

IN THIS ISSUE

Page 1

**Plastics Waste Management
And Handling Rule - 2011**



Page 6

Plastivision - 2011
International Exhibition



Page 7

CHEMTECH World Expo 2011
Exhibition and
International Conference



Page 8

School Awareness Programmes



Envis Eco-Echoes

Volume 12 • Issue 1 • Jan-Mar., 2011

Name of the ENVIS Centre



INDIAN CENTRE
FOR PLASTICS IN
THE ENVIRONMENT

Olympus House, 2nd Floor, 25, Raghunath
Dadaji Street, Fort, Mumbai - 400 001.

Tel.: +91 22 4002 2491, 2261 7137 / 7165

Fax: 2261 7168

E-mail: icpe@vsnl.net, icpe@envis.nic.in

Websites

www.icpeenvis.nic.in

www.icpenviro.org

...

1009, Vijaya Building, 10th Floor, 17
Barakhamba Road, New Delhi - 110 001.

Tel.: 011 4359 6329 • Telefax: 011 2332 6376

E-mail: icpedelhi@airtelmail.in

...

Area of Activity

**Capacity Enhancement Programme
on Management of Plastics,
Polymer Waste and Bio-Polymers,
Impact of Plastics on Eco-System**

Head of Institution

Mr. K. G. Ramanathan

President - Governing Council

Mr. S. K. Ray

Executive Secretary,

Member - Executive Committee

ICPE-ENVIS Co-ordinator

Mr. T. K. Bandopadhyay

Sr. Technical Manager

Editorial Board

Editor

Mr. T. K. Bandopadhyay

Sr. Technical Manager, ICPE, Mumbai

Members

Mr. P. P. Kharas

Member, Governing Council,
Hon. Treasurer, ICPE

Mr. Vijay Merchant

Member, Governing Council,
Convenor – NGO Projects

Ms. Savita Pradeep

Technical Manager, ICPE, Delhi

Editorial



It may be recalled that the Recycled Plastics Manufacture and Usage (Amendment) Rules 2003 was issued after wide consultation with the Industry Associations, users and also ICPE. In the year 2007 Ministry of Environment & Forests (MoEF) proposed certain amendments to the existing Rules. For this purpose meetings / consultations were held with Industry Associations and ICPE to discuss various issues connected with the changes that were contemplated at that time. However no changes were actually affected at that time.

Ultimately on 18th September, 2009 MoEF came out with Draft Notification with some new set of changes, some of which came as surprise to the Industry. After series of discussions at various levels The Ministry of Environment and Forests, Government of India has finally notified Plastics Waste (Management and Handling) Rules, 2011 dated 4th February, 2011 read with Plastics Waste (Management and Handling) (Amendment) Rules, dated 2nd July, 2011. Salient points of the Rule have been covered in this edition. The Gazette Rules may be viewed in ICPE website.

Plastic Waste is only a very small proportion of the total Solid Waste collected and disposed off by our municipal bodies. Several studies have shown that Plastic Waste constitutes only 4 to 7% of the Municipal Solid Waste. Studies have also been conducted to show that although segregation of Dry and Wet waste is not carried out in most of the localities, still waste pickers retrieve most of the plastics waste dumped in the landfill and sell those to waste dealers and recyclers. This clearly implies that there is value in the waste and plastics waste has generally higher value due to various factors. As per the directions of the Supreme Court in the year 1999, Government of India had issued exhaustive Municipal Solid Waste (Management and Handling) Rules, 2000, which had to be implemented throughout the country. Unfortunately, nothing or very less has happened on implementation of these rules issued under the directives of the Supreme Court. Instead, piecemeal regulations on Plastic Waste Management alone are being issued by various State and Municipal authorities. A comprehensive Packaging Waste Management regulation is needed to be issued, of which Plastic Waste could only form a part. Such regulations have been issued in many developed and developing countries including the EU to tackle the total packaging waste issues. Unless and until comprehensive Solid Waste management regulations are enacted and effectively implemented, the problem of handling the Solid Wastes in our urban towns and even in villages cannot be effectively tackled.

Various organisations including ICPE are constantly working towards this goal. And it is encouraging that Government of India realises this and is taking various measures towards achieving this.

