Background Report Reference

AP-42 Section Number: 10.6.1

Background Report Section: 4

Reference Number: 19

Title: Report of Air Emissions Tests For Kirby Forest Industries, Silsbee OSB Plant September 24-26, 1991 Silsbee, TX

Environmental Monitoring Lab.

November 1991

19

No Process Rates

REPORT OF
AIR EMISSIONS TESTS
FOR
KIRBY FOREST INDUSTRIES
SILSBEE OSB PLANT

Silsbee, Texas
September 24, through 26, 1991

Performed By:
Environmental Monitoring Laboratories
Ridgeland, Mississippi
(601-856-3092)

ENVIRONMENTAL MONITORING LABORATORIES, INC.

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November 6, 1991

Subject: Kirby Forest Industries
Silsbee, Texas OSB Plant

During the period September 24, through September 26, 1991, Environmental Monitoring Laboratories conducted air emissions tests for Kirby Forest Industries' OSB facility in Silsbee, Texas. Testing was performed to determine particulate, VOC, and CO emissions from five OSB dryers stacks in accordance with requirements of the Texas Air Control Board. In addition, ground level sampling upwind and downwind of the facility was done for MDI, phenol, and formaldehyde.

A summary of the stack test results in pounds per hour:

	PM	VOC	CO
Dryer No. 1 (09-24-91).....	11.6	21.5	4.18
Dryer No. 2 (09-25-91).....	10.8	22.7	2.40
Dryer No. 3 (09-25-91).....	9.35	25.4	4.96
Dryer No. 4 (09-26-91).....	11.7	29.7	1.68
Dryer No. 5 (09-26-91).....	9.17	27.1	1.04

A summary of the ground level test results in ppm:

	MDI	HCHO	Phenol
Average upwind concentrations	<.0001	<.05	<.01
Average downwind concentrations	<.0001	<.05	<.01

The testing project was coordinated by Dr. Jim Boswell of Louisiana Pacific. Danny Russell of Environmental Monitoring Laboratories was responsible for the collection and analysis of the samples. Sample custody was limited to Mr. Russell with the exception of samples for HCHO, MDI, and phenol. Those samples were shipped to Clayton Environmental Consultants in Edison, New Jersey for analysis.

Following is a report of the test.

REPORT OF AIR EMISSIONS TESTS
FOR KIRBY FOREST INDUSTRIES
SILSBEE OSB PLANT
SILSBEE, TEXAS
SEPTEMBER 24 THROUGH 26, 1991

CONTENTS

REPORT CERTIFICATION

I certify that I have examined the information submitted herein, and based upon my inquiries of those directly responsible for obtaining the data or upon my direct acquisition of the data, I believe the submitted information is true, accurate and complete.

Signed Daniel G. Russell

Daniel G. Russell

1.0 Test Results: The following tables present the measured flow parameters and test results for three separate emissions samples for each of 5 OSB dryer stacks at Kirby Forest Industries in Silsbee, Texas during the period September 24, through 26, 1991, and results of ground level testing upwind and downwind of the facility.

1.2 No. 1 Dryer

Run. No.		1	2	3	avg.
Date		09-24-91	09-24-91	09-24-91	------
Time start		1222	1410	1536	------
Time end		1323	1512	1638	------
PARTICULATE EMISSIONS	#/hr.	11.9	11.1	11.9	11.6
PARTICULATE EMISSIONS	gr/dscf	0.046	0.041	0.043	0.042
CO EMISSIONS	#/hr.	3.81	2.71	6.03	4.18
CO EMISSIONS	ppm	29	20	43	31
VOC EMISSIONS	#/hr.	22.3	22.4	19.9	21.5
VOC EMISSIONS	ppm as C	337	325	287	316
VOLUMETRIC FLOWRATE	acfm	43871	45749	46269	45296
VOLUMETRIC FLOWRATE	dscfm	30132	31850	31940	31307
VELOCITY	ft./sec.	76.0	79.3	80.2	78.5
STACK TEMPERATURE	degrees F	194	192	195	194
MOISTURE	%	14.7	13.8	14.1	14.2
SAMPLE RATE	%isokinetic	103	98	102	101

1.2 No. 2 Dryer

Run. No.		1	2	3	avg.
Date		09-25-91	09-25-91	09-25-91	------
Time start		1025	1200	1336	------
Time end		1126	1302	1438	------
PARTICULATE EMISSIONS	#/hr.	10.1	11.6	10.6	10.8
PARTICULATE EMISSIONS	gr/dscf	0.039	0.045	0.041	0.042
CO EMISSIONS	#/hr.	1.25	2.72	3.23	2.40
CO EMISSIONS	ppm	9.5	21	25	18
VOC EMISSIONS	#/hr.	25.8	17.3	25.0	22.7
VOC EMISSIONS	ppm as C	392	263	396	344
VOLUMETRIC FLOWRATE	acfm	43794	44056	44041	43963
VOLUMETRIC FLOWRATE	dscfm	30151	30077	29843	30024
VELOCITY	ft./sec.	75.9	76.3	76.3	76.2
STACK TEMPERATURE	degrees F	193	200	197	197
MOISTURE	%	14.6	14.5	15.5	14.8
SAMPLE RATE	%isokinetic	100	103	100	101

1.3 Dryer No. 3

Run. No.		1	2	3	avg.
Date		09-25-91	09-25-91	09-25-91	------
Time start		1512	1639	1812	------
Time end		1614	1740	1913	------
PARTICULATE EMISSIONS	#/hr.	9.71	9.36	9.00	9.35
PARTICULATE EMISSIONS	gr/dscf	0.037	0.035	0.034	0.035
CO EMISSIONS	#/hr.	7.11	5.41	2.38	4.96
CO EMISSIONS	ppm	53	40	18	37
VOC EMISSIONS	#/hr.	23.9	26.3	26.1	25.4
VOC EMISSIONS	ppm	356	393	389	380
VOLUMETRIC FLOWRATE	acfm	43735	43749	43825	43770
VOLUMETRIC FLOWRATE	dscfm	30564	30756	30941	30754
VELOCITY	ft./sec.	75.8	75.8	75.9	75.8
STACK TEMPERATURE	degrees F	187	186	185	186
MOISTURE	%	14.2	13.8	13.6	13.9
SAMPLE RATE	%isokinetic	100	99	97	99

1.4 Dryer No. 4

Run. No.		1	2	3	avg.
Date		09-26-91	09-26-91	09-26-91	------
Time start		1030	1205	1326	------
Time end		1147	1306	1445	------
PARTICULATE EMISSIONS	#/hr.	12.5	11.1	11.6	11.7
PARTICULATE EMISSIONS	gr/dscf	0.041	0.037	0.038	0.038
CO EMISSIONS	#/hr.	1.52	1.62	1.89	1.68
CO EMISSIONS	ppm	9.8	10.5	12.1	10.8
VOC EMISSIONS	#/hr.	29.9	28.9	30.45	29.7
VOC EMISSIONS	ppm	391	380	393	388
VOLUMETRIC FLOWRATE	acfm	49458	49234	49892	49528
VOLUMETRIC FLOWRATE	dscfm	35558	35390	35738	35562
VELOCITY	ft./sec.	85.7	85.3	86.4	85.8
STACK TEMPERATURE	degrees F	178	177	176	177
MOISTURE	%	13.0	13.0	13.5	13.2
SAMPLE RATE	%isokinetic	98	102	98	99

1.5 No. 5 Dryer

Run. No.		1	2	3	avg.
Date		09-26-91	09-26-91	09-26-91	------
Time start		1656	1833	2050	------
Time end		1819	2016	2232	------
PARTICULATE EMISSIONS	#/hr.	10.2	8.21	9.12	9.17
PARTICULATE EMISSIONS	gr/dscf	0.033	0.027	0.030	0.030
CO EMISSIONS	#/hr.	1.01	0.99	1.14	1.04
CO EMISSIONS	ppm	6.5	6.4	7.4	6.8
VOC EMISSIONS	#/hr.	25.0	26.7	29.5	27.1
VOC EMISSIONS	ppm	331	354	392	359
VOLUMETRIC FLOWRATE	acfm	48880	48657	48327	48621
VOLUMETRIC FLOWRATE	dscfm	35457	35345	35272	35358
VELOCITY	ft./sec.	84.7	84.3	83.7	84.2
STACK TEMPERATURE	degrees F	177	176	173	175
MOISTURE	%	12.3	12.3	12.3	12.3
SAMPLE RATE	%isokinetic	95	95	96	95

1.7 Results of ground level sampling: Samples for ambient levels of MDI, formaldehyde, and phenol were taken on September 25 and 26, 1991.

Calculations:

Sample volume at std. conditions: (minutes)(flow rate)(Pbar/29.92)(528/Ta)

ppm: (mg sample/volume, liters)(24040/mw)

Formaldehyde concentration determinations

Tube ID	Sample ID	Date	Pump/ Side	Cal. Flow	minutes sampled	Pbar in. Hg	Ta Deg F	Volume liters	Sample wt. mg	HCHO ppm
1	DW R1	09-25-91	823-A	.1053	432	29.87	75	44.82	.002	.04
3	UW R1	09-25-91	910-A	.0909	429	29.87	75	38.42	.003	.06
5	DW R2	09-26-91	823-A	.1053	389	29.89	78	40.16	.002	.04
7	UW R2	09-26-91	910-A	.0909	379	29.89	78	33.78	.002	.05
9	DW R3	09-26-91	823-A	.1053	322	29.89	83	32.94	<.002	* <.05
11	UW R3	09-26-91	910-A	.0909	317	29.89	83	27.99	<.002	* <.06

Phenol concentration determinations

Tube ID	Sample ID	Date	Pump/ Side	Cal. Flow	minutes sampled	Pbar in. Hg	Ta Deg F	Volume liters	Sample wt. mg	PHENOL ppm
2	DW R1	09-25-91	823-B	.0984	432	29.87	75	41.88	<.002	* <.01
4	UW R1	09-25-91	910-B	.0952	429	29.87	75	40.24	<.002	* <.01
6	DW R2	09-26-91	823-B	.0984	389	29.89	78	37.53	<.002	* <.01
8	UW R2	09-26-91	910-B	.0952	379	29.89	78	35.37	<.002	* <.01
10	DW R3	09-26-91	823-B	.0984	322	29.89	83	30.78	<.002	* <.02
12	UW R3	09-26-91	910-B	.0952	317	29.89	83	29.32	<.002	* <.02

MDI Concentration determinations

Sample ID	Date	Pump	Cal. Flow	minutes sampled	Pbar in. Hg	Ta Deg F	Volume liters	Sample wt. mg	MDI ppm
DW R1	09-25-91	9903	1.017	432	29.87	75	432.8	<.0002	*<.00006
UW R1	09-25-91	9178	.9783	429	29.87	75	413.5	<.0002	*<.00007
DW R2	09-26-91	9903	1.017	389	29.89	78	387.8	<.0002	*<.00007
UW R2	09-26-91	9178	.9783	379	29.89	78	363.5	<.0002	*<.00008
DW R3	09-26-91	9903	1.017	322	29.89	83	318.1	<.0002	*<.00009
UW R3	09-26-91	9178	.9783	317	29.89	83	301.3	<.0002	*<.00009

* Below minimum detectible limits

2.0 Source Description: Kirby Forest Industries' oriented strand board (OSB) facility in Silsbee, Texas produces oriented strand board from southern pine timber. Five (5) identical MEC Company rotary dryers are used to dry wood flakes used in the board construction. Particulate emissions from each of the rotary dryers are controlled by a multi-cyclone. Each identical system exhausts to the atmosphere by way of a 42.0 inch diameter stack. Two sample ports are provided at a location which is approximately 28 feet (8.0 diameters) below the stack exit and 50 feet (14 diameters) above the blower inlet to the stack. Detailed descriptions of the processes and operating rates, and operating conditions during the tests are supplied by Kirby Forest Industries under separate cover.

3.0 Test Procedures: Test procedures used are those described in the Code of Federal Regulations, Title 40, Part 60, Appendix A. Specifically those procedures used were Method 1 to determine the number of sample points, Method 3 to determine carbon dioxide and oxygen content of the stack gas, and Method 5 to determine flow rates, moisture content, and particulate emissions. The sampling train used is identical to that described in Method 5. VOC emissions were measured using Method 25A (continuous monitoring with a flame ionization detector). The FID is equipped with multiple scales. The 0 to 100 ppm scale and the 0 to 1000 ppm scale were used for calibrations using zero air, 22.1 ppm propane, 258 ppm propane, and 740 ppm propane. Calibrations are made with propane (C_3H_8). Therefore, to obtain results as methane (CH_3) (or as carbon), measured concentrations were increased by a factor of three. Carbon monoxide concentration was determined using the continuous sampling technique described in Method 10 using a Beckman NDIR analyzer.

Particulate filters were recovered by rinsing the front half of the filter holder into the probe wash and securing the filters in glass petri dishes. Part of the sample filter normally adheres to the filter gasket, and some of the adhering material is recovered into the probe wash. Therefore some of the filter weight is attributed to the probe wash weight.

Filters were heated in an oven for 2 hours at 105° C, desiccated at least 24 hours and weighed to constant weight. Probe wash samples in acetone were evaporated to dryness over low heat in tarred beakers, desiccated for at least 24 hours and weighed to constant weight. Weighings are made at 6 hour or greater intervals (samples stored in desiccator). Final weights are considered valid and are recorded if there is no more than 0.5 milligrams difference from the previous weighing.

Ground level sampling for phenol, formaldehyde, and MDI was conducted simultaneously at areas generally upwind and downwind of the plant. Three separate sampling periods were made for 4 to 7 hour durations during two days when conditions were deemed appropriate. Sampling for MDI was done by using a calibrated personnel sampling pump and two midget impingers containing methoxy phenyl piperidine in toluene. The sample rate was approximately 1 liters per minute. Analyses were made using NIOSH procedure 5521. Sampling and analysis for formaldehyde was done using OSHA procedure 52. Samples were collected using a calibrated personnel pump and treated XAD-2 resin tubes and a sample rate of approximately 100 milliliters per minute. Sampling for phenol was done using OSHA procedure 32. Samples were collected using a calibrated personnel pump and XAD-7 resin tubes and a sample rate of approximately 100 milliliters per minute.

4.0 Data Reduction

Kirby Forest Industries - Silsbee OSB Facility
No. 1 Dryer Stack
Particulate/VOC/CO Emissions Test - September 24, 1991

Collected test data		RUN 1	RUN 2	RUN 3	
1. As	: sq ft	9.621128	9.621128	9.621128	
2. Dn	: in.	.197	.197	.197	
3. Cp	: dimensionless	.84	.84	.84	
4. Theta	: minutes	60	60	60	
5. Y	: dimensionless	1.00	1.00	1.00	
6. Pbar	: in. Hg	29.87	29.87	29.87	
7. Pg	: in. H2O	-.5	-.5	-.5	
8. Vm	: cf (dry gas)	43.785	44.631	46.808	
9. sqr(DP),avg:	in.H2O^.5	1.1844	1.2393	1.2494	
10. DH	: in. H2O	1.6875	1.7417	1.7583	
11. ts	: degrees F	193.83	191.75	195.17	193.58
12. tm	: degrees F	105.75	112.58	115.79	
13. Vlc	: ml	✓ 150	✓ 140.5	✓ 150	
14. CO2	: percent	2.00	2.00	2.00	
15. O2	: percent	19.00	19.00	19.00	
16. CO	: ppm, dry (NDIR)	29	19.5	43.3	30.6
17.a Mn	: mg (front half)	✓ 119.9	✓ 105	✓ 116.8	
17.b Mn(bak)	: mg (back half)	✓ 1.9	✓ 3.8	✓ 4.6	
18. C,VOC	: ppmv as propane,wet	112.40	108.20	95.50	105.37

Kirby Forest Industries - Silsbee OSB Facility
No. 1 Dryer Stack
Particulate/VOC/CO Emissions Test - September 24, 1991

Calculations:	RUN 1	RUN 2	RUN 3	AVG.
1. Pm : in.Hg (DH/13.6)+Pbar	29.99	30.00	30.00	N/A
2. Ps : in. Hg (Pg/13.6)+Pbar	29.83	29.83	29.83	N/A
3. An : sq ft ((Dn/24)^2)(3.1416)	2.117e-4	2.117e-4	2.117e-4	N/A
4. Vmstd: dscf Vm Y(Pm/Pstd)(Tstd/Tm)	40.96460	41.26350	43.03673	N/A
5. Vwstd: scf (.04707cf/ml)(Vlc)	7.0605	6.613335	7.0605	N/A
6. Bws : dimensionless Vwstd/(Vwstd+Vmstd)	.1470169	.1381323	.1409359	.1420284
7. Md : mol.wt. dry basis .44 CO2+.32 O2+.28(CO+N2)	29.08	29.08	29.08	N/A
8. Ms : mol.wt. wet basis Md(1-Bws)+18 Bws	27.45	27.55	27.52	N/A
9. Vs : ft/sec Kp Cp (sqrDP)sqr(Ts/(Ps Ms))	76.00	79.25	80.15	78.47
10. Q : cfm Vs As(60 sec/min)	43871	45749	46269	45296
11. Qstd : dscfm Q(1-Bws)(Ps/Pstd)(Tstd/Ts)	30132	31850	31940	31307
12. I : percent [(100 Ts)(.002669 Vlc+(Vm Pm/Tm)]/ (60 Theta Vs Ps An)	103.00	98.15	102.08	101.08
13. E : pounds/hr ((Mn/Vmstd)(Qstd)(60))/453590 mg/#				
Front Half	11.67	10.72	11.47	11.28
Back Half	.18	.39	.45	.34
Total	11.85	11.11	11.92	11.63
14. C's : grains/dscf (Mn/Vmstd)(.0154 grains/mg)				
Front Half	.0450745	.0391872	.0417950	.0420189
Back Half	.0007143	.0014182	.0016460	.0012595
Total	.0457888	.0406054	.0434410	.0432784
15. E,CO : pounds/hr (C,CO*7.27e-8)(Qstd)(60)	3.81	2.71	6.03	4.18
16. E,VOC : pounds/hr as carbon (C,VOC)(3)(3.1161e-8)(Qstd,wet)60	22.27	22.43	19.92	21.54

Kirby Forest Industries - Silsbee OSB Facility
No. 2 Dryer Stack
Particulate/VOC/CO Emissions Test - September 25, 1991

Collected test data		RUN 1	RUN 2	RUN 3	
1. As	: sq ft	9.621128	9.621128	9.621128	
2. Dn	: in.	.197	.197	.197	
3. Cp	: dimensionless	.84	.84	.84	
4. Theta	: minutes	60	60	60	
5. Y	: dimensionless	1.00	1.00	1.00	
6. Pbar	: in. Hg	29.87	29.87	29.87	
7. Pg	: in. H2O	-.51	-.51	-.51	
8. Vm	: cf (dry gas)	41.815	44.309	42.859	
9. sqr(DP),avg:	in.H2O^.5	1.1831	1.1847	1.1846	
10. DH	: in. H2O	1.625	1.65	1.6417	
11. ts	: degrees F	193.33	199.67	196.58	196.53
12. tm	: degrees F	98.38	112.63	117.25	
13. Vlc	: ml	143.5	147	153	
14. CO2	: percent	2.00	2.00	2.00	
15. O2	: percent	19.00	19.00	19.00	
16. CO	: ppm, dry (NDIR)	9.5	20.7	24.8	18.33333
17.a Mn	: mg (front half)	96.4	104.4	100.4	
17.b Mn(bak)	: mg (back half)	4.2	15	4.6	
18. C,VOC	: ppmv as propane,wet	130.50	87.50	126.40	114.80

Kirby Forest Industries - Silsbee OSB Facility
No. 2 Dryer Stack
Particulate/VOC/CO Emissions Test - September 25, 1991

Calculations:	RUN 1	RUN 2	RUN 3	AVG.
1. Pm : in.Hg (DH/13.6)+Pbar	29.99	29.99	29.99	N/A
2. Ps : in. Hg (Pg/13.6)+Pbar	29.83	29.83	29.83	N/A
3. An : sq ft ((Dn/24)^2)(3.1416)	2.117e-4	2.117e-4	2.117e-4	N/A
4. Vmstd: dscf Vm Y(Pm/Pstd)(Tstd/Tm)	39.63178	40.95301	39.29499	N/A
5. Vwstd: scf (.04707cf/ml)(Vlc)	6.754545	6.91929	7.20171	N/A
6. Bws : dimensionless Vwstd/(Vwstd+Vmstd)	.1456150	.1445364	.1548865	.1483460
7. Md : mol.wt. dry basis .44 CO2+.32 O2+.28(CO+N2)	29.08	29.08	29.08	N/A
8. Ms : mol.wt. wet basis Md(1-Bws)+18 Bws	27.47	27.48	27.36	N/A
9. Vs : ft/sec Kp Cp (sqrDP)sqr(Ts/(Ps Ms))	75.86	76.32	76.29	76.16
10. Q : cfm Vs As(60 sec/min)	43794	44056	44041	43963
11. Qstd : dscfm Q(1-Bws)(Ps/Pstd)(Tstd/Ts)	30151	30077	29843	30024
12. I : percent [(100 Ts)(.002669 Vlc+(Vm Pm/Tm)]/ (60 Theta Vs Ps An)	99.59	103.16	99.76	100.83
13. E : pounds/hr ((Mn/Vmstd)(Qstd)(60))/453590 mg/#				
Front Half	9.70	10.14	10.09	9.98
Back Half	.42	1.46	.46	.78
Total	10.12	11.60	10.55	10.76
14. C's : grains/dscf (Mn/Vmstd)(.0154 grains/mg)				
Front Half	.0374588	.0392587	.0393475	.0386883
Back Half	.0016320	.0056406	.0018028	.0030251
Total	.0390908	.0448993	.0411503	.0417135
15. E,CO : pounds/hr (C,CO*7.27e-8)(Qstd)(60)	1.25	2.72	3.23	2.40
16. E,VOC : pounds/hr as carbon (C,VOC)(3)(3.1161e-8)(Qstd,wet)60	25.83	17.26	25.04	22.71

Kirby Forest Industries - Silsbee OSB Facility
No. 3 Dryer Stack
Particulate/VOC/CO Emissions Test - September 25, 1991

Collected test data		RUN 1	RUN 2	RUN 3	
1. As	: sq ft	9.621128	9.621128	9.621128	
2. Dn	: in.	.197	.197	.197	
3. Cp	: dimensionless	.84	.84	.84	
4. Theta	: minutes	60	60	60	
5. Y	: dimensionless	1.00	1.00	1.00	
6. Pbar	: in. Hg	29.89	29.89	29.89	
7. Pg	: in. H2O	-.53	-.53	-.53	
8. Vm	: cf (dry gas)	43.924	44.146	43.02	
9. sqr(DP),avg	: in.H2O^.5	1.1889	1.191	1.1945	
10. DH	: in. H2O	1.6542	1.6542	1.6542	
11. ts	: degrees F	186.50	185.67	184.75	185.64
12. tm	: degrees F	117.63	120.00	116.63	
13. Vlc	: ml	142	137.5	132	
14. CO2	: percent	2.00	2.00	2.00	
15. O2	: percent	19.00	19.00	19.00	
16. CO	: ppm, dry (NDIR)	53.3	40.3	17.6	37.06667
17.a Mn	: mg (front half)	94.4	86.9	85.7	
17.b Mn(bak)	: mg (back half)	2.3	5.8	1.2	
18. C,VOC	: ppmv as propane,wet	119.50	131.10	129.80	126.80

Kirby Forest Industries - Silsbee OSB Facility
No. 3 Dryer Stack
Particulate/VOC/CO Emissions Test - September 25, 1991

Calculations:	RUN 1	RUN 2	RUN 3	AVG.
1. Pm : in.Hg (DH/13.6)+Pbar	30.01	30.01	30.01	N/A
2. Ps : in. Hg (Pg/13.6)+Pbar	29.85	29.85	29.85	N/A
3. An : sq ft ((Dn/24)^2)(3.1416)	2.117e-4	2.117e-4	2.117e-4	N/A
4. Vmstd: dscf Vm Y(Pm/Pstd)(Tstd/Tm)	40.27301	40.31116	39.51256	N/A
5. Vwstd: scf (.04707cf/ml)(Vlc)	6.68394	6.472125	6.21324	N/A
6. Bws : dimensionless Vwstd/(Vwstd+Vmstd)	.1423419	.1383427	.1358804	.1388550
7. Md : mol.wt. dry basis .44 CO2+.32 O2+.28(CO+N2)	29.08	29.08	29.08	N/A
8. Ms : mol.wt. wet basis Md(1-Bws)+18 Bws	27.50	27.55	27.57	N/A
9. Vs : ft/sec Kp Cp (sqrDP)sqr(Ts/(Ps Ms))	75.76	75.79	75.92	75.82
10. Q : cfm Vs As(60 sec/min)	43735	43749	43825	43770
11. Qstd : dscfm Q(1-Bws)(Ps/Pstd)(Tstd/Ts)	30564	30756	30941	30754
12. I : percent [(100 Ts)(.002669 Vlc+(Vm Pm/Tm)]/ (60 Theta Vs Ps An)	99.83	99.30	96.75	98.63
13. E : pounds/hr ((Mn/Vmstd)(Qstd)(60))/453590 mg/#				
Front Half	9.48	8.77	8.88	9.04
Back Half	.23	.59	.12	.31
Total	9.71	9.36	9.00	9.35
14. C's : grains/dscf (Mn/Vmstd)(.0154 grains/mg)				
Front Half	.0360976	.0331982	.0334015	.0342325
Back Half	.0008795	.0022158	.0004677	.0011877
Total	.0369771	.0354140	.0338692	.0354201
15. E,CO : pounds/hr (C,CO*7.27e-8)(Qstd)(60)	7.11	5.41	2.38	4.96
16. E,VOC : pounds/hr as carbon (C,VOC)(3)(3.1161e-8)(Qstd,wet)60	23.89	26.25	26.07	25.40

Kirby Forest Industries - Silsbee OSB Facility
No. 4 Dryer Stack
Particulate/VOC/CO Emissions Test - September 26, 1991

Collected test data		RUN 1	RUN 2	RUN 3	
1. As	: sq ft	9.621128	9.621128	9.621128	
2. Dn	: in.	.197	.197	.197	
3. Cp	: dimensionless	.84	.84	.84	
4. Theta	: minutes	60	60	60	
5. Y	: dimensionless	1.00	1.00	1.00	
6. Pbar	: in. Hg	29.90	29.90	29.90	
7. Pg	: in. H2O	-.63	-.63	-.63	
8. Vm	: cf (dry gas)	48.137	51.334	50.127	
9. sqr(DP),avg	: in.H2O^.5	1.3555	1.3495	1.3674	
10. DH	: in. H2O	2.2333	2.35	2.3583	
11. ts	: degrees F	177.67	177.42	176.42	177.17
12. tm	: degrees F	94.21	114.29	114.92	
13. Vlc	: ml	146	151	153	
14. CO2	: percent	1.50	1.50	1.50	
15. O2	: percent	19.00	19.00	19.00	
16. CO	: ppm, dry (NDIR)	9.8	10.5	12.1	10.8
17.a Mn	: mg (front half)	116.3	107.1	109.5	
17.b Mn(bak)	: mg (back half)	6	5.6	3.7	
18. C,VOC	: ppmv as propane,wet	130.40	126.80	131.00	129.40

Kirby Forest Industries - Silsbee OSB Facility
No. 4 Dryer Stack
Particulate/VOC/CO Emissions Test - September 26, 1991

