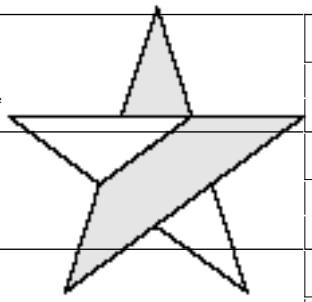

REV.	DATA *DATE*	DESCRIZIONE MODIFICA *DESCRIPTION OF MODIFICATION*	REDATTO *COMPILED*	CONTROLLATO *CHECKED*	APPROVATO *APPROVED*
12	10/01	Revised where indicated 12	Zorzut S. DTN	Toso U. CCUT	Moro D. UQE
11	02/01	Revised where indicated	Zorzut S. DTN	Toso U. CCUT	Moro D. UQE
10	08/00	Revised where indicated	Zorzut DTN	Totis FLUIDTECH	Moro UQE
09	02/00	Revised where indicated	Zorzut DTN	Totis FLUIDTECH	Moro UQE
08	08/99	Revised ESSO oils and Tribol greases where indicated	Zorzut DTN	Totis FLUIDTECH	Moro UQE
07	02/99	Restored - General revision	Zorzut DTN	Totis FLUIDTECH	Moro UQE
06	07/98	Cancelled	Zorzut DTN	Totis FLUIDTECH	Moro UQE
05	02/96	Agg. prodotti Agip, Shell, Citgo, Fuchs *Updated Agip, Shell, Citgo, Fuchs products*	Zorzut DTN	Totis FLUIDTECH	Dalla Franc. UGQ
04	07/95	Mod. punto 5 (Elim. Agip e Signal); agg. sigla Quaker *Mod. item 5 (Del. Agip and Signal); updated Quaker tag*	Zorzut DTN	Totis FLUIDTECH	Dalla Franc. UGQ
03	04/95	Inserito Hydrofluid HFDU 68 (Mobil) *Inserted Hydrofluid HFDU 68 (Mobil)*	Zorzut UGQ/NOR	Totis FLUIDTECH	Coassin DQS
02	08/94	Agg. Brooks; ins. Citgo; elim. Auschem; ins. Roloil; agg. sigle DIN *Upgr. Brooks; ins. Citgo; del. Auschem; ins. Roloil; mod. DIN codes*	Zorzut UGQ/NOR	Totis FLUIDTECH	Coassin DQS
01	09/93	Nuova edizione; sostituisce edizione 01/89 Rev. 4 *First issue; replace edition 01/89 Rev. 4*	Zorzut UGQ/NOR	Nigris FLUIDTECH	Coassin DQS

1 - SCOPO

Scopo della presente Norma é di definire la tipologia dei lubrificanti ed i criteri di scelta per la loro utilizzazione.

2 - ABBREVIAZIONI

Non applicabile.

3 - APPLICABILITA'

La presente Norma si applica nei casi e nelle condizioni definite nell'ambito dei criteri di scelta;
condizioni operative differenti da quelle indicate comportano l'impiego di lubrificanti specifici da definire di volta in volta.

4 - DEFINIZIONI

Non applicabile.

5 - RIFERIMENTI

IEC 60156 - Insulating liquids Determination of the break down voltage at power frequency; test method:
IEC 60296 - Specification for unused mineral insulating oils for transformers and switchgear;
VDE 0370.1 - Insulating oils;new insulating oils for transformers and switchgear;
DIN 51354 - Testing of lubricants; mechanical testing by the FZG gear rig test method; method for A/8,3/90 lubricating oil;
DIN 51355 - Testing of lubricants; testing gear oils for their corrosion-inhibiting properties with respect to steel in the presence of water; method A and B;
DIN 51381 - Testing of governor oils and hydraulic fluids; determination of air release properties;
DIN 51389.2 - Testing of lubricants; mechanical testing of hydraulic fluids by the vane-pump method; method A for anhydrous hydraulic fluids;
DIN 51513 - Lubricants; lubricating oils B; minimum requirements;
DIN 51502 - Lubricants and related products; designation of lubricants and marking the containers;
DIN 51517.1 - C lubricating oils; minimum requirements;
DIN 51517.3 - CLP lubricating oils; minimum requirements;
DIN 51524.2 - Pressure fluids; HLP hydraulic oils; minimum requirements;
DIN 51558.1 - Testing of petroleum products; determination of neutralization number; colour indicator titration;
DIN 51562 - Viscometry; measurement of kinem. viscosity;
DIN 51587 - Testing of lubricants; determination of the ageing behaviour of steam turbine oils and hydraulic oils containing additives
DIN 51599 - Determination of demulsification capacity of lubricating oils using the stirring method;
DIN 51757 - Testing of petroleum products and related products; determination of density;
DIN 51759.1 - Testing of liquid petroleum products; determination of the corrosive effect on copper; copper strip test;
DIN 51802 - Testing of greases for corrosion-inhibiting properties (SKF-Emcor method)
DIN 51805 - Determination of flow pressure of lubricating greases (Kesternich method);
DIN 51807 - Testing of lubricants; test on the behaviour of greases in the presence of water;
DIN 51818 - Consistency classification of lubricating greases; NLGI grades;

1 - PURPOSE

Aim of this Standard is to define the series of lubricants and the selection criteria for their use.

2 - ABBREVIATIONS

Not applicable.

3 - APPLICABILITY

This Standard applies on the applications and operating conditions listed in the selection criteria;
different operating conditions by those selected require the use of detailed lubricants to be specified.

4 - DEFINITIONS

Not applicable.

5 - REFERENCES

IEC 60156 - Insulating liquids Determination of the break down voltage at power frequency; test method:
IEC 60296 - Specification for unused mineral insulating oils for transformers and switchgear;
VDE 0370.1 - Insulating oils;new insulating oils for transformers and switchgear;
DIN 51354 - Testing of lubricants; mechanical testing by the FZG gear rig test method; method for A/8,3/90 lubricating oil;
DIN 51355 - Testing of lubricants; testing gear oils for their corrosion-inhibiting properties with respect to steel in the presence of water; method A and B;
DIN 51381 - Testing of governor oils and hydraulic fluids; determination of air release properties;
DIN 51389.2 - Testing of lubricants; mechanical testing of hydraulic fluids by the vane-pump method; method A for anhydrous hydraulic fluids;
DIN 51513 - Lubricants; lubricating oils B; minimum requirements;
DIN 51502 - Lubricants and related products; designation of lubricants and marking the containers;
DIN 51517.1 - C lubricating oils; minimum requirements;
DIN 51517.3 - CLP lubricating oils; minimum requirements;
DIN 51524.2 - Pressure fluids; HLP hydraulic oils; minimum requirements;
DIN 51558.1 - Testing of petroleum products; determination of neutralization number; colour indicator titration;
DIN 51562 - Viscometry; measurement of kinem. viscosity;
DIN 51587 - Testing of lubricants; determination of the ageing behaviour of steam turbine oils and hydraulic oils containing additives
DIN 51599 - Determination of demulsification capacity of lubricating oils using the stirring method;
DIN 51757 - Testing of petroleum products and related products; determination of density;
DIN 51759.1 - Testing of liquid petroleum products; determination of the corrosive effect on copper; copper strip test;
DIN 51802 - Testing of greases for corrosion-inhibiting properties (SKF-Emcor method)
DIN 51805 - Determination of flow pressure of lubricating greases (Kesternich method);
DIN 51807 - Testing of lubricants; test on the behaviour of greases in the presence of water;
DIN 51818 - Consistency classification of lubricating greases; NLGI grades;

DIN 51821.2 - Testing of lubricating greases using the FAG-FE9 roller bearing grease testing machine; method A/1500/6000

DIN 51825 - K lubricating greases; classification and requirements;

DIN 51826 - G lubricating greases; requirements;

EN 7 - Determination of ash from petroleum products;

ISO 2137 - Petroleum products; lubricating grease; determination of cone penetration;

ISO 2160 - Petroleum products; corrosiveness to copper; copper strip test;

ISO 2176 - Petroleum products; determination of dropping point of greases;

ISO 2592 - Petroleum products; determination of flash and fire points; Cleveland open cup method;

ISO 2909 - Petroleum products; determination of viscosity index from kinematic viscosity;

ISO 3016 - Petroleum products; determination of pour point;

ISO 3448 - Industrial liquid lubricants; ISO viscosity; classification;

ISO 4406 - Hydraulic fluid power; Fluids; Method for coding level of contamination by solid particles;

ISO 6743.1 - Lubricants, industrial oils and related products (class L); classification; family A (total loss systems);

ISO 6743.4 - Lubricants, industrial oils and related products (class L); classification; family H (hydraulic systems);

ISO 6743.6 - Lubricants, industrial oils and related products (class L); classification; family C (gears);

ISO 6743.9 - Lubricants, industrial oils and related products (class L); classification; family X (greases);

ISO 6743.11 - Lubricants, industrial oils and related products (class L); classification; family P (pneumatic tools);

ASTM D 92 - Test method for flash and fire points by Cleveland open cup;

ASTM D 97 - Test method for pour point of petroleum products;

ASTM D 130 - Test method for detection of copper corrosion from petroleum products by the copper strip tarnish test;

ASTM D 217 - Test method for cone penetration of lubricating grease;

ASTM D 445 - Test method for kinematic viscosity of transparent and opaque liquids;

ASTM D 664 - Test method for acid number of petroleum products by potentiometric titration;

ASTM D 665 - Test method for rust-preventing characteristics of inhibited mineral oil in the presence of water;

ASTM D 874 - Test method for sulfated ash from lubricating oils and additives;

ASTM D 892 - Test method for foaming characteristics of lubricating oils;

ASTM D 942 - Test method for oxydation stability of lubricating greases by the Oxygen bomb method;

ASTM D 943 - Test method for oxydation characteristics of inhibited mineral oils;

ASTM D 974 - Test method for acid and base number by color-indicator titration;

ASTM D 1264 - Test method for determining the water washout characteristics of lubricating greases;

DIN 51821.2 - Testing of lubricating greases using the FAG-FE9 roller bearing grease testing machine; method A/1500/6000

DIN 51825 - K lubricating greases; classification and requirements;

DIN 51826 - G lubricating greases; requirements;

EN 7 - Determination of ash from petroleum products;

ISO 2137 - Petroleum products; lubricating grease; determination of cone penetration;

ISO 2160 - Petroleum products; corrosiveness to copper; copper strip test;

ISO 2176 - Petroleum products; determination of dropping point of greases;

ISO 2592 - Petroleum products; determination of flash and fire points; Cleveland open cup method;

ISO 2909 - Petroleum products; determination of viscosity index from kinematic viscosity;

ISO 3016 - Petroleum products; determination of pour point;

ISO 3448 - Industrial liquid lubricants; ISO viscosity; classification;

ISO 4406 - Hydraulic fluid power; Fluids; Method for coding level of contamination by solid particles;

ISO 6743.1 - Lubricants, industrial oils and related products (class L); classification; family A (total loss systems);

ISO 6743.4 - Lubricants, industrial oils and related products (class L); classification; family H (hydraulic systems);

ISO 6743.6 - Lubricants, industrial oils and related products (class L); classification; family C (gears);

ISO 6743.9 - Lubricants, industrial oils and related products (class L); classification; family X (greases);

ISO 6743.11 - Lubricants, industrial oils and related products (class L); classification; family P (pneumatic tools);

ASTM D 92 - Test method for flash and fire points by Cleveland open cup;

ASTM D 97 - Test method for pour point of petroleum products;

ASTM D 130 - Test method for detection of copper corrosion from petroleum products by the copper strip tarnish test;

ASTM D 217 - Test method for cone penetration of lubricating grease;

ASTM D 445 - Test method for kinematic viscosity of transparent and opaque liquids;

ASTM D 664 - Test method for acid number of petroleum products by potentiometric titration;

ASTM D 665 - Test method for rust-preventing characteristics of inhibited mineral oil in the presence of water;

ASTM D 874 - Test method for sulfated ash from lubricating oils and additives;

ASTM D 892 - Test method for foaming characteristics of lubricating oils;

ASTM D 942 - Test method for oxydation stability of lubricating greases by the Oxygen bomb method;

ASTM D 943 - Test method for oxydation characteristics of inhibited mineral oils;

ASTM D 974 - Test method for acid and base number by color-indicator titration;

ASTM D 1264 - Test method for determining the water washout characteristics of lubricating greases;

ASTM D 1298 - Practice for density, relative density of crude petroleum and liquid products by hydrometer method;
ASTM D 1401 - Test method for water separability of petroleum oils and synthetic fluids;

ASTM D 1500 - Test method for ASTM color of petroleum products;
ASTM D 1743 - Test method for corrosion preventive properties of lubricating greases;
ASTM D 1744 - Test method for water in liquid petroleum products by Karl Fisher reagent;
ASTM D 2265 - Test method for dropping point of lubricating grease over wide temperature range;
ASTM D 2266 - Test method for wear preventive characteristics of lubricating grease (Four-ball method)
ASTM D 2270 - Practice for calculating viscosity index from kinematic viscosity at 40° and 100°C;
ASTM D 2272 - Test method for oxydation stability of steam turbine oils by rotating bomb;
ASTM D 2509 - Test method for measurement of load-carrying capacity of lubricating grease (Timken method);
ASTM D 2596 - Test method for measurement of extreme pressure properties of lubricating grease (Four-ball method);
ASTM D 2711 - Test method for demulsibility characteristics of lubricating oils;
ASTM D 2782 - Test method for measurement of extreme pressure properties of lubricating fluids (Timken method);
ASTM D 4172 - Test method for wear preventive characteristics of lubricating fluid (Four-ball method)
ASTM D 4928 - Test method for water in crude oils by coulometric Karl Fischer titration;
ASTM D 5182 - Test method for evaluating the scuffing (scoring) load capacity of oils (FZG visual method);
ASTM E 659 - Test method for autoignition temperature of liquid chemicals

EN 10204 - Metallic products-Types of inspection documents.

- FMST 6930 Factory Mutual Spray Test

- Documento N° 2786/9/80 7^{a} ediz. dell'Organizzazione permanente CEE per la salute e la sicurezza.

6 - RESPONSABILITA'
Non applicabile.

ASTM D 1298 - Practice for density, relative density of crude petroleum and liquid products by hydrometer method;
ASTM D 1401 - Test method for water separability of petroleum oils and synthetic fluids;

ASTM D 1500 - Test method for ASTM color of petroleum products;
ASTM D 1743 - Test method for corrosion preventive properties of lubricating greases;
ASTM D 1744 - Test method for water in liquid petroleum products by Karl Fisher reagent;
ASTM D 2265 - Test method for dropping point of lubricating grease over wide temperature range;
ASTM D 2266 - Test method for wear preventive characteristics of lubricating grease (Four-ball method)
ASTM D 2270 - Practice for calculating viscosity index from kinematic viscosity at 40° and 100°C;
ASTM D 2272 - Test method for oxydation stability of steam turbine oils by rotating bomb;
ASTM D 2509 - Test method for measurement of load-carrying capacity of lubricating grease (Timken method);
ASTM D 2596 - Test method for measurement of extreme pressure properties of lubricating grease (Four-ball method);
ASTM D 2711 - Test method for demulsibility characteristics of lubricating oils;
ASTM D 2782 - Test method for measurement of extreme pressure properties of lubricating fluids (Timken method);
ASTM D 4172 - Test method for wear preventive characteristics of lubricating fluid (Four-ball method)
ASTM D 4928 - Test method for water in crude oils by coulometric Karl Fischer titration;
ASTM D 5182 - Test method for evaluating the scuffing (scoring) load capacity of oils (FZG visual method);
ASTM E 659 - Test method for autoignition temperature of liquid chemicals

EN 10204 - Metallic products-Types of inspection documents.

- FMST 6930 Factory Mutual Spray Test

- ECC Report N° 2786/9/80 7th edition of Permanent Organization for health and safety.

6 - RESPONSIBILITY
Not applicable.

La presente Norma definisce i tipi di lubrificante da utilizzare in base alle condizioni operative delle macchine Danieli.
La scelta di uno specifico lubrificante, nella varietà dei casi di impiego, é definita principalmente dai seguenti parametri di progettazione:

a - carichi trasmissibili specifici (entità, durata);
b - velocità operativa e tipo del moto;
c - temperatura di lavoro e di riposo (condizioni ambientali e climatiche);
d - materiali in contatto e finitura superficiale;
e - condizioni operative influenzanti il comportamento dei lubrificanti (inquinanti, acqua, ecc.);
f - sicurezza;
g - lubrificazione centralizzata di organi o macchine con esigenze diverse (centrali di lubrificazione).

I parametri che definiscono la scelta specifica del lubrificante sono:

1 - Per gli olii:
  a) viscosità alla temperatura di esercizio;
  b) requisiti particolari (additivazione):
    - antiusura (estrema pressione EP);
    - demulsività;
    - antischiuma;
    - correttori di indice di viscosità;
    - antiossidanti;
    - adesività.

2 - Per i grassi:
  a) consistenza;
  b) pompabilità;
  c) requisiti particolari (additivazione):
    - antiusura (estrema pressione EP);
    - antiossidanti;
    - adesività.

Tutti i prodotti devono essere esenti da Piombo e dai suoi derivati.

Gli olii minerali di base devono essere raffinati al solvente, a base paraffinica, ottimo indice di viscosità, resistenti al calore e all'ossidazione.

Devono essere sempre accompagnati dalla relativa scheda di sicurezza.

