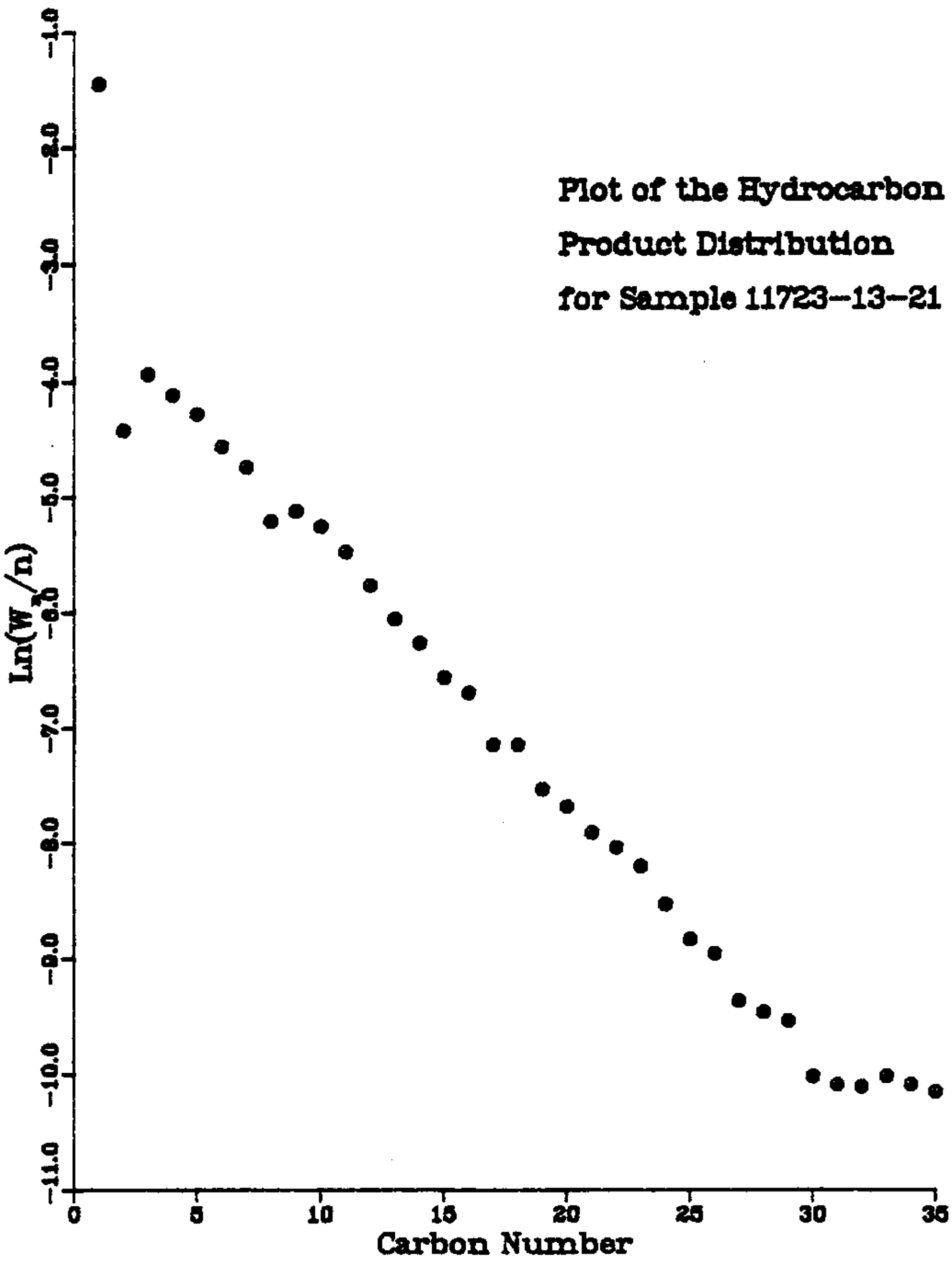
Fig. 154



Plot of the Hydrocarbon
Product Distribution
for Sample 11723-13-21
Ln(W_n/n)
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
-11.0
0
5
10
15
20
25
30
35
Carbon Number

