

# QUALITY BOOSTS.



## **Lubricant Additives**

Formulated lubricants

**QUALITY WORKS.**

**LANXESS**  
Energizing Chemistry

# FULLY FORMULATED LUBRICANT SOLUTIONS INNOVATING THROUGH THE LUBRICANT VALUE CHAIN

**LANXESS' fully formulated solutions include a portfolio of innovative products, serving a wide range of applications and industries. Backed by years of experience and a pedigree of technical leadership, our portfolio of products supports a variety of markets where equipment performance, efficiency and productivity are paramount.**

**We are a world leader in polyol esters used for demanding synthetic lubricant applications, including aviation engine oils and lubricants for environmentally friendly hydrofluorocarbon (HFC) refrigeration compressors as well as high-performance synthetic lubricants used in demanding industrial applications.**

**We have earned the confidence of our customers, largely due to our extensive research and development and technical service capabilities and the ability to work with our customers to offer the most cost effective solutions for their applications.**

# CONTENTS

- 02** Introduction
- 04** REOLUBE® fire resistant hydraulic control fluids and lubricants
- 05** ROYCO® aerospace & defense fluids
- 06** EVEREST® refrigeration fluids
- 07** Calcium sulfonate complex greases



# REOLUBE® FIRE RESISTANT HYDRAULIC CONTROL FLUIDS AND LUBRICANTS

## Reolube® HYD

Fully formulated fire resistant fluids designed for use in a wide variety of general industrial applications. They offer performance and safety advantages in high temperature applications where the risk of fire needs to be minimized such as hydraulic equipment, power generation units and other industrial applications.

For applications where very high operating temperatures are found, the HYD B series provides an even greater level of stability. The Reolube® HYD range is available in several viscosity grades each consisting of carefully selected and blended phosphate esters made from fully synthetic raw materials and additive packages developed over many years of operating experience.

## Reolube® Turbofluid

Fire resistant fluids specifically designed to meet the stringent operating demands and OEM specifications of the modern power generation market. The range includes Turbofluid 32B GT, primarily designed for stationary gas turbines, but are also used for combined cycle and steam turbine units where an ISO VG 32 fluid or lubricant is required. The ISO VG 46 Turbofluids cover the wide range of requirements for both steam and gas turbine governor control and lubrication systems. Reolube® OMTI, originally developed as a combined control and lubrication fluid for large steam turbines is also be used in gas turbines and offers a high degree of fire resistance.



