

Activities at BNL: Ladder Assembly

**Rachid Nouicer, Robert Pisani,
and Steven Antrade**

Production Ladders				HDIs/Chips															Sensors										Ladder					Live Channels		Classes																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
28	Barrel 1			<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>0: Chip is Missing</p> <p>1: Chip is Missing</p> <p>2: Chip is Missing</p> </div> <div style="width: 45%;"> <p>0: Chip is Missing</p> <p>1: Chip is Missing</p> <p>2: Chip is Missing</p> </div> </div>															<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>0: Sensor is Missing</p> <p>1: Sensor is Missing</p> <p>2: Sensor is Missing</p> </div> <div style="width: 45%;"> <p>0: Sensor is Missing</p> <p>1: Sensor is Missing</p> <p>2: Sensor is Missing</p> </div> </div>										<p>0: Ready For Box</p> <p>1: Good</p> <p>2: Good</p>					<p>0: 1 to 5</p> <p>1: Bad Channels</p>		<p>0: Class 5 = 308 %</p> <p>1: 99 % <= Class 2 = 338 %</p> <p>2: 99 % <= Class 3 = 99 %</p> <p>3: 99 % <= Class 4 = 99 %</p> <p>4: Class 5 = 87%</p>	<p>0: Class 5 = 308 %</p> <p>1: 99 % <= Class 2 = 338 %</p> <p>2: 99 % <= Class 3 = 99 %</p> <p>3: 99 % <= Class 4 = 99 %</p> <p>4: Class 5 = 87%</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
32	Barrel 2			<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>0: Chip is Missing</p> <p>1: Chip is Missing</p> <p>2: Chip is Missing</p> </div> <div style="width: 45%;"> <p>0: Chip is Missing</p> <p>1: Chip is Missing</p> <p>2: Chip is Missing</p> </div> </div>															<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>0: Sensor is Missing</p> <p>1: Sensor is Missing</p> <p>2: Sensor is Missing</p> </div> <div style="width: 45%;"> <p>0: Sensor is Missing</p> <p>1: Sensor is Missing</p> <p>2: Sensor is Missing</p> </div> </div>										<p>0: Ready For Box</p> <p>1: Good</p> <p>2: Good</p>					<p>0: 1 to 5</p> <p>1: Bad Channels</p>		<p>0: Class 5 = 308 %</p> <p>1: 99 % <= Class 2 = 338 %</p> <p>2: 99 % <= Class 3 = 99 %</p> <p>3: 99 % <= Class 4 = 99 %</p> <p>4: Class 5 = 87%</p>	<p>0: Class 5 = 308 %</p> <p>1: 99 % <= Class 2 = 338 %</p> <p>2: 99 % <= Class 3 = 99 %</p> <p>3: 99 % <= Class 4 = 99 %</p> <p>4: Class 5 = 87%</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
00	Total																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Coord	Barrel Type	Barrel ID	Barrel Name	South Chips/HDI Status															North Chips/HDI Status										South Sensor Status					North Chips/HDI Status					North/South Sensor Status					Survey File		Encapsulation					Ladder Class		Source Test File																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
				000	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030	031	032	033	034	035	036	037	038	039	040	041	042	043	044	045	046	047	048	049	050	051	052	053	054	055	056	057	058	059	060	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095	096	097	098	099	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
01	PB1-4018	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
02	PB1-4018	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
03	PB1-4018	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
04	PB1-4018	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
05	PB1-4018	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
06	PB1-4018	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
07	PB1-4018	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
08	PB1-4018	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
09	PB1-4018	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
10	PB1-4018	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

