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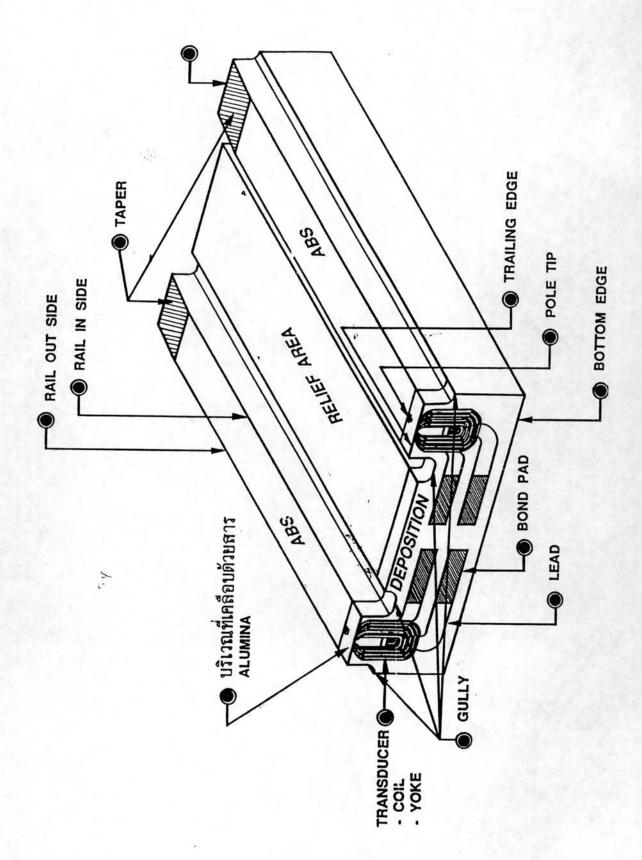
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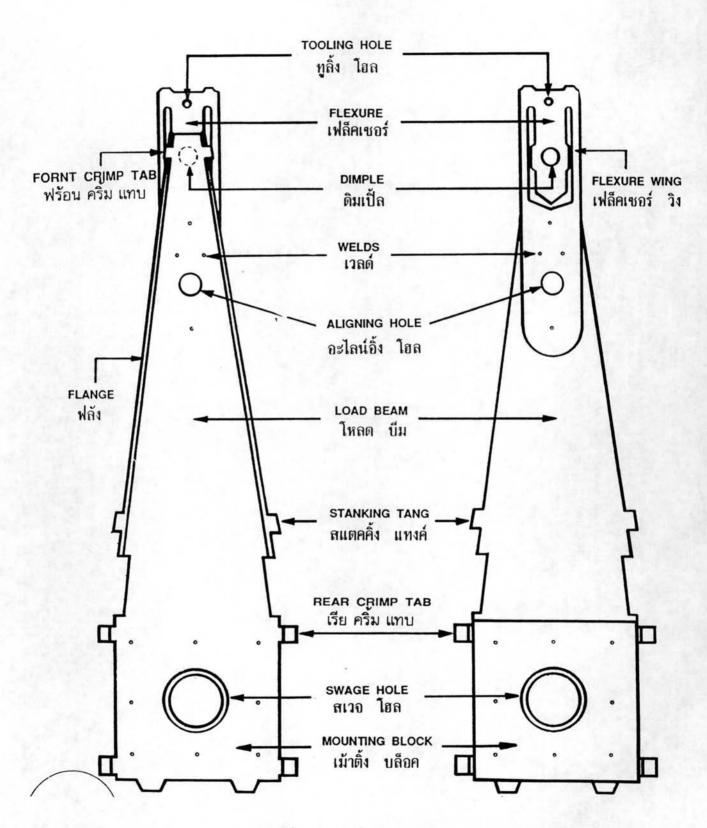
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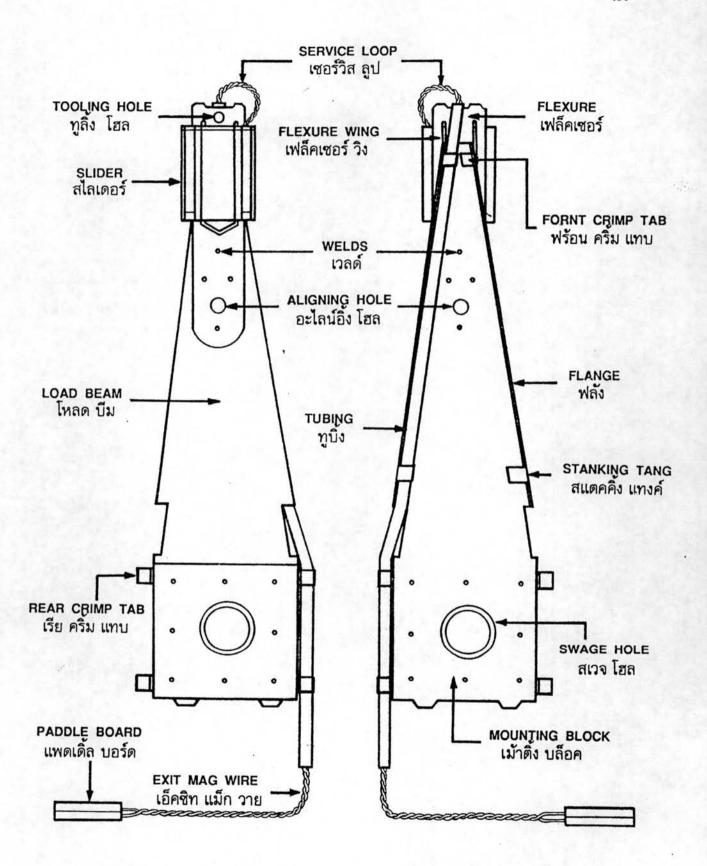
ภาคผนวก



ภาพที่ 1 สไลเคอร์ (Slider)



ภาพที่ 2 ซัสเพนชั่น (Suspension)



ภาพที่ 3 หัวอานและบันทึกสัญญาณแม่เหล็ก (Head Gimble Assembly)

Factor 1/d2 for converting average range into standard deviation

	A							
	1	2	3	4	2	8	10	>10
В								
. 2	0.709	0.781	0.813	0.862	0.840	0.855	0.862	0.885
က	0.524	0.552	0.565	0.571	0.575	0.581	0.581	0.592
4	0.446	0.465	0.472	7270	277.0	707		
۱ ،	0000	0.10	2/1/2	111	0.470	0.401	0.481	0.485
ç	0.403	0.417	0.420	0.422	0.424	0.426	0.427	0.429
9	0.375	0.385	0.388	0.389	0.391	0.392	0.392	0.370
7	0.353	0 361	0 364	0 365	986 0	0360	0000	0.00
	0000	00:0	1000	0.00	0.300	0.300	0.300	0.370
00	0.388	0.344	0.346	0.347	0.348	0.348	0.350	0.351
6	0.325	0.331	0.332	0.333	0.334	0.334	0.336	0.337
,	710	0,00	000	000	000			
2	415.0	0.319	0.322	0.323	0.323	0.324	0.324	0.325

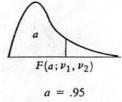
Note: Base on d2 factors in A.J. Duncan, Quality Control and Industrial Statistics, 1965, Thied Edition, table D3, P 910.

