

KES

Methods of Radiographic
Test and Classification
of Radiographs for Stainless
Steel Welds

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1. General rules

1.1 Scope of application

This standard is prescribed to the methods of radiographic test by X-ray or r-ray radiographs and classification of radiographs for stainless steel welds.

1.2 General particulars

1.2.1 In the radiographic test, detect a defect at radiographs for stainless steel welds by irradiating X-ray or r-ray and photographing and classify a class.

1.2.2 Classify a quality of image into normal grade and special grade according to 2.8.

Normal grade is obtained by general method of radiophotography. Special grade is obtained by a method of photography with special high detection sensitivity.

1.2.3 The operator who operate radiographic test must have the sufficient technique and experience about the methods of radiographic test and classification of radiographs include the knowledge about stainless steel welding, radiation instrument, radiation shielding and photograph treatment.

1.2.4 The photography range of test welds, quality of image and allowable grade of the defect is discussed beforehand, the use, design and specification must be examined and decided for a special purpose.

2. Photography method of radiographs

2.1 Efficiency of instrument

The radiation instrument, photosensitive materials, photography instrument and observation instrument have the ability to photograph the radiographs that indicate defects of the test part of the welds and to observe this defects.

2.2 Irradiation direction of radiation

The radiographs must be taken by setting the irradiation direction in the direction that penetra thickness of test part is the smallest. But, In case of not being taken in this direction or being unsuitable, to take a photograph in a suitable direction at each case is

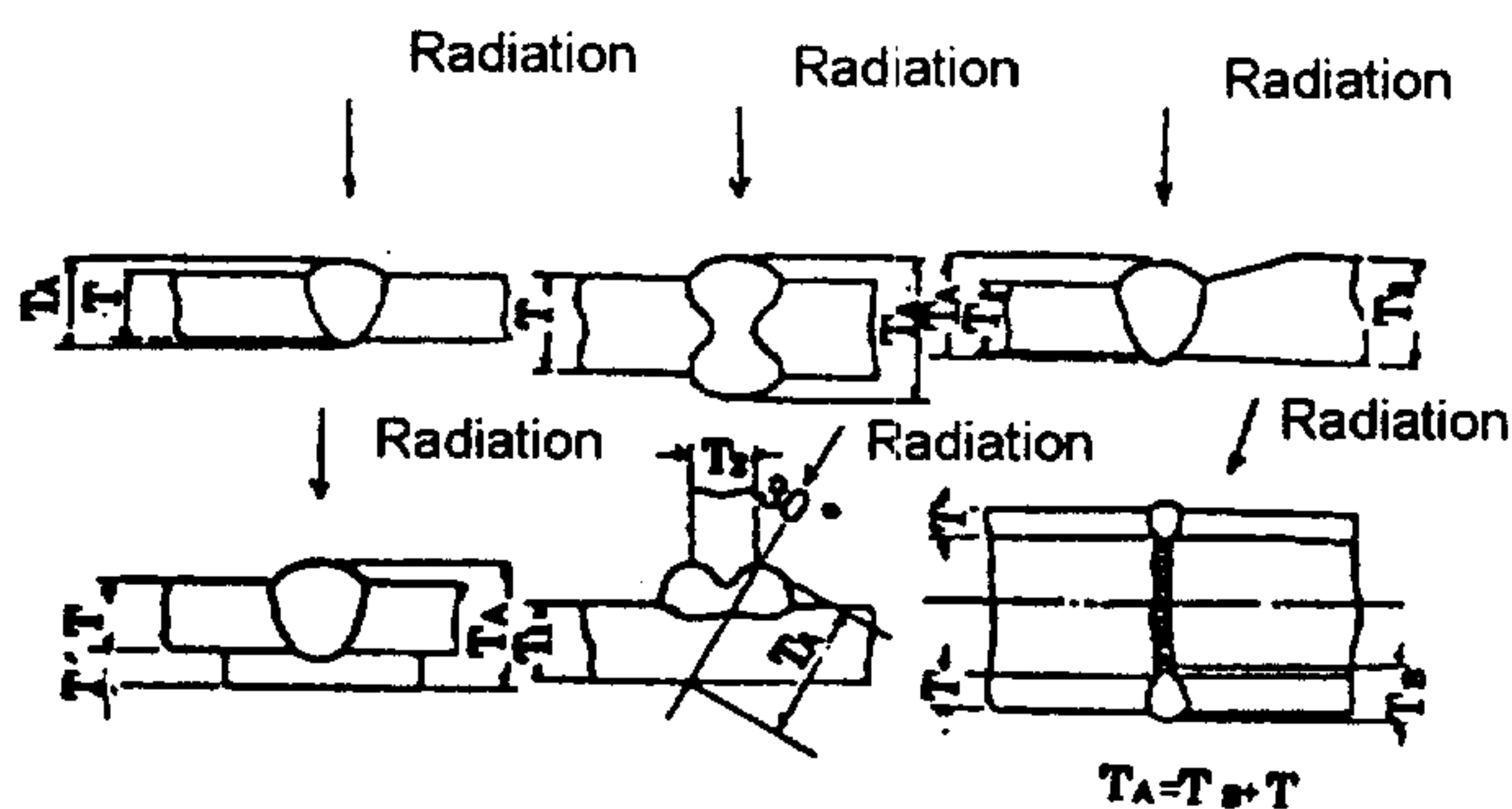
possible.

