

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1975

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	33 5/8"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	29/32"
Flat Length	3/4"
Shoulder Length/Male	.757"/.688"
Shoulder Length/Female	

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

96

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1973

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Brass
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	10 5/8"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	15/16"
Flat Length	25/32"
Shoulder Length/Male	
Shoulder Length/Female	.610"/.693"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

67

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1975

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	46 1/8"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	1"
Flat Length	11/16"
Shoulder Length/Male	
Shoulder Length/Female	

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

84

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1976

MATERIALS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	Yes

COMMENTS

CONNECTOR DIMENSIONS

Length	22 1/8"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	1"
Flat Length	3/4"
Shoulder Length/Male	
Shoulder Length/Female	.764"

INSTRUCTIONS

Non-compliant: none

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

67

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1975

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Brass
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	10"
Nominal Tubing Diameter	3/8"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	7/8"
Flat Length	1/2"
Shoulder Length/Male	.547"
Shoulder Length/Female	.547"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Non-compliant

50

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1971

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Brass
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	10 3/4"
Nominal Tubing Diameter	1/4"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	3/4"
Flat Length	3/8"
Shoulder Length/Male	.564"
Shoulder Length/Female	.488"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Non-compliant

51

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1973

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	34"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	29/32"
Flat Length	3/4"
Shoulder Length/Male	
Shoulder Length/Female	.755"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

52

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1974

MATERIALS

Tubing Composition  
Permanent Fitting Composition  
Removable Fitting Composition  
Protective Polymer Coating

COMMENTS

Brass  
Ferrous alloy  
Ferrous alloy  
None

CONNECTOR DIMENSIONS

Length  
Nominal Tubing Diameter

27 1/2"  
1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats  
Flat Length  
Shoulder Length/Male  
Shoulder Length/Female

31/32"  
3/8"  
.788"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling  
Removable Fittings Marked

Compliant  
Compliant

53



GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1973

MATERIALS

	COMMENTS
Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	23 1/2"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	29/32"
Flat Length	3/4"
Shoulder Length/Male	.771"
Shoulder Length/Female	.689"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

54

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1976

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	21 1/4"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	1"
Flat Length	17/32"
Shoulder Length/Male	
Shoulder Length/Female	.723"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

55

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER:  
SAMPLE NUMBER:  
DATE OF MANUFACTURE: 1974

MATERIALS

	COMMENTS
Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	21 1/8"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	1"
Flat Length	3/4"
Shoulder Length/Male	
Shoulder Length/Female	.708"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

56

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1976

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	34 3/8"
Nominal Tubing Diameter	3/8"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	27/32"
Flat Length	23/32"
Shoulder Length/Male	.815"
Shoulder Length/Female	.776"

INSTRUCTIONS

Non-compliant: psi caution and conn illustration not inc

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

57

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1970

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	32 7/8"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	1"
Flat Length	11/16"
Shoulder Length/Male	
Shoulder Length/Female	.715"/.777"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

58

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1974

MATERIALS

Tubing Composition  
Permanent Fitting Composition  
Removable Fitting Composition  
Protective Polymer Coating

COMMENTS  
~~Aluminum~~ ~~SS~~  
Ferrous alloy  
Ferrous alloy  
None

*Brass /  
out*

CONNECTOR DIMENSIONS

Length 21 3/4"  
Nominal Tubing Diameter 1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats 1"  
Flat Length 3/4"  
Shoulder Length/Male  
Shoulder Length/Female .744"

