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PLASTICS INDIA

A journal for the growth and development of plastics trade & industry

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Editorial



Dear Members,

Good Day!

PUBLIC RELATIONS - The term "public relations" is practically self-explanatory, yet over the years it has meant different things to different people. In its simplest form, public relations means relating to the public, helping an organization and its public adapt mutually to each other. Other definitions of public relations point to its role in protecting and developing goodwill or characterize it as how one organization or group tells other organizations or groups about itself. The effect of good public relations is to lessen the gap between how an organization sees itself and how others outside the organization perceive it.

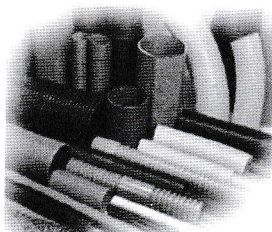
According to experts, public relations involves two-way communication between an organization and its public. It requires listening to the publics on which an organization is dependent as well as analyzing and understanding the attitudes and behaviors of those audiences. Only then can an organization undertake an effective public relations campaign consisting of actions as well as words. Public relations involves many different types of audiences and organizations. Public relations is practiced not only by companies and business firms, but also by trade associations on behalf of specific industries, professional associations on behalf of their members.

If we examine some of the goals and objectives of public relations, it becomes clear that it is a multifaceted activity involving many different functions. Topping the list of objectives, public relations seeks to create, maintain, and protect the organization's reputation, enhance its prestige, and present a favorable image. Studies have shown that consumers often base their purchase decision on a company's reputation, so public relations can have a definite impact on a company's sales and revenue. Public relations can be an effective part of a company's overall marketing strategy. Another major public relations goal is to create goodwill for the organization.

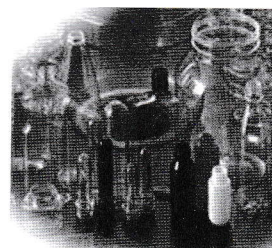
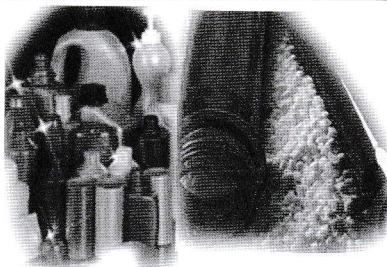
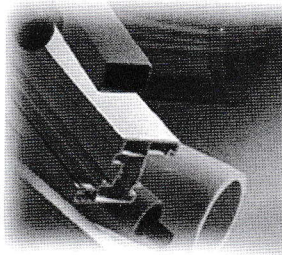
The bottom line is to get word out about you, your company, your products and services to those who could potentially buy from you. Public relations is just one part of marketing, as marketing is made up of many things.

Yours truly,

Pradip Nayyar
Editor



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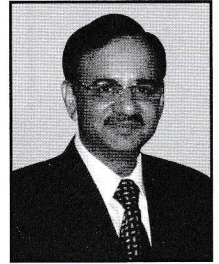
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PRESIDENTIAL

ADDRESS



Dear Members,

I am happy to inform you that the team "INDPLAS 12" has been touching new heights every day. A record sponsorship is due to the tireless working of the team members and the Chairman.

We are lacking behind in the field of stall bookings. My earnest request to all the members is to please come forward and book stalls for themselves & also get booking from other sources.

It is the duty of all our members to see that their own federation gains new heights. I can assure you that we will work in co-operation with each other to see our dream project of knowledge center comes up as per schedule.

I once again request all the members for their co-operation.

With warm regards

A handwritten signature in black ink, appearing to read 'Rajesh Mohta', written over a horizontal line.

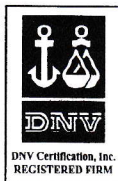
Rajesh Mohta

President

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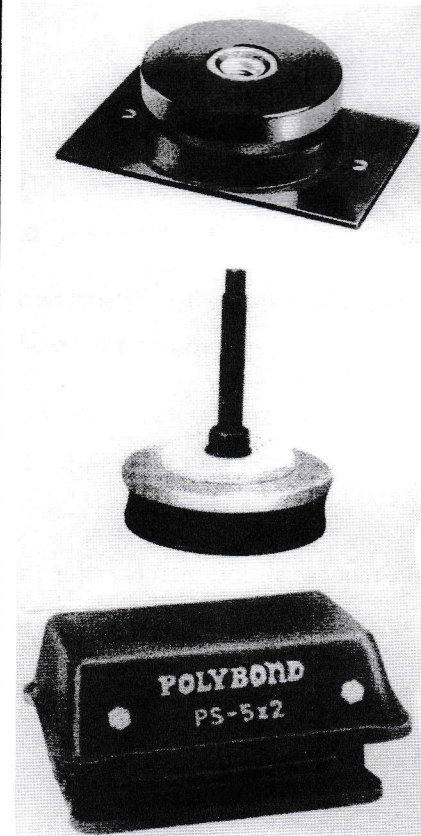
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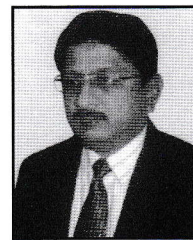
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SECRETARIAL REPORT



Dear Members

The monsoon has already commenced though not in full stream. The heat and sultry weather that was troubling us has decreased. By the time this volume reaches your hand the monsoon might be at full stream. Indplas'12 Press Conference and Industry meet was held at Bhubaneswar on 20th June 2012. The Press Conference was a success with wide reporting in the press. Participants from the Industry also attended the Meet.

A very successful Industry Meet was held at Siluguri on 11th July 2012 which was attended by a large number from the plastics fraternity. Members of the North Bengal Plastics Association actively participated in the Meet. Spot booking was made from 2 members. The Industry Meet was held at Sinclairs. The objective of having the Industry Meet was to give wide publicity to the exhibition that will help in getting more exhibitors and visitors.

The Federation is organising a half-day seminar at Indian Chamber of Commerce, Kolkata on 25th July 2012. This Seminar is being held jointly with KMDA. The theme of the Seminar is "Use of Plastic Waste in Road Construction". The target audience for the Seminar are municipalities and engineers involved in the construction of roads in different municipalities. The Seminar will be held from 3.00 pm to 5.00 pm. Shri Firhad Hakim, Hon'ble Minister of Municipal Affairs and Urban Development has kindly accepted our request to grace the occasion as Chief Guest and Shri Vivek Bharadwaj IAS, CEO - KMDA as Guest of Honour.

The Federation has requested all Poly Park plot holders to support IPF Knowledge Centre by request becoming sponsors to Indplas'12. Many plot holders have already become sponsors and we those plot holders who have not yet become sponsors to promote IPF KC through sponsorship. Sponsors to the exhibition will have their names displayed permanently at IPF KC.

The Federation has come to understand that WBIDC will distribute land for Phase 3 of the Food Park. Since Poly Park is within the Food Park campus and plastics plays a very important role in packaging of food items, IPF has written to the MD, WBIDC to accept applications from plastics sector also.

The process of getting various permissions for holding Indplas'12 continues. The Federation has written to the Chairman and the Member Secretary in this connection. The Federation has also forwarded to the Ministry of External Affairs a list of Confirmed and Potential overseas participants for their approval.

Paresh Rajda of Rajda Group who was associated with the plastics industry for around 5 decades suddenly left for his heavenly abode on 5th July 2012. A condolence meeting was held on 7th July 2012 to mourn his death. Paresh Rajda was taking an active interest in the upcoming IPF KC coming up at Sankrail. The Federation mourns his loss.

With best wishes,

A handwritten signature in black ink, appearing to be 'Pradip Nayyar'.

Pradip Nayyar

Hony. Secretary

Application Range of Unsaturated Polyesters

Dr. Subhas Chandra Shit
Dy. Director,
CIPET- Ahmedabad

Abstract

Unsaturated Polyesters are of different types. They can be made useable for a suitable applications by changing their constituent molecules. Their properties as varies depending on the characteristics can be exploited in the applications which are discussed in the scope of this study.

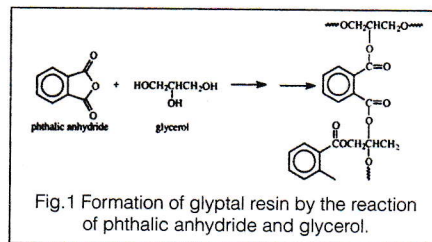
Introduction

Polyesters formed from phthalic anhydride and glycerol are among the first commercial crosslinked polyesters.¹

Linear polyesters seldom are synthesized by the direct reaction of acids or acid anhydrides with alcohols because the higher temperatures required for high conversion lead to side reactions, which interfere with obtaining high molecular weight. This consideration is not so important for cross linking systems, since cross linking is achieved at far lower extent of reaction than are needed to obtain high polymer in a linear polymerization.

Cross linking is achieved either by use of polycols such as glycerol, as in the case of saturated polyesters (glyptal) or by the use of unsaturated dicarboxylic acids such as anhydride in the case of unsaturated polyester resins.

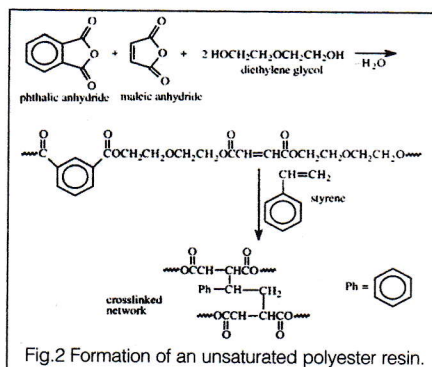
Glyptal which is used mainly as an adhesive or modified with natural or synthetic oils (oil - modified alkyds) for coatings is formed by the reaction of glycerol and pathalic anhydride, as shown in Fig. 1.



The reaction is allowed to continue until a viscous liquid is obtained.

The liquid can then be transferred to a mold for further net work development.

Unsaturated polyester resins, which are used as the matrix component of glass - fibre composites, may be obtained by co-polymerization saturated acids (e.g. phthalic anhydride) and unsaturated acids (e.g. maleic anhydride) with a diol such as propylene glycol or diethylene glycol as shown in Fig. 2.

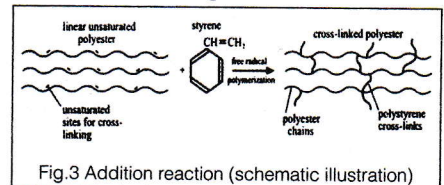


Incorporation of the saturated acid serves to decrease cross link density and

consequently resin brittleless. Fumaric acid may be used in place of maleic acid to increase impact resistance.

The low-molecular-weight product is soluble in styrene, which can then participate in a cross linking step with the double bonds of the prepolymer during initiation by peroxides.

Further, the above mentioned reaction for formation of cross linked polyester can be illustrated through the following reaction scheme Fig. 3



Itaconic acid is also used as the diacid component.

Most reaction formulation, involve a mixture of a saturated diacid (iso and terephthalic, adipic) with the unsaturated diacid or anhydride in appropriate proportions to control the density of cross linking (which depends on the carbon - carbon double bond content of the prepolymer) for specific applications.