Table A Area under the normal curve Proportion of the total area of the standard normal curve from $-\infty$ to z (z represents a normalized statistic)

Z	0.09	0.08	0.07	0.06	0.05	0.04	0.03	0.02	0.01	0.00
-3.5	0.00017	0.00017	0.00018	0.00019	0.00019	0.00020	0.00021	0.00022	0.00022	0.00023
- 3.4	0.00024	0.00025	0.00026	0.00027	0.00028	0.00029	0.00030	0.00031	0.00033	0.00034
-3.3	0.00035	0.00036	0.00038	0.00039	0.00040	0.00042	0.00043	0.00045	0.00047	0.00048
- 3.2	0.00050	0.00052	0.00054	0.00056	0.00058	0.00060	0.00062	0.00064	0.0006	0.00069
- 3.1	0.00071	0.00074	0.00076	- 0.0XX779 -	0.00082	0.00085	0.00087	0.00090	0.00094	0.00097
- 3.0	0.00100	0.00104	0.00107	0.00111	0.00114	0.00118	0.00122	0.00126	0.00131	0.00135
-2.9	0.0014	0.0014	0.0015	0.0015	0.0016	0.0016	0.0017	0.0017	0.0018	0.0019
- 2.8	0.0019	0.0020	0.0021	0.0021	0.0022	0.0023	0.0023	0.0024	0.0025	0.0026
- 2.7	0.0026	0.0027	0.0028	0.0029	0.0030	0.0031	0.0032	0.0033	0.0034	0.0035
-2.6	0.0036	0.0037	0.0038	0.0039	0.0040	0.0041	0.0043	0.0044	0.0045	0.0047
-2.5	0.0048	0.0049	- 0.0051	0.0052	0.0054	0.0055	0.0057	0.0059	0.0060	0.0062
2.4	0.0064	0.0066	. 0.0068	0.0069	0.0071	0.0073	0.0075	0.0078	0.0080	0.0082
-2.3	0.0084	0.0087	0.0089	0.0091	0.0094	0.0096	0.0099	0.0102	0.0104	0.0107
-2.2	0.0110	0.0113	0.0116	0.0119	0.0122	0.0125	0.0129	0.0132	0.0136	0.0139
- 2.1	0.0143	0.0146	0.0150	0.0154	0.0158	0.0162	0.0166	0.0170	0.0174	0.0179
- 2.0	0.0183	0.0188	0.0192	0.0197	0.0202	0.0207	0.0212	0.0217	0.0222	0.0228
-1.9	0.0233	0.0239	0.0244	0.0250	0.0256	0.0262	0.0268	0.0274	0.0281	0.0287
- 1.8	0.0294	0.0301	:0.0307	0.0314	0.0322	0.0329	0.0336	0.0344	0.0351	0.0359
1.7	0.0367	0.0375	.0.0384	0.0392	0.0401	0.0409	0.0418	0.0427	0.0436	0.0446
1.6	0.0455	0.0465	0.0475	0.0485	0.0495	0.0505	0.0516	0.0526	0.0537	0.0548
1.5	0.0559	0.0571	0.0582	0.0594	0.0606	0.0618	0.0630	0.0643	0.0655	0.0668
- 1.4	0.0681	0.0694	10.0708	0.0721	0.0735	0.0749	0.0764	0.0778	0.0793	0.0808
- 1.3	0.0823	0.0838	0.0853	0.0869	0.0885	0.0901	0.0918	0.0934	0.0951	0.0968
- 1.2	0.0985	0.1003	0.1020	0.1038	0.1057	0.1075	0.1093	0.1112	0.1131	0.1151
-1.1	0.1170	0.1190	0.1210	0.1230	0.1251	0.1271	0.1292	0.1314	0.1335	0.1357
-1.0	0.1379	0.1401	0.1423	0.1446	0.1469	0.1492	0.1515	0.1539	0.1562	0.1587
- 0.9	0.1611	0.1635	0.1660	0.1685	0.1711	0.1736	0.1762	0.1788	0.1814	0.1841
-0.8	0.1867	0.1894	0.1922	0.1949	0.1977	0.2005	0.2033	0.2061	0.2090	0.2119
-0.7	0.2148	0.2177	0.2207	0.2236	0.2266	0.2297	0.2327	0.2358	0.2389	0.2420
-0.6	0.2451	0.2483	0.2514	0.2546	0.2578	0.2611	0.2643	0.2676	0.2709	0.2743
- 0.5	0.2776	0.2810	0.2843	0.2877	0.2912	0.2946	0.2981	0.3015	0.3050	0.3085
- 0.4	0.3121	0.3156	0.3192	0.3228	0.3264	0.3300	0.3336	0.3372	0.3409	0.3446
- 0.3	0.3483	0.3520	0.3557	0.3594	0.3632	0.3669	0.3707	0.3745	0.3783	0.3821
- 0.2	0.3859	0.3897	0.3936	0.3974	0.4013	0.4052	0.4090	0.4129	0.4168	0.4207
-0.1	0.4247	0.4286	0.4325	0.4364	0.4404	0.4443	0.4483	0.4522	0.4562	0.4602
-0.0	0.4641	0.4681	0.4721	0.4761	0.4801	0.4840	0.4880	0.4920	0.4960	0.5000

Z	0.00	10.0	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
+ 0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
+0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
+ 0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
+ 0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
+ 0.4	0.6554	0.6591	0.6628	0.6664	0.67(K)	0.6736	0.6772	0.6808	0.6844	0.6879
+ 0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
+ 0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
+ 0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
+ 0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8079	0.8106	0.8133
+0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
+ 1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
+1.1	0,8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
+ 1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
+ 1.3	0.9032	0.9049	0.9066	0.9082	(1.9099)	0.9115	0.9131	0.9147	0.9162	0.9177
+ 1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
+ 1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
+ 1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
+ 1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
+ 1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
+1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
+ 2.0	0.9773	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
+2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
+ 2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
+ 2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
+ 2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
+ 2.5	0.9938	0.9940	0 9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
+ 2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
+ 2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
+2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
+2.9	0.9981	0.9982	0.9983	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
+3.0	0.99865	0.99869	0.99874	0.99878	0.99882	0.99886	0.99889.	0.99893	0.99896	0.99900
+ 3.1	0.99903	0.99906	0.99910	0.99913	0.99915	0.99918	0.99921	0.99924	0.99926	0.99929
+3.2	0.99931	0.99934	0.99936	0.99938	0.99940	0.99942	0.99944	0.99946	0.99948	0.99950
+ 3.3	0.99952	0.99953	0.99955	0.99957	0.99958	0.99960	0.99961	0.99962	0.99964	0.99965
+ 3.4	0.99966	0.99967	0.99969	0.99970	0.99971	0.99972	0.99973	0.99974	0.99975	0.99976
+ 3.5	0.99977	0.99978	0.99978	0.99979	0.99980	0.99981	0.99981	0.99982	0.99983	0.99983

ตารางที่ 2.2 Z - Distribution



				n	umerato	or df			U.S.
denominator df	1	2	3	4	5	6	7	8	9
1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04
120	3.92	3.07	2.68	2.45	2.29	2.17	2.09	2,02	1.96
∞	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88

ตารางที่ 3.1 F - Distribution

a - 95

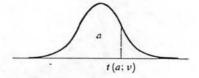
				nume	rator df			1978		
10	12	15	20	24	30	40	60	120	œ	denominato df
241.9	243.9	245.9	248.0	249.1	250.1	251.1	252.2	253.3	254.3	1
19.40		19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50	2
8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53	3
5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63	4
4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.36	5
4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67	6
3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23	7
3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93	8
3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71	9
2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54	10
2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40	11
2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30	12
2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21	13
2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13	14
2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07	15
2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01	16
2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96	17
2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92	18
2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88	19
2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84	20
2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81	21
2.30	2.23	2.15	2.07	2.03		1.94	1.89	1.84	1.78	22
2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76	23
2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73	24
2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71	25
2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69	26
2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67	27
2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65	28
2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64	29
2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62	30
2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51	40
1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39	60
1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25	120
1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00	00

ตารางที่ 3.2 F - Distribution

a = .99

				nu	imerato	r df			
denominator df	1	2	3	4	5	6	7	8	9
1	4052	4999.5	5403	5625	5764	5859	5928	5981	6022
2	98.50	99.00	99.17	99.25	99.30	99.33			
3	34.12	30.82	29.46	28.71	28.24		27.67		
4	21.20		16.69	15.98	15.52	15.21	14.98		
5	16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16
6	13.75	10.92	9.78	9.15	8.75	8.47		8.10	7.98
7	12.25	9.55		7.85	7.46	7.19		6.84	6.72
8	11.26	8.65	7.59	7.01	6.63	6.37		6.03	5.91
9	10.56	8.02	6.99	6.42	6.06	5.80		5.47	5.35
10	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94
11	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63
12	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39
13	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19
14	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03
15	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89
16	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78
17	8.40	6.11	5.18	4.67	4.34	4.10	3.93	3.79	3.68
18	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60
19	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52
20	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46
21	8.02	5.78	4.87	4.37	4.04	3.81	3.64	3.51	3.40
22	7.95	5.72	4.82	4.31	3.99	3.76	3.59	3.45	3.35
23	7.88	5.66	4.76	4.26	3.94	3.71	3.54	3.41	3.30
24	7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26
25	7.77	5.57	4.68	4.18	3.85	3.63	3.46	3.32	3.22
26	7.72	5.53	4.64	4.14	3.82	3.59	3.42	3.29	3.18
27	7.68	5.49	4.60	. 4.11	3.78	3.56	3.39	3.26	3.15
28	7.64	5.45	4.57	4.07	3.75	3.53	3.36	3.23	3.12
29	7.60	5.42	4.54	4.04	3.73	3.50	3.33	3.20	3.09
30	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07
40	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89
60	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72
120	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56
o co	6.63	4.6!	3.78	3.32	3.02	2.80	2.64	2.51	2.41

