



SNS Cavity String Production

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Production Sequence- Receiving Inspection



Receiving Inspection	
1	Cavities moved into testlab receiving area
2	Initial inspection of cavities
3	Cavity is moved into QA lab
4	Mechanical inspection
5	Cavity is moved up to RF tuning area
6	RF Inspection

ACCEL preparation: find more info on what their process is

No internal inspection



Production Sequence- Heat Treatment



Heattreatment	
7	Cavity is moved to chemroom
8	Cavity is Degreased in US
9	Cavity is moved to RF tuning area
10	Insertion into the furnace
11	Furnace run

Rinsing to resistivity? Etch?

Drying after degreasing

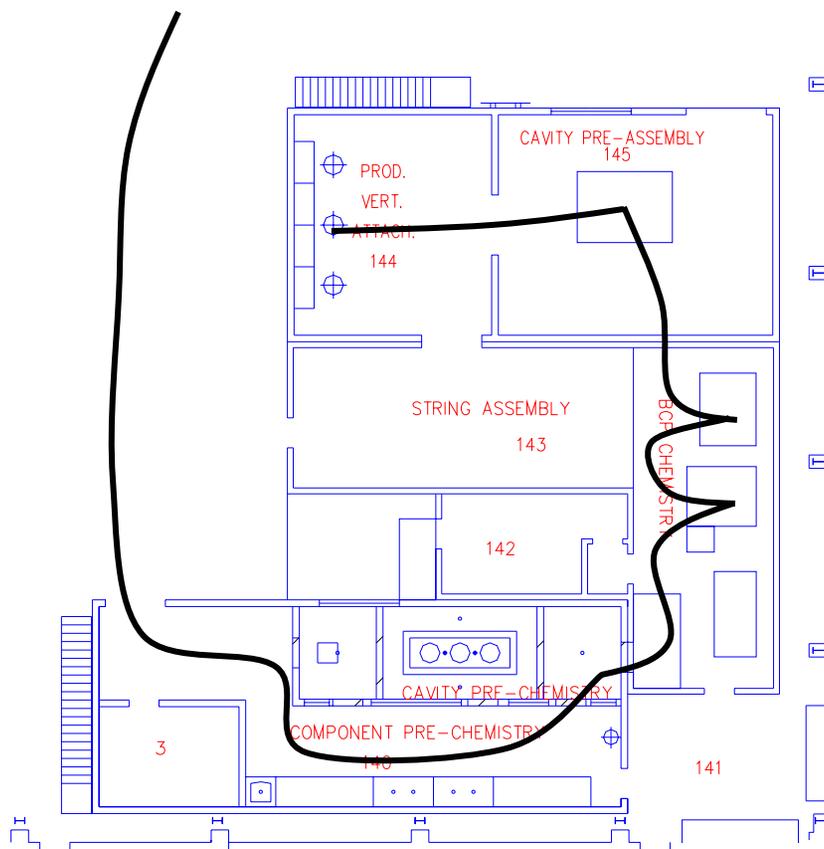
Should change to a liquid detergent vs powder

Production Sequence- Helium Vessel Welding



Helium Vessel Welding	
12	RF tuning
13	Cavity is moved to welding area
14	Component setup and alignment
15	Tack welding completed
16	All Welds are completed
17	Field flatness measurement
18	Cavity is moved to cryomodule assembly area
19	Leak Test of vessel

Plastic cap? Metal sealed flanges
Passband modes



Production Sequence- Vertical Test Qualification



Vertical Test Qualification

20	moved into chemroom on transfer cart	2step rinsing, ultrasonic, degreasing and flowthru
21	Moved to passthru and cavity connected to lift straps	Overflow ultrasonic + filtering
22	Inserted into Ultrasonic tank using overhead hoist	
23	Ultrasonic 1 hour with DI and Alconox	
24	Cavity removed from US tank	Do in chemistry cabinet?
25	Cavity rinsed with DI water	Move to cleanroom sealed
26	Cavity placed back on transfer cart	
27	Cart pushed into cleanroom passthru	
28	Lift cart moved to cavity and connected and removed from transfer cart	

30	Cavity inserted into cabinet and acid connections made	More chemistry? Try 100
31	Water leak test performed	
32	Cavity Process Program Started	Waste the acid after 10 g/l
33	Acid mixed and filtered 15-30 minutes, nitrogen leak test	
34	Acid flows thru cavity (50um)	
35	Acid drains	Increase the fill/dumps & follow with a flowthru rinse to 100
36	DI Water rinse for 3 minutes	
37	Three fill and dumps with DI water	Change flanges and rinse to 18 megaohm
38	Flange hardware removed	Transfer to HP rinse wet and dried
39	DI water rinse of flanges	
40	Cavity moved to HPR cabinet	



Production Sequence- Vertical Test Qualification



40	Cavity moved to HPR cabinet
41	Cavity inserted into cabinet and aligned
42	HPR Program Started
43	Pump starts and wand and table move <small>Total time? 4 hrs Wand movement</small>
44	Wand moves up and down and is repeated n loops <small>Single pass top to bottom Effectiveness & duration</small>
45	Cavity drains overnight <small>pass - Stop intermittently</small>
46	Cavity flanges blanked all but top <small>Cleanroom air flow top only Filtered nitrogen purged during HP</small>
47	Lift cart attached to cavity <small>rinse</small>
48	Cavity is removed from cabinet <small>Optimization of nozzle size, position, and number</small>
49	cavity is transfer to short mast cart
50	Cavity is moved to Class 10 area <small>Transfer to Class 10 immediately after HPR & blanked</small>
51	Cavity top flange assembled <small>Overnight drying</small>
52	Cavity probe flange assembled
53	Cavity HOM flange assembled

