

IGS-PL-022-2(0)

2000

95



National Iranian Gas Co.

مدیریت پژوهش و فناوری

Research and Technology Management

امور تدوین استانداردها

Standardization Division

IGS

Iranian Gas Standards

Specification for :

مشخصات فنی :

**Butt Welding Ends , Low Alloy Steel Fittings For Use in,High  
Pressure Piping Size : from 16 to 56 IN. part(2)**

اتصالات جوش لب به لب

APPROVED

## **FOREWORD**

This standard is intended to be mainly used by **NIGC** and contractors and has been prepared on interpretation of recognized standards , technical documents , knowledge ,backgrounds and experiences in gas industries at national and international levels.

Iranian Gas Standards (**IGS**) are prepared , reviewed and ammended by technical standard committees within NIGC Standardization Div. and submitted to the **NIGC's "STANDARDS COUNCIL"** for approval .

**IGS** Standards are subject to revision , amendment or withdrawal , if required , thus the latest edition of **IGS** shall be checked/inquired by **NIGC** users .

This standard must not be modified or altered by the end users within **NIGC** and her contractors. Any deviation from normative references and/or well known manufacturers specifications must be reported to Standardization div.

Any comments from concerned parties on **NIGC** distributed **IGS** are welcome to technical standards committees and will receive serious attention and consideration should a revision to standards is recommended .

## **GENERAL DEFINITIONS :**

Throughout this standard the following definitions , where applicable , should be followed :

1- "**STANDARDIZATION DIV.**" has been organized to deal with all aspects of industrial standards in NIGC . Therefore , all queries for clarification or amendments are requested to be directed to the mentioned div.

2- "**COMPANY** " : refers to national iranian gas company .

3- "**SUPLIER**" : refers to a firm who will supply the service , equipment or material to igs specification whether as the prime producer or manufacturer or a trading firm .

4- "**SHALL**" : is used where a provision is mandatory.

5- "**SHOULD**" : is used where a provision is advised only.

6- "**MAY**" : is used where a provision is completely discretionary.

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## پیشگفتار

- ۱- این استاندارد/دستورالعمل بمنظور استفاده اختصاصی در شرکت ملی گاز ایران و شرکتهای فرعی وابسته تهیه شده است.
- ۲- شرکت ملی گاز ایران در مورد نیازهای عمومی از استانداردهای وزارت نفت (IPS) و در مورد نیازهای اختصاصی از استانداردهای اختصاصی خود (IGS) استفاده می نماید.
- ۳- استانداردهای شرکت ملی گاز ایران (IGS) توسط کمیته های تخصصی استاندارد متشکل از کارشناسان بخش های مختلف و یا مشاور تهیه می شود و توسط شورای استاندارد (منتخب هیئت مدیره شرکت ملی گاز ایران) به تصویب میرسند.
- ۴- در تنظیم متن استانداردهای (IGS) از کلیه منابع شناخته شده استاندارد، اطلاعات فنی - تخصصی مربوط به صنایع گاز دنیا، مشخصات فنی تولیدات سازندگان معتبر جهانی و نیز از نتیجه تحقیقات و تجربیات کارشناسان و متخصصان داخلی بر حسب مورد استفاده می شود. همچنین بمنظور استفاده هر چه بیشتر از تولیدات داخلی قابلیت های سازندگان داخلی نیز مورد توجه قرار میگیرد.
- ۵- استانداردها از طریق پایگاه اینترنتی شرکت \* و یالوح فشرده (CD) در اختیار واحدها و کاربران قرار می گیرد .
- ۶- استانداردها بطور متوسط هر ۵ سال یکبار و یادر صورت ضرورت زودتر، مورد بازنگری و بروزرسانی قرار میگیرند. بنابراین کاربران باید همیشه آخرین نگارش را مورد استفاده قرار دهند.
- ۷- هرگونه نظر و یا پیشنهاد اصلاح در مورد استانداردها مورد استقبال و بررسی قرار خواهد گرفت و در صورت تأیید، استاندارد مربوطه نیز مورد تجدیدنظر قرار خواهد گرفت .

## تعاریف عمومی

در متن استانداردهای (IGS) از تعاریف و اصطلاحات زیر استفاده میشود.