Comments may be forwarded to ICPE ENVIS Centre.

Subscription Information:

ENVIS is sent free of cost to all those interested in the information on Plastics and Environment.

Readers are welcome to send their suggestions, contributions, articles, case studies, and new developments for publication in the Newsletter to the ICPE-ENVIS address.

Reproduction of material from this Newsletter is welcome, with prior permission.

For more information on ENVIS and about the contents, please contact the editor.

On 17th September, 2009, the Ministry of Environment and Forests (MoEF), Government of India published a Draft Notification on Plastics (Manufacture, Usage and Waste Management) Rules, 2009, which was Notified in the Gazette of India on the 18th September, 2009. This was done to replace the existing Recycled Plastics Manufacture and Usage Rules, 1999 (amended 17th June, 2003) to regulate, among others, the manufacture and usage of plastic carry bags. Objections or suggestions to the proposals contained in the draft notification were invited from the public likely to be affected thereby.

The Ministry received comments from Plastics associations, Industry, Government Departments and others. An expert committee was constituted by the Ministry to examine these comments and to make suggestions. Shri T. K. Bandopadhyay of ICPE was included as one of the 7-Member Expert Committee. Later on, representatives from Indian Institute of Packaging, Mumbai and Industry Representatives through Federation of Indian Chamber of Commerce and Industry (FICCI) were also invited to place their expert opinions on specific issues.

MoEF published the new rule – Plastics Waste (Management and Handling) Rules, 2011, which was notified in the Gazette of India on 4th February, 2011. The Ministry, through a Press Note, explained the salient points of the new rule. Although the new rule as published on 4th February, 2011 included many of the suggestions put forward by the Industry and ICPE, however there were still some areas of confusion which required more clarity. These were – definitions of 'carry bags', 'manufacturer', 'Extended Producer Responsibility', 'multilayered plastic pouch or sachet', 'exemption of some provisions of the rule for export purpose', 'colour of carry bags', 'responsibility of setting up of plastics waste collection centres etc. Suggestions were made to MoEF for making necessary clarifications / modifications in these regards. The Ministry responded quickly and by the time this edition of Eco – Echoes was printed, published an Amendment Notification on 21st April, 2011 and finally came out with the Amendment to the Rule on 2nd July, 2011. Plastic bags used for primary packaging was explained and was kept out of the purview of this rule. The Press Note dated February 7, 2011 is reproduced in this Newsletter. The complete Notification dated 4th February, 2011 and the Amendment Notification dated July 2, 2011 can be accessed in ICPE website www.icpeenvis.nic.in.

The Plastic Waste (Management and Handling) Rules, 2011 dated 4th Feb. 2011 read with The Plastic Waste Management and Handling (Amendment) Rules, 2011 dated 2nd July, 2011

Some of the important rules :

•2. Application-

- (1) The provisions of rules 5 and 8 shall not apply to the manufacture of carry bags exclusively for export purposes, against an order for export, received by the owner or occupier of the concerned manufacturing unit,
- (2) This exemption does not apply to any surplus or rejects, left over and the like.

•3. Definitions-

- (b) "carry bags" mean bags made from any plastic material, used for the purpose of carrying or dispensing commodities but do not include bags that constitute or form an integral part of the packaging in which goods are sealed prior to use;
- (g) 'Extended producer's responsibility (EPR)' means the

responsibility of a manufacturer of plastic carry bags, and multilayered plastic pouches and sachets and the brand owners using such carry bags and multilayered plastic pouches and sachets for the environmentally sound management of the product until the end of its life;

(i) "manufacturer" means any person who manufactures plastic carry bags or multilayered plastic pouches or sachets or like;

(k) "multilayered plastic pouch or sachet" means a pouch or sachet having at least one layer of plastic in combination with one or more layers of packaging material such as paper, paper board, metalized layers of aluminium foil, either in the form of a laminate or co-extruded structure;

•5. Conditions-

(a) carry bags shall either be "in natural shade (colourless) which is without any added pigments" and colourants which are in conformity with Indian Standard :IS 9833:1981 titled as List of pigments and colourants for use in plastics in contact with foodstuffs, pharmaceuticals and drinking water, as amended from time to time;