NOTE:
- L'indicazione del tipo di lubrificante dovrà sempre fare riferimento alla presente Norma, eccetto quei casi in cui é indispensabile designare un prodotto con la sigla specifica della Casa petrolifera.
- Le corrispondenze fra le specifiche Danieli ed il tipo di prodotto relativo, sono state indicate dai singoli Fabbricanti.
  In caso di acquisto si suggerisce di ordinare non solo con la sigla del prodotto ma anche con la Specifica Danieli.

This Standard defines the lubricants to be used according to the operating conditions of Danieli's machines.
In the various uses, the lubricant is mainly defined by the following design parameters:

a - specific transmittable loads (entity, duration);
b - operational speed and motion type;
c - working and rest temperature (environmental conditions);
d - contact materials and surface finishing;
e - operational conditions affecting the lubricant behaviour (pollution, water, etc.);
f - safety;
g - centralised lubrication for components or machines having different requirements (lubrication units).

The parameters for selecting the specific lubricant are:

1 - Oils:
  a) viscosity at the operation temperature;
  b) special requirements (additives):
    - wear resistance (extreme pressure EP);
    - demulsibility;
    - antifoam;
    - correctors of the viscosity index;
    - oxidation resistance;
    - adhesiveness.

2 - Greases:
  a) consistence;
  b) capability of being pumped;
  c) special requirements (additives):
    - wear resistance (extreme pressure EP);
    - oxidation resistance;
    - adhesiveness.

All products shall be free of lead and its derivatives

Basic mineral oils shall be solvent raffinate, paraffin-based, high viscosity index, heat and oxidation resistant.

Oils shall always be complete with safety card.

NOTES:
- The type of lubricant shall always be referred to this Standard, except when a product is to be defined by a specific acronym of the producing Company.
- The correspondence between Danieli's specification and the associated product is specified by the various Suppliers. When purchasing a kindly state both the product acronym and Danieli Specification.

2 - CRITERI DI SCELTA DEI GRASSI - *GREASES SELECTION CRITERIA*

Macchina tipo o dispositivo *Machine type or device*	Designation DIN 51502	Danieli CODE	Carico *Load* daN	Potenza *Power* kW	Velocità *Speed* m/s	Temp. °C min (ambient)	Temp. °C max (operating)	Notes
2.1 - Grasso multifunzionale non additivato EP: Grasso universale per impianti centralizzati per cuscinetti a rotolamento, motori elettrici, velocità normali, bassi carichi. ***Multipurpose grease not additivated EP:*** *Multipurpose grease for centralized system for rolling bearings, electric motors normal speed, low loads*	K1K-20 (Type 4a)	0.340331.R	Basso-medio *Low-medium*				120°C	
	K2K-20 (Type 4)	0.005004.A						
Grasso multifunzionale non additivato EP: Grasso universale per impianti centralizzati per cuscinetti a rotolamento e strisciamento in presenza di elevate temperature e basse velocità: canalette doppie, tappeti di raffreddamento, settore curvo colata continua, rulli al piede. ***Multipurpose grease not additivated EP:*** *Multipurpose grease for centralized system for rolling and friction bearings, operating at high temperatures and low speed: twin channels, cooling conveyor, bens sector continuous casting, foot rollers.*	K1R-20 (Type 6a)	0.340332.V	Basso-medio *Low-medium*	-	-	-20°C÷50°C	160°C	
	K2R-20 (Type 6)	0.005006.C				0°C÷50°C		
Grasso per basse temperature non additivato EP: Grasso adatto per basse temperature ambientali ***Low temperatures grease not additivated EP:*** *Grease suitable for low ambiental temperature*	K1K-30 (Type 30)	0.151164.C	-	-	-	-30°C	100°C	
2.2 - Grasso multifunzionale additivato EP: Grasso universale per impianti centralizzati per cuscinetti a rotolamento e strisciamento, velocità normali, sollecitazioni gravose: treni di laminazione, cuscinetti gabbie, via a rulli in genere, cesoie, raddrizzatrici, pattini (slitte). Applicazioni singole con ingrassatore: bussole in genere, snodi, ingranaggi cilindrici e conici, viti senza fine, allunghe cardaniche, innesti scanalati. ***Multipurpose grease additivated EP:*** *Multipurpose EP grease for centralized system for rolling and friction bearings, normal speed, heavy loads: rolling trains, stand bearings, roller tables in general, shears, slides. single grease lubricator: bush in general, ball joints, spur and bevel gears, worms, spindles, grooved couplings.*	KP0K-20 (Type 1)	0.340328.G	Medio-alto *Medium-high*	-	≤ 4m/s	-20°C÷30°C	100°C	
	KP1K-20 (Type 2)	0.340329.A				0°C÷50°C		
	KP2K-20 (Type 3)	0.340330.F				10°C÷50°C		
Grasso per alti carichi additivato EP: Grasso per cuscinetti a rotolamento di treni di laminazione lenti e molto caricati ***High loads grease additivated EP:*** *Grease for rolling bearings on slow rolling trains with heavy loads*	KPF2K (Type 26)	0.151160.L	Alto *High*	-	-	10°C÷50°C	100°C	

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12

SOSTITUISCE
REPLACES

PAGINA *PAGE* 32 DI *OF* 47

2 - CRITERI DI SCELTA DEI GRASSI
GREASES SELECTION CRITERIA

Macchina tipo o dispositivo ***Machine type or device***	**Designation DIN 51502**	**Danieli CODE**	**Carico** ***Load*** daN	**Potenza** ***Power*** kW	**Velocità** ***Speed*** m/s	**Temp. °C** min (ambient)	**Temp. °C** max (operating)	Notes
2.3 - Grasso sintetico alta temperatura non additivato EP Grasso per lubrificazione centralizzata di cuscinetti a rotolamento e strisciamento, in presenza di calore. Temperature continue di 200°C ***High temperature syntetic grease not additivated EP:*** *Grease for continuous lubrication of rolling or friction bearings with heat presence. To be used in specific applications instead of mineral oil grease based.* *Temperature up to 200°C*	KHC2S (Type 21)	0.340335.Z					200°C	
Grasso sintetico long-life additivato EP Grasso sintetico semifluido per riduttori a vite senza fine ; applicazione long-life. ***Syntetic long-life grease additivated EP:*** *Semi-fluid syntetic grease for worm-gear teeth; long-life applications.*	GPPG00K (Type 9)	0.341257.W			< 4 m/min	-10°C÷100°C	120°C	
2.4 - Grasso additivato EP per sistemi aperti: Ingranaggi scoperti lenti anche di grandi dimensioni, fortemente caricati; funi; grandi comandi a catena, eccentrici per placche. ***Grease for open systems additivated EP:*** *Slow speed exposed gears even of large dimensions and with heavy loads; steel ropes; large chain-type drives, cammes for cooling beds.*	OGF2G (Type 8)	0.340333.W	Alti High				120°C	Replaces applica tions of the former oil BC
2.5 - Grasso sintetico per altissime temperature Funi, catene e cerniere sul crogiolo; corsa elettrodi; dispositivi inclinazione forno; tappi o saracinesche; viterie. Indicato per acciaio inossidabile. ***Syntetic grease for very high temperatures*** *Ropes, chains and hinges on melting furnace, strokes of electrodes, furnace tipping devices, stopper or slide gates, screws.* *Suitable on stainless steel.*	- (Type 22)	0.151157.D					1200°C	
2.6 - Pasta di montaggio Supporti colli cilindri; impiegata in montaggi in presenza di condensa e vibrazioni (es.: mandrini ESS) ***Assembly paste*** *Rolling cylinder neck bearings; used in assemblies with condensation and vibrations (ex.: ESS spindles)*	- (Type 29)	0.151163.B					120C	

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE
REPLACES

PAGINA *PAGE* 33 DI *OF* 47

2 - GRASSI - SPECIFICHE TECNICHE
2.1 - Grassi multifunzionali non additivati EP

2 - GREASES – TECHNICAL SPECIFICATIONS
2.1 - Multipurpose greases not EP additives

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
K 1 K-20	L-XBCEA 1	310	340	1	**Type 4a** 0.340331.R	Elevata stabilità meccanica. Buona resistenza contro: ossidazione, corrosione, umidità, acqua. Temp. -20°÷ + 120°C Conforme DIN 51825	*High mechanical stability. Good resistance against: oxidation, corrosion, humidity and water. Temp. -20°÷ + 120°C Meet DIN 51825*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Lithium-12-hydroxystearate		
Dropping point	ISO 2176 ASTM D 2265	°C	> 180
Oxydation stability	ASTM D942.1P142	bar	≤ 0,5
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	100
	ASTM D445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	-
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	≤ 6
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	310÷340

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D1743		1
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	≤ 0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 180
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 25
FZG gear test	DIN 51354-1/2	Pass stage	-

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	GR MU 1
AXEL CHRISTIERN.	ACINOL 151
BECHEM	HIGH-LUB L 1
BP	GREASE LTX 1 (1)
BROOKS	LITHALENE 910-1
BRUGAROLAS	G.AGUILA Nr. 80/1
FUCHS	RENOLIT 1
ESSO	BEACON 1
Q8	REMBRANDT 1
ROLOIL	MERCURY 1
SHELL	ALVANIA RL1
TEXACO	GREASE L1
VISCOL	SIGNAL GREN AW 1

1 - Only for Italian market

Ex. of design.:
0.340331.R Grease K1K-20 DIN 51825
T.4a N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12

SOSTITUISCE
REPLACES

PAGINA *PAGE* 34 DI *OF* 47

2 - GRASSI - SPECIFICHE TECNICHE
2.1 - Grassi multifunzionali non additivati EP

2 - GREASES – TECHNICAL SPECIFICATIONS
2.1 - Multipurpose greases not EP additives

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
K 2 K-20	L-XBCEA 2	265	295	2	**Type 4** 0.005004.A	Elevata stabilità meccanica. Buona resistenza contro: ossidazione, corrosione, umidità, acqua. Temp. -20°÷ + 120°C Conforme DIN 51825	*High mechanical stability. Good resistance against: oxidation, corrosion, humidity and water. Temp. -20°÷ + 120°C Meet DIN 51825*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Lithium-12-hydroxystearate		
Dropping point	ISO 2176 ASTM D 2265	°C	> 180
Oxydation stability	ASTM D942.1P142	bar	≤ 0,5
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	100
	ASTM D445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	-
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	≤ 5
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	265÷295

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D1743		1
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	≤ 0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 200
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 40
FZG gear test	DIN 51354-1/2	Pass stage	-

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	GR MU 2
AXEL CHRISTIERN.	ACINOL 152
BECHEM	HIGH-LUB L 2
BP	ENERGREASE LS 2 GREASE LTX 2 (1)
BROOKS	LITHALENE 910-2
BRUGAROLAS	G.AGUILA Nr. 85
CASTROL	SPHEEROL APT/2
ESSO	BEACON 2
KLÜBER	CENTOPLEX 2
MOBIL	MOBILUX 2
Q8	REMBRANDT 2
ROLOIL	MERCURY 2
SHELL	ALVANIA RL2
TEXACO	GREASE L2 MULTIFAK MP2
TOTAL	MULTIS 2
TRIBOL	TRIBOL 3030/100-2
VISCOL	SIGNAL GREN AW 2

1 - Only for Italian market

Ex. of design.:
0.005004.A Grease K2K-20 DIN 51825
T.4 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE REPLACES

2 - GRASSI - SPECIFICHE TECNICHE
2.1 - Grassi pompabili alte temperature, non additivati EP

2 - GREASES – TECHNICAL SPECIFICATIONS
2.1 - Pumbable greases for high temperature not EP additives

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
K 1R-20	L-XBFEA 1	310	340	1	**Type 6a** 0.340332.V	Elevata stabilità meccanica; Ottima resistenza contro ossidazione, corrosione, umidità, acqua. Resistente a temp. continue fino 160°C (per brevi punte, fino a 180°C); Basso contenuto in ceneri; pompabili Conformi DIN 51825	*High mechanical stability.* *Excellent resistance to: oxidation, corrosion, humidity and water.* *Resistance to continuous temp.up to 160°C (up to 180°C for short intervals).* *Low ash content; can be pumped.* *Meet DIN 51825*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Lithium complex or better		
Dropping point	ISO 2176 ASTM D 2265	°C	≥ 250
Flow pressure @ -20°C	DIN 51805		≤ 1400
Oxydation stability	ASTM D942.1P142	-	-
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	100
	ASTM D 445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	-
	ASTM D445		
Water Washout 1h @ 79°C	ASTM D 1264	% wt	≤ 6
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	310÷340

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D 1743	-	1
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	≤ 0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 200
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 40
FZG gear test	DIN 51354-1/2	Pass stage	-
Mech.-dyn. test FAG FE 9, A/1500/6000 F_{50} over 100 h	DIN 51821 part 2	°C	160

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	GR AC 1
AXEL CHRISTIERN.	AXELLENCE 641
BECHEM	BERUTOX MBSA-H
BROOKS	SUPERPLEX-1 SUPERPLEX 2010-1
BRUGAROLAS	BESLUX KOMPLEX M-1
CASTROL	BLACK PEARL GREASE EP 1
KLÜBER	STABUTHERM GH 461
MOBIL (12)	MOBILGREASE XHP 461
	MOBILITH AW 1 (1)
Q8	RUBENS 1
ROLOIL	ALCOPLEX 1
SHELL	STAMINA RL 1
TEXACO	POLYSTAR SYNTHETIC 4601
TRIBOL	MOLUB ALLOY 9141
VISCOL	SIGNAL LITHIUM HDP 1

1 - Only for USA market

Ex. of design.:
0.340332.V Grease K1R-20 DIN 51825
T.6a N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE
REPLACES
PAGINA *PAGE* 36 DI *OF* 47

2 - GRASSI - SPECIFICHE TECNICHE
2.1 - Grassi pompabili alte temperature, non additivati EP

2 - GREASES – TECHNICAL SPECIFICATIONS
2.1 - Pumbable greases for high temperature not EP additives

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
K 2R-20	L-XAFEA 2	265	295	2	**Type 6** 0.005006.C	Elevata stabilità meccanica; ottima resistenza contro ossidazione, corrosione, umidità, acqua; adesività. Resistente a temperature continue fino 160°C (per brevi punte, fino a 180°C); Basso contenuto in ceneri; pompabili Conformi DIN 51825	*High mechanical stability; excellent resistance to: oxidation, corrosion, humidity and water; adhesivity; resistance to continuous temperatures up to 160°C (up to 180°C for short intervals). Low ash content; can be pumped. Meet DIN 51825*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Lithium complex or better		
Dropping point	ISO 2176 ASTM D 2265	°C	≥ 250
Flow pressure @ -20°C	DIN 51805		≤ 1400
Oxydation stability	ASTM D942.1P142	bar	0,2
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	100
	ASTM D 445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	-
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	≤ 4
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	265÷295
Change in worked penetration after 100000 DS	ISO 2137 chap. 1 ASTM D 217		≤ 30

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D 1743	-	1
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	≤ 0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 200
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 40
FZG gear test	DIN 51354-1/2	Pass stage	-
Mech.-dyn. test FAG FE 9, A/1500/6000 F_{50} over 100 h	DIN 51821 part 2	°C	160

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	GR AC 2
AXEL CHRISTIERN.	AXELLENCE 642
BECHEM	BERUTOX MB 2H
BP	ENERGREASE LC 2
BROOKS	SUPERPLEX-2 SUPERPLEX 2010-2
BRUGAROLAS	BESLUX KOMPLEX M-2
CASTROL	SUPERGREASE 2
ESSO	UNIREX N
KLÜBER	AMBLYGON TA 30/2
MOBIL 12	MOBILGREASE XHP 222
	MOBILITH AW 2 (1)
Q8	RUBENS 2
ROLOIL	ALCOPLEX 2
SHELL	STAMINA RL 2
TEXACO	POLYSTAR SYNTHETIC 4602
TRIBOL	MOLUB ALLOY 9141
VISCOL	SIGNAL LITHIUM HDP 2

1 - Only for USA market

Ex. of design.:
0.005006.C Grease K2R-20 DIN 51825
T.6 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE *REPLACES*
PAGINA *PAGE* 37 DI *OF* 47

2 - GRASSI - SPECIFICHE TECNICHE
2.1 - Lubrificazione per basse temperature, non additivati EP

2 - GREASES – TECHNICAL SPECIFICATIONS
2.1 - Low temperature lubrication not EP additives

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
K 1 K -30	L-XCCEA 1	310	340	1	**Type 30** 0.151164.C	Antiruggine e antiossidante Temperatura di lavoro: -30°÷+110°C Conformi DIN 51825	*Corrosion inhibitors and anti-oxidants* *Working temperature: -30°÷+110°C* *Meet DIN 51825*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Lithium-12-hydroxystearate		
Dropping point	ISO 2176 ASTM D 2265	°C	≥ 180
Flow pressure @ -30°C	DIN 51805	mbar	≤ 1400
Oxydation stability	ASTM D942.1P142	-	-
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	100
	ASTM D445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	-
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	310÷340

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D 1743		
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	≤ 0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 200
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 40
FZG gear test	DIN 51354-1/2	Pass stage	-

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AXEL CHRISTIERN.	ACINOL 151
BECHEM	HIGH-LUB L 1
BP	ENERGREASE LS-EP1S
BROOKS	LITHALENE 910-1
BRUGAROLAS	G. AGUILA Nr. 80/1
CHEVRON	SRI GREASE 1 (1)
FUCHS	RENOLIT 1
KLÜBER	POLYLUB GA 352P
SHELL	ALVANIA R 1
TEXACO	GREASE L1
TRIBOL	TRIBOL 4747
VISCOL	SIGNAL SINTGREASE A 15