ตารางที่ 3.3 F - Distribution



df		<i>3</i> 4.		а			
ν	.75	.90	.95	.975	.99	.995	.9995
- 1	1.000	3.078	6.314	12.706	31.821	63.657	636.619
2	0.816	1.886	2.920	4.303	6.965	9.925	31.599
3	0.765	1.638	2.353	3.182	4.541	5.841	12.924
4	0.741	1.533	2.132	2.776	3.747	4.604	8.(10
5	0.727	1.476	2.015	2.571	3.365	4.032	6.869
6	0.718	1.440	1.943	2.447	3.143	3.707	5.959
7	0.711	1.415	1.895	2.365	2.998	3.499	5.408
8	0.706	1.397	1.860	2.306	2.896	3.355	5.041
9	0.703	1.383	1.833	2.262	2.821	3.250	4.781
10	0.700	1.372	1.812	2.228	2.764	3.169	4.587
11	0.697	1.363	1.796	2.201	2.718	3.106	4.437
12	0.695	1.356	1.782	2.179	2.681	3.055	4.318
13	0.694	1.350	1.771	2.160	2.650	3.012	4.221
14	0.692	1.345	1.761	2.145	2.624	2.977	4.140
15	0.691	1.341	1.753	2.131	2.602	2.947	4.073
16	0.690	1.337	1.746	2.120	2.583	2.921	4.015
17	0.689	1.333	1.740	2.110	2.567	2.898	3.965
18	0.688	1.330	1.734	2.101	2.552	2.878	3.922
19	0.688	1.328	1.729	2.093	2.539	2.861	3.883
20	0.687	1.325	1.725	2.086	2.528	2.845	3.850
21	0.686	1.323	1.721	2.080	2.518	2.831	3.819
22	0.686	1.321	1.717	2.074	2.508	2.819	3.792
23	0.685	1.319	1.714	2.069	2.500	2.807	3.768
24	0.685	1.318	1.711	2.064	2.492	2.797	3.745
25	0.684	1.316	1.708	2.060	2.485	2.787	3.725
26	0.684	1.315	1.706	2.056	2.479	2.779	3.707
27	0.684	1.314	1.703	2.052	2.473	2.771	3.690
28	0.683	1.313	1.701	2.048	2.467	2.763	3.674
29	0.683	1.311	1.699	2.045	2.462	2.756	3.659
30	0.683	1.310	1.697	2.042	2.457	2.750	3.646
40	0.681	1.303	1.684	2.021	2.423	2.704	3.551
60	0.679	1.296	1.671	2.000	2.390	2.660	3.460
20	0.677	1.289	1.658	1.980	2.358	2.617	3.373
x	0.674	1.282	1.645	1.960	2.326	2.576	3.291

EXAMPLE: t(0.95; 10) = 1.812 so $P[t(10) \le 1.812] = 0.95$. TEXT REFERENCE: Use of this table is discussed on p. 939.

ตารางที่ 4 t - Distribution

Factors for determining from Rbar the 3 sigma control limit for Xbar - R charts.

Number of observations	Factor for	Factor for R chart.	
in subgroup	Xbar chart	LCL	UCL
n	A2	D3	D4
2	1.88	0.00	3.27
3	1.02	0.00	2.57
4	0.73	0.00	2.28
5	0.58	0.00	2.11
6	0.48	0.00	2.00
7	0.42	0.08	1.92
8	0.37	0.14	1.86
9	0.34	0.18	1.82
10	0.31	0.22	1.78
11	0.29	0.26	1.74
12	0.27	0.28	1.72
13	0.25	0.31	1.69
14	0.24	0.33	1.67
15	0.22	0.35	1.65
16	0.21	0.36	1.64
17	0.20	0.38	1.62
18	0.19	0.39	1.61
19	0.19	0.40	1.60
20	0.18	0.41	1.59

ตารางที่ 5 คาคงที่สำหรับ Xbar-R Chart

Table E Factors for determining from 3 and $\bar{\sigma}_{\rm RMS}$ the 3-sigma control limits for \bar{X} and 5 or $\sigma_{\rm RMS}$ charts

	Factor for	Factor for	Factors	for s or $\sigma_{\rm RMS}$ chart
Number of observations in subgroup,	\overline{X} chart using $\overline{\sigma}_{RMS}$,	X chart using 5,	Lower control limit B ₃	Upper control limit B ₄
2	3.76	2.66	0	3.27
3	2.39	1.95	0	2.57
4	1.88	1.63	0	2.27
5	1.60	1.43	0	2.09
6	1.41	1.29	0.03	1.97
7	1.28	1.18	0.03	1.88
8	1.17	1.10	0.12	
9	1.09	1.03	0.19	1.81
10	1.03	0.98	0.24	1.72
11	0.97	0.93	0.32	1.68
12	0.93	0.89	0.35	1.65
13	0.88	0.85	0.38	1.62
14	0.85	0.82	0.41	1.59
15	0.82	0.79	0.43	1.57
16	0.79	0.76	0.45	1.55
17	0.76	0.74	0.47	1.53
18	0.74	0.72	0.48	1.52
19	0.72	0.70	0.50	1.50
20	0.70	0.68	0.51	1.49
21	0.68	0.66	0.52	1.48
22	0.66	0.65	0.53	1.47
23	0.65	0.63	0.54	1.46
24	0.63	0.62	0.55	1.45
25	0.62	0.61	0.56	1.44
30	0.56	0.55	0.60	1.40
35	0.52	0.51	0.63	1.37
40	0.48	0.48	0.66	1.34
45	0.45	0.45	0.68	1 32
50	0.43	0.43	0.70	1.30
55	0.41	0.41	0.71	1.29
60	0.39	0.39	0.72	1.28
6.5	0.38	0.37	0.73	1.27
70	0.36	0.36	0.74	1.26
75	0.35	0.35	0.75	1.25
80	0.34	0.34	0.76	1.24
85 7	0.33	0.33	0.77	1.23
90	0.32	0.32	0.77	1.23
95	0.31	0.31	0.78	1.22
100	0.30	0.30	0.79	1.21

ตารางที่ 6 คาคงที่สำหรับ Xbar - S Chart

n	2	3	• 4	5	6	7	8	9	10
D4	3.27	2.57	2.28	2.11	2	1.92	1.86	1.82	1.78
D3						0.08	0.14	0.18	0.22
E2	2.66	1.77	1.46	1.29	1.18	1.11	1.05	1.01	0.98

UCL MR = D4 * Rbar

UCL - X = Xbar + E2*Rbar

LCL MR = D3 * Rbar

LCL - X = Xbar - E2*Rbar

ตารางที่ 7 คาคงที่สำหรับ X-MR Chart

Inspection Accuracy Worksheet

Part Name
Part No.
Characteristic.
Instruction No. / Rev.
Date

AAA AAA X1 XXX Oct-94	4.
AAA	
X1	
XXX	
Oct-94	

Appraiser	Name	Saisunee				
Sample	Truth (C/N)	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
No.1	C	С	С	С	С	С
No.2	C	N	N	С	С	N
No.3	N	N	N	N	N	N
No.4	C	С	С	C	С	С
No.5	N	N	N	N	N	N
No.6	C	С	С	С	С	C
No.7	C	С	С	С	С	С
No.8	C	С	N	С	С	N
No.9	N	N	N	N	N	N
No.10	N	N	С	С	С	N
No.11	C	С	С	С	С	N
No.12	N	N	N	N	N	N
No.13	C	С	С	С	С	C
No.14	N	С	С	С	N	C
No.15	C	С	С	С	С	С
No.16	N	N	N	N	N	N
No.17	N	С	С	N	N	С
No.18	N	N	N	N	N	N
No.19	C	С	С	С	С	С
No.20	N	С	С	N	N	N
No.21	С	С	С	С	С	C
No.22	N	N	N	N	N	N
No.23	N	С	С	С	С	N
No.24	C	N	N	С	С	С

C : Conforming N : Nonconforming

Inspection Accuracy Calculation Worksheet

Part Name
Part No.
Characteristic.
Instruction No. / Rev.