- ۱- "شرکت" (COMPANY): منظور از شرکت "شرکت ملی گاز ایران" و یا شرکتهای فرعی وابسته میباشد.
- ۲- "فروشنده" (SUPPLIER/VENDOR): به فرد یا موسسه ای اطلاق میگردد که تعهدی رانسبت به شرکت تقبل نموده است.
- ۳- "خریدار" (PURCHASER): منظور از خریدار "شرکت ملی گاز ایران" و یا شرکتهای فرعی وابسته میباشد.
- ۴- "SHALL": در مواردی بکاربرده میشود که انجام خواسته مورد نظر اجباری است
- ۵- "SHOULD": در مواردی بکاربرده میشود که انجام خواسته مورد نظر ترجیحی و درعین حال اختیاری است
- ۶- "MAY": در مواردی بکاربرده میشود که انجام کار به شکل مورد بحث نیز قابل قبول میباشد

## IGS-PL-022 Part 2

**TECHNICAL SPECIFICATION OF BUTT WELDING**  
**ENDS CARBON AND LOW ALLOY STEEL FITTINGS FOR USE IN**  
**HIGH PRESSURE PIPING**  
**SIZE : FROM 16 TO 56 IN**

| <b>CONTENT :</b> |   | <b>PAGE</b> |
|------------------|---|-------------|
| 1.0              | SCOPE   | 1           |
| 2.0              | CODES & STANDARDS   | 2           |
| 3.0              | TECHNICAL SPECIFICATION FOR BUTT<br>WELDING ENDS FITTINGS | 3           |
| 4.0              | DIMENSIONS FOR ELBOW 45 DEG.                              | 4           |
| 5.0              | DIMENSIONS FOR ELBOW 90 DEG.                              | 5           |
| 6.0              | DIMENSIONS FOR STRAIGHT TEE                               | 6           |
| 7.0              | DIMENSIONS FOR REDUCING TEE                               | 7           |
| 8.0              | DIMENSIONS FOR CAP  | 11          |
| 9.0              | DIMENSIONS FOR CONCENTRIC &<br>ECCENTRIC REDUCERS         | 12          |
| 10.              | INSPECTION  | 14          |
| 11.              | DOCUMENTATION   | 14          |

**TECHNICAL SPECIFICATION OF BUTT WELDING**  
**ENDS CARBON AND LOW ALLOY STEEL FITTINGS FOR USE IN**  
**HIGH PRESSURE PIPING**  
**SIZE : FROM 16 TO 56 IN**

### 1.0 SCOPE :

THIS SPECIFICATION SPECIFIES THE MIN. REQUIREMENTS FOR BUTT WELDING ENDS , CARBON AND LOW ALLOY STEEL FITTINGS USE IN TRANSMISSION LINE , COMPRESSOR STATIONS , METERING AND REGULATING STATIONS .  
RATING , TESTING , MATERIAL , CHEMICAL & MECHANICAL PROPERTIES ,  
HEAT TREATMENT , NOTCH TOUGHNESS PROPERTIES , DIMENSIONS AND

MARKING , SHALL BE ALL IN ACCORDANCE WITH MSS – SP – 75 , 1998 EDITION AND SR3 FROM SUPPLEMENTRY REQUIREMENTS .

ALL FITTINGS SHALL BE EXTERNALLY RUST PROTECTED WITH EASILY REMOVEABLE COATING COMPATABLE WITH BUTYL RUBBER PRIMER .

THE APPLICABILITY OF CHANGES IN CODES AND STANDARDS THAT OCCUR AFTER THE DATE OF THIS SPECIFICATION SHALL BE MUTUALLY AGREED UPON BY THE PURCHASER AND MANUFACTURER .

## 2.0 CODES & STANDARDS :

2.1 MSS – SP – 75 , 1998 EDITION

2.2 API 5L , 2000 EDITION

## 3.0 TECHNICAL SPECIFICATION FOR BUTT WELDING ENDS FITTINGS :

FITTINGS , BUTT WELDING ENDS , CARBON AND LOW ALLOY STEEL .