Propylene glycol, 1,4 - butanediol, neopentyl glycol, diethylene glycol and bisphenol A are also used in place of ethylene glycol as the diol component. Aromatic reactants are used in the formulation to improve the hardness,

rigidity and heat resistance of the cross linked product. Halogenated reactants are used to impart flame resistance².

Properties of unsaturated polyesters:

Unsaturated polyesters have a good combination of resistance to softening and deformation at high temperature, electrical properties, resistance to corrosion, weak alkalis and strong acid and possesses very good weather ability³.

Almost all unsaturated polyesters are used with fibrous reinforcements or fillers. More than 80 % of the market consists of structural applications that require the strengthening imparted by fibrous (usually glass fibre) reinforcements. The remainder is used without fibrous reinforcement but with in expensive fillers to lower costs.

Thermosetting unsaturated liquid poly-ester resins are used as the basis of two main families of moulding compound.

1. Polyester bulk moulding compounds (BMC) or DMC (Dough moulding compounds).
2. Sheet Moulding Compounds (SMC).

In addition, two new types of compounds are also available. Thick moulding compounds (TMC) and Continuously Impregnated Compounds (CIC). The different polyester resins have different characteristic effects on Compounds (Table 1).

The BMCs contain the following ingredients:

- Glass fibre, usually between 3 and 25 mm in length;
- An inert particulate filler, chalk, china clay, alumina and many others are used.
- Mould release agent, usually a metallic soap
- Pigments.
- Flame-retardant additives, various halogenated organic substances, antimony oxide, alumina.
- Catalyst, usually an organic peroxide.
- Inhibitors, hydroquinone catechol, paraben-zoquinone.
- Low profile additives, various thermoplastic polymers.

The characteristic Properties of SMC are as follows:

- Strength- Very easy flow and low moulding pressure.
- Rapid curing

Table - 1: Effect of different polyester on compounds

Type	Examples	Characteristics
Unsaturated anhydrides and dibasic acids	Maleic anhydride Fumaric acid	Low cost, moderate heat resistance, high reactivity, improved heat resistance.
Saturated anhydrides and di basic acids	Orthophthalic anhydride	Lowest cost, moderate heat resistance.
	Isophthalic acid	High strength, better chemical resistance.
Glycols	Adipic azelaic and sebacic acids	Flexibility and toughness
	Chloroendic anhydride	Flame resistance
	Terephthalic acid	High strength better chemical resistances
Glycols	Tetrachlorophthalic anhydride	Flame retardance
	Propylene glycol	Low cost, flexible, good wear resistance.
	Dipropylene glycol	Flexibility and toughness
	Ethylene glycol	High heat resistance and strength and low cost
Glycols	Diethylene glycol	Higher toughness and impact strength
	Hydrogenated bisphenol A.	Corrosion resistance, flexibility and strength
	Tetrabromo bisphenol A	Flame resistance

- Zero shrinkage grades available
- Good for moulding large parts, intricate parts varying section parts.
- High rigidity
- Good thermal resistance to + 1750C
- Excellent electrical properties.
- High surface finish with Injection Moulding.
- Low flammability
- Good for insert moulding.
- Excellent property / Cost balance.

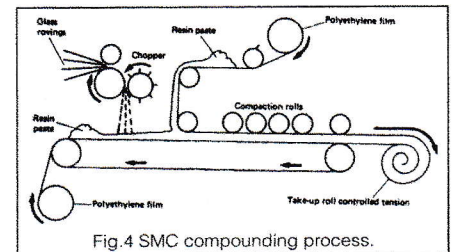
However, it has the weakness in the following regards:

- Handling is not convenient.
- Limited shelf life
- Susceptible to localized impact

SMCs are qualitatively similar to bulk moulding compounds. They are based on unsaturated polyester resins with a styrene monomer and are filled with the some types of glass fiber, fillers, catalysts, pigments etc. They differ BMCs in the proportions of these ingredients, the process by which they are manufactured and form in which the materials comes.

BMC is compounded very simply in a Z – bladed mixer. SMC is formed in a machine consisting of a series of rolls that are devised to bring the ingredients together and consolidate them into a shelf

sandwiched between two layers of polyethylene film. Fig. 4.



The characteristic properties of SMCs are as follows:

- High strength and stiffness
- Excellent all round mechanical properties.
- Good electrical performance.
- Good thermal resistance to 175°C
- Outstanding dimensional accuracy and stability.
- Zero shrinkage grade available.
- High surface finish possible.
- Rapid curing.
- Ideal for large surface area moulding.
- Good performance /cost balance.

The weakness of SMCs are:

- Restricted to compression type processes.
- Limited shelf life
- Elimination of surface porosity & internal

voids in mouldings sometimes difficult.

The compounding phase is more or less identical for both the TMC and C.I.C. Material.

Both new materials are manufactured by a continuous mixing process which enables high filler and glass loadings to be achieved with fast machine through put.

The premixed resin paste is distributed onto two large counter – rotating mixing rolls. Glass fibre (chopped for TMC and cut roving for C I C) are then distributed onto the rolls and efficient mixing

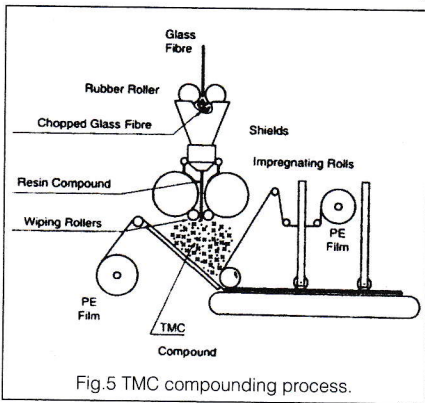


Fig.5 TMC compounding process.

and impregnation takes place as resin-glass compound passes through the restriction between the rolls. (Fig. 5).

The two processes then differ in the subsequent stages. TMC compound is sandwiched between polyethylene fillers and passed through impregnation rolls to give material in a format very similar to traditional SMC. CIC compound is removed from the mixing rolls by doctor blades & transported by a screw or plunger mechanism into boxes or on drums to give a material with similar physical characteristics to traditional BMC.(Fig.6)

A comparison of some of the main physical properties of TMC, BMC, SMC and C I C are given in Table -2.

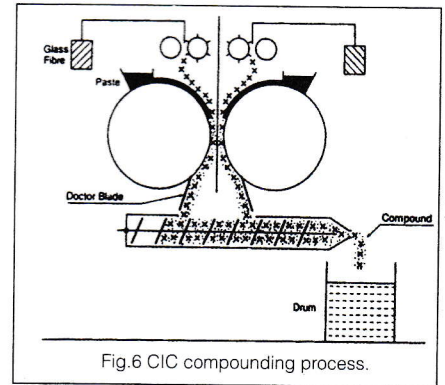


Fig.6 CIC compounding process.

The detailed properties of different grade of polyesters are given in Table 3 along with other thermoset resins for comparison purpose.

Table -2 : Comparison of properties for BMC, CIC, TMC and SMC materials.

Compound	Glass Content (%)	Flexural Strength (MPa)	Flexural Modulus (GPa)	Tensile Strength (MPa)	Charpy Impact Strength (KJ/n ²)
BMC	20	100	11	42	22
CIC	20	120	11	58	41
TMC	25	160	10	80	82
SMC	25	170	10	70	90

Table 3 Guide to thermosetting moulding material properties, part 1

Family Compound	Allylics				Amines						Epoxy		Polimide
	Diallyl phthalate		Diallyl isophthalate		Melamine			Urea		Melamine phenolic	Gen.purpose	High strength	Moulding grade
Property	Organic fibre	Short glass	Organic fibre	Short glass	Alphacellulose	Rag	Glass	Alphacellulose	Wood flour	Cellulose mineral	Glass & mineral	Glass	Glass
Density (g/cm ³)	1.3-1.6	1.6-1.8	1.26	1.65-1.75	1.5	1.5	1.8-2.0	1.5	1.5	1.55-1.74	1.85-1.9	1.85-1.9	1.8-2.0
Water absorption (%) (24h/23°C)	0.1-0.3	<0.2	0.2	<0.2	0.3-0.6	1.5	0.1-0.3	0.6-1.0	0.6-1.0	0.3-0.5	0.05-0.1	0.05-0.1	0.2
Tensile Strength (Mpa)	30-50	55	30-50	55	48-90	0.3-0.6	40	35-50	35-70	30-60	70-85	115-300	140
Elongation (%)	--	--	--	--	--	--	--	--	--	--	--	--	--
Flexural strength (Mpa)	50-65	90-105	50-70	90-105	80-100	80-100	90-160	80-120	70-110	50-90	105-130	260-400	250
Flexural strength (Gpa)	3-4	6-8	3-4	7-9	9.5-13	9.5	16	8-10	9-11	10-13	10	20	15-20
Unnotched impact (kJ/m ²)	2-5	>6	>6	>6	>7	>7	>7	>6.5	>6.5	>7	>10	10-40	15-40
Notched impact (kJ/m ²)	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	>1.5	>1.5	>1.5	>1.5	>1.5	>1.5	2-3	>5	>5
Deflection temperature (°C)													
(1.8N/mm ²)	200	200	210	220-240	>150	>150	>150	>110	>110	>150	150-250	200-260	>315
Max. operating temp (°C) (Short term)	180	200	190	210	100	120	150	75	75	130	120-200	150-220	270
Thermal Conductivity (W/m K)	0.6-1.0	1.0	0.6-1.0	1.0	0.7-1.0	0.9	1.1	0.7-1.0	0.6-0.9	0.9	0.7-0.9	0.8-1.2	9
Coeff. Of thermal expansion (10 ⁻⁵ K ⁻¹)	2.2	1.2-1.6	1.2-1.6	1.2-1.6	2.5	1.7	2	2-5	3-6	3	1.7-3.0	1-3	1.2
Chemical resistance													
Acids weak			R			R			LR	LR		R	R
strong			LR			LR			A	A		R	LR
Alkalis weak			R			R			R	LR		R	LR
strong			LR			R			R	LR		R	LR
Aliphatic hydrocarbons			R			R			LR	LR		R	R
Aromatic hydrocarbons			R			R			R	R		R	R
Ketones			R			R			R	R		R	R
Alcohols			R			R			R	R		R	R
Halogenated hydrocarbons			R			R			R	R		R	LR

R = resistant, LR = limited resistance, A = attacked, D = dissolved.

Notes : 1. Manufacturer's specific literature should be consulted to obtain precise recommendations for specific material grades.

2. It is sometimes possible to improve the mechanical properties and thermal resistance of thermosetting mouldings by subjecting them to a post- moulding stoving operation. General recommendations for suitable stoving conditions are given in Table 3.3.

