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Technical Specification 6.9.1.10

LR-N17-0174

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U.S. Nuclear Regulatory Commission
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Salem Nuclear Generating Station Unit 2
Renewed Facility Operating License No. DPR-75
NRC Docket No. 50-311

Subject: **Steam Generator Tube Inspection Report – Twenty-second Refueling Outage (2R22)**

PSEG Nuclear, LLC (PSEG) hereby submits the Steam Generator Tube Inspection Report consistent with the requirements of Technical Specification (TS) 6.9.1.10. The report is being submitted within 180 days after the initial entry into HOT SHUTDOWN following completion of the inspection performed in accordance with Technical Specification 6.8.4.i, "Steam Generator (SG) Program." Salem Unit 2 entered HOT SHUTDOWN (Mode 4) on May 26, 2017, following the completion of its twenty-second refueling outage.

The following attachments are included in this letter:

Attachment 1	Steam Generator Tube Inspection Report TS 6.9.1.10
Attachment 2	Salem Unit 2 SG Tube Support Arrangement and Terminology
Attachment 3	2R22 Tube Plugged for Each Degradation Mechanism
Attachment 4	Total Number and percentage of Tubes Plugged to Date
Attachment 5	2R22 Nondestructive Examination Techniques
Attachment 6	2R22 Service Induced Indications (AVB Wear)
Attachment 7	2R22 Service Induced Indications (TSP Wear)

There are no commitments contained in this letter.

Should you have any questions regarding this submittal, please contact Mr. Thomas Cachaza at (856) 339-5038.

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Sincerely,

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fol

Patrick Martino
Plant Manager – Salem

Attachments (7)

cc: Mr. W. Dean, Administrator, Region I, NRC
Ms. C. Parker, Project Manager, NRC
NRC Senior Resident Inspector, Salem
Mr. P. Mulligan, Manager IV, NJBNE
Mr. L. Marabella, Corporate Commitment Tracking Coordinator
Mr. T. Cachaza, Salem Commitment Tracking Coordinator
Mr. M. Washington, Chief Inspector – Occupational Safety and Health Bureau of Boiler and
Pressure Vessel Compliance

LR-N17-0174

Steam Generator Tube Inspection Report
TS 6.9.1.10

PSEG Nuclear LLC Salem Unit 2

INTRODUCTION

The original Salem Unit 2 Series 51 steam generators (SG) were replaced with the AREVA Model 61/19T replacement steam generators (RSG) during outage 2R16. The 61 indicates approximately 6,100 square meters of heat transfer surface area per steam generator, the 19 indicates the approximate tube outside diameter (OD) in millimeters, and the "T" corresponds to a triangular tube pitch. The RSGs incorporate state-of-the-art features designed to improve reliability and minimize degradation. The thermally treated Inconel Alloy 690 tubing has a nominal OD of 0.750 inch and nominal wall thickness of 0.043 inch. Industry experience and laboratory testing has shown thermally treated Inconel Alloy 690 to be far more resistant to cracking than the Inconel Alloy 600 tubing found in the original steam generators. There are 5048 tubes within each SG fabricated in a triangular pitch. The tubes are hydraulically expanded the full tubesheet depth and seal welded at the tubesheet primary face. Lateral tube bundle support is accomplished using eight, 410 stainless steel (SS) broached tube support plates (TSP). The TSP holes are of a trefoil design with flat lands. The U-bends are supported with 3 sets of anti-vibration bars (AVBs) bent into a "V" shape. Since a given tube will intersect the same AVB at two separate locations, the AVBs are labeled AV1 through AV6 to segregate the separate hot-leg (HL) and cold-leg (CL) intersections. AV1 is near the upper hot leg TSP, and AV6 is near the upper cold leg TSP. The first 16 rows of tubes have been thermally stress relieved after the bending process to further reduce residual stresses in the U-bend region. Attachment 2 provides a general summary of the Salem Unit 2 SG Tube Support Arrangement and Terminology.

Consistent with Technical Specification (TS) 6.9.1.10, this report is being submitted within 180 days after the initial entry into HOT SHUTDOWN following completion of inspection performed in accordance with the Specification 6.8.4.i, "Steam Generator (SG) Program". Salem Unit 2 entered HOT SHUTDOWN on May 26, 2017.

This report includes:

- a. The scope of inspections performed on each SG,
- b. Active degradation mechanisms found,
- c. Nondestructive examination techniques utilized for each degradation mechanism,
- d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,
- e. Number of tubes plugged during the inspection outage for each active degradation mechanism,
- f. Total number and percentage of tubes plugged to date, and
- g. The results of condition monitoring, including the results of tube pulls and in-situ testing.

EXPLANATION OF TERMS

- 2R22: Salem Unit 2, 22nd Refueling Outage
- AVB: Anti-Vibration Bar
- CL: Cold Leg
- ETSS: Examination Technique Specification Sheet
- HL: Hot Leg
- OD: Outside Diameter
- SG: Steam Generator
- SPT: Support (Designates support/positioning device (Appui))
- TTS: Top of Tubesheet
- TSP: Tube Support Plate
- TW: Through-Wall

SG inspections were performed in accordance with TS 6.8.4.i, "Steam Generator Program", during Salem Unit 2 Outage 2R22. Each applicable reporting requirement of TS 6.9.1.10 is addressed below (items a through g).

a. Technical Specification 6.9.1.10.a, “The scope of inspections performed on each SG”

If not stated otherwise, the following inspections were performed on all four steam generators:

Bobbin Probe

1. A full-length (tube end to tube end) bobbin coil probe inspection was performed on 100% of the in-service tubes.

Array Probe (X-Probe)

1. First 3 outer periphery tubes on both hot leg (HL) and cold leg (CL); and the first 3 rows of no-tube lane on the HL and CL. Inspection extent was from the first tube support (01H or 01C) above the TTS to at least 3 inches below the TTS.
2. Special Interest inspections, including tube locations with historical loose parts and the tubes immediately adjacent to these locations.