(b) no person shall use carry bags made of recycled plastics or compostable plastics for storing, carrying, dispensing or packaging food stuffs;

(c) no person shall manufacture, stock, distribute or sell any carry bag made of virgin or recycled or compostable plastic, which is less than 40 microns in thickness;

(d) sachets using plastic material shall not be used for storing, packing or selling gutkha, tobacco and pan masala;

(e) recycled carry bags shall conform to the Indian Standard : IS 14534:1998 titled as Guidelines for Recycling of Plastics, as amended from time to time;

(f) carry bags made from compostable plastics shall conform to the Indian Standard : IS/ISO 17088:2008 titled as Specifications for Compostable Plastics, as amended from time to time.

(g) plastic material, in any form, shall not be used in any package for packing gutkha, pan masala and tobacco in all forms."

•6. Plastic Waste Management-

(a) recycling, recovery or disposal of plastic waste shall be carried out as per the rules, regulations and standards stipulated by the Central Government from time to time;

(b) recycling of plastics shall be carried out in accordance with the Indian Standard : IS 14534:1998 titled as Guidelines for Recycling of Plastics, as amended from time to time;

©) the municipal authority shall be responsible for setting up, operationalisation and co-ordination of the waste management system and for performing the associated functions, namely : - (i) to ensure safe collection, storage, segregation, transportation, processing and disposal of plastic waste; (ii) to ensure that no damage is caused to the environment during this process; (iii) to ensure setting up of collection centres for plastic waste involving manufacturers; (iv) to ensure its channelization to recyclers; (v) to create awareness among all stakeholders about their responsibilities; (vi) to engage agencies or groups working in waste management including waste pickers, and (vii) to ensure that open burning of plastic waste is not permitted;

•10. Explicit pricing of carry bags-

No carry bags shall be made available free of cost by retailers to consumers. The concerned municipal authority may by notification determine the minimum price for carry bags depending upon their quality and size which covers their material and waste management costs in order to encourage their re-use so as to minimize plastic waste generation.



Plastics Waste (Management & Handling) Rules, 2011 – Press Note

February 7th, 2011: The Ministry of Environment and Forest has today notified the Plastic Waste (Management and Handling) Rules, 2011 to replace the earlier Recycled Plastics Manufacture and Usage Rules, 1999 (amended in 2003). These Rules have been brought out following detailed discussions and consultations with a wide spectrum of stakeholders including civil society, industry bodies, relevant Central Government Ministries and state Governments.

Releasing the Rules the Minister for Environment and Forest, Mr. Jairam Ramesh said “ It is impractical and undesirable to impose a blanket ban on the use of plastics all over the country. the real challenge is to improve municipal solid waste management systems. In addition to the privatization and mechanization of the municipal solid waste management systems we must be sensitive to the needs and concerns of the lakhs of people involved in the informal sectors.

[I] Salient Features

Some of the salient features of the new Rules are:-

- Use of plastics materials in sachets for **Storing, packing or selling gutkha, tobacco and pan masala has been banned.**
- Under the new Rules, **foodstuffs will not be allowed to be packed in recycled plastics or compostable plastics.**
- Recycled carry bags shall conform to specific BIS standards.
- Plastic carry bags shall either be white or only with
- Recycled carry bags shall conform to specific BIS Standards.
- Plastic carry bags shall either be white or only with those pigments and colourants which are in conformity with the bar prescribed by the Bureau of Indian Standards (BIS). This shall apply expressly for pigments and colourants to be used in plastics products which come in contact with foodstuffs, pharmaceuticals and drinking water.
- Plastic carry bags should not be less than 40 microns in thickness. Under the earlier Rules, the minimum thickness was 20 microns. Several State Governments in the meanwhile, had stipulated varying minimum thickness. It is now expected that 40 microns norms will become the uniform standard to be followed across the country.
- The minimum size (8x12 inches) for the plastics carry bags prescribed under the earlier Rules has been dispensed with.

- Carry bags can be made from compostable plastics provided they conform to BIS standards.
- One of the major provisions under the new Rules is the **explicit recognition of the role of waste pickers.** The new Rules require the municipal authority to constructively engage agencies or groups working in waste management **including these waste pickers.** This is the very first time that such a special dispensation has been made.

