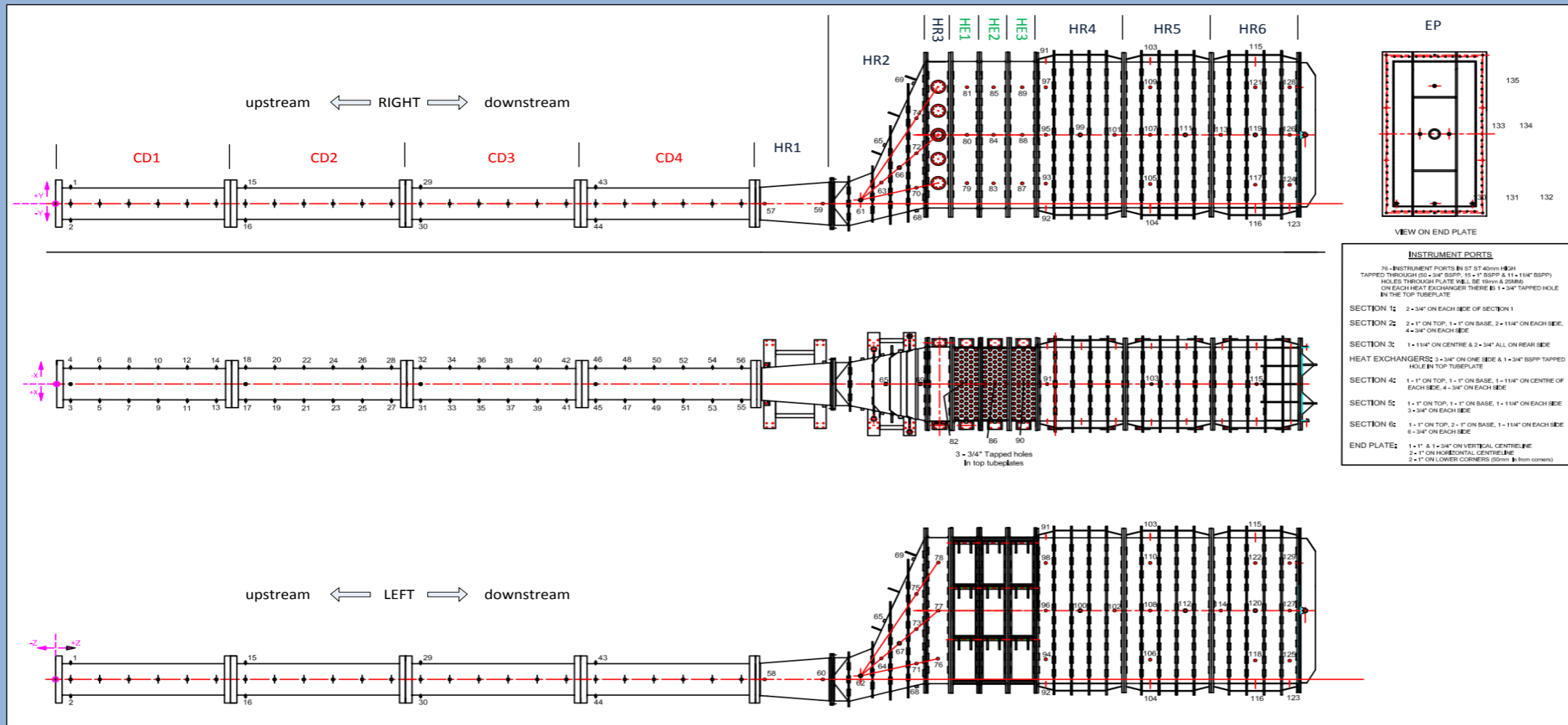


Date	23 May 2016	<b>General Comments: (weather, rig configuration)</b> Weather: Rig configuration: 4 x 3m circular duct; expansion section and HRSG attached. End Plate attached.  Igniter 258mm from beginning of 2nd circular duct section Engine Speed: 40%; 11,800 rpm  2nd test on mixture containing carbon monoxide (60% CO and 40% H2) at an EQR of 0.55 The test gave a moderate combustion event and most sensors (except IP rakes) provided an identifiable response albeit with a significant noise component.  The optical sensors and ionisation probes provide a reasonably consistent picture with flame speeds in the vicinity of 200 m/s ahead of the HE. As in previous test the picture downstream of the HE is more complex with several downstream IP sensor showing flame arrival times ahead of some farther upstream: this may represent actual flame behaviour.  The rake IP data was poor and gave limited information on flame speeds.  Maximum overpressure of 822 mbar was seen in the circular duct, ahead of the heat exchanger.
Time	16:58:46	
Test Number	15	
Mixture Composition	40%H2 60%CO	
Ambient Temperature	15oC	
Ambient Pressure	972 mbar	
Wind Speed	2.5 m/s	
Wind direction	NW	
Relative Humidity	75.00%	
Mass Flow	<input type="text"/> kg/s	
Equivalence Ratio	0.55	

