



Vanderbilt Worldwide Ltd

A Wholly Owned Subsidiary of R.T. Vanderbilt Holding Company, Inc.

FOOD GRADE

Additives

&

ENVIRONMENTALLY

Acceptable Lubricants



VANDERBILT WORLDWIDE Ltd

12 PARK HOUSE

ALVASTON BUSINESS PARK, MIDDLEWICH RD.

NANTWICH, CHESHIRE CW5 6PF, UK

+44 1270 623978

INFO@VANDERBILTWORLDWIDE.COM

WWW.VANDERBILTWORLDWIDE.COM



FOOD GRADE Additives ENVIRONMENTALLY Acceptable Lubricants

The trend towards more environmentally friendly additives for lubricants that are used in certain areas such as food processing, marine applications and agriculture are accelerating. These areas require lubricants and additives that have low or no toxicity and are easily biodegradable. These areas require that additives have been tested and proven to show no harm to the environment.

NSF® Certified

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PART 1 - NSF FOOD GRADE LUBRICANTS

Vanderbilt Chemicals, LLC has invested in manufacturing, supplying, and registering Food Grade Compatible additives used in the production of food grade lubricants. The NSF sets the standards for both food grade additives and lubricants. They have a specific rating to let consumers know they can be used in lubricants that may have incidental food contact (HX-1) or for applications in a federally inspected food processing facility without direct food contact (HX-2).

PART 2 - EUROPEAN ECOLABEL (EEL) FLUIDS

The entire lubricant industry is moving towards more environmentally friendly lubricant formulations. In the past, some lubricant formulations contained additives that were toxic to the environment or not biodegradable. The industry is looking for ways to make lubricants that are non-toxic, biodegradable and renewable. Environmentally Acceptable Lubricants (EAL) is the term used to describe this class of lubricants. This is particularly important in environmentally sensitive areas such as protected waterways, food production, wire & cable, agriculture/forestry and ocean going ships. An additive or finished lubricant that meets the classification specified by European Ecolabel (EEL) on the Lubricant substances classification (LuSC) list, will meet other EAL classifications; including the United States Vessel General Permit (VGP 2013).



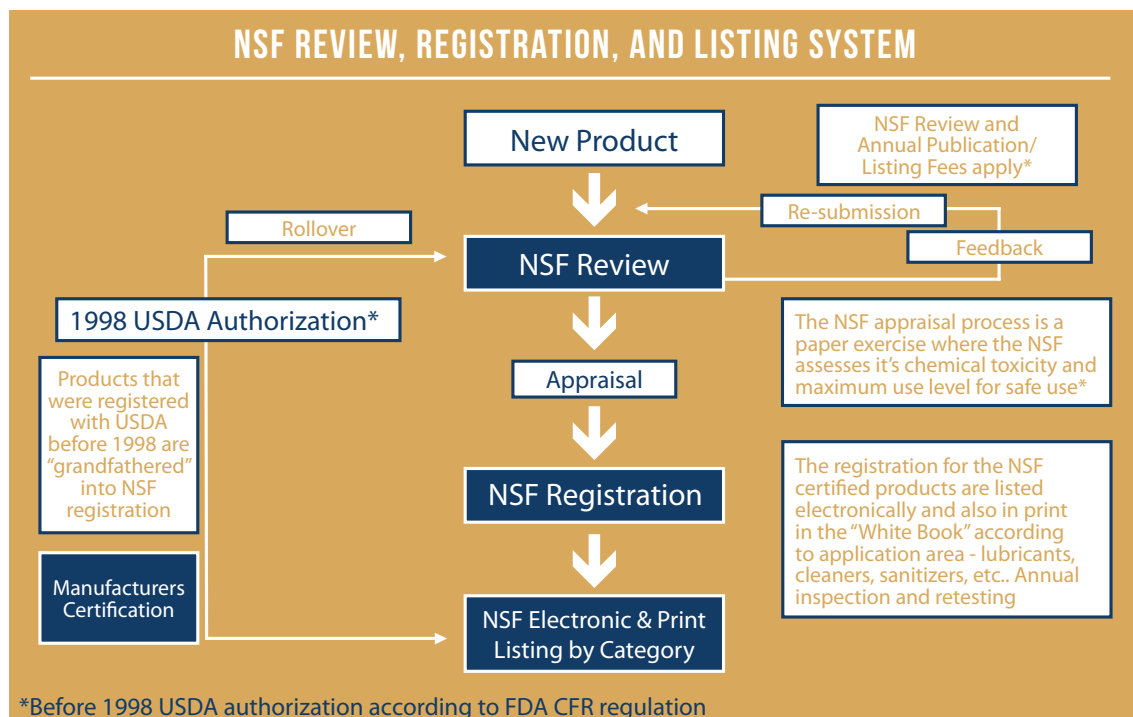
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FOOD GRADE ADDITIVES NSF HX-1 AND HX-2 REGISTERED