[II] Role of Implementing Authority

The Municipal authority shall be responsible for setting up, operationalization and coordination of the waste management systems and for performing the associated functions, namely;

- To ensure safe collections, storage, segregation, transportation, processing and disposal of plastics waste;
- To ensure that no damage is caused to the environment during this process;
- To ensure setting up of collection centres for plastic waste involving manufacturers;
- To ensure its channelization to recyclers.
- To create awareness among all stakeholders about their responsibilities.
- To ensure that open burning of plastic waste is not permitted.

[III] Additional Safeguards

- **No carry bags shall be made available free of cost to consumers. The municipal authority may determine the minimum price for plastic carry bags.**
- The municipal authority may also direct the manufacturers to establish plastic waste collection centres, either collectively or individually, in the line with the principle of ‘Extended Producers Responsibility’.
- The new Rules have stipulated provisions for making or labeling to indicate name, registration number of the manufacturer, thickness and also to indicate whether they are recycled or compostable.



One Day National Workshop on “Plastics Waste Management” on 30th March, 2011 at CIPET, Bhopal

Central Institute of Plastics Engineering and Technology, Bhopal had organized a one day National Workshop on “Plastics Waste Management” on 30th March 2011 at the Institute’s premises. Shri.T.K. Bandopadhyay of ICPE conducted one session on Plastics Recycling - during the Workshop.



PLASTICS

Major Applications of Plastics

- Agriculture
- Healthcare / Medical
- Education
- Pipes for Water, Gas and Sewerage
- Building & Construction – Flooring / Doors & Windows / Drainage Pipes, Water Storage Tanks, Construction Linings etc
- Cables
- Electricals & Electronics Equipments
- Thermal Insulation
- Automobile, Aviation & Railways
- **Packaging**
- Households
- Furniture
- Toys
- Specialty
- Others



Indian Centre for Plastics in the Environment



PLASTICS

**Packaging Constitutes about 40% Consumption
Some of Which Are Discarded After Single Use**

- World wide trend
- Trend in India is similar

**Packaging Waste Necessitates Special Attention for
Waste Management & Recycling**



Indian Centre for Plastics in the Environment



PLASTICS

WHY PLASTIC PACKAGING ?

- SAFETY TO PRODUCTS PACKED
- ENERGY SAVING
- LESSER GREEN HOUSE GAS EMISSION
- LESSER EMISSIONS TO AIR & WATER
 - NOx, SO2, COD, BOD etc
- SAVING OF TRANSPORTATION FUEL DUE TO LIGHT WEIGHT
- HIGHEST PRODUCT TO PACKAGE RATIO
 - RESOURCE SAVING
- CHEAPEST



Indian Centre for Plastics in the Environment



PLASTICS

PLASTICS RECYCLING / RECOVERY OPTIONS

ISO 15270:2008




Indian Centre for Plastics in the Environment



PLASTICS

Mechanical Recycling – Conventional

- Most Preferred And Widely Used Recycling Process Due To Its Cost Effectiveness And Ease Of Conversion To Useful Products Of Daily Use
- Requirement - Homogeneous and Clean Input

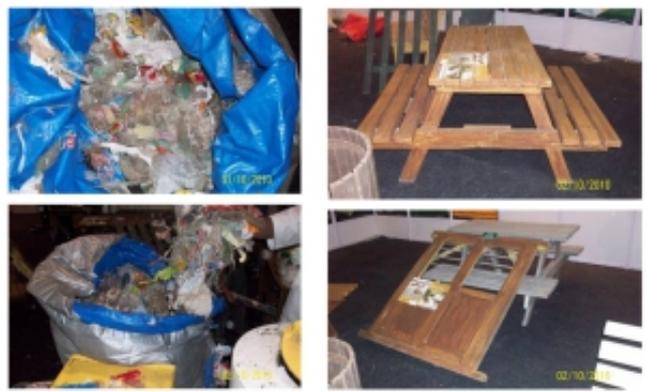
Mechanical Recycling - Steps

Collection → Identification → Sorting
 → Grinding → Washing → Drying → Separating
 → Agglomerating
 → Extruding / Compounding
 → Palletizing
 → Fabrication to Product



