



CÔNG TY TNHH TM&SX HOA CHẤT THẠCH AN

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THE PRODUCT DATA OF CELLCOM FR/ATH-20	<i>EXCELLENT FLAME RETARDANT FOR PLASTICS AND RUBBER</i>
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CELLCOM FR/ATH-20

- Chemical name : Aluminium Hydroxide, Aluminium trihydroxide
- Chemical formula : $\text{Al}(\text{OH})_3$
- Molecular weight : 78.0
- CAS No. : 21645-51-2

PRODUCT DESCRIPTION AND SPECIFICATIONS

Product name	Cellcom-FR/ATH-20
Appearance	White fine powder
Content (%)	64% (as Al_2O_3) min
Average particle size (micron)	1.8~2.5
Water content (%)	1.0 max
Whiteness (%)	96.5 min

PHISICAL PROPERTIES

- Odorless, Non-carconigenic
- Non-smoking, Low toxicity
- Halogen free flame retardant
- Conversion to aluminium oxide by endothermic reaction
 $2 \text{Al}(\text{OH})_3 + \text{heat} \Rightarrow \text{Al}_2\text{O}_3 + 3 \text{H}_2\text{O} - 298 \text{ KJ/mol}$

APPLICATIONS

Cellcom-FR/ATH-20, Aluminium hydroxide is used in various industries as :

- A raw material in the production of aluminium chemicals.
- A raw material in the manufacture of glass and glaze.
- A raw material in catalyst production.
- A flame retardant and smoke suppressant filler in plastics (for example : Cables, Rubber products and Carpet backing)
- A raw material for fertilizers, and fiber cement board products.

- An extender and bodying agent in paper, solvent- and water- born paint, UV curable coatings, inks, and adhesives.
- This mineral compounds are used in polyolefins, TPE, PVC, rubbers, thermosets and can also be used in some engineering polymers (such as polyamide). Aluminium hydroxide is selected when processing temperature is under 200 °C.

SUGGESTED FORMULATIONS

A typical **EPDM** formulation for cable sheathing and insulation

COMPONENTS	phr
EPDM	50
EVA	50
ZnO	5
Cellcom-FR/ATH20	190
Paraffinic oil	10
Vinyl silane	1.5
TRIM	4.5
Antioxidant	0.2
Organic peroxide	2

TRIM : Crosslinking enhancer, Triallyl cyanulate

A typical **EPM** formulation for cable sheathing and insulation

COMPONENTS	phr
Ethylene propylene rubber	100
Zinc stearate	5
ZnO	5
Cellcom-FR/ATH20	200
Zinc borate	10
Paraffinic oil	8
Vinyl silane	2
Lubricant	2
Antioxidant	3
TAC	2
Organic peroxide	6

TAC : Crosslinking enhancer, Trimethylol propan tri methacrylate

A typical **PVC** formulation for cable insulation

COMPONENTS	phr
PVC (K Value=70)	100
DINP	55
Lead stabilizer	4
Cellcom-FR/ATH20	50
Calcium carbonate	10

Lubricant	0.5
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A typical **PVC** formulation for cable sheathing

COMPONENTS	phr
PVC (K Value=70)	100
Phosphate plasticizer	50
Lead stabilizer	4
Cellcom-FR/ATH20	40
Calcium carbonate	10
Cellcom-FR/ATO 10	5
Lubricant	0.5
Zinc borate	3~6

A typical **EVA** formulation for cable sheathing

COMPONENTS	phr
EVA	100
Cellcom-FR/ATH20	150
Amino silane	1.2
Antioxidant	0.4

A typical **Polychloroprene** rubber formulation for conveyor belts

COMPONENTS	phr	phr
Polychloroprene rubber	100	100
Cellcom-FR/ATH20	130	105
Carbon black(N550)	50	50
Zinc borate	16	20
Chlorinated paraffin	6	18
Antioxidants	17	17
Paraffin oil	-	9

Thermal conditions for extrusion

cylinder zone	Cellcom-FR/ATH-20
cylinder 1 (°C)	140±5
cylinder 2 (°C)	150±5
cylinder 3 (°C)	160±5
adapter (°C)	160±5
die (°C)	165±5
Melting range (°C)	170±5

HANDLING PRECAUTIONS

Good ventilation of handling and mixing area are required.

