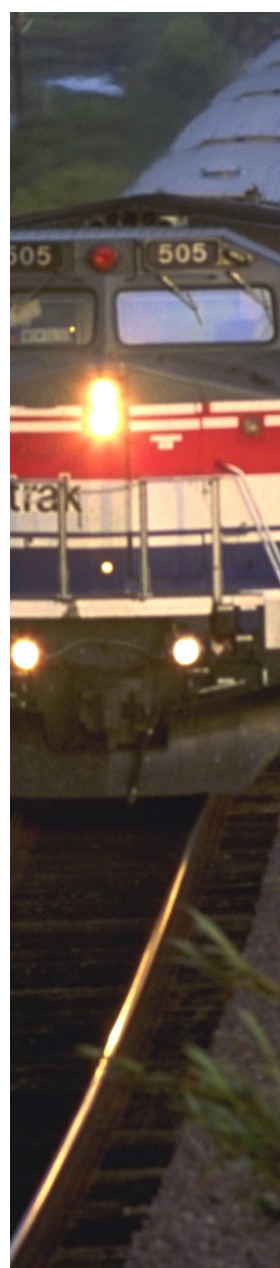
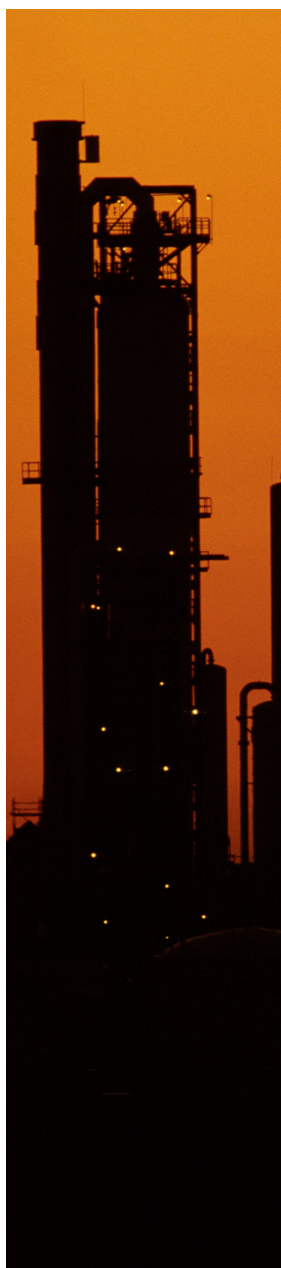




# Tiarco Chemical



Specialty Additives  
For Greases & Lubricants

## Featuring

- Octopol AD
- Octopol AD-I
- Octopol AZ
- Octopol AZ-S
- Octopol bis DMTD
- Octopol MB
- Octopol PTB
- Octopol SIB
- Octopol TMQ
- Octopol 451

## Our Pledge

Tiarco Chemical's commitment is to continue to provide excellent products and superior service to all of our valued customers.

## Introduction

The Tiarco Chemical division of Textile Rubber & Chemical Co., Inc. was created in 1973. Since that time, our primary goal has been to develop and continually deliver specialty chemicals designed to provide the highest levels of cost performance in grease and lubricants, natural and synthetic latices, water treatment, and oil & gas applications. We also offer a wide range of capabilities with our contract and toll manufacturing services. Tiarco has been active in the international arena for many years with global sales offices and distribution facilities worldwide to better serve our customers.

Our products serve a growing number of lubricant applications.

At Tiarco, our philosophy has always been to partner with our customers as well as our suppliers.

In our efforts to exceed our customers' highest expectations, Tiarco is committed to continuous improvement and providing extraordinary "gold standard" customer service and technical support.

If you would like to discuss our ability to meet your needs, or any of the products highlighted in these pages, please contact us.

We look forward to working with you.

