#Importing the necessary libraries import numpy as np import pandas as pd from scipy.stats import stats

df = pd.read_csv("C:\\Users\\jayaraman\\Main Flow Services And
Technology Internship\\01.Data Cleaning and Preprocessing.csv")

print(df.info)

print(dr.into)												
	<pre><bound \<="" bf-cmratio="" blowflow="" chiplevel4="" chiprate="" dataframe.info="" method="" observation="" of="" pre="" y-kappa=""></bound></pre>											
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						
_												
	-upperExt-2	T-lower	Ext-2	UCZAA White	eFlow-4							
SteamF	low-4 \ 358.282		329.545	1.443	599.253							
67.122	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 70.022	351.640		332.709	NaN	638.672							
319 61.141	347.286		310.970	1.523	513.956							

320 67.667	399.135	319.576	1.451	570.058
321	373.633	314.591	1.457	549.306
66.446 322	364.081	308.559 1	1.523	504.852
61.054 323	356.289	310.482	1.474	497.375
58.247				
Lowe BlackFlow		pper-HeatT-3 (ChipMass-4	WeakLiquorF
0 1319.039	329.432	303.099	175.964	1127.197
1 1297.317	330.823	304.879	163.202	665.975
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				
1319.226	330.226	304.686	160.841	887.125
322 1320.225	327.346	304.363	147.589	804.423
323 1320.848	328.092	304.093	144.218	828.328
Weal	kWashF Stea	mHeatF-3 T-Top	o-Chips-4	SulphidityL-4
	257.325 241.182	54.612 46.603	252.077 251.406	NaN 29.11
	237.272 239.478	51.795 54.846	251.335 250.312	NaN 29.02
4 2	215.372	54.186	249.916	29.01
	381.643 25.494	45.264 50.528	252.947 252.092	30.86 30.70
321 322	0.638	45.549	252.438	NaN 31.13
323	0.000 1.276	43.725 43.840	253.176 253.216	NaN

[324 rows x 23 columns]>

type(df)

```
pandas.core.frame.DataFrame
df.head()
  Observation
               Y-Kappa
                         ChipRate
                                   BF-CMratio
                                                BlowFlow
                                                          ChipLevel4
                                                1177.607
                  23.10
                                      121.717
0
     31-00:00
                           16.520
                                                              169.805
     31-01:00
                 27.60
                           16.810
                                       79.022
                                                1328.360
                                                              341.327
1
2
     31-02:00
                 23.19
                           16.709
                                       79.562
                                                1329.407
                                                              239.161
                 23.60
                                       81.011
3
     31-03:00
                           16.478
                                                1334.877
                                                              213.527
     31-04:00
                 22.90
                                       93.244
                                                1334.168
                                                              243.131
                           15.618
   T-upperExt-2 T-lowerExt-2
                                   UCZAA WhiteFlow-4
                                                              SteamFlow-
4
                          329.545
                                                599.253 ...
0
         358.282
                                  1.443
67.122
                                   1.549
         351.050
                          329.067
                                                537.201 ...
1
60.012
         350.022
                          329.260 1.600
                                                549.611 ...
61.304
         350.938
                          331.142
                                   1.604
                                                623.362 ...
68,496
         351.640
                          332.709
                                     NaN
                                                638.672 ...
70.022
   Lower-HeatT-3
                  Upper-HeatT-3
                                   ChipMass-4
                                                 WeakLiquorF
BlackFlow-2
         329.432
                          303.099
                                       175.964
                                                     1127, 197
1319.039
         330.823
                          304.879
                                       163.202
                                                      665.975
1297.317
                          303.383
         329.140
                                       164.013
                                                      677.534
1327.072
         328.875
                          302.254
                                       181.487
                                                      767.853
1324.461
         328.352
                          300.954
                                       183.929
                                                      888.448
1343.424
   WeakWashF
               SteamHeatF-3
                                                SulphidityL-4
                               T-Top-Chips-4
0
      257.325
                       54.612
                                      252.077
                                                           NaN
1
      241.182
                       46.603
                                      251,406
                                                         29.11
2
                       51.795
      237.272
                                      251.335
                                                           NaN
3
      239.478
                       54.846
                                                         29.02
                                      250.312
      215.372
                      54.186
                                      249.916
4
                                                         29.01
[5 rows x 23 columns]
df.tail()
    Observation Y-Kappa ChipRate BF-CMratio
                                                  BlowFlow
                                                            ChipLevel4
319
                   23.75
                             12.667
       10-16:00
                                         93.450
                                                  1178.252
                                                                276.955
```

320	9-19:00	19.80 1	.2.558	94.	. 352	1184.119	:	297.07	1
321	9-20:00	23.01 1	.2.550	90.	.842	1188.517		289.82	6
322	9-21:00	24.32 1	.3.083	88.	.910	1192.879		318.00	6
323	9-22:00	25.75 1	.3.417	85.	.451	1186.342		248.31	.2
	-upperExt-2	T-lowerEx	t-2	UCZAA	White	eFlow-4			
SteamF	low-4 \ 347.286	31	.0.970	1.523		513.956			
61.141 320	399.135	31	9.576	1.451		570.058			
67.667 321	373.633	31	.4.591	1.457		549.306			
66.446	264 001	2.0	0 550	1 522		504 050			
322 61.054	364.081	36	8.559	1.523		504.852			
323	356.289	31	.0.482	1.474		497.375			
58.247									
1.	ower-HeatT-3	Upper-Hea	+T 2	ChipMas	- c 1	WeakLig	uorE		
BlackF		оррет-пеа	111-3	Спітриаз	55-4	weakLiq	uorr		
319	330.117	30	4.006	148	3.174	102	7.201		
1357.2									
320 1311.1	330.848	30	4.616	165	5.178	90	6.962		
321	330.226	ર હ	4.686	166	0.841	88	7.125		
1319.2		30	71.000	100	7.041	00	7.123		
322	327.346	36	4.363	147	7.589	80	4.423		
1320.2									
323	328.092	36	4.093	144	1.218	82	8.328		
1320.8	40								
W	eakWashF S	teamHeatF-3	T-T	op-Chips	s - 4	Sulphidi	tyL-4		
319	381.643	45.26		252.			30.86		
320	25.494	50.52		252.			30.70		
321 322	0.638 0.000	45.54 43.72		252. 253.			NaN 31.13		
323	1.276	43.84		253.			NaN		
[5 row	s x 23 colum	ns J							
df.des	cribe()								
	Y-Kappa	ChipRate		Mratio			ChipLe		\
count	324.000000 20.635370	319.000000 14.347937		000000 464456		.000000 .837614	323.0 258.1		
mean std	3.070036	1.499095		995012		. 593735		87452	

min 25% 50% 75% max	12.170 18.382 20.845 23.032 27.600	500 000 500	9.983 13.358 14.308 15.517 16.958	3000 3000 7000	81.8 86.7	45000 23000 39000 72000 17000) 11) 12) 12	93.2 73.1 89.1	00000 15250 38500 96000 40000	213.5 271.7 321.6	000000 527000 792000 580000 014000
	-upper	_	T-lo	werE	xt-2		UC	ZAA	WhiteF	low-4	
AAWhiteS count 173.0000	322.	000000)	322.	000000	299	9.000	000	323.	000000)
mean 6.140410	356.	904295	5	324.	020180	1	L.492	010	591.	732260)
std	9.	209290)	7.	621402	(0.105	923	67.	016351	L
0.081609 min 5.890000	339.	168000)	284.	633000]	l.182	000	405.	111000)
25% 6.089000	350.	241250)	321.	420000]	L.431	500	540.	989500)
50%	356.	843000)	325.	669000	1	L.498	000	592.	895000)
6.135000 75%		242250)	329.	175000]	L.560	500	639.	480500)
6.199000 max 6.340000	399.	135000)	337.	012000	1	L.747	000	731.	394000)
	St	eamFlo)w-4	Lowe	er-Heat	T-3	Uppe	r-He	atT-3	ChipN	lass-
4 \		323.00			322.000		•		000000	•	000000
	••										
mean .	• •	66.66		3	325.567				525699		222322
std .	• •)8587		4.609				568484		160688
min .	• •	48.56	8000	3	318.051	000		293.	312000	113	922000
25% .		62.51	18000	3	321.385	500		296.	513250	153	032500
50% .		67.42	29000	3	324.741	000		299.	126000	163	690000
75% .		71.52	22000	3	329.845	250		304.	244750	172	555000
max .		76.14	17000	3	33.854	000		311.	146000	189	268000
No	امملالنو	uorE	Black	εl οι	,	eakWa	och E	C+	eamHeat	-E D	T-Top-
Chips-4	/eakLiq										1-10p-
count 323.0000		00000	322	2.000	0000 3	23.00	90000		322.00	0000	
mean 251.2400		28941	1175	5.917	7016 2	63.54	13068		49.69	06907	