RATING , TESTING , MATERIAL , CHEMICAL & MECHANICAL PROPERTIES , HEAT TREATMENT , NOTCH TOUGHNESS PROPERTIES , DIMENSIONS AND MARKING SHALL BE ALL IN ACCORDANCE WITH MSS – SP – 75 , 1998 EDITION AND SR3 FROM SUPPLEMENTRY REQUIREMENTS .

MATERIAL CLASS SYMBOL ( WPHY ) SHALL BE THE SAME AS GRADE OF MATCHING PIPE FOR WHICH PURCHASER SHALL SPECIFIED BOTH GRADE AND WALL THICKNESS .

3.1 CARBON EQUIVALENT SHALL NOT EXCEED 0.42 AND SHALL BE CALCULATED ACC. TO FOLLOWING FORMULA :

$$C.E = C + \frac{MN}{6} + \frac{CR + MO + V}{5} + \frac{NI + CU}{15}$$

3.2 WELDED CONSTRUCTION FITTINGS WITH ONE SEAM OR TWO SEAMS SHALL BE 100% RADIOGRAPHED AS PER MSS – SP – 75 .

3.3 DESIGN SAFETY FACTOR SHALL BE SPECIFIED BY PURCHASER .

3.4 DESIGN PRESSURE SHALL BE SPECIFIED BY PURCHASER .

#### 4.0 DIMENSIONS FOR ELBOW 45 DEG :

| <b>NPS</b> | <b>OUTSIDE DIA<br/>AT BEVEL<br/>( IN )</b> | <b>CENTER TO<br/>END<br/>( IN )</b>  | <b>CONSTRUCTION</b>                             |
|------------|--|--|---|
| 16         | 16.00                                      | 10.00  | SEAMLESS OR WELDED<br>( ONE SEAM OR TWO SEAMS ) |
| 20         | 20.00                                      | 12.50  | SEAMLESS OR WELDED<br>( ONE SEAM OR TWO SEAMS ) |
| 22         | 22.00                                      | 13.50  | SEAMLESS OR WELDED<br>( ONE SEAM OR TWO SEAMS ) |
| 24         | 24.00                                      | 15.00  | SEAMLESS OR WELDED<br>( ONE SEAM OR TWO SEAMS ) |
| 30         | 30.00                                      | 18.50  | WELDED ( ONE SEAM OR TWO SEAMS )                |
| 36         | 36.00                                      | 22.25  | WELDED ( ONE SEAM OR TWO SEAMS )                |
| 40         | 400.00                                     | 24.88  | WELDED ( ONE SEAM OR TWO SEAMS )                |
| 42         | 42.00                                      | 26.00  | WELDED ( ONE SEAM OR TWO SEAMS )                |
| 48         | 48.00                                      | 29.88  | WELDED ( ONE SEAM OR TWO SEAMS )                |
| 56         | 56.00                                      | TO BE<br>SPECIFIED BY<br>MANUFACTURER<br>AND TO BE<br>APPROVED BY<br>PURCHASER | WELDED ( ONE SEAM OR TWO SEAMS )                |

#### 5.0 DIMENSIONS FOR ELBOW 90 DEG :

| <b>NPS</b> | <b>OUTSIDE DIA<br/>AT BEVEL<br/>( IN )</b> | <b>CENTER TO<br/>END<br/>( IN )</b>  | <b>CONSTRUCTION</b>                             |
|------------|--|--|---|
| 16         | 16.00                                      | 24.00  | SEAMLESS OR WELDED<br>( ONE SEAM OR TWO SEAMS ) |
| 18         | 18.00                                      | 27.00  | SEAMLESS OR WELDED<br>( ONE SEAM OR TWO SEAMS ) |
| 20         | 20.00                                      | 30.00  | SEAMLESS OR WELDED<br>( ONE SEAM OR TWO SEAMS ) |
| 22         | 22.00                                      | 33.00  | SEAMLESS OR WELDED<br>( ONE SEAM OR TWO SEAMS ) |
| 24         | 24.00                                      | 36.00  | SEAMLESS OR WELDED<br>( ONE SEAM OR TWO SEAMS ) |
| 30         | 30.00                                      | 45.00  | WELDED ( ONE SEAM OR TWO SEAMS )                |
| 36         | 36.00                                      | 54.00  | WELDED ( ONE SEAM OR TWO SEAMS )                |
| 40         | 40.00                                      | 60.00  | WELDED ( ONE SEAM OR TWO SEAMS )                |
| 42         | 42.00                                      | 63.00  | WELDED ( ONE SEAM OR TWO SEAMS )                |
| 48         | 48.00                                      | 72.00  | WELDED ( ONE SEAM OR TWO SEAMS )                |
| 56         | 56   | TO BE<br>SPECIFIED BY<br>MANUFACTURER<br>AND TO BE<br>APPROVED BY<br>PURCHASER | WELDED ( ONE SEAM OR TWO SEAMS )                |

