



TRACK RECORDS RADIATION EXPOSURE EXTERNAL FIRES INDUSTRIAL PLANTS

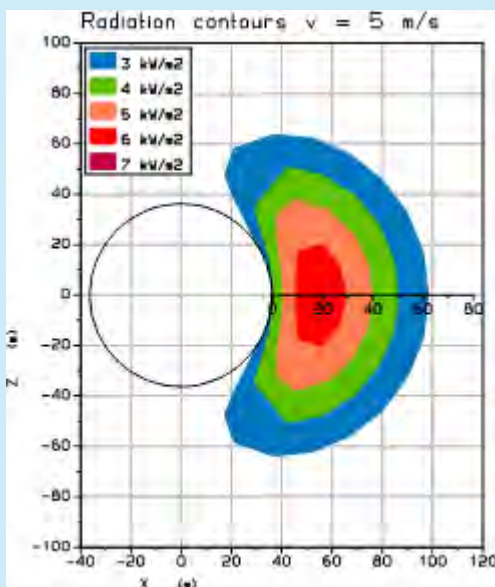
Radiation contours on ground level

According to Dutch regulations the exposure to heat radiation of personnel working on an industrial plant may not exceed a flux of 3 kW/m^2 in case of an external fire.

For a large refinery in the Netherlands Efectis NL calculated such radiation fluxes just above ground level for all relevant potential external fire's on the plant. These fires consisted of a full surface fire in a storage tank, for each operational tank, or a bund fire for each relevant bund. The calculations were carried out for several representative wind speeds with Efectis' in-house radiation code "Shadow". Flame characteristics were calculated with a flame model described in the international accepted Dutch "Yellow" book.

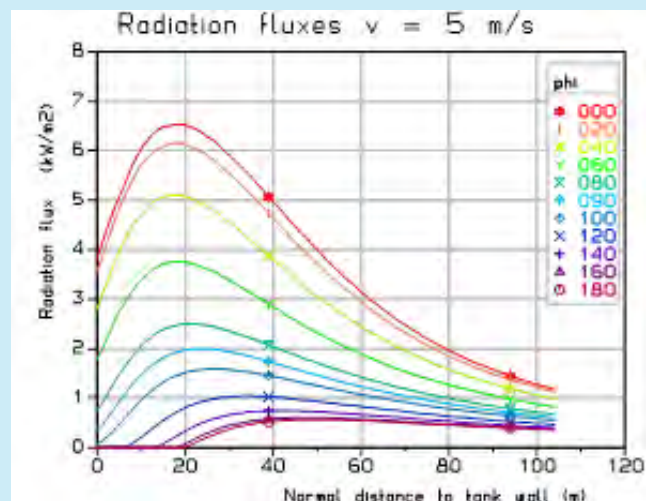
The results were presented in 60 contour plots and graphs.

An example is shown below for a full surface fire in a large storage tank filled with crude oil for a wind speed of 5 m/s .



Calculated radiation contours on a horizontal plane 1.5 m above ground.

Note: for reasons of confidentiality the values shown in the examples differ from the actual calculated values.



Calculated radiation fluxes as function of the distance to the wall of the burning tank for different wind directions.

Note: In the example it is still possible to approach the fire from the upwind side of the tank, e.g. to open a valve of the cooling/extinguishing system of the tank when these valves are located on two different positions opposite the tank.



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Efectis is the Expert in fire science, engineering, design and modelling, risk analysis, testing, inspection and certification.

Efectis covers all fire safety capabilities and know-how in testing and modelling around the world with offices and laboratories located in France, the Netherlands, Spain, Turkey, North Africa and the Middle-East area.