Table 3
Guide to thermosetting moulding material properties, part 2

Family	Phenolics			Polyesters				Polyurethanes			Silicones		Polimide
	General Purpose	Electrical	High Strength	BMC	SMC	TMC/CIC	Granular	PU RIM (H.Modulus)	RRIM (Amine)	RRIM (Polyures)			SMC
Property	Wood flour	Mica	Mineral & glass	Mineral & glass	Mineral & glass	Mineral & glass	Mineral & glass	None	Milled glass	Milled glass	Glass	Fused silica	Mineral & glass
Density (g/cm ³)	1.35-1.45	1.8-1.9	2.0-2.1	1.70-2.1	1.80-2.0	1.8-2.2	1.75-2.1	1.0	1.2	1.2	1.85-1.9	1.85-1.9	1.8-1.9
Water absorption (%) (24h/23°C)	0.2-0.4	0.05	0.15	0.15	0.2	0.2	<0.2	0.8	0.8	0.8	0.16	0.08	0.15
Tensile Strength (Mpa)	40-65	39-50	75-105	20-70	40-95	45-95	30-45	25-35	20-30	20-35	45	36	90-150
Elongation (%)	--	--	--	--	--	--	--	50-80	100-220	100-220	--	--	1.5
Flexural strength (Mpa)	70-90	65-90	80-150	60-140	80-180	80-160	40-70				95	50	150-350
Flexural strength (Gpa)	9	13-16	12-18	7-15	8-13	8-12	6-10	0.6-0.9	0.7-1.5	1.2-1.7	17	11	12-18
Unnotched impact (kJ/m ²)	5-8	5-8	8-12	35-110	45-150	40-100	12-25	No fail	No fail	No fail	12-25	>6	50-150
Notched impact (kJ/m ²)	1.4-2.0	1.5-2.2	3-5	15-40	30-90	15-50	9-12	No fail	No fail	No fail	6-12	0.5-1.5	35-100
Deflection temperature (°C)													
(1.8N/mm ²)	150-200	155	182	>200	>200	>200	>200	80	90-125	95-130	480	450	>200
Max.operating temp (°C)													
(Short term)	110	140	150	160	175	180	160-220	60-100	80-110	85-120	320	320	>180
Thermal Conductivity (W/m K)	0.8	1.6	1.3	0.7	0.5-0.7	0.5-0.7	0.6-1.0	0.2	0.2	0.2	2.0-2.5	2.0-2.5	0.2-0.3
Coeff. Of thermal expansion (10 ⁻⁶ /K)	3-5	1.5-3.0	1.2-2.5	1-3	1-3	1-3	2-3	10-20	5-15	4-15	3.5	3	3-4
Chemical resistance													
Acids weak	R			LR				A			R		R
strong	A(oxidising)			A				LR			LR		LR
Alkalis weak	LR			A				A			R		R
strong	LR			A				LR			LR		LR
Aliphatic hydrocarbons	LR			R				R			A		R
Aromatic hydrocarbons	R			LR				R			D		R
Ketones	R			A				R			R		R
Alcohols	R			A				R			R		R
Halogenated hydrocarbons	R			R				R			R		LR

R = resistant, LR = limited resistance, A = attacked, D = dissolved.

Processibility of unsaturated polyesters : The liquid polyester pre polymers are especially easy to fabricate into infusible thermoset objects by casting in open moulds, spray techniques as well as compression, hand lay-up and resin transfer moulding. BMC can be compression transfer or injection moulded.

SMCs can be compression mould ed for large products. The processing cond-tions are mentioned for BMC and SMC in Table 4.

Table 4
Suggested processing conditions for the main families of thermosetting moulding compounds, part 1

Family	Allylics		Amines			Epoxy	Polymide
	DAP	DIAP	Melamine	Urea	Melamine phenolic	Granular	Moulding grade
Compression							
Preheat temp (°C)	60-80	80-100	80-120	80-120	80-120	50-80	
Mould temp (°C)	150-170	150-170	160-180	160-180	160-180	150-180	200-250
Pressure (bar)	50-300	50-300	200-400	200-400	200-400	50-350	100-300
Cycle time (1-2.5 mm section) (s)	40-150	40-150	40-280	40-280	40-280	50-250	
Shrinkage from mould (%)	0.2-0.8	0.2-0.6	0.2-0.6	0.4-0.8	0.4-0.6	0.4-0.8	0.1-0.3
Post cure (if required) (temp/time)	150-190°C/2-16h		80-110°C/16h			175°C/8h	
Transfer							
Mould Temp (°C)	150-180	150-180	140-160	140-160	140-160	150-180	200-250
Transfer Pressure (bar)	350-600	350-600	500-1200	500-1200	500-1200	300-1200	400-700
Cycle time (1-2.5 mm section) (s)	35-150	35-150	35-250	35-250	35-250	40-200	
Shrinkage from mould (%)	0.2-0.8	0.2-0.4	0.3-0.8	0.4-1.0	0.5-0.8	0.4-0.8	0.1-0.3
Injection							
Cylinder temp (°C)	60-100	60-100	70-90	60-80	70-90	50-80	90-150
Nozzle temp (°C)	85-110	85-110	90-100	80-95	90-100	70-95	150-190
Melt temp (°C)	100-120	100-120	100-110	100-110	100-115	80-110	
Mould temp (°C)	160-180	160-180	155-170	145-155	155-180	160-200	200-250
Injection pressure (bar)	700-2000	700-2000	850-2500	850-2500	800-2500	300-2500	600-2500
Back pressure (bar)	5-15	5-15	5-20	5-20	5-20	5-20	5-25
Cycle time (1-2.5 mm section)(s)	30-120	30-120	20-90	20-90	20-90	25-100	
Shrinkage from mould (%)	0.2-1.0	0.2- 0.8	0.3-0.8	0.5-1.0	0.8-1.5	0.3-0.9	0.1-0.3

Notes : 1. Manufacturer's specific literature should be consulted to assist in optimizing moulding conditions for a specific grade.

2. Many mouldings produced in the thermosetting compounds may be subject to some post-moulding shrinkage in addition to the values quoted in these tables. In some cases it may be advantageous to introduce a post - cure stoving operation to overcome this problem, and improve dimensional stability of the component in service . This process also can be beneficial in achieving higher levels of cure, relieving of moulding stresses, and improving mechanical and thermal performance. A general indication of stoving conditions is given in the tables.

Table 4
Suggested processing conditions for the main families of thermosetting moulding compounds, part 2

Family	Phenolics			Polyesters			Polyurethanes	Silicones	Vinyl Ester
Compound	General Purpose	Electrical	High strength	BMC	SMC	Granular	RIM/RRIM	Granular	BMC/SMC
Compression									
Preheat temp (°C)	90-110	90-110	90-110	---	---	80-100	---	50-80	---
Mould temp (°C)	160-180	160-180	160-180	130-160	135-155	150-170	---	150-170	140-160
Pressure (bar)	140-300	150-320	150-320	30-150	60-200	50-300	---	50-300	60-150
Cycle time (1-2.5 mm section) (s)	45-170	45-170	45-170	40-90	40-90	35-100	---	40-180	45-100
Shrinkage from mould (%)	0.4-0.8	0.2-0.6	0.1-0.5	0-0.4	0-0.2	0.2-0.8	---	0.1-0.6	0-0.2
Post cure (if required) (temp/time)	150-190°C/2-16h			120-170°C/8h			30min/120°C	250°C/8h	175°C/8h
Transfer									
Mould Temp (°C)	160-180	160-180	160-180	150-170	150-170	150-180	---	150-170	140-170
Transfer Pressure (bar)	450-700	450-700	600-900	100-500	150-600	450-850	---	300-700	100-500
Cycle time (1-2.5 mm section) (s)	35-115	35-115	35-115	40-85	40-85	30-90	---	40-180	45-85
Shrinkage from mould (%)	0.5-1.0	0.3-0.7	0.2-0.6	0-0.4	0-0.2	0.2-1.0	---	0.1-0.6	0.02
Injection									
Cylinder temp (°C)	60-85	60-85	60-85	20-60	---	50-80	---	50-80	20-50
Nozzle temp (°C)	80-95	80-95	80-95	20-40	---	80-95	---	70-90	20-50
Melt temp (°C)	110-125	110-125	110-125	30-80	---	100-120	35-45	80-110	30-80
Mould temp (°C)	160-185	160-185	160-185	140-170	---	160-180	60-90	160-200	140-170
Injection pressure (bar)	600-2500	600-2500	600-2500	250-1500	---	300-1200	10-50	300-2500	250-1500
Back pressure (bar)	5-20	5-20	5-20	5-10	---	5-15	---	5-15	
Cycle time (1-2.5 mm section)(s)	20-80	20-80	25-90	35-90	---	30-80	45-150	30-100	0-0.2
Shrinkage from mould (%)	0.6-1.0	0.3-0.7	0.2-0.6	0-0.4	---	0.2-1.0		0.1-0.6	

Applications of unsaturated polyesters

Unsaturated polyesters are used extensively in the construction (tub and shower units, building facades, specially flooring, cultured onyx and marble, chemical storage tanks) transportation (truck, cabs auto body repair), and marine (boat hulls) industries as well as for business machine and electric handtool – molded parts).

BMCs have great in roads into many applications areas in recent years.

Electrical: Meter boxes and lids switch gear, electrical housing, relays, bases.

Lighting: Automotive reflectors, street lamp housings, domestic and commercial lighting.

Building: Cladding panels, flooring panels.

Domestic: Microwave cook ware, iron handles, sandwich to cooker trims.

Automotive: Heater housing, trim mouldings, electrical components, inlet manifold (using cast metal insert technology).

The application areas for SMC are very wide and diverse, covering many uses where high strength and stiffness are prime requirement.

SMC have found considerable use in car body parts, truck cabs, fascias, bumper systems.

It is used in many electrical components where BMC is not considered sufficiently strong and in housing, for

business machine, building, furniture and the like.

Conclusion

The application range of unsaturated polyester is wide. They are mainly used in the applications, where resistance to softening deformation at high temperature, better electrical properties, resistance to corrosion, weak alkalies and strong acids are required.

High Performance Polypropylene Grades from IndianOil



Mr. Abhay Mulay

Sr. Manager & Head
Product Application &
Development Centre,
Indian Oil Corporation Ltd.,
Panipat, India.

1.0 Introduction:

Indian Oil commissioned its polymer units at Panipat in May 2010. In a short span of 18 months, company has successfully launched & established 38 Polyethylene/Polypropylene grades in the market. All the grades are well received in domestic market as well as they have created footprints in 24 countries in export market.

IndianOil has chosen best in class technologies for producing Polyolefins, hence, company always believes that the grades offered should not be of only commodity types but should be differentiated from competition in terms of product performance thereby creating a value for our customers.

With this aim, as a path breaking initiative, Indian Oil, Product Application & Development Centre (PADC) developed two new high performance

Polypropylene grades namely 1110MAS & 2120MC. These new grades were launched by Sh. R.S.Butola, Chairman, IndianOil on 03rd Feb. 2012 in New Delhi in a high profile event in the presence of major customers and business partners in the petrochemicals industry.

Both the grades have shown processing & product performance far superior than any of the equivalent competing grades available in the market.

2.0 Technical Details & Value creation for the Customers:

2.1 PP 1110MAS – High Stiffness, High Productivity Grade

● 11 MI homo Polypropylene grade produced using Spheripol II Technology. This grade is designed to offer a Higher productivity, High stiffness, Low warpage and Superior gloss. The grade contains Antistatic

Agent.

