

KES

Method of Radiographic
Test and Classification of
Radiographs for Steel Welds

KES T – L472

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Quoted Standard

1. General rules

1.1 Scope of application

This standard shall specify method of radiographic test method and classification of radiographs of x-ray or γ -ray for steel welds.

1.2 General particulars

1.2.1 Radiographic test classifies by detecting defects of steel welds from radiographs that is taken by radiation of x-ray or γ -ray.

1.2.2 The quality of radiographs is classified to normal grade and special grade according to 2.8. Normal grade is obtained by general radiographic method and special grade is done by the radiographic method that detection sensitivity is especially high.

1.2.3 Technicians that operate radiographic test must have enough technique and experience about radiation equipment, shielding of radiation, radiation test method including photographs treatment and classification method of radiographs as well as knowledge about steel welds.

1.2.4 Radiographic range and admitted classification of defects of welding part that will be tested should be decided according to usage, design and test method, after deliberation beforehand.

2. Radiographic method

2.1 Capacity of test equipment

Radiation equipment, photosensitive material photographing equipment and observing equipment should have capacities that shows defects of test part of welding parts clearly and observes this.

2.2 Radiating direction of radiation

Radiograph must be taken by applying radiation in the direction that penetration depth of test part is the minimum. However, in case that radiographing in this direction is

impossible or improper, radiation from another direction could be no problem.

2.3 Thickness of basic material and transmission

The value of thickness of basic materials and transmission are measured value indicated at figure 1, and in case that real measurement is impossible, following values are used in principle.

- (1) Title thickness of used plate is used for thickness of basic material.
- (2) The values of table 1 are used for thickness of transmission about each welding connection.

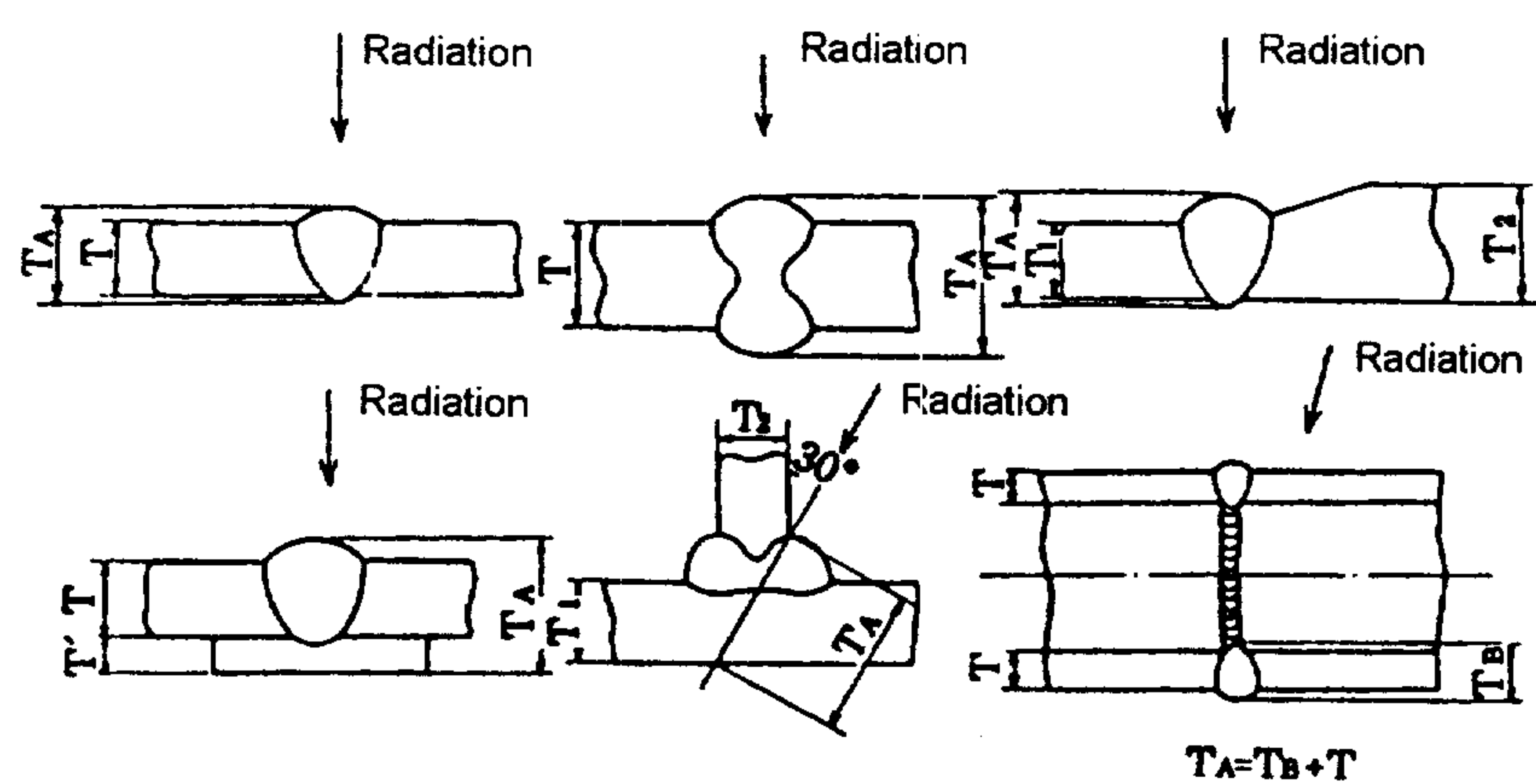


Figure 1. Thickness of basic material and transmission at each connection part

However, T, T1, T2 indicate thickness of basic materials and TA does thickness of transmission.