Rotating Probe (+Point)

1. All AVB wear locations sized with Bobbin 30% TW or greater, and other selected AVB wear.
2. All TSP wear locations detected by Bobbin.
3. All locations in a tube with an SPT and selected tube locations adjacent to those tubes with an SPT.
4. Special Interest Inspections, including all Bobbin “I” code locations

b. Technical Specification 6.9.1.10.b, “Degradation mechanisms found”

The active degradation mechanisms found during outage 2R22 are AVB wear and TSP wear.

c. Technical Specification 6.9.1.10.c, “Nondestructive examination techniques utilized for each degradation mechanism”

Attachment 5 provides the Nondestructive examination techniques utilized for each degradation mechanism.

d. Technical Specification 6.9.1.10.d, “Location, orientation (if linear), and measured sizes (if available) of service induced indications”

The service induced indications detected during outage 2R22 are AVB wear and TSP wear. Attachments 6 and 7 provide information for the AVB and TSP wear service induced indications. The TW sizing provided in Attachments 6 and 7 is from EPRI ETSS 96004.1.

e. Technical Specification 6.9.1.10.e, “Number of tubes plugged during the inspection outage for each degradation mechanism”

Attachment 3 provides the number of tubes plugged during the inspection outage for each degradation mechanism.

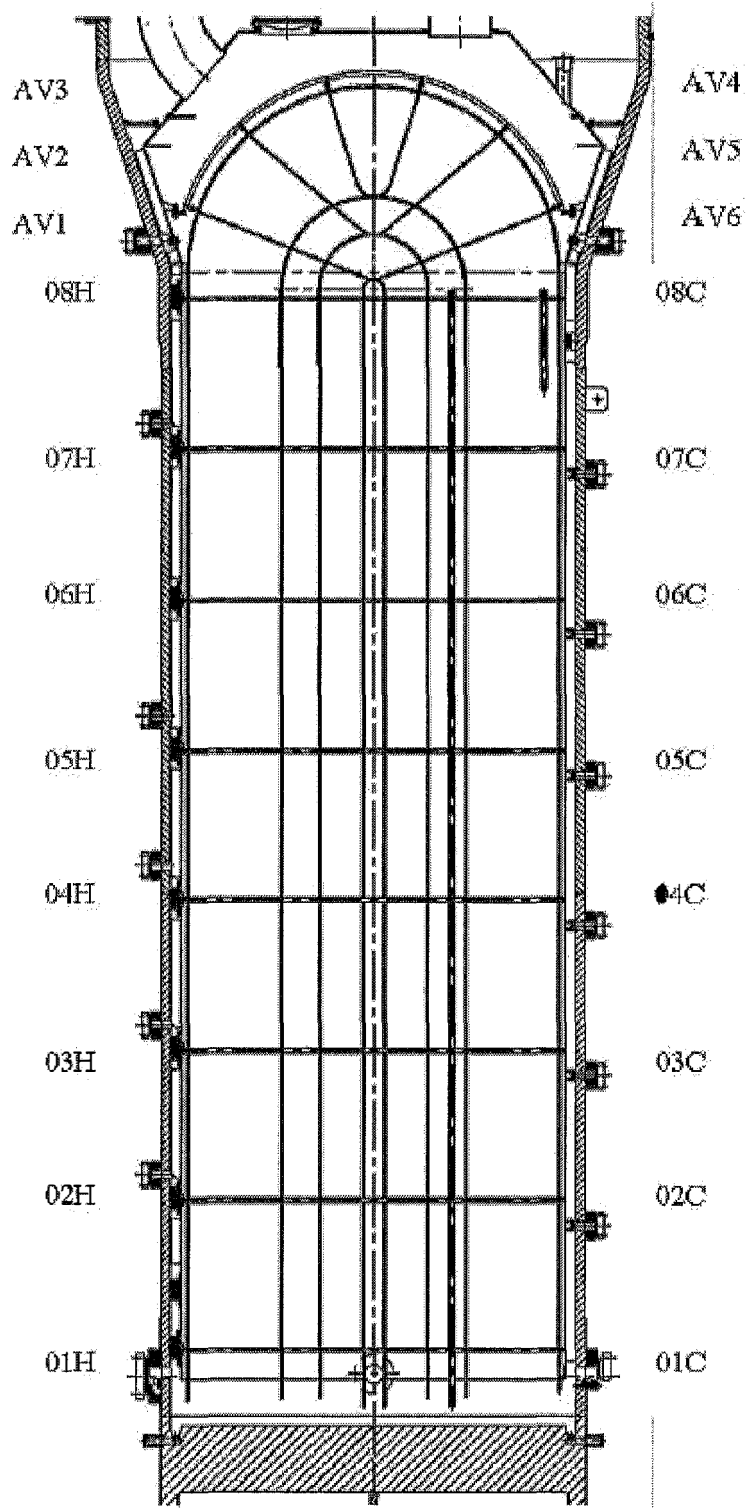
f. Technical Specification 6.9.1.10.f, “Total number and percentage of tubes plugged to date, and the effective plugging percentage in each steam generator”

Attachment 4 provides the total number and percentage of tubes plugged to date in each steam generator. The plugging percentage and the effective plugging percentage are the same.

g. Technical Specification 6.9.1.10.g, “The results of condition monitoring, including the results of tube pulls and in-situ testing”

