

Morwet[®] naphthalene sulfonates



Inside Chapter 4.1

Solid formulations	1
Wetting agents	2
Dispersing agents	3
Liquid formulations	4

Quick Contacts

Technical data and MSDS's
<http://surfactants.akzonobel.com>

Samples for North America
CSRUSA@sc.akzonobel.com

Samples for South America
SC-SouthAmerica@sc.akzonobel.com

Samples for Europe, Africa,
Middle-East, India
Cinnamon.Kelleners@akzonobel.com

Samples for Asia & ASEAN
Florence.Tan@akzonobel.com

Samples for China
Cookie.Xia@akzonobel.com

Our leadership causes others to imitate

AkzoNobel is clearly the agricultural industry leader in producing wetting agents and dispersants based on naphthalene sulfonate chemistry. The Morwet branded naphthalene sulfonates and naphthalene sulfonate condensate are well known for their versatility and formulation robustness across a wide range of crop protection formulations.

The Morwet product family includes wetting agents and dispersants for use in both solid and liquid formulations.



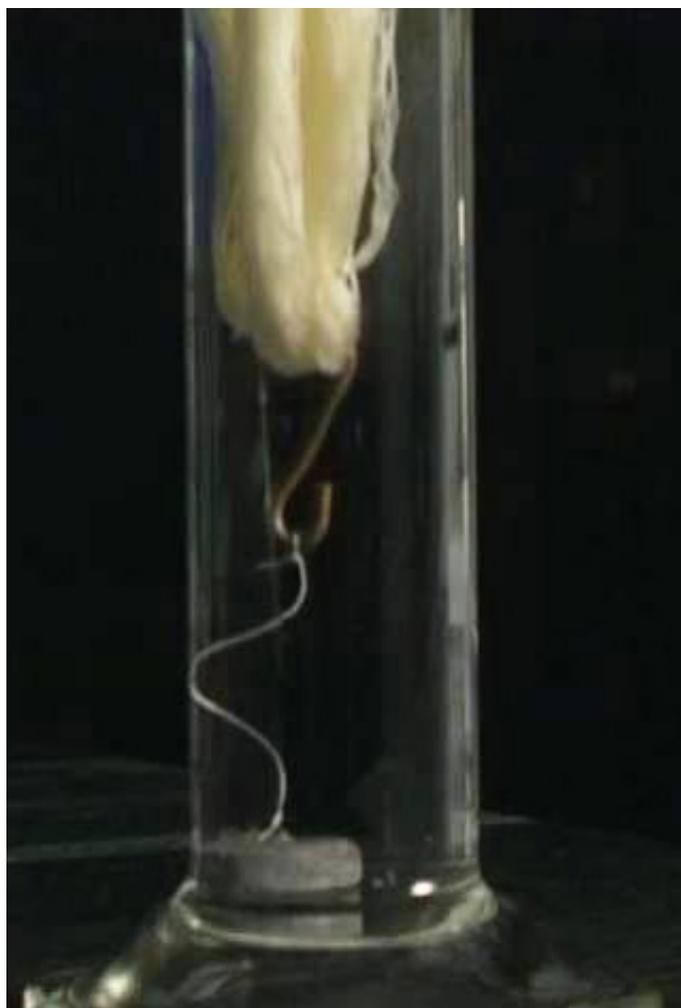
Solid Formulations

Solid formulations are increasingly popular because they do not include solvents, making them more environmentally friendly. Reduced worker exposure potential suggests that they are safer to handle in the field.

Solid formulations require wetting, dispersing and suspension performance from the surface-active formulation components, and Morwet brand naphthalene sulfonates deliver consistent satisfaction to the formulator and the applicator. The Morwet branded naphthalene sulfonates and naphthalene sulfonate condensates are used in wettable powder (WP), water dispersible granule (WDG), dispersible tablets (DT), compaction granules (G), soluble powder (SP), and other solid-form formulations.

In addition to their wetting and dispersing characteristics, Morwet naphthalene sulfonates assist in granule production, whether the process is pan, spray dried, compaction, or fluid-bed agglomeration.

