

Politecnico di Milano

PhD in Materials Engineering

Research Title: MODELLING OF ENVIRONMENTAL STRESS CRACKING OF HDPE PACKAGES

| Scholarships and Financial support | |
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| Monthly net income of PhD scholarship (max 36 months) | €. 1300 (In case of a change of the welfare rates during the three-year period, the amount could be slightly modified) |
| Number of scholarships | 1 |
| Beginning of PhD | 1/5/2015 |
| Deadline for application | 10/04/2015 |
| Context of the research activity | |
| Motivations and objectives of the research in this field | The objective is to develop experimental methodologies to study product-package compatibility, with the long-term goal of predicting, via numerical model, the expected package lifetime also considering the effects induced by processing. The packages considered are currently made of blow-moulded HDPE to contain oxidants (hypochlorite or peroxide bleach) and/or solvents/perfumes, surfactants, strong alkalis/acids. |
| Methods and techniques that will be developed and used to carry out the research | The research will be carried out performing a mechanical characterization of the HDPE material using a fracture mechanics approach. The polymer/product interaction will be studied in its physical and chemical aspects. The research work is sponsored by FATER SpA and will be carried out in the Polymer Engineering Lab of Politecnico. |
| Educational objectives | The PhD student will have the chance to work with state of the art experimental techniques to characterize a very complex and largely understudied phenomenon from the mechanical, physical and chemical point of view. |
| Job opportunities | PhD graduates in this research field can find great job opportunities in the industry (from material producers to end-users), in the academy (several research groups are investigating these topics to fill an existing gap in the actual scientific knowledge) or in independent research centres working to develop and improve related industrial standards. |

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| Composition of the research group | All relevant information regarding the Polymer Engineering Group in Politecnico can be found on this web-page: http://www.chem.polimi.it/polyenglab/staff/ |
| Names of the research directors | Dr. Luca Andena and Prof. Marta Rink |
| E-mail address, phone number and web-page | luca.andena@polimi.it +39 02 2399 3289 http://www.chem.polimi.it/people/faculty/luca-andena/ marta.rink@polimi.it +39 02 2399 3217 http://www.chem.polimi.it/people/faculty/marta-rink/ |
| List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research | FATER S.p.A. |
| Additional support | |
| <u>Housing:</u> financial aid per PhD student per year (gross amount) | <i>No additional support</i> |
| <u>Funding for educational activities</u> (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences): funding per PhD student per year | <i>1st year: euros per student (facoltativo)</i> <i>2nd year: euros per student (min € 1370 obbligatorio)</i> <i>3rd year: euros per student (min € 1370 obbligatorio)</i> |
| <u>Teaching assistantship:</u> availability of funding in recognition of support to teaching activities by the PhD student | There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations. |
| <u>Computer availability:</u> | Individual use |
| <u>Desk availability:</u> | Individual use |