

YOUR KEY TO OPERATIONAL READINESS

LUPROMAX-[®]EA

ENGINE OIL ADDITIVE

Extends the Life-Cycle of Military Equipment

NATO STOCK NO. 9150-32-078-8661

**THE NEXT GENERATION LUBRICANT TECHNOLOGY
MEETS U.S. MIL-I-46152B**



**REVOLUTIONARY
HEAT ACTIVATED TECHNOLOGY**



NATO STOCK NO. 9150-32-078-8661

LUPROMAX-EA

ENGINE OIL ADDITIVE

Extends the Life-Cycle of Military Equipment

Seals the pores of metal surfaces, smoothening out surface asperities without changing tolerances

INTRODUCTION

The degradation of military equipment caused by premature wear is a top concern among armed forces worldwide. Longer downtime for maintenance and repair of military vehicles, weaponry and support equipment leads to a decrease in combat and operational readiness.

Response time is crucial in situations of threat. When lines of communication turn volatile, being able to mobilise weaponry, hardware and military vehicles in a matter of minutes allows for swift action and can bring a significant advantage.

Treatment with Lupromax-EA optimises the working condition of your military equipment and ensures that operational readiness remains a constant.

DESCRIPTION

Lupromax-EA Engine Oil Additive is a slightly viscous amber liquid developed as an oil additive to protect the surfaces of metal against premature wearing due to poor lubricating properties of conventional oils.

Lupromax-EA Engine Oil Additive is an anti-friction oil additive concentrate, formulated with proprietary vegetable fatty acid ester and petroleum based products. It uses heat activated chemical technology (HAT) to achieve the desired lubrication results.

When activated by heat, the E.P. agent in Lupromax-EA Engine Oil Additive attaches itself to the metal surface, sealing the pores of metal surfaces and smoothening surface asperities without changing any tolerances.



NATO MCRL

LISTED IN NATO MCRL • NATO STOCK NUMBER



Lupromax-EA
ENGINE OIL ADDITIVE

AREAS OF USE

- All types of military equipment including armoured vehicles, main battle tanks, transport vehicles, Howitzer guns, general-purpose machine guns and small arms.
- Two and four-cycle diesel and gasoline engines of all sizes.
- Automotive and industrial transmissions and differentials.
- Compressors of all types including refrigeration.
- Assembly line speed-reduction gears, electric motors, pumps.
- Works on any surface with friction between two pieces of metal.

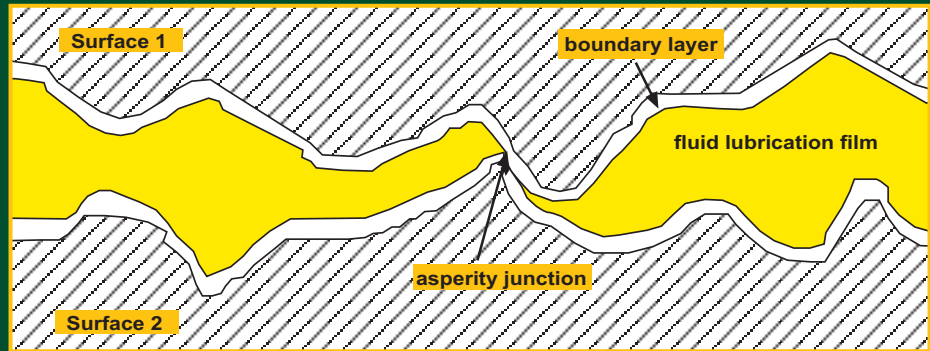
MECHANISM OF LUPROMAX-EA

When applied to a metal surface, Lupromax-EA chemically reacts with and is absorbed by the metal at a temperature range of 30°C- 450 °C. Heat generated from friction activates and fuses Lupromax-EA to the metal surface, smoothing out surface asperities. The rate of fusion directly corresponds to the load conditions and heat generated from the friction.

The reaction of the fortified lubricating oil dramatically reduces the rate of wear and tear.

Military equipment, vehicles and weaponry, when treated, retain adequate lubrication protection for extended periods even if the lubricant is completely lost.

Treatment with Lupromax-EA allows for a more effective, efficient and robust weapons and equipment system.



