

Radiation Safety around the ESRF Beamlines,
P. BERKVENS, P. COLOMP, J.-P. MAGNIEN,
P. MACKRILL, ESRF; F. NOLTE, D. SALIETI,
Antitron Technomedirad - The critical energies of the
ESRF beamlines (up to several 10 keV) imply that the
hutches have to provide efficient shielding for X-ray
energies up to several 100 keV. For these energies
compton scattering cross sections are comparable to
photoelectric cross sections. Non-sophisticated hatch
designs which may be sufficient for lower critical
energies are therefore no longer guaranteed at these
higher energies. Important design improvements were
made at the ESRF, in order to provide not only the
required bulk shielding, but also the necessary
shielding against scattered radiation at the junction of
different hatch-components (joints between panels,
door joints, window frames, ...). The present paper
gives a summary of both the shielding requirements
and design requirements for the ESRF safety hatches.
The first part describes the radiation shielding
calculations, summarising the required lead thicknesses
for the different types of sources (bending magnets,
different undulators and wigglers). The second part
describes the relevant design details of the hatches,
such as doors, chicanes, window frames, cover profiles,
... . The main designs were developed jointly by the
ESRF and the German company Antitron
Technomedirad. Finally a description is given of the
procedures which are used for the radiation tests,
showing typical results and indicating specific
problems which were encountered.