Calculations:	RUN 1	RUN 2	RUN 3	AVG.
1. Pm : in.Hg (DH/13.6)+Pbar	30.06	30.07	30.07	N/A
2. Ps : in. Hg (Pg/13.6)+Pbar	29.85	29.85	29.85	N/A
3. An : sq ft ((Dn/24)^2)(3.1416)	2.117e-4	2.117e-4	2.117e-4	N/A
4. Vmstd: dscf Vm Y(Pm/Pstd)(Tstd/Tm)	46.08152	47.43730	46.27210	N/A
5. Vwstd: scf (.04707cf/ml)(Vlc)	6.87222	7.10757	7.20171	N/A
6. Bws : dimensionless Vwstd/(Vwstd+Vmstd)	.1297778	.1303068	.1346773	.1315873
7. Md : mol.wt. dry basis .44 CO2+.32 O2+.28(CO+N2)	29	29	29	N/A
8. Ms : mol.wt. wet basis Md(1-Bws)+18 Bws	27.57	27.57	27.52	N/A
9. Vs : ft/sec Kp Cp (sqrDP)sqr(Ts/(Ps Ms))	85.68	85.29	86.43	85.80
10. Q : cfm Vs As(60 sec/min)	49458	49234	49892	49528
11. Qstd : dscfm Q(1-Bws)(Ps/Pstd)(Tstd/Ts)	35558	35390	35738	35562
12. I : percent [(100 Ts)(.002669 Vlc+(Vm Pm/Tm)]/ (60 Theta Vs Ps An)	98.18	101.55	98.09	99.28
13. E : pounds/hr ((Mn/Vmstd)(Qstd)(60))/453590 mg/# Front Half Back Half Total	 11.87 .61 12.48	 10.57 .55 11.12	 11.19 .38 11.57	 11.21 .51 11.72
14. C's : grains/dscf (Mn/Vmstd)(.0154 grains/mg) Front Half Back Half Total	 .0388663 .0020051 .0408715	 .0347688 .0018180 .0365868	 .0364431 .0012314 .0376745	 .0366928 .0016848 .0383776
15. E,CO : pounds/hr (C,CO*7.27e-8)(Qstd)(60)	1.52	1.62	1.89	1.68
16. E,VOC : pounds/hr as carbon (C,VOC)(3)(3.1161e-8)(Qstd,wet)60	29.89	28.94	30.35	29.72

Kirby Forest Industries - Silsbee OSB Facility
No. 5 Dryer Stack
Particulate/VOC/CO Emissions Test - September 26, 1991

Collected test data		RUN 1	RUN 2	RUN 3	
1. As	: sq ft	9.621128	9.621128	9.621128	
2. Dn	: in.	.197	.197	.197	
3. Cp	: dimensionless	.84	.84	.84	
4. Theta	: minutes	60	60	60	
5. Y	: dimensionless	1.00	1.00	1.00	
6. Pbar	: in. Hg	29.89	29.89	29.89	
7. Pg	: in. H2O	-.5	-.5	-.5	
8. Vm	: cf (dry gas)	47.418	47.633	47.666	
9. sqr(DP),avg:	in.H2O^.5	1.3442	1.3389	1.3328	
10. DH	: in. H2O	2.0625	2.0625	2.0417	
11. ts	: degrees F	176.58	175.83	173.08	175.16
12. tm	: degrees F	105.75	111.58	105.71	
13. Vlc	: ml	✓ 133	✓ 132	133	
14. CO2	: percent	2.00	2.00	2.00	
15. O2	: percent	19.00	19.00	19.00	
16. CO	: ppm, dry (NDIR)	6.5	6.4	7.4	6.766667
17.a Mn	: mg (front half)	93.6	77	84.7	
17.b Mn(bak)	: mg (back half)	2.8	.6	2.6	
18. C,VOC	: ppmv as propane,wet	110.20	118.10	130.80	119.70

Kirby Forest Industries - Silsbee OSB Facility
No. 5 Dryer Stack
Particulate/VOC/CO Emissions Test - September 26, 1991

Calculations:	RUN 1	RUN 2	RUN 3	AVG.
1. Pm : in.Hg (DH/13.6)+Pbar	30.04	30.04	30.04	N/A
2. Ps : in. Hg (Pg/13.6)+Pbar	29.85	29.85	29.85	N/A
3. An : sq ft ((Dn/24)^2)(3.1416)	2.117e-4	2.117e-4	2.117e-4	N/A
4. Vmstd: dscf Vm Y(Pm/Pstd)(Tstd/Tm)	44.43394	44.18014	44.66722	N/A
5. Vwstd: scf (.04707cf/ml)(Vlc)	6.26031	6.21324	6.26031	N/A
6. Bws : dimensionless Vwstd/(Vwstd+Vmstd)	.1234915	.1232948	.1229259	.1232374
7. Md : mol.wt. dry basis .44 CO2+.32 O2+.28(CO+N2)	29.08	29.08	29.08	N/A
8. Ms : mol.wt. wet basis Md(1-Bws)+18 Bws	27.71	27.71	27.72	N/A
9. Vs : ft/sec Kp Cp (sqrDP)sqr(Ts/(Ps Ms))	84.68	84.29	83.72	84.23
10. Q : cfm Vs As(60 sec/min)	48880	48657	48327	48621
11. Qstd : dscfm Q(1-Bws)(Ps/Pstd)(Tstd/Ts)	35457	35345	35272	35358
12. I : percent [(100 Ts)(.002669 Vlc+(Vm Pm/Tm)]/ (60 Theta Vs Ps An)	94.94	94.70	95.94	95.20
13. E : pounds/hr ((Mn/Vmstd)(Qstd)(60))/453590 mg/#				
Front Half	9.88	8.15	8.85	8.96
Back Half	.30	.06	.27	.21
Total	10.18	8.21	9.12	9.17
14. C's : grains/dscf (Mn/Vmstd)(.0154 grains/mg)				
Front Half	.0324401	.0268401	.0292022	.0294941
Back Half	.0009704	.0002091	.0008964	.0006920
Total	.0334105	.0270493	.0300986	.0301861
15. E,CO : pounds/hr (C,CO*7.27e-8)(Qstd)(60)	1.01	.99	1.14	1.04
16. E,VOC : pounds/hr as carbon (C,VOC)(3)(3.1161e-8)(Qstd,wet)60	25.00	26.71	29.50	27.07

5.0 NOMENCLATURE

SYMBOL	UNITS	DESCRIPTION
An	ft^2	Nozzle area
As	ft^2	Stack area
Bws	dimensionless	Proportion of water vapor
CO2	percent	Carbon dioxide content by volume
CO	percent	Carbon monoxide content by volume
Cp	dimensionless	Pitot correction factor
C,PM	grains/dscf	Particulate concentration
C'PM	gr/dscf@12% CO2	Particulate emissions corrected to 12% excess air
C,[X]	ppm	Concentration of [X]
Dn	inches	Nozzle diameter
delta H	in. H2O	Pressure drop across meter orifice (also DH)
delta P	in. H2O	Stack velocity pressure head (also DP)
E,PM	#/hr	Particulate emission rate
E,[X]	#/hr	Emission rate of X
I	per cent	Per cent isokinetic sampling
Kp	consistent	Pitot tube constant = 85.49
M,PM	milligrams	Particulate sample weight
Md	#/# mole	Dry molecular wt. of stack gas
Ms	#/# mole	Wet molecular wt. of stack gas
N2	percent	Nitrogen content by volume
O2	percent	Oxygen content by volume
Pbar	in. Hg	Barometric pressure
Pg	in. H2O	Static pressure
Pm	in. Hg	Meter pressure = Pbar+(delta H/13.6)
Ps	in. Hg	Stack pressure = Pbar+(Pg/13.6)
Pstd	in. Hg	Standard pressure = 29.92
Q	ft^3/min	Volumetric flow rate at stack conditions
Qstd	dscf/min	Volumetric flow rate at dry, std. conditions
Theta	minutes	Sampling time per run
tm	^oF	Meter temperature (Tm denotes ^oR)
ts	^oF	Stack temperature (Ts denotes ^oR)
Tstd	^oR	Standard temperature = 528^o
Vlc	ml	Volume of water collected
Vm	ft^3	Volume of dry gas sampled
Vmstd	dscf	Sample volume at standard conditions
Vwstd	scf	Sample volume of water vapor
Y	dimensionless	Meter correction factor
Xsair	percent	Excess air

6.0 CALIBRATIONS: Measurement devices used by Environmental Monitoring Laboratories and subject to changes in measurement precision are initially calibrated prior to use. Those instruments for which calibration factors are subject to change or for which calibration checks are required, are calibrated following each field use or as otherwise directed and noted. Calibration procedures for specific equipment are as follows.

Dry Gas Meter: Dry gas meters are periodically removed from the sampling consoles and cleaned and repaired (new gaskets etc. as required). Following the overhaul of a meter, the measuring precision is checked by the Bell Prover Method and adjusted when necessary to read to within 2% of 100% accuracy. This service is provided by Big Three Meter Company in Jackson, Mississippi. Overhaul service or any six month period is followed by a five point calibration described in APTD-0576 using either a wet test meter or calibrated dry gas meter (used exclusively for calibrations) as a standard reference. Following field use, a gas meter calibration is checked in one of two ways. [1] Three calibration checks at intermediate orifice settings are performed or [2] orifice meter coefficients are used.

If a meter coefficient obtained from pre-test and post-test checks differs by more than 5%, the coefficient (Y) giving the lower sample volume is used in the calculations.

Orifice: The orifice coefficient is initially determined and is rechecked following a major gas meter repair and calibration.

Nozzles: Nozzles are checked before each field use with a precision (.001 in.) dial caliper. Three measurements on different axes are made; an average of those three readings is used in calculations. If the tolerance among measurements exceeds 0.004 inches (highest to lowest reading) the nozzle is repaired and recalibrated or discarded.

Pitot Tubes: Pitot tubes meeting EPA geometry standards are assigned a coefficient of 0.84. Pitot tubes are visually inspected for damage before, during and after use. Those pitot tubes not meeting the geometry standards are assigned a coefficient from the manufacturer's calibration which it retains unless damaged. All pitot tubes used by Environmental Monitoring Laboratories are manufactured by NAPP, Inc.

Temperature Measuring Instruments: Most temperature measurements are made with a type K thermocouple and an Omega digital thermocouple thermometer which has an initial calibration traceable to NBS. Other measurements are made using bimetallic dial thermometers. The thermocouples and dial thermometers are checked following or during a test series against an ASTM mercury in glass thermometer.

Barometer: Aneroid field barometers are checked against and adjusted to readings from a mercury barometer or readings obtained from local weather authorities.

Differential Pressure Gauges: Velocity head (delta P) and orifice pressure differential (delta H) measurements are made using water manometers of the appropriate range unless otherwise noted in the test data. Manometers do not require calibration.

Flame Ionization Detector (FID): VOC measurements were made with a Ratfisch portable flame ionization detector set in a range of 0 to 100 ppm or 0 to 1000 ppm propane. Following a sufficient warm up period the instrument was set to respond to and measure 22.1 ppm and 796 ppm calibration propane. Prior to and following each sample run, the instrument's zero and span were checked and adjusted if necessary using supplies of air and calibration propane.

Non-dispersive Infrared Analyzer (NDIR): Carbon monoxide measurements are made with a Beckman 864 infrared instrument calibrated in ranges of 0 to 1000 ppm and 0 to 5000 ppm. Following a sufficient warm up period of at least 1 hour and prior to each sample run, the instrument's zero and span are checked and adjusted if necessary using a supply of 100% nitrogen and 600 ppm CO respectively. An intermediate check at 300 ppm CO is also performed. These calibrations and adjustments are repeated at the conclusion of each sampling period.

Personnel Sample Pumps: Sample pumps used for ground level monitoring and for formaldehyde sampling from emission points were calibrated with a bubble meter. Once adjusted, the pumps were calibrated three times for 60 seconds. The average of the three calibrations was used for the calibrated flow rate.

7.0 Appendices

A. Sampling and Analytical Data

B. CO/VOC Trace

C. Ground Level Monitoring Data

D. Calibration Data

E. Analytical Report for HCHO, Phenol, and MDI

7.0 APPENDICES

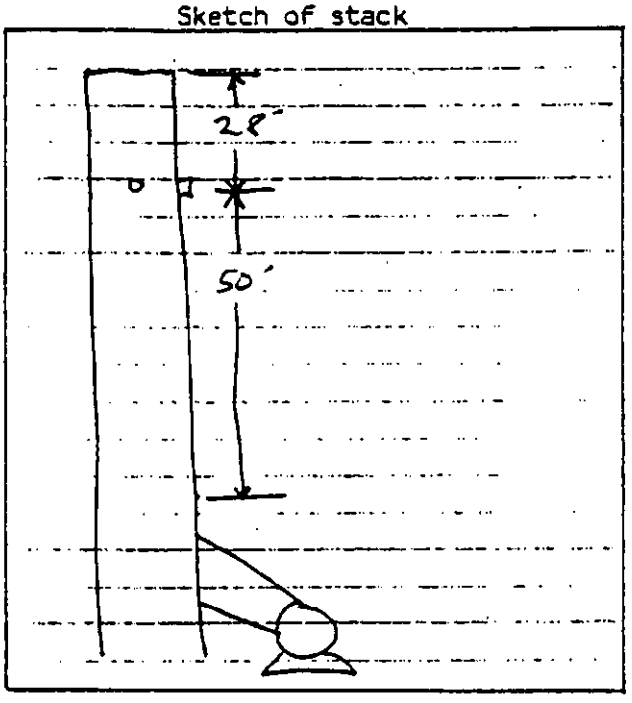
A. SAMPLING AND PARTICULATE ANALYTICAL DATA

STACK CONFIGURATION / SAMPLE AND VELOCITY POINTS

Plant Name Kirby Frost Source _____

Data For: _____ Date _____

Sketch of stack



PERCENT OF DIAMETER

Point No	Points on a Diameter 2	4	6	8	10	12	14	16
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9
3	.....	75.0	29.6	19.4	14.6	11.8	9.9	8.5
4	.....	93.3	70.4	32.3	22.6	17.7	14.6	12.5
5	.....	.....	85.4	67.7	34.2	25.0	20.1	16.9
6	.....	.....	95.6	80.6	65.8	35.6	26.9	22.0
7	.....	.....	.....	89.5	77.4	64.4	36.6	28.3
8	.....	.....	.....	96.8	85.4	75.0	63.4	37.5
9	.....	.....	.....	.....	91.8	82.3	73.1	62.5
10	.....	.....	.....	.....	97.4	88.2	79.9	71.7
11	.....	.....	.....	.....	.....	93.3	85.4	78.0
12	.....	.....	.....	.....	.....	97.9	90.1	83.1
13	.....	.....	.....	.....	.....	.....	94.3	87.5
14	.....	.....	.....	.....	.....	.....	98.2	91.5
15	.....	.....	.....	.....	.....	.....	.....	95.1
16	.....	.....	.....	.....	.....	.....	.....	98.4

Stack diameter 42.0

Distance from ports to disturbance:

distance to upstream disturbance 50"

distance to downstream disturbance 28"

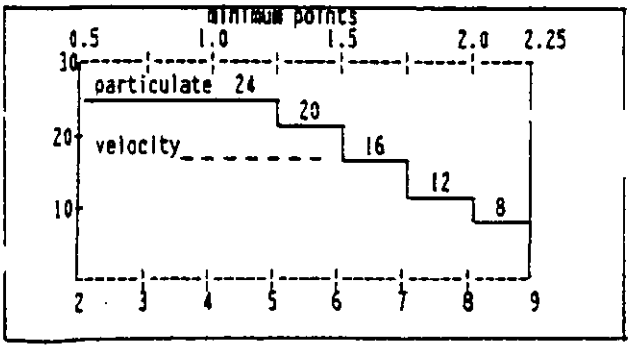
upstream diameters _____

downstream diameters _____

Minimum No. points required 12

No. points selected 6 x 2

Nipple length 4.0



Point	Inches from wall	velocity head
1	1.8	
2	6.1	
3	12.4	
4	29.6	
5	35.6	
6	40.2	
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
Pg =		Ts =
Pitot ID		Cp =

REMARKS _____

NO. 1 DRYER

Plant Louisiana Pacific Kirby Forest Industries

Sampling Location No. 1 Dryer

Test For PM/CO/VOC

Test Operators Russell / Moore

RUN No. 1

Date 9-24-91

Time start 1223 end 1323

Meter Box	RAC591349	No. Sample Pts.	6 x 2	Gas Analysis	Fyrite
Sample Box	No. 1	Minutes/Pt.	5.0	CO_2	2
Probe/Pitot	4' inc.			O_2	19
Pitot Cp	.84	NOMOGRAPH		CO	NDIR
Nozzle Dia.	.197	ΔH@	1.95	Time	
Filter No.		Meter Temp.	105		
		% H_2O	20	Condensate:	
Amb. Temp. °F	86	C-Factor	.85	tare 210?	fin 334
Bar. Press. "Hg	29.87	Stack Temp.	200	Silica gel:	
Static Press. "H_2O	-.50	Ref. ΔP	1.65	tare 663	fin 679

Remarks:
Nozzle Cal:
① .197
② .198 } .197
③ .197

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	857.118	1.35	1.50	189	88	85	255	70	2
2	5	861.0	1.65	1.85	192	92	86	230	66	2
3	10	864.5	1.70	1.90	192	98	86	225	65	2
4	15	868.0	1.65	1.85	196	108	89	235	62	2
5	20	871.8	1.60	1.80	197	114	90	240	65	2
6	25	875.2	1.25	1.40	193	120	93	245	65	2
1	30/0	879.1 / .102	1.30	1.50	195	124	98	255	64	2
2	5	882.7	1.75	2.00	193	124	99	240	62	2
3	10	886.6	1.70	1.90	194	128	99	235	65	2
4	15	890.6	1.45	1.60	199	131	105	245	65	2
5	20	894.1	1.35	1.50	198	132	107	240	65	2
6	25	897.6	1.30	1.45	188	133	109	250	68	2
end	60	900.903								
		43.785	1.184	1.6875	193.83	105.25				

leak check .033 → .035 = .002 cfm @ 6 "Hg

pitot +ve 3.3

pitot -ve 3.9

$\Sigma\sqrt{\Delta P} = 1.2242$

Plant Kiln F | RUN NO. 1
Source Dryer No. 1 | Date 9-24-91
Test For VOC | Time start 1222
Test Operators Runnels / Moore | Time end 1323

	Pre-Run	Post Run	
FID Calibration:	time: 1210	time: 1330	time:
Range setting: 0-1000 ppm	✓ 0-1500	0-1000	
Zero gas Air	0	✓	
Span gas 1 258 ppm	258 ✓	✓ 260 ppm (26.0%)	
Span gas 2 740 ppm	740 ✓	✓ 745 ppm (74.5%)	

Data:

time	FID Scale ppm	FID Range ppm	Sample Pressure mBar	Fuel Pressure psi	Air Pressure psi	Oven Temp °C	Line Temp °F	Chart Speed cm/hr
1223 0	120	0-1000	3.5	6.75	12.0	154	251	N/A
2	110							
4	115		3.5	6.75	12.0	154	250	
6	120							
8	110		3.5	6.75	12.0	155	251	
10	110							
12	110		3.5	6.75	12.0	154	251	
14	110							
16	105		3.5	6.75	12.0	153	250	
18	110							
20	109		3.5	6.75	12.0	155	251	
22	105							
24	120		3.5	6.75	12.0	154	251	
26	110							
28	120		3.5	6.75	12.0	155	251	
30/0	110							
2	105		3.5	6.75	12.0	154	250	
* 4	100							
6	100		3.5	6.75	12.0	155	251	
8	100							
10	110		3.5	6.75	12.0	154	251	
12	120							
14	95		3.5	6.75	12.0	155	251	
16	120							
18	125		3.5	6.75	12.0	154	250	
20	125							
22	120		3.5	6.75	12.0	154	250	
24	125							
26	125		3.5	6.75	12.0	153	251	
28	120							
60	110		3.5	6.75	12.0	153	251	

Remarks: * Recorder began functioning the Failed

✓

AVG = 112.4 ppm

Plant Kirby
Sampling Location No. 1 Dryer
Test For PM / CO / HCl
Test Operators Rumsey / Moore

RUN No. 2
Date 9-24-91
Time start 1410 end 1512

Meter Box	RAC 59849	No. Sample Pts.	6x2	Gas Analysis	Fyrite
Sample Box	No. 3	Minutes/Pt.	5.0	CO_2	
Probe/Pitot	4' inc.	NOMOGRAPH		O_2	
Pitot Cp	.84	ΔH@	1.95	CO	
Nozzle Dia.	.197	Meter Temp.		Time	
Filter No.		% H_2O		Condensate:	
Amb. Temp. °F	85	C-Factor		tare 200 fin 326	
Bar. Press. "Hg	29.87	Stack Temp.		Silica gel:	
Static Press. "H_2O	-.50	Ref. ΔP		tare 616.5 fin 631.0	

Remarks: * pause

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	901.227	1.50	1.70	192	100	99	250	60	2
2	5	905.1	1.70	1.90	192	106	99	205	65	2
* 3	10	908.7	1.75	2.00	190	114	99	200	68	2
4	15	912.6	1.65	1.85	192	118	100	235	67	2
5	20	916.6	1.50	1.70	191	123	102	235	65	2
6	25	920.	1.30	1.50	194	126	103	240	64	2
1	30/0	923.762	1.70	1.90	191	127	104	230	65	2
2	5	927.6	1.70	1.90	192	127	105	200	65	3
3	10	931.6	1.75	2.00	193	129	106	225	68	3
4	15	935.3	1.45	1.60	192	131	108	225	68	3
5	20	938.9	1.70	1.45	191	130	108	230	66	3
6	25	942.7	1.25	1.40	191	130	108	225	68	3
	60	945.858								

Leak check: .018 → .018 = 0.000 @ 7" Hg
pitot + = 4.3
pitot − = 3.6

Evap = 1.2412

		44.631	1.2393	1.7410	191.25	112	58			

Plant Kirby Forest Products — RUN NO. 2

Source No. 4 OSB Dryer Stack — Date 9-24-91

Test For PM/VOC/CO — Time start 1410

Test Operators Rmm/mmm — Time end 1512

FID Calibration:	time: 1330	time: 1515	time:
Range setting: 0-1000	0-1000		
Zero gas 0	0 ✓	0	
Span gas 1 258 ppm	258 ✓	258	
Span gas 2 740 ppm	740 ✓	740	

Data:

time	FID Scale ppm	FID Range ppm	Sample Pressure mBar	Fuel Pressure psi	Air Pressure psi	Oven Temp °C	Line Temp °F	Chart Speed cm/hr
0	110	0-1000	3.5	6.75	12.0	155	250	N/A
2	120							
4	125		3.5	6.75	12.0	155	251	
6	120							
8	110		3.5	6.75	12.0	154	251	
10	120							
12	120		3.5	6.75	12.0	154	250	
14	110							
16	110		3.5	6.75	12.0	154	250	
18	110							
20	110		3.5	6.75	12.0	152	251	
22	120							
24	110		3.5	6.75	12.0	153	251	
26	110							
28	120		3.5	6.75	12.0	154	251	
30	100							
32	110		3.5	6.75	12.0	154	250	
34	100							
36	100		3.5	6.75	12.0	154	250	
38	110							
40	100		3.5	6.75	12.0	153	251	
42	105							
44	110		3.5	6.75	12.0	155	250	
46	100							
48	100		3.5	6.75	12.0	155	250	
50	95							
52	100		3.5	6.75	12.0	155	250	
54	95							
56	100		3.5	6.75	12.0	155	255	
58	105							
60	100		3.5	6.75	12.0	155	255	

Remarks:

AVG = 108.2 ppm

Plant [illegible]
Sampling Location No. 1 Dryer
Test For PM/CO/VOC
Test Operators Russell/[illegible]

RUN No. 3
Date 9-24-91
Time start 1536 end 1638

Meter Box	RACS91349
Sample Box	No. 1
Probe/Pitot	4' inc
Pitot Cp	.84
Nozzle Dia.	.197
Filter No.	
Amb. Temp. °F	86
Bar. Press. "Hg	29.87
Static Press. "H_2O	-.50

No. Sample Pts.	6 x 2
Minutes/Pt.	5.0
NOMOGRAPH	
ΔH@	1.95
Meter Temp.	
% H_2O	
C-Factor	
Stack Temp.	
Ref. ΔP	

Gas Analysis	Fyrite		
CO_2	2.0		
O_2	19.0		
CO			
Time			

Condensate: tare 200 fin 337
Silica gel: tare 635 fin 648

Remarks:

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	946.110	1.60	1.80	195	106	102	250	66	2
2	5	950.4	1.65	1.95	190	122	102	225	60	2
3	10	954.8	1.80	2.00	193	120	104	230	60	2
4	15	958.2	1.65	1.85	202	124	103	195	62	2
5	20	962.3	1.50	1.70	193	128	105	225	65	2
6	25	966.2	1.35	1.50	195	131	106	235	68	2
1	30/0	969.983	1.60	1.80	196	131	105	250	67	2
2	5	974.0	1.85	2.10	196	127	108	255	60	2
3	10	978.1	1.75	1.90	195	131	108	250	60	2
4	15	982.0	1.50	1.70	196	133	109	225	62	2
5	20	985.9	1.35	1.50	195	130	110	230	63	2
6	25	989.5	1.20	1.30	196	133	111	250	63	2
end	60	992.918								
		46.808	1.2494 ~~1.1200~~	1.7583	195.17	115.75				

leak check: .066 → .071 = .005 cfm @ 6" Hg
pitot +ve 3.6
pitot -ve 4.4

Plant Kirby Front
Source No. 1 Dryer
Test For PM/VOC/CO
Test Operators Russell/Brown

RUN NO. 3
Date 9-24-91
Time start 1526
Time end 1658

FID Calibration:	time: 1515	time: 1645	time:
Range setting: 0-1000	0-1000	0-1000	
Zero gas 0	0	0	
Span gas 1 256	258	260 → 256	
Span gas 2 740	740	745 → 740	

Data:

time	FID Scale ppm	FID Range ppm	Sample Pressure mBar	Fuel Pressure psi	Air Pressure psi	Oven Temp °C	Line Temp °F	Chart Speed cm/hr
0	95	0-1000	3.5	6.75	12.0	155	251	N/A
2	95							
4	100		3.5	6.75	12.0	155	250	
6	100							
8	100		3.5	6.75	12.0	155	250	
10	100							
12	110		3.5	6.75	12.0	155	250	
14	110							
16	105		3.5	6.75	12.0	155	250	
18	110							
20	100		3.5	6.75	12.0	154	251	
22	100							
24	105		3.5	6.75	12.0	154	250	
26	110							
28	110		3.5	6.75	12.0	154	250	
30	110		3.5	6.75	12.0	155	250	
2	90							
4	90		3.5	6.75	12.0	155	251	
6	85							
8	90		3.5	6.75	12.0	155	250	
10	100							
12	90		3.5	6.75	12.0	155	250	
14	70							
16	80		3.5	6.75	12.0	155	250	
18	90							
20	80		3.5	6.75	12.0	155	250	
22	80							
24	90		3.5	6.75	12.0	154	251	
26	40							
28	90		3.5		12.0	154	250	
60	90		3.5	6.75	12.0	155	251	

Remarks:

AVG = 95.5 ✓

PARTICULATE CATCH ANALYSIS:

SAMPLES: Dryer vent Kirby

DATE TAKEN: 9-25-91 DATE ANALYZED: 9-29-91

SAMPLES DELIVERED BY: DGR RECEIVED BY: DGR

ANALYZED BY: DGR

Filter treatment: Filters oven dried 2 hours at 105° C, desiccated at least 24 hours, weighed to constant weight

FILTERS:

RUN NO.	1	2	3	
FILTER NO.	732	731	733	
FILTER TARE, gms	.4129	.4115	.4108	
1st weighing	.4918	.4973	.5036	
2nd weighing	.4920	.4973	.5035	
3rd weighing				
FINAL WEIGHT, gms.	.4920	.4973	.5035	
NET GAIN, gms.	.0791 ✓	.0858 ✓	.0927 ✓	

Probe wash treatment: Transferred to a tared beaker, acetone evaporated over low heat, desiccated at least 24 hours, weighed to constant weight.

