```
import pandas as pd

data = pd.read_csv(r'C:\Users\JAISON ABISHEK\Downloads\01.Data
Cleaning and Preprocessing.csv')

type(data)
```

```
pandas.core.frame.DataFrame
```

```
data.describe()
```

```
          Y-Kappa    ChipRate  BF-CMratio     BlowFlow  ChipLevel4   \
count  324.000000  319.000000  307.000000   308.000000   323.000000
mean    20.635370   14.347937   87.464456  1237.837614   258.164483
std      3.070036    1.499095    7.995012   100.593735    87.987452
min     12.170000    9.983000   68.645000     0.000000     0.000000
25%     18.382500   13.358000   81.823000  1193.215250   213.527000
50%     20.845000   14.308000   86.739000  1273.138500   271.792000
75%     23.032500   15.517000   92.372000  1289.196000   321.680000
max     27.600000   16.958000  121.717000  1351.240000   419.014000

       T-upperExt-2   T-lowerExt-2         UCZAA  WhiteFlow-4
AAWhiteSt-4   \
count     322.000000      322.000000  299.000000    323.000000
173.000000
mean      356.904295      324.020180    1.492010    591.732260
6.140410
std         9.209290        7.621402    0.105923     67.016351
0.081609
min       339.168000      284.633000    1.182000    405.111000
5.890000
25%       350.241250      321.420000    1.431500    540.989500
6.089000
50%       356.843000      325.669000    1.498000    592.895000
6.135000
75%       362.242250      329.175000    1.560500    639.480500
6.199000
max       399.135000      337.012000    1.747000    731.394000
6.340000

       ...  SteamFlow-4   Lower-HeatT-3  Upper-HeatT-3   ChipMass-
4   \
count  ...    323.000000     322.000000     322.000000   323.000000

mean   ...     66.668285     325.567820     300.525699   162.222322

std    ...      5.708587       4.609862       4.568484    14.160688

min    ...     48.568000     318.051000     293.312000   113.922000

25%    ...     62.518000     321.385500     296.513250   153.032500
```

```
50%    ...     67.429000     324.741000      299.126000   163.690000

75%    ...     71.522000     329.845250      304.244750   172.555000

max    ...     76.147000     333.854000      311.146000   189.268000


       WeakLiquorF   BlackFlow-2   WeakWashF   SteamHeatF-3   T-Top-
Chips-4   \
count    323.000000    322.000000  323.000000     322.000000
323.000000
mean     873.828941   1175.917016  263.543068      49.696907
251.240087
std      122.073521    149.334010  163.666942       4.551909
1.283432
min      486.938000    838.948000    0.000000      35.510000
248.359000
25%      792.019500   1044.817500  134.649000      46.389750
250.312000
50%      865.254000   1150.221500  269.193000      50.277000
251.380000
75%      965.286500   1319.021250  405.563000      53.294250
252.323500
max     1226.277000   1395.767000  715.715000      63.332000
254.122000

       SulphidityL-4
count      173.000000
mean        30.411671
std          0.701317
min         29.010000
25%         29.970000
50%         30.370000
75%         30.820000
max         32.840000

[8 rows x 22 columns]

data.drop_duplicates()

    Observation  Y-Kappa  ChipRate  BF-CMratio  BlowFlow  ChipLevel4
\
0      31-00:00    23.10    16.520     121.717  1177.607      169.805

1      31-01:00    27.60    16.810      79.022  1328.360      341.327

2      31-02:00    23.19    16.709      79.562  1329.407      239.161

3      31-03:00    23.60    16.478      81.011  1334.877      213.527
```

```
4      31-04:00    22.90    15.618      93.244  1334.168      243.131

..          ...      ...       ...         ...       ...          ...

298    12-09:00    20.90    15.167      84.640  1283.706      339.440

299    12-10:00    24.98       NaN      85.034  1278.345      368.564

300    12-11:00    21.00       NaN      88.013  1307.722      278.842

301    12-12:00    21.40       NaN      85.490  1255.986      273.484

307    31-05:00    20.89    14.308      94.172  1327.832      251.120


     T-upperExt-2   T-lowerExt-2    UCZAA  WhiteFlow-4   ...
