

## DistrictHeatingSystem

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# Contents



# Chapter 1

## Namespace Index

### 1.1 Namespace List

Here is a list of all namespaces with brief descriptions:

Consumer	??
DataIO	??
dbfInputStanet	??
Dictionary	??
DistrictHeatingSystem	??
function	??
HeatExchanger	??
HeatGrid	??
HeatSink	??
HeatSink_Consumptionprofiles	??
HeatSource	??
importDBFfromSTANET	??
inzidenzmatrix	??
Main	??
Node	??
Pipe	??
Producer	??
Pump	??
STANET_DBFtoClass	??
test	??
testPipe	??



## Chapter 2

# Class Index

### 2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

<a href="#">Consumer.Consumer</a>	??
<a href="#">DataIO.DataIO</a>	??
<a href="#">DistrictHeatingSystem.DistrictHeatingSystem</a>	??
<a href="#">HeatExchanger.HeatExchanger</a>	??
<a href="#">HeatGrid.HeatGrid</a>	??
<a href="#">HeatSink.HeatSink</a>	??
<a href="#">HeatSink_Consumptionprofiles.HeatSink_Consumptionprofiles</a>	??
<a href="#">HeatSource.HeatSource</a>	??
<a href="#">Node.Node</a>	??
<a href="#">Pipe.Pipe</a>	??
<a href="#">Producer.Producer</a>	??
<a href="#">Pump.Pump</a>	??
<a href="#">test.test</a>	??





## Chapter 3

# File Index

### 3.1 File List

Here is a list of all files with brief descriptions:

C:/Users/jpelda/Documents/GitHub/districtHeating/ <a href="#">Main.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">Consumer.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">DataIO.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">Dictionary.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">DistrictHeatingSystem.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">function.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">HeatExchanger.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">HeatGrid.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">HeatSink.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">HeatSink_Consumptionprofiles.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">HeatSource.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">Node.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">Pipe.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">Producer.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">Pump.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/ <a href="#">test.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/class/DataIO/ <a href="#">importDBFfromSTANET.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/function/ <a href="#">dbfInputStanet.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/function/ <a href="#">inzidenzmatrix.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/function/ <a href="#">STANET_DBFtoClass.py</a>	??
C:/Users/jpelda/Documents/GitHub/districtHeating/test/ <a href="#">testPipe.py</a>	??



## Chapter 4

# Namespace Documentation

### 4.1 Consumer Namespace Reference

#### Classes

- class [Consumer](#)

### 4.2 DataIO Namespace Reference

#### Classes

- class [DataIO](#)

### 4.3 dbfInputStanet Namespace Reference

#### Functions

- def [getPipe](#) (namePipe)
- def [getNode](#) (nodeName)
- def [getHeatExchanger](#) (nameHeatExchanger)

#### Variables

- [url](#) = os.path.join(os.path.abspath("."), os.path.join('input', 'TestNetz'))

#### 4.3.1 Function Documentation

#### 4.3.1.1 `getHeatExchanger()`

```
def dbfInputStanet.getHeatExchanger (
    nameHeatExchanger )
```

Definition at line 51 of file `dbfInputStanet.py`.

#### 4.3.1.2 `getNode()`

```
def dbfInputStanet.getNode (
    nodeName )
```

Definition at line 38 of file `dbfInputStanet.py`.

#### 4.3.1.3 `getPipe()`

```
def dbfInputStanet.getPipe (
    namePipe )
```

Definition at line 17 of file `dbfInputStanet.py`.

### 4.3.2 Variable Documentation

#### 4.3.2.1 `url`

```
dbfInputStanet.url = os.path.join(os.path.abspath("."), os.path.join('input', 'TestNetz'))
```

Definition at line 15 of file `dbfInputStanet.py`.

## 4.4 Dictionary Namespace Reference

### Variables

- dictionary [HeatGrid\\_pipe\\_dtype](#)
- dictionary [HeatGrid\\_node\\_dtype](#)
- dictionary [HeatSink\\_consumer\\_dtype](#)
- dictionary [HeatGrid\\_pump\\_dtype](#)
- dictionary [HeatSource\\_producer\\_dtype](#)
- dictionary [STANET\\_nodes](#)
- dictionary [STANET\\_pipes](#)
- dictionary [STANET\\_consumer](#)
- dictionary [STANET\\_producer](#)
- dictionary [HeatGrid\\_STANET\\_nodes\\_allocation](#)
- dictionary [HeatGrid\\_STANET\\_pipes\\_allocation](#)
- dictionary [HeatSink\\_STANET\\_consumer\\_allocation](#)
- dictionary [Pump\\_STANET\\_consumer\\_allocation](#)
- dictionary [HeatSource\\_STANET\\_producer\\_allocation](#)

### 4.4.1 Variable Documentation

#### 4.4.1.1 HeatGrid\_node\_dtype

dictionary Dictionary.HeatGrid\_node\_dtype

**Initial value:**

```
1 =      {'names': (
2          'index',
3          'x',
4          'y',
5          'name',
6          'height',
7          'SP_RP'
8        ),
9        'formats': (
10         'i',
11         'f',
12         'f',
13         'U10',
14         'f',
15         'U2',
16        )
17       }
```

Definition at line 60 of file Dictionary.py.

#### 4.4.1.2 HeatGrid\_pipe\_dtype

dictionary Dictionary.HeatGrid\_pipe\_dtype

Definition at line 9 of file Dictionary.py.

#### 4.4.1.3 HeatGrid\_pump\_dtype

dictionary Dictionary.HeatGrid\_pump\_dtype

**Initial value:**

```
1 =      {'names': (
2          'index',
3          'profil',
4          'start_node_name',
5          'end_node_name',
6          'start_x',
7          'start_y',
8          'end_x',
9          'end_y',
10         ),
11        'formats': (
12         'i',
13         'U30',
14         'U10',
15         'U10',
16         'f',
17         'f',
18         'f',
19         'f',
20        )
21       }
```

Definition at line 104 of file Dictionary.py.

#### 4.4.1.4 HeatGrid\_STANET\_nodes\_allocation

dictionary Dictionary.HeatGrid\_STANET\_nodes\_allocation

##### Initial value:

```

1 = {
2     'x': 'XRECHTS',
3     'y': 'YHOCH',
4     'name': 'KNAM'
5 }
```

Definition at line 194 of file Dictionary.py.