PROBE WASH:

	1		2		3		
RUN NO.	Front	BAK	Front	BAK	Front	BAK	
CONTAINER ID	D1R1	D1R1B	D1R2	D1R2B	D1R3	D1R3B	
VOLUME INTACT?	✓	✓	✓	✓	✓	✓	
VOLUME, ml	190	(1w)					
TARE WT., gms.	22 99.0862	111.8059	31 95.7658	67 111.4699	71 115.2579	72 111.3447	
1st weighing	99.0859	111.8056	95.7660	111.4701	115.8579	111.3449	
2nd weighing	99.0859	111.8056	95.7660	111.4699	115.8579	111.3449	
3rd weighing							
FINAL WEIGHT, gms.	99.1270	111.8078	95.7850	111.4737	115.8820	111.3493	
NET GAIN, gms.	.0408 ✓	.0019 ✓	.0192 ✓	.0038 ✓	.0241 ✓	.0046 ✓	
LESS BLANK, gms.							

PARTICULATE SAMPLE WEIGHT, mg.

RUN NO.	1	2	3	
filter + probe	121.8 ✓	108.8 ✓	121.4 ✓	

NO. 2 DRYER

Plant Kirby Ford

Sampling Location No. 2 Dryer

Test For PM/VOC/CO

Test Operators Russel/Moore

RUN No. 1

Date 9-25-91

Time start 1025 end 1126

Meter Box	RAC591249	No. Sample Pts.	6x5
Sample Box	no. 3	Minutes/Pt.	5
Probe/Pitot	4' inc		
Pitot Cp	.84	NOMOGRAPH	
Nozzle Dia.	.197	ΔH@	1.95
Filter No.		Meter Temp.	100
		% H_2O	18
Amb. Temp. °F	69	C-Factor	.89
Bar. Press. "Hg	29.87	Stack Temp.	200
Static Press. "H_2O	-.51	Ref. ΔP	1.6

Gas Analysis Fyrite

CO_2 2.0

O_2 19.0

CO

Time

Condensate: tare 200 fin 329

Silica gel: tare 722 fin 636.5

Remarks:

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	993.215	1.40	1.60	192	79	77	225	66	2
2	5	996.8	1.50	1.70	191	85	78	255	69	2
3	10	000.3	1.55	1.75	195	94	78	255	65	2
4	15	003.9	1.55	1.75	195	101	80	260	65	3
5	20	007.7	1.45	1.70	194	109	83	255	65	3
6	25	011.2	1.25	1.45	191	114	87	250	66	3
1	30/0	014.117	1.45	1.70	193	113	89	260	65	3
2	5	017.8	1.55	1.80	196	118	91	260	67	3
3	10	021.4	1.50	1.75	195	120	94	265	68	3
4	15	025.1	1.40	1.65	193	123	96	260	68	3
5	20	029.0	1.20	1.40	194	125	100	265	68	3
6	25	032.3	1.05	1.25	191	126	101	260	70	3
end	60	035.030								
		41.815	1.183	1.6250	193.33	98.38				

leak check .016 → .019 = .003 @ 9" Hg

pitot + lc 5.5

pitot - lc 4.1

Environmental Monitoring Laboratories ...

Plant Kirby
Sampling Location No. 2 OSB Dryer Stack
Test For PM/VOC/CO
Test Operators Russell/Moore

RUN No. 2
Date 9-25-91
Time start 1200 end 1302

Meter Box	RAC 591349	No. Sample Pts.	6 x 2	Gas Analysis	Fyrite
Sample Box	No.	Minutes/Pt.	5.0	CO_2	2.0
Probe/Pitot	4' inc.			O_2	19.0
Pitot Cp	.84	NOMOGRAPH		CO	
Nozzle Dia.	.296	ΔH@	1.95	Time	
Filter No.		Meter Temp.			
		% H_2O		Condensate:	
Amb. Temp. °F	70	C-Factor		tare 200	fin 334
Bar. Press. "Hg	29.87	Stack Temp.		Silica gel:	
Static Press. "H_2O	-.51	Ref. Δ P	2.2	tare 717	fin 730

Remarks:

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head Δ P, in. H_2O	Orifice Δ H in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	035.530	1.40	1.65	189	92	96	260	69	2
2	5	039.6	1.50	1.75	202	105	96	265	65	2
3	10	043.2	1.50	1.75	202	117	97	245	62	2
4	15	047.1	1.50	1.75	206	119	98	255	60	2
5	20	050.8	1.40	1.65	203	124	120	250	60	2
6	25	054.5	1.25	1.45	198	129	100	265	62	2
1	30/0	057.878	1.40	1.65	201	124	106	265	60	2
2	5	061.0	1.60	1.90	203	123	105	260	62	2
3	10	065.7	1.60	1.90	203	130	106	255	62	2
4	15	069.3	1.40	1.65	197	133	109	260	62	2
5	20	073.0	1.35	1.55	194	135	109	245	62	2
6	25	076.8	1.00	1.15	198	135	120	225	65	2
end	60	079.839								
		44.309	1.1847	1.6500	199.67	112.63				

leak check: .033 → .038 .005 cfm 12" Hg
pitot + ok 3.6
pitot − ok 4.5

Plant Kirby Forest
Sampling Location No. 2 OSB Dryer
Test For PM/VOC/CO
Test Operators [illegible] / Moore

RUN No. 3
Date 9-25-91
Time start 1336 end 1428

Meter Box	RAC 591349
Sample Box	No. 3
Probe/Pitot	4' inc
Pitot Cp	.84
Nozzle Dia.	.197
Filter No.	
Amb. Temp. °F	75
Bar. Press. "Hg	29.87
Static Press. "H_2O	-.01

No. Sample Pts.	6x2
Minutes/Pt.	5.0
NOMOGRAPH	
ΔH@	1.95
Meter Temp.	
% H_2O	
C-Factor	
Stack Temp.	
Ref. ΔP	1.6

Gas Analysis	Fyrite		
CO_2	2.0		
O_2	19.0		
CO			
Time			

Condensate: tare 200 fin 339
Silica gel: tare 704 fin 718

Remarks:

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	080.768	1.55	1.80	198	104	101	255	70	2
2	5	084.7	1.60	1.85	198	111	103	265	60	2
3	10	088.8	1.65	1.90	196	128	103	260	60	3
4	15	091.8	1.50	1.75	197	124	105	260	68	3
5	20	096.0	1.20	1.40	197	127	105	260	65	4
6	25	099.3	1.00	1.15	192	131	107	265	65	2
1	30/0	102.217	1.40	1.65	194	128	109	260	65	2
2	5	105.9	1.55	1.80	200	129	109	265	64	2
3	10	109.6	1.55	1.80	198	131	115	260	65	4
4	15	113.4	1.60	1.90	198	135	113	250	60	4
5	20	117.4	1.35	1.55	199	137	114	250	61	4
6	25	120.7	1.00	1.15	192	137	116			
end	60	123.627								
		42.859	1.1846	1.6419	196.58	117.25				

leak check .027 → .034 = .007 cfm 7" Hg
pitot +ve 4.0
pitot -ve 3.6

PARTICULATE CATCH ANALYSIS:

SAMPLES: Ruby No. 2 Prayer

DATE TAKEN: 9-25-91 DATE ANALYZED: 9-28-91

SAMPLES DELIVERED BY: DGR RECEIVED BY: DGR

ANALYZED BY: DGR

Filter treatment: Filters oven dried 2 hours at 105° C, desiccated at least 24 hours, weighed to constant weight

FILTERS:

RUN NO.	1	2	3	
FILTER NO.	724	735	692	
FILTER TARE, gms	.4165	.4149	.4163	
1st weighing	.5030	.5127	.5116	
2nd weighing	.5030	.5123	.5116	
3rd weighing				
FINAL WEIGHT, gms.	.5030	.5123	.5116	
NET GAIN, gms.	.0865 ✓	.0974 ✓	.0953 ✓	

Probe wash treatment: Transferred to a tared beaker, acetone evaporated over low heat, desiccated at least 24 hours, weighed to constant weight.

PROBE WASH:

RUN NO.	1 F	1B	1F	1B	1F	1B	
CONTAINER ID	D2R1	D2R1B	D2R2	D2R2B	D2R3	D2R3B	
VOLUME INTACT?	✓	✓	✓	—	—	—	
VOLUME, ml	180		200		175		
TARE WT., gms.	12) 104.6301	45 97.0909	12 97.5706	37 98.8411	47 104.1103	44 107.9077	
1st weighing	104.6396	97.0961	97.5771	98.8565	104.1154	107.9126	
2nd weighing	104.6400	97.0954	97.5776	98.8561	104.1154	107.9123	
3rd weighing		97.0951					
FINAL WEIGHT, gms.	104.6400	97.0951	97.5776	98.8561	104.1154	107.9123	
NET GAIN, gms.	.0099 ✓	.0042 ✓	.0070 ✓	.0150 ✓	.0051 ✓	.0046 ✓	
LESS BLANK, gms.							

PARTICULATE SAMPLE WEIGHT, mg.

RUN NO.	F 1	B	F 2	B	F 3	B	
filter + probe	96.4	4.2	104.4	15.0	100.4	4.6	
	100.6 ✓		119.4 ✓		105.0 ✓		

NO. 3 DRYER

Plant Kirby Forest Industries
Sampling Location No. 3 DSR Dryer
Test For PM/VOC/CO
Test Operators Russell/Moore

RUN No. 1
Date 9-25-91
Time start 1512 end 1614

Meter Box	AAC591349
Sample Box	No. 1
Probe/Pitot	4' inc.
Pitot Cp	.84
Nozzle Dia.	.157
Filter No.	
Amb. Temp. °F	75
Bar. Press. "Hg	29.89
Static Press. "H_2O	-.53

No. Sample Pts.	6×2
Minutes/Pt.	5.0
NOMOGRAPH	
ΔH@	1.55
Meter Temp.	
% H_2O	
C-Factor	
Stack Temp.	
Ref. ΔP	1.6

Gas Analysis Fyrite
CO_2 1.5
O_2 20.0
CO
Time

Condensate: tare 200 fin 328
Silica gel: tare 686 fin 700

Remarks:

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	124.105	1.40	1.65	188	106	101	220	67	2
2	5	127.9	1.50	1.75	189	111	101	220	65	2
3	10	131.6	1.65	1.90	185	119	102	225	65	2
4	15	135.5	1.60	1.85	186	125	104	230	67	2
5	20	140.0	1.30	1.50	185	130	106	220	68	2
6	25	143.0	1.10	1.30	183	132	107	225	65	2
1	30/0	146.003	1.55	1.80	186	130	110	240	64	2
2	5	150.3	1.65	1.90	189	132	110	250	64	3
3	10	154.7	1.50	1.75	190	137	113	260	66	2
4	15	157.2	1.40	1.65	187	136	113	220	68	2
5	20	165.0	1.40	1.65	185	135	113	250	68	2
6	25	165.1	1.00	1.15	185	137	113	250	68	2
end	60	168.029								
		43.924	1.1889	1.6542	186.50	117.63				

leak check: .1042 → .046 = .004 cfm
pitot + le 3.3
pitot - le 3.9

Plant: Kirby Forest Industries
Sampling Location: No. 2 DSB Dryer
Test For: PM/VOC/CO
Test Operators: Russell/Moore

RUN No. 2
Date: 9-25-91
Time start: 1639 end: 1740

Meter Box	AACS91249	No. Sample Pts.	6x2	Gas Analysis	Fyrite
Sample Box	No. 3	Minutes/Pt.	5.0	CO_2	2.0
Probe/Pitot	4' inc			O_2	19.0
Pitot Cp	.84	NOMOGRAPH		CO	
Nozzle Dia.	.197	ΔH@	1.96	Time	
Filter No.		Meter Temp.			
		% H_2O		Condensate:	
Amb. Temp. °F	74	C-Factor		tare 200	fin 324
Bar. Press. "Hg	29.89	Stack Temp.		Silica gel:	
Static Press. "H_2O	-.53	Ref. ΔP	1.6	tare 672	fin 685.5

Remarks:

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	168.282	1.45	1.70	186	110	106	245	68	3
2	5	172.0	1.60	1.85	185	117	106	250	65	3
3	10	176.0	1.65	1.95	188	123	108	235	65	3
4	15	180.0	1.50	1.75	186	130	107	235	65	3
5	20	183.5	1.50	1.75	183	130	106	235	68	3
6	25	187.2	1.15	1.35	182	134	108	235	70	3
1	30/0	190.733	1.40	1.60	186	133	111	250	68	3
2	5	194.3	1.30	1.50	187	133	112	250	67	3
3	10	197.9	1.55	1.80	186	134	111	265	68	3
4	15	202.0	1.60	1.85	189	137	113	260	69	3
5	20	205.8	1.40	1.60	188	141	114	250	60	3
6	25	209.6	1.00	1.15	182	140	116	260	60	4
end	60	212.428								
		✓ 44.146	✓ 1.1910	✓ 1.6542	✓ 185.67	✓ 120.00				

leak check .011 → .865 = .004 @ 8" Hg
pitot + ve 4.0
pitot − ve 4.0

Plant Kirby Forest Industries
Sampling Location No. 3 Dryer
Test For PM/VOC/CO
Test Operators Russell/Moore

RUN No. 3
Date 9-25-91
Time start 1812 end 1913

Meter Box	RAC 591599	No. Sample Pts.	6x2	Gas Analysis	Fyrite		
Sample Box	No.	Minutes/Pt.	5.0	CO_2	2.0		
Probe/Pitot	4' inc.	NOMOGRAPH		O_2	19.0		
Pitot Cp	.84	ΔH@	1.95	CO			
Nozzle Dia.	.197	Meter Temp.		Time			
Filter No.		% H_2O		Condensate:			
Amb. Temp. °F	77	C-Factor		tare	200	fin	319
Bar. Press. "Hg	29.89	Stack Temp.		Silica gel:			
Static Press. "H_2O	-.53	Ref. Δ P	1.6	tare	740	fin	753

Remarks:
29.8 H/L

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head Δ P, in. H_2O	Orifice Δ H in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	212.794	1.30	1.50	186	109	105	270	68	2
2	5	215.7	1.50	1.75	185	113	107	240	64	2
3	10	219.6	1.65	1.90	185	119	107	220	60	2
4	15	222.8	1.60	1.85	186	121	106	230	62	2
5	20	226.8	1.45	1.60	186	128	107	220	65	2
6	25	230.5	1.00	1.15	179	131	108	230	65	2
1	30	234.150	1.50	1.75	183	129	109	250	65	2
2	5	238.1	1.60	1.85	186	128	108	250	60	2
3	10	241.9	1.60	1.85	185	130	109	230	60	2
4	15	245.5	1.50	1.75	185	132	109	220	60	2
5	20	249.3	1.20	1.50	185	134	109	210	60	2
6	25	252.8	1.20	1.40	186	132	109	250	60	2
end	60	255.814								

leak check .270 → .274 = .004 cfm @ 6" Hg
pitot + @ 3.7
pitot - @ 4.0

43.020 ✓ 1.1945 ✓ 1.6542 ✓ 184.25 116.63

PARTICULATE CATCH ANALYSIS:

SAMPLES: Kiln No. 3 Dryer

DATE TAKEN: 9-25-91 DATE ANALYZED: 9-29-91

SAMPLES DELIVERED BY: DER RECEIVED BY: DER

ANALYZED BY: DER

Filter treatment: Filters oven dried 2 hours at 105° C, desiccated at least 24 hours, weighed to constant weight

FILTERS:

RUN NO.	1	2	3	
FILTER NO.	736	737	738	
FILTER TARE, gms	.4110	.4141	.4121	
1st weighing	.4954	.4946	.4881	
2nd weighing	.4954	.4947	.4884	
3rd weighing				
FINAL WEIGHT, gms.	.4954	.4947	.4884	
NET GAIN, gms.	.0844 ✓	.0806 ✓	.0763 ✓	

Probe wash treatment: Transferred to a tared beaker, acetone evaporated over low heat, desiccated at least 24 hours, weighed to constant weight.

PROBE WASH:

RUN NO.	1F	1B	1F	1B	1F	1B	
CONTAINER ID	D3R1	D3R1B	D3R2	D3R2B	D3R3	D3R3B	
VOLUME INTACT?	✓	✓	✓	✓	✓	✓	
VOLUME, ml	145		200		210		
TARE WT., gms.	29 98.3969	45 107.2598	63 109.4364	69 112.5840	65 114.7850	70 113.8309	
1st weighing	98.4070	107.2617	109.4429	112.5906	114.7945	113.8326	
2nd weighing	98.4069	107.2621	109.4427	112.5894	114.7944	113.8321	
3rd weighing				112.5898			
FINAL WEIGHT, gms.	98.4069	107.2621	109.4427	112.5898	114.7944	113.8321	
NET GAIN, gms.	.0100 ✓	.0023 ✓	.0063 ✓	.0058 ✓	.0094 ✓	.0012 ✓	
LESS BLANK, gms.							

PARTICULATE SAMPLE WEIGHT, mg.

RUN NO.	1		2		3		
filter + probe	94.4	2.3	86.9	5.8	85.7	1.2	
	96.7 ✓		92.7 ✓		86.9 ✓		

NO. 4 DRYER

Plant Kirby Foant
Sampling Location No. 4 OSB Dryer Stack
Test For PM/VOC/CO
Test Operators Russell / Moore

RUN No. 1
Date 9-26-91
Time start 1030 end 1147

Meter Box	RAC 571149	No. Sample Pts.	6x2	Gas Analysis	Epitz	Remarks:	
Sample Box	No. 2 L	Minutes/Pt.	5.2	CO_2	1.5		
Probe/Pitot	4' ins			O_2	219.0		
Pitot Cp	.84	NOMOGRAPH		CO			
Nozzle Dia.	.197	ΔH@	1.95	Time			
Filter No.		Meter Temp.	100				
		% H_2O	18	Condensate:			
Amb. Temp. °F	70	C-Factor	.90	tare 200 fin 331			
Bar. Press. "Hg	29.90	Stack Temp.	175	Silica gel:			
Static Press. "H_2O	~~-5.0~~ -.63	Ref. ΔP	1.5	tare 639 fin 654			

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	256.645	1.60	1.85	176	70	70	275	66	3
2	5	260.7	2.00	2.30	176	79	70	255	65	3
3	10	265.8	2.00	2.30	181	95	73	250	68	3
4	15	269.6	2.00	2.30	178	105	75	235	63	3
5	20	273.0	1.80	2.20	178	110	77	255	65	4
6	25	277.1	1.60	1.85	180	113	82	255	67	10 → 14
★		280.000								
1	30/0	280.459	1.70	2.00	169	96	87	220	67	3
2	5	284.2	1.75	2.05	178	105	90	225	58	3
3	10	288.9	2.05	2.45	176	114	90	225	60	3
4	15	293.5	2.00	2.30	174	122	92	230	60	4
5	20	297.4	2.00	2.30	182	125	96	230	60	4
6	25	301.9	1.60	1.80	182	128	97	240	61	4
end	60	305.241								
★										

Mid test leak check: high vacuum - changed filters.
.053 → .055 = .002 ✓ @ 18" Hg

Leak check: .093 → .097 = .004 ✓ @ 10" Hg
pitot tube 6.0
pitot tube 9.3

		✓					
	48.137		✓	2.147	✓	✓	
	~~48.690~~	1.3555		2.2333*	177.67	94.21	

Plant: Kirby Fort
Sampling Location: No. 4 OSB Dryer Stack
Test For: PM/VOC/CO
Test Operators: Russell/Moore

RUN No. 2
Date 9-26-91
Time start 1205 end 1706

Meter Box	RAC591744	No. Sample Pts.	6x2	Gas Analysis	Fyrite	Remarks:	
Sample Box	No. 3	Minutes/Pt.	5.0	CO,	1.5		
Probe/Pitot	4' inc	NOMOGRAPH		O,	19.5		
Pitot Cp	.84	ΔH@	1.95	CO			
Nozzle Dia.	.197	Meter Temp.		Time			
Filter No.		% H_2O		Condensate:			
Amb. Temp. °F	73	C-Factor		tare 203 fin 337			
Bar. Press. "Hg	29.90	Stack Temp.		Silica gel:			
Static Press. "H_2O	-.63	Ref. ΔP	1.55	tare 682 fin 696			

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	307.244	1.60	1.85	176	107	97	210	68	3
2	5	311.6	2.05	2.50	178	113	98	225	68	3
3	10	315.6	2.00	2.40	176	119	98	230	65	3
4	15	320.2	2.05	2.60	176	125	100	240	62	3
5	20	324.9	1.60	1.85	178	127	101	235	60	3
6	25	329.3	1.50	1.80	180	130	103	240	62	3
1	30/0	332.749	1.70	2.00	182	128	105	245	64	3
2	5	336.7	1.95	2.30	175	127	105	250	65	3
3	10	341.2	2.05	2.60	175	130	106	240	65	3
4	15	345.8	2.05	2.60	179	133	106	250	67	3
5	20	350.0	2.00	2.50	176	135	108	245	70	3
6	25	354.0	1.40	1.70	176	133	109	250	68	3
end	60	358.578								

leak check: .000 → .006 ÷ .006 yes 8" Hg
pitot +ve 4.4
pitot -ve 5.9

		✓		✓	2.225		✓	~~110~~ 125	✓	
		51.334		1.3495	2.3500		177.42	114.29		

Plant: Kimberly Forest Products
Sampling Location: No. 4 OSB Dryer Stack
Test For: PM/NOx/CO
Test Operators: Russell/Mason

RUN No. 3
Date 9-26-91
Time start 1326 end 1445

Meter Box	RK 551345	No. Sample Pts.	6 x 2	Gas Analysis	Fyrite	Remarks:	
Sample Box	No. 1	Minutes/Pt.	5.0	CO_2	1.6		
Probe/Pitot	7 inch	NOMOGRAPH		O_2	20.0		
Pitot Cp	.84	ΔH@	1.95	CO			
Nozzle Dia.	.197	Meter Temp.		Time			
Filter No.		% H_2O		Condensate:			
Amb. Temp. °F	73	C-Factor		tare 700 fin 339			
Bar. Press. "Hg	29.50	Stack Temp.		Silica gel:			
Static Press. "H_2O	-.63	Ref. ΔP	1.5	tare 741 fin 755			

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac. in. Hg
1	0	358.933	1.65	2.00	179	111	104	230	70	3
2	5	363.4	2.00	2.60	178	115	105	250	66	4
3	10	367.8	2.15	2.60	175	124	104	250	68	5
4	15	372.2	2.15	2.60	175	128	105	255	67	5
5	20	376.8	2.00	2.40	184	132	105	270	67	5
6	25	380.3	1.50	1.80	172	134	107	250	60	5
								265	62	
* 1	30/0	384.674	1.65	1.95	167	131	105	265	62	5 → 7
2	5	388.7	2.05	2.50	177	111	103	250	65	5
3	10	392.8	2.15	2.55	179	121	104	275	60	5
4	15	397.●	2.15	2.55	176	126	105	240	63	5
5	20	401.7	1.60	1.90	177	130	107	250	66	5
6	25	405.4	1.50	1.80	178	133	107	255	67	5
end	60	409.381								

mid test leak check: [386.775] [387.096] .012 → .012 @ 7.8" Hg

leak check .058 → .061 = .003 cfm @ 9" Hg

50.127 1.3674 2.2542 176.42 114.1 92

30.446 2.3583

PARTICULATE CATCH ANALYSIS:

SAMPLES: Kiln No. 4 Dryer

DATE TAKEN: 9-26-91 DATE ANALYZED: 9-29-91

SAMPLES DELIVERED BY: DGR RECEIVED BY: DGR

ANALYZED BY: DGR

Filter treatment: Filters oven dried 2 hours at 105° C, desiccated at least 24 hours, weighed to constant weight

FILTERS:

RUN NO.	1		2	3		
FILTER NO.	017	018	739	019	020	
FILTER TARE, gms	.4673	.4111	.4116	.4089	.4102	
1st weighing	.4616	.4675	.5178	.4655	.4606	
2nd weighing	.4617	.4675	.5180	.4652	.4606	
3rd weighing						
FINAL WEIGHT, gms.	.4617	.4675	.5180	.4652	.4606	
NET GAIN, gms.	.0544 ✓	.0564 ✓	.1064 ✓	.0563 ✓	.0504 ✓	
	.1119			.1067		

Probe wash treatment: Transferred to a tared beaker, acetone evaporated over low heat, desiccated at least 24 hours, weighed to constant weight.

PROBE WASH:

RUN NO.	1F	1B	1F	1B	1F	1B	
CONTAINER ID	D4R1	D4R1B	D4R2	D4R2B	D4R3	D4R3B	
VOLUME INTACT?	✓	✓	✓	✓	✓	✓	
VOLUME, ml	180		200		200		
TARE WT., gms.	104.7542	96.6299	103.8815	103.0346	109.8890	105.8226	
1st weighing	104.7600	96.6356	103.8822	103.0404	109.8933	105.8269	
2nd weighing	104.7597	96.6359	103.8822	103.0402	109.8927	105.8260	
3rd weighing					109.8926	105.8263	
FINAL WEIGHT, gms.	104.7597	96.6359	103.8822	103.0402	109.8926	105.8263	
NET GAIN, gms.	.0055 ✓	.0060 ✓	.0007 ✓	.0056 ✓	.0028 ✓	.0037 ✓	
LESS BLANK, gms.							

PARTICULATE SAMPLE WEIGHT, mg.

RUN NO.	1		2		3		
filter + probe	116.3	6.0	107.1	5.6	109.5	3.7	
	✓	✓	✓	✓	✓	✓	

NO. 5 DRYER

Plant Kirby Forest Industries
Sampling Location No. 5 OSB Dryer Stack
Test For PM/HAPs/CO
Test Operators Russell / Moore

RUN No. 1
Date 9-26-91
Time start 1656 end 1819

Meter Box	RAC91349	No. Sample Pts.	6x2	Gas Analysis	Engelhard
Sample Box	No. 1	Minutes/Pt.	5.0	CO_2	
Probe/Pitot	4' inc.	NOMOGRAPH		O_2	
Pitot Cp	.84	ΔH@	1.95	CO	
Nozzle Dia.	.197	Meter Temp.		Time	
Filter No.		% H_2O		Condensate:	
Amb. Temp. °F	83	C-Factor		tare 200 fin 316	133
Bar. Press. "Hg	29.89	Stack Temp.		Silica gel:	
Static Press. "H_2O	-.50	Ref. ΔP	1.6	tare 703 fin 720	

Remarks: delay during port change; burner flame out

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	409.735	1.60	1.85	171	91	90	175	66	2
2	5	413.9	1.95	2.20	175	97	90	190	60	2
3	10	417.7	2.05	2.40	177	106	93	210	62	2
4	15	422.1	2.05	2.40	178	117	93	225	60	2
5	20	426.1	1.75	2.00	174	122	96	225	62	2
6	25	430.0	1.40	1.60	174	125	97	220	63	2
1	30/0	433.546	1.80	2.10	178	105	98	240	65	3
2	5	437.6	1.90	2.20	180	111	98	240	60	3
3	10	441.4	2.00	2.30	180	118	102	235	68	3
4	15	445.8	1.95	2.25	180	125	100	225	69	3
5	20	449.9	1.65	1.90	180	129	103	220	68	3
6	25	453.7	1.35	1.55	172	131	104	215	68	3
end	60	457.153								

leak check: .030 → .033 = .003 cfm @ 9" Hg
pitot ⊥ to 4.5
pitot ⊥ to 45°

47.418 ✓ 1.3442 ✓ 2.0625 ✓ 176.58 ✓ 105 ✓ 95 ✓

Plant Kirby
Sampling Location No. 5 OSB Dryer
Test For PM/VOC/CO
Test Operators Russell/Moore

RUN No. 2
Date 9-26-91
Time start 1833 end 2016

Meter Box RAC59/349
Sample Box No. 3
Probe/Pitot 4'inc
Pitot Cp .84
Nozzle Dia. .197
Filter No.