PACKAGE : 25kg Bag Packing

THE PRODUCT DATA OF CELLCOM FR/ATO-10

*EXCELLENT FLAME RETARDANT
FOR PLASTICS AND RUBBER*

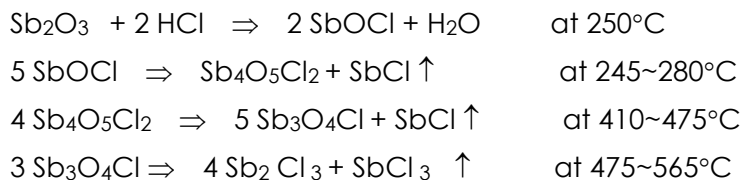
CELLCOM FR/ATO-10

- Chemical name : Antimony trioxide
- Chemical formula : Sb_2O_3
- Molecular weight : 291.5
- CAS No. : 1309-64-4

PRODUCT DESCRIPTION AND SPECIFICATIONS

Product name	Cellcom FR/ATO-10
Appearance	White fine powder
Content (%)	99.5 min
Average particle size (micron)	0.5 ~ 1.5
Water content (%)	1.0 max
Whiteness (%)	96.0 min

DECOMPOSITION MECHANISM & ACTING PRINCIPLE



HCl traps hydrogen or hydroxide radical,
 Heavy SbCl_3 gas blocks oxygen,
 SbOCl produces carbonaceous layer

EXAMPLES FOR VARIOUS COMPOUNDING FORMULATIONS

(WT%)	Polyethylene			Polypropylene	
Resin	82	60	70	60	60
FR/ATO-10	6	13	10	10	10
FR/DBPO-50	12	-	-	-	-
Chlorinated paraffin	-	-	20	-	30

(WT%)	Polystyrene			ABS	
Resin	70	84	80	85	75
FR/ATO-10	15	4	5	5	7.5
PVC	15	-	-	10	-
FR/DBPO-50	-	12	-	-	-

*DOP : Dioctyl phthalate

*Chlorowax : Trademark of Dimond shamrock's chlorinated paraffin

(Parts by weight)	Polyvinylchloride		Textile coating
	Sheet	Plastics	
Resin	100	100	-
Chlorinated paraffin 40%	-	-	13
Chlorinated paraffin 70%	-	-	7
FR/ATO-10	3	10	7
DOP	30	60	-
Chlorowax	5	30	-
Ba-Cd Stabilizer	2.5	3	-
Epoxidized soy bean oil	3	5	-
Stearic acid	0.25	-	-
Filler	15	-	-
Binder	-	-	7
Calcium carbonate	-	-	4
Aluminum stearate	-	-	1
Organic solvent	-	-	51
Pigment	-	-	10

APPLICATIONS

Cellcom FR/ATO-10, Antimony trioxide is used mainly as a fire prevention additive and pigment (concentration:1~13%), the finer fraction is used for pigmentation . The flame retardant property, however, is not affected by particle size. This property

is based on antimony trioxide reacting in the event of a fire with the surrounding material, with the result that a protective layer of various antimony compounds covers the combustible materials. Since the formation of these compounds consumes heat and because they are generally difficult to ignite, they protect the underlying material from ignition. The presence of thermally unstable halogen compounds accelerates the protective impact of antimony. Antimony trioxide is therefore nearly always used together with high halogenated organic compounds such as chloroparaffins.

Antimony products have a wide variety of uses. In today's world their use as a flame-retardant synergist is a large and important application. Antimony trioxide do not react as flame retardants directly. They are used as synergists to enhance the activity of halogenated flame retardant by stepwise releasing the halogenated radicals to retard gas phase chain reaction of flame spread. Antimony trioxide has excellent synergic effects when it is used with Decabromodiphenyl oxide. This is especially evident in PVC, where antimony products at a small addition rate (usually less than 10%) can dramatically improve the flame retardancy of rigid and plasticized PVC articles.

In glass manufacturing, antimony trioxide is used instead of arsenic as a plaining agent. When the parasion of glass is heated, antimony trioxide is gasified, whereupon bubbles of gas are formed which serve to create a remixture of molten glass and also to trap other substances in the gas bubbles formed and to remove them from the glass.

