Weld Strength Mismatch Requirements

Topical Report 277-T-10

For Project

Weld Design, Testing, and Assessment Procedures for High Strength Pipelines

Prepared for the
Design, Materials, and Construction Technical Committee of
Pipeline Research Council International, Inc.
Project MATH-1 Catalog No. L5XXXX
and
U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration
Office of Pipeline Safety
DOT Project BAA DTHP56-07-0001

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November 30, 2011

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FINAL REPORT STRUCTURE

Focus Area 1 - Update of Weld Design, Testing, and Assessment Procedures for High Strength Pipelines		
Report #	**Description**	**Lead Authors**
277-T-01	Background of Linepipe Specifications	CRES/CANMET
277-T-02	Background of All-Weld Metal Tensile Test Protocol	CANMET/Lincoln
277-T-03	Development of Procedure for Low-Constraint Toughness Testing Using a Single-Specimen Technique	CANMET/CRES
277-T-04	Summary of Publications: Single-Edge Notched Tension SE(T) Tests	CANMET
277-T-05	Small Scale Tensile, Charpy V-Notch, and Fracture Toughness Tests	CANMET/NIST
277-T-06	Small Scale Low Constraint Fracture Toughness Test Results	CANMET/NIST
277-T-07	Small Scale Low Constraint Fracture Toughness Test Discussion and Analysis	CANMET/NIST
277-T-08	Summary of Mechanical Properties	CANMET
277-T-09	Curved Wide Plate Tests	NIST/CRES
277-T-10	Weld Strength Mismatch Requirements	CRES/CANMET
277-T-11	Curved Wide Plate Test Results and Transferability of Test Specimens	CRES/CANMET
277-S-01	Summary Report 277 Weld Design, Testing, and Assessment Procedures for High Strength Pipelines	CRES

Focus Area 2 - Development of Optimized Welding Solutions for X100 Linepipe Steel		
Report #	**Description**	**Lead Authors**
278-T-01	State of The Art Review	Lincoln
278-T-02	Material Selection, Welding and Weld Monitoring	Lincoln/CANMET
278-T-03	Microstructure and Hardness Characterization of Girth Welds	CANMET/Lincoln
278-T-04	Microstructure and Properties of Simulated Weld Metals	CANMET/Lincoln
278-T-05	Microstructure and Properties of Simulated Heat Affected Zones	CANMET/Lincoln
278-T-06	Essential Welding Variables	Lincoln/CANMET
278-T-07	Thermal Model for Welding Simulations	CRES/CANMET
278-T-08	Microstructure Model for Welding Simulations	CRES/CANMET
278-T-09	Application to Other Processes	Lincoln/CANMET
278-S-01	Summary Report 278 Development of Optimized Welding Solutions for X100 Line Pipe Steel	Lincoln

EXECUTIVE SUMMARY

Girth weld strength is a critical material parameter in ensuring weld integrity. The weld strength needed for the integrity requirement depends on the expected stress or strain imposed on the welds and other relevant weld parameters, such as the flaw size and high-low misalignment.

Workmanship-based pipeline construction codes, such as the main body of API 1104 and CSA Z662, require that the ultimate tensile strength (UTS) of cross-weld tensile specimens meet the specified minimum tensile strength of the pipe. Such requirements are specified as a part of welding procedure qualification. Given typical pipe strength distributions, the requirements leave room for actual weld strength undermatching, i.e., the actual weld strength being lower than the actual strength of the pipe. For instance, the average value of pipe strength is higher than the specified minimum strength in any given pipe order so the pipe at the lower end of the strength distribution can still meet the minimum strength requirement. If the weld strength is only slightly above the specified minimum strength, the pipe strength would be higher than the weld strength on an average basis.

Depending on the specific loading condition in the pipe longitudinal direction, the girth welds can be sound and safe even with some degree of undermatching. A small degree of undermatching is usually tolerable given the typical weld bevel geometry and weld cap reinforcement. However a high degree of weld strength undermatching may cause gross strain concentration in the weld in the event of longitudinal loading. Such strain concentration may cause premature failure of the welds. Current codes and standards do not address the actual strength mismatch between the pipes and welds. For a given weld, the actual strength mismatch is unknown, as the strength level of both linepipe and girth welds have certain distributions. This distribution is recognized in linepipe specifications, such as API 5L, for practical purposes. For instance, for API 5L PSL 2 X70 pipes, the minimum specified tensile strength is 82 ksi while the upper bound of the tensile strength is 110 ksi.

One might attempt to specify high weld strength to account for the linepipe and weld strength distribution so there would always be weld strength overmatching, i.e., weld strength being higher than the pipe strength. Such proposition carries certain downsides and can be counterproductive. For instance, in the case of the X70 pipes, the lower end of the weld strength distribution needs to be 110 ksi or higher. Welds of such high strength may have reduced ductility and toughness in comparison with welds of lower strength. In addition, the propensity of weld cracking increases with greater weld strength when other variables are kept the same.

The objective of this work is to establish rational approaches to the weld strength requirements. Such requirements are correlated to the expected construction and service conditions throughout the pipeline's service life. No single strength requirement is good for all conditions. "Over-specifying" the strength requirement may not be necessary and can be counterproductive. On the other hand, "under-specifying" the strength requirement may lead to inadequate safety and integrity.

A fitness-for-service philosophy is applied to develop the weld strength requirement in this report. This requirement is presented in the form of weld strength mismatch requirement as the

integrity of the weld is governed by the relative strength between the weld and the pipe. The weld strength mismatch is defined as the ratio of the ultimate tensile strength of weld over the ultimate tensile strength of the pipe. This format facilitates the application to a wide range of pipe grades.

The basis of the weld strength requirements is first described. The trends of the weld strength requirements as functions of other parameters are shown. The strength requirements for a broad range of pipe dimensions, material properties, and flaw sizes, are presented in tabular forms. Examples of applying the strength requirements are given for illustration.

The results of this work may be used for:

- Initial feasibility study of weld strength requirement for a particular pipe grade and application,
- Evaluation of the impact of weld strength on weld performance measures, such as the tensile strain capacity of the girth welds,
- Playing "what-if" scenarios and developing trade-off strategies among various parameters governing the girth weld integrity for certain performance requirement. For instance high degree of overmatching may be used to compensate for large high-low misalignment.

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1 INTRODUCTION

1.1 BACKGROUND AND INCENTIVE

Girth weld strength is a critical material parameter in ensuring weld integrity. Workmanship-based pipeline construction codes, such as the main body of API 1104 and CSA Z662, require that the ultimate tensile strength (UTS) of cross-weld tensile specimens meet the specified minimum tensile strength of the pipe. Such requirements are specified as a part of welding procedure qualification. The requirements are sufficient for many applications, while potentially inadequate for other applications.

For an in-service pipeline, one of the most severe loading conditions is the longitudinal straining from ground movement hazards. Such hazards may come from landslides, subsidence, seismic activities, and frost heave and thaw settlement in arctic regions. At least two limit states are associated with those ground movement hazards: compressive buckling and tensile rupture.

Girth welds are often the focal point of the compressive and tensile strain limit states. In the case of compressive limit state, geometric discontinuities, such as high-low misalignment, weld cap reinforcement, etc., can become the initiation points of a compressive buckling. In addition, the elastic expansion in the hoop direction by the internal pressure may be different at the girth welds from that of the rest of the pipes. This small differential in pipe diameter further increases the likelihood of girth welds becoming the initiation sites of compressive buckling. The weld strength does not play a significant role for this limit state as the material is not likely to fail under the compressive stress.

For the tensile rupture limit state, weld strength is one of the most critical parameters. In the absence of weld flaws and other detrimental geometric features, such as a high degree of high-low misalignment, girth welds could fail by gross strain concentration if the weld strength is significantly lower than the strength of the pipe. The probability of such failure increases if the welds contain flaws and a high degree of high-low misalignment. In practice, the weld strength needs to be sufficiently high to ensure that (1) there is no gross strain concentration at the welds and (2) the detrimental effects of weld flaws and the high-low misalignment are properly compensated for by the weld strength.

To prevent gross strain concentration in the girth welds and to further ensure adequate weld quality in the presence of weld flaws and misalignment underground movement hazards, the actual weld strength should be compared with the actual pipe strength in the longitudinal direction. The current weld procedure qualification requirements do not rigorously address this issue. For instance the average strength of the pipes in a given pipe order is typically higher than the specified minimum strength. If the girth weld strength is only slightly above the specified minimum strength, there is still a chance that the actual weld strength could be lower than the actual strength of the pipe. In fact, a high degree of weld strength undermatching can exist, yet the weld would still pass the procedure qualification requirements. The second, perhaps less significant, issue is the distinction between longitudinal and hoop tensile properties. For large diameter pipes, the pipe strength is verified by testing flattened straps in the hoop direction. The tensile strength in the longitudinal direction of the pipe can be higher or lower than that in the

hoop direction, depending on the steel rolling practice and the type of pipe forming process, e.g., UOE vs. spiral pipes.

1.2 INCENTIVE

Historical evidence suggests that the current weld procedure qualification requirements have worked well. However, such success may not be extrapolated to all future applications due to the changes in materials and the environment of some of the proposed new pipelines. As the pipeline industry moves towards higher strength pipelines (X70 and above), it becomes ever more important to understand the weld strength requirement for expected construction and service conditions. In general having weld strength greater than the pipe strength is desirable. However a weld strength requirement that is overly high may come at the expense of the reduced toughness and ductility, which could result in an overall inferior weld quality.

From the perspectives of having sound weld quality and integrity, the weld strength requirements should be correlated to the expected construction and service conditions. "Over-specifying" the strength requirement may not be necessary and can be counter-productive. On the other hand, "under-specifying" the strength requirement may lead to inadequate safety and integrity.

1.3 OBJECTIVE OF THIS WORK

The objective of this work is to establish rational approaches to the weld strength requirements. In the case of ground movement hazards, the important factor is the relative strength of the weld versus the pipe, i.e., strength mismatch. Consequently, the weld strength requirement is expressed as the requirement for weld strength mismatch. The requirements are correlated to the expected construction and service conditions throughout the pipeline's service life.

1.4 SCOPE AND STRUCTURE OF THE REPORT

In Section 2 of this report, past work related to weld strength requirements is reviewed. The basis of weld strength requirement is outlined in Section 3. In Section 4, the development of the weld strength mismatch requirement is described using the basis established in Section 3. A few examples of the application of the requirements are presented in Section 5. The weld mismatch requirements for a variety of conditions are presented in tabular forms in Appendix A.

1.5 DISTINCTION BETWEEN STRESS- AND STRAIN-BASED DESIGN

Strain-based design refers to pipeline design methodologies that systemically account for possibility of high applied longitudinal strains (applied strain greater than material's yield strain or 0.5%). Traditional pipeline designs focus on the control of hoop stress, often referred to as stress-based design. Contrary to some misconception, stress- and strain-based designs are not mutually exclusive. Strain-based design should be viewed as additional design considerations complementary to the traditional stress-based design. A pipeline designed using strain-based design still needs to meet the requirements of traditional stress-based design.
Even though most pipelines are designed on the basis of controlling hoop stress, these pipelines may still experience longitudinal loading. Such loading may come from aforementioned ground movement hazards. Even in the absence of such hazards, longitudinal stress can exist from

pipeline construction, temperature changes of the pipelines and variations in terrains and support conditions. Therefore, some degree of tolerance to longitudinal stresses/strains should be considered for all pipelines.

The girth weld strength mismatch requirements presented here do not make distinctions between pipelines designed by traditional stress-based design and new pipelines designed by a combination of stress- and strain-based designs. The requirements are given as a function of anticipated applied longitudinal strains. As such, they can be applied to both new designs and in-service pipelines when sufficient material and other conditions are known to apply the strength criteria.

2 PAST WORK ON WELD STRENGTH REQUIREMENTS

Weld metal strength is generally not an explicit requirement in codes and standards that govern pipeline girth welding practice [1,2,3,4]. Contrary to some public-domain misconceptions, weld strength overmatching is not a requirement in most pipeline codes and standards. In fact pipeline codes and standards do not have requirements for all-weld-metal tensile tests, nor procedures that enable the evaluation of the significance of weld strength mismatch.

The effect of weld strength mismatch was the subject of intensive research in the early 1990's, as symbolised by two symposia dedicated to the subject [5,6]. The studies included the following subject areas:

- Impact of weld strength mismatch on the structural integrity of welds,
- Influence of weld strength mismatch on standard toughness testing procedures, and
- Incorporation of weld strength mismatch into weld integrity assessment procedures.

The effects of weld strength mismatch on fracture toughness testing were examined by a number of organizations. A large international program led by EWI and TWI defined the limits of fracture toughness correlation equations for welds with strength mismatch [7,8,9,10,11].

Procedures to account for the weld strength mismatch in weld integrity assessment have been proposed by GKSS [12] and by a European research consortium [13]. The consensus view on the treatment of weld strength mismatch was developed by a group of leading experts in mid-1990s [14].

A procedure specifically formulated for pipeline girth welds that incorporates the effects of weld strength mismatch was developed and validated by Wang, et al., with support from PRCI and its member companies [15,16].

Almost all work prior to approximately 2000 focused on stress-based applications when the nominal applied stress is less than the yield strength of the materials. One of the earliest pieces of work on the effects of weld strength mismatch on strain-based design is by Horsley and Wang for X100 girth welds [17]. The results of a finite element analysis of the behaviour of flaws in X100 pipe and girth welds were described. The investigation utilised an applied crack tip opening displacement (CTOD) approach in defining the strain limit. The results show the

beneficial effects of weld over-matching on weld centreline flaws. This work indicates that a remote strain level of 2.0-2.5% should be achievable, provided certain restrictions are specified on weld metal over-matching and allowable flaw size.

3 BASIS OF GIRTH WELD STRENGTH REQUIREMENT

3.1 OVERALL CONCEPT OF GIRTH WELD STRENGTH REQUIREMENT

Weld strength requirements are closely related to the tensile rupture limit states as described in Section 1.1. The tensile strain limit is typically controlled by the girth welds. The tensile rupture limit state has two components, strain demand and strain capacity. The strain demand is the applied strain on the pipeline by the surrounding environment. The strain capacity is the strain level that can be tolerated by the girth welds. The limit state is defined as the equivalence of the strain demand and the strain capacity. In practical designs, safety factors are often introduced when the limit state is considered. For instance, the required strain capacity may be set at the value of the strain demand multiplied by a safety factor that is greater than 1.0. A term, *target tensile strain capacity* (TTSC), is introduced to represent the required tensile strain capacity with the consideration of the safety factor. For instance, if the strain demand is 1.0% and the safety factor is 1.5, the TTSC is 1.5%. The girth weld strength requirements are formulated to this TTSC under a variety of conditions.

3.2 BASIS OF GIRTH WELD STRENGTH REQUIREMENTS

Independent studies were initially conducted for the girth weld strength requirements within this project. Concurrent to this project, a separate DOT/PRCI funded project (PRCI project ABD-1) on tensile strain capacity was under way. The approach adopted by the ABD-1 project was more refined and more systematic than the earlier approaches of this project. The weld strength requirements presented here make extensive use of the ABD-1 results [18].

The major outcome of the ABD-1 project is the tensile strain design models. A brief overview of these models is provided below.

3.3 OVERVIEW OF TENSILE STRAIN CAPACITY MODELS

3.3.1 Physical Basis of Tensile Strain Capacity Models

The physical process of tensile strain failure starting from a planar girth weld flaw may be described as follows. Under increasingly high remotely applied stress or strain, the flaw first blunts from the initial sharp flaw. The blunted flaw would initiate ductile tearing upon further loading. The small ductile tear would then grow in size, and eventually form a growing flaw with a sharp tip. The initial blunted profile remains behind the sharp flaw. The evolution of the flaw profiles is shown in Figure 1.

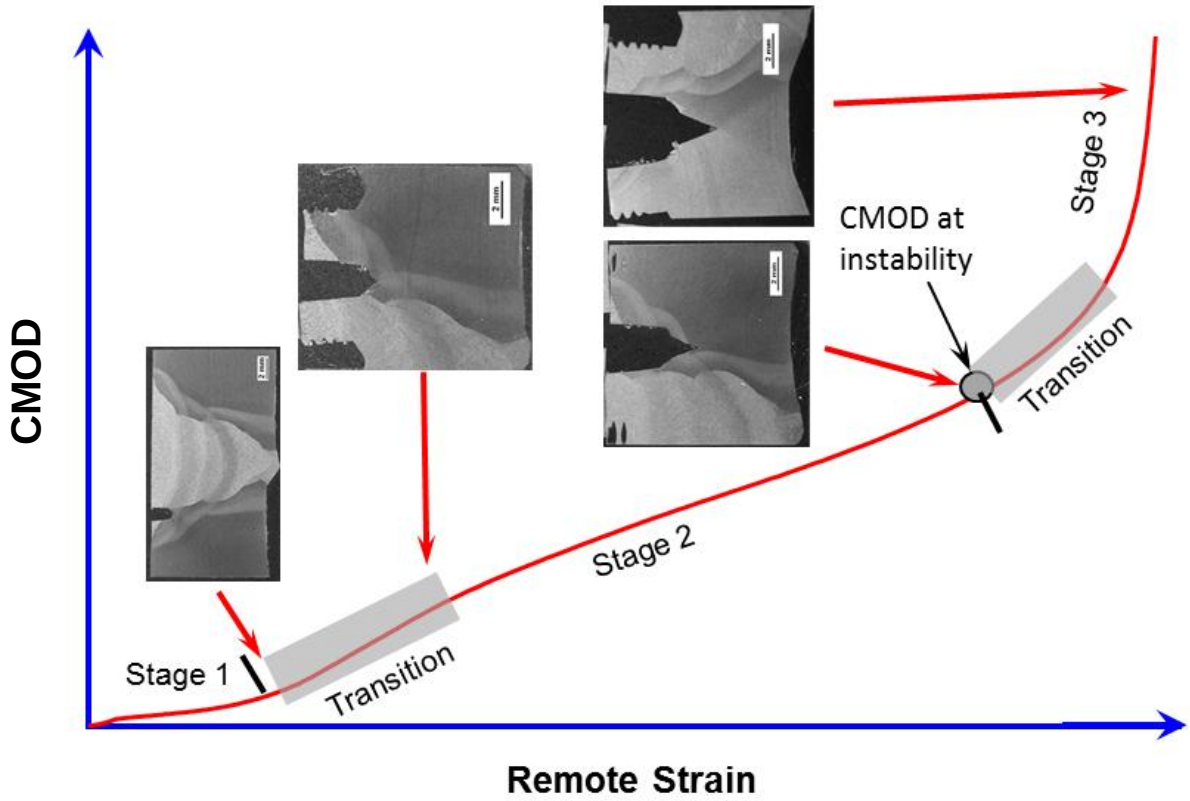


Figure 1. Flaw profile evolution relative to remote tensile strain [18]

The importance of flaw growth is shown by the sequence of the growth relative to the tensile strain value at the failure events. The strain vs. flaw growth history of full-scale tests by JFE is shown in Figure 2 [19]. It is evident that the strain at 0.5 mm flaw growth is very close to the strain of leakage. The flaw growth at the point of leakage is much greater than 0.5 mm. However most of growth occurs near the final leakage point accompanied by a small increase of remote strain.

The start of initiation and the CTOD vs. strain history from Østby is shown in Figure 3 [20]. The amount of flaw growth is about 0.65 mm at the point when the CTOD and strain relation turns nearly vertical, indicating only a small increment of strain with increase of CTOD.

The flaw growth history vs. strain by Minnaar, et al., is shown in Figure 4 [21]. At a flaw growth of 0.5-0.6 mm, the strains are very close to the final failure strains.

The overall observations of those tests are:

(1) Large flaw growth can be observed at the termination of a test.
(2) Much of the flaw growth occurs at the final stage of straining.
(3) The amount of flaw growth up to a strain value very close to the final failure strain can be quite small.
(4) Once the flaw growth rate starts to accelerate, the remaining additional strain capacity is minimal.

These observations form the basis of an initiation-control limit state criterion. The subsequent mismatch requirements are based on this criterion.

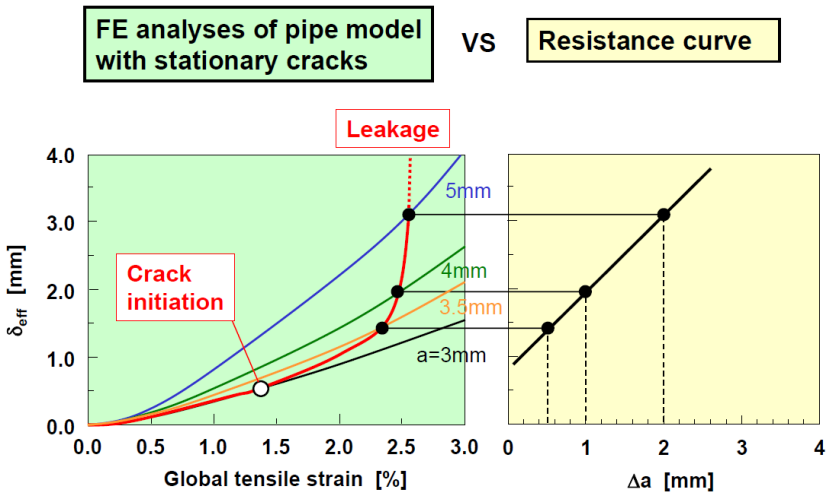
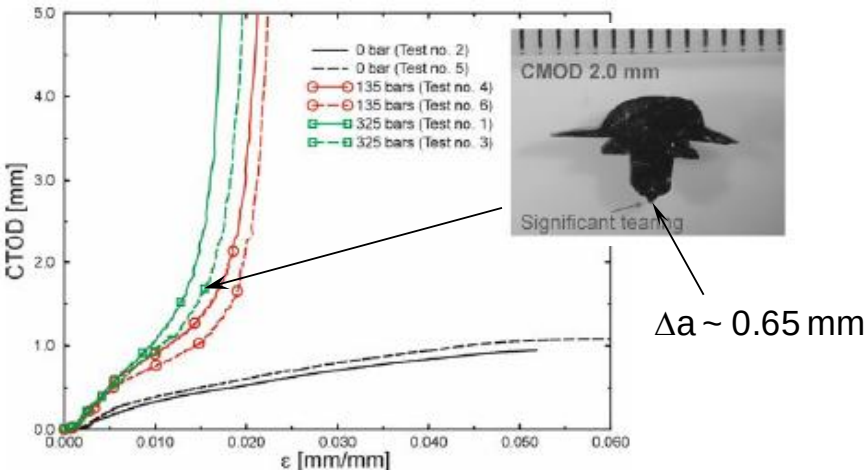


Figure 2. Flaw growth vs. strain history from full-scale pipe tests



[19]

Figure 3. Crack opening profile vs. CTOD-strain history from full-scale pipe tests [20]

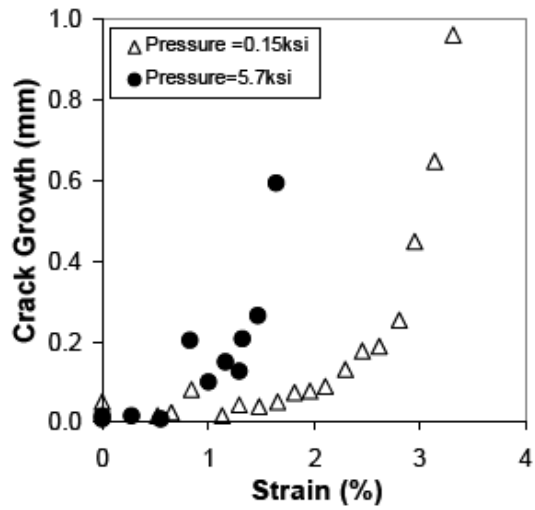


Figure 4. Crack growth vs. strain history from full-scale pipe tests [21]

3.3.2 Limit State of Tensile Strain Models

The tensile strain limit state is the equivalence of the crack driving force, $CTOD_F$, and the specified material resistance, or apparent CTOD toughness $CTOD_A$ or δ_A. This limit state is schematically shown in Figure 5.

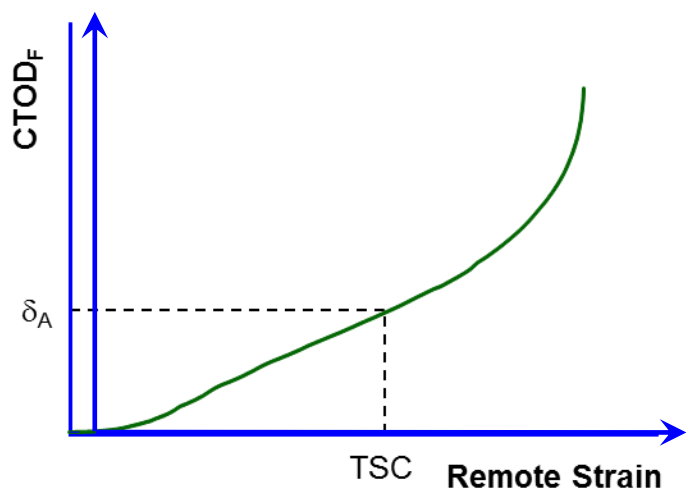


Figure 5. Definition of initiation-control tensile strain limit state

3.3.3 Development of Tensile Strain Models

The tensile strain models consist of two key components: (1) the crack driving force and (2) the apparent toughness. The crack driving force vs. remote strain relations were developed through finite element analysis by varying a number of key parameters. The finite element results were then processed and fitted into parametric equations.

3.3.4 Development of Driving Force Relations

3.3.4.1 Overall Model Setup / Geometries

Three-dimensional finite elements models were created to simulate pipe CTOD driving force vs. remote strain curves. A typical finite element model is shown in Figure 6. Due to symmetry condition, only half of the pipe was modeled. To eliminate the finite simulated pipe length effect on CTOD driving force and have a uniform strain zone, the total length of pipe is six times the pipe outer diameter. The gas metal arc weld profile (GMAW) and parameters are shown in Figure 7. A surface breaking flaw of elliptical shape, shown in Figure 8, along the fusion boundary of the inside pipe surface (HAZ flaw) was modeled. The HAZ flaw is conservative compared to the flaw located in the weld metal centerline because it typically has larger applied CTOD at the same level of remote strain. The finite element models were constructed using ABAQUS® three-dimensional linear elements of type C3D8RH, which was proved effective in large plastic deformation cases. About 130,000 elements were generated for each model.

