

Date	24 May 2019
Time	11:52:23
Test Number	70
Mixture Composition	60 CO 40H2
Ambient Temperature	12.5 °C
Ambient Pressure	968.9 mbar
Wind Speed	3.6 m/s
Wind direction	NW
Relative Humidity	74.00%
Mass Flow	9.6750 kg/s
Equivalence Ratio	0.32

**General Comments: (weather, rig configuration)**

Weather: Light wind. Cloudy with sunny spells.

Rig configuration: 4 x 3m circular duct; expansion section and HRSG attached. End Plate attached. Igniter 258mm from beginning of 2nd circular duct section

Engine Speed: 12.6%; 8,100 rpm

Test on 60% H2 40% CO at an intended EQR of 0.35

LOW TEMPERATURE TESTS (NOMINAL 320 oC)

Test gave a fairly weak combustion event which gave a good response on most sensors albeit weak on some of the downstream IPS. Maximum overpressure of 317 mbar was seen on KU1 in the circular duct.

**Ionisation Probes**

**Ionisation Rakes**

**Optical Probes**

Max overpressure  
317 mbar

Max. gas temperature  
999 °C

Max. flame speed  
113 m/s

Max. flame speed  
121 m/s

Max. flame speed  
218 m/s

Initial gas temperature  
276 °C

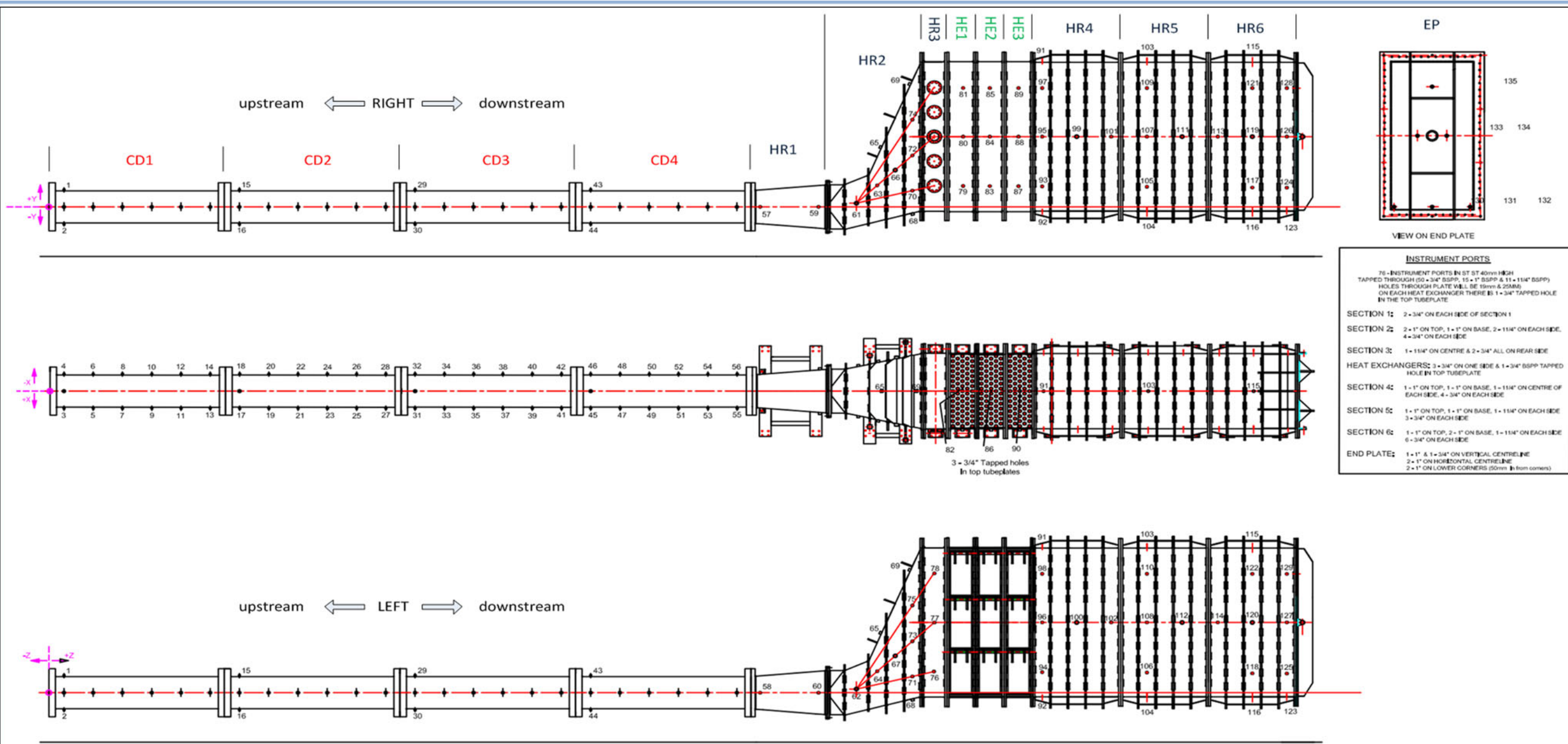
Location of Max. Overpressure  
sensor KU1  
label CD4-R2  
distance 9758 mm

Location of Max. Temperature  
sensor TC6  
label CD4-R3  
distance 10258 mm

Location of Max. Flame Speed  
sensor IP1  
label HR2-L5L  
distance 14745 mm

Location of Max. Flame Speed  
sensor RA4  
label HR4-R3L  
distance 17575 mm

Location of Max. Flame Speed  
sensor OP1  
label CD4-R6  
istance 11758 mm



**INSTRUMENT PORTS**

75 - INSTRUMENT PORTS IN ST 37 40mm H24  
 TAPPED THROUGH 50 x 3/4" BSPP, 15 x 1" BSPP & 11 x 11/4" BSPP  
 HOLES THROUGH PLATE WILL BE 15mm & 25mm  
 ON EACH HEAT EXCHANGER THERE IS 1 x 3/4" TAPPED HOLE  
 IN THE TOP TUBEPLATE

SECTION 1: 2 x 3/4" ON EACH SIDE OF SECTION 1  
 SECTION 2: 2 x 1" ON TOP, 1 x 1" ON BASE, 2 x 11/4" ON EACH SIDE, 4 x 3/4" ON EACH SIDE  
 SECTION 3: 1 x 11/4" ON CENTRE & 2 x 3/4" ALL ON REAR SIDE  
 HEAT EXCHANGERS: 3 x 3/4" ON ONE SIDE & 1 x 3/4" BSPP TAPPED HOLE IN TOP TUBEPLATE  
 SECTION 4: 1 x 1" ON TOP, 1 x 1" ON BASE, 1 x 11/4" ON CENTRE OF EACH SIDE, 4 x 3/4" ON EACH SIDE  
 SECTION 5: 1 x 1" ON TOP, 1 x 1" ON BASE, 1 x 11/4" ON EACH SIDE, 3 x 3/4" ON EACH SIDE  
 SECTION 6: 1 x 1" ON TOP, 2 x 1" ON BASE, 1 x 11/4" ON EACH SIDE, 6 x 3/4" ON EACH SIDE  
 END PLATE: 1 x 1" & 1 x 3/4" ON VERTICAL CENTRELINE  
 2 x 1" ON HORIZONTAL CENTRELINE  
 2 x 1" ON LOWER CORNERS (50mm from corners)

**Naming Convention**

Section Identifier i.e. HE, HR, CD or EP	<b>HR 1 - R 1 U</b>	Vertical position in section (sides only) i.e. U, M or L. Absence of letter denotes centreline
Section Number (1-6) Numbered from downstream to upstream	Side i.e. R, L, T or B	Longitudinal position in section (numbered from 1)

**Key**

<b>CD</b> Circular duct	<b>U</b> Upper
<b>HR</b> HRSG	<b>M</b> Middle
<b>HE</b> Heat Exchanger	<b>L</b> Lower
<b>EP</b> End Plate	<b>R</b> Right Side (when viewed downstream from engine)
	<b>L</b> Left Side
	<b>T</b> Top
	<b>B</b> Bottom

