Date Distributed: January 30, 2018

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD SUBGROUP HISTORICAL BOILERS

MINUTES

Meeting of January 8th, 2018
New Orleans, LA

These minutes are subject to approval and are for the committee use only. They are not to be duplicated or quoted for other than committee use.

The National Board of Boiler & Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, Ohio 43229-1183
Phone: (614)888-8320
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1. **Call to Order**
   The meeting was called to order at 10:07 a.m. on January 8, 2018 by Chairman, Mr. Joel Amato.

2. **Introduction of Members and Visitors**
   M. Bost sat in as an alternate for R. Underwood.
   The attendees are identified on the attendance sign in sheet (**Attachment Pages 1-2)**. With the attached attendance listing, a quorum was established.

3. **Announcements**
   Secretary, Jodi Metzmaier, made announcements to the subgroup.

4. **Adoption of the Agenda**
   - Add R. Troutt & M. Sansone as nominations
   - Add J. Amato, J. Getter, F. Johnson, M. Jordan, Dennis Rupert and Mike Wahl for membership reappointment.
   - Add Officer Selection
   - Add Task Group to NB-16-0503

   The above items were added to the agenda. The revised agenda was adopted unanimously by the subgroup.

5. **Approval of the Minutes of July 17th, 2017 Meeting**
   The minutes from the July 2017 SG Historical meeting were unanimously approved.

6. **Review of Rosters**
   a. **Membership Nominations**
      - Rob Troutt and Matt Sansone would like to be members on the Subgroup Historical Boilers.

      Both R. Troutt and M. Sansone spoke to the SG as to why they would be an asset as members of the SG Historical. A motion was made to recommend they both become members of the SG. The motion was unanimously approved.

   b. **Membership Reappointments**
      - Joel Amato, Jim Getter, Frank Johnson, Mark Jordan, Dennis Rupert and Mike Wahl are all up for reappointment.

      The SG unanimously recommended to not reappoint M. Jordan to the SG on historical boilers, as he will be becoming a member of SG Locomotive.

      A motion was made to reappoint J. Amato, J. Getter, F. Johnson, D. Rupert and Mike Wahl to SG Historical. The motion was unanimously approved.

c. Officer Selection

- Joel Amato's term as Chair will expire in March 2018. A Chair needs to be recommended. Mr. Amato is eligible for reappointment. Anyone else interested, must have at least 2 years committee experience.

J. Amato recommended Tom Dillon to be the new Chair of SG historical. A motion was made, and unanimously passed to make T. Dillon the Chair of SG historical.

Since T. Dillon was the Vice Chair of SG Historical, a new Vice Chair needed to be recommended. A motion was made to appoint Jim Getter as the new Vice Chair of SG historical. The motion was unanimously approved.

7. Action Items

Item Number: NB13-0903	**NBIC Location: Part 2, S2.14**	**Attachment Page 3**

General Description: Add safety requirements for use of liquid or gaseous fuels to fire a historical boiler

Subgroup: Historical
Task Group: D. Rupert (PM), T. Dillon, J. Larson, R. Bryce

January 2018 Meeting Action:
The disapproval comments made by B. Wielgoszinski were reviewed and discussed. B. Wielgoszinski was present to discuss his concerns. Through discussion, he withdrew his first comment. Revisions were made to the proposed document based on his comments. A motion was made to withdraw the Letter Ballot and move the revised document to the Subcommittee Inspection for review and vote. **The motion was unanimously approved.**

Item Number: NB15-1602	**NBIC Location: Part 3, S2.7.1**	**No Attachment**

General Description: Revise material list for historical boiler reports to include bolts, studs, nuts and formed pressure parts

Subgroup: Historical
Task Group: T. Dillon (PM), M. Wahl, G. Galanes

January 2018 Meeting Action:
Progress Report. T. Dillon addressed the Subgroup stating the task group will be working with Subgroup Locomotive to come up with a list of the material for historical reports. They feel the lists should be similar, if not the same.

Add L. Moedinger and Rick Musser to the Task Group.

