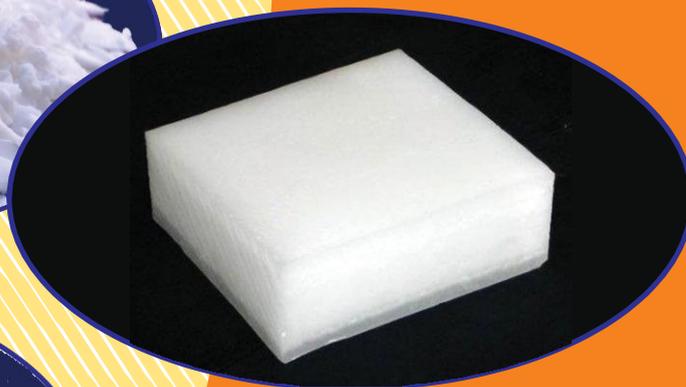


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GOYEL CHEMICAL CORPORATION

[AN ISO 9001 : 2015 CERTIFIED COMPANY]

House of Polymer Additives, Industrial Waxes & Lubricants

PRODUCT SELECTION GUIDE

POLYFINE RANGE OF ONE PACK LUBRICANT

(Composite lubricant system for rigid PVC pipes/conduits/profiles)

GCC Offers PolyFine as one of the finest range of One pack Lubricants. PolyFine is a lubricant system specially developed for rigid PVC application like PVC pipes, Profiles, Pressure Pipes, Non Pressure Pipes etc. It is suitable for both COMMERCIAL RPVC PIPES containing higher filler levels (25 to 40 phr. Filler level) and ISI/PRESSURE PIPES containing 8 to 14 phr. Filler level).

Rigid PVC Pipes are processed on both Single screw and Twin Screw Extruders using different levels of filler, depending on requirement of pipes i.e. Pressure pipes or non Pressure pipes.

A right Balance of Lubricant is a must because there are multiple variables involved in manufacturing pipes like extruder size, raw materials like one pack stabilizers, individual stabilizers, filler types etc.

The balance of both internal and external lubricants is more critical than many think and getting it right means maintaining the difference in productivity from 150 kg/hr to 250 kg/hr. The additional benefit of using the right type of lubricants is the reduction in the dosage of stabilizers and lubricants.

POLYFINE

Polyfine a one pack lubricant is highly recommended to meet the above critical requirement of PVC Pipes and it has a right balance of internal and external lubrication. Polyfine is suitable for both single screw and twin screw extruders, for pressure pipe and commercial/Non Pressure pipes.

SPECIFICATION OF POLYFINE

| Specification | Polyfine PF 0090 | Polyfine PF 100 |
|----------------------|-------------------------|-------------------------|
| Colour | Creamy White Powder | Creamy White Powder |
| Melting Point | 80-85 Degree Centigrade | 90-95 Degree Centigrade |
| Flash Point | 260 Degree Centigrade | 260 Degree Centigrade |

NO OTHER LUBRICANTS ARE REQUIRED WHEN POLYFINE PF 0090 IS USED IN MANUFACTURING RPVC PIPES.

POLYFINE IS AVAILABLE BOTH IN POWDER FORM AS WELL AS SLABS FORM.

MAJOR BENEFITS:

1. One ingredient replaces several others.
2. Improved accuracy of ingredient weights.
3. Better reproductivity of compounding for problem free extrusion.
4. Reduce inventory.
5. Simplify inventory control.
6. Improves impact strength of commercial pipes

USE LEVEL :

1.0 to 3 phr DEPENDING UPON FILLER LEVEL AND STABILIZER COMPOSITION



RPVC PRESSURE PIPES

SPECIFIC REQUIREMENTS :

MECHANICAL PROPERTIES

- ✚ Impact strength
 - ✚ Hydrostatic pressure test
 - ✚ Tensile Strength
- ✚ Polyfine PF 0090, a one pack Lubricant helps to achieve Optimum Mechanical Properties. It enhances Gelation and also improves bondage of PVC with filler.