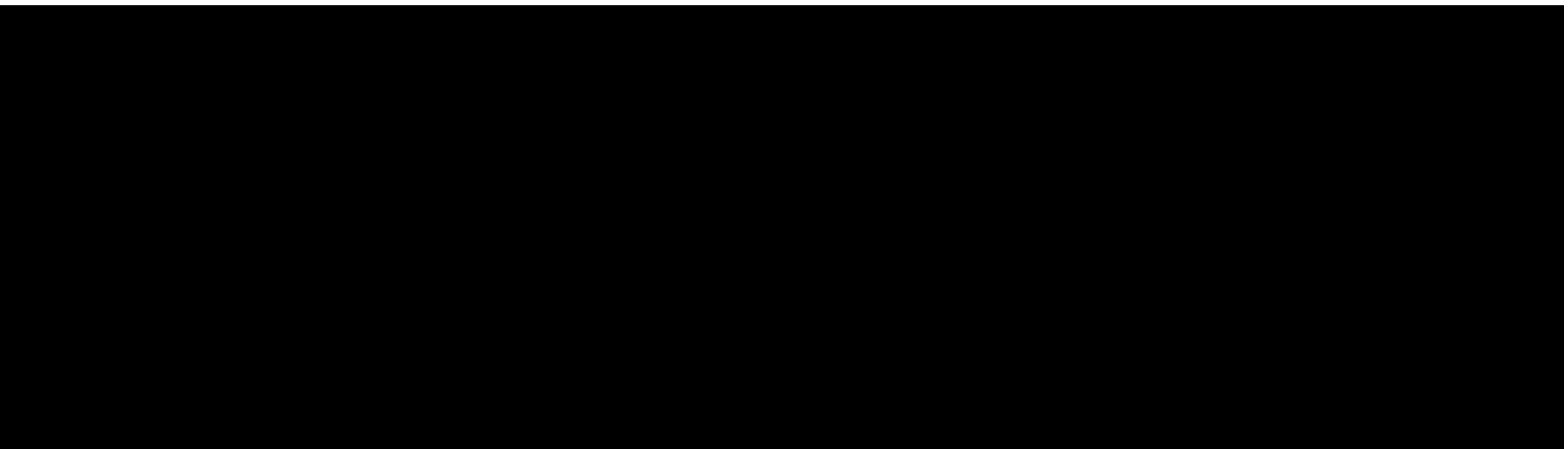
INSTRUCTIONS

Compliant

MARKING

Permanent Labeling Compliant  
Removable Fittings Marked Compliant

59



GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1975

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	21 1/2"
Nominal Tubing Diameter	3/8"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	7/8"
Flat Length	23/32"
Shoulder Length/Male	.784"
Shoulder Length/Female	.786"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

69

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1973

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	70 1/4"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	1"
Flat Length	13/16"
Shoulder Length/Male	
Shoulder Length/Female	.493"/.547"

INSTRUCTIONS

Compliant



MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

61



GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER:   
SAMPLE NUMBER:   
DATE OF MANUFACTURE:

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	22 1/4"
Nominal Tubing Diameter	3/8"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	29/32"
Flat Length	15/32"
Shoulder Length/Male	
Shoulder Length/Female	.685"

INSTRUCTIONS

Non-compliant: psi caution and conn  
illustration not inc.

MARKING

Permanent Labeling	Non-compliant: no date of manufactu
Removable Fittings Marked	Compliant

62

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: None listed  
SAMPLE NUMBER: C855-4991  
DATE OF MANUFACTURE: 1974

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	33 1/2"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	1"
Flat Length	23/32"
Shoulder Length/Male	
Shoulder Length/Female	.683"/.691"

INSTRUCTIONS

Non-compliant: none

MARKING

Permanent Labeling	states "manufactured for Montgomery
Removable Fittings Marked	Compliant

63

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: None listed  
SAMPLE NUMBER: C840-7764  
DATE OF MANUFACTURE: 1975

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	45 1/4"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	1"
Flat Length	11/16"
Shoulder Length/Male	
Shoulder Length/Female	.601"/.570"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

64

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: None listed  
SAMPLE NUMBER: C855-4987  
DATE OF MANUFACTURE: None listed

MATERIALS

Tubing Composition	Brass
Permanent Fitting Composition	Brass
Removable Fitting Composition	
Protective Polymer Coating	None

COMMENTS

CONNECTOR DIMENSIONS

Length	9 5/8"
Nominal Tubing Diameter	1/4"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	5/8"
Flat Length	9/32"
Shoulder Length/Male	
Shoulder Length/Female	

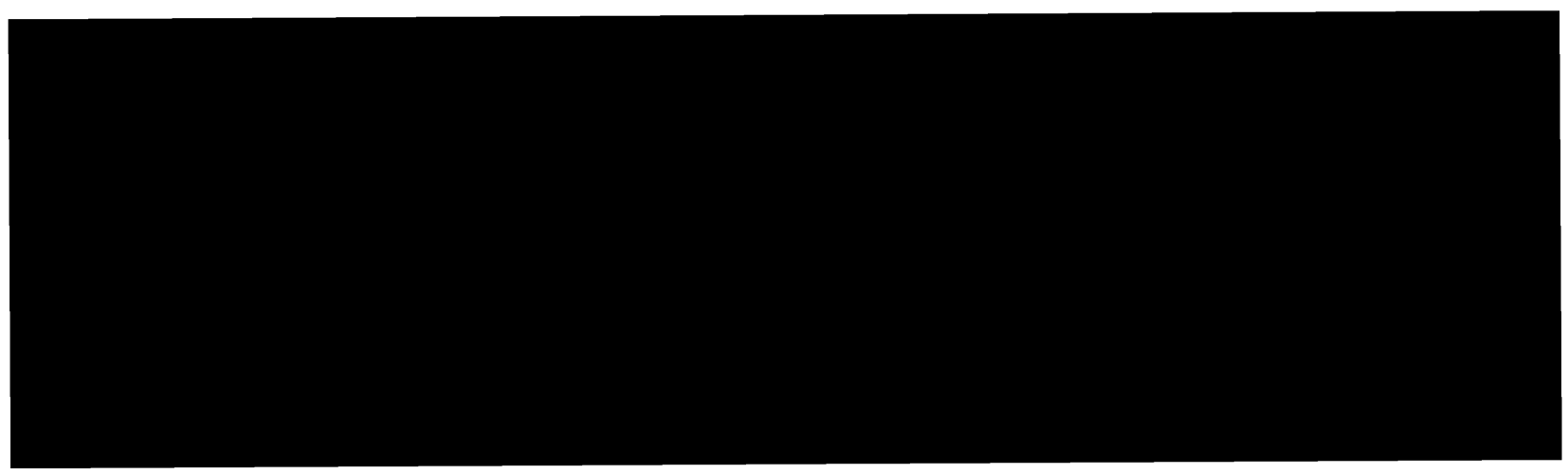
INSTRUCTIONS

psi caution and connector illustration not included

MARKING

Permanent Labeling	Non-compliant: none present
Removable Fittings Marked	Non-compliant