Fig. 155

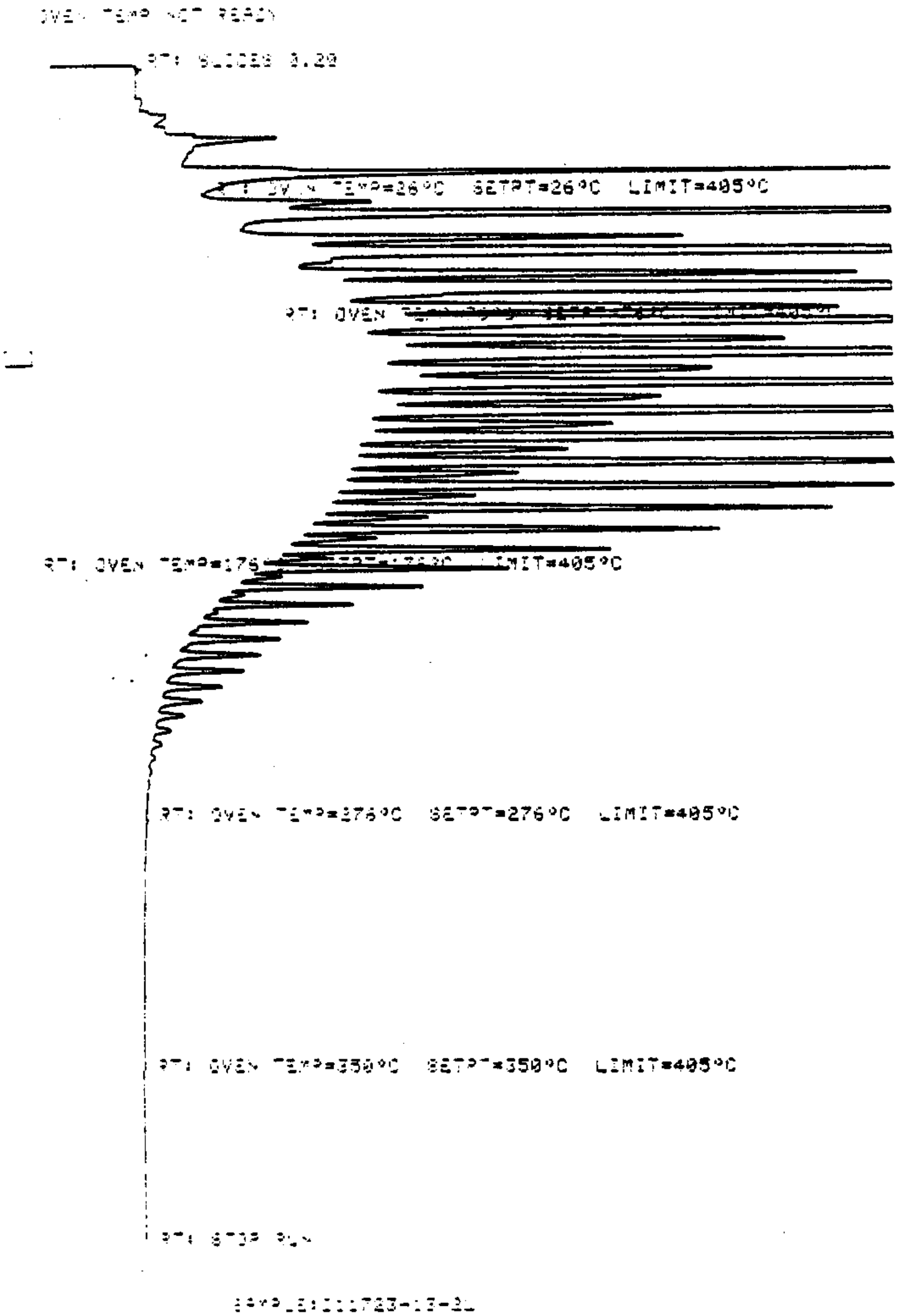

RT: OVEN TEMP=276°C SETPT=276°C LIMIT=405°C
RT: OVEN TEMP=350°C SETPT=350°C LIMIT=405°C

Fig. 156

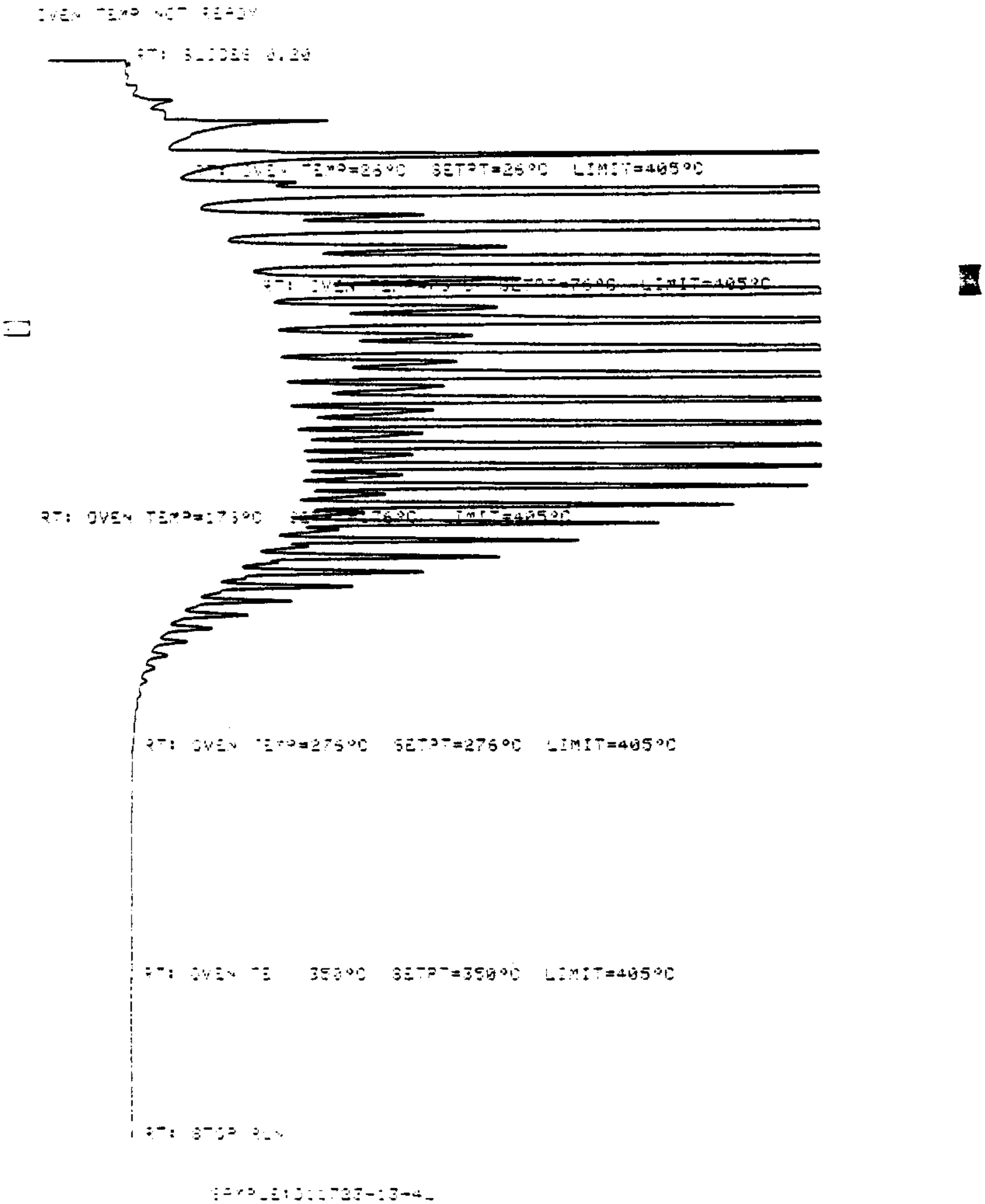
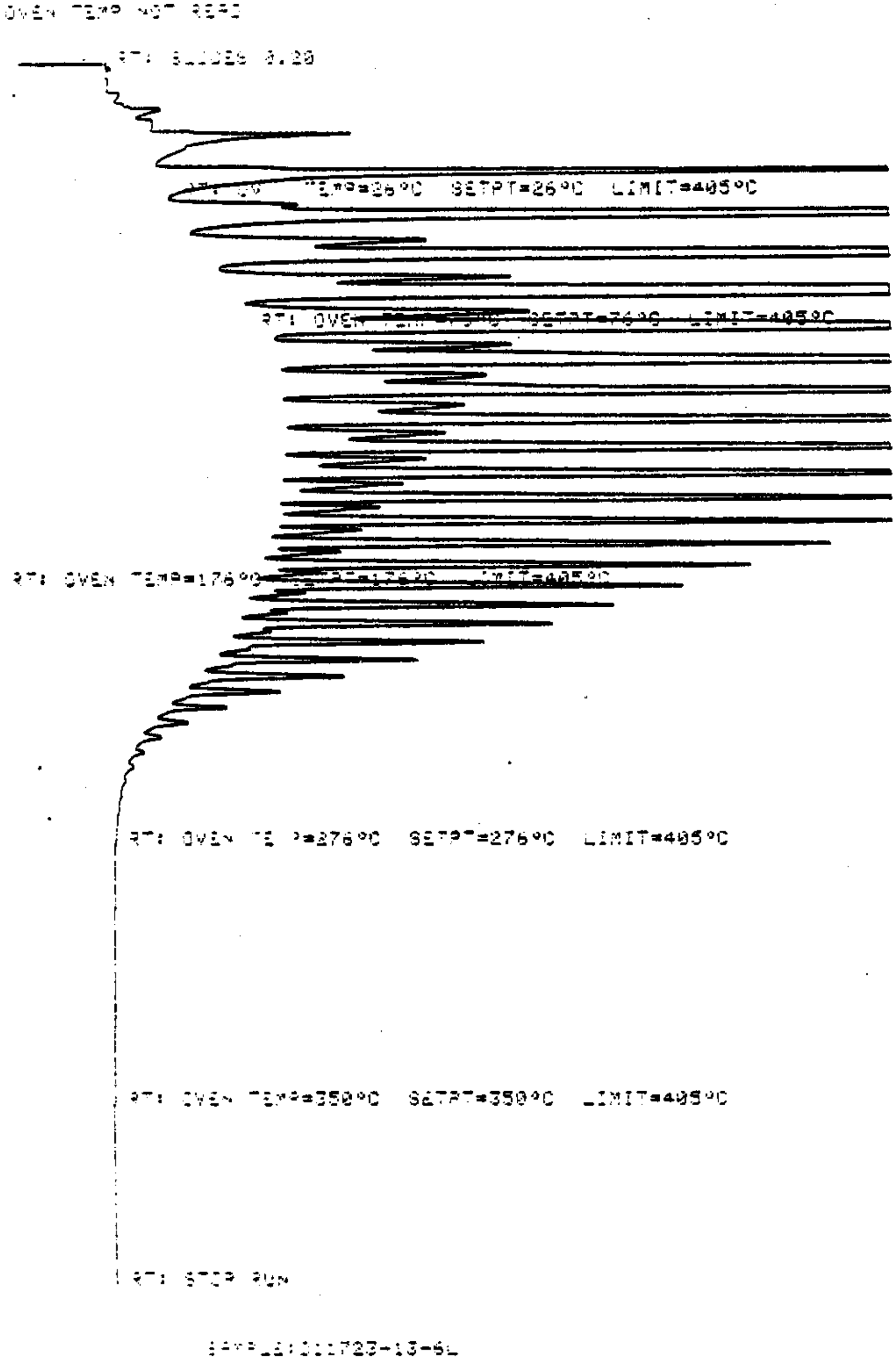