1 - Only for USA market

Ex. of design.:
0.151164.C Grease K1K-30 DIN 51825
T.30 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE
REPLACES

2 - GRASSI - SPECIFICHE TECNICHE *2 - GREASES – TECHNICAL SPECIFICATIONS*
2.2 - Grassi multifunzionali additivati EP *2.2 - Multipurpose greases EP additives*

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
K P0K-20	L-XBCEB 0	355	385	0	**Type 1** 0.340328.G	Elevata stabilità meccanica. Buona resistenza contro: ossidazione, corrosione, umidità, acqua. Temperatura di impiego: -20°÷ 100°C Additivati EP, pompabile Conformi DIN 51825	*High mechanical stability.* *Good resistance against: oxidation, corrosion, humidity and water.* *Operating temperature: -20°÷ 100°C* *Contain EP additives; can be pumped* *Meet DIN 51825*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Lithium-12-hydroxystearate		
Dropping point	ISO 2176 ASTM D 2265	°C	≥ 175
Oxydation stability	ASTM D942.1P142	bar -	max 0,5
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	≥ 100
	ASTM D445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	-
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	≤ 6
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	355÷385
Change in worked penetration after 100000 DS	ISO 2137 ASTM D 217		≤ 30

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D 130	Rating	1b
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 250
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 40
FZG gear test	DIN 51354-1/2	Pass stage	-

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	GR MU/EP0
AXEL CHRISTIERN.	ACINOL 150 EP CS
BECHEM	HIGH-LUB L 474-0
BP	ENERGREASE LS-EP 0B
BROOKS	LITHALENE 900-0
BRUGAROLAS	G. AGUILA Nr. 850 EP-0
CASTROL	SPHEEROL EPL 0
CHEVRON	DURA-LITH GREASE EP 0(1)
ESSO	BEACON EP 0
FUCHS	RENOLIT FEP 0
KLÜBER	CENTOPLEX 0 EP
MOBIL	MOBILUX EP 0
Q8	REMBRANDT EP 0
ROLOIL	LITEX EP 0
SHELL	ALVANIA EP (LF) 0 ALVANIA WR 0
TEXACO	MULTIFAK EP0
TOTAL	MULTIS EP 0
TRIBOL	TRIBOL 3020/1000-0
VISCOL	SIGNAL ROLSFER EP 0

1 - Only for USA market

Ex. of design.:
0.340328.G Grease KP0K-20 DIN 51825
T.1 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE
REPLACES
PAGINA *PAGE* 39 DI *OF* 47

2 - GRASSI - SPECIFICHE TECNICHE
2.2 - Grassi multifunzionali additivati EP

2 - GREASES – TECHNICAL SPECIFICATIONS
2.2 - Multipurpose greases EP additives

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
K P1K-20	L-XBCEB 1	310	340	1	**Type 2** 0.340329.A	Elevata stabilità meccanica. Buona resistenza contro: ossidazione, corrosione, umidità, acqua. Temperatura di impiego: -20°÷ 120°C Additivati EP; pompabile Conformi DIN 51825	*High mechanical stability.* *Good resistance against: oxidation, corrosion, humidity and water.* *Operating temperature: -20°÷ 120°C* *Contain EP additives; can be pumped* *Meet DIN 51825*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Lithium-12-hydroxystearate		
Dropping point	ISO 2176 ASTM D 2265	°C	≥ 180
Flow pressure @ -20°C	DIN 51805		≤ 1400
Oxydation stability	ASTM D942.1P142	bar	max 0,5
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	≥ 150
	ASTM D 445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	-
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	8
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	310÷340
Change in worked penetration after 100000 DS	ISO 2137 chap. 1		≤ 30
Grease+20% dest. water change in worked penetration after 100000 DS	ISO 2137 ASTM D 217		≤ 50

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D 130	Rating	1b
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 250
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 40
FZG gear test	DIN 51354-1/2	Pass stage	-
Mech.-dyn. test FAG FE 9, A/1500/6000 F_{50} over 100 h	DIN 51821 part 2	°C	120

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	GR MU/EP1
AXEL CHRISTIERN.	ACINOL 151 EP
BECHEM	HIGH-LUB L 474-1
BP	ENERGREASE LS-EP 1 GREASE LTX-EP 1 (1)
BROOKS	LITHALENE 900-1
BRUGAROLAS	G. AGUILA AUREA 1
CASTROL	SPHEEROL EPL 1
CHEVRON	DURA-LITH GREASE EP 1 (2)
ESSO	BEACON EP 1
KLÜBER	MICROLUBE GL 261
MOBIL	MOBILUX EP 1
Q8	REMBRANDT EP1
ROLOIL	LITEX EP 1
SHELL	ALVANIA EP (LF) 1 ALVANIA WR 1
TEXACO	MULTIFAK EP1
TOTAL	MULTIS EP 1
TRIBOL	TRIBOL 4020/220-1
VISCOL	SIGNAL GREN AW EP 1

1 - Only for Italian market
2 - Only for USA market

Ex. of design.:
0.340329.A Grease KP1K-20 DIN 51825
T.2 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE *REPLACES*
PAGINA *PAGE* 40 DI *OF* 47

2 - GRASSI - SPECIFICHE TECNICHE ***2 - GREASES – TECHNICAL SPECIFICATIONS***

2.2 - Grassi multifunzionali additivati EP ***2.2 - Multipurpose greases EP additives***

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
K P2K-20	L-XBCEB 2	265	295	2	**Type 3** 0.340330.F	Elevata stabilità meccanica. Buona resistenza contro ossidazione, corrosione, umidità, acqua. Temperatura di impiego: -20°÷ 120°C Additivati EP, pompabile Conformi DIN 51825	*High mechanical stability.* *Good resistance against: oxidation, corrosion, humidity and water.* *Operating temperature: -20°÷ 120°C* *Contain EP additives; can be pumped* *Meet DIN 51825*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Lithium-12-hydroxystearate		
Dropping point	ISO 2176 ASTM D 2265	°C	≥ 180
Flow pressure @ -20°C	DIN 51805		≤ 1000
Oxydation stability	ASTM D942.1P142	bar	max 0,5
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	≥150
	ASTM D445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	-
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	5
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	265÷295
Change in worked penetration after 100000 DS	ISO 2137 chap. 1		≤ 30
Grease+20% dest. water change in worked penetration after 100000 DS	ISO 2137 ASTM D 217		≤ 30

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D 130	Rating	1b
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 250
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 40
FZG gear test	DIN 51354-1/2	Pass stage	-
Mech.-dyn. test FAG FE 9, A/1500/6000 F_{50} over 100 h	DIN 51821 part 2	°C	120

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	GR MU/EP2
AXEL CHRISTIERN.	ACINOL 152 EP
BECHEM	HIGH-LUB L 474-2
BP	ENERGREASE LS-EP 2 GREASE LTX-EP 2 (1)
BROOKS	SUPERLITH 2600-1
BRUGAROLAS	G. AGUILA AUREA 2
CASTROL	SPHEEROL EPL 2
CHEVRON	DURA-LITH GREASE EP 2 (2)
ESSO	BEACON EP 2
KLÜBER	CENTOPLEX 2 EP
MOBIL	MOBILUX EP 2
Q8	REMBRANDT EP2
ROLOIL	LITEX EP 2
SHELL	ALVANIA EP (LF) 2 ALVANIA WR 2
TEXACO	MULTIFAK EP2
TOTAL	MULTIS EP 2
TRIBOL	TRIBOL 4020/220-2
VISCOL	SIGNAL GREN AW EP 2

1 - Only for Italian market

2 - Only for USA market

Ex. of design.:
0.340330.F Grease KP2K-20 DIN 51825
T.3 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12

SOSTITUISCE
REPLACES

2 - GRASSI - SPECIFICHE TECNICHE — ***2 - GREASES – TECHNICAL SPECIFICATIONS***

2.2 - Lubrificazione cuscinetti molto caricati, velocità lente — ***2.2 - Lubrication of heavy loaded and slow bearings***

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
KPF 2 K-20	L-XACEB 2	265	295	2	**Type 26** 0.151160.L	Ottima efficacia lubrificante in presenza di vibrazioni e sollecitazioni d'urto. Ottima resistenza contro ossidazione, corrosione, condense, acqua. Temperatura max 120°C Additivato EP, alta adesività. Conformi DIN 51825	*Excellent lubricating efficiency in the presence of vibrations and impacts.* *Excellent resistance against oxidation, condensation, water. Max temperature 120°C* *Contains EP additives. High adesivity* *Meet DIN 51825*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Lithium-12-hydroxystearate or better		
Dropping point	ISO 2176 ASTM D 2265	°C	> 180
Oxydation stability	ASTM D942.1P142	bar	0,2
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	> 220
	ASTM D445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	-
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	6
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	265÷295
Change in worked penetration after 100000 DS	ISO 2137 ASTM D 217		≤ 30

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D 1743	Rating	N 21
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-60 Kg-1200g/1	ASTM D 2266	wear mm	≤ 0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 250
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 50
FZG gear test	DIN 51354-1/2	Pass stage	-
Mech.-dyn. test FAG FE 9, A/1500/6000 F_{50} over 100 h	DIN 51821 part 2	°C	120

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	ROCOL SAPPHIRE 2
AXEL CHRISTIERN.	ACINOL 152 EPM 3
BECHEM	HIGH-LUB FA 50 M0
BP	ENERGREASE LS-EP2 HD
BROOKS	SUPERLITH 220-2
BRUGAROLAS	G. BESLUX PLEX-2
CHEVRON	ULTRA-DUTY GREASE EP 2 (1)
KLÜBER	KLÜBERLUB BE 41-542
MOBIL	MOBILGREASE HP322 SPECIAL
SHELL	ALVANIA HDX 2
TEXACO	MOLYTEX EP 2
TOTAL	MULTIS CX 2
TRIBOL	MOLUB ALLOY 860/220-2
VISCOL	SIGNAL GREN AW SPECIAL AR 2

1 - Only for USA market

Ex. of design.:
0.151160.L Grease KPF2K-20 DIN 51825
T.26 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12

SOSTITUISCE
REPLACES

2 - GRASSI - SPECIFICHE TECNICHE — ***2 - GREASES – TECHNICAL SPECIFICATIONS***

2.3 - Sintetico - Lubrificazione alta temperatura, non additivato EP — ***2.3 - Syntetic - High temperature lubrication, not EP additives***

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
K HC 2 S	L-XBGEA 2	265	295	1.1/2÷2	**Type 21** 0.340335.Z	Grasso a base di olio sintetico; ottima stabilità meccanica. Ottima resistenza contro ossidazione, corrosione, umidità, acqua, vapore. Bassissimo residuo in ceneri, pompabile, adesivo, stabile anche a temperature continue di 200°C con punte di 220°C. Conformi DIN 51825	*Grease with synthetic base oil; excellent mechanical stability. Excellent resistance to oxidation, corrosion, humidity,water and steam. Very low ash content, can be pumped, good adhesiveness, stability even at continuous temp. of 200° with peaks of 220°C. Meet DIN 51825*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Complex/PAO		
Dropping point	ISO 2176 ASTM D 2265	°C	> 240
Flow pressure @ -20°C	DIN 51805		≤ 1400
Oxydation stability	ASTM D942.1P142	bar -	≤ 0,5
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	≥ 200
	ASTM D445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	≥ 20
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	max 4
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	265÷295
Change in worked penetration after 100000 DS	ISO 2137 ASTM D 217		≤ 40

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D 1743	Gr.	1
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	≤ 0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 220
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 40
FZG gear test	DIN 51354-1/2	Pass stage	-
Mech.-dyn. test FAG FE 9, A/1500/6000 F_{50} over 100 h	DIN 51821 part 2	°C	180

BRANDS COMPARISON

SOCIETY	MARK
AGIP	ROCOL SAPPHIRE HI-TEMP 2
BECHEM	BERUTOX FH 28 EPK 2
BRUGAROLAS	G. BESLUX LIPLEX H-1/2 S
CHEVRON	ULTI-PLEX SYNTHETIC GREASE EP (1)
MOBIL	MOBILITH SHC PM
SHELL	STAMINA HDS 2
TEXACO	SUPER SYNLIPLEX POLYSTAR SYNTHETIC 4602
TRIBOL	TRIBOL 4747
VISCOL	SIGNAL SUPERSINTGREASE HT 220/2

1 - Only for USA market

Preferibili ma non obbligatori
Preferred but not mandatory

Ex. of design.:
0.340335.Z Grease KHC2S DIN 51825
T.21 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12

SOSTITUISCE
REPLACES

PAGINA *PAGE* 43 DI *OF* 47

2 - GRASSI - SPECIFICHE TECNICHE
2.3 - Sintetico - Additivati EP

2 - GREASES – TECHNICAL SPECIFICATIONS
2.3 - Syntetic - EP additives

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
GP PG 00 K-20	L-XBCEB 00	400	430	00	**Type 9** 0.341257.W	Grasso semifluido a base sintetica. Elevata stabilità meccanica e termica, temperatura: -20°÷120°C. Ottima resistenza contro ossidazione, corrosione, condense; Fortemente caricabile Conformi DIN 51826	*Synthetic semi-fluid grease* *High mechanical and thermal stability; temperature -20°÷120°C. Excellent resistance to oxidation, corrosion, condensation.* *Capability of supporting heavy loads* *Meet DIN 51826*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Polyglycol/Metal soap		
Dropping point	ISO 2176 ASTM D 2265	°C	≥ 190
Oxydation stability	ASTM D942.1P142	-	-
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	≥ 100
	ASTM D 445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	≥ 18
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	≤ 5
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	400÷430

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper corrosion	ASTM D 130		1b
Corrosion-prevention	ASTM D 1743		Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	≤ 0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 350
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 50
FZG gear test	DIN 51354-1/2	Pass stage	12

BRANDS COMPARISON

SOCIETY	MARK
AGIP	GR SLL
BECHEM	BERULUB FG 8 EP
BROOKS	PLEXALENE 790-00
BRUGAROLAS	G. BESLUX SINCART M-00D
KLÜBER	KLÜBERSYNTH GE 46-1200
MOBIL	GLYCOLE GREASE 00
Q8	ELI 798 D/3
ROLOIL	TIXOPLEX
SHELL	TIVELA GL 00
TOTAL	CARTER SY 00
VISCOL	SIGNAL CARTERGREASE PAG

Preferibili ma non obbligatori
Preferred but not mandatory

Ex. of design.:
0.341257.W Grease GPPG00K DIN 51826
T.9 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE *REPLACES*
PAGINA *PAGE* 44 DI *OF* 47

2 - GRASSI - SPECIFICHE TECNICHE ***2 - GREASES – TECHNICAL SPECIFICATIONS***
2.4 - Ingranaggi scoperti, funi, catene ***2.4 - Open gears, ropes, chains***

DESIGN. DIN 51502	DESIGN. ISO 6743	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
OG F2G	L-XBCHA 2	265	295	1-2	**Type 8** 0.340333.W	Ottima stabilità meccanica; ottima resistenza contro ossidazione, corrosione, umidità, acqua; ottima adesività; additivato con grafite, MoS_2, additivi EP; Temperatura impiego: 120° Esente da bitumi. Conformi DIN 51825	*Excellent mechanical stability; excellent resistance to oxidation, corrosion, humidity and water; adhesiveness; contains graphite, MoS_2, EP additives; Operating temperature 120°C Bitumen free. Meet DIN 51825*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Lithium-12-hydroxystearate		
Graphite content		%	≥ 8
Dropping point	ISO 2176 ASTM D 2265	°C	≥ 180
Oxydation stability	ASTM D942.1P142	-	-
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	≥ 400
	ASTM D445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	≥ 14
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	≤ 5
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	265÷295

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D 130	-	1a
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	≤ 0,6
4-Ball EP test (weld point)	ASTM D 2596	Kg	≥ 400
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 40
FZG gear test	DIN 51354-1/2	Pass stage	-

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	SAGUS 60
BECHEM	BERULIT 443
BRUGAROLAS	G. BESLUX CROWN H-1/R
CHEVRON	OPEN GEAR GREASE (1)
FUCHS	RENOLIT W/U2 2
KLÜBER	KLÜBERLUB BE 41-1501
MOBIL	MOBILTAC 81
Q8	REMBRANDT MOLY
SHELL	MALLEUS OGH
TRIBOL	MOLUB ALLOY 9790/2500-1
VISCOL	SIGNAL CEP 380 (2)

1 - Only for USA market
2 - NLGI 0

Ex. of design.:
0.340333.W Grease OGF2G DIN 51825
T.8 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE REPLACES
PAGINA *PAGE* 45 DI *OF* 47

2 - GRASSI - SPECIFICHE TECNICHE — ***2 - GREASES – TECHNICAL SPECIFICATIONS***

2.5 - Sintetico - Lubrificazione altissima temperatura — ***2.5 - Syntetic - Very-High temperature lubrication***

DESIGN. DIN 51502	DESIGN. ISO 6743/9	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
-	-	-	-	(1)	**Type 22** 0.151157.D	Ottima stabilità meccanica; sintetico long life. Ottima protezione anticorrosione, anti-tribocor-rosione, antigrippante Lubrificazione, anche a secco, per temp. fino a 1200°C; Esente da piombo, zolfo, cadmio e nichel; Resistenza all'acqua secondo DIN 51807/2 level 1	*Excellent mechanical stability Long-life synthetic* *Excellent protection against corrosion, frictional corrosion, antiseizing.* *Lubrication, even dry, at temp. up to 1200°C.* *Free of lead, sulphur, cadmium and nickel.* *Water resistance according to DIN 51807/2 level1*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener	Stated by the Supplier		
Dropping point	ISO 2176 ASTM D 2265	°C	Stated by Supplier
Oxydation stability	ASTM D942.1P142	-	
Oil Viscosity @ 40°C (kinematic)	DIN 51562 ASTM D 445	cSt	
Oil Viscosity @ 100°C (kinematic)	DIN 51562 ASTM D445	cSt	
Type and solid contents			
Water washout @ 79°C 1h	ASTM D 1264	% wt	
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D 1743		