## Tiarco Lubricant Additive Applications

|                  | Auto Trans Fluid | Compressor Oil | Engine Oil | Gear Oil | Grease | Hydraulic Oil | Turbine Oil | Metal Working | Anti-Rust | Corrosion Inhibitor | Synthetic Lubricant |
|------------------|------------------|----------------|------------|----------|--------|---------------|-------------|---------------|-----------|---------------------|---------------------|
| Octopol AD       |                  | ◆              | ◆          | ◆        | ◆      |               |             |               |           |                     | ◆                   |
| Octopol AD-I     |                  |                |            | ◆        | ◆      |               |             |               |           |                     |                     |
| Octopol AZ       | ◆                | ◆              | ◆          | ◆        | ◆      |               |             | ◆             | ◆         |                     | ◆                   |
| Octopol AZ-S     |                  |                | ◆          | ◆        | ◆      |               |             |               |           |                     |                     |
| Octopol bis DMTD |                  |                |            |          | ◆      |               |             |               |           |                     | ◆                   |
| Octopol MB       |                  | ◆              |            | ◆        | ◆      | ◆             | ◆           |               |           |                     | ◆                   |
| Octopol PTB      | ◆                | ◆              |            | ◆        | ◆      | ◆             |             |               |           |                     |                     |
| Octopol SIB      |                  |                | ◆          | ◆        | ◆      |               |             | ◆             |           |                     |                     |
| Octopol TMQ      |                  |                |            |          | ◆      |               |             |               | ◆         |                     | ◆                   |
| Octopol 451      |                  |                |            | ◆        | ◆      | ◆             |             |               | ◆         | ◆                   |                     |

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Tiarco welcomes inquiries concerning special or custom lubricant additive manufacturing to meet the specific needs of our customers. We are open to forming partnerships and working in collaboration with our customers on research

projects and other projects of a technical nature. For more information, please contact a Tiarco technical representative at the appropriate lubricant additive manufacturing location.

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# Testing

Before discussing the wide array of Tiarco specialty additives, we'd like to spend a few minutes on our grease and lubricant testing capabilities and services:

## Tiarco Internal Testing

### Inspection

All Tiarco grease and lubricant additives are thoroughly tested to ensure the highest levels of quality and performance.

### Performance

All Tiarco additives are designed, developed, and tested to ensure the highest levels of physical and chemical synergies.

Performance test results are highly dependent on additive treat rates, other chemical compounds present, and the environment where used.

In the following pages, when performance test data is provided, we clearly state additive treat rates, sample compositions, and physical test conditions.

## Technical Service Provided to Customers

Tiarco abides by a partnership philosophy: We work closely with our customers to meet their product testing and performance requirements. We provide confirmation of performance and “no harm” data. We remain highly committed to delivering extensive technical services to meet our customers’ ever-changing needs. Our G&L laboratory team works collaboratively with Tiarco’s R&D and engineering teams to continually provide timely, cost-effective solutions and develop new and innovative specialty additives. Tiarco also partners with certified third-party grease and lubricant laboratories as necessary to ensure that we not only meet, but exceed, our customers’ performance requirements.



The following is a select list of our many testing services:

## Featured Grease Tests

- ASTM D217 – Worked and unworked grease penetrations
- ASTM D2265 – Grease dropping point temperature
- ASTM D4048 – Copper corrosion testing at requested test parameters (grease)
- ASTM D664 – Acid number determination
- ASTM D6168 – Oxidation stability of lubricant by PDSC
- ASTM D2266 & D2596 – 4-ball wear, and 4-ball weld respectively
- ASTM D5183 – Coefficient of friction
- ASTM D2696 – Load wear index
- ASTM D6184 – Oil separation from thickener (hanging cone test)
- ASTM D972 – Evaporative loss of oil from grease
- ASTM D95 – Water in petroleum grease
- ASTM D4951 – Elements of interest by ICP-AES analysis

## Featured Lubricating Oil Tests

- ASTM D1298 – Density (Sp. Gr.) determination (also by digital density meter, D4052)
- ASTM D445 & D446 – Kinematic viscosity at 40 & 100 degrees C
- ASTM D2983 – Brookfield viscosity at prescribed temp and rpm
- ASTM D92 – Cleveland Open Cup (COC) flash point temperature
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- ASTM D4377 – Water determination by Karl Fisher Titration
- ASTM D130 – Copper corrosion testing at requested test parameters (lube oil)
- ASTM D4951 – Elemental analysis of lubricant additives by ICP-AES
- ASTM D665 – Rust prevention characteristics of lubricating oils
- ASTM D943 – Oxidation characteristics of inhibited mineral oils (oxidation stability)
- ASTM D1218 – Refractive Index
- ASTM D4172 – 4-ball wear
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- ASTM D6186 – Oxidation stability by PDSC
- ASTM D808 – Chlorine in new and used lubricating oils
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- ASTM D5185 – Wear metals analysis of new and used oils by ICP-AES

# OCTOPOL AD

## OCTOPOL AD—Physical Data

Antimony Tris (Dialkyldithiocarbamate) in Petroleum Process Oil

**Applications:** Compressor Oil, Engine Oil, Gear Oil, Grease, Synthetic Lube

**Additive Functionalities:** Antioxidant, Antiwear, Antiscuff, Friction Reducer, Extreme Pressure

### Physical Properties:

- Appearance, Color: Dark amber
- Density: 1020 kg/m<sup>3</sup> (typical)
- Flash Point COC: > 170 degrees C (> 338 degrees F)
- Solubility Character: Soluble in petroleum and synthetic lubricant bases; insoluble in water

**Typical uses:** Octopol AD is one of the most versatile and highest performing grease and lubricant additives on the market today. Octopol AD is typically formulated in grease and lubricating oils that require a high level of antiwear, extreme pressure, and oxidation performance. In most global regions, Octopol AD remains one of the most cost effective antiwear and extreme pressure additives for all lubricants.