Item Number: NB16-0502	**NBIC Location: Part 2**	**No Attachment**

General Description: Gage glass and water level over historical boiler crown sheets

Subgroup: Historical
Task Group: D. Rupert (PM), T. Dillon, R. Underwood & R. Troutt

January 2018 Meeting Action:
Progress report. The subgroup reviewed and discussed the document proposed. L. Moedinger from SG Locomotive noted that Locomotive marks the highest part of the crown sheet on the back head of the boiler. The SG Historical decided the task group needs to work with locomotive before proposing anything further to SG historical.

Item Number: NB16-0503	NBIC Location: Part 3, S2.13.13.4	Attachment Pages 4-5

General Description: Add types of rivet heads

Subgroup: Historical
Task Group: D. Rose (PM) and R. Bryce

January 2018 Meeting Action:
D. Rose presented new wording along with drawings. The subgroup made a few changes to the wording and a motion was made to accept the revised wording and drawings. **The motion was unanimously approved**.

Item Number: NB17-0601	NBIC Location: Part 3	No Attachment

General Description: Single staybolt with threaded and welded connections

Subgroup: Historical
Task Group: M. Wahl (PM), G. Galanes, R. Underwood

January 2018 Meeting Action:
There was no action taken by SG historical. The item was unanimously closed by SG historical in July 2017.

Item Number: NB17-0602	NBIC Location: Part 3	No Attachment

General Description: Scope of repair/new historical boiler with an R Stamp

Subgroup: Historical
Task Group: R. Underwood (PM), M. Wahl, J. Amato, D. Rose, M. Jordan

January 2018 Meeting Action:
Progress report. D. Rose presented a document to the SG to compare to the document created by R. Underwood. The SG reviewed and discussed the documents and determined the proposals need further work by the task group.

Item Number: 17-136	NBIC Location: Part 2, S2	Attachment Pages 6-7

General Description: Update tables in Part 2, S2 with correct values

Subgroup: Historical
Task Group: J. Amato

January 2018 Meeting Action:
This item was unanimously approved at the July 2017 meeting by SG historical. The SC Inspection did not move the item forward due to lack of information. J. Amato has revised the table with the correct information. A motion was made to move the item back to SC Inspection. **The motion was unanimously approved.**

8. Future Meetings

- July 16th-19th, 2018 – Columbus, Ohio
- January 14th-17th – Location TBD

9. Adjournment

A motion was made and unanimously approved to adjourn the meeting at 12:32 p.m.

Respectfully submitted,

Jodi Metzmaier
SG Historical Secretary

SG Historical Attendance Sheet - 1/8/18

Name	Company	Phone Number	Email	Signature	Attend Reception?	Bringing Guest?
Joel Amato	State of Minnesota	(651) 284-5137	joel.amato@state.mn.us		X	
Tom Dillon	Deltak	612-308-9560 (763) 425-0733	tdillon@deltak.com dillon160hp@GMAIL.COM			
Jodi Metzmaier	National Board	(614) 888-8320	jmetzmaier@nationalboard.org		X	
Jim Getter	Worthington Industries	(614) 840-3087	jim.getter@worthingtonindustries.com		X	
Frank Johnson	PBF Energy	(419) 698-6614	frank.johnson@pbfenergy.com			
Mark Jordan	State of Kentucky	(502) 573-1708	mark.jordan@ky.gov			
David Rose	T&T Inspections	(780) 217-8175	dr3747@telus.net		X	X
Dennis Rupert	Consultant	(517) 437-4565	rupertcull@comcast.net			
Robert Underwood	Hartford Steam Boiler	(618) 593-6231	robert_underwood@hsbct.com			
Mike Wahl	Wisconsin Historical Steam Engine Association	(920) 972-7308	mikew@midstal.com			
Jon Wolf	Zurich	(847) 706-2417	jon.wolf@zurichna.com		✓	
MONTE BOST	HSB	937-620 3676	MONTE_BOST@HSB.COM		✓	✓
TOM SHERNISKY	OneGIS	304-374-5165	thomas.sherniskY@onegis.com		✓	
MIKE VOGEL	STATE OF ILLINOIS	217-725 7595	mike.vogel@illinois.gov		✓	
Donnie LeSage	State of Louisiana	225-263 5549	Donnie.LeSage@LA.Gov		✓	
PAUL WELCH	ARISE	678-446 5290	PAUL.WELCH@ARISEINC.COM		✓	
WAYNE JONES	ARISE	251-937 6225	WAYNE.JONES@ARISEINC.COM		✓	
Matthew Sansone	NY State	585 303-1316	matthew.sansone@labor.ny.gov		X	
JON WOLF	ZURICH	920 253-8781	jon.wolf@zurichna.com		✓	
Rob Troth	Texas	512 - 638-2727	Rob.Troth@TDLR.texas.gov		✓	
Rick Russell	Strasburg Rail Road Co	717 682-7559	rick@strasburgrailroad.com		✓	✓