2.3 Thickness of basic material and material

The thickness of basic material is measured from each data showed in figure 1. In case of measurement trouble, use the following data in principle.

2.3.1 Use the mutual designation thickness of used sheet as the thickness of basic material.

2.3.2 Use the data showed in table 1. as thickness of material for kinds of welding connection.



Remark T₃, T₁, T₂ indicate the thickness of basic material and T₄ indicates the thickness of material.

Figure 1. The thickness of basic material and material at each connection

Table 1. The thickness of basic material and material at each connection

Kind of connection	Thickness of basic material	Shape of welds	Thickness of material(mm)
Facing connection	T	No joining	T
Facing connection	T	One side joining	T + 2
Facing connection	T	Both side joining	T + 4
Facing connection	T	One side joining(Thickness T'mm) Joining metal	T + 2 + T'
Facing connection (Double block photographing)	T	No joining	2.0 × T
Facing connection (Double block photographing)	T	One side joining	2.0 × T + 2
Facing connection (Double block photographing)	T	Both side joining	2.0 × T + 4
T connection	T		2.2 × T
T connection	T ₁ ≠ T ₂		1.1 × (T ₁ + T ₂)

Remark Use the mutual designation thickness for the thickness of basic material

When the thickness of basic material is different at face to face

connection, use the thickness T for the thinner side thickness T₁.

2.4 Use of penetrameter and contrast meter

2.4.1 In photographing, use the penetrameter prescribed in 2.5 and photograph the test part at the same time.

2.4.2 In the decision of photographing condition for face to face welds of flat sheet under 20mm material thickness, photograph the test part using contrast meter prescribed in 2.6 at the same time. Moreover, In case of continuous photographing with same condition, use contrast meter over one time per 1group in principle by letting photographing under 10 times in 1 group.

2.5 Structure of penetrameter

The structure of penetrameter is as follows. But, to follow also KS B 0845 (Methods of radiographic test and classification of radiographs for steel welds) is possible.

2.5.1 Putting a bundle of line in a support paper or a frame makes the penetrameter. The arrangement of line is heavier gradually from left to right. Kind of shape of line and a series of line diameter is as follows referred in table 2.

