.

ArrMuls Tack Technology increases pavement strength by keeping tack where it belongs, while offering strain tolerance for improved pavement resistance to cracking and slippage versus tack coats made of brittle, hard penetration asphalt. It also enables better paving efficiency and faster production rates with less waiting time for tack coat to dry. ArrMuls Tack Technology eliminates costs to replace traffic paint and remove tracked tack, and eradicates the safety liability of reduced friction roads caused by tracked tack.

ArrMuls 1315

ArrMuls 1315 is a slow-setting emulsifier for a wide range of applications including tack coat, fog seal, prime coat, asphaltbased pavement sealer and dense-graded cold mix. ArrMuls 1315 emulsions have small particle size and the highest degree of stability when compounding at elevated emulsion temperature and in terms of sieve, pumping, and long-term settlement. Tack coat emulsions made with ArrMuls 1315 dry faster compared to competing emulsifiers and allow for faster paving. Unlike ligninbased emulsifiers, ArrMuls 1315 protects against biological growth in emulsions which causes foul odor, product stability problems and requires product reprocessing or disposal.

Benefits

- Uses paving-grade asphalt for operational ease and efficiency
- Faster paving production rates for greater contractor profitability
- Stronger pavements and better crack resistance for longer lasting roads
- Saves money in costs to replace traffic paint and remove tracked tack

Benefits

- Foul odor protection saves money on product reprocessing, tank clean-up, customer refunds and credits
- Faster paving for improved profitability
- Better emulsion stability for greater operational ease and efficiency



5-Day Settlement

Mean Emulsion Particle Size

Emulsion made with South American crude based PG64-22



ARRTEKK®

Products and Applications

ArrTekk 710 – Cationic Rapid-Set (CRS) and Cationic Medium-Set (CMS) Emulsifier

- Chip Seal/Surface Dressing
- Open-Graded Cold Mix

ArrTekk 720 – Cationic Rapid-Set (CRS) and Cationic Medium-Set (CMS) Emulsifier

- Chip Seal/Surface Dressing
- Open-Graded Cold Mix
- Scrub Seal
- Sand Seal
- Hot-in-Place Recycling (HIR)

ArrTekk 815 – Cationic Recycling Emulsifier

- High-Performance Cold-in-Place Recycling (CIR)
- High-Performance Full-Depth Reclamation (FDR)
- High-Performance Cold Central Plant Recycling (CCPR)

ArrTekk 860 – Cationic Slow-Set (CSS) and Anionic Slow-Set (SS) Emulsifier

- Tack Coat
- Fog Seal
- Mixing-Grade CIR, FDR, CCPR
- Slow-Set Slurry Seal
- Dense-Graded Cold Mix

ArrTekk 1107 – Cationic Quick-Set (CQS) Emulsifier

• Quick-Set Slurry Seal

ArrTekk 1285 – Cationic Micro-Surfacing Emulsifier

- Micro-Surfacing
- Fast-Breaking Fog Seal

ArrTekk 1295 – Cationic Micro-Surfacing Emulsifier

• High-Performance Micro-Surfacing ArrTekk 1295LV – Cationic Micro-Surfacing Emulsifier and Break Control Additive

 High-Performance Micro-Surfacing

ArrTekk 5500 – Cationic Micro-Surfacing Emulsifier

 High-Performance Micro-Surfacing

ArrTekk TA – Performance-Improving Additive

 Settlement Stabilizer and Latex Compatibilizer for cationic and anionic emulsions

ARRTEKK®

Cationic Asphalt Emulsifiers

ArrTekk 710

ArrTekk 710 is a rapid-setting emulsifier for both neat and polymer-modified chip seal and open-graded cold mix. It is engineered to yield high emulsion viscosity at lower asphalt content, with viscosity off of mill that is within specification and remains consistent during extended storage. ArrTekk 710 chip seal emulsions break fast locking chips into place for reduced sweeping loss and better durability.