ADVANTAGES OF USING LUPROMAX-EA

- Protects military equipment for extended periods even when primary lubricant is lost.
- Protects military equipment even when the primary lubricant is contaminated.
- Does not cause any metal build-up.
- Reduces oxidation, thermal decomposition, corrosion and wear.
- Protects both ferrous and non-ferrous metals.
- Does not contain any heavy metals.
- Listed in the NATO MCRL with NATO assigned Stock No. 9150-32-078-8661.
- Provides continuous constant lubrication to all moving parts.
- Reduces operating temperatures at all metal friction points.
- Increases power using the same energy.
- Greater efficiency in electric motors, alternators and generators.
- Less energy required in engine start-ups, regardless of weather conditions.
- Treated weapons deliver higher muzzle velocity with the same load, and show decreased wear at all critical wear points.
- Allows firearms to be exposed to harsh weather conditions.
- Does not adversely affect the viscosity of primary lubricant.
- Long lasting and remains bonded to metal surfaces even after several oil changes.
- Maintains adequate lubrication even after being completely wiped off.

PROFILE OF METAL SURFACES TREATED WITH LUPROMAX

Laboratory data using SEM (Scanning Electron Microscopy) captured by the School of Materials Sciences at Singapore Polytechnic show comparative results of metal surfaces with and without Lupromax treatment.

The surface treated by Lupromax shows a significantly improved condition as compared to the surfaces treated by generic engine oils, which retain a high amount of asperities and other surface deformities.



LUPROMAX-EA VERSUS CONVENTIONAL LUBRICANTS/GUN OILS

Conventional lubricants and gun oils lubricate by constantly bathing and coating load-bearing surfaces to maintain an adequate film thickness. Frictional force and the resultant heat produce a condition in which a film of oil several molecules thick is absorbed onto the rotational surfaces through physical attraction. This film is non-impregnating, and provides lubrication to the metal parts only when the oil is in constant circulation. If there is a lack of constant lubrication for any reason, there is greatly increased stress at the asperity interaction surface areas. When this happens, these crucial contact areas are unprotected and experience maximum wear rates. This condition is extremely critical during both hot and cold starts, since much or all of the oil has drained away, and in extreme operating conditions that will push the oil to the limits of its ability to lubricate. Under these circumstances, oil without Lupromax-EA may allow excessive wear to occur.

SUMMARY OF LUPROMAX-EA

Lupromax-EA enhances operational readiness and improves efficiency by extending equipment life, reducing downtime and helping to prevent unscheduled maintenance of military equipment. In the long run, this also reduces maintenance costs and capital equipment replacement. Treated weapons deliver higher muzzle velocity with the same load and show decreased wear at all critical points.

Even if completely wiped off, Lupromax-EA maintains adequate lubrication. As it is bonded into the metal, its performance is not compromised during extreme operating conditions or even if the machine is switched off. Lupromax-EA provides continuous, constant lubrication.



Conventional lubricants and gun oils attract contaminants and hold them in fluid suspension. Interactions between these contaminants and the oil form a grease-like compound that cements itself to the metal and becomes lodged inside finely machined parts. This reduces the free flow of oil through oil passages and galleries and increases friction, heat and oxidation, resulting in greater wear and increased maintenance.

Lupromax-EA prevents such a scenario by fusing with the metal, ensuring constant lubrication and strengthening the surface from within.

TYPICAL PROPERTIES

Appearance :	Slight Viscous Free Flowing Liquid
Color:	Amber
Specific Gravity:	0.89
Flash Point:	230 °C