65



GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: None listed  
SAMPLE NUMBER: C -1372  
DATE OF MANUFACTURE: None listed

MATERIALS

Tubing Composition	Brass
Permanent Fitting Composition	Brass
Removable Fitting Composition	Brass
Protective Polymer Coating	None

COMMENTS

CONNECTOR DIMENSIONS

Length	58 1/8"
Nominal Tubing Diameter	1/4"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	5/8"
Flat Length	9/32"
Shoulder Length/Male	.400"
Shoulder Length/Female	.500"

INSTRUCTIONS

Non-compliant: none

MARKING

Permanent Labeling	Non-compliant: none
Removable Fittings Marked	Non-compliant

66

GAS APPLIANCE CONNECTOR SURVEY

\* 57  
55

MANUFACTURER: None listed  
 SAMPLE NUMBER: C825-9286  
 DATE OF MANUFACTURE: None listed

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	35 1/2"
Nominal Tubing Diameter	3/8"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	7/8"
Flat Length	23/32"
Shoulder Length/Male	
Shoulder Length/Female	

INSTRUCTIONS

None

MARKING

Permanent Labeling	None
Removable Fittings Marked	None

67

58  
16

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1972

MATERIALS

	COMMENTS
Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	21 3/8"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	31/32"
Flat Length	3/4"
Shoulder Length/Male	
Shoulder Length/Female	.751"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

89

59  
25

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1976

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	27 1/4"
Nominal Tubing Diameter	3/8"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	7/8"
Flat Length	3/4"
Shoulder Length/Male	.800"
Shoulder Length/Female	.638"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

69



60  
38

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1976

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	15 3/4"
Nominal Tubing Diameter	1/4"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	3/4"
Flat Length	5/8"
Shoulder Length/Male	.888"
Shoulder Length/Female	.649"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

70

61  
53

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1976

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	33 7/8"
Nominal Tubing Diameter	3/8"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	7/8"
Flat Length	3/4"
Shoulder Length/Male	.712"
Shoulder Length/Female	.639"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

71

62  
33

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1975

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	32 3/4"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	1"
Flat Length	3/4"
Shoulder Length/Male	
Shoulder Length/Female	

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Compliant

26

63  
37

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1975

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Brass
Removable Fitting Composition	Brass
Protective Polymer Coating	Yes

CONNECTOR DIMENSIONS

Length	57 1/8"
Nominal Tubing Diameter	3/8"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	7/8"
Flat Length	9/16"
Shoulder Length/Male	.806"
Shoulder Length/Female	.754"

INSTRUCTIONS

Compliant

MARKING

Permanent Labeling	Compliant
Removable Fittings Marked	Non-compliant

73

64  
59

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: 1971

MATERIALS COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	15 5/8"
Nominal Tubing Diameter	1/4"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	3/8"
Flat Length	19/32"
Shoulder Length/Male	.785"
Shoulder Length/Female	.655"

INSTRUCTIONS

Compliant

MARKING

Compliant  
Compliant

Permanent Labeling  
Removable Fittings Marked

65  
10

GAS APPLIANCE CONNECTOR SURVEY

MANUFACTURER: [REDACTED]  
SAMPLE NUMBER: [REDACTED]  
DATE OF MANUFACTURE: None listed

MATERIALS

COMMENTS

Tubing Composition	Brass
Permanent Fitting Composition	Ferrous alloy
Removable Fitting Composition	Ferrous alloy
Protective Polymer Coating	None

CONNECTOR DIMENSIONS

Length	33 3/4"
Nominal Tubing Diameter	1/2"

FITTING DESIGN AND DIMENSIONS

Dimension Across Flats	1"
Flat Length	3/4"
Shoulder Length/Male	
Shoulder Length/Female	.727"/.690"

INSTRUCTIONS

psi caution not included

MARKING

Permanent Labeling	Non-compliant: date of manufacturer not included
Removable Fittings Marked	Compliant

75

yr	#	Mfg	Mkt	Quant	Comp	Just 3.8	psi N	Illust
75	1	A	C	II	✓			
75	2	A	B		✓			
71	3	A	B		✓			
74	4	A	B		✓			
76	5	A	C	II			✓	
75	8	C	SS		✓	Rusty Nuts		
76	9	B	C	III			✓	✓
73	10	B	B		✓			
75	13	B	B	II	✓			
74	14	B	B	II	✓			
-	15	B	B			N		
72	17	B	B		✓			
75	20	B	C		✓			
73	22	B	C		✓			
76	25	D	SS				✓	✓
75	26	D	SS					
76	27	E	C	III			✓	✓
75	31	E	C	III	✓			
-	34	E	B					
74	35	E	B	II	✓			
73	37	E	B	II	✓			
76	39	E	C			N		
75	40	E	C					
71	41	E	B					
73	42	E	B		✓			
75	45	F	C		✓			
74	46	G	B		✓			
73	47	G	C				✓	✓
75	48	G	B		✓			
74	49	G	B/A		✓			
75	50	G	B		✓			
72	51	M	B		✓			
-	52	W	B				✓	✓
74	53	-	B			N		
75	54	-	C		✓			
-	55	-	B				✓	✓
-	56	-	B			N		
-	57	-	C			N		
72	58	P	B		✓			
73	59	R	C	III	✓			
75	62	R	C		✓			
75	63	R	C					
71	64	R	B		✓			
-	65	R	B				✓	