### General industrial hydraulic control fluids

#### **Reolube® HYD isopropylphenyl phosphate based**

Reolube® HYD 32\*

Reolube® HYD 46\*

#### **Reolube® HYD t-butyphenyl phosphate based**

Reolube® HYD 32B\*

Reolube® HYD 46B\*

### Power generation fluids and lubricants

#### **Reolube® Turbofluid trixylyl phosphate based**

Reolube® Turbofluid 46XC\*

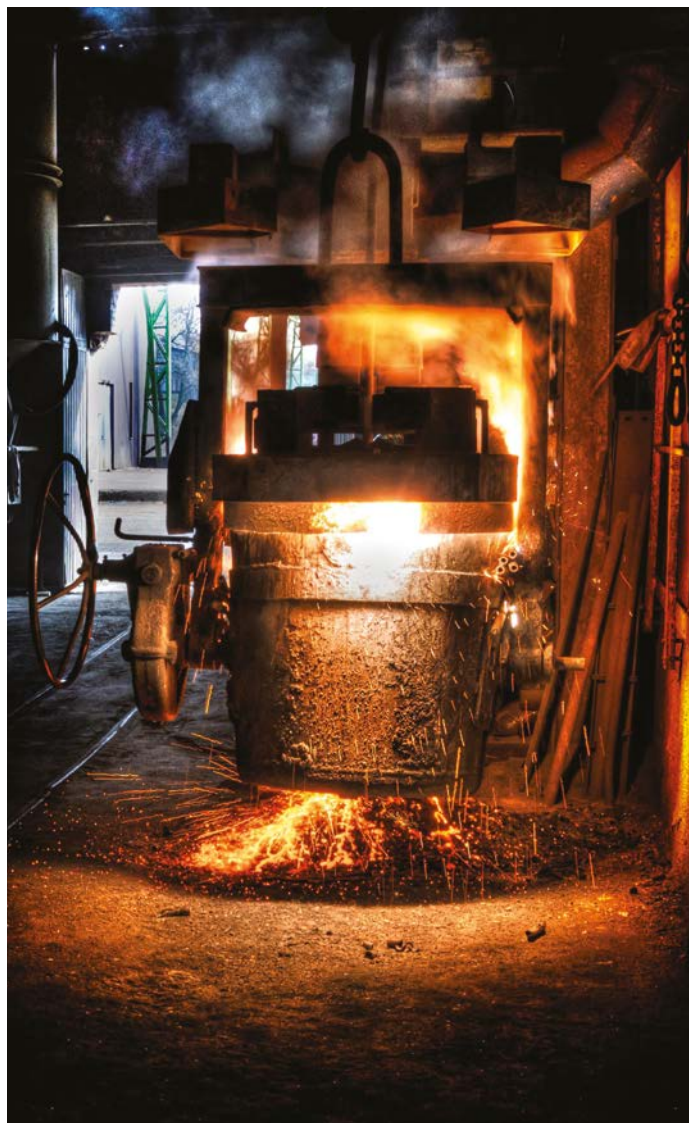
Reolube® OMTI

#### **Reolube® Turbofluid t-butylphenyl phosphate based**

Reolube® Turbofluid 32BGT\*

Reolube® Turbofluid 46B\*

\* Fluids are Factory Mutual approved to Std 6930.-



## AEROSPACE & DEFENSE FLUIDS

### Aerospace & defense

At the dawn of the jet age Royco® established itself as the prominent lubricant for aviation. Ever since, Royco® Fluids have been a trusted and leading technology for the most critical of applications. From the bitter cold of the poles to the simmering heat of the world's deserts, these engineered fluids deliver unrivaled performance for an advanced defense and commercial aerospace requirements. Royco® aerospace and defense fluids set a quality and technology standard. They are AS 9100/ISO 9001:2000 certified.

### Weapons cleaner & preservative lubricants

Royco® weapons cleaner and preservative lubricants are not simple "gun oils." These fluids are complex formulations of contemporary technology that help to remove fouling, prevent corrosion and provide long-lasting lubrication for weapons readiness. These characteristics are proven for use in both small and large caliber weapons – even after severe firing and in the harshest of environments. A truly military grade product that will exceed any sporting demands.

### Specialty application & performance fluids

Today's aerospace environment is broad and has many needs. From coolant to dielectric protection through to gear and sliding surface lubricant requirements, Royco® Specialty application fluids are designed to meet your demands.

### Hydraulic fluids

Royco® hydraulic fluids are engineered for the most rigorous of military applications. With such credentials you can be sure that Royco® hydraulic fluids will perform for your aerospace and industrial hydraulic needs. These fluids are designed to provide optimal anti-wear, corrosion, demulsibility and oxidation performance across broad operating temperature ranges. For added reliability Royco® hydraulic fluids are produced to meet or exceed the military's cleanliness requirements for hydraulic fluids.