SETPT=26°C LIMIT=405°C
RT: OVEN TEMP=276°C SETPT=276°C LIMIT=405°C
SETPT=350°C LIMIT=405°C

Fig. 157



SETPT=26°C LIMIT=405°C
SETPT=276°C LIMIT=405°C
SETPT=350°C LIMIT=405°C

Fig. 158

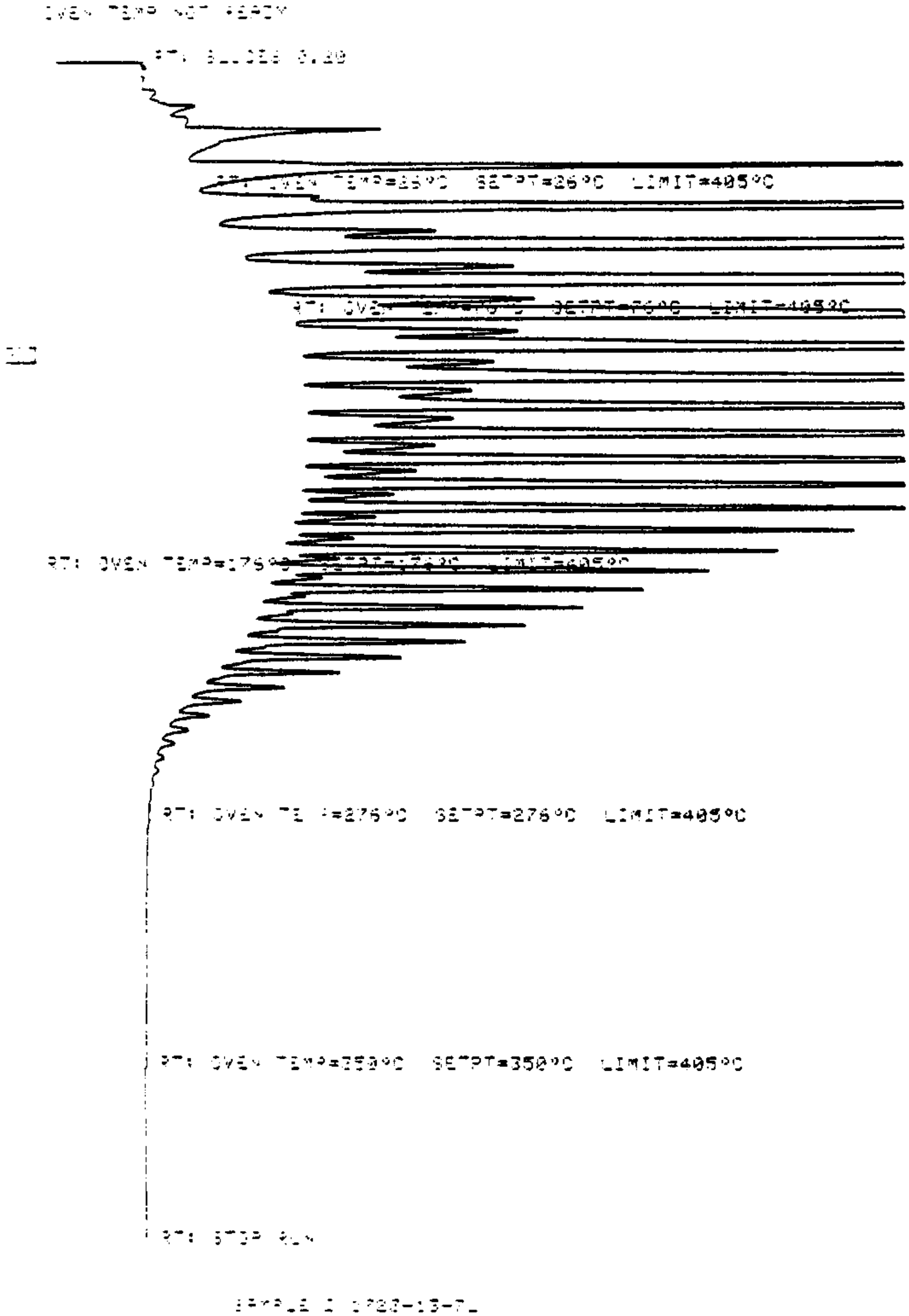


Fig. 159

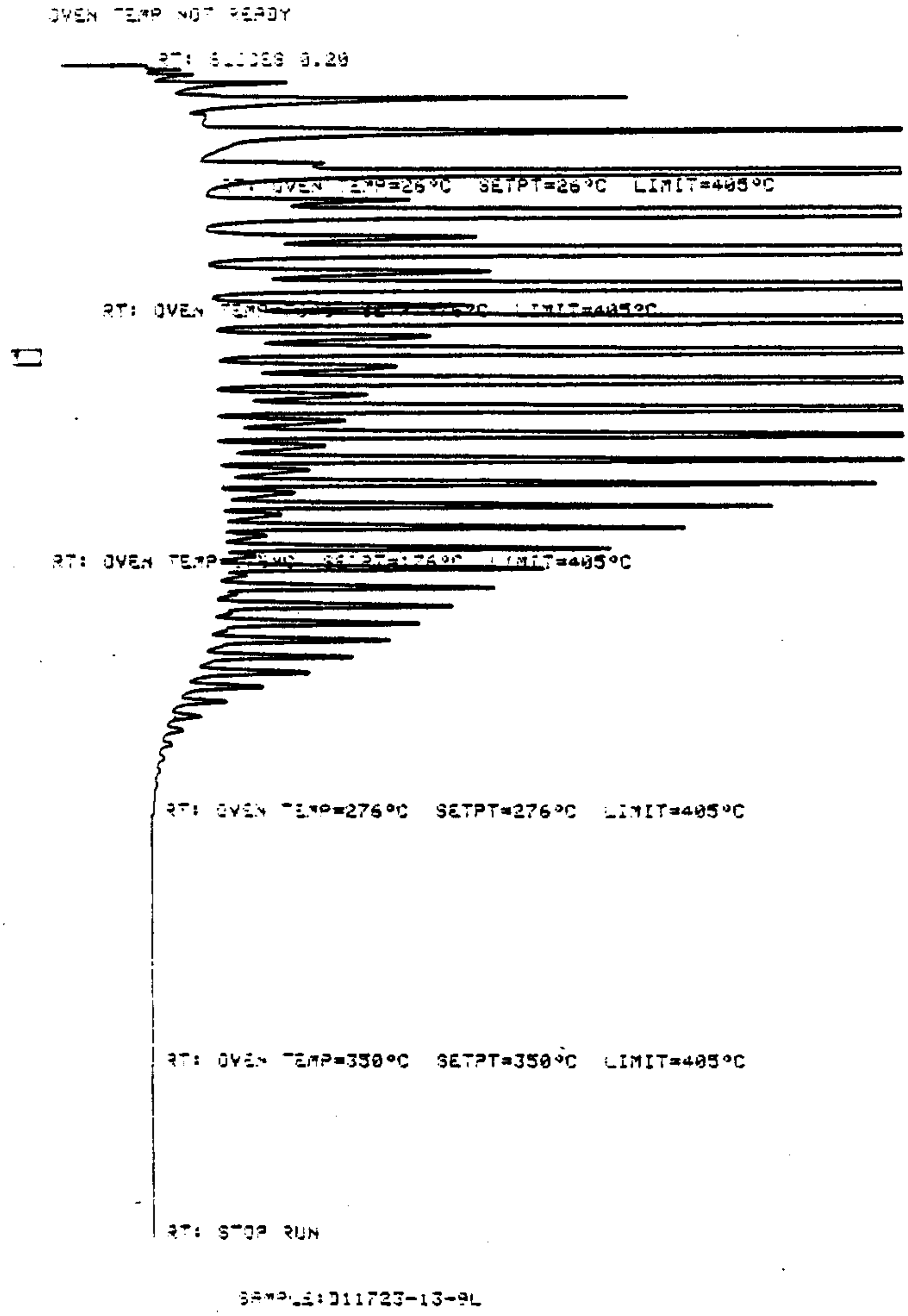

OVEN TEMP NOT READY
RT: OVEN TEMP=276°C SETPT=276°C LIMIT=405°C
RT: OVEN TEMP=350°C SETPT=350°C LIMIT=405°C
RT: STOP RUN
SAMPLE:D11723-13-9L