Indian Centre for Plastics in the Environment

Mechanical Recycling of Mixed Plastics




Indian Centre for Plastics in the Environment

One Day National Workshop on "Plastics Waste Management" on 30th March, 2011 at CIPET, Bhopal



PLASTICS

**FEEDSTOCK Recycling
CONVERSION TO FUEL**

**ALL TYPES OF MIXED PLASTICS WASTE CAN BE USED
ELABORATE CLEANING NOT NECESSARY**

Indian Centre for Plastics in the Environment

PLASTICS

- CATALYTIC DEPOLYMERISATION REACTION TAKES PLACE IN THE ABSENCE OF OXYGEN AND AT TEMPERATURE BELOW 350° C.
- CLEAN OPERATION - NO POSSIBILITY OF DIOXIN FORMATION

LIMITATION
INPUT COST BELOW Rs. 5 per Kg for
SELLING THE FUEL @ Rs. 20 – 22 per Liter

Indian Centre for Plastics in the Environment

PLASTICS

**..... ENERGY RECOVERY
CO-PROCESSING IN CEMENT KILNS**

- CLEANER EMISSIONS (COMPARED TO ONLY COAL)
- 60 – 65 % REPLACEMENT OF COAL - (GERMANY)
- INDIAN TRIAL BY ACC & ICPE WITH 5% REPLACEMENT SUCCESSFUL
- PROCESS APPROVED BY CPCB IN INDIAN CONDITION
- AT 10% REPLACEMENT RATE - 170 CEMENT KILNS IN INDIA CAN DISPOSE OF THE ENTIRE PLASTICS WASTE GENERATED IN THE COUNTRY TODAY

Indian Centre for Plastics in the Environment

PLASTICS

**ENERGY RECOVERY
CO-PROCESSING IN CEMENT KILN**

CALORIFIC VALUES

| | MJ/Kg |
|--------------------|-------|
| Polyethylene | 44 |
| Polyamide (Nylons) | 32 |
| PET | 22 |
| Coal | 29 |

All Types of Mixed Plastics Waste Can be Used

Indian Centre for Plastics in the Environment

PLASTICS

**..... FEEDSTOCK RECYCLING
REDUCING AGENT IN BLAST FURNACE**

| WITH ONLY COKE | WITH COKE & PLASTICS WASTE |
|----------------------------------|---|
| $C + O_2 = CO_2$ | $\frac{1}{2} C_2H_4 + CO_2 = 2 CO + H_2$ |
| $C + CO_2 = 2CO$ | $Fe_2O_3 + 2 CO + H_2 = 2 Fe + 2CO_2 + H_2O$ |
| $Fe_2O_3 + 3 CO = 2 Fe + 3 CO_2$ | H_2 is an additional reducing agent hence the demand for COKE is less |

About 20% Coke has been replaced with Plastics Waste

Indian Centre for Plastics in the Environment

One Day National Workshop on "Plastics Waste Management" on 30th March, 2011 at CIPET, Bhopal

PLASTICS

PLASTICS WASTE IN ROAD CONSTRUCTION

Vidyasagar Street – Kalyani, West Bengal

Indian Centre for Plastics in the Environment

PLASTICS

... PLASTICS WASTE IN ROAD CONSTRUCTION

ASPHALT PLANT OF F&NCL, WORLI, MUMBAI

Prof. V'S AGRIASE ROAD DABAR, MUMBAI

Indian Centre for Plastics in the Environment

PLASTICS

Plastics Waste used in Road Construction

- PE / PP / PS / EPS
- Multilayered Plastics @ 15% of total Plastics Waste

For 1 KM long and 7 feet width Road, 1 MT of Plastics Waste is used with 9 MTs of Bitumen in the bottom layer.

Road with seal coat requires extra Plastics Waste.