std	122.073521	149.334010	163.666942	4.551909
1.283432	2			
min	486.938000	838.948000	0.000000	35.510000
248.3590	900			
25%	792.019500	1044.817500	134.649000	46.389750
250.3120	900			
50%	865.254000	1150.221500	269.193000	50.277000
251.3800	900			
75%	965.286500	1319.021250	405.563000	53.294250
252.323!	500			
max	1226.277000	1395.767000	715.715000	63.332000
254.1220	900			

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

[8 rows x 22 columns]

df.shape

(324, 23)

df.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	Fals	se	False
323	False	False	False		False	Fals	se	False
Tunn	orEv+ 2	T-lowerE>	/ + 2	IICZAA	White	=1 0.4 /		
SteamFlow-		1 - tower Ex	(L-Z	UCZAA	WIITCE	- LOW - 4	• • •	
0 False	False		False	False		False		
1	False		False	False		False		
False 2	False		False	False		False		
False	ratse		гасѕе	ratse		ratse		
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	10136		1 4 1 3 6	1 4 1 3 6		10136		
322	False		False	False		False		
False								
323	False		False	False		False		
False								
Lower	-HeatT-3	Upper-Hea	atT-3	ChipMa	ass-4	WeakLid	quorF	
BlackFlow-	-							
0 False	False		False		False		False	
1	False		False		False		False	
False								
2	False		False		False		False	
False	Fol		Enlar		Enlar		Enlas	
3 False	False		False		False		False	
4	False		False		False		False	
False								
319	False		False		False		False	
False	ratse		ratse		ratse		ratse	
320	False		False		False		False	
False								
321	False		False		False		False	
False								

322	Fals	e	Fa	lse	False	False
False						- 1
323	Fals	e	Fa	lse	False	False
False						
Weakw		SteamHeat		T-Top-Chi		SulphidityL-4
0	False	F	False		False	True
1	False	F	False		False	False
2	False	F	False		False	True
1 2 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	F	False		False	True
[324 rows	x 23 co	lumns]				
df.isnull().sum()					
Observation	n	0				
Y-Kappa		0				
ChipRate		5				
BF-CMratio	1	17				
BlowFlow	•	16				
	1	1				
ChipLevel4						
T-upperExt		2				
T-lowerExt	: - 2	2				
UCZAA		25				
WhiteFlow-		1				
AAWhiteSt-	4	151				
AA-Wood-4		1				
ChipMoistu	ıre-4	1				
SteamFlow-		1				
Lower-Heat		2				
Upper-Heat		2				
		1				
ChipMass-4						
WeakLiquor		1				
BlackFlow-	2	2				
WeakWashF		1				
SteamHeatF	- 3	2				
T-Top-Chip	s-4	1				
Sulphidity		151				
dtype: int		_				
32,701 1110						
df.isnull().sum()	.sum()				
386						

df.n	otnull()								
	Observation	on Y	′-Kappa	ChipRate	BF-CM	Iratio	BlowFlow	w Chi	pLevel4
0	Trı	ıe	True	True		True	Tru	e	True
1	Tru	ıe	True	True		True	Tru	е	True
2	Tru	ıe	True	True		True	Tru	е	True
3	Tru	ıe	True	True		True	Tru	е	True
4	Tru	ıe	True	True		True	Tru	е	True
319	Tru	ıe	True	True		True	Tru	е	True
320	Tru	ıe	True	True		True	Tru	е	True
321	Tru	ıe	True	True		True	Tru	е	True
322	Tru	ıe	True	True		True	Tru	е	True
323	Tru	ıe	True	True		True	Tru	е	True
	T uppopEvt	- n	T 10.40	~Fv+ 3	110744	م ا المالية	Γ Ιου 4		
Stear	T-upperExt mFlow-4 \	2	i - towe	rExt-2	UCZAA	wille	Flow-4		
0		rue		True	True		True		
True 1	7	rue		True	Truo		Truo		
True	ı	rue		True	True		True	• • •	
2		rue		True	True		True		
True 3		rue		True	True		True		
True 4	7	rue		True	False		True		
True									
319		True		True	True		True		
True 320		rue		True	True		True		
True	-			T	T		т		
321 True		rue		True	True		True		
322	7	True		True	True		True		
True	_	_		_					
323 True		rue		True	True		True		
iiue									

Lower-H	eatT-3 Uppe	^-HeatT-3	ChipMass-4	WeakLiquorF
BlackFlow-2	\		·	•
0	True	True	True	True
True				
1	True	True	True	True
True	_	_	_	_
2 T	True	True	True	True
True	True	Truc	True	True
3 True	True	True	True	True
4	True	True	True	True
True	TTUE	True	TTUE	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				
WeakWas	hF SteamHea	atF-3 T-To	op-Chips-4	SulphidityL-4
	rue	True	True	False
	rue	True	True	True
	rue	True	True	False
3 <u>T</u>	rue	True	True	True
4 T	rue	True	True	True
 210 T	• • •	-		
	rue	True	True	True
	rue	True	True	True
	rue	True	True	False
	rue	True	True	True
323 T	rue	True	True	False
[324 rows x	23 columns]			
df_cleaned = df_cleaned	df.dropna()			
0bservat	ion Y-Kappa	ChipRate	BF-CMratio	BlowFlow ChipLevel4
\ 1 31-01	:00 27.60	16.810	79.022	1328.360 341.32
3 31-03	:00 23.60	16.478	81.011	1334.877 213.523

5	1-08:00	14.23	15.350	85.518	1171.604	198.538
7	31-06:00	22.65	14.100	91.887	1307.852	288.989
9	31-08:00	24.70	13.850	96.208	1334.892	362.511
312	31-10:00	24.40	14.117	85.998	1330.104	394.234
317	4-16:00	17.80	16.625	78.367	1276.082	202.744
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
322	9-21:00	24.32	13.083	88.910	1192.879	318.006
T- SteamFl	-upperExt-2 Low-4 \ 351.050	T-lowe	rExt-2 329.067	UCZAA White	eFlow-4	
60.012	350.938		331.142	1.604	623.362	
68.496			325.195			
5 65.225	344.014			1.436	628.245	
7 71.298	352.321		331.162	1.468	625.549	
9 64.249	352.372		327.358	1.515	553.172	
312 62.179	348.089		319.027	1.429	540.558	
317	360.127		329.266	1.488	698.486	
75.296 319	347.286		310.970	1.523	513.956	
61.141 320 67.667	399.135		319.576	1.451	570.058	
322 61.054	364.081		308.559	1.523	504.852	
	ower-HeatT-3 Low-2 \	Upper-I	HeatT-3	ChipMass-4	WeakLiquorF	
1	330.823		304.879	163.202	665.975	
1297.31 3 1324.46	328.875		302.254	181.487	767.853	