Fig. 160

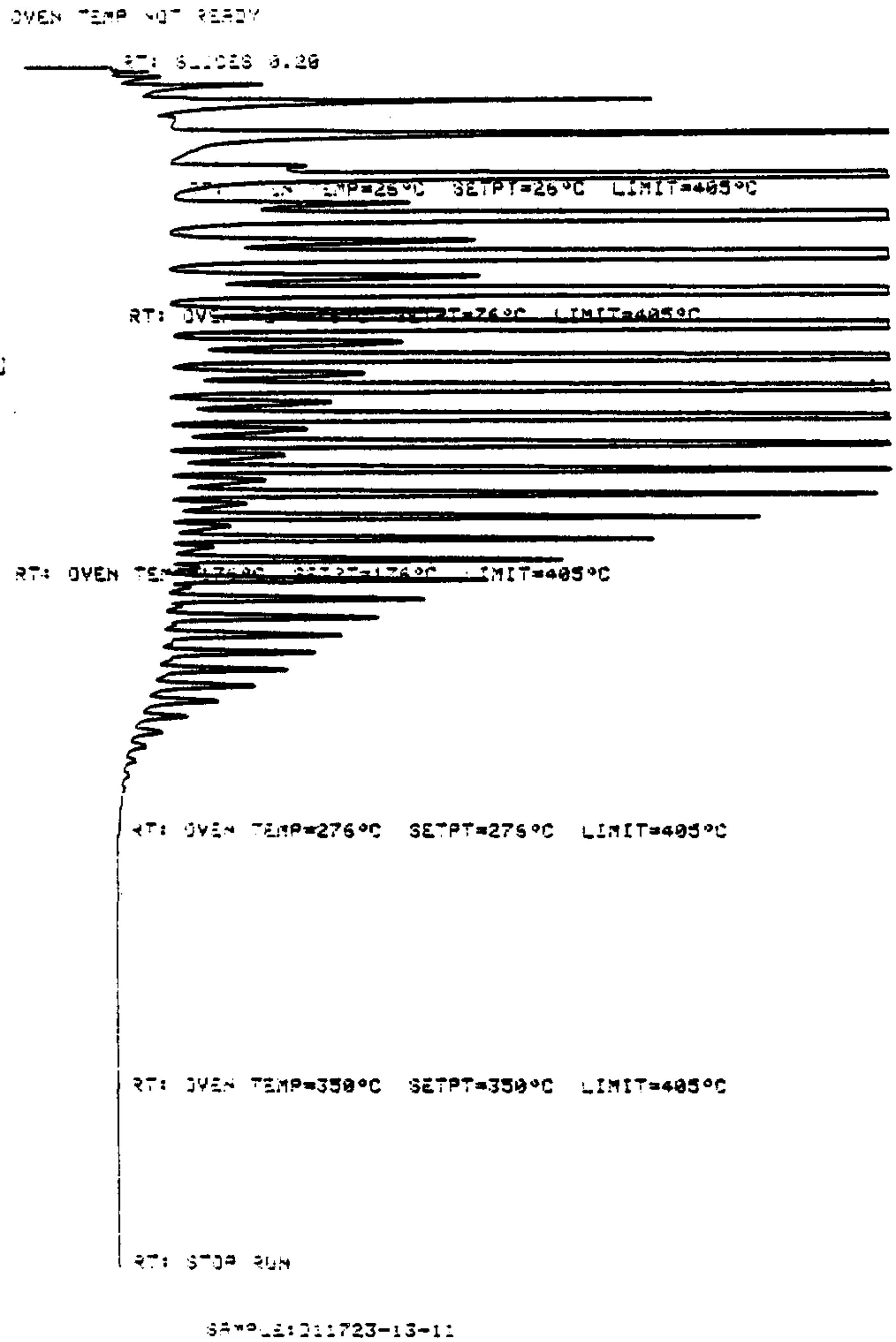

OVEN TEMP NOT READY
RT: OVEN TEMP=276°C SETPT=276°C LIMIT=405°C
RT: OVEN TEMP=350°C SETPT=350°C LIMIT=405°C
RT: STOP RUN

Fig. 161

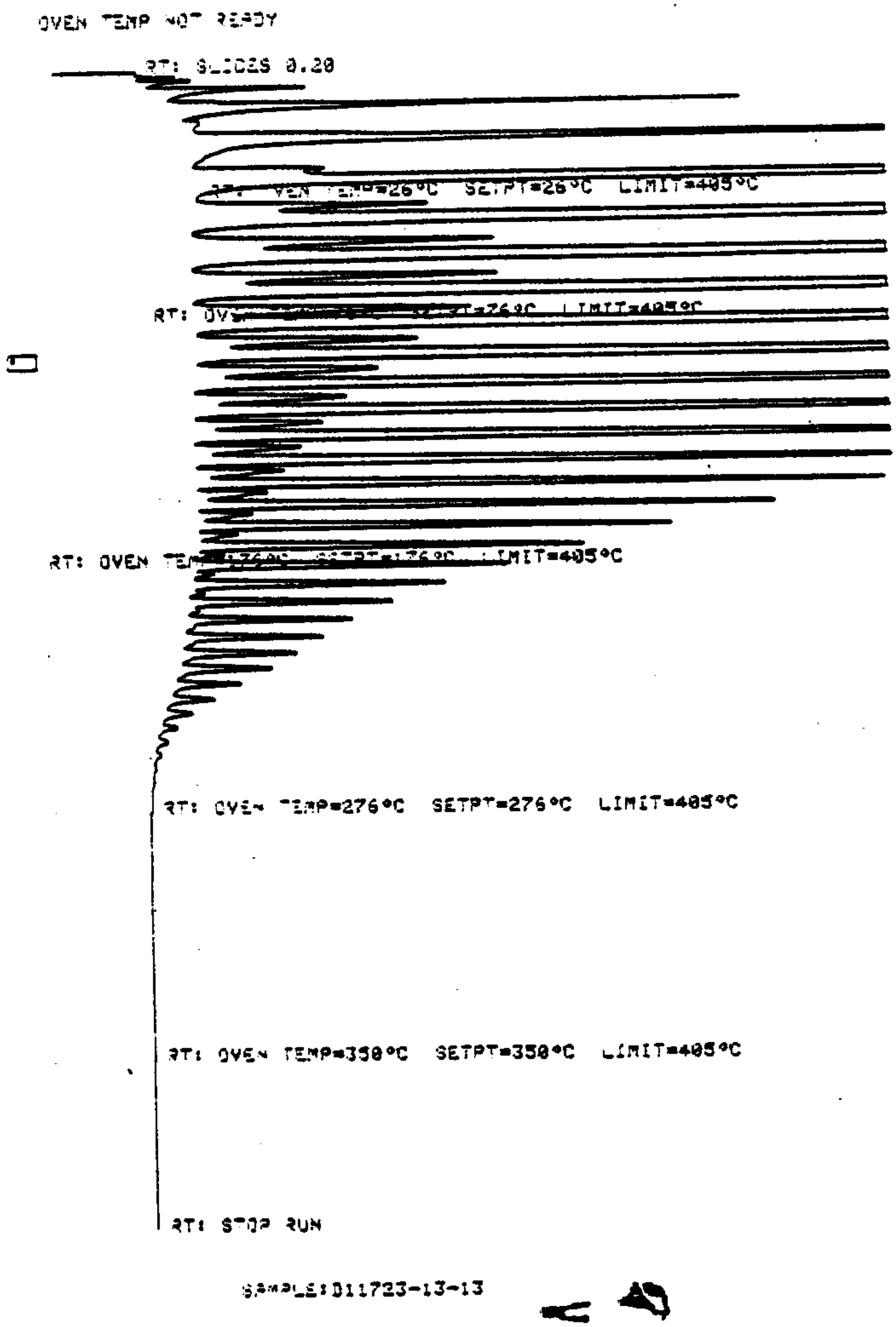

OVEN TEMP NOT READY
RT: OVEN TEMP=276°C SETPT=276°C LIMIT=405°C
RT: OVEN TEMP=350°C SETPT=350°C LIMIT=405°C
RT: STOP RUN
SAMPLE:D11723-13-13