Stave Testing

Barrel 1

Barrel 1		Excellent	Class 1	Barrel 1	X<0.150	good	Barrel 1	X<0.09 psi Good	Range Good								
Lot # -01 Layer 1		Fair	Class 3		0.150<X<0.200	OK		0.09 X>0.20 psi Not Good									
Lot # -02 Layer 2		BAD	Class 5		X>0.200	Bad	No Vacuum	>0.20 Bad									
Count	Lot Number	Serial Number	Stave	Stave	Flatness		Flatness with Vacuum [mm]	Flatness no Vacuum [mm]	Vendor	Flow/Leak		10 min leak in PSI	Vendor 10 min in PSI leak after assembly	Delta P of stave at 200ccm (psi)	Vendor	Serial Number	Comments
			Type	Class	Operator	Date	Flatness [m]	Operator	Date	psi	psi	psi	Flow #				
1	205-310-0100-01	0001	Prototype		RN		0.3297	0.3510		RP		0.138		0.740			
2	205-310-0100-01	0002	Prototype		RN		0.3056	0.3103		RP		0.098		1.050			
3	205-310-0100-01	0003	Prototype		RN		0.4818	0.5513		RP		0.137		1.070			
4	205-310-0100-01	0004	Prototype		RN		0.3680	0.3902		RP		0.157		0.970			
5	205-310-0100-01	0005	Prototype		RN		0.2144	0.2956		RP		0.216		0.920			
6	205-310-0100-01	0006	Prototype		RN		0.4427	0.4215		RP		0.146		0.980			
7	205-310-0100-01	0007	Prototype		RN		0.1434	0.1219		RP		0.155		0.930			
8	205-310-0100-01	0010	Prototype		RN		0.1944	0.0805		RP		0.121		0.920			
9	205-310-0100-01	0011	Prod. Batch1	5	RN	1/8/2021	0.0948	0.0865	0.1190	SA	01/11/21	1.000		2.150	1.015		
10	205-310-0100-01	0013	Prod. Batch1	3	RN	12/23/2020	0.1031	0.0845	0.0320	SA	1/19/21	0.100		1.530	0.856		
11	205-310-0100-01	0014	Prod. Batch1	5	RN	12/23/2020	0.1535	0.1117	0.0580	SA	1/21/21	0.710		1.980	0.870		
12	205-310-0100-01	0016	Prod. Batch1	1	RN	12/23/2020	0.0880	0.0820	0.0560	SA	1/19/21	0.075		1.610	0.827		
13	205-310-0100-01	0017	Prod. Batch1	5	RN	12/23/2020	0.0759	0.0967	0.1030	SA	1/19/21	0.205		1.840	0.783		
14	205-310-0100-01	0019	Prod. Batch1	5	RN	12/23/2020	0.1827	0.0993	0.0780	SA	1/28/21	0.470		1.730	0.841		
15	205-310-0100-01	0020	Prod. Batch1	1	SA	1/26/2021	0.0723	0.1021	0.2560	SA	1/14/21	0.031		1.920	0.856		
16	205-310-0100-01	0022	Prod. Batch1	5	RN	12/21/2020	0.1290	0.0761	0.0990	SA	1/21/21	0.260		1.630	0.769		
17	205-310-0100-01	0023	Prod. Batch1	5	Rn	1/8/2021	0.1055	0.1249	0.3890	SA	01/11/21	0.170		1.600	0.783	0023	
18	205-310-0100-01	0025	Prod. Batch1	5	RN	12/21/2020	0.1096	0.1149	0.1080	SA	1/28/21	3.980		1.950	0.798	0025	
19	205-310-0100-01	0026	Prod. Batch1	1	RN	1/7/2021	0.1360	0.1665	0.2090	RP	11/8/2021	0.043		1.500	0.754	0026	
20	205-310-0100-01	0028	Prod. Batch1	5	RN	1/7/2021	0.1358	0.1150	0.1100	RP		0.157		1.500	0.798	0028	
21	205-310-0100-01	0029	Prod. Batch1	5	RN	12/21/2020	0.1278	0.1352	0.1240	SA	1/22/21	1.045		1.580	0.754	0029	
22	205-310-0100-01	0031	Prod. Batch1	1	RN	1/11/2021	0.0859	0.1479	0.0290	SA	01/11/21	0.067		1.800	1.030	0031	
23	205-310-0100-01	0032	Prod. Batch1	1	RN	1/7/2021	0.1106	0.1230	0.1270	SA/RP		0.054		1.800	0.798	0032	
24	205-310-0100-01	0034	Prod. Batch1	2	SA	1/25/2021	0.2038	0.1959	0.1370	SA	01/14/21	0.055		1.750	0.957	0034	
25	205-310-0100-01	0035	Prod. Batch1	3	RN	12/21/2020	0.1655	0.2005	0.1480	SA	01/28/21	0.060		1.580	0.740	0035	
26	205-310-0100-01	0037	Prod. Batch1	5	RN	12/21/2020	0.0724	0.1563	0.1520	SA	02/04/21	3.035		1.830	0.740	0037	
27	205-310-0100-01	0038	Prod. Batch1	2	RN	12/21/2020	0.2485	0.2179	0.1570	SA	1/22/21	0.045		1.870	0.914	0038	fixed Leak
28	205-310-0100-01	0040	Prod. Batch1	1	RN	12/21/2020	0.1328	0.1620	0.1720	SA	1/28/21	0.040		1.730	0.798	0040	
29	205-310-0100-01	0041	Prod. Batch1	2	RN	12/23/2020	0.1249	0.1713	0.1840	SA	1/19/21	0.065		1.800	0.899	0041	fixed leak/ loose tube
30	205-310-0100-01	0043	Prod. Batch2		RN	Bad	---	---	0.0350	RP	Bad	5.000	0.017	0.690	1.010	0043	Twist Broke
31	205-310-0100-01	0044	Prod. Batch2		RN	04/28/2021	0.1190	0.1020	0.0390	RP	04/26/0202	0.018	0.009	0.760	0.970	0044	460
32	205-310-0100-01	0046	Prod. Batch2		RN				0.0400	RP	4/26/2006	0.023	0.007	0.600	0.880	0046	460
33	205-310-0100-01	0047	Prod. Batch2		RN	04/26/2021	0.1149	0.0790	0.0420	RP	04/26/0202	0.07	0.0059	0.92	0.93	0047	460
34	205-310-0100-01	0049	Prod. Batch2		RN	Bad	---	---	0.0470	RP	Bad	5.000	0.0054	1.3	0.99	0049	Twist Broke
35	205-310-0100-01	0050	Prod. Batch2		RN	04/26/2021	0.1055	0.0925	0.0570	RP	04/26/0202	0.025	0.0081	0.73	1.06	0050	Twist Broke
36	205-310-0100-01	0052	Prod. Batch2		RN	04/26/2021	0.1013	0.0905	0.0680	RP	04/26/0202	0.071	0.0073	1.1	0.93	0052	460
37	205-310-0100-01	0053	Prod. Batch2		RN	04/28/2021	0.0744	0.0983	0.0790	RP	04/26/0202	0.027	0.0067	0.73	0.93	0053	460
38	205-310-0100-01	0055	Prod. Batch2		RN	Bad	---	---	0.0930	RP	Bad	5.000	0.006	1.52	0.97	0055	Twist Broke
39	205-310-0100-01	0056	Prod. Batch2		RN	Bad	---	---	0.0940	RP	Bad	5.000	0.0049	0.76	0.9	0056	Twist Broke
40	205-310-0100-01	0058	Prod. Batch2		RN	Bad	---	---	0.0950	RP	Bad	5.000	0.0071	1.3	0.99	0058	Twist Broke
41	205-310-0100-01	0059	Prod. Batch2		RN	Bad	---	---	0.098	RP	Bad	5.000	0.006	1.42	0.87	0059	Twist Broke
42	205-310-0100-01	0061	Prod. Batch2		RN	04/29/2021	0.1023	0.1016	0.102	RP	4/276/2006	0.02	0.006	0.8	0.88	0061	460
43	205-310-0100-01	0062	Prod. Batch2		RN	04/29/2021	0.129	0.1359	0.104	RP	4/276/2006	0.02	0.0082	0.78	0.83	0062	460
44	205-310-0100-01	0064	Prod. Batch2		RN	Bad	---	---	0.106	RP	Bad	5.000	0.0071	0.73	0.89	0064	Twist Broke
45	205-310-0100-01	0065	Prod. Batch2		RN	04/10/2021	0.1608	0.1429		RP	5/10/2021	0.038		1.17		0065	
46	205-310-0100-01	0067	Prod. Batch2		RN	04/10/2021	0.1291	0.1361		RP	5/10/2021	0.070		1.64		0067	

