

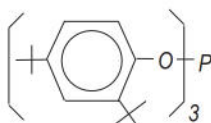
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IRGAFOS® 168

Costabilizer antioxidant

Typical chemical and physical properties

IRGAFOS 168, tris (di-tertiary butyl phenyl) phosphite, is an ashless costabilizer, used in combination with primary antioxidants (hindered phenols and aromatic amines)



Appearance	White powder
Melting point	183-186 °C
Density at 25 °C	1.03 g/cm ³ (ASTM D 2638-helium pycnometer)
Flash point	> 150 °C, Marcusson
Solubility	
Mineral oil	ca. 1 %
Water	< 0.01 %
Phosphorus content	4.8 %

Applications and typical treat level recommended

Industrial lubricants	0.1–0.3 %
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Benefits

Performs as a thermally and hydrolytically stable⁽¹⁾ secondary antioxidant decomposing peroxy radicals and hydroperoxides⁽²⁾ formed during the oxidation process

Approved by FDA/USA for use in blending lubricants with incidental food contact

Highly effective in combination with Irganox L antioxidants for stabilising mineral oil lubricants and synthetic lubricants, particularly PAOs

⁽¹⁾ Gächter/Müller, "Plastics Additives" Hanser Publishers, München Vienna New York, 1985 p.9

⁽²⁾ Gächter/Müller, "Plastics Additives" Hanser Publishers, München Vienna New York, 1985 p.7

Additive volatility

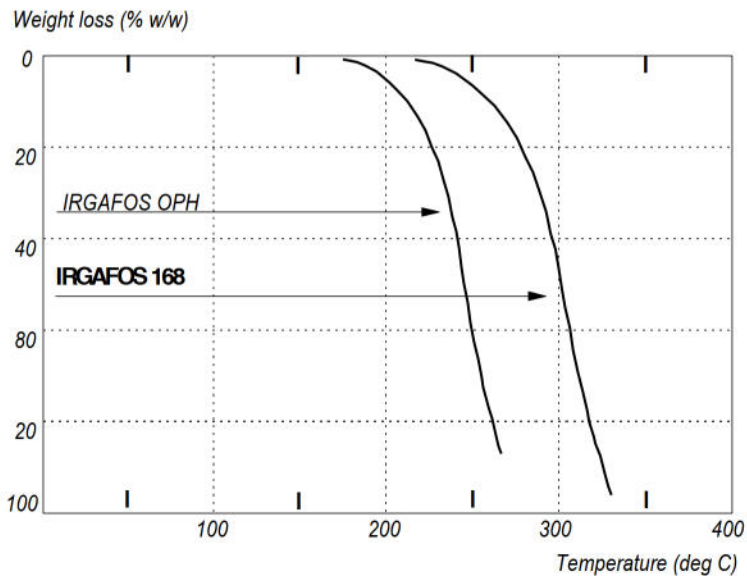
The volatility of additives can have a major impact on lubricant performance characteristics.

Thermogravimetric analysis (TGA) provides information about the volatility of an additive, as well as its thermal and oxidative stability.

Test procedure

Additive < 50 mg, is heated in a controlled atmosphere (air) at a rate of 10 °C per minute from 25 °C up to as high as 400 °C.

The weight loss (in %) of the sample as a function of temperature is represented graphically.



IRGAFOS OPH = di-n-octyl phosphite

Lubricants with incidental food contact

BASF can offer a full range of additives cleared by FDA/USA for formulating lubricants which may come into contact with food. Please see Product Selection Guide for the complete list.

Cleared by the FDA under 21 CFR 178.3570, for use in USDA H-1 lubricants with incidental food contact.

IRGAFOS 168 Maximum treat level ⁽¹⁾ **0.5 % wt/wt**

⁽¹⁾ The maximum allowed concentration may exceed the solubility limit of this additive in some base stocks.