In addition to their wetting and dispersing characteristics, Morwet naphthalene sulfonates assist with the granule production process.



Morwet wetting agents

Different wetting agents have their own specific surface tension reduction and/or wetting characteristics, so it is often critical to evaluate several combinations of wetting agents and dispersants to optimize performance.

Wetting agents are added to dry formulations to assist granule breakdown and enhance bloom or spontaneity of granule dispersion into water. Rapid granule breakdown allows the dispersant to perform more effectively and create a better suspension for the application.

Morwet wetting agents offer superior wetting, even at low concentrations, and offer versatile wetting properties. Their excellent surface tension reduction and very fast wetting characteristics help the formulator to achieve better suspensibility, bloom, and resuspensibility in dry flowable formulations. Certain products also can be used as wetting agents in microencapsulation products and processes.

Morwet wetting agents

PRODUCT NAME	DESCRIPTION	FUNCTION	ACTIVE	EPA	APPLICATIONS
Morwet EFW Powder	Blend of alkyl naphthalene sulfonate and anionic wetting agent.	Wetting	95%	180.920	Special wetting agent to assist granule breakdown in high concentration systems.
Morwet DB Powder	Sodium n-butyl naphthalene sulfonate	Wetting	75%	180.910	Wetting agent for low active concentration systems.
Morwet DIBS Powder	Sodium di-isobutyl naphthalene sulfonate	Wetting	60% min	180.910	Moderate foaming; good for 342 to 750 ppm hard water. Excellent for WP, WG, and SC formulations.
Morwet DIBS Liquid		Wetting	17% min	180.910	
Morwet IP Powder	Sodium isopropyl naphthalene sulfonate	Wetting	75%	180.910	Lowest-foaming product in this category
Morwet 3028 Powder	Blend of sodium alkylaryl sulfonates	Wetting	95%	180.920	Wetting agent to assist granule breakdown in high active concentration systems.

When developing a new formulation, obtaining synergy between the dispersant and the wetting agent is a significant issue. Different wetting agents have their own specific surface tension reduction and/or wetting characteristics, so it is often critical to evaluate several combinations of wetting agents and dispersants to optimize performance. This is described in more detail in the following section on dispersants.

Morwet dispersing agents

General Recommendations for Dry Formulation

PRODUCT	WETTABLE POWDER	DISPERSIBLE GRANULE
Morwet EFW	1-2%	2-3%
Morwet D-425	2-3%	3-5%

We recommend that an initial formulation recipe for wettable powder or dispersible granule development should start with Morwet EFW as the wetting agent and with Morwet D-425 as dispersant. The initial concentrations should be in the range shown above.

Dispersants are used to uniformly suspend active ingredients. Creation of a well-dispersed formulation will allow for a more consistent field application of the active ingredients.

Morwet D-425 dispersant is the standard of performance for dispersants used in suspension concentrates and dry formulations. Compared to others, Morwet D-425 alkyl naphthalene sulfonate condensate is more effective at dispersing a wide variety of active ingredients over a wide range of water hardness applications. Using Morwet dispersants also helps to ensure that the active ingredients can be easily suspended in the spray tank.

Naphthalene sulfonate condensate dispersants are widely successful in dry formulations and suspension concentrates for decades of performance. **Morwet D-425**, from AkzoNobel, is the “benchmark” dispersant for a wide range of difficult dry

applications and technicals. Formulators typically use Morwet D-425 when all other dispersant options are exhausted and they are usually pleased with the final result.

Recently, AkzoNobel Surfactants introduced a variation of the naphthalene sulfonate formaldehyde condensate, **Morwet D-809**, as a complementary partner to Morwet D-425. Morwet D-809 offers superior dispersant performance for a range of representative formulation types; SC, WP, and WDG. With certain actives, this new dispersant allows the formulator to use less dispersant and to achieve equal or better suspensibility performance. Morwet D-809 will perform better with crop protection technicals where Morwet D-425 is adequate and still require less dispersant. Morwet D-809 is more hard water tolerant than other naphthalene sulfonate formaldehyde condensates in many applications.

