Derakane™ epoxy vinyl ester resins chemical resistance guide

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Resin selection guide for corrosion resistant FRP applications

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Foreword

Derakane and Derakane Momentum™ epoxy vinyl ester resins are designed and manufactured by Ashland. These resins possess outstanding corrosion-resistant properties and satisfy critical requirements in Fiber-Reinforced Plastic (FRP). Because they possess outstanding corrosion-resistant properties Derakane and Derakane Momentum resins are particularly well suited for tough industrial applications.

This guide briefly describes the various Derakane and Derakane Momentum resins, and it presents detailed chemical resistance data needed to assist engineers in specifying and designing corrosion-resistant FRP applications.

Recommendations given in this guide apply to "state-of-the-art" corrosion-resistant structures. Typically these structures have a corrosion barrier that is 2.5 to 6.3 mm (100 to 250 mils) thick and are designed for contact with a specific chemical environment. The first layer of the corrosion barrier usually is 0.3 to 0.8 mm (10 to 20 mils) thick and is 95% resin, reinforced by one or two surfacing veils. This layer is then backed with 2 to 6 mm (90 to 230 mils) of 75% resin, reinforced with chopped strand mat (powder binder only). Finally, the corrosion barrier is backed with a structural laminate that provides the strength and stiffness of the overall corrosion-resistant composite structure.

Because many of the variables that affect the performance of a laminate are beyond Ashland's control, no warranty concerning the use of Derakane and Derakane Momentum epoxy vinyl ester resins can be made. However, the service conditions shown in this bulletin are believed to be well within the capabilities of Derakane epoxy vinyl ester resins when laminates are properly designed, fabricated, and installed.

For the design of FRP equipment, prospective users of Derakane resins should refer to the appropriate industry standards and design guidelines.

For more information, contact Ashland at derakane@ashland.com or visit ashland.com.

Brief Product Description

Derakane and Derakane Momentum™ 411 resins are the globally recognized standard for epoxy vinyl ester resins. They are based on bisphenol-A epoxy resin, and they provide resistance to a wide range of acids, alkalis, bleaches and solvents for use in many chemical processing applications. They offer excellent toughness and fatigue resistance.

Derakane and Derakane Momentum 441-400 resins are low styrene monomer bisphenol-A epoxy vinyl ester resins with mechanical, thermal and chemical resistance properties between Derakane 411 and Derakane 470 resins. Their unique combination of high HDT and elongation makes them resins of choice for applications with thermal cycling, e.g., for chemical reaction vessels.

Derakane and Derakane Momentum 470 resins are epoxy novolac-based vinyl ester resins designed to provide exceptional thermal and chemical resistance properties. They offer high resistance to solvents, acids and oxidizing substances such as chlorine. They also offer high retention of strength and toughness at elevated temperatures, making them the resins of choice for flue gas applications.

Derakane and Derakane Momentum 510A/C resins are brominated epoxy vinyl ester resins that offer a high degree of fire retardance[1]. They are very resistant to chemical attack by chlorine and bleach environments. Their bromine content makes them tougher and more fatigue resistant than standard epoxy vinyl ester resins.

Derakane 510N resin is brominated epoxy novolac vinyl ester resin that offers a moderate degree of fire retardance[1]. It exhibits a corrosion resistance similar to Derakane 470 resins in most environments. It is also useful in hot, wet fluegas environments where thermal upsets can occur and where fire retardance is desired. This product is only available in North America.

Derakane 8084 resin is an elastomer-modified bisphenol-A epoxy vinyl ester resin that offers very high toughness, impact- and fatigue-resistance, and excellent adhesion. It is the resin of choice for demanding structural applications and as a primer for chemically resistant FRP linings.

[1] The degree of retardance achieved in properly formulated cured products made of these resins is most frequently quantified by the ASTM E84 tunnel test. This is a controlled test that compares flammability characteristics of one material with another, but may not be predictive of behavior in a real fire situation. Derakane and Derakane Momentum epoxy vinyl ester resins are organic materials and will burn under the right conditions of heat and oxygen supply.

How to Use the Chemical Resistance Table

Content

This listing of chemical reagents and environments shows the highest known temperature at which equipment made with Derakane and Derakane Momentum™ resins has, in general, either:

- given good service in industry or
- been tested in the field or in the laboratory (in accordance with ASTM C 581) with results that indicate a good life expectancy in service.

It should be noted that this is not necessarily the maximum service temperature.

The temperature limits in each row are representative of the whole series of resins (e.g., Derakane 411 resin applies to 411-350, 411-45, 411C-50, etc.) and their Derakane Momentum counterparts. The following table lists the resins that are included in the respective columns.

Table 1

	Columns				
	411 series	441 series	470 series	510N series	510A/C series
Valid for DERAKANE resins	411-350 411-45	441-400	470-300 470-30S 470-36 470-36S 470-45 470HT	510N	510A-40 510C-350
Valid for DERAKANE MOMENTUM resins	411-200 411-350		470-300		510C-350

In the chemical resistance tables, a blank space simply indicates that no data was available at the time that temperature ratings were assigned.

NR stands for "not recommended" at any temperature.

LS stands for "limited service" (at least 3 days to 1 year at maximum 40°C/100°F). Generally in these cases, the respective resins can be used for FRP that is exposed accidentally, and where cleaning and inspection are possible after no more than 3 days.

This guide is updated on a regular basis in order to take into consideration all the new experiences and data (new products, other temperatures or concentrations, etc.).

Example

Chemical Environment	DERAKANE Resin						
	Concentration %	411	441	470	510A/C	510N	8084
Hydrochloric Acid & Dissolved Organics [8,9,13]	0 - 33% HCl	NR		65/150[15]			NR
[8] Double surfacing veil and a 5 mm/200 mil CR barrier should be used [9] Double C-veil should be used in the CR barrier. [13] Acid resistant glass should be used in the corrosion liner and may be used in the structural wall	weight - % (unless otherwise stated)	not recommended	no data available	highest recommended temperature (°C/°F) [15]Slight discoloration of high purity acid can occur during first exposures			

Footnotes

Information indicated in footnotes is essential in order to ensure a good service life of FRP equipment. It is strongly recommended that they are followed.

1. Double synthetic veil should be used in the Chemical Resistant (CR) barrier.
2. Post cure recommended to maximize service life.
3. Benzoyl Peroxide/Amine cure system recommended to increase service life.
4. Recommended provided that solvent used for dissolution is also recommended.
5. Satisfactory up to maximum stable temperature for product.
6. Check with corrosion technical service lab for specific recommendations.
7. Probably satisfactory at higher temperatures, but temperature shown is the highest for which information was available.
8. Double surfacing veil and a minimum of 5mm/200mil CR barrier should be used
9. Double C-veil should be used in the CR barrier.
10. For reactors, use 441, 411, or 510A/C resins
11. Within the solubility limits in aqueous solution.
12. Above 50°C/120°F, acid resistant glass should be used in the CR barrier and may be used in the structural wall.
13. Acid resistant glass should be used in the corrosion liner and may be used in the structural wall.
14. If chemical composition is unknown, obtain Safety Data Sheet from supplier
15. Slight discolouration of high purity acid can occur during first exposures, please contact the technical service, derakane@ashland.com, for futher explanations.
16. The use of the resin above the maximum allowable design temperature as limited by national design standards may require approval of the relevant authorities.
17. The service life is proportional to CR barrier thickness.
18. For food contact applications, local regulations take priority. Please see our Fabricating Tips Guide or contact the Technical Service team, derakane@ashland.com
19. Preference for Derakane 510A-40 resin.

NR: Not Recommended

LS: Limited service, in general 3 days to 1 year lifetime at room temperature (max. 40°C/100°F), usually sufficient for secondary containment.

Postcure

For a service temperature below 100°C/210°F:

A postcure may extend the service life if the operating temperature is within 20°C/40°F of the present CR guide maximum temperature for the service. This means that a postcure can be beneficial for solvent applications with a temperature limit of 25-40°C/80-100°F.

For a service temperature above 100°C/210°F: Postcure in service may be sufficient, provided the resin specific minimum Barcol hardness values are reached before start up.

For service in pure and neutral salt solutions: Postcure may, in general, not be required, provided the resin specific minimum Barcol hardness values are reached and no acetone sensibility is shown before start up.

When using a BPO/Amine cure system, postcure is strongly recommended and should be done within two weeks of construction.

The postcure conditions as detailed in DIN 18820 may be used:

- For 411, 441, 510A/C and 8084 resins: 80°C/180°F.
- For 470 and 510N resins: 100°C/210°F.
- This norm recommends 1 hour per mm thickness of the laminate (between 5 and 15 hours).

Veils

All common veils (non-apertured synthetic and glass veils) are suitable for most environments. Hydrofluoric acid (HF) containing solutions require the use of synthetic or carbon veils. Typically one veil layer results in a final thickness of approximately 0.3 mm. The thickness of the veil layer is at least as important as the nature of the veil itself. Apertured synthetic veil (such as Nexus™ 100-10) offers an extra thickness of the veil layer and is preferred for cases where this extra thickness can increase service life (e.g. hot caustic solutions). Carbon veils have demonstrated excellent resistance to a number of aggressive chemicals such as HF, HCl, NaOH but **not NaOCl (Sodium Hypochlorite).** Carbon veil is also useful to achieve conductive surfaces.

Special Cases

Insufficient Information

In cases where the environment or exposure conditions are outside the scope of this guide and if, therefore, no specific recommendations can be made, a test laminate should be exposed to the actual, or simulated, conditions proposed so that a final decision on resin suitability is made.

Coatings and Linings (reinforced and non-reinforced)

Coatings and linings have their own specific properties and may be limited in operating temperatures because of thermal expansion. In special cases, it is recommended to consult with the Ashland technical service laboratory or with a company in your region that specializes in linings and coatings technology.

Laminate linings can be more durable in liquid environments than other lining systems. For quality reasons, they should be applied by hand lay-up and not by spray-up techniques. As a general rule, and as a result of the low or missing exotherm during polymerization, linings and coatings should be postcured whenever possible (see also "Postcure").

Special precautions are required for strongly diffusing media (HCl, HF, etc.). As a general rule, the thicker and the better cured the lining, the higher the diffusion resistance and the longer the life expectancy.

High (Flue) Gas Temperatures

If a synthetic veil is recommended for hot gas environments, the temperature resistance of the veil must be sufficient.

If it is not, a carbon veil often can be used.

If the environment contains water vapor and/or acids, special measures must be taken to prevent sub-dewpoint conditions in the laminate.

Short Term Exposure/Spillage

If exposure is intermittent or limited to fumes or spills only, it is possible to have good service life at temperatures considerably higher than those shown and even have good service life in chemical environments shown as NR (Not Recommended). Contact Ashland Technical Service for a resin recommendation at derakane@ashland.com or visit ashland.com.

Mixtures of Alternating Environment

The information given in this guide represents the performance of full FRP structures under continuous use in contact with the stated chemical environment (unless otherwise indicated).

It is sometimes difficult to predict just how aggressive certain combinations of chemicals will be toward FRP. Some mixtures are more aggressive toward FRP than the individual components, so special attention should be paid to aggressively synergistic chemicals that could not be simply predicted from the corrosion properties of the individual components.

The chemical resistance also may be negatively influenced by using the same equipment for alternating storage or transport of different products, particularly where these products have widely differing properties, such as acids and bases that chemically react with each other.

When in doubt, please consult with your local distributor or your Ashland sales representative, who can put you in touch with the appropriate technical resources at Ashland.

Chemical Resistance Enquiry

When requesting resin recommendations for corrosion applications, the following data are necessary for your request to be processed:

- Chemical nature of all products in a process or a batch, with their corresponding concentrations (even traces).
- Service temperatures, including maximum and upset temperatures (with corresponding duration).
- State: liquid/gas/solid (risk of phasing or condensation, if any).
- Type of equipment (tank, pipe, lining, etc.).

Please feel free to make copies of the enclosed "Chemical Resistance Enquiry" form and use them to fax your inquiries to your local distributor.

Safety Precautions

Derakane and Derakane Momentum™ epoxy vinyl ester resins and the materials (solvents, accelerators, catalysts, etc.) used with them can be hazardous unless simple but precise precautions are taken. The precautions necessary for handling Derakane and Derakane Momentum resins are similar to those for unsaturated polyesters and will therefore be familiar to trained personnel. Safety Data Sheets on all Derakane and Derakane Momentum resins are available to help customers satisfy their own handling and disposal needs.

Notice

Recommendations as to methods and use of material made in this publication are based on the experience of Ashland Inc. and knowledge of the characteristics of Derakane and Derakane Momentum resins, and are given in good faith. However, since as a material supplier Ashland does not exercise any control over the use of Derakane and Derakane Momentum resins, no legal responsibility is accepted for such recommendations. In particular, no responsibility is accepted by Ashland for any system or application in which Derakane and Derakane Momentum resins are utilized. The legal obligations of Ashland Inc. with respect to any sale of Derakane and Derakane Momentum resins shall be determined solely by the terms of its respective sales contract.

Derakane Epoxy Vinyl Ester Resins
SPECIAL RESISTANCE ENQUIRY FORM

Please fax this form to +1.614.790.6157 (America) or +49(0)7851 99 478-30 (Europe) or your distributor.

Date: ____________ **Number of Pages:** ____________

To

Name: ____________

Company: ____________

Fax: ____________

____

From

Name: ____________

Company: ____________

Fax: ____________

Phone: ____________

End-User/Project/Engineering: ____________

Industry Sector/Process:
(Chemical, Paper, Mining, Flue Gas)
____

Equipment Type:
(Tank, Scrubber, Pipe/Duct, Lining)
____

Dimensions/Capacity:
(Height, Diameter, Flow Rate)
____

Operating Conditions

	Concentrations		
Chemical Environment	Minimum	Normal	Maximum
1)			
2)			
3)			
4)			
5)			
6)			

NOTE: Please show all major/minor components, concentrations – including traces.
(If insufficient space, please add extra sheet or include the respective Safety Data Sheet.)

Temperatures (°C): normal operating ____________ highs/lows ________ upsets __________

Pressure/Vacuum:__________ pH: typical_________ min. _____________ max. ___________

Comments/Notes: ____________
(e.g., unusual process conditions, temperature cycling, high/low concentrations, addition and dilution, novel design or construction)

Avant-propos

Les résines Epoxy Vinylester Derakane et Derakane Momentum™ sont conçues et produites par la division Epoxy Products and Intermediates de Ashland Inc. Elles résistent exceptionnellement bien à la corrosion et satisfont aux exigences les plus critiques des Stratifiés Verre Résine (SVR). Elles sont donc tout indiquées pour les applications industrielles soumises à des conditions de service extrêmes.

Ce guide donne une brève description des diverses résines Derakane et Derakane Momentum et présente des données détaillées sur la résistance chimique qui seront utiles aux ingénieurs lorsqu'ils spécifient et conçoivent des structures SVR résistantes à la corrosion.

Les recommandations faites ici valent pour des structures anticorrosion fabriquées dans les règles de l'art. Généralement, ces structures ont une barrière anticorrosion d'une épaisseur de 2,5 à 6,3 mm (100 à 250 mils) et sont conçues pour être en contact avec un environnement chimique spécifique. La première couche de la barrière a une épaisseur d'environ 0,3 à 0,8 mm (10 à 20 mils) et est constituée à 95% de résine, renforcée d'un ou deux voiles de surface. Derrière cette couche s'ajoute une autre couche de 2 à 6 mm (90 à 230 mils) constituée à 75% de résine, renforcée d'un mat à fils coupés (à liant poudre uniquement). Enfin, la barrière est renforcée d'un stratifié structural qui assure résistance et rigidité à l'ensemble de la structure composite.

Comme bien des facteurs qui influent sur la performance d'un stratifié échappent à son contrôle, Ashland n'est pas en mesure de garantir l'utilisation qui est faite de ses résines Epoxy Vinylester Derakane et Derakane Momentum. Toutefois, les conditions de service exposées dans ce guide passent pour être dans les limites des capacités des résines Derakane lorsque les stratifiés sont conçus, produits et mis en œuvre dans les règles de l'art.

En ce qui concerne la conception d'équipement en SVR, les utilisateurs des résines Derakane et Derakane Momentum sont invités à consulter les normes de l'industrie et les directives de conception pertinentes.

Pour plus d'information, veuillez consulter le site Web à l'adresse ashland.com, ou envoyer un mel à derakane@ashland.com.

Brève description des produits

Derakane et Derakane Momentum™ série 411 – Résines Epoxy Vinylester standards, à base de résine Epoxy bisphénol-A. Elles résistent à une vaste gamme d'acides, d'alcalis, d'agents de blanchiment et de solvants. Employées dans de nombreuses applications de transformation de produits chimiques. Elles présentent une excellente ténacité et une excellente résistance à la fatigue.

Derakane et Derakane Momentum 441-400 – Résines Epoxy Vinylester, à base de résine Epoxy bisphénol-A, à faible teneur en styrène et dotées de propriétés mécaniques, thermiques et chimiques à mi-chemin entre les résines Derakane 411 et Derakane 470. Leurs combinaisons unique HDT élevé –allongement élevé en fait des résines de choix pour les applications impliquant un cycle thermique (cuves de réaction chimique, par exemple).

Derakane et Derakane Momentum série 470 – Résines Epoxy Vinylester à base de novolaque conçues pour offrir des propriétés exceptionnelles de résistance thermique et chimique. Résistance élevée aux solvants, aux acides et aux substances oxydantes comme le chlore gazeux. Haute conservation de la résistance et de la ténacité à des températures élevées, ce qui en fait des résines de choix pour les applications en contact avec des gaz de combustion.

Derakane et Derakane Momentum série 510A/C – Résines Epoxy Vinylester bromées offrant un degré élevé d'auto-extinguibilité[1]. Très résistantes à l'attaque chimique du chlore et des agents de blanchiment. Le brome qu'elles contiennent les rendent plus tenaces et plus résistantes à la fatigue que les résines Epoxy Vinylester standards.

Derakane 510N est une résine Vinylester novolaque bromée offrant un degré d'auto-extinguibilité[1] modéré. Elle possède une tenue à la corrosion similaire aux résines Derakane 470 dans la plupart des environnements chimiques. Elle est également utilisée pour des applications en contact avec des gaz de combustion chauds et humides où des excursions thermiques sont possibles et où une tenue au feu est desirée. Ce produit n'est disponible qu'en Amérique du Nord.

Derakane 8084 – Résine Epoxy Vinylester bisphénol A modifiée par un élastomère. Très haut degré de ténacité et de résistance aux chocs et à la fatigue, et excellente adhérence. C'est la résine de choix pour les applications structurales exigeantes et pour la réalisation de primaires d'accrochage.

[1] Le degré d'auto-extinguibilité atteint dans les produits durcis correctement et formulés à partir de ces résines est établi le plus souvent au moyen de l'essai en tunnel ASTM E84. Cet essai compare les caractéristiques d'inflammabilité d'une matière avec une autre mais il ne peut prévoir le comportement de cette matière dans une situation réelle d'incendie. Les résines Epoxy Vinylester Derakane et Derakane Momentum sont des matières organiques susceptibles de s'enflammer dans des conditions favorables de chaleur et d'oxygène.

Comment se servir de la table de résistance chimique

Contenu

La liste des produits et des environnements chimiques présentée ci-dessous indique la plus haute température connue à laquelle un équipement fait à base de résine Derakane et Derakane Momentum™ ou un coupon test a été soumis:

- soit l'équipement a donné entière satisfaction en service dans l'industrie
- soit un coupon été testé in situ ou en laboratoire (essai ASTM C 581) avec des résultats qui révèlent une bonne durée de service.

À noter qu'il ne s'agit pas nécessairement de la température de service maximale.

Les limites de température indiquées dans chaque ligne valent pour l'ensemble des séries

de résines (par exemple, les valeurs données pour la Derakane 411 s'appliquent aux résines Derakane 411-350, 411-45, 411C-50, etc.) et leurs équivalents Derakane Momentum. Le tableau suivant donne la liste des résines comprises dans chaque séries.

Table 1

	Colonnes				
	411 series	441 series	470 series	510N series	510A/C series
Valide pour les résines DERAKANE suivantes	411-350 411-45	441-400	470-300 470-30S 470-36 470-36S 470-45 470HT	510N	510A-40 510C-350
Valide pour les résines DERAKANE MOMENTUM suivantes	411-200 411-350		470-300		510C-350

Dans la table de résistance chimique, un espace en blanc indique simplement qu'il n'y a pas de données disponibles pour l'instant.

NR signifie "Non recommandé", indépendamment de la température.

LS signifie "Service Limité" (durée d'au moins 3 jours à un an à 40°C/100°F maximum). En général en pareils cas, les résines mentionnées peuvent être utilisées pour fabriquer un SVR exposé accidentellement à un tel milieu. Il est recommandé de réaliser un nettoyage et une inspection après 3 jours de contact.

Ce guide est mis à jour régulièrement pour tenir compte de toutes les nouvelles données et expériences (nouveaux produits, nouvelles températures ou concentrations, etc.). Il existe une version internet, à l'adresse ashland.com, où la recherche est des plus facile.

Exemple

	DERAKANE Resin						
Chemical Environment	Concentration %	411	441	470	510A/C	510N	8084
Hydrochloric Acid & Dissolved Organics[8,9,13]	0 - 33% HCl	NR		65/150[15]			NR
	% en poids (sauf indication contraire)	non recommandé	aucune donnée disponible	plus haute température (°C / °F) recommandée			

[8] Emploi impératif d'un double voile de surface et une barrière anticorrosion de 5 mm (200 mils)

[9] Un double voile de type C dans la barrière anticorrosion est recommandé.

[13] Emploi impératif d'un verre résistant aux acides dans le revêtement anti-corrosion et emploi facultatif dans la paroi structurale

[15] Une légère coloration de d'acide à haute pureté peut se produire lors des premières expositions

Notes en bas de page

Les consignes données dans les notes en bas de page sont essentielles pour assurer une bonne durée de vie à l'équipement en SVR. Il est donc fortement recommandé de les suivre.

1. Un double voile synthétique est recommandé dans la barrière anticorrosion.
2. Une post-cuisson est recommandée pour optimiser la durée de service.
3. Une formulation à base de peroxyde de benzoyle (BPO) / Amine avec post-cuisson est recommandée afin d'accroître la durée de service.
4. Recommandé à condition que le solvant employé pour la dissolution soit compatible avec la résine considérée.
5. Satisfaisant jusqu'à la température de stabilité maximale du produit.
6. Consulter nos services techniques pour obtenir des recommandations précises.
7. Probablement satisfaisant à de plus hautes températures, la température indiquée est la plus élevée pour laquelle il existe des données.
8. Un double voile de surface et une barrière anticorrosion d'au minimum 5mm (200 mils) sont recommandés.
9. Un double voile de type C dans la barrière anticorrosion est recommandé.
10. Pour les réacteurs, utiliser les résines Derakane 411, 441 ou 510A/C.
11. Dans les limites de solubilité en solution aqueuse.
12. Au-dessus de 50°C (120°F), un verre résistant aux acides est recommandé dans la barrière anticorrosion et est facultatif dans la paroi structurale.
13. Un verre résistant aux acides est recommandé dans le revêtement anticorrosion et est facultatif dans la paroi structurale.
14. Si la composition chimique est inconnue, obtenir du fournisseur la fiche de sécurité du produit.
15. Une légère coloration des acides de haute pureté peut se produire lors des premières expositions. Merci de contacter le service technique, derakane@ashland.com, pour plus d'informations.
16. L'utilisation de la résine au-delà de la température maximale de calcul permise par la norme de conception choisie, peut nécessiter l'aval des autorités compétentes.
17. La durée de service est proportionnelle à l'épaisseur de la barrière anticorrosion.
18. Pour des applications de type: contact alimentaire, suivez les régulations en vigueur localement. Pour plus d'informations voir notre brochure: Fabricating Tips Guide ou contacter le service technique, derakane@ashland.com
19. Préférence pour la résine Derakane 510A-40.

NR: Non Recommandé

LS: Service Limité, en général d'une durée de 3 jours à 1 an à température ambiante (max. 40°C/ 100°F). Normalement suffisant en confinement secondaire (bac de rétention ou autre).

Post-cuisson

Température de service inférieure à 100°C (210°F): une post-cuisson peut prolonger la durée de service si la température de service est comprise entre la température maximale indiquée dans ce guide et jusqu'à 20°C en dessous de celle-ci. Cela signifie, par exemple, qu'une post-cuisson est toujours recommandée pour les applications en contact avec des solvants dont la température maximale de service indiquée dans ce guide est comprise entre 25 et 40°C (80 à 100°F).

Température de service supérieure à 100°C (210°F): une post-cuisson en service peut être suffisante, à condition que les valeurs de dureté Barcol minimales spécifiques de la résine soient atteintes avant la mise en service.

Service dans des solutions salines pures et neutres: une post-cuisson n'est généralement pas nécessaire, à condition que les valeurs de dureté Barcol minimales spécifiques de la résine soient atteintes et que le SVR ne présente pas de sensibilité au test à l'acétone, avant la mise en service.

Une post-cuisson est fortement recommandée pour un SVR polymérisé au peroxyde de benzoyle (BPO)/Amine. La post-cuisson sera effectuée de préférence dans les deux semaines suivant la fabrication.

Les conditions de post-cuisson énumérées dans la norme DIN 18820 peuvent être considéreés:

- Pour les résines 411, 441, 510 A/C et 8084: 80°C (180°F).
- Pour les résines 470 et 510N: 100°C (210°F).
- Cette norme recommande 1 heure par mm d'épaisseur du stratifié (entre 5 et 15 heures).

Voiles de surface

Les voiles courants (synthétiques et voiles de verre) sont appropriés pour la plupart des environnements chimiques. Les solutions contenant de l'acide fluorhydrique (HF) exigent par contre l'utilisation de voiles synthétiques ou de carbone. Une couche de voile donne typiquement une épaisseur finale d'environ 0,3 mm. L'épaisseur de cette couche de voile est tout aussi importante que la nature du voile lui même. Un voile ajouré (comme du Nexus™ 100-10) augment l'épaisseur finale de la couche de voile permettant ainsi augmenter la durée de service dans certains cas particuliers comme par exemple au contact de solutions alcalines chaudes. Les voiles de carbone ont prouvé une excellente résistance dans de nombreux environnements chimiques agressifs comme HF, HCl, NaOH **mais pas NaOCl (hypochlorite de sodium, Javel).** Un voile de carbone est aussi utile pour rendre la surface conductrice.

Cas spéciaux

Manque d'information

Il est des cas pour lesquels l'environnement chimique et/ou les conditions d'exposition ne sont pas traitées dans ce guide. Des recommandations spécifiques ne peuvent alors pas être formulées, et il convient donc de réaliser des tests sur des stratifiés dans des conditions réelles ou simulées, avant de se prononcer sur la bonne tenue de la résine.

Revêtements avec et sans renfort (sur acier, béton, etc.)

Ces types de revêtements ont des propriétés particulières qui peuvent amener à limiter les températures de service des installations en raison des différences de comportement thermique entre la résine et le support (veuillez consulter les services techniques de Ashland pour plus d'information ou une des compagnies locales spécialisées dans ce type de d'activité).

Un revêtement stratifié peut donner une durée de service plus longue que d'autres type de revêtement au contact de fluides. Afin d'en garantir la qualité nous recommandons de les réaliser par moulage au contact et non par projection simultanée. En règle générale, en raison du faible voire de l'absence d'exothermie lors de la polymérisation, ces revêtements avec ou sans renfort devraient être post-cuits chaque fois que cela est possible (voir le paragraphe concernant la post-cuisson ci-dessus).

Des précautions particulières sont requises pour les milieux très diffusants (HCl, HF, etc.). La règle générale est la suivante ; plus le revêtement est épais et mieux il a été réticulé, plus sa résistance à la diffusion est élevée et donc plus longue sera sa durée de service.

Gaz de combustion à haute température

Si un voile synthétique est recommandé pour le contact avec des gaz à haute température, ce dernier doit être résistant aux températures considérées. Un voile de carbone peut s'avérer nécessaire.

Si les gaz comprennent de la vapeur d'eau et / ou des acides, des précautions particulières doivent être prises afin d'éviter que le point de rosée acide se situe dans l'épaisseur du stratifié.

Expositions intermittentes

Pour des expositions intermittentes, des fumées ou des déversements accidentels, il est possible d'opérer à des températures de service parfois très supérieures à celles indiquées dans le présent guide. C'est ainsi que des structures telles que des canaux de déversement, revêtements de sol, caillebotis, peuvent dans certains cas, être exposées pour des courtes durées à des produits jugés non recommandés dans ce guide.