SteamFlow-4   \
0          358.282         329.545  1.443       599.253  ...
67.122
1          351.050         329.067  1.549       537.201  ...
60.012
2          350.022         329.260  1.600       549.611  ...
61.304
3          350.938         331.142  1.604       623.362  ...
68.496
4          351.640         332.709    NaN       638.672  ...
70.022
..             ...             ...    ...           ...  ...
...
298        354.803         311.041  1.635       532.419  ...
65.561
299        357.723         321.387    NaN       520.365  ...
65.729
300        357.438         323.757    NaN       553.070  ...
65.795
301        361.365         322.689    NaN       590.199  ...
71.456
307        351.263         332.485  1.522       631.514  ...
71.286

     Lower-HeatT-3  Upper-HeatT-3   ChipMass-4   WeakLiquorF
BlackFlow-2   \
0          329.432         303.099      175.964      1127.197
1319.039
1          330.823         304.879      163.202       665.975
1297.317
2          329.140         303.383      164.013       677.534
1327.072
3          328.875         302.254      181.487       767.853
1324.461
```

```
4          328.352         300.954      183.929       888.448
1343.424
..             ...             ...          ...           ...
...
298        332.924         307.626      145.299       832.906
1344.708
299        332.523         307.169      151.544       905.639
1344.469
300        331.263         306.400      157.954       908.691
1344.588
301        333.032         308.732      174.069       986.206
1348.747
307        328.699         300.706      180.229       903.605
1323.082

     WeakWashF   SteamHeatF-3   T-Top-Chips-4   SulphidityL-4
0       257.325         54.612         252.077             NaN
1       241.182         46.603         251.406           29.11
2       237.272         51.795         251.335             NaN
3       239.478         54.846         250.312           29.02
4       215.372         54.186         249.916           29.01
..          ...            ...             ...             ...
298     388.911         49.524         251.833           30.29
299     418.979         48.135         251.614           30.47
300     462.712         54.373         251.197             NaN
301     457.313         53.194         251.324           30.46
307     232.729         54.503         250.084             NaN

[301 rows x 23 columns]

data.isnull()

     Observation  Y-Kappa  ChipRate  BF-CMratio  BlowFlow  ChipLevel4
\
0          False    False     False       False     False        False

1          False    False     False       False     False        False

2          False    False     False       False     False        False

3          False    False     False       False     False        False

4          False    False     False       False     False        False

..           ...      ...       ...         ...       ...          ...

319        False    False     False       False     False        False

320        False    False     False       False     False        False

321        False    False     False       False     False        False
```

```
322         False    False     False        False     False         False

323         False    False     False        False     False         False


     T-upperExt-2   T-lowerExt-2    UCZAA  WhiteFlow-4   ...
SteamFlow-4   \
0             False           False  False         False  ...
False
1             False           False  False         False  ...
False
2             False           False  False         False  ...
False
3             False           False  False         False  ...
False
4             False           False   True         False  ...
False
..              ...             ...    ...           ...  ...
...
319           False           False  False         False  ...
False
320           False           False  False         False  ...
False
321           False           False  False         False  ...
False
322           False           False  False         False  ...
False
323           False           False  False         False  ...
False

     Lower-HeatT-3  Upper-HeatT-3   ChipMass-4   WeakLiquorF
BlackFlow-2   \
0             False           False        False         False
False
1             False           False        False         False
False
2             False           False        False         False
False
3             False           False        False         False
False
4             False           False        False         False
False
..              ...             ...          ...           ...
...
319           False           False        False         False
False
320           False           False        False         False
False
321           False           False        False         False
```

```
False
322          False           False        False         False
False
323          False           False        False         False
False

     WeakWashF   SteamHeatF-3   T-Top-Chips-4   SulphidityL-4
0         False          False           False            True
1         False          False           False           False
2         False          False           False            True
3         False          False           False           False
4         False          False           False           False
..          ...            ...             ...             ...