#### 4.4.1.5 HeatGrid\_STANET\_pipes\_allocation

dictionary Dictionary.HeatGrid\_STANET\_pipes\_allocation

##### Initial value:

```

1 = {
2     'index': 0,
3     'start_x': 0,
4     'start_y': 0,
5     'end_x': 0,
6     'end_y': 0,
7     'start_node_name': 'ANFNAM',
8     'end_node_name': 'ENDNAM',
9     'length': 'RORL',
10    'diameter_inner': 'DM',
11    'diameter_outer': 0,
12    'start_height': 0,
13    'end_height': 0,
14    'heatTransitionCoefficient': 'WDZ AHL',
15    'roughness': 'RAU',
16    'heat_transferCoefficient_inner': 0,
17    'heat_transferCoefficient_outer': 0,
18    'heat_conductivity_1': 0,
19    'heat_conductivity_2': 0,
20    'heat_conductivity_3': 0,
21    'diameter_1': 0,
22    'diameter_2': 0,
23    'diameter_3': 0,
24    'SP_RP': 'SUPPLY'
25 }
```

Definition at line 200 of file Dictionary.py.

## 4.4.1.6 HeatSink\_consumer\_dtype

dictionary Dictionary.HeatSink\_consumer\_dtype

**Initial value:**

```

1 = {'names': (
2         'index',
3         'heat_exchangerModel',
4         'start_node_name',
5         'end_node_name',
6         'start_x',
7         'start_y',
8         'end_x',
9         'end_y',
10        'heat_consumptionProfile',
11        'heat_consumptionAverage'
12       ),
13      'formats': (
14          'i',
15          'U30',
16          'U10',
17          'U10',
18          'f',
19          'f',
20          'f',
21          'f',
22          'U30',
23          'U30',
24       )
25     }
```

Definition at line 78 of file Dictionary.py.

## 4.4.1.7 HeatSink\_STANET\_consumer\_allocation

dictionary Dictionary.HeatSink\_STANET\_consumer\_allocation

**Initial value:**

```

1 = {
2         'index': 0,
3         'start_node_name': 'ANFNAM',
4         'end_node_name': 'ENDNAM',
5         'performance': 'WAERMENG'
6     }
```

Definition at line 226 of file Dictionary.py.

## 4.4.1.8 HeatSource\_producer\_dtype

dictionary Dictionary.HeatSource\_producer\_dtype

**Initial value:**

```

1 = {'names': (
2         'name',
3         'power',
4         'start_node_name',
5         'end_node_name',
6     ),
7      'formats': (
8          'U30',
9          'f',
10         'U10',
11         'U10',
12     )
13     }
```

Definition at line 126 of file Dictionary.py.

#### 4.4.1.9 HeatSource\_STANET\_producer\_allocation

dictionary Dictionary.HeatSource\_STANET\_producer\_allocation

##### Initial value:

```

1 = {
2     'index': 0,
3     'name': 'NAME',
4     'power': 'Power',
5     'start_node_name': 'ANFNAM',
6     'end_node_name': 'ENDNAM',
7     'start_x': 0,
8     'start_y': 0,
9     'end_x': 0,
10    'end_y': 0,
11    'height': 0
12 }
```

Definition at line 240 of file Dictionary.py.

#### 4.4.1.10 Pump\_STANET\_consumer\_allocation

dictionary Dictionary.Pump\_STANET\_consumer\_allocation

##### Initial value:

```

1 = {
2     'index': 0,
3     'profil': 'PUMPENTYP',
4     'start_node_name': 'ANFNAM',
5     'end_node_name': 'ENDNAM',
6 }
```

Definition at line 233 of file Dictionary.py.

#### 4.4.1.11 STANET\_consumer

dictionary Dictionary.STANET\_consumer

##### Initial value:

```

1 = {'names': (
2     'index',
3     'start_node_name',
4     'end_node_name'
5 ),
6     'formats': (
7     'i',
8     'U10',
9     'U10'
10    )
11 }
```

Definition at line 168 of file Dictionary.py.



## 4.4.1.12 STANET\_nodes

dictionary Dictionary.STANET\_nodes

**Initial value:**

```

1 =          {'names': (
2              'x',
3              'y',
4              'name'
5          ),
6          'formats': (
7              'f',
8              'f',
9              'U10'
10             )
11         )

```

Definition at line 140 of file Dictionary.py.

## 4.4.1.13 STANET\_pipes

dictionary Dictionary.STANET\_pipes

**Initial value:**

```

1 =          {'names': (
2              'start_node_name',
3              'end_node_name',
4              'length',
5              'heatTransitionCoefficient',
6              'roughness'
7          ),
8          'formats': (
9              'U10',
10             'U10',
11             'f',
12             'f',
13             'f'
14         )
15     )

```

Definition at line 152 of file Dictionary.py.

## 4.4.1.14 STANET\_producer

dictionary Dictionary.STANET\_producer

**Initial value:**

```

1 = {'names': (
2     'ANFNAM',
3     'ENDNAM',
4     'NAME',
5     'Power'
6 ),
7     'formats': (
8         'U10',
9         'U10',
10        'U30',
11        'f'
12    )
13 }

```

Definition at line 180 of file Dictionary.py.

## 4.5 DistrictHeatingSystem Namespace Reference

### Classes

- class [DistrictHeatingSystem](#)

## 4.6 function Namespace Reference

### Functions

- def [inzidenzmatrix\\_nodePipe\\_VL](#) (row, column)

### 4.6.1 Function Documentation

#### 4.6.1.1 [inzidenzmatrix\\_nodePipe\\_VL\(\)](#)

```
def function.inzidenzmatrix_nodePipe_VL (  
    row,  
    column )
```

```
column = [int]  
row = [int]
```

Definition at line 9 of file function.py.

## 4.7 HeatExchanger Namespace Reference

### Classes

- class [HeatExchanger](#)

## 4.8 HeatGrid Namespace Reference

### Classes

- class [HeatGrid](#)

## 4.9 HeatSink Namespace Reference

### Classes

- class [HeatSink](#)

## 4.10 HeatSink\_Consumptionprofiles Namespace Reference

### Classes

- class [HeatSink\\_Consumptionprofiles](#)

## 4.11 HeatSource Namespace Reference

### Classes

- class [HeatSource](#)

## 4.12 importDBFfromSTANET Namespace Reference

### Functions

- def [getPipe](#) (namePipe)
- def [getNode](#) (nodeName)
- def [getHeatExchanger](#) (nameHeatExchanger)

### Variables

- [url](#) = os.path.join(os.path.abspath("."), os.path.join('input', 'TestNetz'))

### 4.12.1 Function Documentation

#### 4.12.1.1 [getHeatExchanger\(\)](#)

```
def importDBFfromSTANET.getHeatExchanger (
    nameHeatExchanger )
```

Definition at line 51 of file importDBFfromSTANET.py.