### 6.0 DIMENSIONS FOR STRAIGHT TEE :

| <b>NPS</b> | <b>OUTSIDE DIA<br/>AT BEVEL ( IN )</b> | <b>CENTER TO END<br/>( IN )</b> |                   | <b>CONSTRUCTION</b> |
|------------|--|---------------------------------|-------------------|---------------------|
|            |  | <b>RUN – C</b>                  | <b>OUTLET - M</b> |                     |
| 16         | 16.00                                  | 12.00                           | 12.00             | SEAMLESS            |
| 18         | 18.00                                  | 13.50                           | 13.50             | SEAMLESS            |
| 20         | 20.00                                  | 15.00                           | 15.00             | SEAMLESS            |

|    |       |       |  |  |
|----|-------|-------|--|--|
| 22 | 22.00 | 16.50 | 16.50  | SEAMLESS   |
| 24 | 24.00 | 17.00 | 17.00  | SEAMLESS OR WELDED<br>( ONE SEAM OR TWO SEAMS )<br>BUT EXTRUDED OUTLET |
| 30 | 30.00 | 22.00 | 22.00  | WELDED ( ONE SEAM OR TWO<br>SEAMS ) BUT EXTRUDED OUTLET                |
| 36 | 36.00 | 26.50 | 26.00  | WELDED ( ONE SEAM OR TWO<br>SEAMS ) BUT EXTRUDED OUTLET                |
| 40 | 40.00 | 29.50 | 29.00  | WELDED ( ONE SEAM OR TWO<br>SEAMS ) BUT EXTRUDED OUTLET                |
| 42 | 42.00 | 30.00 | 28.00  | WELDED ( ONE SEAM OR TWO<br>SEAMS ) BUT EXTRUDED OUTLET                |
| 48 | 48.00 | 35.00 | 33.00  | WELDED ( ONE SEAM OR TWO<br>SEAMS ) BUT EXTRUDED OUTLET                |
| 56 | 56.00 |       | TO BE<br>SPECIFIED BY<br>MANUFACTURER<br>AND TO BE<br>APPROVED BY<br>PURCHASER | WELDED ( ONE SEAM OR TWO<br>SEAMS ) BUT EXTRUDED OUTLET                |

## 7.0 DIMENSIONS FOR REDUCING TEE :

| NPS          | OUTSIDE DIA AT BEVEL<br>( IN ) |        | CENTER TO END<br>( IN ) |            | CONSTRUCTION |
|--------------|--------------------------------|--------|-------------------------|------------|--------------|
|              | RUN                            | OUTLET | FUN - C                 | OUTLET - M |              |
| 16 x 16 x 14 | 16.00                          | 14.00  | 12.00                   | 12.00      | SEAMLESS     |
| 16 x 16 x 12 | 16.00                          | 12.75  | 12.00                   | 16.62      | SEAMLESS     |
| 16 x 16 x 10 | 16.00                          | 10.75  | 12.00                   | 10.75      | SEAMLESS     |
| 16 x 16 x 8  | 16.00                          | 8.62   | 12.00                   | 10.75      | SEAMLESS     |
| 16 x 16 x 6  | 16.00                          | 6.62   | 12.50                   | 10.38      | SEAMLESS     |
| 18 x 18 x 16 | 18.00                          | 16.00  | 13.50                   | 13.00      | SEAMLESS     |