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	-
4-Ball EP test (weld point)	ASTM D 2596	Kg	-
Timken EP test (OK load)	ASTM D 2509	pounds	-
FZG gear test	DIN 51354-1/2	Pass stage	-

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	ROCOL J 166
BECHEM	BERULUB VPN 13
BRUGAROLAS	G.BESLUX ANTI-SEIZE PASTE
FUCHS	RENOLIT COPPER PASTE
KLÜBER	WOLFRACOAT C
TRIBOL	MOLUB ALLOY TOP FIT 3844
VISCOL	SIGNAL CUPRUM SIL

Ex. of design.:
0.151157.D Infusible paste
T.22 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12

SOSTITUISCE
REPLACES

PAGINA *PAGE* 46 DI *OF* 47

DESIGN. DIN 51502	DESIGN. ISO 6743	WORKED PENETRATION DIN ISO 2137 Min	WORKED PENETRATION DIN ISO 2137 Max	CONSISTENCE NLGI DIN 51818	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
-	-	220	250	2	**Type 29** 0.151163.B	Pasta da montaggio con spiccata efficacia antiusura ed anti-tribocorrosione Idrorepellente, additivato, alta adesività Temperatura di impiego: - 30°÷+130°C	*Assembly paste with good anti-wear and anti-friction-corrosion efficiency.* *Water repellent, additived, high adhesivity* *Operational temperature: - 30°÷+130°C*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Thickener			Stated by Supplier
Type and solid contents			
Dropping point	ISO 2176 ASTM D 2265	°C	> 250
Oxydation stability	ASTM D942.1P142	-	-
Oil Viscosity @ 40°C (kinematic)	DIN 51562	cSt	-
	ASTM D 445		
Oil Viscosity @ 100°C (kinematic)	DIN 51562	cSt	-
	ASTM D445		
Water washout @ 79°C 1h	ASTM D 1264	% wt	
Worked Penetration @ 25°C	ISO 2137 ASTM D 217	mm/10	265÷295

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Corrosion-prevention	ASTM D 1743		Grade 1
SKF Emcor corrosion test	DIN 51802	Level	0 and 0

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test-40 Kg-1200g/1	ASTM D 2266	wear mm	-
4-Ball EP test (weld point)	ASTM D 2596	Kg	-
Timken EP test (OK load)	ASTM D 2509	pounds	≥ 50
FZG gear test	DIN 51354-1/2	Pass stage	-

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	ROCOL MT-LM
AXEL CHRISTIERN.	AXELPAS ZLE 2
BECHEM	CERITOL PT 2
BROOKS	PLEXALENE 800-2 BENALENE 5500-2
BRUGAROLAS	G.BESLUX TRIBOPASTE L-2/3S
CHEVRON	THREAD SEALING COMP. (1)
KLÜBER	ALTEMP Q NB 50
ROLOIL	COPPER GREASE
TEXACO	METALGREASE AC
TRIBOL	MOLUB-ALLOY TOP FIT 9324
VISCOL	SIGNAL MOLYPAST V

1 - Only for USA market

Ex. of design.:
0.151163.B Assembly paste
T.29 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE *REPLACES*
PAGINA *PAGE* 47 DI *OF* 47

INDICE - *CONTENT:*

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12

SOSTITUISCE
REPLACES

PAGINA *PAGE* 6 DI *OF* 47

TABELLA DI CORRISPONDENZA TRA I TIPI DI OLII , FLUIDI RESISTENTI AL FUOCO E GRASSI RIPORTATI NELLA N 0.000.001/5 SUPERATA E L'ATTUALE N 0.000.001/7

CROSS REFERENCE BETWEEN OILS, FIRE-RESISTANT FLUIDS AND GREASES TYPES LISTED IN SUPERSEDED N 0.000.001/5 AND THE APPLICABLE N 0.000.001/7

OILS AND FIRE-RESISTANT FLUIDS

N 0.000.001/5 - Superseded			N 0.000.001/7 - Revised		
Type	**Designation**	**CODE**	**Design. DIN 51502**	**CODE**	**Notes**
1	CLP 68	0.004981.Z	-	-	Deleted
2	**CLP 150**	0.004982.S	**CLP 150**	0.004982.S	
3	**CLP 220**	0.004983.T	**CLP 220**	0.004983.T	
4	**CLP 320**	0.004984.R	**CLP 320**	0.004984.R	
5	**CLP 460**	0.004985.V	**CLP 460**	0.004985.V	
5a	-	-	**CLP 680**	0.340322.T	
6	CL 68	0.004986.W	-	-	Deleted
7	CL 150	0.004987.X	-	-	Deleted
8	CL 220	0.004988.F	-	-	Deleted
9	CL 320	0.004989.G	-	-	Deleted
10	**HLP 46**	0.004990.E	**HLP 46**	0.004990.E	15-12 ISO 4406
10a				0.341366.R	13-10 ISO 4406
11	**HLP 68**	0.004991.T	**HLP 68**	0.004991.T	15-12 ISO 4406
11a				0.341367.V	13-10 ISO 4406
12	CL 150	0.004992.R	-	-	Use CLP 220
13	**D 22**	0.004993.V	**D 22**	0.004993.V	
14	C 100	0.004994.W	-	-	Deleted
15	BC	0.004995.X	-	-	Use OGF2G
16	C 320	0.014817.M	-	-	Deleted
17	C 460	0.014818.V	-	-	Deleted
18	**C 32**	0.069226.K	**C 32**	0.069226.K	
19	HLP 22	0.151149.L	-	-	Deleted
20	**J**	0.151150.H	**J**	0.151150.H	
21	**C 100**	0.002117.R	**Danieli spec.**	0.002117.R	
22	**C 220**	0.086657.D	**Danieli spec.**	0.086657.D	BGV-ESS
23	**C 320**	0.092434.L	**Danieli spec.**	0.092434.L	Morgoil
24	**C 460**	0.081422.L	**Danieli spec.**	0.081422.L	specification
25	-	-	**Danieli spec.**	0.340321.S	
31	PGP 460	0.151152.F	-	-	Use CLP320/460
32	Gear couplings	0.151151.E	-	-	Use CLP
33	**Chains 150°C**	0.151153.G	**BB-V**	0.151153.G	
34	Mould lubric.	0.151154.A	**FS**	0.340325.W	Vegetable-based
34a				0.340327.Z	Syntetic-based
35	**HFC 46**	0.151165.D	**HFC VG 46**	0.151165.D	
36	**HFD-U VG 46**	0.151166.E	**HFD-U VG 46**	0.151166.E	
37	**HFD-U VG 68**	0.151314.A	**HFD-U VG 68**	0.151314.A	

GREASES

N 0.000.001/5 - Superseded			N 0.000.001/7 - Revised		
Type	**Designation**	**CODE**	**Design. DIN 51502**	**CODE**	**Notes**
1	KP0G	0.005001.E	-	-	Use KP0K
	-	-	**KP0K**	0.340328.G	
2	KP1G	0.005002.F	-	-	Use KP1K
	-	-	**KP1K**	0.340329.A	
3	KP2G	0.005003.G	-	-	Use KP2K
	-	-	**KP2K**	0.340330.F	
4a	-	-	**K1K**	0.340331.R	
4	**K2K**	0.005004.A	**K2K**	0.005004.A	
5	K0R	0.005005.B	-	-	Use K1R
6a	-	-	**K1R**	0.340332.V	
6	**K2R**	0.005006.C	**K2R**	0.005006.C	
7	G2K	0.005007.D	-	-	Use KP2K
8	OG0G	0.098647.N	-	-	Use OGF2G
	-	-	**OGF2G**	0.340333.W	
9	KP00K	0.103190.C	-	-	Use GPPG00K
		-	**GPPG00K**	0.341257.W	
10	K00R	0.151155.B	-	-	Use K1R
11	K2R	0.005010.B	-	-	Use K2R
21	K2S	0.151156.C	-	-	Use KHC2S
	-	-	**KHC2S**	0.340335.Z	
22	**Infusib. paste**	0.151157.D	**Infusible paste**	0.151157.D	
23	Gas valves	0.163622.B	-	-	Deleted
24	Oxyg. system	0.151158.M	-	-	Deleted
25		0.151159.N	-	-	Deleted
26	**KPF2K**	0.151160.L	**KPF2K**	0.151160.L	
27	KP2R	0.151161.G	-	-	Use KP2K
28	KP2K-30	0.151162.A	-	-	Use K1K-30
29	**Ass. paste**	0.151163.B	**Assembly paste**	0.151163.B	
30	**K1K-30**	0.151164.C	**K1K-30**	0.151164.C	

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12

SOSTITUISCE
REPLACES

PAGINA PAGE 7 *DI OF* 47

1 - CRITERI DI SCELTA DEGLI OLII
OILS SELECTION CRITERIA

APPLICAZIONI TIPICHE *TYPICAL APPLICATIONS*	Designation DIN 51502	Danieli CODE	Parameters Speed	Temp. °C min	Temp. °C min - max	Notes
1.1 - SISTEMI A PERDITA - *LOOSE SYSTEMS*						
1.1.1 - Lubrificazione generale di catene che lavorano in condizioni ambientali sfavorevoli (acqua, vapori, ecc.). Catene comando motorulli, via a rulli di colata continua. *General lubrication of chains in unfavourable working environments (water, steam, etc.)* *Powered rolls drive chains, continuous casting roller table.*	BB-V (Type 33)	0.151153.G	-	-	max 150°C	
1.2 - CIRCOLAZIONE FORZATA, SBATTIMENTO, A GOCCIA D'OLIO ***PRESSURE-FED, SPLASH, OIL MIST LUBRICATION***						
1.2.1 - Lubrificazione forzata di ingranaggi, cuscinetti a rotolamento e strisciamento di cilindri di treni a caldo ed a freddo, per carichi e velocità medio-alte, soggetti ad inquinamento di acqua e polvere. Sottoposto a continua filtrazione (10µm), trattamenti di decantazione. Lubrificazione idrodinamica di cuscinetti in metallo bianco. **Impiegare su BGV Blocco gabbie veloce** *Pressure-fed lubrication of gears and rolling and friction bearings for cold-warm train rolls in medium-high load and speed conditions, polluted with water or dust.* *Subject to continuous filtering (10µm), settling treatment.* *Hydrodynamic lubrication of white-metal bearings* ***Use on BGV No-twist stand block***	- (Type 21)	0.002117.R	-	-	20°÷60°C Inlet	12
Lubrificazione forzata di ingranaggi, cuscinetti a rotolamento e strisciamento, per carichi e velocità medio-alte. Lubrificazione idrodinamica di cuscinetti in metallo bianco. **Impiegare su ESS Gabbie a sbalzo, gabbie per nastri** *Pressure-fed lubrication of gears and rolling and friction bearings in medium high load and speed conditions.* *Hydrodynamic lubrication of white-metal bearings.* ***Use on ESS Cantilever stands, strip stands***	- (Type 22)	0.086657.D	> 15 m/s	-	20°÷60°C Inlet	12
	- (Type 23)	0.092434.L	≥4÷≤15 m/s			
	- (Type 24)	0.081422.L	< 4 m/s			
Impiegare su gabbie per nastri ***Use on strip stands***	- (Type 25)	0.340321.S	< 4 m/s			

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE
REPLACES

PAGINA *PAGE* 8 DI *OF* 47

1 - CRITERI DI SCELTA DEGLI OLII
OILS SELECTION CRITERIA

APPLICAZIONI TIPICHE *TYPICAL APPLICATIONS*	Designation DIN 51502	Danieli CODE	Parameters Transm. ratio	Speed	Temp. °C min	Temp. °C min - max	Notes
1.2.2 - Lubrificazione forzata di ingranaggi fortemente caricati, grandi riduttori; cuscinetti a rotolamento e strisciamento in condizioni di carico elevato; altri organi soggetti a carichi elevati: slitte, pattini di allunghe. **Usare CLP 220 nella lubrificazione a goccia d'olio.** *Pressure-fed lubrication for gears in heavy load conditions; rolling and plain bearings in heavy load conditions; other heavy loaded members: slides, spindle plates.* ***Use CLP 220 on oil mist lubrication***	CLP 150 (Type 2) CLP 220 (Type 3)	0.004982.S 0.004983.T	τ≤10	1000÷ 2000 r/1'		20°÷60°C	Speed referred to entry shaft
	CLP 320 (Type 4) CLP 460 (Type 5)	0.004984.R 0.004985.V		0÷1000 r/1'		Inlet	
	CLP 220 (Type 3) CLP 320 (Type 4)	0.004983.T 0.004984.R	τ>10	1000÷ 2000 r/1'	-	20°÷60°C	
	CLP 460 (Type 5) CLP 680 (Type 5a)	0.004985.V 0.340322.T		0÷1000 r/1'		Inlet	
Lubrificazione a sbattimento di: - ingranaggi, cuscinetti (riduttori). *Splash lubrication on:* *- gears, bearings (gear boxes).*	CLP 220 (Type 3)	0.004983.T	-	< 4 m/s	-20°C	90°C	
	CLP 320 (Type 4)	0.004984.R			-10°C		
	CLP 460 (Type 5)	0.004985.V			0°C		
	CLP 150 (Type 2)	0.004982.S	-	≥4÷≤15 m/s	-20°C	90°C	
	CLP 220 (Type 3)	0.004983.T			-10°C		
	CLP 320 (Type 4)	0.004984.R			0°C		
Lubrificazione a sbattimento di: - riduttori a vite senza fine. *Splash lubrication on:* *- worm gears.*	CLP 320 (Type 4)	0.004984.R	-	≥ 4 m/s	0°C	90°C	Power transmission
	CLP 460 (Type 5)	0.004985.V	-	< 4 m/s	0°C	90°C	

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12

SOSTITUISCE
REPLACES

1 - CRITERI DI SCELTA DEGLI OLII
OILS SELECTION CRITERIA

APPLICAZIONI TIPICHE *TYPICAL APPLICATIONS*	Designation DIN 51502	Danieli CODE	Temp. °C min (pump start)	Temp. °C max (operating)	Notes
1.3 - SISTEMI OLEODINAMICI - *HYDRAULIC SYSTEMS* 1.3.1 - **OLII IDRAULICI - *HYDRAULIC OILS*** Oli idraulici per dispositivi di comando con centrali oleodinamiche, che includono componenti molto caricati.	HLP 46 (Type 10)	0.004990.E	10°÷30°C	60°C	
Hydraulic fluids for control devices by hydraulic units, which include highly loaded components.	HLP 68 (Type 11)	0.004991.T	10°÷50°C	60°C	
1.3.2 - **FLUIDI RESISTENTI AL FUOCO - ACQUA-GLICOLE** **FIRE RESISTANTS HYDRAULIC FLUIDS - WATER-GLYCOL** Fluidi ininfiammabili, da utilizzare in circuiti idraulici di macchine operanti in vicinanza di fiamme o punti ad alta temperatura (colata continua, forni, treni di laminazione, trasportatori lingotti, trasporto siviere, ecc.). Utilizzato in trasmissioni idrauliche di comandi di potenza in circuiti operanti fino a pressioni di 150 bar.	HFC 46	0.151165.D	10°÷30°C	50°C	
Non-flammable fluids, to be used in hydraulic circuits of machines operating in the vicinity of flames or sources of high temperature (continuous-casting machines, furnaces, rolling trains, ingot conveyors, ladle cars, etc.). These fluids are used in hydraulic transmissions of power drive devices up to pressures of 150 bar.	(Type 35)				
FLUIDI RESISTENTI AL FUOCO - *ESTERI ORGANICI* ***FIRE RESISTANTS HYDRAULIC FLUIDS - ORGANIC ESTERS*** Fluidi anidri, ad elevato punto di accensione, da utilizzare in condizioni di limitato pericolo di incendio e ove non sia possibile utilizzare prodotti contenenti acqua. Devono possedere resistenza alla propagazione della fiamma. Utilizzato in trasmissioni idrauliche di comando e potenza in circuiti operanti fino a pressione di 700 bar.	HFD/U 46 (Type 36)	0.151166.E	10°÷30°C	70°C	
Water-free fluids with a high ignition point to be used in conditions of low fire hazard and where it is not possible to use water-containing products. *These fluids must be resistant to flame propagation. Used in hydraulic drive and power transmissions in circuits operating at pressures up to 700 bar.*	HFD/U 68 (Type 37)	0.151314.A	10°÷50°C	70°C	
1.4 - DIVERSIFICATI - *MISCELLANEOUS* 1.4.1 - **Lubrificazione linee ad aria compressa - *Compressed air lines lubrication*** Lubrificatori di linee ad aria compressa; utensili pneumatici. *Compressed air lines lubrication; pneumatic tools*	D 22 (Type 13)	0.004993.V			
1.4.2 - **Lubrificazione lingottiere - *Mould separation*** Olii per lubrificazione lingottiere	FS (Type 34)	0.340325.W		-	Vegetable oil based
Oils for mould lubrication	FS (Type 34a)	0.340327.Z	0°C	-	Syntetic oil
1.4.3 - **Olii per isolamenti elettrici - *Oils for electrical insulation*** Olii per isolamenti elettrici di trasformatori ed interruttori *Oils for electrical insulation of transformers and switches*	J (Type 20)	0.151150.H			
1.4.4 - **Olio per flussaggio - *Flushing oils*** Olio per flussaggio di impianti lubrificazione e oleodinamici *Flushing oils for lubrication and hydraulic systems.*	C 32 (Type 18)	0.340324.V			

