ARIHANT CHEMICAL CORPORATION
& J.J ENTERPRISE

For paints / inks / plastic / Rubber industries Raw material available with us under self import / Manufacturing / Trading.

TECHNIAL DATE SHEET OF WAX AF 32

Wax AF types

Chemical nature High-density polyethylene waxes

Properties

	Unit	DGF*	Test methods DIN	ASTM	Wax AF 29 Micropowder	AF 30	AF 31	AF 32	AF
Average particle size	tm	Coulter Multisizer			! 7.5	! 8.5	! 10	! 12	! 30
Colour							White		
Physical form							Micronized powder		
Melting point (Microscope with heated stage)	°C		53736	D-2117			105 –112		
Melting point (DSC)	°C		51007	D-3418			110 –118		
Congealing point (Rotating thermometer)	°C	M-III 4 a	ISO 2207	D-938			102 –107		
Dropping point (Ubbelohde)	°C	M-III 3	51801	D-566			112 –116		
Penetrometer value at 23 °C	dmm	M-III 9 b	51579	D-1321			ca. 1		
Ball hardness at 23 °C	bar	M-III 9 a					300 – 800		
Acid number	mg KOH/g	M-IV 2	53402	D-1386			0		
Saponification number	mg KOH/g	M-IV 2	53401	D-1387			0		
Melt viscosity at 120 °C	mm^2/s	M-III 8	51562	D-2162			135 – 240		
Density at 23 °C	g/cm^3	M-III 2 a	53479	D-792			0.940 – 0.955		

** Standard methods devised by the Deutsche Gesellschaft für Fettwissenschaft e. V., Münster*

The above information is correct at the time of going to press. It does not necessarily form part of the product specification.
A detailed product specification is available from your local ARIHANT representative.

Storage The Wax AF types have a virtually unlimited shelf life in their sealed original packaging, provided they are stored properly.

Solubility The Wax AF types are insoluble or, at most, only very sparingly soluble in conventional solvents at room temperature. They are soluble at elevated temperatures in aliphatic and aromatic hydrocarbons and in most other solvents that are not too polar.

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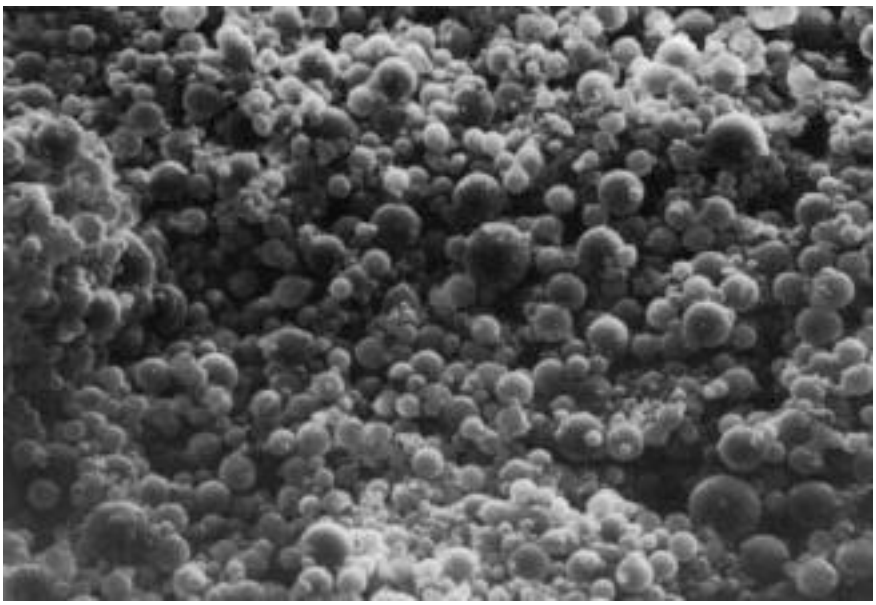
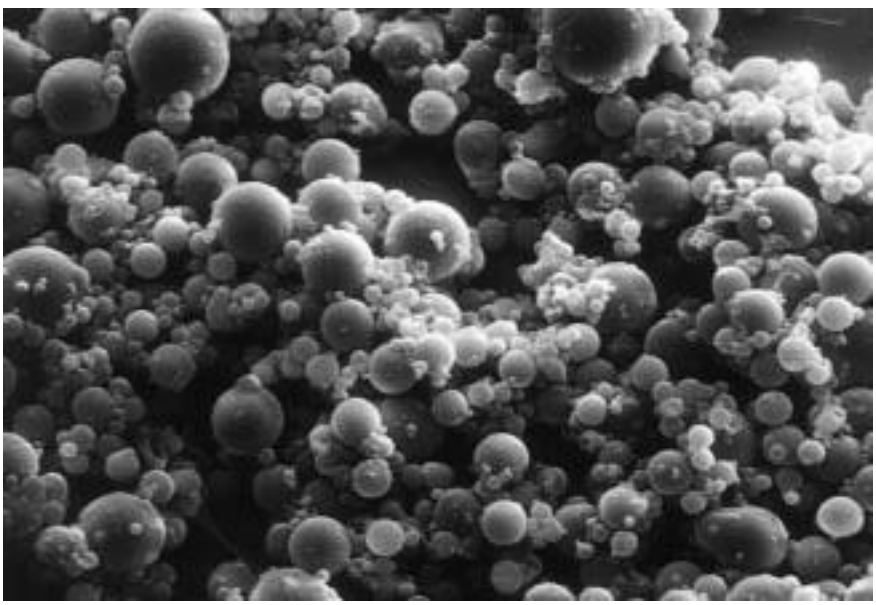
Particle size