319       False          False           False           False
320       False          False           False           False
321       False          False           False            True
322       False          False           False           False
323       False          False           False            True

[324 rows x 23 columns]
```

```
data.isnull().sum()
```

```
Observation          0
Y-Kappa              0
ChipRate             5
BF-CMratio          17
BlowFlow            16
ChipLevel4           1
T-upperExt-2         2
T-lowerExt-2         2
UCZAA               25
WhiteFlow-4          1
AAWhiteSt-4        151
AA-Wood-4            1
ChipMoisture-4       1
SteamFlow-4          1
Lower-HeatT-3        2
Upper-HeatT-3        2
ChipMass-4           1
WeakLiquorF          1
BlackFlow-2          2
WeakWashF            1
SteamHeatF-3         2
T-Top-Chips-4        1
SulphidityL-4      151
dtype: int64
```

```
data.notnull()
```

```
     Observation  Y-Kappa  ChipRate  BF-CMratio  BlowFlow  ChipLevel4
\
0            True     True      True        True      True         True

1            True     True      True        True      True         True

2            True     True      True        True      True         True

3            True     True      True        True      True         True

4            True     True      True        True      True         True

..            ...      ...       ...         ...       ...          ...

319          True     True      True        True      True         True

320          True     True      True        True      True         True

321          True     True      True        True      True         True

322          True     True      True        True      True         True

323          True     True      True        True      True         True


     T-upperExt-2   T-lowerExt-2    UCZAA  WhiteFlow-4   ...
SteamFlow-4   \
0              True            True   True          True  ...
True
1              True            True   True          True  ...
True
2              True            True   True          True  ...
True
3              True            True   True          True  ...
True
4              True            True  False          True  ...
True
..              ...             ...    ...           ...  ...
...
319            True            True   True          True  ...
True
320            True            True   True          True  ...
True
321            True            True   True          True  ...
True
322            True            True   True          True  ...
True
323            True            True   True          True  ...
True

     Lower-HeatT-3  Upper-HeatT-3   ChipMass-4   WeakLiquorF
```

```
BlackFlow-2   \
0             True            True          True           True
True
1             True            True          True           True
True
2             True            True          True           True
True
3             True            True          True           True
True
4             True            True          True           True
True
..             ...             ...           ...            ...
...
319           True            True          True           True
True
320           True            True          True           True
True
321           True            True          True           True
True
322           True            True          True           True
True
323           True            True          True           True
True

     WeakWashF   SteamHeatF-3   T-Top-Chips-4   SulphidityL-4
0          True           True            True           False
1          True           True            True            True
2          True           True            True           False
3          True           True            True            True
4          True           True            True            True
..          ...            ...             ...             ...
319        True           True            True            True
320        True           True            True            True
321        True           True            True           False
322        True           True            True            True
323        True           True            True           False

[324 rows x 23 columns]
```

```
data.isnull().sum().sum()
```

```
np.int64(386)
```

```
data2 = data.fillna(value=0)
data2
```

```
    Observation  Y-Kappa  ChipRate  BF-CMratio  BlowFlow  ChipLevel4
\
0      31-00:00    23.10    16.520     121.717  1177.607      169.805
```

```
1      31-01:00    27.60    16.810      79.022  1328.360      341.327
2      31-02:00    23.19    16.709      79.562  1329.407      239.161
3      31-03:00    23.60    16.478      81.011  1334.877      213.527
4      31-04:00    22.90    15.618      93.244  1334.168      243.131
..          ...      ...       ...         ...       ...          ...
319    10-16:00    23.75    12.667      93.450  1178.252      276.955
320     9-19:00    19.80    12.558      94.352  1184.119      297.071
321     9-20:00    23.01    12.550      90.842  1188.517      289.826
322     9-21:00    24.32    13.083      88.910  1192.879      318.006
323     9-22:00    25.75    13.417      85.451  1186.342      248.312

     T-upperExt-2   T-lowerExt-2    UCZAA  WhiteFlow-4   ...
SteamFlow-4   \
0          358.282         329.545  1.443       599.253  ...
67.122
1          351.050         329.067  1.549       537.201  ...
60.012
2          350.022         329.260  1.600       549.611  ...
61.304
3          350.938         331.142  1.604       623.362  ...
68.496
4          351.640         332.709  0.000       638.672  ...
70.022
..             ...             ...    ...           ...  ...
...
319        347.286         310.970  1.523       513.956  ...
61.141
320        399.135         319.576  1.451       570.058  ...