5 322.103 298.517 165.814 826.243 907.641 7 329.662 301.539 179.886 837.178 1315.111 9 332.264 305.419 166.120 909.810 1318.725										
7 329.662 301.539 179.886 837.178 1315.111 9 332.264 305.419 166.120 909.810 1318.725 12 329.831 302.652 163.258 827.107 1312.372 317 321.658 297.088 180.438 1017.333 1052.785 319 330.117 304.006 148.174 1027.201 1357.271 320 330.848 304.616 165.178 906.962 1311.177 322 327.346 304.363 147.589 804.423 1320.225 WeakWashF SteamHeatF-3 T-Top-Chips-4 SulphidityL-4 1 241.182 46.603 251.406 29.110 3 239.478 54.846 250.312 29.020 5 595.875 52.807 249.580 30.340 7 234.047 53.805 249.971 29.220 9 180.375 48.842 251.121 29.210		322.10	3	298.51	7 16	55.814	8	326.24	43	
99 332.264 305.419 166.120 909.810 1318.725 312 329.831 302.652 163.258 827.107 1312.372 317 321.658 297.088 180.438 1017.333 1052.785 319 330.117 304.006 148.174 1027.201 1357.271 320 330.848 304.616 165.178 906.962 1311.177 322 327.346 304.363 147.589 804.423 1320.225 WeakWashF SteamHeatF-3 T-Top-Chips-4 SulphidityL-4 1 241.182 46.603 251.406 29.110 3 239.478 54.846 250.312 29.020 5 595.875 52.807 249.580 30.340 7 234.047 53.805 249.971 29.220 9 180.375 48.842 251.121 29.210 312 132.163 49.446 251.406 29.292 317 433.089 54.675 251.747 30.320 319 381.643 45.264 252.947 30.860 320 25.494 50.528 252.947 30.860 320 25.494 50.528 252.092 30.700 322 0.000 43.725 253.176 31.130 [141 rows x 23 columns] print(df_cleaned.head()) Observation Y-Kappa ChipRate BF-CMratio BlowFlow ChipLevel4 \ 1 31-01:00 27.60 16.810 79.022 1328.360 341.327 3 31-03:00 23.60 16.478 81.011 1334.877 213.527 5 1.08:00 14.23 15.350 85.518 1171.604 198.538 7 31.06:00 22.65 14.100 91.887 1307.852 288.989 9 31-08:00 24.70 13.850 96.208 1334.892 362.511 T-upperExt-2 T-lowerExt-2 UCZAA WhiteFlow-4 SteamFlow-4 \ 1 351.050 329.067 1.549 537.201 60.012 3 350.938 331.142 1.604 623.362		329.66	2	301.53	9 17	9.886	8	37.17	78	
1318.725 312 329.831 302.652 163.258 827.107 1312.372 317 321.658 297.088 180.438 1017.333 1052.785 319 330.117 304.006 148.174 1027.201 1357.271 320 330.848 304.616 165.178 906.962 1311.177 322 327.346 304.363 147.589 804.423 1320.225 WeakWashF SteamHeatF-3 T-Top-Chips-4 SulphidityL-4 1 241.182 46.603 251.406 29.110 3 239.478 54.846 250.312 29.020 5 595.875 52.807 249.580 30.340 7 234.047 53.805 249.971 29.220 9 180.375 48.842 251.121 29.210 312 132.163 49.446 251.406 29.922 317 433.089 54.675 251.747 30.320 319 381.643 45.264 252.947 30.860 320 25.494 50.528 252.997 30.700 320 25.494 50.528 252.997 30.700 320 25.494 50.528 252.997 30.700 321 130.6163 49.466 251.406 29.292 317 433.089 54.675 251.747 30.320 319 381.643 45.264 252.947 30.860 320 25.494 50.528 252.997 30.700 322 0.000 43.725 253.176 31.130 [141 rows x 23 columns] print(df_cleaned.head()) Observation Y-Kappa ChipRate BF-CMratio BlowFlow ChipLevel4 \ 1 31-01:00 27.60 16.810 79.022 1328.360 341.327 3 31-03:00 23.60 16.478 81.01 1334.877 213.527 5 1.08:00 14.23 15.350 85.518 1171.604 198.538 7 31-06:00 22.65 14.100 91.887 1307.852 288.989 9 31-08:00 24.70 13.850 96.208 1334.892 362.511 T-upperExt-2 T-lowerExt-2 UCZAA WhiteFlow-4 SteamFlow-4 \ 1 351.050 329.067 1.549 537.201 60.012 3 350.938 331.142 1.604 623.362		222.26	4	205 41	0 16	.c 120	0	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1.0	
312		332.20	4	305.41	9 10	06.120	9	109.8.	10	
312										
1312.372 317		329.83	1	302.65	2 16	3.258	8	327.10	97	
1052.785 319	1312.372									
319		321.65	8	297.08	8 18	80.438	16)17.33	33	
320	319	330.11	7	304.00	6 14	8.174	16	27.20	91	
1311.177 322		330 84	Ω	304 61	6 16	5 178	C) 106 06	52	
WeakWashF	1311.177									
WeakWashF SteamHeatF-3 T-Top-Chips-4 SulphidityL-4 1		327.34	6	304.36	3 14	7.589	8	304.42	23	
1 241.182										
3 239.478 54.846 250.312 29.020 5 595.875 52.807 249.580 30.340 7 234.047 53.805 249.971 29.220 9 180.375 48.842 251.121 29.210 312 132.163 49.446 251.406 29.292 317 433.089 54.675 251.747 30.320 319 381.643 45.264 252.947 30.860 320 25.494 50.528 252.092 30.700 322 0.000 43.725 253.176 31.130 [141 rows x 23 columns] print(df_cleaned.head()) Observation Y-Kappa ChipRate BF-CMratio BlowFlow ChipLevel4 \ 1 31-01:00 27.60 16.810 79.022 1328.360 341.327 3 31.03:00 23.60 16.478 81.011 1334.877 213.527 5 1-08:00 14.23 15.350 85.518 1171.604 198.538 7 31-06:00 22.65 14.100 91.887 1307.852 288.989 9 31-08:00 24.70 13.850 96.208 1334.892 362.511 T-upperExt-2 T-lowerExt-2 UCZAA WhiteFlow-4 SteamFlow-4 \ 1 351.050 329.067 1.549 537.201 60.012 3 350.938 331.142 1.604 623.362 68.496							Sulphid			
9	3 23									
9	5 59									
312		0.375		48.842	251					
317					251					
320										
322 0.000 43.725 253.176 31.130 [141 rows x 23 columns] print(df_cleaned.head()) Observation Y-Kappa ChipRate BF-CMratio BlowFlow ChipLevel4 \ 1										
<pre>print(df_cleaned.head()) Observation Y-Kappa ChipRate BF-CMratio BlowFlow ChipLevel4 \ 1 31-01:00 27.60 16.810</pre>										
<pre>print(df_cleaned.head()) Observation Y-Kappa ChipRate BF-CMratio BlowFlow ChipLevel4 \ 1 31-01:00 27.60 16.810</pre>	322	0.000		43.725	253	5.1/6		31	130	
Observation Y-Kappa ChipRate BF-CMratio BlowFlow ChipLevel4 \ 1	[141 rows	x 23 co	lumns]							
1 31-01:00 27.60 16.810 79.022 1328.360 341.327 3 31-03:00 23.60 16.478 81.011 1334.877 213.527 5 1-08:00 14.23 15.350 85.518 1171.604 198.538 7 31-06:00 22.65 14.100 91.887 1307.852 288.989 9 31-08:00 24.70 13.850 96.208 1334.892 362.511 T-upperExt-2 T-lowerExt-2 UCZAA WhiteFlow-4 SteamFlow-4 \ 1 351.050 329.067 1.549 537.201 60.012 3 350.938 331.142 1.604 623.362 68.496	<pre>print(df_c</pre>	leaned.	head())							
1 31-01:00 27.60 16.810 79.022 1328.360 341.327 3 31-03:00 23.60 16.478 81.011 1334.877 213.527 5 1-08:00 14.23 15.350 85.518 1171.604 198.538 7 31-06:00 22.65 14.100 91.887 1307.852 288.989 9 31-08:00 24.70 13.850 96.208 1334.892 362.511 T-upperExt-2 T-lowerExt-2 UCZAA WhiteFlow-4 SteamFlow-4 \ 1 351.050 329.067 1.549 537.201 60.012 3 350.938 331.142 1.604 623.362 68.496	0bservat	ion Y-	Карра	ChipRate	BF-CMrat	io B	lowFlow	Chir	Level4	\
9 31-08:00 24.70 13.850 96.208 1334.892 362.511 T-upperExt-2 T-lowerExt-2 UCZAA WhiteFlow-4 SteamFlow-4 \ 1 351.050 329.067 1.549 537.201 60.012 3 350.938 331.142 1.604 623.362 68.496			27.60	16.810				•	341.327	
9 31-08:00 24.70 13.850 96.208 1334.892 362.511 T-upperExt-2 T-lowerExt-2 UCZAA WhiteFlow-4 SteamFlow-4 \ 1 351.050 329.067 1.549 537.201 60.012 3 350.938 331.142 1.604 623.362 68.496	3 31-03									
9 31-08:00 24.70 13.850 96.208 1334.892 362.511 T-upperExt-2 T-lowerExt-2 UCZAA WhiteFlow-4 SteamFlow-4 \ 1 351.050 329.067 1.549 537.201 60.012 3 350.938 331.142 1.604 623.362 68.496	5 1-08									
4 \ 1										
4 \ 1	Taunnar	Ev+_2	T-10we	rEvt_2	11C7AA \	lhitaF	1 ow - 4		SteamFlo	\a/ _
60.012 3 350.938 331.142 1.604 623.362 68.496	4 \		1 - COWC	ILXC-Z	UCZAA N	mi cci	COW - T		Jecaiii eo	VV -
3 350.938 331.142 1.604 623.362 68.496		51.050		329.067	1.549	5	37.201			
68.496		50.938		331.142	1.604	6	23.362			
5 344.014 325.195 1.436 628.245	68.496									
	5 3	44.014		325.195	1.436	6	28.245			