(3) Maple  
309

(1) Red  
122

(2) House  
a

(4) Dr  
c

(7) Romney  
Field  
3.9.2  
Marko  
#15

7

6

11 12 18 19 21 23

24  
16

✓

✓

✓

28 29 30 32  
33 36 38

✓

✓

✓

43  
44

✓  
✓

✓

✓

N  
N  
N

✓  
✓  
✓

50 51

✓

✓



UNITED STATES GOVERNMENT

# Memorandum

U.S. CONSUMER PRODUCT  
SAFETY COMMISSION  
WASHINGTON, D.C. 20207

TO : Pat Thomas, BESS  
Thru : J. Bigio, Director, BESS  
Thru : J.R. Thurber, Acting Director, BESL  
FROM : R. Sean Fausett, Chief Chemist, BESL

DATE: 21 April 1977

SUBJECT: Gas Appliance Connector Survey: Phase II

This report presents the data and photographic documentation for Phase II of the BESL technical evaluation of selected gas appliance connectors. The performance evaluations were conducted per specified paragraphs of Part IV, ANSI Standard Z21.24, "Appliance Connectors of Flexible Metal Tubing and Fittings":

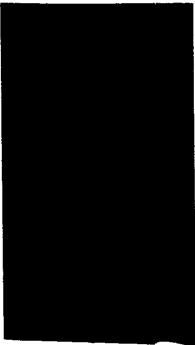
- § 4.3 Bending
- § 4.6 Season Cracking
- § 4.10 Resistance to Ammonia Atmospheres

The performance criteria defined by these paragraphs were judged by BESS technical staff to be the most pertinent to the type of abuse a connector may be subjected to during installation and subsequent use by a consumer.

## §4.3 Bending

Five connectors were evaluated for resistance to flexure cracking per §4.3 of the Standard. Table 1 presents the pertinent data pertaining to these connectors. A photograph of the test fixture and a connector under test is shown in Photo 1. The two connectors supplied with protective polymer coatings fractured through the coatings to the convoluted metal surface. Photos 2 and 3 illustrate the extent of damage done to these connectors. The chipping of the polymer coating evidenced in Photo 3 was not a result of the test procedure, but the condition in which the connector was received by BESL. The circumferential cracking of the polymer coating, however, was induced by the applied flexural stress. The remaining connectors exhibited no damage from the flexure testing.

Table 1  
FLEXURE TEST SPECIMENS

Sample Number	Tubing Composition	Test Results
	SS	Pass
	Brass	Pass
	Brass/Epoxy Coated	Pass
	Brass	Pass
	Brass/Epoxy Coated	Pass

§4.6 Season Cracking

A single brass connector, a stainless steel connector, and two polymer coated connectors were immersed for thirty minutes in a mercurous nitrate/nitric acid bath as specified in §4.6 of the ANSI standard. Photo 4 illustrates the test bath apparatus employed in the evaluation. Photos 5, 6, and 7 show three connectors in their original condition; photos 8 and 9 illustrate the mercurial surface deposit plating the brass connector and the interior of a polymer-coated connector at the termination of the test. This plating was volatilized from the specimens by placing it in a drying oven at 120°C for 30 minutes. The connectors were then microscopically examined under 15x for evidence of corrosion cracking. Photomicrographs of representative damage to the brass connector and coated connectors are shown in photos 10 through 15. No damage was evident on the stainless steel connector. In addition to the overall crevice and pitting damage observed, the brass connector was found to be very brittle. This was judged to be the result of extensive hydrogen embrittlement induced by the corrosive acid bath. The connector fractured completely upon removal from the drying oven. Results of the season cracking evaluation are presented in Table 2.

Table 2  
SEASON CRACKING SPECIMENS




Sample Number	Tubing Composition	Test Results
	Brass	Fail
	SS	Pass







Table 2 (Continued)  
SEASON CRACKING SPECIMENS

Sample Number	Tubing Composition	Test Results
	Brass/Epoxy Coated	Fail
	Brass/Epoxy Coated	Fail

§4.10 Resistance to Ammonia Atmospheres

Six connectors were subjected to the specified ammonia environment outlined in §4.10 of the standard. Photographs 16 and 17 illustrate the connector suspending method employed and the vapor tank apparatus under actual test. Table 3 presents the data representative of each sample tested.

Table 3  
AMMONIA TEST SPECIMENS

Sample Number	Tubing Composition	Test Results
	Brass	Fail
	Brass	Fail
	Brass/Alum.	Pass
	SS	Pass
	Brass/Epoxy Coated	Pass
	Brass/Epoxy (Damaged) Coated	Fail

Photos 18 through 23 picture the connectors in their original condition prior to testing.

Several connectors were received by the BESL in the damaged condition similar to that shown in photograph 23. Testing was conducted on a damaged sample because it was judged possible for a consumer to purchase and install a connector in such condition. All specimens were tested at 22°C ambient temperature, with an internal connector air pressure of 2.94 psig, equivalent to a pressure of six inches of mercury column:

$$(6\text{''Hg}/29.92\text{''Hg}) (14.70 \text{ psig}) = 2.94 \text{ psig}$$

The two brass connectors and the damaged polymer-coated connector failed this evaluation and exhibited extensive corrosive degradation upon removal from the ammoniacal environment. Photos 24 through 31 illustrate the extent of this damage. All other specimens passed this performance evaluation.