The certification of food grade additives and lubricants was controlled and regulated by the United States Department of Agriculture (USDA) via FDA 12 CFR law. In the late 90's the NSF took on the role and responsibility of certifying and regulating chemicals and a variety of substances for food grade applications. The older chemicals that were grandfathered in were part of the new registration process and through the years chemical companies and other technical industries have looked to the NSF for guidance on how to pursue this special registration.

The NSF process for registering a substance is a paper exercise that is done using the testing data from the regulatory bodies and laboratory testing from the submitter's company. The toxicity data is submitted to NSF along with other pertinent chemical information for the additive being considered (often referred to as the "Appraisal"). With this information the NSF creates a chemical and toxicity profile for that substance. The chemical profile determines NSF food grade additive rating (HX-1, HX-2) and treat rate in the food grade lubricant. Once the rating and treat rate are determined, the substance is registered with the NSF and requires an annual maintenance fee. The NSF publishes (print & electronically) a list of additives by their category and application including food grade additives and lubricants.

NSF REGISTRATION PROCESS & LISTING SYSTEM



CERTIFICATION PROCESS

The NSF certification process is specific to the product, process, or service being certified and the type of certification, but generally follows seven steps:

- Application and information submission**
- Product evaluation**
- Product testing in lab**
- Manufacturing facility inspection, production confirmation and product sampling**
- Test results review and acceptance**
- Contract signed and products listed**
- Annual plant inspection and retesting**

THE NSF MARK*

- Provides assurance that a product was impartially reviewed to established standards or guidelines
- Confirms that product labeling and claims have been objectively verified by a trusted third party
- Differentiates a product from the competition, offering a market advantage
- Demonstrates an organization's commitment to quality, compliance and safety
- Is backed by a team of professionals dedicated to public health and safe operation in more than 180 countries
- Insures that products bearing an NSF certification mark meet all standard requirements, including product testing and regular inspections to verify products continue to comply with the standard
- Can be used on packaging and Technical Data Sheets (where applicable)



NSF LOGO



*From their website (<https://www.nsf.org/about-nsf/nsf-mark>).
For more information, see the NSF Website (<http://info.nsf.org/usda/Listings.asp>)



**VANDERBILT CHEMICALS, LLC
FOOD GRADE AND KOSHER PRODUCTS
AND THEIR FUNCTIONS**

VANDERBILT CHEMICALS, LLC - NSF HX-1 / HX-2 REGISTERED & KOSHER CERTIFIED ADDITIVES

NSF HX-1 Registered Additives	NSF HX-2 Registered Additives	Kosher Certified Additives
VANLUBE® 7723 (EP & AO) VANLUBE 9123 (AW & RI) VANLUBE 961 (AO) CUVAN® 303 (CI) VANLUBE 1202 (AO) VANLUBE 407 (AO) VANLUBE 81 (AO) VANLUBE SS (AO) VANLUBE 887 FG (CI & AO)	VANLUBE 7723 (EP & AO) VANLUBE 73 (AW & EP) VANLUBE 7611M (AW & EP) VANLUBE 823 (EP) VANLUBE 9123 (AW & RI) VANLUBE 961 (AO) VANLUBE RI-A (RI)	VANLUBE 7723 (EP & AO) VANLUBE 9123 (AW & RI) VANLUBE 961 (AO) CUVAN 303 (CI) VANLUBE 407 (AO) VANLUBE 81 (AO) VANLUBE SS (AO) VANLUBE 887 FG (CI & AO)

AO: Antioxidant • AW: Antiwear • EP: Extreme Pressure • CI: Corrosion (copper) Inhibitor • RI: Rust Inhibitor

CUVAN and VANLUBE are registered trademarks of Vanderbilt Chemicals, LLC.