Name	Company	Phone Number	Email	Signature	Attend Reception?	Bringing Guest?
Linn Moedinger	Strasburg RR	7075754478	linnwm@supernet.com		Y	Y
David Martinez	FM GLOBAL	757-274-6106	david.martinez@fmglobal.com	David Martinez	Y	Y
Gary Teel	State of California	714-767-1407	gteel@dir.ca.gov	Gary Teel	Y	Y
Ron Spiker	S.C.	803 608 1630	ronndj@gmail.com		Y	N

Action Item Request

Code Revision or Addition: NB13-0903 to Part 2, S2.14

The requestor, Mr Don Cook, Chief Inspector, State of California has been seeing occasions in his state where historical boilers are being fired with liquid or gaseous fuels and is asking the Committee to provide some cautionary guidance in NBIC to address these important safety issues related to that activity.

PROPOSE:

New paragraph, Part 2, Supplement S2.14.16:

FIRING OF HISTORICAL BOILERS WITH LIQUID OR GASEOUS FUELS.

Hand firing of historical boilers with liquid or gaseous fuels poses significant additional safety concerns beyond those encountered when firing with solid fuels for which these boilers were originally designed, such as coal, straw or wood. The cautionary notes listed below are provided as examples to remind the owner or user that additional safety concerns do exist when firing historical boilers with these alternate fuels. These notes are not meant to be all-inclusive so each boilers fuel system should be designed appropriately.

a) JURISDICTIONAL ACCEPTANCE: The owner or user ~~should~~ shall check with the Jurisdiction as applicable to determine if this alternative firing method is allowed.
b) OWNER OR USER KNOWLEDGE: The owner or user shall have an extensive knowledge of the fuel used, fuel transfer system, on board fuel storage, burner, firing controls, emergency shut off devices and procedures.
c) PURGING: To prevent a firebox explosion, ~~it is essential to ensure that~~ the furnace ~~is~~ shall be purged of combustible gasses prior to applying the fuel ignition source to prevent flame-outs.
d) FLAME IMPINGEMENT: Direct flame impingement of the metal surfaces within the furnace can damage the boiler. Installation of refractory or fire brick in the firebox is a common practice to prevent this potential damage.
e) LOW WATER: The owner or user ~~must~~ shall have a ~~plan and method~~procedure in place to immediately shut off the fuel supply to the burner when a boiler low water condition occurs.
f) FUEL CONTAINMENT: The fuel storage system ~~must~~ shall be suitably designed with the appropriate shut off devices for the specific fuel product. The mounting method and proximity of the fuel storage container to the furnace ~~must~~ shall be considered to prevent the fuel from accidental ignition.
g) FUEL SYSTEM: The fuel delivery system and routing from fuel source to the burner shall be suitably designed for the specific fuel product including appropriate emergency shut off devices. ~~The routing of the fuel delivery system should be a consideration as well.~~
h) FUEL AIR MIXTURE: The burner utilized shall be designed to operate within the confines of the boiler furnace and provide the proper fuel/air mixture.
i) SAFETY VALVE: The boilers minimum relieving capacity shall be computed for the type of fuel used.
j) COMPRESSED NATURAL GAS (CNG) vs LIQUID PETROLEUM GAS (LPG): CNG is lighter than air and LPG is heavier than air. The owner or user should understand the properties of the fuels to ensure the gas will not accumulate in the boiler (see Purging above).

NB16-0503

Part 3

S2.13.13.4

Current wording:

c) Rivets shall be of sufficient length to completely fill the rivet holes and form heads at least equal in strength to the bodies of the rivets. Forms of finished rivet heads that will be acceptable are shown in NBIC Part 3, Figure S2.13.13.4-a and S2.13.13.4-b.