Morwet D-809 is USA-FIFRA exempt under 40CFR 180.920 and is classified as a polymer under EINECS. Morwet D-809 often brings superior performance at lower use levels than Morwet D-425, while demonstrating excellent hard water tolerance. Along with Morwet D-425, Morwet D-809 is a new tool in the formulator’s tool box.

To meet more challenging formulation needs, several Morwet dispersants with enhanced characteristics are now offered: For improved suspensibility in hard water applications, **Morwet D-500** dispersant provides ionic separation and steric hindrance. It also acts as an effective wetting agent and improves re-suspensibility.

Morwet dispersants

PRODUCT NAME	DESCRIPTION	FUNCTION	EPA	APPLICATIONS
Morwet D-425 Powder	Alkyl naphthalene sulfonate condensate, sodium salt	Dispersant	180.920	The standard dispersant for WP, SC, and WDG
Morwet D-400 Powder	Alkyl naphthalene sulfonate condensate, sodium salt	Dispersant	180.920	Performance equivalent to Morwet D-425 knock-off products
Morwet D-500 Powder	Morwet D-425 + block copolymer	Dispersant	180.920	Used in systems to improve suspensibility.
Morwet D-809 Powder	Alkyl naphthalene sulfonate condensate, sodium salt	Dispersant	180.920	Used in high-concentration systems to improve hard water performance.

The type of granulation process influences the actual requirement for wetting and dispersing agent concentration. The more densely granulated the composition, more dispersant will be required with greater attention to granule re-wetting and breakdown performance. A robust, broad-application formulation must be based upon the best surface-active products incorporated at a concentration proven to deliver the desired performance attributes.

Liquid formulations

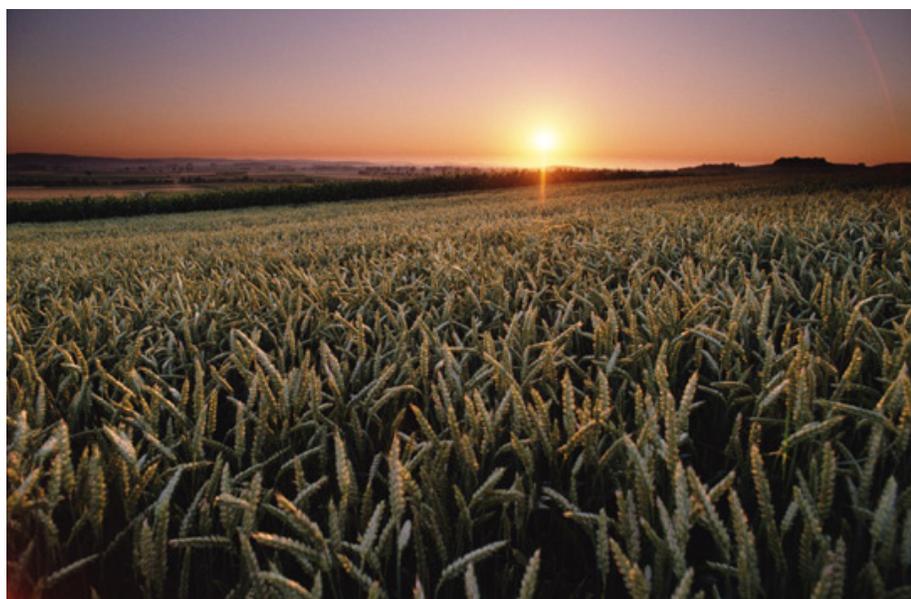
General Recommendations for Suspension

Concentrate Formulation

Typically, suspension concentrates may be formulated with Morwet D-425 dispersant at levels of 2 to 2.5% w/w for 480-500 g/L suspensions while the D-425 should be increased (3-5%) for higher density (720 g/L) formulations. The use rate for surface-active formulation components is generally proportional to the surface area (particle size) of the final formulation. Finer average particle size correlates to increased surface area and a greater use rate of surfactants.

