Nanoparticle exposure models:

CONSUMER MODEL

A. Gallo, M. Domat, M. Gutiérrez, F. Aceti

User manual

2019

Consumer exposure models

Aerosol release[a]

[a] ConsExpo rivm.nl/bibliotheek/rapporten/2016-0171.pdf

Predicting the concentration of a chemical in the air after a spraying event and how much is inhaled and deposited in the 3 different body compartments

Package → food/beverage migration[a]

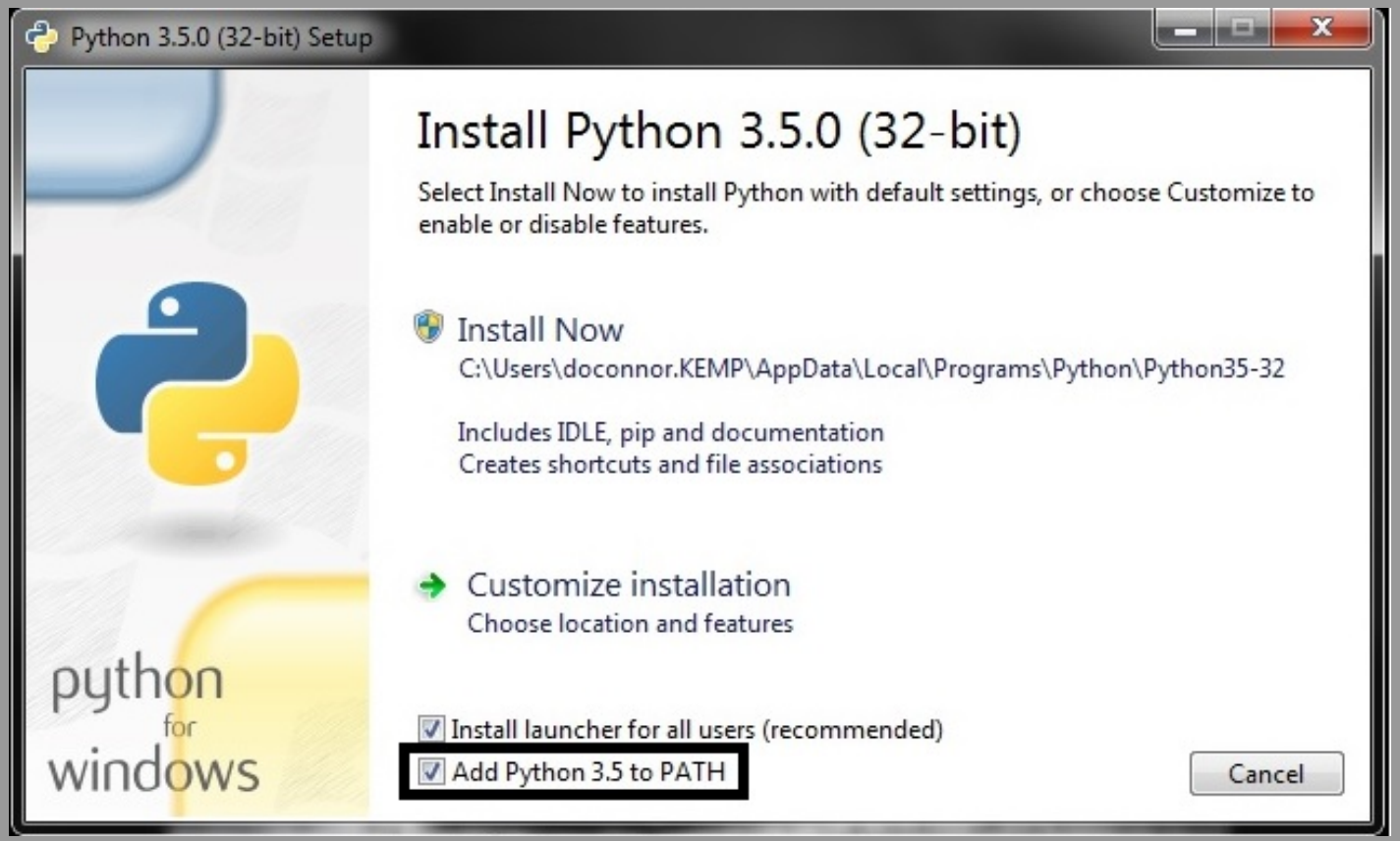
[a] Šimon, P., Chaudhry, Q., & Bakoš, D. (2008). Migration of engineered nanoparticles from polymer packaging to food–a physicochemical view. Journal of Food & Nutrition Research, 47(3).