PF 0090 also control generation of friction heat

THERMAL PROPERTIES

- ✚ Heat Reversion
- ✚ HDT
- ✚ Vicat softening Point

Selection of proper lubricants helps to control the heat reversion. Polyfine PF 0090 controls heat reversion during the processing of RPVC pipe and aids gelation without the generation of frictional heat at the right processing temperature.

Polyfine PF 0090 has no undesirable effect on mechanical properties of PVC unlike Paraffinic and petroleum waxes and hence PVC pipe of HDT and Vicat softening point are retained.

UNIFORM WALL THICKNESS AND OUTER DIAMETER

Like Calcium Stearate, Stearic Acid, Hydrocarbon Waxes, it is not possible to achieve Consistent uniform wall thikness by using conventional lubricants due to their different melting points leading to uneven flow.

Polyfine PF 0090, a kind of lubricant having single melting points that enables uniform flow & maintain the wall thickness. It also controls the “swell factor” of PVC, when used with different lead stabilizers, as it extrudes through the die.

VISUAL APPEARANCE

By using Polyfine PF 0090, blister formation, waviness, roughness of inner & outer surface of PVC pipe are eliminated. Glossy outer finish & smooth inner finish are achieved by a perfect combination of suitable internal & powerful external lubricants in polyfine PF 0090.

RPVC NON-PRESSURE (COMMERCIAL) PIPES

Important requirements of commercial/non-pressure RPVC pipes are

IMPACT STRENGTH :

Higher filler levels delay the gelation. Polyfine PF 0090 Helps to promote faster gelation & uniform dispersion of fillers. Thus, improves the impact strength.

FLOW PROPERTIES :

Polyfine PF 0090 improves the flow properties & increases production even after higher filler loading in commercial RPVC pipes.

VISUAL PROPERTIES :

Stronger external lubrication effect of Polyfine PF 0090 imparts glossy finish even in highly filled RPVC pipes.

PERFORMANCE TEST RESULTS OF POLYFINE PF 0090

To understand the performance of Polyfine PF 0090 & processing behavior, the following Haake Rheometer experiments were carried out :

| RPVC Pipe (formulation) | | | | |
|----------------------------|-----------|-----------|-----------|-----------|
| Formulation | I | II | III | IV |
| PVC (K-67) | 100 | 100 | 100 | 100 |
| One pack stabilizer | 2.4 phr. | 2.4 phr. | 2.4 phr. | 2.4 phr. |
| Stearic Acid | 06 phr. | - | - | - |
| HC Wax | 0.4 phr. | - | - | - |
| CaCO ₃ (coated) | 10.0 phr. | 10.0 phr. | 10.0 phr. | 10.0 phr. |
| Polyfine PF 0090 | - | 0.8 phr. | 1.0 phr. | 1.2 phr. |

Note : For study purpose Baeropan SMS 318 was used.

Dry blend mixing @ 115^oC

Rheocord conditions : Bowl temperature = 190^oC
 Speed = 50rpm
 Charge weight = 62gms

| | Fusion Time (sec) | Fusion Torque (Nm) | Min. Torque (Nm) |
|-----------------|-------------------|--------------------|------------------|
| Formulation I | 540 | 10.04 | 10.35 |
| Formulation II | 327 | 10.71 | 11.32 |
| Formulation III | 424 | 9.69 | 10.14 |
| Formulation IV | 570 | 9.30 | 10.05 |

Conclusions :

1. The fusion time & torque values clearly indicate that the result achieved with polyfine PF 0090 @ 1.0phr. is far better than mixed lubricants @ 1.0phr

2. Polyfine PF 0090 shows faster fusion as compared to conventional lubricants.
3. The lower fusion torque with polyfine PF 0090 Shows lesser load on the machine. Lower the torque, higher the output.