#### 4.12.1.2 `getNode()`

```
def importDBFfromSTANET.getNode (
    nameNode )
```

Definition at line 38 of file importDBFfromSTANET.py.

#### 4.12.1.3 `getPipe()`

```
def importDBFfromSTANET.getPipe (
    namePipe )
```

Definition at line 17 of file importDBFfromSTANET.py.

### 4.12.2 Variable Documentation

#### 4.12.2.1 `url`

```
importDBFfromSTANET.url = os.path.join(os.path.abspath("."), os.path.join('input', 'Test↵  
Netz'))
```

Definition at line 15 of file importDBFfromSTANET.py.

## 4.13 inzidenzmatrix Namespace Reference

### Functions

- def [inzidenzmatrix](#) (rows, cols)

#### 4.13.1 Function Documentation

## 4.13.1.1 inzidenzmatrix()

```
def inzidenzmatrix.inzidenzmatrix (
    rows,
    cols )

arranges an inzidenzmatrix for a directed graph for further
calculations:
    pipes
    f_0  f_1  f_2  f_3
node 0   1   0  -1   0
node 1   0   0   1  -1
Flows towards a node are -1. Flows away from node are 1.

input:
    rows = []
    cols = [[,],[,]] # cols[0] is away from row value -> 1,\
                    cols[1] is towards row value -> -1
```

Definition at line 9 of file inzidenzmatrix.py.

## 4.14 Main Namespace Reference

## Variables

- [DataIO](#)
- [heatgrid\\_nodes](#)
- [heatgrid\\_pipes](#)
- [heatsink](#)
- [heatsource](#)
- [DHS1](#) = [DistrictHeatingSystem](#)([heatgrid\\_pipes](#), [heatgrid\\_nodes](#), [heatsink](#), [heatsource](#))

## 4.14.1 Variable Documentation

## 4.14.1.1 DataIO

[Main.DataIO](#)

## Initial value:

```
1 = DataIO(os.getcwd() + os.sep + 'input',
2         os.getcwd() + os.sep + 'output')
```

Definition at line 20 of file Main.py.

#### 4.14.1.2 DHS1

```
Main.DHS1 = DistrictHeatingSystem(heatgrid_pipes, heatgrid_nodes, heatsink, heatsource)
```

Definition at line 56 of file Main.py.

#### 4.14.1.3 heatgrid\_nodes

```
Main.heatgrid_nodes
```

##### Initial value:

```
1 = DataIO.importDBF('TestNetz' + os.sep + 'KTestNetz.DBF',
2     Dictionary.HeatGrid_node_dtype,
3     Dictionary.HeatGrid_STANET_nodes_allocation)
```

Definition at line 34 of file Main.py.

#### 4.14.1.4 heatgrid\_pipes

```
Main.heatgrid_pipes
```

##### Initial value:

```
1 = DataIO.importDBF('TestNetz' + os.sep + 'STestNetz.DBF',
2     Dictionary.HeatGrid_pipe_dtype,
3     Dictionary.HeatGrid_STANET_pipes_allocation)
```

Definition at line 37 of file Main.py.

#### 4.14.1.5 heatsink

```
Main.heatsink
```

##### Initial value:

```
1 = DataIO.importDBF('TestNetz' + os.sep + 'WTestNetz.DBF',
2     Dictionary.HeatSink_consumer_dtype,
3     Dictionary.HeatSink_STANET_consumer_allocation)
```

Definition at line 41 of file Main.py.

#### 4.14.1.6 heatsource

Main.heatsource

##### Initial value:

```
1 = DataIO.importCSV('TestNetz' + os.sep + 'WTestNetz.csv',
2                     dtype = Dictionary.HeatSource_producer_dtype,
3                     dtypeSource= Dictionary.STANET_producer,
4                     dtypeAllocation =
5                     Dictionary.HeatSource_STANET_producer_allocation,
6                     startrow=1,
7                     columnofdate=None,
8                     dateformat='None')
```

Definition at line 45 of file Main.py.

## 4.15 Node Namespace Reference

### Classes

- class [Node](#)

## 4.16 Pipe Namespace Reference

### Classes

- class [Pipe](#)

## 4.17 Producer Namespace Reference

### Classes

- class [Producer](#)

## 4.18 Pump Namespace Reference

### Classes

- class [Pump](#)

## 4.19 STANET\_DBFtoClass Namespace Reference

### Functions

- def [DBF\\_knotPipesToClassNetwork\(\)](#)

## 4.19.1 Function Documentation

### 4.19.1.1 DBF\_knotPipesToClassNetwork()

```
def STANET_DBFtoClass.DBF_knotPipesToClassNetwork ( )
```

Definition at line 14 of file STANET\_DBFtoClass.py.

## 4.20 test Namespace Reference

### Classes

- class [test](#)

## 4.21 testPipe Namespace Reference

### Variables

- dictionary [pipeValue](#)

### 4.21.1 Variable Documentation

#### 4.21.1.1 pipeValue

dictionary testPipe.pipeValue

#### Initial value:

```
1 = {
2     'index': 12,
3     'start_x': 0,
4     'start_y': 0,
5     'end_x': 0,
6     'end_y': 0,
7     'start_node_name': 'ANFNAM',
8     'end_node_name': 'ENDNAM',
9     'length': 'RORL',
10    'diameter_inner': 'DM',
11    'diameter_outer': 0,
12    'start_height': 0,
13    'end_height': 0,
14    'heatTransitionCoefficient': 12,
15    'roughness': 'RAU',
16    'heat_transferCoefficient_inner': 10,
17    'heat_transferCoefficient_outer': 20,
18    'heat_conductivity_1': 30,
19    'heat_conductivity_2': 40,
20    'heat_conductivity_3': 50,
21    'diameter_1': 0,
22    'diameter_2': 0,
23    'diameter_3': 0,
24    'SP_RP': 'SUPPLY'
25 }
```

Definition at line 15 of file testPipe.py.