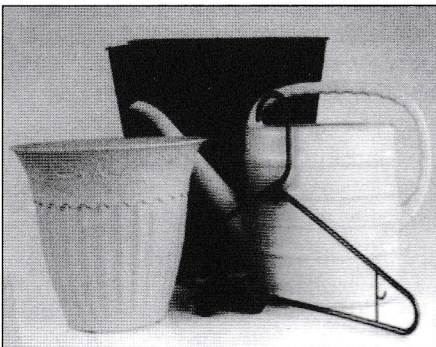
● 1110MAS is recommended for Injection Molded applications like:

- Caps & Closure
- Household articles
- Furniture
- Automotive components

Performance benefits of 1110MAS:

The grade offers benefits such as reduced cycle time & lower cooling time (thus, energy saving to processor), better opticals and better stiffness. This grade is specially designed to offer solutions to processors who are facing problems related to shrinkage and warpage, productivity, aesthetics, or stiffness/impact balance.

1110MAS was tested at several customers & across different application segments to validate its performance vis-à-vis competing grades in the market. The success stories in different



application segments showing the actual benefits are very well documented.

The comparative performance of 1110MAS with conventional 11 MFI homo PP grade 1110MA is shown in the spider chart below (Fig.1).

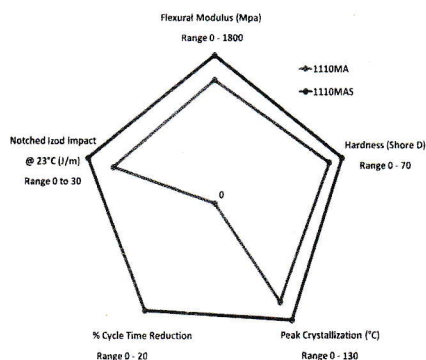


Fig.1 Performance comparison 1110MAS Vs. 1110MA

Value creation for Customers with 1110MAS:

- By switching over to 1110MAS from equivalent competitor's grade, customers will realize following benefits
 - Reduced cycle time (Higher productivity) up to 18%-
 - Higher stiffness & superior impact strength
 - Good dimensional stability & reduced warpage
 - Superior product aesthetics & gloss

Possibility of optimizing pigment loading as the 1110MAS gives brighter colour shade at same pigment loading

With such exceptionally good processing & product performance, 1110MAS will soon become a new benchmark in PP injection molding sector.

2.2 PP 2120MC - High Productivity, Energy Saving Grade

● 12 MI Random PP grade is produced using Spheripol II Technology. This grade is designed to offer superior aesthetics & energy saving at processor end. The grade also has a potential to offer higher productivity depending on mold/machine.

- 2120MC is recommended for Clarified Injection Molded applications like:
 - Household articles



- Injection Stretch blow molded bottles (ISBM)
- Caps & Closure
- Appliance parts

Performance benefits of 2120MC:

2120MC offers benefits such as reduced processing temperatures, reduced cycle time & lower cooling time (thus, energy saving to processor), better opticals and comparable physical properties. This grade is specially designed to offer solutions to processors who would like to improve aesthetic performance of a part without compromising on physical properties but take an advantage of wider processability.

2120MC was tested at several customers & across different application segments to validate its performance vis-à-vis competing grades in the market. The success stories in different application segments showing the actual benefits are very well documented.

The comparative performance of 2120MC vis-a-vis conventional 12 MFI random PP grade of Competitor's is shown in the spider chart below (Fig.2).

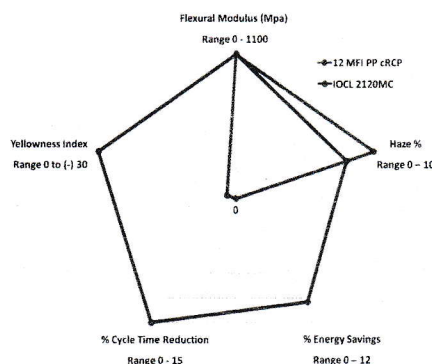


Fig.2 Performance comparison 2120MC Vs. Competitor's grade

Value creation for Customers with 2120MC:

By switching over to 2120MC grade customers will realize following benefits

- Superior product aesthetics & product with bluish tinge
- Customers can reduce/eliminate addition of optical brightener at their end
- Broader processing window. Thus possibility of processing at up to 40 °C lower temperature without sacrificing optical properties (Potential opportunity for energy saving up to 10%).
- Lower specific energy consumption
- Reduced cycle time (Higher productivity) up to 15% (Depending on mold & machine)

2120MC with distinctly superior processing & product performance will open up new opportunities for substitution of conventional clear, transparent packaging materials & will further boost the use of clarified polypropylene in various innovative packaging applications.

3. Conclusion:

Indian Oil has identified Petrochemicals as a prime driver of future growth. The Corporation has established world scale mega petrochemicals plants – LAB, PX/PTA and Naphtha Cracker at its Refineries - as well as a world class Product Application & Development Centre (PADC).

PADC has sophisticated processing as well as testing laboratory & is utilized to renders technical services in the areas of Customer support, New grades development & New application development.

Indian Oil is fully committed to offer innovative solutions & superior grades to polymer industry. By launching two high performance grades 1110MAS & 2120MC, we are reaffirming our commitment to our valued customers. This is just a beginning....there are few more exciting developments under progress at PADC.

Contd. to Page 23

INDPLAS'12 LAUNCH FUNCTION AND INDUSTRY MEET AT BHUBANESWAR

Industry with Odisha based plastics processors was held immediately after press meet on 20th June, 2012.

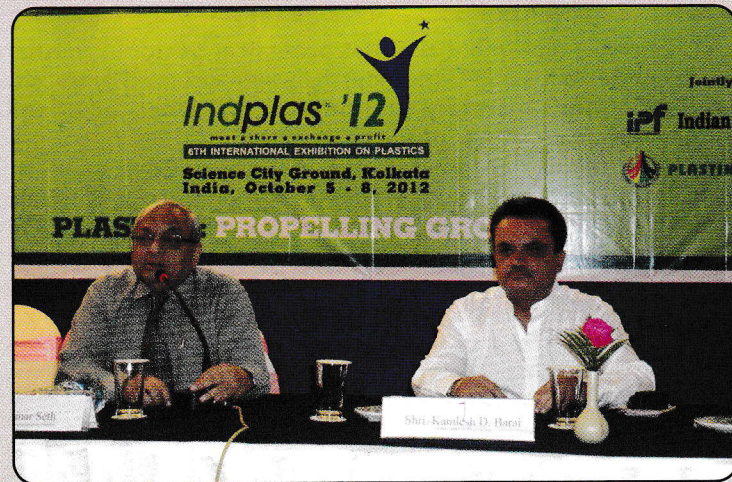
Dr. Yadav, Chief Manager, CIPET Bhubaneswar graced the function as Chief Guest and Shri Nikunj Chhotray, President, Orissa PVC Pipe Manufacturer's Association as Guest of Honour. Meet was attended by good number of leading Processors based at Bhubaneswar, Khurda Rd and Cuttack.

Amar Seth, Chairman - Indplas'12 & IPF Knowledge Centre welcomed the guests and conveyed thanks to Chief Guest and Guest of Honour for very kindly sparing their valuable time. He then briefed all present about upcoming IPF KC and Indplas'12. He requested all to join Indplas'12 as exhibitor or at least as visitor.

In his address Mr. Chhotray requested IPF to involve all associations of Orissa to get a larger canvas for promotion of Indplas'12. He also mentioned that Orissa Plastic Industry need more details on growth of Plastics in other part of India. He assured full support to Indplas'12.

Dr. Yadav in his address as Chief Guest appreciated the efforts of IPF for upcoming IPF KC. He also felt that there is dearth of trained manpower for fast growing plastic processing industry. He extended full support by CIPET. He also requested the industry leaders to visit Indplas'12.

After presenting mementos to Chief Guest and Guest of Honour Shri Kamlesh Barai, Member of indplas'12 Marketing Team proposed Vote of Thanks and invited guests to join for High Tea.



Conference on “Potential of Petrochemical Sector in Northern India with special focus on Downstream Plastic Industry” held on 26th June, 2012 at Chandigarh

A Conference on “Potential of Petrochemical Sector in Northern India with special focus on Plastic Industry” was inaugurated by Ms. Neelkamal Darbari, Joint Secretary (Petrochemicals) Dept. of Chemicals & Petrochemicals, Govt. of India on 26th June, 2012 at Chandigarh. Shri A. R. Talwar, Principal Secretary (Industries), Government of Punjab, Shri Sourabh Khemani, Immediate Past President of IPF, Shri Rajan Kohli, Advisor Federation of Indian Chambers of Commerce & Industry (FICCI) and a large number of captains of the Petrochemicals and Plastics industry incl. Shri Prabh Das, MD & CEO, HMEL were present. Ms. Darbari also released a Knowledge and Strategy Paper prepared by FICCI with the help of Tata Strategic Management on the sector. There was a large representation from the farmer’s community from all the states in the region and also included a good number of potential industry entrepreneurs in the sector.

The Conference was organised by FICCI jointly with the Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India and with the support of various industry associations, such as AIPMA (All India Plastic Manufacturers’ Association), AIFTMA (All India Flat Tape Manufacturers Association), IPF (Indian Plastics Federation), IPI (Indian Plastics Institute) Plastic Export Promotion Council and Central Institute of Plastics Engineering and Technology (CIPET).

Ms. Darbari spoke about the significant contribution of the plastics industry to the economic development and growth of various key sectors in the country, be it Agriculture, Horticulture, Healthcare, Automotive, Packaging or Construction industry to name a few. The sector with a size of about Rs.85,000 crores, employs nearly 3.70 million people both directly and indirectly. There is a huge unrealized potential of further growth of plastic industry she added, as indicated by the present very low per capita consumption level in the country. Per capita consumption of plastics is only about 7 kgs in India compared to about 95 kgs in USA and about 65 kgs in Europe and the world average of above 26 kgs. Even in China the per capita consumption has reached 44 kgs.

In recent times, there have been developments which have resulted in increased availability of raw materials and opportunities in the plastics sector in north India. The refinery project of HMEL Group has taken off at Bhatinda, and the same includes Polypropylene production. Similarly, there is increased availability of raw materials from the Panipat Petrochemical Complex of IOC which includes polypropylene as also polyethylene. The Knowledge Paper released provides details of industries which can come up based on these raw materials.

The conference gave focus to the Plastics applications esp. in Water Management by Lining of canals, ponds & reservoirs with plastics film/Drip & sprinkle irrigation system/Water conveyance using PVC & HDPE pipes & Sub-surface drainage, as also applications in horticulture (protective cultivation) besides innovative packaging solutions. The conference also covered the issue of plastics waste management as also potential of industries which can come up based on plastics waste.

The Session of “Sustainability and Innovations” was chaired by Shri Sourabh Khemani, Immediate Past President of IPF. INDPLAS’12 brochures were placed in the delegate kits of all the participants. Shri Khemani also gave brief highlights about the mega event.

Appropriate follow up action on the suggestions (listed below) as received during the Conference will be taken.

- The plasticulture has special importance for the northern region which has dominance of agriculture sector. The event needs to be made a regular (annual) feature.
- Efforts need to be made to change the public perception about plastics. The issue relates to disposal of plastics waste and not the plastics.
- A group to be set up with reps. of industry/FICCI/State govt. to come up with a package for industry in the sector to come up. (Already constituted for Punjab).
- High end applications of plastics to be encouraged for value addition.
- Importance of skilled manpower and technological support to the sector.