|              |       |       |       |       |          |
|--------------|-------|-------|-------|-------|----------|
| 18 x 18 x 14 | 18.00 | 14.00 | 13.50 | 13.00 | SEAMLESS |
| 18 x 18 x 12 | 18.00 | 12.75 | 13.50 | 12.62 | SEAMLESS |
| 18 x 18 x 10 | 18.00 | 10.75 | 13.50 | 12.12 | SEAMLESS |
| 18 x 18 x 8  | 18.00 | 8.62  | 13.50 | 11.75 | SEAMLESS |
| 20 x 20 x 18 | 20.00 | 18.00 | 15.00 | 14.5  | SEAMLESS |
| 20 x 20 x 16 | 20.00 | 16.00 | 15.00 | 14.00 | SEAMLESS |
| 20 x 20 x 14 | 20.00 | 14.00 | 15.00 | 14.00 | SEAMLESS |
| 20 x 20 x 12 | 20.00 | 12.75 | 15.00 | 13.62 | SEAMLESS |
| 20 x 20 x 10 | 20.00 | 10.75 | 15.00 | 13.12 | SEAMLESS |
| 20 x 20 x 8  | 20.00 | 8.62  | 15.00 | 12.75 | SEAMLESS |
| 22 x 22 x 20 | 22.00 | 20.00 | 16.50 | 16.00 | SEAMLESS |
| 22 x 22 x 18 | 22.00 | 18.00 | 16.50 | 15.50 | SEAMLESS |
| 22 x 22 x 16 | 22.00 | 16.00 | 16.50 | 15.00 | SEAMLESS |
| 22 x 22 x 14 | 22.00 | 14.00 | 16.50 | 15.00 | SEAMLESS |
| 22 x 22 x 12 | 22.00 | 12.75 | 16.50 | 14.62 | SEAMLESS |
| 22 x 22 x 10 | 22.00 | 10.75 | 16.50 | 14.12 | SEAMLESS |

CONTINUED

| NPS          | OUTSIDE DIA AT<br>BEVEL<br>( IN ) |        | CENTER TO END<br>( IN ) |            | CONSTRUCTION                                 |
|--------------|-----------------------------------|--------|-------------------------|------------|--|
|              | RUN                               | OUTLET | FUN - C                 | OUTLET - M |  |
| 24 x 24 x 22 | 24.00                             | 20.00  | 17.00                   | 17.00      | SEAMLESS OR WELDED ( ONE SEAM OR TWO SEAMS ) |
| 24 x 24 x 20 | 24.00                             | 18.00  | 17.00                   | 16.50      | SEAMLESS OR WELDED ( ONE SEAM OR TWO SEAMS ) |
| 24 x 24 x 18 | 24.00                             | 18.00  | 17.00                   | 16.50      | SEAMLESS OR WELDED ( ONE SEAM OR TWO SEAMS ) |
| 24 x 24 x 16 | 24.00                             | 16.00  | 17.00                   | 16.00      | SEAMLESS OR WELDED ( ONE SEAM OR TWO SEAMS ) |
| 24 x 24 x 14 | 24.00                             | 14.00  | 17.00                   | 16.00      | SEAMLESS OR WELDED ( ONE SEAM OR TWO SEAMS ) |
| 24 x 24 x 12 | 24.00                             | 12.75  | 17.00                   | 15.62      | SEAMLESS OR WELDED ( ONE SEAM OR TWO SEAMS ) |

|              |       |       |       |       |  |
|--------------|-------|-------|-------|-------|--|
| 24 x 24 x 10 | 24.00 | 10.75 | 17.00 | 15.12 | SEAMLESS OR WELDED ( ONE SEAM OR TWO SEAMS ) |
| 30 x 30 x 26 | 30.00 | 26.00 | 22.00 | 21.50 | WELDED ONE SEAM OR TWO SEAMS                 |
| 30 x 30 x 24 | 30.00 | 24.00 | 22.00 | 21.00 | “  |
| 30 x 30 x 22 | 30.00 | 22.00 | 22.00 | 20.50 | “  |
| 30 x 30 x 20 | 30.00 | 20.00 | 22.00 | 20.50 | “  |
| 30 x 30 x 18 | 30.00 | 18.00 | 22.00 | 19.50 | “  |
| 30 x 30 x 16 | 30.00 | 16.00 | 22.00 | 19.00 | “  |
| 30 x 30 x 14 | 30.00 | 14.00 | 22.00 | 19.00 | “  |
| 30 x 30 x 12 | 30.00 | 12.75 | 22.00 | 18.62 | “  |
| 30 x 30 x 10 | 30.00 | 12.75 | 22.00 | 18.12 | “  |
| 36 x 36 x 34 | 36.00 | 34.00 | 26.50 | 26.00 | “  |
| 36 x 36 x 30 | 36.00 | 30.00 | 26.50 | 25.00 | “  |
| 36 x 36 x 26 | 36.00 | 26.00 | 26.50 | 24.00 | “  |