AVAILABLE PACKAGING

5 Liters container / 20 Litres pail / 200 Litres drum

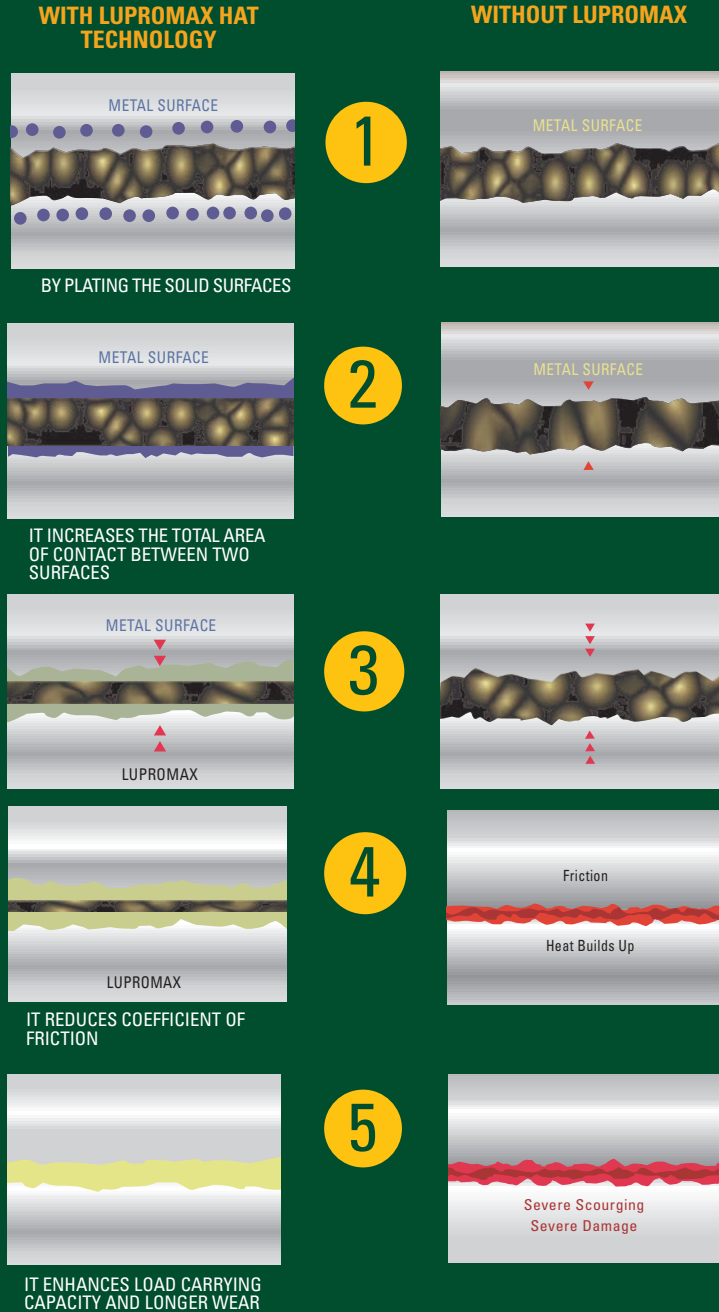


LUPROMAX-EA

ENGINE OIL ADDITIVE

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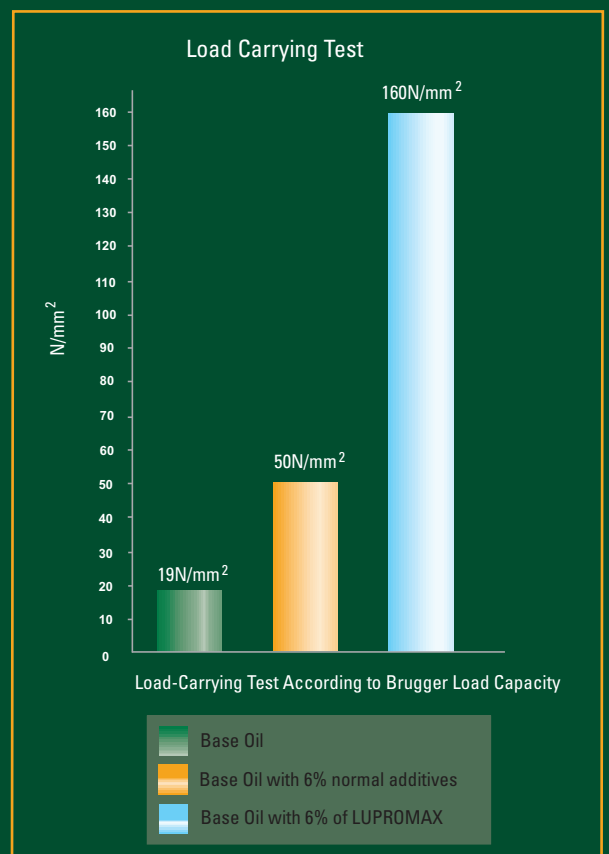
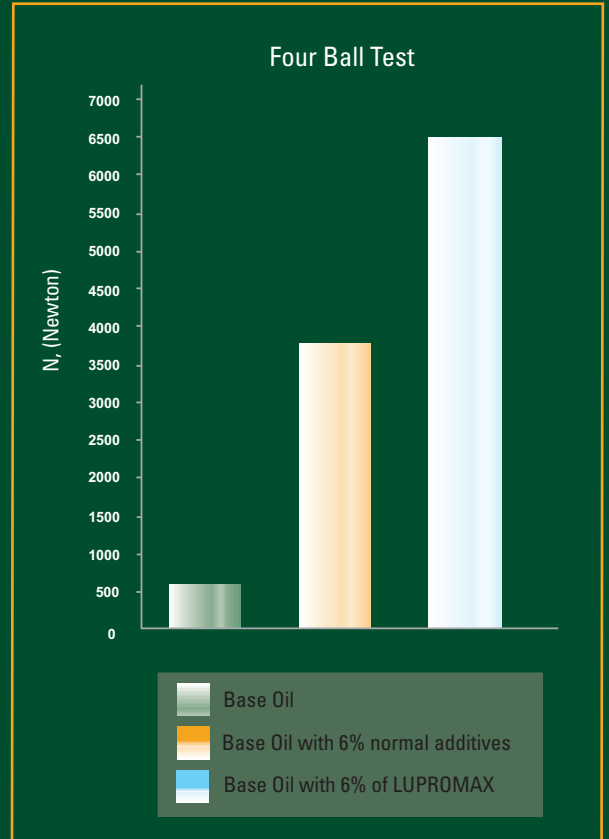
HOW LUPROMAX WORKS



TYPICAL PROPERTIES

Appearance	Amber
Colour ASTM D-1500	Type 1.5
Flash Point ASTM D-92	176°C