To encourage plastics re-cycling and industry based on recycled plastic waste.

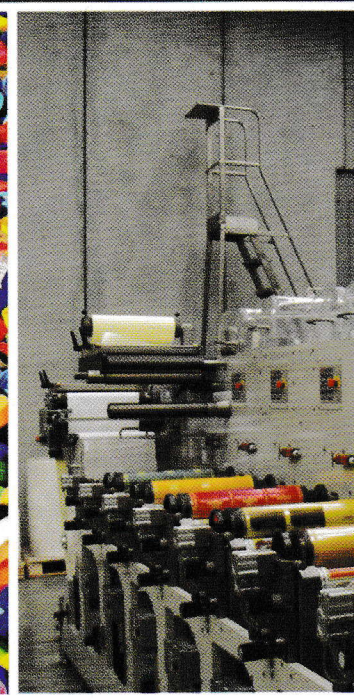
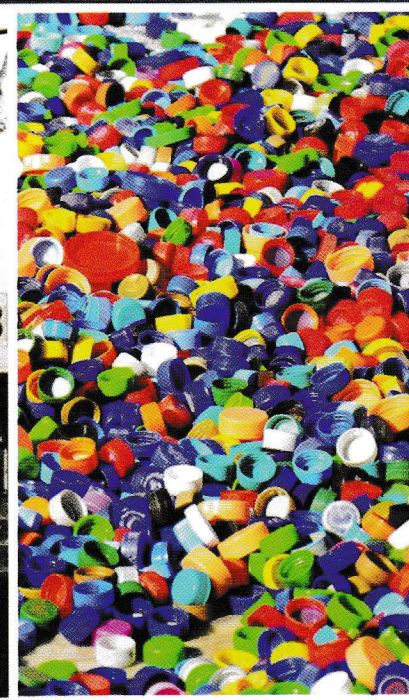
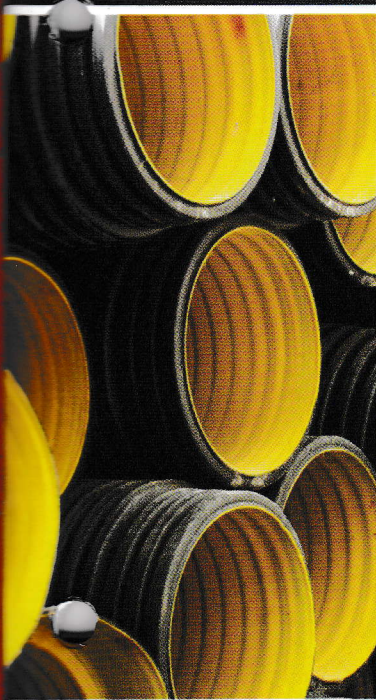


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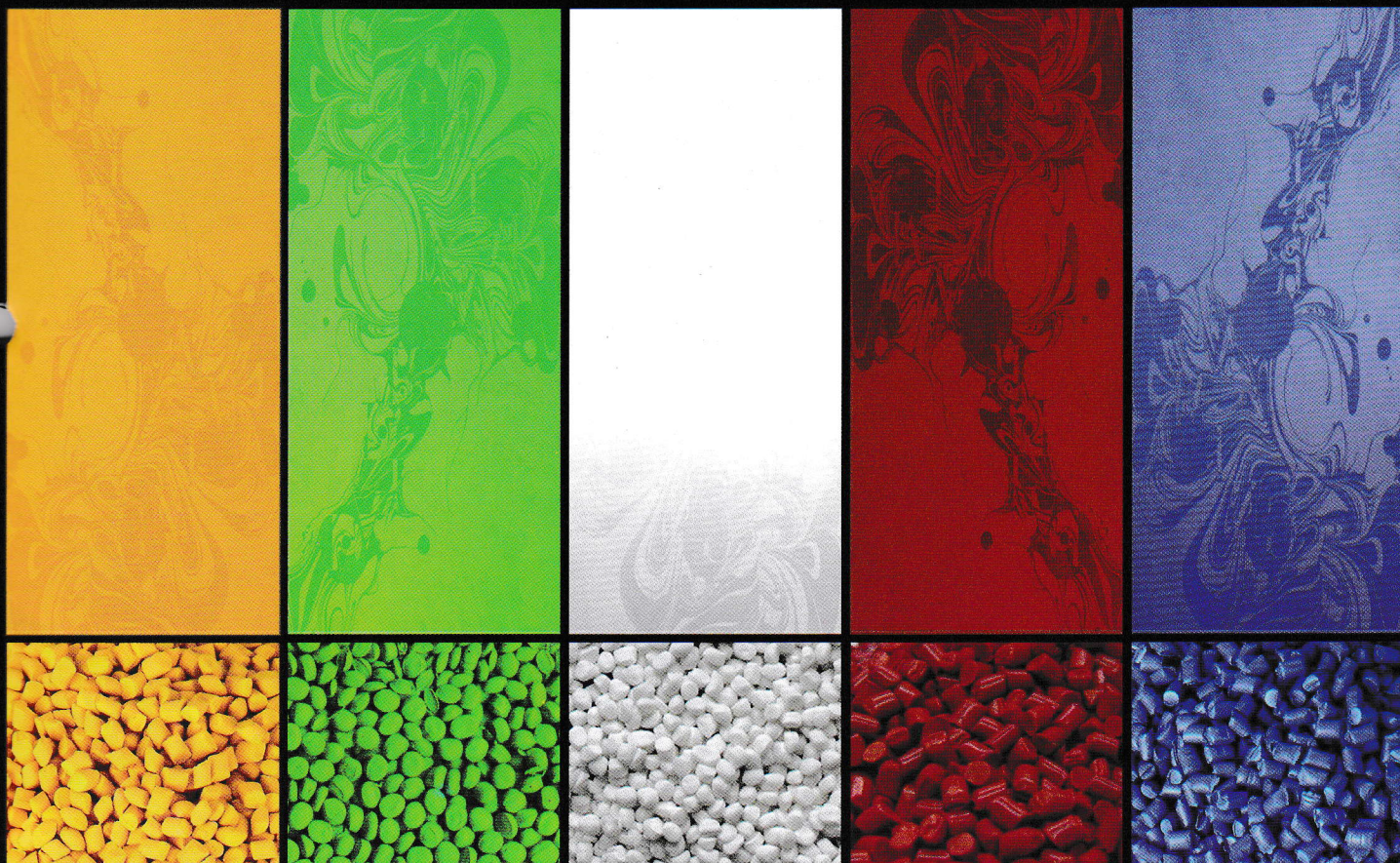
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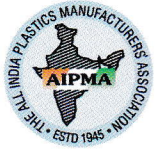


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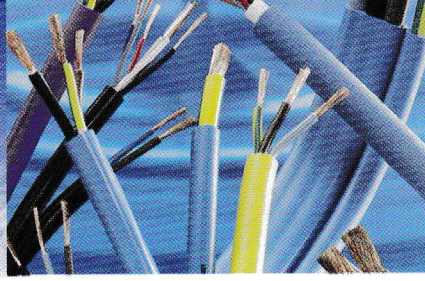
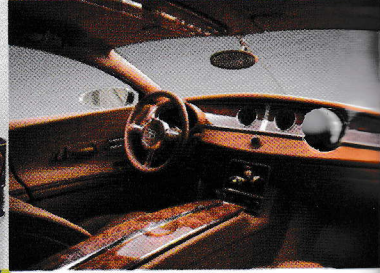
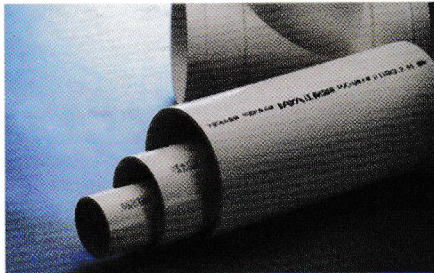
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Dalian Fujia Starts Shutdown of the 700,000-Tpa Paraxylene Plant

Dalian Fujia Petrochemical Co Ltd has begun shutting down its 700,000-Tonne Per Annum (tpa) paraxylene plant following orders of Chinese authorities after thousands of local residents demonstrated, demanding relocation of the factory at the centre of a toxic spill scare. Although the order was issued, safety reasons did not allow the plant to stop immediately due to the complexity of the production cycle. As the paraxylene plant is China's leading importer of heavy naphtha, its closure would mean more availability in the Asian market, currently short on heavy naphtha.

AMEC Awarded Project Management Contract for MDI Plant in China

AMEC, the international engineering and project management company, has been appointed by BASF Polyurethane (Chongqing) Company Ltd. and Chongqing Chemical and Pharmaceutical (Group) Holding Company Ltd. (CCPHC) as the project management contractor for the development of a new 400,000 tonnes per annum Diphenylmethane Diisocyanate (MDI) facility at Changshou, Chongqing, China.

MDI is the main raw material used for the production of polyurethanes. The role of AMEC will be to provide project management services and interface coordination in relation to the CCPHC and BASF facilities as part of an integrated project management team.

Solvay Setting up Speciality Polymers Plant in China

SOLVAY will invest about 120-mn to build a speciality polymers production plant for 'Solef' polyvinylidene fluoride (PVDF), 'Tecnoflon' fluoroelastomers (FKM) and their essential monomer, VF2, in China to cater to growing demand in Asia. The plant will be built at Solvay's industrial site in Changshu in the province of Jiangsu and is scheduled to become operational at the beginning of 2014.

Bayer MaterialScience to Expand Polymer R&D Centre in Shanghai

BAYER MaterialScience has broken ground for the third phase of the expansion of its Polymer Research & Development Centre (PRDC) in Shanghai, China. The PRDC, which will become an innovation centre for the company, is scheduled to be operational by the second half of 2012.

The expansion is part of a 1-bn investment plan announced in December 2010 and the company's global strategy of moving closer to customers in high-growth emerging markets.

Rainbow Polymers to Fight Against Fraud

Scientists from University of Sheffield have developed pigment-free, intense coloured polymer materials, which could provide new,



anti-counterfeit devices on passports or banknotes to make them difficult to copy.

The polymers do not use pigments, but exhibit intense colour due to their intrinsic structure, which, according to scientists, is similar to the way nature creates colour for beetle shells and butterfly wings. The colours are created by a precise formulation of highly ordered block copolymers' layers, which can be used to create colour in the rainbow from two non-coloured solutions. The polymers self-organise their layered structure, causing optical effects similar to those in opals. The colour also changes depending on the viewing angle.

The complexity of the chemistry involved in producing these polymers means that they are difficult for fraudsters to copy, and hence potentially useful for passports and banknotes with advantages over current systems in terms of cost, processing and colour selection. The objective of developing this polymer material was to mimic the stylish and unconventional coloured patterns found in nature, such as peacock feathers.