- Saves money on asphalt
- Saves money and time spent on emulsion reprocessing
- Longer lasting chip seal

ArrTekk 720

ArrTekk 720 is a versatile rapid-setting emulsifier for neat and polymer-modified chip seal, scrub seal, sand seal, open-graded cold mix and HIR applications. Unique chemistry yields moderate emulsion viscosity and promotes easy coating of challenging aggregates with greater asphalt film thickness. Embedded anti-stripping technology protects against aggregate loss and stripping caused by moisture damage.

ArrTekk 815

ArrTekk 815 is an emulsifier for highly durable and easily constructible CIR, FDR and CCPR. The chemistry balances quick early strength development in the recycled roadway with easy pick-up, lay-down and compaction, without premature emulsion breakage and stickiness to CIR machinery. ArrTekk 815 recycled roads resist raveling and weather damage less than a few hours after compaction, enabling quicker traffic return without damaging the road. The chemistry includes powerful adhesion promotion technology that extends the life cycle of the road by providing long-term protection against moisture damage, better retained stability strength and better indirect tensile test (IDT) strength.

ArrTekk 860

ArrTekk 860 is a slow-setting emulsifier for a wide variety of CSS and SS applications. Small emulsion particle size and high stability in terms of sieve, pumping and settlement are typical emulsion characteristics. Mixing-grade emulsions offer extended mixing time, and easily coat recycled asphalt pavement (RAP) and granular materials, even when damp and/or dusty. Emulsions offer plenty of workability for easy constructability, and will not break prematurely and stick to machinery. ArrTekk 860 is easy to handle in the emulsion plant as it disperses quickly and homogeneously in water with minimal agitation for fast soap production. ArrTekk 860 can easily be used to make both cationic and anionic emulsions for added versatility and plant efficiency.



Better Efficiency, Better Emulsion Stability

Benefits

- Use of more cost-effective aggregates previously not utilized due to coating challenges
- Longer lasting chip seal, cold mix and HIR roads

Benefits

- Easier and faster construction by eliminating constructability issues caused by unruly emulsion
- Better durability after compaction saves money by reducing repair expenses and eliminating the need for fog seal application
- Longer roadway life cycle

Benefits

- Better plant efficiency through faster soap production
- Both cationic and anionic emulsion production for greater operational convenience
- Better emulsion stability saves costs in emulsion reprocessing, tank clean-up, and customer refunds and credits
- Easier constructability in mixing-grade applications for faster production rates



Better Efficiency, Better Emulsion Particle Size

CSS emulsion made with Canadian crude based PG64-22

ArrTekk 1107

ArrTekk 1107 is a quick-setting emulsifier for slurry seal designed to provide the contractor easy mix control with highly reactive aggregates, even while paving in high temperature conditions. Mixes have longer mixing time and better field workability balanced with quick setting and curing properties for fast traffic return. Emulsions remain pump and sieve stable several weeks after being produced and stored in cool tanks or trailers.

ArrTekk 1285

ArrTekk 1285 is an emulsifier for micro-surfacing, fast-setting tack coat and fog seal applications. Emulsifier technology provides stronger asphalt-aggregate adhesion in micro-surfacing for minimal raveling and greater durability. Fast-setting tack coats and fog seals break and cure faster for sooner traffic return and reduced vehicular tracking.

ArrTekk 1295

ArrTekk 1295 is a micro-surfacing emulsifier designed to meet the highest industry performance demands. Embedded anti-stripping technology lengthens micro-surfacing life cycle by up to 30% by reducing raveling and 6-Day Wet-Track Abrasion Test (WTAT) loss. The chemistry allows for better workmanship and aesthetics by providing the contractor with longer mixing time and better mix consistency for easy lay-down and hand-work, even while paving in extremely hot weather conditions. During cool conditions and night time paving, easy control of chemical break allows quick traffic return time and increased production rates.