**CONTINUED**

| NPS          | OUTSIDE DIA AT BEVEL ( IN ) |        | CENTER TO END ( IN ) |            | CONSTRUCTION                 |
|--------------|-----------------------------|--------|----------------------|------------|------------------------------|
|              | RUN                         | OUTLET | FUN - C              | OUTLET - M |                              |
| 36 x 36 x 22 | 36.00                       | 22.00  | 26.50                | 23.50      | WELDED ONE SEAM OR TWO SEAMS |
| 36 x 36 x 20 | 36.00                       | 20.00  | 26.50                | 23.50      | “                            |
| 36 x 36 x 18 | 36.00                       | 18.00  | 26.50                | 22.50      | “                            |
| 36 x 36 x 16 | 36.00                       | 16.00  | 26.50                | 22.00      | “                            |
| 40 x 40 x 38 | 40.00                       | 38.00  | 29.50                | 29.50      | “                            |
| 40 x 40 x 36 | 40.00                       | 36.00  | 29.50                | 29.00      | “                            |
| 40 x 40 x 34 | 40.00                       | 34.00  | 29.50                | 28.50      | “                            |
| 40 x 40 x 32 | 40.00                       | 32.00  | 29.50                | 28.00      | “                            |
| 40 x 40 x 30 | 40.00                       | 30.00  | 29.50                | 27.50      | “                            |
| 40 x 40 x 26 | 40.00                       | 26.00  | 29.50                | 26.50      | “                            |
| 40 x 40 x 24 | 40.00                       | 24.00  | 29.50                | 26.00      | “                            |
| 40 x 40 x 22 | 40.00                       | 22.00  | 29.50                | 25.50      | “                            |

|              |       |       |       |       |   |
|--------------|-------|-------|-------|-------|---|
| 40 x 40 x 20 | 40.00 | 20.00 | 29.50 | 25.00 | “ |
| 40 x 40 x 18 | 40.00 | 18.00 | 29.50 | 24.50 | “ |
| 42 x 42 x 36 | 42.00 | 36.00 | 30.00 | 28.00 | “ |
| 42 x 42 x 34 | 42.00 | 34.00 | 30.00 | 28.00 | “ |
| 42 x 42 x 32 | 42.00 | 32.00 | 30.00 | 28.00 | “ |
| 42 x 42 x 30 | 42.00 | 30.00 | 30.00 | 28.00 | “ |
| 42 x 42 x 28 | 42.00 | 28.00 | 30.00 | 27.50 | “ |
| 42 x 42 x 26 | 42.00 | 26.00 | 30.00 | 27.50 | “ |
| 42 x 42 x 24 | 42.00 | 24.00 | 30.00 | 26.00 | “ |
| 42 x 42 x 22 | 42.00 | 22.00 | 30.00 | 26.00 | “ |
| 42 x 42 x 20 | 42.00 | 20.00 | 30.00 | 26.00 | “ |
| 42 x 42 x 18 | 42.00 | 18.00 | 30.00 | 25.00 | “ |
| 42 x 42 x 16 | 42.00 | 16.00 | 30.00 | 25.00 | “ |