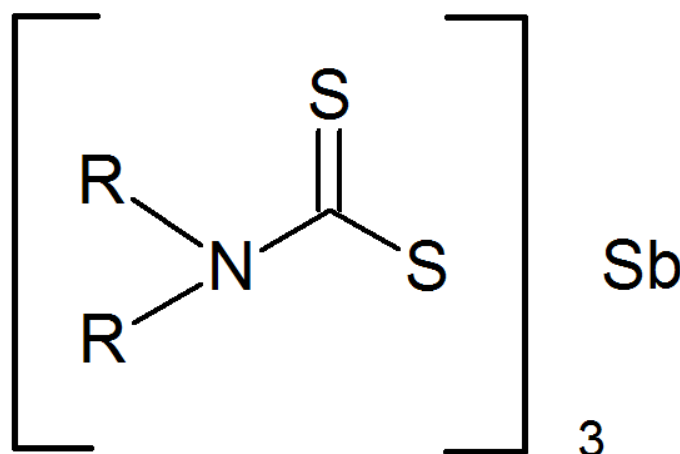
## OCTOPOL AD—Performance Data

### Performance Testing of Octopol AD in Base Oil (NOAP):

| Testing Details   | Lab Report |
|---|------------|
| Treat Level of Additive, wt. %  | 5          |
| Base Oil Grade  | ISO VG 220 |
| Copper Corrosion (ASTM D130)  |            |
| 4 hours, 100 degrees C  | 1b         |
| Rust Preventative Characteristics (ASTM D665, Part B) 60 degrees C, 4 hours | Slight     |
| 4-Ball Wear (ASTM D4172)  |            |
| 1 hour, 75 degrees C, 40 kgf, 1200 rpm                                      |            |
| Scar Diameter, mm   | 0.70       |
| 4-Ball Weld (ASTM D2783)  |            |
| 10 seconds, ~27 degrees C, 1760 rpm   |            |
| OK Load, kgf  | 315        |
| Weld Load, kgf  | 400        |

### Performance Testing of Octopol AD in Lithium 12-Hydroxystearate Grease (NOAP):

| Testing Details                        | Lab Report |
|--|------------|
| Treat Level of Additive, %             | 5          |
| NLGI Grade                             | No. 2      |
| 4-Ball Wear (ASTM D2266)               |            |
| 1 hour, 75 degrees C, 40 kgf, 1200 rpm |            |
| Scar Diameter, mm                      | 0.65       |
| 4-Ball Weld (ASTM D2596)               |            |
| 10 seconds, ~27 degrees C, 1770 rpm    |            |
| OK Load, kgf                           | 400        |
| Weld Load, kgf                         | 500        |
| Timken (ASTM D2509), OK Load, lbs.     | 30         |



# OCTOPOL AD-I

## OCTOPOL AD-I—Physical Data

Antimony Tris (Dialkyldithiocarbamate),  
Sulfurized Isobutylene

**Applications:** Gear Oil, Grease

**Additive Functionalities:** Antioxidant, Antiwear,  
Antiscuff, Extreme Pressure

### Physical Properties:

- Color: ASTM D1500: < 6.0
- Density: 1150 kg/m<sup>3</sup> (typical)
- Flash Point COC: > 160 degrees C (> 320 degrees F)
- Solubility Character: Soluble in petroleum and synthetic lubricant bases; insoluble in water

**Typical uses:** Octopol AD-I is an extreme pressure, antioxidant, lubricant additive used in various lubricating oil and grease applications. Octopol AD-I is compatible with other Octopol additive products such as rust inhibitors, antioxidants, and metal deactivators.