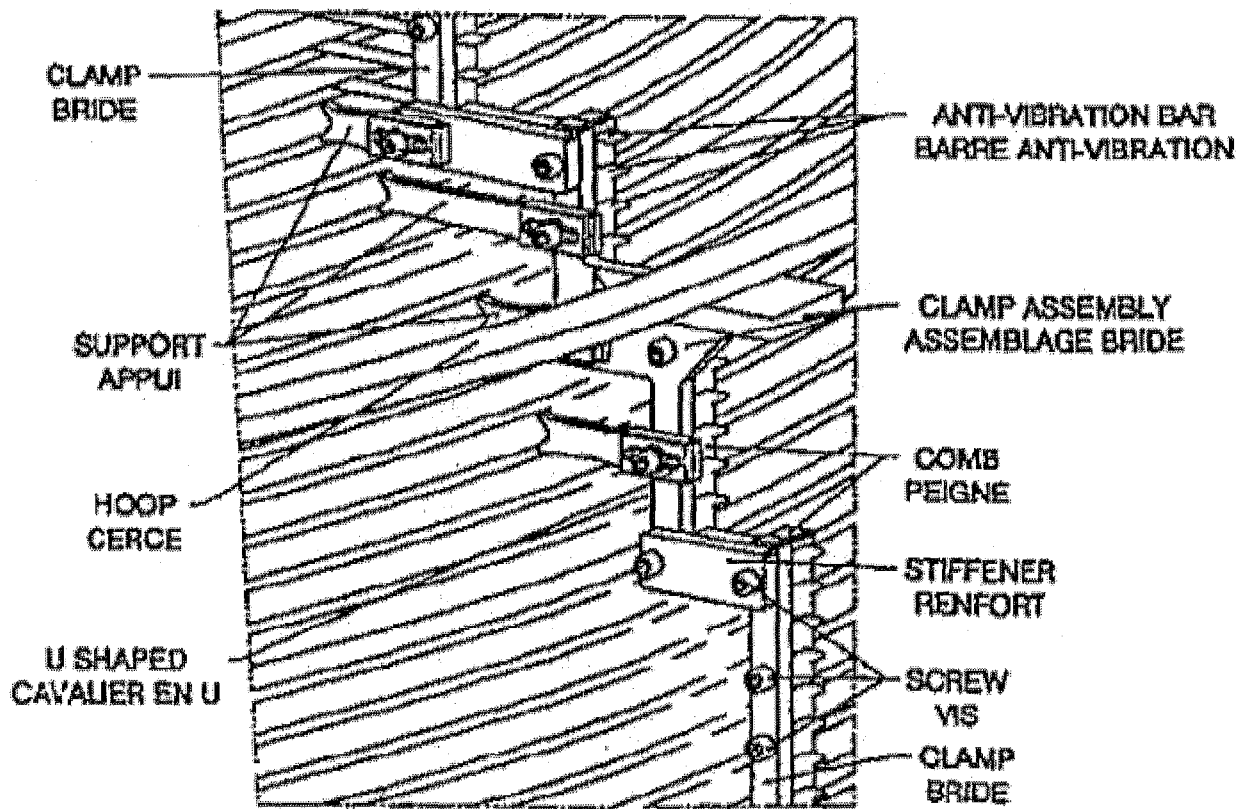
The largest depth of degradation detected during 2R22 for AVB wear was 33% TW, and for TSP wear was 23% TW. No SPT wear or Loose Part (Foreign Object) wear was detected during 2R22. All tubes inspected met the tube integrity performance criteria in TS 6.8.4.i.b. No tubes required in-situ pressure testing, and no tube pulls were required.

SALEM UNIT 2 SG TUBE SUPPORT ARRANGEMENT AND TERMINOLOGY



SALEM UNIT 2 SG TUBE SUPPORT ARRANGEMENT AND TERMINOLOGY

AVB bundle Support/Positioning Devices (Typical Configuration)



Note: The structure (SPT) is labeled "Support" or "Appui" in the above diagram.

2R22 TUBES PLUGGED FOR EACH DEGRADATION MECHANISM

Location	Tube Degradation	Steam Generator				Total
		21	22	23	24	
AVB	Wear	3	3	3	2	11
TSP	Wear	1	0	2	0	3
Total Tubes Plugged		4	3	5	2	14

TOTAL NUMBER AND PERCENTAGE OF TUBES PLUGGED TO DATE

Salem Unit 2 Steam Generator Tube Plugging Status					
	SG 21	SG 22	SG 23	SG 24	Total
Pre Service	0	0	0	0	0
2R17	1	3	1	5	10
2R18	2	5	1	8	16
2R19	29	23	0	20	72
2R20	56	34	6	37	133
2R21	0	0	0	0	0
2R22	4	3	5	2	14
Total Tubes Plugged	92	68	13	72	245
Total Percentage	1.823%	1.347%	0.258%	1.426%	1.213%

2R22 NONDESTRUCTIVE EXAMINATION TECHNIQUES

Technique Coil Type	Industry Qualification	Damage Mechanism	Demonstrated Applicability	Extended Applicability	Site-Specific Review Deemed Acceptable	
					Detection	Sizing
Bobbin	96004.1 Revision 13	Wear	AVB and TSP	AVB Support Structure (Appui)	Yes	Yes AVB &TSP
Bobbin	96004.3 Revision 13	Wear	AVB and TSP	None	Yes	Yes
Bobbin	27091.2 Revision 2	Foreign Object Wear	Foreign Object Wear (Object not present)	Detection of foreign object wear with object Present. Detection of foreign objects	Yes	N/A Size with RPC
Bobbin	Multiple	See Note	See Note	N/A	Yes	N/A
+Point	96910.1 Revision 10	Wear	Broached supports	Sizing of foreign object wear when part is present	Yes	Yes
+Point	21998.1 Revision 4	Volumetric	Freespan	None	Yes	Yes
+Point	27901.1 Rev 1 27902.1 Rev 2 27903.1 Rev 1 27904.1 Rev 2 27905.1 Rev 2 27906.1 Rev 1 27907.1 Rev 2	Foreign Object Wear	Freespan, TSP and Expansion Transition Foreign Object Wear Morphology Dependent (foreign object not present)	Detection of Foreign objects. Sizing of foreign object wear when part is present Sizing of wear associated with APPUI structure in an adjacent tube however	Yes	Yes

2R22 NONDESTRUCTIVE EXAMINATION TECHNIQUES

Technique Coil Type	Industry Qualification	Damage Mechanism	Demonstrated Applicability	Extended Applicability	Site-Specific Review Deemed Acceptable	
					Detection	Sizing
+Point	10908.4 Revision 1	Wear	AVB	Detection of AVB Support Structure Wear (APPUI)	Yes	Yes AVB wear only
+Point	Multiple	See Note	See Note	N/A	Yes	N/A
Array	11956.3 Rev 2 11956.4 Rev 2	Wear	Broached Supports	AVB Wear Volumetric degradation (foreign object wear) at Top- of-Tubesheet, support structures, and freespan. Detection of foreign objects	Yes	Yes TSP wear only
Array	Multiple	See Note	See Note	N/A	Yes	N/A

Note: EPRI qualified techniques used for diagnostic purposes to aid in the evaluation of a specific condition (if necessary).