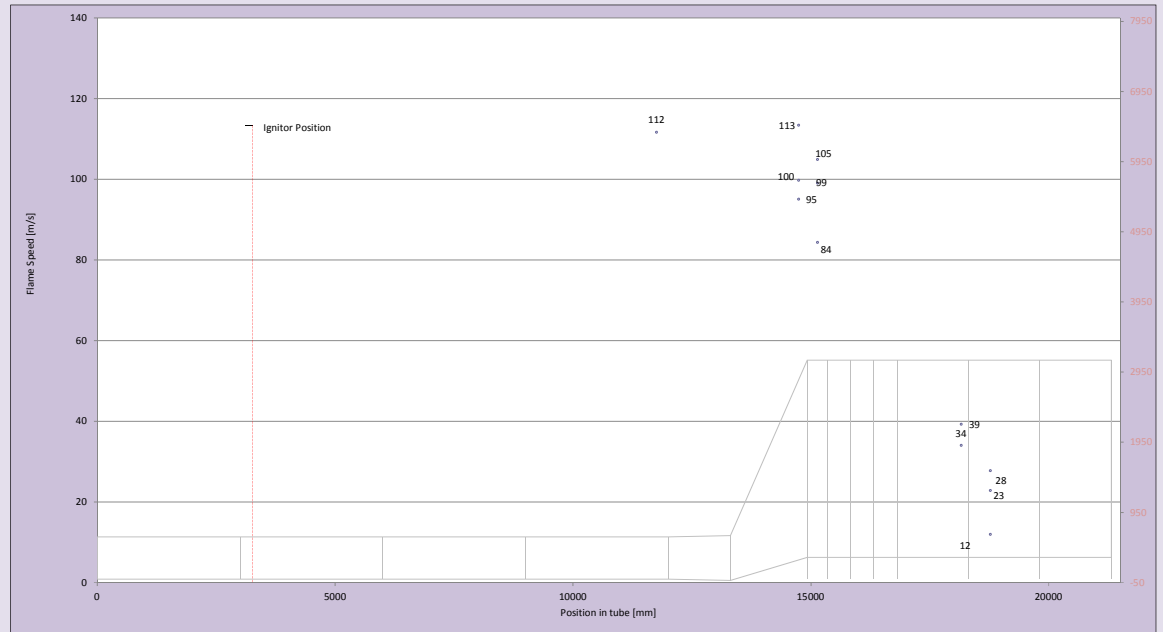
There are 13 sections on the rig

- 4 circular duct sections (CD1 to CD4)
- 6 HRSG sections (HR1 to HR6)
- 3 heat exchanger sections (HE1 to HE3) located between HR3 and HR4

Location of igniter  mm Time of ignition  seconds

IP Number	Location label	Data Name	Position in tube (mm)	Flame arrival time (s)	Avg Flame speed from last sensor (m/s)
IP0	CD4-L6	Ionisation probe 0	11758	16.77648	112
IP1	HR2-L5L	Ionisation probe 1	14745	16.80166	113
IP2	HR2-L5M	Ionisation probe 2	14745	16.81557	100
IP3	HR2-L5U	Ionisation probe 3	14745	16.82122	95
IP4	HR3-R1L	Ionisation probe 4	15140		
IP5	HR3-R1LM	Ionisation probe 5	15140	16.81368	105
IP6	HR3-R1M	Ionisation probe 6	15140	16.82040	99
IP7	HR3-R1U	Ionisation probe 7	15140	16.84128	84
IP8	HR3-L1U	Ionisation probe 8	15140	16.82509	
IP9	HE2-R1M	Ionisation probe 9	16090	16.81808	
IP10	HR4-L1L	Ionisation probe 10	16985	16.82767	
IP11	HR4-L1M	Ionisation probe 11	16985	16.83498	
IP12	HR4-L1U	Ionisation probe 12	16985	16.85239	
IP13	HR4-R1U	Ionisation probe 13	16985		
IP14	HR4-R3U	Ionisation probe 14	17575		
IP15	HR4-L5L	Ionisation probe 15	18165	16.85778	39
IP16	HR4-L5M	Ionisation probe 16	18165	NW	
IP17	HR4-L5U	Ionisation probe 17	18165	ND	
IP18	HR4-R5M	Ionisation probe 18	18165	16.87907	34
IP19	HR5-L2L	Ionisation probe 19	18775	16.87978	28
IP20	HR5-L2M	Ionisation probe 20	18775	16.91352	23
IP21	HR5-L2U	Ionisation probe 21	18775	17.00244	12
IP22	HR5-R2U	Ionisation probe 22	18775	17.02719	
IP23	HR6-L1M	Ionisation probe 23	19985		

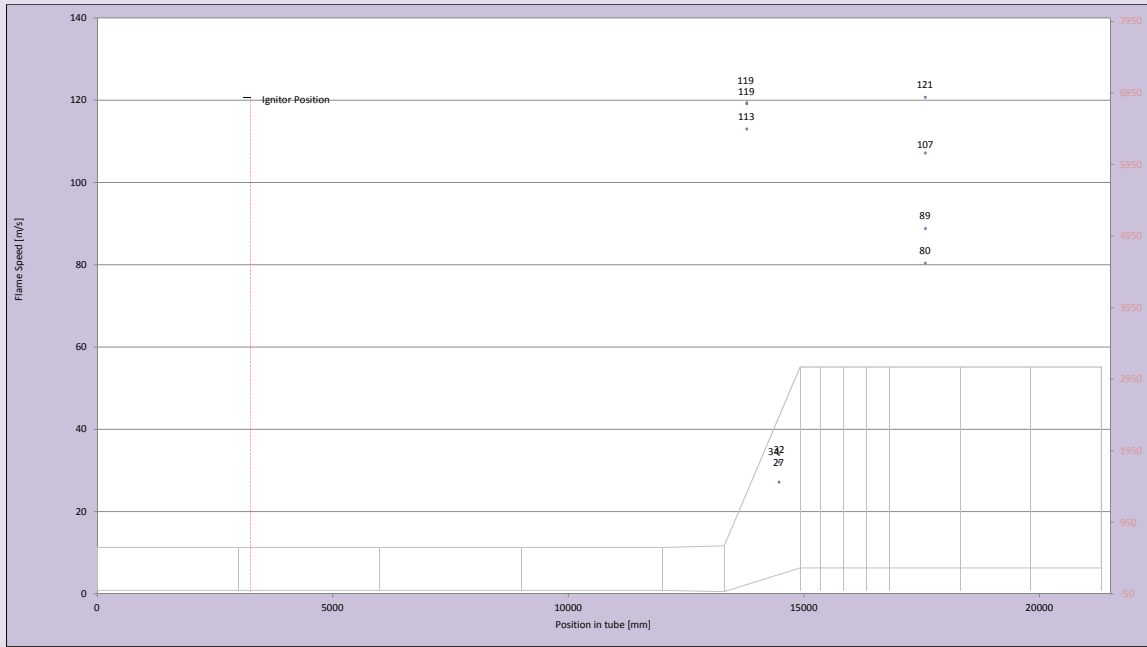
KEY: ND - not detected - sensor working but flame too weak to be picked up  
 NW - not working - sensor not working



