DEVELOPMENT OF FACILITIES AND DEVICES FOR INDUSTRIAL RADIATION PROCESSING

Rela, P.R.; Sampa, M.H.O.; Silva, L.G.A.; Calvo, W.A.P.; Sprenger, F.E.; Omi, N.M.; Costa, F.E.; Vieira, J.M.; Sabato, S.F; Costa, F.E.; Somessari; S.L.; Botelho, C.; Silva, M.C.; Gonçalves, M.

Centro de Tecnologia das Radiações - IPEN/CNEN-SP

Keywords: Multipurpose irradiator; Gamma irradiator; compact irradiator; Cobalt-60 irradiator; Gamma facility; electron beam irradiator.

During the period 2002 and 2004 the activities of the group were concentrated on the construction of the multipurpose gamma irradiator (FIG.1, 2 e 3). It was externally funded by FAPESP (U$ 700 000.00). This irradiator following the trends of compact irradiation facilities to operate in industrial scale basis, has a revolutionary design, it is capable to process continuously products of different sizes and weights, occupying a reduced floor space of 10m x 9m. This facility is a new approach to reduce the requirement of large capital expenditure, and reduce the overall construction time, becoming a feasible alternative to manufactures of medical care devices or food stuffy processors.

FIGURE 1 - Right sided view of the IPEN multipurpose gamma irradiator.

Simultaneously it was obtained from local regulatory authorities the operation license permission, initially the facility was applied to get the license to operate with maximum activity of one million curies using Cobalt 60 sources. It was designed to afford till 2 millions Ci . Concerning to the safety and transport systems they are fully automated and featured with modern and current programmable logic controls (PLC). The irradiator was loaded in 2004 December with the initial activity of 92 000Ci.

This irradiator is being available as a demonstration facility and also to the scientific community for new products and processes development that requires the radiation technology. Moreover, this installation will assist the users on validation process when small volumes are handled and also on qualification of products on radiation processing where small volumes are handled that becomes economically impracticable for the existing contract service of large industrial gamma irradiator in Brazil.

The main feature of the irradiator configuration is that allows to process inside the totes products with external dimension of 600mm x 600mm x 900 and maximum weights of 300kg.

FIGURE 2 - Left sided view of the IPEN multipurpose gamma irradiator.

Others activities of the group were performed on supporting the local industries on selecting equipment for radiation processing. On development of new irradiation facilities focusing on design and studies of economical feasibility of movable electron beam facility to treat hazardous industrial effluent and to process particulate material using fluid bed technology.

FIGURE 3 - External view of of the IPEN multipurpose gamma irradiator.