67.667
321        373.633         314.591  1.457       549.306  ...
66.446
322        364.081         308.559  1.523       504.852  ...
61.054
323        356.289         310.482  1.474       497.375  ...
58.247

     Lower-HeatT-3  Upper-HeatT-3   ChipMass-4   WeakLiquorF
BlackFlow-2   \
0          329.432         303.099      175.964      1127.197
1319.039
```

```
1          330.823          304.879      163.202       665.975
1297.317
2          329.140          303.383      164.013       677.534
1327.072
3          328.875          302.254      181.487       767.853
1324.461
4          328.352          300.954      183.929       888.448
1343.424
..             ...              ...          ...           ...
...
319        330.117          304.006      148.174      1027.201
1357.271
320        330.848          304.616      165.178       906.962
1311.177
321        330.226          304.686      160.841       887.125
1319.226
322        327.346          304.363      147.589       804.423
1320.225
323        328.092          304.093      144.218       828.328
1320.848

     WeakWashF   SteamHeatF-3   T-Top-Chips-4   SulphidityL-4
0       257.325         54.612         252.077            0.00
1       241.182         46.603         251.406           29.11
2       237.272         51.795         251.335            0.00
3       239.478         54.846         250.312           29.02
4       215.372         54.186         249.916           29.01
..          ...            ...             ...             ...
319     381.643         45.264         252.947           30.86
320      25.494         50.528         252.092           30.70
321       0.638         45.549         252.438            0.00
322       0.000         43.725         253.176           31.13
323       1.276         43.840         253.216            0.00

[324 rows x 23 columns]

data2.isnull().sum().sum()

np.int64(0)

data3 = data.fillna(method='pad')
data3

C:\Users\JAISON ABISHEK\AppData\Local\Temp\
ipykernel_21184\1183050913.py:1: FutureWarning: DataFrame.fillna with
'method' is deprecated and will raise in a future version. Use
obj.ffill() or obj.bfill() instead.
  data3 = data.fillna(method='pad')

    Observation  Y-Kappa  ChipRate  BF-CMratio  BlowFlow  ChipLevel4
\
```

```
0      31-00:00    23.10    16.520     121.717  1177.607      169.805
1      31-01:00    27.60    16.810      79.022  1328.360      341.327
2      31-02:00    23.19    16.709      79.562  1329.407      239.161
3      31-03:00    23.60    16.478      81.011  1334.877      213.527
4      31-04:00    22.90    15.618      93.244  1334.168      243.131
..          ...      ...       ...         ...       ...          ...
319    10-16:00    23.75    12.667      93.450  1178.252      276.955
320     9-19:00    19.80    12.558      94.352  1184.119      297.071
321     9-20:00    23.01    12.550      90.842  1188.517      289.826
322     9-21:00    24.32    13.083      88.910  1192.879      318.006
323     9-22:00    25.75    13.417      85.451  1186.342      248.312


     T-upperExt-2   T-lowerExt-2    UCZAA  WhiteFlow-4   ...
SteamFlow-4   \
0          358.282         329.545  1.443       599.253  ...
67.122
1          351.050         329.067  1.549       537.201  ...
60.012
2          350.022         329.260  1.600       549.611  ...
61.304
3          350.938         331.142  1.604       623.362  ...
68.496
4          351.640         332.709  1.604       638.672  ...
70.022
..             ...             ...    ...           ...  ...
...
319        347.286         310.970  1.523       513.956  ...
61.141
320        399.135         319.576  1.451       570.058  ...
67.667
321        373.633         314.591  1.457       549.306  ...
66.446
322        364.081         308.559  1.523       504.852  ...
61.054
323        356.289         310.482  1.474       497.375  ...
58.247

     Lower-HeatT-3  Upper-HeatT-3   ChipMass-4   WeakLiquorF
BlackFlow-2   \
```

```
0          329.432         303.099      175.964      1127.197
1319.039
1          330.823         304.879      163.202       665.975
1297.317
2          329.140         303.383      164.013       677.534
1327.072
3          328.875         302.254      181.487       767.853
1324.461
4          328.352         300.954      183.929       888.448
1343.424
..             ...             ...          ...           ...
...