Amb. Temp. °F 78
Bar. Press. "Hg 29.88
Static Press. "H_2O -.50

No. Sample Pts. 6x2
Minutes/Pt. 5

NOMOGRAPH
ΔH@ 1.95
Meter Temp.
% H_2O
C-Factor
Stack Temp.
Ref. ΔP 1.5

Gas Analysis Eyrite
CO_2 2.0
O_2 19
CO
Time

Condensate: tare 200 fin 317
Silica gel: tare 620 fin 635

Remarks:
Blazed @10'45"

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp. °F In	Meter Temp. °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	457.578	1.70	1.95	177	113	107	220	67	3
2	5	461.8	1.90	2.20	176	116	104	225	66	4
3	10	465.7	2.00	2.30	180	109	102	220	68	4
4	15	470.0	2.10	2.40	176	114	102	235	60	4
5	20	473.8	1.70	2.00	174	126	104	250	61	5
6	25	478.0	1.40	1.60	177	115	107	260	62	5
1	30/0	481.281	1.80	2.00	172	108	108	265	65	4
2	5	485.2	1.95	2.20	178	113	102	250	60	4
3	10	489.3	2.00	2.30	180	120	103	270	60	4
4	15	493.6	2.00	2.30	177	129	104	260	62	5
5	20	497.2	1.65	1.90	176	129	103	260	62	5
6	25	501.4	1.40	1.60	167	132	106	250	62	5
end	60	505.211								
		47.633	1.3389	2.0625	175.83	111.58				

leak check: .022 → .025 = .003 cfm
pitot + ve 4.2
pitot − ve 5.0

Plant: Kirby Forest Industries
Sampling Location: No. 5 OSB Dryer Stack
Test For: PM/VOC/CO
Test Operators: [illegible] / [illegible]

RUN No. 3
Date: 9-26-91
Time start: 2050 end: 2232

Meter Box	RACS91349
Sample Box	No. 1
Probe/Pitot	4' inc.
Pitot Cp	.84
Nozzle Dia.	.197
Filter No.	
Amb. Temp. °F	68
Bar. Press. "Hg	29.88
Static Press. "H_2O	-.50

No. Sample Pts.	6×2
Minutes/Pt.	5.0
NOMOGRAPH	
ΔH@	1.95
Meter Temp.	
% H_2O	
C-Factor	
Stack Temp.	
Ref. ΔP	1.55

Gas Analysis: Extr.

CO_2			
O_2			
CO			
Time			

Condensate: tare 200 fin 316
Silica gel: tare 622 fin 639

Remarks:

Port Point	El. Time, Min.	DGM Reading, Ft.³	Velocity Head ΔP, in. H_2O	Orifice ΔH in. H_2O	Stack Temp. °F	Meter Temp., °F In	Meter Temp., °F Out	Oven Temp. °F	Imp. Temp. °F	Vac in. Hg
1	0	505.482	1.75	2.00	176	102	98	245	68	2
2	5	509.7	1.90	2.20	176	108	99	230	50	2
3	10	513.9	1.95	2.25	175	116	100	225	55	2
4	15	518.1	1.95	2.25	174	116	101	230	55	3
5	20	521.2	1.60	1.80	174	101	95	255	51	3
6	25	526.0	1.35	1.60	172	107	97	240	55	3
1	30/0	529.116	1.60	1.80	173	103	94	250	58	3
2	5	533.2	1.90	2.20	174	107	97	225	60	3
3	10	537.2	2.00	2.25	173	116	97	235	58	3
4	15	542.0	2.10	2.50	173	124	98	220	60	3
5	20	545.7	1.80	2.05	172	128	100	220	60	3
6	25	549.6	1.50	1.70	165	131	102	250	60	3
end	60	553.148								
		47.666 ✓	1.3328 ✓	2.0417 ✓	173.08 ✓	105.71 ✓				

leak check .55 → .011 = .006 cfm @ 12 "Hg
pitot + ok
pitot − ok

PARTICULATE CATCH ANALYSIS:

SAMPLES: Kirby No. 5 Dryer

DATE TAKEN: 9-26-91 DATE ANALYZED: 9-29-91

SAMPLES DELIVERED BY: DGR RECEIVED BY: DGR

ANALYZED BY: DGR

Filter treatment: Filters oven dried 2 hours at 105° C, desiccated at least 24 hours, weighed to constant weight

FILTERS:

RUN NO.	1	2	3	
FILTER NO.	664	021	023	
FILTER TARE, gms	.4102	.4108	.4079	
1st weighing	.4933	.4845	.4855	
2nd weighing	.4932	.4842	.4855	
3rd weighing				
FINAL WEIGHT, gms.	.4932	.4842	.4855	
NET GAIN, gms.	.0830	.0734	.0776	

Probe wash treatment: Transferred to a tared beaker, acetone evaporated over low heat, desiccated at least 24 hours, weighed to constant weight.

PROBE WASH:

RUN NO.	1F	1B	2F	2B	2F	2B	
CONTAINER ID	DSR1	DSR1B	DSR2	DSR2B	DSR3	DSR3B	
VOLUME INTACT?	✓	✓	✓	✓	✓	✓	
VOLUME, ml	180		150		160		
TARE WT., gms.	(4) 108.4630	103.1965	4 114.8236	7 111.5509	68 112.5378	62 113.2252	
1st weighing	108.4733	103.2000	114.8271	111.5516	112.5480	113.2266	?
2nd weighing	108.4736	103.1993	114.8272	111.5515	112.5449	113.2277	?
3rd weighing		103.1993				113.2278	
FINAL WEIGHT, gms.	108.4736	103.1993	114.8272	111.5515	112.5449	113.2278	
NET GAIN, gms.	.0106	.0028	.0036	.0006	.0071	.0026	
LESS BLANK, gms.							

PARTICULATE SAMPLE WEIGHT, mg.

RUN NO.	1		2		3		
filter + probe	93.6	2.8	77.0	0.6	84.7	2.6	

B. CO/VOC RECORDER TRACE

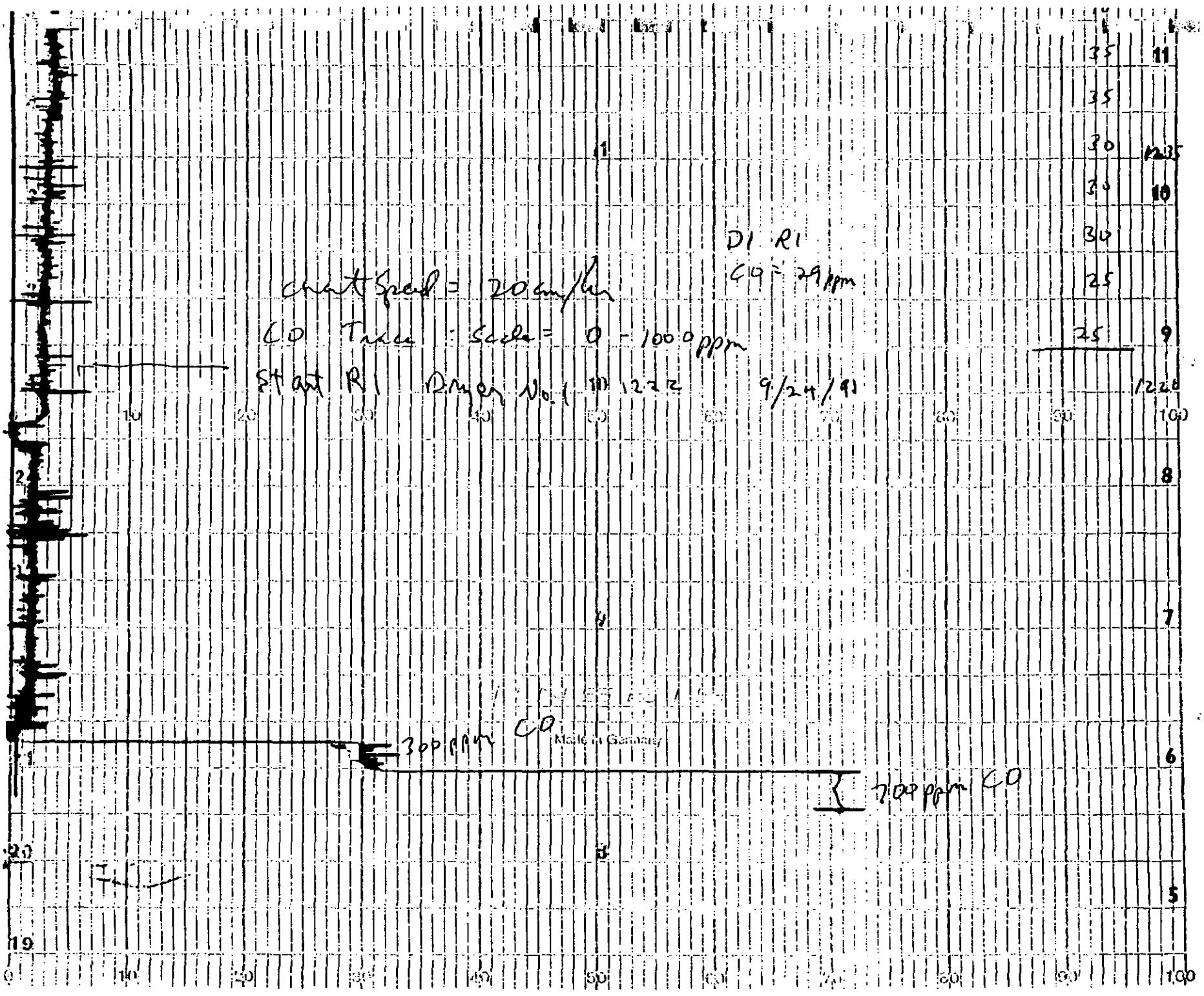
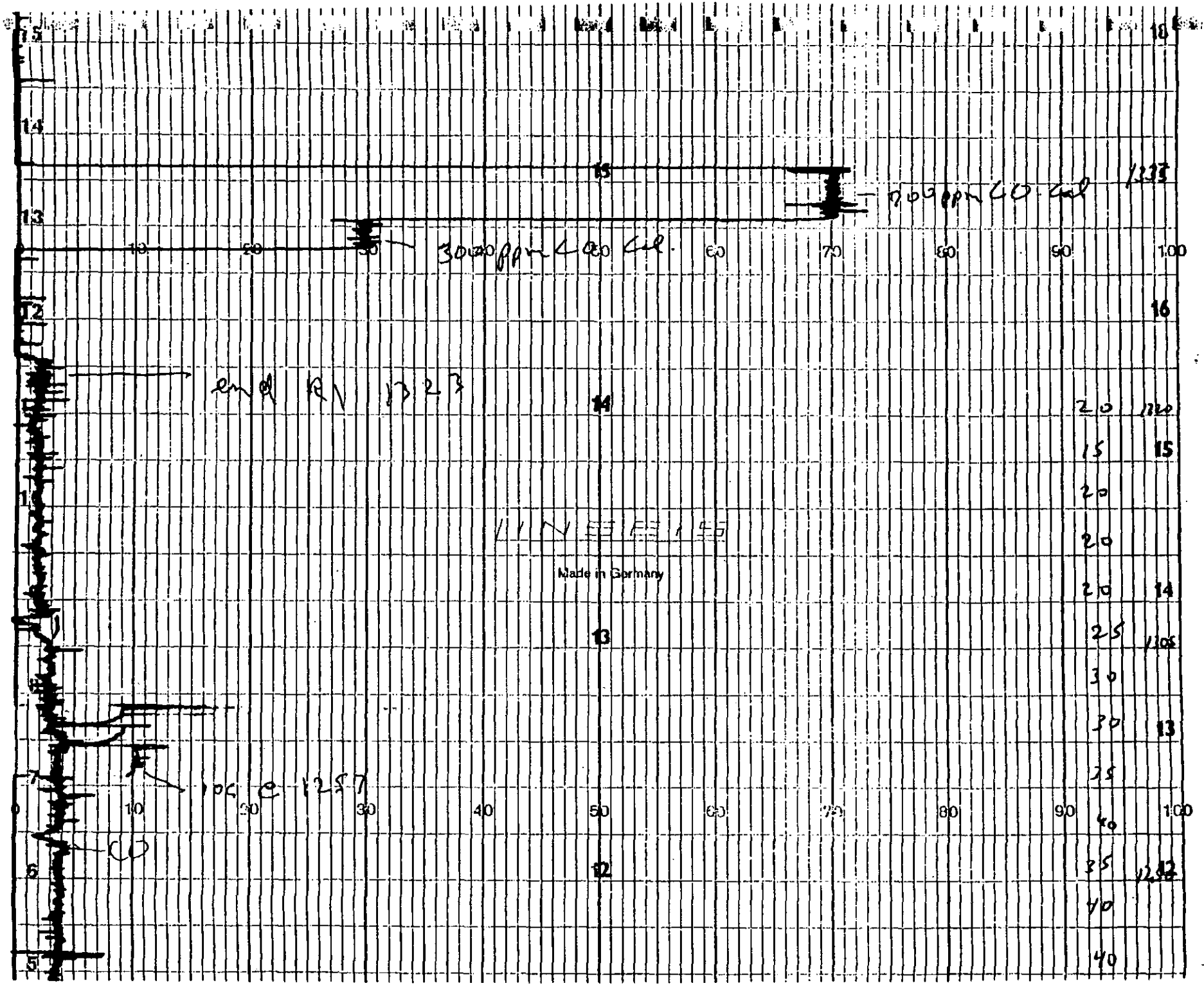
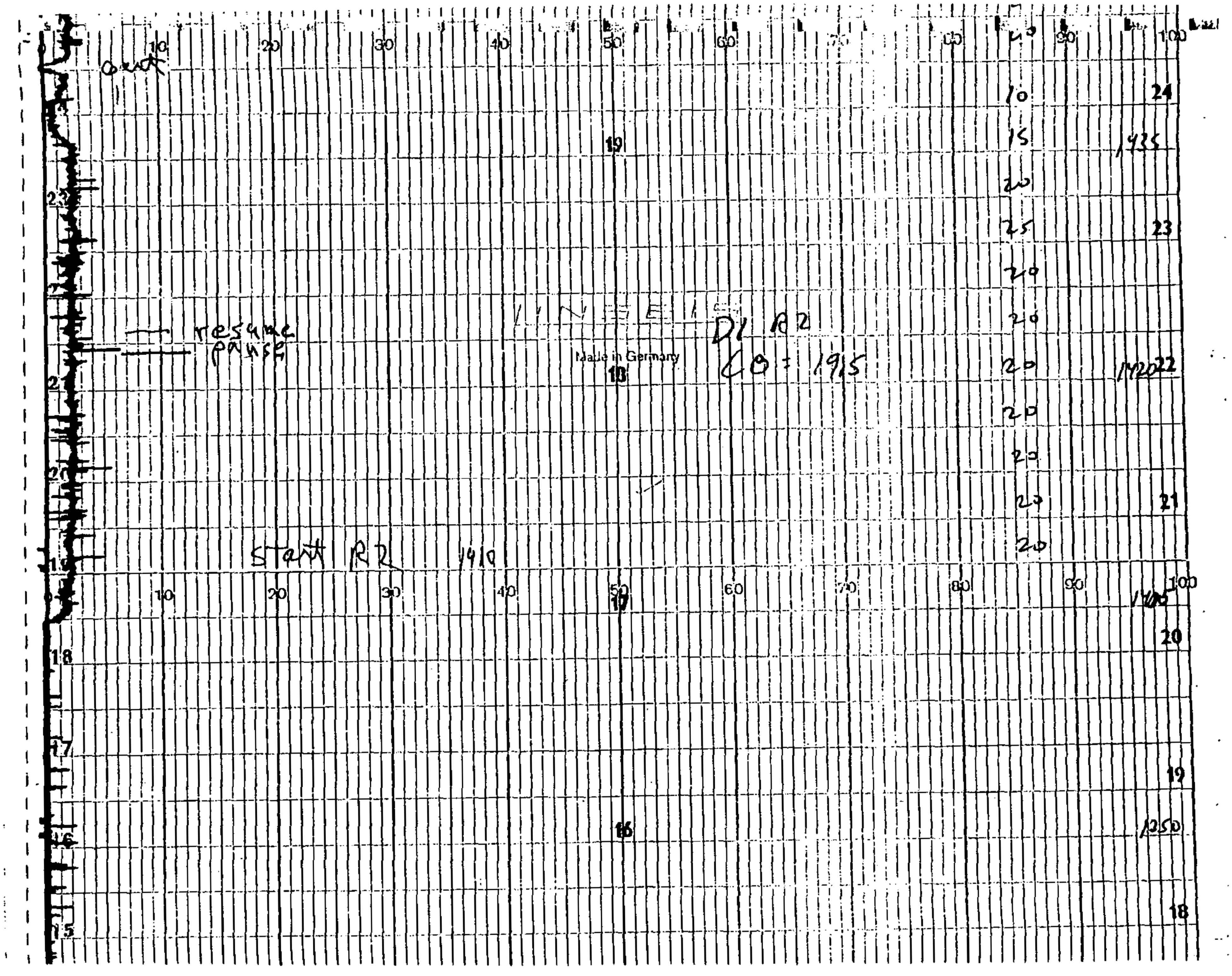
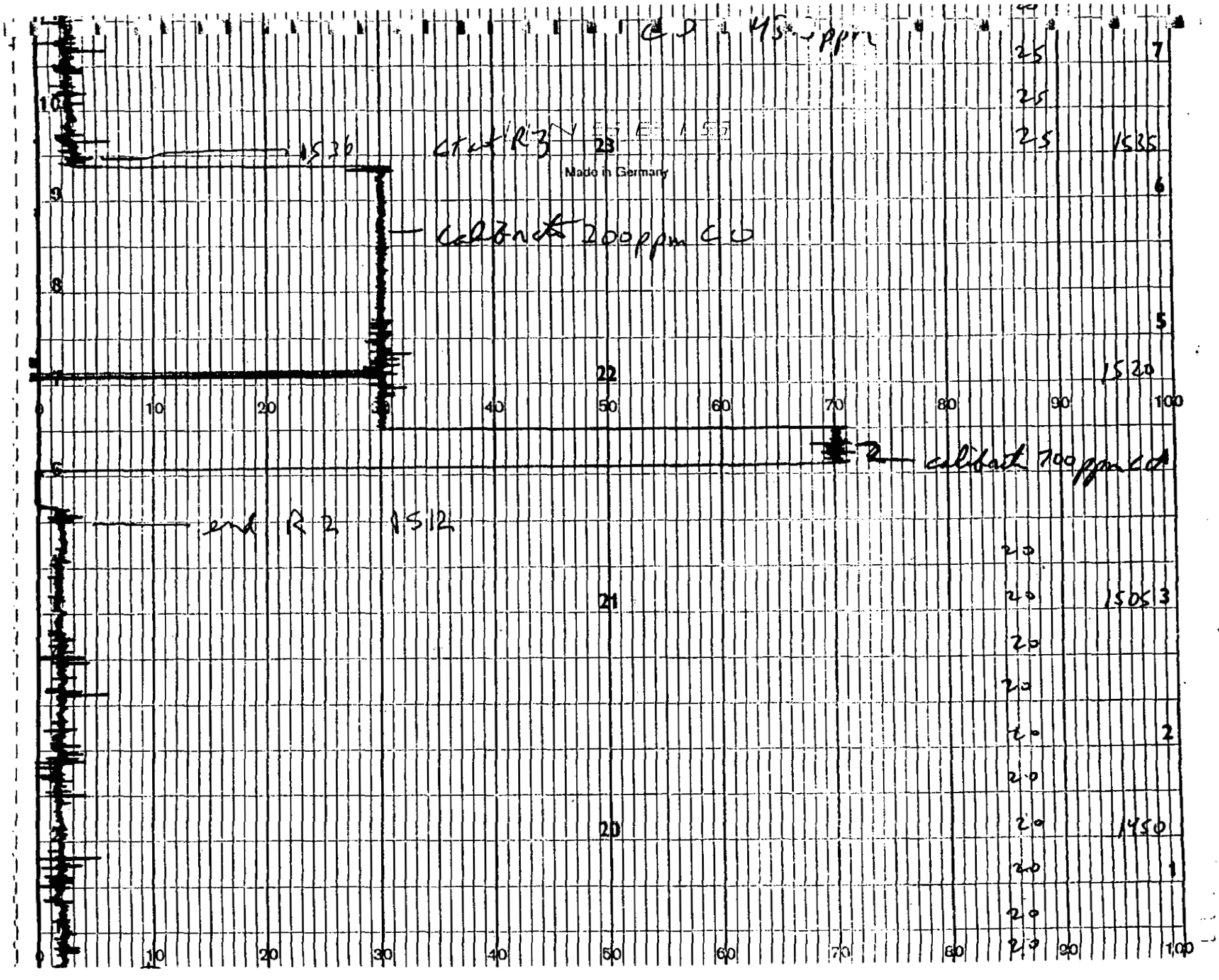


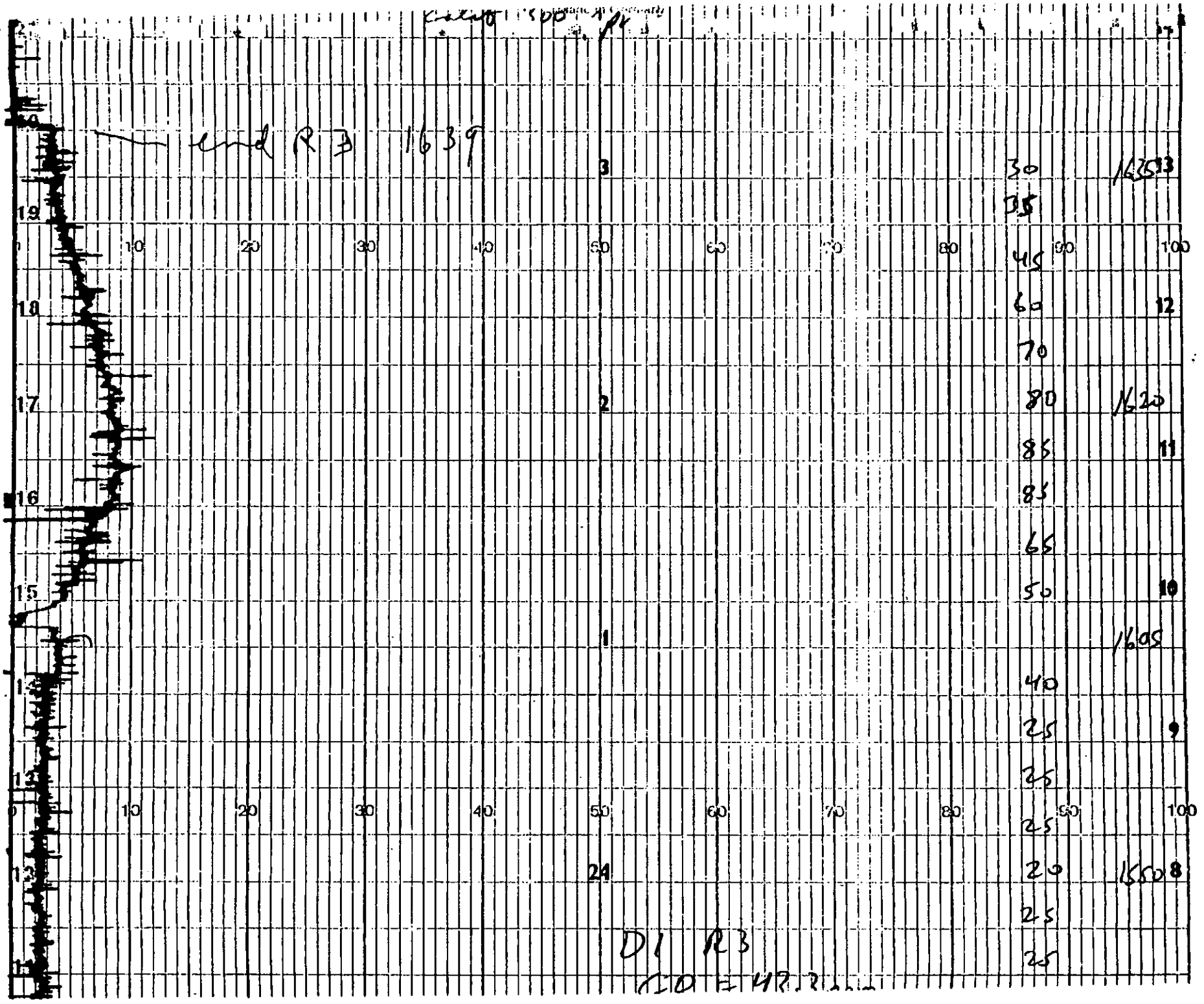
Chart Speed = 20 cm/hr
CO Trace : Scale = 0 - 1000 ppm
Start R1 Dryer No. 1 1122 9/24/91
D1 R1
CO = 29 ppm
300 PPM CO
700 ppm CO
Made in Germany