First production facilities in US\$1.4 bln expansion of BASF-YPC Co Ltd begin

The first production facilities in the US\$1.4 bln expansion of BASF-YPC Company Limited have now begun operations. Along with the successful completion of the steam cracker expansion, the newly constructed butadiene extraction plant and the non-ionic surfactants plant are now operational. "With this expansion, we are now beginning to realize the true potential of BASF-YPC as a 'Verbund' site - a German term referring to a highly integrated, highly energy efficient production complex. At the same time, the chemicals produced here contribute directly to supporting China's energy efficiency goals as outlined in the 12th Five Year

Plan," said Dr. Bernd Blumenberg, President, BASF-YPC Company Limited. These plants are part of a US\$1.4 bln investment project which broke ground in September 2009. The project includes the expansion of the existing steam cracker, from 600,000 tpa to 740,000 tpa of ethylene, the expansion of three existing plants, and the construction of ten new plants. The products of this second phase will serve multiple industries such as agriculture, construction, electronics, pharmaceutical, automotive and chemical manufacturing. Bulk of the remaining plants is expected to come on-stream around the end of 2011.

Kabra Gloucester launches 5 layer barrier film facility at Daman

It was a landmark moment for Kabra Gloucester, as a fully loaded 5 layer plant demonstration successfully took place at their new facility at Daman. 2100 mm layflat 5 layer Barrier Film with an output of 525kgs/hour on a 100 micron thick film for Oil Packaging applications was demonstrated during the Open House. Kabra Gloucester created a specifically designed 5 layer Plant addressing all the categorical needs

of Prropl Packs Ltd, Kerala. The machine features extruders with light groove feed technology, 610 mm self centering die utilizing encapsulated feedport technology, Ultracool II dual lip air ring with film thickness control utilizing Beta gauge measurement, carbon composite rollers for collapsers, and turret style center winders. With this order delivery Kabra Gloucester synergy strongly equips the India Plastic Industry with another option

GAIL India eager to participate in Kazakhstan petrochemical plants

State-run gas transporter GAIL (India) Ltd. has expressed eagerness to participate in gas-based and petrochemical plants in Kazakhstan. According to industry sources, as they say, it is also learnt that GAIL might also be interested in the butadiene manufacturing project of Kazakhstan's United Chemical Company.

CK Technologies building painting plant

Ohio based CK Technologies LLC is building a painting facility in Fort Worth, Texas. The company specializes in large-tonnage injection molding of components for the commercial truck and bus market. The 197,600-square-foot Fort Worth plant is scheduled to open next year, employing 50. The Montpelier-based company said it will invest more than \$5 million in the project. CKT is a unit of Grand Rapids, a Michigan based Cascade Engineering

SABIC inaugurates polypropylene compounding plant in Mississippi

SABIC Innovative Plastics has officially opened its specialty polypropylene (PP) compounding operation at its Bay St. Louis, Mississippi manufacturing site. The new compounding operation will supply SABIC PP compounds and SABIC STAMAX long glass fiber-filled PP (LGFPP) composites for automotive applications. The new plant will meet the rapidly growing demand from automotive OEMs and tiers for

local supply of globally-consistent PP materials in North America, supporting production of regional and global vehicle platforms. In June 2010, SABIC opened a PP compounding facility at Genk, Belgium. "In today's fast-paced automotive industry, we continually strive to help our customers respond to new challenges and demands," said Gregory A. Adams, vice president, Innovative Plastics, Automotive.

Stolt-Nielsen opens chemical storage terminal on Jurong Island

Stolt-Nielsen Limited has announced the formal opening of its new petrochemical terminal in Tembusu on Jurong Island, Singapore. The terminal has commenced operations with three gas spheres, with plans for a total of 300,000 cbm of storage to be built over the next two-to-three years. Stolthaven Terminals' newest facility is strategically situated in the Jurong Island petrochemical complex, among a number of major plants operated by such firms as Shell, ExxonMobil and Lanxess. When fully operational, the Tembusu terminal will employ about 60 people in mainly engineering and management positions. Commenting on the opening, Walter E. Wattenbergh, President of Stolthaven Terminals, said, "We have

ambitious growth plans for Stolthaven Terminals and our investment here in Singapore is a reflection of that. With its central location, deep water draft at all times and good transshipment possibilities, this new terminal significantly strengthens our service capabilities in Asia Pacific. The excellent business environment here in Singapore was also a very important consideration for us." Stolthaven Terminals now operates nine terminals worldwide, plus a network of nine smaller terminals serving Australia and New Zealand. The company recently announced plans to acquire a further terminal located in The Netherlands. Stolthaven's total global storage capacity is now in excess of 3.3 million cubic meters.

IRPC plans 45 day maintenance shutdown

Thai refiner and petrochemical producer IRPC PCL is expecting a 30% drop in Q4 revenue from 2011, due to a planned 45-day maintenance shut down, according to Dow Jones. The planned shutdown coincides with slowing local demand triggered by worst floods faced by the country in decades. Most of Thailand's central provinces are submerged by the floods, including vast areas of farmland and industrial estates that are global production bases of electronics and automobile parts. The inundation of those estates has materially disrupted global production in both industries.

GAIL's earmarks US\$400 mln for its new Singapore office

GAIL (India) has earmarked US\$400 mln for its new Singapore trading office to secure LNG and petrochemical product cargoes for delivery to India in 2012.

The Singapore office will begin trading next month on getting all formal approvals. 90% of the trade would be in LNG from the initial start-up.

Lummus Technology bags contract for two light olefins recovery units in China

CB&I announced that Lummus Technology has been awarded a contract by China Coal Shaanxi Yulin Energy & Chemical Co. Ltd. for the license and engineering design of two light olefins recovery units. The plants will be located in Yulin, Shaanxi Province, China. The start-up of the first unit is expected in 2013. The recovery units, which use breakthrough technology to recover olefins (ethylene and propylene) produced from methanol feed, are each expected to yield 300,000 metric tpa of polymer grade ethylene, and 300,000 tpa of polymer grade propylene. In addition, the Olefins Conversion Technology (OCT) from

Lummus Technology was selected to upgrade the by-product produced by the light olefins recovery units into an additional 165,000 tpa of polymer grade propylene.

AptarGroup buys India's TKH plastics

Illinois based AptarGroup Inc. acquired dispensing-closure licensee Hyderabad based TKH Plastics Pvt. Ltd. in a South Asia regional expansion. In buying TKH, injection molder, AptarGroup paid about \$17 million in cash and assumed debt of \$1 million. TKH, which had annual sales of about \$8 million, began serving the Indian

personal care, food and beverage markets in 2000, collaborated over the years with AptarGroup and became a licensee of the firm's dispensing closure products in 2006.

Separately in Mumbai, India, AptarGroup is completing a clean room-equipped pharmaceutical device facility that is expected to be fully operational at the beginning of 2012. Publicly traded AptarGroup specializes in both dispensing closures and pumps for cosmetic, personal-care, household, food and beverage and pharmaceutical products.

Fortis Plastics announces shutdown of its corporate office

Indiana based Fortis Plastics LLC announced plans to close its corporate office and molding plant in South Bend. The news comes just days after the company announced plans to close its Poplar Bluff, Mo., and Fort Smith, Ark., plants. In layoff notifications filed with the Indiana Department of Workforce Development, the custom injection molder said it would permanently close its corporate office between Nov. 28 and Dec. 11, impacting 17 employees. The molding plant will permanently close between Dec. 9 and Dec. 23, impacting 71 employees.

The company blamed an "inability to secure additional capital," although recent developments have made clear that lost work from some customers may also have played a role. The company's financial woes came to light in mid-October, when the company filed a notice with the city of Fort Smith warning that it would terminate 93 employees there starting November 4-18 "because of an inability to secure additional capital." Then, a week later, the company notified the 142 workers in Poplar Bluff that their plant would close by December 2.

Reliance Industries denies to buy Valero Energy Corp

Reliance Industries Ltd (RIL) has denied news that it is looking to buy Valero Energy Corp as reported by Business Standard. Answering the query RIL said in a statement "While it is, and will remain, the policy of Reliance not to comment on market rumors, in light of the materiality of the rumored transaction, Reliance wishes to dispel the rumors and announce that it is not in discussions with Valero nor otherwise considering an acquisition of Valero". It said it was a company policy to not comment on market speculations but made an exception this time.

Asahi Kasei wins SPE® Innovation Award for "Most Innovative Use of Plastic"

Asahi Kasei Plastics North America, Inc. and Penda Corp. shared the stage in Livonia, Mich. at the Society of Plastics Engineers (SPE®) Automotive Innovation Awards Gala with Chrysler Group LLC, winning the "Most Innovative Use of Plastics" award in the Body Exterior category for the Dodge RamBox® assembly. The RamBox® storage system sports the industry's largest twin-sheet thermoformed lid and is also the largest, most versatile, lockable, waterproof storage and cargo management system available in a pickup truck. Now in its 41st year, the SPE Automotive Innovation Awards Competition & Gala is the largest and oldest recognition event in the automotive and plastics industries. "Winning this award is a first for our company," said John Moyer, president of Asahi Kasei Plastics. "It is a testament to our organization's talent and innovative spirit. This is a proud moment for our employees." "When the design challenge of the larger RamBox® came up, it was clear the application would require something heavy duty," said Senior Technical Consultant, Russ Herlache of Penda Corp., the system supplier for the program. "No one other than Asahi Kasei thought this could be done in polypropylene - everyone else wanted to sell us more costly nylon."

The larger RamBox® posed tougher engineering challenges. The lid still needed to be able to support the weight of two 250 lbs men, requiring the new structure to be stronger than its

predecessor. The box needed to pass 3 to 5Gs of force (100 lb load, 1 million cycles) to pass durability requirements, plus also needed to pass a point-load test (20 lb load, 5 inch drop). Asahi Kasei developed two new and distinct UV-resistant Thermylene® grades - one for the twin-sheet thermoformed lid (Thermylene P6-15FG-0741) and one for the injection-molded bin (P8-40FG-4611) - that maximized performance while reducing weight. The weight savings is projected to save US\$3 mln over the life of the program vs. alternative technologies (long-glass thermoplastic polypropylene (LFT-PP), short-glass nylon (polyamide, PA) 6/6, sheet-molding compound (SMC), and bulk-molding compound (BMC)). "Asahi Kasei Plastics set a new benchmark for high performance short-glass reinforced polypropylene," adds Herlache of Penda. "Not only

did the new materials they developed meet all the performance criteria, they also enabled a number of industry firsts for manufacturing and processing innovations." The materials allowed Penda to replace the blow molding process used on the first generation RamBox® lid, creating a stiff yet lightweight part at lower tooling and processing costs. Tight tolerances were maintained with novel cooling and processing methods. Twin-sheet thermoforming also has stronger weld-line strength, better wall thickness control, and enhanced dimensional control through robotic trimming. "Asahi Kasei's Thermylene® short-glass polypropylene solutions helped us meet the RamBox® design challenges that included customer appeal, good surface appearance, and durability," said Herlache.

Marubeni mulls building a petrochemical complex with Gazprom in Russia

Marubeni plans to build a large petrochemical complex with Russia's Gazprom in the Russian city of Nakhodka, Primorsky Krai, according to local media reports. Japan's Marubeni is one of Asian's largest general trading companies, while Gazprom is the world's largest producer of gas. Financial details of the project, as well as the timing of its

implementation, have not yet been disclosed. Marubeni plans to be the main investor in construction and the main purchaser of its future production. For Gazprom, this participation could form part of the company's current strategy to diversify its business, with paying a particular attention for the development of its petrochemical business.