Number and mass of ENPs that migrate from the package to food/beverage, amount ingested by a consumer and transfer to gastrointestinal tract

HTTPS://WWW.PYTHON.ORG/DOWNLOADS/

Please download last Python version and install it

Make sure to select “Add Python X.X to path”



Download

sudoenanodesk.europeanprojects.net/platform/exposure_models

INSTALL THE MODEL

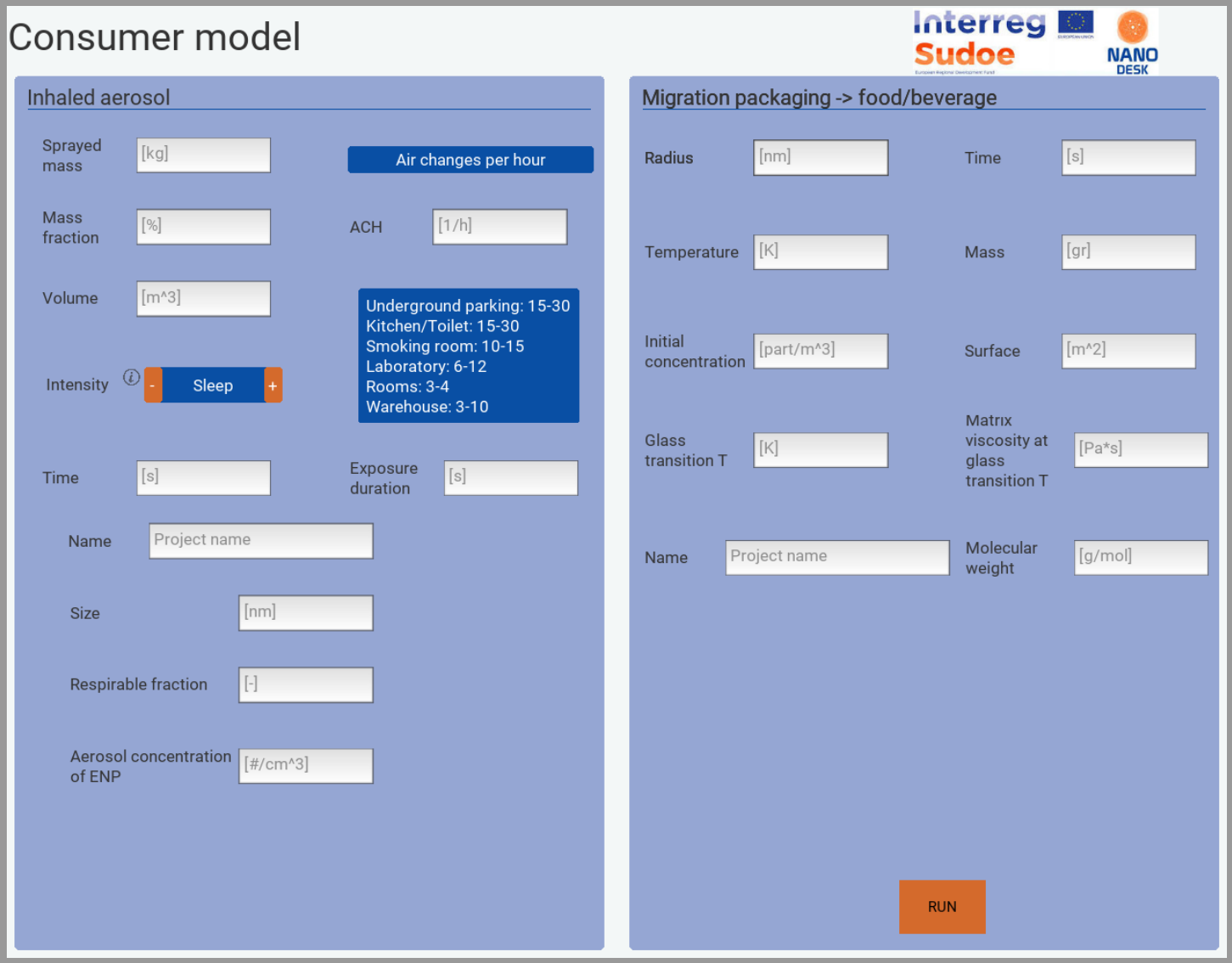
1. Once downloaded, uncompress the file .zip: a folder will be created named:

   consumer_model

2. Double click in the file `setup.bat`:
   All dependencies will install and the Graphical User Interface (GUI) will open

   It can take 2/3 minutes to finish!
   Only the first time the model is run

GRAPHICAL USER INTERFACE (GUI)



Only one model at a time!