319        330.117         304.006      148.174      1027.201
1357.271
320        330.848         304.616      165.178       906.962
1311.177
321        330.226         304.686      160.841       887.125
1319.226
322        327.346         304.363      147.589       804.423
1320.225
323        328.092         304.093      144.218       828.328
1320.848

     WeakWashF   SteamHeatF-3   T-Top-Chips-4   SulphidityL-4
0       257.325         54.612         252.077             NaN
1       241.182         46.603         251.406           29.11
2       237.272         51.795         251.335           29.11
3       239.478         54.846         250.312           29.02
4       215.372         54.186         249.916           29.01
..          ...            ...             ...             ...
319     381.643         45.264         252.947           30.86
320      25.494         50.528         252.092           30.70
321       0.638         45.549         252.438           30.70
322       0.000         43.725         253.176           31.13
323       1.276         43.840         253.216           31.13

[324 rows x 23 columns]
```

```
data4 = data.fillna(method='bfill')
data4
```

```
C:\Users\JAISON ABISHEK\AppData\Local\Temp\
ipykernel_21184\3775538745.py:1: FutureWarning: DataFrame.fillna with
'method' is deprecated and will raise in a future version. Use
obj.ffill() or obj.bfill() instead.
  data4 = data.fillna(method='bfill')

    Observation  Y-Kappa  ChipRate  BF-CMratio  BlowFlow  ChipLevel4
\
0      31-00:00    23.10    16.520     121.717  1177.607      169.805
```

```
1      31-01:00    27.60    16.810      79.022  1328.360      341.327
2      31-02:00    23.19    16.709      79.562  1329.407      239.161
3      31-03:00    23.60    16.478      81.011  1334.877      213.527
4      31-04:00    22.90    15.618      93.244  1334.168      243.131
..          ...      ...       ...         ...       ...          ...
319    10-16:00    23.75    12.667      93.450  1178.252      276.955
320     9-19:00    19.80    12.558      94.352  1184.119      297.071
321     9-20:00    23.01    12.550      90.842  1188.517      289.826
322     9-21:00    24.32    13.083      88.910  1192.879      318.006
323     9-22:00    25.75    13.417      85.451  1186.342      248.312

     T-upperExt-2   T-lowerExt-2    UCZAA  WhiteFlow-4   ...
SteamFlow-4   \
0          358.282         329.545  1.443       599.253  ...
67.122
1          351.050         329.067  1.549       537.201  ...
60.012
2          350.022         329.260  1.600       549.611  ...
61.304
3          350.938         331.142  1.604       623.362  ...
68.496
4          351.640         332.709  1.436       638.672  ...
70.022
..             ...             ...    ...           ...  ...
...
319        347.286         310.970  1.523       513.956  ...
61.141
320        399.135         319.576  1.451       570.058  ...
67.667
321        373.633         314.591  1.457       549.306  ...
66.446
322        364.081         308.559  1.523       504.852  ...
61.054
323        356.289         310.482  1.474       497.375  ...
58.247

     Lower-HeatT-3  Upper-HeatT-3   ChipMass-4   WeakLiquorF
BlackFlow-2   \
0          329.432         303.099      175.964      1127.197
```

```
1319.039
1          330.823          304.879      163.202       665.975
1297.317
2          329.140          303.383      164.013       677.534
1327.072
3          328.875          302.254      181.487       767.853
1324.461
4          328.352          300.954      183.929       888.448
1343.424
..             ...              ...          ...           ...
...
319        330.117          304.006      148.174      1027.201
1357.271
320        330.848          304.616      165.178       906.962
1311.177
321        330.226          304.686      160.841       887.125
1319.226
322        327.346          304.363      147.589       804.423
1320.225
323        328.092          304.093      144.218       828.328
1320.848

     WeakWashF   SteamHeatF-3   T-Top-Chips-4   SulphidityL-4
0       257.325         54.612         252.077           29.11
1       241.182         46.603         251.406           29.11
2       237.272         51.795         251.335           29.02
3       239.478         54.846         250.312           29.02
4       215.372         54.186         249.916           29.01
..          ...            ...             ...             ...
