

Formulation

Name	PREMIUM PLANT-BASED 2X LAUNDRY DETERGENT																																								
No.	1137																																								
Description	This 2X heavy-duty liquid (HDL) uses surfactants listed on CleanGredients.org or ingredients known to be used in Safer Choice-approved formulations. The formulation cleans within the high end of the "green" 2X commercial HDL range and contains surfactants that are plant-derived. Instructions on how to create a high efficiency (HE) version of this formulation are included below.																																								
Formulation	<p><u>INGREDIENTS:</u></p> <table border="0"> <thead> <tr> <th></th> <th><u>% by Weight</u></th> <th><u>Functionality</u></th> </tr> </thead> <tbody> <tr> <td>ALPHA-STEP® PC-48</td> <td>43.59</td> <td>Surfactant</td> </tr> <tr> <td>BIO-SOFT® EC-690</td> <td>16.67</td> <td>Surfactant</td> </tr> <tr> <td>AMMONYX® LMDO</td> <td>2.27</td> <td>Secondary Surfactant</td> </tr> <tr> <td>Hardened Coconut Fatty Acid</td> <td>1.00</td> <td>Foam Modifier</td> </tr> <tr> <td>Sodium Hydroxide (50% aqueous solution)</td> <td>3.50</td> <td>Neutralizer</td> </tr> <tr> <td>Borax Pentahydrate</td> <td>1.90</td> <td>Stabilizer, Buffer</td> </tr> <tr> <td>Glycerol</td> <td>3.00</td> <td>Stabilizer</td> </tr> <tr> <td>Citric Acid (50% aqueous solution)</td> <td>4.00</td> <td>Builder, Buffer</td> </tr> <tr> <td>Protease</td> <td>0.90</td> <td>Enzyme</td> </tr> <tr> <td>Amylase</td> <td>0.45</td> <td>Enzyme</td> </tr> <tr> <td>Deionized Water, Fragrance, Colorant and Preservative</td> <td>q.s. to 100</td> <td>Additives</td> </tr> <tr> <td>Total</td> <td>100.00</td> <td></td> </tr> </tbody> </table>		<u>% by Weight</u>	<u>Functionality</u>	ALPHA-STEP® PC-48	43.59	Surfactant	BIO-SOFT® EC-690	16.67	Surfactant	AMMONYX® LMDO	2.27	Secondary Surfactant	Hardened Coconut Fatty Acid	1.00	Foam Modifier	Sodium Hydroxide (50% aqueous solution)	3.50	Neutralizer	Borax Pentahydrate	1.90	Stabilizer, Buffer	Glycerol	3.00	Stabilizer	Citric Acid (50% aqueous solution)	4.00	Builder, Buffer	Protease	0.90	Enzyme	Amylase	0.45	Enzyme	Deionized Water, Fragrance, Colorant and Preservative	q.s. to 100	Additives	Total	100.00		
	<u>% by Weight</u>	<u>Functionality</u>																																							
ALPHA-STEP® PC-48	43.59	Surfactant																																							
BIO-SOFT® EC-690	16.67	Surfactant																																							
AMMONYX® LMDO	2.27	Secondary Surfactant																																							
Hardened Coconut Fatty Acid	1.00	Foam Modifier																																							
Sodium Hydroxide (50% aqueous solution)	3.50	Neutralizer																																							
Borax Pentahydrate	1.90	Stabilizer, Buffer																																							
Glycerol	3.00	Stabilizer																																							
Citric Acid (50% aqueous solution)	4.00	Builder, Buffer																																							
Protease	0.90	Enzyme																																							
Amylase	0.45	Enzyme																																							
Deionized Water, Fragrance, Colorant and Preservative	q.s. to 100	Additives																																							
Total	100.00																																								
Procedure	<ol style="list-style-type: none"> Charge Deionized Water (50% of the calculated total required amount) at 140°F (60°C) and start agitation. Keep agitation going until batch is complete. Add Citric Acid with mixing and wait until dissolved. This should only take a short time. Add Borax Pentahydrate with mixing and wait until dissolved. This should only take a short time. Add Glycerol with mixing. Add Hardened Coconut Fatty Acid with mixing. Fatty Acid is added molten and will turn the batch cloudy when added. Add 75% of the Sodium Hydroxide charge. When added, the Fatty Acid gels slightly, but dissolves. After a short time, batch will become clear. Slowly add ALPHA-STEP® PC-48 with mixing. Add BIO-SOFT® EC-690 with mixing. Add AMMONYX® LMDO with mixing. Adjust pH with Sodium Hydroxide. The target pH range is 8.5 to 9.0, with a specific target of 8.8. Once batch has cooled to 90°F (32°C) or below, add Preservative, Enzymes, Colorant, and Fragrance with mixing. Add required amount of Deionized Water to complete batch with mixing. Run final pH check. If pH is below 8.5, adjust into target range with Sodium Hydroxide. If pH is above 9.0, adjust into target range with Hydrochloric Acid. <p>HIGH EFFICIENCY (HE) VERSION: Use 3% more Hardened Coconut Fatty Acid (for a total of 4%) in Step 5 and use 1.11% more Sodium Hydroxide in Step 6 for a grand total of 2.11% of 50% Sodium Hydroxide, including both Steps 6 and 10.</p>																																								