		Ionisation Probes		Ionisation Rakes		Optical Probes	
Max overpressure		Max. temperature		Max. flame speed		Max. flame speed	
<input type="text"/> 822 mbar		<input type="text"/> 997 °C		<input type="text"/> 694 m/s		<input type="text"/> 164 m/s	
		Initial Temperature					
		<input type="text"/> 444 °C					
Location of Max. Overpressure		Location of Max. Temperature		Location of Max. Flame Speed		Location of Max. Flame Speed	
sensor	<input type="text"/> KU6	sensor	<input type="text"/> TC7	sensor	<input type="text"/> IP20	sensor	<input type="text"/> RA1
label	<input type="text"/> CD3-R5	label	<input type="text"/> CD3-R2	label	<input type="text"/> HR6-LSU	label	<input type="text"/> HR2-R2M
distance	<input type="text"/> 8258 mm	distance	<input type="text"/> 6758 mm	distance	<input type="text"/> 21165 mm	distance	<input type="text"/> 13785 mm
						ance	<input type="text"/> OP6
							<input type="text"/> HR4-T1
							<input type="text"/> 16985 mm



**VIEW ON END PLATE**

**INSTRUMENT PORTS**  
 76 - INSTRUMENT PORTS IN 5T 40mm HIGH TAPPED THROUGH (50 - 3/4" BSPP, 15 - 1" BSPP & 11 - 1/4" BSPP) HOLES THROUGH PLATE WILL BE (5mm & 25mm) ON EACH HEAT EXCHANGER THERE IS 1 - 3/4" TAPPED HOLE IN THE TOP TUBEPLATE

**SECTION 1:** 2 - 3/4" ON EACH SIDE OF SECTION 1  
**SECTION 2:** 2 - 1" ON TOP, 1 - 1" ON BASE, 2 - 1/4" ON EACH SIDE, 4 - 3/4" ON EACH SIDE  
**SECTION 3:** 1 - 1/4" ON CENTRE & 2 - 3/4" ALL ON REAR SIDE  
**HEAT EXCHANGERS:** 3 - 3/4" ON ONE SIDE & 1 - 3/4" BSPP TAPPED HOLE IN TOP TUBEPLATE  
**SECTION 4:** 1 - 1" ON TOP, 1 - 1" ON BASE, 1 - 1/4" ON CENTRE OF EACH SIDE, 4 - 3/4" ON EACH SIDE  
**SECTION 5:** 1 - 1" ON TOP, 1 - 1" ON BASE, 1 - 1/4" ON EACH SIDE, 3 - 3/4" ON EACH SIDE  
**SECTION 6:** 1 - 1" ON TOP, 2 - 1" ON BASE, 1 - 1/4" ON EACH SIDE, 6 - 3/4" ON EACH SIDE  
**END PLATE:** 1 - 1" & 1 - 3/4" ON VERTICAL CENTRELINE, 2 - 1" ON HORIZONTAL CENTRELINE, 2 - 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

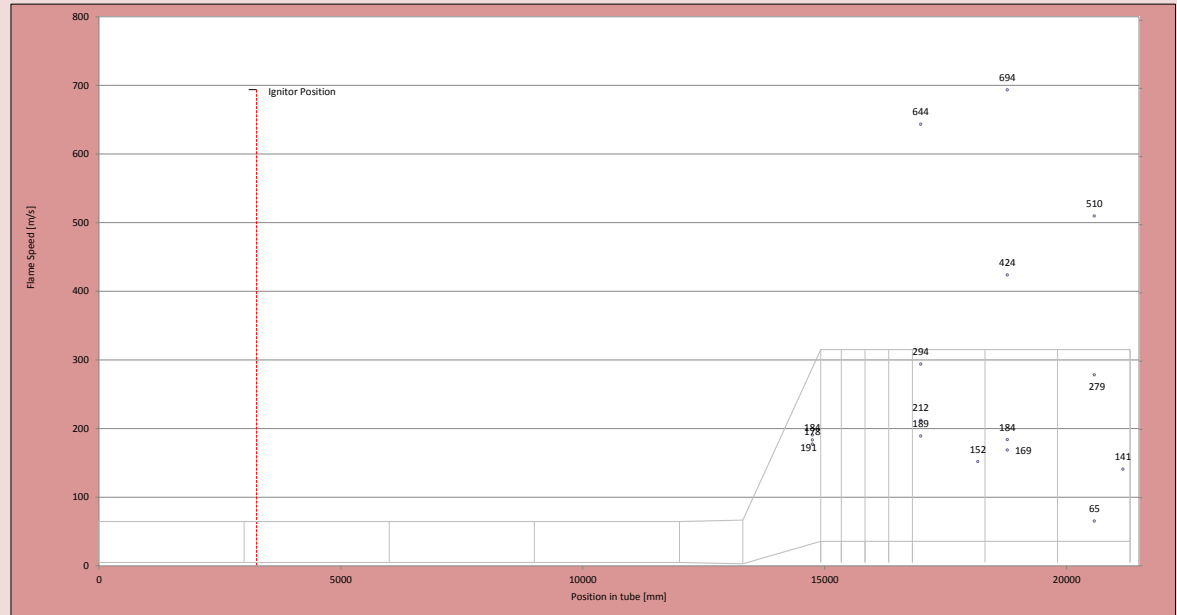
- 4 circular duct sections (CD1 to CD4)
- 6 HRSG sections (HR1 to HR6)
- 3 heat exchanger sections (HE1 to HE3) located between HR3 and HR4

0	3000	6000	9000	12000	13310	14920	15345	15835	16325	16815	18315	19815	21315	21315	19815	16815	16325	15835	15345	14920	13310	12000	9000	6000	3000	0
600	600	600	600	600	620	3120	3120	3120	3120	3120	3120	3120	3120	310	310	310	310	310	310	310	-20	0	0	0	0	0