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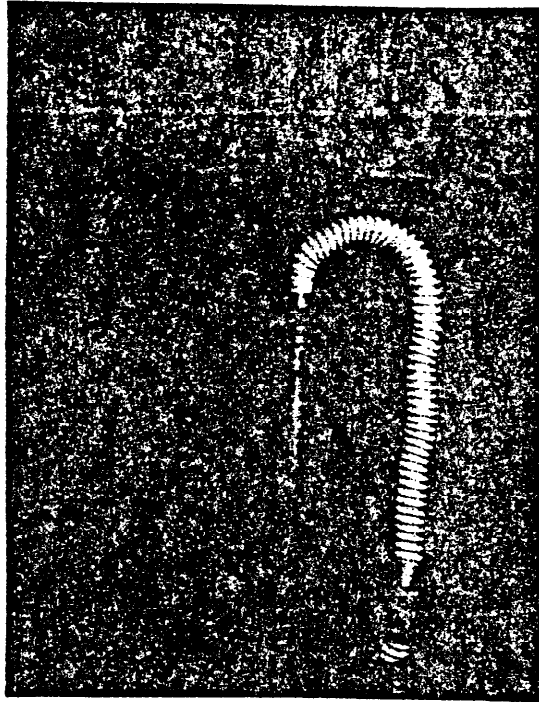


Photo 1: Flexure Tester

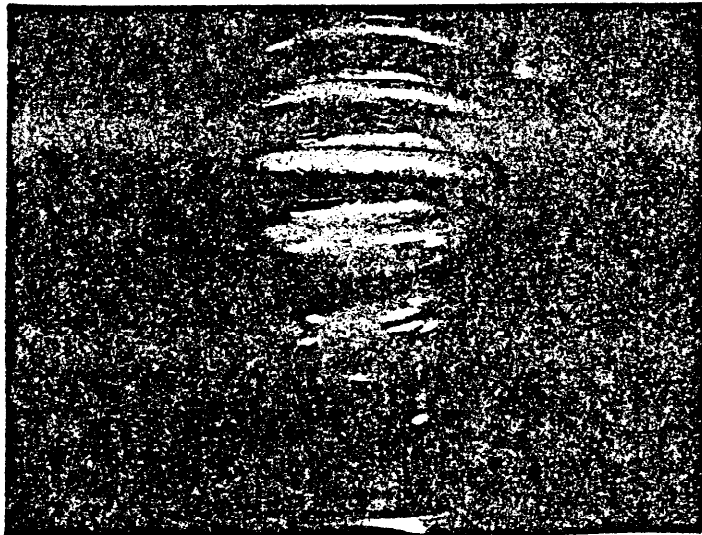


Photo 2: Flexure Stress Cracking Specimen

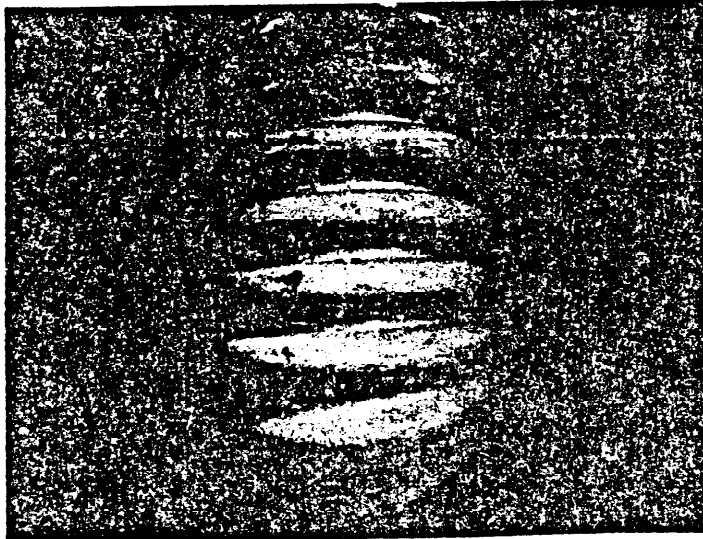


Photo 3: Flexure Stress Cracking  
Specimen [REDACTED]