Replace with:

b) Rivets shall be of sufficient length to completely fill the rivet holes and form heads at least equal in strength to the bodies of the rivets. Common Forms of finished rivet heads that will be acceptable are shown in NBIC Part 3, Figure S2.13.13.4-a, S2.13.13.4-b and S2.13.13.4-c.

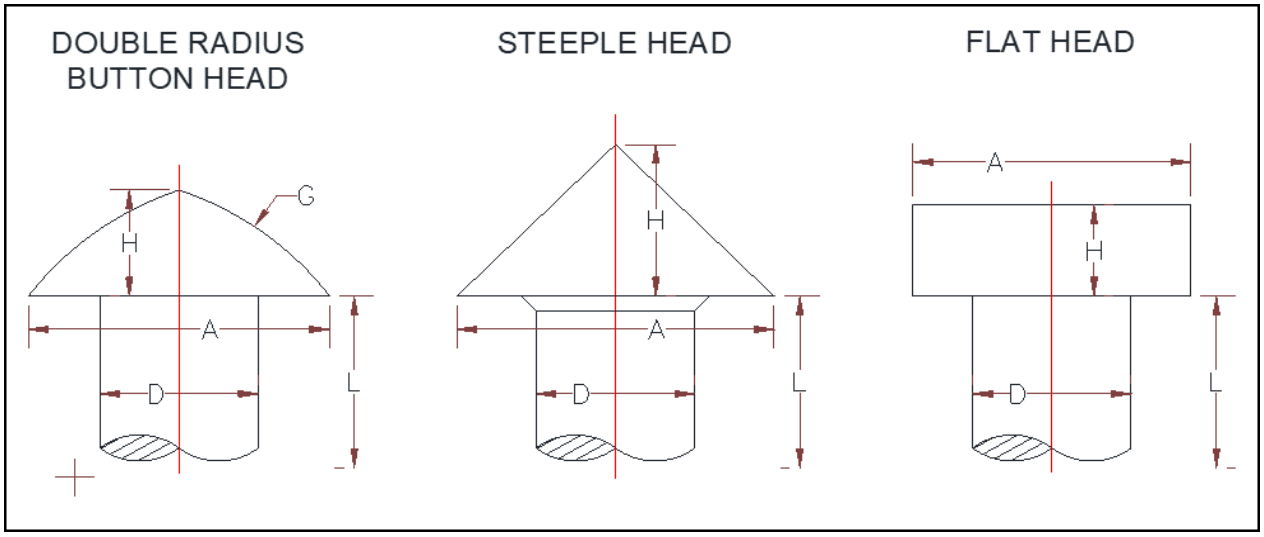
c) For rivet head designs not shown in Figure S2.13.13.4-a, S2.13.13.4-b and S2.13.13.4-c, the strength of the rivet head design may be calculated to demonstrate strength equivalent to the body of the rivet. Formulas for calculation are permitted at the discretion of the inspector.

Part 2

S2.10.2.1 RIVET HEAD TYPES

Common finished rivet heads are shown in NBIC Part 3, Figure S2.13.13.4-a, S2.13.13.4-b and S2.13.13.4-c. Note that a riveted seam may have more than one type of rivet ~~to~~, for example, to provide necessary clearance during operation, or for provision for equipment assembly and maintenance.

Figure S2.13.13.4-c Historic Large Rivets (C.I.S)



Nom. Body Dia. D	Head Dia. A	Height H	Head Dia. A	Height H	Head Dia. A	Height H
	Double Radius Button Head		Steeple Head		Flat Head	
1/2	0.950	0.350	1.000	0.500	0.875	0.250
5/8	1.188	0.438	1.250	0.625	1.094	0.313
3/4	1.425	0.525	1.500	0.750	1.313	0.375
7/8	1.663	0.613	1.750	0.875	1.531	0.438
1	1.900	0.700	2.000	1.000	1.750	0.500
1-1/8	2.138	0.788	2.250	1.125	1.969	0.563
1-1/4	2.375	0.875	2.500	1.250	2.188	0.625
1-3/8	2.613	0.963	2.750	1.375	2.406	0.688
1-1/2	2.850	1.050	3.000	1.500	2.625	0.750
1-5/8	3.088	1.138	3.250	1.625	2.844	0.813
1-3/4	3.325	1.225	3.500	1.750	3.063	0.875

All Dimensions are given in inches.