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ENVIRONMENTALLY ACCEPTABLE LUBRICANTS

Environmentally Acceptable Lubricants' means lubricants are **'biodegradable'** and **'minimally-toxic'** and are **'not bio accumulative'**.

The EPA defines it as:

"...(EAL) is used to describe those lubricants that have been demonstrated to meet standards for biodegradability, toxicity and bioaccumulation potential that minimize their likely adverse consequences in the aquatic environment, compared to conventional lubricants. In contrast, lubricants that may be expected to have desirable environmental qualities, but have not been demonstrated to meet these standards, are referred to as environmentally friendly lubricants (EFLs) or biolubricants..."

ENVIRONMENTALLY ACCEPTABLE LUBRICANTS INCLUDE THOSE LABELED BY THE FOLLOWING LABELING PROGRAMS:

Blue Angel (German) RAL-UZ 178:2014
European Ecolabel
Bio-Lubricants EN 16870: 20172017
Swedish Standards Hydraulics SS 15 54 34 and 15 54 70
Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) requirements
EPA's Design for the Environment (DfE)
Vessel General Permit (VGP) & small Vessel General Permit
EPA will replace with the Vessel Incidental Discharge Act (VIDA)-2022



COMPARISON OF THE DIFFERENT ENVIRONMENTAL & REGULATORY AGENCIES FOR EAL

	EUROPEAN ECOLABEL (LuSC)	BLUE ANGEL	SWEDISH STANDARD GREASES	SWEDISH STANDARD HYDRAULICS	OSPAR HOCNF	VESSEL GENERAL PERMIT (VGP)
BIODEGRADABILITY	Yes	Yes	Yes	Yes	Yes	Yes
AQUATIC TOXICITY	Yes	Yes	Yes	Yes	Yes	Yes
LIMITATIONS ON CHEMICALS	Yes	Yes	Yes	Yes	Yes	Yes
BIOACCUMULATION	Yes	Yes	No	No	Yes	Yes
MINIMUM RENEWABILITY CONTENT	Yes	No	Yes (A & B) No (C)	No	No	No
TECHNICAL REQUIREMENTS SPECIFIED	ISO 15380 for HF and Yes for other applications	ISO 15380 HF and yes for other applications	Yes (SS 15 54 70)	Yes (SS 15 54 34)	No	Yes

Additives or finished lubricants that meet the classification specified by European Ecolabel (EEL) and are listed on the Lubricant Substances Classification (LuSC) list will meet the other EAL classifications from the above list.

EUROPEAN ECOLABEL (EEL) APPROVED LUSC-LIST ADDITIVES & LUBRICANTS



Components (additives, base oils, polymers); single substances are listed on LuSC list according to their eco-tox profile

- Requirements: No hazard statements on health or environment, no metals (besides Na, K, Mg, Ca), no organic halides or nitriles, etc...
- Depending on eco-tox profile, there are treat rate limitations defined on LuSC

Lubricant additives application categories (as of rev. 2019)

- Depending on category (TLL/PLL/ALL- total, partial, all) there are treat rate limitations defined on LuSc

Persistence: Biodegradation & Bioaccumulation

- Ultimately, Inherently, Non-biodegradable and Non-bioaccumulative

Aquatic Toxicity

- Not toxic to aquatic, harmful, toxic, very toxic acute tox.

Renewable Ingredient Classification for some materials

- Palm Oil & Palm Kernel Oils meet the requirements of RSPO criterion
- If "biobased" or "bio-lubricant" marketing terminology is used then it should contain a minimum of 25% according to EN 16807

EAL finished lubricant Packaging and Container requirements for the final products

- Package or container should contain at least 25% post-consumer plastic
- Packaging or container should be designed in a way to reduce spillage.

