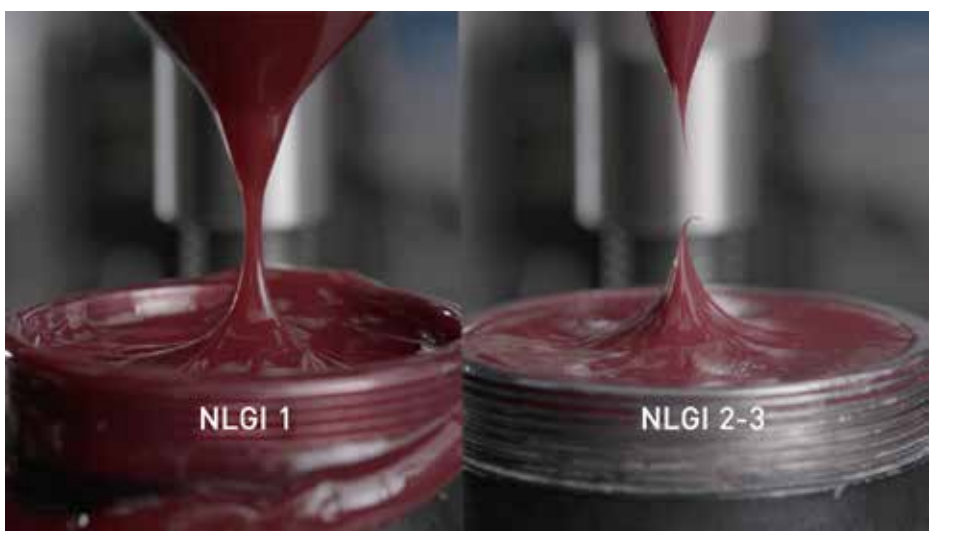
Technical Bulletin

ISO & DIN Classificaitons for Greases

Grease Classification Types

In the world of greases, which have a wide range of applications, two standards stand out to remove the confusion and reach standardization. The first of these standards is the DIN - German Institute for Standardization (Deutsches Institut für Normung) Standard 51502 and the other is ISO (International Organization for Standardization), which is an independent global institution, Standard 6743-9. Using an agreed terminology, both standards provide comprehensive content describing key features such as grease consistency, structure, operating temperature, application recommendations and extreme pressure additive.



Classification according to DIN 51502/Example KF 2 K-20

Character 1: The initial letters such as K, G, OG, M indicate the main application for which the grease is recommended.
Character 2: Second letters such as D, E, F, L, M, S, P and V determine the type of special additive(s) used in the grease.
Character 3: The number determines the NLGI (consistency) of the grease according to the ASTM D-217. The order from the sofest to the hardest is 000, 00, 0, 1, 2, 3, 4, 5 and 6. Number 2 is the most preferred consistency grade for multi-purpose greases.
Character 4: The letters C, D, E, F, G, H, K, M, N, P, R, S, T and U, which constitute the fourth character, indicate the maximum application/operating temperatures given in the table below.

Character 1: KG-OG-M

K F 2 K - 20

Identifying Letter	Type of Grease	Symbol
K*	Rolling bearing, anti-friction and sliding surface greases in accordance with DIN 51825	For greases based on mineral oil
G	Greases for closed gears in accordance with DIN 51826	
OG	Greases for open gears, gears (bitumen-free adherent lubricants)	
M	Greases for bearings and seals**	
Additional letters according to Table 1, material from group 3	With respect to its main characteristics, synthetic greases are classified in the same way as greases based on mineral oil	For lubricating greases with synthetic oil base

*ISO/TR 3498: 1986 uses the letters XM instead of the identifying letter K
**Lower grease requirements where the letter K appears