Tolerance for diameter of body is plus and minus 10% of nominal (shank diameter).

The following formulas give basic dimensions for manufactured shapes:

Double Radius Button Head, A=1.900D; H=0.700D; G=2.000D.

Steeple Head, A=2.000D; H=1.000D.

Flat Head, A=1.750D;

H=0.500D.

Length L is measured parallel to the rivet axis, from the etreme end to the bearing surface plane for flat bearing surface head-type rivets, or to the intersection of the head top surface with the head diameter for countersunk head-type rivets.

Table S2 10.4.1.a [US Customary Units]
Maximum Allowable Working Pressure on the Load Carrying Capacity of a Single Corroded Staybolt

Staybolt Spacing in.	Actual Diameter of Corroded Iron Staybolts, in.																								
	0.35	0.375	0.4	0.425	0.45	0.475	0.5	1.525	0.55	0.575	0.6	0.625	0.65	0.675	0.7	0.725	0.75	0.775	0.8	0.825	0.85	0.875	0.9
3.5	81	93	105	119	133	149	165	182	199	218	237	257	278	300	323	346	370	396	422	448	476	504	533
3.625	75	86	98	111	124	139	153	169	186	203	221	240	259	280	301	323	345	369	393	418	444	470	497
3.75	70	81	92	104	116	129	143	158	174	190	207	224	242	261	281	302	323	345	367	390	415	439	465
3.875	66	76	86	97	109	121	134	148	163	178	193	210	227	245	263	282	302	323	344	366	388	411	435
4	62	71	81	91	102	114	126	139	153	167	182	197	213	230	247	265	284	303	323	343	364	386	408
4.125	58	67	76	86	96	107	119	131	143	157	171	185	200	216	232	249	267	285	308	323	343	363	384
4.25	55	63	71	81	90	101	112	123	135	148	161	174	189	204	219	235	251	268	286	304	323	342	362
4.375	52	59	67	76	85	95	105	116	128	139	152	165	178	192	207	222	237	253	270	287	305	323	341
4.5	49	56	64	72	81	90	100	110	121	132	143	156	168	182	195	209	224	239	255	271	288	305	323
4.625	46	53	60	68	76	85	94	104	114	125	136	147	159	172	185	198	212	227	241	257	273	289	306
4.75	32	37	42	47	53	59	65	72	79	86	94	102	110	119	128	137	147	157	167	178	189	203	211
4.875	30	35	40	45	50	56	62	68	75	82	90	97	105	113	121	130	139	149	159	169	179	190	201
5	29	33	38	43	48	53	59	65	71	78	86	92	100	107	115	124	133	142	151	160	170	180	191
5.125	27	32	36	41	45	51	56	62	68	74	82	88	95	102	110	118	126	135	144	153	162	172	182
5.25	26	30	34	39	43	48	53	59	65	71	78	83	90	97	105	112	120	128	137	145	154	164	173
5.375	25	29	33	37	41	46	51	56	62	67	73	82	86	93	100	107	115	122	130	139	147	156	165
5.5	24	27	31	35											96	102	110	117	125	133	141	149	158
5.625	23	26	30	34											91	98	105	112	119	127	135	143	151
5.75	22	25	29	32											87	94	100	107	114	121	129	136	144
5.875	21	24	27	31											84	90	96	103	109	116	123	131	138
6	20	23	26	30											80	86	92	98	105	111	118	125	133
6.125	19	22	25	28											77	83	88	94	100	107	113	120	127
6.25	18	21	23	27											74	79	85	91	97	103	109	115	122
6.375	18	20	23	26											71	76	82	87	93	99	105	111	117
6.5	17	20	22	25											68	73	78	84	89	95	101	107	113
6.625	16	19	21	24											66	71	75	81	86	91	97	103	109
6.75	16	18	21	23											63	68	73	78	83	88	93	99	105
6.875	15	18	20	23											61	66	70	75	80	85	90	95	101
7	15	17	19	22											59	63	68	72	77	82	87	92	97

$$P = \frac{\pi \left[\frac{d}{2}\right]^2 \cdot S}{p^2}$$

S = 7,500 psi

P = MAWP psi

p = staybolt spacing, in.

d = Minimum diameter of corroded staybolt, in.