Indian Centre for Plastics in the Environment

PLASTICS

SOLID WASTE MANAGEMENT

SEGREGATION OF WASTE AT SOURCE – THE FIRST STEP

Rag Pickers with bin

Dry waste at Housing Colonies

Dry waste being carried for loading into Municipality Van

Loading of dry waste in Municipality van

Municipality van with dry waste on way to segregation area

Segregation of dry waste

Storing of segregation dry waste in secured place

Packing of segregated dry waste

Segregation of dry waste being weighed and sold to recyclers / traders

Indian Centre for Plastics in the Environment

PLASTICS

| Year | Weight (kg.) | Value (Rs.) | Year | Weight (kg.) | Value (Rs.) |
|------|--------------|-------------|------|--------------|-------------|
| 2004 | 1000 | 1000 | 2005 | 1000 | 1000 |
| 2006 | 1000 | 1000 | 2007 | 1000 | 1000 |
| 2008 | 1000 | 1000 | 2009 | 1000 | 1000 |

Solid Waste Management (Segregation) Projects In Select Mumbai Wards

A comparative assessment of the segregation activities since 2003

Indian Centre for Plastics in the Environment

PLASTICS

Do Not Litter. Keep Your Environment Clean.

- Segregate and Throw Waste Only in Waste Bins.
- Use Two Bins – One for Wet Waste, One for Dry Waste.

Plastics, Metals, Paper ...
Can be recycled into useful products.

Waste Food and other Biodegradable Waste.
Can be composted into manure.

Issued in Public Interest by

Municipal Corporation of Greater Mumbai and Indian Centre for Plastics in the Environment (www.icpenviro.org)

PLASTIVISION 2011 Exhibition

Jan. 20th - Jan. 24th, 2011 - Mumbai

ICPE participated in the 8th PLASTIVISION INDIA 2011 – INTERNATIONAL Plastics Exhibition and Conference organised by All India Plastics Manufacturers' Association (AIPMA), Mumbai held at Bombay Exhibition Ground, Goregaon, Mumbai during 20th – 24th January, 2011.

ICPE Pavilion showcased the Environmental benefits of plastics with special reference to Green House Gas Saving, Energy Saving and reduction of emissions of gases in the air and water. Awareness Films were screened which highlighted the issues of plastics waste management and the possible solutions thereof. Chinese Consul-General, Mr. Niu Qingbao inaugurated ICPE Pavilion and shared his views on the rising allegations against

plastics in many parts of the world. He confessed that he was not aware of all the vital benefits of plastics w.r.t. its lesser Carbon Foot Prints in the environment. He appreciated ICPE's initiatives in creating awareness on plastics and the environment.

Shri K. G. Ramanathan, President – Governing Council, ICPE, shared his views on the myths about plastics and solutions to plastics waste management issues during the Essay Award Function after the International Seminar. Shri Vijay Merchant, Member GC – ICPE, who is also an office bearer of the Organising Association, spoke during the occasion.

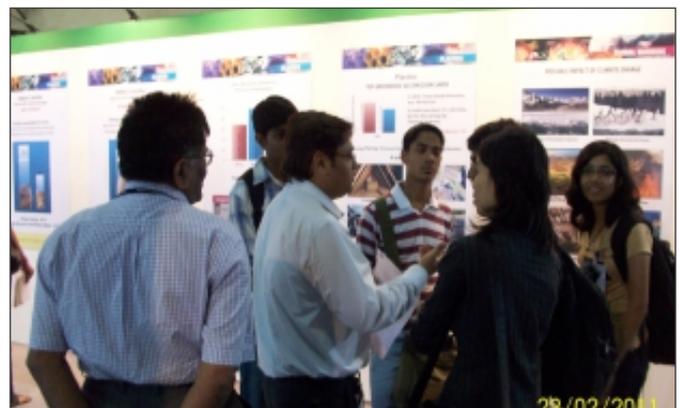


CHEMTECH World Expo 2011 Exhibition and International Conference

Feb. 23rd - Feb. 26th, 2011 - Mumbai

Chemtech World Expo 2011 was organised with the Support of The Government of India 'Ministry of Chemical & Fertilizers', Department of Chemicals & Petrochemicals and the Host State of Maharashtra and Partner State of Gujarat during 23rd – 26th February, 2011 at Bombay Exhibition Centre, Mumbai. The Exhibition displayed activities in the area of Chemical, Pharmaceutical, Industry Automation & Control and Water Treatment Technologies.