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
21	14	18	6	AV6
21	17	11	4	AV6
21	17	15	6	AV6
21	37	33	6	AV2
21	37	33	5	AV5
21	39	69	5	AV2
21	46	46	5	AV3
21	48	70	7	AV3
21	50	52	6	AV5
21	51	41	6	AV4
21	51	63	9	AV2
21	51	63	8	AV5
21	51	73	8	AV4
21	51	73	4	AV5
21	52	62	5	AV2
21	52	78	7	AV5
21	53	53	11	AV3
21	53	53	16	AV2
21	53	53	5	AV4
21	53	53	15	AV5
21	53	57	7	AV5
21	53	57	9	AV4
21	53	65	8	AV2
21	53	79	9	AV4
21	53	95	4	AV3
21	54	72	11	AV2
21	54	76	15	AV5
21	54	76	10	AV3
21	54	76	13	AV4
21	54	82	13	AV4
21	54	82	12	AV3
21	54	88	8	AV2
21	55	35	7	AV4
21	55	41	7	AV4
21	55	83	7	AV5
21	55	83	6	AV4
21	56	36	10	AV3
21	56	64	6	AV3

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
21	57	49	5	AV4
21	58	48	9	AV4
21	58	64	6	AV2
21	58	64	10	AV3
21	58	64	10	AV5
21	58	64	10	AV4
21	58	76	17	AV3
21	58	76	21	AV5
21	58	76	21	AV4
21	59	63	9	AV5
21	59	63	8	AV2
21	59	65	5	AV2
21	59	65	6	AV5
21	59	79	7	AV4
21	60	52	14	AV5
21	60	52	13	AV4
21	61	59	6	AV5
21	61	63	6	AV4
21	61	65	5	AV3
21	61	65	7	AV4
21	61	65	10	AV5
21	62	62	5	AV4
21	62	64	14	AV2
21	62	64	4	AV4
21	62	72	8	AV2
21	62	72	10	AV5
21	63	77	5	AV3
21	64	56	7	AV4
21	64	56	5	AV5
21	65	53	6	AV5
21	65	53	7	AV4
21	65	53	10	AV3
21	65	59	6	AV4
21	65	61	9	AV2
21	65	61	7	AV4
21	65	61	6	AV5
21	65	61	5	AV3
21	66	48	13	AV3
21	66	48	22	AV4

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
21	66	48	8	AV5
21	66	52	6	AV5
21	66	52	12	AV3
21	66	52	16	AV4
21	66	58	7	AV5
21	66	58	11	AV2
21	66	58	13	AV4
21	66	58	13	AV3
21	66	68	19	AV3
21	66	68	23	AV4
21	66	68	8	AV5
21	67	53	21	AV3
21	67	53	15	AV2
21	67	53	21	AV4
21	67	55	10	AV3
21	67	55	8	AV4
21	67	61	11	AV3
21	67	63	10	AV5
21	67	63	10	AV4
21	67	67	15	AV4
21	67	67	8	AV2
21	67	67	17	AV3
21	68	58	16	AV4
21	68	58	15	AV5
21	68	58	10	AV3
21	68	58	8	AV2
21	68	64	17	AV2
21	68	64	18	AV5
21	68	64	21	AV4
21	68	64	6	AV3
21	69	49	5	AV4
21	69	51	19	AV4
21	69	51	14	AV3
21	69	57	8	AV5
21	69	59	5	AV3
21	69	61	15	AV3
21	69	61	8	AV2
21	69	61	22	AV4
21	69	61	8	AV6

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
21	69	61	20	AV5
21	69	63	18	AV5
21	69	63	25	AV4
21	69	63	28	AV3
21	69	63	9	AV2
21	69	65	15	AV4
21	69	65	19	AV3
21	69	67	11	AV4
21	69	67	5	AV3
21	70	48	16	AV3
21	70	48	18	AV4
21	70	52	13	AV5
21	70	52	11	AV4
21	70	54	17	AV3
21	70	54	12	AV2
21	70	54	19	AV4
21	70	56	20	AV4
21	70	56	17	AV2
21	70	56	25	AV5
21	70	56	20	AV3
21	70	58	6	AV3
21	70	58	6	AV4
21	70	60	7	AV4
21	70	62	9	AV3
21	70	62	9	AV4
21	70	62	6	AV5
21	70	62	6	AV2
21	70	66	9	AV5
21	70	66	7	AV4
21	70	66	7	AV3
21	71	51	17	AV3
21	71	51	17	AV4
21	71	59	10	AV3
21	71	59	13	AV4
21	71	59	13	AV2
21	71	63	9	AV5
21	71	63	11	AV4
21	71	65	15	AV4
21	71	65	7	AV2

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
21	71	65	21	AV3
21	71	65	10	AV5
21	71	65	8	AV6
21	72	54	18	AV3
21	72	54	19	AV4
21	72	54	15	AV5
21	72	58	13	AV4
21	72	58	8	AV5
21	72	58	8	AV3
21	72	60	11	AV4
21	72	64	12	AV2
21	72	64	22	AV4
21	72	64	24	AV3
21	72	64	12	AV5
21	72	70	9	AV2
21	72	70	20	AV3
21	72	70	23	AV4
21	72	70	8	AV5
21	73	55	11	AV2
21	73	55	7	AV5
21	73	55	11	AV4
21	73	55	12	AV3
21	73	57	11	AV3
21	73	57	7	AV5
21	73	57	6	AV2
21	73	63	6	AV4
21	73	63	6	AV5
21	73	63	6	AV3
21	73	65	22	AV3
21	73	65	17	AV4
21	73	65	16	AV5
21	73	67	6	AV4
21	73	67	13	AV3
21	74	56	9	AV5
21	74	56	5	AV4
21	74	60	13	AV3
21	74	60	11	AV4
21	74	60	14	AV5
21	74	60	9	AV2

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
21	74	64	6	AV4
21	74	64	7	AV3
21	75	57	16	AV4
21	75	57	14	AV3
21	75	57	15	AV5
21	75	59	18	AV2
21	75	59	12	AV5
21	75	59	15	AV3
21	75	59	7	AV6
21	75	59	18	AV4
21	75	67	17	AV3
21	75	67	16	AV2
21	75	67	9	AV5
21	75	67	22	AV4
21	75	69	20	AV5
21	75	69	8	AV2
21	75	69	19	AV4
21	75	69	19	AV3
21	75	71	10	AV4
21	76	56	8	AV2
21	76	56	10	AV5
21	76	56	8	AV3
21	76	56	12	AV4
21	76	60	13	AV5
21	76	60	10	AV2
21	76	60	25	AV3
21	76	60	15	AV4
21	76	62	8	AV2
21	76	62	11	AV3
21	76	62	15	AV4
21	76	62	10	AV5
21	76	62	7	AV6
21	76	66	8	AV4
21	76	66	7	AV5
21	76	66	10	AV3
21	76	68	15	AV4
21	76	68	11	AV3
21	77	55	9	AV4
21	77	57	11	AV2