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)
IP11	HR2-L5U	Flameion_11	14745	15.1304	178
IP8	HR2-L5M	Flameion_8	14745	15.1260	191
IP9	HR2-L5L	Flameion_9	14745	15.1284	184
IP7	HR3-L1U	Flameion_7	15140	15.1308	
IP10	HE2-R1M	Flameion_10	16090	ND	
IP12	HR4-R1U	Flameion_12	16985	15.1305	212
IP13	HR4-L1U	Flameion_13	16985	15.1406	189
IP2	HR4-L1M	Flameion_2	16985	15.1295	644
IP4	HR4-L1L	Flameion_4	16985	15.1360	294
IP14	HR4-R5M	Flameion_14	18165	ND	
IP21	HR4-L5M	Flameion_21	18165	15.1372	152
IP0	HR5-L2M	Flameion_0	18775	15.1408	169
IP1	HR5-L2U	Flameion_1	18775	15.1432	694
IP15	HR5-R2U	Flameion_15	18775	15.1402	184
IP16	HR5-L2L	Flameion_16	18775	15.1402	424
IP3	HR6-L1M	Flameion_3	19985	15.1396	
IP5	HR6-R1M	Flameion_5	19985	15.1335	
IP18	HR6-R3U	Flameion_18	20575	15.1466	279
IP19	HR6-L3L	Flameion_19	20575	15.1437	510
IP22	HR6-L3U	Flameion_22	20575	15.1440	
IP23	HR6-L3M	Flameion_23	20575	15.1486	65
IP17	HR6-R5U	Flameion_17	21165	ND	
IP20	HR6-L5U	Flameion_20	21165	15.1482	141
IP6	HR6-L5M	Flameion_6	21165	15.1425	

Values highlighted in yellow show flame arrival times that are ambiguous and need further investigation

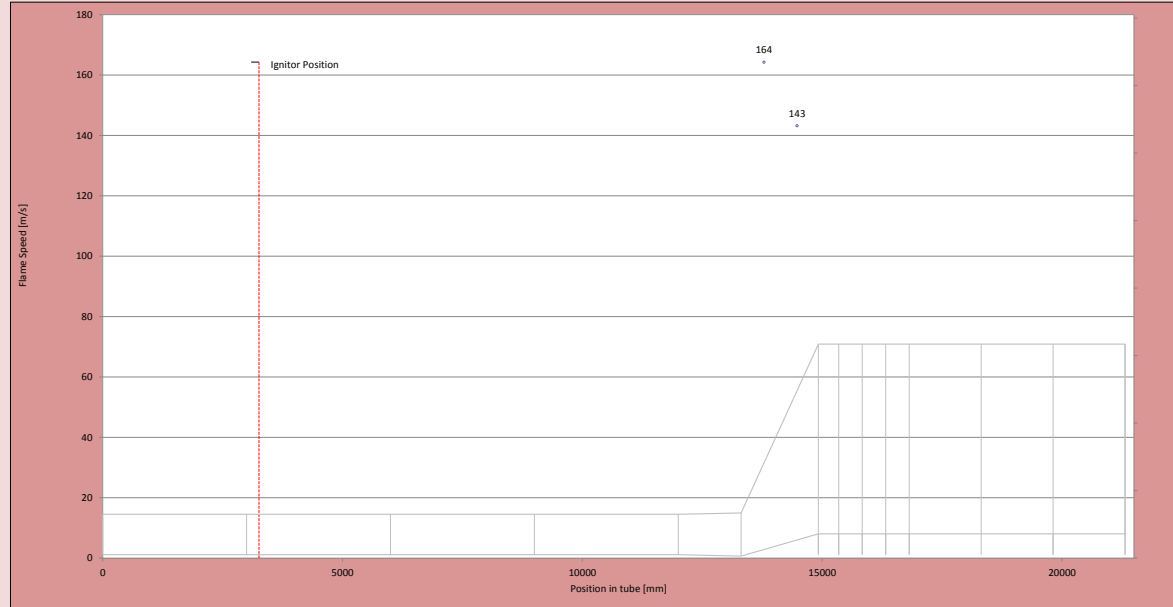


Location of igniter 3258 mm

Time of ignition 15.06581 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	15.1299	164
RA1	IP25	HR2-R2M	IP25	13785		
RA1	IP26	HR2-R2M	IP26	13785		
RA2	IP27	HR2-R4M	IP27	14475	15.1441	143
RA2	IP28	HR2-R4M	IP28	14475		
RA2	IP29	HR2-R4M	IP29	14475		
RA3	IP30	HR4-R3M	IP30	17575		
RA3	IP31	HR4-R3M	IP31	17575		
RA3	IP32	HR4-R3M	IP32	17575		
RA4	IP33	HR5-R4M	IP33	19375		
RA4	IP34	HR5-R4M	IP34	19375		
RA4	IP35	HR5-R4M	IP35	19375		