Viscosity @ 40°C ASTM D-445	39.45 cSt
Specific Gravity ASTM D-4052	1.019
Copper Corrosion ASTM D-130 (6% weight of LUPROMAX-EA in a white oil, 3hr/100°C)	1a Class

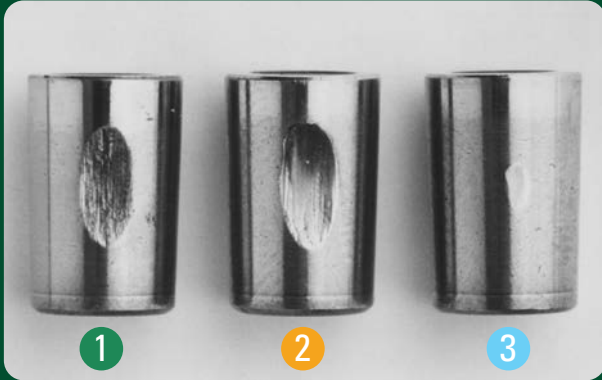
EXTREME PRESSURE PERFORMANCE



LUPROMAX-EA ENGINE OIL ADDITIVE

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EXTREME PRESSURE PERFORMANCE

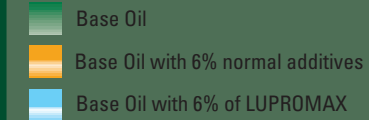
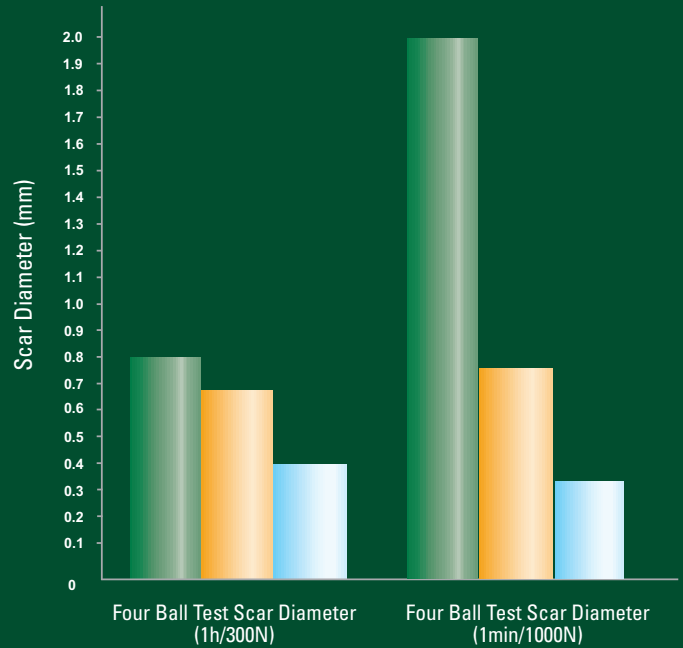