Date

AAA
AAA
XI
XXX
Oct-94

Results						
Appraiser	C correct	N correct	Total Correct	False alarm	Miss	Grand total
Saisunee	52	44	96	8	16	120
Wilai	50	54	104	10	6	120
Srirung	57	42	99	3	18	120
Sontaya	42	45	87	18	15	120
Vipaporn	56	52	108	4	8	120
Pikul	57	49	106	3	11	120
Anong	47	58	105	13	2	120
Phatthani	49	52	101	11	8	120
Rachanee	45	59	104	15	1	120
Supaporn	53	44	97	7	16	120
Total	508	499	1007	92	101	1200

Calculation	ET JE			Acto	
Appraiser	E	P(FA)	P(Miss)	В	Remark
Saisunee	80.00%	13.33%	26.67%	0.6362	
Wilai	86.67%	16.67%	10.00%		
Srirung	82.50%	5.00%	30.00%		1 1111
Sontaya	72.50%	30.00%	25.00%		
Vipaporn	90.00%	6.67%	13.33%		
Pikul	88.33%	5.00%	18.33%		
Anong	87.50%	21.67%	3.33%		1777
Phatthani	84.17%	18.33%	13.33%		
Rachanee	86.67%	25.00%	1.67%		
Supaporn	80.83%	11.67%	26.67%		
Total	83.92%	15.33%	16.83%	1.15	

Table of Random Number (1-24)

No. of parts	Set 1	Set 2	Set 3	Set 4	Set 5	Set 6	Set 7	Set 8	Set 9	Set 10
#1	18	3	12	24	21	3	21	2		-
#2	12	11	14	14	10	22	5	22	12	4
#3	20	2	15	19	15	19	16		20	1
#4	24	6	9	20	5	5		10	22	16
#5	15	10	3	13	3	18	20	14	4	5
#6	8	23	6	12	24		6	15	8	14
#7	16	15	23	3		21	2	5	6	20
#8	5	21	4	11	18	20	14	23	11	12
#9	23	14	1		9	1 .	17	12	18	24
#10	14	12		1	13	12	10	13	7	13
#11	19	1	10	17	2	16	8	18	9	18
#12	2		5	23	11	11	7	17	10	8
#13	3	19	19	4	23	7	1	9	2	2
#14		16	20	22	1	6	9	20	21	15
#15	22	7	7	8	19	15	24	3	24	9
	7	22	11	15	17	9	19	16	16	23
#16	21	4	22	16	4	8	12	19	5	17
#17	11	8	8	6	12	24	3	8	19	11
#18	10	24	18	7	16	14	11	11	15	6
#19	13	13	2	21	22	17	13	6	13	7
#20	6	5	21	18	20	23	4	4	3	
#21	1	17	13	2	7	2	18	7		10
#22	17	20	17	9	8	4	15		17	3
#23	4	9	24	5	6	13		21	23	21
#24	9	18	16	10	14	10	22	24	14	22
			- 10	10	14	10	23	1	1	19

Table of Sample Size - Attribute Data

Quantity of Appraisers,	Min NO. of parts	Min NO. of inspection per parts
1	24	5
2	18	4
3 or more	12	3

ตารางที่ 11 จำนวนตัวอย่างที่เหมาะสมสำหรับ Attribute Data

Table of Bias Factors.

P(FA) or P(Miss)	B(FA) or B(Miss)	P(FA) or P(Miss)	B(FA) or B(Miss
0.01	0.0264	0.26	0.3251
0.02	0.0488	0.27	0.3312
0.03	0.0681	0.28	0.3372
0.04	0.0863	0.29	0.3429
0.05	0.1040	0.30	0.3485
0.06	0.1200	0.31	0.3538
0.07	0.1334	0.32	0.3572
0.08	0.1497	0.33	0.3621
0.09	Ò.1626	0.34	0.3668
0.10	0.1758	0.35	0.3712
0.11	0.1872	0.36	0.3739
0.12	0.1989	0.37	0.3778
0.13	0.2107	0.38	0.3814
0.14	0.2227	0.39	0.3836
0.15	0.2323	0.40	0.3867
0.16	0.2444	0.41	0.3885
0.17	0.2541	0.42	0.3910
0.18	0.2631	0.43	0.3925
0.19	0.2709	0.44	0.3945
0.20	0.2803	0.45	0.3961
0.21	0.2874	0.46	0.3970
0.22	0.2966	0.47	0.3977
0.23	0.3034	0.48	0.3984
0.24	0.3101	0.49	0.3989
0.25	0.3187	0.50	0.3989

ตารางที่ 12 ปัจจัยของความลำเอียง

Table of Attribute Data Criteria

Parameter	Acceptable	Marginal	Unacceptable
E	0.9 or more	0.8 to 0.9	less than 0.8
P(FA)	0.05 or less	0.05 to 0.10	more than 0.10
P(Miss)	0.05 or less	0.05 to 0.10	more than 0.10
В	0.8 to 1.2	0.5 to 0.8 or 1.2 to 1.5	less than 0.5 or more than 1.5

Special case for B value

P(FA)	P(Miss)	В	Decision
0	More than 0	No value	Use E,P(FA),P(Miss) directly
More than 0	0	No value	Use E,P(FA),P(Miss) directly
0	0	No value	Acceptable

ตารางที่ 13 ตารางคายอมรับได้ของการวิเคราะหกวามถูกต้องของการตรวจสอบ

Process: ABS inspection

Question	Yes	No	Remark
1. Are there sufficient personnel identified to cover :		19	and the second
1.1 Control plan requirements.		#	7.5
1.2 Engineering performance testing.	#		
1.3 Problem resolution analysis.	10	#	
2. Is there a documented training program that:			
2.1 Includes all employees?	#	1	
2.2 Lists whose been trained?	#	7	
2.3 Provides a training schedule?	#		
3. Has training been completed for :			1000
3.1 Statistical process control?	#		
3.2 Process capability study?	#		
3.3 Problem solving?		#	
4. Is each operation provided with process instructions that are	#	- 7 - 7	1 100
keyed to the control plan?	677		1 8 S
5. Are standard operator instructions available at each	#		E 1
operation?	346	*	1
6. Were operator/team leaders involved in developing standard	#		
operator instructions?			
7. Do inspection instructions include :			145 117
7.1 Easily understood engineering performance specifications?	#		. 1191/129
7.2 Test frequencies?	#		
7.3 Sample sizes?	#		
7.4 Reaction plan?		#	
7.5 Documentations?	#		
. Are visual aids :		301 - 5	
8.1 Easily understood?	#		
8.2 Available?	#		
8.3 Accessible?	#		1.00
8.4 Approved?	#		7 6.1
8.5 Dated and current?	#	. **	
Is there a procedure to implement, maintain and establish	-	#	1 1 1 1 1 1 1
eaction plan for statistical control chart?	7		The State of the S

Process: ABS inspection

Question	Yes	No	Remark
10. Is there an effective root cause analysis in place?		#	
11. Have provisions been made to place the lastest drawings	#		
and specifications at the point of inspection?			
12. Are forms/logs available for appropriate personnel to record	#	25	
inspection results?	1		
13. Have provisions been made to place the following at the			
monitored operations:			1.3
13.1 Inspection gages?	#		
13.2 Gage instructions?	#		
13.3 Reference samples?	#		
13.4 Inspection logs?	#		
14. Have provisions been made to certify and routinely calibrate	#		
gages and test equipments?			The state of the s
15. Have required measurement system capability studied been :			
15.1 Completed?		#	1 14
15.2 Acceptable?		#	
6. Is there a procedure to identify, segregate and control	#		
nonconforming products to prevent shipment?			to the state of
7. Are rework/repair procedures available?	#		
8. Is there a procedure to requalify, repaired/reworked	#	7	1000
naterial?			
9. Is there an appropriate lot traceability system?	#		
0. Are periodic audits of product/process planned and	#		
mplemented?			
		41.7	- 100
eference: Advance Product Quality Planning and Control,			15.65
ussell Jacobs, Radley Smith and Dan Reid, 1994.			