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
21	77	57	20	AV3
21	77	57	9	AV6
21	77	57	15	AV4
21	77	57	23	AV5
21	77	65	10	AV4
21	77	67	6	AV4
21	77	67	5	AV3
21	77	67	5	AV2
21	77	71	9	AV3
21	78	60	12	AV2
21	78	60	15	AV3
21	78	60	12	AV4
21	78	60	14	AV5
21	78	62	23	AV3
21	78	62	21	AV4
21	78	62	6	AV6
21	78	62	20	AV2
21	78	62	9	AV5
21	78	76	7	AV2
21	78	76	5	AV3
21	79	55	11	AV4
21	79	57	14	AV3
21	79	57	12	AV4
21	79	59	13	AV3
21	79	59	15	AV5
21	79	63	18	AV4
21	79	63	6	AV5
21	79	63	7	AV2
21	79	63	11	AV3
21	80	60	18	AV2
21	80	60	24	AV3
21	80	60	16	AV5
21	80	60	11	AV4
21	80	64	5	AV2
21	81	57	14	AV3
21	81	57	6	AV2
21	82	58	9	AV2
21	82	58	12	AV3
21	82	58	8	AV4

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
21	82	64	8	AV4
21	82	68	22	AV4
21	82	68	17	AV2
21	82	68	19	AV5
21	82	72	8	AV3
21	82	72	8	AV4
21	82	74	19	AV4
21	82	74	24	AV5
21	82	74	7	AV6
21	83	57	7	AV5
21	83	57	8	AV3
21	83	67	15	AV2
21	83	67	14	AV3
21	83	67	20	AV4
21	83	67	11	AV5
21	84	52	8	AV2
21	84	58	21	AV4
21	84	58	16	AV3
21	84	58	13	AV6
21	84	58	25	AV5
21	84	62	19	AV4
21	84	62	5	AV2
21	84	62	15	AV5
21	84	62	19	AV3
21	84	80	21	AV5
21	84	80	16	AV4
21	85	63	14	AV3
21	86	56	7	AV5
21	86	62	8	AV5
21	86	62	11	AV4
21	87	61	7	AV2
21	87	61	10	AV4
21	87	61	13	AV5
21	87	61	16	AV3
21	87	65	7	AV3
21	87	65	15	AV2
21	87	65	7	AV5
21	87	65	23	AV4
21	88	56	10	AV4

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
21	88	66	6	AV6
21	88	72	8	AV4
21	89	57	7	AV2
21	89	57	16	AV5
21	89	57	9	AV3
21	89	57	25	AV4
21	89	73	10	AV5
21	89	73	18	AV4
21	89	73	11	AV3
21	90	56	23	AV4
21	90	56	8	AV3
21	90	60	11	AV2
21	90	60	9	AV5
21	90	60	8	AV4
21	90	62	9	AV3
21	90	62	13	AV4
21	90	64	7	AV4
21	90	64	10	AV5
21	90	74	10	AV3
21	90	74	8	AV2
21	91	57	9	AV4
21	91	57	8	AV2
21	91	57	9	AV3
21	91	59	18	AV3
21	91	59	21	AV2
21	91	59	21	AV4
21	91	59	19	AV5
21	91	61	17	AV5
21	91	63	19	AV5
21	91	63	17	AV4
21	91	67	8	AV4
21	91	71	6	AV2
21	92	58	24	AV4
21	92	58	21	AV3
21	92	58	8	AV6
21	92	62	6	AV5
21	92	66	12	AV4
21	92	66	10	AV5
21	93	51	5	AV3

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
21	93	57	9	AV5
21	93	57	17	AV4
21	93	61	10	AV4
21	93	61	11	AV5
21	93	67	7	AV4
21	93	73	12	AV5
21	94	62	22	AV2
21	94	62	8	AV6
21	94	62	24	AV5
21	94	62	16	AV4
21	94	62	28	AV3
21	94	64	7	AV5
21	94	64	8	AV4
21	94	64	15	AV2
21	94	64	13	AV3
21	95	61	8	AV3
21	95	67	11	AV2
21	95	67	8	AV3
21	96	50	8	AV4
21	96	50	15	AV5
21	96	60	27	AV4
21	96	60	9	AV2
21	96	60	25	AV5
21	96	72	8	AV3
21	96	78	5	AV1
21	96	78	12	AV4
21	97	53	7	AV5
21	97	53	8	AV2
21	97	63	7	AV4
21	97	65	9	AV3
21	97	65	8	AV2
21	98	50	13	AV4
21	98	76	19	AV2
21	98	76	4	AV1
21	98	76	8	AV3
21	98	78	8	AV2
21	99	51	11	AV5
21	99	57	5	AV4
21	99	59	15	AV6

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
21	99	59	31	AV4
21	99	59	12	AV5
21	99	65	21	AV3
21	99	65	11	AV4
21	99	67	11	AV2
21	99	69	9	AV2
21	99	73	5	AV5
21	99	73	10	AV2
21	99	73	19	AV3
21	100	56	10	AV5
21	100	62	5	AV5
21	100	66	8	AV3
21	100	78	10	AV1
21	101	59	8	AV6
21	101	59	23	AV4
21	101	59	22	AV3
21	102	56	7	AV5
21	103	57	7	AV4
22	47	25	6	AV3
22	47	97	7	AV4
22	48	12	7	AV4
22	49	49	6	AV3
22	49	55	4	AV4
22	49	61	6	AV4
22	49	63	5	AV4
22	49	65	8	AV4
22	50	60	10	AV4
22	50	60	9	AV3
22	50	96	6	AV4
22	51	47	6	AV3
22	52	48	6	AV4
22	52	74	11	AV5
22	52	80	6	AV5
22	53	61	5	AV3
22	53	77	9	AV4
22	55	81	9	AV5
22	55	83	4	AV4
22	57	59	12	AV3
22	57	61	6	AV2

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
22	58	52	7	AV4
22	58	62	12	AV4
22	58	62	15	AV2
22	58	62	9	AV5
22	59	61	7	AV2
22	59	61	9	AV3
22	59	61	10	AV4
22	59	61	16	AV5
22	60	48	6	AV4
22	60	58	8	AV4
22	60	58	18	AV3
22	60	62	5	AV5
22	60	62	7	AV4
22	60	66	11	AV4
22	60	74	20	AV2
22	60	74	19	AV4
22	60	74	16	AV5
22	60	74	8	AV3
22	60	78	4	AV2
22	61	61	19	AV5
22	61	61	17	AV3
22	61	61	15	AV4
22	61	65	7	AV4
22	62	52	12	AV3
22	62	52	29	AV4
22	62	52	27	AV5
22	62	60	10	AV2
22	62	60	15	AV4
22	62	60	16	AV3
22	62	62	22	AV5
22	62	62	24	AV4
22	62	62	17	AV2
22	62	62	19	AV3
22	62	74	8	AV3
22	62	74	12	AV2
22	62	74	14	AV5
22	62	74	15	AV4
22	63	63	19	AV2
22	63	63	10	AV4