Benefits

- Better mix control for increased paving production rates
- Faster curing for sooner traffic return
- Dependable emulsion quality after weeks of storage

Benefits

- Longer micro-surfacing life cycle
- Faster traffic return after fog seal and tack coat applications

Benefits

- Eliminate contractor complaints, formulation adjustments, emulsion returns and customer credits
- Easy constructability and faster paving production rates, even in the hottest conditions
- Saves money by reducing call-back repairs related to poor workmanship and aesthetics
- Faster traffic return time and better production rates during night time paving
- 30% longer micro-surfacing life cycle



Smarter Micro-Surfacing

6-Day WTAT Loss

High Temperature Mix Time, 100°F Emulsion and Aggregate Temperature 30 Minute Cohesive Strength, 65°F Curing

Minnesota Type II granite aggregate. Micro-surfacing emulsion made with Canadian crude-based PG58-28. Emulsion content 12.0% by weight of dry aggregate.

Smarter Micro-Surfacing



6-Day WTAT Loss

High Temperature Mix Time, 100°F Emulsion and Aggregate Temperature 30 Minute Cohesive Strength, 65°F Curing

Pennsylvania Type II limestone aggregate. Micro-surfacing emulsion made with Canadian crude-based PG58-28. Emulsion content 12.0% by weight of dry aggregate.

ArrTekk 1295LV

ArrTekk 1295LV is the same chemistry as ArrTekk 1295, but is an easier-to-handle liquid. It is also an effective break control additive when added through the paving machine that significantly extends micro-surfacing and slurry seal mixing time, without delaying traffic return time. It is low viscosity with easy water solubility for convenient plant and field use.

Benefits

- Easy-to-handle liquid for operational ease and efficiency
- Saves money on control additive costs
- Eliminate contractor complaints, formulation adjustments, emulsion returns and customer credits
- Easy constructability and faster paving production rates, even in the hottest conditions
- Saves money by reducing call-back repairs related to poor workmanship and aesthetics
- Faster traffic return time and better production rates during night time paving
- 30% longer micro-surfacing life cycle

ArrTekk 5500

ArrTekk 5500 is a unique emulsifier chemistry used for microsurfacing. It is engineered to perform better with slower, unreactive aggregates for faster early strength development and traffic return, even while paving during night time and cool conditions.

Benefits

- Faster traffic return time and better production rates during night time paving and in cool conditions
- Better durability and less ravel when road is opened to traffic after night time paving and in cool conditions

THIS IS WHAT BETTER CHEMISTRY LOOKS LIKE.



ACRA

Products and Applications

ACRA 880 – Refined Coal Tar Emulsifier

• Coal Tar-Based Pavement Sealer

ACRA 880LV – Refined Coal Tar Emulsifier

• Coal Tar-Based Pavement Sealer

ACRA 900 – Refined Coal Tar Emulsifier

• Coal Tar-Based Pavement Sealer

ACRA

Refined Coal Tar Emulsifiers

ACRA 880

ACRA 880 is an emulsifier for pavement sealer applications. It yields thick-bodied emulsions that easily wet and suspend mineral fines and other compounding additives. ACRA 880 promotes easy wetting and adhesion of sealer to the substrate, and protects the sealer from moisture damage, abrasion wear, delamination and peeling. ACRA 880 promotes deep black color that resists fading and hides crack sealing more effectively.

ACRA 880LV

ACRA 880LV is the same chemistry as ACRA 880 but is an easier-to-handle liquid.

Benefits

- Better abrasion wear resistance for longer lasting sealer
- Better sealer color
- Longer sealer storage shelf life

Benefits

- Easy-to-handle liquid for greater operational ease and efficiency
- Better abrasion wear resistance for longer lasting sealer
- Better sealer color
- Longer sealer storage shelf life

ACRA 900

ACRA 900 is an emulsifier for pavement sealers that demand the highest performance standards. ACRA 900 emulsions have the smallest and best particle size characteristics for maximum polymer dispersion efficiency, and increased body for maximum compounding efficiency. The chemistry includes a powerful adhesion promoter offering the sealer robust protection from moisture damage and abrasion wear. ACRA 900 chemistry promotes a black color in sealers and resists fading through time.