Process: Depo inspection

Question	Yes	No	Remark
Are there sufficient personnel identified to cover :	N.		T W. T V
1.1 Control plan requirements.	UL F	#	
1.2 Engineering performance testing.	#	-	
1.3 Problem resolution analysis.		#	
2. Is there a documented training program that:		#	
2.1 Includes all employees?	#		
2.2 Lists whose been trained?	#	-	1000
2.3 Provides a training schedule?	#	+	
3. Has training been completed for :	#		
3.1 Statistical process control?	#	-	TO COMPANY OF THE PARTY.
3.2 Process capability study?	+		
3.3 Problem solving?	#	-	100 100
. Is each operation provided with process instructions that are		#	
eyed to the control plan?	#		
Are standard operator instructions available at each			1112/751/75
peration?	#		
Were operator/team leaders involved in developing standard			10000000000000000000000000000000000000
erator instructions?	#		
Do inspection instructions include :			
.1 Easily understood engineering performance specifications?			
.2 Test frequencies?	#		
3 Sample sizes?	#		
4 Reaction plan?	#		
5 Documentations?		#	
are visual aids :	#		
Easily understood?	-		* 1111
Available?	#		100000000000000000000000000000000000000
Accessible?	#		
Approved?	#		
Dated and current?	#	la et	
there a procedure to implement, maintain and establish	#		
on plan for statistical control chart?		#	

TOTAL THE STATE OF

Product and process quality checklist

Process: Depo inspection

Question	Yes	No	Remark
10. Is there an effective root cause analysis in place?		#	
11. Have provisions been made to place the lastest drawings	#		
and specifications at the point of inspection?	404		
12. Are forms/logs available for appropriate personnel to record	#		
inspection results?			
13. Have provisions been made to place the following at the			
monitored operations :			
13.1 Inspection gages?	#		
13.2 Gage instructions?	#		
13.3 Reference samples?	#		
13.4 Inspection logs?	#		2. 加州
14. Have provisions been made to certify and routinely calibrate	#		
gages and test equipments?	413		
15. Have required measurement system capability studied been :			77.7
15.1 Completed?	1	#	
15.2 Acceptable?		#	
16. Is there a procedure to identify, segregate and control	#		to a graph of the
nonconforming products to prevent shipment?			
17. Are rework/repair procedures available?	#		75.46.13%
18. Is there a procedure to requalify, repaired/reworked	#		
material?			
19. Is there an appropriate lot traceability system?	#		
20. Are periodic audits of product/process planned and	#		
implemented?			
Reference: Advance Product Quality Planning and Control,			
Russell Jacobs , Radley Smith and Dan Reid , 1994.			* 1

Process: Wire Bond

Question	Yes	No	Remark
Are there sufficient personnel identified to cover :			
1.1 Control plan requirements.		#	
1.2 Engineering performance testing.	#		1
1.3 Problem resolution analysis.	T	#	
2. Is there a documented training program that:			
2.1 Includes all employees?	#		
2.2 Lists whose been trained?	#	1 3 1	1800
2.3 Provides a training schedule?	#		100
3. Has training been completed for :			
3.1 Statistical process control?	#		
3.2 Process capability study?	#	441	10.50
3.3 Problem solving?		#	
4. Is each operation provided with process instructions that are	#		
keyed to the control plan?		71.0	
5. Are standard operator instructions available at each	#		
operation?			1113
6. Were operator/team leaders involved in developing standard	#		
operator instructions?			THE SHAPE OF
7. Do inspection instructions include :	111		
7.1 Easily understood engineering performance specifications?	#		ALC: NO SERVE
7.2 Test frequencies?	#		
7.3 Sample sizes?	#		
7.4 Reaction plan?		#	
7.5 Documentations?	#	114	The Nation
3. Are visual aids :	3.	1	74.0
8.1 Easily understood?	#		1
8.2 Available?	#		
8.3 Accessible?	#	74.1	
8.4 Approved?	#		
8.5 Dated and current?	#		ALC: NO
. Is there a procedure to implement, maintain and establish		#	
eaction plan for statistical control chart?			

Process: Wire Bond

Question	Yes	No	Remark
0. Is there an effective root cause analysis in place?		#	
Have provisions been made to place the lastest drawings	#		To the
and specifications at the point of inspection?			
2. Are forms/logs available for appropriate personnel to record	#		
nspection results?			
3. Have provisions been made to place the following at the			1977
nonitored operations :		1	, 1 E
13.1 Inspection gages?	#		
13.2 Gage instructions?	#		
13.3 Reference samples?	#		
13.4 Inspection logs?	#		
14. Have provisions been made to certify and routinely calibrate	#		
gages and test equipments?			
15. Have required measurement system capability studied been:			
15.1 Completed?		#	
15.2 Acceptable?		#	
16. Is there a procedure to identify, segregate and control	#		
nonconforming products to prevent shipment?			
17. Are rework/repair procedures available?	#		
18. Is there a procedure to requalify, repaired/reworked	#	1 445	
material?			
19. Is there an appropriate lot traceability system?	#		
20. Are periodic audits of product/process planned and	#		
implemented?			
Reference: Advance Product Quality Planning and Control,			
Russell Jacobs , Radley Smith and Dan Reid , 1994.		13	LINE DE LA

Process: Wire Pull Test

1. Are there sufficient personnel identified to cover: 1.1 Control plan requirements. 1.2 Engineering performance testing. 1.3 Problem resolution analysis. 2. Is there a documented training program that: 2.1 Includes all employees? # 2.2 Lists whose been trained? # 2.3 Provides a training schedule? # 3.1 Statistical process control? # 3.2 Process capability study? # 3.3 Problem solving? 4. Is each operation provided with process instructions that are # keyed to the control plan? 5. Are standard operator instructions available at each operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.4 Reaction plan?	#	
1.2 Engineering performance testing. # 1.3 Problem resolution analysis. 2. Is there a documented training program that: 2.1 Includes all employees? # 2.2 Lists whose been trained? # 2.3 Provides a training schedule? # 3. Has training been completed for: 3.1 Statistical process control? # 3.2 Process capability study? # 3.3 Problem solving? # 4. Is each operation provided with process instructions that are # keyed to the control plan? 5. Are standard operator instructions available at each # operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?	#	
1.3 Problem resolution analysis. 2. Is there a documented training program that: 2.1 Includes all employees? # 2.2 Lists whose been trained? # 2.3 Provides a training schedule? # 3. Has training been completed for: 3.1 Statistical process control? # 3.2 Process capability study? # 3.3 Problem solving? 4. Is each operation provided with process instructions that are # keyed to the control plan? 5. Are standard operator instructions available at each # operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?		
2. Is there a documented training program that: 2.1 Includes all employees? # 2.2 Lists whose been trained? # 3.3 Provides a training schedule? # 3.4 Has training been completed for: # 3.2 Process capability study? # 3.3 Problem solving? # 4. Is each operation provided with process instructions that are # keyed to the control plan? # 5. Are standard operator instructions available at each # operation? # 6. Were operator/team leaders involved in developing standard # operator instructions? # 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?		
2.1 Includes all employees? # 2.2 Lists whose been trained? # 2.3 Provides a training schedule? # 3. Has training been completed for: 3.1 Statistical process control? # 3.2 Process capability study? # 3.3 Problem solving? 4. Is each operation provided with process instructions that are # keyed to the control plan? 5. Are standard operator instructions available at each # operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?	#	
2.2 Lists whose been trained? # 2.3 Provides a training schedule? # 3. Has training been completed for: 3.1 Statistical process control? # 3.2 Process capability study? # 3.3 Problem solving? 4. Is each operation provided with process instructions that are # keyed to the control plan? 5. Are standard operator instructions available at each # operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?	#	
2.3 Provides a training schedule? # 3. Has training been completed for: 3.1 Statistical process control? # 3.2 Process capability study? # 3.3 Problem solving? 4. Is each operation provided with process instructions that are # keyed to the control plan? 5. Are standard operator instructions available at each # operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?	#	
3.1 Statistical process control? # 3.2 Process capability study? # 3.3 Problem solving? 4. Is each operation provided with process instructions that are # keyed to the control plan? 5. Are standard operator instructions available at each # operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?	#	
3.1 Statistical process control? # 3.2 Process capability study? # 3.3 Problem solving? 4. Is each operation provided with process instructions that are # keyed to the control plan? 5. Are standard operator instructions available at each # operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?	#	
3.2 Process capability study? 4. Is each operation provided with process instructions that are # keyed to the control plan? 5. Are standard operator instructions available at each # operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?	#	
3.3 Problem solving? 4. Is each operation provided with process instructions that are # keyed to the control plan? 5. Are standard operator instructions available at each # operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?	#	
4. Is each operation provided with process instructions that are keyed to the control plan? 5. Are standard operator instructions available at each operation? 6. Were operator/team leaders involved in developing standard operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?	#	
keyed to the control plan? 5. Are standard operator instructions available at each # operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include : 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?		
5. Are standard operator instructions available at each # operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?		
operation? 6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include : 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?		
6. Were operator/team leaders involved in developing standard # operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?		
operator instructions? 7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?		
7. Do inspection instructions include: 7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?		
7.1 Easily understood engineering performance specifications? # 7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?		
7.2 Test frequencies? # 7.3 Sample sizes? # 7.4 Reaction plan?		
7.3 Sample sizes? # 7.4 Reaction plan?		
7.4 Reaction plan?		
	#	1 1 2 3 5 1
7.5 Documentations? #		
B. Are visual aids :	9	
8.1 Easily understood? #		
8.2 Available? #		
8.3 Accessible? #		
8.4 Approved? #		
8.5 Dated and current? #	- 17. 4.0	
9. Is there a procedure to implement, maintain and establish	#	