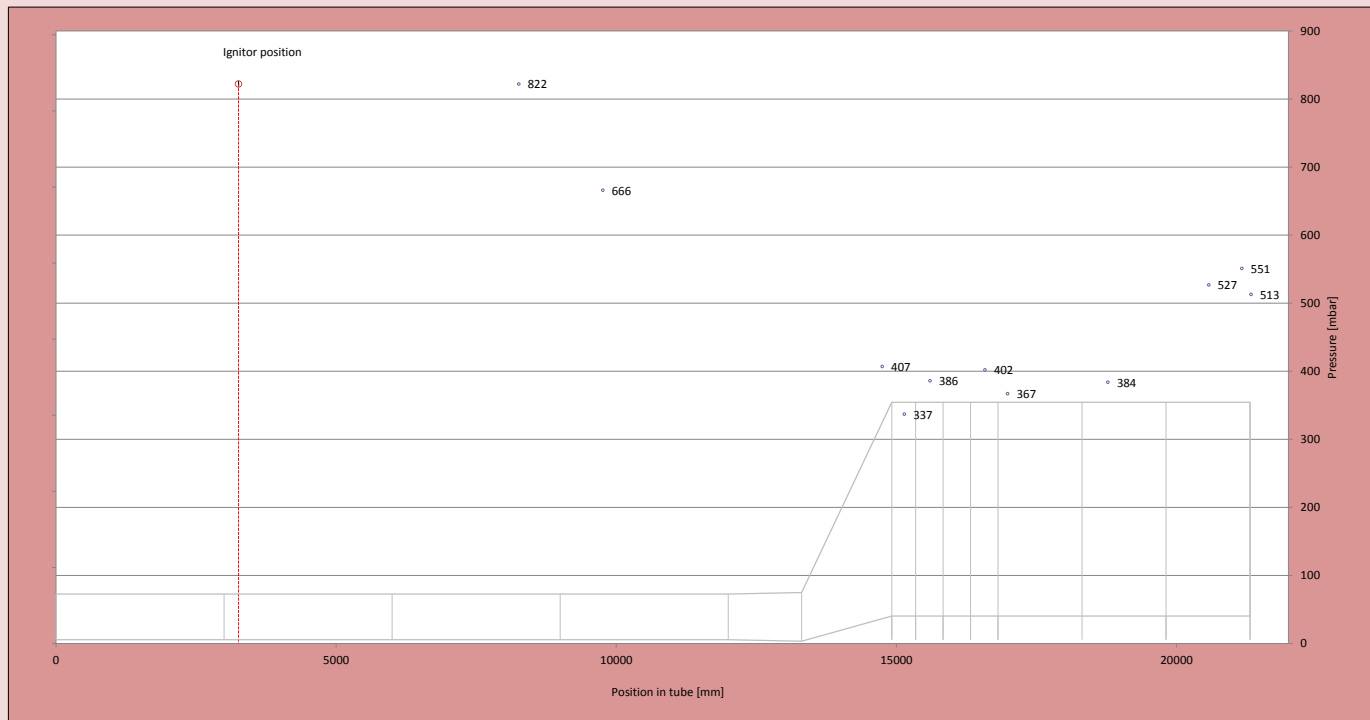
Rake IP responses were poor. Only 2 of the 12 available gave responses which were decipherable. However, the flame speeds are comparable to those given from the wall IPs and the OPs.



Location of igniter  mm

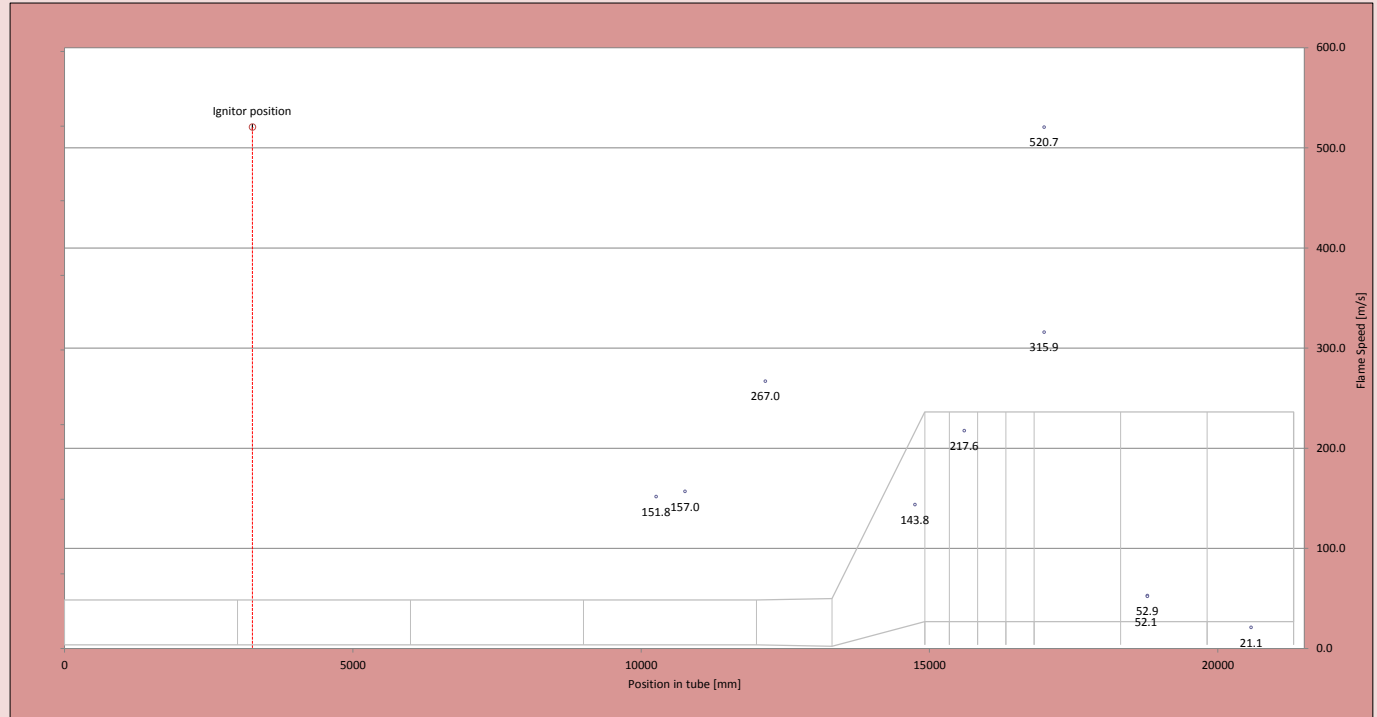
Transducer number	Location	Position in tube [mm]	$\Delta P_{max}$ [mbar]	Time $\Delta P_{max}$ [sec]
KU6	CD3-R5	8258	822	15.1708
KU7	CD4-R2	9758	666	<b>15.5105</b>
KU8	HR2-T5	14745	407	15.1596
KU9	HR3-L1L	15140	337	15.1401
KU0	HE1-R1U	15600	386	15.1399
KU1	HE3-R1L	16580	402	15.1390
KU4	HR4-R1L	16985	367	15.1409
KU3	HR5-R2L	18775	384	15.1527
KU2	HR6-R3L	20575	527	15.1499
KU5	HR6-L5L	21165	551	15.1484
PCB	EP-1M	21330	513	15.1476
KU10	#N/A	#N/A		
KU11	#N/A	#N/A		