Character 2: D-E-F-L-M-S-P-V

K **F** 2 K - 20

Additional Identifying Letter	Lubricants
D	For lubricating oils with detergent additives, e.g.: Hydraulic oil HLPD
E	For lubricating oils that are often used mixed with water, e.g.: Water-soluble coolant lubricant, SE coolant lubricant
F	For lubricants with solid lubricant additives (graphite, molybdenum sulphide), e.g.: CLPF lubricating oil
L	For oils with active substances to increase protection against corrosion and/or aging, e.g.: Oil DIN 51517-CL 100
M	For water-soluble coolants with water and with mineral oil components, e.g.: SEM refrigerant lubricant
S	For water-soluble and synthetic oil-based coolant lubricants, e.g.: SES coolant lubricant
P	For lubricants with active substances to reduce friction and wear under mixed friction conditions and/or increase the stability with regard to the load, e.g.: CLP 100 oil
V*	For lubricants, which dissolve with solvents, e.g.: DIN 51513-BB-V oil

*Products with the additional identifying letter V may require labelling according to regulations on Hazardous Substance

Character 3: 000-00-0-1-2-3-4-5-6

K F **2** K - 20

Coefficient of Consistency (NLGI Grade in Accordance with DIN 51818)	Worked Penetration Based on DIN ISO 2137 Unit*
000	445 to 475
00	400 to 430
0	355 to 385
1	310 to 340
2	265 to 295
3	220 to 250
4	175 to 205
5	130 to 160
6	85 to 115**

*1 unit = 0.1 mm
**Stationary penetration

Character 4: C-D-E-F-G-H-K-M N-P-R-S-T-U

K F 2 **K** - 20

Additional Identifying Letter	Maximum Temperature of Application*
C	+ 60 °C
D	
E	+ 80 °C
F	
G	+ 100 °C
H	
K	+ 120 °C
M	
N	+ 140 °C
P	+ 160 °C
R	+ 180 °C
S	+ 200 °C
T	+ 220 °C
U	More than +220 °C

Last two characters: -10/-20/-30/-40 -50/-60

K F 2 K **- 20**

Additional Identifying Number	Minimum Temperature of Application
-10	-10 °C
-20	-20 °C
-30	-30 °C
-40	-40 °C
-50	-50 °C
-60	-60 °C

Classification according to ISO 6743-9

The ISO 6743-9 standard is used to describe the prominent technical features of the family X products (greases) and the family L products (lubricants, industrial oils and related products). In this classification system, greases are not defined by their application areas rather than their formulas and additives. The ISO code is briefly as follows: ISO-LX-Character 1- Character 2- Character-3 and Character 4- NLGI Consistency.

LUBRICATING GREASE CLASSIFICATION BY LETTERS AND SYMBOLS ACCORDING TO ISO 6743-9

ISO L - X B E G B 00

- L: Lubricant class
- X: Grease family
- B: Symbol 1-Minimum operating temperature
- E: Symbol 2-Maximum operating temperature
- G: Symbol 3-Behaviour in the presence of water
- B: Symbol 4-Extreme pressure properties
- 00: Symbol 5-NLGI grade

Symbol 1: Minimum operating temperature

SYMBOL	A	B	C	D	E
Minimum operating temperature, °C	0	-20	-30	-40	< -40

Symbol 2: Maximum operating temperature

SYMBOL	A	B	C	D	E	F	G
Maximum operating temperature, °C	60	90	120	140	160	180	> 180

Symbol 3: Behaviour in the presence of water

SYMBOL	A	B	C	D	E	F	G	H	I
Environment	L	L	L	M	M	M	H	H	H
Protection	L	M	H	L	M	H	L	M	H

Envitonment:
L - Dry
M - Static humidity
H - Dynamic humidity

Protection:
L - Zero protection
M - Protection with distilled water
H - Protection with salt water

Symbol 4: Extreme pressure properties

Symbol A: Application requires non-EP grease
Symbol B: Application requires EP grease

Symbol 5: NLGI grade

CONSISTENCY GRADE ACCORDING TO NLGI	PENETRATION AFTER 60 STROKES, AT 25 °C, 0.1 MM	CONSISTENCY OF GREASES
000	445-475	Fluid
00	400-430	Fluid
0	355-385	Very Soft
1	310-340	Soft
2	265-295	Moderately Soft
3	220-250	Semi-Fluid
4	175-205	Semi-Thick
5	130-160	Hard
6	85-115	Very Hard