Process: Wire Pull Test

Question	Yes	No	Remark
10. Is there an effective root cause analysis in place?		#	
11. Have provisions been made to place the lastest drawings	#		
and specifications at the point of inspection?			
12. Are forms/logs available for appropriate personnel to record	#		
inspection results?			MATERIAL STATES
13. Have provisions been made to place the following at the			
monitored operations :			
13.1 Inspection gages?	#		
13.2 Gage instructions?	#		
13.3 Reference samples?	#		
13.4 Inspection logs?	#		
14. Have provisions been made to certify and routinely calibrate	#		
gages and test equipments?			
15. Have required measurement system capability studied been :			
15.1 Completed?		#	
15.2 Acceptable?		#	
16. Is there a procedure to identify, segregate and control	#		
nonconforming products to prevent shipment?			
17. Are rework/repair procedures available?	#		
18. Is there a procedure to requalify, repaired/reworked	#		
material?			
19. Is there an appropriate lot traceability system?	#		THE WHILE IS
20. Are periodic audits of product/process planned and	#	·	
implemented?			
			The same
		1	
Reference: Advance Product Quality Planning and Control,	141		
Russell Jacobs , Radley Smith and Dan Reid , 1994.			

Process: Conformal Coat

Question	Yes	No	Remark
Are there sufficient personnel identified to cover :			
1.1 Control plan requirements.		#	
1.2 Engineering performance testing.	#		. I desire
1.3 Problem resolution analysis.		#	
2. Is there a documented training program that:			WM-A
2.1 Includes all employees?	#		
2.2 Lists whose been trained?	#		
2.3 Provides a training schedule?	#		
3. Has training been completed for :			
3.1 Statistical process control?	#	1 - 4	1 - 1 - 1 - 1 mg
3.2 Process capability study?	#		
3.3 Problem solving?		#	
4. Is each operation provided with process instructions that are	#		
keyed to the control plan?			
5. Are standard operator instructions available at each	#		
operation?			
6. Were operator/team leaders involved in developing standard	#		
operator instructions?			
7. Do inspection instructions include :			
7.1 Easily understood engineering performance specifications?	#		
7.2 Test frequencies?	#		
7.3 Sample sizes?	#		
7.4 Reaction plan?		#	
7.5 Documentations?	#		
8. Are visual aids:		17	
8.1 Easily understood?	#		0.088
8.2 Available?	#		16 14 14
8.3 Accessible?	#		
8.4 Approved?	#		
8.5 Dated and current?	.#		
9. Is there a procedure to implement, maintain and establish		#	
reaction plan for statistical control chart?	and the		

Process :Conformal Coat

Question	Yes	No	Remark
10. Is there an effective root cause analysis in place?	,	#	
11. Have provisions been made to place the lastest drawings	#		
and specifications at the point of inspection?			1000
12. Are forms/logs available for appropriate personnel to record	#		
inspection results?			Aug.
13. Have provisions been made to place the following at the			
nonitored operations:			4.16.196
13.1 Inspection gages?	#		
13.2 Gage instructions?	#		
13.3 Reference samples?	#		7 2000
13.4 Inspection logs?	#		
4. Have provisions been made to certify and routinely calibrate	#		
ages and test equipments?			
5. Have required measurement system capability studied been :			
15.1 Completed?		#	100
15.2 Acceptable?		#	
6. Is there a procedure to identify, segregate and control	#		THE RESERVE THE PERSON
onconforming products to prevent shipment?			The state of the s
7. Are rework/repair procedures available?	#		1 750
3. Is there a procedure to requalify, repaired/reworked	#		
aterial?			
. Is there an appropriate lot traceability system?	#		
. Are periodic audits of product/process planned and	#		
plemented?			
ference : Advance Product Quality Planning and Control ,			
ssell Jacobs , Radley Smith and Dan Reid , 1994.			

Process: Flex Bond

Question	Yes	No	Remark
1. Are there sufficient personnel identified to cover :			1
1.1 Control plan requirements.		#	
1.2 Engineering performance testing.	#		
1.3 Problem resolution analysis.		#	
2. Is there a documented training program that:			
2.1 Includes all employees?	#		
2.2 Lists whose been trained?	#		
2.3 Provides a training schedule?	#		WORK
3. Has training been completed for :			- 01
3.1 Statistical process control?	#		
3.2 Process capability study?	#		
3.3 Problem solving?		#	7/11/96
4. Is each operation provided with process instructions that are	#		
keyed to the control plan?			11.0
5. Are standard operator instructions available at each	#		
operation?			10.00
6. Were operator/team leaders involved in developing standard	#		
operator instructions?			
7. Do inspection instructions include :			
7.1 Easily understood engineering performance specifications?	#		ALC: N
7.2 Test frequencies?	#		
7.3 Sample sizes?	#		
7.4 Reaction plan?		#	
7.5 Documentations?	#		12.24
3. Are visual aids :			
8.1 Easily understood?	#		
8.2 Available?	#		
8.3 Accessible?	#		
8.4 Approved?	#		
8.5 Dated and current?	#		
. Is there a procedure to implement, maintain and establish		#	
eaction plan for statistical control chart?			

Process: Flex Bond

Question	Yes	No	Remark
10. Is there an effective root cause analysis in place?		#	
11. Have provisions been made to place the lastest drawings	#		
and specifications at the point of inspection?			
12. Are forms/logs available for appropriate personnel to record	#		
inspection results?			
13. Have provisions been made to place the following at the			
monitored operations :			
13.1 Inspection gages?	#		
13.2 Gage instructions?	#		
13.3 Reference samples?	#		
13.4 Inspection logs?	#		
14. Have provisions been made to certify and routinely calibrate	#		
gages and test equipments?			
15. Have required measurement system capability studied been :			
15.1 Completed?		#	
15.2 Acceptable?		#	
16. Is there a procedure to identify, segregate and control	#		
nonconforming products to prevent shipment?			
7. Are rework/repair procedures available?	#		
8. Is there a procedure to requalify, repaired/reworked	#		
naterial?			
9. Is there an appropriate lot traceability system?	#		
20. Are periodic audits of product/process planned and	#		
mplemented?			
			The Santa
	. 4.1		
deference: Advance Product Quality Planning and Control,			
ussell Jacobs , Radley Smith and Dan Reid , 1994.			