Table 1

Sorts of connection	Thickness of basic materials(mm)	Shapes of welding part	Thickness of materials (mm)
Facing connection	T	No joining	T
Facing connection	T	One side joining	T + 2
Facing connection	T	Both sides joining	T + 4
Facing connection	T	One side joining	T + 2 + T'
Facing connection (Radiographing of dual wall)	T	Back supporter (Thickness T'mm)	2.0 × T
Facing connection (Radiographing of dual wall)	T	No joining	2.0 × T + 2
Facing connection (Radiographing of dual wall)	T	One side joining	2.0 × T + 4
Facing connection (Radiographing of dual wall)	T	Both sides joining	2.2 × T
T connection	T T1≠T2	Both sides joining	1.1 × (T1 + T2)

Remark Thickness of basic materials is title thickness. In case that thickness of basic materials are different for facing connection, thickness of thin part T₁ is T.

2.4 Use of penetrameter and contrast meter

- (1) Use transmission diagram system specified at 2.5 for radiographing and radiograph test part at the same time.
- (2) When radiographing condition is decided about facing welding part that transmission thickness is less than 20mm, radiograph at the same time with test part using contrast meter specified at 2.6. In addition, when radiographing under the same condition, use contrast meter more than one time about one group that is continuous 10 times radiographing in principle.

2.5 Structure of penetrameter

Structure of penetrameter is as follows.

- (1) Penetrameter is made by attachment of one group of lines on ground or a frame, lines are arranged thicker from left to right such as figure 2, and sorts of shapes and series of line diameter are indicated at table 2. However, a penetrameter of figure 3 and table 3 can be used as well.