Location of igniter 3258 mm Time of ignition 16.70035 seconds

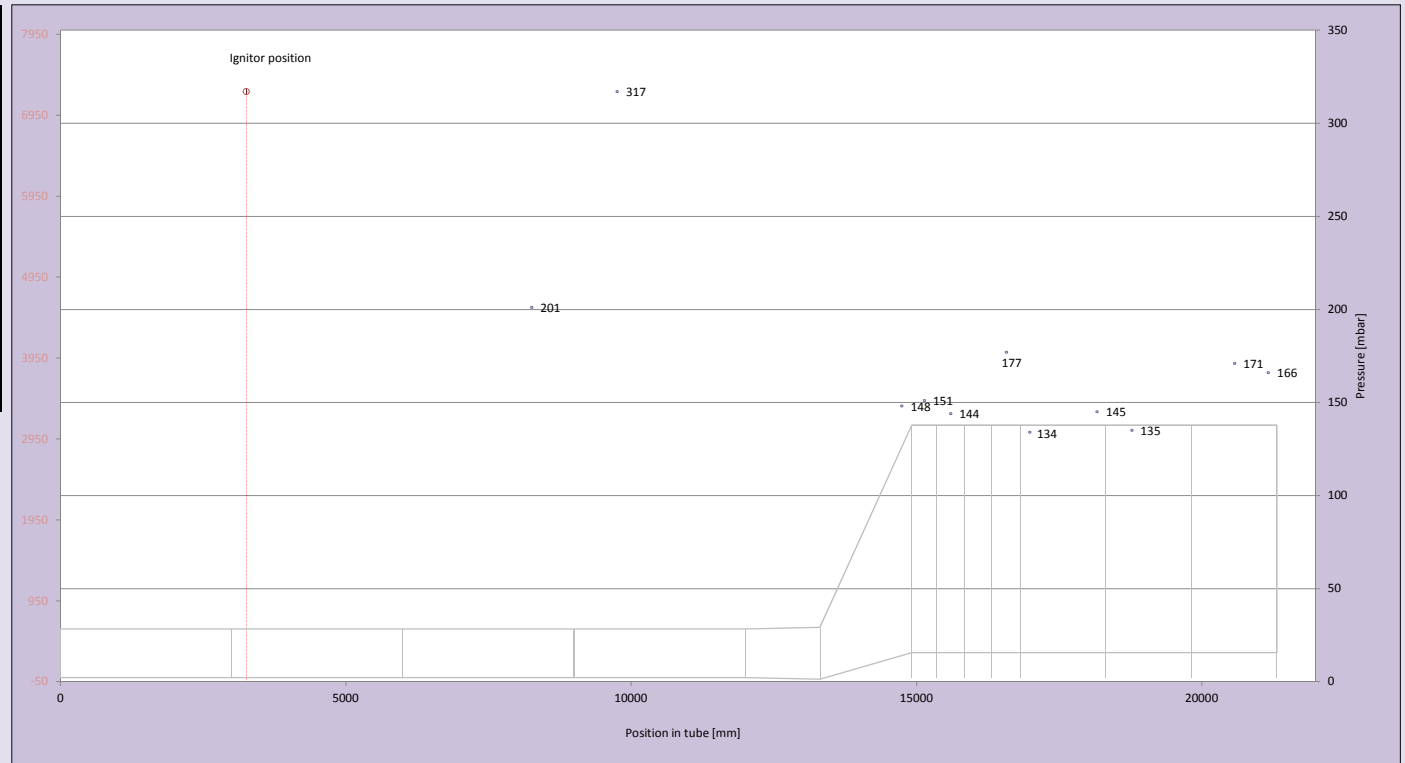
Rake Number	IP Number	Location label	Data Name	Position in tube (mm)	Flame arrival time (s)	Avg Flame speed from last sensor (m/s)
RA1	IP24	HR2-R2M	IP24	13785	16.7887	119
RA1	IP25	HR2-R2M	IP25	13785	16.7885	119
RA1	IP26	HR2-R2M	IP26	13785	16.7935	113
RA2	IP27	HR2-R4M	IP27	14475	16.8102	32
RA2	IP28	HR2-R4M	IP28	14475	16.8139	27
RA2	IP29	HR2-R4M	IP29	14475	16.8139	34
RA3	IP30	HR4-R3M	IP30	17575	16.8488	80
RA3	IP31	HR4-R3M	IP31	17575	16.8428	107
RA3	IP32	HR4-R3M	IP32	17575	16.8488	89
RA4	IP33	HR4-R3L	IP33	17575	16.8359	121
RA4	IP34	HR4-R3L	IP34	17575	NW	
RA4	IP35	HR4-R3L	IP35	17575	NW	

KEY: ND - not detected - sensor working but flame too weak to be picked up  
 NW - not working - sensor not working



Location of igniter 3258 mm

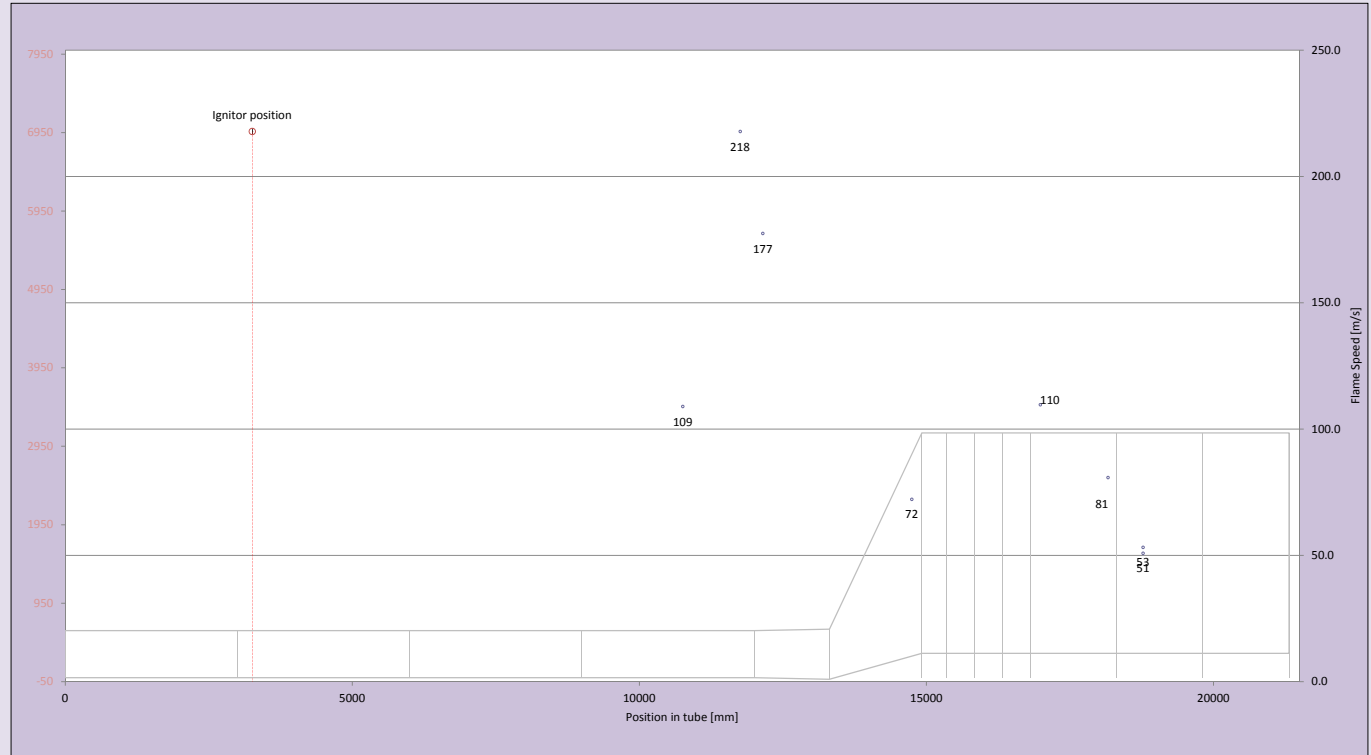
Transducer number	Location	Position in tube [mm]	$\Delta P_{max}$ [mbar]	Time $\Delta P_{max}$ [sec]
KU0	CD3-R5	8258	201	16.8245
KU1	CD4-R2	9758	317	17.0289
KU2	HR2-T5	14745	148	16.8446
KU3	HR3-L1L	15140	151	16.8460
KU4	HE1-R1U	15600	144	16.8427
KU5	HE3-R1L	16580	177	16.8420
KU6	HR4-R1L	16985	134	16.8392
KU7	HR4-R5U	18165	145	16.8371
KU8	HR5-R2L	18775	135	16.8316
KU9	HR6-R3L	20575	171	16.8488
KU10	HR6-LSL	21165	166	16.8297



Location of igniter 3258 mm Time of ignition 16.70035 seconds

OP Number	Location label	Position in tube (mm)	Flame arrival time (s)	Average flame speed (m/s)
OP0	CD4-L4	10758	16.7692	109.0
OP1	CD4-R6	11758	16.7738	217.9
OP2	HR1-R1	12152	16.7760	177.5
OP3	HR2-R5M	14745	16.8119	72.2
OP4	HE1-T1	15600	16.8737	
OP5	HE2-T1	16090	16.8457	
OP6	HE3-T1	16580	16.8659	
OP7	HR4-T1	16985	16.8489	
OP8	HR4-R1M	16985	16.8323	109.6
OP9	HR4-R5L	18165	16.8542	80.8
OP10	HR5-T2	18775	16.8876	53.2
OP11	HR5-R2M	18775	16.8912	50.8