## OCTOPOL AD-I— Performance Data

### Performance Testing of Octopol AD-I in Base Oil (NOAP):

| Testing Details   | Lab Report |
|---|------------|
| Treat Level of Additive, wt. %  | 5          |
| Base Oil Grade  | ISO VG 220 |
| Rust Preventative Characteristics (ASTM D665, Part B) 60 degrees C, 4 hours             | Slight     |
| 4-Ball Wear (ASTM D4172)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | .68        |
| 4-Ball Weld (ASTM D2783)<br>10 seconds, ~27 degrees C, 1760 rpm<br>OK Load, kgf         | 315        |
| Weld Load, kgf  | 400        |

### Performance Testing of Octopol AD-I in Lithium 1 2-Hydroxystearate Grease (NOAP):

| Testing Details   | Lab Report |
|---|------------|
| Treat Level of Additive, %  | 5          |
| NLGI Grade  | No. 2      |
| 4-Ball Wear (ASTM D2266)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.65       |
| 4-Ball Weld (ASTM D2596)<br>10 seconds, ~27 degrees C, 1770 rpm<br>OK Load, kgf         | 315        |
| Weld Load, kgf  | 400        |
| Timken (ASTM D2509), OK Load, lbs.  | 30         |

PROPRIETARY

# OCTOPOL AZ

## OCTOPOL AZ—Physical Data

Zinc Dialkyldithiocarbamate, Petroleum Process Oil

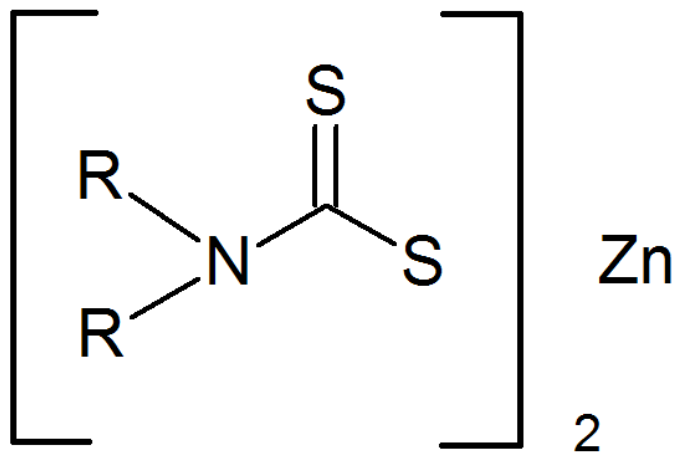
**Applications:** Auto Transmission Fluid, Compressor Oil, Engine Oil, Gear Oil, Grease, Metalworking, Rust Preventative, Synthetic Lubricant Additive

**Additive Functionalities:** Antioxidant, Antiwear, Antiscuff, Corrosion Inhibitor, Metal Deactivator

### Physical Properties:

- Color: ASTM D1500: < 5.0
- Density: 1005 kg/m<sup>3</sup> (typical)
- Flash Point COC: > 190 degrees C (> 374 degrees F)
- Solubility Character: Soluble in petroleum and synthetic lubricant bases; insoluble in water

**Typical uses:** Octopol AZ is used in engine oils, industrial oils, soap, and clay-thickened greases. It is used in gasoline and diesel crankcase oils to prevent bearing corrosion and wear, and to inhibit oil oxidation. Octopol AZ is also an effective copper corrosion inhibitor of film-forming type. When used in combination with detergent, it inhibits corrosion and wear by impeding oil oxidation and forming protective film on metal surfaces. It can also be used as a replacement for zinc dithiophosphates. Because of its effectiveness at high temperature, it is an excellent additive for engine crankcase oils in heavy-duty service. In industrial oil and automatic transmission fluid, it functions as a high-temperature oxidation and corrosion inhibitor.



## OCTOPOL AZ—Performance Data

### Performance Testing of Octopol AZ in Base Oil (NOAP):

| Testing Details   | Lab Report |
|---|------------|
| Treat Level of Additive, wt. %  | 5          |
| Base Oil Grade  | ISO VG 220 |
| Copper Corrosion (ASTM D130)<br>24 hours, 100 degrees C                                 | 1b         |
| Rust Preventative Characteristics (ASTM D665, Part B) 60 degrees C,<br>4 hours          | Pass       |
| 4-Ball Wear (ASTM D4172)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.41       |
| 4-Ball Weld (ASTM D2783)<br>10 seconds, ~27 degrees C, 1760 rpm<br>OK Load, kgf         | 160        |
| Weld Load, kgf  | 200        |

### Performance Testing of Octopol AZ in Lithium 12-Hydroxystearate Grease (NOAP):

| Testing Details   | Lab Report |
|---|------------|
| Treat Level of Additive, %  | 5          |
| NLGI Grade  | No. 2      |
| Copper Corrosion (ASTM D4048)<br>24 hours, 100 degrees C                                | 1b         |
| 4-Ball Wear (ASTM D2266)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.68       |
| 4-Ball Weld (ASTM D2596)<br>10 seconds, ~27 degrees C, 1770 rpm<br>OK Load, kgf         | 200        |
| Weld Load, kgf  | 250        |
| Timken (ASTM D2509), OK Load, lbs.  | 30         |