peak pressure on KU7 was from reflected wave (see time difference)



Location of igniter  mm      Time of ignitio  seconds

OP Number	Location label	Position in tube (mm)	Flame arrival time (s)	Average flame speed (m/s)
OP11	CD4-L3	10258	15.1119	151.8
OP10	CD4-R4	10758	15.1136	157.0
OP0	HR1-R1	12152	15.1188	267.0
OP2	HR2-R5M	14745	15.1368	143.8
OP3	HE1-T1	15600	15.1408	217.6
OP4	HE3-T1	16580	ND	
OP1	HR4-R1M	16985	15.1439	315.9
OP6	HR4-T1	16985	15.1434	520.7
OP5	HR5-R2M	18775	15.1778	52.9
OP7	HR5-T2	18775	15.1778	52.1
OP8	HR6-T3	20575	ND	
OP9	HR6-R3M	20575	15.2629	21.1
OP12	#N/A	#N/A		
OP13	#N/A	#N/A		
OP14	#N/A	#N/A		
OP15	#N/A	#N/A		

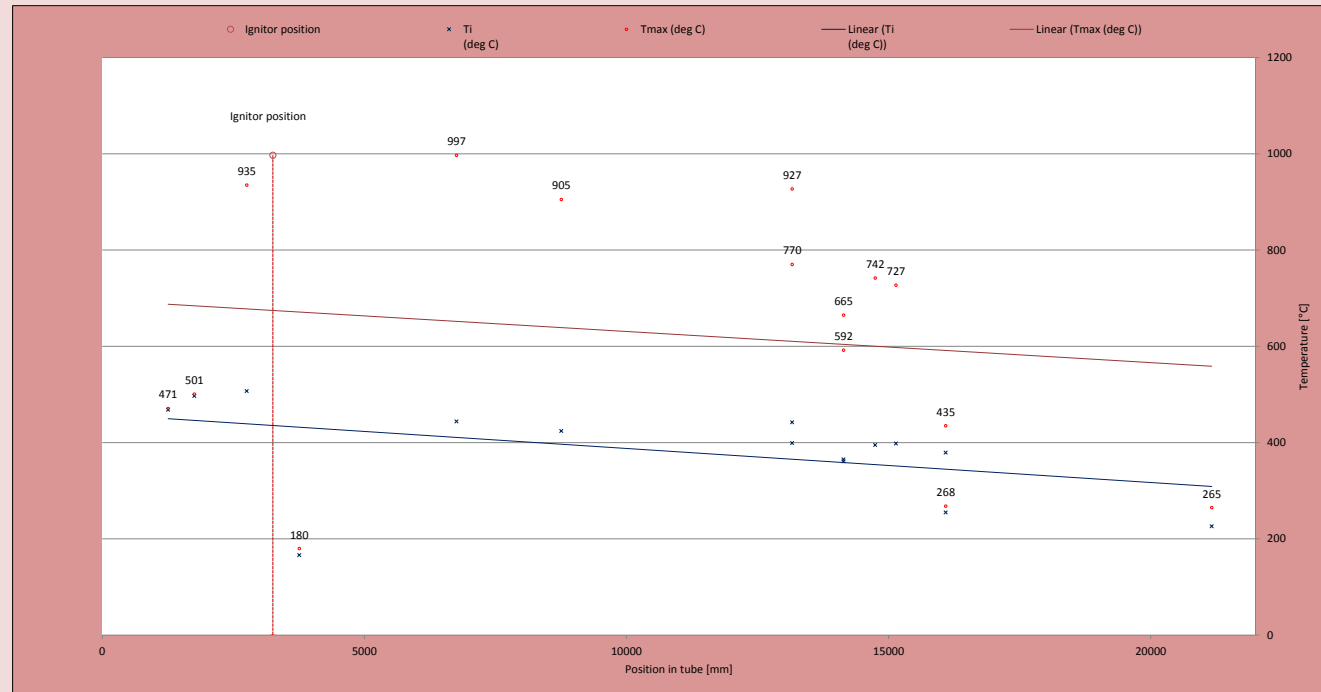


Location of igniter 3258 mm

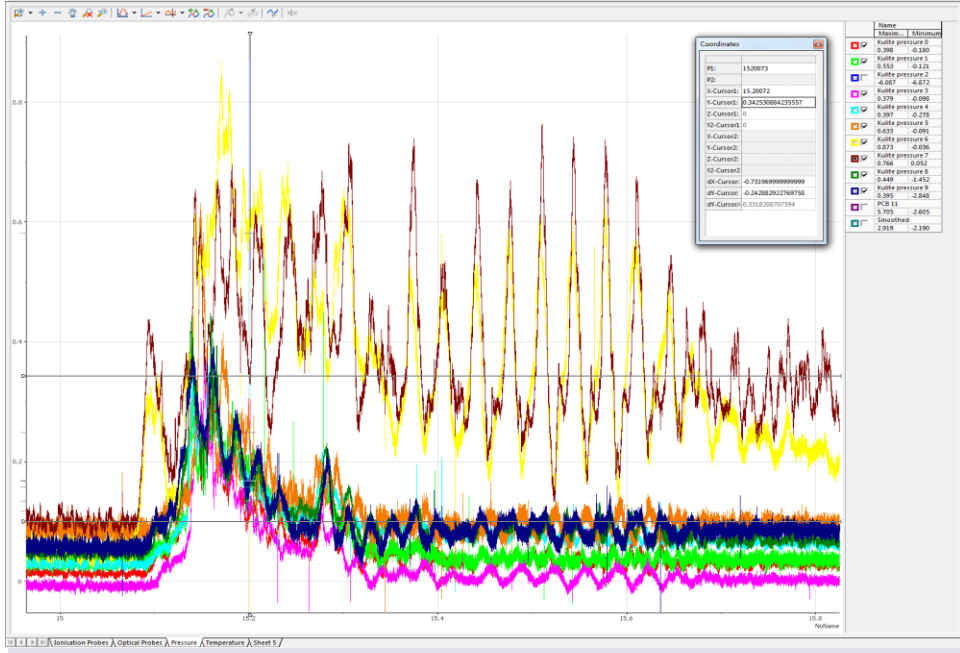
Thermocouple number	Location	Position in tube (mm)	T <sub>max</sub> (deg C)	T <sub>i</sub> (deg C)