ICPE participated in the Exhibition and showcased the benefits of Plastics Recycling. Awareness films on Plastics Recycling and Waste Management were screened during the 4-day Event. The space was sponsored by Reliance Industries Ltd. An interesting event of Quiz Contest was organised and the visitors, many of whom were school and college students, participated. Briefcases made of Recycled Plastics were given to the winners of the contest.



Awareness Programmes in Different Schools

Conducting Awareness Programmes among the school and college students have remained one of the important tasks of ICPE. Through the screening of Awareness Short Films like 'Listen... Plastics Have Something to Say', 'Living in the Age of Plastics' and other films and by making Power Point Presentations, ICPE representatives engage the students in discussions on the subject of Waste Management in general and Plastics Waste Management in particular. In all the occasions students agree that 'Plastics Do not Litter, We Do'. The importance of practicing 'Segregation of Dry & Wet Waste at Source' also is realised by the students.

ICPE Delhi had organised two School Awareness programmes – one at Banyan Tree School, Lodhi Institutional Area, New Delhi and one at Bharatiya Vidya Bhavan, New Delhi. About 500 students and the teachers of those schools attended the programmes.

Awareness Programme in Banyan Tree School at Lodhi Institutional Area, New Delhi on 20th Jan., 2011



Awareness Programme in Bharatiya Vidya Bhawan School at New Delhi on 07th Feb., 2011



DATA SHEET

Barrier Properties of Flexible Packaging Materials

| Packaging Materials | Thickness(um) | WVTR* | OTR* |
|---------------------------|---------------|-------|------|
| Laminates: | | | |
| PET / LDPE | 12/37 | 9.5 | 75 |
| LD //PA/EAA | 37/25/50 | 7.2 | 85 |
| MET.PET/LDPE | 12/37 | 1.5 | 4 |
| PET/HDPE-LDPE | 12/112 | 3.3 | 70 |
| MET.PET/HDPE-LDPE | 12/112 | 0.6 | 2 |
| PET/LDPE/EAA | 12/25/25 | 6.4 | 70 |
| HDPE/EAA | 25/25 | 3.8 | 1395 |
| PAPER/FOIL/LDPE | 40/9/37 | NIL | NIL |
| PET/FOIL/LDPE | 12/9/10 | NIL | NIL |
| PET/PP | 12/50 | 3.5 | 6.5 |
| PET/FOIL/PP | 12/12/50 | NIL | NIL |
| Co-extruded Films: | | | |
| LDPE/LLDPE | 50 | 9 | 4000 |
| LDPE/HDPE | 120 | 2.0 | 1500 |
| HDPE/LDPE/HDPE | 110 | 2.0 | 1200 |
| HDPE/LDPE/EAA | 110 | 2.1 | 1500 |
| LDPE/BA/PA/BA/EAA | 90 | 5.4 | 85 |
| CPP/BA/PA/BA/EAA | 90 | 4.1 | 80 |

*g/m²/24 h at 38°C and 90% RH gradient.

**cc/m²/24h atm at 27°C and 65% RH.

ABBREVIATIONS USED FOR PACKAGING MATERIALS

| | | | |
|--------|---|------|----------------------------------|
| PE | Polyethylene | PA | Polyamide (Nylon) |
| LDPE | Low Density Polyethylene | PVC | Polyvinyl Chloride |
| LLDPE | Linear Low Density Polyethylene | UPVC | Unplasticized Polyvinyl Chloride |
| MDPE | Medium Density Polyethylene | PVDC | Polyvinylidene Chloride |
| HDPE | High Density Polyethylene | PVA | Polyvinyl Acetate (also PVAC) |
| HMHDPE | High Molecular High Density Polyethylene | PVAL | Polyvinyl Alcohol |
| PET | Polyethylene Terephthalate (Polyester) | CMC | Carboxymethyl Cellulose |
| KPET | PVDC Coated Polyester | CA | Cellulose Acetate |
| MPET | Metallised Polyester | EVA | Ethylene / vinyl Acetate |
| PP | Polypropylene | TPX | Pentene Polymer |
| CPP | Cast Polypropylene | CAB | Cellulose Acetate Butyrate |
| OPP | Oriented Polypropylene | EC | Ethyl Cellulose |
| MOPP | Metallised Oriented Polypropylene | EVOH | Ethylene Vinyl Alcohol |
| PS | Polystyrene | B | Bonding Agent |
| OPS | Oriented Polystyrene | ION | Ionomer (Surlyn) |
| EPS | Expanded Polystyrene | MXXT | Cellophane |
| SAN | Styrene/Acrylonitrile Copolymer | FRP | Fiber Reinforced Plastics |
| ABS | Acrylonitrile/Butadiene/Styrene Copolymer | PC | Polycarbonate |
| | | FOIL | Aluminium Foil |