The photographs below show Wax AF 30 and Wax AF 32 Micro-powder under an electron microscope at different levels of magnification.

Waxes produced by the ARIHANT production process consist of regular sphe-res with a narrow particle size distribution. Spherical wax particles are ideal for use in printing inks because they have high rub resistance, but they have only a marginal effect on gloss, even at high concentrations.



Scanning electron micrograph of Wax AF 30 Micropowder (magnified 700 x)



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Applications

Printing inks

The Wax AF types are very finely micronized polyethylene waxes. They can be added to all types of printing inks in order to improve their rub resistance. Their fineness allows them to be dispersed together with the pigments. Alternatively, they can be added at room temperature in the form of a dispersion or a concentrated paste. The Wax AF types can simply be stirred in, and no solvents need to be heated.

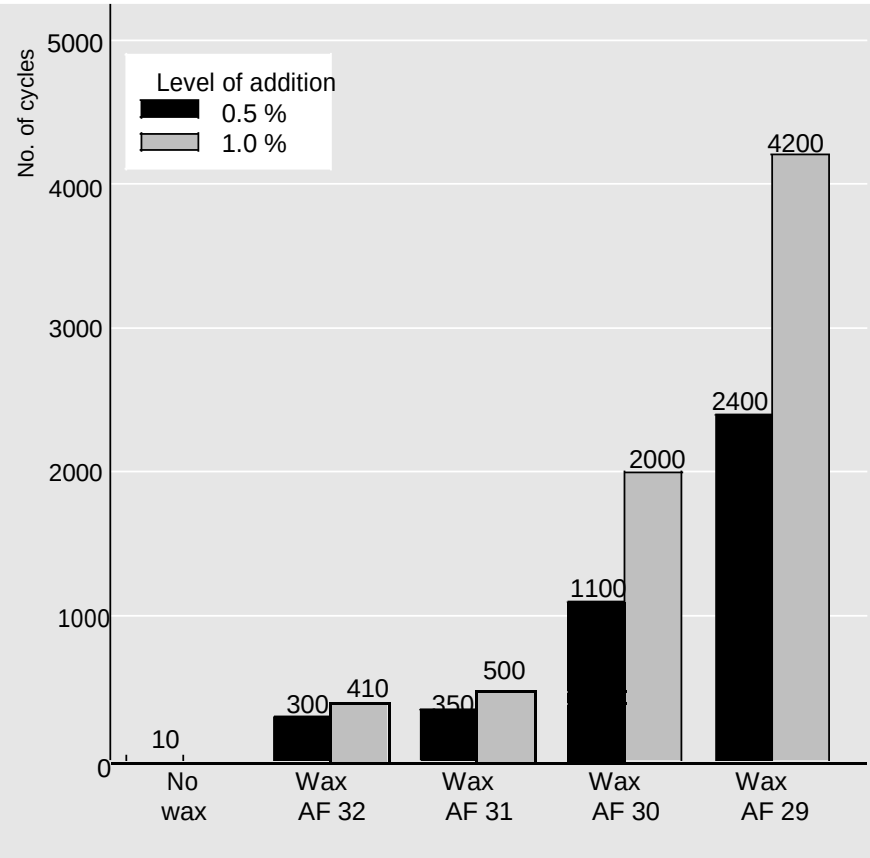
It is therefore very important not to expose the Wax AF types to heat when they are being mixed with inks, because this causes the fine, spheri-cal particles to dissolve, and the wax forms coarse, irregular particles when it recrystallizes.
A very common method is to prepare highly concentrated dispersions of the micronized waxes in solvents at room temperature.

