August 4, 2020
Sanyo Chemical Industries, Ltd.

Development of a new base material for water-soluble metalworking oil imparting excellent lubricity

Which has low foaming properties and excellent seizure resistance—contributing to the evolution of manufacturing

Sanyo Chemical Industries, Ltd. (Head office: Higashiyama-ku, Kyoto City; President & CEO: Takao Ando) has developed a new base material "UTILIOL GA-15P (preproduction prototype)" for water-soluble metalworking oil imparting excellent lubricity with low foaming properties.

UTILIOL GA-15P is water soluble polyether base material which is low viscosity with high cloud point. It is easily handled and stored because of corresponding to a non-hazardous material under the Fire Service Act. UTILIOL GA-15P based lubricating oil has feature of excellent seizure resistance and less foaming. When used in water-soluble working oil, it contributes to productivity improvement by high-speed machining, extension of tool life, high accuracy workpieces and improvement of yield. UTILIOL GA-15P is suitable for high-precise machining, since its transparent working oil helps clear view on working area.

【Background of the development】

Metalworking is indispensable for automobile and machine manufacturing, etc. Metalworking oil is used for reducing friction and cooling in metalworking. Metalworking oils include water-insoluble oils with excellent lubricity (processability) and water-soluble oils that are nonflammable with low risk of fire, and have excellent cooling properties. In recent years, water-soluble oils have been attracting attention from the viewpoint of improving the working environment and reducing the environmental load. However, there are many cases where the lubricity of water-soluble oils is insufficient. If their lubricity is improved, foaming has become another issue. This is why, the replacement from water-insoluble oils to water – soluble oils have not been easily going.

In addition, there are various needs such as improving processing accuracy and speeding up, diversifying materials, extending the life of machines and products, recycling and reducing costs to reduce the amount of waste oil drainage. To meet these needs, not only base manufacturers but also manufacturers that use bases to make metalworking oils are improving their performance on a daily basis.

【Abstract of the new technology】

Polyalkylene glycol (PAG) type water-soluble polyether is mainly used as the base of water-soluble metalworking oil, and plays an important role such as imparting permeability to the metal interface and lubricity. We make full use of our strengths in surface control technology, polymer design technology, and alkylene oxide adduct (AOA) manufacturing technology to develop the new base material UTILIOL GA-15P (preproduction prototype) with significantly improved lubricity while maintaining the characteristics of water-soluble metalworking oils.

【Features of the technology】

The features of UTILIOL GA-15P are as follows.

1. Water soluble polyether with excellent seizure resistance
2. Low foaming property
3. Enable smoother cutting of difficult-to cut gummy metals such as aluminum
4. Metalworking fluid diluted with water is highly transparent

These features not only enable high-speed machining, but are also expected to be suitable for a wide variety of metal machining and improve work efficiency. In addition, by achieving both lubricity and low foaming properties, which were the issues of water-soluble metalworking oil, we can obtain merits such as reduction of environmental load, improvement of working environment, and improvement of cooling efficiency.

【Feature Plan】

Taking advantage of the excellent performance of UTILIOL GA-15P (preproduction prototype), we will expand the application to metalworking oils, and since it may be applicable to a wide range of difficult-to-cut materials, we are also studying applicable metals. We will also expand the use to other water-based lubricants bases.

Various industries such as home appliances, automobiles, buildings, and infrastructure are supported by advanced metal processing technology. We will continue to propose solutions to improve the technology of metalworking oils and contribute to the development of various industries through manufacturing.

＜Reference＞

◆About metalworking oils

Oil agents used for a wide variety of metalworking such as cutting, rolling, drawing, pressing, and forging, whose basic functions are lubrication and cooling. Friction is reduced by the oil applied to the gap between the tool and the work piece or chips, and the cooling effect of the oil suppresses heat generation due to friction, which suppresses tool wear and restrains deformation, prevents seizure, extends the tool life, and improves the processing accuracy.