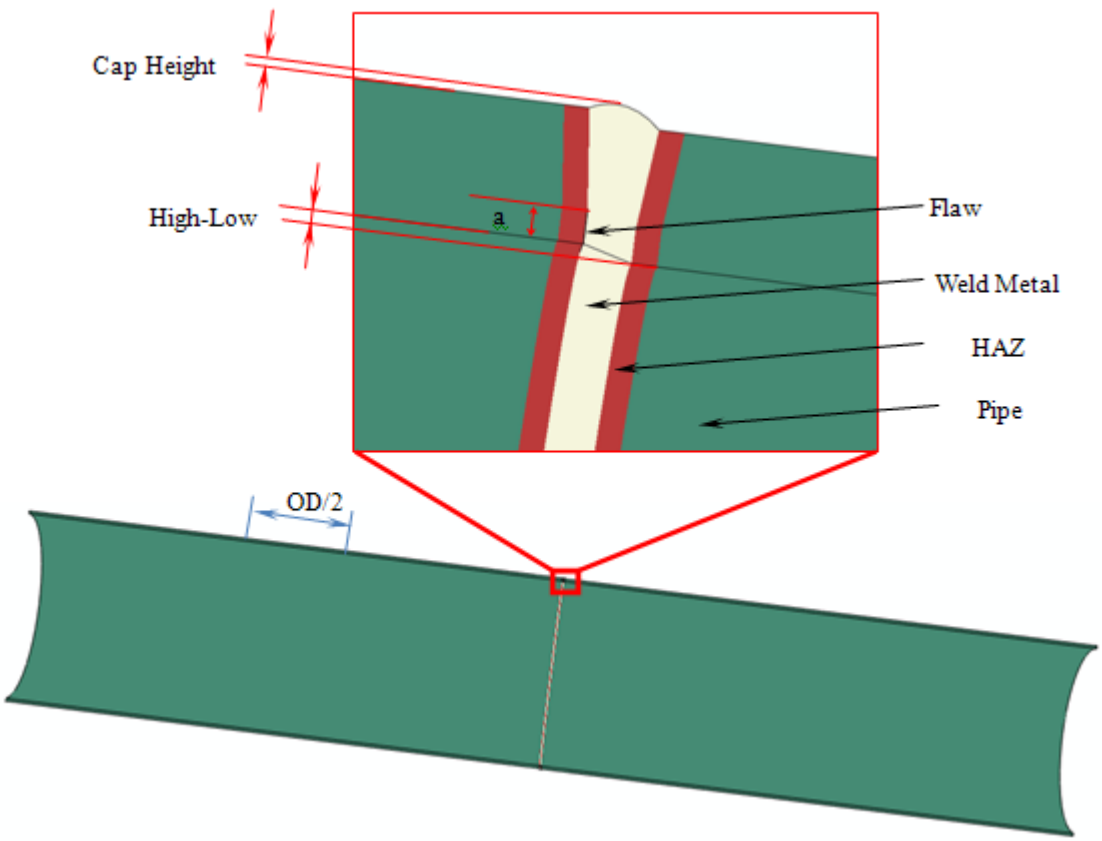


Figure 6. A typical finite element model configuration

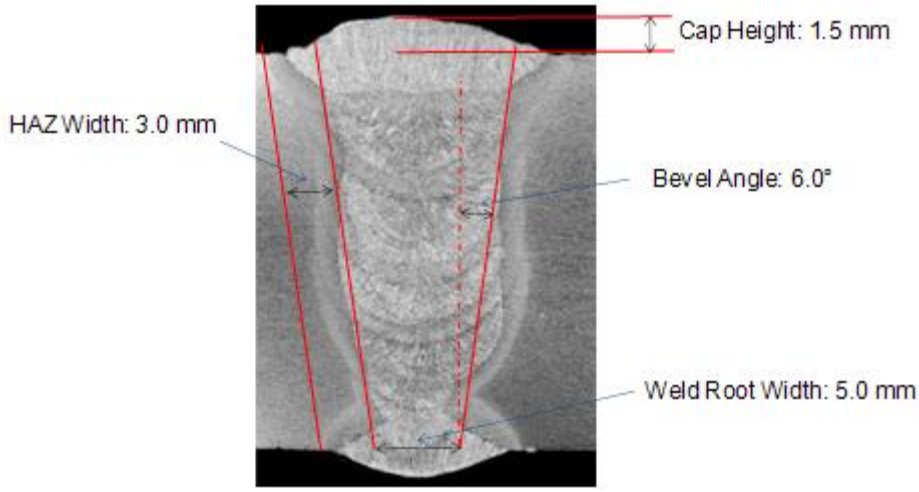


Figure 7. Sample weld macro

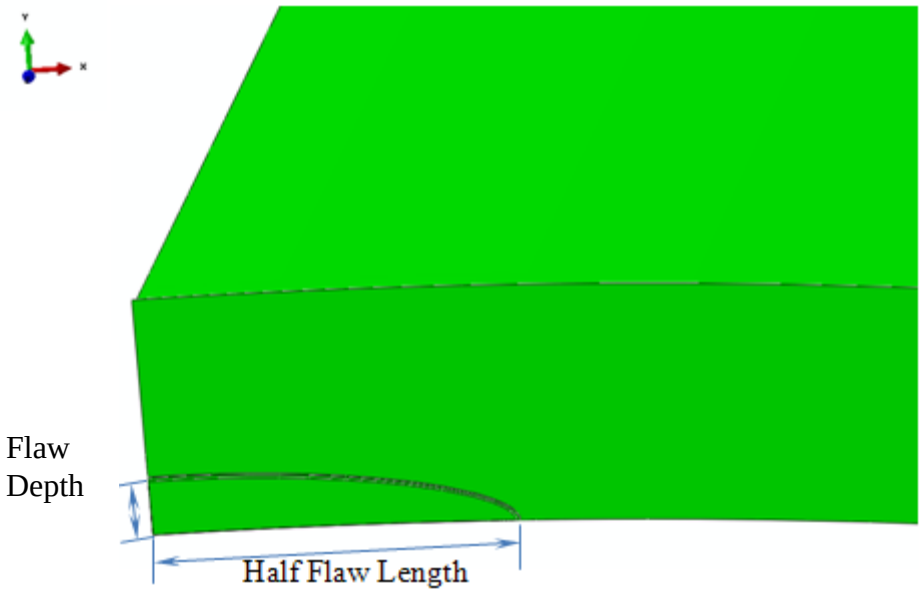


Figure 8. Schematic illustration of half elliptical surface breaking flaw on inside diameter of pipe

3.3.4.2 Boundary Conditions and Loading Sequence

The finite element analysis was conducted in two steps. (i) An internal pressure which introduced hoop stress equal to 72% of specified minimum yield strength according to the "Barlow" formula was applied on the inside surface of the pipe; (ii) a uniform axial displacement was applied at one end of the pipe far from the girth weld while the other end was fixed.

3.3.4.3 Material Models

Details of the material models may be found in a report by Wang, et al. [18]. A brief summary of the models is given below.

A complete representation of a material's tensile property is its full stress-strain curve. However, specifying complete stress-strain curves for pipe manufacturers is impractical. Consequently, the tensile properties are often represented by a few parameters, such as yield strength (YS), ultimate tensile strength (UTS), and uniform elongation (uEL).

To develop a proper representation of pipe tensile properties, a large database of stress-strain curves obtained from experiments was analyzed. Only the round-house type of stress-strain curves (without Lüder's strain) was considered in the analysis. The round-house type of curves typically does not show distinct yield points. Instead, the curve gradually changes from a straight line (elastic portion) to a curved shape (plastic portion). In addition, the stress-strain curves of modern linepipe steels are usually very flat near UTS. Those features made it difficult to represent the full curve by one continuous mathematical equation. Therefore, the pipe stress-strain curve is divided into two sections and represented by two equations. The first section is represented using the CSA Z662 equation and the second section is simply of constant stress as shown in the following,

$$\begin{aligned} \varepsilon &= \frac{\sigma}{E} + \left(0.005 - \frac{\sigma_y}{E}\right)\left(\frac{\sigma}{\sigma_y}\right)^n & \varepsilon \le \varepsilon_0 \\ \sigma &= \sigma_u & \varepsilon_0 < \varepsilon \le \mathrm{uEL} \end{aligned} \qquad \textbf{(1)}$$

where,

$$n = \frac{3.14}{1 - \mathrm{Y/T}},$$

$$\mathrm{Y/T} = \sigma_{\mathrm{y}} / \sigma_u,$$

$$\varepsilon_0 = \frac{\sigma_{\mathrm{u}}}{E} + \left(0.005 - \frac{\sigma_{\mathrm{y}}}{E}\right)\left(\frac{\sigma_{\mathrm{u}}}{\sigma_{\mathrm{y}}}\right)^n \text{, and}$$

$$\mathrm{uEL} = 1.25\varepsilon_0.$$

In the above equations, the symbols σ and ε represent engineering stress and strain, respectively. The σ_y and σ_u are YS and UTS, respectively. It is seen that the full stress-strain curve is solely determined by the YS and UTS (or Y/T). The uEL is not an independent input parameter and instead it is determined by the YS and UTS. The correlation between the uEL and the YS and UTS is established by statistic analyses of material properties.

Similarly, a library of weld tensile properties was analyzed. It was found that the weld stress-strain curves usually contain distinct yield points and Lüder's strains up to 2%. As a result, the weld stress-strain curve was divided into three sections and represented by three equations, as the following:

$$\varepsilon = \frac{\sigma}{E} \qquad \text{if } \varepsilon \le \sigma_y / E$$

$$\sigma = \sigma_y \qquad \text{if } \sigma_y / E < \varepsilon \le 1\%$$

$$\varepsilon = \frac{\sigma}{E} + \left(0.005 - \frac{\sigma_y}{E}\right)\left(\frac{\sigma}{\sigma_y}\right)^n + 0.005 \qquad \text{if } 1\% < \varepsilon \le \text{uEL}$$

where,

$$n = \frac{2.58}{(1 - \text{Y}/\text{T})^{1.17}}\text{, and}$$

$$\sigma_y = \sigma_u - 13.2 \text{ (ksi).}$$

The entire weld stress-strain curve is constructed with a single parameter, i.e., weld UTS (or weld strength mismatch if the pipe UTS is known). The YS and uEL are correlated to its UTS with statistic relation developed from the material database.

3.3.4.4 Weld Strength Mismatch

There are various ways of representing the weld strength mismatch. Traditionally, the weld strength mismatch is most often expressed at the yield strength level. For modern linepipes and girth welds, the yield strength can exhibit much higher variations than the ultimate strength either from pipe to pipe or from one o'clock location to another. Consequently it is much more practical to define the weld strength mismatch on the basis of ultimate tensile strength. The other important feature is that weld metals typically have a lower strain hardening rate at strength level greater than 70 ksi in comparison to the linepipe of the same strength level. Using UTS as the measure of mismatch is conservative relative to using yield strength as the measure. The weld strength mismatch throughout of this report is defined as the ratio of weld metal UTS over the pipe UTS.

3.3.4.5 Analysis Matrix

The analysis matrix within this project builds upon the analysis matrix of the ABD-1 project. Specifically, cases with weld strength undermatching were added to the ABD-1 analysis matrix for the baseline case of pipe wall thickness of 5/8 inch. The entire analysis matrix is given in Table 1.

Table 1. Finite element analysis matrix for wall thickness = 5/8 inch

Category		Parameter	Values	No. of Cases
Materials	Pipe	Grades	X80	1
		Y/T	0.75, 0.81, 0.87, 0.94	4
	Weld	Lüder's Strain	1%	1
		Mismatch	0.90, 1.00, 1.15, 1.30	4
	HAZ	Softening	10%	1
Geometries	Pipe	OD (inch)	42	1
		WT (inch)	5/8	1
		High-low (mm)	0.0, 1.6, 3.2	3
	Weld	Type	GMAW	1
	Flaw	Depth (mm)	2.0, 4.0, 6.0, 8.0	4
		Length (mm)	25, 50, 75, 100	4
		Location	HAZ, inside surface	1
Pressure	Design Factor		0.72	1
Total Cases				768

In addition to the baseline cases with pipe wall thickness of 5/8 inch, many cases were run with three other wall thickness, 1/2, 3/4 and 1 inch. The results of these analyses form the basis of expanding the results of the baseline cases to other wall thicknesses.

3.3.4.6 Sample Results of Crack Driving Force

The CTOD driving force was obtained from the deformed crack-tip profile tip using the 45° line intersection method as illustrated in Figure 9.

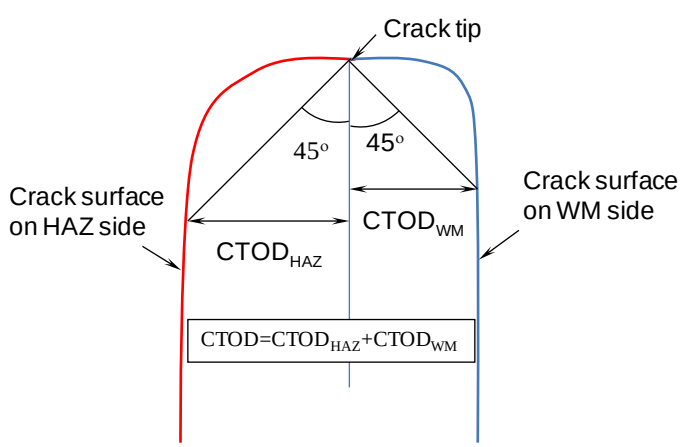


Figure 9. Schematic illustration of CTOD calculation

Sample results of CTOD driving force are shown in Figure 10 for different levels of weld strength mismatch for the baseline case (5/8 inch wall thickness). Welds with a higher degree of overmatch give smaller driving force at the same amount of applied remote strain.

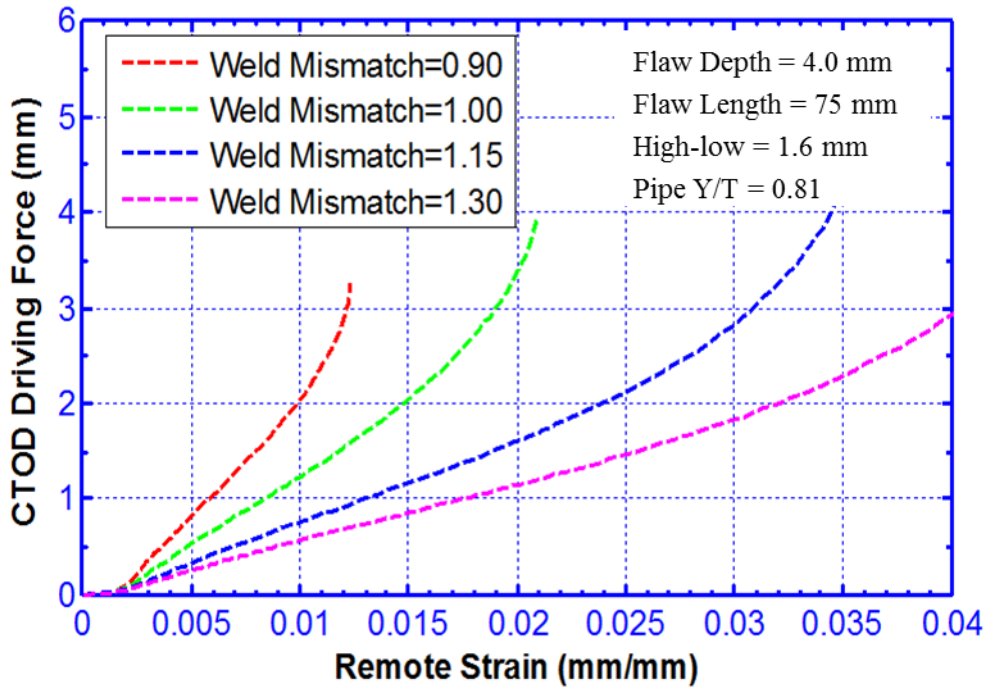


Figure 10. Sample CTOD driving force vs. remote strain curves for four different mismatch levels (wall thickness 5/8 inch)

3.3.5 Tensile Strain Capacity Equation

Tensile strain equations were developed within the ABD-1 project [18]. The equations provide tensile strain capacity as a function of the following input parameters:

t,	wall thickness
$\eta = a/t$	normalized flaw depth,
$\beta = 2c/t$	normalized flaw length,
$\psi = h/t$	normalized girth weld high-low misalignment,
$\xi = \sigma_y / \sigma_U$	pipe metal Y/T ratio,
$\phi = \sigma_U^W / \sigma_U$	weld metal strength mismatch,
δ_A	apparent toughness ($CTOD_A$), mm, and
f_p	pressure factor, ratio of pressure induced hoop stress to pipe yield strength.

3.3.6 Determination of Apparent Toughness

The apparent toughness may be obtained from a number of small- and medium-scale test specimens, including Charpy, standard CTOD, shallow-notched single edge notched bend

(SENB), single edge notched tension (SENT), and curved-wide plate (CWP) specimens. The details of apparent toughness calculation from those specimens are given in the DOT/PRCI project report [18]. One of the most convenient ways of obtaining the apparent toughness is through its correlation with upper shelf Charpy energy (CVN_{us}) by the following relations[1],

$$CTOD_A = \left(0.0080 \cdot \frac{Y}{T} - 0.0014\right) \cdot CVN_{us} \text{ for X52 to X65, and}$$

$$CTOD_A = \left(0.0086 \cdot \frac{Y}{T} - 0.0021\right) \cdot CVN_{us} \text{ for X70 and X80,}$$

where the units of the Charpy energy and $CTOD_A$ are ft-lbf and mm, respectively. The graphical representation of the X80 relation is shown in Figure 11.

The relation should only be used for $CTOD_A$ up to 1.2 mm.

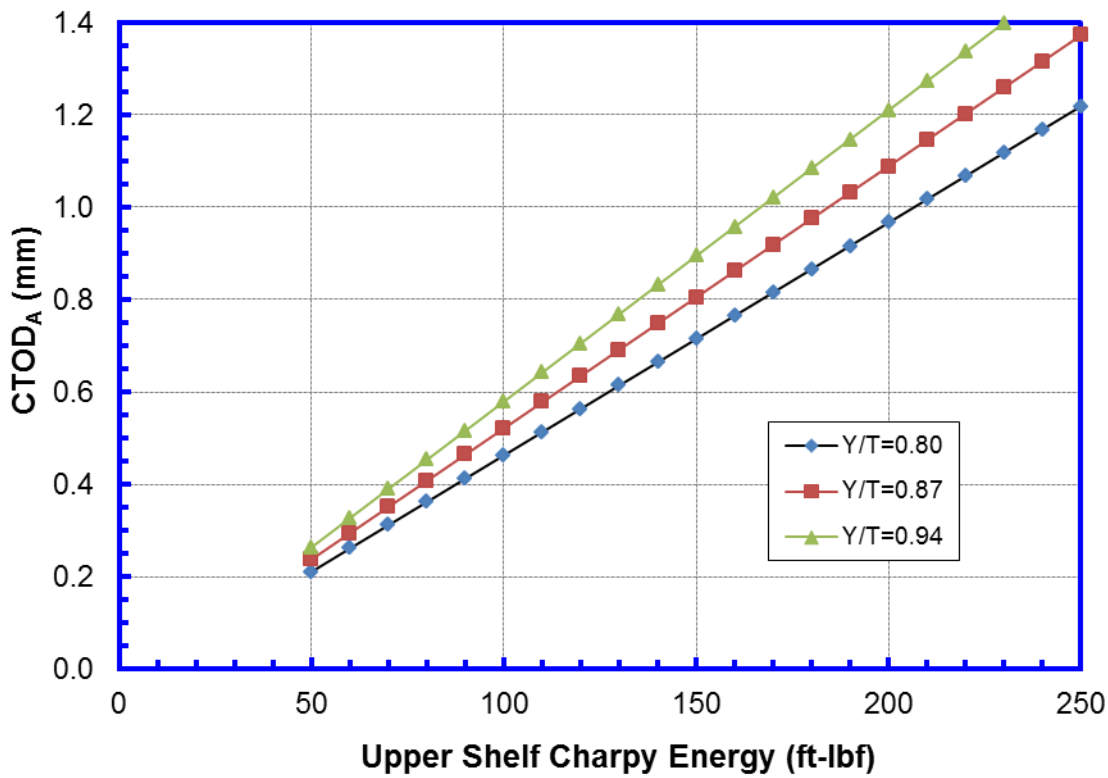


Figure 11. Conversion relation between upper shelf Charpy energy and $CTOD_A$

[1] The full reference to these relations is given in another project report [18]. The correlation between the Charpy impact energy and fracture mechanics parameters is known to depend on steel type (chemical composition, steel making process, etc.). The $CTOD_A$ relations presented here may be used as an initial screening tool. The value of $CTOD_A$ may be confirmed with those from other test methods as described in the project report [18].

4 WELD STRENGTH MISMATCH REQUIREMENTS

4.1 DEVELOPMENT PROCEDURE FOR THE MISMATCH REQUIREMENTS

The weld strength mismatch requirement is developed from the tensile strain design models described above. A term, minimum weld mismatch requirement, or MWMR, is introduced. MWMR is defined as the minimum weld strength mismatch that meets the Target Tensile Strain Capacity or TTSC.

The MWMR is derived either directly from the crack driving force relations or from the tensile strain capacity equations of the ABD-1 project. For the baseline case (wall thickness of 5/8 inch), the crack driving force relations, similar to those shown in Figure 10 are used directly. The procedure to obtain MWMR is illustrated in Figure 12. For each level of material toughness, for instance 1.0 mm in this case, the intersection of horizontal $CTOD_A$ = 1.0 mm line and $CTOD_F$ vs. remote strain curve gives tensile strain capacity. Four pairs of weld strength vs. tensile strain capacity data are obtained in Figure 12(a) and are plotted in Figure 12(b). The strength mismatch level is then computed using the relation formed by the data pairs. For instance the MWMR corresponding to a target tensile strain capacity of 1.5%, or TTSC = 0.015, is shown in Figure 12(b).

For other wall thicknesses, 1/2, 3/4 and 1 inch, relations similar to that shown in Figure 12(b) were directly obtained from the tensile strain capacity equations of the ABD-1 project. The process of obtaining the MWMR is similar to the baseline case of wall thickness of 5/8 in. after the mismatch vs. tensile strain capacity relations are established.

The original tensile strain capacity equations were not intended for welds with weld strength undermatching. The equations predict correct trends when they are applied to cases with slight strength undermatching. These equations are therefore used to compute MWMR for undermatching up to 10%.

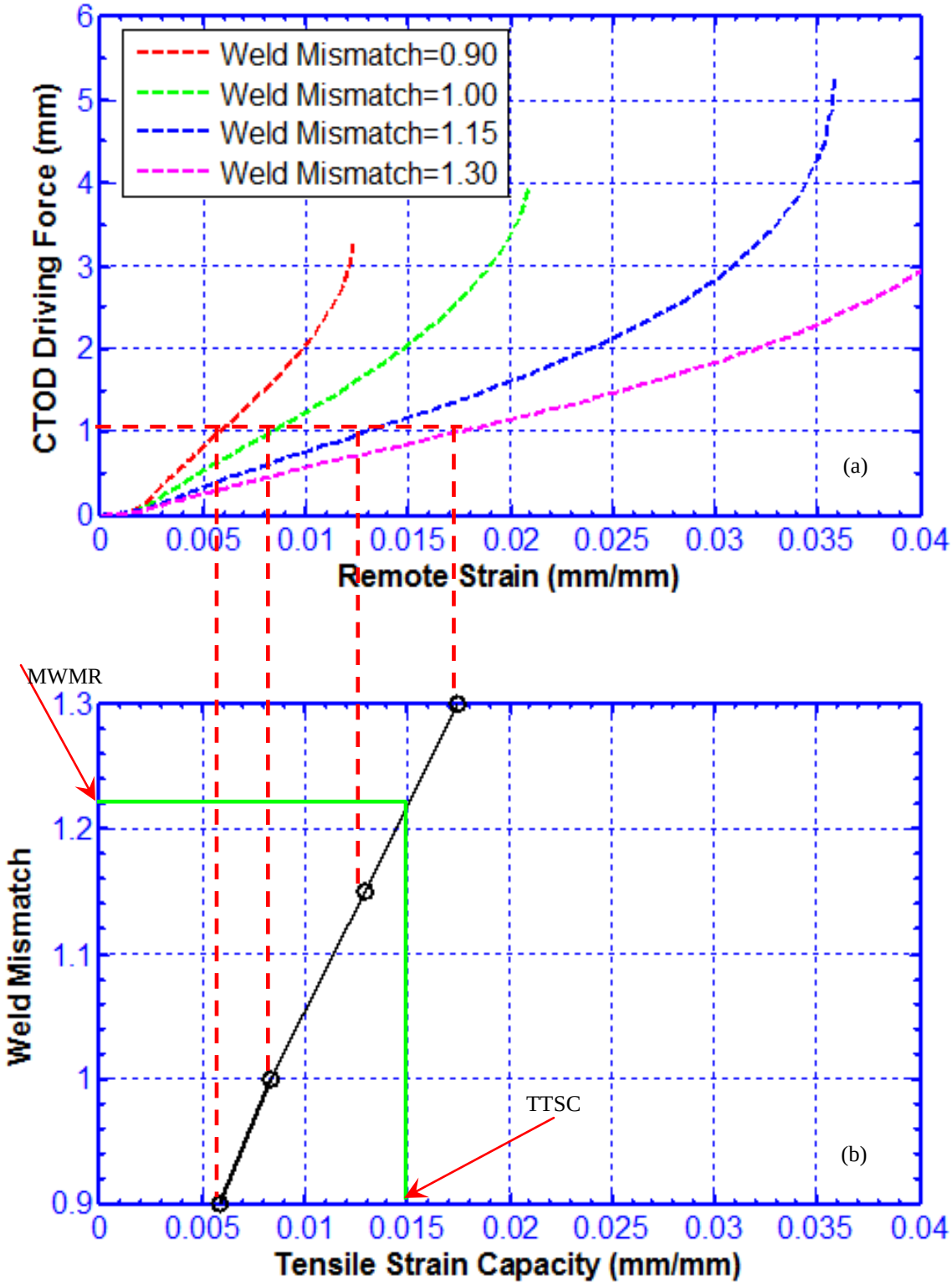


Figure 12. Schematic illustration shows how to obtain MWMR for a given TTSC

4.2 RELATIONSHIP BETWEEN MISMATCH REQUIREMENTS AND OTHER PARAMETERS

The general trend of minimum weld strength requirement vs. flaw depth (Figure 13), flaw length (Figure 14), high-low (Figure 15), wall thickness (Figure 16) and pipe yield strength / tensile strength (Figure 17) are illustrated. The target tensile strain capacity for all the plots is 1%. Each plot has four levels of $CTOD_A$ values.