Rub resistance

In printing inks, it is crucial that the wax particles are spherical in shape, because this minimizes the sliding friction of printed surfaces.

The choice of wax depends on the thickness of the ink film applied during the printing process. Thin films of ink require more finely micronized waxes.

The effects of the Wax AF types on rub resistance are shown in the following diagram.



Rub resistance of lithographic inks
Effectiveness of micronized waxes at different levels of addition

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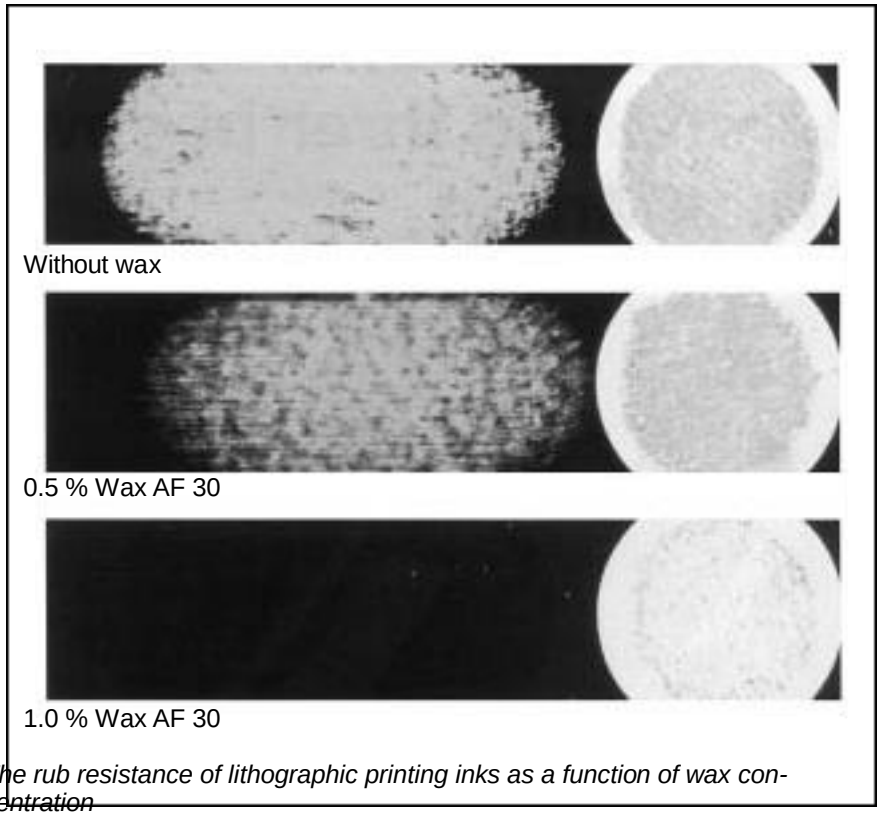

The rub resistance of lithographic printing inks as a function of wax concentration
Thickness of wet film 1.25 µm
Tested with Quartant Rub Tester

The most important types of printing ink in which the Wax AF types are employed are listed in the following table.

Wax	Solvent-based flexographic and packaging gravure inks	Water-based flexographic and packaging gravure inks	Publication gravure	Offset litho-graphy
Wax AF 29	+	+	+	++
Wax AF 30	+	+	+	++
Wax AF 31	++	++	++	+
Wax AF 32	++	++	++	

++ = Recommended
+ = Can be used

Another advantage of spherical particles is that they hardly have any effect on the gloss of the dry ink film.

Gloss

The gloss of printed matter depends on the quality of the wax contained in the printing ink, as well as the pigments and binders. The level of gloss is determined by the microscopic structure of the printed surface. The wax particles have to be homogeneously distributed in order to prevent any drop in gloss. Spherical particles scatter light more evenly than irregular particles.

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Levels of addition

Micronized waxes are more effective than conventional waxes, which have to be melted and then precipitated, and less wax needs to be added to printing inks.