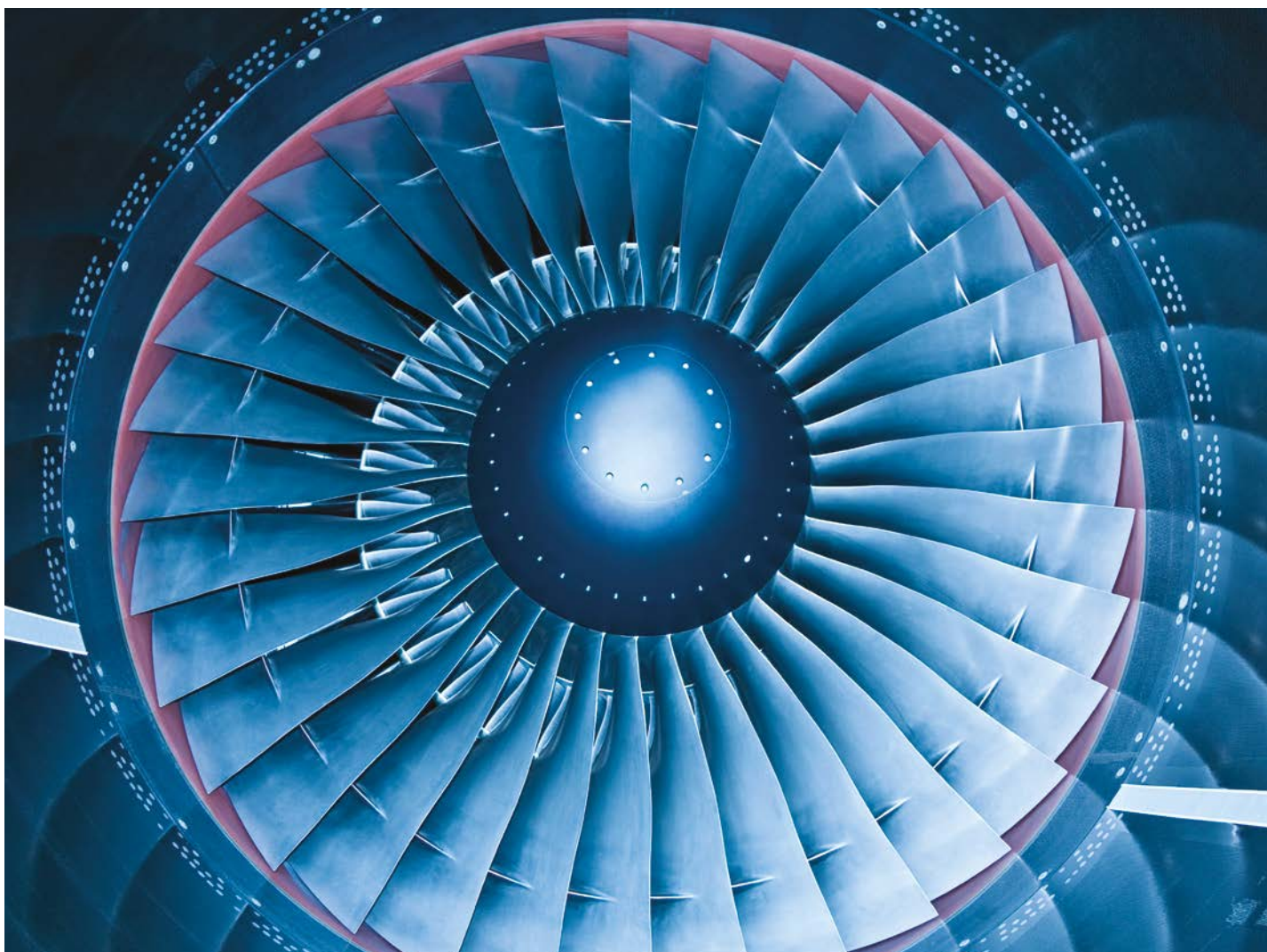
### Performance compounds & greases

Royco® performance compounds and greases are semi-solid blends of the latest technology for additives, base fluids and modern thickeners. These systems are designed for the most demanding lubrication requirements. Whether it is severely loaded gears, extreme pressure sliding surfaces, exposure to high altitude or corrosive and marine environments, Royco® performance compounds and greases deliver the needed performance.

### Turbine & drivetrain fluids

Royco® turbine fluids are developed to deliver performance to a sophisticated industry. At the crossroads of this obligation are decades of technical experience and dedicated manufacturing. You can have confidence in Royco® for use in the most advanced fighters jets, commercial jets and helicopters.