Base Oil

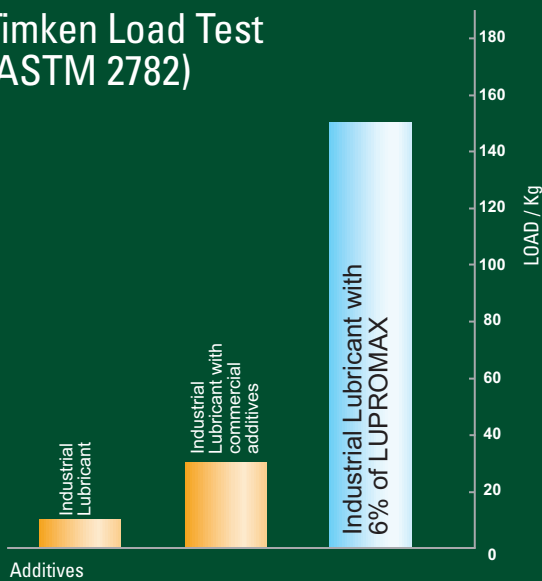
Base Oil with 6%
normal additives

Base Oil with 6%
of LUPROMAX

Four Ball Test Scar Diameter



Timken Load Test (ASTM 2782)



LUPROMAX-EA ENGINE OIL ADDITIVE

NATO STOCK NO. 9150-32-078-8661



TEST REPORT

LAB NO. : (6607)303-0071
DATE : November 2, 2007
PAGE : 1 OF 4

APPLICANT : Magna International Pte Ltd
Blk 9005 Tampines Street 93, #02-242 Tampines Industrial
Park A, Singapore 528839.

CONTACT PERSON : Nelson Cheng

DATE OF SUBMISSION : October 30, 2007

TEST PERIOD : October 30, 2007 to November 2, 2007

NO. OF WORKING DAY(S) : 4

SAMPLE DESCRIPTION : Lupromax EA (amber)
Country of Origin: Singapore
Country of Destination: Singapore
Manufacturer name: Magna International Pte Ltd

SUMMARY OF TEST RESULTS

TEST REQUESTED	PASS	FAIL	REMARK
Restriction of Hazardous Substances Directive (RoHS), 2002/95/EC	X		

REMARK

If there are questions or concerns on this report, please contact the following persons:

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PREPARED BY : Nancy


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CHEMICAL MANAGER (CHEMICAL DIVISION)

RW/2007

LUPROMAX-EA

ENGINE OIL ADDITIVE

NATO STOCK NO. 9150-32-078-8661

SGS OIL, GAS
& CHEMICALS

Lab Order No : JMC/10005351/04
Product : Lupromax-EA
Company : **Magna International Pte Ltd**
Blk 9005 Tampines Street 93
#02-242 Tampines Industrial Park A
Singapore 528839

Sample Recd. Date : 25-08-04

Date Tested : 25-08-04

Date Reported : 31-08-04

ANALYSIS REPORT

Product : Lupromax-EA

On testing, the following results were obtained :

Test	Unit	Method	Results
Arsenic (As)	ppm	ICP	Not Detected
Lead (Pb)	ppm	ICP	Not Detected
Mercury (Hg)	ppm	ICP	Not Detected

Remarks : Detection Limit 0.1ppm.