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
22	63	63	19	AV3
22	63	65	7	AV4
22	63	65	5	AV2
22	64	64	12	AV6
22	64	64	15	AV3
22	64	64	21	AV2
22	64	64	23	AV5
22	65	57	6	AV3
22	65	61	10	AV2
22	65	61	10	AV4
22	65	61	10	AV5
22	65	63	8	AV3
22	65	63	13	AV4
22	65	67	15	AV3
22	65	67	25	AV4
22	65	67	20	AV5
22	65	69	8	AV4
22	65	75	13	AV3
22	65	75	11	AV4
22	65	75	8	AV2
22	65	77	5	AV4
22	66	60	7	AV2
22	66	60	21	AV4
22	66	60	11	AV5
22	66	60	25	AV3
22	66	64	17	AV5
22	66	64	7	AV3
22	66	74	6	AV2
22	66	80	9	AV4
22	66	80	8	AV3
22	66	80	5	AV2
22	67	49	10	AV3
22	67	57	9	AV3
22	67	57	5	AV2
22	67	61	17	AV2
22	67	61	25	AV3
22	67	61	24	AV5
22	67	61	20	AV4
22	67	65	9	AV4

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
22	68	46	11	AV4
22	68	46	6	AV3
22	68	46	7	AV5
22	68	60	16	AV4
22	68	60	23	AV3
22	68	60	12	AV5
22	68	64	11	AV5
22	68	64	17	AV2
22	68	64	15	AV3
22	68	78	7	AV4
22	68	78	4	AV5
22	68	78	5	AV3
22	69	63	15	AV4
22	69	63	16	AV3
22	69	63	19	AV2
22	69	63	10	AV5
22	69	69	6	AV4
22	70	62	14	AV4
22	70	62	18	AV5
22	70	62	6	AV2
22	70	64	17	AV5
22	70	64	21	AV2
22	70	64	18	AV3
22	70	80	7	AV4
22	70	80	9	AV3
22	70	80	8	AV2
22	71	51	9	AV2
22	71	51	6	AV3
22	71	63	24	AV4
22	71	63	9	AV2
22	71	63	22	AV3
22	71	65	14	AV2
22	71	65	24	AV4
22	71	65	18	AV3
22	71	65	19	AV5
22	71	75	6	AV2
22	72	58	14	AV2
22	72	58	27	AV4
22	72	58	17	AV3

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
22	72	58	5	AV5
22	72	64	11	AV2
22	72	64	18	AV3
22	72	64	12	AV5
22	72	66	7	AV3
22	72	66	4	AV5
22	72	68	19	AV3
22	72	68	19	AV4
22	72	82	7	AV4
22	73	65	11	AV3
22	73	65	17	AV5
22	73	65	18	AV4
22	73	65	6	AV2
22	73	77	20	AV5
22	73	77	11	AV4
22	74	48	7	AV4
22	74	48	10	AV3
22	74	66	7	AV3
22	74	66	6	AV2
22	75	61	9	AV3
22	75	61	9	AV4
22	76	54	13	AV3
22	76	54	25	AV4
22	76	54	12	AV5
22	76	60	14	AV3
22	76	60	18	AV4
22	77	63	21	AV4
22	77	63	22	AV3
22	77	63	12	AV2
22	77	65	6	AV2
22	77	65	18	AV4
22	77	65	10	AV3
22	77	65	16	AV5
22	77	75	11	AV5
22	77	79	15	AV3
22	77	79	11	AV4
22	79	59	10	AV2
22	79	59	14	AV4
22	79	59	23	AV5

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
22	79	63	21	AV3
22	79	63	21	AV4
22	79	73	8	AV5
22	80	62	12	AV4
22	80	64	11	AV3
22	80	64	6	AV2
22	80	78	13	AV4
22	80	78	16	AV5
22	81	57	17	AV5
22	81	57	17	AV2
22	81	57	20	AV4
22	81	57	20	AV3
22	81	65	18	AV4
22	81	65	16	AV5
22	81	65	19	AV3
22	81	69	7	AV4
22	81	69	23	AV3
22	81	69	17	AV5
22	81	69	13	AV2
22	82	56	18	AV4
22	82	56	19	AV5
22	82	74	12	AV3
22	82	74	22	AV2
22	83	69	6	AV2
22	84	58	8	AV4
22	84	58	16	AV3
22	84	58	6	AV2
22	85	61	7	AV4
22	85	63	7	AV4
22	85	63	13	AV3
22	85	69	13	AV4
22	85	69	14	AV3
22	85	71	10	AV3
22	86	52	6	AV4
22	86	64	16	AV5
22	86	64	7	AV6
22	86	64	6	AV4
22	87	47	8	AV4
22	87	63	10	AV3

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
22	87	63	12	AV4
22	87	63	16	AV5
22	88	66	8	AV3
22	88	72	9	AV2
22	88	72	6	AV3
22	88	74	18	AV2
22	88	78	9	AV5
22	89	51	7	AV3
22	89	53	22	AV4
22	89	53	7	AV2
22	89	59	18	AV3
22	89	59	9	AV5
22	89	59	23	AV2
22	89	59	9	AV4
22	89	59	7	AV1
22	89	61	15	AV2
22	89	61	10	AV5
22	89	61	19	AV3
22	89	63	15	AV4
22	89	63	17	AV3
22	89	63	10	AV2
22	90	54	8	AV3
22	90	58	6	AV3
22	90	60	10	AV2
22	91	51	7	AV5
22	91	59	20	AV4
22	91	59	13	AV3
22	91	59	4	AV6
22	91	59	25	AV5
22	91	59	12	AV2
22	92	50	23	AV4
22	92	50	18	AV3
22	92	54	13	AV2
22	92	54	29	AV5
22	92	54	26	AV4
22	92	70	7	AV5
22	92	70	6	AV2
22	92	70	18	AV3
22	93	49	10	AV4