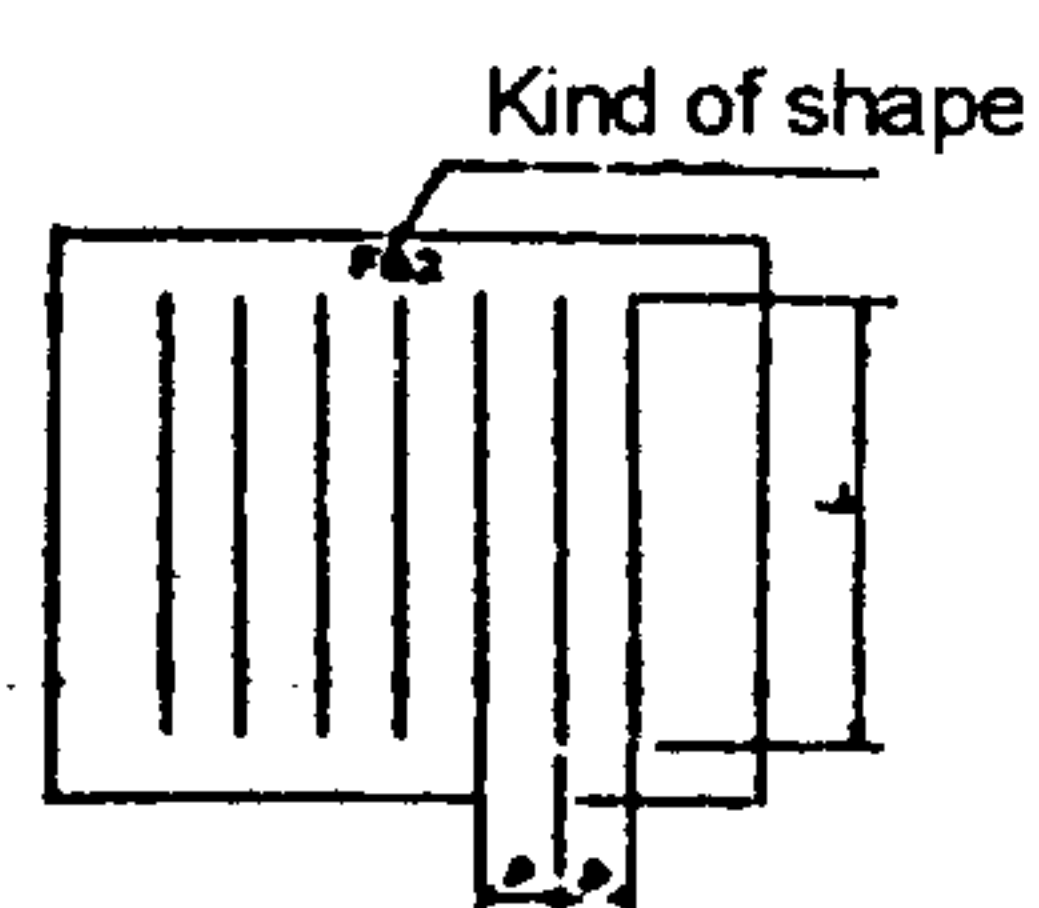


Figure 2

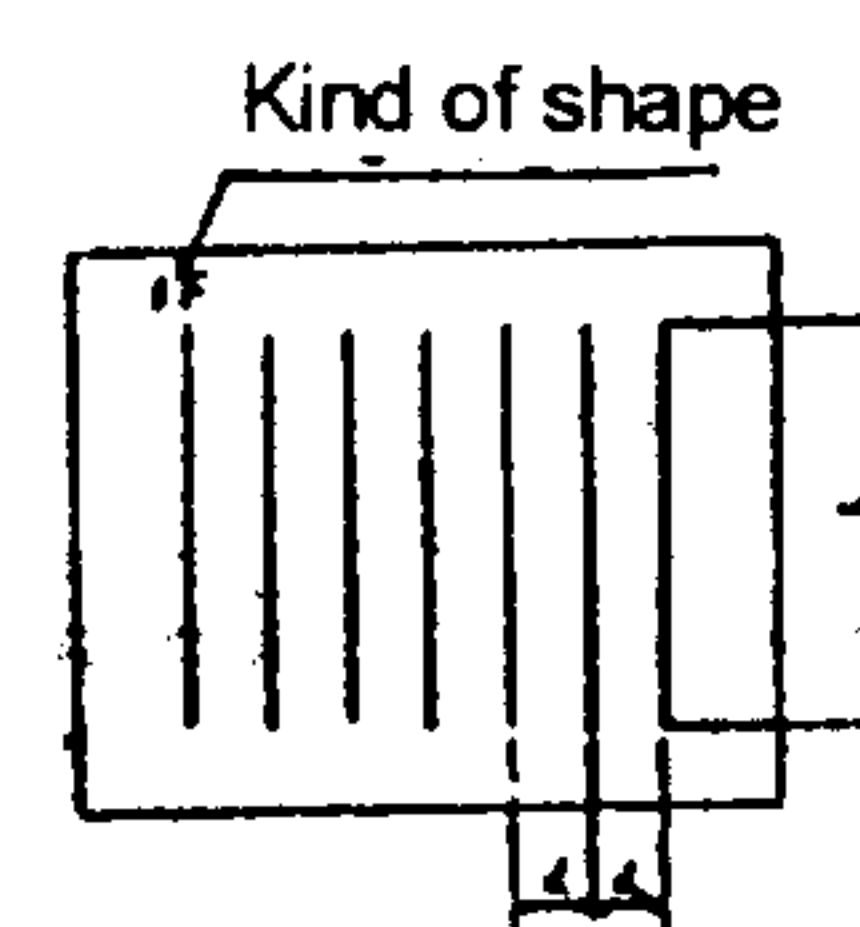


Figure 3

Table 2

Unit : mm

Kind of shape	Thickness range of used transmission		Series of line diameter	Distance between centers of line (D)	Length of line (L)
	Nomal grade	Special grade			
F 02			0.10 0.125 0.16 0.20 0.25 0.32 0.40	3	40
F 04	10 ~ 40	15 ~ 60	0.20 0.25 0.32 0.40 0.50 0.64 0.80	4	40
F 08	20 ~ 80	30 ~ 130	0.40 0.50 0.64 0.80 1.00 1.25 1.60	6	60
F 16	40~160	60 ~ 300	0.80 1.00 1.25 1.60 2.00 2.50 3.20	10	60
F 32	80~320	130~500	1.60 2.00 2.50 3.20 4.00 5.00 6.40	15	60
Permitted difference of size			Fixed value at KS D 3556 or smaller value of ± 5%	± 15%	± 1

Table 3

Unit : mm

Kind of shape	Thickness range of used transmission		Series of line diameter	Distance between centers of line (D)	Length of line (L)
	Nomal grade	Special grade			
1F			0.1 0.15 0.2 0.25 0.3 0.35 0.4	2~5	35
2F	10 ~ 50	15 ~ 70	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 1.0	3~6	40
3F	40~100	60~190	0.8 1.0 1.2 1.4 1.6 1.8 2.0	4~7	45
4F	50~200	70~350	1.0 1.5 2.0 2.5 3.0 3.5 4.0	5~8	50

- (2) For lines, use piano lines or steel lines specified at KES B-B002A (Piano line) or KS D 3552 (Steel line).
- (3) For ground or a frame, use paper, rubber or plastics. This must have smaller absorption of radiation than a line and sorts of the shape of the penetrameter is marked using material that appeared clearly on a film such as fugure 2.

2.6 Structure of contrast meter

Structure of a contrast meter is as follows.