And antimony trioxide is used as catalyst in PET production, flocculent in titanium dioxide production, paints and adhesives industries, pigments and ceramic frittes.

HANDLING PRECAUTIONS

Antimony trioxide is suspected to cause the cancer, so careful precautions and good ventilation of handling and mixing area are required.

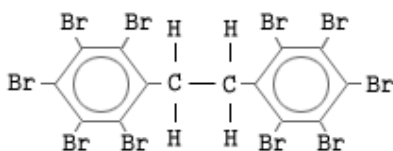
PACKAGE : 25 kg bag package

THE PRODUCT DATA OF CELLCOM FR/DBPE-50

*EXCELLENT FLAME RETARDANT
FOR PLASTICS AND RUBBER*

CELLCOM FR/DBPE-50

- Chemical name : Decabromodiphenyl ethane
- Molecular weight : 971.2
- CAS No. : 84852-53-9
- Molecular weight : 971.2
- Initial melting point : 350 °C
- Chemical structure



CELLCOM FR/DBPE-50, Decabromodiphenyl ethane is a white powder, non-diphenyl oxide based product containing high level of aromatic bromine and is hardly soluble in all solvents and exhibits good UV resistance.

CELLCOM FR/DBPE-50 does not send off poisonous poly brominated materials when thermal cracking and burning, it is completely meeting environmental regulations and has a strong light stability and low transudation.

PRODUCT DESCRIPTION AND SPECIFICATIONS

Product name	CELLCOM FR/DBPE-50
Appearance	White fine powder
Bromine Content (%)	81.5 min
Average particle size (micron)	5.0 max
Water content(%)	0.01 max

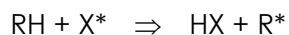
ACTING PRINCIPLE

Interruption of the radical chain mechanism of the combustion process in the gas phase.

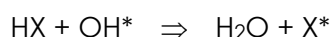
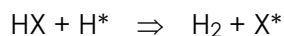
1. Release of halogen radicals



2. Formation of halogen hydroxides (HX)



3. Neutralization of energy-rich radicals



APPLICATIONS

CELLCOM FR/DBPE-50, Decabromodiphenyl ethane has very good thermal stability and high bromine content making it a prime candidate for high temperature applications and is applicable to ABS, PS, PP, PE, Polyamide, PC, PBT, PET, PVC, Thermoplastic Elastomers, Epoxy Resins, Unsaturated Polyester Resin, Adhesive & Coating, Textiles etc. It can be used in a wide range of styrenic polymers, engineering resins, wire & cable covers, insulator and thermosetting plastics as well. It is especially suitable for high quality materials used to produce computer, electrograph, telephone, manifold, household electrical appliances etc.

SUGGESTED DOSE

	FR/DBPE-50 Dose	FR/AT0-10 Dose	UL94 (1.6 mm)
PP+Silicate	22	6	V-0
HIPS	12	4	V-0
ABS	15	4	V-0
PS	14	5	V-0
PBT	10	5	V-0
Thermoplastic elastomer	18	9	V-0
XLPE	21	7	V-0
Thermosetting EP	6	3	V-0
Nylon 66	14	5	V-0

HANDLING PRECAUTIONS

Good ventilation of handling and mixing area are required.

PACKAGE : 25 kg Bag Packing

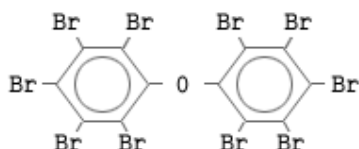
THE PRODUCT DATA OF CELLCOM FR/DBPO-50

*EXCELLENT FLAME RETARDANT
FOR PLASTICS AND RUBBER*

CELLCOM FR/DBPO-50

- Chemical name : Decabromodiphenyl oxide
- Chemical formula : $C_{12}Br_{10}O$
- Molecular weight : 959.2
- CAS No. : 1163-19-5

Chemical structure



CELLCOM FR/DBPO-50, Decabromodiphenyl oxide is a prime candidate for most applications due to its overall performance and cost effectiveness and its good thermal stability and has been extensively studied to determine its toxicological character and its safety has been demonstrated through many years of use.