# OCTOPOL AZ-S

## OCTOPOL AZ-S—Physical Data

Zinc Dialkyldithiocarbamate, Petroleum Process Oil, Sulfurized Isobutylene

**Applications:** Gear Oil, Grease

**Additive Functionalities:** Antioxidant, Antiwear, Antiscuff, Extreme Pressure

### Physical Properties:

- Color: ASTM D1500: < 5.0
- Density: 1130 kg/m<sup>3</sup> (typical)
- Flash Point COC: > 130 degrees C (> 266 degrees F)
- Solubility Character: Soluble in petroleum and synthetic lubricant bases; insoluble in water

**Typical uses:** Octopol AZ-S is an effective extreme pressure, antioxidant suitable for lubricating oils and greases. Octopol AZ-S is compatible with other rust inhibitors, antioxidants, and metal deactivators.

## OCTOPOL AZ-S—Performance Data

### Performance Testing of Octopol AZ-S in Base Oil (NOAP):

| Testing Details | Lab Report |
|-----------------|------------|
|-----------------|------------|

|   |            |
|---|------------|
| Treat Level of Additive, wt. %  | 5          |
| Base Oil Grade  | ISO VG 220 |
| Copper Corrosion (ASTM D130)<br>24 hours, 100 degrees C                                 | 4c         |
| Rust Preventative Characteristics (ASTM D665, Part B) 60 degrees C, 4 hours             | Moderate   |
| 4-Ball Wear (ASTM D4172)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.58       |
| 4-Ball Weld (ASTM D2783)<br>10 seconds, ~27 degrees C, 1760 rpm<br>OK Load, kgf         | 200        |
| Weld Load, kgf  | 250        |

### Performance Testing of Octopol AZ-S in Lithium 12-Hydroxystearate Grease (NOAP):

| Testing Details | Lab Report |
|-----------------|------------|
|-----------------|------------|

|   |       |
|---|-------|
| Treat Level of Additive, %  | 5     |
| NLGI Grade  | No. 2 |
| Copper Corrosion (ASTM D4048)<br>24 hours, 100 degrees C                                | 4a    |
| 4-Ball Wear (ASTM D2266)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.58  |
| 4-Ball Weld (ASTM D2596)<br>10 seconds, ~27 degrees C, 1770 rpm<br>OK Load, kgf         | 250   |
| Weld Load, kgf  | 315   |
| Timken (ASTM D2509), OK Load, lbs.  | 20    |

PROPRIETARY

# OCTOPOL bis DMTD

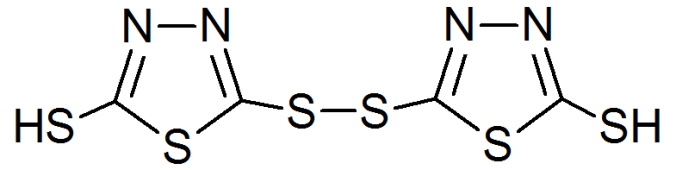
## OCTOPOL bis DMTD—Physical Data

CAS No. 72676-55-2

5,5'-dithiobis-1,3,4-Thiadiazole-2(3H)-thione

**Application:** Grease

**Additive Functionalities:** Ashless, High Temperature, Antioxidant, Antiwear, Antiscuff, Friction Reducer, Corrosion Inhibitor, Extreme Pressure, Metal Deactivator



### Physical Properties:

- Appearance, Color: Yellow powder solid
- Density: 2090 kg/m<sup>3</sup> (typical)
- Solubility Character: Soluble in acetone; insoluble in oil but easily dispersed in grease

**Typical uses:** Octopol bis DMTD possesses excellent extreme pressure properties when dispersed in grease. It also functions as an antiwear agent and an antioxidant. Octopol bis DMTD should be used in greases in applications where extreme pressure prevails, such as steel mills and heavy equipment lubrication.