Mélanges de produits ou expositions alternées à différents environnements

Toutes les données contenues dans ce guide s'entendent pour des installations travaillant en continu et au contact d'un seul produit (sauf indication contraire).

Une attention particulière sera portée au cas des mélanges de produits chimiques pour lesquels, des effets synergiques (interactions entre eux) peuvent conduire à une réduction de la résistance à la corrosion, comparée à celles des produits pris individuellement.

La résistance chimique peut être altérée du fait de l'emploi (stockage ou transport) d'un même équipement avec alternance de l'environnement chimique (en particulier quand ces produits sont de natures différentes, acides, bases, solvants, etc.).

En cas de doute, veuillez consulter les services techniques de Ashland, votre distributeur ou votre bureau de vente.

Demande de résistance chimique

Pour toute demande concernant la résistance de nos résines, les renseignements suivants sont nécessaires:

- Nature chimique de tous les produits ainsi que leur concentration respective (y compris les traces).
- Températures de service, de pointe, voire accidentelle ainsi que les durées correspondantes.
- Etat (liquide/solide/gazeux) ainsi que les risques de séparation de phase ou de condensation.
- Type d'équipement (cuve, tuyau, revêtement, etc.)

Pour toute demande, veuillez utiliser une copie de la fiche réponse ci-jointe intitulée, "demande de résistance chimique".

Comment travailler en sécurité avec les résines Derakane et Derakane Momentum et les produits associés

Les résines Epoxy Vinylester Derakane et Derakane Momentum™ ainsi que les produits associés (solvants, catalyseurs, accélérateurs, etc.) peuvent se révéler dangereux si des précautions simples mais précises ne sont pas observées. Les précautions nécessaires à la manipulation et la mise en œuvre des résines Derakane et Derakane Momentum sont similaires à celles des résines polyesters insaturées plus couramment utilisés dans l'industrie et seront de ce fait familières au personnel formé à ce dernier type de produits. Des fiches de sécurité sur toutes les résines Derakane et Derakane Momentum sont disponibles pour aider les clients à les stocker ou les éliminer (le cas échéant).

Avertissement

Les recommandations concernant les méthodes et l'utilisation des produits contenus dans cette brochure, sont basées sur l'expérience de Ashland Chemical et sur la connaissance des caractéristiques des résines Vinylester Derakane et Derakane Momentum. Elles sont données de bonne foi. Ces informations sont toutefois données sans garantie et ne sauraient engager notre responsabilité. Elles n'impliquent aucune garantie du résultat de l'utilisation de notre produit ni de la libre exploitation de quelque brevet que ce soit. Ashland n'exerçant aucun contrôle sur la bonne utilisation du produit, aucune responsabilité liée à cette mise en œuvre ne saurait, en conséquence, lui être imputée. L'étendue des obligations de Ashland est exclusivement fixée par les termes de ses contrats de vente.

Derakane Epoxy Vinyl Ester Resins
Demande de Resistance Chimique

Veuillez envoyer ce formulaire par fax au +1.614.790.6157 (Amerique) ou +49(0)7851 99478-30 (Europe) ou à votre distributeur.

Date: ____________________ **No de Pages:** ____________________

Destinataire	**Expéditeur**
Nom:	Nom:
Société:	Société:
Fax:	Fax:
	Téléphone:

Utilisateur/Projet/Engineering: ____________________

Secteur industriel/procédé: ____________________
(chimie, papeterie, traitement des minéraux, lavages de gaz, etc.)

Type d'équipement: ____________________
(cuve, colonne, tuyau / conduit, revêtement, etc.)

Dimensions/Capacité: ____________________
(hauteur, diamètre, débit)

Conditions de service

	Concentrations		
Produits chimiques	Minimum	Normal	Maximum
1)			
2)			
3)			
4)			
5)			
6)			

NOTE:Veuillez également indiquer les composés présents à faibles concentrations (traces).
Si il manque de la place, veuillez rajouter une feuille.

Températures (°C): conditions normales__________ min./max.________ accidentelles________

Pression/Dépression:_________ pH: typique ________ min. _____________ max. __________

Commentaires/notes: ____________________
(ex: procédé particulier, cycle de températures, concentrations variables, addition & dilution, design particulier, etc.)

Vorwort

Derakane und Derakane Momentum™ Epoxy-Vinylesterharze werden hergestellt von Ashland Inc. Zu Hochleistungs-Glasfaserverbundwerkstoffen (GFK) verarbeitet, bieten diese Reaktionsharze eine hervorragende Chemikalienbeständigkeit. Dies erlaubt einen Einsatz unter extremen industriellen Bedingungen.

Diese Broschüre umfaßt eine Einführung mit wichtigen Anwendungsdetails, sowie eine ausführliche Beständigkeitstabelle. Zu den Zielgruppen gehören insbesondere GFK-Hersteller, Endanwender, Ingenieurfirmen und Anlagenbauer, technische Berater und Experten.

Die Empfehlungen in dieser Broschüre gelten für korrosionsbeständige GFK-Laminate, hergestellt nach dem Stand der Technik. Im allgemeinen besitzen diese Laminate eine 2.5-6.3 mm starke Chemieschutzschicht (CSS), ausgelegt für ein bestimmtes Medium. Die erste Schicht der CSS ist ca. 0.3-0.8 mm dick und enthält ca. 95% Harz. Sie wird durch ein oder zwei Vlieslagen verstärkt. Auf diese Schicht werden mehrere Lagen (2-6 mm) harzgetränkte, pulvergebundene Wirrfasermatten aufgebracht. Diese CSS wird dann mit dem sogenannten Traglaminat versehen, das für die Festigkeit und die Steifigkeit des GFK-Bauteils sorgt.

Die Einsatzgrenzen in dieser Broschüre sind nach unserem besten Wissen und Gewissen mit GFK auf der Basis von Derakane Harzen zu erreichen, vorausgesetzt, die Bauteile wurden korrekt ausgelegt, hergestellt, und installiert. Da jedoch Ashland als Harzhersteller keinerlei Kontrolle über die Verarbeitung der Derakane und Derakane Momentum Harze sowie über die vielen anderen Einflussgrößen hat, wird für die Empfehlungen keine Haftung übernommen.

Eine Auslegung von GFK – Bauteilen ist nicht Gegenstand dieser Broschüre. Wir verweisen hierzu auf die einschlägigen Regelwerke.

Weitere Informationen finden Sie auf unserer Internetseite ashland.com, oder per E-mail-Anfrage bei derakane@ashland.com.

Kurzbeschreibung der Harze

Derakane und Derakane Momentum™ 411 Harze sind die Standard-Epoxy Vinylesterharze des chemischen und verarbeitenden Gewerbes. Sie basieren auf Bisphenol-A Epoxidharz und sind beständig gegen eine Vielzahl von Säuren, Laugen, Bleichmittel, und Lösungsmittel. Sie besitzen eine hervorragende Zähigkeit und Dauerschwingfestigkeit.

Derakane und Derakane Momentum 441-400 Harz ist ein Bisphenol-A Epoxy Vinylesterharz mit Eigenschaften zwischen den Derakane 411 und Derakane 470 Harzen (mechanische, thermische, und chemische Beständigkeit). Dank seiner einzigartigen Kombination von hoher Wärmeformbeständigkeit und hoher Bruchdehnung ist es besonders für Reaktionsbehälter mit zyklischer Temperaturfahrweise geeignet.

Derakane und Derakane Momentum 470 Harze sind Epoxy-Novolac Vinylesterharze, ausgelegt für eine maximale thermische und chemische Beständigkeit. Sie sind besonders für den Einsatz im Kontakt mit Lösungsmitteln, Säuren, und oxidierenden Substanzen, wie z.b. Chlorgas geeignet. Durch ihre gute Zähigkeit bei hohen Temperaturen haben sie sich zudem in Rauchgasanwendungen ausgezeichnet bewährt.

Derakane und Derakane Momentum 510A/C Harze sind bromierte Epoxy Vinylesterharze mit einer hohen Flammwidrigkeit[1]. Sie besitzen außerdem eine hohe chemische Beständigkeit gegen Chlor und Bleichmittel. Dank ihres Bromgehaltes sind sie noch zäher und dauerschwingfester als Standard Epoxy Vinylesterharze.

Derakane 510N Harz ist ein bromiertes Epoxy-Novolak Vinylesterharz, das eine gute Flammwidrigkeit[1] bietet. In den meisten Medien bietet es eine gleich gute Korrosionsbeständigkeit wie Derakane 470 Harz. Es ist besonders leistungsfähig in heißem, feuchtem Rauchgas, wo starke Temperatursprünge auftretenden und wo Flammwidrigkeit erwünscht ist. Dieses Produkt ist nur in Nordamerika verfügbar.

Derakane 8084 Harz ist an Elastomer- modifiziertes Bisphenol-A Epoxy Vinylesterharz mit außergewöhnlicher Zähigkeit, Durchschlags- und Dauerschwingfestigkeit. Darüber hinaus bietet es ausgezeichnete Adhäsionseigenschaften. Es ist das Harz der Wahl für anspruchsvolle strukturelle Anwendungen und als Grundierung für chemisch beständige GFK-Beschichtungen.

[1] Der Grad der Flammwidrigkeit, der mit korrekt formulierten und gehärteten Produkten auf der Basis dieser Harze erreicht wird, wird meistens durch einen Tunneltest nach ASTM E 84 bestimmt. Dies ist ein kontrolliertes Verfahren, welches das Brandverhalten mehrerer Materialien miteinander vergleicht, das jedoch möglicherweise keine Voraussagen des Verhaltens in echten Brandsituationen zuläßt. Derakane und Derakane Momentum Epoxy Vinylesterharze sind organische Materialien, die unter bestimmten Bedingungen (Wärme- und Sauerstoffzufuhr) brennen.

Anleitung zur Benutzung dieser Broschüre

Inhalt der Broschüre

Bei den in den Tabellen aufgeführten Beständigkeitsdaten handelt es sich um die höchsten uns bekannten Temperaturen, bei denen sich die Derakane und Derakane Momentum™ Harze entweder in der Praxis bewährt haben, oder bei denen aus Laborversuchen (nach ASTM C 581) eine gute Lebenserwartung in der Praxis abgeleitet werden kann. Diese entsprechen nicht notwendigerweise den höchsten möglichen Einsatztemperaturen.

Die Daten in den einzelnen Spalten gelten jeweils für alle Harze der selben Produktfamilie (z.b. 411: 411-350, 411-45, 411C-50, etc.). Alle Daten gelten sowohl für Standard Derakane, als auch für die neueren Derakane Momentum Harze.

Table 1

	Columns				
	411 series	441 series	470 series	510N series	510A/C series
Gültig für DERAKANE Harze	411-350 411-45	441-400	470-300 470-30S 470-36 470-36S 470-45 470HT-400	510N	510A-40 510C-350
Gültig für DERAKANE MOMENTUM Harze	411-200 411-350		470-300		510C-350

Eine Leerstelle in den Tabellen bedeutet, dass bis zur Drucklegung keine spezifischen Daten zur Verfügung standen.

«NR» bedeutet «nicht zu empfehlen», unabhängig von der Temperatur.

«LS» bedeutet «begrenzte Haltbarkeit» (mindestens 3 Tage bis 1 Jahr bei maximal 40°C/100°F). In der Regel eignen sich die entsprechenden Harze in diesen Fällen für Bauteile, die nur in Ausnahmefällen mit den Medien in Berührung kommen, und wenn nach spätestens 3 Tagen eine Reinigung und Inspektion möglich sind.

Diese Broschüre wird laufend überarbeitet. Neue Daten (neue Medien, Konzentrationen, Temperaturgrenzwerte usw.) sind damit schnell verfügbar. Eine Internetversion mit komfortablen Suchmöglichkeiten finden Sie unter ashland.com.

Beispiel

	DERAKANE Resin						
Chemical Environment	Concentration %	411	441	470	510A/C	510N	8084
Hydrochloric Acid & Dissolved Organics[8,9,13]	0 - 33% HCl	NR		65/150[15]			NR
[8] Doppeltes Vlies und eine 5mm Chemieschutzschicht empfohlen [9] Doppeltes C-Vlies in der Chemieschutzschicht empfohlen. [13] Säurebeständiges Glas sollte in der Chemieschutzschicht und kann im Traglaminat verwendet werden	Gew.-% (wenn nichts anderes angegeben)	nicht zu empfehlen	keine Daten verfügbar	höchste zulässige Temperatur (°C/°F) [15]Eine leichte Verfärbung von reiner Säure kann während der ersten Expositionen auftreten			

Fußnoten

Die Fußnoten enthalten Informationen, die für eine lange Standzeit der GFK-Bauteile von ausschlaggebender Bedeutung sind. Sie sollten daher unbedingt befolgt werden:

1. In der Chemieschutzschicht sollte ein doppeltes synthetisches Vlies verwendet werden.
2. Eine Nachhärtung wird zur Verlängerung der Standzeit empfohlen.
3. Maximale Standzeit wird durch die Verwendung eines Benzoylperoxid (BPO)/Amin-Härtungssystems mit Nachhärtung erreicht.
4. Empfehlung gültig unter der Bedingung, dass das Harz gegenüber dem Lösungsmittel ebenfalls beständig ist.
5. Beständig bis zur höchsten Temperatur, bei der das Medium noch stabil ist.
6. Es wird empfohlen, sich mit der Ashland Anwendungstechnik in Verbindung zu setzen.
7. Voraussichtlich auch bei höheren Temperaturen beständig (Daten derzeit jedoch nur bis zur angegebenen Temperatur verfügbar).
8. Ein doppeltes Vlies und eine min. 5 mm dicke Chemieschutzschicht wird empfohlen.
9. Doppeltes C-Vlies in der Chemieschutzschicht empfohlen.
10. Für Reaktionsbehälter werden 441, 411, und 510A/C Harze empfohlen.
11. Innerhalb der Löslichkeitsgrenzen in wässriger Lösung.
12. Säurebeständiges Glas sollte über 50°C in der Chemieschutzschicht und kann im Traglaminat verwendet werden.
13. Säurebeständiges Glas sollte in der Chemieschutzschicht und kann im Traglaminat verwendet werden.
14. Wenn chemische Zusammensetzung unbekannt, ein Sicherheitsdatenblatt des Herstellers anfordern.
15. Eine leichte Verfärbung von reiner Säure kann während der ersten Expositionen auftreten. Bitte setzen Sie sich bei Fragen mit der Anwendungstechnik von Ashland in Verbindung, z.B. ueber derakane@ashland.com.
16. Der Einsatz des Harzes oberhalb der in manchen Normen erlaubten Grenzen kann die Genehmigung durch die zuständigen Behörden erforderlich machen.
17. Die erwartete Standzeit ist proportional zur Dicke der Chemieschutzschicht.
18. Fuer Anwendungen mit Lebensmittelkontakt bitte die nationalen oder regionalen Regelwerke beachten. Wir verweisen auch auf die Broschuere “Fabricating Tips”. Bitte setzen Sie sich ggf. mit der Anwendungstechnik von Ashland in Verbindung, z.B. ueber derakane@ashland.com.
19. Bevorzugtes Harz ist Derakane 510A-40.

NR: Nicht zu empfehlen

LS: Begrenzte Haltbarkeit, im allgemeinen 3 Tage bis 1 Jahr bei Raumtemperatur (max. 40°C), in der Regel geeignet für Tanktassen, Auffangwannen, etc.

Nachhärtung

Für eine Einsatztemperatur unter 100°C: Eine Nachhärtung kann die Lebenserwartung verlängern, wenn die Einsatztemperatur innerhalb 20°C unter den Temperaturgrenzen (Tmax - 20°C) in der Beständigkeitstabelle liegt. Dies bedeutet, dass z.b. beim Einsatz in Lösungsmitteln mit einer Temperaturgrenze von 25 - 40°C eine Nachhärtung immer empfehlenswert ist.

Für eine Einsatztemperatur über 100°C: Eine Nachhärtung im Betrieb kann ausreichend sein, vorausgesetzt, die Mindest-Barcolhärte des jeweiligen Harzes wird vor der Inbetriebnahme erreicht.

Für einen Einsatz in reinen und neutralen Salzlösungen: Eine Nachhärtung ist im allgemeinen nicht notwendig, vorausgesetzt, die Mindest-Barcolhärte des jeweiligen Harzes wird vor der Inbetriebnahme erreicht, und wenn der Acetontest eine klebfreie Oberfläche ergibt.

Eine Nachhärtung von Laminaten, die mit einem BPO/Amin-System gehärtet wurden, wird empfohlen. Die Nachhärtung sollte innerhalb von 2 Wochen nach der Fertigung erfolgen.

Die folgenden in DIN 18820 vorgeschlagenen Nachhärtungsbedingungen sind empfehlenswert:

- Für 411, 441, 510A/C, und 8084 Harze: 80°C/180°F.
- Für 470 und 510N Harze: 100°C/210°F
- Diese Norm empfiehlt eine Nachhärtungsdauer von 1 Stunde pro mm Laminat-Wandstärke (zwischen mindestens 5 und maximal 15 Stunden).

Vliese

Alle gängigen Vliese (synthetische und Glasvliese) sind für fast alle Medien geeignet. Flusssäure bzw. HF-haltige Lösungen erfordern jedoch ausschließlich synthetische oder Carbon-Vliese. Die Dicke einer ausgehärteten Vliesschicht beträgt typischerweise ca. 0,3 mm. Die Dicke der Vliesschicht ist genauso wichtig wie die Art des Vlieses. Strukturierte synthetische Vliese (wie z.B. Nexus™ 100-10) eignen sich besonders für Fälle, in denen die zusätzliche Dicke die Standzeit in z.B. heißen Laugen erhöhen kann. Carbonvliese haben eine hervorragende Beständigkeit gegenüber einer Vielzahl von aggressiven Chemikalien, wie z.B. HF, HCl, NaOH, **aber nicht NaOCl (Chlorbleichlauge)**. Carbonvliese werden auch für leitfähige Oberflächen eingesetzt.

Spezialfälle

Keine Beständigkeitsdaten verfügbar

Falls diese Broschüre für ein bestimmtes Medium oder für bestimmte Einsatzbedingungen keine Daten enthält, und wenn Ashland aufgrund fehlender Daten keine Empfehlungen aussprechen kann, sollte die Beständigkeit von Testlaminaten unter Betriebs-oder Laborbedingungen untersucht werden. Solche Tests lassen im allgemeinen eine Abschätzung über die zu erwartende Standzeit zu.

Beschichtungen (verstärkt und unverstärkt)

Beschichtungen folgen eigenen physikalischen Gesetzen. Sie können daher – zum Beispiel aufgrund von unterschiedlichen Ausdehnungskoeffizienten – andere Temperaturgrenzen aufweisen als massiver GFK. Es wird daher empfohlen, sich in speziellen Fragen mit der Ashland Anwendungstechnik oder mit einem erfahrenen Anbieter in Verbindung zu setzen.

Laminatbeschichtungen können in Kontakt mit flüssigen Medien haltbarer sein als andere Systeme und sollten aufgrund der besseren Qualität im Handlaminierverfahren und nicht durch Faserspritzen aufgebracht werden. Generell sollten Beschichtungen wegen schwacher oder fehlender Exotherme nachgehärtet werden, wenn immer möglich (siehe auch «Nachhärtung»).

Bei stark diffundierenden Medien (HCl, HF, etc.) ist besondere Vorsicht geboten. Generell gilt: Je dicker die Beschichtung, und je besser sie ausgehärtet ist, desto diffusionsdichter und haltbarer ist sie.

Hohe (Rauch-) Gastemperaturen (über 100°C)

Falls für ein heißes gasförmiges Medium ein synthetisches Vlies empfohlen wird, so muss dessen Temperaturbeständigkeit gewährleistet sein. Gegebenenfalls können z.B. Kohlefaservliese eingesetzt werden. Wenn das Medium Wasserdampf und/oder Säuren enthält, so muss durch geeignete Maßnahmen eine Taupunktunterschreitung im Laminatquerschnitt verhindert werden.

Kurzzeitiger Kontakt mit aggressiven Medien

Wird der GFK nur kurzzeitig oder diskontinuierlich korrosiven Medien ausgesetzt, oder wenn es sich um Dämpfe handelt, so kann auch bei wesentlich höheren Temperaturen (als angegeben), oder in als «NR» klassifizierten Fällen eine gute Standzeit erreicht werden. Dies kann z. B. bei Abflüssen, Böden, Gitterrosten, sowie bei Tragrahmen für Laufstege oder Treppen der Fall sein.

Mischmedien oder Wechselbeanspruchung

Die Daten in dieser Broschüre beziehen sich auf massiven GFK in kontinuierlichem Kontakt mit den jeweiligen Medien (sofern nichts anderes angegeben).

Besondere Vorsicht ist bei Mischmedien angebracht, da (negative) synergetische oder andere Effekte auftreten können, die sich nicht ohne weiteres aus den Einzeldaten in dieser Broschüre ableiten lassen.

Die chemische Beständigkeit kann ebenfalls negativ beeinflusst werden, wenn der GFK für abwechselnde Lagerung oder Transport von unterschiedlichen Medien verwendet wird, insbesondere, wenn diese Medien hinsichtlich ihrer Eigenschaften stark voneinander abweichen, wie z. B. Säuren und Laugen, anorganische und organische Substanzen, etc.

Es wird empfohlen, sich im Zweifelsfalle oder für spezielle Fragen mit Ihrem Fachhändler, der Ashland Anwendungstechnik, oder mit einem unserer Verkaufsbüros in Verbindung zu setzen.

Beständigkeitsanfragen

Wird eine Harzempfehlung für korrosive Medien gewünscht, so sollten die folgenden Daten zur Verfügung gestellt werden:

- Chemische Zusammensetzung aller Produkte eines Prozesses oder Ansatzes, mit den zugehörigen Konzentrationen (auch Spuren).
- Betriebstemperatur, sowie die Maximal- und Störfalltemperaturen (mit Zeitdauer).
- Aggregatzustand: Flüssig, gasförmig, fest (Risiko einer Phasentrennung oder Kondensation?).
- Art des Bauteils (GFK-Tank, -Rohr, Beschichtung usw.).

Eine Kopie des umseitigen Vordrucks kann für Beständigkeitsanfragen verwendet werden (bitte per Fax an Ihren Händler oder an die Ashland Anwendungstechnik schicken).

Sicherheitshinweise

Derakane und Derakane Momentum™ Harze und Formulierungshilfsmittel können unter Befolgung üblicher Vorschriften zur Arbeitsorganisation und -hygiene von ausgebildetem Fachpersonal sicher verarbeitet werden. Es gelten die gleichen Vorsichtsmaßnahmen wie für styrolverdünnte Polyesterharze.

Hinweis

Empfehlungen zu Endanwendung und Verarbeitung der Derakane und Derakane Momentum Harze beruhen auf Erfahrungen der Ashland sowie auf anderen Leistungskennwerten und werden nach bestem Wissen und Gewissen gemacht. Da jedoch Ashland als Harzhersteller keinerlei Kontrolle über die Verarbeitung der Derakane und Derakane Momentum Harze hat, wird für die Empfehlungen keine Haftung übernommen. Insbesondere übernimmt Ashland keine Haftung für irgendwelche Systeme oder Anwendungen, in denen Derakane und Derakane Momentum Harze verwendet werden. Pflichten und Haftung der Ashland in bezug auf den Verkauf von Derakane und Derakane Momentum Harzen bestimmen sich ausschließlich nach dem jeweils zugrundeliegenden Kaufvertrag.

Derakane Epoxy Vinyl Ester Resins Vordruck für Beständigkeitsanfragen

Bitte schicken sie diesen Vordruck per Fax an +1.614.790.6157 (Amerika) oder +49(0)7851 99478-30 (Europa) oder an Ihren Händler.

Datum: ______ **Seitenzahl:** ______

An	**Von**
Name:	Name:
Firma:	Firma:
Fax:	Fax:
	Tel:

Endkunde/Ingenieurfirma/Anlagenbauer/Projekt:

Industriezweig/Prozess:
(Chemie, Papier, Erzaufbereitung, Rauchgas...)

Art des Bauteils:
(Tank, Wäscher, Rohr / Kanal, Beschichtung...)

Abmessungen/Leistung:
(Höhe, Durchmesser, Durchsatz...)

Betriebsbedingungen

Medien	**Konzentrationen** Minimum	Normal	Maximum
1)			
2)			
3)			
4)			
5)			
6)			

HINWEIS: Bitte alle Komponenten angeben, auch solche in Spuren. Wenn der Platz nicht ausreicht, bitte ein separates Blatt oder ein Sicherheitsdatenblatt beifügen.

Temperaturen (°C): normal/Betrieb ________ Störfall ________ für ________ h ________

Druck / Unterdruck: ________ **pH**: normal ________ min. ________ max. ________

Bemerkungen:
(z.B.: außergewöhnliche Prozessbedingungen, Temperaturschwankungen min,/max. Konzentrationen, Zugaben und Verdünnungen, neuartige(s) Design oder Bauweise)

Prefácio

As resinas epóxi éster vinílicas Derakane e Derakane Momentum™ são desenvolvidas e fabricadas pela Ashland. Essas resinas possuem excelentes propriedades de resistência à corrosão e atendem requisitos essenciais do Plástico Reforçado com Fibra de Vidro (PRFV). Graças as suas excelentes propriedades de resistência à corrosão, as resinas Derakane e Derakane Momentum são particularmente apropriadas para aplicações industriais exigentes.

Este guia descreve as diversas resinas Derakane e Derakane Momentum e apresenta dados detalhados sobre a resistência química que os engenheiros precisam para especificar e projetar aplicações de PRFV resistentes à corrosão.

As recomendações apresentadas neste guia são aplicáveis às mais modernas estruturas resistentes à corrosão. Geralmente, elas têm uma barreira de proteção contra corrosão com espessura entre 2,5 e 6,3 mm (100 a 250 milipolegadas), projetadas para o contato com um determinado ambiente químico. A primeira camada da barreira de proteção química é conhecida como liner e normalmente possui entre 0,3 e 0,8 mm de espessura, com teor de resina entre 90 a 95%, e tem de um a dois véus de superfície. O liner é seguido e reforçado pela camada conhecida como barreira química e que possui entre 2 a 6 mm de espessura e teor de resina próximo de 75%. A barreira química é composta de mantas de fio picado (contendo apenas aglutinante em pó). Finalmente, a barreira protetora contra corrosão recebe uma camada estrutural que fornece força e rigidez para o compósito resistente à corrosão.

Como existem muitas variáveis que afetam o desempenho de um laminado e que a maioria delas está fora das possibilidades de controle da Ashland, nenhuma garantia quanto ao uso das resinas epóxi éster vinílicas Derakane e Derakane Momentum podem ser dadas. Entretanto, as condições de operação apresentadas neste boletim são adequadas às capacidades das resinas epóxi éster vinílicas Derakane quando os laminados são adequadamente projetados, fabricados e instalados.

Para informações sobre design de um equipamento de PRFV, os futuros usuários das resinas Derakane devem consultar normas e diretrizes industriais adequadas.

Para obter mais informações, entre em contato com a Ashland através do e-mail derakane@ashland.com ou acesse ashland.com.

Breve Descrição do Produto

Derakane e Derakane Momentum™ 411 são reconhecidas mundialmente como padrão de referência para as resinas epóxi éster vinílicas. Têm como base resinas epóxi do Bisfenol-A e oferecem resistência química contra vários ácidos, álcalis, alvejantes e solventes utilizados em diversos processos químicos. Além disso, oferecem excelente tenacidade e resistência à fadiga.

Derakane e Derakane Momentum 441-400 são resinas epóxi éster vinílica do Bisfenol-A que contém baixo teor de monômero de estireno e possuem propriedades de resistência mecânica, térmica e química entre as resinas Derakane 411 e Derakane 470. Sua exclusiva combinação de alto HDT e alto alongamento na ruptura faz dela a melhor opção para aplicações com ciclos térmicos, tais como em tanques de reação química.

Derakane e Derakane Momentum 470 são resinas epóxi éster vinílicas baseadas no epóxi novolac, projetadas para oferecer excelente resistência térmica e química. Elas possuem grande resistência a solventes, ácidos e substâncias oxidantes, tais como cloro. Também proporcionam alta retenção de propriedades mecânicas em altas temperaturas, tornando-as a melhor escolha para aplicações com gases de combustão.