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12

SOSTITUISCE
REPLACES

PAGINA *PAGE* 10 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.1 - SISTEMI A PERDITA
1.1.1 - Lubrificazione catene, funi

1 - OILS: TECHNICAL SPECIFICATIONS
1.1 - OPEN SYSTEMS
1.1.1 - Chains, ropes lubrication

DESIGN. DIN 51502	DESIGN. ISO 6743/6	VISCOSITY mm^2/s @ 100°C	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
BB-V	L-CKH-DIL	46÷100	**Type 33** 0.151153.G	Olio minerale bituminoso in solvente non infiammabile; Adesivo ed idrorepellente, ottima efficacia antiusura; proprietà detergenti; viscosità dopo evaporazione solventi. Antigoccia. Temperatura max 150°C. Supera DIN 51513	*Bituminous mineral oil in non flammable solvent. Adhesive and water repellent, excellent anti-wear efficiency, detergent properties; viscosity after evaporation of the solvent Antidrop. Max temperature 150° C. Exceeds DIN 51513*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Ash content	EN 7 ASTM D 874	g/100g	≤ 0,2
Demulsibility	DIN 51599 ASTM D 2711		-
Density @ 15°C	DIN 51757 ASTM D1298	kg/dm^3	Stated by Supplier
Flash Point	ISO 2592 ASTM D92	°C	≥ 180
Neutralization number TAN	DIN 51558/1 ASTM D 974	mg KOH/g	Neutral
Pour Point	ISO 3016 ASTM D 97	°C	≤ 6
Viscosity @ 40°C (kinematic)	DIN 51562 ASTM D445	cSt mm^2/s	-
Viscosity @ 100°C (kinematic)*	DIN 51562 ASTM D445	cSt mm^2/s	49÷114
Viscosity Index	ISO 2909 ASTM D 2270	-	> 100

* Without solvent

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	-
Corrosion-prevention	DIN 51355/A ASTM D 665A ASTM D 665B	Level Demi water Salt water	0-A Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 40 kg 1200g/1' 75°C 1h	ASTM D 4172-B	wear mm	-
4-Ball EP test (weld point)	ASTM D 2596	kg	-
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test A/8.3/90	DIN 51354-1/2	Pass stage	-

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	FIN 332/F
BROOKS	KLINGFAST XX LT KLINGFAST EX LT
ESSO	SURETT FLUID NX
KLÜBER	GRAFLOSCON SY20 ULTRA
MOBIL	MOBILTAC LL (1) MOBILTAC 375 NC (2)
SHELL	MALLEUS OGH
TEXACO	CRATER 0 CRATER SPECIAL 0
VISCOL	SIGNAL GN/S/NF

1 - Only for USA market
2 - Available in Europe

Ex. of design.:
0.151153.G Mineral oil BB-V DIN51513
46÷100 mm^2/s at 100°C
T.33 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE *REPLACES*
PAGINA *PAGE* 11 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE — ***1 - OILS: TECHNICAL SPECIFICATIONS***

1.2 - SISTEMA CIRCOLAZIONE FORZATA, SBATTIMENTO — ***1.2 - PRESSURE-FED, SPLASH SYSTEM***

1.2.1 - BGV lubrificazione cuscinetti non additivati EP — ***1.2.1 - BGV bearings lubrication not additivated EP***

DESIGN. DIN 51502	DESIGN. ISO 6743/6	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
-	-	**100**	**Type 21** 0.002117.R	Oli minerali paraffinici altamente raffinati, ottime resistenza all'ossidazione, alla formazione di depositi, di protezione contro la corrosione, privi di acidi o altre impurità. Non contengono additivi EP; ammessa leggera additivazione antiusura. Temp. max lavoro 170°C. Filtrabile classe 15-12 ISO 4406 Eccellenti potere di separare rapidamente acqua, aria, altri contaminanti a lungo termine in servizio.	*Paraffinic highly refined mineral oils with oxidation and corrosion inhibitors, resistance to formation of sludge, free from acid and other impurities. Do not contain EP additives; allowed light antiwear additivation; max working temperature 170°C Product should be filtered down to 15-12 ISO 4406 class. Must separate rapidly from water, air and other contaminants long term in service.* 12

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	≤ 15
Ash content	ASTM D 874	% wt	≤ 0,1
Color	ASTM D 1500	-	Report
Demulsibility (2) Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
	ASTM D 1401 40 ml water 40 ml oil @ 82°C	min	to 40-37-3 in < 20'
Density @ 15°C	DIN 51757 ASTM D1298	kg/dm^3	Stated by Supplier
Flash Point Cleveland open cup	ISO 2592 ASTM D 92	°C	> 220
Foaming tendency/stability (3) 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	10/0 30/0 10/0
Neutralization number TAN	DIN 51587 ASTM D 974	mg KOH/g	≤ 1
Oxydation stability after 1000 h	ASTM D 943	Δ mg KOH/g	≤ 2
Pour Point	ISO 3016 ASTM D 97	°C	≤ - 10
Viscosity @ 100°C (kinematic)	DIN 51562 ASTM D445	cSt mm^2/s	≥10
Viscosity Index (1)	ISO 2909 ASTM D 2270	-	≥ 95

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion	DIN 51759 ASTM D130	3h @ 100°C	max 1b
Corrosion-prevention	ASTM D 665A ASTM D 665B	Demi water Salt water	Pass Pass
Rotary bomb oxydation test (RBOT)	ASTM D 2272	minutes	min 140

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 15 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	≤ 0,3
4-Ball EP test (weld load)	ASTM D 2596	kg	≥ 150
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test A/8.3/90	DIN 51354-1/2 ASTM D 5182	Pass stage	10

1 - No Viscosity Index (VI) improvers. Danieli must be notified if the VI is ≥ 120;

2 - Danieli highly recommends that mill operators request that the following tests also be run using local roll coolant to confirm that standard test results are valid for the specific installation;

3 - Danieli don't recommend the addition of excess antifoaming agents, as they tend to interfere with demulsivity and air release.

4 - The lubricant supplier shall assume responsibility for satisfactory in-service performance, and shall provide assurance that the lubricant will not cause damage to materials commonly used in the bearing assembly or the lubrication system. The lubricant supplier shall assume responsibility for compatibility of the lubricant with any existing lubricant in the system. The lubricant supplier should also assume responsibility for repair any equipment damage directly caused by a defect or malfunction of a selected lubricant, provided that the lubricant was selected and maintained in accordance with specifications of the original equipment manufacturer.

OILS ACTUALLY RUNNING AND TESTED ON FIELD

BRANDS COMPARISON

SOCIETY	MARK
BP	ENERGOL MG 88
ESSO	NURAY RM 100
MOBIL	VACUOLINE 525
SHELL 12	MORLINA OIL T 100

OILS WHOSE SPECIFICATIONS MEET DANIELI'S REQUIREMENTS BUT NOT ACTUALLY RUNNING AND TESTED ON FIELD

BRANDS COMPARISON

SOCIETY	MARK
CASTROL	MAGNA XX 100
FUCHS 12	RENOLIN MORGEAR 100
TEXACO/CALTEX	HONOR ASHLESS AW 100
TOTAL	CORTIS RM 100
CEPSA	CIRCULANTE 525

Ex. of design.:
0.002117.R Mineral oil ISO VG100
T.21 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE
REPLACES

PAGINA *PAGE* 12 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE — ***1 - OILS: TECHNICAL SPECIFICATIONS***

1.2 - SISTEMA CIRCOLAZIONE FORZATA, SBATTIMENTO — ***1.2 - PRESSURE-FED, SPLASH SYSTEM***

1.2.1 - ESS lubrificazione cuscinetti non additivati EP — ***1.2.1 - ESS bearings lubrication not additivated EP***

DESIGN. DIN 51502	DESIGN. ISO 6743/6	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
-	-	**220**	**Type 22** 0.086657.D	Oli minerali paraffinici altamente raffinati, ottime resistenza all'ossidazione, alla formazione di depositi, di protezione contro la corrosione, privi di acidi o altre impurità. Non contengono additivi EP; ammessa leggera additivazione antiusura. Temp. max lavoro 170°C. Filtrabile classe 15-12 ISO 4406 Eccellenti potere di separare rapidamente acqua, aria, altri contaminanti a lungo termine in servizio.	*Paraffinic highly refined mineral oils with oxidation and corrosion inhibitors, resistance to formation of sludge, free from acid and other impurities. Do not contain EP additives; allowed light antiwear additivation; max working temperature 170°C* *Product should be filtered down to 15-12 ISO 4406 class.* *Must separate rapidly from water, air and other contaminants long term in service.* 12

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	≤ 15
Ash content	ASTM D 874	% wt	≤ 0,1
Color	ASTM D 1500	-	Report
Demulsibility (2) Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
	ASTM D 1401 40 ml water 40 ml oil @ 82°C	min	to 40-37-3 in < 20'
Density @ 15°C	DIN 51757 ASTM D1298	kg/dm^3	Stated by Supplier
Flash Point Cleveland open cup	ISO 2592 ASTM D 92	°C	> 230
Foaming tendency/stability (3) 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	10/0 30/0 10/0
Neutralization number TAN	DIN 51587 ASTM D 974	mg KOH/g	≤ 1
Oxydation stability after 1000 h	ASTM D 943	Δ mg KOH/g	≤ 2
Pour Point	ISO 3016 ASTM D 97	°C	≤ -10
Viscosity @ 100°C (kinematic)	DIN 51562 ASTM D445	cSt mm^2/s	≥ 18
Viscosity Index (1)	ISO 2909 ASTM D 2270	-	≥ 95

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion	DIN 51759 ASTM D130	3h @ 100°C	max 1b
Corrosion-prevention	ASTM D 665A ASTM D 665B	Demi water Salt water	Pass Pass
Rotary bomb oxydation test (RBOT)	ASTM D 2272	minutes	min 140

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 15 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	≤ 0,3
4-Ball EP test (weld load)	ASTM D 2596	kg	≥ 150
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test	DIN 51354-1/2 ASTM D 5182	Pass stage	10

1 - No Viscosity Index (VI) improvers. Danieli must be notified if the VI is ≥ 120;

2 - Danieli highly recommends that mill operators request that the following tests also be run using local roll coolant to confirm that standard test results are valid for the specific installation;

3 - Danieli don't recommend the addition of excess antifoaming agents, as they tend to interfere with demulsivity and air release.

4 - The lubricant supplier shall assume responsibility for satisfactory in-service performance, and shall provide assurance that the lubricant will not cause damage to materials commonly used in the bearing assembly or the lubrication system. The lubricant supplier shall assume responsibility for compatibility of the lubricant with any existing lubricant in the system. The lubricant supplier should also assume responsibility for repair any equipment damage directly caused by a defect or malfunction of a selected lubricant, provided that the lubricant was selected and maintained in accordance with specifications of the original equipment manufacturer.

OILS ACTUALLY RUNNING AND TESTED ON FIELD

BRANDS COMPARISON

SOCIETY	MARK
BP	ENERGOL MG 220
MOBIL	VACUOLINE 533

OILS WHOSE SPECIFICATIONS MEET DANIELI'S REQUIREMENTS BUT NOT ACTUALLY RUNNING AND TESTED ON FIELD

BRANDS COMPARISON

SOCIETY	MARK
CASTROL	MAGNA XX 220
FUCHS 12	RENOLIN MORGEAR 220
ESSO	NURAY RM 220
SHELL	MORLINA OIL T 220
TEXACO/CALTEX	HONOR ASHLESS AW 220
CEPSA	CIRCULANTE 535

Ex. of design.:
0.086657.D Mineral oil ISO VG 220
T.22 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE
REPLACES

PAGINA *PAGE* 13 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.2 - SISTEMA CIRCOLAZIONE FORZATA, SBATTIMENTO
1.2.1 - ESS lubrificazione cuscinetti non additivati EP

1 - OILS: TECHNICAL SPECIFICATIONS
1.2 - PRESSURE-FED, SPLASH SYSTEM
1.2.1 - ESS bearings lubrication not additivated EP

DESIGN. DIN 51502	DESIGN. ISO 6743/6	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
-	-	**320**	**Type 23** 0.092434.L	Oli minerali paraffinici altamente raffinati, ottime resistenza all'ossidazione, alla formazione di depositi, di protezione contro la corrosione, privi di acidi o altre impurità. Non contengono additivi EP: ammessa leggera additivazione antiusura. Temp. max lavoro 170°C. Filtrabile classe 15-12 ISO 4406 Eccellenti potere di separare rapidamente acqua, aria, altri contaminanti a lungo termine in servizio.	*Paraffinic highly refined mineral oils with oxidation and corrosion inhibitors, resistance to formation of sludge, free from acid and other impurities. Do not contain EP additives; allowed light antiwear additivation; max working temperature 170°C Product should be filtered down to 15-12 ISO 4406 class. Must separate rapidly from water, air and other contaminants long term in service.* 12

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	≤ 20
Ash content	ASTM D 874	% wt	≤ 0,1
Color	ASTM D 1500	-	Report
Demulsibility (2) Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
	ASTM D 1401 40 ml water 40 ml oil @ 82°C	min	to 40-37-3 in < 30'
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Flash Point Cleveland open cup	ISO 2592 ASTM D 92	°C	> 250
Foaming tendency/stability (3) 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	10/0 30/0 10/0
Neutralization number TAN	DIN 51587	mg KOH/g	≤ 1
	ASTM D 974		
Oxydation stability after 1000 h	ASTM D 943	Δ mg KOH/g	≤ 2
Pour Point	ISO 3016	°C	≤ -6
	ASTM D 97		
Viscosity @ 100°C (kinematic)	DIN 51562	cSt	≥ 24
	ASTM D445	mm^2/s	
Viscosity Index (1)	ISO 2909 ASTM D 2270	-	≥ 95

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion	DIN 51759 ASTM D130	3h @ 100°C	max 1b
Corrosion-prevention	ASTM D 665A	Demi water	Pass
	ASTM D 665B	Salt water	Pass
Rotary bomb oxydation test (RBOT)	ASTM D 2272	minutes	min 140

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 15 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	≤ 0,3
4-Ball EP test (weld load)	ASTM D 2596	kg	≥ 150
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test A/8.3/90	DIN 51354-1/2 ASTM D 5182	Pass stage	10

1 - No Viscosity Index (VI) improvers. Danieli must be notified if the VI is ≥ 120;
2 - Danieli highly recommends that mill operators request that the following tests also be run using local roll coolant to confirm that standard test results are valid for the specific installation;
3 - Danieli don't recommend the addition of excess antifoaming agents, as they tend to interfere with demulsivity and air release.
4 - The lubricant supplier shall assume responsibility for satisfactory in-service performance, and shall provide assurance that the lubricant will not cause damage to materials commonly used in the bearing assembly or the lubrication system. The lubricant supplier shall assume responsibility for compatibility of the lubricant with any existing lubricant in the system. The lubricant supplier should also assume responsibility for repair any equipment damage directly caused by a defect or malfunction of a selected lubricant, provided that the lubricant was selected and maintained in accordance with specifications of the original equipment manufacturer.

OILS ACTUALLY RUNNING AND TESTED ON FIELD

BRANDS COMPARISON

SOCIETY	MARK
BP	ENERGOL MG 320
MOBIL	VACUOLINE 537

OILS WHOSE SPECIFICATIONS MEET DANIELI'S REQUIREMENTS BUT NOT ACTUALLY RUNNING AND TESTED ON FIELD

BRANDS COMPARISON

SOCIETY	MARK
CASTROL	MAGNA XX 320
FUCHS 12	RENOLIN MORGEAR 320
ESSO	NURAY RM 320
SHELL	MORLINA OIL T 320
TEXACO/CALTEX	HONOR ASHLESS AW 320

Ex. of design.:
0.092434.L Mineral oil ISO VG 320
T.23 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE REPLACES
PAGINA *PAGE* 14 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.2 - SISTEMA CIRCOLAZIONE FORZATA, SBATTIMENTO
1.2.1 - ESS lubrificazione cuscinetti non additivati EP

1 - OILS: TECHNICAL SPECIFICATIONS
1.2 - PRESSURE-FED, SPLASH SYSTEM
1.2.1 - ESS bearings lubrication not additivated EP

DESIGN. DIN 51502	DESIGN. ISO 6743/6	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
-	-	**460**	**Type 24** 0.081422.L	Oli minerali paraffinici altamente raffinati, ottime resistenza all'ossidazione, alla formazione di depositi, di protezione contro la corrosione, privi di acidi o altre impurità. Non contengono additivi EP; ammessa leggera additivazione antiusura. Temp. max lavoro 170°C. Filtrabile classe 15-12 ISO 4406 Eccellenti potere di separare rapidamente acqua, aria, altri contaminanti a lungo termine in servizio.	*Paraffinic highly refined mineral oils with oxidation and corrosion inhibitors, resistance to formation of sludge, free from acid and other impurities. Do not contain EP additives; allowed light antiwear additivation; max working temperature 170°C* *Product should be filtered down to 15-12 ISO 4406 class.* *Must separate rapidly from water, air and other contaminants long term in service.* 12

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	≤ 20
Ash content	ASTM D 874	% wt	≤ 0,1
Color	ASTM D 1500	-	Report
Demulsibility (2) Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
	ASTM D 1401 40 ml water 40 ml oil @ 82°C	min	to 40-37-3 in < 30'
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Flash Point Cleveland open cup	ISO 2592 ASTM D 92	°C	> 250
Foaming tendency/stability (3) 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	10/0 30/0 10/0
Neutralization number TAN	DIN 51587	mg KOH/g	≤ 1
	ASTM D 974		
Oxydation stability after 1000 h	ASTM D 943	Δ mg KOH/g	≤ 2
Pour Point	ISO 3016	°C	≤ -6
	ASTM D 97		
Viscosity @ 100°C (kinematic)	DIN 51562	cSt mm^2/s	≥ 28
	ASTM D445		
Viscosity Index (1)	ISO 2909 ASTM D 2270	-	≥ 95

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion	DIN 51759 ASTM D130	3h @ 100°C	max 1b
Corrosion-prevention	ASTM D 665A ASTM D 665B	Demi water Salt water	Pass Pass
Rotary bomb oxydation test (RBOT)	ASTM D 2272	minutes	min 140

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 15 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	≤ 0,3
4-Ball EP test (weld load)	ASTM D 2596	kg	≥ 150
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test A/8.3/90	DIN 51354-1/2 ASTM D 5182	Pass stage	10

1 - No Viscosity Index (VI) improvers. Danieli must be notified if the VI is ≥ 120;
2 - Danieli highly recommends that mill operators request that the following tests also be run using local roll coolant to confirm that standard test results are valid for the specific installation;
3 - Danieli don't recommend the addition of excess antifoaming agents, as they tend to interfere with demulsivity and air release.
4 - The lubricant supplier shall assume responsibility for satisfactory in-service performance, and shall provide assurance that the lubricant will not cause damage to materials commonly used in the bearing assembly or the lubrication system. The lubricant supplier shall assume responsibility for compatibility of the lubricant with any existing lubricant in the system. The lubricant supplier should also assume responsibility for repair any equipment damage directly caused by a defect or malfunction of a selected lubricant, provided that the lubricant was selected and maintained in accordance with specifications of the original equipment manufacturer.