## Chapter 5

# Class Documentation

### 5.1 Consumer.Consumer Class Reference

#### Public Member Functions

- `def __init__(self, consumerValues)`
- `def heat\_consumptionProfiles (self, i=slice(None, None))`
- `def heat\_consumption (self, heatExProfile, i=slice(None, None))`
- `def heat\_consumptionAverage (self, i=slice(None, None))`

#### Public Attributes

- [index](#)
- [heat\\_exchangerModel](#)
- [start\\_node\\_name](#)
- [end\\_node\\_name](#)
- [start\\_x](#)
- [start\\_y](#)
- [end\\_x](#)
- [end\\_y](#)
- [heat\\_consumptionProfile](#)
- [heat\\_consumptionAverage](#)
- [massflow](#)

#### 5.1.1 Detailed Description

Definition at line 11 of file Consumer.py.

#### 5.1.2 Constructor & Destructor Documentation

#### 5.1.2.1 `__init__()`

```
def Consumer.Consumer.__init__ (
    self,
    consumerValues )
```

Definition at line 13 of file Consumer.py.

### 5.1.3 Member Function Documentation

#### 5.1.3.1 `heat_consumption()`

```
def Consumer.Consumer.heat_consumption (
    self,
    heatExProfile,
    i = slice(None, None) )
```

Definition at line 34 of file Consumer.py.

#### 5.1.3.2 `heat_consumptionAverage()`

```
def Consumer.Consumer.heat_consumptionAverage (
    self,
    i = slice(None, None) )
```

Definition at line 38 of file Consumer.py.

#### 5.1.3.3 `heat_consumptionProfiles()`

```
def Consumer.Consumer.heat_consumptionProfiles (
    self,
    i = slice(None, None) )
```

Definition at line 31 of file Consumer.py.

### 5.1.4 Member Data Documentation

#### 5.1.4.1 end\_node\_name

`Consumer.Consumer.end_node_name`

Definition at line 18 of file `Consumer.py`.

#### 5.1.4.2 end\_x

`Consumer.Consumer.end_x`

Definition at line 21 of file `Consumer.py`.

#### 5.1.4.3 end\_y

`Consumer.Consumer.end_y`

Definition at line 22 of file `Consumer.py`.

#### 5.1.4.4 heat\_consumptionAverage

`Consumer.Consumer.heat_consumptionAverage`

Definition at line 25 of file `Consumer.py`.

#### 5.1.4.5 heat\_consumptionProfile

`Consumer.Consumer.heat_consumptionProfile`

Definition at line 23 of file `Consumer.py`.

#### 5.1.4.6 heat\_exchangerModel

`Consumer.Consumer.heat_exchangerModel`

Definition at line 16 of file `Consumer.py`.

#### 5.1.4.7 index

`Consumer.Consumer.index`

Definition at line 15 of file `Consumer.py`.

#### 5.1.4.8 massflow

`Consumer.Consumer.massflow`

Definition at line 27 of file `Consumer.py`.

#### 5.1.4.9 start\_node\_name

`Consumer.Consumer.start_node_name`

Definition at line 17 of file `Consumer.py`.

#### 5.1.4.10 start\_x

`Consumer.Consumer.start_x`

Definition at line 19 of file `Consumer.py`.

#### 5.1.4.11 start\_y

`Consumer.Consumer.start_y`

Definition at line 20 of file `Consumer.py`.

The documentation for this class was generated from the following file:

- `C:/Users/jpelda/Documents/GitHub/districtHeating/class/Consumer.py`

## 5.2 DataIO.DataIO Class Reference

### Public Member Functions

- `def __init__ (self, filepath_import, filepath_export)`
- `def importCSV (self, filename_import, dtype=None, dtypeSource=None, dtypeAllocation=None, startrow=0, delimiter=";", columnofdate=None, dateformat=None)`
- `def importTRY (self, location, year, season, quarterHour, startrow, dtype)`
- `def importDBF (self, filename_import, dtype=None, dtypeAllocation=None)`
- `def importDict (self, filename, delimiter=";")`
- `def exportCSV (self, filename, results, delimiter=";")`
- `def exportFig (self, filename, fig)`
- `def str2date (self, columnofdate=None, dateformat=None)`
- `def str2num (self, column)`
- `def strpdate2num (self, column)`

### 5.2.1 Detailed Description

Definition at line 25 of file DataIO.py.

### 5.2.2 Constructor & Destructor Documentation

#### 5.2.2.1 \_\_init\_\_()

```
def DataIO.DataIO.__init__ (
    self,
    filepath_import,
    filepath_export )
```

DataIO for Import and Export of data

Definition at line 27 of file DataIO.py.

### 5.2.3 Member Function Documentation

### 5.2.3.1 exportCSV()

```
def DataIO.DataIO.exportCSV (
    self,
    filename,
    results,
    delimiter = ";" )

exports results as CSV with "," as decimal seperator
filename = string without '.csv'
results = []
```

Definition at line 185 of file DataIO.py.

### 5.2.3.2 exportFig()

```
def DataIO.DataIO.exportFig (
    self,
    filename,
    fig )

exports matplotlib grafik as pdf and png\n
#####\n
return:\n
    pp.close()
```

Definition at line 207 of file DataIO.py.

### 5.2.3.3 importCSV()

```
def DataIO.DataIO.importCSV (
    self,
    filename_import,
    dtype = None,
    dtypeSource = None,
    dtypeAllocation = None,
    startrow = 0,
    delimiter = ";",
    columnofdate = None,
    dateformat = None )

imports CSV and replaces first comma start counting from right
#####
return:
    array with dtype
```

Definition at line 36 of file DataIO.py.

#### 5.2.3.4 importDBF()

```
def DataIO.DataIO.importDBF (
    self,
    filename_import,
    dtype = None,
    dtypeAllocation = None )

imports dBASE and allocates values to dtype of returnArray. Allocation
of values of dBASE to dtype of returnArray must be given in
dtypeAllocation.
#####
return:
    array with dtype
```

Definition at line 159 of file DataIO.py.

#### 5.2.3.5 importDict()

```
def DataIO.DataIO.importDict (
    self,
    filename,
    delimiter = ";" )
```

Definition at line 180 of file DataIO.py.

#### 5.2.3.6 importTRY()

```
def DataIO.DataIO.importTRY (
    self,
    location,
    year,
    season,
    quarterHour,
    startrow,
    dtype )
```

Definition at line 116 of file DataIO.py.

#### 5.2.3.7 str2date()

```
def DataIO.DataIO.str2date (
    self,
    columnofdate = None,
    dateformat = None )
```

Definition at line 224 of file DataIO.py.