Derakane e Derakane Momentum 510A/C são resinas epóxi éster vinílicas bromadas que oferecem um alto grau de resistência à propagação de chama[1]. Elas são muito resistentes ao ataque químico em ambientes contendo cloro e químicos alvejantes. Seu conteúdo de bromo as tornam mais fortes mecanicamente, possuindo maior resistência à fadiga do que resinas epóxi éster vinílicas comuns.

Derakane 510N é uma resina epóxi novolac vinil éster bromada que oferece um grau moderado de retardância a chama1. Exibe uma resistência a corrosão similar a Derakane 470 na maioria doa ambientes químicos. Ela também é usada em ambientes quentes, gases úmidos onde podem ocorrer variações térmicas e onde a retardância a chama é necessária. Este produto somente é disponível apenas na América do Norte.

Derakane 8084 é uma resina epóxi éster vinílica do Bisfenol-A modificada com elastômero que oferece alta resistência ao impacto e à fadiga, além de uma excelente adesão aos substratos. Ela é a melhor opção para aplicações estruturais exigentes e revestimentos de PRFV quimicamente resistentes.

[1] O grau de resistência à propagação de chama obtido em produtos curados e adequadamente formulados, feitos dessas resinas, são comumente quantificados pelo teste de túnel ASTM E84. Este é um teste controlado que compara a característica de inflamabilidade de um material em relação a outro, mas pode não prever seu comportamento em uma situação real de incêndio. As resinas epóxi éster vinílicas Derakane e Derakane Momentum são materiais orgânicos e queimarão quando submetidas a algumas condições de calor e disponibilidade de oxigênio.

Como Utilizar a Tabela de Resistência Química

Conteúdo

Este guia mostra uma lista de reagentes e ambientes químicos e também apresenta a maior temperatura conhecida em que um equipamento feito a partir das resinas Derakane e Derakane Momentum™ pode ser aplicado ou submetido, sempre tomando como base:

- já ter proporcionado uma boa condição de operação na indústria ou
- foi testado em campo ou laboratório (de acordo com a norma ASTM C 581) cujos resultados indicaram uma boa expectativa de vida útil em operação.

É importante observar que esta não é necessariamente a temperatura máxima de operação.

Os limites de temperatura em cada linha representam toda a série da resina (por exemplo, resina Derakane 411 se aplica para a 411-350, 411-45, 411C-50, etc.) e suas resinas Derakane Momentum correspondentes. A tabela a seguir relaciona as resinas que estão inclusas nas respectivas colunas.

Tabela 1

	Colunas				
	série 411	série 441	série 470	série 510N	série 510A/C
Válido para resinas DERAKANE	411-350 411-45	441-400	470-300 470-30S 470-36 470-36S 470-45 470HT	510N	510A-40 510C-350
Válido para resinas DERAKANE MOMENTUM	411-200 411-350		470-300		510C-350

Nas tabelas de resistência química, um espaço em branco indica simplesmente que nenhum dado estava disponível quando os níveis de temperatura foram atribuídos.

NR significa "Não Recomendado" a qualquer temperatura.

LS significa "Limite Serviço" (pelo menos de 3 dias a 1 ano à temperatura máxima de 40ºC/100ºF). Geralmente, para esses casos, as respectivas resinas podem ser utilizadas para materiais de PRFV acidentalmente expostos e onde a limpeza e inspeção forem possíveis dentro de, no máximo, 3 dias.

Este guia é atualizado regularmente a fim de considerar todas as novas experiências e dados (produtos novos, temperaturas ou concentrações diferentes, etc.).

Exemplo

	Resina DERAKANE						
Ambiente Químico	Concentração %	411	441	470	510A/C	510N	8084
Ácido Clorídrico contendo Orgânicos Dissolvidos [8,9,13]	0 - 33% HCl	NR		65/150[15]			NR
	% em Peso (a menos que de outra forma indicado	Não recomendado	Nenhum dado disponível	Maior temperatura recomendada (ºC/ºF)			

8 Duplo véu de superfície e barreira química de 5 mm devem ser utilizados.

9 Duplo véu de vidro tipo C deve ser utilizado no Liner /Barreira Química.

13 Vidro com resistência à ácidos deve ser utilizado no Liner /Barreira Química e na parede estrutural.

15 Pode ocorrer uma leve descoloração do ácido de alta pureza durante as primeiras exposições.

Notas de Rodapé

As informações indicadas nas notas de rodapé são essenciais para garantir a longevidade dos equipamentos de PRFV. É altamente recomendado que tais informações sejam seguidas.

1. Duplo véu sintético deverá ser utilizado no Liner /Barreira Química.
2. Pós-cura é recomendada para maximizar a vida útil.
3. O sistema de cura com Peróxido de Benzoíla/Dimetilanilina, juntamente com a pós-cura, é recomendado para prolongar a vida útil.
4. Recomendado, desde que o solvente utilizado para a dissolução também seja recomendado.
5. Satisfatório até a máxima temperatura de estabilidade do produto.
6. Consulte o Suporte Técnico para recomendações específicas.
7. Provavelmente satisfatório a temperaturas mais altas, mas a temperatura indicada é a máxima, de acordo com as informações disponíveis.
8. Duplo véu de superfície e uma espessura mínima de 5 mm/200 mil devem ser usadas na barreira química.
9. Duplo véu de vidro tipo C deve ser utilizado no Liner /Barreira Química.
10. Para reatores, utilize as resinas 441, 411 ou 510A/C.
11. Dentro dos limites de solubilidade em uma solução aquosa.
12. Acima de 50ºC, fibra de vidro com resistência à ácidos deve ser utilizada na Barreira Química e na parede estrutural.
13. Vidro com resistência à ácidos deve ser utilizado no Liner / Barreira Química e na parede estrutural.
14. Se a composição química é desconhecida, obtenha a FISPQ com o fornecedor.
15. Pode ocorrer uma leve descoloração do ácido de alto grau de pureza durante as primeiras exposições, por favor contate o serviço técnico, derakane@ashland.com para maiores explicações
16. O uso de uma resina em temperatura acima da máxima permitida pela norma nacional que regulamenta esta aplicação pode requerer aprovação das autoridades competentes.
17. A vida útil é proprocional a espessura da barreira química.
18. Para contato com produtos alimentícios, assuma primeiramente as regulações locais. Por favor, consulte nosso Guia de Dicas do Fabricante ou contate o nosso Serviço Técnico, derakane@ashland.com
19. Preferência para a Derakane 510 A-40.

NR: Não recomendada.

LS: Limite de Serviço com operação limitada, geralmente de 3 dias a 1 ano à temperatura ambiente (máx. 40ºC); geralmente suficiente para contenção secundária.

PÓS-CURA

Para temperatura de operação abaixo de 100ºC: A pós-cura pode aumentar a vida útil do equipamento se a diferença entre a temperatura de operação e a máxima temperatura informada neste guia for menor que 20ºC. Isso significa que uma pós-cura pode ser benéfica para aplicações com solventes, onde a temperatura limite indicada no guia está entre 25-40ºC.

Para temperatura de operação acima de 100ºC: A pós-cura em operação (no processo) pode ser suficiente, contanto que os valores mínimos especificados de dureza Barcol sejam alcançados antes do início de operação.

Para operações com soluções salinas puras e neutras: A pós-cura geralmente não é exigida, contanto que os valores mínimos específicos de dureza Barcol sejam alcançados, e não haja qualquer sensibilidade à acetona antes do início.

Ao utilizar um sistema de cura com Peróxido de Benzoíla/amina, a pós-cura é altamente recomendada e deve ser feita em até duas semanas da construção.

Podem ser utilizadas as condições de pós-cura como detalhadas na norma DIN 18820:

- Para as resinas Derakane 411, 441, 510A/C e 8084: Temperatura de 80°C.
- Para as resinas Derakane 470 e 510N: Temperatura de 100°C.
- Esta norma recomenda 1 hora de exposição para cada milímetro de espessura do laminado (mínimo de 5 horas e máximo de 15 horas).

As taxas de aquecimento e resfriamento para realização da pós-cura devem ser controladas e não exceder a 30°C/hora. Não devem ser consideradas no tempo de pós-cura.

Véus

Todos os véus comuns (véu sintético não agulhado e vidro) são adequados para a maioria dos ambientes. Soluções contendo Ácido Fluorídrico (HF) requerem o uso de véus sintéticos ou de carbono. Tipicamente uma camada de véu resulta em uma espessura final de aproximadamente 0,3 mm. A espessura de uma camada de véu é tão importante quanto a natureza do véu utilizado. Véu sintético agulhado (como o Nexus ™ 100-10) oferece uma espessura superior e é preferido para casos onde a espessura extra pode aumentar a vida útil (ex: soluções alcalinas quentes). Véu de carbono tem demonstrado excelente resistência para um grande número de químicos agressivos como o HF, HCl, NaOH mas **não NaOCl (Hipoclorito de Sódio).** Véu de carbono é também utilizado para obter superfície condutiva.

Casos Especiais

Informações Insuficientes

Em casos onde o ambiente químico ou as condições de exposição não forem contemplados pelo escopo deste guia e se, em decorrência disto, não for possível gerar uma recomendação específica, um laminado de teste deve ser exposto às condições reais ou mesmo simulada em laboratório, a fim de se alcançar uma decisão final sobre a resina.

REVESTIMENTOS (REFORÇADOS E NÃO-REFORÇADOS)

Os revestimentos têm suas propriedades específicas e podem ser limitados por temperaturas operacionais devido à sua expansão térmica. Em casos especiais, é recomendável que a Assistência Técnica da Ashland ou uma empresa local, especializada em tecnologia de revestimento, seja consultada.

Os revestimentos laminados (reforçados com véu e mantas de fibra de vidro) podem durar mais em ambientes líquidos do que outros tipos de revestimento não reforçados. Por motivos de qualidade, eles devem ser aplicados utilizando-se o processo de laminação manual (hand lay-up), evitando o processo de laminação por pistola (spray-up). Via de regra – e como resultado da baixa ou inexistente exotermia durante a polimerização da resina - os revestimentos devem ser pós-curados sempre que possível (veja também “Pós-Cura”).

É necessário tomar precauções especiais para ambientes fortemente difusíveis ou permeáveis (HCl, HF, etc.). Como regra geral, quanto mais espesso e melhor curado for o revestimento, maior será a resistência à permeação e mais longa será sua vida útil.

GASES (DE COMBUSTÃO) EM ALTAS TEMPERATURAS

Se um véu sintético for recomendado para ambientes gasosos quentes, o véu escolhido deve ter resistência térmica suficiente para operar na temperatura projetada.

Caso contrário, normalmente um véu de carbono pode ser utilizado.

Caso o ambiente químico contenha vapor d’água e/ou ácidos, devem ser tomadas medidas especiais para se prevenir pontos de condensação no laminado.

EXPOSIÇÃO/DERRAME DE CURTO PRAZO

Se a exposição for intermitente ou limitada apenas a fumos ou derramamentos de curto prazo, é possível se obter uma boa vida útil em temperaturas consideravelmente mais altas do que aquelas exibidas neste guia e até mesmo em ambientes químicos apontados como NR (Não Recomendado). Para recomendações sobre resinas, entre em contato com o Departamento Técnico da Ashland através de um dos e-mails: teccenter@ashland.com (Brasil), derakane@ashland.com (EUA) ou acesse ashland.com.

Misturas ou Ambientes Alternados

As informações fornecidas neste Guia representam o desempenho das estruturas completas em PRFV, sob uso contínuo, em contato com o ambiente químico apresentado (a menos que de outra forma indicado).

Algumas vezes é difícil de se prever quão agressivas podem ser determinadas combinações de produtos químicos sobre equipamentos de PRFV. Algumas misturas são mais agressivas sobre os equipamentos de PRFV do que seus componentes individuais, de forma que é necessário dedicar atenção especial a produtos químicos de sinergia agressiva. A resistência química também pode ser negativamente influenciada pelo uso do mesmo equipamento para armazenamento alternado ou transporte de produtos químicos diferentes, especialmente quando tais produtos apresentam propriedades muito diferentes, tais como ácidos e bases que reagem uns com os outros.

Em caso de dúvida, consulte seu distribuidor local ou o representante de vendas da Ashland, que poderá lhe colocar em contato com o Departamento Técnico da Ashland.

Formulário para Consulta sobre Resistência Química

Ao solicitar recomendações sobre resinas para aplicações corrosivas, os seguintes dados são necessários para que sua solicitação seja processada:

- A natureza química de todos os produtos existentes no processo ou batelada, com suas concentrações correspondentes (até mesmo pequenos valores).
- Temperaturas de operação e projeto, incluindo a temperatura máxima limite (com a duração correspondente).
- Estado físico: líquido/gasoso/sólido (risco de formação de fases ou condensação, se houver).
- Tipo de equipamento (tanque, tubulação, revestimento, etc.).

Fique à vontade para copiar o "Formulário para Consulta sobre Resistência Química" e utilize-o para enviar suas solicitações de consulta por fax ao seu distribuidor local.

Medidas de Segurança

As resinas epóxi éster vinílicas Derakane e Derakane Momentum™ e os materiais (solventes, aceleradores, catalisadores, etc.) utilizados com elas podem ser perigosos, a menos que medidas de segurança simples, embora eficientes, sejam tomadas. As precauções necessárias para lidar com as resinas Derakane e Derakane Momentum são similares àquelas para as resinas poliésteres insaturadas e, portanto, familiares aos profissionais treinados. As Fichas de Informações de Segurança de Produtos Químicos (FISPQ), para todas as resinas Derakane e Derakane Momentum, são disponibilizadas para ajudar os clientes a satisfazerem suas necessidades de manuseio e descarte.

Nota

As recomendações sobre os métodos e utilização dos materiais fornecidas nesta publicação são baseadas na experiência da Ashland Inc. e nos conhecimentos sobre as características das resinas Derakane e Derakane Momentum, e são oferecidas de boa fé. Entretanto, sendo um fornecedor de matéria prima, a Ashland não exerce qualquer controle sobre o uso das resinas Derakane e Derakane Momentum, sendo assim não há qualquer responsabilidade legal por tais recomendações. Particularmente, nenhuma responsabilidade é aceita pela Ashland sobre qualquer sistema ou aplicação que utilize as resinas Derakane e Derakane Momentum. As obrigações legais da Ashland Inc., em relação a qualquer venda das resinas Derakane e Derakane Momentum, serão limitadas apenas aos termos de seu respectivo contrato de vendas.

Resinas Epóxi Éster Vinílicas Derakane
Formulário Para Consulta Sobre Resistência Química

Envie, por Fax, este formulário preenchido para um dos seguintes números: +55.11.4136.1996 (Brasil) ou +1.614.790.5157 (EUA) ou +49(0)7227 5049-30 (Europa) ou para seu distribuidor.

Data: ____________________ **Número da Páginas:** ____________________

Para

Nome: ____________________

Empresa: ____________________

Fax: ____________________

____

De

Nome: ____________________

Empresa: ____________________

Fax: ____________________

Telefone: ____________________

Usuário Final/Projeto/Engenharia: ____________________

Tipo de Indústria/Processo:
(Química, Papel, Mineração, Gás Combustível)

Tipo de Equipamento:
(Tanque, Depurador, Tubo/Duto, Revestimento)

Dimensões/Capacidade:
(Altura, Diâmetro, Taxa de Fluxo

Condições Operacionais

Ambiente Químico	Concentrações Mínima	Normal	Máxima
1)			
2)			
3)			
4)			
5)			
6)			

Nota: Indique todos os produtos presentes, mesmo os de baixa concentração – incluindo traços.
(Caso não haja espaço suficiente, adicione uma folha extra ou inclua a respectiva FISPQ do material)

Temperaturas (°C): Operação Normal ________ Máxima/Mínima ________ Limite ________

Pressão/Vácuo: ________ **pH**(típico)________ min.________ máx.________

Observações/Notas: ____________________
(por exemplo, conduções incomuns de processo, temperatura, ciclo, concentrações altas/baixas, adição e diluição, novo design ou composição).

Prólogo

Las resinas epoxi vinil éster Derakane y Derakane Momentum™ (EVER) son diseñadas y producidas por el departamento Epoxy Products and Intermediates de Ashland Inc. Resisten exce cionalmente bien a la corrosión y satisfacen las exigencias más difíciles de los composites basados en laminados vidrio y resina (PRFV). Así, estas resinas son muy adecuadas para las aplicaciones industriales sometidas a condiciones de uso extremado.

Este guía propone una breve descripción de las diversas resinas Derakane y Derakane Momentum y presenta datos detallados sobre la resistencia química que serán útiles cuando los ingenieros tengan que especificar y concebir estructuras PRFV resistentes a la corrosión.

Las recomendaciones siguientes valen para estructuras anticorrosivas producidas bajo todas las normas de la fabricación. En general, estas estructuras tienen una barrera anticorrosiva de 2.5 a 6.3 mm (100 a 250 mils) de espesor y están concebidas para estar en contacto con un medio químico específico. La primera capa de la barrera tiene de unos 0.3 a 0.8 mm (de 10 a 20 mils) de espesor y consta de un 95% de resina reforzada con uno o dos velos de superficie. Debajo de esta capa hay otra capa de 2 a 6 mm (de 90 a 230 mils) que consta de un 75% de resina reforzada con una malla de fibras cortadas (solamente con vínculo de polvo). Finalmente, se refuerza la barrera con un laminado que garantiza la resistencia y la rigidez del conjunto de la estructura composite.

Muchos factores que influyen en la elaboración de un laminado están fuera de nuestro control, por eso Ashland no está en condiciones de garantizar la utilización que se hace de sus resinas epoxi vinil éster Derakane. Sin embargo, se considera que todas las condiciones de uso presentadas en este guía están dentro de los límites de las capacidades de las resinas Derakane, siempre que los laminados se conciban, produzcan y utilicen siguiendo las correctas normas de fabricación.

En cuanto a la concepción de la estructura de PRFV, aconsejamos a los usuarios de las resinas Derakane y Derakane Momentum que consulten las normas de la industria y las directivas pertinentes de utilización.

Para más información, entre en contacto con Ashland en derakane@ashland.com o visite ashland.com.

Breve Descripción de los Productos

Derakane y Derakane Momentum™ serie 411 – Resinas epoxi vinil éster standard, basadas en resina epoxi de tipo bisphenol-A. Resisten a una amplia gama de ácidos, de álcalis, de agentes blanqueadores y de disolventes, empleadas en numerosas aplicaciones de transformación de productos químicos. Ofrecen también una tenacidad y una resistencia excelentes a la fatiga.

Derakane y Derakane Momentum serie 441-400 – Resinas epoxi vinil éster, basadas en resina epoxi de tipo bisphenol-A, de bajo contenido en estireno y dotadas de propiedades mecánicas, térmicas y químicas intermedias entre las resinas Derakane 411 y las Derakane 470. Sus combinaciones únicas HDT elevado y elongación elevada hacen que estas resinas sean las preferidas para las aplicaciones que sufren un ciclo térmico (cubas o depósitos de reacción química, por ejemplo).

Derakane y Derakane Momentum serie 470 – Resinas epoxi vinil éster basadas en epoxy-novolaca diseñadas para ofrecer propiedades excepcionales de resistencia térmica y química, resistencia elevada a los disolventes, a los ácidos y a las sustancias oxidantes como el cloro gas. Mayor y constante resistencia a temperaturas elevadas, por eso son las resinas preferidas para las aplicaciones que están en contacto con gases de combustión.

Derakane y Derakane Momentum serie 510 A/C – Resinas epoxi vinil éster bromadas que ofrecen un grado elevado de retardancia al fuego[1]. Muy resistentes a la corrosión química del cloro y de los agentes blanqueadores. El bromo que contienen les permite ser más tenaces y resistentes a la fatiga que las resinas epoxi vinil éster standard.

Derakane 510N Resina epoxi vinil éster Novolac bromada que ofrece un grado moderado de retardancia al fuego <1>. Ésta expone una resistencia a la corrosión similar a las resinas DERAKANE 470 en la mayor parte de entornos. Es también útil en entornos calientes y con gases de combustión húmedos donde los trastornos térmicos pueden ocurrir y donde la retardancia al fuego es deseada. Este producto está sólo disponible en Norteamérica.

Derakane 8084 – Resina epoxi vinil éster de tipo bisphenol-A modificada con un elastómero. Tenacidad y resistencia muy elevadas a los choques, a la fatiga y tiene una excelente adherencia. Es la mejor resina para las aplicaciones estructurales exigentes y para la realización de imprimaciones.

[1] El grado de retardancia alcanzado en los productos endurecidos correctamente y formulados a partir de estas resinas se evalúa bajo el ensayo en túnel ASTM E84. Este ensayo compara las características de inflamabilidad de una materia con otra, pero no puede prever el comportamiento de esta materia en condiciones reales de incendio. Las resinas epoxi vinil éster Derakane y Derakane Momentum son materias orgánicas que pueden inflamarse en condiciones propicias de calor y oxígeno.

Cómo utilizar la Tabla de Resistencia Química

Contenido

La lista de los productos y de los medios químicos presentados a continuación indican la temperatura más elevada conocida a la cual se ha sometido la construcción basada en resina Derakane y Derakane Momentum™ e indica si:

- ha funcionado bien en la aplicación industrial
- se ha ensayado en la industria o en laboratorio (ensayo ASTM C 581)

con resultados que revelan largo tiempo de vida.

Es de resaltar que no se trata necesariamente de la temperatura máxima de utilización. Los límites de temperatura indicados en cada línea son válidos para el conjunto de las series de resinas (por ejemplo, Derakane 411-350, 411-45, 411 C-50, etc.) y sus equivalentes Derakane Momentum. El cuadro siguiente da la lista de resinas incluidas en cada serie.

Table 1

	Columnas				
	411 series	441 series	470 series	510N series	510A/C series
Válido para las resinas DERAKANE siguientes	411-350 411-45	441-400	470-300 470-30S 470-36 470-36S 470-45 470HT	510N	510A-40 510C-350
Válido para las resinas DERAKANE MOMENTUM siguientes	411-200 411-350		470-300		510C-350

En la tabla de resistencia química, un espacio blanco indica simplemente que no existen todavía datos disponibles.

NR significa « No Recomendado » cualquiera que sea la temperatura.

LS significa « Utilización Limitada » (Limited Service). Duración de 3 días a 1 año a temperatura de ambiente (maximum de 40°C/100°F). En general, en los casos en que está indicado LS, las resinas citadas pueden utilizarse para fabricar un PRFV expuesto accidentalmente y momentáneamente en semejante medio. Se recomienda realizar una limpieza y una inspección después de 3 días de contacto.

Este guía se reactualiza regularmente para tener en cuenta todos los últimos datos y nuevas experiencias (nuevos productos, nuevas temperaturas o concentraciones, etc.). Estos datos se pueden consultar y buscar fácilmente en la citada web ashland.com.

Ejemplo

	DERAKANE Resin						
Chemical Environment	Concentration %	411	441	470	510A/C	510N	8084
Hydrochloric Acid & Dissolved Organics[8,9,13]	0 - 33% HCl	NR		65/150[15]			NR

[8] Debe utilizarse un doble velo de superficie y una barrera anticorrosiva de 5 mm (200 mils).

[9] Se recomienda un doble velo de tipo C en la barrera anticorrosiva.

[13] Es necesario emplear un vidrio resistente a los ácidos en la barrera anticorrosiva y es recomendable también su uso en la pared estructural.

% en peso (excepto indicación de lo contrario)

NR « No Recomendado »

Ningún dato disponible

Temperatura máxima recomendada (°C / °F)

[15]Una coloración débil de ácido de pureza elevada, puede ocurrir durante las primeras exposiciones

Notas al Pie de la Página

Las anotaciones dadas al pie de página son fundamentales para asegurar una buena resistencia de la construcción de PRFV. Se recomienda mucho tenerlas muy en cuenta.

1. Se recomienda un doble velo sintético en la barrera anticorrosiva.
2. Se recomienda un postcurado para optimizar el tiempo de vida.
3. Formulación basada en Peróxido de Benzoilo (BPO)/Amino recomendada con postcurado para aumentar el tiempo de vida.
4. Recomendado con tal que el disolvente utilizado para la disolución sea compatible con la resina considerada.
5. Satisfactorio hasta la temperatura de estabilidad máxima del producto.
6. Consultar nuestros departamentos técnicos para conseguir recomendaciones precisas.
7. Probablemente satisfactorio a temperaturas más elevadas, la temperatura indicada es la más elevada para la cual existen datos.
8. Se debería utilizar una barrera resistente a la corrosión con un doble velo de superficie y un mínimo de 5 mm (200 mils).
9. Se recomienda un doble velo de tipo C en la barrera anticorrosiva.
10. Para los reactores utilizar las resinas Derakane 411, 441 o 510 A/C.
11. En los límites de solubilidad en solución de agua.
12. Por encima de 50°C (120°F), se recomienda un vidrio resistente a los ácidos en la barrera anticorrosiva y es facultativo en la pared estructural.
13. Es necesario emplear un vidrio resistente a los ácidos en la barrera anticorrosiva y es recomendable también su uso en la pared estructural.
14. Si se desconoce la composición química, pedirle al proveedor la ficha de seguridad del producto.
15. Durante las primeras exposiciones puede ocurrir una leve decoloración debida a la gran pureza del ácido. Para más información, por favor, contacte con el Equipo de Servicio Técnico, derakane@ashland.com.
16. La utilización de la resina, por encima de la temperatura máxima de cálculo permitida por la norma de diseño elegida, puede requerir la aprobación de las autoridades competentes.
17. La vida de servicio es proporcional al grosor de la barrera resistente a la corrosión.
18. Para usos de contacto con alimentos, las regulaciones locales toman prioridad. Por favor, mirar nuestra guía de Consejos de Fabricación o póngase en contacto con el Equipo de Servicio Técnico, derakane@ashland.com
19. Preferencia por el Derakane 510A-40.

NR: No Recomendado

LS: Limited Service, « Utilización limitada », en general a una duración de 3 días a 1 año a temperatura ambiente (max. de 40°C, es decir 100°F). Es normalmente suficiente en confinamiento secundario.

Postcurado

Temperatura de utilización inferior a 100°C (210°F): un postcurado del producto puede aumentar su tiempo de vida si la temperatura de utilización está comprendida entre la temperatura máxima indicada en este guía y 20°C por debajo de dicha temperatura. Lo que significa, por ejemplo, que un postcurado puede ser beneficioso para las aplicaciones en contacto con disolventes dentro de una gama de temperaturas que van de 25 a 40°C (de 80 a 100°F).

Temperatura de utilización superior a 100°C (210°F): un postcurado utilizado puede ser suficiente, si los valores mínimos de dureza Barcol específicos de la resina se alcanzan antes de la utilización del producto final.

Utilización en soluciones de sales puras o neutras: un postcurado no suele ser necesario siempre que los valores mínimos de dureza Barcol específicos de la resina se alcanzan y que el PRFV no presenta sensibilidad a la prueba de la acetona, antes de la utilización del producto final.

Se recomienda mucho un postcurado para un PRFV curado con Peróxido de Benzoilo (BPO)/Amina. Se efectuará con preferencia el postcurado dentro de las dos semanas a partir de la fabricación.

Pueden utilizarse según las condiciones de postcurado enumeradas en la norma DIN 18820:

- Resinas Derakane 411, 441, 510 A/C y 8084: 80°C (180°F)
- Resinas Derakane 470 y 510N: 100°C (210°F)
- La recomendación es 1 hora /mm de espesor (entre 5 y 15 horas).

Velos

Todos los velos (velos tupidos sintéticos y de vidrio) son más o menos convenientes para la mayor parte de entornos. Las disoluciones que contienen ácido fluorhídrico (HF) requieren velos sintéticos o de carbono. Normalmente una capa de velo conlleva un grosor final de aproximadamente 0.3 mm. El grosor de la capa de velo es al menos tan importante como la propia naturaleza del velo. El velo sintético no tupido (como el Nexus™) 100-10) ofrece un grosor suplementario y es el preferido para casos donde el grosor suplementario puede aumentar la vida de servicio, por ejemplo con disoluciones cáusticas calientes. Los velos de carbono han demostrado tener una excelente resistencia a un buen número de productos químicos agresivos como el HF, HCl, NaOH, **pero no con el NaOCl (Hipoclorito de Sodio).** El velo de carbono es también útil para lograr superficies conductoras.

