

SAUDI STANDARDS, METROLOGY AND QUALITY ORGANIZATION

SAUDI Draft
SASO /2020

Metal Cutting Oils

ICS: 75.100

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Foreword

Saudi Standards, Metrology and Quality Organization (SASO) has updated the Saudi Standard No. (2059/2002.) "Metal Cutting Oils "based on relevant International / National Standards and references. The approved Saudi Standard / will replace and supersede the Saudi Standard / No. 2059/2002.

Metal Cutting Oils

1 SCOPE AND FIELD OF APPLICATION

- 1.1 This Gulf standard is concerned with water-soluble cutting oil that can be used as a coolant/ lubricant for general purpose machining of metal such as turning, milling, shaping and drilling.

2 COMPLEMENTARY REFERENCES

- 2.1 SASO 20 “Methods of Sampling Lubricating Oils”.
- 2.2 SASO ISO 2592 “Determination of flash and fire points - Cleveland open cup method”.
- 2.3 SASO ASTM D1298 “Standard Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method”.
- 2.4 SASSO ISO 3733 “Petroleum products and bituminous materials – Determination of water - Distillation method”.
- 2.5 SASO ISO 6614 “Petroleum products - Determination of water separability of petroleum oils and synthetic fluids”.
- 2.6 SASO ISO 4316 “Surface Active Agents – Determination of pH of Aqueous SOLUTIONS – Potentiometric Method”.
- 2.7 SASO ASTM D 4294 “Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry“
- 2.8 SASO ISO 2160 “Petroleum products - Corrosiveness to copper - Copper strip test “

3 DEFINITION

- 3.1 Water –Soluble cutting Oil:** Cutting oil applicable after being diluted with water.
- 3.2 Total Sulphur content:** Content percentage of all sulphur contained in the fluids contained by totaling that in base oil and additives.
- 3.3 Emulsion stability:** When the cutting oil is diluted with water, stability of emulsification under the specified conditions.
- 3.4 Metal corrosion:** The existence of corrosion on metal after immersing it in water-soluble cutting oil and standing for the specified time.
- 3.5 Hard Water:** Prepared by dissolve 0.334 g of calcium sulfate (CaSO_4) to one liter of distilled water.

4 CIASSIFICATION

The cutting oils, which are based on mineral oil, is divided in two section:

- 4.1 Water-soluble oil.
- 4.2 Pure oil, which contained additive to enhance the cutting process.

5 REQUIREMENTS

- 5.1 The oil must be easily able to form emulsion immediately when mixed with water by 1% to 10% of the oil.
- 5.2 The emulsion must with clear bright milky appearance without any foaming when it mixed with tap water.
- 5.3 The emulsion must with clear bright milky appearance without any foaming when it mixed with hard water.
- 5.4 Soluble cutting oil smoothed the cutting surface and protect the cutter edge.

- 5.5 Soluble cutting oil prevent the swarf form getting stick on the metal surface or the cuter edge.
- 5.6 Soluble cutting oil do not form any sedimentary residues on the metal surface or the cuter edge.
- 5.7 Soluble cutting oil prevent rust and corrosion.
- 5.8 Soluble cutting oil do not enhance bacteria formation or generate a bad smell.
- 5.9 The water-soluble cutting oil shall fulfill the following characteristics mentioned in the Table (1).

Table (1) - Requirements

Properties	TEST METHOD	Limits
Flash point, °C , (Min)	See item(2/2)	160
Density at 20 ° C	See item(2/3)	Report
Water content, % Volume	See item(2/4)	0.2
Emulsion stability ml (room temperature, 24 hrs.)		
Water:		
Oil layer	See item(2/5)	Trace
Cream layer, Max		2.5
Hard water:		
Oil layer, Max		2.5
Cream layer, Max		2.5
PH	See item(2/6)	8.5 to 10.50
Total Sulphur content, % mass, (Max)	See item(2/7)	5.0
Metal corrosion, Room temperature, 48 hrs.	See item(2/8)	No discoloration (Steel Plate)

6 SAMPLING

Samples shall be drawn according to the Gulf standard mentioned in (2.1).

7 TEST METHODS

The following tests shall be carried out according to the Gulf standard mentioned in items (2/2 to 2/8):

- 7.1 Visual inspection.
- 7.2 Determination of flash point.
- 7.3 Calculation of density.
- 7.4 Determination of water content.
- 7.5 Determination of emulsion stability.
- 7.6 Determination of PH.
- 7.7 Determination of total Sulphur content.
- 7.8 Metal Corrosion test.

8 PACKAGING AND STORAGE

8.1 **PACKAGING:** Water –Soluble cutting oil shall be packaged in tightly closed containers preventing possibility of oil leakage or oil contamination with any impurities; such containers shall neither affect nor be affected by the oil.

8.2 **STORAGE:** When water-soluble oil is filed in drums, placing the drum in the warehouse in horizontal position to avoid leakage that may cause water pollution.

Note: WARNIN - Method of dealing: It must be kept away from the eyes. Need to clean the skin and clothes before and after work.

Adequate ventilation should be provided in the workplace.

9 MARKING

- 9.1 The following information shall be legibly and indelibly marked in Arabic or Arabic and English language on each container of the Water –Soluble-cutting oil:
 - 9.1.1 Product name.
 - 9.1.2 Net volume, liter
 - 9.1.3 Manufacturer’s name and / or his trade mark
 - 9.1.4 Name of the country of origin.
 - 9.1.5 Date of production and batch number.
 - 9.1.6 Precaution: “Avoid Environment Pollution” or put the “International Symbol for No Pollution”.
- 9.2 should write the above data in the invoice. A warning notice should also be placed on truck and tankers oils.

المراجع

REFERENCE

-Japanese Industrial Standard
JIS K 2241/2017
"Cutting Fluid"

- المواصفة اليابانية
رقم كي ٢٠١٧/٢٢٤١
"سائل القطع"

Other References

المراجع الأخرى

-Korean Industrial Standard
KS M 2173 – 1985
"Cutting Fluid"

- المواصفة الكورية
رقم كي اس أم ١٩٨٥/٢١٧٣
"سائل القطع"

-Egyptian Standard
ES 1391/2005
"Metal Cutting Oils"

- المواصفة المصرية
رقم ٢٠٠٥/١٣٩١
زيوت قطع المعادن"