Application	Product	Specification	Base fluid	Viscosity ISO VG	Comments
Hydraulics	ROYCO® 756	MIL-PRF-5606	Mineral oil	15	“Red oil” hydraulic fluid
Hydraulics	ROYCO® 782	MIL-PRF-83282	PAO	15	Fire resistant synthetic hydraulic fluid
Turbine & drivetrain	ROYCO® 500	MIL-PRF-23699 STD	POE	22/32	5 cSt Synthetic turbine engine oil
Turbine & drivetrain	ROYCO® 555	DOD-PRF-85734	POE	22/32	5 cSt Synthetic turbine engine and helicopter transmission oil
Turbine & drivetrain	ROYCO® 560	MIL-PRF-23699 HTS	POE	22/32	5 cSt High temperature stability synthetic turbine engine oil
Turbine & drivetrain	ROYCO® 899	MIL-PRF-23699 CI	POE	22/32	5 cSt Corrosion inhibition synthetic turbine engine oil



# EVEREST®

## REFRIGERATION FLUIDS

### Everest® refrigeration fluids

Synthetic polyol ester (POE) refrigeration lubricants that are designed to impart optimum performance, wear protection and longer service life. Not only to conventional HFC based refrigeration and air conditioning systems, but also to various new generation energy efficient and environmental friendly refrigerant technologies, including R-32, CO<sub>2</sub> hydrocarbons, hydrofluoroolefins and their blends.

All Everest® polyol ester refrigeration lubricants are manufactured to exacting standards of high purity, low residual acid value, low color and low moisture. LANXESS is one of the world's largest manufacturers of polyol esters with special expertise in

the production of POEs for refrigeration lubricants. We are also amongst the innovation leaders of new polyol ester lubricant base stocks and formulations for next generation low-GWP refrigerant technologies. LANXESS' state-of-the-art manufacturing facilities located in Fords, New Jersey are fully automated with the most efficient esterification technology employed. This ensures consistent high quality products.

Many compressor manufacturers have their own specific formulated lubricants for OEM factory fill and maintenance. LANXESS manufactures a number of POEs that match the exact specification requirements for select OEMs.



Everest® product	Kinematic viscosity @ 100°C (cSt)	Kinematic viscosity @ 40°C (cSt)	Viscosity index (typical)	Flash point (°C)	Pour point (°C)	Density at 15.6°C (lbs/gal)	Low temp. miscibility 10 volume % oil in refrigerant (°C)		
							R-134a	R-404a	R-410a
–	3.6	15.6	115	232	–59	8.52	NA	15	15
22	4.7	23.5	120	252	–59	8.27	<–50	<–60	<–40
32	5.6	31.6	115	250	–55	8.21	<–50	<–60	<–45
46	6.9	46.2	105	258	–46	8.14	<–50	<–60	<–40
68	8.3	64.9	96	256	–40	8.07	<–35	<–60	<–30
100	10.6	95.7	93	271	–34	8.07	<–35	<–60	<–15
150	14.4	148.0	91	279	–27	8.06	<–20	<–50	<–15
170	15.3	168.0	91	279	–24	8.07	<–20	<–50	<–15
220	18.1	221.3	88	254	–28	8.04	<–20	<–50	NA

• All products are manufactured to a maximum moisture level specification of 50ppm

Page 8 of 12: This document contains important information and must be read in its entirety.



# CALCIUM SULFONATE COMPLEX GREASES

LANXESS calcium sulfonate complex greases are characterized by exceptional mechanical stability, high dropping point, high load carrying performance, reduced wear and excellent resistance to water and corrosion. Our products also have outstanding performance at high temperatures. For low temperatures, with a proper formulation, most performance requirements can be met. This technology equals and in many ways outperforms other premium, high temperature greases such as lithium complex, aluminum complex and polyurea.



- Modern grease facilities, dedicated solely to calcium sulfonate complex grease
- Back integrated into the manufacture of overbased calcium sulfonate used to make this grease
- Recognized globally as a high quality grease producer
- Numerous market general formulations available, both industrial and food grade
- Ability to offer custom formulations
- Small batch sizes starting at 5000 lb
- ISO9000, ISO14000, and Responsible Care certified
- LANXESS was the first manufacturer of calcium sulfonate complex grease to obtain H1 Incidental Food Contact approval, giving food producers a series of significantly improved products over the existing food machinery grease technology

## Grease compatibility

The following is a general compatibility chart. While LANXESS's grease is generally considered to be compatible with several other thickener types, the user must still exercise caution whenever switching to a new product. Variations in

manufacturing process and selection of raw materials may affect compatibility significantly. LANXESS recommends testing for compatibility prior to making a change in any critical application.