Casos Específicos

Ausencia de Información

En este guía no están expuestos ni todos los casos, ni todos los productos quimicos, ni tampoco todas las condiciones de exposición. En algunos casos no se puede dar recomendaciones (por falta de datos previos) y por eso es conveniente realizar ensayos de laminados en condiciones reales o simulaciones antes de decidir sobre la resistencia o el tipo de resina.

Revestimientos con o sin Refuerzo (en acero, hormigón, etc.)

Estos tipos de revestimientos tienen propiedades específicas que pueden llevar a limitar las temperaturas de utilización por culpa de la diferencia de comportamiento térmico entre la resina y el soporte. Consulte los departamentos técnicos de Ashland para más informaciones o a alguna de las empresas locales especializadas en este tipo de actividad.

Un revestimiento laminado puede permitir unautilización más larga que otro tipo de revestimiento en contacto con fluidos. Para garantizar la calidad le aconsejamos que no los realice con la proyección simultánea sino con la aplicación manual. En general, por culpa de la ausencia o la débil exotermía durante la polymerización, estos revestimientos con o sin refuerzo tendrían que estar postcurados siempre que fuera posible (ver el párrafo más arriba que trata del postcurado).

Es necesario que se tomen precauciones particulares para los medios que difunden mucho (HCl, HF, etc.). En general cuanto más espeso sea el revestimiento es y cuanto mejor curado esté, tendrá una mayor resistencia a la difusión y un tiempo de vida más largo.

Gases de Ignición a temperatura elevada

Si se recomienda un velo sintético para el contacto de gases a temperatura elevada, éste tiene que resistir a dichas temperaturas. Un velo de carbono puede ser necesario.

Si los gases comportan vapor de agua y/o ácidos, hay que tener precauciones particulares para evitar que el punto de rocío ácido ocurra dentro del espesor del laminado.

Exposiciones intermitentes

Para exposiciones intermitentes, humos o vertimientos accidentales, es posible actuar a temperaturas de utilización a veces superiores a las indicadas en este guía. Por eso, estructuras como canales de desagüe, revestimientos de suelo y entramados pueden en algunos casos exponerse durante breves momentos a productos considerados como no recomendados en este guía.

Mezclas de Productos o Exposiciones alternadas a diferentes Medios

Todos los datos presentes en este guía conciernen instalaciones que trabajan de manera continua en contacto con un único producto (excepto si se indica lo contrario).

Hay que tener cuidado con las mezclas de productos químicos para las cuales efectos sinérgicos (interacciones entre sí) pueden llevar a una disminución de la resistencia a la corrosión respecto a la resistencia de los productos utilizados individualmente.

La resistencia química puede alterarse por culpa de la utilización de una misma aplicación (de almacenamiento o de transporte) en contacto con diversos medios químicos (en particular cuando estos productos son de naturaleza diferente, ácidos, bases, disolventes, etc.).

Si hay alguna duda, consulte los departamentos técnicos de Ashland, su proveedor o distribuidor.

Solicitud de Resistencia Química

Para poder saber la resistencia de nuestras resinas, necesitamos las informaciones siguientes:

- Naturaleza química de todos los productos así como la concentración de cada uno (incluso los indicios).
- Temperaturas de utilización, máximas o accidentales así como la duración de cada tipo de temperatura.
- Estado (líquido, sólido, gaseoso) así como los riesgos posibles de separación de fase o de condensación.
- Tipo de aplicación (cuba, tubo, revestimiento, etc.).

Para hacer su solicitud de información de resistencia química, utilice una copia de la hoja adjunta titulada « solicitud de resistencia química ».

Cómo trabajar con Seguridad con las Resinas Derakane y Derakane Momentum y los Productos asociados

Las resinas epoxi vinil éster Derakane y Derakane Momentum™ así como los productos asociados (disolventes, catalizadores, aceleradores, etc.) podrán resultar peligrosos si no se toman precauciones tan simples como precisas. Las precauciones necesarias para la manipulación y la utilización de las resinas Derakane y Derakane Momentum son semejantes a las de las resinas poliéster insaturadas que suelen ser de uso más común en la industria y por eso serán más familiares a los empleados formados para este tipo de producto. Las fichas de seguridad de todas las resinas Derakane y Derakane Momentum están disponibles para ayudar a los clientes a almacenarlas o destruirlas (si llega el caso).

Aviso

Las recomendaciones sobre los métodos y la utilización de los productos presentes en este guía se dan de buena fe y están basadas en la experiencia de Ashland y en su conocimiento de las características de las resinas vinil éster Derakane y Derakane Momentum.

Sin embargo, no se da garantía alguna para las mismas y no implican nuestra responsabilidad. Al no poder controlar el buen uso de nuestros productos, no se garantizan los resultados de uso ni la libre explotación de cualquier patente, quedando Ashland libre de toda responsabilidad.

Derakane Resinas Epoxi Vinil Éster Solicitud de Resistencia Química

Envie por favor esta forma, por fax a +1.614.790.6157 (America) o +49(0)7851 99478-30 (Europa) o su distribuidor.

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Teléfono: ____________________

Usuario/Proyecto/Engineering: ____________________

Sector industrial/procedimiento:
(Química, industria papelera, tratamiento de los minerales, limpieza de gases, etc.)

Aplicación:
(cuba, columna, tubo, cañería, revestimiento, etc.)

Dimensiones/Capacidad:
(altura, diametra, caudal)

Condiciones de Uso

	Concentraciones		
Productos químicos	Mínimo	Normal	Máximo
1)			
2)			
3)			
4)			
5)			
6)			

NOTA : le pedimos también que precise los productos presentes con concentraciones débiles (indicios).
Si es necesario, se puede añada una hoja adicional).

Temperaturas (°C): condiciones normales________ min./max.______ accidentales____ h_____

Presión/Vacío:____________ **pH:** (típico)__________ min. _____________ max. ___________

Comentarios/notas: ____________________
(ej: procedimiento particular, ciclo de temperaturas, concentraciones variables, adición & dilución, diseño particular, etc.)

Chemical Names/CAS Numbers

CAS No.	Chemical Name
7-31-3	Methyl Formate
10-54-3	Hexane
50-0-0	Formaldehyde
50-21-5	Lactic Acid
50-70-4	Sorbitol
50-78-2	Acetylsalicylic Acid
56-23-5	Carbon Tetrachloride
56-81-5	Glycerin or Glycerol
56-93-9	Benzyltrimethylammonium Chloride
57-10-3	Palmitic Acid
57-11-4	Stearic Acid
57-13-6	Urea
57-50-1	Cane Sugar, Sugar
57-55-6	Propylene Glycol
60-24-2	Mercaptoethanol
60-29-7	Diethyl Ether
60-29-7	Ethyl Ether
60-34-4	Monomethylhydrazine
62-53-3	Aniline
62-56-6	Thiourea
62-76-0	Sodium Oxalate
64-2-8	Ethylenediaminetetraacetic acid, tetrasodium salt (EDTA)
64-17-5	Alcohol, Ethyl: e.g: ethanol
64-17-5	Ethanol (Ethyl Alcohol)
64-18-6	Formic Acid
64-19-7	Acetic Acid
64-67-5	Diethyl Sulfate
65-85-0	Benzoic Acid
67-43-6	Diethylenetriaminepentaacetic acid
67-48-1	Choline Chloride
67-56-1	Methanol (Methyl Alcohol)
67-63-0	Isopropyl Alcohol
67-64-1	Acetone
67-68-5	Dimethyl Sulfoxide (DMSO)
67-72-1	Hexachloroethane
68-11-1	Mercaptoacetic Acid
68-12-2	Dimethyl Formamide
69-72-7	Salicylic Acid
71-23-8	Propanol (n-)
71-36-3	Alcohol, Butyl: e.g. n-butanol
71-36-3	Butanol (-n)
71-36-3	Butyl Alcohol
71-41-0	Alcohol, Amyl: e.g: 1-pentanol
71-43-2	Benzene
71-55-6	Trichloroethane (1,1,1-)
74-82-8	Methane
74-83-9	Methyl Bromide
74-87-3	Methyl Chloride
74-89-5	Methylamine
74-90-8	Hydrocyanic Acid
74-93-1	Methyl Mercaptan (Gas)
74-96-4	Ethyl Bromide
74-98-6	Propane
75-0-3	Ethyl Chloride
75-1-4	Vinyl Chloride
75-4-7	Ethyl Amine
75-5-8	Acetonitrile
75-7-0	Acetaldehyde
75-9-2	Dichloromethane
75-9-2	Methylene Chloride
75-12-7	Formamide
75-15-0	Carbon Disulfide
75-18-3	Dimethyl Sulfide
75-21-8	Ethylene Oxide
75-31-0	Isopropyl Amine
75-36-5	Acetyl Chloride
75-45-6	Chlorodifluoromethane
75-52-5	Nitromethane
75-56-9	Propylene Oxide
75-59-2	Tetramethyl Ammonium Hydroxide
75-69-4	Chlorofluorocarbon (CFC): R-11 (Trichlorofluoromethane)
75-71-8	Chlorofluorocarbon (CFC): R-12 (Dichlorodifluoromethane)
75-87-6	Chloral
75-99-0	Dichloropropionic Acid (2,2-)
76-1-7	Pentachloroethane
76-3-9	Trichloroacetic Acid
76-5-1	Trifluoroacetic Acid (see Chloroacetic Acid)
76-6-2	Chloropicrin (Nitrochloroform)
76-13-1	Chlorofluorocarbon (CFC): CFC-113 (Trichlorotrifluoroethane)
77-47-4	Hexachlorocyclopentadiene
77-73-6	Dicyclopentadiene
77-78-1	Dimethyl Sulfate
77-92-9	Citric Acid
78-10-4	Ethyl Silicate
78-10-4	Tetraethyl Orthosilicate
78-42-2	Trioctylphosphate
78-50-2	Trioctyl Phosphine Oxide
78-83-1	Isobutyl Alcohol
78-87-5	Dichloropropane
78-93-3	Methyl Ethyl Ketone
78-96-6	Isopropanol Amine
79-0-5	Trichloroethane (1,1,2-)
79-1-6	Trichloroethylene
79-3-8	Propionyl Chloride
79-6-1	Acrylamide
79-9-4	Propionic Acid
79-10-7	Acrylic Acid
79-11-8	Chloroacetic Acid
79-14-1	Glycolic acid
79-14-1	Hydroxyacetic Acid
79-20-9	Methyl Acetate
79-21-0	Peracetic Acid
79-41-4	Methacrylic Acid
79-43-6	see Chloroacetic Acid
80-62-6	Methyl Methacrylate
81-16-3	Tobias Acid
84-69-5	Diisobutyl Phthalate
84-74-2	Dibutyl Phthalate
85-44-9	Phthalic Anhydride
85-52-9	o-Benzoyl Benzoic Acid
85-68-7	Butyl Benzyl Phthalate
87-86-5	Pentachlorophenol
88-89-1	Picric Acid (Alcoholic)
88-99-3	Phthalic Acid
89-8-7	Sulfophtalic Acid (4-)
91-20-3	Naphthalene
91-22-5	Quinoline
93-97-0	Benzoic Anhydride
94-75-7	2,4-Dichlorophenoxyacetic Acid
95-49-8	Chlorotoluene (o-)
95-50-1	Dichlorobenzene (o-)
95-53-4	Toluidine (o-)
95-63-6	Trimethyl Benzene
96-13-9	Dibromopropanol (2, 3-)
96-22-0	Diethyl Ketone
96-23-1	Glycerol Dichlorohydrin
96-24-2	Glycerol Monochlorohydrin
97-65-4	Itaconic Acid
97-99-4	Tetrahydrofuryl Alcohol
98-0-0	Furfuryl Alcohol
98-1-1	Furfural
98-7-7	Benzotrichloride
98-9-9	Benzenesulfonyl Chloride
98-11-3	Benzenesulfonic Acid
98-82-8	Cumene
98-83-9	Alpha-Methylstyrene
98-83-9	Methylstyrene (Alpha-)
98-86-2	Acetophenone
98-87-3	Dichlorotoluene
98-88-4	Benzoyl Chloride
98-95-3	Nitrobenzene
100-37-8	Diethylaminoethanol
100-41-4	Ethylbenzene
100-42-5	Styrene
100-44-7	Benzyl Chloride
100-51-6	Benzyl Alcohol
100-52-7	Benzaldehyde
100-97-0	Hexamethylenetetramine
101-2-0	Triphenyl Phosphite
101-68-8	Diphenylmethane-4,4-Diisocyanate (MDI)
101-84-8	Diphenyl Oxide
102-71-6	Triethanolamine
104-15-4	Toluenesulfonic Acid
104-74-5	Lauryl Pyridinium Chloride
104-76-7	Isooctyl Alcohol
105-58-8	Diethyl Carbonate
105-60-2	Caprolactam
106-43-4	Chlorotoluene (p-)
106-46-7	Dichlorobenzene (p-)
106-49-0	Toluidine (p-)
106-88-7	Butylene Oxide (1,2-)
106-89-8	Epichlorohydrin
106-93-4	Ethylene Dibromide
106-94-5	Propyl Bromide
106-97-8	Butane
106-99-0	Butadiene
107-2-8	Acrolein (Acrylaldehyde)
107-5-1	Allyl Chloride
107-6-2	Dichloroethane
107-7-3	Ethylene Chlorohydrin
107-13-1	Acrylonitrile
107-15-3	Ethylene Diamine
107-18-6	Allyl Alcohol
107-21-1	Ethylene Glycol
107-22-2	Glyoxal
107-39-1	Diisobutylene
107-92-6	Butyric Acid
107-96-0	Mercaptopropionic (3-) Acid
107-98-2	1-Methoxy-2-Propanol
108-1-0	Dimethylethanolamine
108-5-4	Vinyl Acetate
108-24-7	Acetic Anhydride
108-31-6	Maleic Anhydride
108-44-1	Toluidine (m-)
108-46-3	Resorcinol
108-65-6	Propylene Glycol Methyl Ether Acetate
108-77-0	Cyanuric Chloride
108-80-5	Cyanuric Acid
108-83-8	Diisobutyl Ketone
108-88-3	Toluene
108-90-7	Chlorobenzene
108-90-7	Monochlorobenzene
108-91-8	Cyclohexylamine
108-94-1	Cyclohexanone
108-95-2	Phenol
109-43-3	Dibutyl Sebacate
109-60-4	Propyl Acetate
109-64-8	Dibromopropane
109-69-3	Butyl Chloride
109-70-6	Trimethylene Chlorobromide
109-73-9	Butyl Amine
109-89-7	Diethylamine
109-99-9	Tetrahydrofuran THF
110-16-7	Maleic Acid
110-27-0	Isopropyl Myristate
110-61-2	Succinonitrile
110-82-7	Cyclohexane
110-86-1	Pyridine
110-91-8	Morpholine
110-94-1	Glutaric Acid
111-30-8	Glutaraldehyde
111-40-0	Diethylenetriamine
111-42-2	Diethanolamine
111-46-6	Diethylene Glycol
111-76-2	Ethylene Glycol n-Butylether: Ethanol, 2-butoxy
111-77-3	Diethylene Glycol Methyl Ether
111-90-0	Diethylene Glycol Monoethyl Ether
111-96-6	Diethylene Glycol Dimethylether
112-16-3	Lauroyl Chloride
112-18-5	Dodecyldimethylamine
112-27-6	Triethylene Glycol
112-30-1	Decanol
112-34-5	Diethylene Glycol n-Butyl Ether also called Ethanol,2-(2-butoxy-ethoxy)-
112-40-3	Dodecane
112-41-4	Dodecene
112-52-7	Lauryl Chloride
112-53-8	Dodecanol (Lauryl Alcohol)
112-53-8	Lauryl Alcohol
112-55-0	Dodecylmercaptan
112-55-0	Lauryl Mercaptan
112-73-2	Dibutyl Carbitol (diethylene glycol dibutyl ether)
112-80-1	Oleic Acid
117-81-7	Dioctyl Phthalate
120-51-4	Benzyl Benzoate
121-3-9	Nitrotoluene (4-) Sulfonic Acid (2-)
121-43-7	Trimethyl Borate in Methyl Alcohol
121-44-8	Triethylamine
121-47-1	Sulfanilic Acid (meta)
121-57-3	Sulfanilic Acid (para)
121-69-7	Dimethylaniline (N,N)
123-42-2	Diacetone Alcohol
123-51-3	Isoamyl Alcohol
123-72-8	Butyraldehyde
123-76-2	Levulinic Acid (also 4-oxopentanoic acid)
123-86-4	Butyl Acetate
123-91-1	Dioxane
123-95-5	Butyl Stearate
123-99-9	Azelaic Acid
124-4-9	Adipic Acid
124-7-2	Caprylic Acid (Octanoic Acid)
124-7-2	Octanoic Acid
124-38-9	Carbon Dioxide
124-40-3	Dimethyl Amine
124-64-1	Tetrakis (Hydroxymethyl) Phosphonium Chloride
126-11-4	Nitromethane (tris, hydroxymethyl)
126-30-7	Neopentyl Glycol
126-72-7	Dibromopropyl Phosphate
126-73-8	Tributyl Phosphate
127-9-3	Sodium Acetate
127-18-4	Perchloroethylene
127-18-4	Tetrachloroethylene (Perchloroethylene)
127-19-5	Dimethyl Acetamide
127-20-8	Dalapon, Sodium salt (Also 2,2-dichloropropionic acid and sodium salt)
128-4-1	Sodium Dimethyldithiocarbamate
131-11-3	Dimethyl Phthalate
131-17-9	Diallylphthalate
132-27-4	Sodium salt o-phenylphenate (Antimicrobial)
136-60-7	Butyl Benzoate
137-42-8	Sodium Methyldithiocarbamate
140-1-2	Diethylenetriaminepentaacetic acid, sodium salt (-penta sodium)
140-31-8	Aminoethyl Piperazine
140-88-5	Ethyl Acrylate
141-32-2	Butyl Acrylate
141-43-5	Ethanolamine
141-78-6	Ethyl Acetate
141-91-3	Dimethyl Morpholine (2,6-)
141-97-9	Ethyl Acetoacetate
142-4-1	Aniline Hydrochloride
142-62-1	Caproic Acid (Hexanoic Acid)
142-62-1	Hexanoic Acid
142-82-5	Heptane, n-
142-91-6	Isopropyl Palmitate
142-96-1	Dibutyl Ether (-n)
143-7-7	Lauric Acid
143-33-9	Sodium Cyanide
144-55-8	Sodium Bicarbonate
144-62-7	Oxalic Acid
149-91-7	Gallic Acid
151-21-3	Sodium Lauryl Sulfate
151-50-8	Potassium Cyanide
287-92-3	Cyclopentane
298-7-7	Di (2-Ethylhexyl) Phosphoric Acid (DEHPA)
298-12-4	Glyoxylic Acid
298-14-6	Potassium Bicarbonate
301-4-2	Lead (II) Acetate
302-1-2	Hydrazine
334-48-5	Capric Acid (Decanoic Acid)
334-48-5	Decanoic Acid
497-19-8	Sodium Carbonate
502-44-3	Caprolactone
506-59-2	Dimethylammonium Hydrochloride (Dimethylamine HCl, DMA-HCl)
506-64-9	Silver Cyanide
507-40-4	Butyl Hypochlorite (tert-)
513-77-9	Barium Carbonate
526-83-0	Tartaric Acid
526-95-4	Glyconic Acid
527-7-1	Sodium Gluconate
532-32-1	Sodium Benzoate
540-54-5	Propyl Chloride
540-59-0	Dichloroethylene
540-72-7	Sodium Thiocyanate
540-82-9	Ethyl Sulfate
541-41-3	Ethyl Chloroformate
542-16-5	Aniline Sulfate
542-62-1	Barium Cyanide
542-75-6	Dichloropropene
543-59-9	Amyl Chloride
543-59-9	Chloropentane
543-80-6	Barium Acetate
544-63-8	Myristic Acid
544-92-3	Copper Cyanide
545-6-2	Trichloroacetonitrile
546-93-0	Magnesium Carbonate
554-7-4	Potassium Gold Cyanide
554-13-2	Lithium Carbonate
557-21-1	Zinc Cyanide
583-52-8	Potassium Oxalate
584-8-7	Potassium Carbonate
593-81-7	Trimethyl Ammonium Chloride (Trimethylamine HCl, TMA-HCl)
598-54-9	Copper Acetate
608-33-3	Dibromophenol (-2,6)
611-6-3	Dichloronitrobenzene (2,4-)
615-58-7	Dibromophenol (-2,4)
616-38-6	Dimethylcarbonate
617-84-5	Diethyl Formamide
622-97-9	Methylstyrene (p-)
626-61-9	Chloropyridine
627-3-2	Ethoxy Acetic Acid
628-63-7	Amyl Acetate
630-8-0	Carbon Monoxide Gas
630-20-6	Tetrachloroethane
631-61-8	Ammonium Acetate
704-76-7	2-Ethylhexyl Alcohol
753-73-1	Dimethyl Tin Dichloride
759-94-4	Ethyl-N,N-di-n-propylthiolcarbamate (herbicide)
763-69-9	Ethyl-3-Ethoxy Propionate
853-68-9	Anthraquinone Disulfonic Acid
866-81-9	Cobalt Citrate
868-18-8	Sodium Tartrate
872-50-4	N-methyl-2-pyrrolidone
929-6-6	Diglycolamine
993-16-8	Methyl Tin Trichloride
1066-33-7	Ammonium Bicarbonate
1071-83-6	Glyphosate
1113-38-8	Ammonium Oxalate