Fig. 162

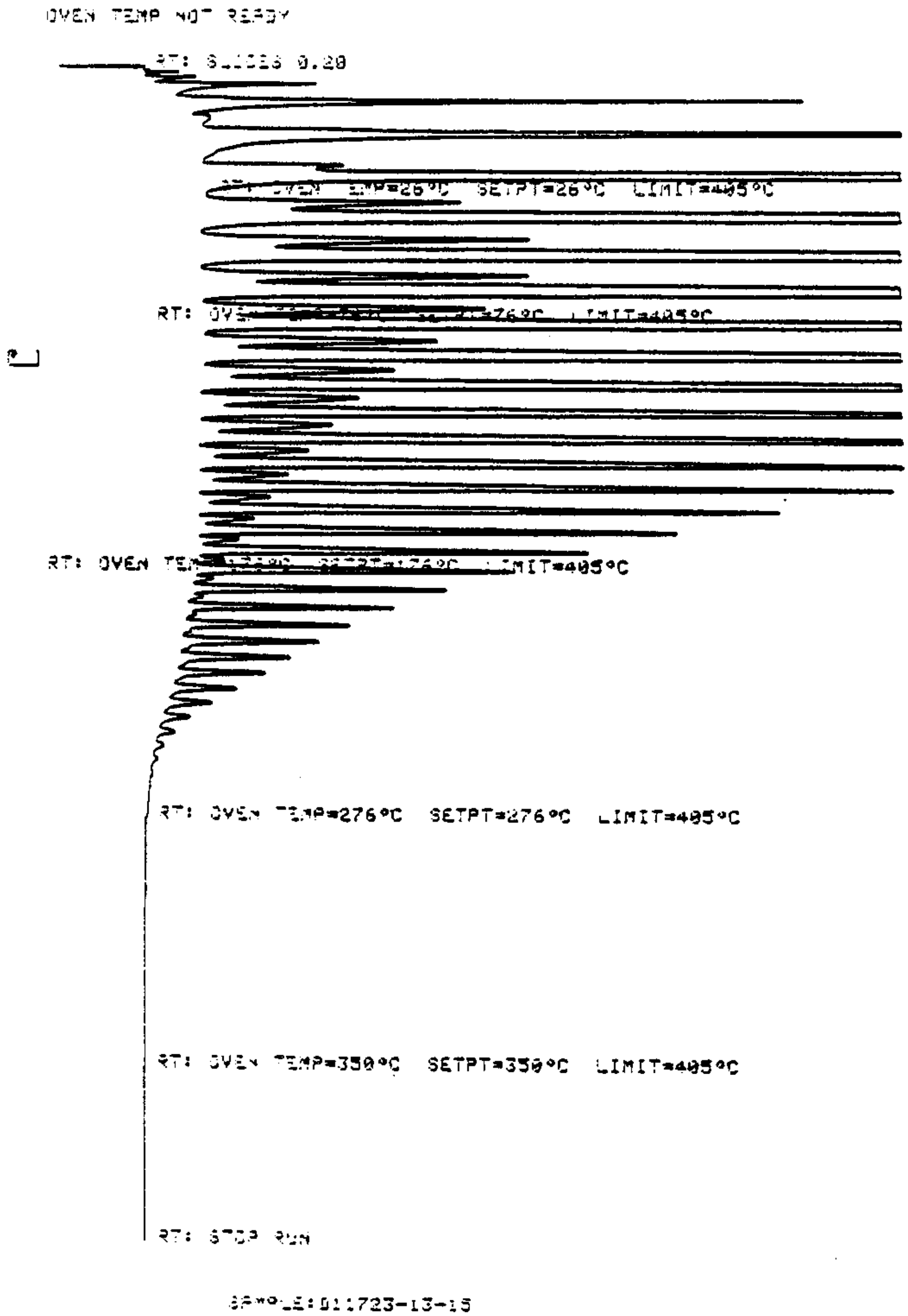

OVEN TEMP NOT READY
RT: OVEN TEMP=276°C SETPT=276°C LIMIT=405°C
RT: OVEN TEMP=350°C SETPT=350°C LIMIT=405°C
RT: STOP RUN

Fig. 163

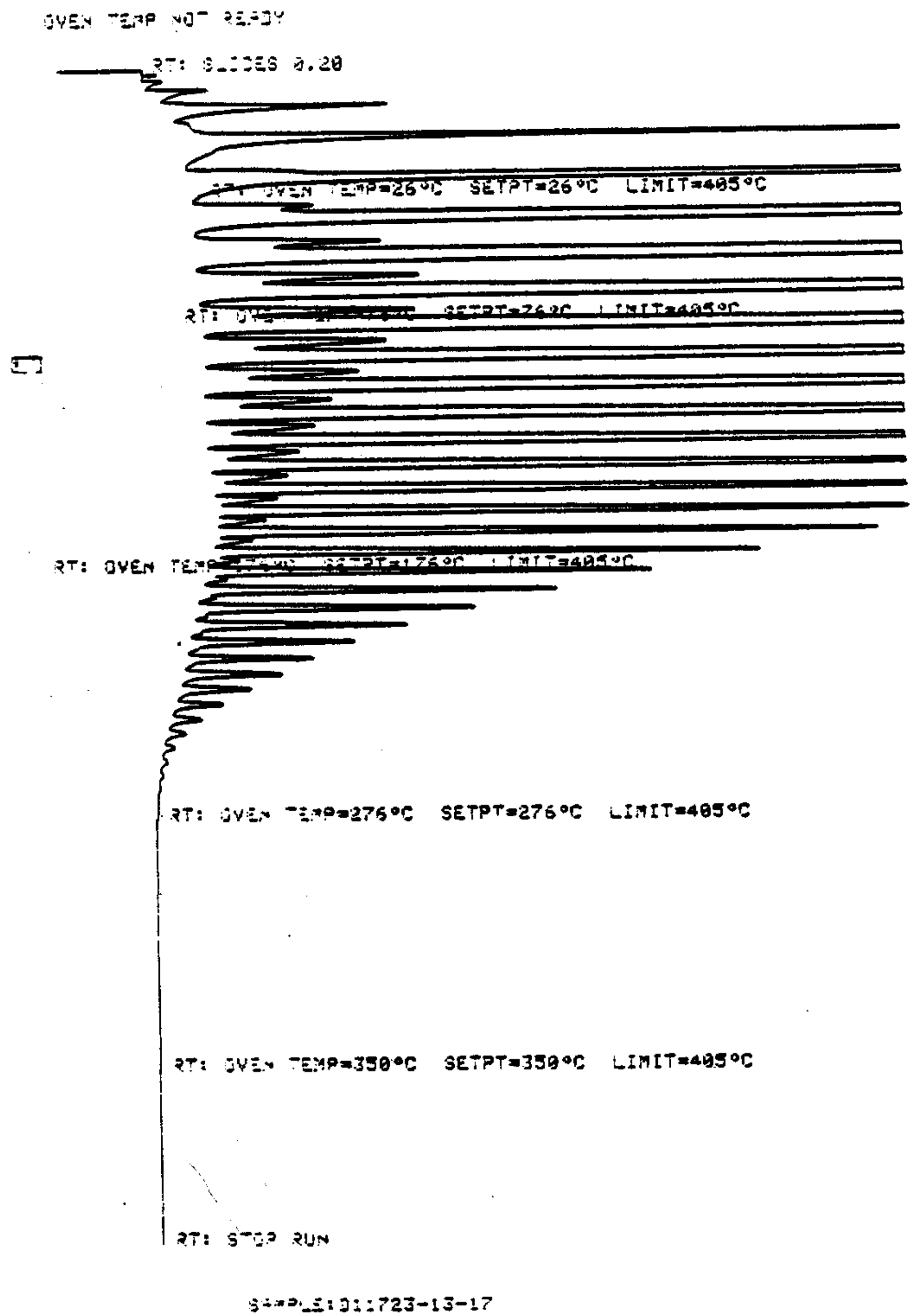

OVEN TEMP NOT READY
RT: OVEN TEMP=276°C SETPT=276°C LIMIT=405°C
RT: OVEN TEMP=350°C SETPT=350°C LIMIT=405°C
RT: STOP RUN

Fig. 164

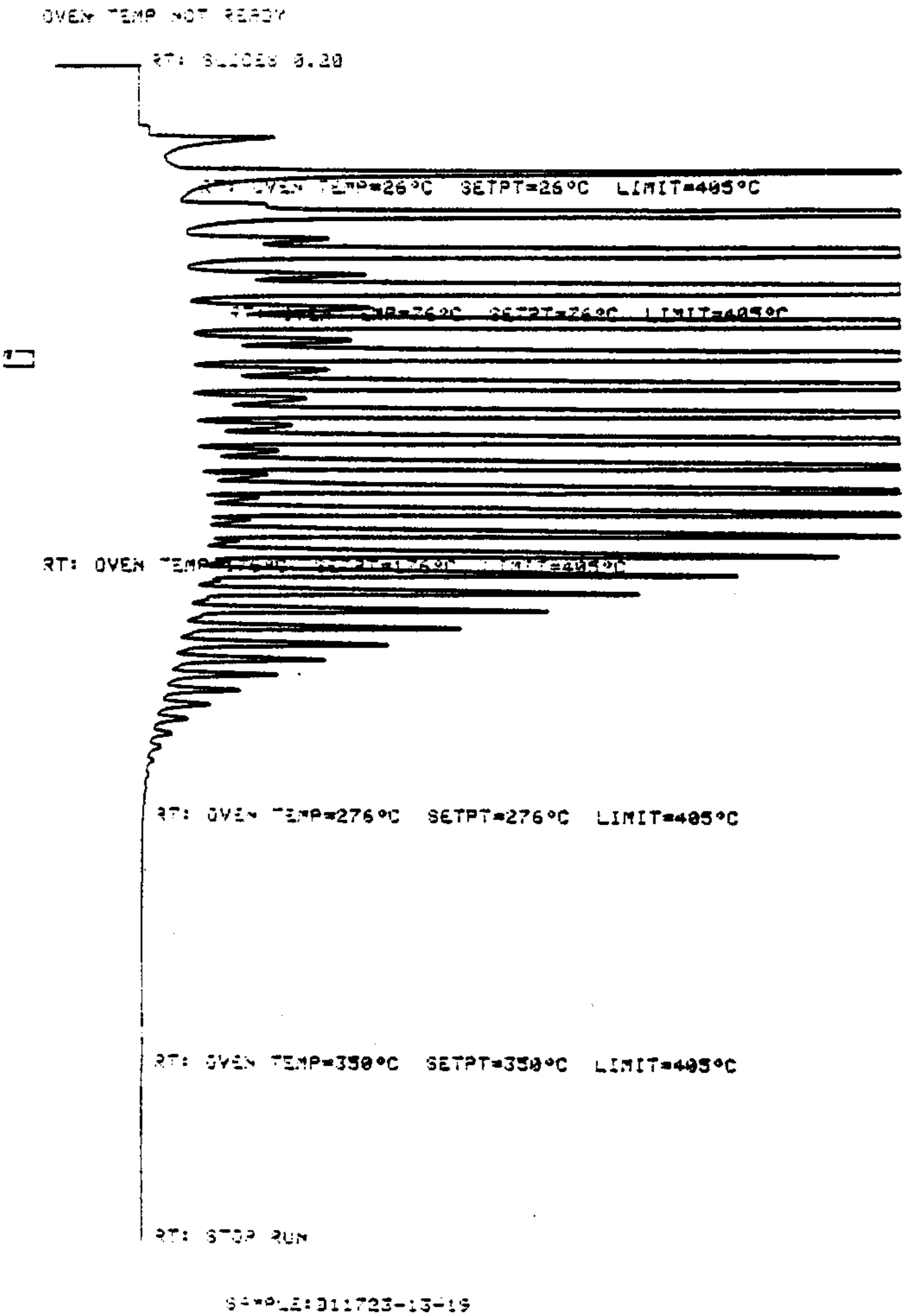

OVEN TEMP NOT READY
RT: OVEN TEMP=26°C SETPT=26°C LIMIT=405°C
RT: OVEN TEMP=276°C SETPT=276°C LIMIT=405°C
RT: OVEN TEMP=350°C SETPT=350°C LIMIT=405°C
RT: STOP RUN

Fig. 165

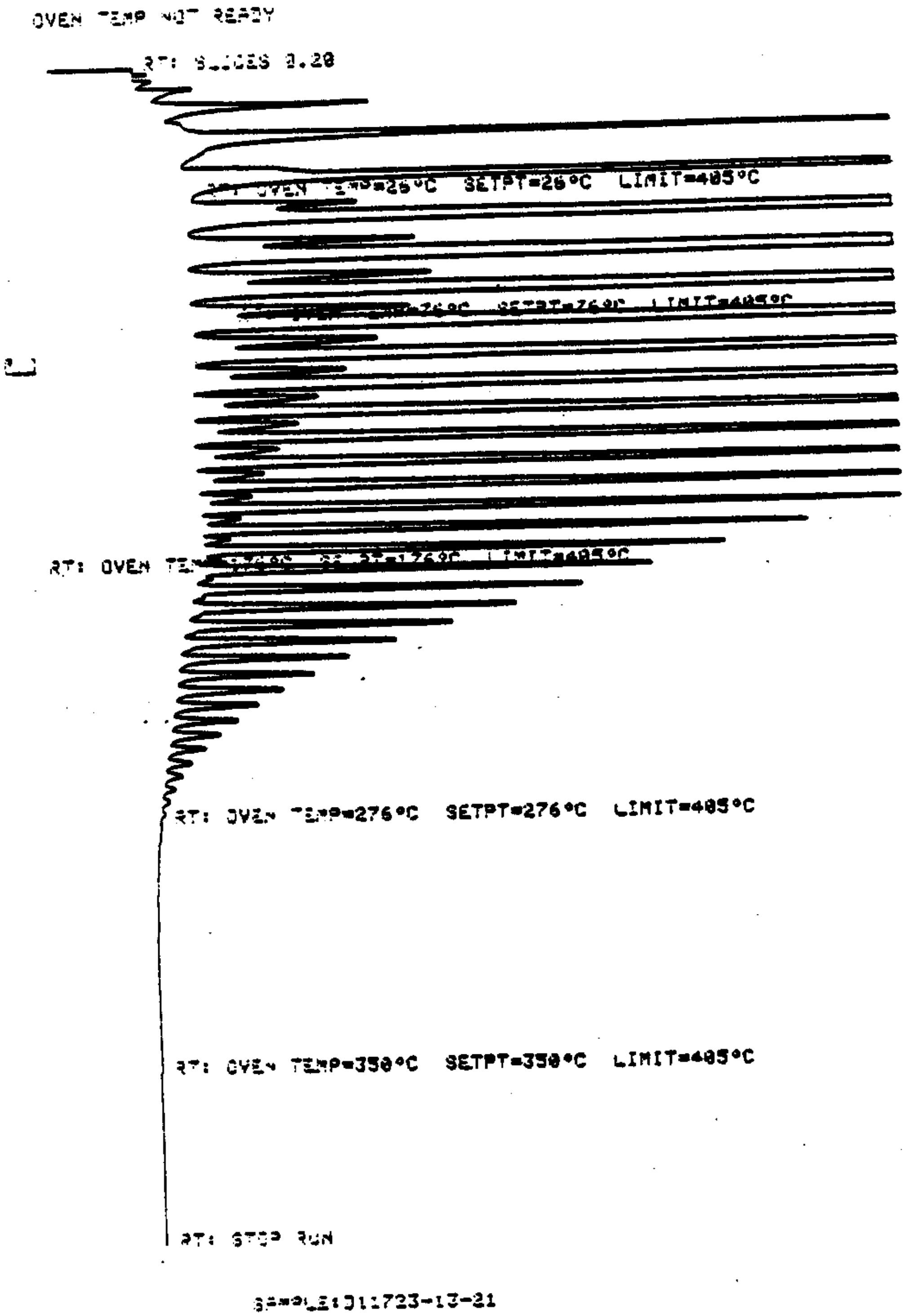

RT: OVEN TEMP=276°C SETPT=276°C LIMIT=405°C
RT: OVEN TEMP=350°C SETPT=350°C LIMIT=405°C

Table 25

RESULT OF SYNGAS OPERATION

RUN NO. 11723-13
CATALYST CoTh+U103+U101+CuZn/MS-A 250 CC 111.GM (Cat#11684-99C +17 G)
FEED H2:CO:ARGON OF 50:50:0 @ 1260 CC/MN OR 302 GHSV

RUN & SAMPLE NO.	11723-13-06	723-13-07	723-13-08	723-13-09	723-13-10
FEED H2:CO:AR	50:50: 0	50:50: 0	62:37: 0	65:34: 0	66:33: 0
HRS ON STREAM	68.0	91.0	98.5	114.5	121.5
PRESSURE,PSIG	299	296	293	295	296
TEMP. C	263	263	263	262	263
FEED CC/MIN	1260	1260	1008	965	945
HOURS FEEDING	25.00	23.00	7.50	23.50	7.00
EFFLNT GAS LITER	1213.65	1146.65	211.35	566.95	154.40
GM AQUEOUS LAYER	166.27	154.17	62.10	186.30	57.53