Process: Flex Pull Test

Question	Yes	No	Remark
Are there sufficient personnel identified to cover :		14.	
1.1 Control plan requirements.		#	
1.2 Engineering performance testing.	#		
1.3 Problem resolution analysis.		#	
2. Is there a documented training program that:			
2.1 Includes all employees?	#		THE STATE OF THE S
2.2 Lists whose been trained?	#		anaka Maria
2.3 Provides a training schedule?	#		The Atlanta
3. Has training been completed for :			1 1 5 8 00
3.1 Statistical process control?	#		
3.2 Process capability study?	#		
3.3 Problem solving?		#	Section in
4. Is each operation provided with process instructions that are	#		THE RESIDENCE
keyed to the control plan?			
5. Are standard operator instructions available at each	#		
operation?	Kh.		
6. Were operator/team leaders involved in developing standard	#		
operator instructions?			
7. Do inspection instructions include :			
7.1 Easily understood engineering performance specifications?	#		
7.2 Test frequencies?	#		
7.3 Sample sizes?	#		
7.4 Reaction plan?		#	
7.5 Documentations?	#		
3. Are visual aids :			1
8.1 Easily understood?	#		3 75
8.2 Available?	#		17.3
8.3 Accessible?	#	15	1,190
8.4 Approved?	#		1900
8.5 Dated and current?	#		
. Is there a procedure to implement, maintain and establish		#	
eaction plan for statistical control chart?			13.31

Process: Flex Pull Test

Question	Yes	No	Remark
10. Is there an effective root cause analysis in place?		#	
11. Have provisions been made to place the lastest drawings	#		17
and specifications at the point of inspection?			
12. Are forms/logs available for appropriate personnel to record	#	24	
inspection results?		7/37/22	
13. Have provisions been made to place the following at the			
monitored operations :			
13.1 Inspection gages?	#		1 2 2 4 1
13.2 Gage instructions?	#		
13.3 Reference samples?	#		
13.4 Inspection logs?	#		
14. Have provisions been made to certify and routinely calibrate	#		
gages and test equipments?			
15. Have required measurement system capability studied been :			
15.1 Completed?		#	
15.2 Acceptable?		#	
16. Is there a procedure to identify, segregate and control	#		Phillips
nonconforming products to prevent shipment?			TA LETTE
17. Are rework/repair procedures available?	#		
18. Is there a procedure to requalify, repaired/reworked	#	143	
naterial?			
9. Is there an appropriate lot traceability system?	#		
20. Are periodic audits of product/process planned and	#		
mplemented?			
100	1		
h n e la			
Significant to the second seco			34.4-11
Reference: Advance Product Quality Planning and Control,			
Russell Jacobs , Radley Smith and Dan Reid , 1994.			

Process: XY Dimension Audit.

Question	Yes	No	Remark
1. Are there sufficient personnel identified to cover :			
1.1 Control plan requirements.		#	
1.2 Engineering performance testing.	#		
1.3 Problem resolution analysis.		#	
2. Is there a documented training program that:			
2.1 Includes all employees?	#		THE REAL PROPERTY.
2.2 Lists whose been trained?	#		
2.3 Provides a training schedule?	#		
3. Has training been completed for:			
3.1 Statistical process control?	#		
3.2 Process capability study?	#		
3.3 Problem solving?		#	
Is each operation provided with process instructions that are	#		45.75
eyed to the control plan?			
. Are standard operator instructions available at each	#	3	100
peration?			
. Were operator/team leaders involved in developing standard	#		
perator instructions?			7.00
. Do inspection instructions include :			
7.1 Easily understood engineering performance specifications?	#		
7.2 Test frequencies?	#		- 100
7.3 Sample sizes?	#		A A COLO
7.4 Reaction plan?	123	#	
7.5 Documentations?	#		10.00
Are visual aids :			
8.1 Easily understood?	#		
3.2 Available?	#		
3.3 Accessible?	#		THE RESERVE
3.4 Approved?	#		
3.5 Dated and current?	#		
Is there a procedure to implement, maintain and establish	1	#	
action plan for statistical control chart?			

Process: XY Dimension Audit.

Question	Yes	No	Remark
10. Is there an effective root cause analysis in place?		#	- X - 512
11. Have provisions been made to place the lastest drawings	#		
and specifications at the point of inspection?			
12. Are forms/logs available for appropriate personnel to record	#		
inspection results?			53
13. Have provisions been made to place the following at the			
monitored operations :			
13.1 Inspection gages?	#		
13.2 Gage instructions?	#		
13.3 Reference samples?	#	11 12	
13.4 Inspection logs?	#		
14. Have provisions been made to certify and routinely calibrate	#		
gages and test equipments?			
15. Have required measurement system capability studied been :			
15.1 Completed?		#	
15.2 Acceptable?		#	
16. Is there a procedure to identify, segregate and control	#		La Figure
nonconforming products to prevent shipment?			
17. Are rework/repair procedures available?	#		
8. Is there a procedure to requalify, repaired/reworked	#		
naterial?			3441 3
9. Is there an appropriate lot traceability system?	#		1 1 6 - 16
20. Are periodic audits of product/process planned and	#		
mplemented?			
			100
	1		
deference: Advance Product Quality Planning and Control,			
ussell Jacobs , Radley Smith and Dan Reid , 1994.			

Process: Staking

Question	Yes	No	Remark
1. Are there sufficient personnel identified to cover :			
1.1 Control plan requirements.		#	
1.2 Engineering performance testing.	#		1.0
1.3 Problem resolution analysis.		#	
2. Is there a documented training program that :			15.00
2.1 Includes all employees?	#		
2.2 Lists whose been trained?	#		1 130
2.3 Provides a training schedule?	#		1.5
3. Has training been completed for :	W 23		
3.1 Statistical process control?	#		10
3.2 Process capability study?	#		
3.3 Problem solving?		#	100
4. Is each operation provided with process instructions that are	#		
keyed to the control plan?			
5. Are standard operator instructions available at each	#		
operation?			
i. Were operator/team leaders involved in developing standard	#	139	
operator instructions?			
. Do inspection instructions include :			
7.1 Easily understood engineering performance specifications?	#	3.1	
7.2 Test frequencies?	# .		
7.3 Sample sizes?	#		
7.4 Reaction plan?		#	
7.5 Documentations?	#		. 22/12
. Are visual aids :			
8.1 Easily understood?	#		1.72
8.2 Available?	#		
8.3 Accessible?	#		
8.4 Approved?	#		
8.5 Dated and current?	#		
Is there a procedure to implement, maintain and establish		#	William Co.
action plan for statistical control chart?	8. 6. J		

Process : Staking

Question	Yes	No	Remark
10. Is there an effective root cause analysis in place?		#	
11. Have provisions been made to place the lastest drawings	#		
and specifications at the point of inspection?			77.25
12. Are forms/logs available for appropriate personnel to record	#		
inspection results?			7.93
13. Have provisions been made to place the following at the			194
monitored operations :			
13.1 Inspection gages?	#		
13.2 Gage instructions?	#		
13.3 Reference samples?	#	7 6 6	T. J. T. S.
13.4 Inspection logs?	#		
4. Have provisions been made to certify and routinely calibrate	#	7 7	
ages and test equipments?		100	
5. Have required measurement system capability studied been :		71	
15.1 Completed?		#	CALLSON C
15.2 Acceptable?		#	
6. Is there a procedure to identify, segregate and control	#		
onconforming products to prevent shipment?			
7. Are rework/repair procedures available?	#		
8. Is there a procedure to requalify, repaired/reworked	#		
aterial?			
P. Is there an appropriate lot traceability system?	#		The state of the s
). Are periodic audits of product/process planned and	#		
aplemented?			
			1000
	+ 7		
ference: Advance Product Quality Planning and Control,			
ssell Jacobs , Radley Smith and Dan Reid , 1994.			AL PRINT

Process : Magnetic Test

Question	Yes	No	Remark
1. Are there sufficient personnel identified to cover :			
1.1 Control plan requirements.		#	7.00
1.2 Engineering performance testing.	#		1 000
1.3 Problem resolution analysis.		#	W. 14.1
2. Is there a documented training program that :	75		100000
2.1 Includes all employees?	#	100	
2.2 Lists whose been trained?	#	-130	
2.3 Provides a training schedule?	#		
3. Has training been completed for:			
3.1 Statistical process control?	#		
3.2 Process capability study?	#		
3.3 Problem solving?		#	
4. Is each operation provided with process instructions that are	#		
seyed to the control plan?		1 1 1 1 1	
. Are standard operator instructions available at each	#		- Nation Base
operation?			
. Were operator/team leaders involved in developing standard	#		
perator instructions?			
. Do inspection instructions include :			and the same
7.1 Easily understood engineering performance specifications?	#		
7.2 Test frequencies?	#		- E- A-
7.3 Sample sizes?	#		- 5/
7.4 Reaction plan?		#	- 4120
7.5 Documentations?	#		1992 19
Are visual aids :			
8.1 Easily understood?	#		
8.2 Available?	#		
8.3 Accessible?	#		A STATE OF
8.4 Approved?	#		
3.5 Dated and current?	#		
Is there a procedure to implement, maintain and establish		#	
action plan for statistical control chart?			