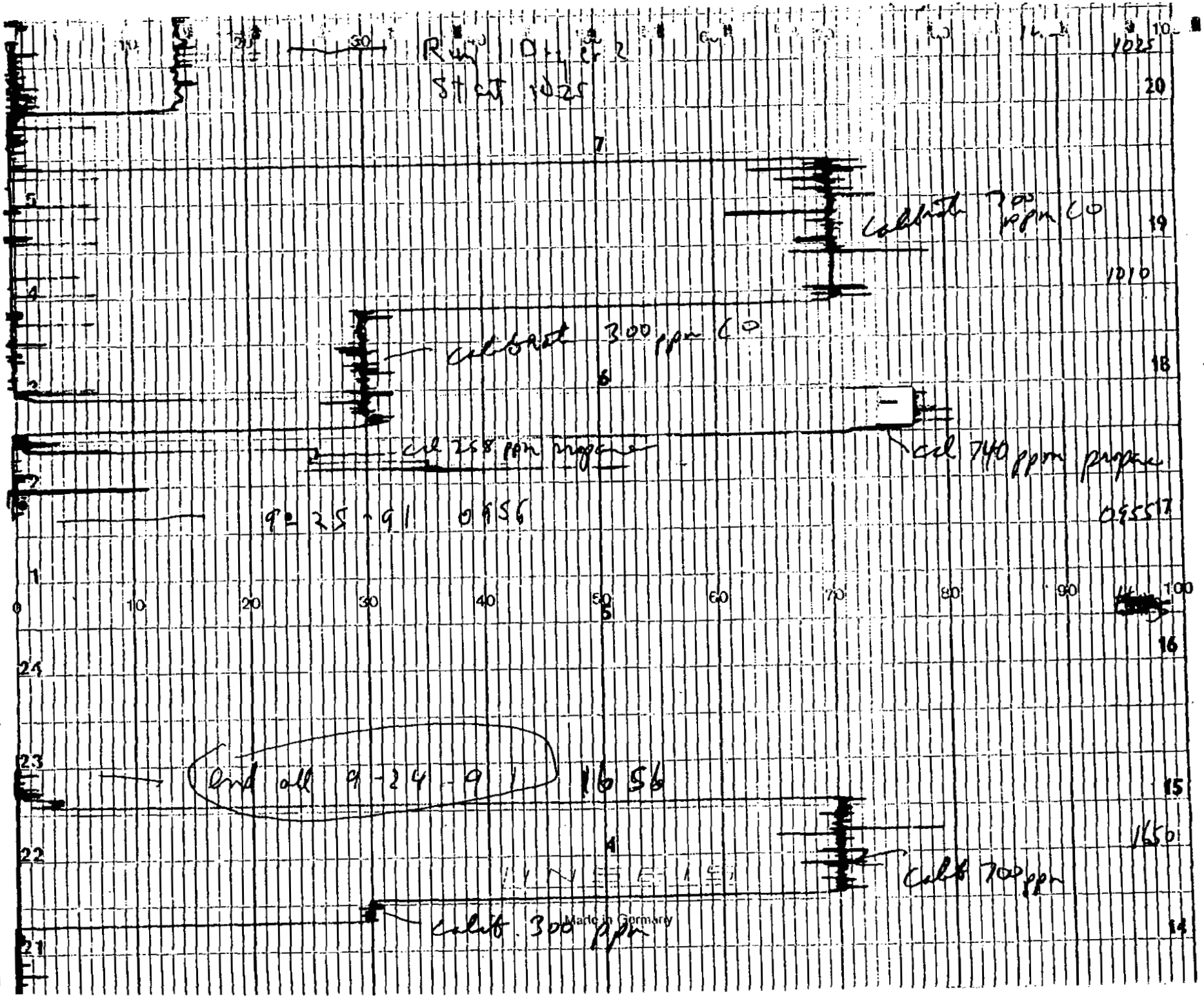

3000 ppm CO Cal
Made in Germany

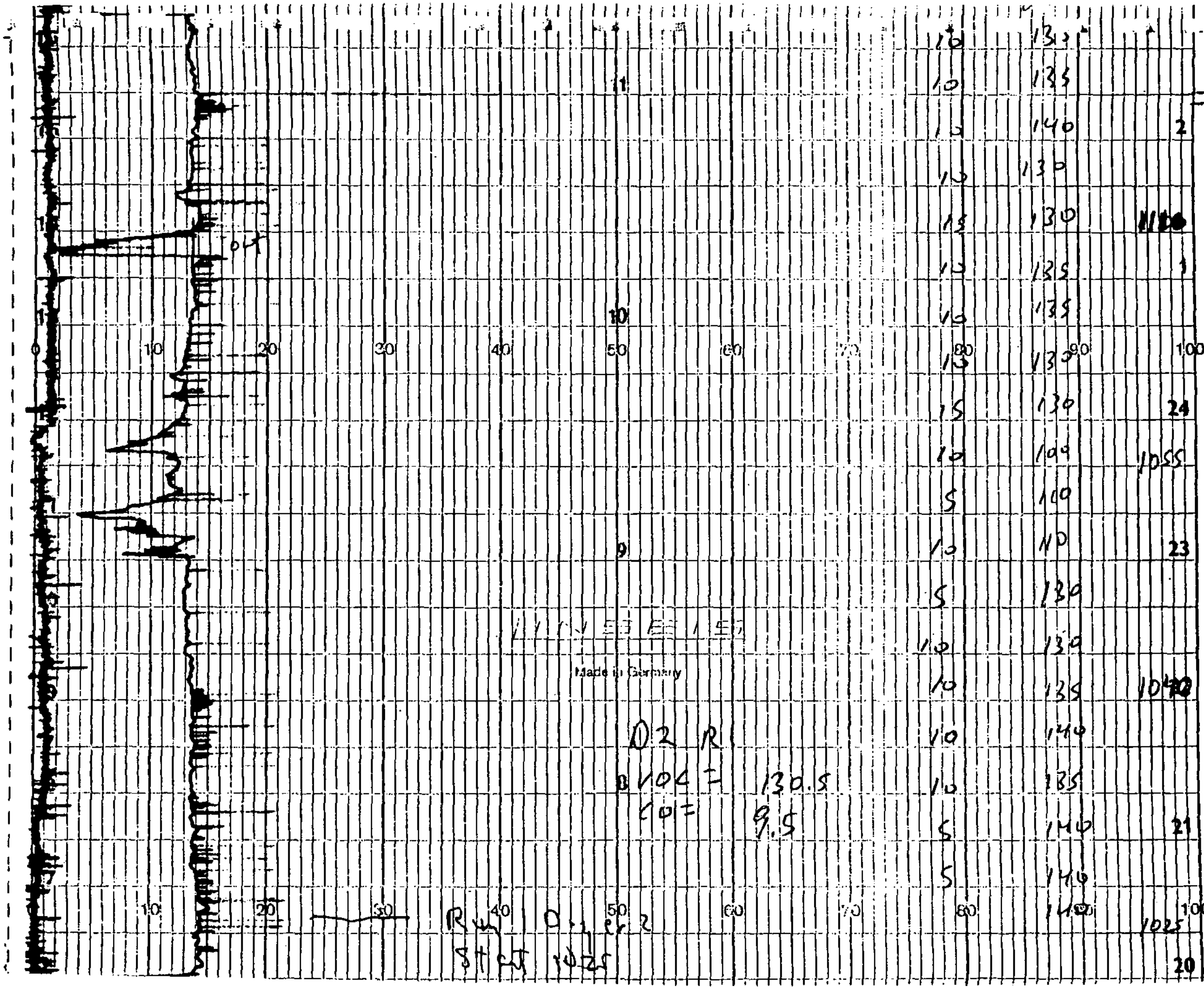


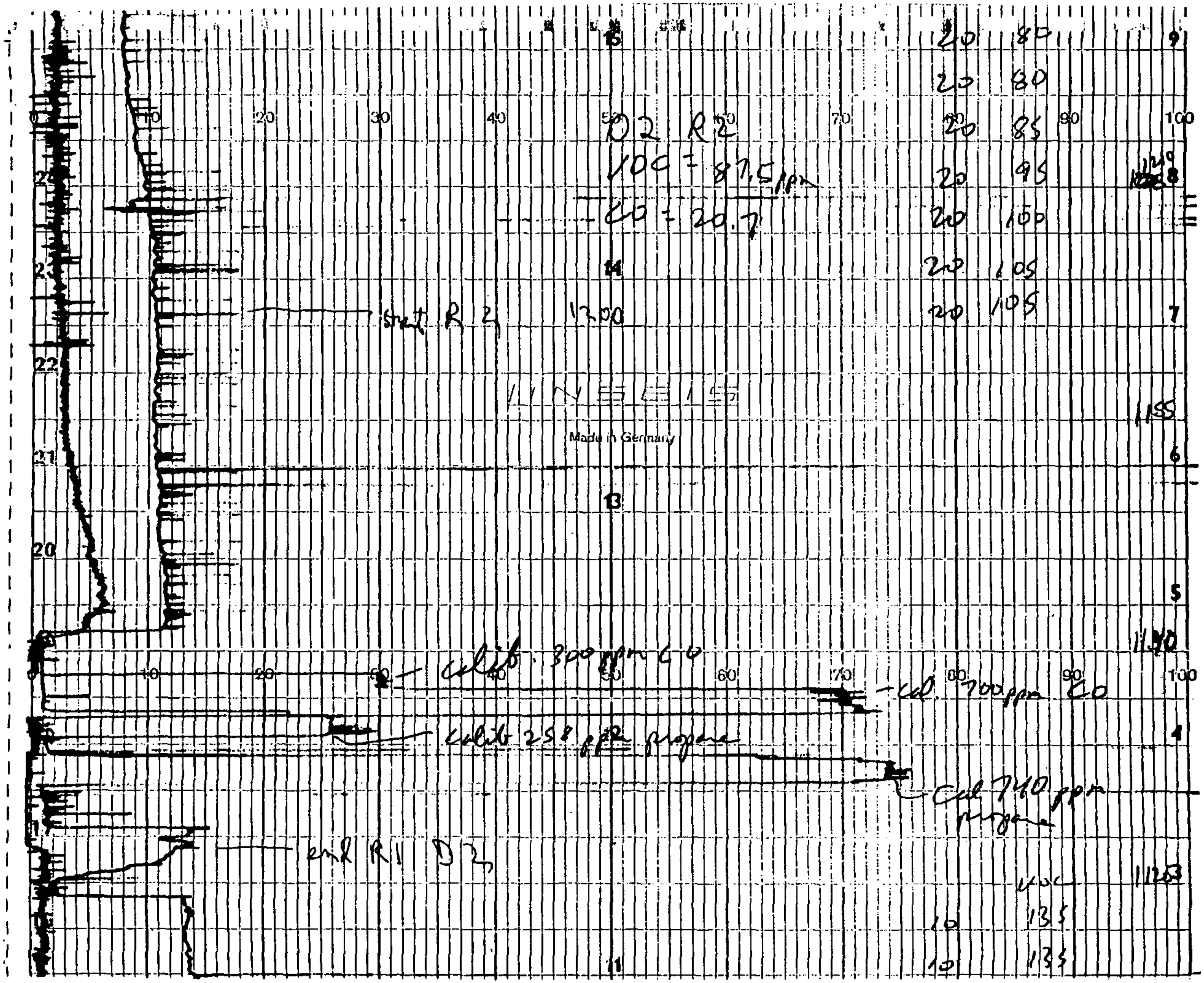
out
resume
pause
Start R2 1410
Made in Germany
D1 R2
CO = 1915
1435
1420
1405
1350

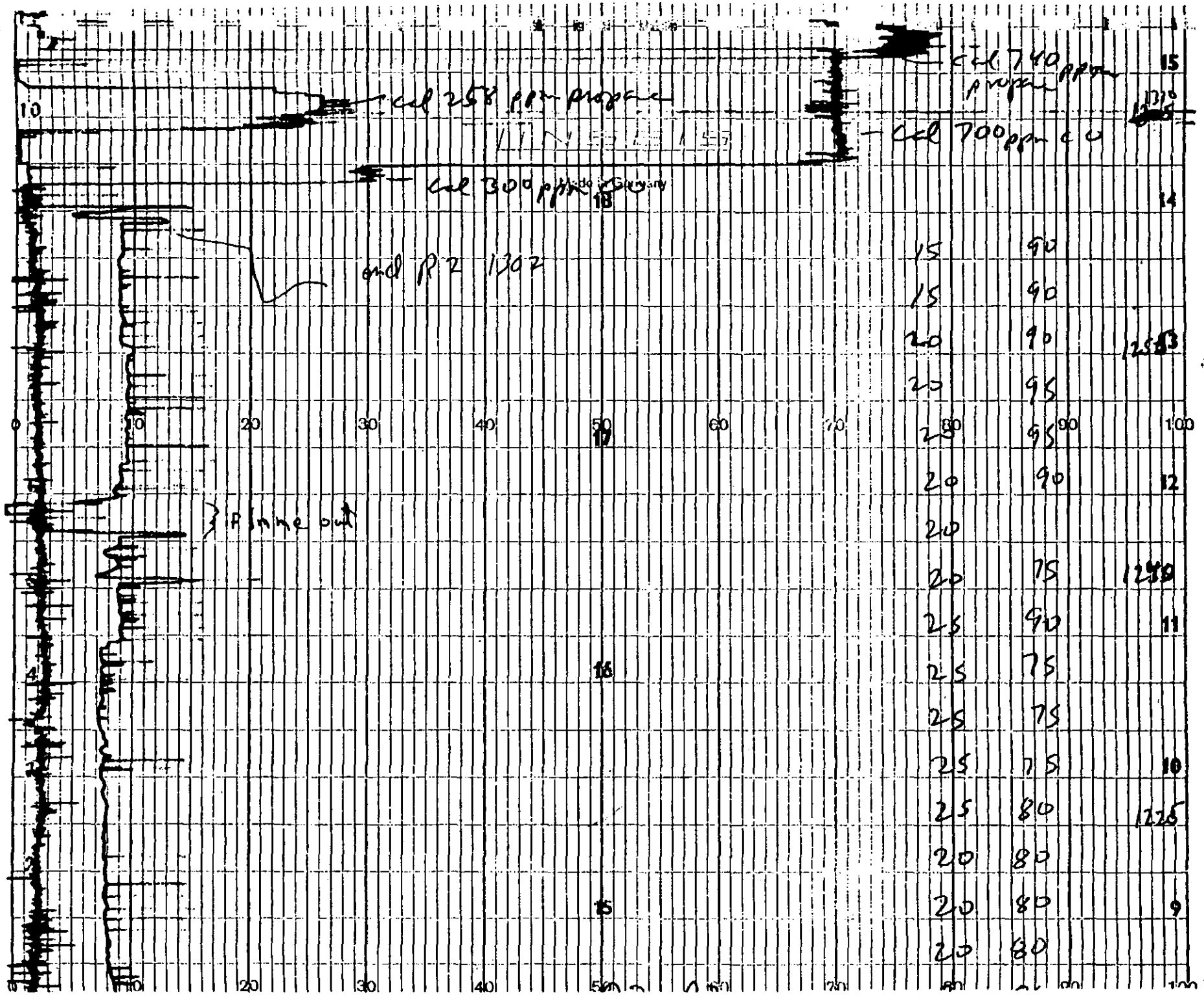

Made in Germany
1536
start R3
calibrate 200ppm CO
calibrate 100ppm CO
end R2
1512
1535
1520
1505
1450

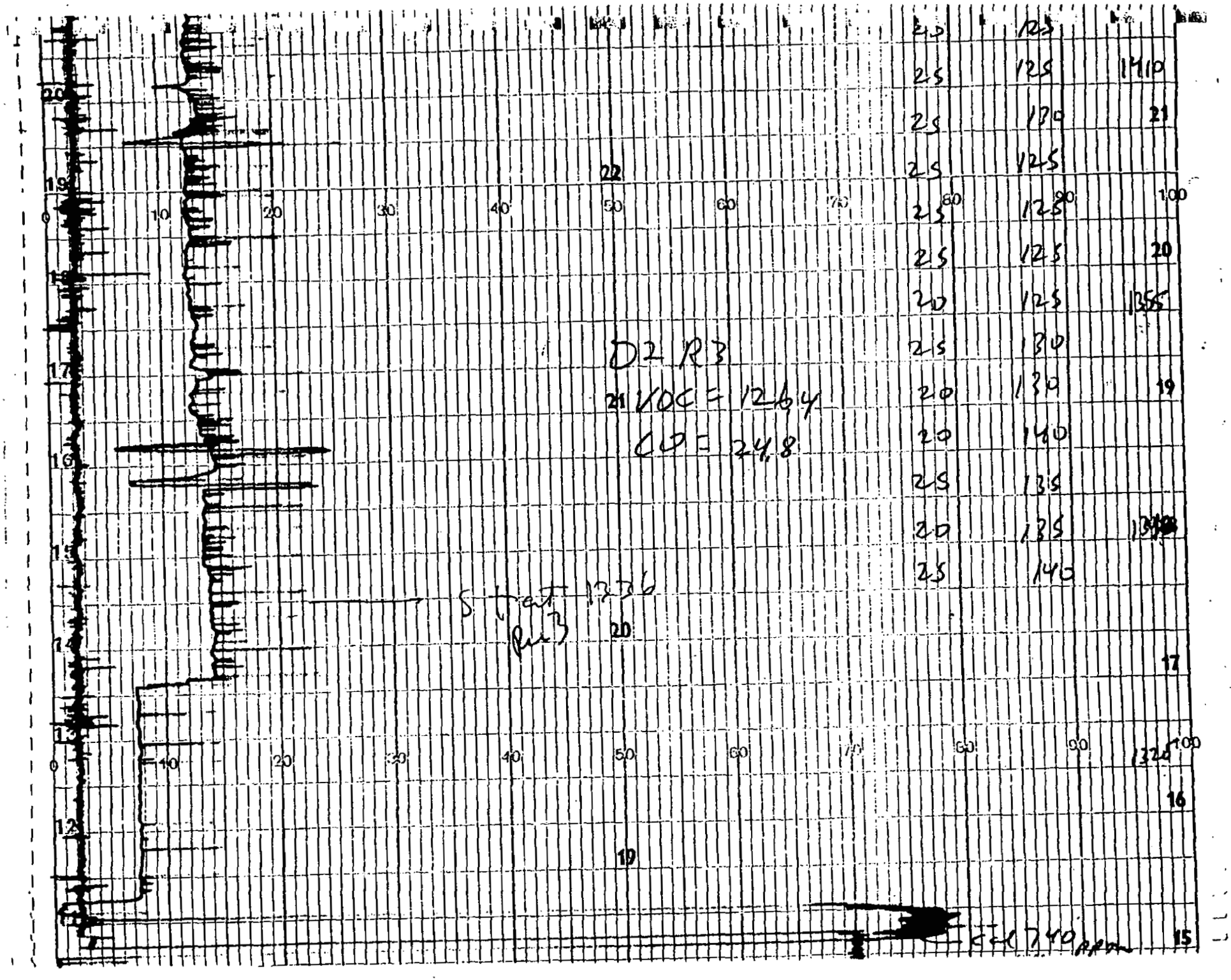

end RT 1639
DI RB
1635
1620
1605
1550

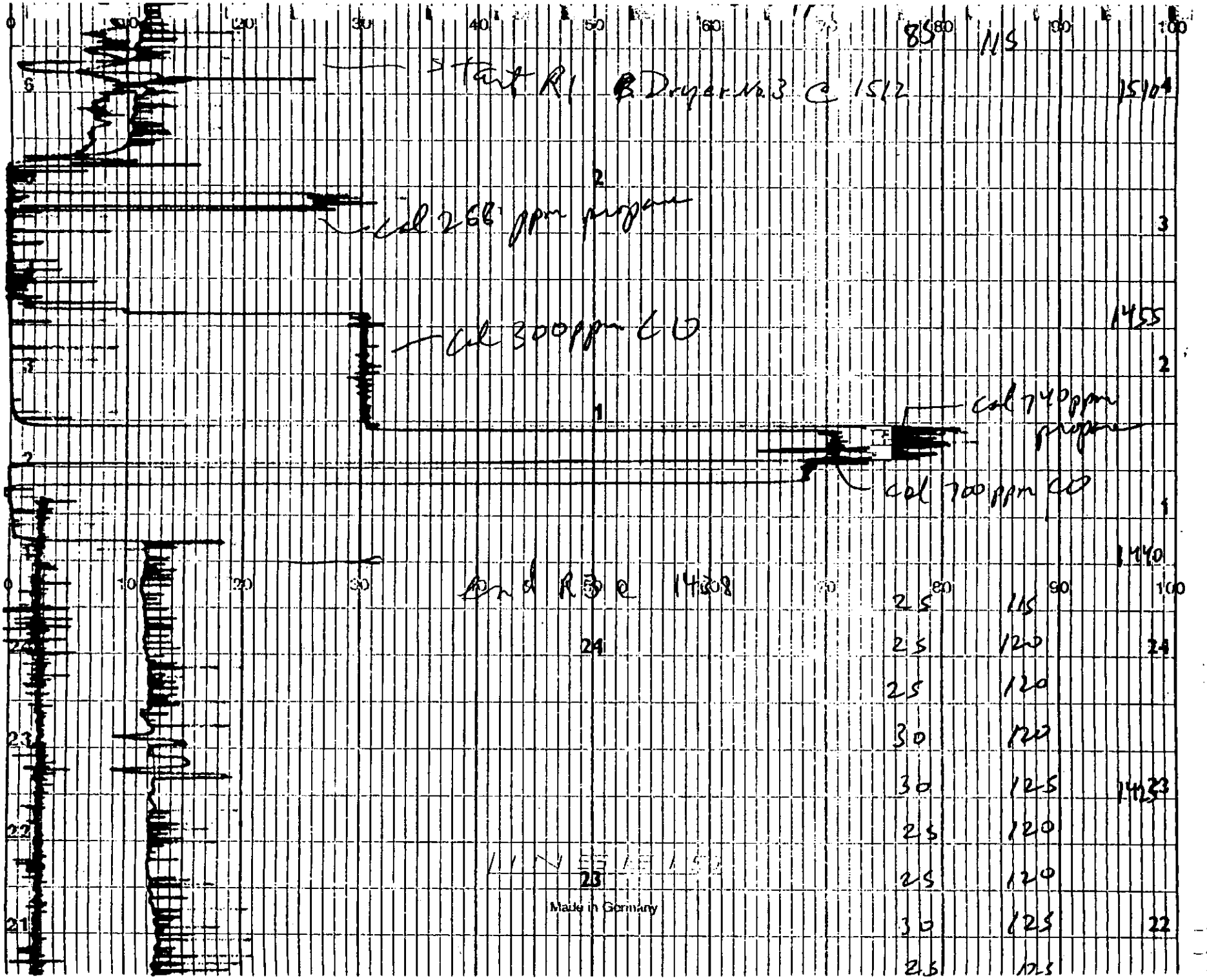

Run Data
Start 1025
Calibrate 700 ppm CO
1010
Calibrate 300 ppm CO
Cal 258 ppm propane
9-25-91 0956
Cal 740 ppm propane
0955
End cal 9-24-91 1656
Calib 700 ppm
Calib 300 ppm
Made in Germany

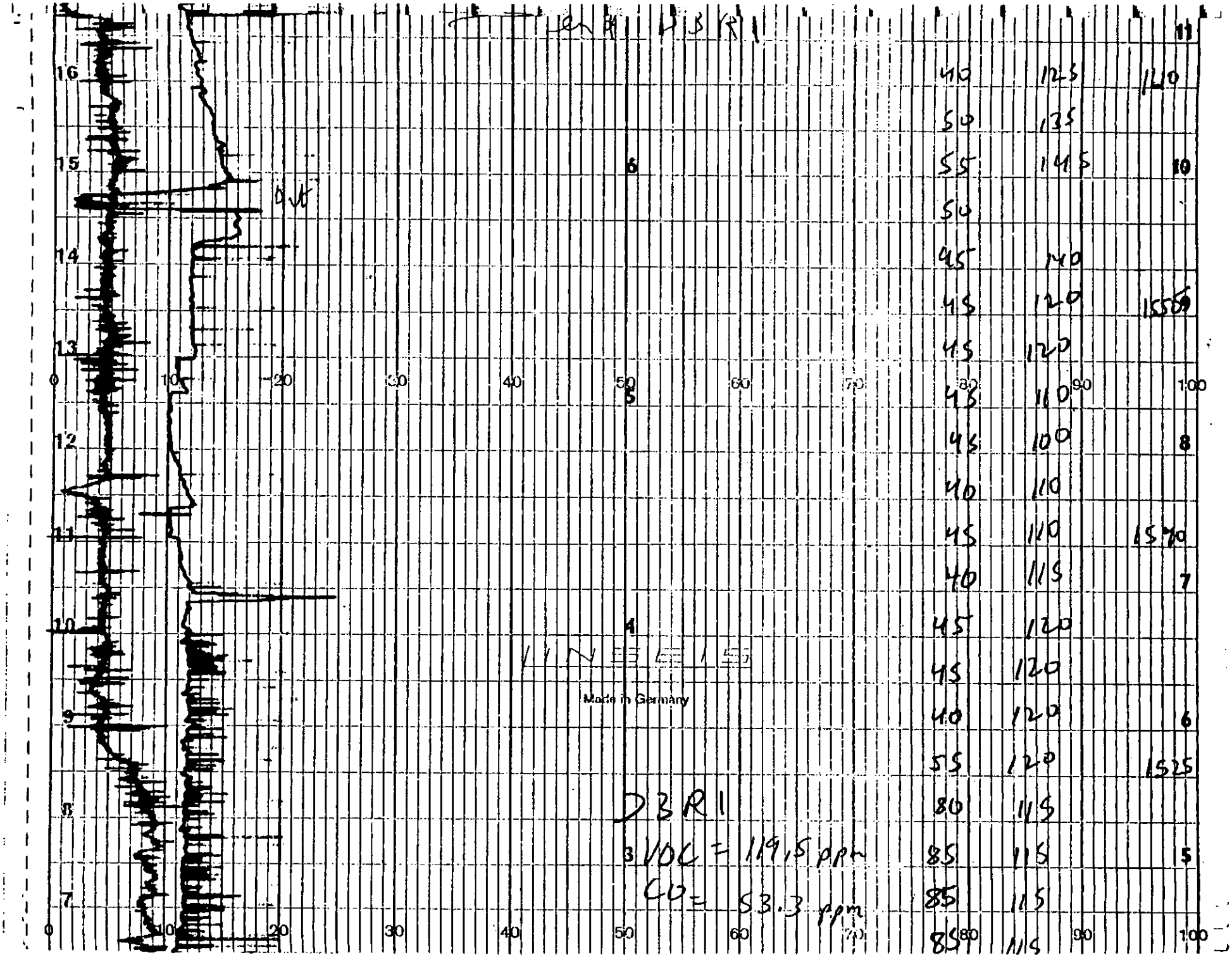

Made in Germany
O2 R
NOx = 130.5
CO = 9.5
Run Dryer 2
Start 1025
1025
1055
1100
off

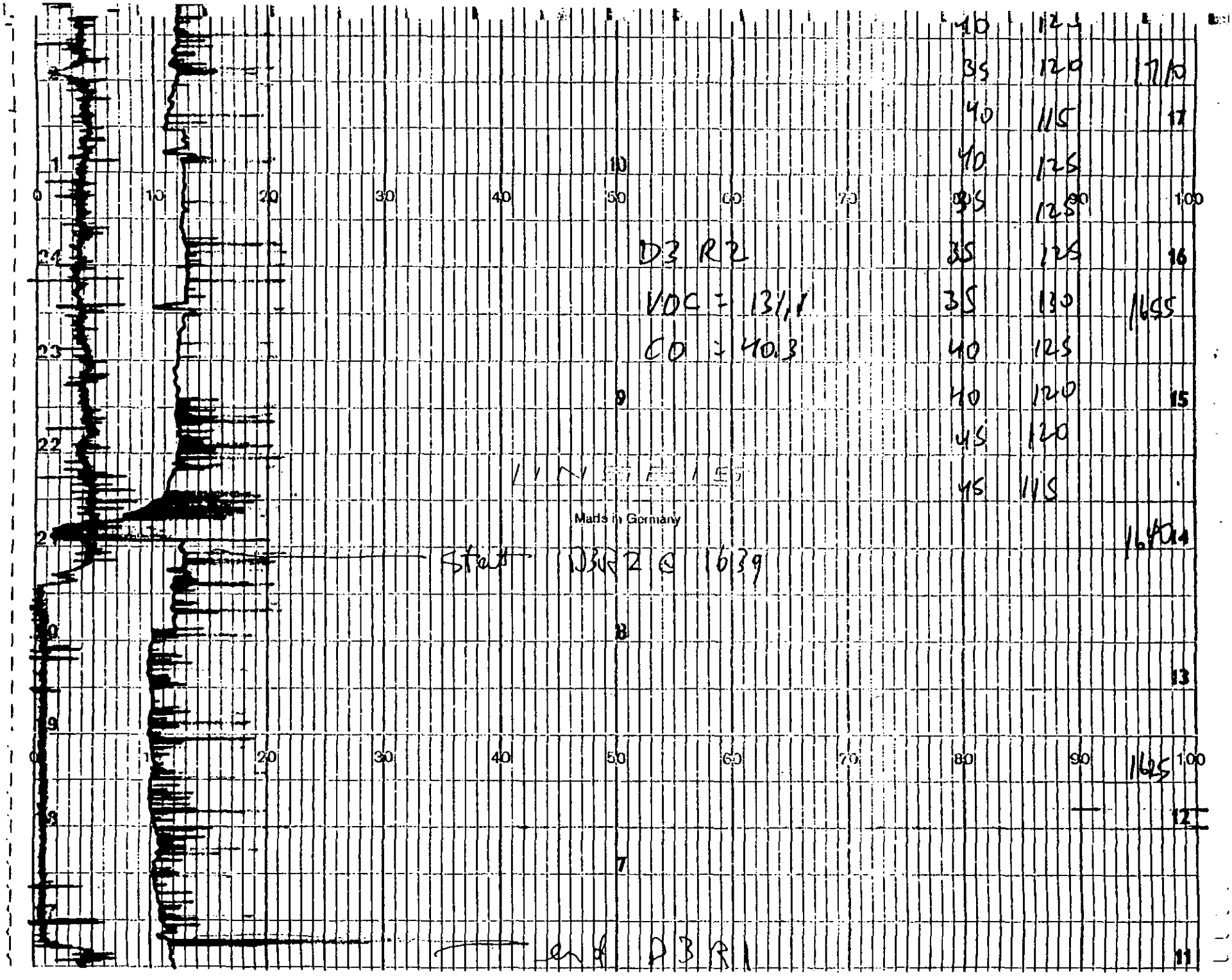

D2 R2
100 = 87.5 ppm
CO = 20.7
start R2
1200
Made in Germany
20 80
20 80
20 85
20 95
20 100
20 105
20 105
1120
1155
1140
calib. 300 ppm CO
cal. 700 ppm CO
calib 258 ppm propane
Cal 740 ppm propane
end R1 D2
1123
VOC
10 135
10 135