GM OIL	57.39	54.51	18.40	55.20	15.16
MATERIAL BALANCE					
GM ATOM CARBON %	94.89	96.84	95.55	98.69	97.02
GM ATOM HYDROGEN %	101.49	103.41	115.75	105.62	100.85
GM ATOM OXYGEN %	99.25	101.38	92.81	95.35	99.85
RATIO CHX/(H2O+CO2)	0.8379	0.8332	1.0496	1.0564	0.9565
RATIO X IN CHX	2.4309	2.4408	2.7400	2.6972	2.7187
USAGE H2/CO PRODT	2.2989	2.3077	2.1263	2.1056	2.1917
FEED H2/CO FRM EFFLNT	1.0695	1.0678	2.0189	2.0120	2.0811
RÉSIDUAL H2/CO RATIO	0.6691	0.6719	1.8239	1.8188	1.8409
RATIO CO2/(H2O+CO2)	0.0279	0.0284	0.0660	0.0645	0.0638
K SHIFT IN EFFLNT	0.0192	0.0197	0.1288	0.1254	0.1256
SPECIFIC ACTIVITY SA	0.5303	0.5235	0.4036	0.4508	0.4267
CONVERSION					
ON CO %	24.57	24.20	64.51	67.34	68.46
ON H2 %	52.81	52.30	67.94	70.48	72.10
ON CO+H2 %	39.17	38.71	66.80	69.44	70.92
PRDT SELECTIVITY,WT %					
CH4	17.36	18.03	31.03	28.51	29.60
C2 HC'S	1.98	2.15	3.37	3.23	3.36
C3H8	2.54	2.31	5.46	5.60	5.67
C3H6=	2.17	2.02	1.19	1.35	1.20
C4H10	2.09	1.90	4.89	5.57	5.51
C4H8=	3.28	3.18	1.93	2.48	2.31
C5H12	2.27	1.89	4.84	5.43	5.31
C5H10=	4.08	3.76	2.14	1.39	2.25
C6H14	2.47	2.27	4.89	4.97	4.86
C6H12= & CYCLO'S	2.87	2.87	1.54	1.41	1.35
C7+ IN GAS	13.64	13.15	8.04	9.30	8.26
LIQ HC'S	45.23	46.46	30.68	30.77	30.35
TOTAL	100.00	100.00	100.00	100.00	100.00