KEY: ND - not detected - sensor working but flame too weak to be picked up  
 NW - not working - sensor not working

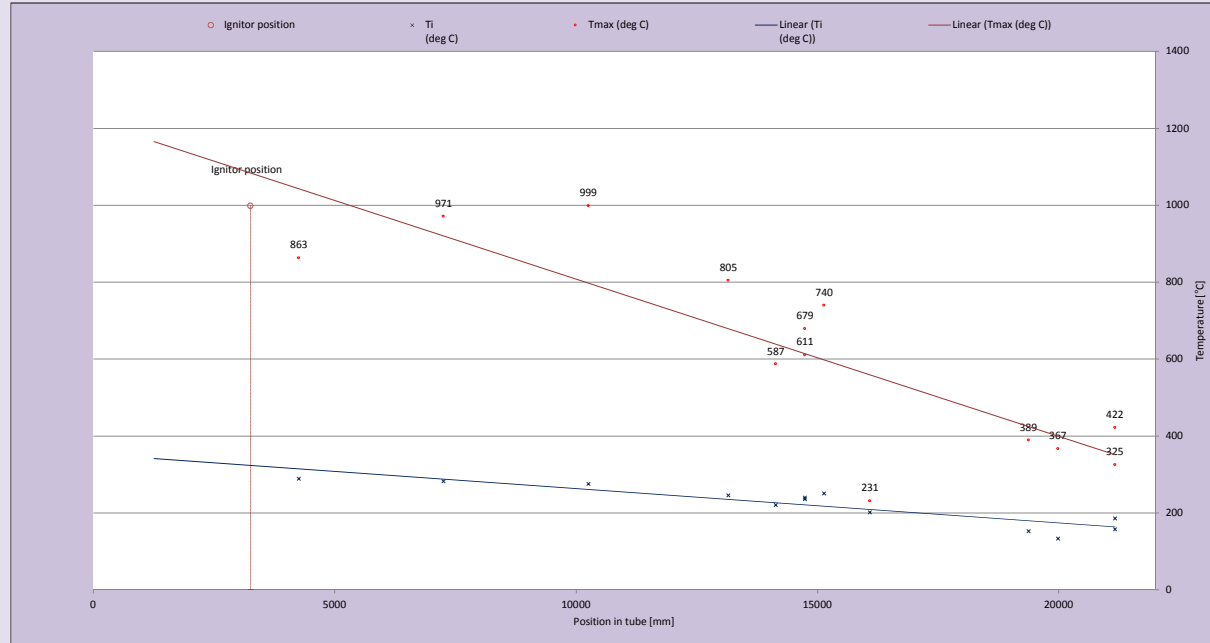


Location of igniter  mm      Time of ignition  seconds

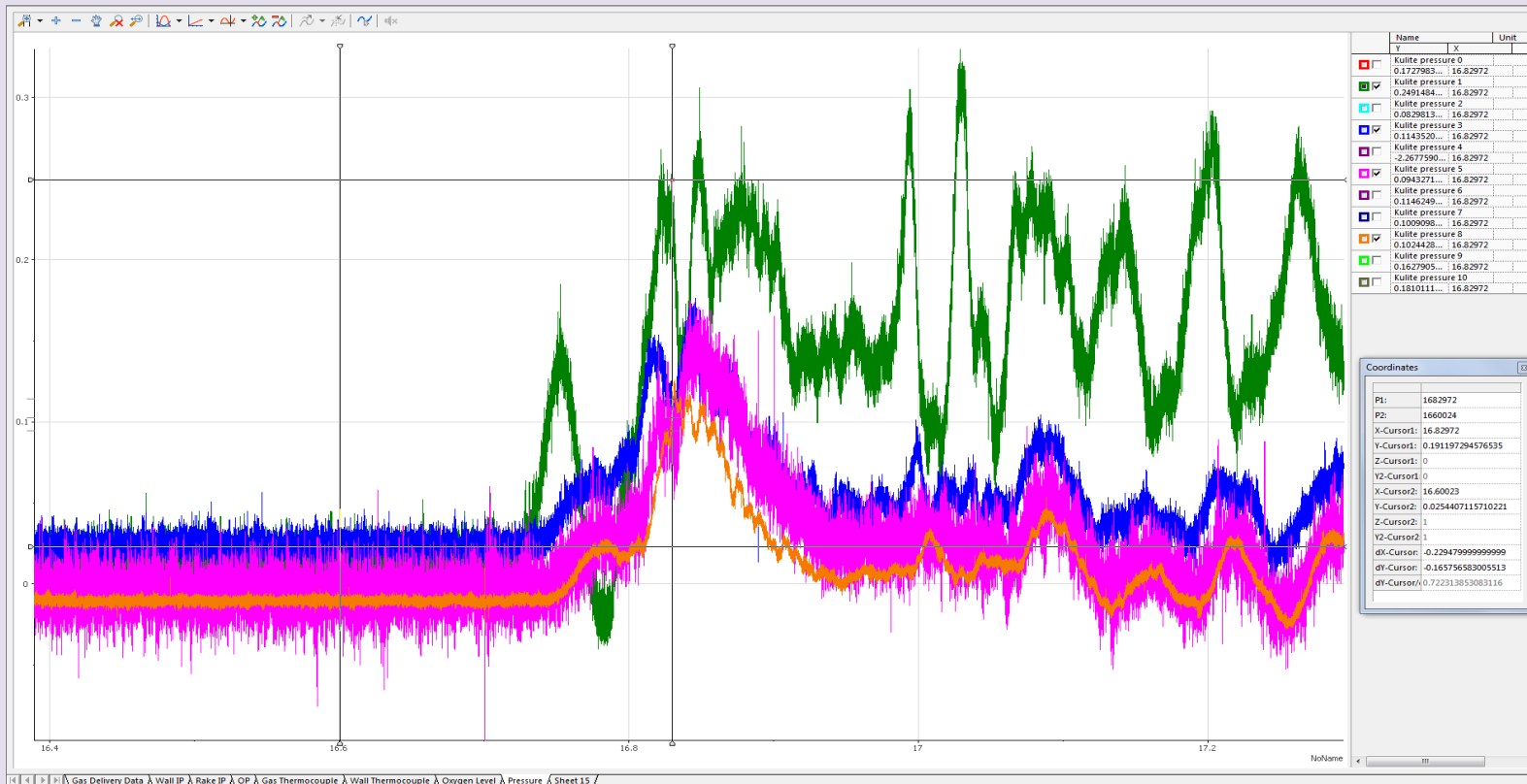
Thermocouple number	Location	Position in tube (mm)	T <sub>max</sub> (deg C)	T <sub>i</sub> (deg C)
TC0	CD1-R3	1258		
TC2	CD2-R3	4258	863	289
TC4	CD3-R3	7258	971	283
TC6	CD4-R3	10258	999	276
TC8	HR1-R2	13160	805	246
TC12	CD3-T1	6258	416	287
TC13	CD3-L1	6258	411	285
TC14	CD3-B1	6258		
TC15	CD3-R1	6258	437	295
TC16	HR2-R3M	14140	587	221
TC17	HR2-R5L	14745	679	240
TC18	HR2-R5U	14745	611	236
TC19	HR3-L1M	15140	740	251
TC20	HE2-R1L	16090		
TC21	HE2-R1U	16090	231	202
TC22	HR5-R4M	19375	389	153
TC23	HR6-R1M	19985	367	134
TC24	HR6-R5L	21165	325	158
TC25	HR6-R5U	21165	422	186

surface thermocouples [not plotted]