This section of the table has incorrect data. From 3.5" to 4.625" staybolt spacing and diameters of .35 to .9. The correct data for this section of the table is listed on the attached Word document.

Add the word "Iron" between corroded and staybolt

Attachment page 6 of 7

Corrected Table

Staybolt Spacing, in.	Actual Diameter of Corroded Iron Staybolts, in.																						
	0.35	0.375	0.4	0.425	0.45	0.475	0.5	0.525	0.55	0.575	0.6	0.625	0.65	0.675	0.7	0.725	0.75	0.775	0.8	0.825	0.85	0.875	0.9
3.5	59	68	77	87	97	108	120	133	145	159	173	188	203	219	236	253	270	289	308	327	347	368	389
3.625	55	63	72	81	91	101	112	124	136	148	161	175	189	204	220	236	252	269	287	305	324	343	363
3.75	51	59	67	76	85	95	105	115	127	138	151	164	177	191	205	220	236	252	268	285	303	321	339
3.875	48	55	63	71	79	89	98	108	119	130	141	153	166	179	192	206	221	236	251	267	283	300	318
4	45	52	59	66	75	83	92	101	111	122	133	144	156	168	180	194	207	221	236	251	266	282	298
4.125	42	49	55	63	70	78	87	95	105	114	125	135	146	158	170	182	195	208	222	236	250	265	280
4.25	40	46	52	59	66	74	82	90	99	108	117	127	138	149	160	171	183	196	209	222	236	250	264
4.375	38	43	49	56	62	69	77	85	93	102	111	120	130	140	151	162	173	185	197	209	222	236	249
4.5	36	41	47	53	59	66	73	80	88	96	105	114	123	133	143	153	164	175	186	198	210	223	236
4.625	34	39	44	50	56	62	69	76	83	91	99	108	116	125	135	145	155	165	176	187	199	211	223
4.75	32	37	42	47	53	59	65	72	79	86	94	102	110	119	128	137	147	157	167	178	189	200	211
4.875	30	35	40	45	50	56	62	68	75	82	89	97	105	113	121	130	139	149	159	169	179	190	201
5	29	33	38	43	48	53	59	65	71	78	85	92	100	107	115	124	133	142	151	160	170	180	191
5.125	27	32	36	41	45	51	56	62	68	74	81	88	95	102	110	118	126	135	144	153	162	172	182
5.25	26	30	34	39	43	48	53	59	65	71	77	83	90	97	105	112	120	128	137	145	154	164	173
5.375	25	29	33	37	41	46	51	56	62	67	73	80	86	93	100	107	115	122	130	139	147	156	165
5.5	24	27	31	35	39	44	49	54	59	64	70	76	82	89	95	102	110	117	125	133	141	149	158
5.625	23	26	30	34	38	42	47	51	56	62	67	73	79	85	91	98	105	112	119	127	135	143	151
5.75	22	25	29	32	36	40	45	49	54	59	64	70	75	81	87	94	100	107	114	121	129	136	144
5.875	21	24	27	31	35	39	43	47	52	56	61	67	72	78	84	90	96	103	109	116	123	131	138
6	20	23	26	30	33	37	41	45	49	54	59	64	69	75	80	86	92	98	105	111	118	125	133
6.125	19	22	25	28	32	35	39	43	47	52	57	61	66	72	77	83	88	94	100	107	113	120	127
6.25	18	21	24	27	31	34	38	42	46	50	54	59	64	69	74	79	85	91	97	103	109	115	122
6.375	18	20	23	26	29	33	36	40	44	48	52	57	61	66	71	76	82	87	93	99	105	111	117
6.5	17	20	22	25	28	31	35	38	42	46	50	54	59	64	68	73	78	84	89	95	101	107	113
6.625	16	19	21	24	27	30	34	37	41	44	48	52	57	61	66	71	75	81	86	91	97	103	109
6.75	16	18	21	23	26	29	32	36	39	43	47	51	55	59	63	68	73	78	83	88	93	99	105
6.875	15	18	20	23	25	28	31	34	38	41	45	49	53	57	61	66	70	75	80	85	90	95	101
7	15	17	19	22	24	27	30	33	36	40	43	47	51	55	59	63	68	72	77	82	87	92	97