Table 25 (continued)

SUB-GROUPING					
C1 -C4	29.43	29.60	47.87	46.73	47.64
C5 -420 F	41.62	40.43	36.79	37.88	37.64
420-700 F	24.02	24.59	12.83	12.86	12.72
700-END PT	4.93	5.38	2.52	2.52	2.00
C5+-END PT	70.57	70.40	52.13	53.27	52.36
ISO/NORMAL MOLE RATIO					
C4	0.0435	0.0353	0.0276	0.0557	0.0528
C5	0.0406	0.0413	0.0335	0.0435	0.0457
C6	0.1032	0.0998	0.0651	0.0777	0.0789
C4=	0.0587	0.0580	0.0828	0.1343	0.1325
PARAFFIN/OLEFIN RATIO					
C3	1.1155	1.0920	4.3757	3.9688	4.5213
C4	0.6171	0.5781	2.4491	2.1650	2.3048
C5	0.5393	0.4870	2.1945	3.7858	2.2943
SCHULZ-FLORY DISTRBTN					
ALPHA (EXP(SLOPE))	0.8385	0.8424	0.7882	0.7992	
RATIO CH4/(1-A)**2	6.6535	7.2596	6.9173	7.0688	
LIQ HC COLLECTION					
PHYS. APPEARANCE	CLR OIL	OIL/SLD		CLR OIL	
DENSITY	0.7637	0.7639		0.7474	
N, REFRACTIVE INDEX	1.4293	1.4294		1.4200	
SIMULT'D DISTILATN					
10 WT % @ DEG F	303	303		258	
16	342	342		293	
50	482	483		420	
84	663	667		618	
90	709	713		674	
RANGE(16-84 %)	321	325		325	
WT % @ 420 F	36.00	35.50	50.00	50.00	51.50
WT % @ 700 F	89.10	88.42	91.80	91.80	93.41

NEW FORMAT AUG 29,84

Table 26

RESULT OF SYNGAS OPERATION

RUN NO. 11723-13
CATALYST CoTh+U103+U101+CuZn/MS-A 250 CC 111.GM (Cat#11684-99C +17 G)
FEED H2:CO:ARGON OF 50:50:0 @ 1260 CC/MN OR 302 GHSV

RUN & SAMPLE NO.	11723-13-01	723-13-02	723-13-03	723-13-04	723-13-05
FEED H2:CO:AR	50:50: 0	50:50: 0	50:50: 0	50:50: 0	50:50: 0
HRS ON STREAM	2.0	18.5	26.5	43.0	50.5
PRESSURE,PSIG	304	300	297	300	296
TEMP. C	262	263	262	262	263
FEED CC/MIN	1260	1260	1260	1260	1260
HOURS FEEDING	2.00	18.50	8.00	24.50	7.50
EFFLNT GAS LITER	120.95	965.35	380.45	1176.70	359.75
GM AQUEOUS LAYER	10.57	97.74	52.95	162.17	49.88
GM OIL	2.10	19.43	16.73	51.25	17.22
MATERIAL BALANCE					
GM ATOM CARBON %	98.80	96.50	92.93	93.32	94.18
GM ATOM HYDROGEN %	108.90	93.97	98.22	99.12	100.05
GM ATOM OXYGEN %	107.91	101.39	98.40	98.76	98.83
RATIO CHX/(H2O+CO2)	0.6174	0.7811	0.7956	0.7970	0.8274
RATIO X IN CHX	2.5951	2.5314	2.4373	2.4378	2.4199
USAGE H2/CO PRODT	2.4652	2.3828	2.3517	2.3559	2.3056
FEED H2/CO FRM EFFLNT	1.1023	0.9738	1.0570	1.0621	1.0623
RESIDUAL H2/CO RATIO	0.8265	0.6447	0.6527	0.6607	0.6601
RATIO CO2/(H2O+CO2)	0.0805	0.0377	0.0294	0.0279	0.0283
K SHIFT IN EFFLNT	0.0724	0.0252	0.0198	0.0190	0.0192
SPECIFIC ACTIVITY SA	0.2663	0.4232	0.5632	0.5435	0.5440
CONVERSION					
ON CO %	16.83	18.94	23.79	23.68	24.44
ON H2 %	37.63	46.33	52.94	52.52	53.05
ON CO+H2 %	27.74	32.45	38.77	38.53	39.18
PRDT SELECTIVITY,WT %					
CH4	21.73	22.46	17.52	17.78	16.88
C2 HC'S	3.17	2.49	1.94	1.94	1.91
C3H8	6.07	3.84	2.77	2.59	2.42
C3H6=	0.71	2.71	2.13	2.26	2.02
C4H10	6.92	3.32	2.49	2.15	2.13
C4H8=	1.19	4.04	3.18	3.52	3.15
C5H12	7.34	3.51	2.55	2.57	2.03
C5H10=	1.07	4.53	3.49	3.16	3.56
C6H14	7.35	3.66	2.81	2.41	2.33
C6H12= & CYCLO'S	0.14	3.46	2.75	2.99	2.96
C7+ IN GAS	12.91	19.39	14.79	15.09	14.73
LIQ HC'S	31.38	26.60	43.58	43.54	45.89
TOTAL	100.00	100.00	100.00	100.00	100.00

Table 26 (continued)

SUB-GROUPING					
C1 -C4	39.80	38.85	30.03	30.24	28.50
C5 -420 F	39.80	43.86	41.43	41.24	42.13
420-700 F	18.44	15.63	24.04	24.02	24.37
700-END PT	1.96	1.66	4.51	4.50	5.00
C5+-END PT	60.20	61.15	69.97	69.76	71.50
ISO/NORMAL MOLE RATIO					
C4	0.2306	0.0418	0.0505	0.0442	0.0504
C5	0.5141	0.0818	0.0823	0.0585	0.0449
C6	1.0745	0.1351	0.1224	0.1043	0.0813
C4=	0.0000	0.0472	0.0536	0.0524	0.0574
PARAFFIN/OLEFIN RATIO					
C3	8.1422	1.3529	1.2435	1.0924	1.1424
C4	5.5925	0.7916	0.7545	0.5881	0.6527
C5	6.6476	0.7533	0.7101	0.7891	0.5538
SCHULZ-FLORY DISTRBTN					
ALPHA (EXP(SLOPE))		0.7841	0.8305	0.8349	
RATIO CH4/(1-A)**2		4.8176	6.0977	6.5233	
LIQ HC COLLECTION					
PHYS. APPEARANCE		CLDY		CLR OIL	
DENSITY		0.7629		0.7651	
N, REFRACTIVE INDEX		1.4282		1.4301	
SIMULT'D DISTILATN					
10 WT % @ DEG F		320		304	
16		346		344	
50		470		487	
84		622		664	
90		664		703	
RANGE(16-84 %)		276		320	
WT % @ 420 F	35.00	35.00	34.50	34.50	36.00
WT % @ 700 F	93.77	93.77	89.66	89.66	89.10

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Table 27

RESULT OF SYNGAS OPERATION

RUN NO. 11723-13
CATALYST CoTh+U103+U101+CuZn/MS-A 250 CC 111.GM (Cat#11684-99C +17 G)
FEED H2:CO:ARGON OF 50:50:0 @ 1260 CC/MN OR 302 GHSV