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
22	93	57	7	AV2
22	93	57	16	AV3
22	93	57	10	AV5
22	93	57	20	AV4
22	93	59	8	AV3
22	93	59	18	AV4
22	93	59	12	AV2
22	93	65	11	AV4
22	93	65	23	AV5
22	93	67	12	AV4
22	93	67	9	AV5
22	93	69	5	AV5
22	93	69	11	AV3
22	94	56	14	AV4
22	94	56	9	AV2
22	94	56	8	AV5
22	94	62	5	AV4
22	95	53	7	AV2
22	95	55	8	AV4
22	95	55	29	AV3
22	95	55	9	AV2
22	95	57	22	AV4
22	95	57	24	AV5
22	95	61	26	AV4
22	95	61	30	AV3
22	95	61	8	AV2
22	96	58	6	AV2
22	96	60	10	AV2
22	97	57	11	AV3
22	97	57	19	AV4
22	97	57	14	AV5
22	97	71	10	AV5
22	98	52	15	AV2
22	98	56	7	AV2
22	98	58	20	AV4
22	98	58	21	AV3
22	98	58	8	AV5
22	98	60	8	AV4
22	98	60	6	AV5

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
22	98	62	9	AV5
22	98	66	14	AV5
22	98	66	6	AV4
22	98	78	18	AV3
22	98	78	26	AV2
22	98	78	7	AV6
22	98	78	7	AV4
22	98	78	15	AV5
22	101	73	9	AV2
22	103	55	9	AV3
23	46	12	5	AV4
23	54	48	5	AV2
23	54	50	9	AV3
23	54	50	8	AV4
23	54	82	7	AV3
23	54	82	5	AV4
23	58	82	5	AV1
23	58	82	7	AV3
23	58	82	11	AV4
23	58	82	10	AV5
23	59	73	7	AV3
23	59	73	8	AV4
23	59	75	8	AV3
23	59	75	5	AV4
23	63	51	6	AV3
23	63	51	6	AV4
23	63	81	10	AV5
23	67	61	8	AV2
23	67	61	23	AV3
23	67	61	22	AV4
23	67	61	9	AV5
23	67	73	9	AV2
23	67	73	9	AV3
23	67	73	15	AV4
23	67	73	16	AV5
23	68	78	17	AV3
23	68	78	11	AV4
23	69	59	5	AV2
23	69	59	5	AV3

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
23	70	68	11	AV2
23	70	68	11	AV3
23	70	68	7	AV4
23	70	68	7	AV5
23	71	69	12	AV3
23	71	69	12	AV4
23	73	75	12	AV3
23	73	75	18	AV4
23	75	61	6	AV2
23	75	61	12	AV3
23	75	61	10	AV4
23	75	73	12	AV3
23	75	73	17	AV4
23	75	73	21	AV5
23	76	72	6	AV3
23	76	72	8	AV4
23	77	73	12	AV2
23	77	73	13	AV3
23	77	73	25	AV4
23	77	73	17	AV5
23	79	61	7	AV3
23	79	65	7	AV2
23	79	65	13	AV4
23	79	65	9	AV5
23	79	73	7	AV3
23	81	71	11	AV4
23	81	71	12	AV5
23	83	67	8	AV2
23	83	67	11	AV4
23	83	67	27	AV5
23	84	66	8	AV2
23	86	64	10	AV4
23	86	68	5	AV2
23	86	68	7	AV5
23	88	64	14	AV2
23	88	64	21	AV3
23	88	64	33	AV4
23	89	59	9	AV3
23	89	59	6	AV4

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
23	91	61	7	AV4
23	91	63	9	AV2
23	91	63	29	AV5
23	91	71	7	AV2
23	91	73	21	AV2
23	91	73	18	AV3
23	91	73	14	AV4
23	91	73	11	AV5
23	91	73	7	AV6
23	92	50	6	AV3
23	92	56	9	AV2
23	92	56	6	AV3
23	92	56	21	AV4
23	92	56	20	AV5
23	92	62	16	AV3
23	92	62	30	AV4
23	93	57	6	AV2
23	93	65	5	AV3
23	94	64	7	AV2
23	95	51	17	AV4
23	95	51	22	AV5
23	95	73	7	AV3
23	95	73	17	AV4
23	95	73	10	AV5
23	97	75	13	AV5
23	98	50	5	AV4
23	98	54	14	AV5
23	100	50	10	AV3
23	102	64	15	AV4
23	102	64	33	AV5
23	102	64	17	AV6
24	46	64	5	AV5
24	47	9	6	AV2
24	50	64	8	AV5
24	51	47	5	AV3
24	51	81	7	AV4
24	51	81	13	AV3
24	52	44	8	AV5
24	52	44	11	AV4

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
24	52	44	11	AV3
24	53	43	5	AV2
24	53	53	17	AV3
24	53	53	24	AV4
24	53	53	21	AV5
24	53	53	11	AV6
24	53	53	5	AV2
24	53	67	10	AV2
24	53	67	9	AV3
24	53	67	8	AV4
24	53	73	7	AV4
24	53	77	6	AV2
24	53	77	8	AV3
24	53	77	6	AV5
24	53	77	8	AV4
24	54	38	8	AV4
24	55	45	5	AV3
24	55	45	8	AV4
24	55	71	4	AV2
24	55	79	7	AV3
24	55	79	8	AV4
24	56	46	7	AV3
24	56	46	8	AV4
24	56	70	8	AV1
24	56	70	7	AV3
24	57	41	5	AV3
24	57	49	14	AV4
24	57	49	16	AV5
24	57	49	8	AV3
24	57	55	8	AV5
24	57	67	6	AV5
24	57	73	5	AV5
24	58	44	5	AV3
24	58	46	14	AV5
24	58	46	17	AV4
24	58	46	16	AV3
24	59	61	9	AV3
24	59	61	9	AV4
24	59	67	8	AV4

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
24	59	67	12	AV3
24	59	67	9	AV5
24	59	67	6	AV2
24	59	73	10	AV2
24	59	73	20	AV4
24	59	73	17	AV3
24	59	73	18	AV5
24	60	46	9	AV3
24	60	46	10	AV4
24	60	56	7	AV5
24	63	59	7	AV3
24	63	71	8	AV4
24	63	71	10	AV5
24	63	71	5	AV2
24	64	64	10	AV2
24	64	64	13	AV5
24	64	64	9	AV3
24	64	66	5	AV1
24	64	66	9	AV4
24	64	66	8	AV3
24	65	63	8	AV4
24	65	69	5	AV4
24	65	71	8	AV2
24	66	64	12	AV3
24	66	64	6	AV4
24	66	64	12	AV2
24	66	66	11	AV5
24	66	66	13	AV4
24	66	68	6	AV2
24	66	68	13	AV3
24	66	68	13	AV4
24	67	67	16	AV4
24	67	67	17	AV3
24	67	67	11	AV5
24	67	67	9	AV2
24	67	69	11	AV4
24	67	69	8	AV3
24	67	69	6	AV5
24	67	69	6	AV2

