

A close-up, low-angle shot of a black tire tread with a complex siping pattern, resting on green grass. The background is a bright green gradient.

NAUGARD

**BIO>XL**™

SUSTAINABILITY WITHOUT COMPROMISE.

ULTRA-ACCELERATOR FOR

**TIRES**

MANUFACTURING EXCELLENCE  
PRODUCT PERFORMANCE  
GLOBAL FOOTPRINT

**SI Group**®



# INTRODUCING NAUGARD BIO-XL™:

An ultra-accelerator that contains over

**85%** BIO-BASED  
MATERIALS

Developed as part of our continued focus  
on sustainability.



## BIO-SOURCED TECHNOLOGY:

SI Group's NAUGARD BIO-XL™ ultra-accelerator is a game changing innovation that uses bio-sourced technology without compromising performance. Designed with the future of the rubber industry in mind, NAUGARD BIO-XL™ is an environmentally friendly, high-efficiency solution.

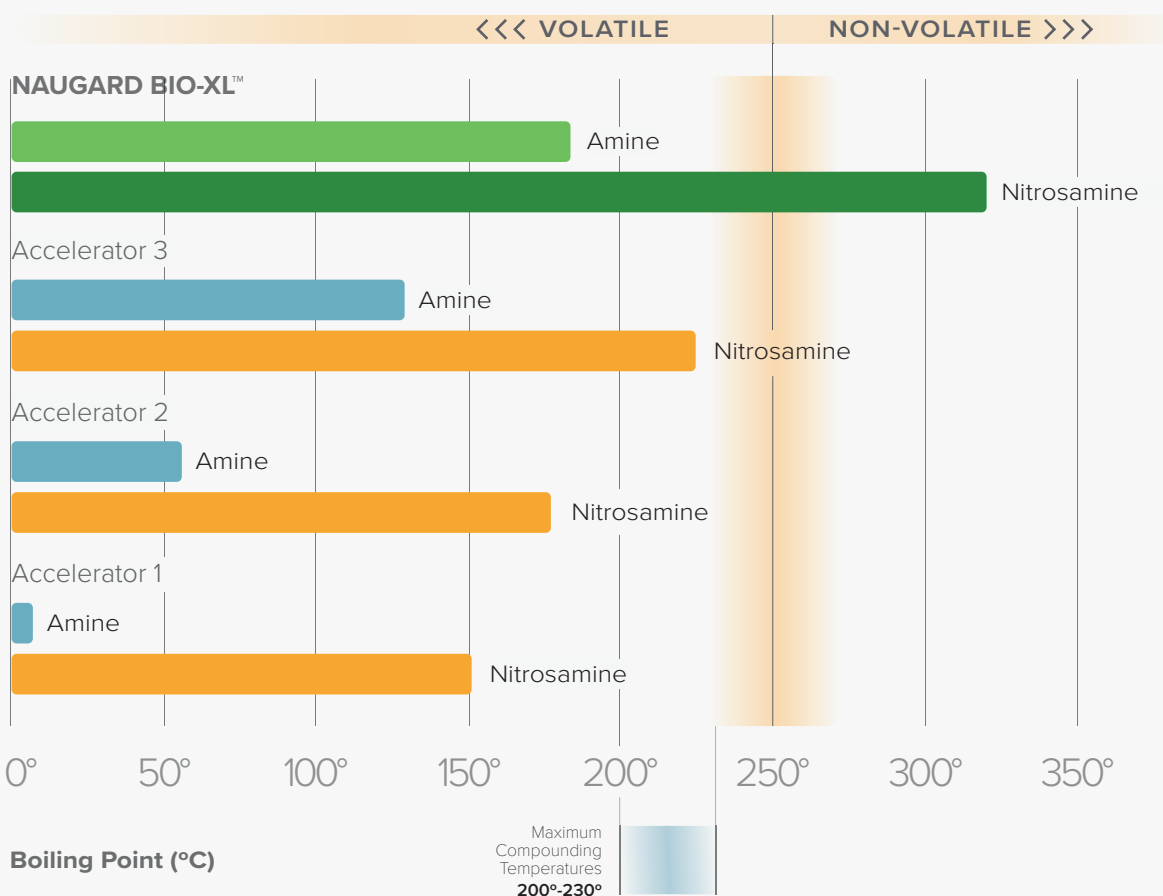




## SAFETY RESULTS:

NAUGARD BIO-XL™ ultra-accelerator is free from Substances of Very High Concern (SVHC).

### NAUGARD BIO-XL™ does not generate harmful nitrosamines\*



Volatility of Amines and Their Corresponding Nitrosamines.  
\*As listed in TRGS552.