Process: Magnetic Test

Question	Yes	No	Remark
10. Is there an effective root cause analysis in place?		#	
11. Have provisions been made to place the lastest drawings	#		14.7
and specifications at the point of inspection?			
12. Are forms/logs available for appropriate personnel to record	#		1 1/8
inspection results?			W 10
13. Have provisions been made to place the following at the			
monitored operations :			1 2 2 5 6
13.1 Inspection gages?	#		1.17
13.2 Gage instructions?	#		
13.3 Reference samples?	#		DAMES IN
13.4 Inspection logs?	#		
14. Have provisions been made to certify and routinely calibrate	#		
gages and test equipments?			T UNE
15. Have required measurement system capability studied been :		(1)	
15.1 Completed?		#	
15.2 Acceptable?		#	V TOTAL
6. Is there a procedure to identify, segregate and control	#	- V-	
nonconforming products to prevent shipment?			
7. Are rework/repair procedures available?	#		1000
8. Is there a procedure to requalify, repaired/reworked	#		7735.0
naterial?			1-36-60
9. Is there an appropriate lot traceability system?	#		7 11 11 11
0. Are periodic audits of product/process planned and	#	4	
nplemented?			
			77.45
			1 1127
	- 3		
			-279
eference: Advance Product Quality Planning and Control,			32,197
ussell Jacobs , Radley Smith and Dan Reid , 1994.			1 35173

Process: !00% High Power Inspection

Question	Yes	No	Remark
1. Are there sufficient personnel identified to cover :			
1.1 Control plan requirements.		#	
1.2 Engineering performance testing.	#		
1.3 Problem resolution analysis.		#	
2. Is there a documented training program that:			
2.1 Includes all employees?	#		
2.2 Lists whose been trained?	#		1 Section
2.3 Provides a training schedule?	#		
3. Has training been completed for :			
3.1 Statistical process control?	#		Property
3.2 Process capability study?	#		
3.3 Problem solving?		#	Through the
4. Is each operation provided with process instructions that are	#		
reyed to the control plan?			
. Are standard operator instructions available at each	#		
peration?			1 2 1 1
. Were operator/team leaders involved in developing standard	#		1000
perator instructions?			0.01
. Do inspection instructions include :			
7.1 Easily understood engineering performance specifications?	#		
7.2 Test frequencies?	#		
7.3 Sample sizes?	#		
7.4 Reaction plan?		#	
7.5 Documentations?	#		
Are visual aids :			
8.1 Easily understood?	#		- 239
8.2 Available?	#		
8.3 Accessible?	#		
8.4 Approved?	#		
3.5 Dated and current?	#		2.45
Is there a procedure to implement, maintain and establish		#	
action plan for statistical control chart?		10 M	

Process: !00% High Power Inspection

Question	Yes	No	Remark
10. Is there an effective root cause analysis in place?		#	
11. Have provisions been made to place the lastest drawings	#		
and specifications at the point of inspection?			1.00
12. Are forms/logs available for appropriate personnel to record	#		
inspection results?			1. 50
13. Have provisions been made to place the following at the			11 11 11 11
monitored operations :			
13.1 Inspection gages?	#		100
13.2 Gage instructions?	#		
13.3 Reference samples?	#		
13.4 Inspection logs?	#		
14. Have provisions been made to certify and routinely calibrate	#		1. P. W. T. S. W.
gages and test equipments?	71		Julie Val
15. Have required measurement system capability studied been :	7		
15.1 Completed?		#	
15.2 Acceptable?		#	
16. Is there a procedure to identify, segregate and control	#		
nonconforming products to prevent shipment?			
17. Are rework/repair procedures available?	#		
8. Is there a procedure to requalify, repaired/reworked	#		
naterial?			101400
9. Is there an appropriate lot traceability system?	#		
20. Are periodic audits of product/process planned and	#		
mplemented?			
			- W.
Reference : Advance Product Quality Planning and Control ,	- 1		A HITTORY
cussell Jacobs , Radley Smith and Dan Reid , 1994.			

Process: !00% Low Power Inspection

Question	Yes	No	Remark
1. Are there sufficient personnel identified to cover :			
1.1 Control plan requirements.		#	
1.2 Engineering performance testing.	#		
1.3 Problem resolution analysis.	/0	#	Te i seli
2. Is there a documented training program that:		162	
2.1 Includes all employees?	#		
2.2 Lists whose been trained?	#		
2.3 Provides a training schedule?	#		
3. Has training been completed for :		418	
3.1 Statistical process control?	#		
3.2 Process capability study?	#		
3.3 Problem solving?		#	
4. Is each operation provided with process instructions that are	#		
keyed to the control plan?			
5. Are standard operator instructions available at each	#		
operation?			
6. Were operator/team leaders involved in developing standard	#		
operator instructions?			
7. Do inspection instructions include :			
7.1 Easily understood engineering performance specifications?	#		
7.2 Test frequencies?	#		
7.3 Sample sizes?	#		
7.4 Reaction plan?		#	
7.5 Documentations?	#		
8. Are visual aids :			
8.1 Easily understood?	#		
8.2 Available?	#	-4	1 - 11/2
8.3 Accessible?	#		4.508
8.4 Approved?	#		
8.5 Dated and current?	#		
9. Is there a procedure to implement, maintain and establish	141	#	
reaction plan for statistical control chart?			

Process: !00% Low Power Inspection

Question	Yes	No	Remark
10. Is there an effective root cause analysis in place?		#	
11. Have provisions been made to place the lastest drawings	#		
and specifications at the point of inspection?			
12. Are forms/logs available for appropriate personnel to record	#		
inspection results?			
13. Have provisions been made to place the following at the			
monitored operations :			
13.1 Inspection gages?	#		A STATE
13.2 Gage instructions?	#		
13.3 Reference samples?	#		
13.4 Inspection logs?	#		Asset Balling
14. Have provisions been made to certify and routinely calibrate	#		
gages and test equipments?			
15. Have required measurement system capability studied been :			
15.1 Completed?		#	
15.2 Acceptable?	- 1	#	
16. Is there a procedure to identify, segregate and control	#		
nonconforming products to prevent shipment?			
17. Are rework/repair procedures available?	#		
18. Is there a procedure to requalify, repaired/reworked	#		
material?			
19. Is there an appropriate lot traceability system?	#		
20. Are periodic audits of product/process planned and	#		
implemented?	47.		
		1	HE CANADA
Reference: Advance Product Quality Planning and Control,			
Russell Jacobs , Radley Smith and Dan Reid , 1994.			



ประวัติผู้วิจัย .

นาย จักรพงศ์ กาญจนสมวงศ์ เกิดวันที่ 29 สิงหาคม พ.ศ. 2509 ที่อำเภอโนนไทย จังหวัด นครราชสีมา ได้รับการศึกษาในคณะวิทยาศาสตร์ มหาวิทยาลัย เกษตรศาสตร์ เมื่อปี พ.ศ. 2527 และ สำเร็จการศึกษา วิทยาศาสตร์บัณฑิต ในปี พ.ศ. 2531 .