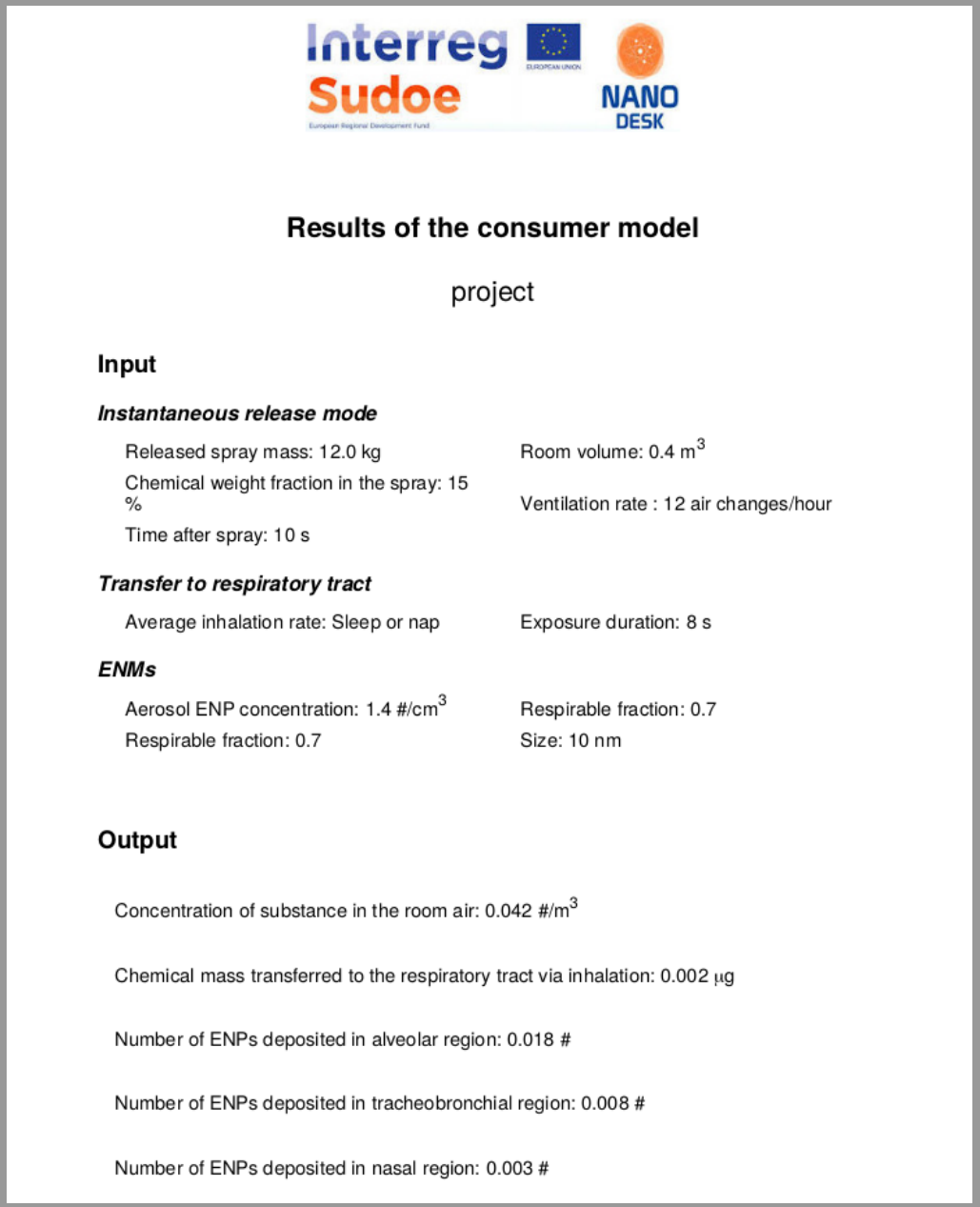
Execute the model

RUN

Click RUN to execute the model

- It will operate with the input data
- A .pdf file with input and output date will be generated
- Everything will be saved in the same folder where the code has been run

REPORT IN .PDF



Results of the consumer model

project

Input

Instantaneous release mode

Released spray mass: 12.0 kg

Chemical weight fraction in the spray: 15 %

Time after spray: 10 s

Room volume: 0.4 m^3

Ventilation rate : 12 air changes/hour

Transfer to respiratory tract

Average inhalation rate: Sleep or nap

Exposure duration: 8 s

ENMs

Aerosol ENP concentration: 1.4 #/cm^3

Respirable fraction: 0.7

Respirable fraction: 0.7

Size: 10 nm

Output

Concentration of substance in the room air: 0.042 #/m^3

Chemical mass transferred to the respiratory tract via inhalation: 0.002 μg

Number of ENPs deposited in alveolar region: 0.018 #

Number of ENPs deposited in tracheobronchial region: 0.008 #

Number of ENPs deposited in nasal region: 0.003 #