65.225 7	352.321	3	331.162	1.468	625.549	
71.298		_	27 250		FF0 170	
9 64.249	352.372	3	327.358	1.515	553.172	
04.249	9					
	ver-HeatT-3 Flow-2 \	Upper-He	eatT-3	ChipMass-4	WeakLiquor	F
1 1297.3	330.823 317	3	804.879	163.202	665.9	75
3 1324.4	328.875 161	3	302.254	181.487	767.8	53
5 907.64	322.103	2	298.517	165.814	826.2	43
7 1315.1	329.662	3	801.539	179.886	837.1	78
9	332.264	3	805.419	166.120	909.8	10
131017	23					
1 3 5 7	241.182 239.478 595.875 234.047	46.6 54.8 52.8 53.8	503 346 307 305	p-Chips-4 251.406 250.312 249.580 249.971	29 30 29	.11 .02 .34 .22
9	180.375	48.8	342	251.121	29	.21
[5 rov	vs x 23 col	umns]				
<pre>df_fil df_fil</pre>	lled = df.f: lled	illna(valı	ıe= <mark>0</mark>)			
	servation	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	2 1329.407	239.161
3	31-03:00	23.60	16.478	81.01	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	2 1184.119	297.071
321	9-20:00	23.01	12.550	90.842	2 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
323	3 22100	23173	131117	031.131	11001312	2 101312
	upperExt-2	T-low	erExt-2	UCZAA Whit	eFlow-4	
SteamFlo	-		329.545	1.443	E00 3E3	
0 67.122	358.282		329.343	1.443	599.253	
1	351.050		329.067	1.549	537.201	
60.012 2	350.022		329.260	1.600	549.611	
61.304						
3 68.496	350.938		331.142	1.604	623.362	
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 66.446	373.633		314.591	1.457	549.306	
322	364.081		308.559	1.523	504.852	
61.054 323	356.289		310.482	1.474	497.375	
58.247	330.203		310.402	1.4/4	4371373 111	
Lov	wer-HeatT-3	Unner	-HeatT-3	ChipMass-4	WeakLiquorF	
BlackFl		оррст	-ncaci-5	CHIPHU33-4	WCakEIquoii	
0 1319.03	329.432		303.099	175.964	1127.197	
1319.03	330.823		304.879	163.202	665.975	; ;
1297.31			202 202	164 012	677 52/	
2 1327.07	329.140 2		303.383	164.013	677.534	•
3	328.875		302.254	181.487	767.853	3
1324.46 4	1 328.352		300.954	183.929	888.448	}
1343.42						
319	330.117		304.006	148.174	1027.201	
1357.27 320	1 330.848		304.616	165.178	906.962)
1311.17			204.010	103.176	900.902	
321	330.226		304.686	160.841	887.125	
1319.22	U					

1 241.182 46.603 251.406 29.11 2 237.272 51.795 251.335 0.06 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 30.76 321 0.638 45.549 252.438 0.06					
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 0.06 1 241.182 46.603 251.406 29.11 2 237.272 51.795 251.335 0.06 3 239.478 54.846 250.312 29.02 4 215.372 54.186 249.916 29.01	_		46 304.	363 147.589	804.423
WeakWashF SteamHeatF-3 T-Top-Chips-4 SulphidityL-4 0 257.325 54.612 252.077 0.06 1 241.182 46.603 251.406 29.11 2 237.272 51.795 251.335 0.06 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 30.76 321 0.638 45.549 252.438 0.06		_	92 304.	093 144.218	828.328
0 257.325 54.612 252.077 0.06 1 241.182 46.603 251.406 29.11 2 237.272 51.795 251.335 0.06 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 30.76 321 0.638 45.549 252.438 0.06					
0 257.325 54.612 252.077 0.06 1 241.182 46.603 251.406 29.11 2 237.272 51.795 251.335 0.06 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 30.76 321 0.638 45.549 252.438 0.06		WeakWashF	SteamHeatF-3	T-Top-Chips-4	SulphidityL-4
2 237.272 51.795 251.335 0.06 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 30.76 321 0.638 45.549 252.438 0.06	0	257.325	54.612	• •	0.00
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 30.76 321 0.638 45.549 252.438 0.06	1	241.182	46.603	251.406	29.11
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 30.76 321 0.638 45.549 252.438 0.06	2	237.272	51.795	251.335	0.00
319 381.643 45.264 252.947 30.86 320 25.494 50.528 252.092 30.76 321 0.638 45.549 252.438 0.06	3	239.478	54.846	250.312	29.02
319 381.643 45.264 252.947 30.86 320 25.494 50.528 252.092 30.76 321 0.638 45.549 252.438 0.06	4	215.372	54.186	249.916	29.01
320 25.494 50.528 252.092 30.76 321 0.638 45.549 252.438 0.06					
321 0.638 45.549 252.438 0.06	319		45.264	252.947	30.86
	320	25.494	50.528	252.092	30.70
322 0.000 43.725 253.176 31.13	321	0.638	45.549	252.438	0.00
	322	0.000	43.725	253.176	31.13

43.840

[324 rows x 23 columns]

1.276

323

df.fillna(method="pad")
df

C:\Users\jayaraman\AppData\Local\Temp\ipykernel_19016\3567329548.py:1:
FutureWarning: DataFrame.fillna with 'method' is deprecated and will
raise in a future version. Use obj.ffill() or obj.bfill() instead.
 df.fillna(method="pad")

253.216

0.00

	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
_	21 02 00	22 10	16 700	70 562	1220 407	220 161
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
5	31-03.00	23.00	10.470	01.011	1334.077	213.327
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
220	0 10 00	10.00	10 550	04.252	1104 110	207 071
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
221	9-20.00	25.01	12.550	90.042	1100.517	209.020
322	9-21:00	24.32	13.083	88.910	1192.879	318.006
	J			30.020		0_0.000
323	9-22:00	25.75	13.417	85.451	1186.342	248.312