OILS ACTUALLY RUNNING AND TESTED ON FIELD

BRANDS COMPARISON

SOCIETY	MARK
BP	ENERGOL MG 460
MOBIL	VACUOLINE 546

OILS WHOSE SPECIFICATIONS MEET DANIELI'S REQUIREMENTS BUT NOT ACTUALLY RUNNING AND TESTED ON FIELD

BRANDS COMPARISON

SOCIETY	MARK
CASTROL	MAGNA XX 460
FUCHS 12	RENOLIN MORGEAR 460
ESSO	NURAY RM 460
SHELL	MORLINA OIL T 460
TEXACO/CALTEX	HONOR ASHLESS AW 460
CEPSA	CIRCULANTE 546

Ex. of design.:
0.081422.L Mineral oil ISO VG 460
T.24 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE REPLACES

PAGINA *PAGE* 15 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE — ***1 - OILS: TECHNICAL SPECIFICATIONS***

1.2 - SISTEMA CIRCOLAZIONE FORZATA, SBATTIMENTO — ***1.2 - PRESSURE-FED, SPLASH SYSTEM***

1.2.1 - Lubrificazione cuscinetti non additivati EP — ***1.2.2 - ESS bearings lubrication not additivated EP***

DESIGN. DIN 51502	DESIGN. ISO 6743/6	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
-	-	**680**	**Type 25** 0.340321.S	Oli minerali paraffinici altamente raffinati, ottime resistenza all'ossidazione, alla formazione di depositi, di protezione contro la corrosione, privi di acidi o altre impurità; ammessa leggera additivazione antiusura.Non contengono additivi EP; Temp. max lavoro 170°C. Filtrabile classe 15-12 ISO 4406 Eccellenti potere di separare rapidamente acqua, aria, altri contaminanti a lungo termine in servizio.	*Paraffinic highly refined mineral oils with oxidation and corrosion inhibitors, resistance to formation of sludge, free from acid and other impurities; allowed light antiwear additivation. Do not contain EP additives; max working temperature 170°C* *Product should be filtered down to 15-12 ISO 4406 class.* *Must separate rapidly from water, air and other contaminants long term in service.* 12

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	≤ 20
Ash content	ASTM D 874	% wt	≤ 0,1
Color	ASTM D 1500	-	Report
Demulsibility (2) Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
	ASTM D 1401 40 ml water 40 ml oil @ 82°C	min	to 40-37-3 in < 50'
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Flash Point Cleveland open cup	ISO 2592 ASTM D 92	°C	> 250
Foaming tendency/stability (3) 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	10/0 30/0 10/0
Neutralization number TAN	DIN 51587	mg KOH/g	≤ 1
	ASTM D 974		
Oxydation stability after 1000 h	ASTM D 943	Δ mg KOH/g	≤ 2
Pour Point	ISO 3016	°C	≤ 0
	ASTM D 97		
Viscosity @ 100°C (kinematic)	DIN 51562	cSt	≥ 32
	ASTM D445	mm^2/s	
Viscosity Index (1)	ISO 2909 ASTM D 2270	-	≥ 90

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion	DIN 51759 ASTM D130	3h @ 100°C	max 1a
Corrosion-prevention	ASTM D 665A ASTM D 665B	Demi water Salt water	Pass Pass
Rotary bomb oxydation test (RBOT)	ASTM D 2272	minutes	min 140

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 15 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	≤ 0,3
4-Ball EP test (weld load)	ASTM D 2596	kg	≥ 150
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test A/8.3/90	DIN 51354-1/2 ASTM D 5182	Pass stage	10

1 - Danieli must be notified if the Viscosity Index (VI) is ≥ 120;

2 - Danieli highly recommends that mill operators request that the following tests also be run using local roll coolant to confirm that standard test results are valid for the specific installation;

3 - Danieli don't recommend the addition of excess antifoaming agents, as they tend to interfere with demulsivity and air release.

4 - The lubricant supplier shall assume responsibility for satisfactory in-service performance, and shall provide assurance that the lubricant will not cause damage to materials commonly used in the bearing assembly or the lubrication system. The lubricant supplier shall assume responsibility for compatibility of the lubricant with any existing lubricant in the system. The lubricant supplier should also assume responsibility for repair any equipment damage directly caused by a defect or malfunction of a selected lubricant, provided that the lubricant was selected and maintained in accordance with specifications of the original equipment manufacturer.

OILS ACTUALLY RUNNING AND TESTED ON FIELD

BRANDS COMPARISON

SOCIETY	MARK
BP	ENERGOL MG 680
MOBIL	VACUOLINE 548

OILS WHOSE SPECIFICATIONS MEET DANIELI'S REQUIREMENTS BUT NOT ACTUALLY RUNNING AND TESTED ON FIELD

BRANDS COMPARISON

SOCIETY	MARK
CASTROL	MAGNA XX 680
FUCHS 12	RENOLIN MORGEAR 680
TEXACO/CALTEX	HONOR ASHLESS AW 680
CEPSA	CIRCULANTE 548

Ex. of design.:
0.340321.S Mineral oil ISO VG 680
T.25 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12

SOSTITUISCE REPLACES

PAGINA PAGE 16 *DI OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.2 - SISTEMA CIRCOLAZIONE FORZATA, SBATTIMENTO
1.2.2 - Ingranaggi, cuscinetti Additivati EP

1 - OILS: TECHNICAL SPECIFICATIONS
1.2 - PRESSURE-FED, SPLASH SYSTEM
1.2.2 - Gears, bearings Additivated EP

DESIGN. DIN 51502	DESIGN. ISO 6743/6	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
CLP 150	L-CKC-150	**150**	**Type 2** 0.004982.S	Olii minerali altamente raffinati contenente additivi EP atti a migliorare le proprietà contro la corrosione, la resistenza all'invecchiamento, ridurre l'usura. Temperature di impiego max 120°C Supera DIN 51517 Parte 3	*Highly refined mineral oils, containing EP additives improving corrosion protection, ageing resistance, protection against wear and scoring wear.* *Max operating temperature: 120°C* *Exceeds DIN 51517 Part 3*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	18
Ash content	EN 7 ASTM D 874	% wt	≤ 0,6
Demulsibility Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
	ASTM D 1401 40 ml water 40 ml oil @ 82°C	min	to 40-37-3 in < 20'
Density @ 15°C	DIN 51757 ASTM D1298	kg/dm^3	Stated by Supplier
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	≥ 230
Foaming tendency/stability 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	30/0 30/0 30/0
Neutralization number TAN	DIN 51558/1 ASTM D 974	mg KOH/g	≤ 1,5
Pour Point	ISO 3016 ASTM D 97	°C	≤ -15
Viscosity @ 100°C (kinematic)	DIN 51562 ASTM D445	cSt mm^2/s	≥ 14
Viscosity Index	ISO 2909 ASTM D 2270	-	> 95

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1b
Corrosion-prevention	ASTM D 665A ASTM D 665B	Demi water Salt water	Pass Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 40 kg 1200g/1' 75°C 1h	ASTM D 4172-B	wear mm	≤ 0,4
4-Ball EP test (weld point)	ASTM D 2596	kg	> 230
Timken EP test (OK load)	ASTM D 2782	pounds	> 60
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	12

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	BLASIA 150
BECHEM	STAROIL G 150
BP	ENERGOL GR-XP 150
BROOKS	GEARGUARD EP-150
BRUGAROLAS	BESLUX GEAR 150
CASTROL	ALPHA SP 150
CHEVRON	GEAR COMP. EP ISO 150 (1)
ESSO	SPARTAN EP 150
KLÜBER	KLÜBEROIL GEM 1-150
LUBRA	DACTA EP 150
MOBIL	MOBILGEAR 629 MOBILGEAR XMP 150
Q8	GOYA 150
ROLOIL	EP 150
SHELL	OMALA OIL 150
TEXACO	MEROPA 150
TOTAL	CARTER EP 150
TRIBOL	1100/150
VISCOL	SIGNAL VL EP 150

1 - Only for USA market

Ex. of design.:
0.004982.S Mineral oil CLP 150 DIN 51517/3
T.2 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE
REPLACES

PAGINA PAGE 17 *DI OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.2 - SISTEMA CIRCOLAZIONE FORZATA, SBATTIMENTO
1.2.2 - Ingranaggi, cuscinetti Additivati EP

1 - OILS: TECHNICAL SPECIFICATIONS
1.2 - PRESSURE-FED, SPLASH SYSTEM
1.2.2 - Gears, bearings Additivated EP

DESIGN. DIN 51502	DESIGN. ISO 6743/6	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
CLP 220	L-CKC-220	**220**	**Type 3** 0.004983.T	Olii minerali altamente raffinati, estratti al solvente, contenente additivi EP atti a migliorare le proprietà contro la corrosione, incrementare la resistenza all'invecchiamento, ridurre l'usura. Temperature di impiego max 120°C Supera DIN 51517 Parte 3	*Highly refined mineral oils, containing EP additives improving corrosion protection, ageing resistance, protection against wear and scoring wear.* *Max operating temperature: 120°C* *Exceeds DIN 51517 Part 3*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	Report
Ash content	EN 7 ASTM D 874	% wt	≤ 0,6
Demulsibility Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	≥ 230
Foaming tendency/stability 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	30/0 30/0 30/0
Neutralization number TAN	DIN 51558/1	mg KOH/g	≤ 1,5
	ASTM D 974		
Pour Point	ISO 3016	°C	≤ -9
	ASTM D 97		
Viscosity @ 100°C (kinematic)	DIN 51562	cSt	≥ 18
	ASTM D445	mm^2/s	
Viscosity Index	ISO 2909 ASTM D 2270	-	> 95

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1b
Corrosion-prevention	ASTM D665A	Demi water	Pass
	ASTM D665B	Salt water	Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 40 kg 1200g/1' 75°C 1h	ASTM D 4172-B	wear mm	≤ 0,4
4-Ball EP test (weld point)	ASTM D 2596	kg	> 230
Timken EP test (OK load)	ASTM D 2782	pounds	> 60
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	12

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	BLASIA 220
BECHEM	STAROIL G 220
BP	ENERGOL GR-XP 220
BROOKS	GEARGUARD EP-220
BRUGAROLAS	BESLUX GEAR 220
CASTROL	ALPHA SP 220
CHEVRON	GEAR COMP. EP ISO 220 (1)
ESSO	SPARTAN EP 220
KLÜBER	KLÜBEROIL GEM 1-220
LUBRA	DACTA EP 220
MOBIL	MOBILGEAR 630 MOBILGEAR XMP 220
Q8	GOYA 220
ROLOIL	EP 220
SHELL	OMALA OIL 220
TEXACO	MEROPA 220
TOTAL	CARTER EP 220
TRIBOL	1100/220
VISCOL	SIGNAL VL EP 220

1 - Only for USA market

Ex. of design.:
0.004983.T Mineral oil CLP 220 DIN 51517/3
T.3 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE REPLACES
PAGINA PAGE 18 *DI OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.2 - SISTEMA CIRCOLAZIONE FORZATA, SBATTIMENTO
1.2.2 - Ingranaggi, cuscinetti Additivati EP

1 - OILS: TECHNICAL SPECIFICATIONS
1.2 - PRESSURE-FED, SPLASH SYSTEM
1.2.2 - Gears, bearings Additivated EP

DESIGN. DIN 51502	DESIGN. ISO 6743/6	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
CLP 320	L-CKC-320	**320**	**Type 4** 0.004984.R	Olii minerali altamente raffinati, estratti al solvente, contenente additivi EP atti a migliorare le proprietà contro la corrosione, incrementare la resistenza all'invecchiamento, ridurre l'usura. Temperature di impiego max 120°C Supera DIN 51517 Parte 3	*Highly refined mineral oils, containing EP additives improving corrosion protection, ageing resistance, protection against wear and scoring wear.* *Max operating temperature: 120°C* *Exceeds DIN 51517 Part 3*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	Report
Ash content	EN 7 ASTM D 874	% wt	≤ 0,6
Demulsibility Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
Density @ 15°C	DIN 51757 ASTM D1298	kg/dm^3	Stated by Supplier
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	≥ 235
Foaming tendency/stability 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	30/0 30/0 30/0
Neutralization number TAN	DIN 51558/1 ASTM D 974	mg KOH/g	≤ 1,5
Pour Point	ISO 3016 ASTM D 97	°C	≤ -9
Viscosity @ 100°C (kinematic)	DIN 51562 ASTM D445	cSt mm^2/s	≥ 23
Viscosity Index	ISO 2909 ASTM D 2270	-	> 95

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1b
Corrosion-prevention	ASTM D665A ASTM D665B	Demi water Salt water	Pass Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 40 kg 1200g/1' 75°C 1h	ASTM D 4172-B	wear mm	≤ 0,4
4-Ball EP test (weld point)	ASTM D 2596	kg	> 250
Timken EP test (OK load)	ASTM D 2782	pounds	> 60
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	12

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	BLASIA 320
BECHEM	STAROIL G 320
BP	ENERGOL-XP 320
BROOKS	GEARGUARD EP-320
BRUGAROLAS	BESLUX GEAR 320
CASTROL	ALPHA SP 320
CHEVRON	GEAR COMP. EP ISO 320 (1)
ESSO	SPARTAN EP 320
KLÜBER	KLÜBEROIL GEM 1-320
LUBRA	DACTA EP 320
MOBIL	MOBILGEAR 632 MOBILGEAR XMP 320
Q8	GOYA 320
ROLOIL	EP 320
SHELL	OMALA OIL 320
TEXACO	MEROPA 320
TOTAL	CARTER EP 320
TRIBOL	1100/320
VISCOL	SIGNAL VL EP 320

1 - Only for USA market

Ex. of design.:
0.004984.R Mineral oil CLP 320 DIN 51517/3
T.4 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE
REPLACES

PAGINA *PAGE* 19 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.2 - SISTEMA CIRCOLAZIONE FORZATA, SBATTIMENTO
1.2.2 - Ingranaggi, cuscinetti Additivati EP

1 - OILS: TECHNICAL SPECIFICATIONS
1.2 - PRESSURE-FED, SPLASH SYSTEM
1.2.2 - Gears, bearings Additivated EP

DESIGN. DIN 51502	DESIGN. ISO 6743/6	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
CLP 460	L-CKC-460	**460**	**Type 5** 0.004985.V	Olii minerali altamente raffinati, estratti al solvente, contenente additivi EP atti a migliorare le proprietà contro la corrosione, incrementare la resistenza all'invecchiamento, ridurre l'usura. Temperature di impiego max 120°C Supera DIN 51517 Parte 3	*Highly refined mineral oils, containing EP additives improving corrosion protection, ageing resistance, protection against wear and scoring wear. Max operating temperature: 120°C Exceeds DIN 51517 Part 3*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	Report
Ash content	EN 7 ASTM D 874	% wt	≤ 0,6
Demulsibility Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	≥ 235
Foaming tendency/stability 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	30/0 30/0 30/0
Neutralization number TAN	DIN 51558/1	mg KOH/g	≤ 1,5
	ASTM D 974		
Pour Point	ISO 3016	°C	≤ -6
	ASTM D 97		
Viscosity @ 100°C (kinematic)	DIN 51562	cSt	≥ 30
	ASTM D445	mm^2/s	
Viscosity Index	ISO 2909 ASTM D 2270	-	> 90

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1b
Corrosion-prevention	ASTM D 665A	Demi water	Pass
	ASTM D 665B	Salt water	Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 40 kg 1200g/1' 75°C 1h	ASTM D 4172-B	wear mm	≤ 0,4
4-Ball EP test (weld point)	ASTM D 2596	kg	> 250
Timken EP test (OK load)	ASTM D 2782	pounds	> 60
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	12