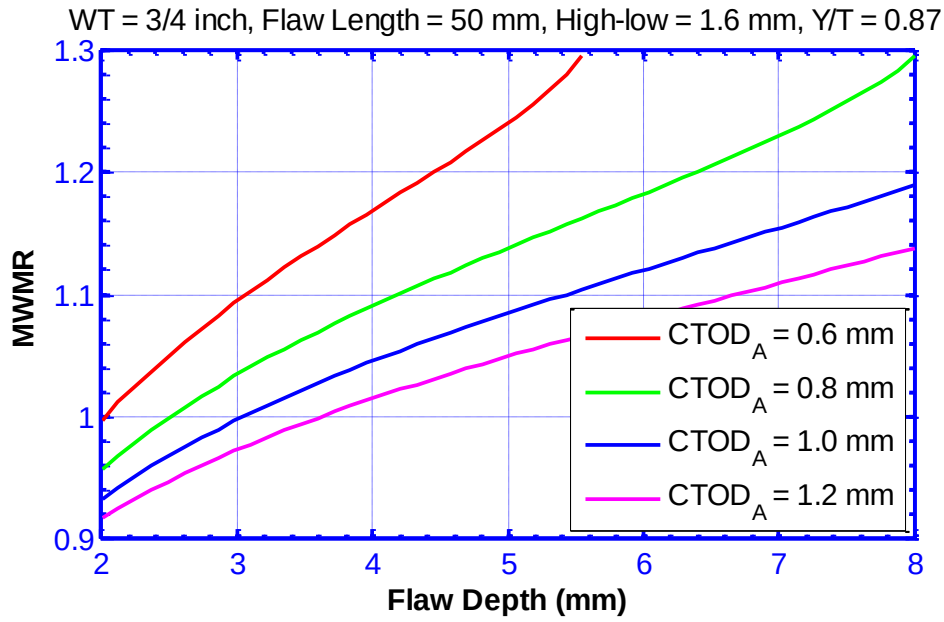


Figure 13. Minimum weld strength requirement for different flaw depth at TTSC=1%

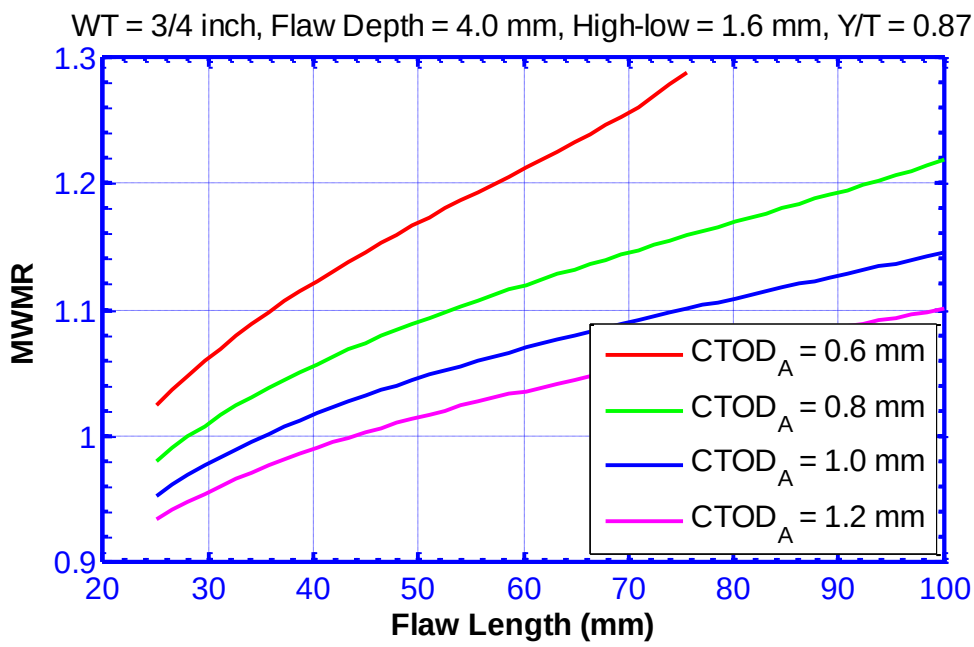


Figure 14. Minimum weld strength requirement for different flaw length at TTSC=1%

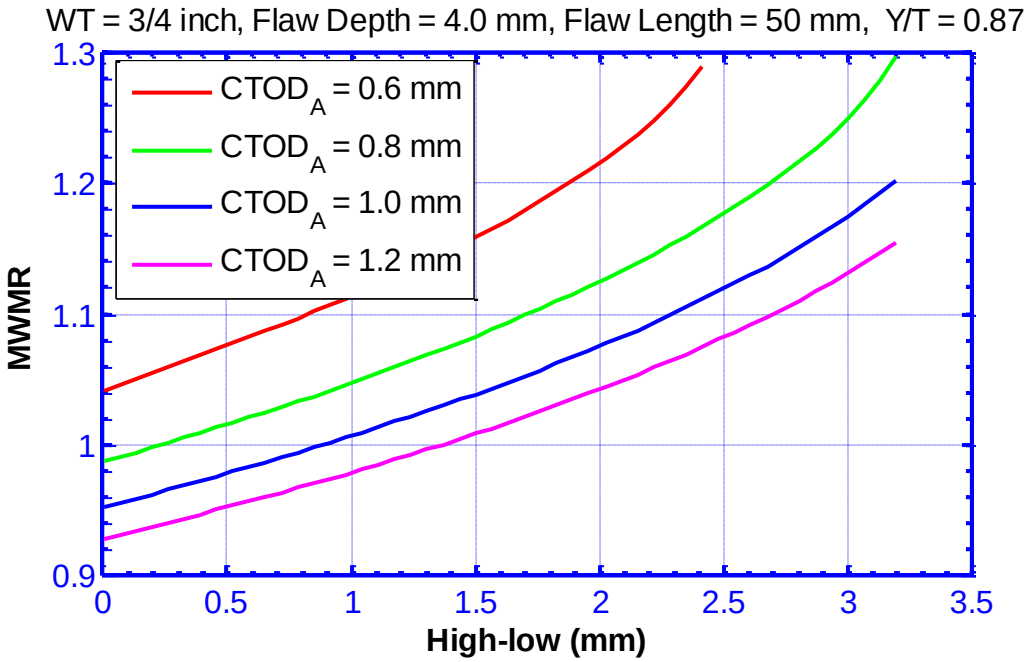


Figure 15. Minimum weld strength requirement for different high-low at TTSC=1%

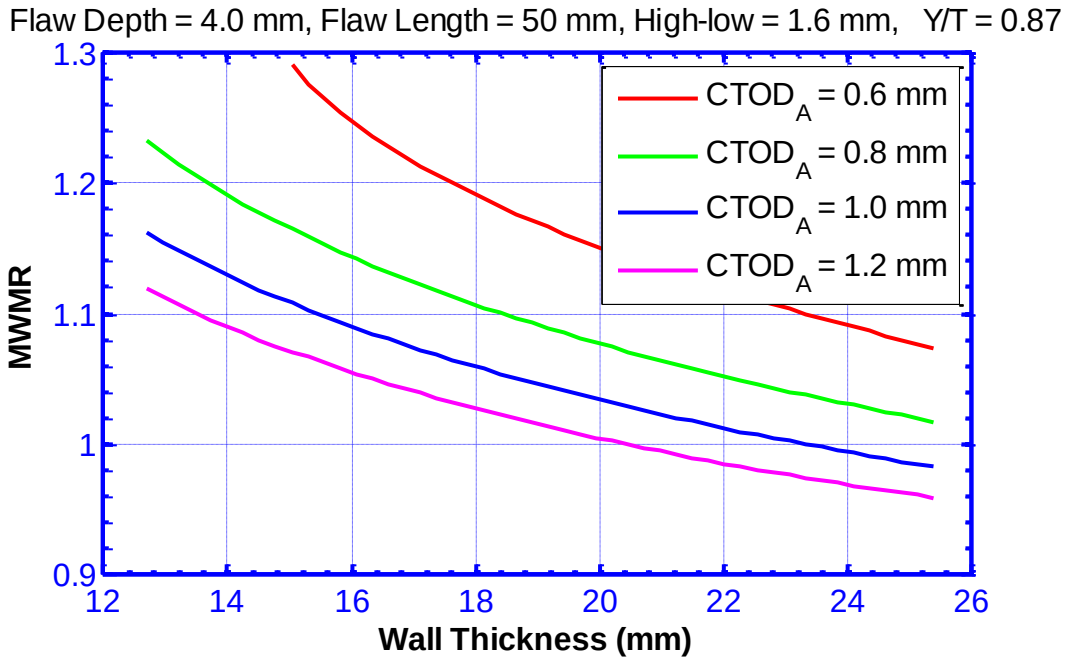


Figure 16. Minimum weld strength requirement for different wall thickness (WT) at TTSC=1%

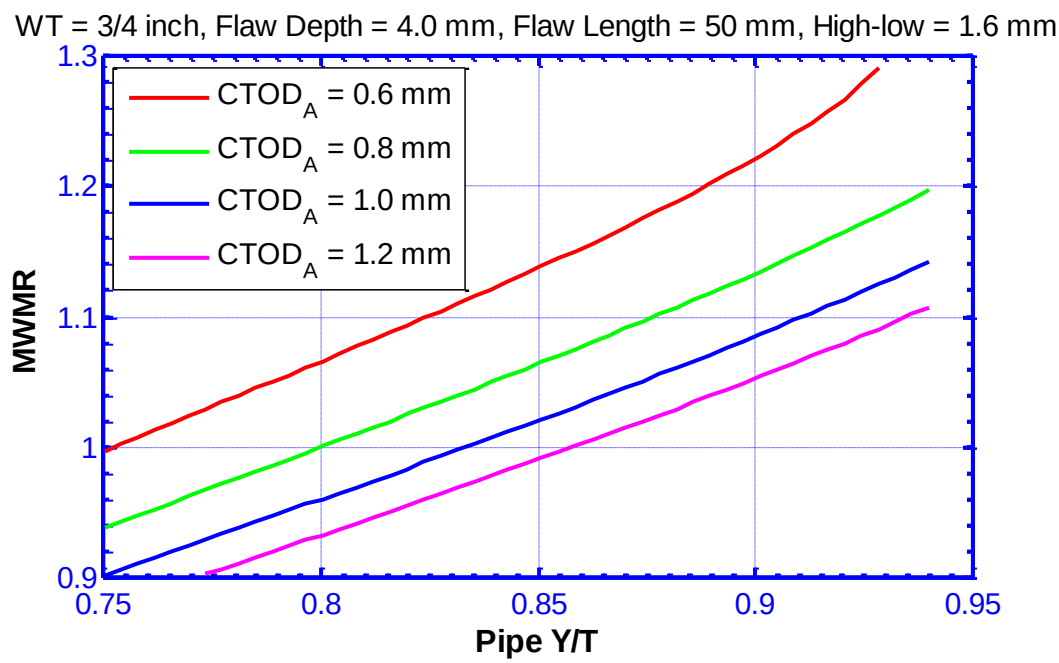


Figure 17. Minimum weld strength requirement for different pipe yield strength / tensile strength (Y/T) at TTSC=1%

4.3 ORGANIZATION OF THE MISMATCH REQUIREMENTS

The material toughness $CTOD_A$ under tension are assumed to have six values: 0.4, 0.6, 0.8, 1.0, 1.2 and 1.4 mm. The Target Tensile Strain Capacity (TTSC) is set to 0.5, 1.0, 1.5, 2.0, 2.5 and 3.0%. The minimum weld mismatch requirement (MWMR) for different pipe yield strength / tensile strength and high-low combinations are listed in Appendix A total of sixty tables (Table A1 to Table A60) are given for different flaw depth, flaw length and wall thickness. The specific values of parameters covered in these tables are shown in Table 2.

Table 2. Values of parameters for the MWMR covered in Appendix A

Parameter	Values
Wall Thickness (inch)	5/8, 1/2, 3/4, 1
Flaw Depth (mm)	2.0, 4.0, 6.0, 8.0
Flaw Length (mm)	25, 50, 75, 100
High-low (mm)	0.0, 1.6, 3.2
$CTOD_A$ (mm)	0.40, 0.60, 0.80, 1.00, 1.20, 1.40
Pipe Y/T	0.75, 0.81, 0.87, 0.94
TTSC	0.5%, 1.0%, 1.5%, 2.0%, 2.5%, 3.0%

4.4 SPECIAL NOTES ON MISMATCH REQUIREMENTS

(1) The empty cells in the tables of Appendix A indicate that the given parameters are out-of-range of the applicability of the equations from which the mismatch requirements are derived.

(2) For practical considerations, the maximum strength undermatching is limited to 10%, or mismatch ratio of 0.90. Although a greater degree of strength undermatching may be permitted for a given low applied strain and small flaw size condition, workmanship considerations dictate that having a high degree of strength undermatching is not desirable. Consequently the minimum mismatch requirement is limited to 0.90 for all cases.

(3) The analysis from which the mismatch requirements are developed had maximum overmatch ratio of 1.3. Under certain conditions of high misalignment and large flaw size, the mismatch requirement may be higher than 1.3 to achieve the target tensile strain capacity. However the current solutions cannot be extended to mismatch ratios greater than 1.3. When a mismatch level greater than 1.3 is required to achieve the target tensile strain capacity, the cell is given as "*>1.3*". It should be understood that having mismatch ratio greater than 1.3 is the *necessary* condition, but *not the sufficient* condition. For instance, a mismatch ratio of 1.4 may be required but the table only shows "*>1.3*".

(4) The mismatch requirements in Appendix A are given for pipes under Class 1 and Class 2 pressure conditions, i.e., the hoop stress from the internal pressure is 60% to 80% of the specified minimum yield strength (SMYS). Non-pressurized pipes have greater strain capacity, generally by a factor of 1.5 to 2.5. The tensile strain design procedure of ABD-1 recommends that the tensile strain capacity of non-pressurized pipes be set at 1.5 times the strain capacity of pressurized pipes of Classes 1 and 2 designs.

5 SAMPLE APPLICATIONS

Examples of mismatch requirements for a few practical cases are given below. These examples are for illustrative purposes. They should not be used as fixed requirements for all similar cases.

5.1 LOWERING-IN PROCESS FOR NON-CONCRETE-COATED PIPES

For onshore pipelines, the lowering-in process in the construction phase imposes one of the highest stresses in the entire service life of the pipeline. The analysis of lowering practice indicates that the longitudinal stress level can be kept under 80-90% of SMYS for X70-X80 pipes. This stress level translates an applied strain level of 0.20-0.25%. With a safety factor of 3, the target tensile strain capacity is 0.75%

Since the pipe is non-pressurized during lowering-in, the tensile strain capacity is at least 1.5 higher than the tensile strain capacity of pressurized cases listed in Appendix A. The equivalent TTSC is 0.5% when Appendix A is used by considering the pressure effects. The mismatch requirements under various pipe dimensions and flaw sizes are given in Table 3.

Table 3. Minimum weld strength requirement for the lowering-in process of non-concrete-coated pipes with high-low = 1.6 mm

Pipe Y/T	$CTOD_A$ (mm)	Flaw Depth (mm)	Flaw Length (mm)	MWMR	
				Wall Thickness = 1/2 inch	Wall Thickness = 5/8 inch
0.87	0.60	2.0	25	0.95	0.90
			50	1.00	0.93
			75	1.02	0.94
			100	1.04	0.96
		4.0	25	1.00	0.95
			50	1.09	1.02
			75	1.17	1.07
			100	1.28	1.13
		6.0	25	1.03	0.99
			50	1.07	1.12
			75	>1.3	1.29
			100	>1.3	>1.3
	1.00	2.0	25	0.90	0.90
			50	0.93	0.90
			75	0.95	0.90
			100	0.97	0.90
		4.0	25	0.94	0.90
			50	1.01	0.92
			75	1.07	0.96
			100	1.13	1.00
		6.0	25	0.97	0.90
			50	1.08	0.96
			75	1.20	1.04
			100	>1.3	1.13
0.94	0.60	2.0	25	1.04	1.02
			50	1.10	1.05
			75	1.12	1.08
			100	1.15	1.12
		4.0	25	1.10	1.06
			50	1.22	1.18
			75	>1.3	>1.3
			100	>1.3	>1.3
		6.0	25	1.14	1.14
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3
	1.00	2.0	25	1.00	0.95
			50	1.03	0.98
			75	1.05	1.00
			100	1.07	1.01
		4.0	25	1.04	1.00
			50	1.12	1.04
			75	1.19	1.13
			100	1.27	1.20
		6.0	25	1.07	1.00
			50	1.20	1.14
			75	>1.3	>1.3
			100	>1.3	>1.3

5.2 LOWERING-IN PROCESS FOR CONCRETE-COATED PIPES

In swamp areas, pipes may be coated by concrete for floatation control. The girth weld areas are not coated. These areas experience higher strains than the pipe sections with concrete coating as the concrete-coated sections are stiffer.

Assuming the applied strain in the girth weld area is 1.0%, a safety factor of 1.5 gives a target tensile strain capacity of 1.5%. Since the pipe is non-pressurized during lowering-in, the tensile strain capacity is at least 1.5 higher than the tensile strain capacity of pressurized cases listed in Appendix A. The equivalent TTSC is 1.0% when Appendix A is used by considering the pressure effects. The mismatch requirements under various pipe dimensions and flaw sizes are given in Table 4.

Table 4. Minimum weld strength requirement for the lowering-in process of concrete-coated pipes with high-low = 1.6 mm

Pipe Y/T	$CTOD_A$ (mm)	Flaw Depth (mm)	Flaw Length (mm)	MWMR	
				Wall Thickness = 1/2 inch	Wall Thickness = 5/8 inch
0.87	0.60	2.0	25	1.05	1.02
			50	1.13	1.06
			75	1.18	1.10
			100	1.23	1.13
		4.0	25	1.14	1.09
			50	>1.3	1.25
			75	>1.3	>1.3
			100	>1.3	>1.3
		6.0	25	1.22	1.16
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3
	1.00	2.0	25	0.97	0.93
			50	1.02	0.96
			75	1.05	0.99
			100	1.08	1.01
		4.0	25	1.04	0.99
			50	1.16	1.07
			75	1.30	1.15
			100	>1.3	1.28
		6.0	25	1.08	1.03
			50	>1.3	1.22
			75	>1.3	>1.3
			100	>1.3	>1.3
0.94	0.60	2.0	25	1.16	1.13
			50	1.27	1.20
			75	>1.3	1.27
			100	>1.3	>1.3
		4.0	25	1.30	1.21
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3
		6.0	25	>1.3	>1.3
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3
	1.00	2.0	25	1.07	1.04
			50	1.13	1.07
			75	1.17	1.11
			100	1.21	1.14
		4.0	25	1.15	1.08
			50	>1.3	1.23
			75	>1.3	>1.3
			100	>1.3	>1.3
		6.0	25	1.21	1.16
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3

5.3 GROUND MOVEMENT HAZARDS

A ground movement hazard imposes an applied strain of 1.0%. A safety factor of 1.5 leads to a TTSC of 1.5%. If the pipe is under Class 1 pressure, the TTSC table of Appendix A can be applied directly without further consideration of the pressure effects.

The mismatch requirements under various pipe dimensions and flaw sizes are given in Table 5 below.

Table 5. Minimum weld strength requirement for pipes with high-low = 1.6 mm under a postulated ground movement hazard

Pipe Y/T	$CTOD_A$ (mm)	Flaw Depth (mm)	Flaw Length (mm)	MWMR	
				Wall Thickness = 1/2 inch	Wall Thickness = 5/8 inch
0.87	0.60	2.0	25	1.14	1.08
			50	1.29	1.16
			75	>1.3	1.24
			100	>1.3	1.29
		4.0	25	>1.3	1.21
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3
		6.0	25	>1.3	>1.3
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3
	1.00	2.0	25	1.03	1.00
			50	1.11	1.04
			75	1.15	1.07
			100	1.20	1.10
		4.0	25	1.13	1.06
			50	>1.3	1.19
			75	>1.3	>1.3
			100	>1.3	>1.3
		6.0	25	1.21	1.12
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3
0.94	0.60	2.0	25	1.29	1.21
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3
		4.0	25	>1.3	>1.3
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3
		6.0	25	>1.3	>1.3
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3
	1.00	2.0	25	1.15	1.09
			50	1.25	1.15
			75	>1.3	1.20
			100	>1.3	1.26
		4.0	25	1.28	1.16
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3
		6.0	25	>1.3	1.26
			50	>1.3	>1.3
			75	>1.3	>1.3
			100	>1.3	>1.3

6 CONCLUDING REMARKS

The requirements for weld strength mismatch are developed in this report. The focus is on the strength requirement for strain-based design. The basis of the weld strength requirements is first described. The trends of the weld strength requirements as functions of other parameters are shown. The strength requirements for a broad range of pipe dimensions, material properties, and flaw sizes, are presented in tabular forms. Examples of applying the strength requirements are given.

The strength mismatch requirements may be used as a set of general guidelines. They may be used for:

- Initial feasibility study of weld strength requirement for a particular pipe grade and application,
- Evaluation of the impact of weld strength on weld performance measures, such as the tensile strain capacity of the girth welds, and
- Playing "what-if" scenarios and developing trade-off strategies among various parameters governing the girth weld integrity for certain performance requirement. For instance high degree of overmatching may be used to compensate for large high-low misalignment.

To achieve a certain performance requirement, the mismatch requirements should be considered in conjunction with other requirements, such as fracture toughness. Pursuing one requirement at the expense of the other can be counter-productive for overall performance. For instance, beyond a certain strength level, high weld strength may be associated with reduced toughness and ductility. The productivity of the welding processes and the propensity of generating weld flaws, which would result in increased repair rate, should also be considered. In summary the weld strength mismatch requirement is only one of the necessary components to achieve satisfactory weld performance.

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8 Appendix A—Weld Strength Mismatch (UTS_{weld} / UTS_{pipe}) Requirements

A.1 Wall Thickness = 1/2 inch

Table- Error! No text of specified style in document.**-1 Minimum weld strength mismatch requirement for flaw size 2 mm × 25 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90		0.90	0.96		0.91	1.07		0.97	1.18		1.03	>1.3		1.08	>1.3	
0.40	0.81	0.90	0.92		0.91	1.05		0.98	1.17		1.04	>1.3		1.10	>1.3		1.17	>1.3	
0.40	0.87	0.90	1.00		0.97	1.14		1.04	>1.3		1.11	>1.3		1.19	>1.3		1.29	>1.3	
0.40	0.94	0.94	1.10		1.03	1.29		1.11	>1.3		1.21	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	0.90	0.90		0.90	0.90		0.90	0.96		0.90	1.03		0.93	1.10		0.97	1.18	
0.60	0.81	0.90	0.90		0.90	0.96		0.91	1.05		0.95	1.12		1.00	1.22		1.04	>1.3	
0.60	0.87	0.90	0.95		0.91	1.05		0.96	1.14		1.01	1.25		1.06	>1.3		1.11	>1.3	
0.60	0.94	0.90	1.04		0.97	1.16		1.03	1.29		1.08	>1.3		1.14	>1.3		1.20	>1.3	
0.80	0.75	0.90	0.90		0.90	0.90		0.90	0.91		0.90	0.97		0.90	1.03		0.92	1.08	
0.80	0.81	0.90	0.90		0.90	0.92		0.90	0.99		0.91	1.05		0.94	1.11		0.98	1.18	
0.80	0.87	0.90	0.92		0.90	1.00		0.92	1.07		0.96	1.14		1.00	1.23		1.04	>1.3	
0.80	0.94	0.90	1.02		0.93	1.10		0.98	1.20		1.03	>1.3		1.07	>1.3		1.11	>1.3	
1.00	0.75	0.90	0.90		0.90	0.90		0.90	0.90		0.90	0.93		0.90	0.98		0.90	1.03	
1.00	0.81	0.90	0.90		0.90	0.90		0.90	0.95		0.90	1.01		0.91	1.06		0.94	1.12	
1.00	0.87	0.90	0.90		0.90	0.97		0.90	1.03		0.93	1.09		0.97	1.16		1.00	1.23	
1.00	0.94	0.90	1.00		0.91	1.07		0.95	1.15		0.99	1.23		1.03	>1.3		1.07	>1.3	
1.20	0.75	0.90	0.90		0.90	0.90		0.90	0.90		0.90	0.91		0.90	0.95		0.90	0.99	
1.20	0.81	0.90	0.90		0.90	0.90		0.90	0.93		0.90	0.98		0.90	1.03		0.92	1.08	
1.20	0.87	0.90	0.90		0.90	0.95		0.90	1.01		0.91	1.06		0.94	1.12		0.97	1.18	
1.20	0.94	0.90	0.99		0.90	1.05		0.94	1.12		0.97	1.19		1.01	1.27		1.04	>1.3	
1.40	0.75	0.90	0.90		0.90	0.90		0.90	0.90		0.90	0.90		0.90	0.93		0.90	0.97	
1.40	0.81	0.90	0.90		0.90	0.90		0.90	0.91		0.90	0.96		0.90	1.00		0.90	1.05	
1.40	0.87	0.90	0.90		0.90	0.94		0.90	0.99		0.90	1.04		0.92	1.09		0.95	1.14	
1.40	0.94	0.90	0.98		0.90	1.04		0.92	1.10		0.95	1.16		0.99	1.23		1.02	1.30	

Table- Error! No text of specified style in document.**-2 Minimum weld strength mismatch requirement for flaw size 2 mm × 50 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90		0.91	1.06		1.00	1.25		1.08	>1.3		1.18	>1.3		>1.3	>1.3	
0.40	0.81	0.90	0.98		0.98	1.16		1.07	>1.3		1.18	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.87	0.93	1.06		1.04	1.30		1.15	>1.3		1.30	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.94	0.99	1.18		1.12	>1.3		1.27	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	0.90	0.90		0.90	0.95		0.91	1.05		0.97	1.16		1.02	1.29		1.08	>1.3	
0.60	0.81	0.90	0.92		0.91	1.04		0.97	1.15		1.04	>1.3		1.10	>1.3		1.17	>1.3	
0.60	0.87	0.90	1.00		0.96	1.13		1.04	1.29		1.11	>1.3		1.19	>1.3		1.28	>1.3	
0.60	0.94	0.94	1.10		1.03	1.27		1.11	>1.3		1.20	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.75	0.90	0.90		0.90	0.90		0.90	0.98		0.91	1.06		0.96	1.13		1.00	1.23	
0.80	0.81	0.90	0.90		0.90	0.98		0.92	1.07		0.97	1.15		1.02	1.27		1.07	>1.3	
0.80	0.87	0.90	0.96		0.92	1.06		0.98	1.16		1.04	1.29		1.09	>1.3		1.15	>1.3	
0.80	0.94	0.91	1.05		0.98	1.18		1.05	>1.3		1.11	>1.3		1.18	>1.3		1.26	>1.3	
1.00	0.75	0.90	0.90		0.90	0.90		0.90	0.94		0.90	1.01		0.92	1.07		0.96	1.13	
1.00	0.81	0.90	0.90		0.90	0.94		0.90	1.02		0.94	1.09		0.98	1.17		1.02	1.26	
1.00	0.87	0.90	0.93		0.90	1.02		0.95	1.11		1.00	1.20		1.04	>1.3		1.09	>1.3	
1.00	0.94	0.90	1.03		0.95	1.13		1.01	1.25		1.06	>1.3		1.12	>1.3		1.17	>1.3	
1.20	0.75	0.90	0.90		0.90	0.90		0.90	0.91		0.90	0.97		0.90	1.03		0.92	1.08	
1.20	0.81	0.90	0.90		0.90	0.92		0.90	0.99		0.91	1.05		0.95	1.11		0.99	1.18	
1.20	0.87	0.90	0.92		0.90	1.00		0.92	1.07		0.97	1.14		1.01	1.23		1.05	>1.3	
1.20	0.94	0.90	1.02		0.93	1.10		0.99	1.20		1.03	>1.3		1.08	>1.3		1.12	>1.3	
1.40	0.75	0.90	0.90		0.90	0.90		0.90	0.90		0.90	0.94		0.90	0.99		0.90	1.05	
1.40	0.81	0.90	0.90		0.90	0.90		0.90	0.96		0.90	1.02		0.93	1.08		0.96	1.14	
1.40	0.87	0.90	0.91		0.90	0.98		0.91	1.04		0.95	1.11		0.98	1.18		1.02	1.26	
1.40	0.94	0.90	1.00		0.92	1.08		0.97	1.16		1.01	1.25		1.05	>1.3		1.09	>1.3	