319     381.643         45.264         252.947           30.86
320      25.494         50.528         252.092           30.70
321       0.638         45.549         252.438           31.13
322       0.000         43.725         253.176           31.13
323       1.276         43.840         253.216             NaN

[324 rows x 23 columns]

import numpy as np
import matplotlib.pyplot as plt
from scipy import stats

data2.columns

Index(['ChipRate', 'BF-CMratio', 'BlowFlow', 'ChipLevel4 ', 'T-
upperExt-2 ',
       'T-lowerExt-2  ', 'UCZAA', 'WhiteFlow-4 ', 'AAWhiteSt-4 ',
       'AA-Wood-4  ', 'ChipMoisture-4 ', 'SteamFlow-4 ', 'Lower-HeatT-
3',
       'Upper-HeatT-3 ', 'ChipMass-4 ', 'WeakLiquorF ', 'BlackFlow-2
',
```

```
       'WeakWashF ', 'SteamHeatF-3 ', 'T-Top-Chips-4 ', 'SulphidityL-4
'],
      dtype='object')

data2.drop(['ChipRate'], axis=1, inplace=True)
data2.columns

Index(['BF-CMratio', 'BlowFlow', 'ChipLevel4 ', 'T-upperExt-2 ',
       'T-lowerExt-2  ', 'UCZAA', 'WhiteFlow-4 ', 'AAWhiteSt-4 ',
       'AA-Wood-4  ', 'ChipMoisture-4 ', 'SteamFlow-4 ', 'Lower-HeatT-
3',
       'Upper-HeatT-3 ', 'ChipMass-4 ', 'WeakLiquorF ', 'BlackFlow-2
',
       'WeakWashF ', 'SteamHeatF-3 ', 'T-Top-Chips-4 ', 'SulphidityL-4
'],
      dtype='object')

Q1 = data2.quantile(0.25)
Q3 = data2.quantile(0.75)

IQR = Q3 - Q1
print(IQR)

BF-CMratio          11.11225
BlowFlow            98.43375
ChipLevel4         107.92275
T-upperExt-2        11.96500
T-lowerExt-2         7.82875
UCZAA                0.13925
WhiteFlow-4         98.59525
AAWhiteSt-4          6.14000
AA-Wood-4            1.45900
ChipMoisture-4       2.22000
SteamFlow-4          9.04675
Lower-HeatT-3        8.46750
Upper-HeatT-3        7.77050
ChipMass-4          19.70375
WeakLiquorF        174.05550
BlackFlow-2        276.51675
WeakWashF          271.44325
SteamHeatF-3         6.94975
T-Top-Chips-4        2.01025
SulphidityL-4       30.40250
dtype: float64

df_filtered = data2[~((data2 < (Q1 - 1.5 * IQR)) | (data2 > (Q3 + 1.5
* IQR)))]
print(df_filtered)

     BF-CMratio  BlowFlow  ChipLevel4   T-upperExt-2   T-lowerExt-2
UCZAA  \
```

```
0           NaN  1177.607      169.805        358.282          329.545
1.443
1        79.022  1328.360      341.327        351.050          329.067
1.549
2        79.562  1329.407      239.161        350.022          329.260
1.600
3        81.011  1334.877      213.527        350.938          331.142
1.604
4        93.244  1334.168      243.131        351.640          332.709
NaN
..          ...       ...          ...            ...              ...
...
319      93.450  1178.252      276.955        347.286          310.970
1.523
320      94.352  1184.119      297.071            NaN          319.576
1.451
321      90.842  1188.517      289.826        373.633          314.591
1.457
322      88.910  1192.879      318.006        364.081              NaN
1.523
323      85.451  1186.342      248.312        356.289          310.482
1.474

     WhiteFlow-4   AAWhiteSt-4   AA-Wood-4    ChipMoisture-4
SteamFlow-4   \
0         599.253         0.000       16.471           46.011
67.122
1         537.201         6.076       16.543           43.954
60.012
2         549.611         0.000       16.559           44.495
61.304
3         623.362         6.054       16.562           45.592
68.496
4         638.672         6.110       16.677           45.512
70.022
..            ...           ...          ...              ...
...