**CONTINUED**

| NPS          | OUTSIDE DIA AT BEVEL |        | CENTER TO END ( IN ) |            | CONSTRUCTION                 |
|--------------|----------------------|--------|----------------------|------------|------------------------------|
|              | RUN                  | OUTLET | FUN - C              | OUTLET - M |                              |
| 48 x 48 x 46 | 48.00                | 46.00  | 35.00                | 33.00      | WELDED ONE SEAM OR TWO SEAMS |
| 48 x 48 x 44 | 48.00                | 44.00  | 35.00                | 33.00      | “                            |
| 48 x 48 x 42 | 48.00                | 42.00  | 35.00                | 32.00      | “                            |
| 48 x 48 x 40 | 48.00                | 40.00  | 35.00                | 32.00      | “                            |
| 48 x 48 x 38 | 48.00                | 38.00  | 35.00                | 32.00      | “                            |
| 48 x 48 x 36 | 48.00                | 36.00  | 35.00                | 31.00      | “                            |
| 48 x 48 x 34 | 48.00                | 34.00  | 35.00                | 31.00      | “                            |
| 48 x 48 x 32 | 48.00                | 32.00  | 35.00                | 31.00      | “                            |
| 48 x 48 x 30 | 48.00                | 30.00  | 35.00                | 30.00      | “                            |
| 48 x 48 x 26 | 48.00                | 26.00  | 35.00                | 30.00      | “                            |
| 48 x 48 x 24 | 48.00                | 24.00  | 35.00                | 29.00      | “                            |
| 48 x 48 x 22 | 48.00                | 22.00  | 35.00                | 29.00      | “                            |

**NOTES :**

1. **RUN – C ( CENTER TO END ) FOR OUTLETS WHICH NOT INCLUDED IN THE TABLE SHALL NOT BE LESS THAN THE SPECIFID FIGURE .**
2. **THE DIMENSIONS OF 56” REDUCING OUTLET TEE SHALL BE SPECIFIED BY MANUFACTURER AND TO BE APPROVED BY PURCHASER .**
3. **IN CASE OF WELDED , THE OUTLET SHALL BE EXTRUDED .**

**8.0 DIMENSIONS FOR CAP :**

| NPS | OUTSIDE DIA<br>AT BEVEL<br>( IN ) | CAP LENGTH<br>( E )  | CAP LENGTH<br>( E1 ) | CONSTRUCTION |
|-----|-----------------------------------|--|----------------------|--------------|
|     |                                   | NOM.   | NOM.                 |              |
| 16  | 16.00                             | 7.00   | 8.00                 | SEAMLESS     |
| 18  | 18.00                             | 8.50   | 9.00                 | SEAMLESS     |
| 20  | 20.00                             | 9.00   | 10.00                | SEAMLESS     |
| 22  | 22.00                             | 10.00  | 10.00                | SEAMLESS     |
| 24  | 24.00                             | 10.50  | 12.00                | SEAMLESS     |
| 30  | 30.00                             | 10.50  | 12.00                | SEAMLESS     |
| 36  | 36.00                             | 10.50  | 12.00                | SEAMLESS     |
| 40  | 40.00                             | 12.00  | 13.50                | SEAMLESS     |
| 48  | 48.00                             | 13.50  | 15.00                | SEAMLESS     |
| 56  | 56.00                             | TO BE SPECIFIED BY<br>MANUFACTURER & TO BE<br>APPROVED BY PURCHASR |                      | SEAMLESS     |

**9.0 DIMENSIONS ( CONCENTRIC & ECCENTRIC EDUCERS ) :**

| NPS     | O.D AT BEVEL        |                     | END TO END<br>LENGTH ( H )<br>( IN ) | CONSTRUCTION       |
|---------|---------------------|---------------------|--------------------------------------|--------------------|
|         | LARGE END<br>( IN ) | SMALL END<br>( IN ) |                                      |                    |
| 16 x 14 | 16.00               | 14.00               | 14.00                                | SEAMLESS OR WELDED |