CELLCOM FR/DBPO-50 is a high efficient fire retardant, wide-ranged, white powdered and additive type fire retardant. Its melting point is more than 300°C. It has no causticity and is insoluble in some solvent such water, ethyl alcohol, acetone and benzene.

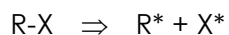
PRODUCT DESCRIPTION AND SPECIFICATIONS

Product name	CELLCOM FR/DBPO-50
Appearance	White fine powder
Bromine Content (%)	80 min
Average particle size (micron)	5 max
Whiteness (%)	93 min
Melting range (°C)	300~310

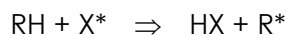
ACTING PRINCIPLE

Interruption of the radical chain mechanism of the combustion process in the gas phase.

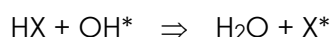
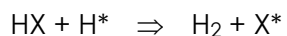
4. Release of halogen radicals



5. Formation of halogen hydroxides (HX)



6. Neutralization of energy-rich radicals



APPLICATIONS

CELLCOM FR/DBPO-50, Decabromodiphenyl oxide is used as flame retardant for ABS, PS, PP, PE, Polyamide, PC, PBT, PET, PVC, Thermoplastic Elastomers, Epoxy Resins, Unsaturated Polyester Resin, Adhesive & Coating, Textiles etc, particularly effective in polyolefins, styrenic, polyamides and polyester resins.

SUGGESTED DOSE

	FR/DBPE-50 Dose	FR/ATO-10 Dose	UL94(1.6 mm)
PP + Silicate	22	6	V-0
XLPE	21	7	V-0
Thermoplastic elastomer	18	9	V-0
ABS	15	4	V-0
PS	14	5	V-0
HIPS	12	4	V-0
PBT	10	5	V-0
Thermosetting EP	6	3	V-0

HANDLING PRECAUTIONS

Good ventilation of handling and mixing area are required.

PACKAGE : 25 kg Bag packing

THE PRODUCT DATA OF CELLCOM FR/MHO-15

*EXCELLENT FLAME RETARDANT
FOR PLASTICS AND RUBBER*

CELLCOM FR/MHO-15

- Chemical name : Magnesium Hydroxide

- Chemical formula : $Mg(OH)_2$

- Molecular weight : 58.32

- CAS No. : 1309-42-8

- specific gravity : 2.36

- Magnesium Hydroxide is a white powder ;

very slightly soluble in water; decomposing at 350 °C.

It is an inert filler, flame retardant and smoke suppressant for plastics,

synthetic rubber, reinforced polyesters, phenolics, and urethane foam.

Magnesium hydroxide releases its 31% water when heated to above 325 °C,

which cools the product below flash point to reduce fire occurrence.

Conversion to magnesium oxide by endothermic reaction



PRODUCT DESCRIPTION AND SPECIFICATIONS

Product name	Cellcom FR/MHO-15
Appearance	White fine powder
Content (%)	98 min
Average particle size (micron)	1~2
Water content (%)	1.0 max.

APPLICATIONS

CELLCOM FR/MHO-15, Magnesium hydroxide, is inorganic filling flame-retarding agent with high decomposing temperature (exceeds 200 °C) and non-toxicity, it is widely applied to flame-retarding wires and cables, low-smoke halogen-free polymers, mining-used conveyor belt, indoor decoration materials etc.

This mineral compounds are used in polyolefins, TPE, PVC, rubbers, thermosets and can also be used in some engineering polymers (such as polyamide).

SUGGESTED FORMULATIONS

A typical EVA formulation for cable sheathing

COMPONENTS	phr
EVA	100
Cellcom FR/MHO-15	150
Amino silane	1.2
Antioxidant	0.4

Thermal conditions for extrusion

cylinder zone	Cellcom FR/MHO-15
cylinder 1 (°C)	150±5
cylinder 2 (°C)	160±5
cylinder 3 (°C)	170±5
adapter (°C)	180±5
die (°C)	185±5
Melting range (°C)	185±5

HANDLING PRECAUTIONS

Good ventilation of handling and mixing area are required.

PACKAGE : 25 kg Bag Packing