319       513.956         6.068       17.165           45.954
61.141
320       570.058         6.190       16.911           44.198
67.667
321       549.306         0.000       16.858           44.079
66.446
322       504.852         6.128       16.821           43.734
61.054
323       497.375         0.000       16.822           43.627
58.247

     Lower-HeatT-3  Upper-HeatT-3   ChipMass-4   WeakLiquorF
```

```
BlackFlow-2   \
0          329.432         303.099      175.964      1127.197
1319.039
1          330.823         304.879      163.202       665.975
1297.317
2          329.140         303.383      164.013       677.534
1327.072
3          328.875         302.254      181.487       767.853
1324.461
4          328.352         300.954      183.929       888.448
1343.424
..             ...             ...          ...           ...
...
319        330.117         304.006      148.174      1027.201
1357.271
320        330.848         304.616      165.178       906.962
1311.177
321        330.226         304.686      160.841       887.125
1319.226
322        327.346         304.363      147.589       804.423
1320.225
323        328.092         304.093      144.218       828.328
1320.848

     WeakWashF   SteamHeatF-3   T-Top-Chips-4   SulphidityL-4
0       257.325         54.612         252.077            0.00
1       241.182         46.603         251.406           29.11
2       237.272         51.795         251.335            0.00
3       239.478         54.846         250.312           29.02
4       215.372         54.186         249.916           29.01
..          ...            ...             ...             ...
319     381.643         45.264         252.947           30.86
320      25.494         50.528         252.092           30.70
321       0.638         45.549         252.438            0.00
322       0.000         43.725         253.176           31.13
323       1.276         43.840         253.216            0.00

[324 rows x 20 columns]

data2.describe()

       BF-CMratio     BlowFlow  ChipLevel4   T-upperExt-2   T-
lowerExt-2    \
count  324.000000   324.000000   324.000000     324.000000
324.000000
mean    82.875272  1176.709830   257.367679     354.701182
322.020056
std     21.025304   285.954891    89.014211      29.464419
26.529237
min      0.000000     0.000000     0.000000       0.000000
```

```
0.000000
25%     81.011000  1190.195000   213.362250     350.139750
321.318250
50%     85.828500  1254.658500   271.605500     356.782000
325.638500
75%     92.123250  1288.628750   321.285000     362.104750
329.147000
max    121.717000  1351.240000   419.014000     399.135000
337.012000

            UCZAA  WhiteFlow-4   AAWhiteSt-4   AA-Wood-4
ChipMoisture-4   \
count  324.000000    324.000000    324.000000   324.000000
324.000000
mean     1.376886    589.905926      3.278676    17.780836
46.637580
std      0.411528     74.551912      3.068435     1.346680
2.990143
min      0.000000      0.000000      0.000000     0.000000
0.000000
25%      1.416000    540.862500      0.000000    17.101500
45.689000
50%      1.485000    592.717000      6.009500    17.758000
46.835500
75%      1.555250    639.457750      6.140000    18.560500
47.909000
max      1.747000    731.394000      6.340000    19.582000
50.658000

       SteamFlow-4   Lower-HeatT-3  Upper-HeatT-3   ChipMass-4
WeakLiquorF   \
count    324.000000     324.000000      324.000000   324.000000
324.000000
mean      66.462519     323.558142      298.670602   161.721636
871.131938
std        6.797438      25.949567       24.010833    16.766835
131.196523
min        0.000000       0.000000        0.000000     0.000000
0.000000
25%       62.472750     321.368250      296.457750   152.851250
791.096750
50%       67.408000     324.131000      299.057500   163.601000
865.254000
75%       71.519500     329.835750      304.228250   172.555000
965.152250
max       76.147000     333.854000      311.146000   189.268000
1226.277000

       BlackFlow-2   WeakWashF   SteamHeatF-3   T-Top-Chips-4
SulphidityL-4
```

```
count    324.000000  324.000000     324.000000      324.000000
324.000000
mean    1168.658269  262.729664      49.390136      250.464654
16.238330
std      175.133720  164.067984       5.982470       14.016483
15.202823
min        0.000000    0.000000       0.000000        0.000000
0.000000
25%     1042.475000  133.968250      46.335000      250.309500
0.000000
50%     1148.117500  266.983500      50.192500      251.375000
29.236000
75%     1318.991750  405.411500      53.284750      252.319750
30.402500
max     1395.767000  715.715000      63.332000      254.122000
32.840000
```