#### 5.2.3.8 str2num()

```
def DataIO.DataIO.str2num (
    self,
    column )
```

Definition at line 233 of file DataIO.py.

#### 5.2.3.9 strpdate2num()

```
def DataIO.DataIO.strpdate2num (
    self,
    column )
```

Definition at line 236 of file DataIO.py.

The documentation for this class was generated from the following file:

- C:/Users/jpelda/Documents/GitHub/districtHeating/class/[DataIO.py](#)

## 5.3 DistrictHeatingSystem.DistrictHeatingSystem Class Reference

### Public Member Functions

- def `__init__` (self, heatgrid\_pipes, heatgrid\_nodes, [heatsink](#), [heatsource](#))
- def [calculateDHS](#) (self)

### Public Attributes

- [heatgrid](#)
- [heatsink](#)
- [heatsource](#)

#### 5.3.1 Detailed Description

Definition at line 26 of file DistrictHeatingSystem.py.

#### 5.3.2 Constructor & Destructor Documentation



#### 5.3.2.1 `__init__()`

```
def DistrictHeatingSystem.DistrictHeatingSystem.__init__ (
    self,
    heatgrid_pipes,
    heatgrid_nodes,
    heatsink,
    heatsource )
```

Definition at line 28 of file DistrictHeatingSystem.py.

### 5.3.3 Member Function Documentation

#### 5.3.3.1 `calculateDHS()`

```
def DistrictHeatingSystem.DistrictHeatingSystem.calculateDHS (
    self )
```

Definition at line 71 of file DistrictHeatingSystem.py.

### 5.3.4 Member Data Documentation

#### 5.3.4.1 `heatgrid`

DistrictHeatingSystem.DistrictHeatingSystem.heatgrid

Definition at line 30 of file DistrictHeatingSystem.py.

#### 5.3.4.2 `heatsink`

DistrictHeatingSystem.DistrictHeatingSystem.heatsink

Definition at line 31 of file DistrictHeatingSystem.py.

#### 5.3.4.3 `heatsource`

DistrictHeatingSystem.DistrictHeatingSystem.heatsource

Definition at line 32 of file DistrictHeatingSystem.py.

The documentation for this class was generated from the following file:

- C:/Users/jpelda/Documents/GitHub/districtHeating/class/[DistrictHeatingSystem.py](#)

## 5.4 HeatExchanger.HeatExchanger Class Reference

### Public Member Functions

- def [\\_\\_init\\_\\_](#) (self)

#### 5.4.1 Detailed Description

Definition at line 9 of file HeatExchanger.py.

#### 5.4.2 Constructor & Destructor Documentation

##### 5.4.2.1 [\\_\\_init\\_\\_](#)()

```
def HeatExchanger.HeatExchanger.__init__ (
    self )
```

Definition at line 10 of file HeatExchanger.py.

The documentation for this class was generated from the following file:

- C:/Users/jpelda/Documents/GitHub/districtHeating/class/[HeatExchanger.py](#)

## 5.5 HeatGrid.HeatGrid Class Reference

### Public Member Functions

- def [\\_\\_init\\_\\_](#) (self, tableOfPipes, tableOfNodes)
- def [pipes](#) (self, i=slice(None, None))
- def [nodes](#) (self, i=slice(None, None))

### Public Attributes

- [nodes\\_name](#)

#### 5.5.1 Detailed Description

Definition at line 10 of file HeatGrid.py.

#### 5.5.2 Constructor & Destructor Documentation

### 5.5.2.1 `__init__()`

```
def HeatGrid.HeatGrid.__init__ (
    self,
    tableOfPipes,
    tableOfNodes )

input:
    tableOfPipes = [] # contains all Pipes of network, \
allocation Dictionary can be found in Dictionary
    tableOfNodes = [] # same as tabelOfPipes but for nodes
    SP = '' # name in imported tables for supply line
    RP = '' # name in imported tables for return line
```

Definition at line 12 of file HeatGrid.py.

## 5.5.3 Member Function Documentation

### 5.5.3.1 `nodes()`

```
def HeatGrid.HeatGrid.nodes (
    self,
    i = slice(None, None) )
```

Definition at line 44 of file HeatGrid.py.

### 5.5.3.2 `pipes()`

```
def HeatGrid.HeatGrid.pipes (
    self,
    i = slice(None, None) )
```

Definition at line 41 of file HeatGrid.py.

## 5.5.4 Member Data Documentation

### 5.5.4.1 `nodes_name`

```
HeatGrid.HeatGrid.nodes_name
```

Definition at line 28 of file HeatGrid.py.

The documentation for this class was generated from the following file:

- C:/Users/jpelda/Documents/GitHub/districtHeating/class/[HeatGrid.py](#)

## 5.6 HeatSink.HeatSink Class Reference

### Public Member Functions

- def `__init__` (self, tableOfConsumer)
- def `consumer` (self, i=slice(None, None))

#### 5.6.1 Detailed Description

Definition at line 14 of file HeatSink.py.

#### 5.6.2 Constructor & Destructor Documentation

##### 5.6.2.1 `__init__()`

```
def HeatSink.HeatSink.__init__ (  
    self,  
    tableOfConsumer )
```

Definition at line 15 of file HeatSink.py.

#### 5.6.3 Member Function Documentation

##### 5.6.3.1 `consumer()`

```
def HeatSink.HeatSink.consumer (  
    self,  
    i = slice (None, None) )
```

Definition at line 29 of file HeatSink.py.

The documentation for this class was generated from the following file:

- C:/Users/jpelda/Documents/GitHub/districtHeating/class/[HeatSink.py](#)

## 5.7 HeatSink\_Consumptionprofiles.HeatSink\_Consumptionprofiles Class Reference

### Public Member Functions

- def `__init__`
- def `date` (self, i=slice(None, None))
- def `consumptionProfile` (self, profile, i=slice(None, None))

### 5.7.1 Detailed Description

Definition at line 8 of file HeatSink\_Consumptionprofiles.py.

### 5.7.2 Constructor & Destructor Documentation

#### 5.7.2.1 \_\_init\_\_()

```
def HeatSink_Consumptionprofiles.HeatSink_Consumptionprofiles.__init__ (
    self,
    filename = os.getcwd() + os.sep + 'heat_consumptionProfiles.csv',
    startrow = 1,
    dtype = {'names':(
        'industry',
        formats )
    },
    'date',
    'household'
```

Definition at line 17 of file HeatSink\_Consumptionprofiles.py.