Guideline formulations : Polyfine PF 0090 with one pack pb-stabilizers.

| RPVC Pressure Pipe | | RPVC Non Pressure Pipe | |
|----------------------------------|-----------|---------------------------------|-----------|
| One pack pb - stabilizer 2.4 phr | 2.0 | One pack pb-stabilizers 2.8 phr | 2.4 |
| CaCO3 (coated) | 10-12 phr | CaCO3 (coated) | 30-40 phr |
| PVC (K-67) | 100 | PVC (K-67) | 100 |
| Polyfine PF 0090 1.4 phr | 1.2 | Polyfine PF 0090 2.0 phr | 1.6 |

Dry blend mixing at 120° C in high speed mixer.

Guideline Formulations : Polyfine PF 0090 with individual pb-stabilizers.

| RPVC Pressure Pipe | | RPVC Non Pressure Pipe | |
|--------------------|-------------|------------------------|-------------|
| Polyfine PF 0090 | 1.3-1.5 phr | Polyfine PF 0090 | 2.2-2.7 phr |
| CaCO3 (coated) | 10-12 phr | CaCO3 (coated) | 25-40 phr |
| TBLS | 1.2-1.4 phr | TBLS | 2.0-2.5 phr |
| DBLS | 0.6-0.8 phr | DBLS | 0.7-0.8 phr |
| LS | 0.5-0.7 phr | LS | 0.6-0.7 phr |
| PVC (K-67) | 100 | PVC (K-67) | 100 |

Dry blend mixing at 120° C in high speed mixer.

HC WAX (HYDROCARBON WAX)

HC Wax is a refined, distilled hydrocarbon wax recommended for processing of RPVC pipes/conduits.

Conventional waxes contain residual oils and other impurities. They show high volatility, inconsistent quality and low melting points.



| HYDROCARBON WAX - (IN HDP Bag) | | | |
|--------------------------------|------|---------------|---------------|
| Characteristics | Unit | Specification | Test Method |
| Drop Melting Point | °C | 80 ± 5 | ASTM D 127-63 |
| Congealing Point | °C | 75 ± 5 | ASTM D 938-71 |
| Flash Point | °C | 280 ± 10 | IS 1448 P-21 |
| Oil Content | % | 3 to 8 | ASTM D 728-68 |
| Colour | - | 4 to 6.0 | ASTM D 1500 |
| Saponification Value | mg | 2.5 Max | IS 1448 P-55 |
| Nature | | Free Flow | |

| HYDROCARBON WAX - (IN HW 95) | | | |
|------------------------------|------|---------------|---------------|
| Characteristics | Unit | Specification | Test Method |
| Drop Melting Point | °C | 90 ± 5 | ASTM D 127-63 |
| Congealing Point | °C | 80 ± 5 | ASTM D 938-71 |
| Flash Point | °C | 280 ± 10 | IS 1448 P-21 |
| Oil Content | % | 3 to 8 | ASTM D 728-68 |
| Colour | - | 3 to 5.0 | ASTM D 1500 |
| Saponification Value | mg | 2.5 Max | IS 1448 P-55 |
| Nature | | Free Flow | |

Major advantages of HC Wax Over conventional waxes :

1. Effective external lubrication
2. Contains no oil or low molecular weight impurities, consequently has a high melting point.
3. Dosage required is lower as compared to conventional waxes.
4. No adverse effects like bending or reduction in mechanical properties of the pipe.
5. Imparts glossy & smooth surface finish.

Application :

“H. C. WAX” is an excellent external lubricant for PVC Processing. “H. C. WAX” is mainly recommended for extrusion of Rigid PVC Pipes, PVC Profiles, PVC Wires & Cables, PVC Rigid and Semi Rigid Film and Sheets, PVC Tube and PVC Tubing.

Dosage :

The Optimum dosage will depend upon individual application, other ingredients present in the formulation. Equipment used for extrusion and experience of technical personnel.

On Our Part We Suggest :

PVC pipes & profiles: 0.5 to 1.5%
PVC films & sheets: 0.5%
PVC wires & cables: 0.3% to 0.5%
PVC tape & tubing: 0.5%

We are also in the position to manufacture Hc wax with higher Melting point as per customers requirement.