TC1	CD1-T2	1508	193	189
TC3	CD2-T2	4508	166	161
TC5	CD3-T2	7508	165	161
TC7	CD4-T2	10508	148	145

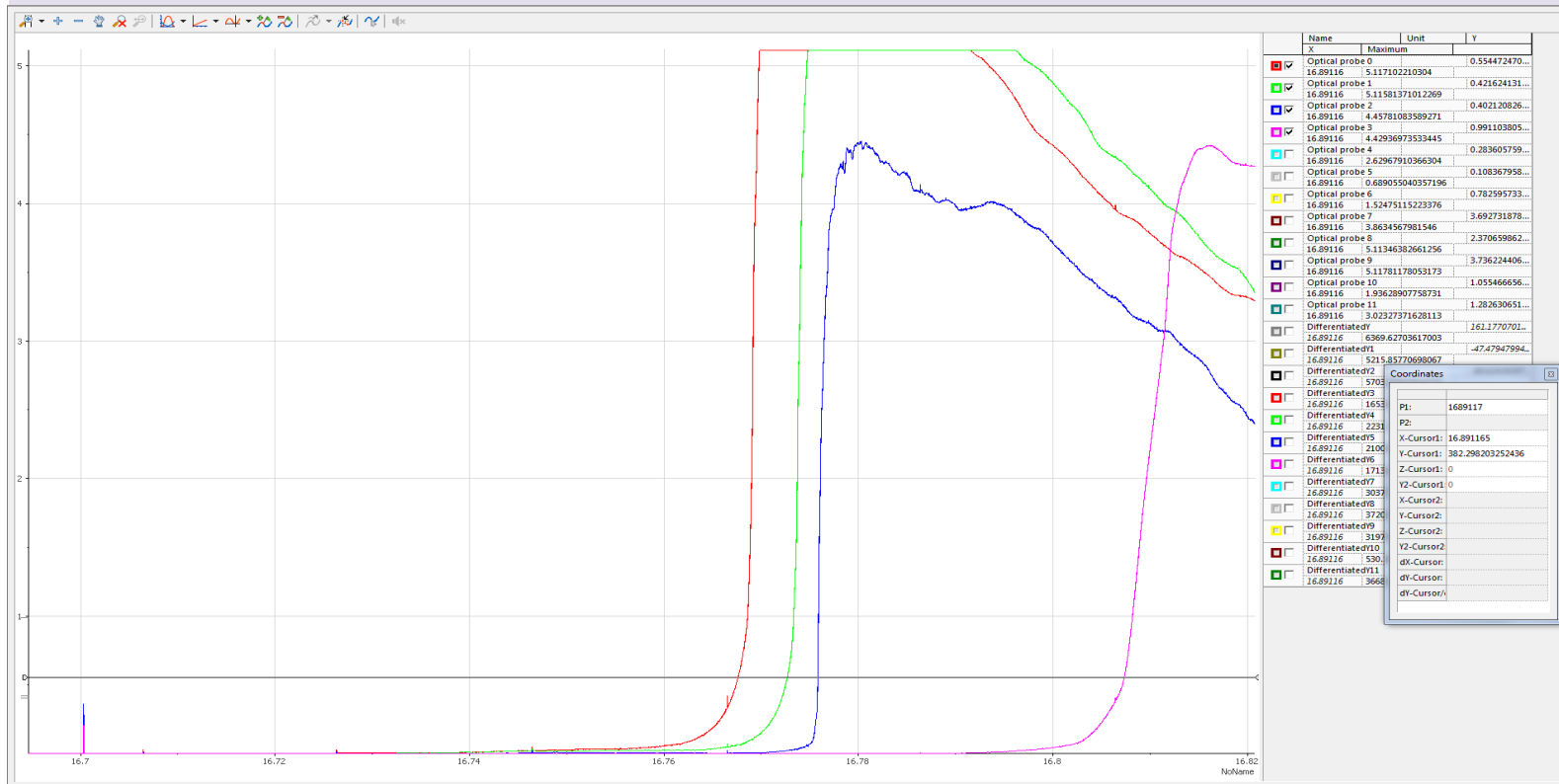


# Pressure





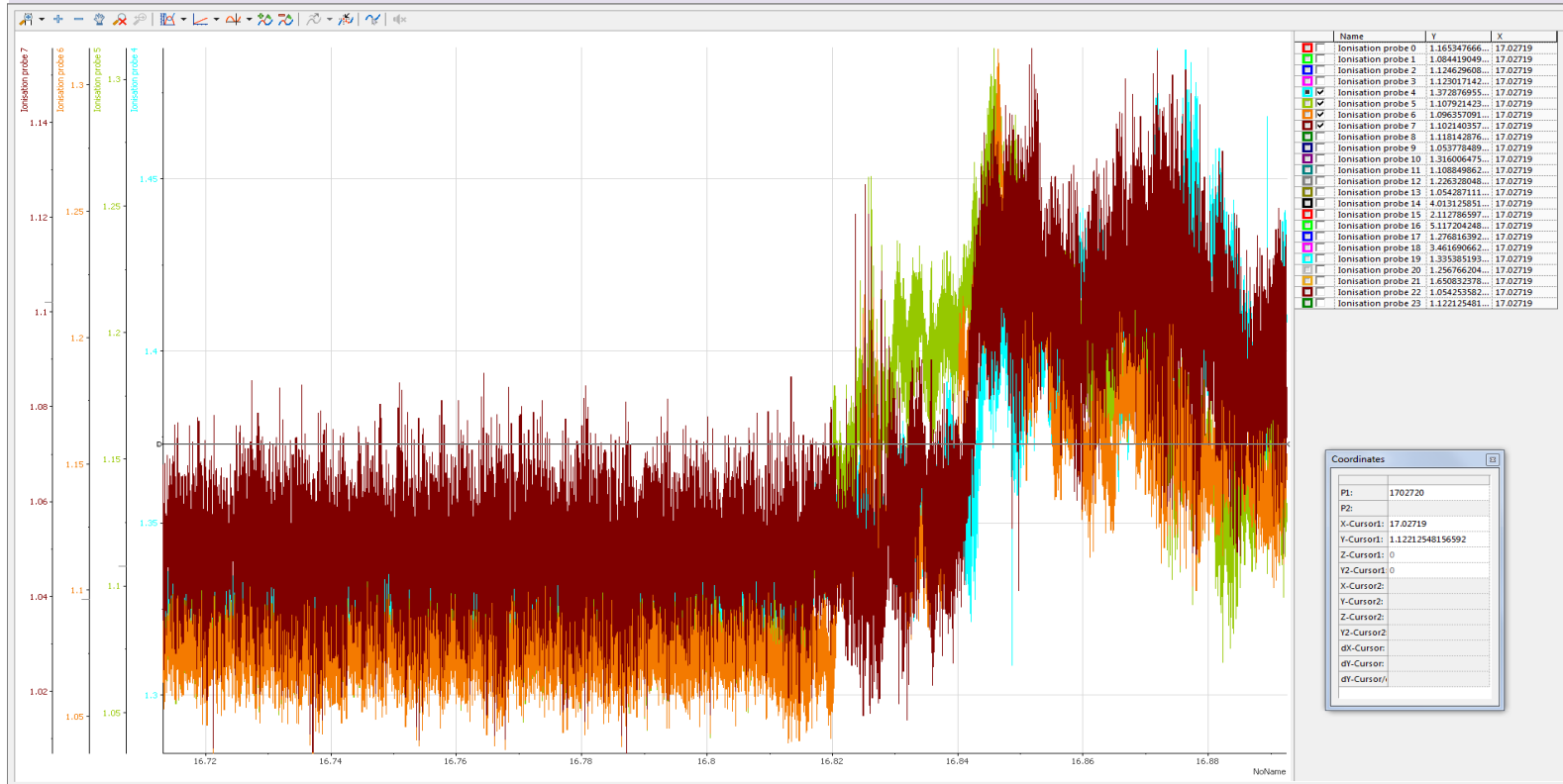
# Optical Probes



Name	Unit	Y
Optical probe 0	Maximum	0.554472470...
16.89116	5.117102210304	
Optical probe 1		0.421624131...
16.89116	5.11581371012269	
Optical probe 2		0.402120826...
16.89116	4.45781083589271	
Optical probe 3		0.991103805...
16.89116	4.42936973533445	
Optical probe 4		0.283605759...
16.89116	2.62967910366304	
Optical probe 5		0.108367958...
16.89116	0.68905040357196	
Optical probe 6		0.782995733...
16.89116	1.52475115223376	
Optical probe 7		3.692731878...
16.89116	3.8634567981546	
Optical probe 8		2.370659862...
16.89116	5.11346382661256	
Optical probe 9		3.736224406...
16.89116	5.11781178053173	
Optical probe 10		1.055466656...
16.89116	1.93628907758731	
Optical probe 11		1.282630651...
16.89116	3.02327371628113	
Differentiatedv		161.1770701...
16.89216	6369.62703617003	
Differentiatedv1		-47.47947994...
16.89216	521.85770698067	
Differentiatedv2		5703
16.89216	1653	
Differentiatedv4		2231
16.89216	2100	
Differentiatedv6		1713
16.89216	3037	
Differentiatedv8		3700
16.89216	3197	
Differentiatedv10		530
16.89216	3668	