Table- Error! No text of specified style in document.**-3 Minimum weld strength mismatch requirement for flaw size 2 mm × 75 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.91		0.95	1.11		1.06	>1.3		1.17	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.81	0.90	1.00		1.02	1.24		1.14	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.87	0.95	1.10		1.09	>1.3		1.26	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.94	1.02	1.23		1.18	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	0.90	0.90		0.90	0.99		0.95	1.11		1.02	1.25		1.09	>1.3		1.17	>1.3	
0.60	0.81	0.90	0.94		0.94	1.08		1.02	1.23		1.10	>1.3		1.19	>1.3		1.29	>1.3	
0.60	0.87	0.90	1.02		1.00	1.18		1.09	>1.3		1.19	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.94	0.96	1.12		1.07	>1.3		1.18	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.75	0.90	0.90		0.90	0.93		0.90	1.02		0.96	1.11		1.01	1.22		1.06	>1.3	
0.80	0.81	0.90	0.90		0.90	1.01		0.96	1.11		1.02	1.23		1.08	>1.3		1.14	>1.3	
0.80	0.87	0.90	0.98		0.95	1.10		1.02	1.23		1.09	>1.3		1.16	>1.3		1.25	>1.3	
0.80	0.94	0.93	1.08		1.02	1.23		1.09	>1.3		1.18	>1.3		1.28	>1.3		>1.3	>1.3	
1.00	0.75	0.90	0.90		0.90	0.90		0.90	0.97		0.92	1.05		0.96	1.12		1.01	1.21	
1.00	0.81	0.90	0.90		0.90	0.97		0.93	1.06		0.98	1.14		1.03	1.24		1.08	>1.3	
1.00	0.87	0.90	0.95		0.92	1.05		0.98	1.15		1.04	1.27		1.10	>1.3		1.15	>1.3	
1.00	0.94	0.91	1.05		0.98	1.17		1.05	>1.3		1.11	>1.3		1.19	>1.3		1.28	>1.3	
1.20	0.75	0.90	0.90		0.90	0.90		0.90	0.94		0.90	1.01		0.93	1.07		0.97	1.13	
1.20	0.81	0.90	0.90		0.90	0.94		0.90	1.02		0.95	1.09		0.99	1.17		1.04	1.26	
1.20	0.87	0.90	0.93		0.90	1.02		0.96	1.11		1.01	1.20		1.06	>1.3		1.11	>1.3	
1.20	0.94	0.90	1.03		0.96	1.13		1.02	1.25		1.08	>1.3		1.13	>1.3		1.20	>1.3	
1.40	0.75	0.90	0.90		0.90	0.90		0.90	0.92		0.90	0.98		0.91	1.03		0.94	1.09	
1.40	0.81	0.90	0.90		0.90	0.92		0.90	0.99		0.92	1.06		0.97	1.12		1.01	1.20	
1.40	0.87	0.90	0.92		0.90	1.00		0.93	1.08		0.98	1.15		1.03	1.25		1.07	>1.3	
1.40	0.94	0.90	1.02		0.94	1.11		1.00	1.21		1.05	>1.3		1.10	>1.3		1.15	>1.3	

Table- Error! No text of specified style in document.**-4 Minimum weld strength mismatch requirement for flaw size 2 mm × 100 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.93		0.99	1.16		1.12	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.81	0.91	1.03		1.07	>1.3		1.24	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.87	0.98	1.12		1.14	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.94	1.05	1.27		1.26	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	0.90	0.90		0.91	1.02		0.99	1.15		1.08	>1.3		1.17	>1.3		1.28	>1.3	
0.60	0.81	0.90	0.95		0.97	1.11		1.07	>1.3		1.17	>1.3		1.30	>1.3		>1.3	>1.3	
0.60	0.87	0.92	1.04		1.04	1.23		1.14	>1.3		1.28	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.94	0.99	1.15		1.11	>1.3		1.26	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.75	0.90	0.90		0.90	0.96		0.93	1.06		1.00	1.16		1.06	1.30		1.13	>1.3	
0.80	0.81	0.90	0.92		0.92	1.04		1.00	1.15		1.07	>1.3		1.14	>1.3		1.24	>1.3	
0.80	0.87	0.90	1.00		0.98	1.13		1.06	1.29		1.14	>1.3		1.25	>1.3		>1.3	>1.3	
0.80	0.94	0.95	1.10		1.05	1.28		1.14	>1.3		1.26	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.75	0.90	0.90		0.90	0.92		0.90	1.00		0.95	1.09		1.01	1.17		1.06	1.28	
1.00	0.81	0.90	0.90		0.90	1.00		0.96	1.09		1.02	1.19		1.08	>1.3		1.14	>1.3	
1.00	0.87	0.90	0.97		0.95	1.08		1.02	1.20		1.09	>1.3		1.15	>1.3		1.25	>1.3	
1.00	0.94	0.93	1.07		1.01	1.21		1.09	>1.3		1.17	>1.3		1.28	>1.3		>1.3	>1.3	
1.20	0.75	0.90	0.90		0.90	0.90		0.90	0.97		0.92	1.04		0.97	1.11		1.02	1.19	
1.20	0.81	0.90	0.90		0.90	0.97		0.93	1.05		0.98	1.13		1.04	1.23		1.09	>1.3	
1.20	0.87	0.90	0.95		0.92	1.05		0.99	1.14		1.05	1.26		1.11	>1.3		1.17	>1.3	
1.20	0.94	0.91	1.04		0.99	1.16		1.06	1.30		1.12	>1.3		1.20	>1.3		1.30	>1.3	
1.40	0.75	0.90	0.90		0.90	0.90		0.90	0.94		0.90	1.01		0.94	1.07		0.99	1.14	
1.40	0.81	0.90	0.90		0.90	0.94		0.91	1.02		0.96	1.09		1.01	1.17		1.06	1.27	
1.40	0.87	0.90	0.93		0.91	1.02		0.96	1.11		1.02	1.20		1.07	>1.3		1.13	>1.3	
1.40	0.94	0.90	1.03		0.97	1.13		1.03	1.25		1.09	>1.3		1.15	>1.3		1.24	>1.3	

Table- Error! No text of specified style in document.**-5 Minimum weld strength mismatch requirement for flaw size 4 mm × 25 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90		0.94	1.06		1.05	1.29		1.18	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.81	0.90	0.97		1.02	1.18		1.14	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.87	0.94	1.06		1.09	>1.3		1.26	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.94	1.02	1.19		1.18	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	0.90	0.90		0.90	0.96		0.95	1.08		1.02	1.20		1.10	>1.3		1.18	>1.3	
0.60	0.81	0.90	0.92		0.94	1.05		1.02	1.18		1.10	>1.3		1.20	>1.3		>1.3	>1.3	
0.60	0.87	0.90	1.00		1.00	1.14		1.09	>1.3		1.19	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.94	0.96	1.10		1.07	1.30		1.18	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.75	0.90	0.90		0.90	0.92		0.90	1.00		0.96	1.09		1.01	1.18		1.07	1.29	
0.80	0.81	0.90	0.90		0.90	1.00		0.96	1.09		1.03	1.20		1.09	>1.3		1.15	>1.3	
0.80	0.87	0.90	0.96		0.95	1.08		1.03	1.20		1.09	>1.3		1.17	>1.3		1.26	>1.3	
0.80	0.94	0.93	1.06		1.02	1.21		1.10	>1.3		1.18	>1.3		1.29	>1.3		>1.3	>1.3	
1.00	0.75	0.90	0.90		0.90	0.90		0.90	0.96		0.92	1.03		0.96	1.10		1.01	1.18	
1.00	0.81	0.90	0.90		0.90	0.96		0.93	1.04		0.98	1.12		1.03	1.21		1.08	>1.3	
1.00	0.87	0.90	0.94		0.93	1.04		0.99	1.13		1.04	1.24		1.10	>1.3		1.16	>1.3	
1.00	0.94	0.91	1.04		0.99	1.15		1.05	1.28		1.12	>1.3		1.19	>1.3		1.28	>1.3	
1.20	0.75	0.90	0.90		0.90	0.90		0.90	0.93		0.90	0.99		0.93	1.05		0.97	1.11	
1.20	0.81	0.90	0.90		0.90	0.93		0.90	1.01		0.95	1.08		0.99	1.14		1.04	1.23	
1.20	0.87	0.90	0.93		0.91	1.01		0.96	1.09		1.01	1.18		1.06	1.28		1.11	>1.3	
1.20	0.94	0.90	1.02		0.96	1.12		1.02	1.23		1.08	>1.3		1.13	>1.3		1.20	>1.3	
1.40	0.75	0.90	0.90		0.90	0.90		0.90	0.91		0.90	0.96		0.91	1.02		0.94	1.07	
1.40	0.81	0.90	0.90		0.90	0.92		0.90	0.98		0.93	1.04		0.97	1.11		1.01	1.17	
1.40	0.87	0.90	0.92		0.90	0.99		0.94	1.06		0.98	1.13		1.03	1.22		1.07	>1.3	
1.40	0.94	0.90	1.01		0.95	1.10		1.00	1.19		1.05	1.29		1.10	>1.3		1.15	>1.3	

Table- Error! No text of specified style in document.**-6 Minimum weld strength mismatch requirement for flaw size 4 mm × 50 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.96		1.11	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.81	0.96	1.08		1.25	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.87	1.04	1.20		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.94	1.12	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	0.90	0.91		0.99	1.11		1.13	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.81	0.91	1.00		1.07	1.24		1.26	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.87	0.98	1.09		1.15	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.94	1.05	1.22		1.26	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.75	0.90	0.90		0.94	1.03		1.04	1.18		1.14	>1.3		1.28	>1.3		>1.3	>1.3	
0.80	0.81	0.90	0.96		1.01	1.12		1.12	>1.3		1.26	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.87	0.94	1.04		1.07	1.25		1.22	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.94	1.01	1.15		1.15	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.75	0.90	0.90		0.91	0.99		0.99	1.10		1.07	1.24		1.15	>1.3		1.26	>1.3	
1.00	0.81	0.90	0.93		0.97	1.07		1.06	1.21		1.15	>1.3		1.27	>1.3		>1.3	>1.3	
1.00	0.87	0.92	1.01		1.03	1.16		1.13	>1.3		1.26	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.94	0.98	1.12		1.10	>1.3		1.24	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.75	0.90	0.90		0.90	0.95		0.95	1.05		1.02	1.15		1.09	1.28		1.16	>1.3	
1.20	0.81	0.90	0.92		0.94	1.03		1.02	1.14		1.10	1.28		1.18	>1.3		1.29	>1.3	
1.20	0.87	0.90	0.99		1.00	1.12		1.08	1.27		1.18	>1.3		1.29	>1.3		>1.3	>1.3	
1.20	0.94	0.96	1.09		1.06	1.26		1.17	>1.3		1.30	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.75	0.90	0.90		0.90	0.93		0.93	1.02		0.99	1.10		1.05	1.20		1.11	>1.3	
1.40	0.81	0.90	0.90		0.92	1.01		0.99	1.10		1.06	1.21		1.13	>1.3		1.21	>1.3	
1.40	0.87	0.90	0.97		0.97	1.09		1.05	1.21		1.13	>1.3		1.22	>1.3		>1.3	>1.3	
1.40	0.94	0.94	1.07		1.04	1.22		1.13	>1.3		1.23	>1.3		>1.3	>1.3		>1.3	>1.3	

Table- Error! No text of specified style in document.**-7 Minimum weld strength mismatch requirement for flaw size 4 mm × 75 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5% High-low (mm)			TTSC=1.0% High-low (mm)			TTSC=1.5% High-low (mm)			TTSC=2.0% High-low (mm)			TTSC=2.5% High-low (mm)			TTSC=3.0% High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.94	1.02		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.81	1.04	1.16		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.87	1.14	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.94	1.26	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	0.90	0.96		1.12	1.28		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.81	0.98	1.06		1.24	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.87	1.05	1.17		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.94	1.13	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.75	0.90	0.93		1.04	1.13		1.20	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.81	0.94	1.01		1.11	1.26		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.87	1.01	1.10		1.21	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.94	1.08	1.24		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.75	0.90	0.91		0.99	1.07		1.11	1.25		1.26	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.81	0.92	0.98		1.06	1.16		1.21	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.87	0.98	1.07		1.13	1.30		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.94	1.04	1.19		1.23	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.75	0.90	0.90		0.95	1.03		1.06	1.16		1.16	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.81	0.90	0.96		1.02	1.11		1.13	1.30		1.28	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.87	0.95	1.04		1.09	1.23		1.23	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.94	1.02	1.15		1.17	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.75	0.90	0.90		0.93	1.00		1.02	1.11		1.11	1.25		1.22	>1.3		>1.3	>1.3	
1.40	0.81	0.90	0.94		0.99	1.08		1.09	1.22		1.21	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.87	0.94	1.02		1.05	1.17		1.17	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.94	1.00	1.12		1.13	>1.3		1.29	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	

Table- Error! No text of specified style in document.**-8 Minimum weld strength mismatch requirement for flaw size 4 mm × 100 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	1.04	1.11		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.81	1.17	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.87	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.94	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	0.97	1.02		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.81	1.06	1.13		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.87	1.14	1.28		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.94	1.26	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.75	0.94	0.98		1.16	1.28		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.81	1.01	1.08		1.29	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.87	1.08	1.18		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.94	1.16	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.75	0.92	0.96		1.09	1.17		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.81	0.98	1.04		1.18	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.87	1.04	1.13		1.29	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.94	1.11	1.27		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.75	0.90	0.94		1.04	1.11		1.20	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.81	0.96	1.01		1.12	1.22		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.87	1.01	1.09		1.21	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.94	1.08	1.22		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.75	0.90	0.92		1.01	1.07		1.13	1.24		1.30	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.81	0.94	0.99		1.08	1.16		1.24	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.87	0.99	1.07		1.15	1.29		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.94	1.06	1.19		1.26	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	

Table- Error! No text of specified style in document.**-9 Minimum weld strength mismatch requirement for flaw size 6 mm × 25 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90		1.01	1.12		1.21	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.81	0.91	0.99		1.10	1.28		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.87	0.99	1.09		1.21	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.94	1.06	1.24		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	0.90	0.90		0.93	1.01		1.04	1.15		1.15	>1.3		1.30	>1.3		>1.3	>1.3	
0.60	0.81	0.90	0.94		1.00	1.10		1.12	1.30		1.28	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.87	0.94	1.03		1.07	1.22		1.22	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.94	1.01	1.14		1.15	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.75	0.90	0.90		0.90	0.95		0.97	1.06		1.05	1.17		1.13	>1.3		1.23	>1.3	
0.80	0.81	0.90	0.91		0.95	1.04		1.04	1.16		1.13	>1.3		1.24	>1.3		>1.3	>1.3	
0.80	0.87	0.91	0.99		1.02	1.13		1.11	1.30		1.23	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.94	0.97	1.09		1.09	1.28		1.21	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.75	0.90	0.90		0.90	0.92		0.93	1.01		1.00	1.10		1.06	1.19		1.12	>1.3	
1.00	0.81	0.90	0.90		0.92	1.00		1.00	1.10		1.07	1.21		1.14	>1.3		1.23	>1.3	
1.00	0.87	0.90	0.97		0.98	1.08		1.06	1.21		1.14	>1.3		1.24	>1.3		>1.3	>1.3	
1.00	0.94	0.95	1.07		1.05	1.21		1.14	>1.3		1.25	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.75	0.90	0.90		0.90	0.90		0.90	0.98		0.96	1.05		1.02	1.12		1.07	1.21	
1.20	0.81	0.90	0.90		0.90	0.97		0.96	1.06		1.03	1.14		1.09	1.25		1.15	>1.3	
1.20	0.87	0.90	0.95		0.95	1.05		1.03	1.15		1.09	1.27		1.16	>1.3		1.26	>1.3	
1.20	0.94	0.93	1.05		1.02	1.17		1.10	>1.3		1.18	>1.3		1.28	>1.3		>1.3	>1.3	
1.40	0.75	0.90	0.90		0.90	0.90		0.90	0.95		0.93	1.02		0.98	1.08		1.03	1.15	
1.40	0.81	0.90	0.90		0.90	0.95		0.94	1.03		1.00	1.10		1.05	1.19		1.11	1.29	
1.40	0.87	0.90	0.94		0.93	1.03		1.00	1.11		1.06	1.21		1.12	>1.3		1.19	>1.3	
1.40	0.94	0.92	1.03		1.00	1.14		1.07	1.26		1.14	>1.3		1.22	>1.3		>1.3	>1.3	

Table- Error! No text of specified style in document.**-10 Minimum weld strength mismatch requirement for flaw size 6 mm × 50 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.93	0.99		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.81	1.06	1.14		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.87	1.17	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.94	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	0.91	0.96		1.18	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.81	1.00	1.06		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.87	1.07	1.17		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.94	1.16	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.75	0.90	0.93		1.08	1.14		1.30	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.81	0.96	1.02		1.16	1.29		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.87	1.03	1.11		1.28	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.94	1.10	1.25		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.75	0.90	0.92		1.02	1.08		1.16	1.28		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.81	0.94	0.99		1.10	1.19		1.29	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.87	1.00	1.08		1.18	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.94	1.07	1.20		1.30	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.75	0.90	0.90		0.99	1.04		1.10	1.19		1.24	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.81	0.92	0.97		1.06	1.13		1.20	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.87	0.98	1.05		1.12	1.25		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.94	1.04	1.16		1.22	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.75	0.90	0.90		0.96	1.01		1.06	1.13		1.16	1.28		1.30	>1.3		>1.3	>1.3	
1.40	0.81	0.91	0.96		1.02	1.09		1.13	1.25		1.28	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.87	0.96	1.03		1.09	1.20		1.24	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.94	1.02	1.13		1.17	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	

Table- Error! No text of specified style in document.**-11 Minimum weld strength mismatch requirement for flaw size 6 mm × 75 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	1.18	1.15		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.81	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.87	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.94	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	1.06	1.07		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.81	1.17	1.22		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.87	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.94	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.75	1.02	1.04		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.81	1.10	1.14		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.87	1.19	1.27		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.94	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.75	0.99	1.01		1.26	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.81	1.06	1.10		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.87	1.13	1.20		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.94	1.23	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.75	0.97	0.99		1.17	1.22		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.81	1.03	1.07		1.29	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.87	1.09	1.16		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.94	1.18	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.75	0.95	0.97		1.12	1.15		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.81	1.01	1.04		1.22	1.28		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.87	1.07	1.13		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.94	1.14	1.26		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	

Table- Error! No text of specified style in document.**-12 Minimum weld strength mismatch requirement for flaw size 6 mm × 100 mm (depth × length) with wall thickness of 1/2"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.81	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.87	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.40	0.94	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.75	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.81	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.87	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.60	0.94	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.75	1.25	1.21		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.81	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.87	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
0.80	0.94	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.75	1.15	1.14		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.81	1.27	1.27		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.87	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.00	0.94	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.75	1.10	1.10		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.81	1.20	1.21		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.87	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.20	0.94	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.75	1.07	1.07		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.81	1.14	1.16		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.87	1.24	1.28		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	
1.40	0.94	>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3		>1.3	>1.3	

A.2 Wall Thickness = 5/8 inch

Table- Error! No text of specified style in document.**-13 Minimum weld strength mismatch requirement for flaw size 2 mm × 25 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.92	0.90	0.93	1.10	0.91	1.03	1.26	0.97	1.11	>1.3	1.02	1.20	>1.3	1.07	1.30	>1.3
0.40	0.81	0.90	0.90	1.03	0.90	1.01	1.23	0.96	1.11	>1.3	1.02	1.20	>1.3	1.07	>1.3	>1.3	1.12	>1.3	>1.3
0.40	0.87	0.90	0.97	1.17	0.95	1.09	>1.3	1.02	1.20	>1.3	1.07	>1.3	>1.3	1.12	>1.3	>1.3	1.18	>1.3	>1.3
0.40	0.94	0.95	1.09	>1.3	1.03	1.24	>1.3	1.09	>1.3	>1.3	1.14	>1.3	>1.3	1.20	>1.3	>1.3	1.25	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	1.01	0.90	0.94	1.11	0.90	1.01	1.21	0.94	1.06	1.30	0.98	1.11	>1.3
0.60	0.81	0.90	0.90	0.95	0.90	0.93	1.11	0.90	1.02	1.22	0.94	1.07	>1.3	0.99	1.13	>1.3	1.02	1.19	>1.3
0.60	0.87	0.90	0.90	1.07	0.90	1.02	1.24	0.95	1.08	>1.3	1.00	1.15	>1.3	1.03	1.22	>1.3	1.07	1.29	>1.3
0.60	0.94	0.91	1.02	1.28	0.98	1.13	>1.3	1.02	1.21	>1.3	1.05	1.29	>1.3	1.09	>1.3	>1.3	1.12	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.90	1.05	0.90	0.95	1.12	0.90	1.00	1.20	0.93	1.04	1.27
0.80	0.81	0.90	0.90	0.91	0.90	0.90	1.05	0.90	0.96	1.15	0.90	1.02	1.24	0.94	1.06	>1.3	0.97	1.11	>1.3
0.80	0.87	0.90	0.90	1.02	0.90	0.97	1.17	0.91	1.03	1.29	0.95	1.08	>1.3	0.99	1.13	>1.3	1.02	1.19	>1.3
0.80	0.94	0.90	0.99	1.20	0.94	1.07	>1.3	0.98	1.14	>1.3	1.01	1.20	>1.3	1.04	1.26	>1.3	1.06	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	1.01	0.90	0.91	1.08	0.90	0.96	1.15	0.90	1.00	1.21
1.00	0.81	0.90	0.90	0.90	0.90	0.90	1.02	0.90	0.93	1.10	0.90	0.98	1.19	0.91	1.03	1.27	0.93	1.07	>1.3
1.00	0.87	0.90	0.90	0.99	0.90	0.93	1.12	0.90	1.00	1.23	0.92	1.05	>1.3	0.95	1.09	>1.3	0.98	1.14	>1.3
1.00	0.94	0.90	0.95	1.17	0.92	1.04	>1.3	0.95	1.09	>1.3	0.98	1.15	>1.3	1.01	1.20	>1.3	1.03	1.26	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.99	0.90	0.90	1.05	0.90	0.93	1.11	0.90	0.97	1.18
1.20	0.81	0.90	0.90	0.90	0.90	0.90	1.00	0.90	0.91	1.08	0.90	0.96	1.15	0.90	1.00	1.23	0.92	1.04	>1.3
1.20	0.87	0.90	0.90	0.96	0.90	0.92	1.09	0.90	0.98	1.20	0.91	1.03	>1.3	0.93	1.07	>1.3	0.96	1.11	>1.3
1.20	0.94	0.90	0.93	1.14	0.91	1.02	>1.3	0.93	1.07	>1.3	0.96	1.12	>1.3	0.98	1.17	>1.3	1.01	1.23	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.90	1.04	0.90	0.92	1.10	0.90	0.96	1.16
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.90	1.06	0.90	0.94	1.13	0.90	0.99	1.21	0.91	1.03	1.29
1.40	0.87	0.90	0.90	0.95	0.90	0.91	1.08	0.90	0.96	1.18	0.90	1.01	1.28	0.93	1.05	>1.3	0.95	1.09	>1.3
1.40	0.94	0.90	0.93	1.11	0.91	1.01	1.30	0.93	1.06	>1.3	0.95	1.11	>1.3	0.97	1.15	>1.3	0.99	1.21	>1.3

Table- Error! No text of specified style in document.**-14 Minimum weld strength mismatch requirement for flaw size 2 mm x 25 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.96	0.90	0.98	1.19	0.95	1.10	>1.3	1.03	1.24	>1.3	1.10	>1.3	>1.3	1.17	>1.3	>1.3
0.40	0.81	0.90	0.90	1.07	0.93	1.07	>1.3	1.02	1.21	>1.3	1.09	>1.3	>1.3	1.17	>1.3	>1.3	1.25	>1.3	>1.3
0.40	0.87	0.90	1.01	1.23	1.00	1.18	>1.3	1.08	>1.3	>1.3	1.17	>1.3	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.00	1.16	>1.3	1.10	>1.3	>1.3	1.19	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	1.06	0.90	0.99	1.19	0.94	1.07	>1.3	0.99	1.14	>1.3	1.03	1.23	>1.3
0.60	0.81	0.90	0.90	0.99	0.90	0.98	1.17	0.94	1.07	>1.3	1.00	1.15	>1.3	1.05	1.24	>1.3	1.09	>1.3	>1.3
0.60	0.87	0.90	0.93	1.11	0.93	1.06	>1.3	1.00	1.16	>1.3	1.05	1.27	>1.3	1.10	>1.3	>1.3	1.15	>1.3	>1.3
0.60	0.94	0.93	1.05	>1.3	1.02	1.20	>1.3	1.08	>1.3	>1.3	1.14	>1.3	>1.3	1.20	>1.3	>1.3	1.26	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	1.00	0.90	0.93	1.10	0.90	1.00	1.20	0.93	1.05	1.29	0.97	1.11	>1.3
0.80	0.81	0.90	0.90	0.93	0.90	0.92	1.09	0.90	1.01	1.22	0.94	1.07	>1.3	0.99	1.13	>1.3	1.02	1.20	>1.3
0.80	0.87	0.90	0.90	1.04	0.90	1.01	1.22	0.95	1.08	>1.3	1.00	1.16	>1.3	1.04	1.24	>1.3	1.07	>1.3	>1.3
0.80	0.94	0.90	1.01	1.26	0.97	1.12	>1.3	1.03	1.21	>1.3	1.07	>1.3	>1.3	1.11	>1.3	>1.3	1.15	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	1.05	0.90	0.95	1.13	0.90	1.00	1.21	0.93	1.05	1.29
1.00	0.81	0.90	0.90	0.90	0.90	0.90	1.05	0.90	0.96	1.15	0.91	1.02	1.25	0.94	1.07	>1.3	0.98	1.12	>1.3
1.00	0.87	0.90	0.90	1.01	0.90	0.96	1.17	0.92	1.04	1.29	0.96	1.10	>1.3	1.00	1.16	>1.3	1.03	1.22	>1.3
1.00	0.94	0.90	0.98	1.20	0.94	1.07	>1.3	0.99	1.15	>1.3	1.03	1.22	>1.3	1.06	1.30	>1.3	1.09	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	1.02	0.90	0.92	1.09	0.90	0.97	1.17	0.90	1.02	1.24
1.20	0.81	0.90	0.90	0.90	0.90	0.90	1.02	0.90	0.93	1.11	0.90	0.99	1.20	0.92	1.04	1.29	0.95	1.08	>1.3
1.20	0.87	0.90	0.90	0.99	0.90	0.94	1.13	0.90	1.01	1.24	0.93	1.06	>1.3	0.97	1.11	>1.3	1.00	1.17	>1.3
1.20	0.94	0.90	0.95	1.17	0.92	1.05	>1.3	0.96	1.11	>1.3	1.00	1.18	>1.3	1.03	1.24	>1.3	1.06	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	1.00	0.90	0.91	1.07	0.90	0.95	1.14	0.90	0.99	1.20
1.40	0.81	0.90	0.90	0.90	0.90	0.90	1.00	0.90	0.92	1.09	0.90	0.97	1.17	0.90	1.02	1.25	0.93	1.06	>1.3
1.40	0.87	0.90	0.90	0.96	0.90	0.92	1.11	0.90	0.99	1.22	0.92	1.04	>1.3	0.95	1.09	>1.3	0.98	1.14	>1.3
1.40	0.94	0.90	0.94	1.15	0.92	1.03	>1.3	0.95	1.09	>1.3	0.98	1.14	>1.3	1.01	1.21	>1.3	1.04	1.27	>1.3