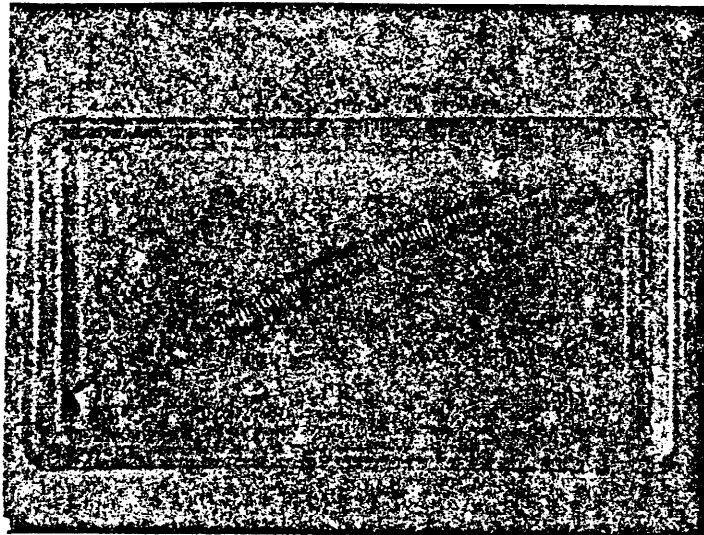


Photo 4: Mercurous Nitrate/Nitric Acid  
Test Bath

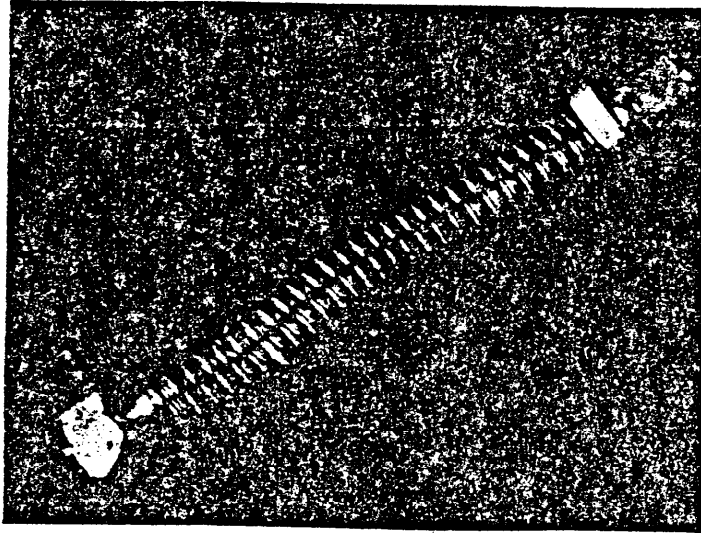


Photo 5: Brass Connector Original Condition  
Specimen [REDACTED]

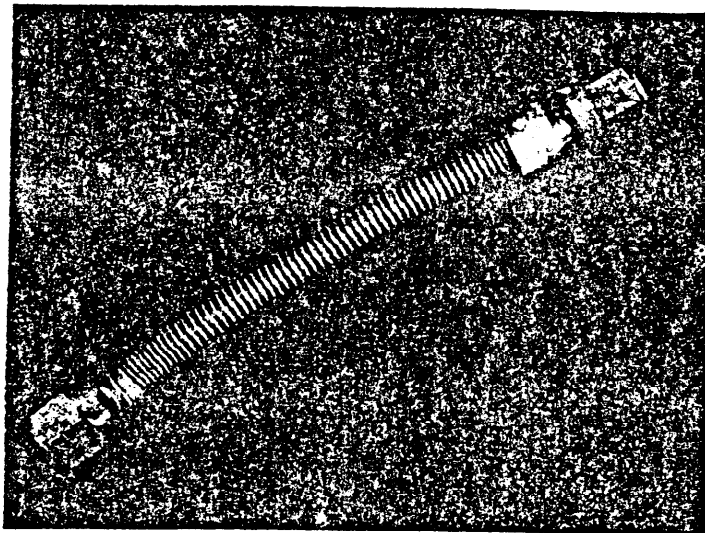


Photo 6: Stainless Steel Connector Original Condition  
Specimen [REDACTED]

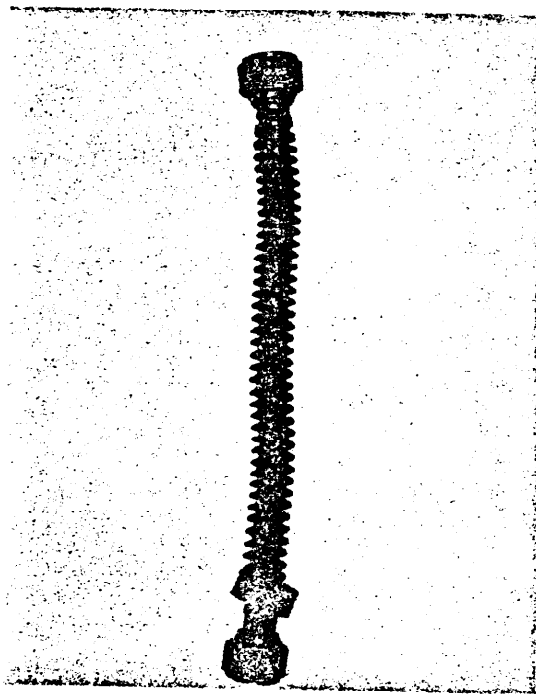


Photo 7: Polymer-coated Connector Original Condition  
Specimen [REDACTED]