Physical Properties	Appearance at 25°C pH, as is Viscosity at 25°C, cps	Clear liquid 8.5 - 9.0 (Target 8.8) 250 - 500
Storage/Stability	3 Freeze/thaw Cycles 4 weeks at 5°C 4 weeks at RT 4 weeks at 40°C	Pass Pass Pass Pass
Instructions for Use	32 loads/50 fl. oz bottle = 1.56 fl. oz/load HE = 32 loads/50 fl. oz bottle	
External Comment	Marketing Notes: ALPHA-STEP® PC-48, BIO-SOFT® EC-690, and AMMONYX® LMDO are approved ingredients on www.cleangredients.org . For further information, visit www.stepan.com or www.cleangredients.org . This core formulation should be able to be used to create a final formula capable of receiving a Safer Choice certification. Customer would need to carefully choose colorant, fragrance, and preservative ingredients that would be compatible with DfE requirements. Customer is responsible for obtaining Safer Choice approval on final formulation. Use of the term "green" on the finished product or label is at the sole risk of the finished product manufacturer, for which Stepan bears no responsibility. Label and/or trademark usage of the final product is the sole responsibility of the finished product manufacturer.	
Registered Trademarks of Stepan Company	ALPHA-STEP® AMMONYX® BIO-SOFT®	
For Additional Assistance	For applications or product handling assistance, call our Technical Service Department at 1-800-745-7837 (U.S.) or 011-334-76-505-100 (Europe). For ordering assistance, call our Account Service Department at 1-800-457-7673. The information contained herein is based on the manufacturer's own study and the works of others and is subject to change without prior notice. The information is not intended to be all-inclusive, including as to the manner and conditions of use, handling, storage or disposal or other factors that may involve additional legal, environmental, safety or performance considerations. Nothing contained herein grants or extends a license, express or implied, in connection with any patents issued or pending of the manufacturer or others, or shall be construed as a recommendation to infringe any patents. STEPAN COMPANY MAKES NO PRODUCT WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR USE, EXPRESS OR IMPLIED, AND NO OTHER WARRANTY OR GUARANTY, EXPRESS OR IMPLIED, IS MADE, INCLUDING AS TO INFORMATION REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY, ACCURACY, COMPLETENESS, OR ADEQUACY. Stepan Company (and its employees, subsidiaries and affiliates) shall not be liable (regardless of fault) to the vendee, its employees, or any other party for any direct, indirect, special or consequential damages arising out of or in connection with the accuracy, completeness, adequacy, furnishing, use, or reliance upon information provided herein. The vendee assumes and releases Stepan Company (and its employees, subsidiaries and affiliates) from all liability, whether in tort, contract or otherwise to the fullest extent possible under the relevant law.	
	 <p>Stepan Company Northfield, Illinois 60093 Telephone (847) 446-7500</p>	