TC0	CD1-R3	1258	471	468
TC2	CD1-R4	1758	501	497
TC3	CD1-R5	2258		
TC4	CD1-R6	2758	935	507
TC5	CD2-R2	3758	180	166
TC7	CD3-R2	6758	997	444
TC9	CD3-R6	8758	905	424
TC12	HR1-R2	13160	927	442
TC24	HR1-L2	13160	770	399
TC13	HR2-R3M	14140	665	365
TC25	HR2-L3M	14140	592	361
TC16	HR2-R5L	14745	742	395
TC26	HR3-L1M	15140	727	398
TC17	HE2-R1U	16090	268	255
TC20	HE2-R1L	16090	435	379
TC18	HR6-R5L	21165	265	226
TC11	#N/A	#N/A		
TC14	#N/A	#N/A		
TC15	#N/A	#N/A		
TC19	#N/A	#N/A		
TC22	#N/A	#N/A		
TC23	#N/A	#N/A		
TC27	#N/A	#N/A		
TC28	#N/A	#N/A		
TC29	#N/A	#N/A		
TC30	#N/A	#N/A		
TC31	#N/A	#N/A		

surface thermocouples [not plotted]

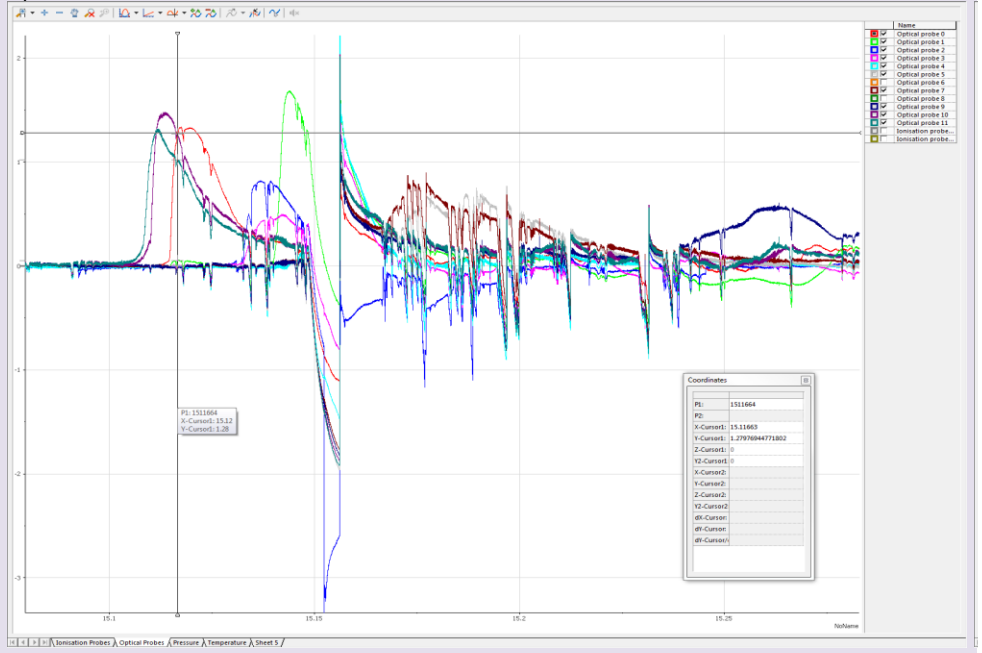
TC1	CD1-T2	1508		
TC6	CD2-T2	4508	140	128
TC8	CD3-T2	7508	154	141
TC10	CD4-T2	10508	93	85
TC21	HR5-R1M	18455	27	25