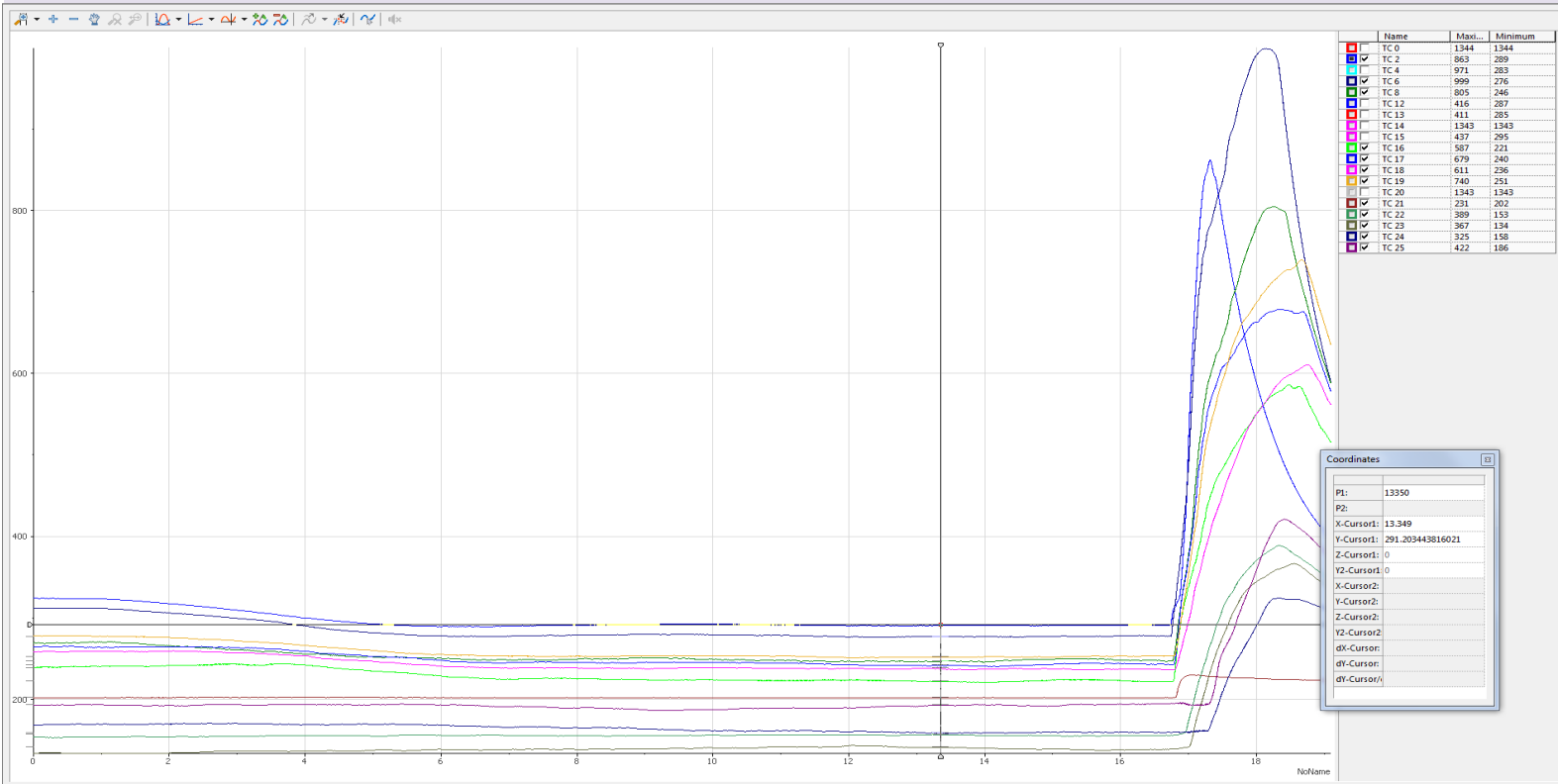
Coordinates	
P1:	1689117
P2:	
V-Cursor1:	16.891165
V-Cursor1:	382.298203252436
Z-Cursor1:	0
V2-Cursor1:	0
V-Cursor2:	
V-Cursor2:	
Z-Cursor2:	
V2-Cursor2:	
dx-Cursor:	
dy-Cursor:	
dy-Cursorv:	

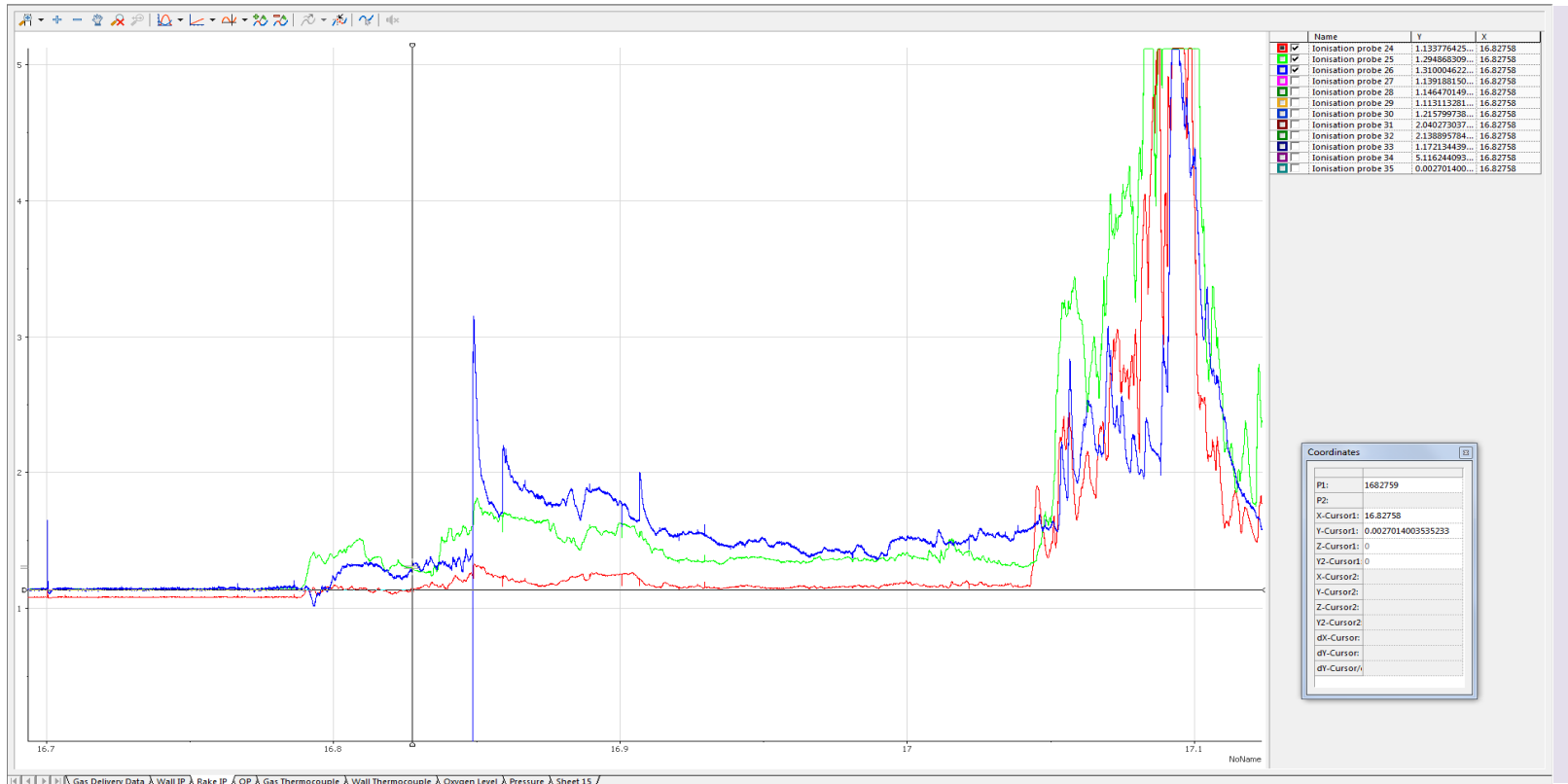
# Ionisation Probes



Coordinates	
P1:	1702720
P2:	
X-Cursor1:	17.02719
Y-Cursor1:	1.12212548156592
Z-Cursor1:	0
Y2-Cursor1:	0
X-Cursor2:	
Y-Cursor2:	
Z-Cursor2:	
Y2-Cursor2:	
dX-Cursor:	
dY-Cursor:	
dY-Cursor/:	