EXPLANATORY NOTE

Explanatory Note to the mass awareness campaign (See message on back cover)

Intra Venous solution Bottles (IV Bottles) are used for administering life saving medicines to millions of ailing patients daily not only in India but across the whole world. Plastics have replaced the erstwhile conventional material – Glass, for this application for various reasons. Plastics, besides fulfilling the main critical criterion of being a safe material from health & safety points of view, provide additional benefits like light weight and unbreakable property. Due to light weight, transportation of Plastics IV Bottles during delivery consumes lesser fuel and hence reduces environmental pollution. IV Bottles are made of Polyethylene – a plastic material approved for its use in direct contact with ready to eat food stuffs, drinking water and pharmaceutical products.

Normal plastic carry bags are made of the same material as that of IV Bottle – Polyethylene. The attributes, which have made the use of plastics IV Bottle safe, exists for carry bags also. Still it is alleged that Plastics carry bags are not environment friendly. Consider these facts revealed by Life Cycle Impact Studies conducted by credible International Organizations:

- Normal plastic carry bags consume only about 35% of energy compared to that required for manufacturing paper and compostable plastic carry bags.
- The weight of equivalent paper bags is 9 times more than plastic carry bags, which necessitates 10 times more transportation trips for paper bags consuming more fuel and thus causing more environmental pollution.
- Millions of trees would have to be cut every year to manufacture paper carry bags, if normal plastic carry bags are banned.
- Normal plastic carry bags manufacturing process consume only about 5% fresh water compared to that of paper or

- Compostable plastic bags. In real terms, this saving can meet the drinking water requirement of millions of people.
- Plastic bags generate 60% less Green House Gas (GHG) Emission than uncomposted paper bags and 79% less GHG Emissions than composted paper bags. The saving is much more when the comparison is made with compostable plastic or jute bags.
- Plastics bags are recyclable. Paper bags also are recyclable; however it takes 91% more energy for recycling equivalent weight of paper than that of plastics. Compostable or jute bags are not recyclable.
- Paper bags generate 70% more air pollutants and 50% more water pollutants than normal plastic bags do during manufacture.
- Energy Saving during manufacture of raw materials, production and transportation of plastic bags compared to jute bags is 81%.
- Environmental Burden with respect to Air and Water pollution during Production of Raw Material and Bags for Plastic Bags is much less than that created by Jute bags.

Our poor littering habits coupled with inadequate infrastructure for waste management has created the disposal problem of solid waste, including the plastic waste especially in the urban areas. Discontinuation of Plastic bags is no solution and will rather multiply the problem many fold. This will add to the woes of common man as the so called alternatives are unviable, costly and place greater burden on the environment. The challenge facing us is to improve the solid waste management system and create awareness among general mass against littering.

The solution lies in Segregation of Waste at Source and arrangement for Recycling of all recyclable waste. Plastics Bags are 100% recyclable. Plastics Bags are Environment friendly.

The pouch that brings you milk and the bag you carry for shopping are made from the same material.

That's why plastic bags are not harmful.

For more information visit www.icpeenvvis.nic.in

Do not litter.
Plastics are recyclable.

based in public interest by Indian Centre for Plastics in the Environment.

The pouch that packs your cooking oil and the bag you carry for shopping are made from the same material.

That's why plastic bags are not harmful.

For more information visit www.icpeenvvis.nic.in

Do not litter.
Plastics are recyclable.

based in public interest by Indian Centre for Plastics in the Environment.



The bottle that packs IV fluids and the bag you carry for shopping are made from the same material.

That's why plastic bags are not harmful.

For more information visit www.icpeenvis.nic.in



**Do not litter.
Plastics are recyclable.**

Issued in public interest by Indian Centre for Plastics in the Environment.