SGS Testing & Control Services Singapore Pte Ltd



Zainal Abidin
Assistant Manager

1) Tests performed in accordance with the latest issue of relevant test method unless otherwise indicated.
2) Unless specified, above results relate only to the items tested.
3) Precision parameters apply in the determination of the above results. Also refer to latest ASTM D3744, IP 307 & Appendix E of IP Standard Methods for analysis & testing, for utilization of test data to determine conformance with specifications.
4) This report shall not be reproduced except in full, without the written approval of the laboratory.

LUPROMAX-EA

ENGINE OIL ADDITIVE

NATO STOCK NO. 9150-32-078-8661

SGS OIL, GAS
& CHEMICALS

Lab Order No : JMC/10005351A/04
Product : Lupromax-EA
Company : Magna International Pte Ltd
Blk 9005 Tampines Street 93
#02-242 Tampines Industrial Park A
Singapore 528839

Sample Recd. Date : 25-08-04
Date Tested : 25-08-04
Date Reported : 31-08-04

ANALYSIS REPORT

Product : Lupromax-EA

On testing, the following result was obtained :

Test	Method	Result
Extreme Pressure and Lubricity test	SGS-SP-112	See Attach

SGS Testing & Control Services Singapore Pte Ltd



Zainal Abidin
Assistant Manager

1) Tests performed in accordance with the latest issue of relevant test method unless otherwise indicated.
2) Unless specified, above results relate only to the items tested.
3) Precision parameters apply in the determination of the above results. Also refer to latest ASTM D3244, IP 387 & Appendix E of IP Standard Methods for analysis & testing, for utilization of test data to determine conformance with specifications.
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Member of the SGS Group

All business is carried out and reported in accordance with our General Conditions of Business (see overleaf) unless otherwise agreed in a written contract.

LUPROMAX-EA

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TO TEST THE EFFECT OF VISCOPRO EA ON ENGINE OIL

OBSERVATION : On testing, the following observations were noted.

The normal engine lube oil under a load weight of **210 kg** (using Compound Leverage Principle) will cause the rotating bearing to seize. A scar mark was observed on the Timken bearing. The length of the scar mark was **5.26 mm**.

Viscopro EA was added to the same engine oil, which was then subjected to the same load weight. It was observed that the bearing proceeded with rotation and did not seize. Rotation continued even with a full load of **456 kg**. The scar mark was found to be **2.48 mm**.

When water and sand was added to the engine oil containing Viscopro EA, with the application of heat by means of the burner on the bearing for 30 seconds, no seizure was observed. The scar mark was found to be **4.77 mm**.

Subsequently the bath was removed from the Falex machine and the bearings were subjected to loads of 456 kg for 30 seconds. No seizure was observed. A scar mark of 4.77 mm was recorded.

REMARK: The said test shows that Viscopro EA enhances the lubricity and extreme pressure of common lubricating oil using **fusion / heat activated lubrication technology**.



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ANALYSIS RESULT

PRODUCT : VISCOPRO E.A

TEST : EXTREME PRESSURE AND LUBRICITY TEST

METHOD : SGS-SP-112

EQUIPMENT USED : FALEX / TIMKEN TEST MACHINE

COMPARISON DATA

PRODUCT	Temp	BATH	LOAD	TIME	SCAR SIZE (length)
Normal Engine oil	Ambient	Full	210 kg (463 lb)	Immediate Failure	5.26 mm
Normal engine oil with 8% Viscoprop EA additive	Ambient	Full	210 kg (463 lb)	1 minute	Tiny polish mark
Normal engine oil with 8% Viscoprop EA additive	Ambient	Full	456 kg (1005 lb)	1 minute	2.48 mm
Normal engine oil with 8% Viscoprop EA additive with <i>water and sand added</i>	Ambient	Full	456 kg (1005 lb)	1 minute	2.48 mm
Normal engine oil with 8% Viscoprop EA additive with <i>water and sand added</i>	With heat apply by means a Gas burner 500°C	Full	456 kg (1005 lb)	10 seconds	4.77 mm
Normal engine oil with 8% Viscoprop EA additive with <i>water and sand added</i>	With heat apply by means a Gas burner 500°C	Empty	456 kg (1005 lb)	10 seconds	4.77 mm



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www.lupromax.com

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