|         |       |       |       |                           |
|---------|-------|-------|-------|---------------------------|
|         |       |       |       | ( ONE SEAM OR TWO SEAMS ) |
| 16 x 12 | 16.00 | 12.75 | 14.00 | “                         |
| 16 x 10 | 16.00 | 10.75 | 14.00 | “                         |
| 16 x 8  | 16.00 | 8.62  | 14.00 | “                         |
| 18 x 16 | 18.00 | 16.00 | 15.00 | “                         |
| 18 x 14 | 18.00 | 14.00 | 15.00 | “                         |
| 18 x 12 | 18.00 | 12.75 | 15.00 | “                         |
| 18 x 10 | 18.00 | 10.75 | 15.00 | “                         |
| 20 x 18 | 20.00 | 18.00 | 20.00 | “                         |
| 20 x 16 | 20.00 | 16.00 | 20.00 | “                         |
| 20 x 14 | 20.00 | 14.00 | 20.00 | “                         |
| 20 x 12 | 20.00 | 12.75 | 20.00 | “                         |
| 22 x 20 | 22.00 | 20.00 | 20.00 | “                         |
| 22 x 18 | 22.00 | 18.00 | 20.00 | “                         |
| 22 x 16 | 22.00 | 16.00 | 20.00 | “                         |
| 22 x 14 | 22.00 | 14.00 | 20.00 | “                         |
| 24 x 22 | 24.00 | 22.00 | 20.00 | “                         |
| 24 x 20 | 24.00 | 20.00 | 20.00 | “                         |
| 24 x 18 | 24.00 | 18.00 | 20.00 | “                         |
| 24 x 16 | 24.00 | 16.00 | 20.00 | “                         |

## CONTINUED

| NPS     | O.D AT BEVEL     |                  | END TO END LENGTH ( H ) ( IN ) | CONSTRUCTION                                 |
|---------|------------------|------------------|--------------------------------|--|
|         | LARGE END ( IN ) | SMALL END ( IN ) |                                |  |
| 30 x 24 | 30.00            | 24.00            | 24.00                          | SEAMLESS OR WELDED ( ONE SEAM OR TWO SEAMS ) |
| 30 x 20 | 30.00            | 20.00            | 24.00                          | “  |
| 36 x 30 | 36.00            | 30.00            | 24.00                          | “  |
| 36 x 24 | 36.00            | 24.00            | 24.00                          | “  |
| 40 x 36 | 40.00            | 36.00            | 24.00                          | “  |
| 40 x 30 | 40.00            | 30.00            | 24.00                          | “  |
| 40 x 24 | 40.00            | 24.00            | 24.00                          | “  |

|         |       |       |       |   |
|---------|-------|-------|-------|---|
| 40 x 22 | 40.00 | 22.00 | 22.00 | “ |
| 40 x 20 | 40.00 | 20.00 | 24.00 | “ |
| 42 x 36 | 42.00 | 36.00 | 24.00 | “ |
| 42 x 30 | 42.00 | 30.00 | 24.00 | “ |
| 42 x 24 | 42.00 | 24.00 | 24.00 | “ |
| 48 x 42 | 48.00 | 42.00 | 28.00 | “ |
| 48 x 40 | 48.00 | 40.00 | 28.00 | “ |
| 48 x 36 | 48.00 | 36.00 | 28.00 | “ |
| 48 x 30 | 48.00 | 30.00 | 28.00 | “ |
| 48 x 24 | 48.00 | 24.00 | 28.00 | “ |

**NOTE : THE DIMENSIONS OF 56” REDUCERS AS A LARGE END SHALL BE SPECIFIED BY MANUFACTURER AND TO BE APPROVED BY PURCHASER**

## **10. INSPECTION :**

IN ADDITION TO MSS – SP – 75 REQUIREMENTS , FOLLOWING CLAUSES SHALL BE CARRIED OUT AND TO BE CONFIRMED BY MANUFACTURER .

10.1 MANUFACTURER SHALL SUPPLY TO THE PURCHASER DETAILS OF TESTS PREFORMED .

10.2 NON – DESTRUCTIVE TESTING SHALL CONFORM TO THE ASME CODE SECTION 5. AND ACCEPTANCE LIMIT SHALL BE AS PER ASME CODE SECTION 8 .

10.3 REPAIR WELDING :

BASE METAL REPAIR BY WELDING IS NOT ALLOWED .

## **11. DOCUMENTATION :**

MANUFACTUREING DRAWINGS INCLUDED PLAN , SECTIONAL , DIMENSIONS ON SECTION , CLASS RATING , INDENT NO, ITEM NO , CONCERNING FITTINGS 36IN AND LARGER SHALL BE SENT WITH TECHNICAL QUOTATION FOR PURCHASER EVALUATION AND APPROVAL .