# OPTIMIZING PERFORMANCE:

By optimizing cure characteristics and crosslinking efficiency, NAUGARD BIO-XL™ ultra-accelerator effectively enhances key tire properties, such as wet grip and fuel efficiency.

# KEY PERFORMANCE ADVANTAGES:



Faster curing  
at enhanced  
scorch safety



Improved  
crosslinking  
efficiency

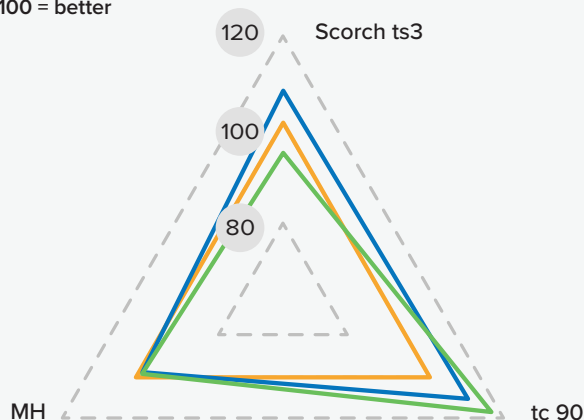


No harmful  
nitrosamines

## Cure Characteristics

● DPG control ● BXL-25% DPG ● BXL-50% DPG

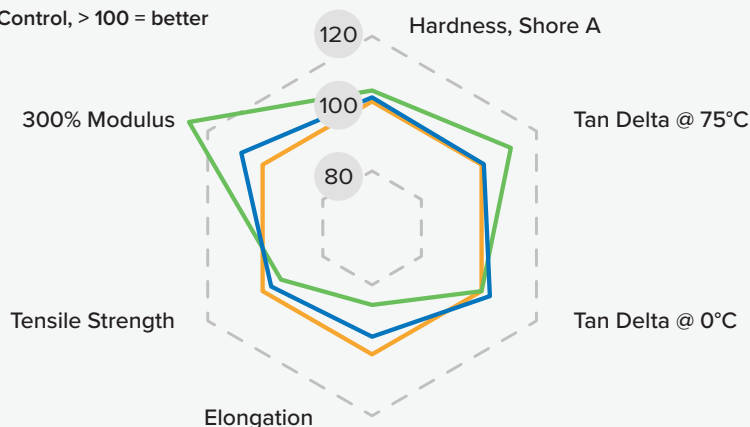
% vs % vs Control, > 100 = better



## Mechanical & Dynamic Properties

● DPG control ● BXL-25% DPG ● BXL-50% DPG

% vs % vs Control, > 100 = better



When tested in an SSBR/BR silica-filled tread formulation, replacing 2 phr of DPG (diphenyl guanidine) co-accelerator by only 1 phr of NAUGARD BIO-XL™ ultra-accelerator, NAUGARD BIO-XL™ boasts a combination of better wet grip as well as rolling resistance lab indicators (tan delta 0°C/75°C). It offers comparable hardness, modulus @ 300% elongation, and tensile strength. With further optimization of the curative package, the observed reduction in elongation at break could be balanced out.



# NAUGARD BIO-XL™ IN TIRE APPLICATIONS:

Beyond the demonstrated example in an SSBR/BR silica tread formulation, NAUGARD BIO-XL™ ultra-accelerator can be used in a variety of tire treads and other components:



**Tread and  
undertread**



**Carcass, sidewall and  
belt skim compounds**



**Bead filler and  
chafer components**

By incorporating NAUGARD BIO-XL™ into these applications, manufacturers can enhance the performance and sustainability of their rubber products.



SI GROUP'S COMMITMENT TO

## SUSTAINABILITY AND PERFORMANCE:

As a global leader in cutting-edge technology, we specialize in performance additives, process solutions, active pharmaceutical ingredients, and chemical intermediates. Our solutions cater to a wide array of industries and applications, delivering remarkable outcomes. We add value by elevating the quality, performance, and longevity of numerous everyday items. We are sustainability without compromise.





## NEXT-GEN TECHNOLOGY

**NAUGARD BIO-XL™** represents next-generation ultra-accelerator technology that pushes the envelope

OF IMPROVED

sustainability

&

performance

solidifying its position as a game-changer in the rubber industry.

# CONCLUSIONS



## HIGH PERFORMANCE

DPG replacement with improved sustainability

- Optimized cure characteristics
- Improved dynamic performance in tread
- +85% Bio-Sourced

Samples available in 70% active solid form.

FOLLOW US ON



#AcceleratedSustainability

# NAUGARD BIOXL™

For more information visit  
[siigroup.com](https://siigroup.com)

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