# Temperature





Sensor	OLD DESIGNATION	NEW DESIGNATION	Section	Section Number	Side	Horizontal Location	Vertical Location	PORT REF	SIZE	"X"	"Y"	"Z"
-		CD1-T1	CD	1	T	1		1	1" BSPP	0	298	258
TC1	TS1-1	CD1-T2	CD	1	T	2		NA	SURFACE	0	298	1508
-		CD1-B1	CD	1	B	1		2	1" BSPP	0	-298	258
-	NS1-1	CD1-R1	CD	1	R	1		3	3/4" BSPP	298	0	258
-	FS1-1	CD1-L1	CD	1	L	1		4	3/4" BSPP	-298	0	258
-	NS1-2	CD1-R2	CD	1	R	2		5	3/4" BSPP	298	0	758
-	FS1-2	CD1-L2	CD	1	L	2		6	3/4" BSPP	-298	0	758
TC0	NS1-3	CD1-R3	CD	1	R	3		7	3/4" BSPP	298	0	1258
-	FS1-3	CD1-L3	CD	1	L	3		8	3/4" BSPP	-298	0	1258
-	NS1-4	CD1-R4	CD	1	R	4		9	3/4" BSPP	298	0	1758
-	FS1-4	CD1-L4	CD	1	L	4		10	3/4" BSPP	-298	0	1758
-	NS1-5	CD1-R5	CD	1	R	5		11	3/4" BSPP	298	0	2258
-	FS1-5	CD1-L5	CD	1	L	5		12	3/4" BSPP	-298	0	2258
-	NS1-6	CD1-R6	CD	1	R	6		13	3/4" BSPP	298	0	2758
-	FS1-6	CD1-L6	CD	1	L	6		14	3/4" BSPP	-298	0	2758
IGN		CD2-T1	CD	2	T	1		15	1" BSPP	0	298	3258
TC3	TS2-1	CD2-T2	CD	2	T	2		NA	SURFACE	0	298	4508
-		CD2-B1	CD	2	B	1		16	1" BSPP	0	-298	2358
-	NS2-1	CD2-R1	CD	2	R	1		17	3/4" BSPP	298	0	3258
-	FS2-1	CD2-L1	CD	2	L	1		18	3/4" BSPP	-298	0	3258
-	NS2-2	CD2-R2	CD	2	R	2		19	3/4" BSPP	298	0	3758
-	FS2-2	CD2-L2	CD	2	L	2		20	3/4" BSPP	-298	0	3758
TC2	NS2-3	CD2-R3	CD	2	R	3		21	3/4" BSPP	298	0	4258
-	FS2-3	CD2-L3	CD	2	L	3		22	3/4" BSPP	-298	0	4258
-	NS2-4	CD2-R4	CD	2	R	4		23	3/4" BSPP	298	0	4758
-	FS2-4	CD2-L4	CD	2	L	4		24	3/4" BSPP	-298	0	4758
-	NS2-5	CD2-R5	CD	2	R	5		25	3/4" BSPP	298	0	5258
-	FS2-5	CD2-L5	CD	2	L	5		26	3/4" BSPP	-298	0	5258
-	NS2-6	CD2-R6	CD	2	R	6		27	3/4" BSPP	298	0	5758
-	FS2-6	CD2-L6	CD	3	L	6		28	3/4" BSPP	-298	0	5758
TC12		CD3-T1	CD	3	T	1		29	1" BSPP	0	298	6258
TC5	TS1-1	CD3-T2	CD	3	T	2		NA	SURFACE	0	298	7508
TC14		CD3-B1	CD	3	B	1		30	1" BSPP	0	-298	6258
TC15	NS3-1	CD3-R1	CD	3	R	1		31	3/4" BSPP	298	0	6258
TC13	FS3-1	CD3-L1	CD	3	L	1		32	3/4" BSPP	-298	0	6258
-	NS3-2	CD3-R2	CD	3	R	2		33	3/4" BSPP	298	0	6758
-	FS3-2	CD3-L2	CD	3	L	2		34	3/4" BSPP	-298	0	6758
TC4	NS3-3	CD3-R3	CD	3	R	3		35	3/4" BSPP	298	0	7258
-	FS3-3	CD3-L3	CD	3	L	3		36	3/4" BSPP	-298	0	7258
-	NS3-4	CD3-R4	CD	3	R	4		37	3/4" BSPP	298	0	7758
-	FS3-4	CD3-L4	CD	3	L	4		38	3/4" BSPP	-298	0	7758
KU0	NS3-5	CD3-R5	CD	3	R	5		39	3/4" BSPP	298	0	8258
-	FS3-5	CD3-L5	CD	3	L	5		40	3/4" BSPP	-298	0	8258
-	NS3-6	CD3-R6	CD	3	R	6		41	3/4" BSPP	298	0	8758
-	FS3-6	CD3-L6	CD	3	L	6		42	3/4" BSPP	-298	0	8758
-		CD4-T1	CD	4	T	1		43	1" BSPP	0	298	9258
TC7	TS1-1	CD4-T2	CD	4	T	2		NA	SURFACE	0	298	10508
-		CD4-B1	CD	4	B	1		44	1" BSPP	0	-298	9258
-	NS4-1	CD4-R1	CD	4	R	1		45	3/4" BSPP	298	0	9258
-	FS4-1	CD4-L1	CD	4	L	1		46	3/4" BSPP	-298	0	9258
KU1	NS4-2	CD4-R2	CD	4	R	2		47	3/4" BSPP	298	0	9758
-	FS4-2	CD4-L2	CD	4	L	2		48	3/4" BSPP	-298	0	9758
TC6	NS4-3	CD4-R3	CD	4	R	3		49	3/4" BSPP	298	0	10258
-	FS4-3	CD4-L3	CD	4	L	3		50	3/4" BSPP	-298	0	10258
-	NS4-4	CD4-R4	CD	4	R	4		51	3/4" BSPP	298	0	10758
OP0	FS4-4	CD4-L4	CD	4	L	4		52	3/4" BSPP	-298	0	10758
-	NS4-5	CD4-R5	CD	4	R	5		53	3/4" BSPP	298	0	11258
-	FS4-5	CD4-L5	CD	4	L	5		54	3/4" BSPP	-298	0	11258
OP1	NS4-6	CD4-R6	CD	4	R	6		55	3/4" BSPP	298	0	11758