Table- Error! No text of specified style in document.**-15 Minimum weld strength mismatch requirement for flaw size 2 mm × 75 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.98	0.90	1.02	1.25	0.99	1.17	>1.3	1.08	>1.3	>1.3	1.17	>1.3	>1.3	1.26	>1.3	>1.3
0.40	0.81	0.90	0.92	1.10	0.95	1.12	>1.3	1.06	>1.3	>1.3	1.16	>1.3	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.90	1.02	1.28	1.04	1.26	>1.3	1.15	>1.3	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.02	1.20	>1.3	1.16	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.91	0.90	0.92	1.09	0.90	1.03	1.25	0.97	1.12	>1.3	1.03	1.22	>1.3	1.08	>1.3	>1.3
0.60	0.81	0.90	0.90	1.01	0.90	1.01	1.22	0.96	1.12	>1.3	1.03	1.23	>1.3	1.09	>1.3	>1.3	1.15	>1.3	>1.3
0.60	0.87	0.90	0.94	1.14	0.95	1.10	>1.3	1.03	1.24	>1.3	1.10	>1.3	>1.3	1.17	>1.3	>1.3	1.25	>1.3	>1.3
0.60	0.94	0.95	1.08	>1.3	1.05	1.27	>1.3	1.13	>1.3	>1.3	1.21	>1.3	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	1.02	0.90	0.96	1.14	0.91	1.04	1.25	0.96	1.10	>1.3	1.01	1.17	>1.3
0.80	0.81	0.90	0.90	0.95	0.90	0.95	1.13	0.91	1.04	1.27	0.97	1.11	>1.3	1.02	1.20	>1.3	1.06	1.29	>1.3
0.80	0.87	0.90	0.90	1.06	0.91	1.03	1.27	0.97	1.12	>1.3	1.03	1.23	>1.3	1.08	>1.3	>1.3	1.13	>1.3	>1.3
0.80	0.94	0.91	1.02	>1.3	1.01	1.17	>1.3	1.06	1.29	>1.3	1.12	>1.3	>1.3	1.17	>1.3	>1.3	1.24	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.92	1.08	0.90	0.99	1.17	0.92	1.04	1.26	0.96	1.10	>1.3
1.00	0.81	0.90	0.90	0.91	0.90	0.91	1.07	0.90	0.99	1.19	0.93	1.06	>1.3	0.97	1.12	>1.3	1.01	1.19	>1.3
1.00	0.87	0.90	0.90	1.02	0.90	0.99	1.20	0.94	1.07	>1.3	0.99	1.14	>1.3	1.03	1.23	>1.3	1.07	>1.3	>1.3
1.00	0.94	0.90	1.00	1.23	0.97	1.11	>1.3	1.02	1.20	>1.3	1.07	1.30	>1.3	1.11	>1.3	>1.3	1.16	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	1.04	0.90	0.95	1.13	0.90	1.00	1.21	0.93	1.05	1.29
1.20	0.81	0.90	0.90	0.90	0.90	0.90	1.04	0.90	0.96	1.15	0.90	1.02	1.24	0.94	1.07	>1.3	0.97	1.13	>1.3
1.20	0.87	0.90	0.90	1.00	0.90	0.96	1.16	0.91	1.03	1.28	0.95	1.10	>1.3	0.99	1.16	>1.3	1.03	1.24	>1.3
1.20	0.94	0.90	0.97	1.19	0.94	1.07	>1.3	0.99	1.15	>1.3	1.03	1.23	>1.3	1.07	>1.3	>1.3	1.11	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	1.02	0.90	0.93	1.10	0.90	0.98	1.17	0.91	1.02	1.24
1.40	0.81	0.90	0.90	0.90	0.90	0.90	1.02	0.90	0.94	1.12	0.90	1.00	1.21	0.92	1.05	1.30	0.95	1.09	>1.3
1.40	0.87	0.90	0.90	0.98	0.90	0.94	1.13	0.90	1.01	1.25	0.94	1.07	>1.3	0.97	1.12	>1.3	1.01	1.19	>1.3
1.40	0.94	0.90	0.95	1.17	0.93	1.05	>1.3	0.97	1.12	>1.3	1.01	1.19	>1.3	1.05	1.27	>1.3	1.08	>1.3	>1.3

Table- Error! No text of specified style in document.**-16 Minimum weld strength mismatch requirement for flaw size 2 mm × 100 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.99	0.90	1.05	>1.3	1.01	1.24	>1.3	1.11	>1.3	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.90	0.94	1.12	0.98	1.16	>1.3	1.09	>1.3	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.91	1.05	>1.3	1.06	>1.3	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.03	1.25	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.91	0.90	0.94	1.12	0.91	1.06	1.30	0.99	1.16	>1.3	1.05	1.29	>1.3	1.11	>1.3	>1.3
0.60	0.81	0.90	0.90	1.01	0.90	1.03	1.26	0.99	1.16	>1.3	1.06	1.29	>1.3	1.12	>1.3	>1.3	1.20	>1.3	>1.3
0.60	0.87	0.90	0.96	1.17	0.97	1.13	>1.3	1.06	1.29	>1.3	1.14	>1.3	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	0.97	1.12	>1.3	1.08	>1.3	>1.3	1.18	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	1.03	0.90	0.98	1.17	0.92	1.06	1.30	0.98	1.14	>1.3	1.02	1.23	>1.3
0.80	0.81	0.90	0.90	0.95	0.90	0.96	1.15	0.93	1.06	>1.3	0.99	1.15	>1.3	1.04	1.26	>1.3	1.09	>1.3	>1.3
0.80	0.87	0.90	0.91	1.08	0.92	1.05	>1.3	1.00	1.17	>1.3	1.06	1.28	>1.3	1.11	>1.3	>1.3	1.18	>1.3	>1.3
0.80	0.94	0.92	1.04	>1.3	1.03	1.21	>1.3	1.09	>1.3	>1.3	1.16	>1.3	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.99	0.90	0.93	1.10	0.90	1.01	1.21	0.93	1.07	>1.3	0.97	1.13	>1.3
1.00	0.81	0.90	0.90	0.92	0.90	0.92	1.09	0.90	1.01	1.22	0.94	1.08	>1.3	1.00	1.15	>1.3	1.04	1.24	>1.3
1.00	0.87	0.90	0.90	1.04	0.90	1.01	1.23	0.95	1.10	>1.3	1.01	1.19	>1.3	1.06	1.29	>1.3	1.10	>1.3	>1.3
1.00	0.94	0.90	1.01	1.25	0.99	1.14	>1.3	1.05	1.26	>1.3	1.10	>1.3	>1.3	1.16	>1.3	>1.3	1.23	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.91	1.06	0.90	0.97	1.16	0.91	1.03	1.24	0.94	1.08	>1.3
1.20	0.81	0.90	0.90	0.90	0.90	0.90	1.05	0.90	0.98	1.17	0.92	1.04	1.28	0.96	1.10	>1.3	1.01	1.16	>1.3
1.20	0.87	0.90	0.90	1.01	0.90	0.98	1.18	0.93	1.06	>1.3	0.97	1.13	>1.3	1.02	1.21	>1.3	1.07	1.30	>1.3
1.20	0.94	0.90	0.99	1.20	0.96	1.10	>1.3	1.02	1.20	>1.3	1.06	1.29	>1.3	1.11	>1.3	>1.3	1.16	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.03	0.90	0.95	1.12	0.90	1.00	1.20	0.92	1.05	1.28
1.40	0.81	0.90	0.90	0.90	0.90	0.90	1.02	0.90	0.95	1.14	0.90	1.02	1.24	0.94	1.07	>1.3	0.98	1.12	>1.3
1.40	0.87	0.90	0.90	0.99	0.90	0.96	1.15	0.91	1.03	1.28	0.95	1.10	>1.3	0.99	1.16	>1.3	1.04	1.24	>1.3
1.40	0.94	0.90	0.97	1.18	0.94	1.07	>1.3	1.00	1.15	>1.3	1.04	1.24	>1.3	1.08	>1.3	>1.3	1.13	>1.3	>1.3

Table- Error! No text of specified style in document.**-17 Minimum weld strength mismatch requirement for flaw size 4 mm × 25 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.99	0.91	1.02	1.23	1.01	1.15	>1.3	1.11	>1.3	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.90	0.93	1.10	0.98	1.10	>1.3	1.08	1.27	>1.3	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.92	1.03	1.26	1.05	1.22	>1.3	1.16	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.02	1.16	>1.3	1.14	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.91	0.90	0.93	1.09	0.93	1.03	1.24	1.00	1.12	>1.3	1.06	1.21	>1.3	1.12	>1.3	>1.3
0.60	0.81	0.90	0.90	1.01	0.91	1.01	1.21	0.99	1.11	>1.3	1.05	1.21	>1.3	1.12	>1.3	>1.3	1.18	>1.3	>1.3
0.60	0.87	0.90	0.95	1.14	0.98	1.09	>1.3	1.05	1.21	>1.3	1.11	>1.3	>1.3	1.19	>1.3	>1.3	1.26	>1.3	>1.3
0.60	0.94	0.97	1.06	>1.3	1.06	1.21	>1.3	1.13	>1.3	>1.3	1.20	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	1.03	0.90	0.96	1.14	0.94	1.04	1.24	0.99	1.10	>1.3	1.04	1.16	>1.3
0.80	0.81	0.90	0.90	0.96	0.90	0.95	1.13	0.94	1.04	1.25	1.00	1.11	>1.3	1.04	1.18	>1.3	1.09	1.26	>1.3
0.80	0.87	0.90	0.91	1.07	0.93	1.03	1.26	1.00	1.11	>1.3	1.05	1.20	>1.3	1.09	1.28	>1.3	1.14	>1.3	>1.3
0.80	0.94	0.93	1.02	1.29	1.02	1.13	>1.3	1.06	1.23	>1.3	1.11	>1.3	>1.3	1.17	>1.3	>1.3	1.23	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.99	0.90	0.92	1.08	0.90	0.99	1.17	0.94	1.04	1.26	0.99	1.09	>1.3
1.00	0.81	0.90	0.90	0.92	0.90	0.91	1.08	0.90	0.99	1.19	0.95	1.05	1.29	1.00	1.11	>1.3	1.04	1.17	>1.3
1.00	0.87	0.90	0.90	1.03	0.90	0.99	1.20	0.96	1.06	>1.3	1.01	1.13	>1.3	1.05	1.20	>1.3	1.09	1.27	>1.3
1.00	0.94	0.91	1.00	1.22	0.98	1.08	>1.3	1.03	1.16	>1.3	1.07	1.24	>1.3	1.11	>1.3	>1.3	1.15	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	1.05	0.90	0.95	1.13	0.91	1.01	1.20	0.95	1.05	1.28
1.20	0.81	0.90	0.90	0.90	0.90	0.90	1.04	0.90	0.96	1.15	0.92	1.02	1.24	0.96	1.07	>1.3	1.00	1.12	>1.3
1.20	0.87	0.90	0.90	1.01	0.90	0.96	1.16	0.93	1.03	1.27	0.97	1.09	>1.3	1.01	1.15	>1.3	1.05	1.21	>1.3
1.20	0.94	0.90	0.98	1.19	0.95	1.05	>1.3	1.01	1.12	>1.3	1.04	1.18	>1.3	1.07	1.25	>1.3	1.10	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	1.02	0.90	0.93	1.10	0.90	0.98	1.17	0.92	1.02	1.24
1.40	0.81	0.90	0.90	0.90	0.90	0.90	1.02	0.90	0.94	1.12	0.90	1.00	1.20	0.94	1.04	1.28	0.97	1.09	>1.3
1.40	0.87	0.90	0.90	0.99	0.90	0.94	1.13	0.91	1.01	1.24	0.95	1.06	>1.3	0.99	1.11	>1.3	1.02	1.17	>1.3
1.40	0.94	0.90	0.96	1.17	0.93	1.04	>1.3	0.98	1.09	>1.3	1.02	1.15	>1.3	1.05	1.21	>1.3	1.07	1.27	>1.3

Table- Error! No text of specified style in document.**-18 Minimum weld strength mismatch requirement for flaw size 4 mm × 50 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.91	1.09	1.02	1.19	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.90	1.01	1.21	1.11	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.98	1.11	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.12	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.98	0.92	1.03	1.26	1.04	1.21	>1.3	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.90	0.92	1.10	0.99	1.12	>1.3	1.13	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.91	1.02	1.20	1.08	1.25	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.03	1.18	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.92	0.90	0.96	1.14	0.96	1.09	>1.3	1.05	1.22	>1.3	1.14	>1.3	>1.3	1.25	>1.3	>1.3
0.80	0.81	0.90	0.90	1.03	0.93	1.04	1.24	1.03	1.17	>1.3	1.13	>1.3	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.90	0.96	1.12	1.01	1.13	>1.3	1.11	>1.3	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	0.98	1.09	>1.3	1.11	>1.3	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.91	1.08	0.91	1.02	1.23	0.99	1.12	>1.3	1.06	1.22	>1.3	1.13	>1.3	>1.3
1.00	0.81	0.90	0.90	0.98	0.90	0.99	1.18	0.98	1.09	>1.3	1.06	1.20	>1.3	1.13	>1.3	>1.3	1.23	>1.3	>1.3
1.00	0.87	0.90	0.92	1.07	0.96	1.07	1.29	1.05	1.19	>1.3	1.13	>1.3	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	0.94	1.04	1.28	1.06	1.23	>1.3	1.15	>1.3	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	1.03	0.90	0.97	1.16	0.95	1.06	1.28	1.01	1.14	>1.3	1.07	1.23	>1.3
1.20	0.81	0.90	0.90	0.94	0.90	0.95	1.14	0.94	1.04	1.25	1.01	1.13	>1.3	1.07	1.22	>1.3	1.14	>1.3	>1.3
1.20	0.87	0.90	0.90	1.04	0.93	1.03	1.22	1.01	1.13	>1.3	1.08	1.24	>1.3	1.15	>1.3	>1.3	1.25	>1.3	>1.3
1.20	0.94	0.92	1.02	1.23	1.03	1.15	>1.3	1.10	>1.3	>1.3	1.19	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	1.00	0.90	0.94	1.12	0.91	1.02	1.23	0.97	1.09	>1.3	1.02	1.16	>1.3
1.40	0.81	0.90	0.90	0.91	0.90	0.92	1.10	0.91	1.01	1.21	0.97	1.08	>1.3	1.03	1.16	>1.3	1.09	1.25	>1.3
1.40	0.87	0.90	0.90	1.02	0.90	1.01	1.18	0.98	1.09	>1.3	1.04	1.17	>1.3	1.10	1.28	>1.3	1.17	>1.3	>1.3
1.40	0.94	0.91	1.00	1.20	1.00	1.11	>1.3	1.07	1.24	>1.3	1.14	>1.3	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-19 Minimum weld strength mismatch requirement for flaw size 4 mm × 75 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.97	1.18	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.94	1.08	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.04	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	1.04	0.98	1.11	>1.3	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.90	0.97	1.18	1.07	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.95	1.07	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.09	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.97	0.91	1.03	1.25	1.04	1.20	>1.3	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.90	0.90	1.08	0.99	1.13	>1.3	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.90	1.01	1.24	1.08	1.26	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.03	1.21	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.92	0.90	0.97	1.16	0.97	1.09	>1.3	1.07	1.25	>1.3	1.18	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.90	0.90	1.02	0.93	1.05	1.29	1.05	1.22	>1.3	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.90	0.96	1.17	1.02	1.15	>1.3	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	0.98	1.13	>1.3	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.92	1.10	0.93	1.04	1.27	1.01	1.14	>1.3	1.10	1.29	>1.3	1.20	>1.3	>1.3
1.20	0.81	0.90	0.90	0.99	0.90	1.01	1.22	1.00	1.14	>1.3	1.10	1.28	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.90	0.92	1.12	0.97	1.09	>1.3	1.09	1.26	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	0.95	1.07	>1.3	1.10	>1.3	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	1.06	0.90	1.01	1.21	0.97	1.09	>1.3	1.05	1.19	>1.3	1.12	>1.3	>1.3
1.40	0.81	0.90	0.90	0.95	0.90	0.97	1.17	0.96	1.09	>1.3	1.05	1.20	>1.3	1.13	>1.3	>1.3	1.25	>1.3	>1.3
1.40	0.87	0.90	0.90	1.07	0.94	1.06	>1.3	1.04	1.19	>1.3	1.15	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.93	1.04	>1.3	1.06	1.24	>1.3	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-20 Minimum weld strength mismatch requirement for flaw size 4 mm × 100 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	1.02	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.98	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.10	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.91	1.07	1.04	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.90	1.01	1.24	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.98	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.98	0.95	1.09	>1.3	1.11	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.90	0.94	1.13	1.04	1.22	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.92	1.04	>1.3	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.07	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.94	0.90	1.02	1.23	1.02	1.20	>1.3	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.90	0.90	1.06	0.97	1.12	>1.3	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.90	1.00	1.23	1.08	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.02	1.20	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.91	0.90	0.97	1.16	0.97	1.11	>1.3	1.08	1.28	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.90	0.90	1.02	0.93	1.06	1.30	1.06	1.24	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.90	0.95	1.17	1.02	1.17	>1.3	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	0.98	1.13	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.93	1.10	0.93	1.06	1.29	1.03	1.19	>1.3	1.12	>1.3	>1.3	1.25	>1.3	>1.3
1.40	0.81	0.90	0.90	0.98	0.90	1.02	1.23	1.01	1.16	>1.3	1.13	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.90	0.92	1.12	0.98	1.11	>1.3	1.12	>1.3	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.95	1.08	>1.3	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-21 Minimum weld strength mismatch requirement for flaw size 6 mm × 25 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	1.04	0.97	1.09	>1.3	1.11	1.28	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.90	0.97	1.16	1.05	1.19	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.95	1.07	>1.3	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.06	1.25	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.94	0.90	0.98	1.17	0.99	1.10	>1.3	1.08	1.22	>1.3	1.17	>1.3	>1.3	1.27	>1.3	>1.3
0.60	0.81	0.90	0.90	1.05	0.95	1.06	1.30	1.06	1.20	>1.3	1.15	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.90	0.99	1.19	1.03	1.16	>1.3	1.13	>1.3	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.01	1.14	>1.3	1.13	>1.3	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.92	1.08	0.93	1.02	1.22	1.01	1.11	>1.3	1.07	1.20	>1.3	1.13	1.29	>1.3
0.80	0.81	0.90	0.90	0.99	0.91	1.00	1.19	0.99	1.10	>1.3	1.06	1.20	>1.3	1.13	>1.3	>1.3	1.21	>1.3	>1.3
0.80	0.87	0.90	0.93	1.12	0.97	1.08	>1.3	1.06	1.20	>1.3	1.13	>1.3	>1.3	1.21	>1.3	>1.3	1.30	>1.3	>1.3
0.80	0.94	0.96	1.04	>1.3	1.06	1.22	>1.3	1.14	>1.3	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	1.03	0.90	0.97	1.15	0.95	1.05	1.26	1.01	1.12	>1.3	1.07	1.19	>1.3
1.00	0.81	0.90	0.90	0.94	0.90	0.95	1.13	0.95	1.04	1.26	1.01	1.12	>1.3	1.07	1.21	>1.3	1.13	1.29	>1.3
1.00	0.87	0.90	0.90	1.06	0.93	1.03	1.26	1.01	1.12	>1.3	1.07	1.22	>1.3	1.13	>1.3	>1.3	1.20	>1.3	>1.3
1.00	0.94	0.93	1.00	1.27	1.02	1.16	>1.3	1.09	1.26	>1.3	1.15	>1.3	>1.3	1.22	>1.3	>1.3	1.29	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.99	0.90	0.93	1.10	0.92	1.01	1.20	0.97	1.07	1.29	1.02	1.13	>1.3
1.20	0.81	0.90	0.90	0.91	0.90	0.91	1.08	0.92	1.01	1.21	0.98	1.07	>1.3	1.03	1.14	>1.3	1.08	1.21	>1.3
1.20	0.87	0.90	0.90	1.02	0.91	1.00	1.20	0.98	1.08	>1.3	1.03	1.16	>1.3	1.08	1.24	>1.3	1.13	>1.3	>1.3
1.20	0.94	0.91	0.97	1.21	1.00	1.10	>1.3	1.05	1.20	>1.3	1.11	1.29	>1.3	1.16	>1.3	>1.3	1.22	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.91	1.06	0.90	0.97	1.16	0.94	1.03	1.24	0.99	1.09	>1.3
1.40	0.81	0.90	0.90	0.90	0.90	0.90	1.05	0.90	0.97	1.17	0.95	1.04	1.27	1.00	1.10	>1.3	1.04	1.16	>1.3
1.40	0.87	0.90	0.90	1.00	0.90	0.97	1.17	0.95	1.05	1.29	1.01	1.12	>1.3	1.05	1.19	>1.3	1.09	1.26	>1.3
1.40	0.94	0.90	0.94	1.18	0.97	1.06	>1.3	1.03	1.16	>1.3	1.07	1.24	>1.3	1.12	>1.3	>1.3	1.17	>1.3	>1.3

Table- Error! No text of specified style in document.**-22 Minimum weld strength mismatch requirement for flaw size 6 mm × 50 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	1.01	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.97	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.08	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	1.08	1.04	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.90	0.99	1.23	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.97	1.12	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.12	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.99	0.94	1.07	>1.3	1.12	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.90	0.91	1.11	1.03	1.19	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.91	1.02	>1.3	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.04	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.93	0.90	1.00	1.22	1.03	1.18	>1.3	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.90	0.90	1.04	0.96	1.09	>1.3	1.12	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.90	0.96	1.20	1.06	1.22	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.00	1.14	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.94	1.15	0.97	1.09	>1.3	1.08	1.25	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.90	0.90	0.99	0.92	1.03	1.28	1.05	1.20	>1.3	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.90	0.92	1.14	1.00	1.14	>1.3	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	0.97	1.08	>1.3	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	1.08	0.93	1.04	1.27	1.03	1.17	>1.3	1.13	>1.3	>1.3	1.26	>1.3	>1.3
1.40	0.81	0.90	0.90	0.94	0.90	0.98	1.20	1.00	1.13	>1.3	1.11	1.28	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.90	0.90	1.08	0.97	1.08	>1.3	1.09	1.26	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.94	1.04	>1.3	1.09	1.27	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-23 Minimum weld strength mismatch requirement for flaw size 6 mm × 75 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.97	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	1.10	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.98	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.94	1.10	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	1.07	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	1.09	1.07	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.90	0.99	1.25	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.97	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	1.00	0.97	1.13	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.90	0.92	1.14	1.08	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.92	1.04	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.09	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.94	0.92	1.05	>1.3	1.11	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.90	0.90	1.06	1.00	1.16	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.90	0.99	1.25	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	1.04	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.99	1.22	1.03	1.20	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.81	0.90	0.90	1.01	0.96	1.09	>1.3	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.90	0.95	1.18	1.07	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	1.00	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-24 Minimum weld strength mismatch requirement for flaw size 6 mm × 100 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	1.09	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.91	1.06	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	1.03	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.95	1.19	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.92	1.07	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	1.05	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	1.08	1.08	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.90	0.98	1.24	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.98	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	1.00	0.99	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.90	0.93	1.15	1.12	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.93	1.06	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.95	0.94	1.08	>1.3	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.81	0.90	0.90	1.08	1.05	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.90	1.00	1.27	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	1.08	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-25 Minimum weld strength mismatch requirement for flaw size 8 mm × 25 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	1.03	1.01	1.12	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.90	0.97	1.16	1.10	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.97	1.08	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.10	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.93	0.92	1.00	1.18	1.04	1.14	>1.3	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.90	0.90	1.04	0.99	1.09	>1.3	1.12	1.25	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.91	1.00	1.18	1.07	1.20	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.03	1.15	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.93	1.09	0.97	1.05	1.25	1.06	1.16	>1.3	1.15	1.28	>1.3	1.25	>1.3	>1.3
0.80	0.81	0.90	0.90	0.98	0.93	1.02	1.20	1.04	1.14	>1.3	1.13	1.26	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.90	0.93	1.11	1.01	1.10	>1.3	1.11	1.25	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	0.98	1.07	>1.3	1.11	1.26	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	1.04	0.92	1.00	1.17	1.00	1.09	1.30	1.07	1.18	>1.3	1.15	1.27	>1.3
1.00	0.81	0.90	0.90	0.93	0.90	0.96	1.14	0.99	1.07	1.29	1.07	1.17	>1.3	1.14	1.28	>1.3	1.24	>1.3	>1.3
1.00	0.87	0.90	0.90	1.05	0.96	1.05	1.27	1.06	1.17	>1.3	1.14	1.28	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	0.94	1.03	1.26	1.06	1.19	>1.3	1.16	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	1.00	0.90	0.96	1.12	0.96	1.04	1.23	1.03	1.12	>1.3	1.09	1.20	>1.3
1.20	0.81	0.90	0.90	0.90	0.90	0.93	1.09	0.95	1.03	1.23	1.02	1.12	>1.3	1.09	1.20	>1.3	1.16	1.29	>1.3
1.20	0.87	0.90	0.90	1.02	0.93	1.01	1.21	1.02	1.11	>1.3	1.09	1.21	>1.3	1.16	>1.3	>1.3	1.25	>1.3	>1.3
1.20	0.94	0.92	1.00	1.21	1.03	1.13	>1.3	1.11	1.25	>1.3	1.19	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.92	1.08	0.93	1.01	1.19	0.99	1.08	1.28	1.05	1.14	>1.3
1.40	0.81	0.90	0.90	0.90	0.90	0.90	1.05	0.92	1.00	1.18	0.99	1.08	1.29	1.05	1.15	>1.3	1.11	1.23	>1.3
1.40	0.87	0.90	0.90	0.99	0.91	0.98	1.17	0.99	1.07	>1.3	1.05	1.16	>1.3	1.12	1.25	>1.3	1.18	>1.3	>1.3
1.40	0.94	0.91	0.98	1.18	1.01	1.10	>1.3	1.07	1.20	>1.3	1.14	1.30	>1.3	1.22	>1.3	>1.3	1.29	>1.3	>1.3

Table- Error! No text of specified style in document.**-26 Minimum weld strength mismatch requirement for flaw size 8 mm × 50 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.94	1.07	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	1.05	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.93	1.12	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.92	1.03	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	1.03	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	1.02	1.03	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.90	0.94	1.16	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.95	1.07	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.94	0.95	1.07	>1.3	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.90	0.90	1.07	1.05	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.91	1.00	1.24	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.06	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	1.00	1.21	1.08	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.90	0.90	1.01	0.99	1.10	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.90	0.95	1.17	1.10	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	1.02	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.95	1.14	1.01	1.13	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.81	0.90	0.90	0.96	0.94	1.04	1.28	1.12	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.90	0.92	1.11	1.05	1.16	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.99	1.08	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-27 Minimum weld strength mismatch requirement for flaw size 8 mm × 75 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.93	1.06	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	1.05	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.94	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.94	1.06	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	1.08	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	1.05	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.90	0.98	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.99	1.12	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.98	1.03	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.90	0.92	1.11	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.94	1.05	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.93	0.96	1.09	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.81	0.90	0.90	1.04	1.09	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.91	1.00	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	1.11	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-28 Minimum weld strength mismatch requirement for flaw size 8 mm × 100 mm (depth × length) with wall thickness of 5/8"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	1.05	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.92	1.05	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	1.05	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.96	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.95	1.08	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	1.12	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	1.08	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.90	1.01	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	1.04	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	1.01	1.12	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.81	0.90	0.95	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.98	1.10	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