54	Cavity FPC flange assembled <small>Nitrogen cleaning of hardware w/particle counts</small>
55	Cavity HOM flange assembled
56	All hardware is torqued <small>Horizontal drying?</small>
57	Cavity is moved back to the main cleanroom <small>2 times 4 hours HPR w/drain inbetween</small>
58	Cavity is transferred to the tall mast cart <small>Drain cavity by flipping then overnight dry?</small>
59	Cavity inserted into HPR cabinet
60	Cavity HPR program started <small>Cavity is evacuated & isolated</small>
61	Pump starts and wand and table move <small>& moves out of cleanroom to VTA & assembly into stand</small>
62	Wand moves up and down and is repeated n loops
63	Cavity bottom flange blanked
64	Cavity removed from cabinet <small>Cavity is transfer to short mast cart</small>
65	Cavity is moved into Class 10 area
66	Pumpout flange is assembled to cavity
67	Bolts are torqued
68	

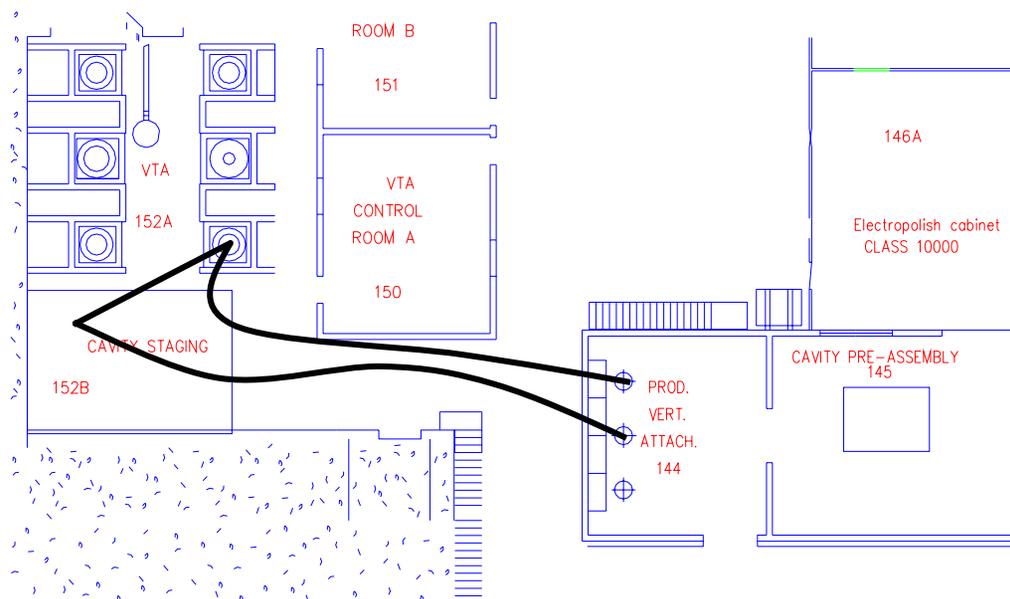


Production Sequence- Vertical Test Qualification



69	Cavity is moved into vertical attachment room	Clean test stand	79	Dewar is qualified
70	Cavity vacuum connection is made	Cavity isolated from test stand during testing? Also allows for lower pressure in the cavity	80	Dewar is cooled down and filled
71	Vacuum pump is started		81	Dewar is topped off and pumped
72	Cavity is isolated and cold trap removed from rough pump line	Stop processing at the sign of field emission?	82	Cavity is RF tested
73	Vacuum pump is started, pumps over night	Surface resistance measurements during pumpdown	83	Dewar is warmed up
74	Leak test of cavity and stand		84	Cavity is moved back into cleanroom
75	Cavity moved into VTA parkinglot	Passband Q vs E	85	Cavity is letup to nitrogen and disassembled
76	Cavity vacuum is reestablished	No HOM probes		
77	Cavity HOM 's are tuned	High Power connectors DESY/CERN		
78	Cavity is moved into dewar	Need to backfill with nitrogen in a clean way		

Outside cleaning of cavity & cart prior to entering cleanroom at all stages





Production Sequence-String Assembly



String Assembly	
86	Chemistry of first cavity
87	HPR of first cavity
88	Fisrt cavity is moved to Class 10 area
89	Cavity HOM and filed probes are assembled
90	Cavity end valve is assembled
91	Cavity is moved into main assembly room
92	Coupler is aligned to cavity
93	Cavity and coupler flanges opened and assembled
94	Cavity is installed onto alignment rail

HPR only after good performance in VTA?

95	86-94 repeated for cavity two and three
96	Bellows between cavities are assembled
97	Cavity string is evacuated
98	Cavity string is leaktested
99	Frequencies are measured on all cavities
100	Cavity string is transfered out of cleanroom and onto module assembly transfer rail



Production Sequence-String Assembly



Auxiliary Part Cleaning

1	Degreasing in ultrasonic with DI and Micro in chemroom
2	DI water rinse
3	Placed in plastic container submerged in DI and covered
4	Transferred into cleanroom passthru
5	Removed from DI bath and Blown dry with Filtered N2
6	Transferred to Class 10 assembly area
7	N2 gun cleaning prior to assembly