## OCTOPOL bis DMTD—Performance Data

### Performance Testing of Octopol bis DMTD in Base Oil (NOAP):

**Not applicable: Additive is dispersible but insoluble in oils.**

### Performance Testing of Octopol bis DMTD in Lithium 12-Hydroxystearate Grease (NOAP):

| Testing Details   | Lab Report          |
|---|---------------------|
| Treat Level of Additive, %  | 5                   |
| NLGI Grade  | No. 2               |
| Copper Corrosion (ASTM D4048)<br>24 hours, 100 degrees C  | 3a                  |
| 4-Ball Wear (ASTM D2266)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm           | 0.65                |
| 4-Ball Weld (ASTM D2596)<br>10 seconds, ~27 degrees C, 1770 rpm<br>OK Load, kgf<br>Weld Load, kgf | 800<br>Exceeds 800+ |
| Timken (ASTM D2509), OK Load, lbs.  | 30                  |

# OCTOPOL MB

## OCTOPOL MB—Physical Data

CAS No. 10254-57-6

4,4' Methylene Bis (Dibutyldithiocarbamate)

**Applications:** Compressor Oil, Gear Oil, Grease, Hydraulic Oil, Synthetic Lube, Turbine Oil

**Additive Functionalities:** Ashless, High Temperature, Antioxidant, Antiwear, Antiscuff, Friction Reducer, Extreme Pressure

### Physical Properties:

- Appearance, Color: Amber to yellow liquid
- Density: 1060 kg/m<sup>3</sup> (typical)
- Flash Point COC: > 220 degrees C (> 428 degrees F)
- Solubility Character: Soluble in petroleum and synthetic lubricant bases; insoluble in water

**Typical uses:** Octopol MB is a general purpose, ashless antioxidant that has application in petroleum lubricants of all types. It is effective at economical concentrations, readily soluble, and easy to blend. Octopol MB has been tested in a variety of base stocks commonly used in compounding turbine, hydraulic, and circulating oils. In addition to being an effective antioxidant, Octopol MB provides extreme-pressure performance alone and in combination with synergistic additives. It is useful as a component of additive packages.

## OCTOPOL MB—Performance Data

### Performance Testing of Octopol MB in Base Oil (NOAP):

#### Testing Details

#### Lab Report

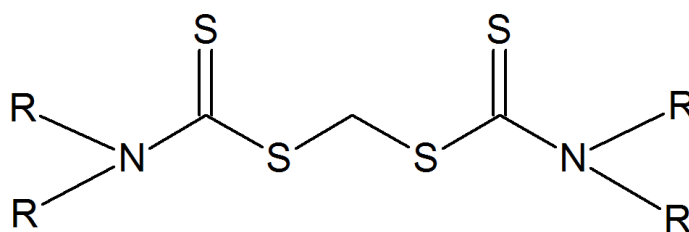
|   |            |
|---|------------|
| Treat Level of Additive, wt. %  | 5          |
| Base Oil Grade  | ISO VG 220 |
| Copper Corrosion (ASTM D130)<br>24 hours, 100 degrees C                                 | 2a         |
| Rust Preventative Characteristics (ASTM D665, Part B) 60 degrees C,<br>4 hours          | Moderate   |
| 4-Ball Wear (ASTM D4172)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.75       |
| 4-Ball Weld (ASTM D2783)<br>10 seconds, ~27 degrees C, 1760 rpm<br>OK Load, kgf         | 200        |
| Weld Load, kgf  | 315        |

### Performance Testing of Octopol MB in Lithium 12-Hydroxystearate Grease (NOAP):

#### Testing Details

#### Lab Report

|   |       |
|---|-------|
| Treat Level of Additive, %  | 5     |
| NLGI Grade  | No. 2 |
| Copper Corrosion (ASTM D4048)<br>24 hours, 100 degrees C                                | 1b    |
| 4-Ball Wear (ASTM D2266)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.60  |
| 4-Ball Weld (ASTM D2596)<br>10 seconds, ~27 degrees C, 1770 rpm<br>OK Load, kgf         | 250   |
| Weld Load, kgf  | 315   |
| Timken (ASTM D2509), OK Load, lbs.  | 30    |



# OCTOPOL PTB

## OCTOPOL PTB—Physical Data

Potassium Triborate, Petroleum Oil

**Applications:** Gas Compressor Oils, Gear Oil, Grease, High Pressure Hydraulic Systems, Automotive Manual Transmissions and Differentials, and Industrial Applications of both open and closed gear sets requiring EP wear protection

**Additive Functionalities:** High Temperature, Antioxidant, Antiwear, Antiscuff, Friction Reducer, Extreme Pressure

### Physical Properties:

- Appearance, Color: Opaque liquid, amber to brown
- Density: 1210 kg/m<sup>3</sup> (typical)
- Flash Point COC: > 230 degrees C (> 446 degrees F)
- Solubility Character: Compatible with petroleum and synthetic base oils; hygroscopic in nature