RUN & SAMPLE NO.	11723-13-11	723-13-12	723-13-13	723-13-14	723-13-15
FEED H2:CO:AR	66:33: 0	66:33: 0	66:33: 0	66:33: 0	66:33: 0
HRS ON STREAM	138.5	145.5	163.0	169.5	187.5
PRESSURE,PSIG	292	295	294	293	293
TEMP. C	263	263	262	263	266
FEED CC/MIN	945	945	945	945	945
HOURS FEEDING	24.00	7.00	24.50	6.50	24.50
EFFLNT GAS LITER	535.65	157.55	553.45	148.30	556.40
GM AQUEOUS LAYER	197.24	56.90	199.15	53.09	200.09
GM OIL	51.99	14.71	51.49	13.37	50.41
MATERIAL BALANCE					
GM ATOM CARBON %	96.58	96.02	96.71	96.15	102.09
GM ATOM HYDROGEN %	100.45	100.11	100.86	100.77	104.00
GM ATOM OXYGEN %	100.51	100.03	99.68	100.83	101.76
RATIO CHX/(H2O+CO2)	0.9394	0.9376	0.9536	0.9275	1.0050
RATIO X IN CHX	2.7107	2.7155	2.7049	2.7350	2.7956
USAGE H2/CO PRODT	2.2146	2.2198	2.2069	2.2333	2.1354
FEED H2/CO FRM EFFLNT	2.0824	2.0873	2.0880	2.0982	2.0395
RESIDUAL H2/CO RATIO	1.8126	1.8227	1.8468	1.8315	1.8116
RATIO CO2/(H2O+CO2)	0.0600	0.0595	0.0577	0.0609	0.0825
K SHIFT IN EFFLNT	0.1157	0.1154	0.1132	0.1189	0.1629
SPECIFIC ACTIVITY SA	0.4188	0.4044	0.4258	0.4005	0.4028
CONVERSION					
ON CO %	67.11	66.63	66.98	66.39	70.40
ON H2 %	71.37	70.86	70.79	70.67	73.71
ON CO+H2 %	69.99	69.49	69.56	69.29	72.62
PRDT SELECTIVITY,WT %					
CH4	29.29	29.63	29.04	30.51	33.18
C2 HC'S	3.40	3.44	3.35	3.52	3.99
C3H8	5.60	5.52	5.55	5.60	6.45
C3H6=	1.15	1.08	1.12	1.08	1.22
C4H10	5.08	5.10	5.17	5.19	5.88
C4H8=	1.89	1.93	1.94	1.82	1.90
C5H12	5.16	4.98	5.10	5.10	5.11
C5H10=	2.19	1.94	1.87	1.88	1.75
C6H14	4.93	4.91	5.27	5.00	4.56
C6H12= & CYCLO'S	1.38	1.30	1.32	1.16	1.21
C7+ IN GAS	8.88	9.68	10.22	9.22	7.87
LIQ HC'S	31.04	30.49	30.05	29.93	26.89
TOTAL	100.00	100.00	100.00	100.00	100.00

Table 27 (continued)

SUB-GROUPING					
C1 -C4	46.41	46.71	46.16	47.73	52.61
C5 -420 F	38.54	38.51	39.26	38.36	34.89
420-700 F	13.01	12.87	12.69	12.22	10.98
700-END PT	2.05	1.92	1.89	1.70	1.53
C5+-END PT	53.59	53.29	53.84	52.27	47.39
ISO/NORMAL MOLE RATIO					
C4	0.0245	0.0268	0.0246	0.0259	0.0486
C5	0.0308	0.0355	0.0319	0.0347	0.0392
C6	0.0729	0.0649	0.0651	0.0687	0.0790
C4=	0.1135	0.1113	0.1152	0.1131	0.1384
PARAFFIN/OLEFIN RATIO					
C3	4.6628	4.8660	4.7126	4.9446	5.0349
C4	2.6014	2.5461	2.5710	2.7570	2.9916
C5	2.2885	2.5019	2.6552	2.6398	2.8359
SCHULZ-FLORY DISTRBTN					
ALPHA (EXP(SLOPE))	0.7914		0.7870	0.7746	0.7800
RATIO CH4/(1-A)**2	6.7314		6.3986	6.0086	6.8585
LIQ HC COLLECTION					
PHYS. APPEARANCE	CLR OIL		CLR OIL		CLR OIL
DENSITY	0.7443		0.7442		0.7433
N, REFRACTIVE INDEX	1.4186		1.4182		1.4181
SIMULT'D DISTILATN					
10 WT % @ DEG F	259		259		258
16	275		267		264
50	413		404		392
84	597		593		579
90	652		648		644
RANGE(16-84 %)	322		326		315
WT % @ 420 F	51.50	51.50	51.50	53.50	53.50
WT % @ 700 F	93.41	93.71	93.71	94.32	94.32

Table 28

RESULT OF SYNGAS OPERATION

RUN NO. 11723-13
CATALYST CoTh+U103+U101+CuZn/MS-A 250 CC 111.GM (Cat#11684-99C +17 G)
FEED H2:CO:ARGON OF 50:50:0 @ 1260 CC/MN OR 302 GHSV

RUN & SAMPLE NO.	11723-13-16	723-13-17	723-13-18	723-13-19	723-13-20
FEED H2:CO:AR	66:33: 0	66:33: 0	66:33: 0	66:33: 0	66:33: 0
HRS ON STREAM	194.5	211.0	218.5	235.0	242.0
PRESSURE,PSIG	300	298	295	295	297
TEMP. C	254	253	255	253	264
FEED CC/MIN	945	945	945	945	945
HOURS FEEDING	7.00	23.50	7.50	24.00	7.00
EFFLNT GAS LITER	202.80	686.40	218.40	705.90	187.95
GM AQUEOUS LAYER	47.00	157.78	50.65	162.07	50.41
GM OIL	11.57	38.85	13.86	44.34	13.55
MATERIAL BALANCE					
GM ATOM CARBON %	93.57	91.79	95.83	95.22	112.23
GM ATOM HYDROGEN %	99.47	98.67	100.69	100.18	109.96
GM ATOM OXYGEN %	99.56	99.95	100.39	101.15	101.95
RATIO CHX/(H2O+CO2)	0.8855	0.8435	0.9132	0.8870	1.1720
RATIO X IN CHX	2.6374	2.6264	2.6310	2.6006	2.8168
USAGE H2/CO PRODT	2.3432	2.4056	2.3097	2.3399	2.0193
FEED H2/CO FRM EFFLNT	2.1284	2.1522	2.1038	2.1064	1.9616
RESIDUAL H2/CO RATIO	1.9041	1.9068	1.8833	1.8719	1.8423
RATIO CO2/(H2O+CO2)	0.0278	0.0231	0.0278	0.0233	0.0941
K SHIFT IN EFFLNT	0.0544	0.0451	0.0539	0.0447	0.1913
SPECIFIC ACTIVITY SA	0.3600	0.3594	0.3608	0.3856	0.3884
CONVERSION					
ON CO %	51.08	49.20	51.70	50.12	67.43
ON H2 %	56.24	54.99	56.76	55.68	69.41
ON CO+H2 %	54.59	53.15	55.13	53.89	68.74
PRDT SELECTIVITY,WT %					
CH4	26.18	25.74	25.85	24.55	34.01
C2 HC'S	2.78	2.73	2.75	2.62	4.09
C3H8	4.96	4.73	5.00	4.55	6.66
C3H6=	1.37	1.44	1.40	1.25	0.95
C4H10	4.79	4.51	4.44	4.28	5.93
C4H8=	2.34	1.90	1.90	1.88	1.78
C5H12	4.64	4.59	4.52	4.26	5.64
C5H10=	2.24	2.24	2.17	2.17	1.98
C6H14	5.07	4.81	4.94	4.79	5.56
C6H12= & CYCLO'S	1.60	1.72	1.56	1.57	1.25
C7+ IN GAS	12.75	12.55	11.73	13.14	8.22
LIQ HC'S	31.29	33.03	33.74	34.95	23.95
TOTAL	100.00	100.00	100.00	100.00	100.00

Table 28 (continued)

SUB-GROUPING					
C1 -C4	42.42	41.05	41.34	39.12	53.41
C5 -420 F	40.21	40.62	37.41	38.86	33.78
420-700 F	15.32	16.16	18.60	19.27	10.77
700-END PT	2.05	2.17	2.65	2.75	2.04
C5+-END PT	57.58	58.95	58.66	60.88	46.59
ISO/NORMAL MOLE RATIO					
C4	0.0433	0.0238	0.0220	0.0212	0.0294
C5	0.0327	0.0245	0.0269	0.0262	0.0407
C6	0.0522	0.0374	0.0422	0.0392	0.0841
C4=	0.0998	0.0740	0.0796	0.0759	0.1150
PARAFFIN/OLEFIN RATIO					
C3	3.4575	3.1354	3.4059	3.4682	6.6838
C4	1.9711	2.2846	2.2579	2.1983	3.2207
C5	2.0165	1.9927	2.0290	1.9068	2.7769
SCHULZ-FLORY DISTRBTN					
ALPHA (EXP(SLOPE))	0.8037	0.7975	0.8025	0.8110	
RATIO CH4/(1-A)**2	6.7984	6.2763	6.6309	6.8719	
LIQ HC COLLECTION					
PHYS. APPEARANCE		CLR OIL		CLR OIL	
DENSITY		0.7511		0.7524	
N, REFRACTIVE INDEX		1.4218		1.4225	
SIMULT'D DISTILATN					
10 WT % @ DEG F		266		306	
16		306		345	
50		428		460	
84		608		631	
90		664		682	
RANGE(16-84 %)		302		286	
WT % @ 420 F	44.50	44.50	37.00	37.00	46.50
WT % @ 700 F	93.44	93.44	92.14	92.14	91.47

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