

## DARVAN<sup>®</sup> Dispersing Agents for Ceramics and Refractories

	Form	Solids	MW	pH	Moisture	Foaming	Ash	Sodium
<i>Sodium Polymethacrylate</i>								
<b>DARVAN 7-NS<sup>a</sup></b>	powder	---	13,000	8.5-11.5 <sup>1</sup>	5% max	none	---	---
<b>DARVAN 7-N<sup>b</sup></b>	liquid	25%	13,000	9.5-11.5 <sup>2</sup>	---	none	---	---
<i>Ammonium Polymethacrylate</i>								
<b>DARVAN C-N<sup>b</sup></b>	liquid	25%	13,000	7.5-9.0 <sup>2</sup>	---	none	<0.04%	<70 ppm
<i>Sodium Polyacrylate and Sodium Polymethacrylate</i>								
<b>DARVAN 811D<sup>a</sup></b>	powder	---	3,500	6.0-9.0 <sup>2</sup>	8% max	none	---	---
<i>Sodium Polyacrylate</i>								
<b>DARVAN 811<sup>c</sup></b>	liquid	43%	3,500	7.0-8.0 <sup>1</sup>	---	none	---	---
<i>Ammonium Polyacrylate</i>								
<b>DARVAN 821A<sup>c</sup></b>	liquid	40%	3,500	7.0-8.0 <sup>1</sup>	---	none	<0.01%	<50 ppm

<sup>a</sup>Somewhat hygroscopic; store in a dry area <sup>b</sup>Freezes at -5°C; protect from freezing. Partial freezing does not affect dispersing properties.

<sup>c</sup>Store above 10°C (50°F). Partial freezing does not affect dispersing properties.

<sup>1</sup>1% solution <sup>2</sup>5% solution

**DARVAN 7-N** is recommended for use in the preparation of casting slips made from whiteware and refractory compositions, producing slips with a wide casting range. The slips show little tendency to thicken on standing, or to become thixotropic. Ware cast from these slips is very plastic and easy to “scrap”.

Most whiteware bodies are readily dispersed by the addition of 0.2 to 1% of **DARVAN 7-N**, based on dry body weight. During the casting process, very little **DARVAN 7-N** is absorbed by the molds and, under most factory conditions, a good casting slip can be made from 100% scrap just by adding water to give the desired fluidity. Compared to the use of sodium silicate and soda ash, **DARVAN 7-N** enables longer life for plaster molds.

Both drain and solid castware made from slips containing **DARVAN 7-N** can be left in the molds for long periods of time without cracking. Hobbyware consisting of difficult shapes is made successfully on a commercial scale by leaving the ware in the molds for 6 to 24 hours. If the ware is to be left in the mold for a long time, the drain hole in the mold must be covered or the mold inverted onto a flat surface in order to prevent surface drying around the drain hole. A long set in the molds produces ware that is very easy to handle, and decreases the tendency of large pieces, e.g. vases, planters or sanitaryware, to warp or distort while drying. Ware made from slips containing **DARVAN 7-N** can also be removed from the molds in the usual time of one to two hours, with the exception of heavy types of solid casts.

**DARVAN 7-N** provides sprayed glazes with outstanding viscosity stability. In ceramic compositions it can be used where sodium oxide is not detrimental, such as casting of barium titanate, zirconium oxide and aluminum oxide. In spray-dried bodies, in addition to its dispersing properties, it can be used as a binder at levels of about 2%

**DARVAN 7-N** has been tested in various applications as a grinding aid. Depending on the application, 0.005% to 0.1% has been reported to help dry grinding.

**DARVAN C-N** and **DARVAN 821-A** are used mainly in electronic and specialty ceramics applications – such as slurries of ferrites and casting slips from high oxide electronic bodies – where a low sodium content is required.

**DARVAN 811D** can be used in all applications where **DARVAN 811** dispersion is used but where dry powder is a prerequisite. It can be successfully used in low moisture castables and in other refractory products where a dispersing agent in its powdered form is preferred.

**DARVAN 811** is used in vitreous and semivitreous bodies, and in glazes. A slip deflocculated with **DARVAN 811** provides the following advantages over the conventional soda-ash, sodium silicate system used to disperse ceramic bodies:

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|------------------------------------------------------------------------------------|--------------------------------------------------|
| Longer casting range                                                               | Higher solids content                            |
| Controlled thixotropy                                                              | Improved viscosity stability                     |
| Reduces "hard spots", "yellow spots", or "soda spots"                              | No calcium silicate scum so less glaze rejection |
| Significantly increases the life of plaster molds compared to the use of soda ash. |                                                  |

Study of the compatibility of DARVAN 811 Dispersing Agent with other dispersants. DARVAN 811 was most effective when used without primary dispersing agents.

F-4 feldspar	25.8%
325m silica	21.2%
O.M. #4 ball clay	16.0%
Tenn. #5 ball clay	11.6%
<b>PEERLESS® #2 Clay</b>	25.4%
Total	100.0%
Controlled water; 13K Ohms*	38.8%

Soda Ash	0.05%	0.05%	---	---	---	---	---
Sod. Sil.	0.168%	0.10%	---	---	---	---	0.10%
<b>DARVAN 811</b>	---	0.05%	0.09%	0.021%	0.09%	0.085%	0.089%
TSPP	---	---	---	0.05%	---	---	---
DTPA**	---	---	---	---	0.10%	---	---
NaOH	---	---	---	---	---	0.025%	---

Viscosity after preparation (cps.)

10 rpm	12,440	11,980	21,400	10,700	19,020	20,960	20,080
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Viscosity after standing overnight

10 rpm	2,600	4,500	7,310	7,160	8,080	9,830	20,080
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Adjusted	---	---	0.009%	0.008%	0.014%	0.009%	---
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10 rpm	2,600	4,500	2,990	2,510	5,000	4,150	5,340
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Viscosity after standing for two nights (total)

10 rpm	1,520	2,900	3,190	1,830	5,450	3,220	5,140
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Viscosity after standing for three nights (total)

10 rpm	1,090	2,010	2,340	1,270	3,740	2,300	3,290
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Viscosity after standing for 11 nights (total)

10 rpm	1,060	1,030	1,050	940	1,340	1,260	1,420
20 rpm	925	875	830	835	1,035	1,020	1,090
50 rpm	704	628	580	636	702	696	726
100 rpm	584	534	493	566	567	559	569
10 at 3 minutes	2,040	1,930	1,740	2,000	2,060	2,080	2,190

Casting Characteristics

Outflow:	good	good	good	good	good	good	good
Firmness:	slightly hard	slightly hard	slightly hard	slightly hard	good	good	good
Mold Release:	good	good	good	good	good	good	good
Casting Rate:	88.1	87.2	91.7	89.7	89.8	89.0	95.7
% Water Ret.:	21.3	21.8	21.8	21.7	22.0	21.7	22.6

\*\* (Carboxymethylimino)-bis(ethylenedinitrilo)-tetraacetic acid pentasodium salt.

For technical questions regarding these products or their use in your application, please contact our R&D center at [MineralLab@vanderbiltminerals.com](mailto:MineralLab@vanderbiltminerals.com) or click on the Technical Inquiry link on any [www.vanderbiltminerals.com](http://www.vanderbiltminerals.com) website page.