ConocoPhillip to rename new independent downstream spinoff Phillips 66

ConocoPhillips announced that the new independent downstream company created through its previously announced strategic repositioning will be named Phillips 66 and will be headquartered in Houston. Phillips 66 will have leading businesses in refining, marketing, midstream and chemicals. "Phillips 66 has strong brand recognition and value and it provides a link between our rich history and our exciting future," said Greg Garland, designated chairman and chief executive officer of Phillips 66. "Our name reflects an independent spirit and drive -- two attributes of our future company." The specific location in Houston for the Phillips 66 headquarters will be announced at a later date. "Our decision to make Houston our global headquarters

leverages the city's supportive business environment and strong economic climate," Garland said. "Houston is a major energy center and Phillips 66 will benefit from its ability to attract the top business and technical talent in the field." ConocoPhillips, which will be a pure-play exploration and production company after the repositioning, will continue to be headquartered in Houston at the existing ConocoPhillips facility. Both companies will maintain a significant presence in Oklahoma, where ConocoPhillips was founded, and support a large number of jobs in the state. Bartlesville will be the global center for the Phillips 66 technology organization as well as the transaction services organizations for both companies.

Reliance Industries Q2 net up by 16% to Rs 5703 crore

According to the release Reliance Industries (RIL), largely driven by improved performance in the refining and petrochemicals business, posted a 15.8% rise in the net profit to Rs 5703 crore for quarter ended September 30, 2011 as compared with Rs 4923 crore in the comparable quarter of previous fiscal. Total income of RIL during the quarter increased

to Rs 79,671 crore versus Rs 58,151 crore in Q2FY-11. During the quarter, RIL's petrochem revenues surged to Rs 21,100 crore from Rs 15,100 crore yoy. Refining revenue of the company was up at Rs Rs 68,100 crore versus Rs 49,700 crore, while its Oil & Gas revenue was down at Rs 3,560 crore versus Rs 4,300 crore, yoy.

BR awarded first license for ACOTM facility plant in China

BR has been awarded a License and Process Design Package contract for a new olefins production unit using the Advanced Catalytic Olefins (ACOTM) technology. This award represents the first license using this innovative technology which catalytically cracks naphtha and other straight run feeds to produce olefins yields which surpass those available from traditional steam cracking technology. Shaanxi Yanchang Petroleum Yanan Energy and Chemical Co., Ltd. will construct and operate the plant which will be constructed in Luoyang Village, Fucheng Town, Fu County, Shaanxi Province, China. The ACO Converter will have a capacity of approximately 200 kta of olefins (ethylene plus propylene). ACO technology is developed jointly by KBR and SK Innovation. The keys to this novel technology are the development of a proprietary catalyst and optimization of operating conditions by SK Innovation coupled with the know-how of KBR in the design of fluid bed reactors and olefins production facilities. In October of 2010, SK Innovation successfully started up and operated an ACO Demonstration unit at its facility in Ulsan, South Korea.

New crash-optimized polyamides at FAKUMA 2011

On the occasion of the FAKUMA trade fair in Friedrichshafen, Germany, BASF introduced three new representatives of its crash-optimized specialty polyamide 6 family at hall B4, booth 4306. The first two grades are designated Ultramid® B3ZG7 CR and Ultramid® B3ZG3 CR, reinforced with 35 or 15 percent glass fibers. The third grade is Ultramid® B3ZG10 CR, the first impact-modified polyamide

6 from BASF with 50 percent glass fibers. Initially targeted for body applications intended to provide pedestrian protection, these high-strength plastics are also suitable for other crash-relevant components on the vehicle, at the steering wheel, as structural inserts or on the seats: wherever fast absorption of high amounts of energy is required.

New impact modifiers for applications developed by Arkema

A new impact modifier range that is suitable for applications requiring exceptional impact resistance at extremely low temperatures has been developed by Arkema. Lotader 2200 is an impact modifier range for Polyamide 6 and 66 components.

The new acrylate-based ethylene terpolymers are ideal for manufacturing PA66 components, including the lawnmower body, handle, hubcap, mirror and rearview. The material has been developed based

on customer demand in household, industrial and automotive markets. Lotader impact modifiers are used globally to process technical polymers such as polycarbonate (PC), thermoplastic polyesters and polyamides. In addition, the company has developed Orevac IM300 impact modifier for PA6 components. The new grafted polyolefin grade provides an exceptional balance between flexibility and resistance to cracks and impact at lower temperatures.

Wines available in plastic containers

The major distributors of alcohol, beer and fine wines have started using plastic packaging for the first time ever to supply wines. The IL Pet barrier bottle has been delivered by Amcor Rigid Plastics. The Polyethylene Terephthalate (PET) stock containers weight just 54 g

compared to the glass predecessor weighs 430 g. The bottle is made with KHS Plasmax's special barrier coating technology. It comes with an aluminum screw cap. Plasmax is a Food and Drug Administration (FDA)-approved passive barrier for the products that are sensitive to oxygen.

New paper bags seek to rival 'green' polypropylene bags

Earth Bags Australia Pty. Ltd. has launched what it claims is Australia's first 100 percent recyclable paper bag, aimed at replacing so-called green polypropylene bags. Called Earth Bag, the woven paper bags have a natural beeswax coating. Reg Ferguson, Earth Bags Australia director, said the bags are already in use in the retail and food industries and are a viable option to replace PP bags. It took Ormeau-based Earth Bags Australia more than three years to research, develop and release the product. Ferguson said that, to his knowledge, Earth Bags are Australia's first biodegradable reusable bag and the first to be supported by scientific research. He said Earth bags are chemical-free, can be used for up to two years and will turn to compost 45 days after disposal in landfill. He said the bags are as strong and practical as their PP counterparts, but produce about 20 percent fewer carbon emissions during manufacture and disposal. At A\$2.50 (US\$2.64) a unit, Earth bags are more expensive than PP bags but Ferguson said the extra cost is offset by the future cost of trying to dispose of PP bags. Research by scientists at Perth, Australia-based Murdoch University show the paper bags are better for the environment.

Ford introduces castor oil-based foam

Ford Motor, which was the first major automaker to begin using soybean oil-based urethane foam, is debuting a foam with a castor oil blend. The material is part of a soft touch instrument panel in the 2012 Ford Focus sedan, and has 10% of its content from renewable castor oil, which comes from a plant grown throughout Asia. BASF is the material supplier. Castor oil blends have been

used previously in nylon used in under-the-hood applications. Michigan-based Ford said the new foam blend has a better ability to maintain its shape over the car's lifetime. It also cures 43% faster than traditional foam blends, which improves the manufacturing process. Ford said it plans to expand the use of castor oil foam blends throughout its product line globally.

7UP reports progress on recycled PET

The trademark green 7UP bottles got a little greener in Canada this summer. PepsiCo Beverages Canada unveiled the new 7UP EcoGreen bottles in July and rolled them out across the country last month. The bottles are made from 100 percent recycled PET. By using recycled PET, the company says it will cut its greenhouse gas emissions by 30 percent. It will also reduce its energy use by 55 percent

during manufacturing, the company reported. On average, PepsiCo mixes 10 percent of recycled PET in soft drink bottles in the U.S. and Canada. According to PepsiCo, carbonated beverages put more stress on recycled PET plastic because pressure builds within the bottles. Pepsi-owned Naked Juice, based in Monrovia, Calif., already uses 100 percent recycled PET for its products, but the juices are not carbonated.

Thermoformer Inline Plastics boosts production at two plants

Thermoformer Inline Plastics Corp. has expanded one plant and added two large thermoforming production lines to make its PET clamshell containers and other food packaging. At its plant in Salt Lake City, Inline has installed a roll-fed TSL thermoforming machine from

Thermoforming Systems LLC of Union Gap, Wash. The company expanded the factory by 47,000 square feet, bringing its total size to 156,000 square feet of manufacturing and warehousing space. Inline plans to make several new sizes of its Safe-T-Fresh line of tamper-evident containers, and new

Plastic Fine Polymer develops plastic brightener

Ahmedabad based Plastic Fine Polymer provides plastic brighteners/shiners/whitener for the natural transparent, colours and milky white end products. It is used for giving clarity and also gloss finish to the natural transparent polymers. It also gives shining and bright finish colours to the end products. This brightener or whitener also successfully removes the yellowness and also the dullness. From the end products, it makes them milky white. This product is used in virgin, second, dull natural or milky white threads, ropes, twine, reprocess granules, HDPE-LDPE-PVC pipes and profiles, box strap, PET jars spoon container, carry bags, sheet, yarns and also other important end-product

grab-and-go food-service containers, on the new thermoforming line. Inline Plastics, based in Shelton makes thermoformed PET packaging for fresh-cut fruit and vegetables, salads, food-service, baked goods and deli items.

INTERNATIONAL NEWS

Plastics associations take proactive steps to deal with marine debris

Following up on their meeting and joint declaration on plastics and marine debris back in March, over 30 global plastics industry leaders met again in Dubai 14 to 17 November, 2011 to chalk out plans ahead for 2012 onwards. The group issued a news release from Dubai and stated they had identified 100 projects in 32 countries that are aimed at addressing the issue from all parts of the world. The group is inviting assistance from other stakeholders and has formed 3 main teams 1) the Americas, 2) Europe & Africa and 3) Asia and Australia which will coordinate activities of the sub groups. The global group also agreed to take the United Nations Environment Programme efforts seriously and act responsibly to provide factual science based data to

the experts team set up by UNEP. The global plastics industry heads have stated they are determined to use scientific data, conduct research and play a constructive role in building new partnerships to create solutions to the issue of marine litter. Plastics makers from around the globe agree that our products don't belong in world's oceans. It was restated that plastics are valuable resources even after use. The heads of national associations including major new players from Gulf region have stated they would like to partner & share information on marine litter. They agreed to implement solutions that keep more valuable plastics in productive use through improved stewardship and expanded infrastructure to increase collection & recycling and help conserve

resources and strive to protect the environment as responsible sector of society. Amongst some of the noted participants who deliberated for 3 days at Dubai were Dr. Abdulwhab Al-Sadoun Sec. Gen. of GPCA, Dr. Wilfried Haensel from Plastics Europe, Mr. Steven Russel from ACC USA, Mr. Katsuura from Japan, Mr Vijay Merchant from Plastindia Foundation, Mr Farad Alkhoidari SABIC, Mr Peter Bury from PACIA Australia, Ms Cathy Cirko from Canada, Mr. Laurence Jones from Borogue, Mr Alcantara from Braskem Brazil, Mr Khairuddin from Petronas Malaysia, Mr Bruder from Germany IKV, Mr Zhao from China, Mr Johanasson from UK PE and Mr Douw Steyn Plastics South Africa and several others.