Thickener	1	2	3	4	5	6	7	8	9	10	11
1 Ca Sulfonate complex		NC	NC	FC	NC	FC	FC	FC	NC	NC	NC
2 Aluminum complex	NC		NC	FC	NC	NC	NC	NC	NC	FC	NC
3 Barium	NC	NC		FC	NC	NC	NC	NC	NC	FC	NC
4 Anhydrous calcium	FC	FC	FC		SC	FC	FC	FC	NC	?	NC
5 Calcium complex	FC	NC	NC	SC		NC	NC	FC	FC	NC	NC
6 Clay	NC	NC	NC	FC	NC		NC	NC	NC	FC	NC
7 Lithium	FC	NC	NC	FC	NC	NC		FC	NC	?	SC
8 Lithium complex	FC	NC	NC	FC	FC	NC	FC		NC	FC	SC
9 Polyurea	NC	NC	NC	NC	FC	NC	NC	NC		?	NC
10 Silica gel	NC	FC	FC	?	NC	FC	?	FC	?		FC
11 Sodium	NC	NC	NC	NC	NC	NC	SC	SC	NC	FC	

FC Fully compatible

SC Somewhat compatible - mixtures soften, but, remains grease-like

NC Not compatible - mixtures soften severely and do not remain grease-like

All precautions were taken to ensure that the data in this table is correct, however, it is recommended that you consult the manufacturer before mixing two different products.

# CALCIUM SULFONATE COMPLEX GREASES

LANXESS calcium sulfonate complex grease products have been designed for a wide range of applications, from ultra clean environments in food processing, to extreme conditions experienced in general manufacturing, off-highway and marine.

Grease	Description	Oil type	NLGI grade	Base oil viscosity @ 40°C	Operating temperature range	Color	4 ball wear
				ASTM D445			ASTM D2266
				cSt	(°C)	Visual	mm
<b>Industrial use – general, steel, paper, marine</b>							
G-2032	Multipurpose grease; low temperature applications	Mineral	2	23	-40-140	Tan	0.38
G-2180	Enhanced multipurpose grease; automotive and industrial bearings	Mineral	2	112	-40-160	Green	0.42
G-2000	Multipurpose grease; heavy industrial; steel, automotive (GC/LB)	Mineral	2	135	-20-160	Tan	0.42
G-2163	Heavy industrial- steel, marine, paper	Mineral	2	220	-18-160	Tan	0.40
G-2106	Heavy duty industrial grease – couplings, steel	Mineral	1	303	0-160	Brown	0.42
G-2181	Heavy duty industrial grease – steel mill applications	Mineral	1.5	460	-18-160	Brown	0.42
G-2162	Heavy duty industrial grease – mining, steel applications	Mineral	1	760	0-180	Brown	0.43
<b>Synthetic industrial grease</b>							
G-2115	Low viscosity synthetic formulation; low temperatures; high speed bearings, sealed-for-life bearings, long life applications	PAO	2	50	-40-180	Tan	0.42
G-2190	Mid viscosity synthetic grease; low to medium speed bearings; high temperatures; infrequent lubrication	PAO	2	220	-40-190	Tan	0.42
G-2087	Industrial; high temperature	PAO	1.5	400	-40-190	Tan	0.42
<b>Mining / off-Road / construction</b>							
G-2063	Diamond drill rod grease; low speed, high load bearings only	Mineral	2	232	0-140	Tan	0.4
G-2137	Industrial; wire rope, open gear, pin bushings	Mineral / PAO	1	227	-18-140	Black	0.42
G-2251	3% Molybdenum disulfide, pin bushings	Mineral	1	112	-32-170	Black	0.42
G-2253	5% Molybdenum disulfide; construction equipment grease; pin bushings	Mineral	2	150	-32-170	Black	0.49
<b>Food processing</b>							
G-2234	H1 Food machinery grease; multipurpose	White mineral	2	100	-20-160	Tan	0.45
G-2248	High viscosity H1 approved food machinery grease; low to medium speed bearings; Ideal for heavily loaded bearings such as crushing operations	White mineral	2	180	-20-180	Tan	0.45
G-2233	H1 Food machinery grease; wide temperature range	PAO	2	50	-40-180	Tan	0.42
G-2161	Mid viscosity synthetic H1 approved food machinery grease; low to medium speed bearings; high temperatures; Infrequent Lubrication	PAO	2	100	-40-180	Tan	0.4
G-2249	Mid viscosity synthetic H1 approved food machinery grease; low to medium speed bearings; high temperatures; infrequent lubrication	PAO	2	220	-40-190	Tan	0.42
G-2235	H1 Food machinery grease; high temperature	PAO	1.5	400	-40-190	Tan	0.50