A.3 Wall Thickness = 3/4 inch

Table- Error! No text of specified style in document.**-29 Minimum weld strength mismatch requirement for flaw size 2 mm × 25 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.92	1.07	0.90	0.98	1.18	0.92	1.03	>1.3	0.96	1.09	>1.3
0.40	0.81	0.90	0.90	0.93	0.90	0.92	1.05	0.90	0.99	1.18	0.94	1.05	>1.3	0.99	1.12	>1.3	1.03	1.19	>1.3
0.40	0.87	0.90	0.91	1.02	0.90	0.99	1.16	0.95	1.07	>1.3	1.00	1.14	>1.3	1.05	1.23	>1.3	1.10	>1.3	>1.3
0.40	0.94	0.90	0.99	1.14	0.96	1.08	>1.3	1.02	1.17	>1.3	1.07	1.28	>1.3	1.13	>1.3	>1.3	1.19	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.91	1.06	0.90	0.95	1.14	0.90	0.99	1.24
0.60	0.81	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.92	1.07	0.90	0.97	1.16	0.92	1.02	1.28	0.95	1.07	>1.3
0.60	0.87	0.90	0.90	0.97	0.90	0.94	1.07	0.90	0.99	1.18	0.94	1.05	>1.3	0.98	1.10	>1.3	1.01	1.16	>1.3
0.60	0.94	0.90	0.95	1.08	0.92	1.02	1.22	0.96	1.09	>1.3	1.00	1.15	>1.3	1.04	1.23	>1.3	1.08	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.01	0.90	0.91	1.08	0.90	0.95	1.15
0.80	0.81	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.02	0.90	0.93	1.10	0.90	0.98	1.18	0.91	1.02	1.28
0.80	0.87	0.90	0.90	0.94	0.90	0.91	1.03	0.90	0.96	1.12	0.91	1.01	1.22	0.94	1.05	>1.3	0.97	1.10	>1.3
0.80	0.94	0.90	0.94	1.06	0.90	1.00	1.17	0.93	1.05	1.29	0.97	1.10	>1.3	1.00	1.16	>1.3	1.04	1.22	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.98	0.90	0.90	1.04	0.90	0.92	1.11
1.00	0.81	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.99	0.90	0.91	1.06	0.90	0.95	1.14	0.90	0.99	1.22
1.00	0.87	0.90	0.90	0.93	0.90	0.90	1.01	0.90	0.94	1.09	0.90	0.98	1.17	0.92	1.02	1.27	0.95	1.07	>1.3
1.00	0.94	0.90	0.93	1.05	0.90	0.98	1.14	0.91	1.03	1.24	0.95	1.07	>1.3	0.98	1.12	>1.3	1.01	1.18	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.90	1.02	0.90	0.90	1.08
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.97	0.90	0.90	1.04	0.90	0.93	1.11	0.90	0.97	1.19
1.20	0.87	0.90	0.90	0.92	0.90	0.90	0.99	0.90	0.92	1.07	0.90	0.96	1.14	0.90	1.00	1.23	0.93	1.04	>1.3
1.20	0.94	0.90	0.92	1.04	0.90	0.97	1.12	0.90	1.01	1.22	0.93	1.06	>1.3	0.96	1.10	>1.3	0.99	1.15	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.00	0.90	0.90	1.06
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.90	1.03	0.90	0.92	1.09	0.90	0.95	1.16
1.40	0.87	0.90	0.90	0.91	0.90	0.90	0.98	0.90	0.91	1.05	0.90	0.95	1.13	0.90	0.99	1.21	0.92	1.03	1.30
1.40	0.94	0.90	0.92	1.03	0.90	0.96	1.11	0.90	1.00	1.20	0.92	1.04	1.29	0.95	1.09	>1.3	0.98	1.13	>1.3

Table- Error! No text of specified style in document.**-30 Minimum weld strength mismatch requirement for flaw size 2 mm × 50 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.92	0.90	0.92	1.08	0.90	1.01	1.26	0.96	1.09	>1.3	1.01	1.18	>1.3	1.07	1.30	>1.3
0.40	0.81	0.90	0.90	1.00	0.90	1.00	1.19	0.97	1.09	>1.3	1.03	1.20	>1.3	1.09	>1.3	>1.3	1.15	>1.3	>1.3
0.40	0.87	0.90	0.96	1.09	0.96	1.08	>1.3	1.03	1.20	>1.3	1.10	>1.3	>1.3	1.17	>1.3	>1.3	1.26	>1.3	>1.3
0.40	0.94	0.94	1.05	1.24	1.03	1.19	>1.3	1.10	>1.3	>1.3	1.19	>1.3	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.92	1.08	0.90	0.98	1.20	0.93	1.04	>1.3	0.97	1.10	>1.3
0.60	0.81	0.90	0.90	0.93	0.90	0.93	1.06	0.90	1.00	1.19	0.94	1.06	>1.3	0.99	1.13	>1.3	1.03	1.21	>1.3
0.60	0.87	0.90	0.91	1.02	0.90	1.00	1.17	0.95	1.07	>1.3	1.01	1.15	>1.3	1.05	1.25	>1.3	1.10	>1.3	>1.3
0.60	0.94	0.90	0.99	1.14	0.96	1.09	>1.3	1.02	1.18	>1.3	1.08	1.30	>1.3	1.13	>1.3	>1.3	1.20	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	1.01	0.90	0.93	1.10	0.90	0.98	1.20	0.92	1.03	>1.3
0.80	0.81	0.90	0.90	0.90	0.90	0.90	1.01	0.90	0.95	1.11	0.90	1.00	1.22	0.94	1.06	>1.3	0.98	1.11	>1.3
0.80	0.87	0.90	0.90	0.98	0.90	0.95	1.10	0.92	1.02	1.23	0.96	1.08	>1.3	1.00	1.14	>1.3	1.04	1.22	>1.3
0.80	0.94	0.90	0.96	1.10	0.93	1.04	1.26	0.98	1.12	>1.3	1.03	1.20	>1.3	1.07	1.29	>1.3	1.12	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.90	1.05	0.90	0.94	1.13	0.90	0.99	1.23
1.00	0.81	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.92	1.06	0.90	0.97	1.15	0.91	1.02	1.26	0.95	1.07	>1.3
1.00	0.87	0.90	0.90	0.96	0.90	0.93	1.06	0.90	0.99	1.17	0.93	1.04	1.29	0.97	1.10	>1.3	1.01	1.15	>1.3
1.00	0.94	0.90	0.95	1.08	0.91	1.02	1.21	0.95	1.08	>1.3	0.99	1.14	>1.3	1.04	1.22	>1.3	1.08	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	1.02	0.90	0.92	1.09	0.90	0.96	1.17
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	1.03	0.90	0.94	1.11	0.90	0.99	1.21	0.93	1.04	>1.3
1.20	0.87	0.90	0.90	0.95	0.90	0.92	1.04	0.90	0.97	1.13	0.91	1.02	1.24	0.95	1.07	>1.3	0.98	1.12	>1.3
1.20	0.94	0.90	0.94	1.06	0.90	1.00	1.18	0.94	1.06	>1.3	0.97	1.12	>1.3	1.01	1.18	>1.3	1.05	1.25	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	1.00	0.90	0.90	1.07	0.90	0.94	1.14
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	1.01	0.90	0.93	1.09	0.90	0.97	1.17	0.91	1.01	1.27
1.40	0.87	0.90	0.90	0.94	0.90	0.90	1.02	0.90	0.95	1.11	0.90	1.00	1.20	0.93	1.05	>1.3	0.97	1.10	>1.3
1.40	0.94	0.90	0.93	1.05	0.90	0.99	1.15	0.92	1.04	1.27	0.96	1.10	>1.3	1.00	1.15	>1.3	1.03	1.22	>1.3

Table- Error! No text of specified style in document.**-31 Minimum weld strength mismatch requirement for flaw size 2 mm × 75 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.94	0.90	0.95	1.11	0.93	1.05	>1.3	1.00	1.14	>1.3	1.06	1.27	>1.3	1.11	>1.3	>1.3
0.40	0.81	0.90	0.91	1.02	0.92	1.03	1.25	1.00	1.14	>1.3	1.07	1.28	>1.3	1.13	>1.3	>1.3	1.22	>1.3	>1.3
0.40	0.87	0.90	0.98	1.12	0.98	1.11	>1.3	1.06	1.27	>1.3	1.14	>1.3	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	0.95	1.07	1.28	1.05	1.24	>1.3	1.14	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	1.00	0.90	0.95	1.11	0.91	1.02	1.26	0.96	1.08	>1.3	1.00	1.15	>1.3
0.60	0.81	0.90	0.90	0.95	0.90	0.95	1.09	0.92	1.02	1.24	0.97	1.10	>1.3	1.02	1.18	>1.3	1.07	1.28	>1.3
0.60	0.87	0.90	0.92	1.04	0.92	1.02	1.21	0.98	1.10	>1.3	1.03	1.20	>1.3	1.09	>1.3	>1.3	1.14	>1.3	>1.3
0.60	0.94	0.91	1.01	1.16	0.98	1.11	>1.3	1.05	1.23	>1.3	1.11	>1.3	>1.3	1.18	>1.3	>1.3	1.26	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.04	0.90	0.96	1.13	0.91	1.01	1.25	0.95	1.07	>1.3
0.80	0.81	0.90	0.90	0.91	0.90	0.91	1.03	0.90	0.97	1.13	0.93	1.03	1.27	0.97	1.09	>1.3	1.01	1.15	>1.3
0.80	0.87	0.90	0.90	1.00	0.90	0.97	1.12	0.94	1.04	1.27	0.98	1.11	>1.3	1.03	1.19	>1.3	1.08	1.28	>1.3
0.80	0.94	0.90	0.98	1.12	0.94	1.06	1.29	1.00	1.14	>1.3	1.05	1.25	>1.3	1.10	>1.3	>1.3	1.16	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.99	0.90	0.92	1.08	0.90	0.97	1.16	0.91	1.02	1.27
1.00	0.81	0.90	0.90	0.90	0.90	0.90	0.99	0.90	0.94	1.08	0.90	0.99	1.18	0.94	1.05	>1.3	0.97	1.10	>1.3
1.00	0.87	0.90	0.90	0.97	0.90	0.95	1.08	0.91	1.01	1.20	0.95	1.07	>1.3	0.99	1.13	>1.3	1.04	1.20	>1.3
1.00	0.94	0.90	0.96	1.09	0.92	1.03	1.23	0.97	1.10	>1.3	1.02	1.18	>1.3	1.06	1.27	>1.3	1.11	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.90	1.04	0.90	0.94	1.12	0.90	0.99	1.21
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.92	1.05	0.90	0.97	1.14	0.91	1.02	1.24	0.95	1.07	>1.3
1.20	0.87	0.90	0.90	0.95	0.90	0.93	1.05	0.90	0.98	1.15	0.93	1.04	1.27	0.97	1.10	>1.3	1.01	1.15	>1.3
1.20	0.94	0.90	0.95	1.07	0.91	1.02	1.19	0.95	1.08	>1.3	0.99	1.14	>1.3	1.04	1.22	>1.3	1.08	1.30	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.02	0.90	0.92	1.09	0.90	0.97	1.17
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	1.03	0.90	0.95	1.11	0.90	0.99	1.20	0.93	1.04	>1.3
1.40	0.87	0.90	0.90	0.94	0.90	0.92	1.04	0.90	0.97	1.13	0.92	1.02	1.23	0.95	1.07	>1.3	0.99	1.13	>1.3
1.40	0.94	0.90	0.94	1.06	0.90	1.00	1.17	0.94	1.06	1.30	0.98	1.12	>1.3	1.02	1.19	>1.3	1.06	1.26	>1.3

Table- Error! No text of specified style in document.**-32 Minimum weld strength mismatch requirement for flaw size 2 mm × 100 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.95	0.90	0.97	1.13	0.95	1.07	>1.3	1.02	1.19	>1.3	1.09	>1.3	>1.3	1.15	>1.3	>1.3
0.40	0.81	0.90	0.92	1.03	0.94	1.05	1.28	1.02	1.17	>1.3	1.10	>1.3	>1.3	1.18	>1.3	>1.3	1.28	>1.3	>1.3
0.40	0.87	0.91	1.00	1.13	1.00	1.13	>1.3	1.09	>1.3	>1.3	1.18	>1.3	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	0.97	1.08	1.30	1.07	1.28	>1.3	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	1.01	0.90	0.97	1.13	0.93	1.04	1.28	0.98	1.11	>1.3	1.03	1.19	>1.3
0.60	0.81	0.90	0.90	0.96	0.90	0.96	1.10	0.94	1.04	1.27	0.99	1.12	>1.3	1.05	1.22	>1.3	1.10	>1.3	>1.3
0.60	0.87	0.90	0.93	1.04	0.93	1.03	1.22	1.00	1.13	>1.3	1.06	1.24	>1.3	1.12	>1.3	>1.3	1.19	>1.3	>1.3
0.60	0.94	0.92	1.02	1.18	1.00	1.13	>1.3	1.07	1.27	>1.3	1.13	>1.3	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.92	1.05	0.90	0.97	1.15	0.93	1.03	1.27	0.97	1.09	>1.3
0.80	0.81	0.90	0.90	0.92	0.90	0.92	1.03	0.90	0.98	1.15	0.94	1.05	1.29	0.99	1.12	>1.3	1.03	1.19	>1.3
0.80	0.87	0.90	0.91	1.00	0.90	0.99	1.13	0.95	1.06	1.29	1.00	1.13	>1.3	1.05	1.23	>1.3	1.10	>1.3	>1.3
0.80	0.94	0.90	0.99	1.12	0.96	1.08	>1.3	1.02	1.17	>1.3	1.07	1.28	>1.3	1.13	>1.3	>1.3	1.20	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	1.00	0.90	0.94	1.09	0.90	0.99	1.18	0.93	1.04	1.29
1.00	0.81	0.90	0.90	0.90	0.90	0.90	1.00	0.90	0.95	1.09	0.91	1.01	1.20	0.95	1.07	>1.3	0.99	1.12	>1.3
1.00	0.87	0.90	0.90	0.98	0.90	0.96	1.09	0.92	1.02	1.21	0.97	1.09	>1.3	1.01	1.15	>1.3	1.06	1.24	>1.3
1.00	0.94	0.90	0.97	1.09	0.93	1.05	1.24	0.98	1.12	>1.3	1.04	1.21	>1.3	1.09	>1.3	>1.3	1.14	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.91	1.05	0.90	0.96	1.13	0.91	1.01	1.23
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.93	1.06	0.90	0.98	1.15	0.93	1.03	1.26	0.97	1.09	>1.3
1.20	0.87	0.90	0.90	0.96	0.90	0.94	1.06	0.90	1.00	1.16	0.95	1.06	1.29	0.99	1.12	>1.3	1.03	1.18	>1.3
1.20	0.94	0.90	0.95	1.08	0.92	1.02	1.20	0.96	1.09	>1.3	1.01	1.16	>1.3	1.06	1.25	>1.3	1.10	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	1.02	0.90	0.94	1.10	0.90	0.98	1.18
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.91	1.03	0.90	0.96	1.12	0.91	1.01	1.21	0.95	1.06	>1.3
1.40	0.87	0.90	0.90	0.95	0.90	0.92	1.04	0.90	0.98	1.13	0.93	1.04	1.25	0.97	1.09	>1.3	1.01	1.15	>1.3
1.40	0.94	0.90	0.94	1.06	0.91	1.01	1.18	0.95	1.07	>1.3	0.99	1.14	>1.3	1.04	1.21	>1.3	1.08	1.29	>1.3

Table- Error! No text of specified style in document.**-33 Minimum weld strength mismatch requirement for flaw size 4 mm × 25 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.91	0.90	0.95	1.08	0.95	1.05	1.29	1.02	1.15	>1.3	1.09	1.29	>1.3	1.17	>1.3	>1.3
0.40	0.81	0.90	0.90	1.00	0.94	1.03	1.20	1.02	1.14	>1.3	1.10	1.30	>1.3	1.19	>1.3	>1.3	1.30	>1.3	>1.3
0.40	0.87	0.90	0.98	1.09	1.00	1.11	>1.3	1.09	1.27	>1.3	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	0.96	1.06	1.24	1.07	1.24	>1.3	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.95	1.10	0.93	1.02	1.23	0.98	1.09	>1.3	1.03	1.16	>1.3
0.60	0.81	0.90	0.90	0.94	0.90	0.95	1.07	0.94	1.03	1.22	1.00	1.11	>1.3	1.05	1.20	>1.3	1.10	>1.3	>1.3
0.60	0.87	0.90	0.93	1.02	0.93	1.02	1.18	1.00	1.11	>1.3	1.06	1.22	>1.3	1.12	>1.3	>1.3	1.19	>1.3	>1.3
0.60	0.94	0.92	1.01	1.15	1.00	1.12	>1.3	1.07	1.24	>1.3	1.14	>1.3	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.91	1.03	0.90	0.96	1.12	0.93	1.02	1.24	0.97	1.08	>1.3
0.80	0.81	0.90	0.90	0.91	0.90	0.91	1.02	0.90	0.98	1.12	0.94	1.04	1.25	0.99	1.10	>1.3	1.03	1.17	>1.3
0.80	0.87	0.90	0.90	0.99	0.90	0.98	1.11	0.95	1.05	1.26	1.00	1.12	>1.3	1.05	1.20	>1.3	1.10	1.30	>1.3
0.80	0.94	0.90	0.98	1.11	0.96	1.07	1.27	1.02	1.15	>1.3	1.07	1.26	>1.3	1.13	>1.3	>1.3	1.19	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.99	0.90	0.93	1.07	0.90	0.98	1.15	0.93	1.02	1.26
1.00	0.81	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.94	1.08	0.91	1.00	1.17	0.95	1.05	1.29	0.99	1.11	>1.3
1.00	0.87	0.90	0.90	0.97	0.90	0.95	1.07	0.92	1.01	1.19	0.97	1.08	>1.3	1.01	1.14	>1.3	1.05	1.21	>1.3
1.00	0.94	0.90	0.96	1.08	0.93	1.04	1.22	0.99	1.11	>1.3	1.04	1.19	>1.3	1.08	1.28	>1.3	1.13	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.90	1.04	0.90	0.95	1.11	0.90	0.99	1.20
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.92	1.04	0.90	0.97	1.13	0.93	1.02	1.23	0.96	1.07	>1.3
1.20	0.87	0.90	0.90	0.95	0.90	0.93	1.05	0.91	0.99	1.15	0.94	1.05	1.26	0.98	1.10	>1.3	1.02	1.16	>1.3
1.20	0.94	0.90	0.95	1.07	0.92	1.02	1.19	0.96	1.08	>1.3	1.01	1.15	>1.3	1.05	1.23	>1.3	1.10	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.01	0.90	0.93	1.08	0.90	0.97	1.16
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.02	0.90	0.95	1.10	0.91	1.00	1.19	0.94	1.04	1.29
1.40	0.87	0.90	0.90	0.94	0.90	0.92	1.03	0.90	0.97	1.12	0.93	1.02	1.22	0.96	1.08	>1.3	1.00	1.13	>1.3
1.40	0.94	0.90	0.94	1.06	0.91	1.00	1.16	0.95	1.06	1.29	0.99	1.12	>1.3	1.03	1.19	>1.3	1.07	1.26	>1.3

Table- Error! No text of specified style in document.**-34 Minimum weld strength mismatch requirement for flaw size 4 mm × 50 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.92	1.03	1.00	1.12	>1.3	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.92	1.01	1.14	1.08	1.26	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.99	1.09	1.28	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.06	1.21	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.94	0.91	1.00	1.14	1.00	1.12	>1.3	1.09	1.28	>1.3	1.18	>1.3	>1.3	1.30	>1.3	>1.3
0.60	0.81	0.90	0.93	1.03	0.98	1.08	1.29	1.07	1.24	>1.3	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.92	1.01	1.13	1.04	1.17	>1.3	1.15	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	0.99	1.10	1.29	1.11	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.94	1.05	0.94	1.03	1.22	1.01	1.13	>1.3	1.07	1.24	>1.3	1.14	>1.3	>1.3
0.80	0.81	0.90	0.90	0.98	0.93	1.01	1.15	1.00	1.12	>1.3	1.08	1.25	>1.3	1.15	>1.3	>1.3	1.25	>1.3	>1.3
0.80	0.87	0.90	0.97	1.07	0.99	1.09	1.30	1.07	1.23	>1.3	1.15	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	0.95	1.05	1.21	1.05	1.21	>1.3	1.15	>1.3	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	1.00	0.90	0.98	1.13	0.96	1.06	1.28	1.01	1.14	>1.3	1.07	1.23	>1.3
1.00	0.81	0.90	0.90	0.95	0.90	0.97	1.09	0.96	1.06	1.26	1.02	1.15	>1.3	1.08	1.26	>1.3	1.15	>1.3	>1.3
1.00	0.87	0.90	0.94	1.04	0.95	1.04	1.21	1.02	1.14	>1.3	1.09	1.27	>1.3	1.16	>1.3	>1.3	1.25	>1.3	>1.3
1.00	0.94	0.93	1.02	1.17	1.02	1.14	>1.3	1.09	1.29	>1.3	1.18	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.95	1.08	0.92	1.02	1.20	0.97	1.08	>1.3	1.02	1.15	>1.3
1.20	0.81	0.90	0.90	0.93	0.90	0.94	1.05	0.93	1.02	1.18	0.99	1.10	>1.3	1.04	1.18	>1.3	1.10	1.28	>1.3
1.20	0.87	0.90	0.92	1.01	0.93	1.01	1.16	0.99	1.10	>1.3	1.05	1.20	>1.3	1.11	>1.3	>1.3	1.18	>1.3	>1.3
1.20	0.94	0.91	1.00	1.13	0.99	1.11	>1.3	1.06	1.22	>1.3	1.13	>1.3	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.92	1.04	0.90	0.98	1.14	0.95	1.05	1.26	0.99	1.11	>1.3
1.40	0.81	0.90	0.90	0.91	0.90	0.92	1.03	0.91	0.99	1.14	0.96	1.06	1.28	1.01	1.13	>1.3	1.06	1.21	>1.3
1.40	0.87	0.90	0.91	1.00	0.91	0.99	1.12	0.97	1.07	1.27	1.02	1.15	>1.3	1.08	1.25	>1.3	1.13	>1.3	>1.3
1.40	0.94	0.90	0.99	1.11	0.97	1.08	1.29	1.03	1.18	>1.3	1.09	1.29	>1.3	1.16	>1.3	>1.3	1.24	>1.3	>1.3

Table- Error! No text of specified style in document.**-35 Minimum weld strength mismatch requirement for flaw size 4 mm × 75 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.97	1.09	1.08	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.96	1.06	1.23	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.04	1.16	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.11	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.98	0.96	1.06	1.26	1.08	1.26	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.90	0.98	1.08	1.04	1.16	>1.3	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.96	1.05	1.19	1.11	1.29	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.03	1.15	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.93	0.91	0.99	1.12	1.00	1.11	>1.3	1.08	1.26	>1.3	1.18	>1.3	>1.3	1.29	>1.3	>1.3
0.80	0.81	0.90	0.93	1.02	0.97	1.07	1.25	1.07	1.22	>1.3	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.92	1.00	1.11	1.04	1.16	>1.3	1.14	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	0.99	1.09	1.27	1.11	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.95	1.05	0.95	1.04	1.22	1.02	1.14	>1.3	1.09	1.27	>1.3	1.17	>1.3	>1.3
1.00	0.81	0.90	0.90	0.98	0.94	1.02	1.15	1.02	1.13	>1.3	1.10	1.27	>1.3	1.18	>1.3	>1.3	1.29	>1.3	>1.3
1.00	0.87	0.90	0.97	1.07	1.00	1.10	1.29	1.08	1.25	>1.3	1.18	>1.3	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	0.96	1.06	1.21	1.06	1.22	>1.3	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.92	1.01	0.92	1.00	1.14	0.98	1.09	>1.3	1.05	1.18	>1.3	1.11	1.29	>1.3
1.20	0.81	0.90	0.90	0.96	0.91	0.99	1.10	0.98	1.08	1.28	1.05	1.18	>1.3	1.12	>1.3	>1.3	1.20	>1.3	>1.3
1.20	0.87	0.90	0.95	1.04	0.97	1.06	1.22	1.04	1.17	>1.3	1.12	>1.3	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	0.94	1.03	1.17	1.03	1.16	>1.3	1.12	>1.3	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.97	1.10	0.95	1.05	1.23	1.01	1.12	>1.3	1.07	1.21	>1.3
1.40	0.81	0.90	0.90	0.94	0.90	0.96	1.07	0.96	1.05	1.21	1.02	1.13	>1.3	1.08	1.24	>1.3	1.14	>1.3	>1.3
1.40	0.87	0.90	0.93	1.02	0.94	1.03	1.18	1.02	1.13	>1.3	1.08	1.25	>1.3	1.16	>1.3	>1.3	1.25	>1.3	>1.3
1.40	0.94	0.92	1.02	1.14	1.01	1.13	>1.3	1.09	1.27	>1.3	1.17	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-36 Minimum weld strength mismatch requirement for flaw size 4 mm × 100 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.92	1.01	1.13	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	1.00	1.11	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.08	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.93	1.01	1.01	1.12	>1.3	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.93	1.01	1.11	1.09	1.25	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.99	1.09	1.24	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.06	1.20	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.95	0.95	1.03	1.16	1.05	1.18	>1.3	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.90	0.96	1.04	1.02	1.12	>1.3	1.13	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.95	1.03	1.14	1.08	1.23	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.02	1.13	>1.3	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.92	0.91	0.98	1.09	1.00	1.10	1.29	1.08	1.23	>1.3	1.18	>1.3	>1.3	1.29	>1.3	>1.3
1.00	0.81	0.90	0.93	1.00	0.97	1.06	1.20	1.07	1.20	>1.3	1.17	>1.3	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.92	1.00	1.10	1.04	1.15	>1.3	1.14	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	0.98	1.09	1.24	1.11	1.29	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.95	1.04	0.96	1.05	1.20	1.04	1.14	>1.3	1.11	1.27	>1.3	1.20	>1.3	>1.3
1.20	0.81	0.90	0.91	0.98	0.94	1.02	1.14	1.03	1.13	>1.3	1.11	1.27	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.90	0.97	1.06	1.00	1.10	1.28	1.09	1.25	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	0.96	1.06	1.20	1.07	1.22	>1.3	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.92	1.01	0.93	1.01	1.14	1.00	1.10	1.30	1.07	1.20	>1.3	1.14	>1.3	>1.3
1.40	0.81	0.90	0.90	0.95	0.92	0.99	1.10	1.00	1.09	1.27	1.07	1.20	>1.3	1.15	>1.3	>1.3	1.25	>1.3	>1.3
1.40	0.87	0.90	0.95	1.04	0.98	1.07	1.22	1.06	1.19	>1.3	1.14	>1.3	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.94	1.04	1.17	1.04	1.18	>1.3	1.14	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-37 Minimum weld strength mismatch requirement for flaw size 6 mm × 25 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.93	0.92	1.00	1.13	1.02	1.13	>1.3	1.12	>1.3	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.90	0.93	1.02	0.99	1.08	1.27	1.10	1.26	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.93	1.01	1.12	1.06	1.18	>1.3	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.00	1.10	1.28	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.92	1.02	0.93	1.01	1.15	1.00	1.09	>1.3	1.06	1.19	>1.3	1.12	>1.3	>1.3
0.60	0.81	0.90	0.90	0.96	0.92	0.99	1.11	1.00	1.09	1.30	1.07	1.20	>1.3	1.14	>1.3	>1.3	1.23	>1.3	>1.3
0.60	0.87	0.90	0.95	1.05	0.98	1.07	1.24	1.06	1.19	>1.3	1.14	>1.3	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	0.95	1.04	1.18	1.05	1.18	>1.3	1.14	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.95	1.07	0.94	1.02	1.18	0.99	1.09	>1.3	1.04	1.16	>1.3
0.80	0.81	0.90	0.90	0.92	0.90	0.94	1.05	0.94	1.02	1.17	1.00	1.10	>1.3	1.06	1.19	>1.3	1.12	1.29	>1.3
0.80	0.87	0.90	0.92	1.01	0.94	1.02	1.15	1.00	1.10	>1.3	1.07	1.20	>1.3	1.13	>1.3	>1.3	1.21	>1.3	>1.3
0.80	0.94	0.92	1.01	1.13	1.00	1.11	>1.3	1.07	1.23	>1.3	1.15	>1.3	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.91	1.02	0.90	0.97	1.11	0.95	1.03	1.22	0.99	1.09	>1.3
1.00	0.81	0.90	0.90	0.90	0.90	0.91	1.01	0.91	0.98	1.11	0.96	1.05	1.24	1.01	1.12	>1.3	1.06	1.19	>1.3
1.00	0.87	0.90	0.90	0.98	0.91	0.98	1.10	0.97	1.06	1.24	1.02	1.13	>1.3	1.08	1.23	>1.3	1.13	>1.3	>1.3
1.00	0.94	0.90	0.98	1.10	0.97	1.07	1.26	1.03	1.16	>1.3	1.10	1.27	>1.3	1.16	>1.3	>1.3	1.24	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.99	0.90	0.94	1.07	0.92	1.00	1.16	0.96	1.05	1.27
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.96	1.08	0.93	1.02	1.18	0.98	1.08	1.30	1.02	1.13	>1.3
1.20	0.87	0.90	0.90	0.97	0.90	0.96	1.08	0.94	1.03	1.19	0.99	1.10	>1.3	1.04	1.17	>1.3	1.09	1.25	>1.3
1.20	0.94	0.90	0.97	1.08	0.95	1.05	1.22	1.01	1.13	>1.3	1.06	1.22	>1.3	1.12	>1.3	>1.3	1.18	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.92	1.04	0.90	0.97	1.12	0.93	1.02	1.22
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.94	1.05	0.91	0.99	1.14	0.95	1.05	1.25	1.00	1.10	>1.3
1.40	0.87	0.90	0.90	0.95	0.90	0.94	1.05	0.92	1.01	1.15	0.97	1.07	1.28	1.02	1.13	>1.3	1.06	1.20	>1.3
1.40	0.94	0.90	0.96	1.07	0.93	1.03	1.20	0.99	1.10	>1.3	1.04	1.18	>1.3	1.09	1.27	>1.3	1.14	>1.3	>1.3