Power cut at Ulsan affects SK Energy's refining and petrochemical plants

An unexpected power cut in the first week of the month in South Korea's southeastern oil and petrochemical hub of Ulsan hit the refining and petrochemical plants of the country's largest crude refiner, SK Energy, prompting some shutdowns, prompting some shutdowns. SK Energy runs crude distillation units (CDUs) with a total capacity of 840,000 bdp in Ulsan, two naphtha crackers with a combined capacity of 860,000 tpa, a heavy oil upgrading facilities of a combined

capacity of 172,000 bpd. As per state-run utility Korea Electric Power Corp., the power supply had been restored after a 10 minute disruption at around 2 p.m. because of problems at a substation. Investigations are underway about the cause of the shutdown. SK spokesmen said some of the units were closed, but it was hard to tell which units. "We don't know which units are running or how long shutdowns will continue. Some units are running on the company's emergency power

generating facilities, but it is hard to tell which are operating and which are not, as the whole place is dark and you can only see a few flares from the chimneys of the facilities." Any delays in gasoil cargoes are likely to have some impact as SK Energy is one of the largest exporters of diesel, but the impact may be kept to a minimum as demand is lackluster in Asia with Indonesian imports remaining stable for December and China's domestic diesel demand steady, regional traders said.

Sasol mulls US\$4.5 bln ethane cracker based on natural gas in Louisiana

Sasol Ltd plans to invest US\$4.5 bln to build a plant using low-cost natural gas to make ethylene and related chemicals in Louisiana. The board of directors has approved a feasibility study on a possible ethane cracker and ethylene derivatives complex in Lake Charles. The feasibility study is estimated to be completed by June 2013. The investment outlay

is estimated at US\$3.5-4.5 bln for ethylene capacity estimated between 1-1.4 mln tpa. "The rapid development of the shale gas industry in North America and the resulting decoupling of the crude oil and natural gas prices have created several opportunities for growth for Sasol in both fuels and chemicals, the company said in a statement. In particular, the availability

of significant volumes of natural gas liquids, and specifically ethane, has opened up opportunities in the ethane feedstock area for cracker-based chemicals." Sasol joins Dow Chemical Co., Chevron Phillips Chemical Co. and Royal Dutch Shell Plc, among others, who are studying whether to build ethane crackers in the US.

Rosneft plans to build naphtha steam cracker, butadiene and benzene extraction unit in Russia

Lummus Technology, a CB&I company, has been awarded a contract by CJSC Vostochnaya Neftekhimicheskaya (VNHK), a subsidiary of OJSC Rosneft, for the license and basic engineering of a naphtha steam cracking unit and a butadiene and benzene extraction unit for VNHK's new petrochemical complex in Russia. The steam cracking unit, which will be the world's largest, is designed to produce more than 1.4 mln tpa of ethylene and more than 600,000 tpa of propylene, using the latest advances in the Lummus SRT-VII heater technology. The butadiene unit is designed to produce 230,000 tpa of benzene and approximately 200,000 tpa of butadiene. It will use the Lummus/BASF butadiene extraction technology. CJSC (VHHK), a fully owned subsidiary of OJSC Rosneft Oil Company, was established in 2011 for the realization

of Rosneft's petrochemical production in Russia's Primorsky region near the Pervostroiteley settlement of the Nakhodka city district. The enterprise will be engaged in polymers production

and will produce a range of other petrochemical products. As part of the project, a specialized sea terminal near Vostochny port is planned for shipment of the finished products.

Total to sign contract with Egyptian Petrochemicals Holding Co for olefins unit

French energy company Total is on the verge of signing a contract with the Egyptian Petrochemicals Holding Company to establish a US\$3 bln plant for the production of olefins by steam cracking of natural gas, according to almasryalyoum.com. The plant is planned to be established in the industrial zone in the North West of the Gulf of Suez, and will

include a methanol-to-propylene processing unit. The expected production capacity of the plant will reach an annual 470,000 tons of polypropylene, 185,000 tons of gasoline, 40,000 tons of LPG, and 530,000 tons of acetic acid. The plant will be established over a three-year period, to begin production by late 2014.

Westlake to spend US\$40 mln to improve ethylene feedstock operations in Calvert city

With the ongoing natural gas boom in North America, Westlake Chemical Corp. plans to invest and spend \$40 million on improvements to its ethylene feedstock operations in Calvert City, supporting the retention of 380 Kentucky jobs. According to the release the company plans to perform a major modification of ethylene furnaces that

will ultimately reduce costs, improve operating efficiency and consume less energy. The modifications are expected to be completed by mid-2013. Westlake Chemical Corporation is an international manufacturer and supplier of petrochemicals, polymers and building products with headquarters in Houston, Texas. The company's Westlake Vinyl subsidiary,

located on Industrial Parkway in Calvert City, has been operating for 21 years. The company has indicated that without assistance of tax incentives, the improvements in both process and technology would not have been economically feasible and the alternative would be to produce additional ethylene at a sister plant out of state.

Brazil approves Eco-One additives for use in food contact applications

Eco-One additives for enhancing biodegradation of polyamide (Nylon), polyethylene terephthalate (PET), polypropylene (PP) and clear-molded polypropylene made by EcoLogic, have achieved compliance with Brazil's National Health Surveillance Agency (ANVISA) Resolution RDC N.17 of March

17, 2008 for use in food contact applications in Brazil. The company's Eco-One additives for enhancing biodegradation of polyethylene (PE) and polypropylene (PP) achieved compliance in August of 2011.

In Brazil, "resolutions" for food packaging materials (according to the type of packaging material) have

been published by the ANVISA, which is linked to the Ministry of Health. The purpose of ANVISA, an autonomous agency, is to foster protection of the health of the population by exercising sanitary control over production and marketing of products and services subject to sanitary surveillance.

CPDC plans to build phenol plant in China's Jiangsu Province

Taiwan-based China Petrochemical Development Corp. (CPDC) plans to invest NT\$30 bln (US\$987 mln) to build a phenol plant in China's Jiangsu Province. The investment plan has been approved by the company's board of directors and awaits approval from

the authorities in Taiwan and China. The new plant is expected to begin operations two years after regulatory approval. Phenol is a feedstock used in the production of caprolactam and CPDC is one of the world's top five producers of caprolactam. This investment is expected to facilitate a

vertical integration of the company and ensure steady raw material supply. NT\$11.5 bln out of the total NT\$30 bln investment will be funded by the company, and it seeks financing in China or from other sources for the balance.

MONTHLY CIRCULAR OF THE FEDERATION

CIRCULAR NO. 61/2012 :

Sub: Membership of the Federation

The Federation has received the following application for membership of the Federation :

1. a) Name & Address of the Applicant Firm : **M/S. R. M. POLYPETS PVT. LTD.**
3/1, New Tangra Road
Kolkata - 700 046
- b) Class of membership : **Manufacturer Member**
- c) Proposed by : M/s. Barai & Turakhia
- d) Seconded by : M/s. Orissa Chem Pest Pvt. Ltd.
- e) Name of representatives : 1) Mr. Sanjay Poddar
2) Mr. Harsh Sureka
- f) Items of manufacture : Manufacturer of PET Preform & PET Bottles.
2. a) Name & Address of the Applicant Firm : **M/S. GARIMA POLYMERS**
18, Armenian Street
Kolkata - 700 001
- b) Class of membership : **Manufacturer Member**
- c) Proposed by : M/s. Harshit Polymers (I) Pvt. Ltd.
- d) Seconded by : M/s. Plastic Engineers
- e) Name of representative : Mr. Niraj Ladha
- f) Items of manufacture : Manufacturer of Injection Moulding Items.
3. a) Name & Address of the Applicant Firm : **M/S. EAST INDIA THERMOPACK PVT. LTD.**
29, R. N. Mukherjee Road
2nd Floor, Room No. 19
Kolkata - 700 001
- b) Class of membership : **Manufacturer Member**
- c) Proposed by : M/s. East India Mercantile Co.
- d) Seconded by : M/s. Uma Cosmoplastics Pvt. Ltd.
- e) Name of representative : Mr. R. B. Agarwal
- f) Items of manufacture : Manufacturer of Thermocol & Air Bubble Sheets.

(Circulated in terms of Article 15 of the Articles of Association of the Federation)

CIRCULAR NO. 62/2012 :

**Sub: Consumer Price Index Number for Industrial Workers
for Kolkata for the months of January to April 2012**

M o n t h	Consumer Price Index	
	Base (1982 = 100)	Base (1960 = 100)
January, 2012	942	4465
February, 2012	952	4512
March, 2012	973	4612
April, 2012	1004	4759

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 - ◆ Consumer Goods & Industrial Components
 - ◆ Construction
- And many more ...*

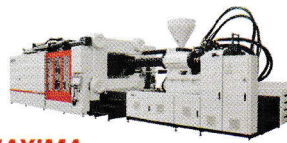
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Toggle Injection Moulding
Machine 50 to 500 ton



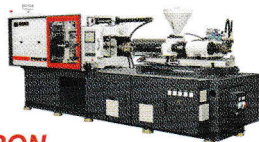
OMEGA
Hydraulic Injection Moulding
Machine 80 to 910 Ton



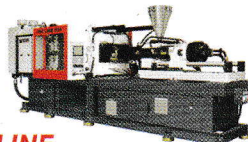
MAXIMA
Two Platen Injection Moulding
Machine 500 to 3000 Ton



ELEKTRON
All Electric Machine
50 to 350 Ton



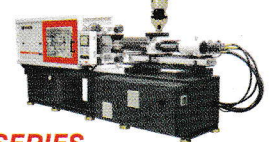
HYDRON
Hydraulic Injection Moulding
Machine 100 to 450 Ton



PVC LINE
Hydraulic Injection Moulding
Machine 100 to 910 Ton



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Toggle Injection Moulding
Machine 110 to 500 Ton



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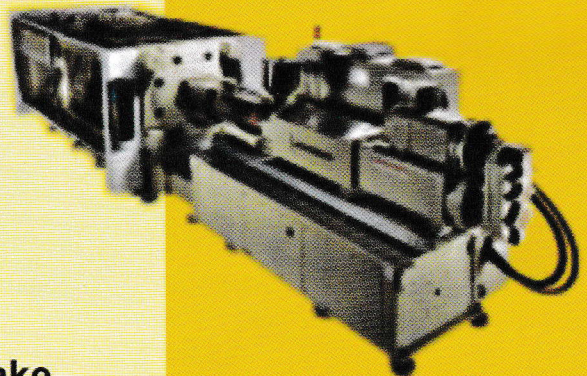
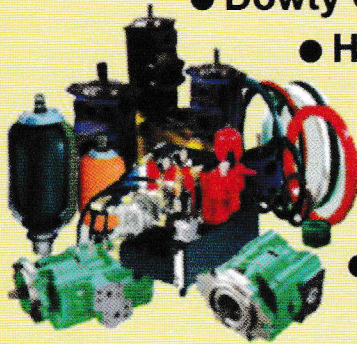


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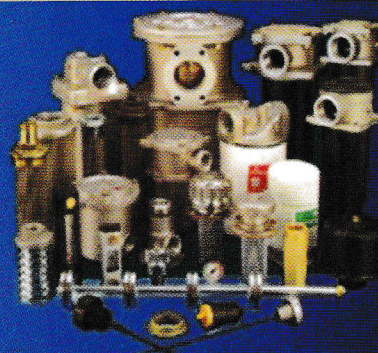
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