T-upp SteamFlow	oerExt-2 -4 \	T-lowerExt-2	UCZAA Whit	eFlow-4
0 67.122	358.282	329.545	1.443	599.253
1 60.012	351.050	329.067	1.549	537.201
2 61.304	350.022	329.260	1.600	549.611
3 68.496	350.938	331.142	1.604	623.362
4 70.022	351.640	332.709	NaN	638.672
319 61 141	347.286	310.970	1.523	513.956
61.141	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 58.247	356.289	310.482	1.474	497.375
	r-HeatT-3	Upper-HeatT-3	ChipMass-4	WeakLiquorF
BlackFlow-	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	328.875	302.254	181.487	767.853
1324.461	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	NaN
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	NaN
322	0.000	43.725	253.176	31.13
323	1.276	43.840	253.216	NaN

[324 rows x 23 columns]

df.fillna(method="ffill")
df

C:\Users\jayaraman\AppData\Local\Temp\ipykernel_19016\1737168024.py:1:
FutureWarning: DataFrame.fillna with 'method' is deprecated and will
raise in a future version. Use obj.ffill() or obj.bfill() instead.
 df.fillna(method="ffill")

	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	Э т 1		116744 1454	- F1 · . 4	
	T-upperExt-	Z I-LOW	erExt-2	UCZAA Whit	eFlow-4	1.1.1

SteamFlow-	4 \			
0	358.282	329.545	1.443	599.253
67.122 1	351.050	329.067	1.549	537.201
60.012	331.030	329.007	1.549	537.201
2	350.022	329.260	1.600	549.611
61.304	250 020	221 142	1 604	(22, 262
3 68.496	350.938	331.142	1.604	623.362
4	351.640	332.709	NaN	638.672
70.022				
• •				
 319	347.286	310.970	1.523	513.956
61.141		5201070		
320	399.135	319.576	1.451	570.058
67.667	272 622	214 501	1 457	E40 206
321 66.446	373.633	314.591	1.457	549.306
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-	-			
9	2 \ 329.432	303.099	175.964	1127.197
) 1319.039	329.432			
9 1319.039 L	-	303.099 304.879	175.964 163.202	1127.197 665.975
0 1319.039 1 1297.317	329.432			
9 1319.039 1 1297.317 2 1327.072	329.432 330.823 329.140	304.879 303.383	163.202 164.013	665.975 677.534
9 1319.039 1 1297.317 2 1327.072	329.432	304.879	163.202	665.975
9 1319.039 1 1297.317 2 1327.072 3 1324.461	329.432 330.823 329.140 328.875	304.879 303.383 302.254	163.202 164.013 181.487	665.975 677.534 767.853
0 1319.039 1 1297.317 2 1327.072 3 1324.461	329.432 330.823 329.140	304.879 303.383	163.202 164.013	665.975 677.534
0 1319.039 1 1297.317 2 1327.072 3 1324.461	329.432 330.823 329.140 328.875	304.879 303.383 302.254	163.202 164.013 181.487	665.975 677.534 767.853
0 1319.039 1 1297.317 2 1327.072 3 1324.461 4 1343.424	329.432 330.823 329.140 328.875 328.352	304.879 303.383 302.254 300.954	163.202 164.013 181.487 183.929	665.975 677.534 767.853 888.448
319.039 2297.317 2327.072 324.461 4 343.424	329.432 330.823 329.140 328.875	304.879 303.383 302.254	163.202 164.013 181.487	665.975 677.534 767.853 888.448
9 1319.039 1 1297.317 2 1327.072 3 1324.461 4 1343.424 	329.432 330.823 329.140 328.875 328.352	304.879 303.383 302.254 300.954	163.202 164.013 181.487 183.929	665.975 677.534 767.853 888.448
9 1319.039 1 1297.317 2 1327.072 3 1324.461 4 1343.424 319 1357.271 320 1311.177	329.432 330.823 329.140 328.875 328.352 330.117 330.848	304.879 303.383 302.254 300.954 304.006 304.616	163.202 164.013 181.487 183.929 148.174 165.178	665.975 677.534 767.853 888.448 1027.201 906.962
9 1319.039 1 1297.317 2 1327.072 3 1324.461 4 1343.424 319 1357.271 320 1311.177	329.432 330.823 329.140 328.875 328.352 330.117	304.879 303.383 302.254 300.954 304.006	163.202 164.013 181.487 183.929 148.174	665.975 677.534 767.853 888.448
0 1319.039 1 1297.317 2 1327.072 3 1324.461 4 1343.424 319 1357.271 320 1311.177 321 1319.226	329.432 330.823 329.140 328.875 328.352 330.117 330.848 330.226	304.879 303.383 302.254 300.954 304.006 304.616 304.686	163.202 164.013 181.487 183.929 148.174 165.178 160.841	665.975 677.534 767.853 888.448 1027.201 906.962 887.125
0 1319.039 1 1297.317 2 1327.072 3 1324.461 4 1343.424 319 1357.271 320 1311.177 321 1319.226 322	329.432 330.823 329.140 328.875 328.352 330.117 330.848	304.879 303.383 302.254 300.954 304.006 304.616	163.202 164.013 181.487 183.929 148.174 165.178	665.975 677.534 767.853 888.448 1027.201 906.962
319 1357.271 320 1311.177 321 1319.226 322 1320.225 323	329.432 330.823 329.140 328.875 328.352 330.117 330.848 330.226	304.879 303.383 302.254 300.954 304.006 304.616 304.686	163.202 164.013 181.487 183.929 148.174 165.178 160.841	665.975 677.534 767.853 888.448 1027.201 906.962 887.125
0 1319.039 1 1297.317 2 1327.072 3 1324.461 4 1343.424 319 1357.271 320 1311.177 321 1319.226 322 1320.225	329.432 330.823 329.140 328.875 328.352 330.117 330.848 330.226 327.346	304.879 303.383 302.254 300.954 304.006 304.616 304.686 304.363	163.202 164.013 181.487 183.929 148.174 165.178 160.841 147.589	665.975 677.534 767.853 888.448 1027.201 906.962 887.125 804.423

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

[324 rows x 23 columns]

df.fillna(method="bfill")
df

C:\Users\jayaraman\AppData\Local\Temp\ipykernel_19016\967781409.py:1:
FutureWarning: DataFrame.fillna with 'method' is deprecated and will
raise in a future version. Use obj.ffill() or obj.bfill() instead.
 df.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
C.	T-upperExt-2	T-low	erExt-2	UCZAA Whit	eFlow-4	
Stea 0	amFlow-4 \ 358.282	2	329.545	1.443	599.253	
0	220.20	_	323.343	1,440	JJJ. ZJJ	