Consistency 1/10mm		Oil separation		Corrosion resistance	Water washout	Drop point	Load wear index	Weld point	Low temp torque (Nm)			All available grades
ASTM D217		ASTM D6184		ASTM D1743	ASTM D1264	ASTM D2265	ASTM D2596	ASTM D2596	ASTM D1478			
Worked 60	Worked 100K	Temp (°C)	% Loss	Rating	%	(°C)		(kg)	(°C)	Starting	Running	
280	286	100	NIL	Pass	1.0	300	62	500	-40	0.85	0.08	2, 1, 0.5, 0
280	288	100	NIL	Pass	0.5	318	80	620	-29	0.62	0.08	2.5, 2, 1, 0, 00
280	287	100	NIL	Pass	0.5	318	62	500	-29	0.72	0.06	2,1
289	286	100	NIL	Pass	1.0	318	62	500	-18	0.53	0.06	2, 1.5, 1
325	332	100	NIL	Pass	2.5	318	62	500	n/a	n/a	n/a	2, 1
300	306	100	NIL	Pass	1.0	318	62	500	-18	0.16	0.03	2, 1.5
325	332	100	NIL	Pass	1.0	318	55	400	n/a	n/a	n/a	2, 1
280	286	100	NIL	Pass	0.5	318	62	500	-40	0.55	0.06	2, 1, 0.5
280	293	100	NIL	Pass	0.1	318	50	400	-40	0.60	0.09	2
300	315	100	NIL	Pass	0.5	318	55	400	-40	0.76	0.12	1.5
280	286	100	NIL	Pass	0.1	300	62	500	n/a	n/a	n/a	2.5, 2
325	332	100	NIL	Pass	1.0	280	65	500	n/a	n/a	n/a	1, 0, 00
325	333	100	1	Pass	0.3	318	100	800	-29	0.50	0.06	1
280	287	100	2.11	Pass	0.1	318	118	800	-32	0.96	0.15	2
280	286	100	0.1	Pass	0.3	318	55	400	-18	0.10	0.02	2
280	274	100	NIL	Pass	0.3	318	62	500	-18	0.22	0.03	2
280	288	100	NIL	Pass	0.5	318	55	400	-29	0.24	0.05	2, 1
280	293	100	NIL	Pass	0.5	318	55	400	-40	0.42	0.09	2
280	293	100	NIL	Pass	0.1	318	50	400	-40	0.60	0.09	2
300	291	100	1.9	Pass	0.5	318	55	400	-29	0.24	0.05	2, 1.5



**LANXESS Solutions US Inc.**

199 Benson Road  
Middlebury, CT 06749  
USA  
Tel: +1-203-573-2000

[add.lanxess.com](http://add.lanxess.com)

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.

**Health and Safety Information:** Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling the LANXESS products mentioned in this publication. For materials mentioned which are not LANXESS products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be followed. Before working with any of these products, you must read and become familiar with the available information on their hazards, proper use, and handling. This cannot be overemphasized. Information is available in several forms, e.g., material safety data sheets and product labels. Consult your LANXESS Solutions US Inc. representative or contact the Product Safety and Regulatory Affairs Department at LANXESS.

**Regulatory Compliance Information:** Some of the end uses of the products described in this publication must comply with applicable regulations, such as the FDA, NSF, USDA, CPSC and BfR. If you have any questions on the regulatory status of these products, contact your LANXESS Solutions US Inc. representative or Regulatory Affairs Manager at LANXESS.

**Note:** The information contained in this publication is current as of April, 2017. Please contact LANXESS Solutions US Inc. to determine if this publication has been revised. Edition 04/2017

® = trademark of LANXESS Deutschland GmbH or its affiliates, registered in many countries in the world.