**Typical uses:** Tiarco Chemical offers a new and improved chemistry extreme pressure (EP) lubricant additive in the form of Octopol PTB (potassium triborate). Octopol PTB is a particulate dispersion of a hydrated potassium borate having a mean particle size of slightly less than 1 micron. Octopol PTB is composed of both potassium and boron in a ratio of ~4.5 wt. % to ~2.5 wt. % respectively, making it a very active EP wear preventer even at slightly less than normal additive treat rates. Octopol PTB also has other benefits: While some EP additives are chemically aggressive and even harmful to polymeric or rubber seals, Octopol PTB consistently demonstrates it is not chemically aggressive. Octopol PTB exhibits excellent compatibility with other additives that are often chosen for inclusion in lubricant products, and in many cases, Octopol PTB demonstrates synergy with these additives.

PROPRIETARY

## OCTOPOL PTB—Performance Data

### Performance Testing of Octopol PTB in Base Oil (NOAP):

| Testing Details   | Lab Report |
|---|------------|
| Treat Level of Additive, wt. %  | 5          |
| Base Oil Grade  | ISO VG 220 |
| Copper Corrosion (ASTM D130)<br>24 hours, 100 degrees C                                 | 1a         |
| Rust Preventative Characteristics (ASTM D665, Part B) 60 degrees C,<br>4 hours          | Pass       |
| 4-Ball Wear (ASTM D4172)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.66       |
| 4-Ball Weld (ASTM D2783)<br>10 seconds, ~27 degrees C, 1760 rpm<br>OK Load, kgf         | 200        |
| Weld Load, kgf  | 315        |

### Performance Testing of Octopol PTB in Lithium 12-Hydroxystearate Grease (NOAP):

| Testing Details   | Lab Report |
|---|------------|
| Treat Level of Additive, %  | 5          |
| NLGI Grade  | No. 2      |
| Copper Corrosion (ASTM D4048)<br>24 hours, 100 degrees C                                | 1a         |
| 4-Ball Wear (ASTM D2266)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.63       |
| 4-Ball Weld (ASTM D2596)<br>10 seconds, ~27 degrees C, 1770 rpm<br>OK Load, kgf         | 315        |
| Weld Load, kgf  | 400        |
| Timken (ASTM D2509), OK Load, lbs.  | 50         |

# OCTOPOL SIB

## OCTOPOL SIB—Physical Data

CAS No. 68511-50-2

Sulfurized Isobutylene

**Applications:** Engine Oil, Gear Oil, Grease, Metalworking

**Additive Functionalities:** Antiwear, Antiscuff,

Extreme Pressure

### Physical Properties:

- Appearance: Orange-amber liquid
- Color: ASTM D1500: < 4.0
- Density: 1110 kg/m<sup>3</sup> (typical)
- Flash point Open Cup: > 150 degrees C (> 302 degrees F)
- Solubility Character: Soluble in petroleum and synthetic lubricant bases; insoluble in water

**Typical uses:** Octopol SIB is a sulfur-based additive used in the formulation of industrial gear oils, automotive and industrial greases of varying types, and other formulations where noncorrosive sulfur is desired. Octopol SIB is an economical source of sulfur in a form that provides good load-carrying and antiwear properties combined with low copper corrosion tendency.

## OCTOPOL SIB—Performance Data

### Performance Testing of Octopol SIB in Base Oil (NOAP):

#### Testing Details

#### Lab Report

|   |            |
|---|------------|
| Treat Level of Additive, wt. %  | 5          |
| Base Oil Grade  | ISO VG 220 |
| Copper Corrosion (ASTM D130)<br>24 hours, 100 degrees C                                 | 4a         |
| Rust Preventative Characteristics (ASTM D665, Part B) 60 degrees C,<br>4 hours          | Severe     |
| 4-Ball Wear (ASTM D4172)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.80       |
| 4-Ball Weld (ASTM D2783)<br>10 seconds, ~27 degrees C, 1760 rpm<br>OK Load, kgf         | 620        |
| Weld Load, kgf  | 800        |

### Performance Testing of Octopol SIB in Lithium 12-Hydroxystearate Grease (NOAP):

#### Testing Details

#### Lab Report

|   |       |
|---|-------|
| Treat Level of Additive, %  | 5     |
| NLGI Grade  | No. 2 |
| Copper Corrosion (ASTM D4048)<br>24 hours, 100 degrees C                                | 4a    |
| 4-Ball Wear (ASTM D2266)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.83  |
| 4-Ball Weld (ASTM D2596)<br>10 seconds, ~27 degrees C, 1770 rpm<br>OK Load, kgf         | 620   |
| Weld Load, kgf  | 800   |
| Timken (ASTM D2509), OK Load, lbs.  | 20    |