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	BLASIA 460
BECHEM	STAROIL G 460
BP	ENERGOL GR-XP 460
BROOKS	GEARGUARD EP-460
BRUGAROLAS	BESLUX GEAR 460
CASTROL	ALPHA SP 460
CHEVRON	GEAR COMP. EP ISO 460 (1)
ESSO	SPARTAN EP 460
KLÜBER	KLÜBEROIL GEM 1-460
LUBRA	DACTA EP 460
MOBIL	MOBILGEAR 634 MOBILGEAR XMP 460
Q8	GOYA 460
ROLOIL	EP 460
SHELL	OMALA OIL 460
TEXACO	MEROPA 460
TOTAL	CARTER EP 460
TRIBOL	1100/460
VISCOL	SIGNAL VL EP 460

1 - Only for USA market

Ex. of design.:
0.004985.V Mineral oil CLP 460 DIN 51517/3
T.5 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE
REPLACES
PAGINA *PAGE* 20 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.2 - SISTEMA CIRCOLAZIONE FORZATA, SBATTIMENTO
1.2.2 - Ingranaggi, cuscinetti Additivati EP

1 - OILS: TECHNICAL SPECIFICATIONS
1.2 - PRESSURE-FED, SPLASH SYSTEM
1.2.2 - Gears, bearings Additivated EP

DESIGN. DIN 51502	DESIGN. ISO 6743/6	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
CLP 680	L-CKC-680	**680**	**Type 5a** 0.340322.T	Olii minerali altamente raffinati, estratti al solvente, contenente additivi EP atti a migliorare le proprietà contro la corrosione, incrementare la resistenza all'invecchiamento, ridurre l'usura. Temperature di impiego max 120°C Supera DIN 51517 Parte 3	*Highly refined mineral oils, containing EP additives improving corrosion protection, ageing resistance, protection against wear and scoring wear. Max operating temperature: 120°C Exceeds DIN 51517 Part 3*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	Report
Ash content	EN 7 ASTM D 874	% wt	≤ 0,6
Demulsibility Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	≥ 240
Foaming tendency/stability 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	30/0 30/0 30/0
Neutralization number TAN	DIN 51558/1	mg KOH/g	≤ 1,5
	ASTM D 974		
Pour Point	ISO 3016	°C	≤ -3
	ASTM D 97		
Viscosity @ 100°C (kinematic)	DIN 51562	cSt	≥ 35
	ASTM D445	mm^2/s	
Viscosity Index	ISO 2909 ASTM D 2270	-	> 85

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1b
Corrosion-prevention	ASTM D 665A	Demi water	Pass
	ASTM D 665B	Salt water	Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 40 kg 1200g/1' 75°C 1h	ASTM D 4172-B	wear mm	≤ 0,4
4-Ball EP test (weld point)	ASTM D 2596	kg	> 250
Timken EP test (OK load)	ASTM D 2782	pounds	> 60
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	12

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	BLASIA 680
BECHEM	STAROIL G 680
BP	ENERGOL GR-XP 680
BROOKS	GEARGUARD EP-680
BRUGAROLAS	BESLUX GEAR 680
CASTROL	ALPHA SP 680
CHEVRON	GEAR COMP. EP ISO 680 (1)
ESSO	SPARTAN EP 680
KLÜBER	KLÜBEROIL GEM 1-680
LUBRA	DACTA EP 460
MOBIL	MOBILGEAR 636 MOBILGEAR XMP 680
Q8	GOYA 680
ROLOIL	EP 680
SHELL	OMALA OIL 680
TEXACO	MEROPA 680
TOTAL	CARTER EP 680
TRIBOL	1100/680
VISCOL	SIGNAL VL EP 680

1 - Only for USA market

Ex. of design.:
0.340322.T Mineral oil CLP 680 DIN 51517/3
T.5a N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE REPLACES
PAGINA *PAGE* 21 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.3 - SISTEMI OLEODINAMICI
1.3.1 - Olii idraulici per dispositivi di comando

1 - OILS: TECHNICAL SPECIFICATIONS
1.3 - HYDRAULIC SYSTEMS
1.3.1 - Hydraulic oils for drive units

DESIGN. DIN 51502	DESIGN. ISO 6743/4	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
HLP 46	L-HM-46	**46**		Oli minerali altamente raffinati con ottime proprietà antiossidazione e contro la corrosione, additivi antiusura. Antischiuma. Supera DIN 51524 parte 2	*Highly refined mineral oils with oxidation and corrosion inhibitors, antiwear additives, antifoaming. Exceeds DIN 51524 part 2*
		Type 10	0.004990.E	Filtrabile nella classe 15-12 ISO 4406.	*Product should be filtered down to 15-12 ISO 4406 class.*
		Type 10a	0.341366.R	Filtrabile nella classe 13-10 ISO 4406.	*Product should be filtered down to 13-10 ISO 4406 class.*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	≤ 10
Ash content	EN 7 ASTM D 874	% wt	Stated by Supplier
Demulsibility Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
	ASTM D 1401 40 ml water 40 ml oil @ 82°C	min	to 40-37-3 in < 20'
Density @ 15°C	DIN 51757	kg/dm^3	Stated by Supplier
	ASTM D1298		
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	≥ 200
Foaming tendency/stability 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	10/0 30/0 10/0
Neutralization number TAN	DIN 51558/1	mg KOH/g	≤ 1
	ASTM D 974		
Oxydation stability	ASTM D 943	h	≥ 1500
Pour Point	ISO 3016	°C	≤ -15
	ASTM D 97		
Viscosity @ 100°C (kinematic)	DIN 51562	cSt mm^2/s	≥ 6
	ASTM D445		
Viscosity Index	ISO 2909 ASTM D 2270	-	> 95

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1b
Corrosion-prevention	ASTM D 665A	Demi water	Pass
	ASTM D 665B	Salt water	Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 40 kg 1200g/1' 75°C 1h	ASTM D 4172-B	wear mm	≤ 0,45
4-Ball EP test (weld point)	ASTM D 2596	kg	150
Timken EP test (OK load)	ASTM D 2782	pounds	> 50
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	10
Vane pump test Vickers pump V104-C10	DIN 51389 part 2	mg	Ring 120 Vane 30

Preferibili ma non obbligatori
Preferred but not mandatory

HLP 46	FILTR. 13-10 ISO 4406
BRANDS COMPARISON	
SOCIETY	**MARK**
AGIP	ARNICA 46
BP	ENERGOL HLP-HM 46
ESSO	NUTO H 46
KLÜBER	LAMORA HLP 46
MOBIL	DTE 25
Q8	HOLST 46
ROLOIL	LI 46-HTW
SHELL	TELLUS 46 TELLUS S 46
VISCOL	SIGNAL CO 46

HLP 46	FILTR. 15-12 ISO 4406
BRANDS COMPARISON	
SOCIETY	**MARK**
AGIP	OSO 46
BECHEM	STAROIL NR 46
BP	ENERGOL HLP-HM 46
BROOKS	VERSALENE AW/OX 46
BRUGAROLAS	FLUID DRIVE HM-46
CASTROL	HYSPIN AWS 46
CHEVRON	HYDR. OIL AW ISO 46 (1)
KLÜBER	LAMORA HLP 46
LUBRA	OLEODIN 46
MOBIL	DTE 25
Q8	HAYDN 46
ROLOIL	LI 46
TEXACO	RANDO HDZ 46
TOTAL	AZOLLA ZS 46
TRIBOL	943AW-46
VISCOL	SIGNAL CO 46

1 - Only for USA market

Ex. of design.:
0.004990.E Mineral oil HLP 46 DIN 51524/2
T.10 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE REPLACES

PAGINA *PAGE* 22 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.3 - SISTEMI IDRAULICI
1.3.1 - Olii idraulici per dispositivi di comando

1 - OILS: TECHNICAL SPECIFICATIONS
1.3 - HYDRAULIC SYSTEMS
1.3.1 - Hydraulic oils for drive units

DESIGN. DIN 51502	DESIGN. ISO 6743/4	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
HLP 68	L-HM-68	**68**		Oli minerali altamente raffinati con ottime proprietà antiossidazione e contro la corrosione, additivi antiusura. Antischiuma. Supera DIN 51524 parte 2	*Highly refined mineral oils with oxidation and corrosion inhibitors, antiwear additives, antifoaming. Exceeds DIN 51524 part 2*
		Type 11	0.004991.T	Filtrabile nella classe 15-12 ISO 4406.	*Product should be filtered down to 15-12 ISO 4406 class.*
		Type 11a	0.341367.V	Filtrabile nella classe 13-10 ISO 4406.	*Product should be filtered down to 13-10 ISO 4406 class.*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	≤ 10
Ash content	EN 7 ASTM D 874	% wt	Stated by Supplier
Demulsibility Reagent-grade distilled water	ASTM D 2711 45 ml water 405 ml oil @ 82°C	36 ml min total free water (≥ 90% before centrifuging) 1,5% water in oil max 1,0 ml max oil emulsion	
	ASTM D 1401 40 ml water 40 ml oil @ 82°C	min	to 40-37-3 in < 30'
Density @ 15°C	DIN 51757	kg/dm^3	Stated by Supplier
	ASTM D1298		
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	> 210
Foaming tendency/stability 24°-93°-24°C	ASTM D 892 Seq. I-II-III	ml/ml	10/0 30/0 10/0
Neutralization number TAN	DIN 51558/1	mg KOH/g	≤ 1
	ASTM D 974		
Oxydation stability	ASTM D 943	h	≥ 1500
Pour Point	ISO 3016	°C	≤ -12
	ASTM D 97		
Viscosity @ 100°C (kinematic)	DIN 51562	cSt mm^2/s	≥ 8
	ASTM D445		
Viscosity Index	ISO 2909 ASTM D 2270	-	> 95

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1b
Corrosion-prevention	ASTM D 665A	Demi water	Pass
	ASTM D 665B	Salt water	Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 40 kg 1200g/1' 75°C 1h	ASTM D 4172-B	wear mm	≤ 0,45
4-Ball EP test (weld point)	ASTM D 2596	kg	150
Timken EP test (OK load)	ASTM D 2782	pounds	> 50
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	10
Vane pump test Vickers pump V104-C10	DIN 51389 part 2	mg	Ring 120 Vane 30

Preferibili ma non obbligatori
Preferred but not mandatory

HLP 68	FILTR. 13-10 ISO 4406
BRANDS COMPARISON	
SOCIETY	**MARK**
AGIP	ARNICA 68
BP	ENERGOL HLP-HM 68
ESSO	NUTO H 68
KLÜBER	LAMORA HLP 68
MOBIL	DTE 26
Q8	HOLST 68
ROLOIL	LI 68-HTW
SHELL	TELLUS 68 TELLUS S 68
VISCOL	SIGNAL CO 68

HLP 68	FILTR. 15-12 ISO 4406
BRANDS COMPARISON	
SOCIETY	**MARK**
AGIP	OSO 68
BECHEM	STAROIL NR 68
BP	ENERGOL HLP-HM 68
BROOKS	VERSALENE AW/OX 68
BRUGAROLAS	FLUID DRIVE HM-68
CASTROL	HYSPIN AWS 68
CHEVRON	HYDR. OIL AW ISO 68 (1)
KLÜBER	LAMORA HLP 68
LUBRA	OLEODIN 68
MOBIL	DTE 26
Q8	HAYDN 68
ROLOIL	LI 68
TEXACO	RANDO HDZ 68
TOTAL	AZOLLA ZS 68
TRIBOL	943AW-68
VISCOL	SIGNAL CO 68

1 - Only for USA market

Ex. of design.:
0.004991.T Mineral oil HLP 68 DIN 51524/2
T.11 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE REPLACES

PAGINA *PAGE* 23 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.3 - SISTEMI IDRAULICI
1.3.2 - Fluidi ininfiammabili - Acqua-Glicole (HFC)

1 - OILS: TECHNICAL SPECIFICATIONS
1.3 - HYDRAULIC SYSTEMS
1.3.2 -Aqueous polymer solutions - Water-glycole (HFC)

DESIGN. DIN 51502	DESIGN. ISO 6743/4	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
HFC 46	L-HFC	**46**	**Type 35** 0.151165.D	Dispersioni acquose di polimeri (poliglicoli) HFC; temperatura impiego: 10°C +50°C; Non deve contenere composti tossico nocivi; consigliati fluidi ad elevata purezza (filtrazione di produzione 10 µm); non compatibile con oli minerali, emulsioni acqua- olio, esteri fosforici o fluidi a base di esteri. Antischiuma, anticorrosivo. Filtrabile classe 15-12 ISO 4406. Conforme al documento N° 2786/9/80 7ª edizione dell'Organo permanente CEE per la salute e la sicurezza	*Aqueous polymer solutions (polyglycols) HFC; operating temperature: 10° ÷ +50° C; Must not contain toxic compounds; high-purity fluids are recommended (degree of production filtration = 10 µm); not compatible with mineral oils, water-oil emulsions, phosphoric esters or ester-based fluids. Antifoam, antiwear. Product should be filtered down to 15-12 ISO 4406 class. Conform to the document N° 2786/9/80 7th report of the permanent CEE Council for health and safety.*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min	≤ 20
Water content	ASTM D 1744	% wt	35÷45
PH	ASTM D 664	-	8,5÷10
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Inflammability resistance	7th report CEE FMST 6930	-	1 pass
Foaming tendency/stability	ASTM D892 III Seq.	ml/ml	30/0
Alcalinity reserve ml 0,1NHCl/50g to PH 5,5@25°C	ASTM D 1121	ml	≥ 13
Pour Point	ASTM D 97	°C	≤ - 30
Viscosity @ 40°C (kinematic)	DIN 51562	cSt	
	ASTM D445	mm^2/s	41÷50
Viscosity Index	ISO 2909 ASTM D 2270	-	≥ 175

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 50°C	1
Corrosion-prevention	DIN 51355/A ASTM D 665A	Level Demi water	- Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 40 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	≤ 0,80
4-Ball EP test (weld point)	ASTM D 2596	kg	≥ 140
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test (A/8.3/60) (1)	DIN 51354-1/2	Pass stage	7
Vane pump test (250h-140 bar) Vickers pump V-104-C10	DIN 51389/3	mg	≤ 150 ≤ 50

1 - Supplier must give the test diagram

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	ARNICA 104/FR
BECHEM	HYDROSTAR HY 40
BP	ENERSYN SF-C 14
CASTROL	ANVOL WG 46
CONDAT	GUARD C 46
ESSO	HYDRAULIC FLUID FR-C46
HOUGHTON	HOUGHTO SAFE 620 HOUGHTO SAFE 419-R (1)
LUBRA	CORSAFE 2000
MOBIL	HYDROFLUID HFC 46 NYVAC FR 200 D (1)
PETROFER	ULTRASAFE 620
Q8	ELI 798 D/1
QUAKER	QUINTOLUBRIC 702 QUINTOLUBRIC N720
ROLOIL	HYDROGLIX 46
SHELL	IRUS FLUID C
TEXACO	GLYTEX HFC 46
VISCOL	SIGNAL VISCOFLUID AG

1 - Only for USA market

Ex. of design.:
0.151165.D Water-glycole HFC 46 DIN 51502
T.35 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE
REPLACES

PAGINA 24 *DI* 47
PAGE *OF*

1 - OLII: SPECIFICHE TECNICHE
1.3 - SISTEMI IDRAULICI
1.3.2 - Fluidi ininfiammabili sintetici a base di esteri organici (HFD-U)

1 - OILS: TECHNICAL SPECIFICATIONS
1.3 - HYDRAULIC SYSTEMS
1.3.2 - Water-free organic ester fluids (HFD-U)

DESIGN. DIN 51502	DESIGN. ISO 6743/4	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
HFD-U / 46	L-HFDU-46	**46**	**Type 36** 0.151166.E	Fluidi anidri, esteri organici di natura sintetica HFD-U; temperatura di impiego: 10° +80°C. prodotto non tossico; non miscibile con prodotti contenenti acqua, compatibili con olio minerale; fluidi ad elevata purezza. (filtrazione di produzione 10 µm). Antischiuma Filtrabile classe 15-12 ISO 4406. Conforme al documento N° 2786/9/80 7ª edizione dell'Organo permanente CEE per la salute e la sicurezza	*Water-free fluids, syntetic organic esters HFD-U; operating temperature: 10° +80°C. Non-toxic; not miscible with products containing water; compatible with mineral oil; high-purity fluids are recommended (degree of production filtration = 10 µm). Antifoaming Product should be filtered down to 15-12 ISO 4406 class. Conform to the document N° 2786/9/80 7th report of the permanent CEE Council for health and safety.*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	≤ 7
Ash content	EN 7 ASTM D 874	% wt	≤ 0,03
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Fire Point COC	ASTM D92	°C	≥ 300
Auto ignition point	ASTM E 659	°C	> 350
Inflammability resistance	7th report CEE FMST 6930	-	2 pass
Foaming tendency/stability	ASTM D892 III Seq.	ml/ml	30/0
Neutralization number TAN	ASTM D 664	mg KOH/g	max 2
Pour Point	ASTM D 97	°C	≤ - 20
Viscosity @ 40°C (kinematic)	DIN 51562	cSt	
	ASTM D445	mm^2/s	41,4÷50,6
Viscosity Index	ISO 2909 ASTM D 2270	-	≥ 175
Water content Karl Fisher method	ASTM D 4928	% wt	≤ 0,01

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1b
Corrosion-prevention	DIN 51355/A	Level	
	ASTM D 665A	Demi water	Pass
	ASTM D 665B	Salt water	Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 40 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	≤ 0,5
4-Ball EP test (weld point)	ASTM D 2596	kg	-
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test (A/8.3/60) (1)	DIN 51354-1/2	Pass stage	12
Vane pump test (250h-140 bar) Vickers pump V-104-C10	DIN 51389/3	mg	≤ 120 ≤ 30