- Best emulsion quality for improved operational ease and efficiency
- Longer sealer storage shelf life
- Best abrasion wear resistance for longest lasting sealer
- Better sealer color



AD-HERE®

Products and Applications

AD-here SC-901 – Anionic Rapid-Set (RS), Medium-Set (MS), Slow-Set (SS), High Float Rapid-Set (HFRS), High Float Medium-Set (HFMS) and Coal Tar Performance-Improving Additive

- Adhesion Promoter for Chip Seal/Surface Dressing
- Adhesion Promoter for Open-Graded Cold Mix and Cold Patch Stockpile Mix
- Adhesion Promoter for Asphalt-Based Pavement Sealer
- Adhesion Promoter for Coal Tar-Based Pavement Sealer
- Adhesion Promoter for Crack Sealer

AD-here HP Plus – Anionic Rapid-Set (RS) and High-Float Rapid-Set (HFRS), High-Float Medium-Set (HFMS) Performance-Improving Additive

• Adhesion Promoter for Chip Seal/Surface Dressing



ARRMULS[®] ARRTEKK[®] AD-HERE[®]

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EMULSION PERFORMANCE-IMPROVING ADDITIVES

ArrMuls 220

ArrMuls 220 is an asphalt-additive chemical formulated to quicken the rate of emulsion break and cure in cationic chip seal and micro-surfacing applications. A faster curing rate locks chips in place sooner reducing early chip loss. In double and triple chip seal applications, it protects from damage caused by rain events soon after placement and eliminates runoff of brown water. Faster curing between applications reduces waiting time and speeds up construction. In micro-surfacing applications, ArrMuls 220 creates faster strength development allowing for sooner traffic return during cool conditions and night time paving.

Benefits

• Faster micro-surfacing traffic return time and better production rates

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- Faster multiple chip seal production rates
- Saves money by reducing repair and call-back expenses in multiple chip seal construction
- Better chip seal durability and longer life cycle



Mean Sweep Test Loss, %

CRS-2 chip seal emulsion made w/Canadian crude-based PGS8-28. 2% pre-wet moisture added to granitic aggregate. Sweep specimens cured for 2 hours at temperature of 30°C and 50% humidity. 0.41 gallon/square yard shot rate.

Faster Curing Chip Seal, Better Chip Retention

ArrMuls D-Tekk

ArrMuls D-Tekk is an emulsion additive that improves durability of both asphalt and coal tar-based pavement sealers by toughening and protecting the finished surface from tire scuffing at elevated temperatures, abrasion wear, moisture damage, fuel spills and ultraviolet (UV) rays. ArrMuls D-Tekk reduces vehicular, shopping cart and foot tracking of sealers only minutes after sealer application, and saves headaches and added costs of tracked sealer clean-up and traffic paint replacement.

ArrTekk TA

ArrTekk TA is an emulsion additive that inhibits asphalt particle settlement during long-term storage and lengthens product shelf life. It can easily reduce 24-hour settlement values from 10% or more to 0.5% or less. ArrTekk TA also works as a compatibilizer to keep latex homogeneously dispersed throughout emulsion and prevent latex separation in polymer-modified emulsions during prolonged storage.

AD-here SC-901

AD-here SC-901 is a versatile emulsion additive used for a variety of applications. It enables easy coating of cool, damp and dusty aggregates in cold mix paving and cold patch stockpile mixes, yielding greater asphalt film thickness, stronger asphalt adhesion and protection against rain-induced stockpile stripping. Stronger adhesion extends the life of the patch by strengthening bonding of patch to the pothole substrate and protecting it from moisture damage. When added to coal tar-based pavement sealers, AD-here SC-901 increases sealer body allowing for better suspension of compounding additives, better stability during storage and dramatically improved wear resistance. When used in anionic chip seal emulsions, the chemistry allows for better emulsion wetting, coverage and adhesion to chips for better chip retention and long term durability.