Performance benefits: Lubricant protection

Oxidation inhibition

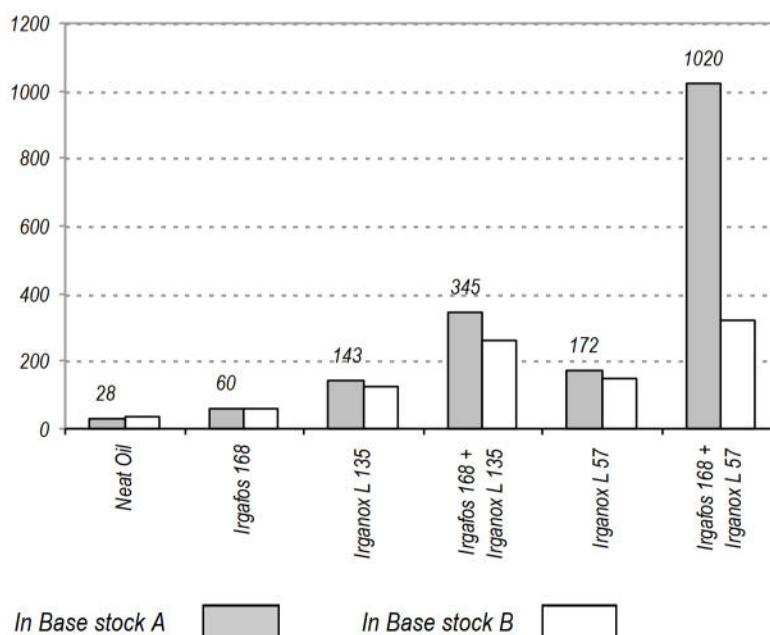
IRGAFOS 168 in combination with IRGANOX L antioxidants, provide good high temperature oxidative stability of lubricating oils, especially hydrotreated base oils.

Test fluids

IRGAFOS 168	(%)	0.25	as
IRGANOX® L 135 and Irganox L 57	(%)	0.25	indicated
IRGAMET® 39	(%)	0.5	below
IRGACOR® L 12	(%)	0.5	
Base stock A and Base stock B ⁽¹⁾		balance	

Oxidation stability
 RPVOT (Rotating Pressure Vessel Oxidation Test)
 ASTM D 2272
 150 °C, 90 psi O₂, water and copper catalyst

Induction period (min)



(¹) Hydrotreated base stock characteristics	Based stock A	Based stock B
ISO VG	32	46
VI	100	97
C (aromatic) (%)	0	16.6
Sulphur (%)	0	0

Oxidation inhibition

IRGAFOS 168 in combination with a high molecular weight phenolic antioxidant provides excellent high temperature viscosity control of the lubricant.

Test fluids

IRGAFOS 168 (%)	0.5	–	0.4
IRGANOX® L 101 (%)	–	0.5	0.1
IRGACOR® L 12 (%)	0.05	0.05	0.05
IRGAMET® 39 (%)	0.04	0.04	0.04
Hydrotreated base stock ISO VG 32	balance	balance	balance

(IP 48 test)
 200 °C, 24 hrs

Viscosity increase (%)	1017	402	354
TAN change (mg KOH/g)	12.6	9.8	9.4

Note: Combinations of high molecular weight phenolic antioxidants with phosphites for stabilising hydrotreated base stocks are protected by Petro Canada Patent US 4'652'385 (24.03.87)

Hydrolytic stability

IRGAFOS 168 is highly stable to hydrolysis.

Hydrolysis test

IRGAFOS 168 is stored for 10 days at 50 °C in 80 % ethanol/water solution

IRGAFOS 168 was recovered unchanged

Safety and Handling

Please read Material Safety Data Sheet (MSDS) before handling.

Product Specification

This information is available on request through our local representative.

Packaging

This information is available on request through our local representative.

Safety

When using this product, the information and advice given in our **Safety Data Sheet** should be observed. Due attention should also be given to the **precautions** necessary for handling chemicals.

Note

The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out their own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed.

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