Stave Testing Barrel 1

Barrel 1			Excellent	Class 1	Barrel 1	X<0.150	good	Barrel 1			X < 0.09 psi Good	Range Good					
Lot # -01 Layer 1			Fair	Class 3		0.150<X<0.200	OK				0.09 X>0.20 psi Not Good						
Lot # -02 Layer 2			BAD	Class 5		X>0.200	Bad	No Vacuum				>0.20 Bad					
Count	Lot Number	Serial Number	Stave	Stave	Flatness		Flatness with Vacuum [mm]	Flatness no Vacuum [mm]	Vendor	Flow/Leak		10 min leak in PSI	Vendor 10 min in PSI leak after assembly	Delta P of stave at 200ccm (psi)	Vendor	Serial Number	Comments
			Type	Class	Operator	Date			Flatness [mm]	Opeerator	Date				Flow #		
					Name				Name		from ~20psi				psi		
47	205-310-0100-01	0068	Prod. Batch2		RN	04/11/2021	0.0531	0.1027		RP	5/10/2021	0.053		1.7		0068	
48	205-310-0100-01	0070	Prod. Batch2		RN	04/11/2021	0.1097	0.1559		RP	5/10/2021	0.050		1.59		0070	
49	205-310-0100-01	0071	Prod. Batch2		RN	04/11/2021	0.0977	0.1419		RP	5/10/2021	0.043		1.33		0071	
50	205-310-0100-01	0073	Prod. Batch2		RN	04/11/2021	0.1044	0.1756		RP	5/10/2021	0.053		1.11		0073	
	205-310-0100-01	0075	Prod Batch 3								8/16/2021	0.025		0.74			
	205-310-0100-01	0076	Prod Batch 3								8/16/2021	0.045		0.77			
	205-310-0100-01	0078	Prod Batch 3								8/16/2021	0.003		0.75			
	205-310-0100-01	0079	Prod Batch 3								8/16/2021	0.017		0.74			
	205-310-0100-01	0080	Prod Batch 3								8/16/2021	0.053		0.76			
	205-310-0100-01	0086	Prod Batch 3								8/16/2021	0.049		0.76			
	205-310-0100-01	0087	Prod Batch 3								8/16/2021	0.035		0.82			
	205-310-0100-01	0088	Prod Batch 3								8/16/2021	0.005		0.76			
	205-310-0100-01	0089	Prod Batch 3								8/16/2021	0.008		0.74			
	205-310-0100-01	0090	Prod Batch 3								8/16/2021	0.044		0.81			