POLYETHYLENE WAX (PE WAX)

We have emerged as one of the most prominent names in the industry for the manufacturing and supplying a wide range of chemicals and Industrial Waxes like Polyethylene Wax. The wax offered by us is widely applicable in the industry for various purposes. We do not compromise in terms of quality and so we use high grade basic chemicals for the processing of these waxes that ensures reliability.

Property :

White powdery, lumpy, or flaky product, non-toxic, concentrated distribution of molecular weight, specific gravity about 0.94 with high softening point but low fusion viscosity.

Applications :

- ✦ Polyethylene Wax (PE-Wax) is used as processing auxiliary for PVC pipes, special-shaped materials, film, wire and cable and other plastics and rubber. Polyethylene Wax (PE-Wax) is also used as the lubricant and demoulding agent of polyolefins and PVC.
- ✦ Polyethylene Wax (PE-Wax) can improve the fluidity of polyethylene, polypropylene and ABS and the demoulding property of polymethyl methacrylate and polycarbonate.
- ✦ For PVC, Polyethylene Wax (PE-Wax) has better internal lubrication as compared with other external lubricants. Polyethylene Wax (PE-Wax) can be used as lubricant and dispersing agent for plastics color master to improve the dispersion of filler or pigment.
- ✦ Polyethylene Wax (PE-Wax) is also used as the processing modifier for plastics and elastomers, the ink paste polisher, paper coating and in candle.

Package :

25 kg in HDPE Bags.

Storage and Transportation :

Polyethylene Wax (PE-Wax) is a non-hazardous product.

| ITEM NO. / SPECIFICATION | GCC-110 | GCC-70 |
|--------------------------|------------------------------|--------------------------|
| Appearance | White particle, Flakes | White particle, Granules |
| Viscosity @ 149°C | 10 - 40 cps | 35 - 65 cps |
| Melting Point (°C) | 110 - 118 | 100 - 105 |
| Density (gms/cc) | 0.94 | 0.93 +/- 0.1 |
| Melt Peak (°C) | 100 | 92 |
| Flash Point (°C) | Min 210 | Min 210 |
| Molecular Weight | 1500 | 1500 |
| Penetration @ 25°C | 3.00 - 4.00 | 2.00 - 5.00 |
| Packages | 25 Kgs/bag | 25 Kgs/bag |
| Colour | White /As per Sample | White /As per Sample |
| 20" FCL | 14 Tonnes (Without Pallet) | |

PE waxes are available both in Prills form/Flakes.

APPLICATION SUMMARY for PE Wax GCC 110

| APPLICATION | FORM | ATTRIBUTE |
|-----------------------------|--------|--|
| PVC Pipes, Wires and Cables | Flakes | Processing Auxilliary, Lubricant and Demoulding agent. |
| Cable Filling | Flakes | Gelling agent & improved heat resistance. |
| Corrugated Board | Flakes | Enhancement of surface for scuff & blocking resistance. |
| Hot Melt Adhesive | Flakes | Viscosity control & improved heat resistance. |
| Hot Melt Road Marking | Flakes | Viscosity reduction, processing benefits, heat resistance. |
| Paint | Flakes | Flatting, abrasion & scratch resistance, anti-blocking. |
| Printing Ink | Flakes | Excellent rub resistance. |
| PVC Compounding | Flakes | Efficient external lubricants at low concentrations. |
| Rubber Processing | Flakes | Superb processing aid & lubricant. |



MICROCRYSTALLINE WAX (MC WAX)

GCC Microcrystalline wax 2305 is specially recommended in the textile industry and in all those application where microcrystalline wax is required with good adherence and flexibility. It has got a wide range of application and among them we can highlight industrial Vaseline, dressing of textiles and batiks, polish, rubber.