### 5.7.3 Member Function Documentation

#### 5.7.3.1 consumptionProfile()

```
def HeatSink_Consumptionprofiles.HeatSink_Consumptionprofiles.consumptionProfile (
    self,
    profile,
    i = slice(None, None) )
```

Definition at line 34 of file HeatSink\_Consumptionprofiles.py.

#### 5.7.3.2 date()

```
def HeatSink_Consumptionprofiles.HeatSink_Consumptionprofiles.date (
    self,
    i = slice(None, None) )
```

Definition at line 32 of file HeatSink\_Consumptionprofiles.py.

The documentation for this class was generated from the following file:

- C:/Users/jpelda/Documents/GitHub/districtHeating/class/HeatSink\_Consumptionprofiles.py

## 5.8 HeatSource.HeatSource Class Reference

### Public Member Functions

- def `__init__` (self, tableOfProducer)
- def `producer` (self, i=slice(None, None))

### 5.8.1 Detailed Description

Definition at line 9 of file HeatSource.py.

### 5.8.2 Constructor & Destructor Documentation

#### 5.8.2.1 `__init__()`

```
def HeatSource.HeatSource.__init__ (  
    self,  
    tableOfProducer )
```

Definition at line 11 of file HeatSource.py.

### 5.8.3 Member Function Documentation

#### 5.8.3.1 `producer()`

```
def HeatSource.HeatSource.producer (  
    self,  
    i = slice(None, None) )
```

Definition at line 19 of file HeatSource.py.

The documentation for this class was generated from the following file:

- C:/Users/jpelda/Documents/GitHub/districtHeating/class/[HeatSource.py](#)

## 5.9 Node.Node Class Reference

### Public Member Functions

- def `__init__` (self, nodeValues)

## Public Attributes

- [index](#)
- [x](#)
- [y](#)
- [name](#)
- [height](#)
- [SP\\_RP](#)

### 5.9.1 Detailed Description

Definition at line 9 of file Node.py.

### 5.9.2 Constructor & Destructor Documentation

#### 5.9.2.1 `__init__()`

```
def Node.Node.__init__ (
    self,
    nodeValues )
```

Definition at line 10 of file Node.py.

### 5.9.3 Member Data Documentation

#### 5.9.3.1 `height`

`Node.Node.height`

Definition at line 15 of file Node.py.

#### 5.9.3.2 `index`

`Node.Node.index`

Definition at line 11 of file Node.py.

### 5.9.3.3 name

`Node.Node.name`

Definition at line 14 of file Node.py.

### 5.9.3.4 SP\_RP

`Node.Node.SP_RP`

Definition at line 16 of file Node.py.

### 5.9.3.5 x

`Node.Node.x`

Definition at line 12 of file Node.py.

### 5.9.3.6 y

`Node.Node.y`

Definition at line 13 of file Node.py.

The documentation for this class was generated from the following file:

- [C:/Users/jpelda/Documents/GitHub/districtHeating/class/Node.py](#)

## 5.10 Pipe.Pipe Class Reference

### Public Member Functions

- `def __init__ (self, pipeValues)`
- `def setHeatflow (self, heatFlow)`
- `def getHeatflow (self)`
- `def start_flowspeed (self)`
- `def reynold (self)`
- `def heat_transferCoefficient (self, transferCoefficients, layer_heat_conductivities, layer_thicknesses)`
- `def heatloss (self)`
- `def pipe_lambda (self)`
- `def pressure_difference (self)`
- `def end_pressure (self, start_pressure)`
- `def end_volumeStream (self)`
- `def end_flowspeed (self)`
- `def volume (self)`



## Public Attributes

- [ambient\\_temp](#)
- [fluid\\_temp](#)
- [index](#)
- [start\\_x](#)
- [start\\_y](#)
- [end\\_x](#)
- [end\\_y](#)
- [start\\_node\\_name](#)
- [end\\_node\\_name](#)
- [length](#)
- [diameter\\_inner](#)
- [diameter\\_outer](#)
- [start\\_height](#)
- [end\\_height](#)
- [roughness](#)
- [SP\\_RP](#)
- [heatTransitionCoefficient](#)

### 5.10.1 Detailed Description

Definition at line 12 of file Pipe.py.

### 5.10.2 Constructor & Destructor Documentation

#### 5.10.2.1 `__init__()`

```
def Pipe.Pipe.__init__ (
    self,
    pipeValues )
```

Definition at line 13 of file Pipe.py.

### 5.10.3 Member Function Documentation

#### 5.10.3.1 `end_flowspeed()`

```
def Pipe.Pipe.end_flowspeed (
    self )
```

Definition at line 209 of file Pipe.py.

#### 5.10.3.2 end\_pressure()

```
def Pipe.Pipe.end_pressure (
    self,
    start_pressure )
```

Definition at line 200 of file Pipe.py.

#### 5.10.3.3 end\_volumeStream()

```
def Pipe.Pipe.end_volumeStream (
    self )
```

Definition at line 204 of file Pipe.py.

#### 5.10.3.4 getHeatflow()

```
def Pipe.Pipe.getHeatflow (
    self )
```

Definition at line 81 of file Pipe.py.

#### 5.10.3.5 heat\_transferCoefficient()

```
def Pipe.Pipe.heat_transferCoefficient (
    self,
    transferCoefficients,
    layer_heat_conductivities,
    layer_thicknesses )

array of transferCoefficients = alpha [W / m2*K]
array of heat_conductivities = lamda [W / m*K]
```

Definition at line 114 of file Pipe.py.

#### 5.10.3.6 heatloss()

```
def Pipe.Pipe.heatloss (
    self )
```

Definition at line 126 of file Pipe.py.

#### 5.10.3.7 pipe\_lambda()

```
def Pipe.Pipe.pipe_lambda (
    self )
```

Calculation of lambda  
If the flow is laminar...  
else if the flow is turbulent...

Definition at line 153 of file Pipe.py.

#### 5.10.3.8 pressure\_difference()

```
def Pipe.Pipe.pressure_difference (
    self )
```

Difference between PressureStart and PressureEnd  
calculated by Darcy-Law

Definition at line 184 of file Pipe.py.

#### 5.10.3.9 reynold()

```
def Pipe.Pipe.reynold (
    self )
```

calculation of reynold number  
 $Re = (w * d) / \mu$

Definition at line 100 of file Pipe.py.

#### 5.10.3.10 setHeatflow()

```
def Pipe.Pipe.setHeatflow (
    self,
    heatFlow )
```

Definition at line 78 of file Pipe.py.