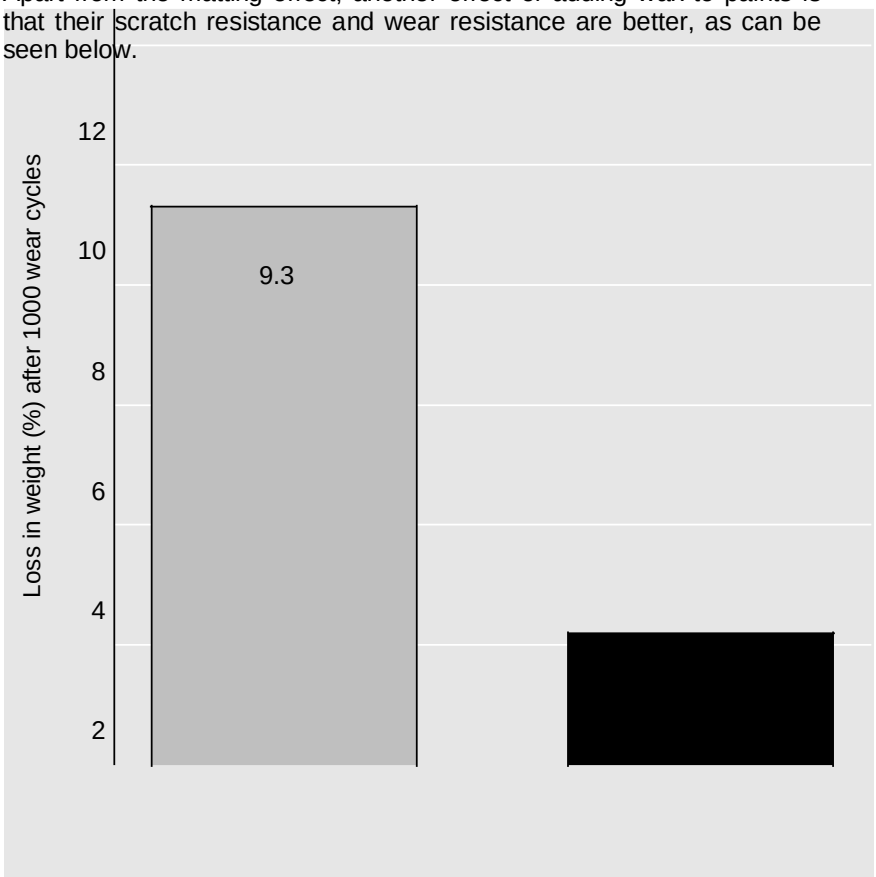
Typical levels of addition are listed in the following table.

Printing process	Level of addition
Solvent-based flexographic and packaging gravure inks	0.5 –1.0 %
Water-based flexographic and packaging gravure inks	0.8 –1.5 %
Publication gravure inks	0.8 –1.2 %
Inks for offset lithography	1.0 –1.5 %

Paints and varnishes

The Wax AF types can be used as matting agents for coatings applied to metal and wood. Micronized waxes have the advantage over coarser waxes in that they do not have to be melted and precipitated. The most common method is to prepare a dispersion at room temperature, which is then added to the paint direct.

Apart from the matting effect, another effect of adding wax to paints is that their scratch resistance and wear resistance are better, as can be seen below.



TECHNIAL DATE SHEET OF WAX

stable for a reasonable length of time. Aqueous dispersions can be prepared by stirring the wax into a very dilute solution of dispersing agents and

The effects of Wax AF 30 on the wear resistance of water-borne coatings for wood
Tested with Taber Abraser with CS 10 wheels and 500 g load

Miscellaneous applications

Because the Wax AF types are so finely divided, they are easy to disperse in water, organic solvents and mixtures of water and solvents. Dispersions containing 40 – 50 % solids can be prepared which remain surfactants.

Apart from the applications described above, the Wax AF types can also be used for coating paper, textiles and metal and in mould-release agents.

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Food-contact legislation

The composition of the Wax AF types conforms to the recommendations issued by the German *Bundesgesundheitsamt* listed in the following table.