Pressure

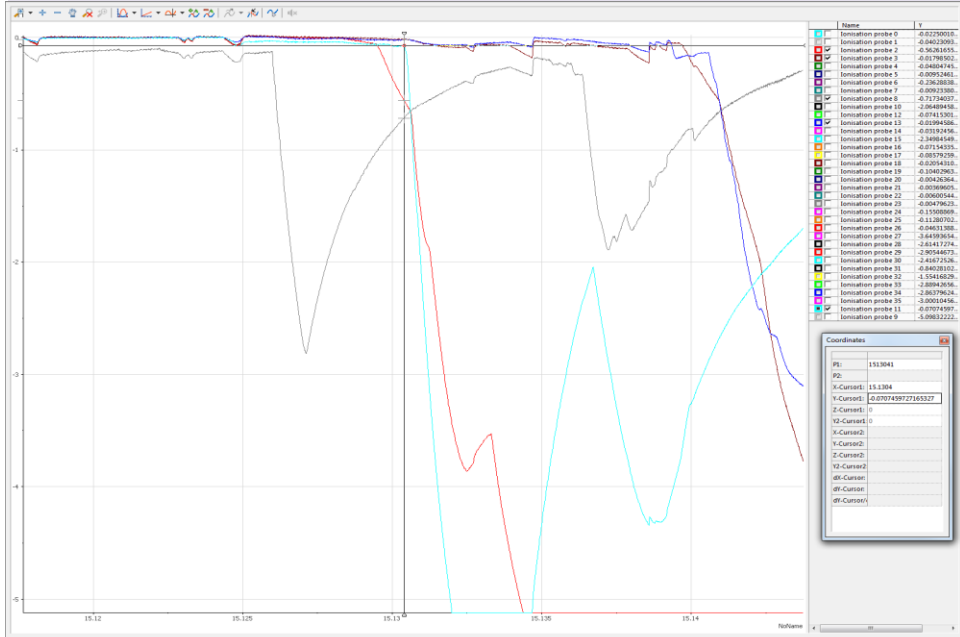


Optical Probes

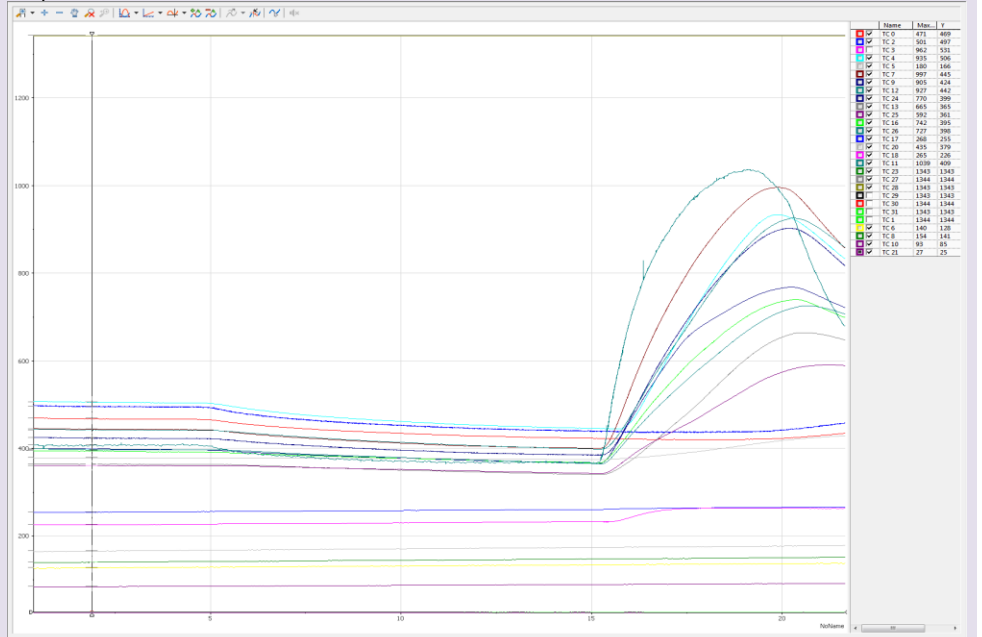




### Ionisation Probes



### 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
TC2	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
TC3	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
TC4	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
TC6	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
TC5	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
-	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
-		CD3-T1	CD	3	T	1		29	1" BSPP	0	298	6258
TC8	TS1-1	CD3-T2	CD	3	T	2		NA	SURFACE	0	298	7508
-		CD3-B1	CD	3	B	1		30	1" BSPP	0	-298	6258
-	NS3-1	CD3-R1	CD	3	R	1		31	3/4" BSPP	298	0	6258
-	FS3-1	CD3-L1	CD	3	L	1		32	3/4" BSPP	-298	0	6258
TC7	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
-	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
KU6	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
TC9	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
TC10	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
KU7	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
-	NS4-3	CD4-R3	CD	4	R	3		49	3/4" BSPP	298	0	10258
OP11	FS4-3	CD4-L3	CD	4	L	3		50	3/4" BSPP	-298	0	10258
OP10	NS4-4	CD4-R4	CD	4	R	4		51	3/4" BSPP	298	0	10758
-	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
-	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"
-	FS4-6	CD4-L6	CD	4	L	6		56	3/4" BSPP	-298	0	11758
OP0		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
TC12		HR1-R2	HR	1	R	2		59	3/4" BSPP	393	0	13160
TC24		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
TC13		HR2-R3M	HR	2	R	3	M	63	3/4" BSPP	528	410	14140
TC25		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
KU8		HR2-T5	HR	2	T	5		69	1" BSPP	0	2315	14745
TC16		HR2-R5L	HR	2	R	5	L	70	3/4" BSPP	662	310	14745
IP9		HR2-L5L	HR	2	L	5	L	71	3/4" BSPP	-662	310	14745
OP2		HR2-R5M	HR	2	R	5	M	72	3/4" BSPP	662	975	14745
IP8		HR2-L5M	HR	2	L	5	M	73	3/4" BSPP	-662	975	14745
-		HR2-R5U	HR	2	R	5	U	74	3/4" BSPP	662	1660	14745
IP11		HR2-L5U	HR	2	L	5	U	75	3/4" BSPP	-662	1660	14745
KU9		HR3-L1L	HR	3	L	1	L	76	3/4" BSPP	-700	400	15140
TC26		HR3-L1M	HR	3	L	1	M	77	11/4" BSPP	-700	1335	15140
IP7		HR3-L1U	HR	3	L	1	U	78	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
KU0		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
IP10		HE2-R1M	HE	2	R	1	M	84	3/4" BSPP	700	1335	16090