1 - Supplier must give the test diagram

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	ARNICA S 46
BECHEM	HYDROSTAR TE 46 S
BRUGAROLAS	HYDROSECUR D-46
CONDAT	D 46
FUCHS	PLANTOFLUX-AT 46 S
HOUGHTON	COSMOLUBRIC HF 122
Q8	ELI 997/46
QUAKER	QUINTOLUBRIC 822-220 QUINTOLUBRIC 840-46
ROLOIL	ESTIN 46-S
SHELL	IRUS FLUID DU 46
TEXACO	SYNSTAR HFDU 46
VISCOL	SIGNAL IDROFLUX 46 S

Ex. of design.:
0.151166.E Organic ester HFD-U 46 DIN 51502
T.36 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE *REPLACES*
PAGINA *PAGE* 25 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.3 - SISTEMI IDRAULICI
1.3.2 - Fluidi ininfiammabili sintetici a base di esteri organici (HFD-U)

1 - OILS: TECHNICAL SPECIFICATIONS
1.3 - HYDRAULIC SYSTEMS
1.3.2 - Water-free organic ester fluids (HFD-U)

DESIGN. DIN 51502	DESIGN. ISO 6743/4	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
HFD-U 68	L-HFDU-68	**68**	**Type 37** 0.151314.A	Fluidi anidri, esteri organici totalmente sintetica HFD-U; temperatura impiego: 10°C +80°C. Prodotto non tossico; non miscibile con prodotti contenenti acqua, compatibili con olio minerale; fluidi ad elevata purezza. (filtrazione di produzione 10 µm). Resistente allo schiumeggiamento. Filtrabile classe 15-12 ISO 4406. Conforme al documento N° 2786/9/80 7ª edizione dell'Organo permanente CEE per la salute e la sicurezza	*Water-free fluids, full syntetic organic esters HFD-U; operating temperature: 10° +80°C. Non-toxic; not miscible with products containing water; compatible with mineral oil; high-purity fluids are recommended. (degree of production filtration = 10 µm). Antifoaming. Product should be filtered down to 15-12 ISO 4406 class. Conform to the document N° 2786/9/80 7th report of the permanent CEE Council for health and safety.*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	≤ 9
Ash content	EN 7 ASTM D 874	% wt	≤ 0,03
PH		-	Report
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Fire Point COC	ASTM D92	°C	≥ 330
Auto ignition point	ASTM E 659	°C	> 400
Inflammability resistance	7th report CEE FMST 6930	-	2 pass
Foaming tendency/stability	ASTM D892 III Seq.	ml/ml	30/0
Neutralization number TAN	ASTM D 664	mg KOH/g	max 2
Pour Point	ASTM D 97	°C	≤- 20
Viscosity @ 40°C (kinematic)	DIN 51562	cSt	
	ASTM D 445	mm^2/s	61,2÷74,8
Viscosity Index	ISO 2909 ASTM D 2270	-	≥ 180
Water content Karl Fisher method	ASTM D 4928	% wt	≤ 0,05

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1b
Corrosion-prevention	DIN 51355/A	Level	
	ASTM D 665A	Demi water	Pass
	ASTM D 665B	Salt water	Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 15 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	≤ 0,5
4-Ball EP test (weld point)	ASTM D 2596	kg	-
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test (A/8.3/60) (1)	DIN 51354-1/2	Pass stage	12
Vane pump test (250h-140 bar) Vickers pump V-104-C10	DIN 51389/3	mg	≤ 120 ≤ 30

1 - Supplier must give the test diagram

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	ARNICA S 68
BECHEM	HYDROSTAR TE 68 S
CASTROL	ANVOL SWX
CONDAT	D 68
ESSO	FIREXX HF-DU 68
FUCHS	PLANTOFLUX-AT 68 S
HOUGHTON	COSMOLUBRIC HF 130
MOBIL	HYDROFLUID HFD-U 68
Q8	ELI 997/68
QUAKER	QUINTOLUBRIC 822-300 QUINTOLUBRIC 840-68
ROLOIL	ESTIN 68-S
SHELL	IRUS FLUID DU 68
TEXACO	SYNSTAR HFDU 68
VISCOL	SIGNAL IDROFLUX 68 S

Ex. of design.:
0.151314.A Organic ester HFD-U 68 DIN 51502
T.37 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE
REPLACES

PAGINA *PAGE* 26 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.4 - APPLICAZIONI DIVERSIFICATE
1.4.1 - Lubrificazione di linee ad aria compressa

1 - OILS: TECHNICAL SPECIFICATIONS
1.4 - MISCELLANEOUS
1.4.1 - Air compressed lines lubrication

DESIGN. DIN 51502	DESIGN. ISO 6743/11	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
D 22	L-PBB-22	**22**	**Type 13** 0.004993.V	Olio minerale altamente raffinato, con elevata efficacia lubrificante ed anticorrosiva ed ottima stabilità all'ossidazione. Operante in condizioni moderate di carico e con condensa presente nell'aria.	*Highly refined mineral oil with high lubrication and anticorrosion efficiency and excellent stability against oxidation. Operating under moderate load conditions and with condensate present in the air.*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	-
Ash content	EN 7 ASTM D 874	% wt	-
Demulsibility	DIN 51599		
	ASTM D 2711		-
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	> 190
Foaming tendency/stability	ASTM D892	ml/ml	30/0
Neutralization number TAN	DIN 51558/1	mg KOH/g	≤ 2
	ASTM D 974		
Pour Point	ISO 3016	°C	≤ - 20
	ASTM D 97		
Viscosity @ 100°C (kinematic)	DIN 51562	cSt mm^2/s	≥ 4,2
	ASTM D445		
Viscosity Index	ISO 2909 ASTM D 2270	-	> 95

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1b
Corrosion-prevention	DIN 51355/A ASTM D665A ASTM D665B	Level Demi water Salt water	0-A Pass -

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 15 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	≤ 0,4
4-Ball EP test (weld point)	ASTM D 2596	kg	≥ 150
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	11

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	ARNICA 22
BECHEM	STAROIL CBT 22
BP	ENERGOL HLP-HM 22
BRUGAROLAS	BESLUX NEULUB 22
CASTROL	HYSPIN AWS 22
CHEVRON	HYDR. OIL AW ISO 22 (2)
ESSO	SPINESSO 22
FUCHS	RENOLIN FD 22
KLÜBER	AIRPRESS 32
MOBIL	VELOCITE OIL D (1) VELOCITE OIL No 10 (2)
Q8	VERDI 22
ROLOIL	LI 22
SHELL	TELLUS 22
TEXACO	RANDO HD 22
TOTAL	AZOLLA ZS 22
TRIBOL	ATO 100 LS
VISCOL	SIGNAL VL P 22

1 - Only for European market
2 - Only for USA market

Ex. of design.:
0.004993.V Mineral oil D 22 DIN 51502
T.13 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE *REPLACES*

1 - OLII: SPECIFICHE TECNICHE
1.4 - APPLICAZIONI DIVERSIFICATE
1.4.2 - Lubrificazione lingottiere - Olio a base vegetale

1 - OILS: TECHNICAL SPECIFICATIONS
1.4 - MISCELLANEOUS
1.4.2 - Mould release - Vegetal oil based

DESIGN. DIN 51502	DESIGN. ISO 6743	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
FS	L-B	**32**	**Type 34** 0.340325.W	Olii a base vegetale, elevata untuosità, limitata presenza di fumi e odori nell'impiego specifico. Esclusa la tossicità durante la decomposizione. Esente da acqua.	*Oils with a vegetable base, high greasiness, limited absence of fumes and odour in their specific application. No toxicity allowed during their decomposition. Water free.*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	-
Ash content	EN 7 ASTM D 874	% wt	Nil
Demulsibility	DIN 51599	-	-
	ASTM D 2711		
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	≥ 180
Foaming tendency/stability	ASTM D892	ml/ml	0
Neutralization number TAN	DIN 51558/1	mg KOH/g	-
	ASTM D 974		
Pour Point	ISO 3016	°C	≤ -8
	ASTM D 97		
Viscosity @ 100°C (kinematic)	DIN 51562	cSt mm^2/s	-
	ASTM D445		
Viscosity Index	ISO 2909 ASTM D 2270	-	≥ 150
Water content	CARL FISHER FINA Method	%	≤ 0,01

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	-
Corrosion-prevention	DIN 51355/A ASTM D 665A ASTM D 665B	Level Demi water Salt water	-

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 15 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	-
4-Ball EP test (weld point)	ASTM D 2596	kg	-
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	-

BRANDS COMPARISON

SOCIETY	MARK
DICA	CASTING OIL 1000 OS CASTING OIL 1300
SHELL	RELEASE HCA (1)

1 - Blend of mineral and vegetal oils

Preferibili ma non obbligatori
Preferred but not mandatory

Ex. of design.:
0.340325.W Vegetable base oil FS DIN 51502
T.34 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001

REV. 12
SOSTITUISCE REPLACES

PAGINA *PAGE* 28 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.4 - APPLICAZIONI DIVERSIFICATE
1.4.2 - Lubrificazione lingottiere - Olio sintetico

1 - OILS: TECHNICAL SPECIFICATIONS
1.4 - MISCELLANEOUS
1.4.2 - Mould release - Syntetic oil

DESIGN. DIN 51502	DESIGN. ISO 6743	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
FS	L-B	**32**	**Type 34a** 0.340327.Z	Olii a base sintetica ad alto I.V., elevata untuosità, limitata presenza di fumi e odori nell'impiego specifico. Esclusa la tossicità durante la decomposizione. Esente da acqua.	*Oils with a synthetic base with a high V.I., high greasiness, limited absence of fumes and odour in their specific application. No toxicity allowed during their decomposition. Water free.*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	-
Ash content	EN 7 ASTM D 874	% wt	
Demulsibility	DIN 51599		-
	ASTM D 2711		
Density @ 15°C	DIN 51757	kg/dm^3	Stated by
	ASTM D1298		Supplier
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	≥ 230
Foaming tendency/stability	ASTM D892	ml/ml	-
Neutralization number TAN	DIN 51558/1	mg KOH/g	-
	ASTM D 974		
Pour Point	ISO 3016	°C	≤ -12
	ASTM D 97		
Viscosity @ 100°C (kinematic)	DIN 51562	cSt mm^2/s	≥ 7
	ASTM D445		
Viscosity Index	ISO 2909 ASTM D 2270	-	≥ 150
Water content	CARL FISHER FINA Method	%	≤ 0,01

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	-
Corrosion-prevention	DIN 51355/A	Level	0-A
	ASTM D 665A	Demi water	Pass
	ASTM D 665B	Salt water	

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 15 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	-
4-Ball EP test (weld point)	ASTM D 2596	kg	-
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	-

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
BRUGAROLAS	BESTRIL 140
DICA	CASTING OIL 1400 CASTING OIL 1700
FUCHS	METALGLIDE 68 SYNT
Q8	ELI 798 D/2
QUAKER	QUACAST N 1500
ROLOIL	SIDERFLOW SINT
VISCOL	SIGNAL LINGOIL SINT 68

Ex. of design.:
0.340327.Z Syntetic oil FS DIN 51502
T.34a N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE *REPLACES*
PAGINA *PAGE* 29 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE
1.4 - APPLICAZIONI DIVERSIFICATE
1.4.3 - Olio per isolamento elettrico

1 - OILS: TECHNICAL SPECIFICATIONS
1.4 - MISCELLANEOUS
1.4.3 - Oils for electrical insulation

DESIGN. DIN 51502	DESIGN. ISO 6743	VISCOSITY ISO VG 3448 mm^2/s @ 20°C ± 10%	DANIELI CODE	CARATTERISTICHE	CHARACTERISTICS
J		**25**	**Type 20** 0.151150.H	Olio dielettrico per trasformatori Secondo IEC 60296 Classe I (climi normali) Elevatissima resistenza alla ossidazione, proprietà isolanti e raffreddanti	*Dielectric transformer oils* *Meet IEC 60296 Std., Class I (normal environment)* *Very high resistance against oxydation, insulating and cooling properties*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Dielectric rigidity	IEC 20156	KV/2,5mm	≥ 70
Ash content	EN 7 ASTM D 874	% wt	-
Measure tg δ 90Y (Loss tangent V-I)	VDE 0370.1 IEC 60296 Cl.I		< 0,005
Density @ 15°C	DIN 51757 ASTM D1298	kg/dm^3	Stated by Supplier
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	> 140
Foaming tendency/stability	ASTM D892	ml/ml	-
Neutralization number TAN	DIN 51558/1 ASTM D 974	mg KOH/g	≤ 0,03
Oxydation stability	CEI n° 344	% wt	≤ 0,03
Pour Point	ISO 3016 ASTM D 97	°C	≤ -30
Viscosity @ 40°C (kinematic)	DIN 51562 ASTM D445	cSt	≤ 16
Viscosity Index	ISO 2909 ASTM D 2270	-	-

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1
Corrosion-prevention	ASTM D 665A ASTM D 665B	Demi water Salt water	Pass Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 15kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	-
4-Ball EP test (weld point)	ASTM D 2596	kg	-
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	-

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	ITE 360
BECHEM	TRANSFORMATORENÖL T10
BP	ENERGOL JS-A TRANSFORMER OIL (1)
BRUGAROLAS	LECTROIL
CASTROL	INSULEX A
ESSO	TRANSFORM OIL P 60
MOBIL	MOBILECT 46
Q8	MICHELANGELO A
ROLOIL	LP - T
SHELL	DIALA OIL B
TOTAL	ELETTRA
VISCOL	SIGNAL TRASFORM

1 - Only for Italian market

Ex. of design.:
0.151150.H Transformer oil J DIN 51502
T.20 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE *REPLACES*
PAGINA *PAGE* 30 DI *OF* 47

1 - OLII: SPECIFICHE TECNICHE — ***1 - OILS: TECHNICAL SPECIFICATIONS***
1.4 - APPLICAZIONI DIVERSIFICATE — ***1.4 - MISCELLANEOUS***
1.4.4 - Olio di flussaggio per sistemi idraulici — ***1.4.4 - Flushing oil***

DESIGN. DIN 51502	DESIGN. ISO 6743-6	VISCOSITY ISO VG 3448 mm^2/s @ 40°C ± 10%	DANIELI CODE	CARATTERISTICHE	*CHARACTERISTICS*
C 32	ISO-L-AN-32	32	**Type 18** 0.340324.V	Oli minerali puri raffinati a base paraffinica Supera DIN 51517 Parte 1	*Pure refined mineral oils with a paraffin base* *Exceeds DIN 51517 Part 1*

PHYSICAL CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
Air separation ability	DIN 51381 0,2% @ 50°C	min.	≤ 20
Ash content	EN 7 ASTM D 874	% wt	≤ 0,02
Demulsibility	DIN 51599 ASTM D 2711		-
Density @ 15°C	DIN 51757 ASTM D1298	kg/dm^3	Stated by Supplier
Flash Point	ISO 2592 ASTM D92 (Cleveland open cup)	°C	≥ 200
Foaming tendency/stability	ASTM D892	ml/ml	
Neutralization number TAN	DIN 51558/1 ASTM D 974	mg KOH/g	≤ 0,15
Pour Point	ISO 3016 ASTM D 97	°C	≤ - 9
Viscosity @ 100°C (kinematic)	DIN 51562 ASTM D445	cSt mm^2/s	≥ 4
Viscosity Index	ISO 2909 ASTM D 2270	-	> 90

CORROSION TESTS

Characteristic	Std ref.	Unit of measurem.	Value
Copper strip corrosion method A	DIN 51759/1 ISO 2160 ASTM D130	3h @ 100°C	1b
Corrosion-prevention	DIN 51355/A ASTM D 665A ASTM D 665B	Level Demi water Salt water	0-A Pass Pass

WEAR CHARACTERISTICS

Characteristic	Std ref.	Unit of measurem.	Value
4-Ball wear test 15 kg 1200g/1' 75°C 1h	ASTM D 4172-A	wear mm	-
4-Ball EP test (weld point)	ASTM D 2596	kg	-
Timken EP test (OK load)	ASTM D 2782	pounds	-
FZG gear test (A/8.3/90)	DIN 51354-1/2	Pass stage	-

Preferibili ma non obbligatori
Preferred but not mandatory

BRANDS COMPARISON

SOCIETY	MARK
AGIP	RADULA 32
BECHEM	STAROIL CBT 32
BP	ENERGOL CS 32
BRUGAROLAS	HYDRAULIC B-200
CASTROL	MAGNA 32
CHEVRON	NEUTRAL OILS (2)
ESSO	NURAY 32
MOBIL	RUBREX 100 (1) AMBREX 32
Q8	CT 32
ROLOIL	TMP 324
SHELL	VITREA 32
TEXACO	TEXPAR 30
TOTAL	CORTIS 32
TRIBOL	943AW-32
VISCOL	SIGNAL NU 32

1 - Only for Italian market
2 - Only for USA market

Ex. of design.:
0.340324.V Mineral oil C 32 DIN 51517/1
T.18 N 0.000.001
Cert. EN10204/2.2

DANIELI

CLASSIFICAZIONE DEI LUBRIFICANTI
OLII - FLUIDI RESISTENTI AL FUOCO - GRASSI
CLASSIFICATION OF LUBRICANTS
OILS - FIRE-RESISTANT HYDRAULIC FLUIDS - GREASES

STANDARD N° 0.000.001
REV. 12
SOSTITUISCE REPLACES
PAGINA *PAGE* 31 DI *OF* 47