67.122	251 252	220 067	1 540	527 201
1 60.012	351.050	329.067	1.549	537.201
2	350.022	329.260	1.600	549.611
61.304 3	350.938	331.142	1.604	623.362
68.496	330.330	331.142	1.004	023.302
4	351.640	332.709	NaN	638.672
70.022				
319 61.141	347.286	310.970	1.523	513.956
320	399.135	319.576	1.451	570.058
67.667	272 622	214 501	1 457	E40, 206
321 66.446	373.633	314.591	1.457	549.306
322	364.081	308.559	1.523	504.852
61.054 323	356.289	310.482	1.474	497.375
58.247	330.203	310.402	1.7/7	737.373
Lowo	r-HeatT-3	Upper-HeatT-3	ChipMacs 4	WeakLiquorF
BlackFlow		upper-nearr-3	СПТРМа55-4	weakLiquorr
0	329.432	303.099	175.964	1127.197
1319.039 1	330.823	304.879	163.202	665.975
1297.317				
2 1327.072	329.140	303.383	164.013	677.534
3	328.875	302.254	181.487	767.853
1324.461		200 054	102 020	000 440
4 1343.424	328.352	300.954	183.929	888.448
 319	330.117	304.006	148.174	1027.201
1357.271	220.111	304.000	140.1/4	1027.201
320	330.848	304.616	165.178	906.962
1311.177 321	330.226	304.686	160.841	887.125
1319.226				
322 1320.225	327.346	304.363	147.589	804.423
323	328.092	304.093	144.218	828.328
1320.848			_	
Weakl	WashF Ste	eamHeatF-3 T-Te	op-Chips-4	SulphidityL-4
0 25	57.325	54.612	252.077	NaN

```
1
                       46.603
                                     251.406
                                                      29.11
       241.182
2
                                     251.335
       237.272
                       51.795
                                                        NaN
3
       239.478
                       54.846
                                     250.312
                                                      29.02
4
       215.372
                       54.186
                                     249.916
                                                      29.01
                                                        . . .
       381.643
                       45.264
319
                                     252.947
                                                      30.86
320
        25.494
                       50.528
                                     252.092
                                                      30.70
321
         0.638
                       45.549
                                     252.438
                                                        NaN
                                     253.176
322
         0.000
                       43.725
                                                      31.13
323
         1.276
                       43.840
                                     253.216
                                                        NaN
[324 rows x 23 columns]
df.columns
'SteamFlow-4', 'Lower-HeatT-3', 'Upper-HeatT-3', 'ChipMass-4
       'WeakLiquorF ', 'BlackFlow-2 ', 'WeakWashF ', 'SteamHeatF-3 ',
       'T-Top-Chips-4 ', 'SulphidityL-4 '],
     dtype='object')
print(df filled.head())
                                                     ChipLevel4 \
  Observation Y-Kappa
                       ChipRate
                                BF-CMratio
                                           BlowFlow
    31-00:00
                23.10
                        16.520
                                   121.717
                                           1177.607
0
                                                         169.805
1
    31-01:00
                27.60
                         16.810
                                    79.022
                                            1328.360
                                                         341.327
2
                23.19
                         16.709
                                    79.562
                                           1329.407
                                                         239.161
    31-02:00
3
    31-03:00
                23.60
                         16.478
                                    81.011
                                           1334.877
                                                         213.527
                22.90
                                    93.244 1334.168
    31-04:00
                        15.618
                                                         243.131
  T-upperExt-2 T-lowerExt-2
                                UCZAA WhiteFlow-4 ... SteamFlow-
4
0
        358.282
                       329.545 1.443
                                           599.253 ...
67.122
        351.050
                       329.067 1.549
                                           537.201 ...
1
60.012
        350.022
                       329.260 1.600
                                            549.611 ...
61.304
        350.938
                       331.142 1.604
                                            623.362 ...
68.496
        351.640
                       332.709 0.000
                                            638.672 ...
70.022
   Lower-HeatT-3 Upper-HeatT-3
                                ChipMass-4
                                            WeakLiquorF
BlackFlow-2
                       303.099
                                    175.964
        329.432
                                                1127.197
```

1319.039 1	330.823	304	1.879	163.202	665.975	
1297.317 2	329.140		3.383	164.013	677.534	
1327.072	328.875		2.254	181.487	767.853	
1324.461						
4 1343.424	328.352	300	9.954	183.929	888.448	
WeakWa	ashF Stea	mHeatF-3	T-Top-	Chips-4 S	ulphidityL-4	
	7.325 1.182	54.612 46.603	2	252.077 251.406	0.0 29.1	0
2 237	7.272	51.795	5	251.335	0.0	0
	9.478 5.372	54.846 54.186		250.312 249.916	29.0 29.0	
[5 rows :	x 23 columr	ıs]				
	plicates =	df.drop_d	duplicate	es()		
df_no_du		Kanana Cl	- ' - D - 1 -	DE CM L'	D1	N
\		• •	·	BF-CMratio		hipLevel4
0 3:	1-00:00	23.10	16.520	121.717	1177.607	169.805
1 3:	1-01:00	27.60	16.810	79.022	1328.360	341.327
2 33	1-02:00	23.19	16.709	79.562	1329.407	239.161
3 33	1-03:00	23.60	16.478	81.011	1334.877	213.527
4 33	1-04:00	22.90	15.618	93.244	1334.168	243.131
298 12	2-09:00	20.90	15.167	84.640	1283.706	339.440
299 12	2-10:00	24.98	NaN	85.034	1278.345	368.564
300 12	2-11:00	21.00	NaN	88.013	1307.722	278.842
301 12	2-12:00	21.40	NaN	85.490	1255.986	273.484
307 33	1-05:00	20.89	14.308	94.172	1327.832	251.120
T-up SteamFlow	pperExt-2 w-4 \	T-lower	Ext-2	UCZAA Whit	eFlow-4	
0 67.122	358.282	3	329.545	1.443	599.253	

1	351.050	329.067	1.549	537.201
60.012 2	350.022	329.260	1.600	549.611
61.304				
3 68.496	350.938	331.142	1.604	623.362
4	351.640	332.709	NaN	638.672
70.022				
298	354.803	311.041	1.635	532.419
65.561	257 722	221 207	NI – NI	F20 20F
299 65.729	357.723	321.387	NaN	520.365
300	357.438	323.757	NaN	553.070
65.795	261 265	222 600	NI – NI	F00 100
301 71.456	361.365	322.689	NaN	590.199
307	351.263	332.485	1.522	631.514
71.286				
Lowe	r-HeatT-3 U	pper-HeatT-3	ChipMass-4	WeakLiquorF
BlackFlow		pp		
0	329.432	303.099	175.964	1127.197
1319.039 1	330.823	304.879	163.202	665.975
1297.317				
2 1327.072	329.140	303.383	164.013	677.534
3	328.875	302.254	181.487	767.853
1324.461				
4 1343.424	328.352	300.954	183.929	888.448
298 1344.708	332.924	307.626	145.299	832.906
299	332.523	307.169	151.544	905.639
1344.469	221 262	206 400	157.054	000 601
300 1344.588	331.263	306.400	157.954	908.691
301	333.032	308.732	174.069	986.206
1348.747	220 622	200 700	100 222	002.665
307 1323.082	328.699	300.706	180.229	903.605
1323.002				
			p-Chips-4	SulphidityL-4
	57.325 41.182	54.612 46.603	252.077 251.406	NaN 29.11
	0 _	.01005	_51.100	23111

3	237.272 239.478 215.372		51.795 54.846 54.186	251.33 250.31 249.91	2	NaN 29.02 29.01
299 300 301	388.911 418.979 462.712 457.313 232.729		49.524 48.135 54.373 53.194 54.503	251.83 251.61 251.19 251.32 250.08	3 4 7 4	30.29 30.47 NaN 30.46 NaN
[301 row	s x 23 co	olumns]				
<pre>print(df</pre>	_no_dupli	icates.h	nead())			
1 31-0 2 31-0 3 31-0	ation Y- 00:00 01:00 02:00 03:00 04:00	-Kappa 23.10 27.60 23.19 23.60 22.90	16.709	121.717 79.022 79.562	BlowFlow 1177.607 1328.360 1329.407 1334.877 1334.168	ChipLevel4 \ 169.805 341.327 239.161 213.527 243.131
T-upp	erExt-2	T-lowe	erExt-2	UCZAA White	eFlow-4	SteamFlow-
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	350.938		331.142	1.604	623.362	
68.496 4 70.022	351.640		332.709	NaN	638.672	
	-HeatT-3	Upper-	HeatT-3	ChipMass-4	WeakLiquo	orF
BlackFlor	329.432		303.099	175.964	1127	. 197
1319.039	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 1343.424	328.352		300.954	183.929	888	. 448
	ashF St 7.325 1.182		:F-3 T-T 1.612 5.603	op-Chips-4 252.077 251.406	Sulphidity	/L-4 NaN 29.11