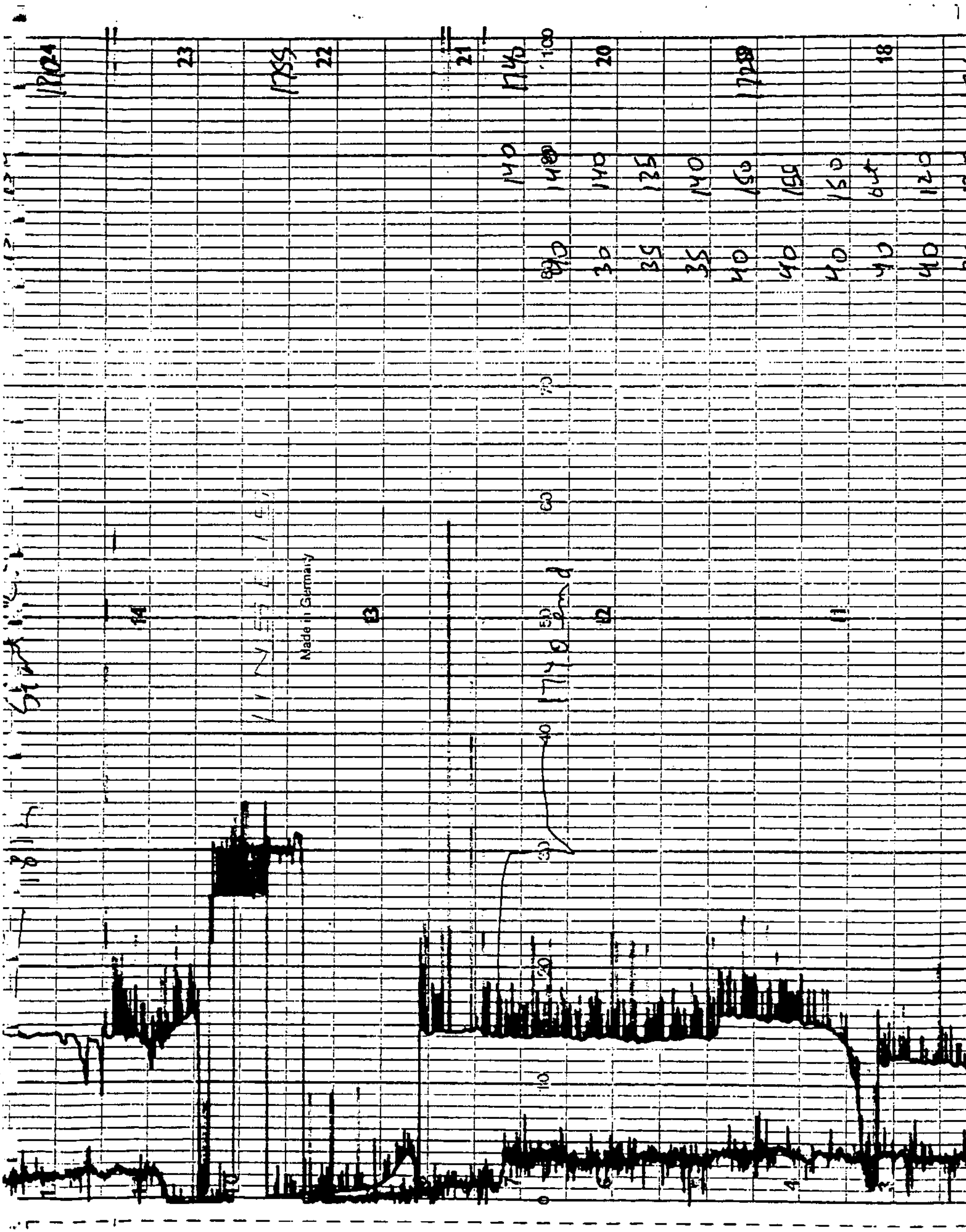

Cal 258 ppm propane
Cal 300 ppm Hydrogen
end PT 1302
Purge out
Cal 740 ppm
propane
Cal 700 ppm C O
15 90
15 90
20 90
20 95
25 95
20 90
20
20 75
25 90
25 75
25 75
25 75
25 80
20 80
20 80
20 80
0 10 20 30 40 50 60 70 80 90 100

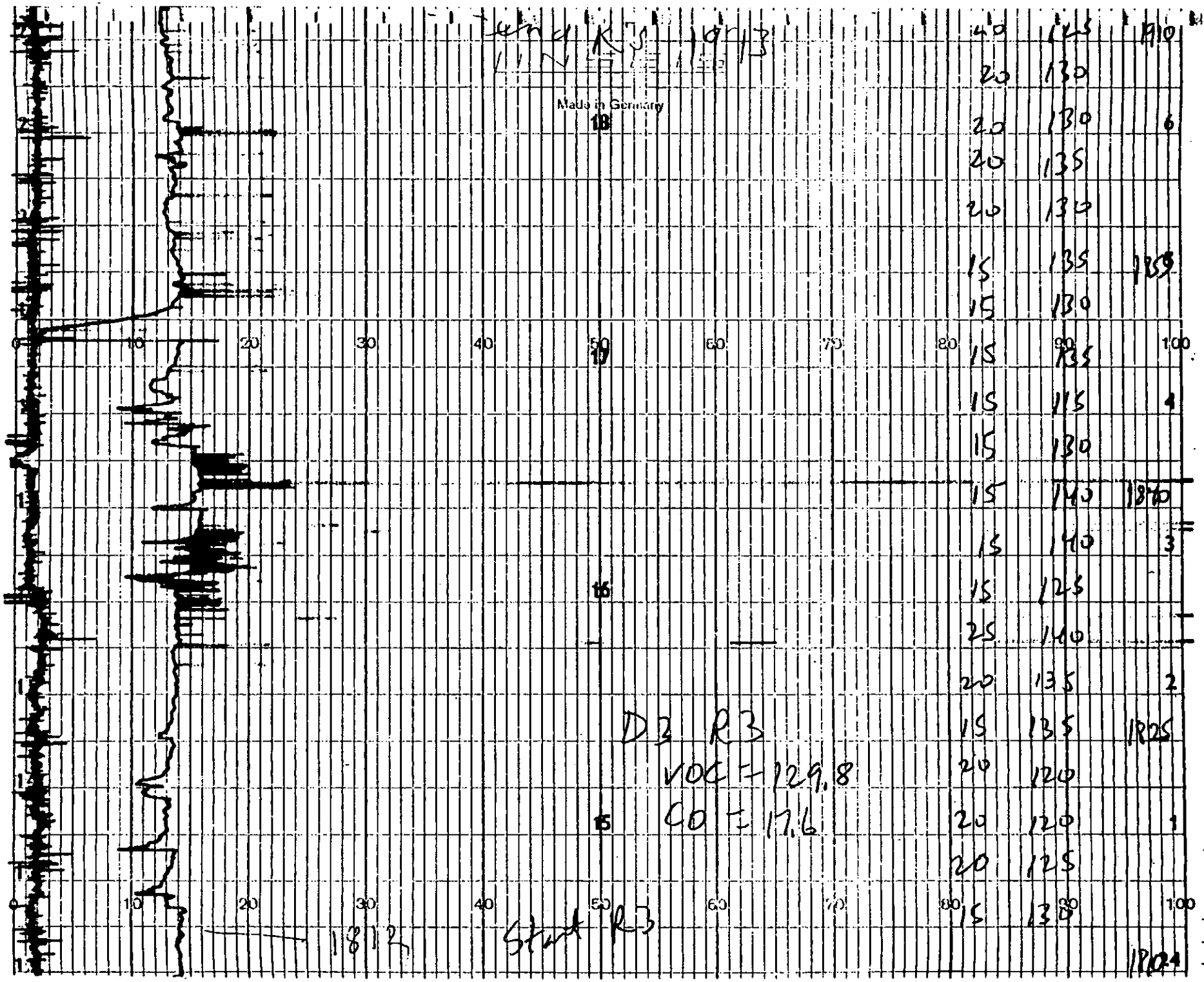

D2 R3
VOC = 12.64
CO = 24.8
S heat 1336
Run 3

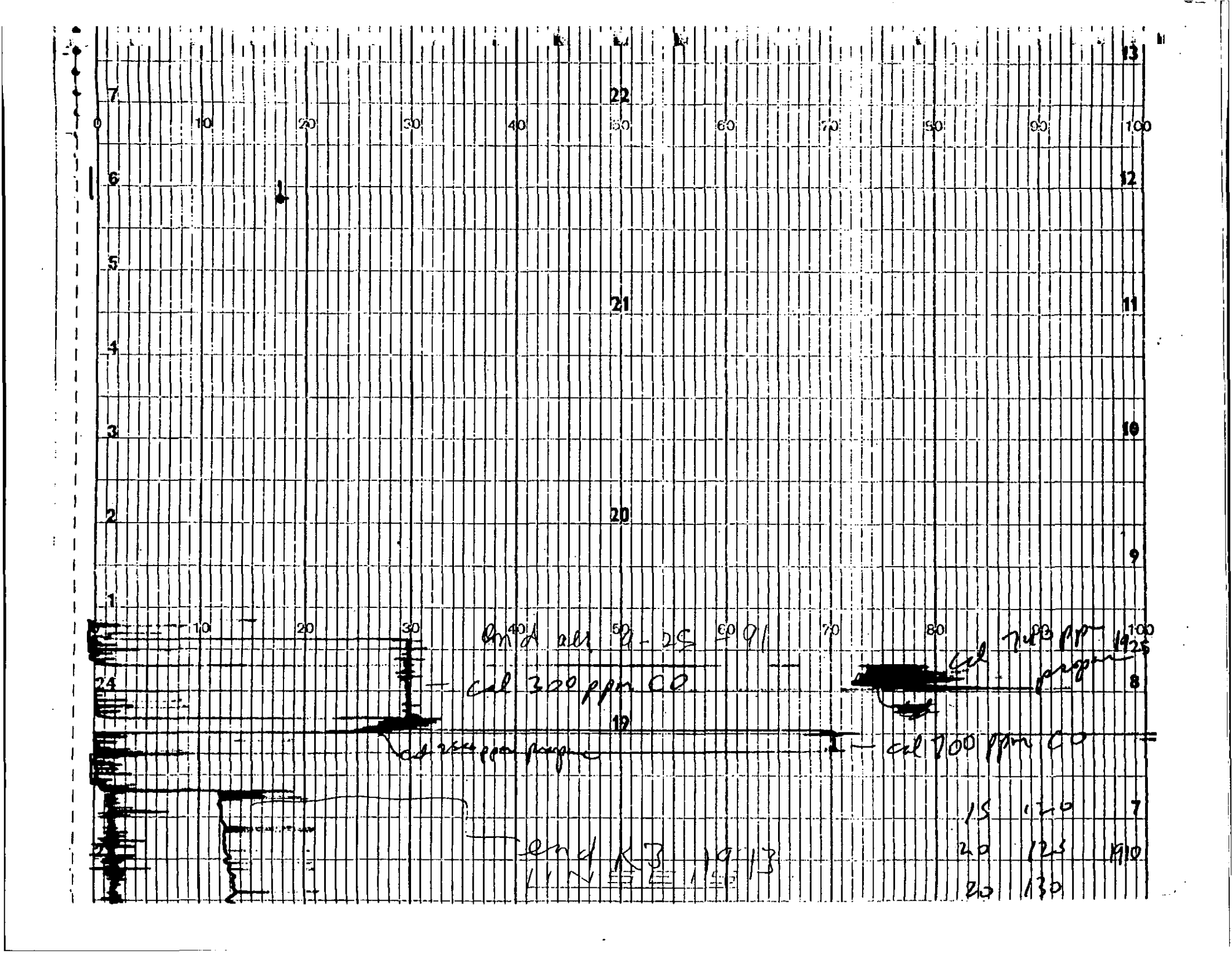

Start R1 @ Dryer No. 3 @ 1512
Col 268 ppm propane
Col 300 ppm CO
Col 740 ppm propane
Col 700 ppm CO
End R3 @ 1408
Made in Germany

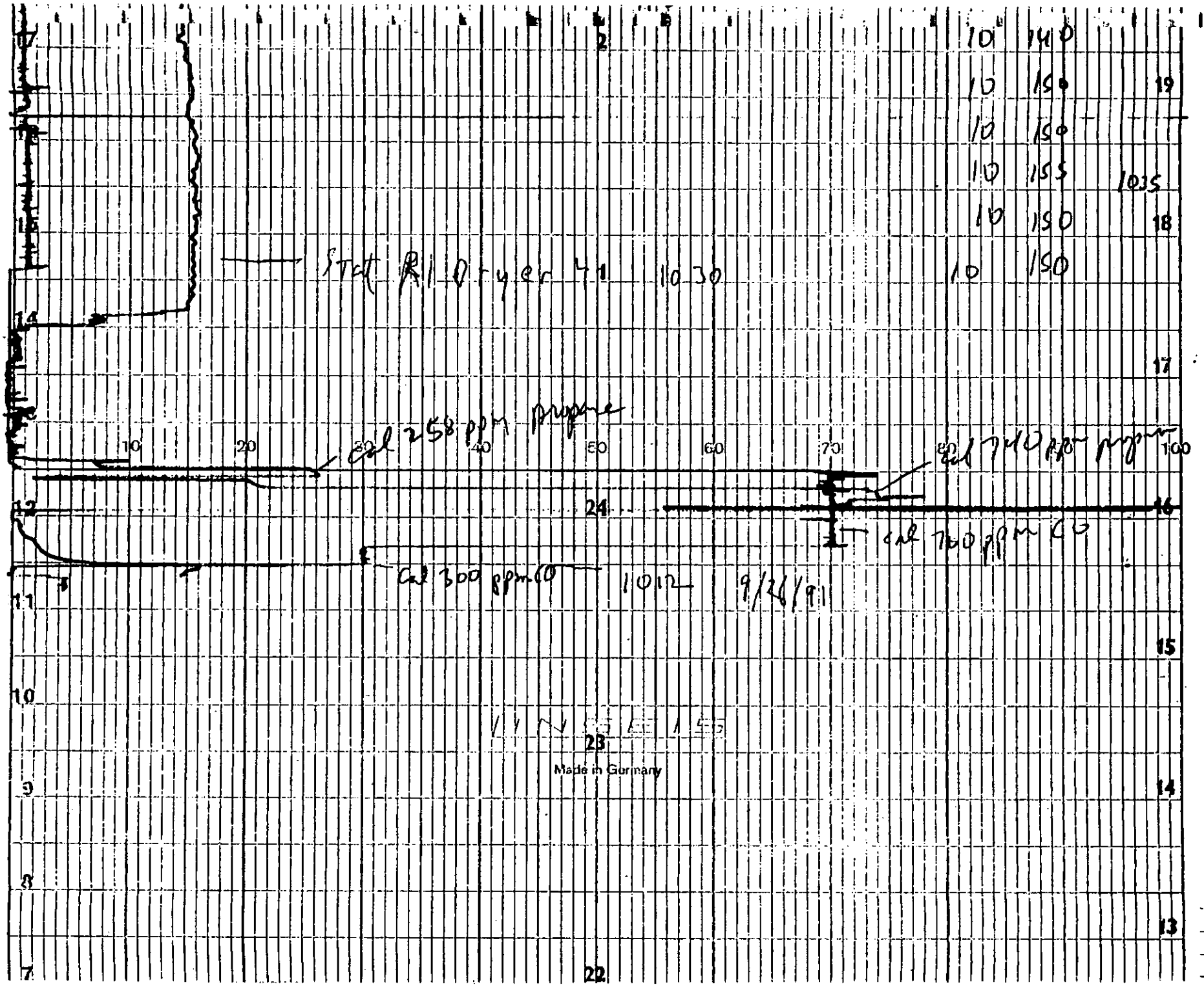

Made in Germany
DBR11
VOC = 119,5 ppm
CO = 53.3 ppm

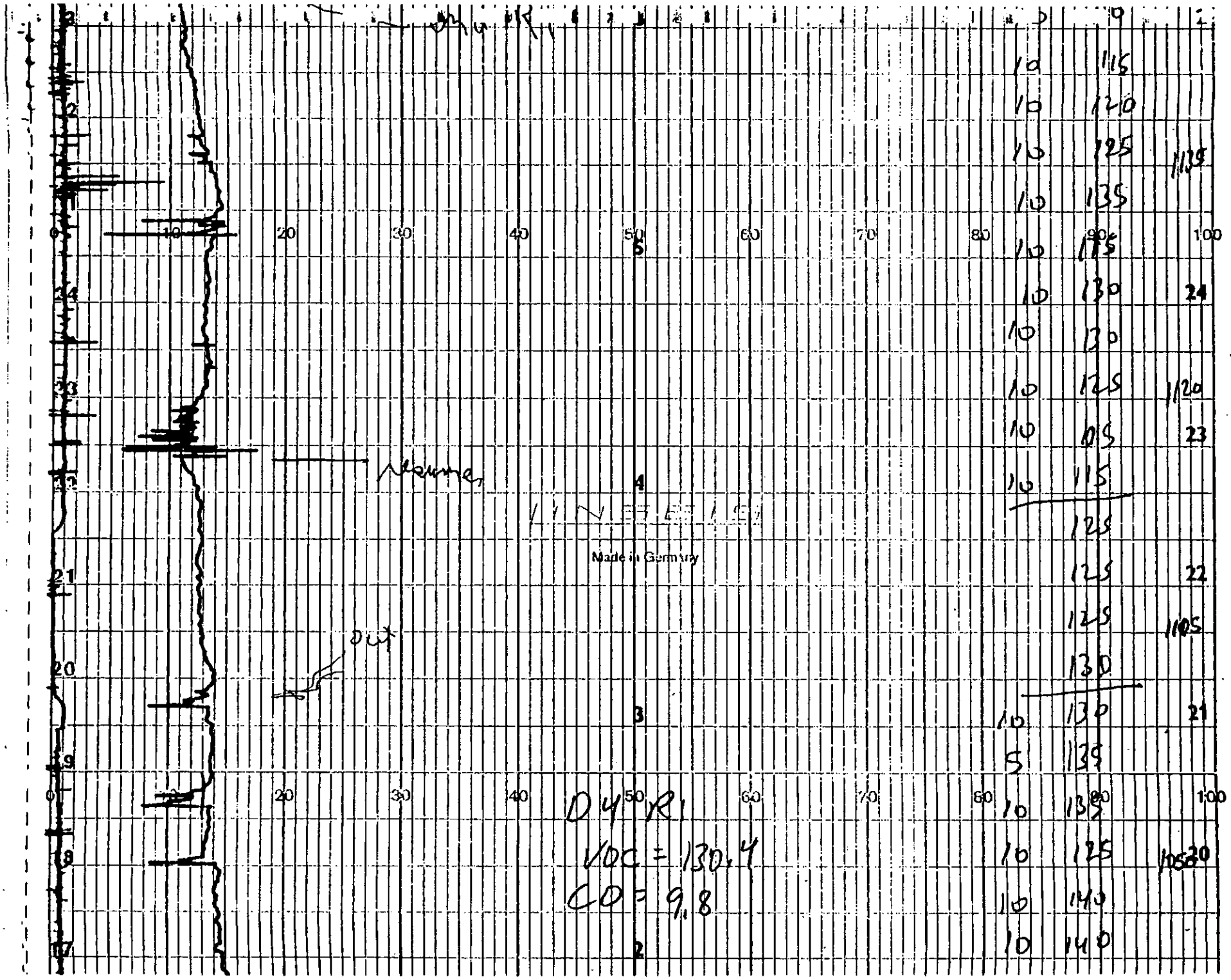

10 12
35 120 1710
40 115 17
40 125
35 125
35 125 16
35 130 1655
40 125
40 120 15
45 120
45 115
1640 14
Start 1034 2 C 1639
13
1645
12
11
D3 R2
VOC = 131.1
CO = 40.3
D3 R1
Made in Germany

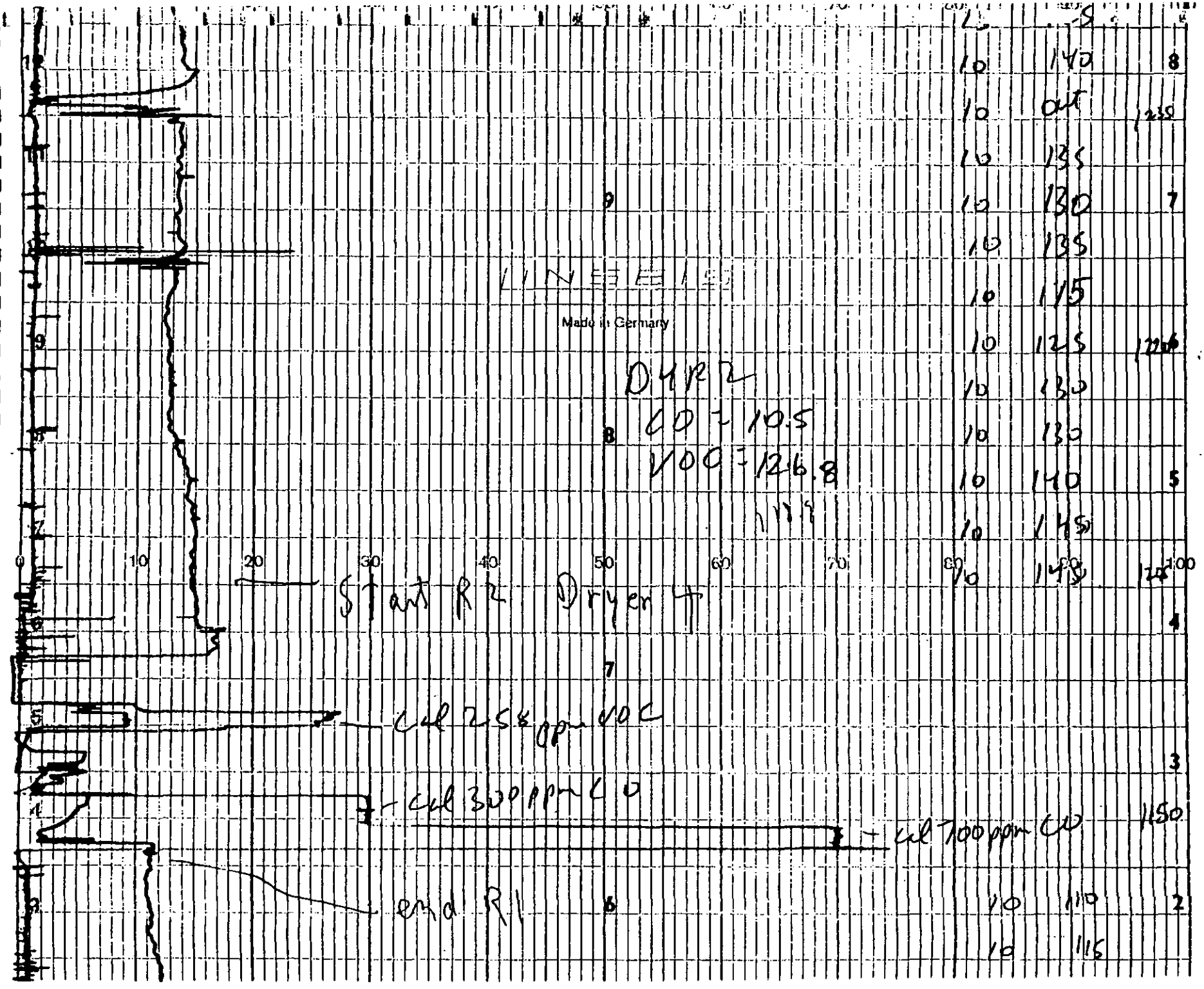

Made in Germany

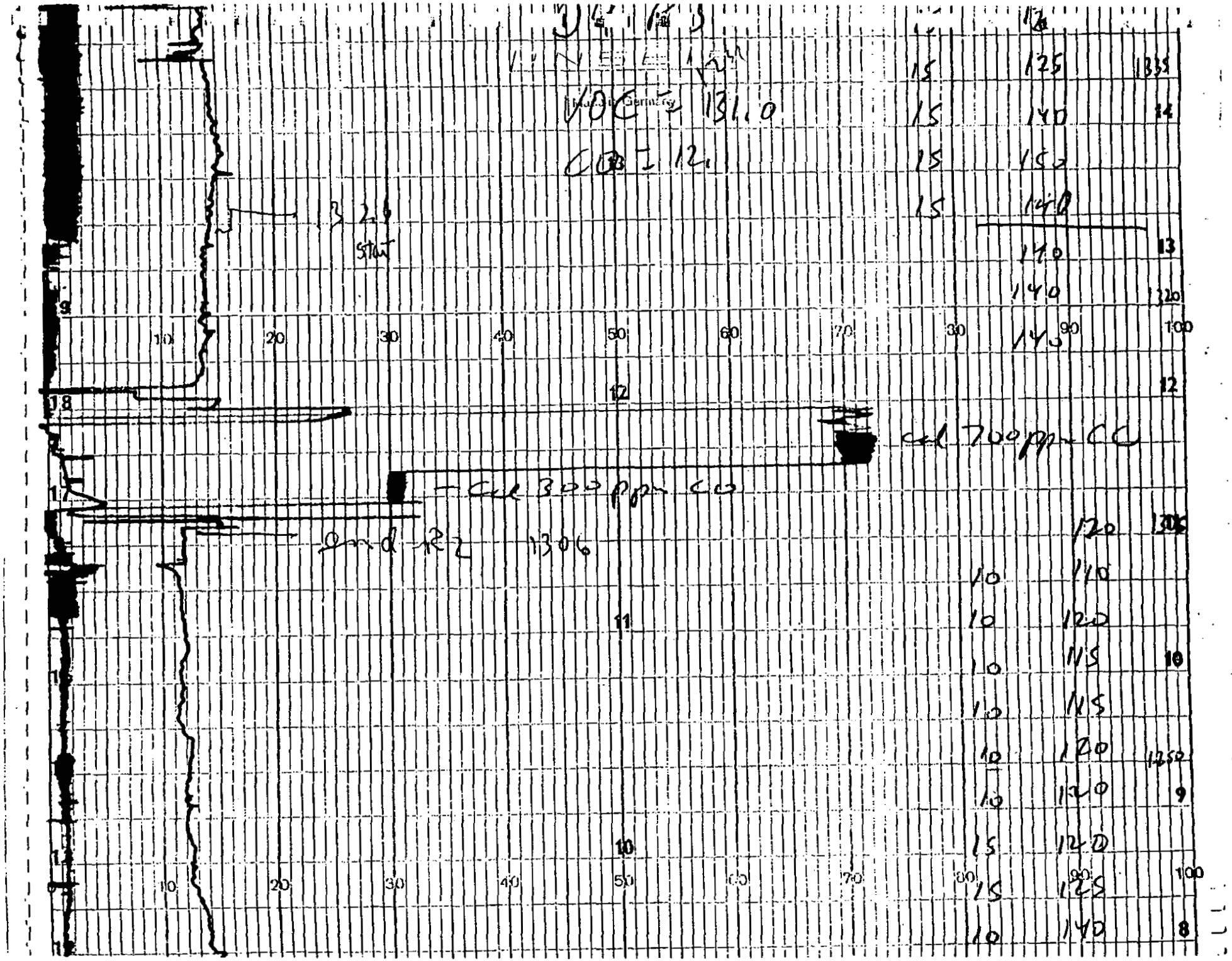

Made in Germany
D2 R3
VOL = 129.8
CO = 17.6
Start R3

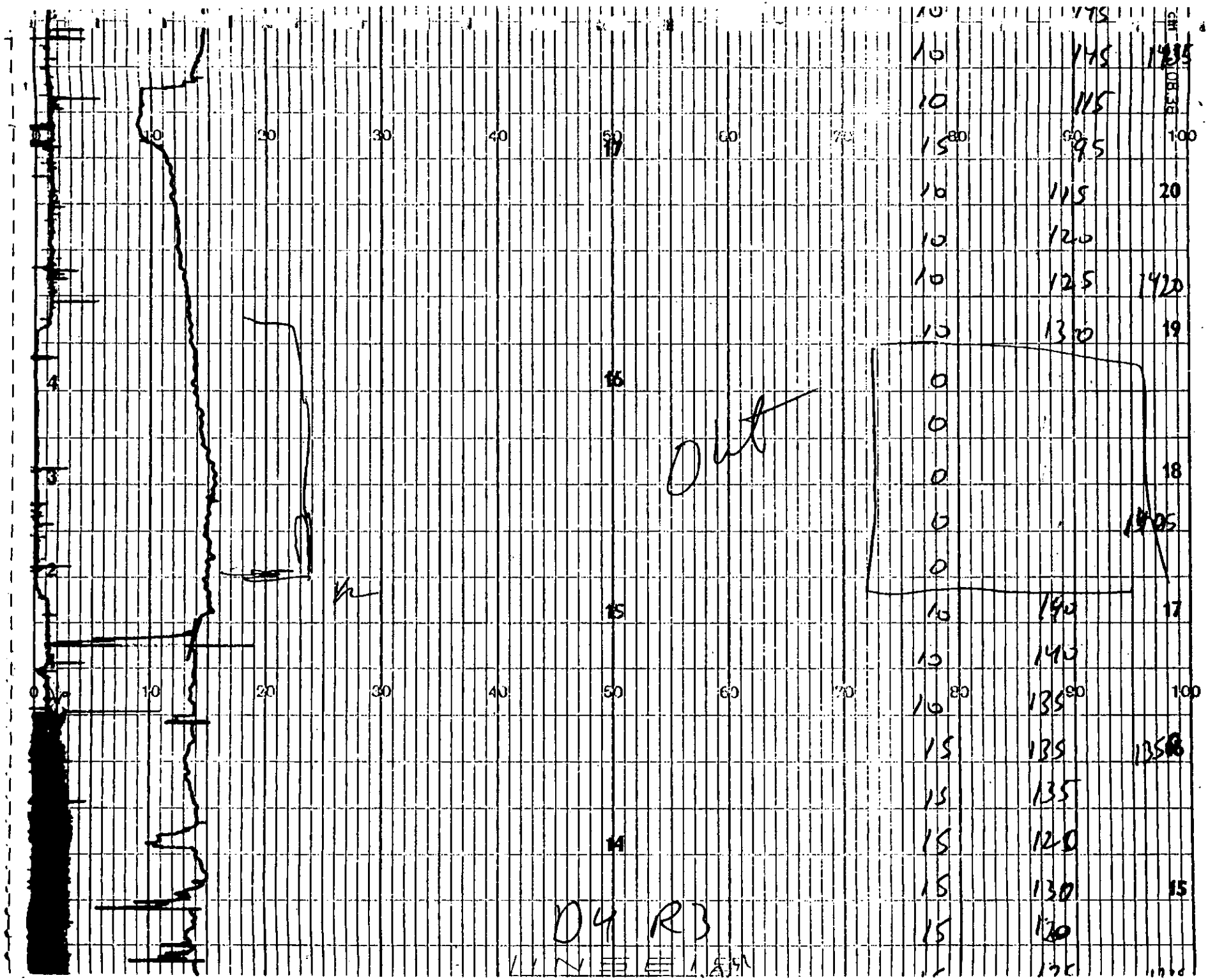

0
10
20
30
40
50
60
70
80
90
100
cal 300 ppm CO
cal 700 ppm CO
15 120
20 125
20 130