Morwet liquid formulations

PRODUCT NAME	DRAVES WETTING 1 G/L @ 25°C	SURFACE TENSION 1 G/L	CONTACT ANGLE 1 G/L @ 60S	ROSS MILES FOAM TEST 0.5 G/L @ 25°C (MM FOAM)			
				DISTILLED WATER		342 PPM HARD WATER	
	SECONDS	MN/M	DEGREES	INITIAL	AFTER 5 MIN	INITIAL	AFTER 5 MIN
Morwet EFW Powder	17	33	64	120	60	30	10
Morwet 3028 Powder	20	36	64	160	155	140	130
Morwet DB Powder	>600 (30 @ 0.5%)	33	78	75	25	85	35
Morwet IP Powder	>600 (16 @ 0.5%)	45	87	25	0	25	0
Morwet D-425 Powder	>600	60	91	70	25	40	30
Morwet D-400 Powder	>600	60	85	70	45	35	25
Morwet D-500 Powder	>600	43	79	65	40	45	40
Morwet D-809 Powder	>600	65	93	80	35	30	20



For technical advice

North America

Linda Terwilliger
Technical Manager, Surface Chemistry
AkzoNobel Surface Chemistry LLC
 525 W. Van Buren Street
 Chicago, IL 60607-3823

Toll Free: 877 565 8432
 Office: 312 544 7006
 Fax: 312 544 7410
 Customer Service: 800 906 9977

linda.terwilliger@akzonobel.com
www.surface.akzonobel.com

South America

Natália Gonçalves
Research Chemist,
Agrochemical Applications
Akzo Nobel Ltda
BU Surface Chemistry
 Rodovia Akzo Nobel, 707
 Bairro São Roque da Chave
 Itupeva – São Paulo – Brazil
 Zip Code 13295-000

Tel: +55 11 4591 8882
 Mobile: +55 11 9 9278 4583

natalia.goncalves@akzonobel.com
www.surface.akzonobel.com

Asia and ASEAN

Rupak Paul, PhD
R&D Manager,
Agrochemical Applications
AkzoNobel Surface Chemistry Pte Ltd
 3 Changi Business Park Vista, Level 2
 Singapore 486051

Tel: +65 6635 5167
 Mobile: +65 9785 3777
 Fax: +65 6635 5155

rupak.paul@akzonobel.com
www.surfactantsasia.akzonobel.com

China

Tom Zhang
R&D Research Chemist
Akzo Nobel (Shanghai) Co., Ltd
 No. 137 Jiangtian East Road
 Shanghai
 P.R. China

Tel. +86 021 5707 9367
 Mobile +86 13761700741

agro.china@akzonobel.com

Europe

Technical Service, Agro Additives
AkzoNobel Surfactants
 SE-44485 Stenungsund
 Sweden

Tel: +46 303 85 000
 Fax: +46 303 843 71

Surfactants.Europe@akzonobel.com
www.se.akzonobel.com

Disclaimer

All information concerning these products and/or all suggestions for handling and use contained herein are offered in good faith and believed to be reliable. Akzo Nobel Surface Chemistry LLC and its affiliates, however, make no warranty as to the accuracy and/or sufficiency of such information and/or suggestions, as to the products' merchantability or fitness for any particular purpose, or that any suggested use will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. Buyer must determine for himself, by preliminary tests or otherwise, the suitability of these products for his purposes. The information contained herein supersedes all previously issued bulletins on the subject matter covered. The user may forward, distribute and/or photocopy this document only if unaltered and complete, including all of its headers and footers, and should refrain from any unauthorized use. You may not copy this document to a website.

©2014 Akzo Nobel Surface Chemistry LLC, all rights reserved.



www.akzonobel.com

AkzoNobel is a leading global paints and coatings company and a major producer of specialty chemicals. We supply industries and consumers worldwide with innovative products and are passionate about developing sustainable answers for our customers. Our portfolio includes well-known brands such as Dulux, Sikkens, International and Eka. Headquartered in Amsterdam, the Netherlands, we are consistently ranked as one of the leaders in the area of sustainability. With operations in more than 80 countries, our 50,000 people around the world are committed to delivering leading products and technologies to meet the growing demands of our fast-changing world.

© 2014 Akzo Nobel N.V. All rights reserved.