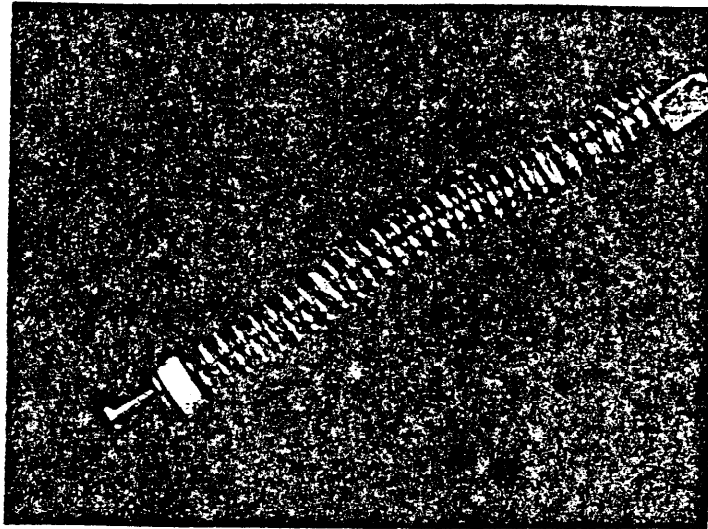


Photo 8: Mercurial Deposit After  
 $\text{HgNO}_3/\text{HNO}_3$  Exposure  
Specimen [REDACTED]

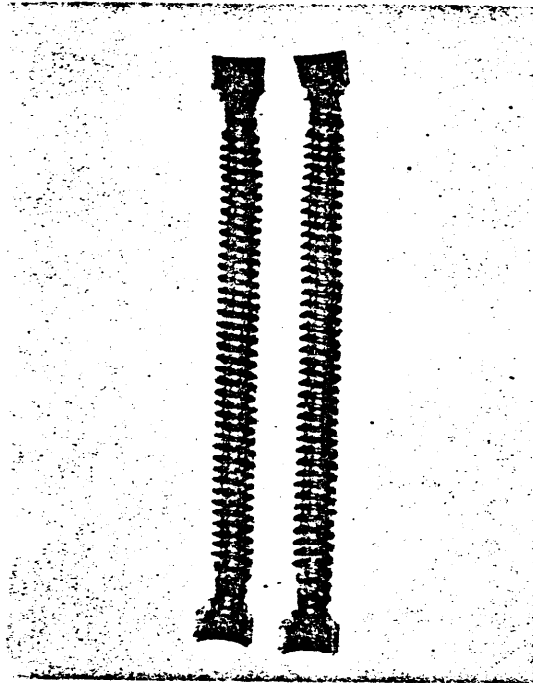


Photo 9: Mercurial Deposit After  
 $\text{HgNO}_3/\text{HNO}_3$  Exposure  
Specimen [REDACTED]



Photo 10: Stress Corrosion Cracking, 25x  
Specimen [REDACTED]

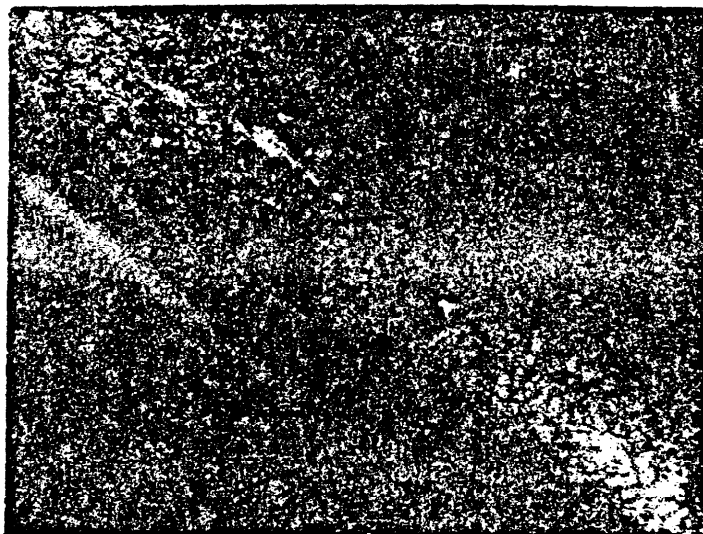


Photo 11: Stress Corrosion Cracking, 25x  
Specimen [REDACTED]

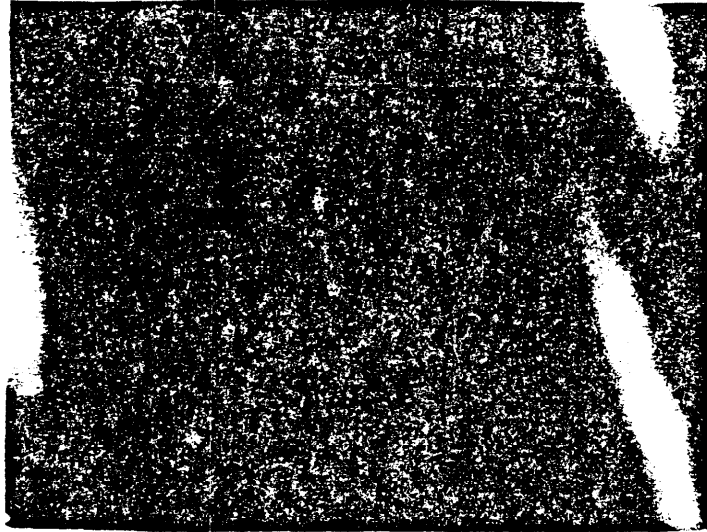


Photo 12: Stress Corrosion Cracking, 25x  
Specimen [REDACTED]