AD-here HP Plus

AD-here HP Plus is an emulsion additive adhesion promoter for anionic rapid-setting and medium-setting high-float emulsions for chip seal and graded aggregate chip seal applications. It is easy to use and predictable since emulsion viscosity and demulsibility are not affected. AD-here HP Plus improves emulsion wetting and adhesion to chips and strengthens moisture damage resistance resulting in longer lasting chip seals.

Benefits

- Longer lasting sealer
- Saves money by reducing pavement sealer tracking clean-up costs

Benefits

• Longer emulsion shelf life

Benefits

- Enables easy cold patch aggregate coating and extends stockpile life for operational ease and efficiency
- Longer lasting cold patch
- Improves pavement sealer compounding efficiency
- Longer lasting sealer
- Longer lasting chip seal

- Predictable emulsion viscosity characteristics for operational ease and efficiency
- Longer lasting chip seal

THIS IS WHAT EMUL SIFIER INNOVATION LOOKS LIKE.





Typical Formulation

Emulsifier																					% by weight of emulsion Soap pH
ArrMuls®201	Х			Х			Х	Х													0.25 - 1.00 11.0 - 11.5
ArrMuls 310	Х												Х		Х						1.4 - 1.7 as-is
ArrMuls 1315	Х							Х	Х	Х			Х	Х	Х						1.0 - 1.6 as-is
ArrMuls 3015	Х									Х				Х							2.5 - 5.0 as-is
ArrMuls 5012	Х									Х				Х							1.75 - 3.0 as-is
ArrMuls Tack Part A	Х										Х										1.20 - 1.40 as-is
ArrMuls Tack Part B	Х										Х										3.0 - 5.0 as-is
ArrTekk®710				X			Х														0.24 - 0.45 1.6 - 2.0
ArrTekk 720				X	X	Х	Х														0.15 - 0.40 1.6 - 2.0
ArrTekk 815																		Х	Х	Х	1.6 - 2.2 1.8 - 2.2
ArrTekk 860	Х								Х	Х		Х	Х	Х				Х	Х	Х	1.6 - 2.0 1.5-2.5, as-i
ArrTekk 1107																Х					2.0 - 2.5 1.4 - 2.5
ArrTekk 1285										Х		Х					Х				0.7 - 2.0 1.4 - 2.0
ArrTekk 1295																	Х				1.2 - 2.0 1.4 - 2.0
ArrTekk 1295LV																	Х				2.4 - 4.0 1.4 - 2.0
ArrTekk 5500																	Х				1.2 - 1.8 1.4 - 2.0
ACRA 880			Х											Х							0.70 - 1.0* -
ACRA 880LV			Х											Х							0.70 - 1.0* -
ACRA 900			Х											Х							0.70 - 1.0* -
Performance Improving Additive																					
ArrMuls 220		Х		х													х	r			04-07* 14-22
ArrMuls D-Tekk	х		Х											х				-			3.0 - 4.0 9.0 - 11.5
ArrTekk TA	Х	Х	Х							Х	х	Х	х	х	х	Х	X	x	х	Х	0.01 - 0.02 2.0 - 11.5
AD-here SC-901	Х		Х	X			х	Х	Х					Х							0.2 - 1.0 2.0 - 11.5
AD-here HP Plus	Х			X																	0.30 - 0.75* 10.0 - 11.5
Field Control																					% by weight
Additive																					of aggregate
ArrTekk 1295LV		Х														Х	X				0.03 - 0.06

*Percentages are by weight of coal tar or asphalt

CONTACT ROAD SCIENCE

Learn more about our emulsifier and emulsion performance-improving additive products and industry-leading support services.

Reach a representative today at 918-960-3800 or email customerservice@roadscience.net. You can also visit our website for more information at www.roadscience.net or scan the code below.



Road Science Division of ArrMaz 6502 South Yale Avenue Tulsa, OK 74136





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