| MICROCRYSTALLINE WAX (MC WAX 2305) | | | |
|--|--------------|----------|---------------|
| PROPERTY | STANDARD | UNIT | SPECIFICATION |
| Colour | Visual | - | Yellow |
| Appearance | | | Slab |
| Brookfield viscosity at 110 ⁰ C | ASTM D. 3236 | cP | 9 |
| Melting Point | ASTM D.127 | °C | 75-78 |
| Congeaing Point | ASTM D. 938 | °C | 68-72 |
| Needle penetration at 25 ⁰ C | ASTM D.1321 | 1 / 10mm | 25 |
| Oil content | ASTM D. 721 | % | 3 |

| MICROCRYSTALLINE WAX 1080 (MC WAX 1080) | | | |
|---|------------|-------------------------------|---------------|
| PROPERTY | STANDARD | UNIT | SPECIFICATION |
| Colour | ASTM D1500 | - | White |
| Appearance | | | Slab |
| Melting Point | ASTM D.127 | °C | 82-87 |
| Penetration | ASTM D1321 | 0.1mm 25°C 35°C | 14 20 |
| Viscosity | ASTM D445 | mm ² /sec 100°C | 14-20 |
| Flash Point(C. O. C) | ASTM D92 | °C | 310 |

We are also involved in the manufacturing of Table Waxes of industrial grade. Our expert and qualified professionals process the Table Waxes using the best quality materials and technology, strictly abiding by the set industry standards. Our Table Wax is highly demanded in Fabric printing, Dye printing applications etc, we offer the Table Waxes at economical prices and best quality.

TABLE WAX

| PROPERTY | STANDARD | UNIT | SPECIFICATION |
|-------------------------------|-----------------|-------------|----------------------|
| Colour | Visual | - | Yellow |
| Appearance | | | Slab |
| Brookfield viscosity at 110°C | ASTM D. 3236 | cP | 9 |
| Melting Point | ASTM D.127 | °C | 75-80 |
| Congealing Point | ASTM D. 938 | °C | 70-75 |
| Needle penetration at 25°C | ASTM D5-73 | 1 / 10mm | 30-35 |
| Oil content | ASTM D. 721 | % | 4 |
| Flash Point | | | 280-300 Degree |

We are also in the position to manufacture Customized MC wax as per customer's requirement both in terms of Viscosity as well as melting points.



ABOUT US :

Goyel Chemical Corporation is a leading manufacturer of different grades / varieties of hard and soft waxes in India having more than 25 years of experience. The company is in the manufacture of various industrial waxes catering to multiple industries like Candle Industry, PVC Industry, Rubber Industry, Paper Industry and various other industries. Our experience makes us stronger and capable in satisfying the varied market needs with growing utility of wax in essentials as well as other consumerable products. We have a well developed infrastructure and manufacturing setup.

VISION :

Relying on it's 'ability to dream' and it's 'will to do', GCC initiative stems from it's strategies to expand in emerging markets and, in accordance, has geared itself with most modern plants in Kolkata with a vision to become and remain the most admired company in the industrial waxes sector in India.

MISSION :

..to achieve our challenging growth targets in harmony with :

- ✚ Environment
- ✚ Technology
- ✚ Business Associates

CORE VALUES....

... Ethical transparency in all our business operations-Manufacturing, Marketing & Services.

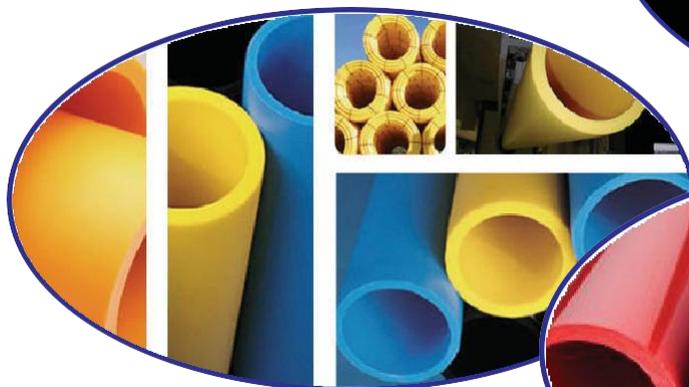
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