PROPRIETARY

# OCTOPOL TMQ

## OCTOPOL TMQ—Physical Data

CAS No. 26780-96-1

Polymerized 1,2-dihydro-2,2,4-trimethylquinoline

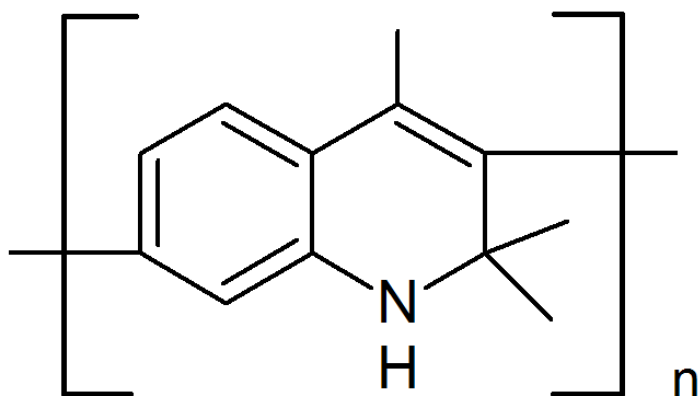
Applications: Compressor Oils, Engine Oils, Gear Oils,  
Greases, Petroleum Lubes

Additive Functionalities: Rust Prevention

### Physical Properties:

- Appearance, Color: Light brown to brown pellets
- Density: 1110 kg/m<sup>3</sup> (typical)
- Flash point Open Cup: > 200 degrees C  
(> 392 degrees F)
- Melting Point, Degrees C, ASTM D1519: 80 - 108
- Moisture Content, wt. %, ASTM D4571: < 1.0
- Ash Content, wt. %, ASTM D4574: < 0.5

Octopol TMQ is an additive compatible with greases, and industrial and automotive gear oils. Typical use levels are 0.25%–1.0% by weight in lubricating greases and industrial gear oil.



# OCTOPOL 451

## OCTOPOL 451—Physical Data

**Trade Name:** Octopol 451

**Applications:** Engine Oil, Gear Oil, Grease, Metalworking

Additive Functionalities: Antiwear, Antiscuff,

Extreme Pressure

### Physical Properties:

- Appearance, Color: Dark amber liquid
- Density: 930 kg/m<sup>3</sup> (typical)
- Flash Point: > 240 degrees C (> 464 degrees F)
- Solubility Character: Soluble in petroleum lubricant bases; insoluble in water

**Typical uses:** Octopol 451 has been specifically formulated to provide excellent rust inhibition for greases. It can be used with other Octopol extreme pressure, antioxidant, and antiwear additives.

### OCTOPOL 451—Performance Data

#### Performance Testing of Octopol 451 in Base Oil (NOAP):

| Testing Details | Lab Report |
|-----------------|------------|
|-----------------|------------|

|   |            |
|---|------------|
| Treat Level of Additive, wt. %  | 5          |
| Base Oil Grade  | ISO VG 220 |
| Copper Corrosion (ASTM D130)<br>24 hours, 100 degrees C                                 | 1a         |
| Rust Preventative Characteristics (ASTM D665, Part B) 60 degrees C,<br>4 hours          | Pass       |
| 4-Ball Wear (ASTM D4172)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.41       |
| 4-Ball Weld (ASTM D2783)<br>10 seconds, ~27 degrees C, 1760 rpm<br>OK Load, kgf         | 160        |
| Weld Load, kgf  | 200        |

#### Performance Testing of Octopol 451 in Lithium 12-Hydroxystearate Grease (NOAP):

| Testing Details | Lab Report |
|-----------------|------------|
|-----------------|------------|

|   |       |
|---|-------|
| Treat Level of Additive, %  | 5     |
| NLGI Grade  | No. 2 |
| Copper Corrosion (ASTM D4048)<br>24 hours, 100 degrees C                                | 1a    |
| 4-Ball Wear (ASTM D2266)<br>1 hour, 75 degrees C, 40 kgf, 1200 rpm<br>Scar Diameter, mm | 0.71  |
| 4-Ball Weld (ASTM D2596)<br>10 seconds, ~27 degrees C, 1770 rpm<br>OK Load, kgf         | 160   |
| Weld Load, kgf  | 200   |
| Timken (ASTM D2509), OK Load, lbs.  | 20    |

PROPRIETARY



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