2 3 4	237.272 239.478 215.372	51. 54.8 54.	846	251.335 250.312 249.916	29	NaN .02 .01		
[5 r	[5 rows x 23 columns]							
filt	ered_data = d	df[df["Bl	owFlow"]> <mark>1</mark>	.6]				
filt	ered_data							
	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 upperFyt 1) Tlov	on[v+]	11C7AA Whit	oFlov. 4			
Stea	T-upperExt-2 amFlow-4 \	2 I-LOW	erExt-2	UCZAA Whit	eFlow-4			
0 67.1	358.28	32	329.545	1.443	599.253			
1	351.05	50	329.067	1.549	537.201			
60.0)12 350.02	22	329.260	1.600	549.611			
61.3	350.93	88	331.142	1.604	623.362			
68.4	196							
4 70.0	351.6 ²)22	10	332.709	NaN	638.672			
319	347.28	36	310.970	1.523	513.956			
61.1 320	.41 399.13	35	319.576	1.451	570.058			

67.667 321					
66.446 322					
322		373.633	314.591	1.457	549.306
61.054 323		364.081	308.559	1.523	504.852
Lower-HeatT-3 Upper-HeatT-3 ChipMass-4 WeakLiquorF BlackFlow-2 \ 0	61.054				
Lower-HeatT-3 Upper-HeatT-3 ChipMass-4 WeakLiquorF		356.289	310.482	1.474	497.375
BlackFlow-2	30.247				
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 1343.424 119 330.117 304.006 148.174 1027.201 1357.271 1320 330.848 304.616 165.178 906.962 1311.177 1321 330.226 304.686 160.841 887.125 1319.226 1322 327.346 304.363 147.589 804.423 1320.225 1323 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 1241.182 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			Upper-HeatT-3	ChipMass-4	WeakLiquorF
1319.039 1		-	303.099	175.964	1127.197
1297.317 2					
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 NaN 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		330.823	304.879	163.202	665.975
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 NaN 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 NaN 322 0.000 43.725 253.176 31.13 323 1.276 43.840 253.216 NaN		329.140	303.383	164.013	677.534
1324.461 4					
4 328.352 300.954 183.929 888.448 1343.424		328.875	302.254	181.48/	/6/.853
		328.352	300.954	183.929	888.448
319	1343.424				
319					
320	319	330.117	304.006	148.174	1027.201
1311.177 321		220 040	204 616	165 170	006 062
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 NaN 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 NaN 322 0.000 43.725 253.176 31.13 323 1.276 43.840 253.216 NaN		330.040	304.010	103.176	900.902
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 NaN 3 239.478 54.846 250.312 29.02 4 215.372 54.186 249.916 29.01	321	330.226	304.686	160.841	887.125
1320.225 323		327 346	304 363	147 589	804 423
WeakWashF SteamHeatF-3 T-Top-Chips-4 SulphidityL-4		3271340	3041303	147.505	0041425
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 37.272 51.795 251.335 NaN 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 NaN 322 0.000 43.725 253.176 31.13 323 1.276 43.840 253.216 NaN		328.092	304.093	144.218	828.328
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 29.01 319 381.643 45.264 252.947 30.86 320 25.494 50.528 252.092 30.70 321 0.638 45.549 252.438 NaN 322 0.000 43.725 253.176 31.13 323 1.276 43.840 253.216 NaN	1320.848				
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 29.01 319 381.643 45.264 252.947 30.86 320 25.494 50.528 252.092 30.70 321 0.638 45.549 252.438 NaN 322 0.000 43.725 253.176 31.13 323 1.276 43.840 253.216 NaN				•	
	2 23				
	3 23				
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 NaN 322 0.000 43.725 253.176 31.13 323 1.276 43.840 253.216 NaN [307 rows x 23 columns]					
321 0.638 45.549 252.438 NaN 322 0.000 43.725 253.176 31.13 323 1.276 43.840 253.216 NaN [307 rows x 23 columns]					
322 0.000 43.725 253.176 31.13 323 1.276 43.840 253.216 NaN [307 rows x 23 columns]					
323 1.276 43.840 253.216 NaN [307 rows x 23 columns]					
	[307 rows	x 23 colu	mns1		
print(filtered_data.nead())			_		
	print(Till	tered_data	.nead())		

```
Observation
               Y-Kappa
                        ChipRate
                                   BF-CMratio
                                               BlowFlow
                                                          ChipLevel4
                 23.10
                                      121.717
0
     31-00:00
                           16.520
                                               1177.607
                                                              169.805
1
     31-01:00
                 27.60
                           16.810
                                       79.022
                                               1328.360
                                                              341.327
2
                 23.19
                                       79.562
     31-02:00
                           16.709
                                               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
                                   UCZAA WhiteFlow-4
                                                              SteamFlow-
   T-upperExt-2 T-lowerExt-2
4
0
                          329.545
                                   1.443
                                               599.253 ...
         358.282
67.122
                          329.067
         351.050
                                   1.549
                                               537.201 ...
1
60.012
         350.022
                          329.260 1.600
                                               549.611 ...
2
61.304
         350.938
                          331.142
                                  1.604
                                               623.362 ...
68,496
         351.640
                          332.709
                                     NaN
                                               638.672 ...
70.022
   Lower-HeatT-3
                  Upper-HeatT-3
                                   ChipMass-4
                                                WeakLiquorF
BlackFlow-2
         329.432
                          303.099
                                       175.964
                                                     1127.197
1319.039
         330.823
                          304.879
                                       163.202
                                                      665.975
1297.317
                          303.383
                                       164.013
                                                      677.534
         329.140
1327.072
                          302.254
                                       181.487
         328.875
                                                      767.853
1324.461
         328.352
                          300.954
                                       183.929
                                                      888.448
1343.424
   WeakWashF
               SteamHeatF-3
                               T-Top-Chips-4
                                               SulphidityL-4
0
      257.325
                      54.612
                                      252.077
                                                           NaN
      241.182
                      46.603
                                      251.406
1
                                                         29.11
2
      237.272
                      51.795
                                      251.335
                                                           NaN
3
      239.478
                      54.846
                                      250.312
                                                         29.02
      215.372
                      54.186
                                      249.916
                                                         29.01
[5 rows x 23 columns]
sorted data = df.sort values(by='ChipRate', ascending=True)
sorted data
    Observation Y-Kappa ChipRate BF-CMratio
                                                 BlowFlow
                                                            ChipLevel4
284
       11-19:00
                   20.20
                              9.983
                                        102.237
                                                 1027.485
                                                                369.632
289
       12-00:00
                   22.50
                             10.625
                                         89.193
                                                 1010.855
                                                                322.470
```

37	1-12:00	14.53	10.833	93.121	1202.818	339.119
288	11-23:00	22.10	10.933	97.752	1038.618	333.743
36	1-11:00	12.81	10.942	114.567	1241.142	215.485
206	8-13:00	16.70	NaN	NaN	NaN	0.000
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
314	8-13:00	16.70	NaN	NaN	NaN	0.000
	upperExt-2	T-lowe	erExt-2	UCZAA Whit	eFlow-4	
284	342.576		298.560	1.639	454.091	
54.259 289	342.637		305.806	1.571	447.743	
58.147 37	342.535		324.194	1.258	601.694	
63.969 288	343.695		305.528	NaN	437.205	
56.182 36	346.411		328.375	1.378	654.744	
70.261						
206	373.867		324.184	1.596	533.538	
59.310 299	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	
71.456 314	373.867		324.184	1.596	533.538	
59.310						
	ower-HeatT-3 Low-2 \	Upper-	HeatT-3	ChipMass-4	WeakLiquorF	
284 1361.31	328.976		304.282	130.177	1000.752	
289	330.078		307.162	130.474	848.433	

1290.827				
37 838.948	322.040	299.894	146.584	602.040
288	329.052	307.915	122.927	910.166
1294.447	222 055	200 042	172 005	406 020
36 989.378	323.855	300.942	172.085	486.938
206	328.206	304.038	150.399	705.880
1145.549 299	332.523	307.169	151.544	905.639
1344.469			1311311	
300 1344.588	331.263	306.400	157.954	908.691
301	333.032	308.732	174.069	986.206
1348.747 314	328.206	304.038	150.399	705.880
1145.549	320.200	304.030	130.399	703.000
WeakW	achE Sto	amHeatF-3 T-Top	o-Chips-4 Sul	phidityL-4
	3.880	41.850	252.565	NaN
	0.214 8.632	42.822	253.180	NaN 30.650
	6.579	41.508 39.162	251.630 253.796	30.750
	1.412	47.804	250.373	NaN
206 48	1.277	50.671	250.683	29.252
	8.979	48.135	251.614	30.470
	2.712 7.313	54.373 53.194	251.197 251.324	NaN 30.460
	1.277	50.671	250.683	29.252
		_		