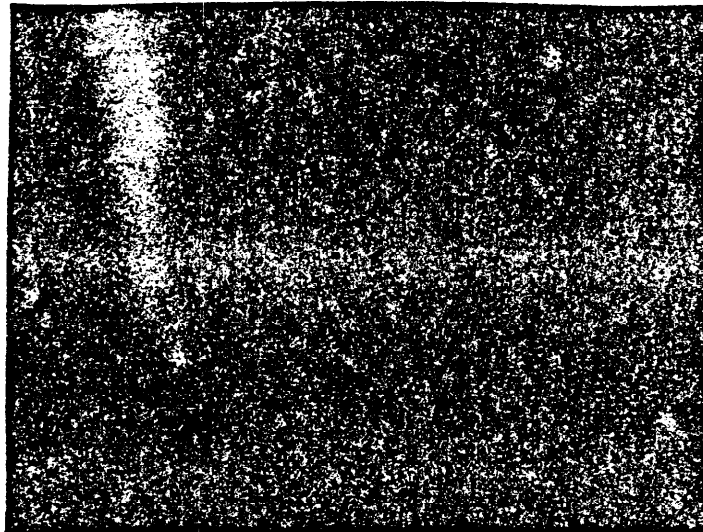


Photo 13: Stress Corrosion Cracking, 25x  
Specimen [REDACTED]

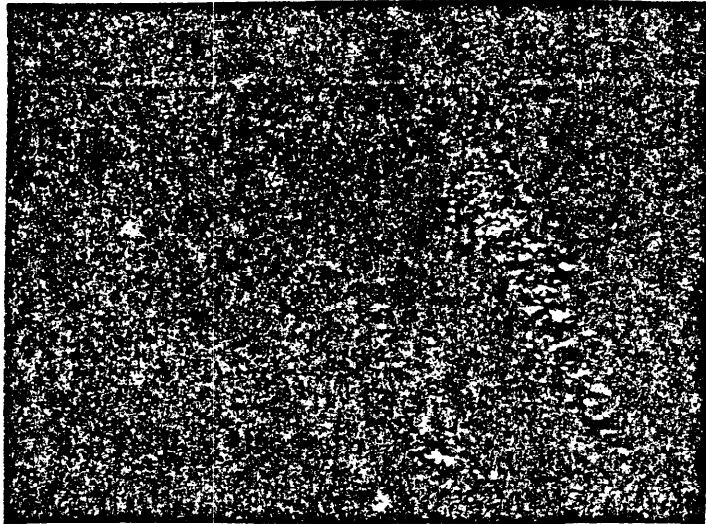


Photo 14: Stress Corrosion Cracking, 25x  
Specimen [REDACTED]

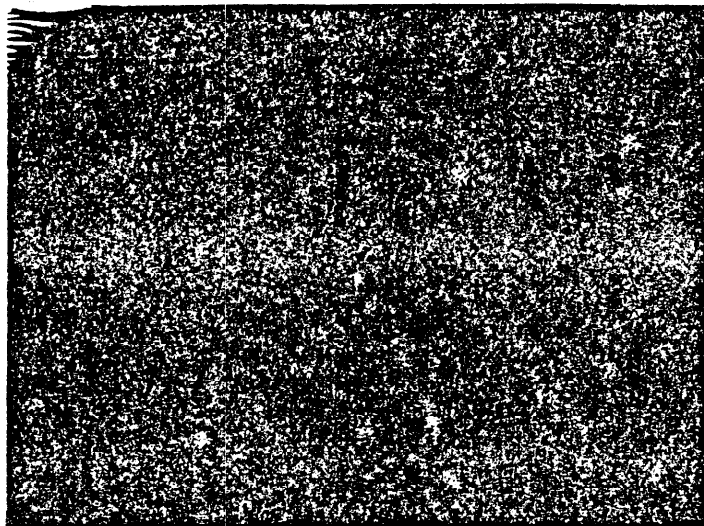


Photo 15: Stress Corrosion Cracking, 25x  
Specimen [REDACTED]



Photo 16: Connector Suspending Apparatus

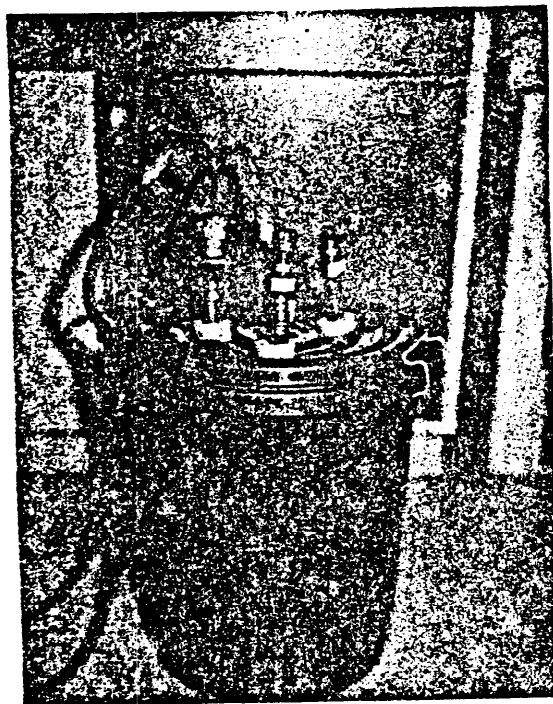


Photo 17: Ammonia Vapor Test Chamber