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
24	68	64	16	AV5
24	68	64	10	AV4
24	68	64	9	AV2
24	68	64	13	AV3
24	68	66	5	AV5
24	68	68	10	AV3
24	68	68	11	AV4
24	68	68	8	AV5
24	68	70	10	AV4
24	68	70	11	AV2
24	68	70	12	AV3
24	68	70	13	AV5
24	68	76	6	AV5
24	68	76	8	AV4
24	68	78	6	AV5
24	69	65	5	AV3
24	69	65	12	AV4
24	69	65	8	AV5
24	70	68	15	AV5
24	70	68	25	AV4
24	70	68	15	AV2
24	70	68	22	AV3
24	70	74	17	AV4
24	70	74	8	AV2
24	70	74	18	AV3
24	70	74	11	AV5
24	70	76	5	AV4
24	70	76	10	AV5
24	70	76	19	AV2
24	70	76	6	AV3
24	71	65	13	AV3
24	71	67	6	AV6
24	71	67	13	AV3
24	71	67	18	AV5
24	71	67	7	AV4
24	71	67	17	AV2
24	71	73	8	AV3
24	71	73	9	AV4
24	71	73	11	AV2

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
24	73	61	22	AV3
24	73	61	17	AV4
24	73	61	13	AV2
24	73	61	15	AV5
24	75	71	10	AV5
24	75	71	16	AV4
24	75	71	8	AV3
24	75	71	12	AV2
24	76	62	18	AV5
24	76	62	7	AV6
24	76	62	22	AV3
24	76	62	23	AV4
24	77	69	8	AV4
24	77	69	13	AV2
24	77	69	9	AV3
24	77	73	30	AV5
24	77	73	30	AV4
24	77	73	7	AV6
24	79	65	25	AV4
24	79	65	17	AV3
24	79	65	12	AV2
24	79	65	11	AV5
24	80	60	20	AV5
24	80	62	11	AV4
24	80	62	6	AV2
24	81	45	16	AV5
24	81	45	14	AV4
24	81	57	6	AV3
24	81	57	8	AV4
24	81	57	10	AV5
24	81	59	11	AV3
24	81	59	8	AV2
24	81	59	11	AV5
24	81	59	17	AV4
24	81	63	8	AV4
24	81	67	10	AV3
24	81	67	21	AV5
24	81	67	22	AV2
24	81	67	6	AV1

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
24	81	67	21	AV4
24	82	64	19	AV3
24	82	64	20	AV5
24	82	64	8	AV2
24	83	55	5	AV2
24	83	67	7	AV5
24	83	67	8	AV4
24	84	60	7	AV5
24	84	60	8	AV4
24	85	57	8	AV5
24	85	57	20	AV4
24	85	57	10	AV2
24	85	57	12	AV3
24	85	67	7	AV2
24	86	58	7	AV3
24	86	58	18	AV4
24	86	66	10	AV4
24	87	53	9	AV2
24	87	61	9	AV3
24	87	61	8	AV2
24	87	61	14	AV4
24	87	63	10	AV5
24	87	63	4	AV2
24	87	63	9	AV4
24	89	57	17	AV4
24	89	57	17	AV5
24	90	64	8	AV2
24	90	64	5	AV3
24	91	63	5	AV3
24	91	75	13	AV6
24	92	76	22	AV2
24	93	49	19	AV4
24	93	49	8	AV3
24	93	55	18	AV3
24	93	55	6	AV2
24	93	55	16	AV4
24	93	59	6	AV2
24	93	71	15	AV3
24	93	71	6	AV2

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
24	93	71	15	AV4
24	94	48	7	AV2
24	94	50	10	AV3
24	94	50	7	AV2
24	94	68	17	AV3
24	94	68	11	AV4
24	95	57	12	AV2
24	95	57	11	AV5
24	95	57	10	AV4
24	96	60	15	AV3
24	96	60	11	AV4
24	96	60	13	AV2
24	96	64	21	AV4
24	96	64	18	AV5
24	96	76	16	AV2
24	97	51	8	AV5
24	97	51	14	AV3
24	97	51	11	AV2
24	97	59	10	AV2
24	97	77	12	AV2
24	97	77	11	AV4
24	97	77	15	AV3
24	98	50	8	AV6
24	98	50	11	AV5
24	98	50	17	AV4
24	98	50	10	AV3
24	98	52	24	AV2
24	98	78	9	AV2
24	100	50	7	AV3
24	100	58	15	AV4
24	100	58	17	AV5
24	100	76	22	AV2
24	100	76	8	AV1
24	101	53	15	AV4
24	101	53	22	AV5
24	101	53	8	AV2
24	101	53	8	AV6
24	101	53	7	AV3
24	101	59	8	AV5

2R22 SERVICE INDUCED INDICATIONS (AVB WEAR)

SG	ROW	COL	%TW	SUPPORT
24	101	59	11	AV2
24	101	69	13	AV5
24	101	69	26	AV4
24	101	69	21	AV2
24	102	70	12	AV3
24	102	70	29	AV2
24	102	72	14	AV2

2R22 SERVICE INDUCED INDICATIONS (TSP WEAR)

SG	ROW	COL	%TW	SUPPORT
21	1	61	9	06C -0.18
21	1	67	15	04C -0.14
21	2	64	10	05C +0.14
21	14	96	8	07H -0.75
21	80	24	9	06H -0.76
21	100	80	12	05H +0.37
22	3	11	9	06C -0.78
22	45	73	9	04C -0.64
22	85	91	10	05H +0.42
23	1	9	12	05C +0.34
23	1	23	11	04C +0.34
23	1	65	20	04C -0.13
23	1	85	23	05C -0.71
23	1	85	14	05C +0.29
23	1	87	13	05C -0.65
23	1	97	13	04C +0.00
23	1	97	14	05C +0.32
23	3	75	14	05C -0.57
23	15	125	13	05H +0.39
23	53	51	11	06H -0.76
23	97	43	10	04H +0.46
24	1	65	11	05C +0.35
24	1	65	10	06C -0.71
24	1	65	12	06C +0.25
24	1	67	10	06C -0.78
24	1	83	9	06C -0.71
24	2	44	9	07C -0.68
24	11	53	9	05C -0.72
24	61	91	11	06H -0.78
24	69	29	10	03H -0.67
24	84	62	8	06H +0.39
24	98	82	12	07H +0.35
24	100	78	8	07C +0.36
24	103	73	12	07H +0.46
24	104	66	12	06C -0.55