[324 rows x 23 columns]

print(sorted_data.head())

	Observation	Y-Kappa	ChipRate	BF-CMratio	BlowFlow	ChipLevel4
\	ODSCI VACION	т-карра	СПІРКАСС	DI -CIII d'ELO	D COWI COW	CHIPLEVECT
284	11-19:00	20.20	9.983	102.237	1027.485	369.632
289	12-00:00	22.50	10.625	89.193	1010.855	322.470
37	1-12:00	14.53	10.833	93.121	1202.818	339.119
288	11-23:00	22.10	10.933	97.752	1038.618	333.743
36	1-11:00	12.81	10.942	114.567	1241.142	215.485

T-upp SteamFlow-	erExt-2 4 \	T-lowerExt-2	UCZAA White	eFlow-4
284	342.576	298.560	1.639	454.091
54.259 289 58.147	342.637	305.806	1.571	447.743
37 63.969	342.535	324.194	1.258	601.694
288 56.182	343.695	305.528	NaN	437.205
36 70.261	346.411	328.375	1.378	654.744
Lower BlackFlow-	-HeatT-3	Upper-HeatT-3	ChipMass-4	WeakLiquorF
284 1361.314	328.976	304.282	130.177	1000.752
289 1290.827	330.078	307.162	130.474	848.433
37 838.948	322.040	299.894	146.584	602.040
288 1294,447	329.052	307.915	122.927	910.166
36 989.378	323.855	300.942	172.085	486.938
284 289 39 37 4 288 38	ashF St 3.880 0.214 8.632 6.579 1.412	eamHeatF-3 T-T 41.850 42.822 41.508 39.162 47.804	7op-Chips-4 252.565 253.180 251.630 253.796 250.373	SulphidityL-4 NaN NaN 30.65 30.75 NaN
[5 rows x	23 column	s]		
grouped_da grouped_da		roupby('ChipMass	s-4 ').sum()	
ChipLevel4 ChipMass-4		tion Y-Kappa (ChipRate BF-	CMratio BlowFlow
113.922 388.538	11-2	2:00 21.20	11.292	92.194 1041.020
116.333 354.500	8-1	7:00 19.20	14.183	85.406 1211.339
121.490 300.098	12 - 0	4:00 19.50	12.567	96.937 1204.438
122.011 366.787	12-0	3:00 22.00	11.858	93.199 1171.206

122.927 333.743	11-23:00	22.10	10.933	97.752	1038.618
186.165 259.527	2-23:00	18.13	16.825	84.836	1246.387
186.241 106.110	3-01:00	18.90	15.067	83.178	1245.584
187.665 157.417	2-11:00	18.86	13.550	91.876	1244.918
187.777 287.397	3-00:00	18.30	16.833	91.341	1236.911
189.268 266.968	2-19:00	22.30	15.492	75.395	1232.071
4	T-upperExt-2	T-lowe	erExt-2	UCZAA Whit	ceFlow-
4 \ ChipMass-4					
113.922	341.538		297.247	1.457	405.111
116.333	366.827		321.326	1.478	562.029
121.490	345.516		311.489	1.578	454.678
122.011	345.261		310.115	1.513	428.202
122.927	343.695		305.528	0.000	437.205
186.165	355.515		325.985	0.000	662.577
186.241	362.677		330.216	1.480	676.106
187.665	357.865		330.227	1.393	688.720
187.777	356.787		327.856	1.540	661.532
189.268	354.244		325.212	1.416	662.780
	ChipMoisture-	1 Sta	amFlow-4	Lower-Heatl	-3 Upper-
HeatT-3 \ ChipMass-4	Chiphoistare	4 J.C.	ami cow 4	Lower near	3 оррет
113.922	47.3	81	51.192	328.2	289
305.824 116.333	44.9	38	69.674	329.2	238
301.817 121.490	47.8	20	58.135	330.0	93

307.904 122.011	48.216	52.494	330.589		
309.152 122.927	47.825	56.182	329.052		
307.915	171023	301102	323.032		
	• • •	• • • •	• • • •		
186.165 296.185	48.312	72.407	321.904		
186.241	46.345	71.263	324.407		
297.655 187.665	46.167	72.997	322.716		
298.414 187.777	47.809	71.891	323.285		
297.755 189.268	45.883	70.978	322.028		
299.212					
ChipMass-4	WeakLiquorF Bla	ckFlow-2 Wea	akWashF Steam	HeatF-3	\
113.922 116.333 121.490 122.011	838.094 819.783 918.355 816.020	1292.599 1247.445 1296.989 1294.891	353.625 282.044 388.881 391.607	38.642 50.032 44.507 42.080	
122.927	910.166	1294.447	386.579	39.162	
186.165 186.241 187.665 187.777 189.268	810.272 707.326 858.439 841.552 776.143	1132.813 1142.856 995.964 1144.876 1103.063	0.000 0.000 83.763 0.000 412.781	54.044 54.000 54.684 53.897 50.496	
	T-Top-Chips-4 S	ulphidityL-4			
ChipMass-4 113.922 116.333 121.490 122.011 122.927	253.161 248.390 253.308 253.206 253.796	30.57 30.21 0.00 30.24 30.75			
186.165 186.241 187.665 187.777 189.268	250.266 250.083 250.399 250.212 250.251	29.63 31.03 29.80 0.00 0.00			
[291 rows x	22 columns]				
_	d_data.head())				
	_				

ChipLevel4 ChipMass-4	Observation \	Y-Kappa	ChipRate	BF-CMrati	io BlowFlow	ı
113.922	11-22:00	21.2	11.292	92.19	94 1041.020)
388.538 116.333	8-17:00	19.2	14.183	85.40	96 1211.339)
354.500 121.490	12-04:00	19.5	12.567	96.93	37 1204.438	}
300.098 122.011	12-03:00	22.0	11.858	93.19	99 1171.206	j
366.787 122.927 333.743	11-23:00	22.1	10.933	97.75	52 1038.618	3
4 \ ChipMass-4	T-upperExt-2	? T-low	erExt-2	UCZAA Wł	niteFlow-	
•						
113.922	341.53	88	297.247	1.457	405.111	
116.333	366.82	27	321.326	1.478	562.029	
121.490	345.51	.6	311.489	1.578	454.678	
122.011	345.26	51	310.115	1.513	428.202	
122.927	343.69)5	305.528	0.000	437.205	
HeatT-3 \ ChipMass-4	ChipMoisture	e-4 Ste	eamFlow-4	Lower-Hea	atT-3 Upper	
113.922	47.	381	51.192	328	3.289	
305.824 116.333	44.	938	69.674	329	9.238	
301.817 121.490	47.	820	58.135	330	0.093	
307.904 122.011	48.	216	52.494	330	0.589	
309.152 122.927	47.	825	56.182	329	9.052	
307.915						
	WeakLiquorF	BlackF	low-2 W	eakWashF	SteamHeatF-	3 \
ChipMass-4 113.922	838.094		92.599	353.625	38.6	
116.333 121.490	819.783 918.355		47.445 96.989	282.044 388.881	50.0 44.5	
122.011	816.020		94.891	391.607	42.0	

122.927	910.166	1294.447	386.579	39.162
	T-Top-Chips-4	SulphidityL-4		
ChipMass-4				
113.922	253.161	30.57		
116.333	248.390	30.21		
121.490	253.308	0.00		
122.011	253.206	30.24		
122.927	253.796	30.75		
[5 rows x 22	columns]			