#### 5.10.3.11 start\_flowspeed()

```
def Pipe.Pipe.start_flowspeed (
    self )

calculation of flow speed

 $((m^3)/h) / 3600 = ((m^3)/s)$ 

 $w = \text{VolumeStream (in } (m^3)/s) / A \text{ (in } m^2)$ 
```

Definition at line 86 of file Pipe.py.

#### 5.10.3.12 volume()

```
def Pipe.Pipe.volume (
    self )
```

Definition at line 214 of file Pipe.py.

### 5.10.4 Member Data Documentation

#### 5.10.4.1 ambient\_temp

```
Pipe.Pipe.ambient_temp
```

Definition at line 15 of file Pipe.py.

#### 5.10.4.2 diameter\_inner

```
Pipe.Pipe.diameter_inner
```

Definition at line 35 of file Pipe.py.

#### 5.10.4.3 diameter\_outer

```
Pipe.Pipe.diameter_outer
```

Definition at line 36 of file Pipe.py.

#### 5.10.4.4 end\_height

Pipe.Pipe.end\_height

Definition at line 38 of file Pipe.py.

#### 5.10.4.5 end\_node\_name

Pipe.Pipe.end\_node\_name

Definition at line 33 of file Pipe.py.

#### 5.10.4.6 end\_x

Pipe.Pipe.end\_x

Definition at line 30 of file Pipe.py.

#### 5.10.4.7 end\_y

Pipe.Pipe.end\_y

Definition at line 31 of file Pipe.py.

#### 5.10.4.8 fluid\_temp

Pipe.Pipe.fluid\_temp

Definition at line 16 of file Pipe.py.

#### 5.10.4.9 heatTransitionCoefficient

Pipe.Pipe.heatTransitionCoefficient

Definition at line 43 of file Pipe.py.

#### 5.10.4.10 index

`Pipe.Pipe.index`

Definition at line 27 of file Pipe.py.

#### 5.10.4.11 length

`Pipe.Pipe.length`

Definition at line 34 of file Pipe.py.

#### 5.10.4.12 roughness

`Pipe.Pipe.roughness`

Definition at line 39 of file Pipe.py.

#### 5.10.4.13 SP\_RP

`Pipe.Pipe.SP_RP`

Definition at line 40 of file Pipe.py.

#### 5.10.4.14 start\_height

`Pipe.Pipe.start_height`

Definition at line 37 of file Pipe.py.

#### 5.10.4.15 start\_node\_name

`Pipe.Pipe.start_node_name`

Definition at line 32 of file Pipe.py.

#### 5.10.4.16 start\_x

`Pipe.Pipe.start_x`

Definition at line 28 of file Pipe.py.

#### 5.10.4.17 start\_y

`Pipe.Pipe.start_y`

Definition at line 29 of file Pipe.py.

The documentation for this class was generated from the following file:

- [C:/Users/jpelda/Documents/GitHub/districtHeating/class/Pipe.py](#)

## 5.11 Producer.Producer Class Reference

### Public Member Functions

- `def __init__` (self, producerValues)

### Public Attributes

- `name`
- `power`
- `start_node_name`
- `end_node_name`

### 5.11.1 Detailed Description

Definition at line 8 of file Producer.py.

### 5.11.2 Constructor & Destructor Documentation

#### 5.11.2.1 \_\_init\_\_()

```
def Producer.Producer.__init__ (  
    self,  
    producerValues )
```

Definition at line 9 of file Producer.py.

### 5.11.3 Member Data Documentation

#### 5.11.3.1 `end_node_name`

`Producer.Producer.end_node_name`

Definition at line 14 of file `Producer.py`.

#### 5.11.3.2 `name`

`Producer.Producer.name`

Definition at line 11 of file `Producer.py`.

#### 5.11.3.3 `power`

`Producer.Producer.power`

Definition at line 12 of file `Producer.py`.

#### 5.11.3.4 `start_node_name`

`Producer.Producer.start_node_name`

Definition at line 13 of file `Producer.py`.

The documentation for this class was generated from the following file:

- `C:/Users/jpelda/Documents/GitHub/districtHeating/class/Producer.py`

## 5.12 Pump.Pump Class Reference

### Public Member Functions

- `def \_\_init\_\_(self, pumpValues)`



## Public Attributes

- [index](#)
- [profil](#)
- [start\\_node\\_name](#)
- [end\\_node\\_name](#)

### 5.12.1 Detailed Description

Definition at line 9 of file Pump.py.

### 5.12.2 Constructor & Destructor Documentation

#### 5.12.2.1 `__init__()`

```
def Pump.Pump.__init__ (
    self,
    pumpValues )
```

Definition at line 10 of file Pump.py.

### 5.12.3 Member Data Documentation

#### 5.12.3.1 `end_node_name`

`Pump.Pump.end_node_name`

Definition at line 14 of file Pump.py.

#### 5.12.3.2 `index`

`Pump.Pump.index`

Definition at line 11 of file Pump.py.

### 5.12.3.3 profil

`Pump.Pump.profil`

Definition at line 12 of file Pump.py.

### 5.12.3.4 start\_node\_name

`Pump.Pump.start_node_name`

Definition at line 13 of file Pump.py.

The documentation for this class was generated from the following file:

- `C:/Users/jpelda/Documents/GitHub/districtHeating/class/Pump.py`

## 5.13 test.test Class Reference

### Public Member Functions

- `def __init__ (self, i)`
- `def was (self)`

### 5.13.1 Detailed Description

Definition at line 9 of file test.py.

### 5.13.2 Constructor & Destructor Documentation

#### 5.13.2.1 \_\_init\_\_()

```
def test.test.__init__ (  
    self,  
    i )
```

Definition at line 10 of file test.py.

### 5.13.3 Member Function Documentation

#### 5.13.3.1 was()

```
def test.test.was (  
    self )
```

Definition at line 14 of file test.py.