10 140
10 150
10 150
10 155
10 150
10 150
1035
Start R1 0-4er 41 1030
Cal 258 ppm Propane
Cal 740 ppm Propane
Cal 300 ppm CO
Cal 700 ppm CO
10/2
9/24/91
Made in Germany

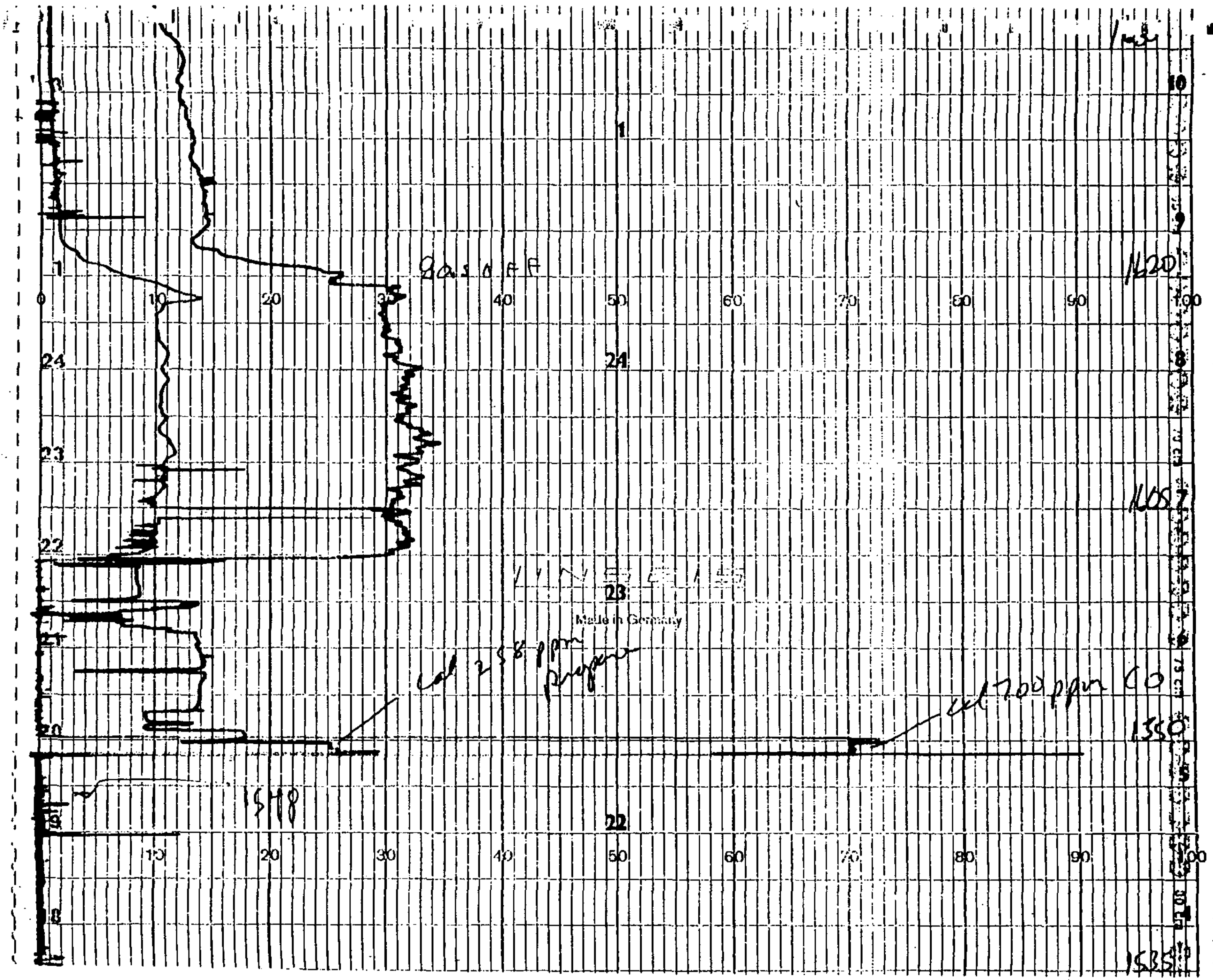

Made in Germany
10 116
10 120
10 125
10 135
10 135
10 130
10 125
10 115
125
125
125
130
10 130
5 135
10 135
10 125
10 140
10 140
1135
24
1120
23
22
1105
21
20
1050
0 10 20 30 40 50 60 70 80 90 100
0 10 20 30 40 50 60 70 80 90 100
out
DAY R1
VOC = 130.4
CO = 9.8


Made in Germany
DHR2
CO = 10.5
H2O = 12.6.8
Start R2 Dryer ↑
cal 2.5% CO2
cal 300 ppm CO
cal 100 ppm CO
end R1

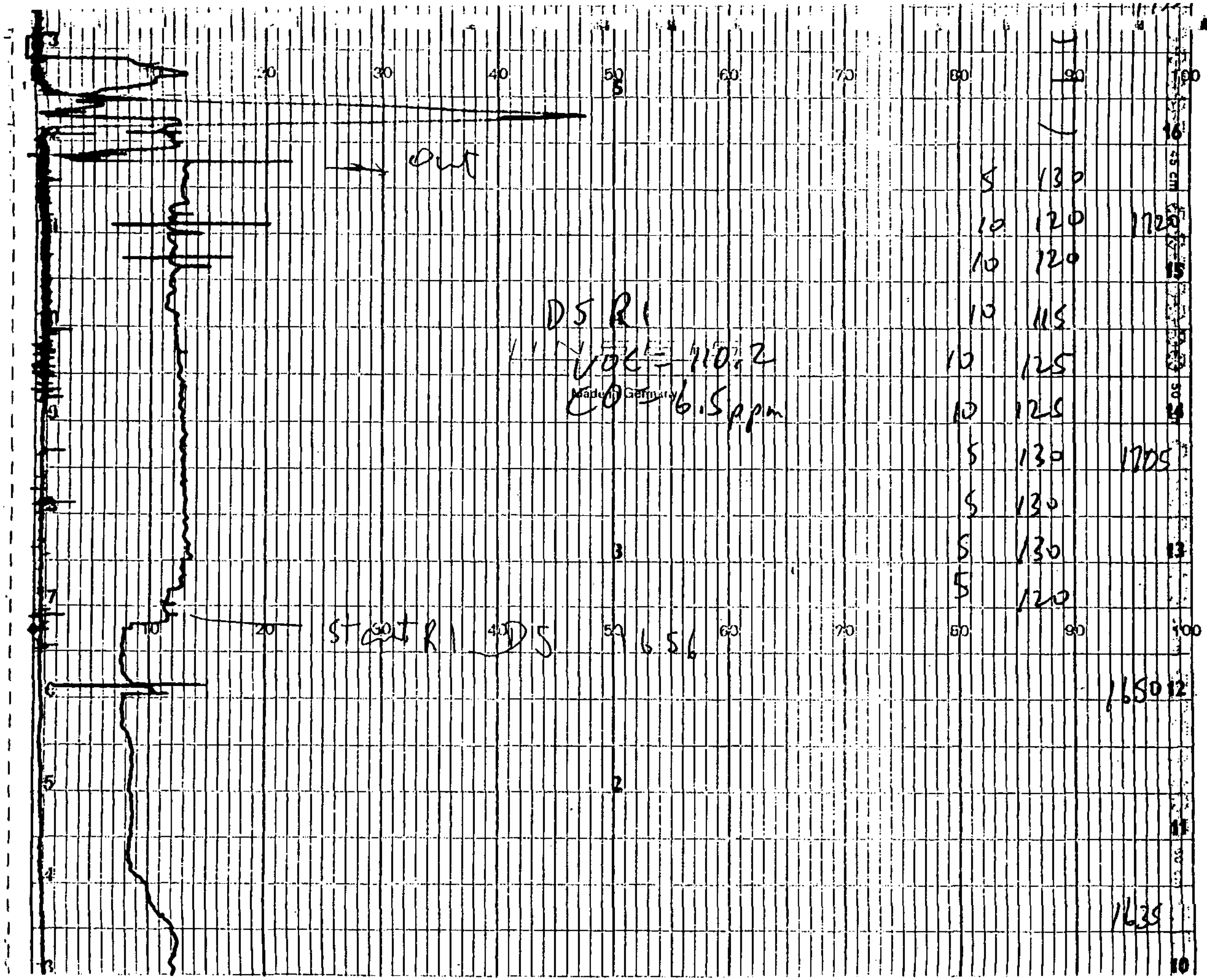

Start
Cal 700 ppm CO
Cal 300 ppm CO
End 122 1306

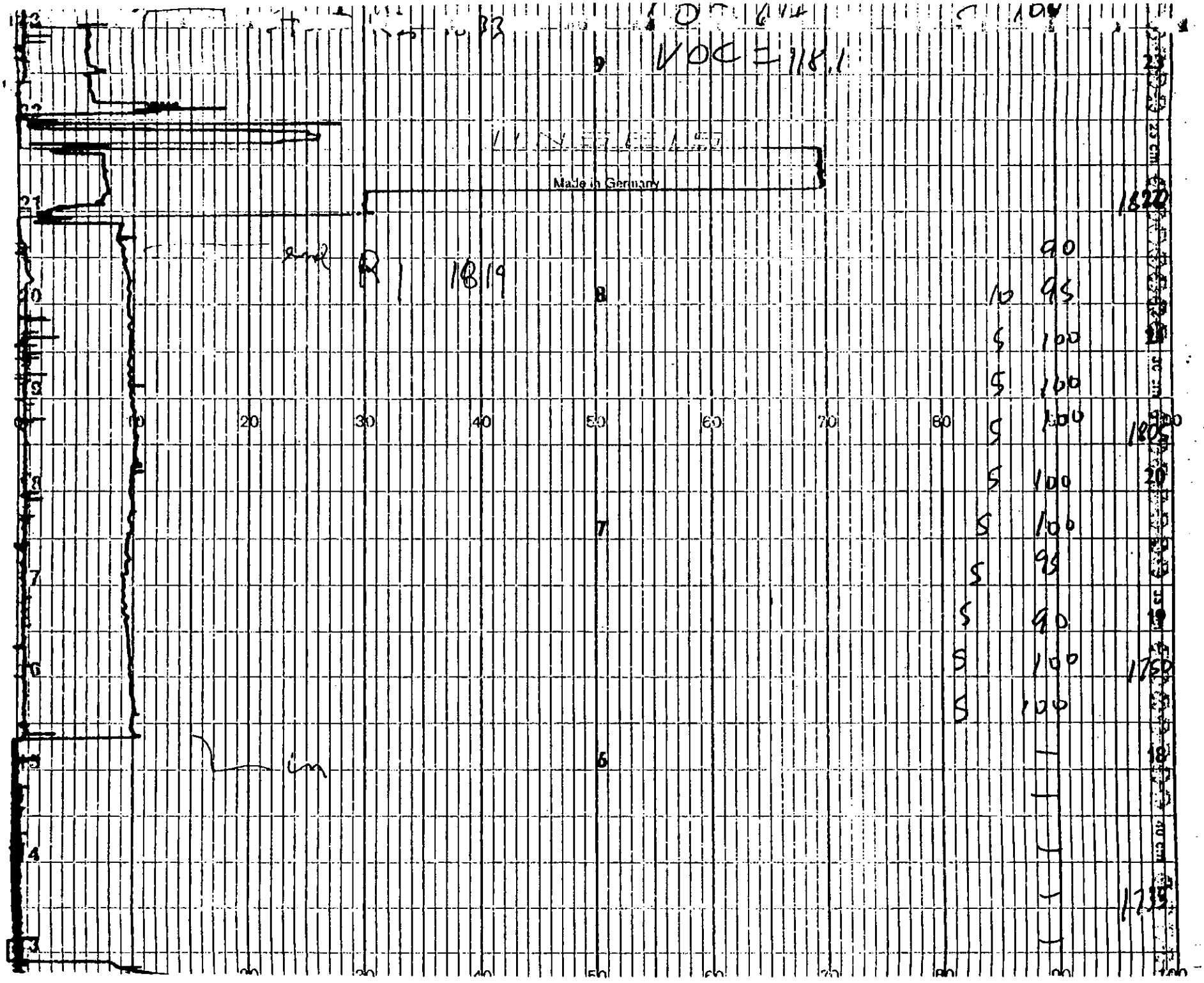

Out
DURB

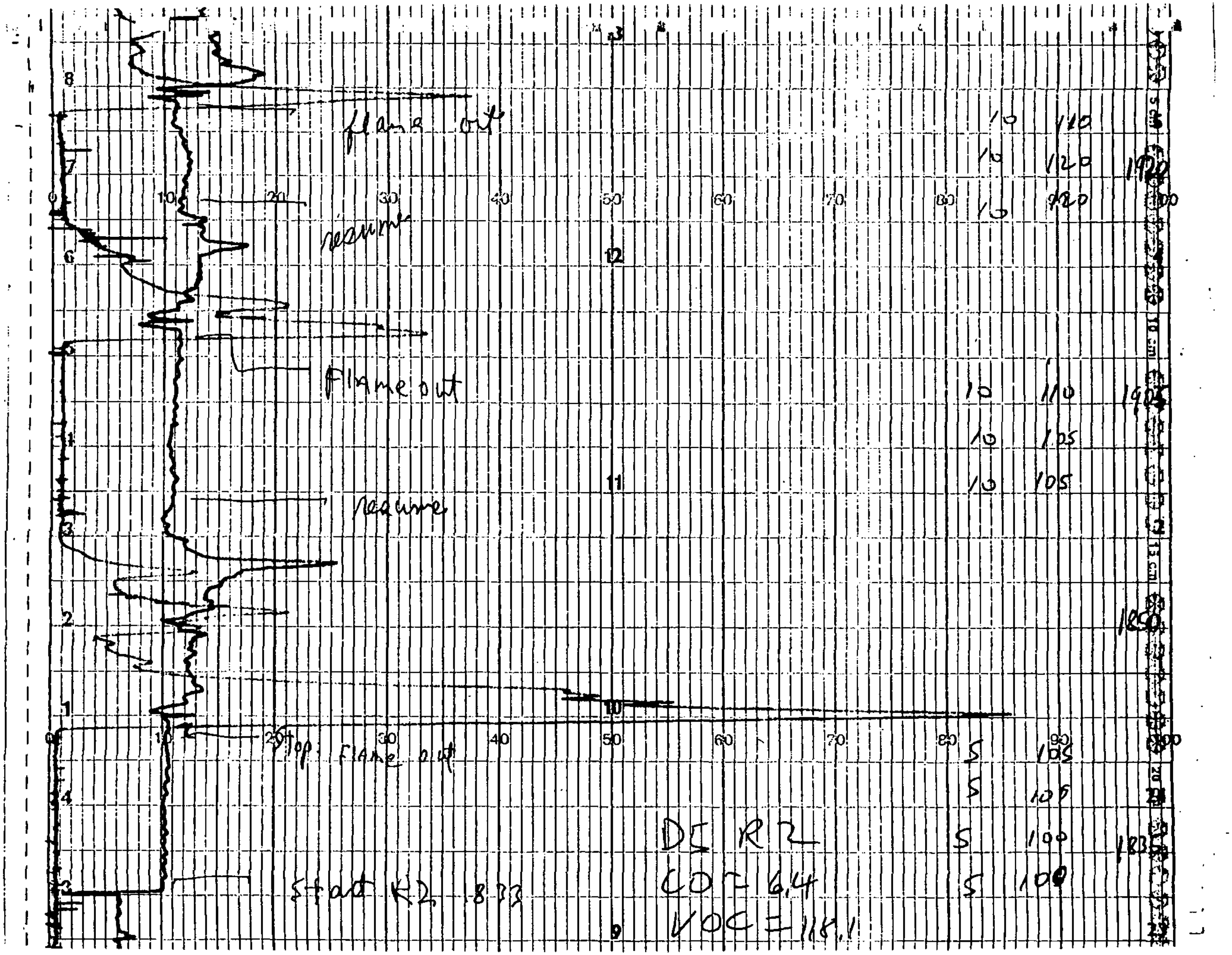

1535
1520
150
145
140
21
20
19
10
20
30
40
50
60
70
80
90
100
Made in Germany
1B
and R3
15
10
15D
145

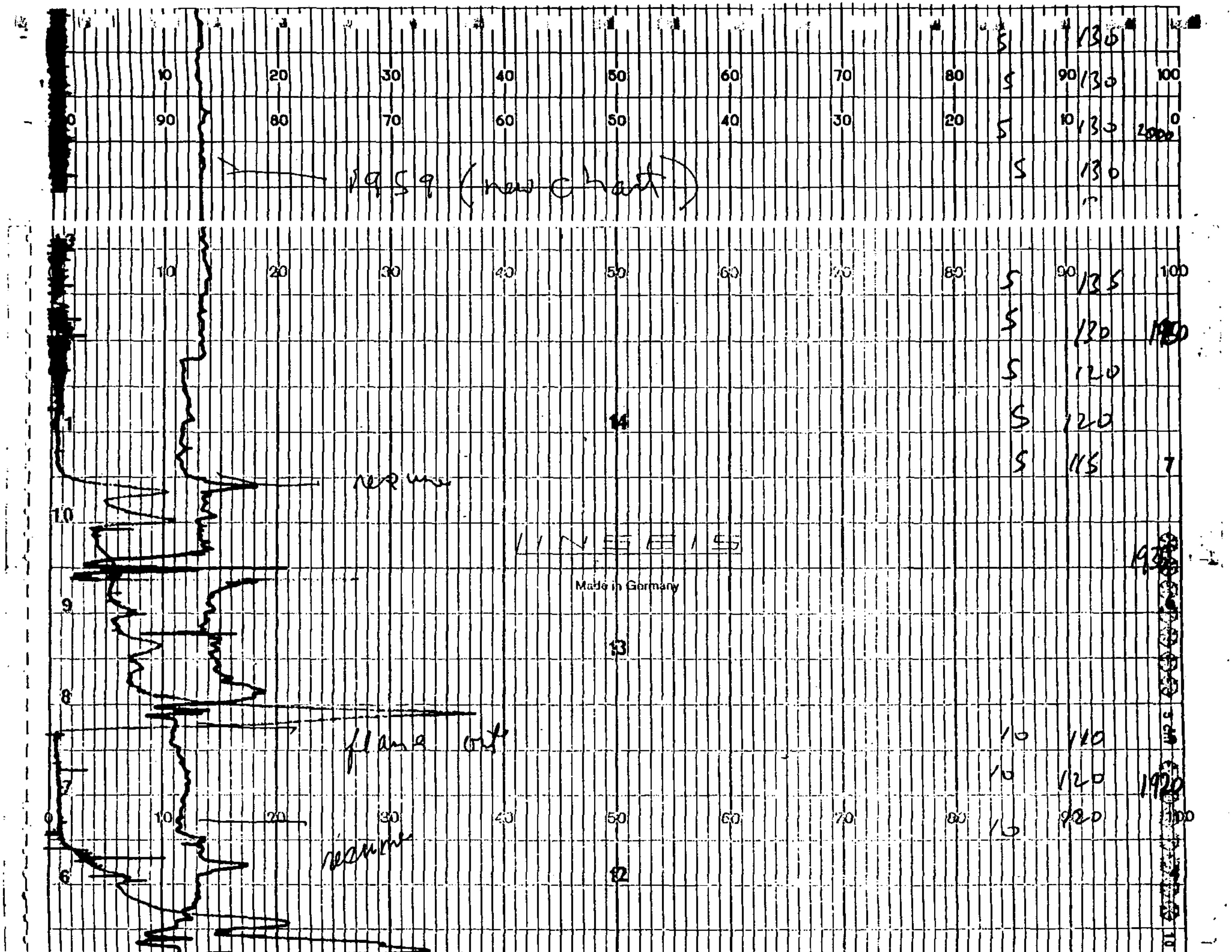


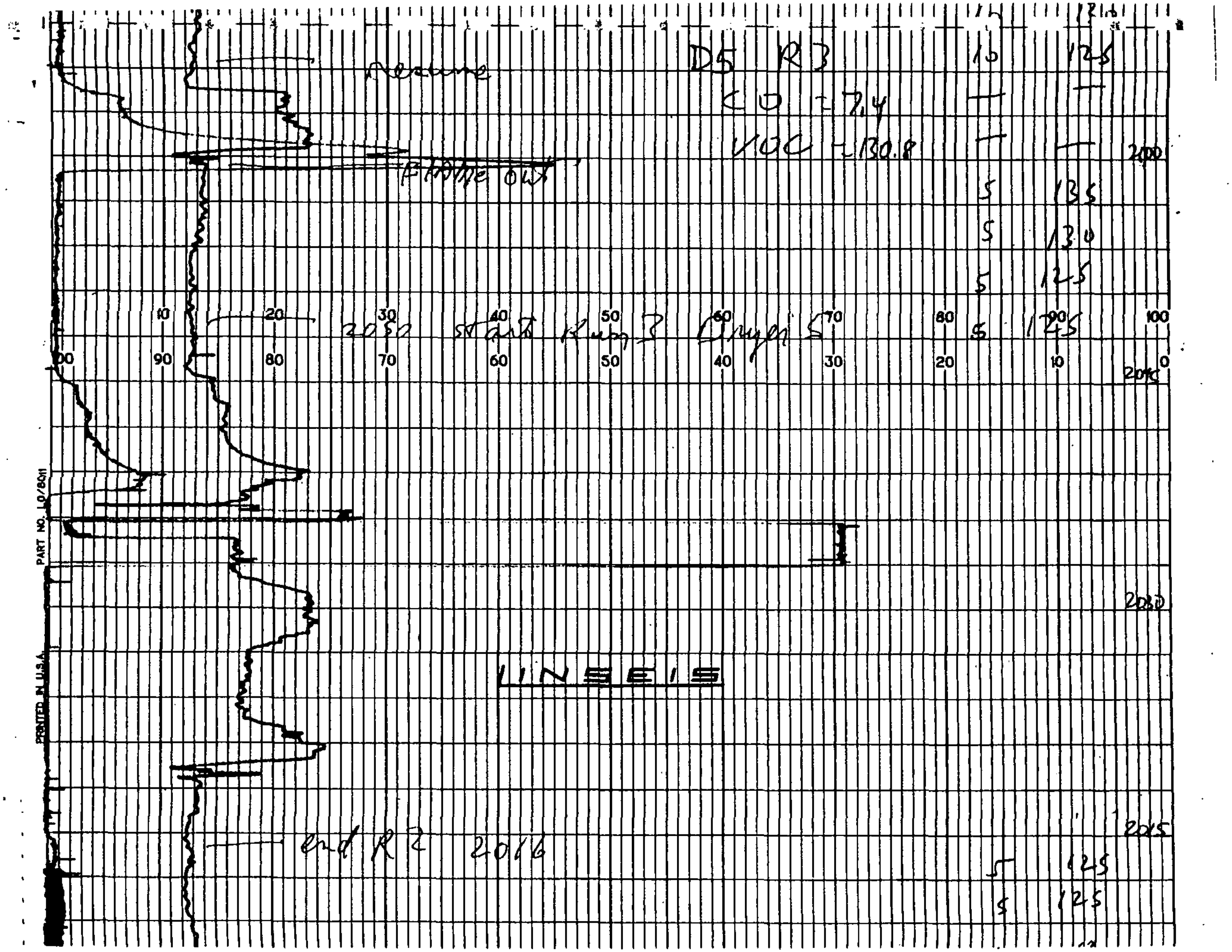
gas off
1420
1455
Made in Germany
cal 258 ppm propane
cal 700 ppm CO
1530
1518
1535


OUT
DS R1
VOC = 110.2
CO = 6.5 ppm
Made in Germany
START R1 DS
6.56
5 130
10 120
10 120
10 115
10 125
10 125
5 130
5 130
5 130
5 120
1720
1705
1650
1635