Table- Error! No text of specified style in document.**-38 Minimum weld strength mismatch requirement for flaw size 6 mm × 50 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.97	1.08	1.12	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.98	1.07	1.21	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.06	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.98	0.99	1.09	1.26	1.13	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.92	0.99	1.08	1.07	1.20	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.98	1.06	1.19	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.05	1.17	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.93	0.93	1.01	1.12	1.04	1.14	>1.3	1.13	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.90	0.94	1.02	1.00	1.09	1.25	1.11	1.27	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.94	1.02	1.12	1.07	1.19	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.01	1.11	1.27	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.96	1.06	0.98	1.07	1.23	1.06	1.18	>1.3	1.14	>1.3	>1.3	1.25	>1.3	>1.3
1.00	0.81	0.90	0.91	0.98	0.96	1.04	1.16	1.05	1.16	>1.3	1.14	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.91	0.98	1.07	1.02	1.12	>1.3	1.12	1.29	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	0.98	1.07	1.22	1.09	1.25	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.93	1.02	0.95	1.02	1.15	1.02	1.11	>1.3	1.09	1.22	>1.3	1.16	>1.3	>1.3
1.20	0.81	0.90	0.90	0.96	0.93	1.00	1.11	1.01	1.10	1.29	1.09	1.22	>1.3	1.17	>1.3	>1.3	1.27	>1.3	>1.3
1.20	0.87	0.90	0.96	1.05	0.99	1.08	1.23	1.08	1.21	>1.3	1.17	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	0.95	1.04	1.18	1.06	1.19	>1.3	1.16	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.91	0.99	0.92	0.99	1.10	0.98	1.07	1.24	1.05	1.15	>1.3	1.11	1.26	>1.3
1.40	0.81	0.90	0.90	0.94	0.91	0.98	1.08	0.98	1.07	1.22	1.05	1.16	>1.3	1.12	1.28	>1.3	1.20	>1.3	>1.3
1.40	0.87	0.90	0.94	1.03	0.97	1.05	1.19	1.04	1.15	>1.3	1.12	1.29	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.94	1.03	1.15	1.03	1.15	>1.3	1.12	1.30	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-39 Minimum weld strength mismatch requirement for flaw size 6 mm × 75 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.96	1.05	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	1.06	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.96	1.04	1.10	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.98	1.05	1.15	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	1.05	1.14	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.12	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.92	0.98	1.02	1.10	1.25	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.93	1.00	1.08	1.09	1.22	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	1.00	1.08	1.19	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.06	1.18	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.95	0.97	1.04	1.14	1.08	1.20	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.91	0.96	1.03	1.04	1.13	1.28	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.96	1.04	1.13	1.11	1.24	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.03	1.13	1.29	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.92	0.94	1.00	1.09	1.03	1.12	1.29	1.13	1.28	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.90	0.94	1.01	1.00	1.08	1.20	1.11	1.24	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.94	1.01	1.10	1.07	1.17	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	1.00	1.10	1.24	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.91	0.91	0.97	1.05	1.00	1.08	1.21	1.08	1.20	>1.3	1.18	>1.3	>1.3	1.29	>1.3	>1.3
1.40	0.81	0.90	0.92	0.98	0.97	1.05	1.15	1.07	1.17	>1.3	1.17	>1.3	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.92	0.99	1.07	1.03	1.13	1.29	1.14	1.30	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.98	1.07	1.21	1.11	1.26	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-40 Minimum weld strength mismatch requirement for flaw size 6 mm × 100 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	1.04	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.95	1.02	1.09	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	1.04	1.12	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	1.11	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.92	0.97	1.03	1.11	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.98	1.05	1.13	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	1.05	1.13	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.12	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.93	0.99	1.04	1.12	1.24	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.95	1.01	1.08	1.12	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	1.01	1.09	1.19	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.08	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.91	0.96	1.00	1.07	1.16	1.13	1.24	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.93	0.98	1.04	1.07	1.15	1.30	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.98	1.05	1.14	1.14	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	1.05	1.15	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.94	0.97	1.03	1.11	1.08	1.17	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.81	0.91	0.96	1.02	1.04	1.11	1.23	1.16	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.96	1.03	1.11	1.10	1.22	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	1.03	1.12	1.26	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-41 Minimum weld strength mismatch requirement for flaw size 8 mm × 25 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.94	0.96	1.03	1.16	1.08	1.21	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.90	0.95	1.03	1.04	1.13	>1.3	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.96	1.03	1.13	1.11	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.03	1.13	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.94	1.04	0.97	1.05	1.19	1.05	1.15	>1.3	1.13	1.29	>1.3	1.24	>1.3	>1.3
0.60	0.81	0.90	0.90	0.97	0.95	1.02	1.13	1.05	1.14	>1.3	1.13	1.29	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.91	0.97	1.06	1.02	1.10	1.27	1.12	1.26	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	0.97	1.06	1.20	1.09	1.23	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.98	0.92	0.98	1.10	0.98	1.06	1.23	1.05	1.14	>1.3	1.11	1.24	>1.3
0.80	0.81	0.90	0.90	0.93	0.91	0.97	1.07	0.98	1.06	1.21	1.05	1.15	>1.3	1.12	1.27	>1.3	1.21	>1.3	>1.3
0.80	0.87	0.90	0.94	1.02	0.97	1.05	1.18	1.05	1.15	>1.3	1.12	1.28	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	0.94	1.02	1.14	1.04	1.14	>1.3	1.12	1.29	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.94	1.04	0.94	1.01	1.14	0.99	1.08	1.27	1.05	1.15	>1.3
1.00	0.81	0.90	0.90	0.91	0.90	0.94	1.03	0.95	1.02	1.14	1.01	1.09	1.28	1.06	1.17	>1.3	1.12	1.27	>1.3
1.00	0.87	0.90	0.92	0.99	0.94	1.01	1.12	1.01	1.10	1.28	1.07	1.19	>1.3	1.14	>1.3	>1.3	1.22	>1.3	>1.3
1.00	0.94	0.92	1.00	1.11	1.00	1.10	1.29	1.08	1.22	>1.3	1.15	>1.3	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	1.01	0.91	0.98	1.10	0.96	1.04	1.20	1.01	1.10	>1.3
1.20	0.81	0.90	0.90	0.90	0.90	0.92	1.00	0.92	0.98	1.10	0.97	1.05	1.22	1.03	1.12	>1.3	1.08	1.20	>1.3
1.20	0.87	0.90	0.90	0.98	0.92	0.98	1.09	0.98	1.06	1.22	1.03	1.14	>1.3	1.09	1.23	>1.3	1.15	>1.3	>1.3
1.20	0.94	0.91	0.98	1.10	0.98	1.07	1.25	1.04	1.17	>1.3	1.11	1.28	>1.3	1.18	>1.3	>1.3	1.27	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.95	1.07	0.93	1.01	1.16	0.98	1.06	1.26
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.96	1.07	0.95	1.02	1.17	1.00	1.09	1.29	1.05	1.15	>1.3
1.40	0.87	0.90	0.90	0.96	0.90	0.96	1.07	0.95	1.04	1.18	1.01	1.11	>1.3	1.06	1.18	>1.3	1.11	1.27	>1.3
1.40	0.94	0.90	0.97	1.08	0.96	1.05	1.22	1.02	1.13	>1.3	1.08	1.23	>1.3	1.14	>1.3	>1.3	1.21	>1.3	>1.3

Table- Error! No text of specified style in document.**-42 Minimum weld strength mismatch requirement for flaw size 8 mm × 50 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.94	1.01	1.10	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	1.04	1.12	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.12	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.94	1.00	1.08	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.96	1.03	1.11	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	1.03	1.11	1.24	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.10	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.96	1.00	1.07	1.18	1.13	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.92	0.98	1.05	1.08	1.17	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.98	1.05	1.15	1.15	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.05	1.15	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.93	0.96	1.02	1.10	1.06	1.15	>1.3	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.90	0.95	1.01	1.02	1.10	1.22	1.14	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.95	1.02	1.10	1.09	1.20	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.02	1.11	1.25	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.91	0.93	0.98	1.06	1.02	1.09	1.22	1.11	1.22	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.90	0.93	0.98	0.99	1.06	1.15	1.09	1.19	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.93	0.99	1.07	1.05	1.14	1.30	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	1.00	1.08	1.21	1.12	1.28	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.95	1.02	0.98	1.05	1.16	1.06	1.15	>1.3	1.14	1.28	>1.3	1.25	>1.3	>1.3
1.40	0.81	0.90	0.91	0.96	0.96	1.02	1.11	1.05	1.14	1.30	1.14	1.28	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.92	0.97	1.05	1.02	1.10	1.24	1.12	1.25	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.98	1.06	1.18	1.09	1.22	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-43 Minimum weld strength mismatch requirement for flaw size 8 mm × 75 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	1.05	1.14	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.97	1.03	1.09	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	1.06	1.13	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	1.13	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.93	0.98	1.03	1.14	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	1.00	1.06	1.13	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	1.07	1.15	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.15	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.91	0.95	0.99	1.07	1.14	1.25	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.97	1.02	1.08	1.15	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	1.03	1.10	1.19	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.10	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.92	0.96	1.03	1.09	1.16	1.17	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.94	0.99	1.05	1.10	1.18	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	1.00	1.07	1.14	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	1.07	1.17	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.91	0.94	0.99	1.05	1.12	1.11	1.20	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.81	0.93	0.97	1.02	1.06	1.13	1.24	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.98	1.04	1.11	1.13	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	1.04	1.13	1.27	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-44 Minimum weld strength mismatch requirement for flaw size 8 mm × 100 mm (depth × length) with wall thickness of 3/4"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	1.07	1.13	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	1.18	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	1.01	1.06	1.10	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	1.09	1.15	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	1.18	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.98	1.02	1.05	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	1.05	1.10	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	1.12	1.20	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.95	0.99	1.02	1.14	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	1.02	1.06	1.11	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	1.08	1.14	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	1.15	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.93	0.96	1.00	1.09	1.15	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.81	0.99	1.03	1.08	1.18	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	1.05	1.11	1.18	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	1.12	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

A.4 Wall Thickness = 1 inch

Table- Error! No text of specified style in document.**-45 Minimum weld strength mismatch requirement for flaw size 2 mm × 25 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.98	0.90	0.93	1.04	0.90	0.97	1.10
0.40	0.81	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.99	0.90	0.95	1.06	0.92	0.99	1.12	0.95	1.04	1.20
0.40	0.87	0.90	0.90	0.92	0.90	0.92	1.00	0.90	0.97	1.07	0.94	1.02	1.15	0.97	1.07	1.25	1.01	1.12	>1.3
0.40	0.94	0.90	0.93	1.01	0.92	0.99	1.10	0.96	1.05	1.20	1.00	1.11	>1.3	1.04	1.17	>1.3	1.08	1.24	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.97	0.90	0.91	1.03
0.60	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.00	0.90	0.94	1.06	0.91	0.98	1.11
0.60	0.87	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.93	1.02	0.90	0.97	1.08	0.93	1.01	1.15	0.96	1.05	1.23
0.60	0.94	0.90	0.91	0.99	0.90	0.96	1.06	0.92	1.01	1.13	0.96	1.05	1.22	0.99	1.10	>1.3	1.03	1.15	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.99
0.80	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.97	0.90	0.92	1.02	0.90	0.95	1.08
0.80	0.87	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.91	0.99	0.90	0.94	1.05	0.91	0.98	1.11	0.94	1.02	1.18
0.80	0.94	0.90	0.90	0.98	0.90	0.94	1.04	0.91	0.99	1.11	0.94	1.03	1.18	0.97	1.07	1.26	1.00	1.12	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.98
1.00	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.90	1.00	0.90	0.94	1.06
1.00	0.87	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.98	0.90	0.93	1.04	0.90	0.97	1.10	0.92	1.01	1.15
1.00	0.94	0.90	0.90	0.97	0.90	0.93	1.03	0.90	0.97	1.09	0.93	1.01	1.16	0.96	1.06	1.23	0.99	1.10	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.96
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.99	0.90	0.93	1.05
1.20	0.87	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.97	0.90	0.92	1.03	0.90	0.96	1.08	0.92	0.99	1.14
1.20	0.94	0.90	0.90	0.97	0.90	0.93	1.02	0.90	0.97	1.08	0.92	1.01	1.14	0.95	1.05	1.21	0.98	1.09	1.29
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.96
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.99	0.90	0.92	1.04
1.40	0.87	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.97	0.90	0.92	1.02	0.90	0.95	1.08	0.91	0.99	1.13
1.40	0.94	0.90	0.90	0.96	0.90	0.93	1.02	0.90	0.96	1.08	0.91	1.00	1.14	0.94	1.04	1.20	0.97	1.08	1.27

Table- Error! No text of specified style in document.**-46 Minimum weld strength mismatch requirement for flaw size 2 mm × 50 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.91	1.01	0.90	0.97	1.09	0.93	1.02	1.19	0.97	1.08	1.30
0.40	0.81	0.90	0.90	0.90	0.90	0.91	1.00	0.90	0.98	1.10	0.95	1.04	1.21	1.00	1.10	>1.3	1.04	1.17	>1.3
0.40	0.87	0.90	0.90	0.97	0.91	0.98	1.08	0.96	1.05	1.21	1.01	1.12	>1.3	1.06	1.20	>1.3	1.11	1.30	>1.3
0.40	0.94	0.90	0.97	1.07	0.97	1.06	1.22	1.03	1.14	>1.3	1.08	1.25	>1.3	1.14	>1.3	>1.3	1.21	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.00	0.90	0.95	1.07	0.91	0.99	1.14
0.60	0.81	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.92	1.01	0.90	0.97	1.09	0.93	1.02	1.17	0.97	1.07	1.27
0.60	0.87	0.90	0.90	0.93	0.90	0.93	1.02	0.91	0.98	1.10	0.95	1.04	1.20	0.99	1.09	>1.3	1.03	1.15	>1.3
0.60	0.94	0.90	0.93	1.03	0.92	1.01	1.13	0.97	1.07	1.24	1.01	1.13	>1.3	1.06	1.21	>1.3	1.11	1.29	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.91	1.02	0.90	0.95	1.09
0.80	0.81	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.97	0.90	0.93	1.04	0.90	0.98	1.11	0.94	1.02	1.19
0.80	0.87	0.90	0.90	0.91	0.90	0.90	0.98	0.90	0.95	1.06	0.92	1.00	1.13	0.96	1.05	1.22	0.99	1.10	>1.3
0.80	0.94	0.90	0.92	1.00	0.90	0.98	1.09	0.94	1.03	1.18	0.98	1.09	1.29	1.02	1.15	>1.3	1.06	1.21	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.99	0.90	0.93	1.05
1.00	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.91	1.01	0.90	0.95	1.08	0.92	1.00	1.14
1.00	0.87	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.93	1.03	0.90	0.98	1.10	0.94	1.02	1.18	0.97	1.07	1.27
1.00	0.94	0.90	0.91	0.99	0.90	0.96	1.07	0.93	1.01	1.15	0.96	1.07	1.24	1.00	1.12	>1.3	1.04	1.18	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.98	0.90	0.91	1.03
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.99	0.90	0.94	1.06	0.90	0.98	1.12
1.20	0.87	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.92	1.02	0.90	0.96	1.08	0.93	1.01	1.15	0.96	1.06	1.24
1.20	0.94	0.90	0.91	0.98	0.90	0.95	1.06	0.92	1.00	1.13	0.95	1.05	1.22	0.99	1.10	>1.3	1.03	1.15	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.96	0.90	0.90	1.02
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.98	0.90	0.93	1.05	0.90	0.97	1.11
1.40	0.87	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.91	1.01	0.90	0.96	1.07	0.92	1.00	1.14	0.95	1.04	1.22
1.40	0.94	0.90	0.90	0.98	0.90	0.95	1.05	0.91	0.99	1.12	0.94	1.04	1.20	0.98	1.09	1.29	1.02	1.14	>1.3

Table- Error! No text of specified style in document.**-47 Minimum weld strength mismatch requirement for flaw size 2 mm × 75 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.93	1.04	0.91	0.99	1.13	0.96	1.05	1.25	1.00	1.11	>1.3
0.40	0.81	0.90	0.90	0.91	0.90	0.93	1.03	0.92	1.00	1.13	0.97	1.07	1.26	1.02	1.14	>1.3	1.07	1.22	>1.3
0.40	0.87	0.90	0.91	0.99	0.92	1.00	1.11	0.98	1.08	1.26	1.03	1.15	>1.3	1.09	1.26	>1.3	1.14	>1.3	>1.3
0.40	0.94	0.91	0.99	1.09	0.98	1.08	1.26	1.05	1.18	>1.3	1.11	>1.3	>1.3	1.18	>1.3	>1.3	1.27	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.92	1.03	0.90	0.97	1.10	0.93	1.02	1.18
0.60	0.81	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.93	1.04	0.91	0.99	1.12	0.95	1.04	1.21	0.99	1.10	>1.3
0.60	0.87	0.90	0.90	0.94	0.90	0.94	1.03	0.92	1.00	1.13	0.97	1.06	1.24	1.01	1.12	>1.3	1.06	1.19	>1.3
0.60	0.94	0.90	0.94	1.04	0.93	1.02	1.15	0.98	1.09	1.28	1.03	1.16	>1.3	1.08	1.25	>1.3	1.13	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.98	0.90	0.93	1.05	0.90	0.97	1.12
0.80	0.81	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.99	0.90	0.95	1.06	0.92	1.00	1.14	0.96	1.05	1.23
0.80	0.87	0.90	0.90	0.91	0.90	0.91	1.00	0.90	0.96	1.08	0.93	1.02	1.16	0.97	1.07	1.26	1.02	1.13	>1.3
0.80	0.94	0.90	0.93	1.01	0.91	0.99	1.11	0.95	1.05	1.21	1.00	1.11	>1.3	1.04	1.18	>1.3	1.09	1.25	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.91	1.02	0.90	0.95	1.08
1.00	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.93	1.03	0.90	0.97	1.10	0.94	1.02	1.18
1.00	0.87	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.94	1.05	0.92	0.99	1.12	0.95	1.05	1.21	0.99	1.10	>1.3
1.00	0.94	0.90	0.92	1.00	0.90	0.97	1.08	0.94	1.03	1.17	0.98	1.08	1.27	1.02	1.14	>1.3	1.06	1.21	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	0.99	0.90	0.93	1.06
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.91	1.01	0.90	0.96	1.08	0.92	1.00	1.15
1.20	0.87	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.93	1.03	0.90	0.98	1.10	0.94	1.03	1.18	0.98	1.08	1.27
1.20	0.94	0.90	0.91	0.99	0.90	0.96	1.07	0.93	1.01	1.15	0.97	1.07	1.24	1.00	1.12	>1.3	1.05	1.18	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.98	0.90	0.92	1.04
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.00	0.90	0.95	1.07	0.91	0.99	1.13
1.40	0.87	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.92	1.02	0.90	0.97	1.09	0.93	1.02	1.16	0.97	1.07	1.25
1.40	0.94	0.90	0.91	0.98	0.90	0.95	1.06	0.92	1.00	1.14	0.96	1.06	1.22	0.99	1.11	>1.3	1.04	1.16	>1.3

Table- Error! No text of specified style in document.**-48 Minimum weld strength mismatch requirement for flaw size 2 mm × 100 mm (depth × length) with wall thickness of 1”**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.94	1.05	0.92	1.01	1.15	0.97	1.07	1.27	1.02	1.13	>1.3
0.40	0.81	0.90	0.90	0.92	0.90	0.94	1.04	0.93	1.01	1.15	0.98	1.08	1.29	1.04	1.16	>1.3	1.09	1.25	>1.3
0.40	0.87	0.90	0.92	1.00	0.93	1.01	1.13	0.99	1.09	1.29	1.05	1.18	>1.3	1.10	1.29	>1.3	1.17	>1.3	>1.3
0.40	0.94	0.91	0.99	1.10	0.99	1.09	1.28	1.06	1.20	>1.3	1.12	>1.3	>1.3	1.20	>1.3	>1.3	1.30	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.93	1.04	0.90	0.98	1.12	0.94	1.03	1.20
0.60	0.81	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.94	1.05	0.92	1.00	1.13	0.96	1.06	1.23	1.01	1.11	>1.3
0.60	0.87	0.90	0.90	0.94	0.90	0.95	1.04	0.93	1.01	1.14	0.98	1.07	1.26	1.02	1.14	>1.3	1.07	1.22	>1.3
0.60	0.94	0.90	0.95	1.04	0.94	1.03	1.16	0.99	1.10	1.30	1.04	1.18	>1.3	1.10	1.27	>1.3	1.15	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.99	0.90	0.94	1.06	0.91	0.99	1.13
0.80	0.81	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.91	1.00	0.90	0.96	1.07	0.93	1.01	1.15	0.97	1.06	1.24
0.80	0.87	0.90	0.90	0.92	0.90	0.92	1.00	0.90	0.97	1.09	0.94	1.03	1.17	0.99	1.09	1.28	1.03	1.14	>1.3
0.80	0.94	0.90	0.93	1.02	0.91	1.00	1.11	0.96	1.06	1.22	1.01	1.12	>1.3	1.05	1.19	>1.3	1.10	1.28	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.92	1.03	0.90	0.96	1.09
1.00	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.94	1.04	0.91	0.98	1.11	0.95	1.03	1.19
1.00	0.87	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.95	1.06	0.92	1.00	1.13	0.96	1.06	1.23	1.00	1.11	>1.3
1.00	0.94	0.90	0.92	1.00	0.90	0.98	1.09	0.94	1.04	1.18	0.99	1.09	1.29	1.03	1.15	>1.3	1.08	1.23	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.90	1.00	0.90	0.94	1.07
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.92	1.02	0.90	0.97	1.09	0.93	1.01	1.16
1.20	0.87	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.94	1.04	0.91	0.99	1.11	0.95	1.04	1.20	0.99	1.09	1.29
1.20	0.94	0.90	0.91	0.99	0.90	0.97	1.07	0.93	1.02	1.16	0.97	1.08	1.26	1.02	1.13	>1.3	1.06	1.20	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.99	0.90	0.93	1.06
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.91	1.01	0.90	0.96	1.08	0.92	1.00	1.15
1.40	0.87	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.93	1.03	0.90	0.98	1.10	0.94	1.03	1.18	0.98	1.08	1.27
1.40	0.94	0.90	0.91	0.99	0.90	0.96	1.07	0.93	1.01	1.14	0.97	1.07	1.24	1.01	1.12	>1.3	1.05	1.18	>1.3

Table- Error! No text of specified style in document.**-49 Minimum weld strength mismatch requirement for flaw size 4 mm × 25 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.95	1.04	0.94	1.01	1.14	0.99	1.08	1.26	1.04	1.15	>1.3
0.40	0.81	0.90	0.90	0.91	0.90	0.94	1.02	0.95	1.02	1.13	1.01	1.09	1.27	1.06	1.17	>1.3	1.12	1.27	>1.3
0.40	0.87	0.90	0.91	0.98	0.94	1.01	1.11	1.01	1.10	1.26	1.07	1.19	>1.3	1.13	>1.3	>1.3	1.21	>1.3	>1.3
0.40	0.94	0.92	0.99	1.08	1.01	1.10	1.26	1.08	1.21	>1.3	1.15	>1.3	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.93	1.03	0.92	0.99	1.11	0.95	1.04	1.19
0.60	0.81	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.95	1.04	0.93	1.00	1.12	0.98	1.06	1.22	1.02	1.12	>1.3
0.60	0.87	0.90	0.90	0.94	0.90	0.95	1.04	0.94	1.02	1.13	0.99	1.08	1.24	1.04	1.14	>1.3	1.09	1.22	>1.3
0.60	0.94	0.90	0.95	1.04	0.95	1.03	1.15	1.01	1.10	1.28	1.06	1.19	>1.3	1.11	1.28	>1.3	1.17	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.98	0.90	0.94	1.05	0.91	0.98	1.11
0.80	0.81	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.91	0.99	0.90	0.96	1.06	0.93	1.01	1.14	0.97	1.06	1.22
0.80	0.87	0.90	0.90	0.92	0.90	0.92	1.00	0.91	0.98	1.08	0.95	1.03	1.16	0.99	1.08	1.26	1.03	1.14	>1.3
0.80	0.94	0.90	0.93	1.01	0.92	1.00	1.11	0.97	1.06	1.21	1.02	1.12	>1.3	1.06	1.19	>1.3	1.11	1.27	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.91	1.01	0.90	0.95	1.07
1.00	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.93	1.03	0.91	0.98	1.10	0.94	1.02	1.17
1.00	0.87	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.95	1.05	0.93	1.00	1.12	0.96	1.05	1.20	1.00	1.10	1.30
1.00	0.94	0.90	0.92	1.00	0.91	0.98	1.08	0.95	1.03	1.17	0.99	1.09	1.27	1.03	1.15	>1.3	1.07	1.21	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.99	0.90	0.93	1.04
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.91	1.01	0.90	0.96	1.07	0.92	1.00	1.13
1.20	0.87	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.94	1.03	0.91	0.98	1.10	0.95	1.03	1.17	0.98	1.07	1.25
1.20	0.94	0.90	0.91	0.99	0.90	0.97	1.07	0.93	1.02	1.14	0.97	1.07	1.24	1.01	1.12	>1.3	1.05	1.18	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.97	0.90	0.91	1.02
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.99	0.90	0.94	1.05	0.91	0.98	1.11
1.40	0.87	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.92	1.01	0.90	0.97	1.08	0.93	1.01	1.15	0.97	1.06	1.23
1.40	0.94	0.90	0.91	0.98	0.90	0.96	1.06	0.92	1.01	1.13	0.96	1.05	1.21	1.00	1.10	>1.3	1.03	1.15	>1.3