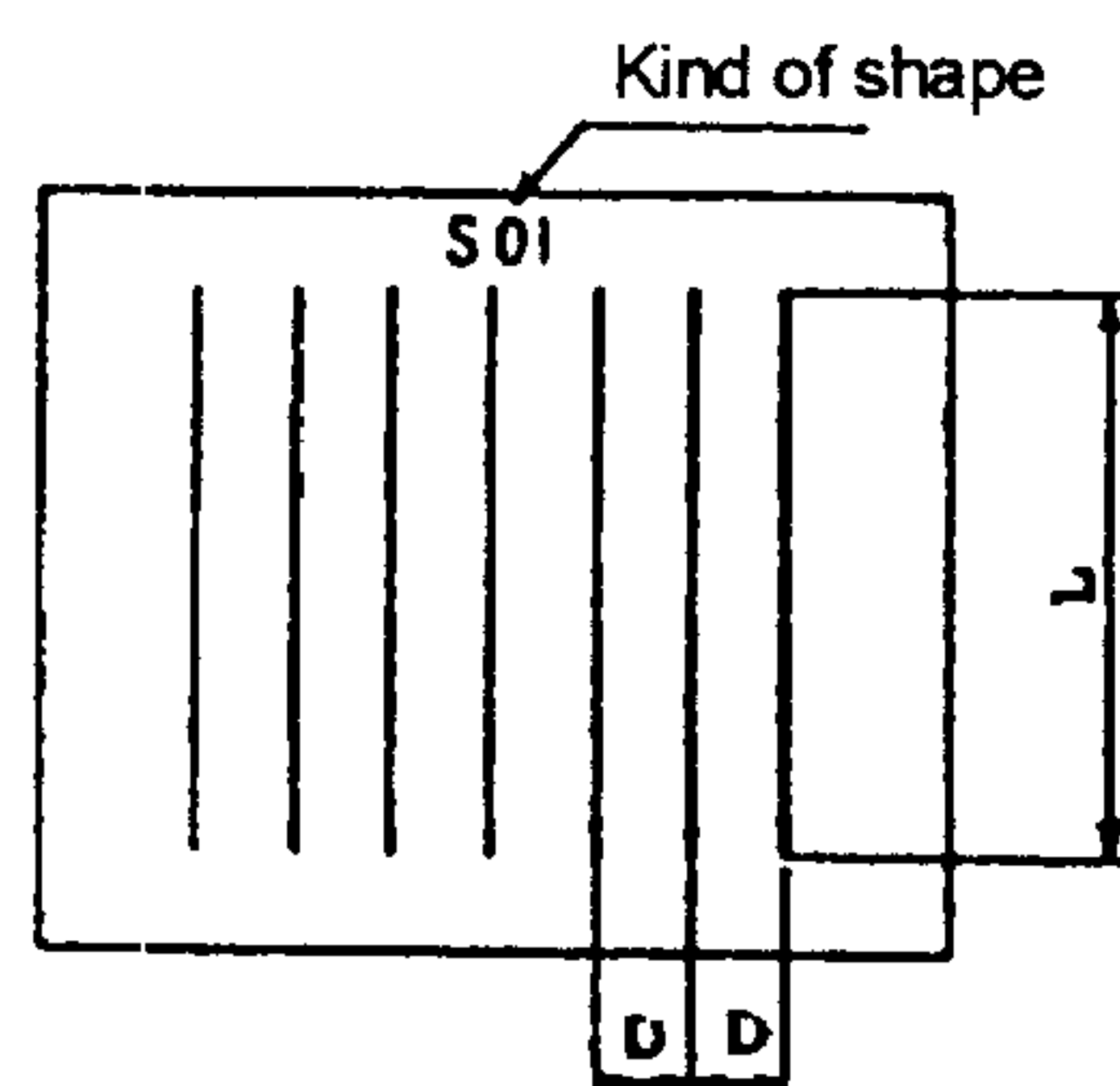


Figure 2. Shape of penetrameter

Table 2. Kind of penetrameter

Unit : mm

Kind of shape	Range of thickness used material		Series of line diameter (1)	Distance among the center of line (2) (D)	Length of line (3) (L)
	Quality of image of normal grade	Quality of image of special grade			
S 01	Less than 10	Less than 15	0.05 0.065 0.08 0.10 0.125 0.16 0.20	3	40
S 02	5~20	7.5~30	0.10 0.125 0.16 0.20 0.25 0.32 0.40	3	40
S 04	10~40	15~60	0.20 0.250.32 0.40 0.50 0.64 0.80	4	40
S 08	20~80	30~130	0.40 0.50 0.64 0.80 1.00 1.25 1.60	6	60
S 16	40~160	60~300	0.80 1.001.25 1.60 2.00 2.50 3.20	10	60

Note (1) Allowable error of line diameter is according to the rule of KS D 3703.

(2) Let allowable error of distance among the center of line in the range $\pm 15\%$.

(3) Let allowable error of length of line in the range $\pm 1\text{mm}$.

2.5.2 Use soft no.2 and hard 1/2 of STS 304 prescribed in KS D 3703 (Stainless steel line) for the kind of line. But, the content of molybdenum is under 0.06.

2.5.3 Use paper, rubber or synthetic resin for support paper and frame. It is needed that the support paper and frame have lower absorption of radiation than line. And indicate the kind of shape of penetrameter by using a material that is showed on the film clearly like figure 2.

2.6 Structure of contrast meter

The structure of contrast meter is as follows.

2.6.1 The contrast meter has the stair like shape showed in figure 3. The thickness of I type are 1.0, 2.0 and 3.0mm. The thickness of II type are 3.0, 4.0 and 5.0mm. Each thickness part is a square whose side length is 15mm. Also, to indicate the kind of shape and number of manufacture is possible by making a dotted line part like figure 3.