EAL finished lubricant needs to meet a minimum performance criteria

- Various ISO and DIN specifications for a variety of industrial applications -hydraulic (ISO 15380), gear oil (DIN 51517), chainsaw oils, two-stroke oils (ISO 13738) and lubricating greases (ISO 12828, DIN 51825)

EAL finished Lubricant must have consumer information regarding use and disposal

EAL finished lubricant may have certain optional EU label information allowed by EEL to indicate that it meets certain performance criteria or is better for the environment

LUBRICANT SUBSTANCE CLASSIFICATIONS - APPLICATION AND USE

LuSC CLASSIFICATION LIST

CATEGORY	APPLICATIONS
TILL (Total Loss Lubrication)	Greases, chainsaw oils, wire rope lubricants, concrete release agents
PLL (Partial Loss Lubrication)	Greases, "open" gear oils, stern tube oils, 2-stroke oils, oils for temporary protection against corrosion
ALL (Accidental Loss Lubrication)	Greases, hydraulic fluids, metalworking fluids, "closed" gear oils



Vanderbilt Chemicals Products - LuSC Listed Additives & Treat Levels

Additive	Maximum Allowed Treat Rate						If Less than 100% see D or E on Table Below	
	ALL (No Grease)	ALL (Only Grease)	PLL (No Grease)	PLL (Only Grease)	TLL (No Grease)	TLL (Only Grease)	EEL Biodegradation	EEL Aquatic Toxicity
							A/B/C/X	D/E/F/G
Extreme Pressure & Antiwear								
VANLUBE® 289	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	90% A; 10% C	90% E; 10% D
VANLUBE 972M	0.67%	0.67%	0.67%	0.67%	0.67%	0.67%	45% A; 40% C	45% D; 40% F
Antioxidants								
VANLUBE 951	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	49% C	100% E
VANLUBE BHC	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	97% C	100% D
VANLUBE 81	5.0%	15%	20%	15%	5%	15%	100% C	100% D
VANLUBE 7723	5.0%	15%	20%	15%	5%	15%	99% C	100% D
VANLUBE 407	5.9%	6.7%	4.0%	4.0%	2.7%	2.7%	15% B; 84% C	85% D; 15% F
VANLUBE 996E	0.58%	0.58%	0.58%	0.58%	0.58%	0.58%	7% A; 92% C	95% D; 5% F
Corrosion Inhibitors								
VANLUBE 887	5.0%	2.0%	1.2%	1.2%	0.8%	0.8%	100% C	50% D; 50% F
VANLUBE RI-A	0.81%	0.81%	0.81%	0.81%	0.81%	0.81%	69% C	52% E; 48% D

Key to the Biodegradation & Aquatic Toxicity Codes seen in the Table Above

EEL Biodegradation & Aquatic Toxicity Ratings

Biodegradation	A: Ultimately aerobically biodegradable
	B: Inherently aerobically biodegradable
	C: Non-biodegradable & non- bioaccumulative
	X: Non-biodegradable & bioaccumulative
Aquatic Toxicity	D: Not toxic to aquatic organisms (>100 mg/L)
	E: Harmful 10mg/L <acute tox. ≤ 10mg/L
	F: Toxic 1mg/L <acute tox. ≤ 10mg/L
	G: Very toxic acute tox. ≤ 1mg/L

**FOR SAMPLES, PRODUCT INFORMATION AND/OR TECHNICAL SERVICE PLEASE CONTACT
VANDERBILT CHEMICALS, LLC, OR THE VANDERBILT REPRESENTATIVE IN YOUR AREA:**

VANDERBILT WORLDWIDE LTD

12 Park House
Alvaston Business Park, Middlewich Road
Nantwich, Cheshire, CW5 6PF
United Kingdom

WWW.VANDERBILTWORLDWIDE.COM

VANDERBILT CHEMICALS, LLC

30 Winfield Street, P.O. Box 5150
Norwalk, CT 06856-5150
P: (203) 853-1400
F: (203) 853-1452

WWW.VANDERBILTCHEMICALS.COM

VANDERBILT (BEIJING) TRADING, LTD

Room 220A, Tower A
No. 8 Hengfeng Road
Science Town, Fengtai District
Beijing 100070 P. R. China
P: 011- 86 10 56541176
F: 011- 86 10 56541175





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