Chemical Names/CAS Numbers

CAS No.	Chemical Name
1191-50-0	Sodium Myristyl Sulfate
1300-21-6	Dichloroethane
1300-72-7	Sodium Xylene Sulfonate
1302-42-7	Sodium Aluminate
1303-96-4	Borax
1305-62-0	Calcium Hydroxide
1309-42-8	Magnesium Hydroxide
1310-58-3	Potassium Hydroxide
1310-65-2	Lithium Hydroxide
1310-73-2	Sodium Hydroxide
1312-76-1	Potassium Metasilicate
1313-82-2	Sodium Sulfide
1314-56-3	Phosphorous Pentoxide
1314-85-8	Phosphorus Sesquisulfide
1317-65-3	Calcium Carbonate
1319-77-3	Cresylic Acid
1327-41-9	Aluminum Chlorohydrate
1327-52-2	Arsenic Acid
1327-53-3	Arsenious Acid
1330-20-7	Xylene
1330-43-4	Sodium Tetraborate
1330-78-5	Tricresyl Phosphate
1330-86-5	Isooctyl Adipate
1330-96-4	Sodium Borate
1333-39-7	Phenol Sulfonic Acid
1333-83-1	Sodium Bifluoride
1335-54-2	Diisopropanolamine
1336-21-6	Ammonium Hydroxide
1341-49-7	Ammonium Bifluoride
1344-9-8	Sodium Silicate
1344-67-8	Copper Chloride
1461-25-2	Tetrabutyltin
1565-80-6	Amyl Alcohol
1634-4-4	Methyl t-Butyl Ether
1634-4-4	t-Butyl Methyl Ether (MTBE)
1762-95-4	Ammonium Thiocyanate
1863-63-4	Ammonium Benzoate
2008-39-1	2,4-D, Dimethylamine salt
2052-49-5	Tetra-n-Butylammonium Hydroxide
2082-81-7	Trimethylamine
2090-64-4	Carbonic acid
2235-54-3	Ammonium Lauryl Sulfate
2402-79-1	Tetrachloropyridine
2836-32-0	Sodium Glycolate
2971-90-6	Clopidol
3012-65-5	Ammonium Citrate
3039-83-6	Ethylenesulfonic acid, sodium salt
3251-23-8	Copper Nitrate
3710-84-7	Diethyl Hydroxylamine
4316-73-8	Sodium Sarcosinate
5329-14-6	Sulfamic Acid
5421-46-5	Ammonium Thioglycolate
5536-61-8	Sodium Methacrylate
5996-10-1	Glucose
6164-98-3	Chlordimeform Insecticide
6303-21-5	Hypophosphorous Acid
6484-52-2	Ammonium Nitrate
6871-90-2	Potassium Silicofluoride
6899-5-4	Glutamic Acid
6915-15-7	Malic Acid
7320-34-5	Potassium Pyrophosphate
7378-99-6	Alkyl (C8-C10) Dimethyl Amine: e.g.: octyl dimethyl amine
7439-97-6	Mercury
7446-9-5	Sulfur Dioxide
7446-11-9	Sulfur Trioxide
7446-70-0	Aluminum Chloride
7447-39-4	Curpric Chloride, see Copper Chloride
7447-40-7	Potassium Chloride
7447-41-8	Lithium Chloride
7487-88-9	Magnesium Sulfate
7488-52-0	Zinc Sulfite
7550-35-8	Lithium Bromide
7550-45-0	Titanium Tetrachloride
7553-56-2	Iodine
7558-79-4	Sodium Phosphate (di)
7558-80-7	Sodium Phosphate (mono)
7601-54-9	Sodium Phosphate (tri)
7601-54-9	Trisodium Phosphate
7601-89-0	Sodium Perchlorate
7601-90-3	Perchloric Acid
7631-90-5	Sodium Bisulfite
7631-99-4	Sodium Nitrate
7632-0-0	Sodium Nitrite
7646-78-8	Stannic Chloride
7646-79-9	Cobalt Chloride
7646-85-7	Zinc Chloride
7647-1-0	Hydrochloric Acid
7647-1-0	Hydrogen Chloride
7647-14-5	Sodium Chloride
7647-15-6	Sodium Bromide
7647-18-9	Antimony Pentachloride
7664-38-2	Phosphoric Acid
7664-39-3	Hydrofluoric Acid or hydrogen fluoride
7664-41-7	Ammonia
7664-93-9	Sulfuric Acid
7681-11-0	Potassium Iodide
7681-38-1	Sodium Bisulfate
7681-49-4	Sodium Fluoride
7681-52-9	Sodium Hypochlorite
7681-53-0	Sodium Monophosphate
7681-57-4	Sodium Metabisulfite
7697-37-2	Nitric Acid
7704-34-9	Sulfur
7705-8-0	Ferric Chloride
7718-54-9	Nickel Chloride
7719-9-7	Thionyl Chloride
7719-12-2	Phosphorus Trichloride
7720-78-7	Ferrous Sulfate
7722-64-7	Potassium Permanganate
7722-76-1	Ammonium Phosphate, monobasic
7722-84-1	Hydrogen Peroxide
7722-88-5	Tetrapotassium Pyrophospate
7726-95-6	Bromine
7727-15-3	Aluminum Bromide
7727-21-1	Potassium Persulfate
7727-43-7	Barium Sulfate
7727-54-0	Ammonium Persulfate
7732-18-5	Water or steam
7733-2-0	Zinc Sulfate
7738-94-5	Chromic Acid
7757-79-1	Potassium Nitrate
7757-82-6	Sodium Sulfate
7757-83-7	Sodium Sulfite
7757-87-1	Magnesium Phosphate
7758-1-2	Potassium Bromate
7758-2-3	Potassium Bromide
7758-11-4	Dipotassium phosphate
7758-19-2	Sodium Chlorite
7758-29-4	Sodium Tripolyphosphate
7758-98-7	Copper Sulfate
7761-88-8	Silver Nitrate
7772-98-7	Sodium Thiosulfate
7772-99-8	Stannous Chloride
7773-1-5	Manganese Chloride (Manganous Chloride)
7775-9-9	Sodium Chlorate
7775-11-3	Sodium Chromate
7775-14-6	Sodium Hydrosulfite
7775-27-1	Sodium Persulfate
7778-50-9	Potassium Dichromate
7778-54-3	Calcium Hypochlorite
7778-66-7	Potassium Hypochlorite
7778-80-5	Potassium Sulfate
7779-86-4	Zinc Hydrosulfite
7779-88-6	Zinc Nitrate
7779-90-0	Zinc Phosphate
7782-41-4	Fluorine Gas
7782-50-5	Chlorine Gas
7782-77-6	Nitrous Acid
7782-99-2	Sulfurous Acid
7783-0-8	Selenious Acid
7783-6-4	Hydrogen Sulfide
7783-13-3	Sodium Ammonium Phosphate
7783-18-8	Ammonium Thiosulfate
7783-20-2	Ammonium Sulfate
7783-28-0	Ammonium Phosphate, dibasic
7783-28-0	Diammonium Phosphate
7784-18-1	Aluminum Fluoride
7784-24-9	Potassium Aluminum Sulfate
7784-46-5	Sodium Arsenite
7785-87-7	Manganese Sulfate (Manganous Sulfate)
7786-30-3	Magnesium Chloride
7786-81-4	Nickel Sulfate
7789-23-3	Potassium Fluoride
7789-32-4	Ammonium Bromide
7789-38-0	Sodium Bromate
7789-41-5	Calcium Bromide
7790-92-3	Hypochlorous Acid
7790-93-4	Chloric Acid
7790-94-5	Chlorosulfonic Acid
7790-98-9	Ammonium Perchlorate
7791-8-4	Antimony Oxychloride
8000-26-8	Pine Oil
8000-48-4	Eucalyptus Oil
8001-22-7	Soybean Oil
8001-25-0	Olive Oil
8001-26-1	Linseed Oil
8001-29-4	Cottonseed Oil
8001-30-7	Corn Oil
8001-54-5	Benzalkonium Chloride
8001-69-2	Cod Liver Oil
8001-79-4	Castor Oil
8002-3-7	Peanut Oil
8002-26-4	Tall Oil
8002-74-2	Paraffin Wax
8002-92-4	Ammonium Carbonate
8006-64-2	Turpentine
8007-56-5	Aqua Regia
8007-69-0	Almond Oil
8008-20-6	Kerosene
8008-79-5	Spearmint Oil <18>
8012-14-4	Sodium Hexametaphosphate
8013-7-8	Soybean Oil, epoxidized
8013-54-5	Chloroform
8014-95-7	Oleum (Fuming Sulfuric)
8016-79-3	Beet Sugar Liquor
8017-16-1	Polyphosphoric Acid
8017-16-1	Superphosphoric Acid
8027-16-5	Cresols, Mixture
8028-89-5	Caramel
8029-43-4	Corn Syrup
8032-32-4	Naphtha
8052-42-4	Asphalt
8061-53-8	Ammonium Ligno Sulfonate
8062-15-5	Lignin Sulfonate
8064-96-2	Cashew Nut Oil
8140-1-2	Cocamidopropyl Dimethylamine
9002-85-1	Polyvinylidiene Chloride (PVDC)
9002-86-2	Polyvinyl Chloride (PVC)
9002-89-5	Polyvinyl Alcohol
9002-98-6	Polyethyleneimine
9003-1-4	Polyacrylic Acid
9003-4-7	Sodium Polyacrylate
9003-5-8	Polyacrylamide
9003-20-7	Polyvinyl Acetate Emulsion
9003-35-4	Phenol Formaldehyde Resin
9003-35-4	Phenolic Resin
9004-32-4	Carboxymethylcellulose
9004-74-4	Polyethylene glycol methyl ether
9005-25-8	Starch
9016-45-9	Ethoxylated Nonyl Phenol
10025-67-9	Sulfur Chloride
10025-73-7	Chromic Chloride
10025-87-3	Phosphorus Oxychloride
10025-91-9	Antimony Trichloride
10026-4-7	Silicone Tetrachloride
10028-15-6	Ozone in solution
10034-85-2	Hydriodic Acid
10034-93-2	Hydrazine Sulfate
10035-10-6	Hydrobromic Acid or Hydrogen Bromide
10039-54-0	Hydroxylamine Acid Sulfate
10043-1-3	Aluminum Sulfate
10043-35-3	Boric Acid
10043-52-4	Calcium Chloride
10043-67-1	Aluminum Potassium Sulfate
10049-4-4	Chlorine Dioxide
10099-74-8	Lead (II) Nitrate
10101-53-8	Chromic Sulfate
10108-64-2	Cadmium Chloride
10108-73-3	Cerous Nitrate
10112-91-1	Mercurous Chloride
10124-37-5	Calcium Nitrate
10137-74-3	Calcium Chlorate
10141-0-1	Chromium Potassium Sulfate
10141-5-6	Cobalt Nitrate (II)
10196-4-0	Ammonium Sulfite
10222-1-2	Dibromonitrilo-Propionamide
10257-55-3	Calcium Sulfite
10294-34-5	Boron Trichloride
10361-37-2	Barium Chloride
10377-48-7	Lithium Sulfate
10377-60-3	Magnesium Nitrate
10377-66-9	Manganese Nitrate (Manganous)
10421-48-4	Ferric Nitrate
10450-55-2	Ferric Acetate
10545-99-0	Sulfur Dichloride
10553-31-8	Barium Bromide
10588-1-9	Sodium Dichromate
11120-25-5	Ammonium Tungstate
12007-89-5	Ammonium Pentaborate
12021-95-3	Fluozirconic Acid
12028-48-7	Ammonium Metatungstate
12042-91-0	Aluminum Chlorohydroxide
12124-99-1	Ammonium Sulfide
12125-1-8	Ammonium Fluoride
12125-2-9	Ammonium Chloride
12259-92-6	Ammonium Polysulfide
12379-40-7	Imidazoline Acetate
12501-45-0	Ammonium Molybdate
13235-36-4	Tetrasodium Ethylenediaminetetraacetic Acid (Tetrasodium Salt of EDTA)
13463-67-7	Titanium Dioxide
13473-90-0	Aluminum Nitrate
13478-10-10	Ferrous Chloride
13520-68-9	Ferrous Nitrate
13598-36-2	Phosphorous Acid, ortho-
13601-19-9	Sodium Ferrocyanide
13674-87-8	Dichloro-(2)-Propyl Phosphate
13746-66-2	Potassium Ferricyanide
13755-29-8	Sodium Fluoroborate
13770-89-3	Nickel Sulfamate
13774-25-9	Magnesium Bisulfite
13814-97-6	Tin Fluoborate
13826-88-5	Zinc Fluoborate
13840-33-0	Lithium Hypochlorite
13843-59-9	Ammonium Bromate
13846-18-9	Calcium Bisulfite
13943-58-3	Potassium Ferrocyanide
13967-50-5	Potassium Gold Cyanide
14216-75-2	Nickel Nitrate
14217-21-1	Sodium Ferricyanide
14518-69-5	Tetra-n-Butylphosphonium Hydroxide
15972-60-8	Alachlore, Herbicide
16529-56-9	2-Methyl-3-Butenenitrile
16672-87-0	Ethephon
16721-80-5	Sodium Bisulfide (Hydrosulfide)
16721-80-5	Sodium Hydrosulfide
16872-11-0	Fluoboric Acid
16893-85-9	Sodium Fluorosilicate
16940-66-2	Sodium Borohydride SWS (Stabilized Water Solution)
16949-65-8	Magnesium Fluosilicate
16961-83-4	Fluosilicic Acid
16961-83-4	Hydrofluosilicic Acid
17194-0-2	Barium Hydroxide
17439-11-1	Fluotitanic Acid
17496-8-1	Ammonium Propionate
18130-44-4	Titanium Sulfate
18483-17-5	Tannic Acid
19351-18-9	2,2-Dimethyl Thiazolidine
21645-51-2	Aluminum Hydroxide
23210-56-2	N-Chloro-o-Tolyl (insecticide emulsion)
24347-58-8	Butylene Glycol
24800-44-0	Tripropylene Glycol, see Ethylene Glycol
25013-15-4	Vinyl Toluene
25154-55-6	Nitrophenol
25155-30-0	Sodium Dodecylbenzenesulfonate
25265-71-8	Dipropylene Glycol
25322-68-3	Polyethylene Glycol
25339-17-7	Isodecanol
25340-17-4	Diethylbenzene
25567-55-9	Sodium Tetrachlorophenate
25639-42-3	Methylcyclohexanol
26248-24-8	Sodium Tridecylbenzene Sulfonate
26968-58-1	Ethyl Benzyl Chloride
27138-31-4	Dipropylene Glycol Dibenzoate
27176-87-0	Dodecyl Benzene Sulfonic Acid
27458-94-2	Isononyl Alcohol
28348-53-0	Sodium Cumenesulfonate
28553-12-0	Diisonoyl Phthalate
29965-97-7	Cyclooctadiene
31142-56-0	Aluminum Citrate
34590-94-8	Dipropylene Glycol Methyl Ether , Propanol, (2-Methoxy-methylethoxy)-
35139-28-8	Ferric Sulfate
36653-82-4	Cetyl alcohol
36653-82-4	Hexadecanol (n-)
50864-67-0	Barium Sulfide
51218-45-2	Metolachlor
61789-32-0	Fatty Acids
61789-40-0	Cocamidopropyl Betaine
61789-77-3	Dicoco Dimethyl Ammonium Chloride
61804-50-0	Divinyl Benzene
63449-41-2	Benzyltrimethylammonium Chloride
65996-63-6	Corn Starch
68002-20-0	Melamine Formaldehyde Resin
68131-30-6	Green Liquor (Pulp Mill)
68412-54-4	Nonyl(phenoxypoly(ethyleneoxy)ethanol, branched.
68439-50-9	Ethoxylated Alcohol, C12-C14
68439-57-6	Sodium alpha-Olefin Sulfonate
68476-34-6	Diesel Fuel
68476-78-8	Molasses
68526-83-0	Isooctyl Alcohol
68526-85-2	Alcohol, Isodecyl: e.g. isodecanol
68603-42-9	Coconut Fatty Acid
72674-5-6	Alpha Olefin Sulfonate
74552-83-3	Trichloroethane (1,1,1-)
84961-48-8	Coconut Oil
91722-14-4	Epoxidized Soybean Oil
95077-5-7	Kaolin Slurry
97328-76-2	Carbonic Acid
99400-1-8	Calcium Sulfate
99551-14-1	Oils, Mineral (aliphatic)
105839-17-6	Epoxidized Castor Oil

Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Acetaldehyde	20	40/100	40/100	40/100	40/100	40/100	40/100
Acetaldehyde	100	NR	NR	LS	NR		NR
Acetic Acid	0.5 - 25	100/210	100/210	100/210	100/210	100/210	65/150
Acetic Acid	26 - 50	80/180	80/180	80/180	80/180	80/180	
Acetic Acid	51 - 75	65/150	65/150	65/150	65/150	65/150	
Acetic Acid	76 - 85	45/110	45/110	45/110	45/110	45/110	
Acetic Acid, Glacial	100	NR	NR	40/100	NR	NR	NR
Acetic Anhydride	100	NR	NR	40/100	NR	NR	NR
Acetic Acid/ Nitric Acid/ Chromic Oxide	3/5/3	65/150	80/180	80/180	65/150	80/180	65/150
Acetic Acid/ Sulfuric Acid	20/10	100/210	100/210	100/210	100/210	100/210	65/150
Acetone	10		80/180	80/180	80/180	80/180	
Acetone	20		30/85	40/100			
Acetone	100	NR	NR	LS	NR	NR	NR
Acetone, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Acetonitrile	20	40/100	40/100	40/100	40/100	40/100	
Acetonitrile	100	NR	NR	LS	NR	NR	NR
Acetonitrile, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Acetyl Acetone	20	40/100	40/100	50/120	40/100	50/120	40/100
Acetyl Acetone	100	NR	NR	LS	NR	NR	NR
Acid Cleaner - 31% hydrochloric acid <2,8,9,13>	31	65/150	70/160	80/180 <15>	65/150	80/180 <15>	65/150
Acrolein (Acrylaldehyde)	20	40/100	40/100	40/100	40/100	40/100	
Acrolein (Acrylaldehyde)	100	NR	NR	LS	NR	NR	NR
Acrylamide	50	40/100	40/100	40/100	40/100	40/100	40/100
Acrylic Acid <7>	25	40/100	40/100	40/100	40/100	40/100	40/100
Acrylic Acid	100	NR	NR	LS	NR	NR	NR
Acrylic Latex	All	80/180	80/180	80/180	80/180	80/180	
Acrylonitrile	7 (max. solubility at 20°C.)	40/100	40/100	40/100	40/100	40/100	
Acrylonitrile	100	NR	NR	LS	NR	NR	NR
Acrylonitrile Latex dispersion <7>	2	25/80	25/80	25/80	25/80	25/80	25/80
Activated Carbon Beds, Water Treatment		80/180	100/210	100/210	80/180	100/210	65/150
Adipic Acid (1.5 g sol. in water at 25C, sol. hot water)	23	80/180	80/180	80/180	80/180	80/180	
Air (max. surface temperature of the FRP) <16>		180/360	180/360	200/392	160/320	160/320	
Alachlore, Herbicide <4>	All			40/100			
Alcohol, Amyl	100	50/120	60/140	65/150	50/120	60/140	50/120
Alcohol, Butyl	100	50/120	50/120	65/150	50/120	50/120	NR
Alcohol, Ethyl	95	25/80	25/80	40/100	25/80	25/80	NR
Alcohol, Isodecyl	100	50/120	65/150	80/180	50/120	65/150	50/120
Alcohol, Propyl	100	40/100	40/100	50/120	40/100	40/100	NR
Alkaline Cleaner (see Sodium and Potassium Hydroxides)							
Alkaline Solutions: See sodium, potassium, and ammonium hydroxides, and carbonates							
Alkane Sulfonate, see Sodium Dodecylbenzene Sulfonate							
Alkyl (C8-C10) Dimethyl Amine	100	80/180	95/200	100/210	80/180	95/200	
Alkyl (C8-C18) Chloride	> 0.5	80/180	95/200	100/210	95/200	100/210	
Alkyl Aryl Sulfonic Acid, see Alkyl Benzene Sulfonic Acid							
Alkyl Benzene Sulfonic Acid <6>	> 0.5	80/180	95/200	100/210	95/200	100/210	
Alkyldiphenyloxide Disulfonate (Surfactant type: Anionic)	All	50/120	50/120	50/120	50/120	50/120	

For notes in English, see page 8; French, see page 16; German, see page 24; Portuguese, see page 32; Spanish, see page 40.

Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Alkyl Tolyl Trimethyl Ammonium Chloride		40/100	50/120	50/120	40/100	50/120	
Allyl Alcohol	100	NR	NR	25/80	NR	NR	NR
Allyl Chloride	100	25/80	25/80	25/80	25/80	25/80	NR
Alpha-Oleum Sulfates	100	50/120	50/120	50/120	50/120	50/120	
Alpha-Methylstyrene	100	25/80	40/100	50/120	25/80	40/100	NR
Alum	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Alumina Hydrate	All	80/180	80/180	80/180	80/180	80/180	80/180
Aluminum Chloride	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Aluminum Chlorohydrate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Aluminum Chlorohydrate/ Hydrochloric Acid <9,10,12>	> 0.5 / <15	80/180	100/210	100/210	80/180	100/210	65/150
Aluminum Chlorohydroxide	50	100/210	100/210	100/210	100/210	100/210	80/180
Aluminum Fluoride	All	25/80	25/80	25/80	25/80	25/80	25/80
Aluminum Hydroxide	100	80/180	80/180	95/200	80/180	80/180	80/180
Aluminum Nitrate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Aluminum Potassium Sulfate	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Aluminum Sulfate	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Aluminum Sulfate Reactor <10>	> 0.5	100/210	100/210		100/210		
Amine Salts	All	50/120	65/150	65/150	50/120	65/150	
Amino Acids	All	40/100	40/100	40/100	40/100	40/100	
Ammonia	Liquified Gas	NR	NR	NR	NR	NR	NR
Ammonia Gas	100	40/100	40/100	40/100	40/100	40/100	40/100
Ammonia Vapors (wet)	40 vol-%	80/180	80/180	80/180	80/180	80/180	
Ammonia, Aqueous (see Ammonium Hydroxide)							
Ammonium Acetate	> 0.5	25/80	25/80	40/100	25/80	25/80	NR
Ammonium Bicarbonate	0.5 - 50	70/160	70/160	70/160	70/160	70/160	70/160
Ammonium Bifluoride <1>	> 0.5	65/150	65/150	65/150			65/150
Ammonium Bisulfite black liquor		80/180	80/180	80/180	80/180	80/180	
Ammonium Bisulfite cooking liquor		65/150	65/150	65/150	65/150	65/150	
Ammonium Bromate	0.5 - 43	70/160	70/160	70/160	70/160	70/160	70/160
Ammonium Bromide	0.5 - 43	70/160	70/160	70/160	70/160	70/160	70/160
Ammonium Carbonate	> 0.5	65/150	65/150	65/150	65/150	65/150	65/150
Ammonium Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Ammonium Citrate	> 0.5	65/150	65/150	65/150	65/150	65/150	65/150
Ammonium Fluoride <1>	> 0.5	65/150	65/150	65/150	65/150	65/150	65/150
Ammonium Hydroxide	0.5 - 5	80/180	80/180	65/150	80/180	65/150	80/180
Ammonium Hydroxide	6 - 20	65/150	65/150	40/100	65/150	40/100	65/150
Ammonium Hydroxide	30 (as NH3)	40/100	40/100	40/100	40/100	40/100	40/100
Ammonium Hydroxide/ Ammonium Chloride/ Ammonium Carbonate <1>	30 (as NH3)/ 35/5	40/100	40/100		40/100	40/100	40/100
Ammonium Lauryl Sulfate	0.5 - 30	50/120	50/120	50/120	50/120	50/120	50/120
Ammonium Ligno Sulfonate	0.5 - 50	80/180	80/180	80/180	80/180	80/180	65/150
Ammonium Molybdate	> 0.5	65/150					65/150
Ammonium Nitrate	Sat'd	100/210	120/250	120/250	105/220	120/250	80/180
Ammonium Oxalate	> 0.5	65/150	65/150				
Ammonium Pentaborate	0.5 - 12	50/120	50/120				50/120
Ammonium Perchlorate	0.5 - 15	75/170					
Ammonium Persulfate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Ammonium Phosphate, dibasic	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Ammonium Phosphate, monobasic	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Ammonium Polysulfide	> 0.5	50/120	50/120	65/150			50/120
Ammonium Propionate	> 0.5	25/80	25/80	40/100	25/80	25/80	NR
Ammonium Sulfate	Sat'd	100/210	120/250	120/250	105/220	120/250	80/180
Ammonium Sulfate/ Ethyl Alcohol/ Ethoxylate	60/15/3	40/100	50/120	65/150	40/100	50/120	40/100
Ammonium Sulfide (Bisulfide)	Sat'd	50/120	50/120	50/120			50/120
Ammonium Sulfite	Sat'd	65/150	65/150	65/150	65/150		65/150
Ammonium Thiocyanate	0.5 - 20	100/210	100/210	100/210	100/210	100/210	80/180
Ammonium Thiocyanate	Sat'd	50/120	50/120	50/120	50/120	50/120	

For notes in English, see page 8; French, see page 16; German, see page 24; Portuguese, see page 32; Spanish, see page 40.

Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Ammonium Thioglycolate	All	40/100	40/100	40/100	40/100	40/100	
Ammonium Thiosulfate	All	60/140	60/140	60/140	60/140	60/140	
Amyl Acetate	> 0.5	20/70	40/100	50/120			
Amyl Alcohol	100	50/120	60/140	65/150	50/120	60/140	50/120
Amyl Alcohol, Vapor	100	50/120	100/210	100/210	50/120	100/210	
Amyl Chloride	100	50/120	50/120	50/120	50/120	50/120	
Aniline	20	40/100	40/100	40/100	40/100	40/100	
Aniline	100	NR	NR	20/70	NR	NR	NR
Aniline Hydrochloride	> 0.5	80/180	80/180	80/180	80/180	80/180	
Aniline Sulfate	> 0.5	100/210	100/210	100/210	100/210	100/210	
Animal Fat	100	80/180	100/210				
Anionic Surfactant	All	40/100	50/120	50/120	40/100	50/120	
Anionic/ Cationic Polymer Emulsions in Kerosene or Petroleum Distillates/Water	0-50	40/100	50/120	50/120			
Anodize (15% Sulfuric acid)		100/210	100/210	100/210	100/210	100/210	
Antimony Pentachloride, for aqueous solutions see Hydrochlorid Acid	> 99	40/100	40/100	40/100	40/100	40/100	40/100
Aqua Regia <6>							
Aromatic Naphtha/ Naphthalene/ Isopropanol	60/5/10		50/120	50/120		50/120	
Arsenic Acid	> 0.5	80/180	80/180	80/180	80/180	80/180	
Arsenic Acid/ Copper Sulfate/ Sodium Dichromate	17/37/20	80/180	80/180	80/180	80/180	80/180	
Arsenic Pentoxide/ Copper Oxide/ Chromic Acid	17/9/24	40/100	40/100	40/100	40/100	40/100	40/100
Arsenious Acid	19°Be	80/180	80/180	80/180	80/180	80/180	65/150
Barium Acetate	> 0.5	80/180	80/180	80/180		80/180	
Barium Bromide	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Barium Carbonate (slurry)	All	80/180	80/180	80/180	80/180	80/180	80/180
Barium Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Barium Cyanide	> 0.5	65/150	65/150	65/150	65/150	65/150	65/150
Barium Hydroxide	> 0.5	65/150	65/150	65/150	65/150	65/150	65/150
Barium Sulfate	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Barium Sulfide	> 0.5	80/180	80/180	80/180	80/180	80/180	
Barley Solution <18>	> 0.5	75/170	75/170				
Beer <18>	> 0.5	50/120	50/120				
Beet Sugar Liquor <18>	> 0.5	80/180	80/180				
o-Benzoyl Benzoic Acid	All	100/210	100/210	100/210	100/210	100/210	65/150
Benzaldehyde	100	NR	NR	20/70	NR	NR	NR
Benzalkonium Chloride	Dilute	40/100	40/100				40/100
Benzene	100	NR	NR	40/100	NR	LS	NR
Benzene, 50°C/120°F	100	NR	NR	LS	NR	LS	NR
Benzene Sulfonic Acid <6>	> 0.5	65/150	65/150	65/150	65/150	65/150	65/150
Benzene, Vapor		25/80	25/80	50/120	NR	25/80	NR
Benzene/ Methyl Tertiary Butyl Ether	80/20	NR	NR	40/100	NR	LS	NR
Benzene/Ethyl Benzene/Toluene/ Trimethyl Benzene/ Xylene	All	NR	NR	40/100	NR	LS	NR
Benzene: Ethylbenzene	33/67	NR	25/80	40/100	NR	25/80	NR
Benzenesulfonyl Chloride	100	NR	NR	LS	NR	NR	NR
Benzoic Acid	Sat'd	100/210	100/210	100/210	100/210	100/210	80/180
Benzyl Alcohol	20	40/100	50/120	50/120	40/100	50/120	40/100
Benzyl Alcohol	100	NR	25/80	40/100	NR	25/80	NR
Benzyl Chloride <2>	100	NR	NR	40/100	NR	NR	NR
Benzyltrimethylammonium Chloride	60	40/100	40/100	40/100	40/100	40/100	
Black Liquor (Pulp & Kraft Mill) <1,2>	Thin	80/180	80/180	80/180	80/180	80/180	
Black Liquor (Pulp & Kraft Mill) Thick, Heavy <1,2>	Thick	95/200	105/220	105/220	105/220	105/220	
Black Liquor recovery, furnace gases <6,16>		165/325	175/350	205/400	165/325	175/350	

Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Blow Down (Non-Condensable Gases from Pulp Digester, i.e. Dimethyl Sulfide and Mercaptanes) <8>		120/250	120/250	120/250	120/250	120/250	
Borax	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Boric Acid	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Boron Trichloride Scrubbing	> 0.5	65/150	65/150	65/150	65/150	65/150	
Brake Fluids	100	50/120	50/120	50/120 <7>	50/120	50/120	50/120
Brass Plating Solution: 3% Copper, 1% Zinc, 5.6% Sodium Cyanides, 3.0% Sodium Carbonate <1>		80/180	80/180	80/180	80/180	80/180	80/180
Brine Mixture (0.4% MgSO4, 9.5% NaCl, 5.0% Na2SO4, 2.0% K2SO4, 7% CaSO4:2H2O, 3% Na2SO3:9H2O, pH 7)		100/210	100/210	100/210	100/210	100/210	80/180
Brine, Chlorinated, see Chlorinated Brine							
Brine, Salt	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Brine, Salt	Sat'd	100/210	120/250	120/250	110/230	120/250	80/180
Brominated Phosphate Ester	> 0.5			50/120			
Bromine, Dry Gas	100	40/100	40/100	40/100 <7>	40/100	40/100	40/100
Bromine in Water (no pure Bromine phase)	< Sat'd			80/180			
Bromine, Liquid	100	NR	NR	NR	NR	NR	NR
Bromine, Wet Gas	100	40/100	40/100	40/100	40/100	40/100	40/100
Brown Stock		95/200	95/200	80/180	95/200	80/180	
Bunker C Fuel Oil (heavy fraction)	100	100/210	105/220	105/220	100/210	105/220	65/150
Butadiene (Gas) <2>	100	45/110	45/110	45/110	45/110	45/110	45/110
Butane	100	60/140	60/140	60/140	60/140	60/140	60/140
Butanol	100	50/120	50/120	65/150	50/120	50/120	NR
Butyl Acetate	100	NR	25/80	30/90	NR	25/80	NR
Butyl Acrylate	100	NR	NR	25/80	NR	NR	NR
Butyl Alcohol	100	50/120	50/120	65/150	50/120	50/120	NR
Butyl Alcohol/ Benzene	93/4	NR	40/100	50/120	NR	40/100	NR
Butyl Amine	100	NR	NR	LS	NR	NR	NR
Butyl Benzoate	70			40/100			
Butyl Benzyl Phthalate	100	80/180	100/210	100/210	80/180	100/210	
Butyl Chloride	0.1-100	NR	LS	25/80	NR	LS	NR
Butyl Hypochlorite	98	NR	NR	NR	NR	NR	NR
Butyl Stearate (5% in Mineral Spirits)		40/100	40/100				
Butylene Glycol	100	70/160	80/180	80/180	70/160	80/180	
Butylene Oxide	100	NR	NR	LS	NR	NR	NR
Butyraldehyde	100	NR	NR	40/100	NR	NR	NR
Butyric Acid	0.5 - 50	100/210	100/210	100/210	100/210	100/210	
Butyric Acid	100	25/80	50/120	50/120	25/80	50/120	
Cadmium Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Cadmium Cyanide Plating Bath, (3% Cadmium Oxide, 10% Sodium Cyanide, 1.2% Sodium Hydroxide) <1>		80/180	80/180	80/180	80/180	80/180	80/180
Calcium Bisulfite	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Calcium Bromide	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Calcium Carbonate (slurry)	All	80/180	80/180	80/180	80/180	80/180	80/180
Calcium Chlorate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Calcium Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Calcium Chloride	Sat'd	100/210	120/250	120/250	105/220	120/250	80/180
Calcium Hydroxide <1>	100	100/210	100/210	100/210	100/210	100/210	80/180
Calcium Hydroxide Slurry <1>	0.5 - 25	80/180	65/150	40/100	80/180	65/150	65/150
Calcium Hypochlorite <2,3,5,9>	All	80/180	80/180	40/100	80/180	80/180	80/180
Calcium Nitrate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Calcium Sulfate Slurry	All	100/210	100/210	100/210	100/210	100/210	80/180

For notes in English, see page 8; French, see page 16; German, see page 24; Portuguese, see page 32; Spanish, see page 40.

Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Calcium Sulfite	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Cane Sugar Liquor & Sweetwater <18>	All	80/180	80/180				
Capric Acid (Decanoic Acid) <4>	> 0.5	80/180	80/180	80/180	80/180	80/180	80/180
Capric Acid/ Lauric Acid/ Fatty Acids (C10-C18)	70/15/15	80/180	80/180	95/200	80/180	80/180	80/180
Caproic Acid (Hexanoic Acid)	100	25/80	50/120	50/120	25/80	50/120	25/80
Caprolactam	0-50	40/100	40/100	40/100	40/100	40/100	40/100
Caprolactam	100	NR	NR	LS	NR	NR	NR
Caprolactone	100	NR	NR	LS	NR	NR	NR
Caprylic Acid (Octanoic Acid)	100	80/180	100/210	100/210	80/180	100/210	
Caramel <18>	All	50/120	50/120				
Carbon Dioxide Gas <16>	All	165/325	175/350	205/400	165/325	175/350	80/180
Carbon Disulfide	100	NR	NR	LS	NR	NR	NR
Carbon Disulfide Fumes, no condensation or coalesence	All	40/100	65/150	65/150	40/100	65/150	NR
Carbon Monoxide Gas <16>	All	165/325	175/350	205/400	165/325	175/350	80/180
Carbon Tetrachloride	100	65/150	80/180	80/180	65/150	80/180	
Carbon Tetrachloride, vapor	All	80/180	95/200	95/200	80/180	95/200	
Carboxyethyl Cellulose	10	65/150	65/150	65/150	65/150	65/150	65/150
Cashew Nut Oil	100	65/150	65/150				
Castor Oil (Ricinus Oil)	100	70/160	70/160	70/160	70/160	70/160	70/160
Cationic/Anionic Polymer Emulsions in Kerosene or Petroleum Distillates/Water	0-50	40/100	50/120	50/120			
Caustic (See Sodium Hydroxide)							
Cetyl alcohol (hexadecanol)	100	65/150	80/180	80/180	65/150	80/180	50/120
Chlordimeform Insecticide	100	25/80	50/120	50/120	25/80	50/120	
Chloric Acid	All	25/80	25/80	25/80	25/80	25/80	25/80
Chlorinated Brine, pH < 2.5 <8>	Sat'd Cl2	80/180	80/180	95/200	80/180	95/200	
Chlorinated Brine, pH > 9 (Hypochlorite), <2,3,9>	Sat'd Cl2	80/180	80/180	65/150	80/180	65/150	
Chlorinated Brine, pH 2.5-9<6>	Sat'd Cl2						
Chlorinated Pulp <6>	All	80/180	90/190	95/200	90/190	95/200	
Chlorinated Solvent Recovery (See specific solvents)							
Chlorinated Wax	All	80/180	80/180	80/180	80/180	80/180	
Chlorination Washer (Hoods & Vent Systems)	Vapors, All	80/180	95/200	95/200	80/180	95/200	65/150
Chlorine Dioxide Generator Effluent, R2 System		65/150	80/180	80/180	65/150	80/180	65/150
Chlorine Dioxide Scrubber <1,2,3>		75/170	75/170		75/170		
Chlorine Dioxide, Chlorine (Bleaching Solution, with or without Pulp) <6>	All	80/180	90/190	95/200	90/190	95/200	
Chlorine Dioxide, No Chlorine (Bleaching Solution, with or without Pulp) <6>	All	80/180	90/190	95/200	90/190	95/200	
Chlorine Dioxide, Solution Storage	Sat'd	20/70	20/70	20/70	20/70	20/70	
Chlorine Water (See Chlorinated brine)							
Chlorine, dry gas <2,8,17>	100	80/180	90/190	**100/210**	80/180	100/210	65/150
Chlorine, wet gas <2,8,17>	100	80/180	90/190	**100/210**	80/180	100/210	65/150
Chlorine/ Chlorine Dioxide/ Sulfur Dioxide	0.8/2/0.7	95/200	95/200	95/200	95/200	95/200	80/180
Chlorine-Hydrogen Chloride, with aqueous condensate, <8,9,12,16>	8-10% HCl	80/180	100/210	100/210, 175/350 LS	80/180	100/210	80/180
Chloroacetic Acid	0-25	50/120	50/120	50/120	50/120	50/120	
Chloroacetic Acid	26-50	40/100	40/100	40/100	40/100	40/100	
Chloroacetic Acid	51-79	25/80	25/80	30/90	25/80	30/90	
Chloroacetic Acid	80-85	25/80	25/80	25/80	25/80	25/80	
Chloroacetic Acid	86-100	NR	NR	LS	NR	NR	NR
Chlorobenzene	100	NR	25/80	40/100	NR	25/80	NR

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In bold: preferred resin

Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Chlorofluorocarbon (CFC): R-11 (Trichlorofluoromethane), R-12 (Dichlorodifluoromethane)	100	25/80	40/100	40/100	25/80	40/100	NR
Chlorofluorocarbon (CFC): CFC-113 (Trichlorotrifluoroethane)		40/100	40/100	40/100	40/100	40/100	
Chloroform	100	NR	NR	LS	NR	NR	NR
Chloroform, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Chloroform/ Dichloroethane/ Methylene Chloride	All	NR	NR	LS	NR	NR	NR
Chloropentane (1 to 5 Cl)	100	40/100	50/120	55/130	40/100	50/120	NR
Chloropicrin (Nitrochloroform)	100	NR	NR	LS	NR	NR	NR
Chloropyridine (tetra)	100	25/80	50/120	50/120	25/80	50/120	NR
Chlorosulfonic Acid	10	NR	NR	NR	NR	NR	NR
Chlorotoluene	100	25/80	40/100	40/100	25/80	40/100	NR
N-Chloro-o-Tolyl (insecticide emulsion)	10	50/120	50/120	50/120	50/120	50/120	
Choline Chloride	> 0.5	50/120	65/150	65/150	50/120	65/150	50/120
Chrome Bath, 19% Chromic Acid with Sodium Fluorosilicate and Sulfate <1>		50/120	50/120	65/150	50/120	50/120	50/120
Chrome Reduction Process <6>	25	90/190			90/190		
Chromic Acid	0.5 - 10	65/150	65/150	65/150	65/150	65/150	65/150
Chromic Acid	11 - 20	50/120	65/150	65/150	65/150	65/150	50/120
Chromic Acid	30	LS	LS	LS	LS	LS	
Chromic Acid	40	NR	NR	LS	NR	NR	
Chromic Acid/ Sodium Metabisulfite	15/45	50/120	65/150	65/150	65/150	65/150	50/120
Chromic Acid: Nitric Acid Mixture	5/10	40/100	50/120	65/150	40/100	40/100	40/100
Chromic Acid: Sulfuric Acid Mixture (Maximum Total Concentration 10%)	10	50/120	65/150	65/150	50/120	65/150	50/120
Chromium Plate, Electroplating with a Salt Solution (with Sulfuric Acid: Not Recommended)		55/130	55/130	55/130	55/130	55/130	55/130
Chromium Sulfate (water soluble forms)	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Citric Acid	> 0.5	100/210	100/210	100/210	100/210	100/210	65/150
Clopidol <4>	All			40/100		40/100	
Cobalt Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Cobalt Chloride Reactor (Hydrochloric/Sulfuric Acid) <10>	40		95/200				
Cobalt Citrate	12	80/180	80/180	80/180			50/120
Cobalt Nitrate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Coconut Oil <18>	100	80/180	95/200	95/200	80/180	95/200	80/180
Cod-liver Oil <18>	100	40/100	40/100				
Copper Chloride	Sat'd	100/210	120/250	120/250	105/220	120/250	80/180
Copper Chloride/ Ammonium Chloride/ Ammonium Hydroxide, see Ammonium Hydroxide	26/5/2						
Copper Cyanide	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Copper Cyanide Plating Bath (10.5% Copper and 14% Sodium Cyanides; 6% Rochelle Salts)		70/160	70/160	70/160	70/160	70/160	70/160
Copper Cyanide, Potassium Cyanide, Potassium Hydroxide <1>	7:2.5:2%	65/150	40/100	25/80	65/150	25/80	
Copper Matte Dipping Bath, (30% FeCl3, 19% Hydrochloric acid) <8,9,13>		80/180	95/200	95/200	95/200	95/200	80/180
Copper Nitrate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Copper Plating Solution (45% Cu(BF4)2; 19% Copper Sulfate; 8% Sulfonic) <1>		80/180	80/180	80/180	80/180	80/180	80/180
Copper Sulfate	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Corn Oil <18>	100	80/180	100/210	100/210	80/180	100/210	65/150
Corn Starch <18>	Slurry	100/210	100/210				

For notes in English, see page 8; French, see page 16; German, see page 24; Portuguese, see page 32; Spanish, see page 40.

Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Corn Sugar/Syrup (Glucose) <18>	All	80/180	80/180				
Cottonseed Oil <18>	100	100/210	100/210	100/210	100/210	100/210	65/150
Crude Oil, Sweet, Sour	100	100/210	120/250	120/250	100/210	120/250	65/150
Cumene	100	25/80	50/120	50/120	25/80	50/120	25/80
Cumene/ Toluene/ Xylene	All	25/80	40/100	50/120	25/80	50/120	NR
Curpric Chloride, see Copper Chloride							
Cyanide Disposal (Reaction with Hypo (gives Sodium Thiosulfite))			40/100	40/100			
Cyanuric Acid	All	25/80	40/100	50/120	25/80	40/100	
Cyanuric Chloride <4>	All	50/120	50/120	50/120	50/120	50/120	50/120
Cyclohexane	100	50/120	65/150	65/150	50/120	65/150	
Cyclohexylamine	100		LS	40/100		LS	
Cyclopentane	100	40/100	45/110	50/120	40/100	45/110	
Dalapon, Sodium salt (Also 2,2-dichloropropionic acid and sodium salt)	100	NR	25/80	40/100	NR	25/80	NR
Decanoic Acid <4>	> 0.5	80/180	80/180	80/180	80/180	80/180	80/180
Decanol	100	50/120	65/150	80/180	50/120	65/150	
Deionized Water <2>	100	80/180	80/180	80/180	80/180	80/180	80/180
Demineralized Water <2>	100	80/180	80/180	80/180	80/180	80/180	80/180
De-waxed Paraffin Distillate	100	80/180	80/180	80/180	80/180	80/180	65/150
Diacetone Alcohol	10		40/100	50/120	40/100	50/120	
Diacetone Alcohol	100	NR	NR	LS	NR	NR	NR
Diallyl Phthalate	All	80/180	100/210	100/210		100/210	65/150
Diammonium Phosphate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Dibasic Acid (51-61% Glutaric Acid, 18-28% Succinic Acid, 15-25% Adipic Acid, 2% Nitric Acid)	> 0.5 - 50	80/180	95/200	95/200	80/180	95/200	80/180
Dibromonitrilo-Propionamide	100	NR	25/80	40/100	NR	25/80	NR
Dibromophenol	100	NR	40/100	40/100	NR	40/100	NR
Dibromopropane	100	NR	25/80	40/100	NR	25/80	NR
Dibromopropanol	100			40/100			
Dibutyl Carbitol (diethylene glycol dibutyl ether)	100	25/80	40/100	40/100	25/80	40/100	
Dibutyl Ether	100	25/80	50/120	80/180		65/150	
Dibutyl Sebacate	100	50/120	65/150	65/150		65/150	
Dibutyl Phthalate	100	80/180	80/180	100/210		80/180	
2,4-Dichlorophenoxyacetic Acid (Acid, Salts, Esters and Formulations) <4>		50/120	50/120	50/120	50/120	50/120	
Dichloroacetic Acid, see Chloroacetic Acid							
Dichlorobenzene (ortho and para)	100	NR	40/100	50/120	NR	40/100	NR
Dichloroethane	100	NR	NR	25/80	NR	NR	NR
Dichloroethylene	100	NR	NR	LS	NR	NR	NR
Dichloromethane (Methylene Chloride)	100	NR	NR	LS	NR	NR	NR
Dichloropropane	100	NR	25/80	40/100	NR	25/80	NR
Dichloropropene	100	NR	NR	25/80	NR	NR	NR
Dichloropropionic Acid	100	NR	25/80	40/100	NR	25/80	NR
Dichlorotoluene	100	25/80	50/120	50/120	25/80	50/120	NR
Diesel Fuel	100	80/180	100/210	100/210	80/180	100/210	65/150
Diethanolamine	100	50/120	50/120	65/150	50/120	50/120	
Diethanolamine/ Ethanolamine	80/20	50/120	50/120	50/120	50/120	50/120	
Diethyl Carbonate	100	NR	25/80	40/100	NR	25/80	NR
Diethyl Ether	100	NR	NR	NR	NR	NR	NR
Diethyl Formamide	20	40/100	40/100	40/100	40/100	40/100	NR
Diethyl Formamide	100	NR	LS	40/100	NR	LS	NR
Diethyl Hydroxylamine	100	NR	NR	LS	NR	NR	
Diethyl Ketone	20	40/100	45/110	50/120	40/100	40/100	40/100
Diethyl Ketone	100	NR	NR	25/80	NR	NR	NR
Diethyl Sulfate	100	40/100	50/120	50/120	40/100	50/120	
Diethylamine	20	40/100	40/100	40/100	40/100	40/100	NR

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Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Diethylamine	100	NR	NR	LS	NR	NR	NR
Diethylaminoethanol	100	50/120	50/120	50/120	50/120	50/120	40/100
Diethylbenzene	100	40/100	65/150	65/150	40/100	65/150	NR
Diethylene Glycol	100	80/180	100/210	100/210	80/180	100/210	80/180
Diethylene Glycol Dimethylether	20	40/100	40/100	40/100	40/100	40/100	NR
Diethylene Glycol Dimethylether	100	NR	NR	25/80	NR	NR	NR
Diethylene Glycol n-Butyl Ether also called Ethanol,2-(2-butoxy-ethoxy)- ; CAS N°112-34-5	100	40/100	40/100	40/100	40/100	40/100	NR
Diethylene Glycol Methyl Ether CAS N°111-77-3	100	NR	NR	LS	NR	NR	NR
Diethylenetriaminepentaacetic acid	All	40/100	50/120	50/120	50/120	50/120	
Diethylenetriaminepentaacetic acid, sodium salt	40	40/100	50/120	50/120	50/120	50/120	
Di-2-Ethylhexyl Phosphoric Acid (DEHPA) in Kerosene	20	80/180	80/180	80/180	80/180	80/180	
Diglycolamine (Aminoethoxyethanol)	20	40/100	50/120	50/120	40/100	50/120	40/100
Diglycolamine (Aminoethoxyethanol)	50	40/100	40/100	40/100	40/100	40/100	40/100
Diglycolamine (Aminoethoxyethanol)	100	NR	NR	LS	NR	NR	NR
Diisobutyl Ketone	100	NR	50/120	50/120	NR	50/120	NR
Diisobutyl Phthalate	100	65/150	65/150	65/150	65/150	65/150	
Diisobutylene	100	40/100	40/100	40/100	40/100	40/100	25/80
Diisonoyl Phthalate	100	65/150	100/210	100/210	65/150	100/210	65/150
Diisopropanolamine	100	50/120	50/120	65/150	50/120	50/120	40/100
Dimethyl Acetamide	20	40/100	40/100	40/100	40/100	40/100	NR
Dimethyl Acetamide	100	NR	NR	LS	NR	NR	NR
Dimethyl Acetamide, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Dimethyl Amine	20	40/100	40/100	40/100	40/100	40/100	40/100
Dimethyl Amine	40	LS	LS	LS	LS	LS	NR
Dimethylammonium Hydrochloride (Dimethylamine HCl, DMA-HCl)	70	40/100	40/100	50/120 <7>	40/100	40/100	40/100
2,4-D, Dimethylamine salt	67	50/120	50/120	50/120	50/120	50/120	
Dimethyl Aniline	100	NR	LS	40/100	NR	25/80	LS
Dimethylcarbonate	100	NR	NR	NR	NR	NR	NR
Dimethylethanolamine	20	50/120	50/120	60/140			
Dimethylethanolamine	100	25/80	30/85	40/100	25/80	30/85	NR
Dimethylformamide	20	40/100	40/100	40/100	40/100	40/100	
Dimethylformamide	100	NR	NR	LS	NR	NR	NR
Dimethylformamide, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Dimethylformamide/ Acetonitrile/ Methanol	26/9/7	NR	NR	LS	NR	NR	NR
Dimethyl Morpholine	100	NR	25/80	50/120	NR	25/80	NR
Dimethyl Phthalate	100	65/150	80/180	80/180	65/150	80/180	
Dimethyl Sulfate	20	40/100	50/120	50/120	40/100	50/120	40/100
Dimethyl Sulfate	100	NR	LS	LS	NR	NR	NR
Dimethyl Sulfide	100	NR	LS	25/80	NR	25/80	NR
Dimethyl Sulfoxide (DMSO)	20	40/100	40/100	40/100	40/100	40/100	40/100
Dimethyl Sulfoxide (DMSO)	100	NR	LS	LS	NR	NR	NR
2,2-Dimethyl Thiazolidine	1	65/150	80/180	80/180	65/150	80/180	
Dimethyl Tin Dichloride / Methyl Tin Tri-chloride (90/10) in aqueous solution <7>	50			45/110			
Dioctyl Phthalate	100	65/150	100/210	100/210	65/150	100/210	65/150
Diphenylmethane-4,4-Diisocyanate (MDI)	100	NR	NR	NR	NR	NR	NR
Diphenyl Oxide (Diphenyl Ether, Phenyl Ether)	100	25/80	40/100	50/120	25/80	50/120	NR
Dipotassium phosphate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Dipropylene Glycol	100	80/180	100/210	100/210	80/180	100/210	65/150

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Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Dipropylene Glycol Methyl Ether, Propanol, (2-Methoxy-methylethoxy)- ; CAS 34590-94-8	20	40/100	50/120	65/150	50/120	65/150	40/100
Dipropylene Glycol Methyl Ether , Propanol, (2-Methoxy-methylethoxy)- ; CAS 34590-94-8	100	NR	LS	20/70	NR	NR	NR
Dishwashing Detergent in Solution <14>	All	80/180	80/180	65/150	80/180	65/150	80/180
Distilled Water <2>	100	80/180	80/180	80/180	80/180	80/180	80/180
Divinylbenzene	100	40/100	50/120	50/120	40/100	50/120	NR
Dodecanol (Lauryl Alcohol)	100	65/150	80/180	80/180	65/150	80/180	50/120
Dodecene	100	65/150	80/180	80/180	65/150	80/180	50/120
Dodecyl Benzene Sulfonic Acid <6>	100	80/180	95/200	100/210	95/200	100/210	
Dodecyl Benzene Sulfonic Acid: Sulfuric Acid: Water: Oil	85:10:4:1	65/150	65/150	65/150	65/150	65/150	65/150
Dodecyldimethylamine	100	80/180	95/200	100/210	80/180	95/200	
Dodecylmercaptan	100	80/180	95/200	100/210	80/180	95/200	
DOWTHERM* Heat Transfer Agent	100	50/120	65/150	65/150	50/120	65/150	
Epichlorohydrin	100	LS	LS	25/80	NR	NR	NR
Epoxidized Castor Oil	100	40/100	40/100				40/100
Epoxidized Soybean Oil	100	65/150	65/150	65/150	65/150	65/150	65/150
Esters, Fatty Acid	100	80/180	80/180	80/180	80/180	80/180	65/150
Ethanol (Ethyl Alcohol)	10	50/120	50/120	65/150	50/120	50/120	50/120
Ethanol (Ethyl Alcohol)	50	40/100	40/100	65/150	40/100	40/100	NR
Ethanol (Ethyl Alcohol)	90-95	25/80	25/80	40/100	25/80	25/80	NR
Ethanol (Ethyl Alcohol)	100	NR	LS	40/100	NR	25/80	NR
Ethanol, Fumes, no condensation or coalescence	fumes	65/150	65/150	80/180	80/180	80/180	65/150
Ethanol/ Ethylacetate/ Methanol/ DMF	35/29/10/10	NR	NR	LS	NR	NR	NR
Ethanolamine	20	40/100	45/110	50/120	40/100	50/120	
Ethanolamine	100	25/80	30/90	40/100	25/80	30/90	NR
Ethephon	100		40/100	40/100			
Ethoxy Acetic Acid	10		40/100	40/100		40/100	
Ethoxy Acetic Acid	100	NR	NR	LS	NR	NR	NR
Ethoxylated Alcohol, C12-C14	100	25/80	40/100	50/120	25/80	40/100	
Ethoxylated Alkyl Amines, C12 and higher	100	25/80	40/100	50/120	25/80	40/100	
Ethoxylated Nonyl Phenol	100	NR	LS	40/100	NR	LS	NR
Ethyl Acetate	100	NR	LS	25/80	NR	LS	NR
Ethyl Acetate, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Ethyl Acetate/ Sodium Hydroxide <1,2>	4/0-50	50/120	50/120	40/100	50/120	40/100	
Ethyl Acrylate	100	NR	LS	25/80	NR	20/70	NR
Ethyl Amine	20	40/100	40/100	40/100	40/100	40/100	40/100
Ethyl Amine	70	NR	NR	LS	NR	NR	NR
Ethyl Benzyl Chloride <2>	100	NR	NR	40	NR	NR	NR
Ethyl Bromide	100	NR	LS	LS	NR	LS	NR
Ethyl Chloride	100	NR	LS	25/80	NR	25/80	NR
Ethyl Ether	100	NR	NR	NR	NR	NR	NR
Ethyl Silicate	100			40/100			
Ethyl Sulfate	100	40/100	40/100	40/100	40/100	40/100	40/100
2-Ethylhexyl Alcohol	100	65/150	70/160	80/180	70/160	80/180	50/120
Ethyl-3-Ethoxy Propionate	100	NR	LS	25/80	NR	LS	NR
Ethylbenzene	100	25/80	40/100	50/120	25/80	40/100	
Ethylbenzene: Benzene	67/33	NR	25/80	40/100	NR	25/80	NR
Ethylene Chloride (See Dichloroethane)							
Ethylene Chlorohydrin	20	40/100	50/120	65/150	50/120	65/150	40/100
Ethylene Chlorohydrin	100	40/100	40/100	40/100	40/100	40/100	NR
Ethylene Diamine	20	40/100	40/100	40/100	40/100	40/100	40/100
Ethylene Diamine	100	NR	NR	LS	NR	NR	NR
Ethylene Dibromide	100	NR	NR	NR	NR	NR	NR
Ethylene Dichloride (See Dichloroethane)							

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Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Ethylene Dichloride/Ethylene Dibromide/ Tetra Ethyl Lead (above water solublity)	5:5:5	NR	NR	LS	NR	NR	NR
Ethylene Glycol	100	100/210	100/210	100/210	100/210	100/210	65/150
Ethylene Glycol based Coolants	> 0.5	100/210	100/210	100/210	100/210	100/210	
Ethylene Glycol n-Butylether: Ethanol, 2-butoxy; CAS N°111-76-2	20	40/100	50/120	65/150	50/120	65/150	40/100
Ethylene Glycol n-Butylether: Ethanol, 2-butoxy; CAS N°111-76-2	100	40/100	40/100	65/150	40/100	40/100	NR
Ethylene Glycol/Sulfuric Acid	0-40/0-10	65/150	80/180	80/180	80/180	80/180	
Ethylene Oxide	100	NR	NR	NR	NR	NR	NR
Ethylenediaminetetraacetic Acid (EDTA)	All	80/180	80/180	80/180	80/180	80/180	80/180
Ethylenesulfonic acid, sodium salt <6>	All	70/160	70/160	70/160	70/160	70/160	
Eucalyptus Oil <18>	100	60/140	60/140	60/140	60/140	60/140	
Fatty Acid/ Sterol/ Triglyceride	All	100/210	120/250	120/250	100/210	120/250	65/150
Fatty Acid/ Sulfuric Acid <10>	5:2	100/210	100/210	100/210	100/210	100/210	
Fatty Acids	All	100/210	120/250	120/250	100/210	120/250	65/150
Ferric Acetate	All	80/180	80/180	80/180	80/180	80/180	
Ferric Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Ferric Chloride: Ferrous Chloride	5:20	100/210	100/210	100/210	100/210	100/210	80/180
Ferric Chloride/ Ferrous Chloride/ Hydrochloric Acid	48/0.2/0.2	100/210	105/220	105/220	100/210	105/220	80/180
Ferric Chloride/ Hydrochloric Acid <8,9,12>	0-29/1-20	80/180	105/220	105/220	80/180	105/220	80/180
Ferric or Ferrous Sulfate/ Sulfuric Acid	0-40/0-25	100/210	100/210	100/210	100/210	100/210	80/180
Ferric Sulfate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Ferrous Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Ferrous Chloride/ Hydrochloric Acid <8,9,12>	0-29/1-20	80/180	100/210	100/210	80/180	100/210	80/180
Ferrous Chloride+Manganese Chloride+Ferric Chloride / Hydrochloric Acid <8,9,12>	1-60/0-20	80/180	100/210	100/210	100/210	100/210	80/180
Ferrous Nitrate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Ferrous Sulfate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Fertilizer 32-0-0 (32% wt of total nitrogen), Urea-Ammonium Nitrate solution.		65/150	65/150	65/150	65/150	65/150	65/150
Fertilizer 8-8-8 (% wt of total nitrogen, phosphorus, and potassium)		65/150	65/150	65/150	65/150	65/150	65/150
Flue Gas, Dry <16>	All	165/325	175/350	205/400	160/320	160/320	
Flue Gas, Wet	All	80/180	100/210	100/210	80/180	100/210	80/180
Fluoboric Acid <1,2>	All	100/210	100/210	100/210	100/210	100/210	65/150
Fluoride Salts + Hydrochloric Acid <1,2>	30:10	50/120	50/120	50/120	50/120	50/120	50/120
Fluorine in Flue Gas, Wet <1>	2	80/180	100/210	100/210	80/180	100/210	80/180
Fluosilicic Acid <1,2>	0 - 10	80/180	80/180	80/180	80/180	80/180	65/150
Fluosilicic Acid <1,2>	11-20	60/140	60/140	60/140	60/140	60/140	60/140
Fluosilicic Acid <1,2>	21-35	40/100	40/100	40/100	40/100	40/100	40/100
Fluosilicic Acid Fumes <1,2>	All	80/180	80/180	80/180	80/180		65/150
Fluosilicic/ Hydrofluoric /Phosphoric Acids <1,2>	22/5/5	40/100	40/100	40/100	40/100	40/100	40/100
Fluozirconic Acid, Fluotitanic Acid, Ammonium Hydroxide <1,2>	5:4:3	40/100	40/100	40/100	40/100	40/100	40/100
Fly Ash Slurry		80/180	80/180	80/180	80/180	80/180	80/180
Formaldehyde	All	50/120	65/150	65/150	50/120	65/150	
Formaldehyde/Methanol	0-37/0-15	50/120	65/150	65/150	50/120	65/150	
Formamide	20	40/100	50/120	65/150	50/120	65/150	40/100
Formamide	100	20/70	20/70	20/70	20/70	20/70	
Formic Acid	10	80/180	80/180	80/180	80/180	80/180	65/150
Formic Acid	25	50/120	65/150	65/150	50/120	65/150	50/120
Formic Acid	50	50/120	50/120	50/120	50/120	50/120	
Formic Acid	85	25/80	25/80	40/100	25/80	25/80	
Formic Acid	98			40/100			

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Fuel C (50/50 Isooctane/Toluene)	100			50/120			
Fuel C / Methyl t-Butyl Ether (MTBE) Note: Fuel C is 50% toluene and 50% isooctane)	85:15			50/120			
Fuel Oil	100	80/180	100/210	100/210	80/180	100/210	65/150
Furfural <11>	0 - 10	40/100	50/120	50/120	40/100	50/120	
Furfural	100	NR	NR	LS	NR	NR	NR
Furfural in organic solvent <4>	0 - 20	NR	25/80	40/100	NR	40/100	
Furfural/ Acetic Acid/ Methanol	30/10/5	NR	NR	LS	NR	NR	NR
Furfuryl Alcohol <2>	20	40/100	50/120	65/150	40/100	50/120	40/100
Furfuryl Alcohol <2>	100	NR	NR	25/80	NR	NR	NR
Gallic Acid	Sat'd	80/180	80/180	80/180	80/180	80/180	
Gasohol (1-100% Alcohol)	100			40/100			
Gasoline, no alcohol	100			50/120			
Glucose <18>	100	80/180	80/180				
Glutamic Acid <18>	50	50/120	50/120	50/120	50/120	50/120	
Glutaraldehyde	50	50/120	50/120	50/120	50/120	50/120	50/120
Glutaric Acid	50	50/120	50/120	50/120	50/120	50/120	
Glycerine	100	100/210	100/210	100/210	100/210	100/210	65/150
Glycine and derivatives	All	40/100	40/100	40/100	40/100	40/100	
Glycol	100	100/210	100/210	100/210	100/210	100/210	65/150
Glycolic Acid (Hydroxyacetic acid)	70	40/100	40/100	40/100	40/100	40/100	
Glyconic Acid	50	80/180	80/180	80/180	80/180	80/180	65/150
Glyoxal	40	40/100	40/100	40/100	40/100	40/100	
Glyphosate	All		40/100	40/100		40/100	
Gold Plating Solution (23% Potassium Ferrocyanide with Potassium Gold Cyanide and Sodium Cyanide)		100/210	100/210	100/210	100/210	100/210	80/180
Green Liquor <1,2>	All	80/180	80/180	80/180	80/180	80/180	80/180
Gypsum Slurry (see also Calcium Sulfate)	All	100/210	100/210	100/210	100/210	100/210	80/180
Hard Chrome Plating Baths (with Sulfuric Acid - Not Recommended)		60/140	60/140				
Heptane	100	100/210	100/210	100/210	100/210	100/210	80/180
Heptane, Fumes	fumes	100/210	100/210	100/210	100/210	100/210	80/180
Herbicides <6>							
Hexachloroethane	100	LS	40/100	50/120	LS	40/100	NR
Hexadecanol	100	65/150	80/180	80/180	65/150	80/180	50/120
Hexamethylenetetramine	40	40/100	50/120	50/120	40/100	50/120	
Hexane	100	70/160	70/160	70/160	70/160	70/160	
Hexanoic Acid	100	25/80	50/120	50/120	25/80	50/120	25/80
Hot Stack Gas (see Flue Gas)							
Hydraulic Fluid (Glycols) <14>	100	80/180	80/180	80/180	80/180	80/180	
Hydrazine	20		LS	LS	LS	LS	
Hydrazine	100	NR	NR	LS	NR	NR	NR
Hydrazine/ Sodium Phosphate	5:10		LS	LS	LS	LS	
Hydriodic Acid	40	65/150	65/150	65/150	65/150	65/150	65/150
Hydriodic Acid	57		40/100	40/100	40/100	40/100	
Hydrobromic Acid	0 - 25	80/180	80/180	80/180	80/180	80/180	80/180
Hydrobromic Acid	48	65/150	65/150	65/150	65/150	65/150	65/150
Hydrobromic Acid	62	40/100	40/100	40/100	40/100	40/100	40/100
Hydrobromic Acid/ Bromine	40/2		40/100	40/100	40/100	40/100	
Hydrochloric Acid <9,12>	1 - 15	80/180	105/220	110/230	100/210	105/220	80/180
Hydrochloric Acid <8,9,12>	16 - 20	80/180	105/220	110/230	100/210	105/220	80/180
Hydrochloric Acid <8,9,12>	21 - 25	65/150	80/180	100/210	80/180	80/180	80/180
Hydrochloric Acid <8,9,12>	26 - 30	65/150	80/180	95/200	80/180	80/180	80/180
Hydrochloric Acid <8,9,13>	31 - 32	65/150	70/160	80/180 <15>	65/150	80/180 <15>	65/150
Hydrochloric Acid <8,9,13>	33 - 34	50/125	50/125	70/160 <15>	50/125	70/160 <15>	50/125

For notes in English, see page 8; French, see page 16; German, see page 24; Portuguese, see page 32; Spanish, see page 40.

Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Hydrochloric Acid <8,9,13>	35 - 36	50/125	50/125	**60/140** **<15>**	50/125	60/140 <15>	50/125
Hydrochloric Acid <8,9,13>	37	40/100	45/110	**50/125** **<15>**	40/100	50/120 <15>	
Hydrochloric Acid & Dissolved Organics <8,9,13>	0 - 33% HCl	NR		65/150 <15>			NR
Hydrochloric Acid + Aluminum (Reactor), Aluminum chloride <9,10,12>	< 15% HCl	80/180	100/210		80/180		
Hydrochloric Acid/ Aluminum Chloride <8,9,12>	30/0-40	65/150	70/160	80/180 <15>	65/150	80/180 <15>	65/150
Hydrochloric Acid + Chlorine <8,9,12>	0.5 - 20% HCl	80/180	90/190	100/210	80/180	100/210	80/180
Hydrochloric Acid, Fumes + Free Chlorine, dry above 210°F/100°C <8,9,12,16>			175/350	175/350		175/350	
Hydrochloric Acid, Fumes <9,16>		100/210	175/350	175/350	100/210	175/350	80/180
Hydrochloric Acid/ Bromine/ Chlorine <8,9,12>	22/0.1/0.1	65/150	80/180	100/210	80/180	80/180	80/180
Hydrochloric Acid/ Calcium Chloride <8,9,12>	27/15	65/150	80/180	95/200	80/180	80/180	80/180
Hydrochloric Acid/ Diethylene Triamine (as Hydrochloride)/ Ammonium Chloride <8,9,13>	33/10/10			65/150			
Hydrochloric Acid/ Ferric Chloride <8,9,12>	1-20/0-29	80/180	105/220	105/220	80/180	105/220	80/180
Hydrochloric Acid/ Ferric Chloride/ Organics <2,8,9,13>	28/35/1	NR	NR	65/150	NR	NR	NR
Hydrochloric Acid/ Ferrous Chloride <8,9,12>	1-20/0-29	80/180	100/210	100/210	80/180	100/210	80/180
Hydrochloric Acid/ Formaldehyde <2,8,9,13>	25/3	NR	NR	65/150	NR	NR	NR
Hydrochloric / Hydrofluoric Acid <1,2,8,13>	36/1		40/100	40/100 <15>		40/100 <15>	
Hydrochloric / Hydrofluoric Acid <1,2,8,13>	Max Total 20	40/100	40/100	40/100	40/100	40/100	40/100
Hydrochloric/ Hydrofluoric Acid <1,2,13>	15/0.1-1	80/180	100/210	100/210	100/210	100/210	80/180
Hydrochloric/ Hydrofluoric Acid <1,2,8,13>	25/6	40/100	45/110	50/120	40/100	50/120	
Hydrochloric/ Hydrofluoric/ Phosphoric Acid, Nitrobenzene, <1,2>	15/1/1/0.5	NR	LS	40/100	NR	LS	NR
Hydrochloric/ Hydrofluoric/ Xylene	15/15/70			NR			
Hydrochloric/Hydrofluoric Acid <1,2,8,13>	0.5 - 20/0 - 1	65/150	80/180	80/180	65/150	80/180	
Hydrochloric/Hydrofluoric Acid <1,2,8,13>	30/15			40/100			
Hydrocyanic Acid	All	100/210	100/210	100/210	100/210	100/210	80/180
Hydrofluoric Acid <1,2>	10	65/150	65/150	65/150	65/150	65/150	65/150
Hydrofluoric Acid <1,2>	20	40/100	40/100	40/100	40/100	40/100	40/100
Hydrofluoric/ Nitirc Acid <1,2>	15/15			40/100		40/100	
Hydrofluoric/ Nitric Acid <1,2>	6/20	50/120	50/120	60/140	55/130	60/140	40/100
Hydrofluoric/ Nitric Acid <1>	3-5/30-35	NR	NR	LS	NR	LS	NR
Hydrofluoric/Nitric/Sulfuric Acid <1,2>	8/20/2			60/140		60/140	
Hydrofluosilicic Acid / Polyaluminum Hydroxychloride (or Polyaluminum Chloride, PAC) <1,2>	1 - 22/1 - 35	40/100	40/100	40/100	40/100	40/100	40/100
Hydrofluosilicic Acid <1> (See Fluosilicic Acid)							
Hydrofluosilicic Acid / Zinc Chloride <1>	20/All	40/100	40/100	40/100	40/100	40/100	40/100
Hydrogen Bromide, dry gas	100	80/180	80/180	100/210	80/180	100/210	80/180
Hydrogen Bromide, wet gas	100	80/180	80/180	80/180	80/180	80/180	80/180
Hydrogen Chloride, dry gas <6,16>	100	100/210	175/350	175/350	100/210	175/350	80/180
Hydrogen Chloride, wet gas	100	100/210	110/230	110/230	100/210	110/230	80/180
Hydrogen Fluoride, Dry Gas/Vapor (if wet max. 40°C/100°F) <1,2,6>		80/180	80/180	80/180	80/180	80/180	80/180
Hydrogen Peroxide <2,3,6>	5	65/150	65/150	65/150	65/150	65/150	65/150
Hydrogen Peroxide <2,3,6>	30	40/100	40/100	65/165	40/100	65/150	40/100

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In bold: preferred resin

Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Hydrogen Peroxide <2,3,6>	35	25/80	30/90	40/100	30/90	40/100	NR
Hydrogen Peroxide <2,3,6>	50	NR	NR	LS	NR	NR	NR
Hydrogen Sulfide <6,16>	5	100/210	175/350	175/350	100/210	175/350	80/180
Hydrogen Sulfide, aqueous	All	100/210	100/210	100/210	100/210	100/210	80/180
Hydrogen Sulfide, dry gas	100	100/210	110/230	110/230	100/210	110/230	80/180
Hydrogenated tallow alkyl amine (C8-C18)	100	40/100	40/100				
Hydrosulfite Bleach, Aqueous Solution containing 5% Zinc Hydrosulfite and 2.5% Tripolyphosphate <5>		80/180	80/180	80/180	80/180	80/180	80/180
Hydroxyacetic Acid (Glycolic Acid)	20	40/100	50/120	65/150	40/100	50/120	40/100
Hydroxyacetic Acid (Glycolic Acid)	70	40/100	40/100	40/100	40/100	40/100	
Hydroxylamine Acid Sulfate (Hydroxylammonium Acid Sulfate, HSA), Reaction of Hydroxylamine Acid Disulfate with steam to form HAS, Sulfuric Acid, Ammonium Sulfate	> 0.5		100/210	100/210			
Hypochlorous Acid <6>							
Hypophosphorous Acid	0-50	50/120	50/120	50/120	50/120	50/120	50/120
Imidazoline Acetate/Solvent <2,4>	20	40/100	45/110	50/120	40/100	45/110	NR
Imidazoline Acetate/Solvent <2,4>	60	NR	LS	40/100	NR	NR	NR
Incinerator Gases, see Flue Gas							
Insecticides emulsions <6>							
Iodine, Crystals	100	65/150	65/150	65/150	65/150	65/150	65/150
Iodine, Vapor	100	65/150	65/150	80/180	65/150	65/150	65/150
Ion Exchange Resin, fine mesh resins		80/180	80/180	80/180	80/180	80/180	80/180
Iron and Steel Cleaning Bath, 9% Hydrochloric, 23% Sulfuric acid		80/180	100/210	100/210	80/180	100/210	80/180
Iron Plating Solution 45% FeCl2; 15% CaCl2; 20% FeSO4; 11% (NH4)2SO4		80/180	120/250	120/250	80/180	120/250	80/180
Isoamyl Alcohol	20	65/150	65/150	80/180	65/150	65/150	65/150
Isoamyl Alcohol	100	50/120	60/140	65/150	50/120	60/140	50/120
Isobutyl Alcohol	20	65/150	65/150	80/180	65/150	65/150	40/100
Isobutyl Alcohol	100	50/120	50/120	65/150	50/120	50/120	NR
Isodecanol	100	50/120	65/150	80/180	50/120	65/150	50/120
Isononyl Alcohol	100	65/150	65/150	65/150	65/150	65/150	40/100
Isooctyl Adipate	100	50/120	50/120	65/150	50/120		40/100
Isooctyl Alcohol	100	65/150	65/150	65/150	65/150	65/150	50/120
Isopropanol Amine	100	50/120	50/120	50/120	50/120	50/120	NR
Isopropyl Alcohol (Isopropanol)	100	50/120	50/120	50/120	50/120	50/120	NR
Isopropyl Amine	0.5-50	40/100	40/100	40/100	40/100	40/100	
Isopropyl Amine	100	NR	NR	LS	NR	NR	NR
Isopropyl Myristate	100	100/210	110/230	110/230		110/230	65/150
Isopropyl Palmitate	100	100/210	110/230	110/230	100/210	110/230	65/150
Itaconic Acid	0.5-40	60/140	60/140	60/140	60/140	60/140	60/140
Jet Fuel, General	100	60/140	60/140	60/140	60/140	60/140	60/140
Kerosene	100	80/180	80/180	80/180	80/180	80/180	65/150
Kraft Recovery Boiler Breeching (see Flue Gas)							
Lactic Acid	All	100/210	100/210	100/210	100/210	100/210	65/150
Latex (Emulsion in Water), for specific latices see under chemical/polymer name	All	50/120	50/120	50/120	50/120	50/120	50/120
Lauroyl Chloride	100	40/100	50/120	50/120		50/120	
Lauryl Alcohol	100	65/150	80/180	80/180	65/150	80/180	50/120
Lauryl Chloride	100	100/210	100/210	100/210	100/210	100/210	65/150
Lauryl Mercaptan	100	80/180	95/200	100/210	80/180	95/200	
Lead Acetate	Sat'd	100/210	110/230	110/230	100/210	110/230	
Levulinic Acid	Sat'd	100/210	110/230	110/230	100/210	110/230	
Lignin Sulfonate	All	80/180	80/180	80/180	80/180	80/180	65/150
Lime Slurry (see Calcium Hydroxide)							

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Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Limestone Slurry (see Calcium Carbonate)	All	80/180	80/180	80/180	80/180	80/180	80/180
Linseed Oil	100	100/210	110/230	110/230	100/210	110/230	65/150
Liquid Petroleum Gas (LPG)	100	60/140	60/140	60/140	60/140	60/140	60/140
Lithium Bromide	Sat'd	100/210	120/250	120/250	100/210		80/180
Lithium Carbonate <1>	All	80/180	80/180	80/180	80/180	80/180	80/180
Lithium Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Lithium Chloride	Sat'd (35-40)	100/210	120/250	120/250	100/210	120/250	80/180
Lithium Hydroxide <1>	All	80/180	80/180	40/100	80/180	80/180	80/180
Lithium Hypochlorite <2,3,5,9>	All	80/180	80/180	40/100	80/180	80/180	80/180
Magnesium Bisulfite	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Magnesium Carbonate	All	80/180	80/180	80/180	80/180	80/180	80/180
Magnesium Chloride	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Magnesium Fluosilicate <1>	All	80/180	80/180	80/180		80/180	80/180
Magnesium Hydroxide	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Magnesium Nitrate	All	100/210	100/210	100/210	100/210	100/210	80/180
Magnesium Phosphate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Magnesium Sulfate	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Magnesium Sulfate, Phosphoric Acid	1-40/0-36	100/210	100/210	100/210	100/210	100/210	100/210
Flocculant MW>40.000, cationic polyamine <6>	All	60/140	60/140	60/140	60/140	60/140	60/140
Maleic Acid	> 0.5	80/180	100/210	100/210	80/180	100/210	80/180
Manganese Chloride (Manganous Chloride)	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Manganese Nitrate (Manganous)	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Manganese Sulfate (Manganous Sulfate)	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
MDI, see Diphenylmethane-4,4-Diisocyanate	100						
Melamine Formaldehyde Resin	All	40/100	50/120	50/120	40/100	50/120	40/100
Mercaptoacetic Acid	All	NR	25/80	40/100	NR	25/80	NR
Mercaptoethanol	10		80/180	80/180		80/180	
Mercuric Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Mercurous Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Mercury	100	100/210	120/250	120/250	100/210	120/250	65/150
Metal Pickling Solutions (Sulfuric-, Hydrochloric-, and/or Phosphoric Acids) <9>	0.5-15 Total	100/210	100/210	100/210	100/210	100/210	
Methacrylic Acid <7>	25	40/100	40/100	50/120	40/100	40/100	40/100
Methacrylic Acid	100	NR	NR	LS	NR	NR	NR
Methane / Nitrogen	70/30	60/140	80/180	95/200	80/180	95/200	60/140
Methane Sulfonic Acid <6>	20-100	NR	LS	40/100	NR	NR	NR
Methanol (Methyl Alcohol)	5	50/120	50/120	50/120	50/120	50/120	50/120
Methanol (Methyl Alcohol)	20	NR	30/90	40/100	NR	40/100	NR
Methanol (Methyl Alcohol)	40 - 100	NR	LS	40/100	NR	NR	NR
Methanol, Fumes, no condensation or coalescence	fumes		65/150	80/180	80/180	80/180	
Methanol/ Ethanolamine	0-60/0-20	NR	LS	40/100	NR	NR	NR
Methanol/ Formaldehyde/ Sulfuric	60/20/2	NR	LS	40/100	NR	NR	NR
Methanol/Formaldehyde	0-15/0-37	50/120	65/150	65/150	50/120	65/150	
Methanol/Formaldehyde	35/4	NR	NR	40/100	NR	NR	
1-Methoxy-2-Propanol	100	NR	LS	20/70	NR	NR	NR
Methyl Acetate	20	40/100	40/100	40/100	40/100	40/100	40/100
Methyl Acetate	100	NR	NR	LS	NR	LS	NR
Methylamine	20	40/100	40/100	40/100	40/100	40/100	40/100
Methylamine	40	LS	LS	LS	LS	LS	NR
Methylamine	100	NR	NR	LS	NR	NR	NR
Methyl Bromide	10	25/80	25/80	25/80	25/80	25/80	NR
Methyl Bromide	100	NR	NR	LS	NR	NR	NR
2-Methyl-3-Butenenitrile	All	25/80	40/100	40/100	25/80	40/100	
Methyl Butyl Ketone (MBK), includes Methyl t-Butyl Ketone (MTBK) and other Isomers	100	25/80	40/100	50/120	25/80	40/100	NR

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Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Methyl Chloride, Gas	All	40/100	65/150	65/150	40/100	65/150	NR
Methyl Chloride, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Methyl Chloroform (also 1,1,1-Trichloroethane inhibited)	100	40/100	50/120	50/120	40/100	50/120	NR
Methyl chloroform / Perchloroethylene	75/25	40/100	50/120	50/120	40/100	50/120	
Methyldiethanolamine	20	50/120	65/150	80/180	50/120	65/150	40/100
Methyldiethanolamine	100	50/120	50/120	65/150	50/120	50/120	
Methyl Distearyl Ammonium Chloride/ Isopropanol	75/25	50/120	50/120	50/120	50/120	50/120	
Methylene Chloride	100	NR	NR	LS	NR	NR	NR
Methylene Chloride, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Methylene Chloride: Methanol: Water	1:4:95	40/100	40/100	50/120	40/100	40/100	40/100
Methyl Ethyl Ketone	20	40/100	40/100	40/100	40/100	40/100	40/100
Methyl Ethyl Ketone	100	LS	LS	20/70	LS	LS	NR
Methyl Ethyl Ketone, 2-Butanol, Triethylamine, 2-Butoxy Ethanol	<25 Total	LS	25/80	40/100	LS	25/80	NR
Methyl Formate	5	40/100	45/110	50/120	45/110	50/120	
Methyl Isobutyl Ketone (MIBK)	100	25/80	40/100	50/120	25/80	40/100	NR
Methyl Mercaptan (Gas)	All	40/100	65/150	65/150	40/100	65/150	NR
Methyl Methacrylate	All	NR	LS	25/80	NR	20/70	NR
N-methyl-2-pyrrolidone	10			LS			
N-methyl-2-pyrrolidone	100	NR	NR	LS	NR	NR	NR
Methylstyrene (alpha)	100	25/80	40/100	50/120	25/80	40/100	NR
Methyl t-Butyl Ether	100	NR	25/80	25/80	NR	25/80	NR
Methyl t-Butyl Ether (MTBE) / Fuel C (Fuel C is 50% toluene and 50% isooctane)	15:85	40/100	50/120	50/120	40/100	50/120	NR
Methyl t-Butyl Ether, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Methyl Tin Trichloride / Dimethyl Tin Di-chloride (10/90) in aqueous solution <7>	50			45/110			
Mineral Oils, aliphatic	100	100/210	120/250	120/250	100/210	120/250	65/150
Molasses	100	80/180	80/180				
Monochloroacetic Acid, see Chloroacetic Acid							
Monochlorobenzene	100	NR	25/80	40/100	NR	25/80	NR
Monoethanolamine (See Ethanolamine)							
Monomethylhydrazine	100	NR	NR	LS	NR	NR	NR
Morpholine <2>	20	40/100	45/110	50/120	45/110	50/120	40/100
Morpholine <2>	100	NR	NR	25/80	NR	NR	NR
Morpholine/ Cyclohexylamine	All	NR	NR	25/80	NR	NR	NR
Motor Oil	100	100/210	120/250	120/250	100/210	120/250	65/150
Muriatic Acid (See Hydrochloric Acid)							
Myristic Acid	100	100/210	120/250	120/250	100/210	120/250	65/150
Naphtha	100	80/180	100/210	100/210	80/180	100/210	80/180
Naphtha, Heavy Aromatic	100		50/120	50/120		50/120	
Naphthalene	100	100/210	100/210	100/210	100/210	100/210	80/180
Neutralizer & Desmut	All	65/150	65/150	65/150	65/150	65/150	65/150
Nickel Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Nickel Nitrate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Nickel Plating Solution #1 (11% Nickel Sulfate; 2% Nickel Chloride: 1% Boric Acid)		80/180	80/180	80/180	80/180	80/180	80/180
Nickel Plating Solution #2 (44% Nickel Sulfate: 4% Ammonium Chloride: 4% Boric Acid)		80/180	80/180	80/180	80/180	80/180	80/180
Nickel Plating Solution #3 (15% Nickel Sulfate/ 5% Nickel Chloride/ 3% Boric Acid)		100/210	100/210	100/210	100/210	100/210	80/180
Nickel Sulfamate	All	80/180	80/180	80/180	80/180	80/180	80/180

For notes in English, see page 8; French, see page 16; German, see page 24; Portuguese, see page 32; Spanish, see page 40.

Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Nickel Sulfate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Nitric Acid	0-5	65/150	80/180	80/180	65/150	80/180	65/150
Nitric Acid	6-10	65/150	65/150	65/150	65/150	65/150	50/120
Nitric Acid	11-20	50/120	50/120	65/150	50/120	65/150	50/120
Nitric Acid <2>	21-29	40/100	40/100	50/120	40/100	50/120	40/100
Nitric Acid <2>	30-35	25/80	30/90	40/100	30/90	40/100	NR
Nitric Acid <2>	36-40	NR	NR	40/100	NR	25/80	NR
Nitric Acid	70	NR	NR	LS	NR	NR	NR
Nitric Acid Fumes <2>	< 60 (soln.)	80/180	80/180	80/180	80/180	80/180	80/180
Nitric Acid Fumes, no condensation <2>	> 60 (soln.)	80/180	80/180	80/180	80/180	80/180	80/180
Nitric Acid/ Hexavalent Chrome (Chromic Acid)	10/5	40/100	50/120	65/150	40/100	40/100	40/100
Nitric Acid/ Hydrogen Peroxide/ Hydrofluoric Acid <1,2,3>	30/5/0.5	25/80	30/90	40/100	30/90	40/100	NR
Nitric/ Hydrofluoric <1,2>	25/3	40/100	40/100	50/120	40/100	50/120	40/100
Nitric/ Hydrofluoric Acid	30-35/3-5	NR	NR	LS	NR	LS	NR
Nitric/ Hydrofluoric Acid <1,2>	15/15			40/100		40/100	
Nitric/ Hydrofluoric Acid <1,2>	20/6	50/120	50/120	60/140	55/130	60/140	40/100
Nitric/Hydrofluoric/Sulfuric Acid <1,2>	20/8/2			60/140		60/140	
Nitric/ Phosphoric Acid <2>	24/23	40/100	40/100	50/120	40/100	50/120	40/100
Nitric/ Sulfuric Acid <2>	20/20	40/100	40/100	50/120	40/100	50/120	40/100
Nitric/ Sulfuric/ Phosphoric Acid	20/5/2	40/100	40/100	50/120	40/100	50/120	40/100
Nitric/Phosphoric Acid <2>	5/5	65/150	80/180	80/180	80/180	80/180	65/150
Nitrobenzene	100	NR	25/80	40/100	NR	25/80	NR
Nitrophenol <11>		NR	25/80	40/100	NR	25/80	NR
N-methyl-2-pyrrolidone	10			LS			
N-methyl-2-pyrrolidone	100	NR	NR	LS	NR	NR	NR
Noncondensable Blow-Down Gases (see Flue Gas or Blow Down)							
Octanoic Acid	100	80/180	100/210	100/210	80/180	100/210	
Oil, Sweet and Sour, Crude	100	100/210	120/250	120/250	100/210	120/250	65/150
Oleic Acid	100	100/210	100/210				
Oleum (Fuming Sulfuric)		NR	NR	LS	NR	NR	NR
Olive Oils <18>	100	100/210	120/250				
Ortho-dichlorobenzene (see Dichlorobenzene)							
Oxalic Acid <18>	Sat'd	50/120	50/120	50/120	50/120	50/120	
Ozone in solution <6>	2mg/l	40/100	40/100	40/100	40/100	40/100	40/100
Palladium suspensions in Ammonium Hydroxide, see Ammonium Hydroxide							
Palladium suspensions in Hydrochloric Acid, see Hydrochloric Acid							
Palmitic Acid <18>	100	100/210	120/250				
Paper Mill Effluent (see Sulfite/Sulfate Liquors (Pulp Mill))							
Para-dichlorobenzene (see Dichlorobenzene)							
Peanut Oil <18>	100	80/180	80/180				
Pentabromo diphenyl oxide	100	25/80	45/110	50/120	25/80	50/120	NR
Pentachlorophenol <4>	All	50/120	50/120	50/120	50/120	50/120	50/120
Pentanedioic Acid (See Glutaric Acid)							
Peracetic Acid <1,2,3,6>	20	40/100	40/100	40/100	40/100	40/100	
Peracetic Acid	35	NR	NR	LS	NR	NR	NR
Perchloric Acid	10	65/150	65/150	65/150	65/150	65/150	65/150
Perchloric Acid	30	40/100	40/100	40/100	40/100	40/100	40/100
Perchloroethylene	100	25/80	50/120	50/120	25/80	50/120	NR
Perchloroethylene / Methyl chloroform	75/25	40/100	50/120	50/120	40/100	50/120	
Phenol (Carbolic Acid) <2>	0 - 2	25/80	40/100	50/120	25/80	40/100	NR
Phenol (Carbolic Acid) <2>	5	NR	25/80	50/120	NR	25/80	NR

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Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Phenol (Carbolic Acid) <2>	10	NR	LS	50/120	NR	LS	NR
Phenol (Carbolic Acid) <2>	15	NR	LS	30/90	NR	LS	NR
Phenol (Carbolic Acid) <2>	88	NR	NR	20/70	NR	NR	NR
Phenol Formaldehyde Resin	All	40/100	50/120	50/120	40/100	50/120	40/100
Phenol Sulfonic Acid <6>	All	25/80	25/80	25/80	25/80	25/80	
Phenol/ Methanol/ Anionic Detergent	15/10/20	NR	NR	LS	NR	NR	NR
Phenolic Resin/ Phenol <2>	80/20			25/80			
Phenolic Resin/ Phenol <2>	90/10			50/120			
Phosphoric Acid	0.5 - 85	100/210	100/210	100/210	100/210	100/210	80/180
Phosphoric Acid	85 - 100	100/210	100/210	105/220	100/210	100/210	80/180
Phosphoric Acid (Polyphosphoric Acid)	115	100/210	100/210	105/220	100/210	100/210	80/180
Phosphoric Acid (Superphosphoric Acid 76% P2O5)	105	100/210	100/210	105/220	100/210	100/210	80/180
Phosphoric Acid/ Tributyl Phosphate (Vapor Phase, Condensation)	85/0.5	50/120	60/140	60/140	50/120	60/140	40/100
Phosphoric Acid with Phosphorous Pentoxide, Hydrochloric Acid and Sulfuric Dioxide	Fumes	100/210	110/230	110/230	100/210	110/230	80/180
Phosphoric Acid, Vapor <6>	All	100/210	120/250	120/250	100/210	120/250	80/180
Phosphoric Acid/ Gypsum	61/39	100/210	100/210	100/210	100/210	100/210	80/180
Phosphoric Acid/ Sulfuric Acid	85/15	40/100	40/100	50/120	40/100	40/100	40/100
Phosphoric Acid/ Tributyl Phosphate/ Hydrofluoric Acid (no condensation of TBP)	88/0.1/0.03	80/180	80/180	100/210	80/180	80/180	
Phosphoric Acid/ Zinc Chloride	0-100/0.5-70	100/210	100/210	100/210	100/210	100/210	80/180
Phosphoric Acid/ Hydrochloric Acid, sat'd with Cl2 <8,9,12>	15:9	100/210	100/210	100/210	100/210	100/210	
Phosphoric Acid / Sulfuric Acid	0-25/0-25	80/180	80/180	80/180	80/180	80/180	80/180
Phosphoric/ Sulfuric/ Hydrofluoric Acid <1,2>	0-75/1/0-3	65/150	65/150	65/150	65/150	65/150	65/150
Phosphorous Acid	70	80/180	80/180	80/180	80/180	80/180	80/180
Phosphorous Acid / Hydrochloric Acid <9,15>	0-70/1-5	100/210	100/210	100/210	100/210	100/210	80/180
Phosphorous Acid / Hydrochloric Acid <8,9,15>	0-70/6-10	65/150	65/150	80/180	65/150	65/150	
Phosphorus Oxychloride	100	NR	NR	LS	NR	NR	NR
Phosphorus Trichloride	100	NR	NR	LS	NR	NR	NR
Phthalic Acid <4>	All	100/210	100/210	100/210	100/210	100/210	
Picric Acid (Alcoholic) <4>	10	NR	LS	40/100	NR	NR	NR
Pine Oil	100	90/190	90/190	90/190	90/190	90/190	
Plating Chemicals <6>							
Polyacrylamide	All	80/180	80/180	80/180	80/180	80/180	80/180
Polyacrylic Acid	All	80/180	80/180	80/180	80/180	80/180	80/180
Polyethylene Glycol	100	100/210	100/210	100/210	100/210	100/210	65/150
Polyethylene glycol methyl ether <6>	100						
Polyethyleneimine	All	80/180	80/180	80/180	80/180	80/180	
Polyphosphoric Acid 115% H3PO4 (See phosphoric acid)							
Polyvinyl Acetate Adhesives	All	50/120	50/120	50/120	50/120	50/120	
Polyvinyl Alcohol	100	80/180	80/180	80/180	80/180	80/180	
Polyvinyl Chloride Latex with 35 parts Dioctyl Phthalate	All	50/120	50/120	50/120	50/120	50/120	
Potassium Aluminum Sulfate	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Potassium Bicarbonate	> 0.5	80/180	80/180	80/180	80/180	80/180	80/180
Potassium Bromide	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Potassium Carbonate <1>	0 - 50	80/180	80/180	65/150	80/180	65/150	80/180
Potassium Carbonate/ Boric acid/ Potassium Metavanadate <1>	20/4/1	80/180	80/180	65/150	80/180	65/150	80/180
Potassium Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Potassium Dichromate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Potassium Ferricyanide	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180