BGA Recommendations		Approval
I	Lubricants for plasticized high polymers and for special plasticized PVC film used to wrap fresh meat	Up to 8 %
II	Lubricants for unplasticized PVC	Up to 8 %
VI	Slip agents for styrene copolymers and graft polymers/ Mixtures of styrene polymers and other polymers	Approved
VIII	Lubricants for manufacturing plastic hoses for dispensing beer and soft drinks (in accordance with other recommendations)	Approved
IX	Additives for colorants used to colour plastics	Approved
XIII	Coatings (in accordance with Recommendations II and XXV) a) Cellophane base sheet b) Coatings for cellophane	Approved
XV	Auxiliaries present in dispersions of paraffin wax and other waxes added to silicone resins used to coat paper (in accordance with Recommendation XXV)	< 50 %
XVII	Polyterephthalic acid, diol esters	Up to 0.5 %
XXI	Additives for consumer articles made from natural and synthetic rubber (in accordance with Recommendation XXV)	< 1.5 %
XXV	Additives for paraffin wax and microcrystalline wax used for impregnation and coating and in pressure-sensitive adhesives	< 50 %
XXVII	Lubricants for conveyor belts made from plasticized PVC (in accordance with Recommendation II)	Up to 8 %
XXXII	Additives for dispersions of natural and synthetic rubber (in accordance with Recommendation XXI)	< 1.5 %
XXXV	Auxiliaries for extenders added to copolymers of ethylene, propylene, butylene, vinyl esters and unsaturated aliphatic acids, etc. (in accordance with Recommendations XXV, II and III)	< 4 %
XXXVI	Auxiliaries used in the manufacture of paper and board for food packaging (in accordance with Recommendation XXV)	< 50 %
XXXVIII	Hoses for dairies and milking machines made from plastics or rubber	< 1.5 %
XL	Additives for paints and coatings	Approved
XLII	Lubricants for chlorinated PVC, plasticizer-free	< 4 %
XLIV	Coatings (containing paraffin wax and microcrystalline wax) a) for sausage skins made from cellophane (in accordance with Recommendation XXV) b) for sausage skins made from polyamide (base sheet)	< 50 %
XLVII	Toys made from plastics and other polymers	Approved
XLVIII	Materials applied as external coatings to glass containers	Approved
KTW 1.3.1	Lubricants for PVC and copolymers that come into contact with drinking water	Up to 8 %
German additives legislation	Chewing gum	Approved
	Cheese wax	Up to 10 %

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The composition of the Wax AF types also conforms to the requirements of the following paragraphs of United States FDA regulations.

FDA Paragraph 21 CFR	
172.615	Chewing gum base
173.20	Ion-exchange membranes
175.105	Adhesives
175.125	Pressure-sensitive adhesives
175.300	Resinous and polymeric coatings
175.320	Resinous and polymeric coatings for polyolefin films
175.350	Vinyl acetate/crotonic acid copolymer
175.380	Xylene-formaldehyde resins condensed with 4,4;-isopropylidenediphenolepichlorohydrin epoxy resins
175.390	Zinc-silicon dioxide matrix coatings
176.170	Components of paper and paperboard in contact with aqueous and fatty foods
176.180	Components of paper and paperboard in contact with dry foods
176.200	Defoaming agents used in coatings
176.210	Defoaming agents used in the manufacture of paper and paperboard
176.300	Slimicides
177.1200	Cellophane
177.1210	Closures with sealing gaskets for food containers
177.1240	1,4-Cyclohexylene dimethylene terephthalate and 1,4-cyclohexylene dimethylene isophthalate copolymer
177.1320	Ethylene-ethyl acrylate copolymers
177.1350	Ethylene-vinyl acetate copolymers
177.1390	High-temperature laminates
177.1400	Hydroxyethyl cellulose film, water-insoluble
177.1520	Olefin polymers
177.1630	Polyethylene phthalate polymers
177.2600	Rubber articles intended for repeated use
177.2910	Ultra-filtration membranes
178.3120	Animal glue
178.3570	Lubricants with incidental food contact
178.3850	Reinforced wax
179.45	Packaging materials for use during the irradiation of prepackaged foods

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Safety

We know of no ill effects that could have resulted from using the Wax AF types for the purpose for which they are intended and from processing them in accordance with current practice.

According to the experience we have gained over many years and other information at our disposal, the Wax AF types do not exert any harmful effects on health, provided that they are used properly, due attention is given to the precautions necessary for handling chemicals, and the information and advice given in our safety data sheets are observed.

Handling Goggles and a respirator should be worn when handling large quantities in

the absence of air extraction equipment, and measures should be taken to prevent electrostatic charges from building up.

The Wax AF types are extremely slippery, and spills should be swept up immediately.

Further details are given in our safety data sheets.

Note -The information submitted in this publication is based on our current knowledge and experience. In view of the many factors that may affect processing and application, these data do not relieve processors of the responsibility of carrying out their own tests and experiments; neither do they imply any legally binding assurance of certain properties or of suit-ability for a specific purpose. It is the responsibility of those to whom we supply our products to ensure that any proprietary rights and existing laws and legislation are observed.

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