Table- Error! No text of specified style in document.**-50 Minimum weld strength mismatch requirement for flaw size 4 mm × 50 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.95	0.94	1.02	1.15	1.04	1.16	>1.3	1.14	>1.3	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.90	0.95	1.03	1.01	1.10	1.29	1.12	1.30	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.95	1.02	1.12	1.08	1.21	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.01	1.11	1.27	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.93	1.02	0.94	1.02	1.15	1.01	1.11	>1.3	1.07	1.21	>1.3	1.14	>1.3	>1.3
0.60	0.81	0.90	0.90	0.95	0.93	1.00	1.10	1.01	1.10	1.29	1.08	1.22	>1.3	1.16	>1.3	>1.3	1.26	>1.3	>1.3
0.60	0.87	0.90	0.95	1.03	0.99	1.07	1.22	1.07	1.20	>1.3	1.16	>1.3	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	0.95	1.03	1.14	1.06	1.18	>1.3	1.15	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.96	1.06	0.95	1.03	1.17	1.00	1.10	1.30	1.06	1.18	>1.3
0.80	0.81	0.90	0.90	0.91	0.90	0.95	1.04	0.95	1.03	1.15	1.01	1.11	>1.3	1.07	1.20	>1.3	1.13	>1.3	>1.3
0.80	0.87	0.90	0.92	0.99	0.94	1.02	1.13	1.01	1.11	1.29	1.08	1.21	>1.3	1.14	>1.3	>1.3	1.23	>1.3	>1.3
0.80	0.94	0.92	1.00	1.09	1.01	1.10	1.28	1.08	1.23	>1.3	1.16	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	1.01	0.91	0.98	1.10	0.96	1.04	1.20	1.01	1.10	>1.3
1.00	0.81	0.90	0.90	0.90	0.90	0.92	1.00	0.92	0.99	1.09	0.97	1.06	1.21	1.02	1.12	>1.3	1.08	1.21	>1.3
1.00	0.87	0.90	0.90	0.96	0.91	0.98	1.08	0.97	1.06	1.20	1.03	1.14	>1.3	1.09	1.23	>1.3	1.15	>1.3	>1.3
1.00	0.94	0.90	0.97	1.06	0.97	1.07	1.21	1.04	1.16	>1.3	1.11	1.27	>1.3	1.18	>1.3	>1.3	1.27	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.98	0.90	0.95	1.06	0.93	1.01	1.14	0.97	1.06	1.24
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.96	1.06	0.94	1.02	1.15	0.99	1.08	1.26	1.04	1.15	>1.3
1.20	0.87	0.90	0.90	0.94	0.90	0.96	1.05	0.95	1.03	1.15	1.00	1.10	1.28	1.05	1.17	>1.3	1.11	1.26	>1.3
1.20	0.94	0.90	0.95	1.04	0.95	1.04	1.17	1.01	1.12	>1.3	1.07	1.21	>1.3	1.13	>1.3	>1.3	1.20	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.93	1.03	0.91	0.98	1.10	0.95	1.03	1.19
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.94	1.03	0.92	0.99	1.11	0.97	1.05	1.21	1.01	1.11	>1.3
1.40	0.87	0.90	0.90	0.93	0.90	0.94	1.03	0.93	1.01	1.12	0.98	1.07	1.23	1.03	1.13	>1.3	1.08	1.21	>1.3
1.40	0.94	0.90	0.94	1.03	0.94	1.02	1.14	0.99	1.09	1.27	1.05	1.17	>1.3	1.10	1.27	>1.3	1.16	>1.3	>1.3

Table- Error! No text of specified style in document.**-51 Minimum weld strength mismatch requirement for flaw size 4 mm × 75 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.92	1.00	1.00	1.10	>1.3	1.13	>1.3	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.92	1.00	1.09	1.07	1.21	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.99	1.07	1.21	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.06	1.17	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.92	0.91	0.98	1.08	1.00	1.09	1.28	1.08	1.23	>1.3	1.17	>1.3	>1.3	1.28	>1.3	>1.3
0.60	0.81	0.90	0.92	1.00	0.97	1.06	1.19	1.07	1.20	>1.3	1.17	>1.3	>1.3	1.30	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.92	0.99	1.08	1.04	1.14	>1.3	1.14	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	0.99	1.07	1.21	1.11	1.27	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.92	1.01	0.94	1.01	1.13	1.00	1.10	1.29	1.07	1.20	>1.3	1.14	>1.3	>1.3
0.80	0.81	0.90	0.90	0.95	0.92	0.99	1.09	1.00	1.09	1.26	1.07	1.20	>1.3	1.15	>1.3	>1.3	1.25	>1.3	>1.3
0.80	0.87	0.90	0.95	1.03	0.98	1.07	1.20	1.07	1.19	>1.3	1.15	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	0.95	1.03	1.13	1.05	1.16	>1.3	1.14	>1.3	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.96	1.07	0.96	1.04	1.18	1.02	1.11	>1.3	1.07	1.20	>1.3
1.00	0.81	0.90	0.90	0.92	0.90	0.95	1.04	0.96	1.04	1.17	1.02	1.12	>1.3	1.09	1.22	>1.3	1.15	>1.3	>1.3
1.00	0.87	0.90	0.92	0.99	0.95	1.02	1.13	1.02	1.12	>1.3	1.09	1.23	>1.3	1.16	>1.3	>1.3	1.26	>1.3	>1.3
1.00	0.94	0.92	1.00	1.10	1.01	1.11	1.29	1.09	1.24	>1.3	1.18	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.93	1.03	0.93	1.00	1.12	0.98	1.07	1.23	1.03	1.14	>1.3
1.20	0.81	0.90	0.90	0.90	0.90	0.93	1.01	0.93	1.00	1.11	0.99	1.08	1.24	1.05	1.15	>1.3	1.10	1.25	>1.3
1.20	0.87	0.90	0.90	0.97	0.92	0.99	1.09	0.99	1.08	1.23	1.05	1.16	>1.3	1.12	1.27	>1.3	1.19	>1.3	>1.3
1.20	0.94	0.91	0.98	1.07	0.99	1.08	1.23	1.06	1.18	>1.3	1.13	>1.3	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.91	1.00	0.91	0.97	1.08	0.95	1.03	1.18	1.00	1.10	1.29
1.40	0.81	0.90	0.90	0.90	0.90	0.91	0.98	0.91	0.98	1.08	0.96	1.05	1.19	1.02	1.12	>1.3	1.07	1.19	>1.3
1.40	0.87	0.90	0.90	0.95	0.91	0.97	1.07	0.97	1.05	1.18	1.03	1.13	>1.3	1.08	1.22	>1.3	1.14	>1.3	>1.3
1.40	0.94	0.90	0.96	1.06	0.97	1.06	1.19	1.03	1.14	>1.3	1.10	1.25	>1.3	1.17	>1.3	>1.3	1.26	>1.3	>1.3

Table- Error! No text of specified style in document.**-52 Minimum weld strength mismatch requirement for flaw size 4 mm × 100 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.95	1.04	1.04	1.16	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.95	1.03	1.13	1.12	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.02	1.11	1.27	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.09	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.94	0.94	1.02	1.13	1.04	1.15	>1.3	1.13	>1.3	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.90	0.94	1.02	1.01	1.10	1.26	1.12	1.28	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.94	1.02	1.11	1.07	1.20	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.01	1.10	1.25	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.95	1.04	0.97	1.05	1.19	1.05	1.15	>1.3	1.12	1.28	>1.3	1.21	>1.3	>1.3
0.80	0.81	0.90	0.90	0.97	0.95	1.02	1.13	1.04	1.14	>1.3	1.12	1.28	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.91	0.97	1.05	1.01	1.10	1.26	1.11	1.25	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	0.97	1.05	1.16	1.08	1.21	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.91	0.99	0.93	1.00	1.11	0.99	1.08	1.25	1.06	1.17	>1.3	1.12	1.28	>1.3
1.00	0.81	0.90	0.90	0.93	0.92	0.98	1.07	0.99	1.07	1.22	1.06	1.18	>1.3	1.13	>1.3	>1.3	1.23	>1.3	>1.3
1.00	0.87	0.90	0.94	1.01	0.97	1.05	1.17	1.05	1.16	>1.3	1.13	>1.3	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	0.94	1.02	1.12	1.04	1.14	>1.3	1.13	>1.3	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.96	1.06	0.96	1.04	1.17	1.02	1.11	>1.3	1.08	1.20	>1.3
1.20	0.81	0.90	0.90	0.91	0.90	0.95	1.03	0.96	1.03	1.15	1.02	1.12	>1.3	1.09	1.22	>1.3	1.16	>1.3	>1.3
1.20	0.87	0.90	0.92	0.99	0.94	1.02	1.12	1.02	1.11	1.29	1.09	1.22	>1.3	1.17	>1.3	>1.3	1.26	>1.3	>1.3
1.20	0.94	0.92	1.00	1.09	1.01	1.11	1.27	1.09	1.24	>1.3	1.18	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.94	1.03	0.93	1.00	1.12	0.99	1.07	1.24	1.04	1.15	>1.3
1.40	0.81	0.90	0.90	0.90	0.90	0.93	1.01	0.94	1.01	1.11	1.00	1.08	1.24	1.06	1.16	>1.3	1.12	1.26	>1.3
1.40	0.87	0.90	0.90	0.97	0.93	0.99	1.09	0.99	1.08	1.23	1.06	1.17	>1.3	1.13	1.28	>1.3	1.21	>1.3	>1.3
1.40	0.94	0.91	0.98	1.07	0.99	1.08	1.23	1.06	1.19	>1.3	1.14	>1.3	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-53 Minimum weld strength mismatch requirement for flaw size 6 mm × 25 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.90	0.90	0.91	0.99	0.94	1.00	1.11	1.01	1.09	1.25	1.07	1.18	>1.3	1.14	1.30	>1.3
0.40	0.81	0.90	0.90	0.93	0.93	0.99	1.07	1.00	1.08	1.23	1.08	1.19	>1.3	1.15	>1.3	>1.3	1.25	>1.3	>1.3
0.40	0.87	0.90	0.94	1.01	0.99	1.06	1.17	1.07	1.17	>1.3	1.15	>1.3	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	0.95	1.02	1.12	1.05	1.15	>1.3	1.15	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	1.00	0.92	0.99	1.09	0.97	1.05	1.19	1.02	1.11	1.30
0.60	0.81	0.90	0.90	0.90	0.90	0.92	0.99	0.93	0.99	1.09	0.99	1.06	1.20	1.04	1.13	>1.3	1.09	1.22	>1.3
0.60	0.87	0.90	0.90	0.96	0.93	0.99	1.08	0.99	1.07	1.20	1.05	1.14	>1.3	1.11	1.25	>1.3	1.18	>1.3	>1.3
0.60	0.94	0.91	0.98	1.06	0.99	1.07	1.21	1.06	1.17	>1.3	1.13	1.28	>1.3	1.21	>1.3	>1.3	1.30	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.94	1.03	0.92	0.99	1.10	0.97	1.04	1.18
0.80	0.81	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.95	1.03	0.94	1.01	1.12	0.99	1.06	1.21	1.03	1.12	>1.3
0.80	0.87	0.90	0.90	0.93	0.90	0.95	1.03	0.95	1.02	1.12	1.00	1.08	1.23	1.05	1.15	>1.3	1.10	1.23	>1.3
0.80	0.94	0.90	0.95	1.03	0.95	1.03	1.14	1.01	1.11	1.27	1.07	1.19	>1.3	1.12	1.28	>1.3	1.19	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.91	0.99	0.90	0.95	1.06	0.93	1.00	1.13
1.00	0.81	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	1.00	0.91	0.97	1.07	0.95	1.02	1.15	0.99	1.08	1.24
1.00	0.87	0.90	0.90	0.92	0.90	0.93	1.00	0.92	0.99	1.09	0.97	1.04	1.17	1.01	1.10	1.28	1.06	1.16	>1.3
1.00	0.94	0.90	0.93	1.02	0.93	1.01	1.11	0.98	1.07	1.22	1.03	1.14	>1.3	1.08	1.22	>1.3	1.13	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.93	1.03	0.91	0.97	1.09
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.90	0.98	0.90	0.95	1.05	0.93	1.00	1.12	0.97	1.05	1.20
1.20	0.87	0.90	0.90	0.91	0.90	0.91	0.98	0.90	0.96	1.06	0.95	1.02	1.14	0.99	1.07	1.23	1.03	1.13	>1.3
1.20	0.94	0.90	0.93	1.00	0.92	0.99	1.09	0.96	1.05	1.19	1.01	1.11	1.29	1.06	1.18	>1.3	1.10	1.25	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.90	0.91	1.01	0.90	0.95	1.07
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.90	0.93	1.03	0.91	0.98	1.09	0.95	1.03	1.16
1.40	0.87	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.95	1.04	0.93	1.00	1.12	0.97	1.05	1.20	1.01	1.10	1.29
1.40	0.94	0.90	0.92	1.00	0.91	0.98	1.08	0.95	1.03	1.16	0.99	1.09	1.26	1.04	1.15	>1.3	1.08	1.22	>1.3

Table- Error! No text of specified style in document.**-54 Minimum weld strength mismatch requirement for flaw size 6 mm × 50 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.93	1.00	1.03	1.13	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.94	1.01	1.10	1.11	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.01	1.09	1.22	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.08	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.92	0.93	1.00	1.10	1.03	1.13	>1.3	1.13	1.30	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.90	0.93	1.00	1.00	1.08	1.22	1.11	1.25	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.94	1.01	1.09	1.07	1.17	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.01	1.09	1.22	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.94	1.02	0.96	1.04	1.16	1.04	1.14	>1.3	1.12	1.26	>1.3	1.20	>1.3	>1.3
0.80	0.81	0.90	0.90	0.95	0.95	1.01	1.11	1.03	1.12	1.30	1.12	1.26	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.91	0.96	1.04	1.01	1.09	1.23	1.10	1.23	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	0.96	1.04	1.14	1.08	1.20	>1.3	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.97	0.92	0.99	1.09	0.99	1.07	1.21	1.05	1.15	>1.3	1.12	1.26	>1.3
1.00	0.81	0.90	0.90	0.92	0.91	0.97	1.06	0.99	1.06	1.19	1.06	1.16	>1.3	1.13	1.28	>1.3	1.22	>1.3	>1.3
1.00	0.87	0.90	0.93	1.00	0.97	1.04	1.15	1.05	1.15	>1.3	1.13	1.28	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	0.94	1.01	1.11	1.04	1.13	>1.3	1.13	1.28	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.95	1.04	0.95	1.03	1.14	1.01	1.10	1.27	1.07	1.18	>1.3
1.20	0.81	0.90	0.90	0.90	0.90	0.94	1.02	0.95	1.02	1.13	1.02	1.11	1.27	1.08	1.20	>1.3	1.14	>1.3	>1.3
1.20	0.87	0.90	0.91	0.98	0.94	1.01	1.11	1.02	1.10	1.26	1.08	1.21	>1.3	1.16	>1.3	>1.3	1.25	>1.3	>1.3
1.20	0.94	0.92	0.99	1.08	1.01	1.10	1.25	1.09	1.22	>1.3	1.17	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.93	1.01	0.93	0.99	1.10	0.98	1.06	1.20	1.03	1.13	>1.3
1.40	0.81	0.90	0.90	0.90	0.90	0.92	0.99	0.93	1.00	1.10	0.99	1.07	1.21	1.05	1.14	>1.3	1.11	1.24	>1.3
1.40	0.87	0.90	0.90	0.96	0.92	0.99	1.08	0.99	1.07	1.21	1.05	1.15	>1.3	1.12	1.26	>1.3	1.19	>1.3	>1.3
1.40	0.94	0.91	0.98	1.06	0.99	1.07	1.21	1.06	1.17	>1.3	1.13	1.29	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-55 Minimum weld strength mismatch requirement for flaw size 6 mm × 75 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.93	1.00	1.09	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	1.00	1.09	1.22	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.08	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.91	0.98	1.01	1.09	1.25	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.93	0.99	1.07	1.08	1.20	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.99	1.06	1.17	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.06	1.16	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.93	0.94	1.01	1.11	1.05	1.14	>1.3	1.15	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.90	0.94	1.01	1.01	1.09	1.23	1.12	1.27	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.94	1.01	1.09	1.08	1.19	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.01	1.09	1.22	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.91	0.96	1.04	0.99	1.07	1.20	1.08	1.18	>1.3	1.16	>1.3	>1.3	1.27	>1.3	>1.3
1.00	0.81	0.90	0.91	0.97	0.97	1.04	1.13	1.06	1.16	>1.3	1.16	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.92	0.98	1.05	1.03	1.11	1.26	1.13	1.28	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	0.98	1.06	1.16	1.10	1.23	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.93	1.00	0.95	1.02	1.13	1.03	1.12	1.28	1.10	1.23	>1.3	1.18	>1.3	>1.3
1.20	0.81	0.90	0.90	0.94	0.94	1.00	1.09	1.02	1.10	1.25	1.10	1.23	>1.3	1.19	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.90	0.95	1.02	1.00	1.07	1.19	1.09	1.20	>1.3	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	0.96	1.03	1.13	1.06	1.17	>1.3	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.91	0.97	0.93	0.99	1.08	0.99	1.07	1.21	1.06	1.16	>1.3	1.13	1.27	>1.3
1.40	0.81	0.90	0.90	0.92	0.92	0.97	1.05	0.99	1.07	1.19	1.06	1.16	>1.3	1.14	1.29	>1.3	1.23	>1.3	>1.3
1.40	0.87	0.90	0.93	1.00	0.97	1.04	1.14	1.05	1.15	>1.3	1.14	1.28	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.94	1.01	1.10	1.04	1.13	>1.3	1.13	1.29	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-56 Minimum weld strength mismatch requirement for flaw size 6 mm × 100 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.97	1.05	1.16	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	1.05	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.13	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.95	1.02	1.07	1.17	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.96	1.03	1.11	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	1.03	1.11	1.24	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.10	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.96	0.99	1.07	1.18	1.12	1.25	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.92	0.97	1.04	1.06	1.15	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.98	1.05	1.13	1.13	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.04	1.14	1.28	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.92	0.95	1.01	1.09	1.05	1.14	>1.3	1.15	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.90	0.94	1.00	1.01	1.09	1.21	1.12	1.26	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.94	1.01	1.08	1.08	1.18	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.01	1.09	1.21	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.91	0.97	1.05	1.00	1.08	1.20	1.09	1.20	>1.3	1.19	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.90	0.91	0.97	0.98	1.04	1.14	1.07	1.17	>1.3	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.92	0.98	1.05	1.04	1.12	1.26	1.15	1.30	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	0.98	1.06	1.17	1.11	1.25	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.94	1.01	0.97	1.04	1.14	1.05	1.14	>1.3	1.13	1.26	>1.3	1.23	>1.3	>1.3
1.40	0.81	0.90	0.90	0.95	0.95	1.01	1.10	1.04	1.12	1.27	1.13	1.26	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.91	0.96	1.03	1.01	1.09	1.21	1.11	1.23	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.96	1.04	1.13	1.08	1.19	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-57 Minimum weld strength mismatch requirement for flaw size 8 mm × 25 mm (depth × length) with wall thickness of 1"**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.90	0.90	0.90	0.90	0.94	1.01	0.98	1.04	1.15	1.06	1.14	>1.3	1.14	1.28	>1.3	1.24	>1.3	>1.3
0.40	0.81	0.90	0.90	0.95	0.96	1.02	1.10	1.05	1.13	1.29	1.14	1.28	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	0.91	0.96	1.03	1.02	1.09	1.22	1.12	1.25	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	0.97	1.04	1.14	1.09	1.21	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.95	1.03	0.96	1.03	1.13	1.02	1.10	1.25	1.08	1.17	>1.3
0.60	0.81	0.90	0.90	0.90	0.90	0.94	1.01	0.96	1.03	1.12	1.03	1.11	1.26	1.09	1.20	>1.3	1.16	>1.3	>1.3
0.60	0.87	0.90	0.91	0.97	0.95	1.01	1.10	1.03	1.10	1.25	1.10	1.21	>1.3	1.17	>1.3	>1.3	1.27	>1.3	>1.3
0.60	0.94	0.93	0.99	1.08	1.02	1.10	1.24	1.10	1.22	>1.3	1.19	>1.3	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.98	0.91	0.97	1.06	0.96	1.03	1.14	1.01	1.09	1.24
0.80	0.81	0.90	0.90	0.90	0.90	0.91	0.97	0.92	0.97	1.06	0.97	1.04	1.15	1.03	1.11	1.27	1.08	1.18	>1.3
0.80	0.87	0.90	0.90	0.94	0.92	0.97	1.05	0.98	1.05	1.16	1.04	1.12	1.29	1.09	1.21	>1.3	1.15	>1.3	>1.3
0.80	0.94	0.90	0.96	1.05	0.98	1.05	1.17	1.04	1.14	>1.3	1.11	1.25	>1.3	1.18	>1.3	>1.3	1.27	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.93	1.02	0.93	0.99	1.09	0.97	1.04	1.17
1.00	0.81	0.90	0.90	0.90	0.90	0.90	0.94	0.90	0.94	1.02	0.94	1.00	1.10	0.99	1.06	1.20	1.03	1.12	1.30
1.00	0.87	0.90	0.90	0.93	0.90	0.94	1.02	0.95	1.01	1.11	1.00	1.08	1.22	1.05	1.14	>1.3	1.10	1.23	>1.3
1.00	0.94	0.90	0.95	1.03	0.95	1.03	1.13	1.01	1.10	1.26	1.07	1.18	>1.3	1.13	1.28	>1.3	1.20	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.91	0.99	0.90	0.96	1.06	0.94	1.01	1.13
1.20	0.81	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.92	1.00	0.92	0.98	1.07	0.96	1.03	1.15	1.00	1.09	1.25
1.20	0.87	0.90	0.90	0.91	0.90	0.93	1.00	0.93	0.99	1.08	0.97	1.05	1.17	1.02	1.11	1.28	1.07	1.17	>1.3
1.20	0.94	0.90	0.94	1.01	0.93	1.01	1.11	0.99	1.08	1.22	1.04	1.14	>1.3	1.09	1.23	>1.3	1.15	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97	0.90	0.94	1.03	0.92	0.98	1.10
1.40	0.81	0.90	0.90	0.90	0.90	0.90	0.91	0.90	0.91	0.98	0.90	0.96	1.05	0.94	1.01	1.12	0.98	1.06	1.21
1.40	0.87	0.90	0.90	0.91	0.90	0.91	0.99	0.91	0.97	1.06	0.95	1.03	1.14	1.00	1.08	1.24	1.05	1.14	>1.3
1.40	0.94	0.90	0.93	1.01	0.92	0.99	1.09	0.97	1.06	1.19	1.02	1.12	>1.3	1.07	1.19	>1.3	1.12	1.27	>1.3

Table- Error! No text of specified style in document.**-58 Minimum weld strength mismatch requirement for flaw size 8 mm × 50 mm (depth × length) with wall thickness of 1”**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.91	0.96	1.04	1.11	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	0.98	1.05	1.14	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.05	1.14	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.13	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.90	0.90	0.95	0.99	1.06	1.16	1.12	1.25	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.92	0.97	1.03	1.06	1.15	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	0.98	1.04	1.13	1.14	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.04	1.13	1.27	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.90	0.91	0.93	0.99	1.07	1.03	1.11	1.25	1.12	1.25	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.90	0.92	0.98	1.00	1.06	1.16	1.10	1.22	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.94	0.99	1.06	1.06	1.15	>1.3	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.00	1.08	1.19	1.14	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.90	0.90	0.94	1.01	0.98	1.04	1.14	1.06	1.14	>1.3	1.14	1.27	>1.3	1.24	>1.3	>1.3
1.00	0.81	0.90	0.90	0.95	0.95	1.02	1.10	1.05	1.13	1.28	1.13	1.27	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.91	0.96	1.03	1.02	1.09	1.21	1.11	1.24	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	0.97	1.04	1.14	1.09	1.20	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.90	0.91	0.98	0.94	1.00	1.09	1.01	1.09	1.22	1.08	1.18	>1.3	1.15	1.29	>1.3
1.20	0.81	0.90	0.90	0.93	0.93	0.98	1.06	1.01	1.08	1.20	1.08	1.18	>1.3	1.16	>1.3	>1.3	1.27	>1.3	>1.3
1.20	0.87	0.90	0.94	1.00	0.98	1.05	1.15	1.07	1.17	>1.3	1.16	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	0.95	1.02	1.11	1.05	1.15	>1.3	1.15	>1.3	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.90	0.90	0.95	0.92	0.97	1.05	0.98	1.05	1.16	1.04	1.13	1.29	1.11	1.22	>1.3
1.40	0.81	0.90	0.90	0.91	0.91	0.96	1.03	0.98	1.04	1.14	1.05	1.13	1.29	1.12	1.24	>1.3	1.20	>1.3	>1.3
1.40	0.87	0.90	0.92	0.98	0.96	1.03	1.12	1.04	1.12	1.28	1.12	1.24	>1.3	1.21	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.93	1.00	1.09	1.03	1.11	1.26	1.11	1.25	>1.3	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-59 Minimum weld strength mismatch requirement for flaw size 8 mm × 75 mm (depth × length) with wall thickness of 1”**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	0.98	1.06	1.16	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	1.07	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.91	0.96	1.02	1.10	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	0.98	1.04	1.12	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	1.05	1.12	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.12	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.90	0.91	0.96	1.01	1.09	1.20	1.15	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.93	0.99	1.05	1.09	1.19	>1.3	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	0.99	1.06	1.14	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.06	1.15	1.29	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.90	0.93	0.97	1.03	1.11	1.08	1.17	>1.3	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.90	0.95	1.01	1.03	1.11	1.22	1.16	1.30	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	0.96	1.02	1.09	1.10	1.21	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.03	1.10	1.22	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.90	0.93	0.99	1.06	1.03	1.10	1.23	1.12	1.24	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.90	0.92	0.98	1.00	1.06	1.15	1.10	1.21	>1.3	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.94	0.99	1.06	1.06	1.14	1.28	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	1.00	1.07	1.18	1.13	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.90	0.91	0.96	1.02	0.99	1.06	1.16	1.08	1.17	>1.3	1.17	>1.3	>1.3	1.29	>1.3	>1.3
1.40	0.81	0.90	0.91	0.95	0.97	1.03	1.11	1.06	1.14	1.29	1.16	1.30	>1.3	1.29	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.92	0.97	1.03	1.03	1.10	1.22	1.13	1.26	>1.3	1.27	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	0.98	1.05	1.14	1.10	1.22	>1.3	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3

Table- Error! No text of specified style in document.**-60 Minimum weld strength mismatch requirement for flaw size 8 mm × 100 mm (depth × length) with wall thickness of 1”**

$CTOD_A$ (mm)	Pipe Y/T	TTSC=0.5%			TTSC=1.0%			TTSC=1.5%			TTSC=2.0%			TTSC=2.5%			TTSC=3.0%		
		High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)			High-low (mm)		
		0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2	0.0	1.6	3.2
0.40	0.75	1.05	1.14	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.81	1.15	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.87	1.28	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.40	0.94	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.75	0.96	1.01	1.08	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.81	1.03	1.10	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.87	1.11	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.60	0.94	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.75	0.91	0.96	1.01	1.09	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.81	0.98	1.03	1.10	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.87	1.04	1.11	1.22	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
0.80	0.94	1.12	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.75	0.90	0.92	0.97	1.03	1.10	1.20	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.81	0.94	0.99	1.05	1.10	1.20	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.87	1.00	1.07	1.14	1.19	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.00	0.94	1.07	1.16	1.29	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.75	0.90	0.90	0.94	0.99	1.05	1.12	1.11	1.21	>1.3	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.81	0.92	0.96	1.02	1.06	1.13	1.25	1.21	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.87	0.98	1.03	1.10	1.13	1.24	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.20	0.94	1.04	1.12	1.24	1.23	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.75	0.90	0.90	0.92	0.96	1.01	1.08	1.07	1.14	1.27	1.18	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.81	0.90	0.94	0.99	1.02	1.09	1.18	1.14	1.26	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.87	0.95	1.01	1.07	1.09	1.18	>1.3	1.25	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3
1.40	0.94	1.02	1.09	1.20	1.17	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3	>1.3