Sensor	OLD DESIGNATION	NEW DESIGNATION	Section	Section Number	Side	Horizontal Location	Vertical Location	PORT REF	SIZE	"X"	"Y"	"Z"
IP0	FS4-6	CD4-L6	CD	4	L	6		56	3/4" BSPP	-298	0	11758
OP2		HR1-R1	HR	1	R	1		57	3/4" BSPP	308	0	12152
-		HR1-L1	HR	1	L	1		58	3/4" BSPP	-308	0	12152
TC8		HR1-R2	HR	1	R	2		59	3/4" BSPP	393	0	13160
-		HR1-L2	HR	1	L	2		60	3/4" BSPP	-393	0	13160
RA1		HR2-R2M	HR	2	R	2	M	61	11/4" BSPP	448	70	13785
RA1		HR2-L2M	HR	2	L	2	M	62	11/4" BSPP	-448	70	13785
TC16		HR2-R3M	HR	2	R	3	M	63	3/4" BSPP	528	410	14140
-		HR2-L3M	HR	2	L	3	M	64	3/4" BSPP	-528	410	14140
-		HR2-T3	HR	2	T	3		65	1" BSPP	0	1122	14215
RA2		HR2-R4M	HR	2	R	4	M	66	11/4" BSPP	598	700	14475
RA2		HR2-L4M	HR	2	L	4	M	67	11/4" BSPP	-598	700	14475
-		HR2-B5	HR	2	B	5		68	1" BSPP	0	-100	14745
KU2		HR2-T5	HR	2	T	5		69	1" BSPP	0	2315	14745
TC17		HR2-R5L	HR	2	R	5	L	70	3/4" BSPP	662	310	14745
IP1		HR2-L5L	HR	2	L	5	L	71	3/4" BSPP	-662	310	14745
OP3		HR2-R5M	HR	2	R	5	M	72	3/4" BSPP	662	975	14745
IP2		HR2-L5M	HR	2	L	5	M	73	3/4" BSPP	-662	975	14745
TC18		HR2-R5U	HR	2	R	5	U	74	3/4" BSPP	662	1660	14745
IP3		HR2-L5U	HR	2	L	5	U	75	3/4" BSPP	-662	1660	14745
KU3		HR3-L1L	HR	3	L	1	L	76	3/4" BSPP	-700	400	15140
TC19		HR3-L1M	HR	3	L	1	M	77	11/4" BSPP	-700	1335	15140
IP8		HR3-L1U	HR	3	L	1	U	78	3/4" BSPP	-700	2270	15140
IP4		HR3-R1L	HR	3	R	1	L	136	3/4" BSPP	700	400	15140
IP5		HR3-R1LM	HR	3	R	1	LM	137	3/4" BSPP	700	868	15140
IP6		HR3-R1M	HR	3	R	1	M	138	3/4" BSPP	700	1335	15140
-		HR3-R1UM	HR	3	R	1	UM	139	3/4" BSPP	700	1802	15140
IP7		HR3-R1U	HR	3	R	1	U	140	3/4" BSPP	700	2270	15140
-		HE1-R1L	HE	1	R	1	L	79	3/4" BSPP	700	400	15600
-		HE1-R1M	HE	1	R	1	M	80	3/4" BSPP	700	1335	15600
KU4		HE1-R1U	HE	1	R	1	U	81	3/4" BSPP	700	2270	15600
TC20		HE2-R1L	HE	2	R	1	L	83	3/4" BSPP	700	400	16090
IP9		HE2-R1M	HE	2	R	1	M	84	3/4" BSPP	700	1335	16090
TC21		HE2-R1U	HE	2	R	1	U	85	3/4" BSPP	700	2270	16090
KU5		HE3-R1L	HE	3	R	1	L	87	3/4" BSPP	700	400	16580
-		HE3-R1M	HE	3	R	1	M	88	3/4" BSPP	700	1335	16580
-		HE3-R1U	HE	3	R	1	U	89	3/4" BSPP	700	2270	16580
OP4		HE1-T1	HE	1	T	1		82	3/4" BSPP HOLE	-47	2735	15600
OP5		HE2-T1	HE	2	T	1		86	3/4" BSPP HOLE	0	2735	16090
OP6		HE3-T1	HE	3	T	1		90	3/4" BSPP HOLE	-47	2735	16580
OP7		HR4-T1	HR	4	T	1		91	1" BSPP	0	2735	16985
-		HR4-B1	HR	4	B	1		92	1" BSPP	0	-65	16985
KU6		HR4-R1L	HR	4	R	1	L	93	3/4" BSPP	700	400	16985
IP10		HR4-L1L	HR	4	L	1	L	94	3/4" BSPP	-700	400	16985
OP8		HR4-R1M	HR	4	R	1	M	95	3/4" BSPP	700	1335	16985
IP11		HR4-L1M	HR	4	L	1	M	96	3/4" BSPP	-700	1335	16985
IP13		HR4-R1U	HR	4	R	1	U	97	3/4" BSPP	700	2270	16985
IP12		HR4-L1U	HR	4	L	1	U	98	3/4" BSPP	-700	2270	16985
RA3		HR4-R3M	HR	4	R	3	M	99	11/4" BSPP	700	1335	17575
RA3		HR4-L3M	HR	4	L	3	M	100	11/4" BSPP	-700	1335	17575
RA4		HR4-R3L	HR	4	R	3	L	141	11/4" BSPP	700	400	17575
IP14		HR4-R3U	HR	4	R	3	U	142	3/4" BSPP	700	2270	17575
RA4		HR4-L3L	HR	4	L	3	L	143	11/4" BSPP	-700	400	17575
-		HR4-L3U	HR	4	L	3	U	144	3/4" BSPP	-700	2270	17575
IP18		HR4-R5M	HR	4	R	5	M	101	3/4" BSPP	700	1335	18165
IP16		HR4-L5M	HR	4	L	5	M	102	3/4" BSPP	-700	1335	18165
OP9		HR4-R5L	HR	4	R	5	L	145	3/4" BSPP	700	400	18165
KU7		HR4-R5U	HR	4	R	5	U	146	3/4" BSPP	700	2270	18165
IP15		HR4-L5L	HR	4	L	5	L	147	3/4" BSPP	-700	400	18165

Sensor	OLD DESIGNATION	NEW DESIGNATION	Section	Section Number	Side	Horizontal Location	Vertical Location	PORT REF	SIZE	"X"	"Y"	"Z"
IP17		HR4-L5U	HR	4	L	5	U	148	3/4" BSPP	-700	2270	18165
-		HR5-R1M	HR	5	R	1	M	NA	SURFACE	700	1200	18455
OP10		HR5-T2	HR	5	T	2		103	1" BSPP	0	2735	18775
-		HR5-B2	HR	5	B	2		104	1" BSPP	0	-65	18775
KU8		HR5-R2L	HR	5	R	2	L	105	3/4" BSPP	700	400	18775
IP19		HR5-L2L	HR	5	L	2	L	106	3/4" BSPP	-700	400	18775
OP11		HR5-R2M	HR	5	R	2	M	107	3/4" BSPP	700	1335	18775
IP20		HR5-L2M	HR	5	L	2	M	108	3/4" BSPP	-700	1335	18775
IP22		HR5-R2U	HR	5	R	2	U	109	3/4" BSPP	700	2270	18775
IP21		HR5-L2U	HR	5	L	2	U	110	3/4" BSPP	-700	2270	18775
TC22		HR5-R4M	HR	5	R	4	M	111	11/4" BSPP	700	1335	19375
-		HR5-L4M	HR	5	L	4	M	112	11/4" BSPP	-700	1335	19375
TC23		HR6-R1M	HR	6	R	1	M	113	3/4" BSPP	700	1335	19985
IP23		HR6-L1M	HR	6	L	1	M	114	3/4" BSPP	-700	1335	19985
-		HR6-T3	HR	6	T	3		115	1" BSPP	0	2735	20575
-		HR6-B3	HR	6	B	3		116	3/4" BSPP	0	-65	20575
KU9		HR6-R3L	HR	6	R	3	L	117	3/4" BSPP	700	400	20575
-		HR6-L3L	HR	6	L	3	L	118	3/4" BSPP	-700	400	20575
-		HR6-R3M	HR	6	R	3	M	119	11/4" BSPP	700	1335	20575
-		HR6-L3M	HR	6	L	3	M	120	11/4" BSPP	-700	1335	20575
-		HR6-R3U	HR	6	R	3	U	121	3/4" BSPP	700	2270	20575
-		HR6-L3U	HR	6	L	3	U	122	3/4" BSPP	-700	2270	20575
-		HR6-B5	HR	6	B	5		123	1" BSPP	0	-65	21165
TC24		HR6-R5L	HR	6	R	5	L	124	3/4" BSPP	700	400	21165
KU10		HR6-L5L	HR	6	L	5	L	125	3/4" BSPP	-700	400	21165
-		HR6-R5M	HR	6	R	5	M	126	3/4" BSPP	700	1335	21165
-		HR6-L5M	HR	6	L	5	M	127	3/4" BSPP	-700	1335	21165
TC25		HR6-R5U	HR	6	R	5	U	128	3/4" BSPP	700	2270	21165
-		HR6-L5U	HR	6	L	5	U	129	3/4" BSPP	-700	2270	21165
-		EP-1L	EP			1	L	130	1" BSPP	650	-15	21330
-		EP-2L	EP			2	L	131	1" BSPP	0	-15	21330
-		EP-3L	EP			3	L	132	1" BSPP	-650	-15	21330
-		EP-1M	EP			1	M	133	1" BSPP	250	1335	21330
-		EP-2M	EP			2	M	134	1" BSPP	-250	1335	21330
-		EP-1U	EP			1	U	135	3/4" BSPP	0	2270	21330