The documentation for this class was generated from the following file:

- `C:/Users/jpelda/Documents/GitHub/districtHeating/class/test.py`

## Chapter 6

# File Documentation

### 6.1 C:/Users/jpelda/Documents/GitHub/districtHeating/class/Consumer.py File Reference

#### Classes

- class [Consumer.Consumer](#)

#### Namespaces

- [Consumer](#)

### 6.2 C:/Users/jpelda/Documents/GitHub/districtHeating/class/DataIO.py File Reference

#### Classes

- class [DataIO.DataIO](#)

#### Namespaces

- [DataIO](#)

### 6.3 C:/Users/jpelda/Documents/GitHub/districtHeating/class/DataIO/importDBFfromSTANET.py File Reference ↩↪

#### Namespaces

- [importDBFfromSTANET](#)

## Functions

- def [importDBFfromSTANET.getPipe](#) (namePipe)
- def [importDBFfromSTANET.getNode](#) (nameNode)
- def [importDBFfromSTANET.getHeatExchanger](#) (nameHeatExchanger)

## Variables

- [importDBFfromSTANET.url](#) = os.path.join(os.path.abspath("."), os.path.join('input', 'TestNetz'))

## 6.4 C:/Users/jpelda/Documents/GitHub/districtHeating/class/Dictionary.py File Reference

### Namespaces

- [Dictionary](#)

### Variables

- dictionary [Dictionary.HeatGrid\\_pipe\\_dtype](#)
- dictionary [Dictionary.HeatGrid\\_node\\_dtype](#)
- dictionary [Dictionary.HeatSink\\_consumer\\_dtype](#)
- dictionary [Dictionary.HeatGrid\\_pump\\_dtype](#)
- dictionary [Dictionary.HeatSource\\_producer\\_dtype](#)
- dictionary [Dictionary.STANET\\_nodes](#)
- dictionary [Dictionary.STANET\\_pipes](#)
- dictionary [Dictionary.STANET\\_consumer](#)
- dictionary [Dictionary.STANET\\_producer](#)
- dictionary [Dictionary.HeatGrid\\_STANET\\_nodes\\_allocation](#)
- dictionary [Dictionary.HeatGrid\\_STANET\\_pipes\\_allocation](#)
- dictionary [Dictionary.HeatSink\\_STANET\\_consumer\\_allocation](#)
- dictionary [Dictionary.Pump\\_STANET\\_consumer\\_allocation](#)
- dictionary [Dictionary.HeatSource\\_STANET\\_producer\\_allocation](#)

## 6.5 C:/Users/jpelda/Documents/GitHub/districtHeating/class/DistrictHeatingSystem.py File Reference

### Classes

- class [DistrictHeatingSystem.DistrictHeatingSystem](#)

### Namespaces

- [DistrictHeatingSystem](#)

## 6.6 C:/Users/jpelda/Documents/GitHub/districtHeating/class/function.py File Reference

### Namespaces

- [function](#)

### Functions

- def [function.inzidenzmatrix\\_nodePipe\\_VL](#) (row, column)

## 6.7 C:/Users/jpelda/Documents/GitHub/districtHeating/class/HeatExchanger.py File Reference

### Classes

- class [HeatExchanger.HeatExchanger](#)

### Namespaces

- [HeatExchanger](#)

## 6.8 C:/Users/jpelda/Documents/GitHub/districtHeating/class/HeatGrid.py File Reference

### Classes

- class [HeatGrid.HeatGrid](#)

### Namespaces

- [HeatGrid](#)

## 6.9 C:/Users/jpelda/Documents/GitHub/districtHeating/class/HeatSink.py File Reference

### Classes

- class [HeatSink.HeatSink](#)

### Namespaces

- [HeatSink](#)

## 6.10 C:/Users/jpelda/Documents/GitHub/districtHeating/class/HeatSink\_Consumptionprofiles.py File Reference

### Classes

- class [HeatSink\\_Consumptionprofiles.HeatSink\\_Consumptionprofiles](#)

### Namespaces

- [HeatSink\\_Consumptionprofiles](#)

## 6.11 C:/Users/jpelda/Documents/GitHub/districtHeating/class/HeatSource.py File Reference

### Classes

- class [HeatSource.HeatSource](#)

### Namespaces

- [HeatSource](#)

## 6.12 C:/Users/jpelda/Documents/GitHub/districtHeating/class/Node.py File Reference

### Classes

- class [Node.Node](#)

### Namespaces

- [Node](#)

## 6.13 C:/Users/jpelda/Documents/GitHub/districtHeating/class/Pipe.py File Reference

### Classes

- class [Pipe.Pipe](#)

### Namespaces

- [Pipe](#)

## 6.14 C:/Users/jpelda/Documents/GitHub/districtHeating/class/Producer.py File Reference

### Classes

- class [Producer.Producer](#)

### Namespaces

- [Producer](#)

## 6.15 C:/Users/jpelda/Documents/GitHub/districtHeating/class/Pump.py File Reference

### Classes

- class [Pump.Pump](#)

### Namespaces

- [Pump](#)

## 6.16 C:/Users/jpelda/Documents/GitHub/districtHeating/class/test.py File Reference

### Classes

- class [test.test](#)

### Namespaces

- [test](#)

## 6.17 C:/Users/jpelda/Documents/GitHub/districtHeating/function/dbflInputStanet.py File Reference

### Namespaces

- [dbflInputStanet](#)

### Functions

- def [dbflInputStanet.getPipe](#) (namePipe)
- def [dbflInputStanet.getNode](#) (nodeName)
- def [dbflInputStanet.getHeatExchanger](#) (nameHeatExchanger)

### Variables

- [dbfInputStanet.url](#) = `os.path.join(os.path.abspath("."), os.path.join('input', 'TestNetz'))`

## 6.18 C:/Users/jpelda/Documents/GitHub/districtHeating/function/inzidenzmatrix.py File Reference

### Namespaces

- [inzidenzmatrix](#)

### Functions

- def [inzidenzmatrix.inzidenzmatrix](#) (rows, cols)

## 6.19 C:/Users/jpelda/Documents/GitHub/districtHeating/function/STANET\_DBFtoClass.py File Reference

### Namespaces

- [STANET\\_DBFtoClass](#)

### Functions

- def [STANET\\_DBFtoClass.DBF\\_knotPipesToClassNetwork](#) ()

## 6.20 C:/Users/jpelda/Documents/GitHub/districtHeating/Main.py File Reference

### Namespaces

- [Main](#)

### Variables

- [Main.DataIO](#)
- [Main.heatgrid\\_nodes](#)
- [Main.heatgrid\\_pipes](#)
- [Main.heatsink](#)
- [Main.heatsource](#)
- [Main.DHS1](#) = `DistrictHeatingSystem(heatgrid_pipes, heatgrid_nodes, heatsink, heatsource)`

## 6.21 C:/Users/jpelda/Documents/GitHub/districtHeating/test/testPipe.py File Reference

### Namespaces

- [testPipe](#)

### Variables

- dictionary [testPipe.pipeValue](#)