TC17		HE2-R1U	HE	2	R	1	U	85	3/4" BSPP	700	2270	16090
KU1		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
OP3		HE1-T1	HE	1	T	1		82	3/4" BSPP HOLE	-47	2735	15600
-		HE2-T1	HE	2	T	1		86	3/4" BSPP HOLE	0	2735	16090
OP4		HE3-T1	HE	3	T	1		90	3/4" BSPP HOLE	-47	2735	16580
OP6		HR4-T1	HR	4	T	1		91	1" BSPP	0	2735	16985
-		HR4-B1	HR	4	B	1		92	1" BSPP	0	-65	16985
KU4		HR4-R1L	HR	4	R	1	L	93	3/4" BSPP	700	400	16985
IP4		HR4-L1L	HR	4	L	1	L	94	3/4" BSPP	-700	400	16985
OP1		HR4-R1M	HR	4	R	1	M	95	3/4" BSPP	700	1335	16985
IP2		HR4-L1M	HR	4	L	1	M	96	3/4" BSPP	-700	1335	16985
IP12		HR4-R1U	HR	4	R	1	U	97	3/4" BSPP	700	2270	16985
IP13		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
IP14		HR4-R5M	HR	4	R	5	M	101	3/4" BSPP	700	1335	18165
IP21		HR4-L5M	HR	4	L	5	M	102	3/4" BSPP	-700	1335	18165
TC21		HR5-R1M	HR	5	R	1	M	NA	SURFACE	700	1200	18455
OP7		HR5-T2	HR	5	T	2		103	1" BSPP	0	2735	18775
-		HR5-B2	HR	5	B	2		104	1" BSPP	0	-65	18775
KU3		HR5-R2L	HR	5	R	2	L	105	3/4" BSPP	700	400	18775
IP16		HR5-L2L	HR	5	L	2	L	106	3/4" BSPP	-700	400	18775
OP5		HR5-R2M	HR	5	R	2	M	107	3/4" BSPP	700	1335	18775
IP0		HR5-L2M	HR	5	L	2	M	108	3/4" BSPP	-700	1335	18775
IP15		HR5-R2U	HR	5	R	2	U	109	3/4" BSPP	700	2270	18775
IP1		HR5-L2U	HR	5	L	2	U	110	3/4" BSPP	-700	2270	18775
RA4		HR5-R4M	HR	5	R	4	M	111	11/4" BSPP	700	1335	19375
RA4		HR5-L4M	HR	5	L	4	M	112	11/4" BSPP	-700	1335	19375
IP5		HR6-R1M	HR	6	R	1	M	113	3/4" BSPP	700	1335	19985

Sensor	OLD DESIGNATION	NEW DESIGNATION	Section	Section Number	Side	Horizontal Location	Vertical Location	PORT REF	SIZE	"X"	"Y"	"Z"
IP3		HR6-L1M	HR	6	L	1	M	114	3/4" BSPP	-700	1335	19985
OP8		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
KU2		HR6-R3L	HR	6	R	3	L	117	3/4" BSPP	700	400	20575
IP19		HR6-L3L	HR	6	L	3	L	118	3/4" BSPP	-700	400	20575
OP9		HR6-R3M	HR	6	R	3	M	119	11/4" BSPP	700	1335	20575
IP23		HR6-L3M	HR	6	L	3	M	120	11/4" BSPP	-700	1335	20575
IP18		HR6-R3U	HR	6	R	3	U	121	3/4" BSPP	700	2270	20575
IP22		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
TC18		HR6-R5L	HR	6	R	5	L	124	3/4" BSPP	700	400	21165
KU5		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
IP6		HR6-L5M	HR	6	L	5	M	127	3/4" BSPP	-700	1335	21165
IP17		HR6-R5U	HR	6	R	5	U	128	3/4" BSPP	700	2270	21165
IP20		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
PCB		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