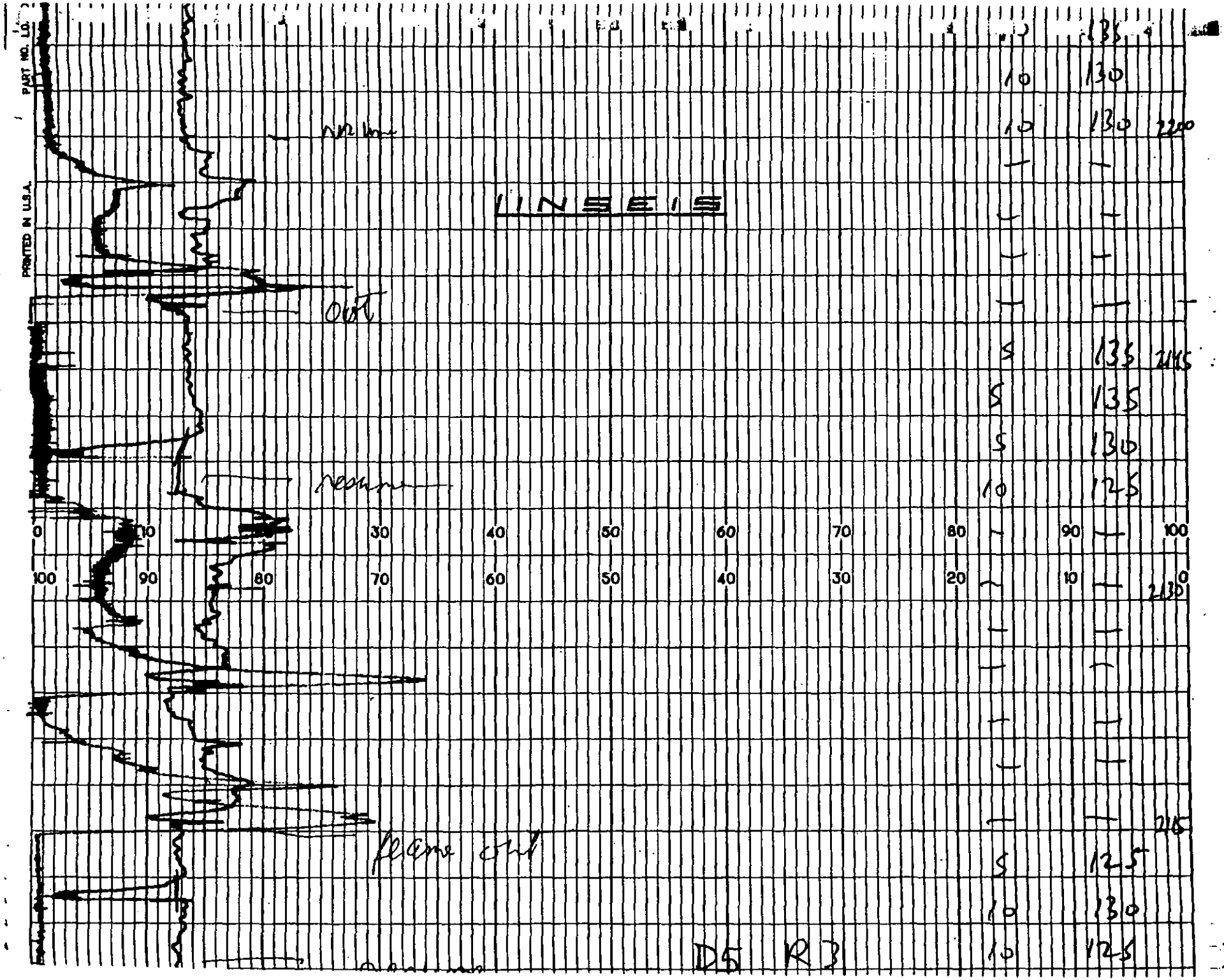

Made in Germany

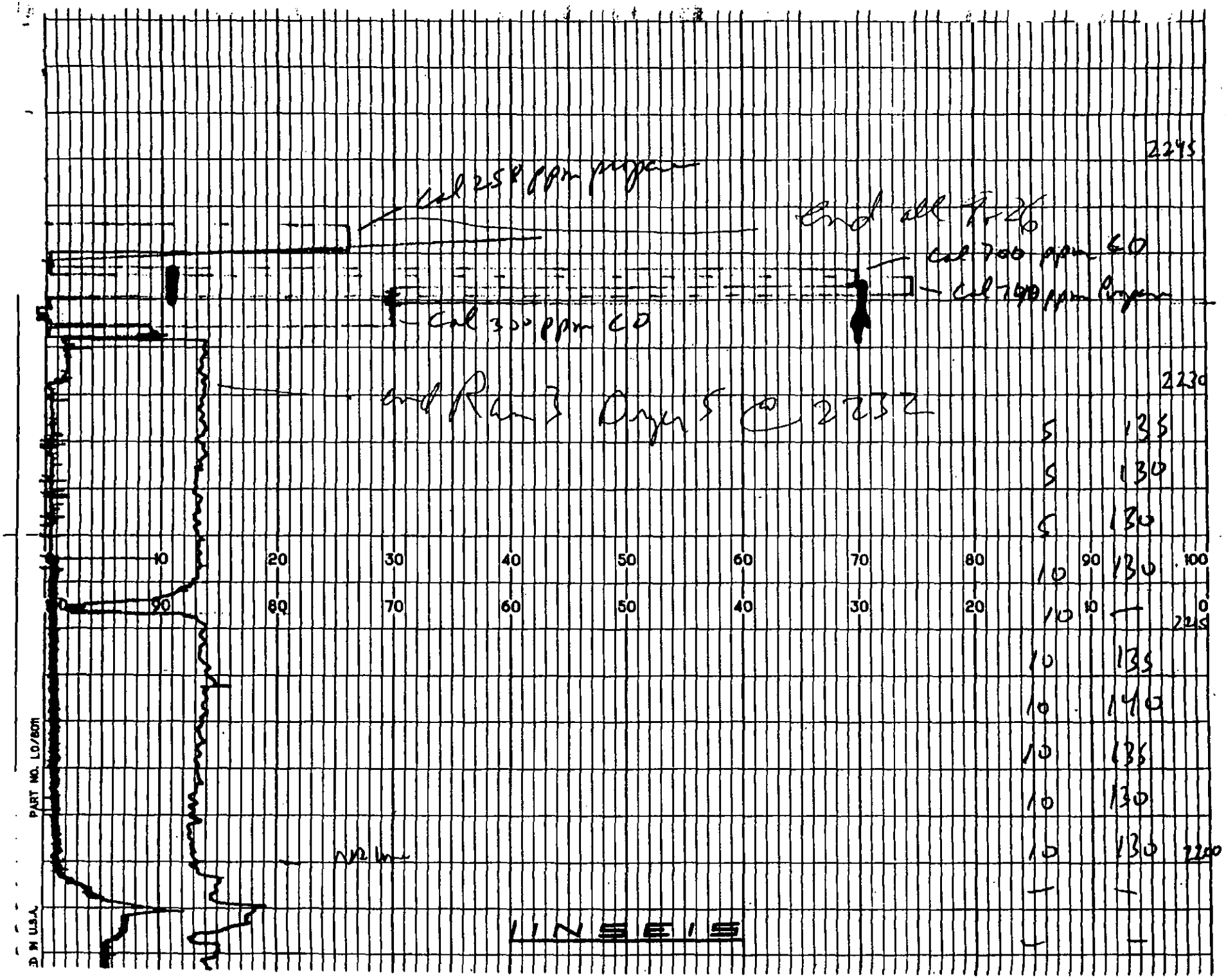

flame out
resume
Flame out
resume
Stop Flame out
Start R2 8 33
DE R2
CO = 6.4
VOC = 118.1
10 110
10 120
10 120
10 110
10 105
10 105
5 105
5 106
5 100
5 100
1920
1905
1850
1833


1959 (new chart)
resume
flame out
resume
Made in Germany



D5 R3
CO = 7.4
VOC = 130.8
Resume
Flame out
2050 start Run 3 Dryer 5
end R2 2016
LINSEIS
PART NO. L0/8011
PRINTED IN U.S.A.
2000
2010
2020
2025

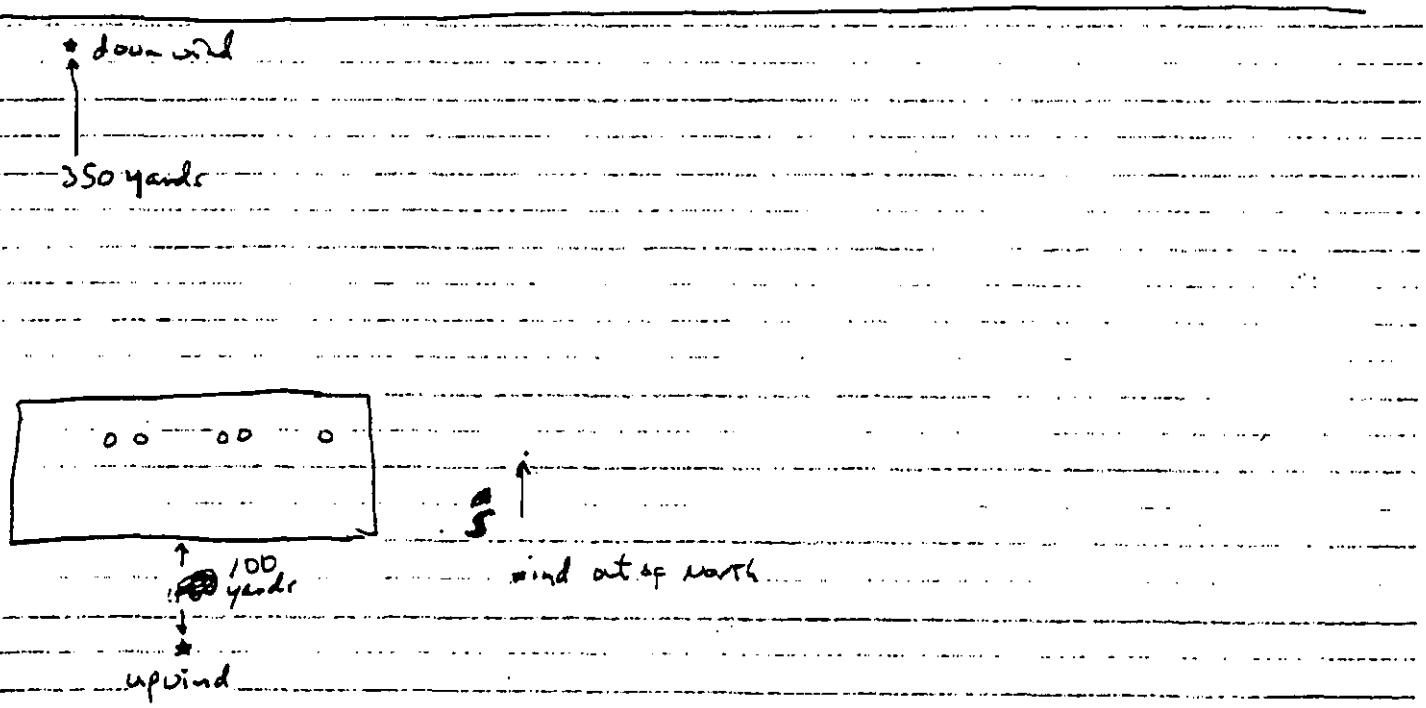

PART NO. L0
PRINTED IN U.S.A.
LINSEIS
out
0
10
30
40
50
60
70
80
90
100
100
90
80
70
60
50
40
30
20
10
0
D5
R3


Cal 225 ppm propane
Cal 300 ppm CO
end Run 3 Cycle 2232
Cal 200 ppm CO
Cal 100 ppm Propane
end test #26
2245
2230
2215
2200
10 20 30 40 50 60 70 80 90 100
90 80 70 60 50 40 30 20 10 0
5 135
5 130
5 130
10 130
10 135
10 140
10 135
10 130
10 130
PART NO. LO/BOM
D IN U.S.A.
LINSEIS

C. GROUND LEVEL SAMPLING DATA

Kirby Forest Industries - Silsbee OSB Plant

Sample ID	PARAMETER	Location	Time Start	Time End	DATE	Amb Temp °F	P bar	Pump
Tube 1	HCHO	Downwind	0908	1621	9-25-91			823 A
Tube 2	Phenol	Downwind	0909	1621	9-25-91			823 B
BIMP.D1	MDI	Downwind	0909	1621	9-25-91			9903
Tube 3	HCHO	upwind	0916	1625	9-25-91			910A
Tube 4	Phenol	upwind	0916	1625	9-25-91			910B
Imp U1	MDI	upwind	0916	1625	9-25-91			9178
Tube 5	HCHO	Downwind	0825	1454	9-26-91			823 A
Tube 6	Phenol	Downwind	0825	1454	9-26-91			823 B
IMP D2	MDI	Downwind	0825	1454	9-26-91			9903
Tube 7	HCHO	upwind	0846	1505	9-26-91			910A
Tube 8	Phenol	upwind	0846	1505	9-26-91			910B
Imp U2	MDI	upwind	0846	1505	9-26-91			9178
Tube 9	HCHO	Downwind	1500	2022	9-26-91			823 A
Tube 10	Phenol	Downwind	1500	2022	9-26-91			823 B
IMP D3	MDI	Downwind	1500	2022	9-26-91			9903
Tube 11	HCHO	upwind	1510	2027	9-26-91			910A
Tube 12	Phenol	upwind	1510	2027	9-26-91			910B
Imp. U3	MDI	upwind	1510	2027	9-26-91			9178



Ground Level monitoring Pumps * calibration 9-27-91
By DGR

Pump	cal. Vol.	Seconds	cal. RATE
823 A	100 ml	57	105.26 ml/min
823 A	100	57	105.26 ml/min
823 A	100	57	105.26 ml/min
823 B	100 ml	60	
823 B	100	62	
823 B	100	61	98.36 ml/min
910 A	100 ml	66	90.91 ml/min
910 A	100 ml	66	90.91
910 A	100 ml	66	90.91
910 B	100 ml	63	
910 B	100 ml	63	95.24 ml/min
910 B	100 ml	63	
9178	1000	62	.9677 lpm } .9783 lpm
9178	1000	61	.9836
9178	1000	61	.9836
9903	1000	59	
9903	1000	59	1.0169 lpm
9903	1000	59	

* Bubble meter calibrations.

D. CALIBRATION DATA

DRY GAS METER CALIBRATION

Meter I.D.	RAC 591349	Date	08-10-91
Calibration Method	DGM/DGM Bell Prove	By	DGR
Calibration Meter I.D.	651729		
Barometric Pressure	29.75		

Vac in. H2O	DH in. H2O	Time min.	Calibrating Meter Vi cf	Vf cf	Temp F	Field Meter Vi cf	Vf cf	Temp F initial		Temp F final		Y	Q	K	DH@
1	4	9.75	632.119	642.452	70	727.109	737.642	74	73	98	76	.990	1.06	.676	2.02
1	2.5	13	642.452	653.242	70	737.642	748.73	97	75	113	84	1.01	.840	.674	2.03
1	2	13.8	653.242	663.448	70	748.73	759.355	109	85	118	90	1.01	.763	.679	2.00
1	1.5	17.3	663.553	674.732	73	759.462	770.937	73	73	100	78	.985	.649	.674	2.03
1	1	20.8	674.732	686.078	73	770.937	782.686	99	79	112	89	1.00	.557	.702	1.87
												.999			1.99

$$Y = [(Vcal)(Pbar)(Tdgm)]/[(Vdgm)(Pm)(Tcal)]$$

Where:

Y = Meter Correction Factor

Vcal = Volume of gas through calibrating meter, ft.3

Vdgm = Volume of gas through field dry gas meter, ft.3

Pbar = Barometric pressure, in. Hg

Pm = Meter pressure, (Pbar=DH/13.6), in. Hg

Tdgm = Average dry gas meter temp., degrees R

Tcal = Temperature of gas through calibrating meter, degrees R

DRY GAS METER CALIBRATION

Meter I.D. RAC Date 10-12-91

Calibration Method DGM/DGM Bell Prove By DGR

Calibration Meter I.D. 651729

Barometric Pressure 29.85

Vac in. H2O	DH in. H2O	Time min.	Calibrating Meter Vi cf	Calibrating Meter Vf cf	Calibrating Meter Temp F	Field Meter Vi cf	Field Meter Vf cf	Field Meter Temp F initial	Field Meter Temp F final	Y	Q	K	DH@
7	1.8	15	881.886	892.072	64	200.093	210.444	67 67	90 74	.999	.684	.653	2.16
7	1.8	15	892.072	902.473	66	210.444	221.156	90 74	105 83	1.01	.707	.669	2.06
7	1.8	15	902.473	912.835	68	221.156	231.994	105 83	112 92	1.01	.713	.670	2.05
										1.00			2.09

$$Y = [(Vcal)(Pbar)(Tdgm)]/[(Vdgm)(Pm)(Tcal)]$$

Where:

Y = Meter Correction Factor

Vcal = Volume of gas through calibrating meter, ft.3

Vdgm = Volume of gas through field dry gas meter, ft.3

Pbar = Barometric pressure, in. Hg

Pm = Meter pressure, (Pbar-DH/13.6), in. Hg

Tdgm = Average dry gas meter temp., degrees R

Tcal = Temperature of gas through calibrating meter, degrees R

DRY GAS METER CALIBRATION

Meter I.D.	RAC	Date	10-31-91
Calibration Method	DGM/DGM Bell Prove	By	DGR
Calibration Meter I.D.	651729		
Barometric Pressure	29.73		

Vac in. H2O	DH in. H2O	Time min.	Calibrating Meter Vi cf	Calibrating Meter Vf cf	Calibrating Meter Temp F	Field Meter Vi cf	Field Meter Vf cf	Field Meter Temp F initial		Field Meter Temp F final		Y	Q	K	DH@
6	2	15	968.886	979.99	70	702.034	713.479	80	80	106	85	.998	.754	.674	2.03
6	2	15	979.99	990.989	71	713.479	724.919	105	85	118	93	1.01	.754	.670	2.05
6	2	21.5	990.989	1006.94	70	724.919	741.685	102	90	122	97	1.01	.771	.682	1.98
												1.00			2.02

$$Y = [(Vcal)(Pbar)(Tdgm)]/[(Vdgm)(Pm)(Tcal)]$$

Where:

Y = Meter Correction Factor

Vcal = Volume of gas through calibrating meter, ft.3

Vdgm = Volume of gas through field dry gas meter, ft.3

Pbar = Barometric pressure, in. Hg

Pm = Meter pressure, (Pbar-DH/13.6), in. Hg

Tdgm = Average dry gas meter temp., degrees R

Tcal = Temperature of gas through calibrating meter, degrees R

PITOT TUBE GEOMETRY CALIBRATION

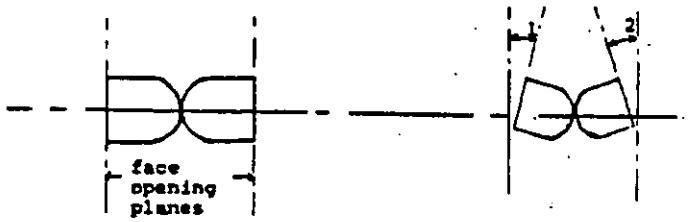
Pitot tube/probe identification: 4" inc. Date Checked: 9-24-91 By: DSR

I. Pitot tubes having the following geometric characteristics are assigned a pitot tube coefficient of 0.84.

1. Face openings perpendicular to transverse axis: ($\alpha 1$ and $\alpha 2 < 10^0$)

$\alpha 1$ = 0

$\alpha 2$ = 0

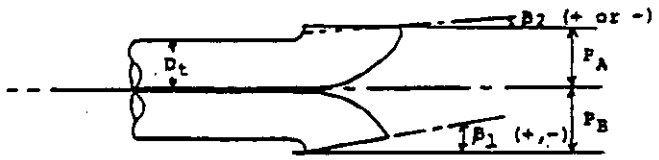


2. Face openings parallel to longitudinal axis: (β_1 and β_2 5^0; P = 1.05 D_t to 1.50 D_t; $P_A = P_B$)

D_t = .375 β_1 = 0

P_A = .45 β_2 = 0

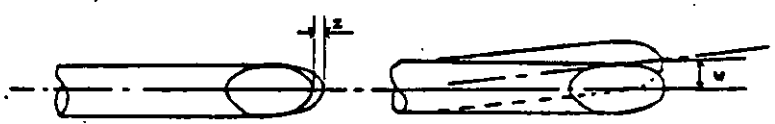
P_B = .45



3. Both legs equal length and centerline coincident ($z < .125$ inch; $w < .031$ inch)

z = 0

w = 0



PITOT/PROBE CLEARANCE CHECK:

Nozzle ID: .197 Nozzle dia: .197" Date: 9-24-91

II. Pitot/probe/nozzle assemblies have the same Cp as the isolated Pitot tube when the following conditions exist.

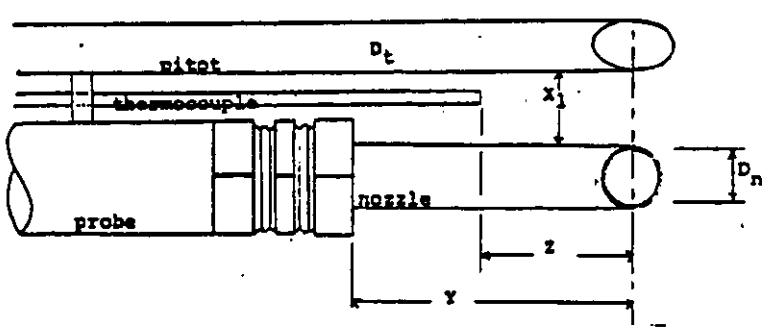
1. $D_t > .188$ & $< .375$ inch D_t = .375"

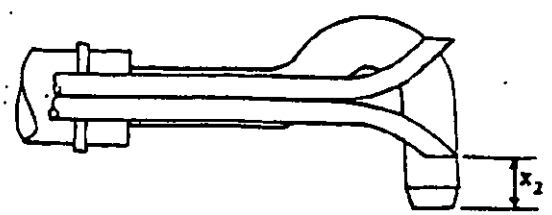
2. $X_1 \geq .75$ inch X_1 = 1.0"

3. $X_2 \geq 0$ inch X_2 = .40"

4. $Y \geq 3.0$ inch Y = 6.3"

5. $z \geq 2.0$ inch z = 2.3"





THERMOMETER/THERMOCOUPLE CALIBRATION

Date: 9-25-91 By: DGR

Reference Thermometer ASTM Hg/glass 20°-760°F

Last Service _____

Field Thermometer	Temp. Source	Reference Temperature	Field Therm. Temperature	% error, absolute
4' T'couple Omega 650	Stack	196	194	1
Meter In Omega 650	Room	85	86	1
Meter Out Omega 650	Room	85	~~85~~	~~—~~
Impinger out Bimetal-dial	Room	85	86	1
Sample Box Bimetal-dial	Box No. 1	243	240	1

E. ANALYLTICAL REPORTS FOR HCHO, PHENOL AND MDI

Northeastern Operations

Raritan Center
160 Fieldcrest Avenue
Edison, NJ 08837
(908) 225-6040
Fax (908) 225-4577

Clayton
ENVIRONMENTAL
CONSULTANTS

October 14, 1991

Mr. Daniel G. Russell
ENVIRONMENTAL MONITORING LABORATORIES, INC.
P.O. Box 655
224-B Highway 51 N
Ridgeland, Mississippi 39157

PARTIAL REPORT
Clayton Project No. 37686.00
Batch No. B100204240
P.O. No. DR0930

Dear Mr. Russell:

The samples which you submitted to us on October 2, 1991, have been analyzed as requested; results are presented in the attached table. Please note, the report dated October 4, 1991, should have been a partial. When completed, results for the other analyte will follow in a final report.

Please note that any unused portion of the samples will be disposed in 30 days unless otherwise requested.

It is a pleasure to provide our services to you. If you have any questions, please call.

Sincerely,

Odette Mina
Supervisor, Laboratory Services

OM:ge

Attachment

Clayton
ENVIRONMENTAL
CONSULTANTS

Analytical Data
for
Environmental Monitoring Laboratories, Inc.
Clayton Project No. 37686.00/B100204240
October 14, 1991

Sample Matrix/Media: Sorbent Tube
Analytical Method: OSHA 32
Date Received: 10/2/91
Date Analyzed: 10/10/91

Lab Number	Sample Description	Phenol* (µg)
158572	#2	<2
158573	#4	<2
158574	#6	<2
158575	#8	<2
158576	#10	<2
158577	#12	<2
Limit of Detection:		2

<: Less than the indicated limit of detection.
*Back sections were checked and showed no breakthrough at >10%.

Northeastern Operations

Raritan Center
160 Fieldcrest Avenue
Edison, NJ 08837
(908) 225-6040
Fax (908) 225-4577

Clayton
ENVIRONMENTAL
CONSULTANTS

October 4, 1991

Mr. Daniel G. Russell
ENVIRONMENTAL MONITORING LABORATORIES, INC.
P.O. Box 655
224-B Highway 51 N
Ridgeland, Mississippi 39157

FINAL REPORT
Clayton Project No. 37686.00
Batch No. B100204240
P.O. No. DR0930

Dear Mr. Russell:

The samples which you submitted to us on October 2, 1991, have been analyzed as requested; results are presented in the attached table.

Please note that any unused portion of the samples will be disposed in 30 days unless otherwise requested.

It is a pleasure to provide our services to you. If you have any questions, please call.

Sincerely,

Odette Mina
Supervisor, Laboratory Services

OM:ge

Attachment

Analytical Data
for
Environmental Monitoring Laboratories, Inc.
Clayton Project No. 37686.00/B100204240
October 4, 1991

Sample Matrix/Media: Treated XAD-2 Tubes
Analytical Method: OSHA 52

Date Received: 10/2/91
Date Analyzed: 10/3/91

Lab Number	Sample Description	Formaldehyde* (mg)
158564	#1	0.002
158565	#3	0.003
158566	#5	0.002
158567	#7	0.002
158568	#9	<0.002
158569	#11	<0.002
158570	Blank	<0.002
158571	Blank	<0.002
Limit of Detection:		0.002

<: Less than the indicated limit of detection.
*Back sections were checked and showed no breakthrough at >10%.

Northeastern Operations

Raritan Center
160 Fieldcrest Avenue
Edison, NJ 08837
(908) 225-6040
Fax (908) 225-4577

Clayton
ENVIRONMENTAL
CONSULTANTS

October 30, 1991

Mr. Daniel G. Russell
ENVIRONMENTAL MONITORING LABORATORIES, INC.
P.O. Box 655
224-B Highway N
Ridgeland, Mississippi 39157

FINAL REPORT
Clayton Project No. 37686.00
Batch No. B100204240
P.O. No. DR0930

Dear Mr. Russell:

The attached results complete the partial reports previously sent for the samples submitted to us on October 2, 1991.

Please note that any unused portion of the samples will be disposed in 30 days unless otherwise requested.

It is a pleasure to provide our services to you. If you have any questions, please call.

Sincerely,

Odette Mina
Supervisor, Laboratory Services

OM:ge

Attachment

Clayton
ENVIRONMENTAL
CONSULTANTS

Analytical Data
for
Environmental Monitoring Laboratories, Inc.
Clayton Project No. 37686.00/B100204240
October 30, 1991

Sample Matrix/Media: Impinger Solution
Analytical Method: NIOSH 5521 (Modified)
Date Received: 10/2/91
Date Analyzed: 10/18/91

Lab Number	Sample Description	Methylene Bisphenyl Isocyanate (µg)
158578	Upwind Run 1	<0.2
158579	Upwind Run 2	<0.2
158580	Upwind Run 3	<0.2
158582	Downwind Run 2	<0.2
158583	Downwind Run 3	<0.2
158584	Reagent Blank	<0.2
Limit of Detection:		0.2

<: Less than the indicated limit of detection.