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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

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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 :

NPS	OUTSIDE DIA AT BEVEL (IN)	CENTER TO END (IN)	CONSTRUCTION
16	16.00	10.00	SEAMLESS OR WELDED (ONE SEAM OR TWO SEAMS)
20	20.00	12.50	SEAMLESS OR WELDED (ONE SEAM OR TWO SEAMS)
22	22.00	13.50	SEAMLESS OR WELDED (ONE SEAM OR TWO SEAMS)
24	24.00	15.00	SEAMLESS OR WELDED (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 SPECIFIED BY MANUFACTURER AND TO BE APPROVED BY PURCHASER	WELDED (ONE SEAM OR TWO SEAMS)

5.0 DIMENSIONS FOR ELBOW 90 DEG :

NPS	OUTSIDE DIA AT BEVEL (IN)	CENTER TO END (IN)	CONSTRUCTION
16	16.00	24.00	SEAMLESS OR WELDED (ONE SEAM OR TWO SEAMS)
18	18.00	27.00	SEAMLESS OR WELDED (ONE SEAM OR TWO SEAMS)
20	20.00	30.00	SEAMLESS OR WELDED (ONE SEAM OR TWO SEAMS)
22	22.00	33.00	SEAMLESS OR WELDED (ONE SEAM OR TWO SEAMS)
24	24.00	36.00	SEAMLESS OR WELDED (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 SPECIFIED BY MANUFACTURER AND TO BE APPROVED BY PURCHASER	WELDED (ONE SEAM OR TWO SEAMS)

6.0 DIMENSIONS FOR STRAIGHT TEE :

NPS	OUTSIDE DIA AT BEVEL (IN)	CENTER TO END (IN)		CONSTRUCTION
		RUN – C	OUTLET - M	
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 (ONE SEAM OR TWO SEAMS) BUT EXTRUDED OUTLET
30	30.00	22.00	22.00	WELDED (ONE SEAM OR TWO SEAMS) BUT EXTRUDED OUTLET
36	36.00	26.50	26.00	WELDED (ONE SEAM OR TWO SEAMS) BUT EXTRUDED OUTLET
40	40.00	29.50	29.00	WELDED (ONE SEAM OR TWO SEAMS) BUT EXTRUDED OUTLET
42	42.00	30.00	28.00	WELDED (ONE SEAM OR TWO SEAMS) BUT EXTRUDED OUTLET
48	48.00	35.00	33.00	WELDED (ONE SEAM OR TWO SEAMS) BUT EXTRUDED OUTLET
56	56.00		TO BE SPECIFIED BY MANUFACTURER AND TO BE APPROVED BY PURCHASER	WELDED (ONE SEAM OR TWO SEAMS) BUT EXTRUDED OUTLET

7.0 DIMENSIONS FOR REDUCING TEE :

NPS	OUTSIDE DIA AT BEVEL (IN)		CENTER TO END (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 BEVEL (IN)		CENTER TO END (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 AT BEVEL (IN)	CAP LENGTH (E)	CAP LENGTH (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 MANUFACTURER & TO BE APPROVED BY PURCHASR		SEAMLESS

9.0 DIMENSIONS (CONCENTRIC & ECCENTRIC EDUCERS) :

NPS	O.D AT BEVEL		END TO END LENGTH (H) (IN)	CONSTRUCTION
	LARGE END (IN)	SMALL END (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 .