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Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Potassium Ferrocyanide	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Potassium Fluoride	All	80/180	80/180	80/180	80/180	80/180	80/180
Potassium Gold Cyanide	12	100/210	100/210	100/210	100/210	100/210	80/180
Potassium Hydroxide <1,2>	0 - 45	65/150	40/100	25/80	65/150	25/80	
Potassium Hydroxide:Potassium Cyanide:Copper Cyanide <1>	2:3:8 oz/gal, 2:2.5:7%	65/150	40/100	25/80	65/150	25/80	
Potassium Hypochlorite, Potassium Hydroxide, Potassium Metasilicate <2,3,9>	50/40/10	50/120					
Potassium Iodide	All	100/210	100/210	100/210	100/210	100/210	100/210
Potassium Nitrate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Potassium Oxalate	All	65/150	65/150	65/150	65/150	65/150	65/150
Potassium Permanganate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Potassium Persulfate	All	100/210	100/210	100/210	100/210	100/210	80/180
Potassium Pyrophosphate	60	55/130	65/150	65/150	55/130	65/150	55/130
Potassium Silicofluoride <1>	All	40/100	40/100	40/100	40/100	40/100	40/100
Potassium Sulfate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Propane	100	60/140	60/140	60/140	60/140	60/140	60/140
Propanol (n-)	100	40/100	40/100	50/120	40/100	40/100	NR
Propanol (n-), Fumes, no condensation or coalescence	fumes	80/180	80/180	80/180	80/180	80/180	80/180
Propionic Acid	0-50	80/180	80/180	80/180	80/180	80/180	80/180
Propionic Acid	100	NR	25/80	40/100	NR	25/80	NR
Propionyl Chloride	100	NR	NR	LS	NR	NR	NR
Propyl Acetate	100	NR	LS	25/80	NR	NR	NR
Propyl Bromide	100	NR	LS	25/80	NR	LS	NR
Propyl Chloride	100	NR	LS	25/80	NR	LS	NR
Propylene Glycol	100	100/210	100/210	100/210	100/210	100/210	
Propylene Glycol Methyl Ether, 2-Propanol,1-Methoxy- ; CAS 107-98-2	100	NR	LS	20/70	NR	NR	NR
Propylene Glycol Methyl Ether Acetate; CAS N°108-65-6 <2>	20	40/100	50/120	50/120	40/100	50/120	40/100
Propylene Glycol Methyl Ether Acetate; CAS N°108-65-6 <2>	100	NR	LS	20/70	NR	NR	NR
Propylene Glycol/ Ethoxylated Fatty Alcohols/ Diethylene Glycol n-Butyl Ether	60/20/20	40/100	45/110	50/120	40/100	50/120	NR
Propylene Glycol/ Monoethanolamine	0-99/1	25/80	30/90	40/100	25/80	30/90	NR
Propylene Oxide	100	NR	NR	NR	NR	NR	NR
Propylene Oxide, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Pulp Paper Mill Blow Down (Noncondensable Gases), see Blow Down							
Pyridine	20	40/100	40/100	40/100	40/100	40/100	NR
Pyridine	100	NR	NR	LS	NR	NR	NR
Quaternary Amine Salts	> 0.5	80/180	80/180	80/180	80/180	80/180	
Quinoline	20	40/100	40/100	40/100	40/100	40/100	
Quinoline	100			LS			
Radiation Resistance <6>							
Rayon Spin Bath				60/140			
Rayon Spinning	Fumes	60/140	60/140	60/140	60/140	60/140	
Recovery Boiler Gases (see Flue Gas)							
Red Liquor	All	80/180	80/180	80/180	80/180	80/180	65/150
Salicylic Acid	All	70/160	70/160				
Salt Brine	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Scrubbing Low MW Amines with 10% Sulfuric Acid, see Amine Salts							
Sea Water		100/210	100/210	100/210	100/210	100/210	80/180
Selenious Acid	All	100/210	100/210	100/210	100/210	100/210	80/180
Silicon Tetrafluoride/Hydrofluoric/ Sulfuric Acid <1,2>	< 10 total	50/120	50/120	50/120	50/120	50/120	50/120

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Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Silver Nitrate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Silver Plating Solution, 4% Silver; 7% Potassium and 5% Sodium Cyanides; 2% Potassium Carbonate <1>		80/180	80/180	65/150	80/180	65/150	
Sodium Acetate	> 0.5	100/210	100/210	100/210	100/210	100/210	
Sodium Alkyd Aryl Sulfonates	All	80/180	80/180	80/180	80/180	80/180	65/150
Sodium Aluminate <1>	All	70/160	70/160	50/120	70/160	50/120	50/120
Sodium Benzoate	All	80/180	80/180	80/180	80/180	80/180	80/180
Sodium Bicarbonate	All	80/180	80/180	80/180	80/180	80/180	80/180
Sodium Bicarbonate: Sodium Carbonate <1>	15:20	80/180	80/180	65/150	80/180	65/150	80/180
Sodium Bifluoride <1>	All	50/120	50/120	50/120	50/120	50/120	50/120
Sodium Bisulfate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Bisulfide (Hydrosulfide)	All	80/180	80/180	80/180	80/180	80/180	80/180
Sodium Bisulfite	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Borate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Borohydride SWS (Stabilized Water Solution)	All	40/100	40/100				
Sodium Bromate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Bromide	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Carbonate <1>	All	80/180	80/180	65/150	80/180	65/150	80/180
Sodium Carbonate: Sodium Bicarbonate <1>	20:15	80/180	80/180	65/150	80/180	65/150	80/180
Sodium Chlorate, stable	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Chlorate/ Phosphoric Acid <6>	1-20/1-20						
Sodium Chlorate/ Sulfuric Acid <6>	1-20/1-20						
Sodium Chlorate: Sodium Chloride	34:20	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Chloride saturated solution (See Salt Brine)	Sat'd						
Sodium Chloride with Chlorine (See Chlorinated Brine)							
Sodium Chloride/ Ethyl Vanillin	0.1-25/1	50/120	50/120				
Sodium Chloride/ Magnesium Oxide/ Lime	0.5-26/0.1-20/0.1-10	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Chloride/ Sodium Hydroxide <1,2>	0.5-10/0.1-2	80/180	65/150	40/100	80/180	65/150	50/120
Sodium Chloride:Sodium Chlorate	20:34	100/210	100/210	100/210	100/210	100/210	
Sodium Chlorite, pH < 6, see Chlorine Dioxide							
Sodium Chlorite, pH > 6, <5>	All	80/180	80/180	80/180	80/180	80/180	80/180
Sodium Chlorite/ Sodium Hypochlorite, pH > 11, <2,3,9>	0.1-25/0.1-15	40/100	40/100	40/100	40/100	40/100	40/100
Sodium Chromate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Cyanide	> 0.5	100/210	100/210	100/210	100/210	100/210	
Sodium Dichromate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Dimethyldithiocarbamate/ Disodium Ethylene Bisdithiocarbamate	0.1-15/0.1-15	40/100	40/100	50/120	40/100	50/120	40/100
Sodium Diphosphate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Dodecylbenzene Sulfonate	All	70/160	70/160	70/160	70/160	70/160	
Sodium Ferricyanide	> 0.5	100/210	100/210	100/210	100/210	100/210	
Sodium Ferrocyanide	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Fluoride	All	80/180	80/180	80/180	80/180	80/180	80/180
Sodium Fluoroborate <1>	> 0.5	95/200	95/200	95/200			
Sodium Fluorosilicate <1>	All	50/120	50/120	50/120	50/120	50/120	50/120
Sodium Gluconate	> 0.5	80/180	95/200	100/210	95/200	100/210	65/150
Sodium Glycolate	> 0.5	80/180	95/200	100/210	80/180	95/200	65/150
Sodium Hexametaphosphate	All	80/180	80/180	80/180	80/180	80/180	80/180
Sodium Hydrosulfide (Sodium Bisulfide)	All	80/180	80/180	80/180	80/180	80/180	80/180
Sodium Hydrosulfite	All	40/100	40/100	40/100	40/100	40/100	40/100

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Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Sodium Hydroxide <1,2>	All	**80/180**	65/150	40/100	80/180	65/150	65/150
Sodium Hydroxide/ Sodium Bisulfite <1,2>	All	80/180	65/150	40/100	80/180	65/150	65/150
Sodium Hydroxide/ Sodium Chloride/ Sodium Sulfate/ Sodium Hypochlorite (active Chlorine) <2,3,5,9>	1-20/1-15/1-8/ 0-15	80/180	65/150	40/100	80/180	65/150	
Sodium Hydroxide/Organics (within solubility limits, i.e. no phase separation or coalescence)	8/ traces	80/180	65/150				
Sodium Hydroxide/Sodium Hypochlorite (active Chlorine) <1,2>	0-20/0-0.1	80/180					
Sodium Hypochlorite (active Chlorine), pH > 11, <2,3,5,9>	0.5-5.25	65/150	65/150	40/100	80/180	65/150	65/150
Sodium Hypochlorite (active Chlorine), pH > 11, <2,3,5,9,19>	5.25-18	65/150	50/120		**65/150**	50/120	65/150
Sodium Hypochlorite (active Chlorine), pH > 11, <2,3,5,9,19>	18-21		40/100		510A: 50/120; 510C:45/110		
Sodium Hypochlorite (active Chlorine), pH > 11, <2,3,5,9,19>	21-25				**510A only: 40/100**		
Sodium Lauryl Sulfate	All	70/160	70/160	70/160	70/160	70/160	
Sodium Metabisulfite	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Methyldithiocarbamate	All	80/180	80/180	80/180	80/180	80/180	
Sodium Monophosphate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Myristyl Sulfate	All	70/160	70/160	70/160	70/160	70/160	
Sodium Nitrate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Nitrite	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Oxalate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Perchlorate	60	40/100	40/100	40/100	40/100	40/100	40/100
Sodium Persulfate	All	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Phosphate, mono-, di-, tribasic	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Polyacrylate	All	80/180	80/180	80/180	80/180	80/180	
Sodium salt o-phenylphenate (Antimicrobial)	All	50/120	50/120	50/120	50/120	50/120	
Sodium Sarcosinate	40	50/120	50/120	50/120	50/120	50/120	
Sodium Silicate <1>	> 0.5	80/180	80/180	65/150	80/180	65/150	80/180
Sodium Sulfate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Sulfate/ Sodium Sulfite	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Sulfhydrate (See Sodium Hydrosulfide)							
Sodium Sulfide	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Sulfite	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Sulphite/ Sodium Hydroxide/ Toluene	22/10/5	25/80	40/100	40/100	25/80	40/100	NR
Sodium Tartrate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Tetraborate	All	80/180	80/180	80/180	80/180	80/180	80/180
Sodium Thiocyanate	All	80/180	80/180	80/180	80/180	80/180	80/180
Sodium Thiosulfate	All	80/180	80/180	80/180	80/180	80/180	80/180
Sodium Tripolyphosphate	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sodium Xylene Sulfonate	All	70/160	70/160	70/160	70/160	70/160	
Solder Plate (see Plating Chemicals)							
Solvent Extraction Solutions: 3% Isodecanol, 6% Amines tri-C8-C10-alkyl, 91% Kerosene		80/180	80/180	80/180	80/180	80/180	65/150
Solvent Extraction Solutions: 4% Trioctylphosphine Oxide (TOPO), 4% Di 2-Ethylhexyl Phosphoric Acid (DEHPA), 92% Kerosene		80/180	80/180	80/180	80/180	80/180	

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In bold: preferred resin

Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Sorbitol Solutions	All	70/160	70/160	80/180	70/160	70/160	
Sour Crude Oil (see crude oil)							
Soy (Soya) Sauce <18>		70/160	70/160				
Soya Oil <18>	100	100/210	100/210	100/210	100/210	100/210	65/150
Spearmint Oil <18>	100	40/100	40/100				
Stannic Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Stannous Chloride	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Steam, dry, no condensation		100/210	105/220	105/220	100/210	105/220	80/180
Steam, wet, condensation		80/180	80/180	80/180	80/180	80/180	80/180
Stearic Acid	All	100/210	100/210	100/210	100/210	100/210	65/150
Styrene	100	NR	40/100	50/120	NR	40/100	NR
Styrene Acrylic Emulsion	All	50/120	50/120	50/120	50/120	50/120	
Styrene-Butadiene Latex	All	60/140	60/140	60/140	60/140	60/140	60/140
Succinonitrile, Aqueous	All	25/80	40/100	40/100	25/80	40/100	NR
Sugar / Sucrose <18>	All	100/210	100/210				
Sugar Beet, Liquor <18>	All	80/180	80/180				
Sugar Cane, Liquor & Sweetwater <18>	All	80/180	80/180				
Sulfamic Acid	0.5 - 10	100/210	100/210	100/210	100/210	100/210	80/180
Sulfamic Acid	11 - 15	80/180	80/180	80/180	80/180	80/180	65/150
Sulfamic Acid	16 - 25	65/150	65/150	65/150	65/150	65/150	65/150
Sulfamic/ Boric/ Glycolic Acid	0.5-25/0.5-30/0.5-10	65/150	65/150	65/150	65/150	65/150	
Sulfanilic Acid (meta)	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sulfanilic Acid (para) <4,6>	> 0.5	100/210	100/210	100/210	100/210	100/210	80/180
Sulfate Process Noncondensable Gases (see Flue Gas)							
Sulfated Detergents (see Sulfonated Detergents)							
Sulfated Tall Oil Fatty Acid, see Tall Oil	1-70						
Sulfides Scrubbing with Caustic, see Sodium Hydroxide							
Sulfite/Sulfate Liquors (Pulp Mill)		95/200	95/200	95/200	95/200	95/200	80/180
Sulfonated Detergents	100	70/160	80/180	80/180	70/160	80/180	70/160
Sulfur Chloride	Fumes	95/200	95/200	95/200	95/200	95/200	80/180
Sulfur Chloride	100	NR	NR	LS	NR	NR	NR
Sulfur Dioxide, see Flue Gas							
Sulfur Trioxide, dry <6>	Fumes						
Sulfur Trioxide, wet <6>, see Sulfuric Acid							
Sulfur, Molten (dry) <16>	100		120/250	150/300		120/250	
Sulfur, Wettable, Fungicide <4>	All	80/180	80/180	80/180	80/180	80/180	80/180
Sulfuric / Nitric/ Phosphoric Acids	0-13/0-11/0-30	65/150	65/150	65/150	65/150	65/150	
Sulfuric Acid	0.5 - 25	100/210	105/220	105/220	100/210	105/220	80/180
Sulfuric Acid	26 - 50	100/210	100/210	100/210	100/210	100/210	80/180
Sulfuric Acid	51 - 70	80/180	80/180	80/180	80/180	80/180	80/180
Sulfuric Acid <15>	71 - 75	40/100	50/120	80/180	40/100	50/120	40/100
Sulfuric Acid <2,15>	76 - 80/180	40/100	40/100	50/120	40/100	40/100	
Sulfuric Acid <15>	> 80	NR	NR	LS	NR	LS	NR
Sulfuric Acid/ Ammonium Bifluoride <1>	0-75/0.1-3	40/100	50/120	65/150	40/100	50/120	
Sulfuric Acid/ Copper Sulfate	0-25/1-35	100/210	100/210	100/210	100/210	100/210	
Sulfuric Acid/ Copper Sulfate/ Sodium Persulfate/ EDTA	13/12/1/1	55/130	55/130	55/130	55/130	55/130	55/130
Sulfuric Acid/ Hydriodic Acid	60/20	40/100	40/100	50/120	40/100	40/100	
Sulfuric Acid/ Hydrofluoric Acid <1,2>	25/10	40/100	45/110	50/120	40/100	40/100	
Sulfuric Acid/ Hydrofluoric Acid <1,2>	10/10	40/100	50/120	65/150	40/100	40/100	
Sulfuric Acid/ Hydrogen Peroxide <3>	1-20/1-10	65/150	65/150	65/150	65/150	65/150	
Sulfuric Acid/ Hydrogen Peroxide/ Ammonium Sulfate/ Copper Sulfate <3>	10/5/5/5	40/100	40/100	40/100	40/100	40/100	
Sulfuric Acid/ Hydrogen Sulfide	1-50/0-10	100/210	100/210	100/210	100/210	100/210	80/180
Sulfuric Acid/ Methanol	30/5		40/100	50/120			

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Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Sulfuric Acid/ Nitric Acid	20/5	65/150	80/180	80/180	65/150	80/180	65/150
Sulfuric Acid/ Phosphoric Acid	0-25/0-25	80/180	80/180	80/180	80/180	80/180	80/180
Sulfuric Acid/ Sodium Chromate <6>							
Sulfuric Acid/ Sodium Dichromate, see Sulfuric Acid/Chromic Acid Mixture							
Sulfuric Acid/Hydrochloric Acid <8,9,13>	50/15	40/100	45/110	50/120	40/100	50/120	
Sulfuric Acid/Hydrochloric Acid <9,12>	1-25/1-10	80/180	100/210	100/210	100/210	100/210	80/180
Sulfuric Acid/Hydrofluoric Acid <1,2>	1-20/3-6	55/130	55/130	60/140	55/130	60/140	40/100
Sulfuric Acid/Hydrofluoric Acid	30-35/3-5	LS	LS	LS	LS	LS	LS
Sulfuric Acid/Inorganic Salts	0.5-20/0.5-50	100/210	100/210	100/210	100/210	100/210	80/180
Sulfuric Acid/Inorganic Salts	21-50/0.5-20	80/180	80/180	80/180	80/180	80/180	80/180
Sulfuric Acid/Sulfate Salts, max. total concentration 80%, see Sulfuric Acid							
Sulfuric Acid: Chromic Acid Mixture (Maximum Total Concentration 10%)		50/120	65/150	65/150	50/120	65/150	50/120
Sulfuric/ Hydrochloric/ Hydrofluoric / Phosphoric Acids/ Chlorinated Solvents	40/20/5/35/1	NR	NR	LS	NR	LS	NR
Sulfuric/ Hydrofluosilicic Acids/ MIBK <1,2>	25/10/2	LS	40/100	50/120	LS	40/100	
Sulfuric/ Lactic Acids/ Sodium Sulfate	50/20/0-10	40/100	50/120	65/150	40/100	50/120	40/100
Sulfurous Acid	10	50/120	50/120	50/120	50/120	50/120	50/120
Superphosphoric Acid (76% P2O5) (See Phosphoric acid)	105% H3PO4						
Surfactant, Anionic	All	40/100	50/120	50/120	40/100	40/100	
Surfactant <6>							
Tall Oil (Storage)	100	95/200	105/220	105/220	95/200	105/220	
Tall Oil Reactor <6>		100/210	105/220	105/220	100/210	105/220	
Tallow/ Sulfuric Acid	99/1	80/180	80/180				
Tannic Acid	> 0.5	100/210	100/210	100/210	100/210	100/210	65/150
Tap Water, hard <2>	All	100/210	100/210	100/210	100/210	100/210	80/180
Tap Water, soft <2>	All	80/180	80/180	80/180	80/180	80/180	80/180
Tartaric Acid	> 0.5	100/210	100/210	100/210	100/210	100/210	65/150
t-Butyl Methyl Ether (MTBE)	20	40/100	50/120	50/120	40/100	50/120	30/90
t-Butyl Methyl Ether (MTBE)	100	NR	25/80	25/80	NR	25/80	NR
Tetrabutyltin	100	50/120	50/120	50/120	50/120	50/120	
Tetrachloroethane	100	40/100	50/120	55/130	40/100	50/120	NR
Tetrachloroethylene (Perchloroethylene)	100	25/80	40/100	50/120	25/80	50/120	NR
Tetrachloropyridine	100	25/80	50/120	50/120	25/80	50/120	NR
Tetraethyl Orthosilicate	100			40/100			
Tetrahydrofuran	0-5	40/100	40/100	50/120	40/100	50/120	
Tetrahydrofuran	10-100	NR	NR	LS	NR	NR	NR
Tetrahydrofuran, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Tetramethyl Ammonium Hydroxide <1>	0-10	50/120	40/100		50/120	40/100	
Tetra-n-Butylammonium Hydroxide <1,2>	40	40/100	40/100		40/100	40/100	
Tetra-n-Butylphosphonium Hydroxide, <1,2>	40	40/100	40/100		40/100	40/100	
Tetrapotassium Pyrophospate	0-60	55/130	65/150	65/150	55/130	65/150	55/130
Tetrasodium Ethylenediaminetetraacetic Acid (Tetrasodium Salt of EDTA)	All	80/180	80/180	65/150	80/180	65/150	80/180
Thermal Oxidizer (HCl Absorption), see Flue Gas, Wet							
Thioglycolic Acid, see Mercaptoacetic Acid							
Thionyl Chloride	100	NR	NR	LS	NR	NR	NR
Thiourea	0-50	65/150	65/150	65/150	65/150	65/150	65/150
Tin Fluoborate Plating Bath: 18% Stannous Fluoborate, 7% Tin, 9% Fluoboric Acid, 2% Boric Acid <1>		100/210	100/210	100/210	100/210	100/210	80/180
Titanium Dioxide	All	80/180	80/180	80/180	80/180	80/180	80/180
Titanium Dioxide/ Sulfuric Acid	0-30/30	100/210	100/210	100/210	100/210	100/210	80/180

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Chemical Resistance Table: Maximum Service Temperatures for Derakane and Derakane Momentum™ Resins—*continued*

Chemical Environment	Concentration %	411 °C/°F	441 °C/°F	470 °C/°F	510A/C °C/°F	510N °C/°F	8084 °C/°F
Titanium Tetrachloride	All	65/150	80/180	80/180	65/150	80/180	
Tobias Acid (2-Naphthylamine-1-Sulfonic) <6>	100	100/210	100/210	100/210	100/210	100/210	
Toluene	100	25/80	40/100	50/120	25/80	40/100	NR
Toluene Diisocyanate (TDI) <2>	100	NR	NR	30/85 <6>	NR	NR	NR
Toluene Sulfonic Acid <6>	> 0.5	80/180	95/200	100/210	95/200	100/210	
Toluene, Fumes, no condensation or coalescence	fumes		65/150	80/180	80/180	80/180	
Toluidine (o-, p-, m-)	100	NR	NR	20/70	NR	NR	NR
Tomato Sauce	All	90/190	90/190				
Transformer Oils (Ester types)	100	50/120	65/150	65/150		65/150	
Transformer Oils (Silicone and Mineral Oils) <16>	100	100/210	120/250	150/300	110/230	120/250	
Tributyl Phosphate	100	50/120	60/140	60/140	50/120	60/140	40/100
Trichloroacetic Acid	85	25/80	40/100	50/120	25/80	40/100	25/80
Trichloroethane	100	40/100	50/120	50/120	40/100	50/120	NR
Trichloroethylene	100	NR	NR	LS	NR	NR	NR
Tricresyl Phosphate	100	70/160	70/160	70/160	70/160	70/160	
Triethanolamine	100	50/120	50/120	65/150	50/120	50/120	NR
Triethylamine	All	50/120	50/120	50/120	50/120	50/120	NR
Triethylamine/ Triethylamine Hydrochloride/ Hydrochloric Acid	50/20/5	50/120	50/120	50/120	50/120	50/120	NR
Triethylene Glycol, see Ethylene Glycol							
Trifluoroacetic Acid (see Chloroacetic Acid)							
Trimethyl Ammonium Chloride (Trimethylamine HCl, TMA-HCl)	70	40/100	40/100	50/120 <7>	40/100	40/100	40/100
Trimethyl Benzene	100	25/80	40/100	50/120	25/80	50/120	NR
Trimethylamine	20	40/100	50/120	50/120	40/100	50/120	NR
Trimethylamine	100	25/80	25/80	40/100	25/80	25/80	
Trimethylamine, Fumes, no condensation or coalescence	fumes			80/180	80/180	80/180	
Trimethylene Chlorobromide		NR	25/80	40/100	NR	25/80	NR
Trioctyl Phosphine Oxide: Di 2-Ethylhexyl Phosphoric Acid (DEHPA): Kerosene	4:4:92	80/180	80/180	80/180	80/180	80/180	
Trioctylphosphate	100	70/160	70/160	80/180	70/160	70/160	40/100
Tripropylene Glycol, see Ethylene Glycol							
Trisodium Phosphate	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Turpentine	100	65/150	100/210	100/210	65/150	100/210	40/100
Uranium Extraction, see Kerosene							
Urea	All	70/160	70/160	70/160	70/160	70/160	65/150
Urea Formaldehyde Resin	All	40/100	50/120	50/120	40/100	50/120	40/100
Urea: Ammonium Nitrate: Water	35:44:20	65/150	65/150	65/150	65/150	65/150	65/150
Urine, see Urea	All						
Vanillin Black Liquor <18>		50/120	50/120				
Vinegar <18>	100	100/210	100/210	100/210	100/210	100/210	65/150
Vinyl Acetate	20	40/100	40/100	40/100	40/100	40/100	NR
Vinyl Acetate	100	NR	NR	LS	NR	NR	NR
Vinyl Chloride	100	NR	NR	LS	NR	NR	NR
Vinyl Chloride Fumes, no condensation	All			80/180	80/180	80/180	
Vinyltoluene	100	25/80	50/120	50/120	25/80	50/120	NR
Water Deionized <2>	100	80/180	80/180	80/180	80/180	80/180	80/180
Water Vapor, no condensation, see Flue Gas, dry							
Water Vapor, wet <2>	Sat'd	80/180	80/180	80/180	80/180	80/180	80/180
Water, Distilled <2>	100	80/180	80/180	80/180	80/180	80/180	80/180
Water, Phenol, see Phenol							
Water, Sea, Desalination	All	80/180	80/180	80/180	80/180	80/180	80/180
Water, Steam Condensate <2>	100	80/180	80/180	80/180	80/180	80/180	80/180

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Water, Tap, hard <2>	100	100/210	100/210	100/210	100/210	100/210	80/180
Water, Tap, soft <2>	100	80/180	80/180	80/180	80/180	80/180	80/180
Whey	All	65/150	65/150				
White Liquor (Pulp Mill) <1,2>	All	80/180	80/180	40/100	80/180	80/180	80/180
Xylene	100	25/80	40/100	50/120	25/80	50/120	NR
Xylene, Fumes, no condensation or coalescence	Fumes		65/150	80/180	80/180	80/180	
Xylene/ Methyl Ethyl Ketone/ Butyl Acetate/ Methyl Acetate	50/20/20/10	NR	NR	LS	NR	NR	NR
Zinc Chloride	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Zinc Cyanide Plating Bath, 9% Zinc and 4% Sodium Cyanides, 9% Sodium Hydroxide <1,2>		80/180	80/180	40/100	80/180	80/180	80/180
Zinc Electrolyte (Zinc Sulfate, 35g/l Sulfuric Acid), see Sulfuric Acid							
Zinc Fluoborate Plating Bath, 49% Zinc Fluoborate; 5% Ammonium Chloride, 6% Ammonium Fluoborate <1>		95/200	95/200	95/200	95/200	95/200	80/180
Zinc Nitrate	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180
Zinc Phosphate (slurry)	> 0.5	80/180	80/180	80/180	80/180	80/180	80/180
Zinc Sulfate	Sat'd	100/210	120/250	120/250	100/210	120/250	80/180

Notes

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