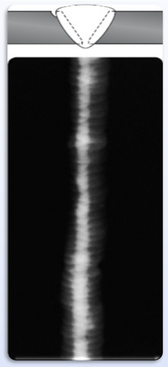
تارادیس تابش آزما
آموزش تست های غیر مخرب
طراحی، بازرسی، مشاوره، اجرا، نظارت
تامین مواد و تجهیزات فنی و مهندسی

آدرس:
تهران، خیابان توحید، خیابان فرصت شیرازی، بعد از خیابان دکتر قریب، پلاک۸۳، واحد۸B

۰۲۱-۶۶۹۱۳۷۳۶
۰۲۱-۶۶۹۰۸۶۶۵
www.taradista.com

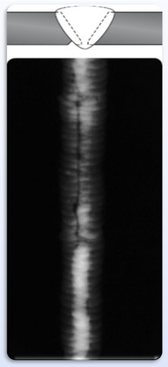
Radiographer's Weld Interpretation Reference

External Undercut



An irregular density along the edge of the weld image. The density will always be darker than the density of the pieces being welded.

Internal (root) Undercut.

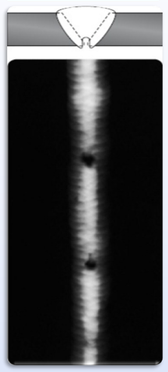


An irregular darker density near the centre of the width of the weld image and along the edge of the root pass image.

Internal concavity (suck back).

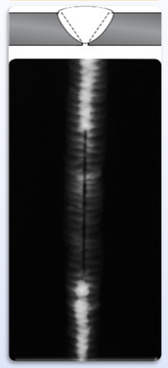
An elongated irregular darker density with fuzzy edge. In the centre of the width of the weld image.

Burn through.



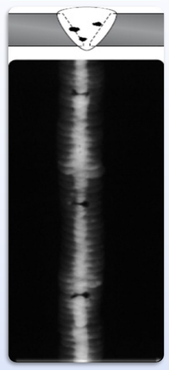
Localized darker density with fuzzy edges in the centre of the width of the weld image. It may be wider than the width of the root pass image.

lack of Penetration



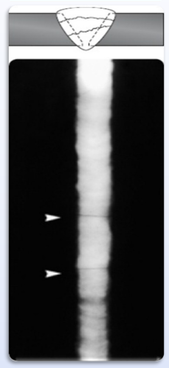
A dark density band, with very straight parallel, in the center of the width of the weld image.

Interpas slag inclusion.



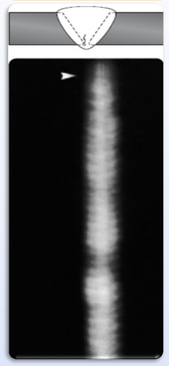
Irregularly shape darker density spot, usually slightly elongated and randomly space.

Transverse crack



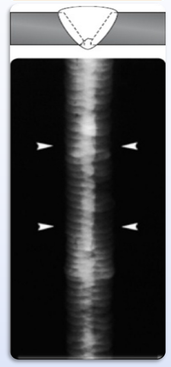
Feathery, twisting lines of darker density running across the width of the weld image.

Longitudinal crack



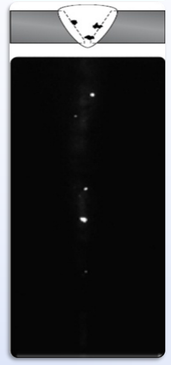
Feathery, twisting lines of darker density running lengthwise along the weld at any location in the width of the weld image.

Longitudinal root crack



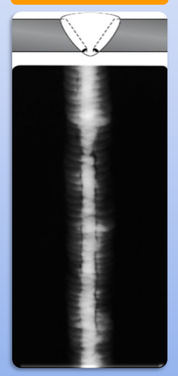
Feathery, twisting lines of darker density along the edge of the image of the root pas the twisting feature helps to distinguish the root crack from incomplete root penetration.

Tungestan inclusions.



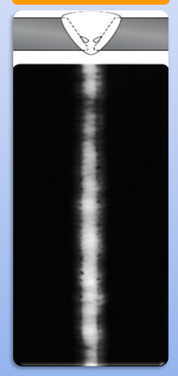
Irregularly shape density spots randomly in the weld image.

Elongate slag lines .



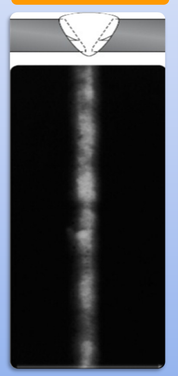
Elongated parallel or single darker density line, irregular in width and slightly winding lengthwise.

Lack of side wall fusion (LOF).



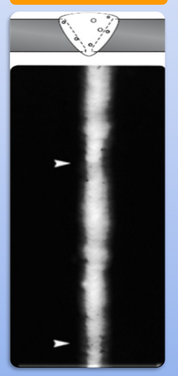
Elongated parallel, or single, darker density lines sometimes within darker density spots dispersed along the LOF-lines which are very straight in the lengthwise direction and not winding like elongate slag lines.

Interpass cold lap.



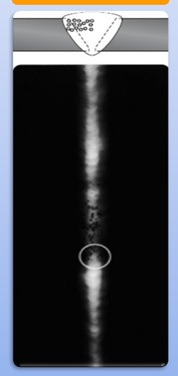
Small spot of darker densities. Some with slightly elongate tails in the welding direction.

Scattered porosity.



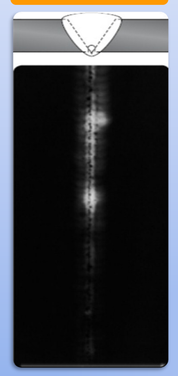
Rounded spots darker densities random in size and location.

Cluster porosity.



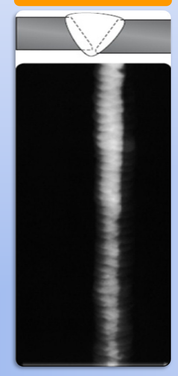
Rounded or slightly elongated darker density spots In clusters with the clusters randomly spaced.

Root pass aligned porosity.



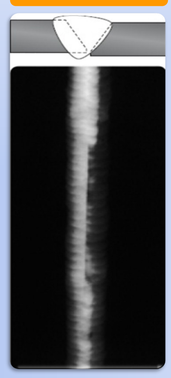
Rounded and elongated darker density spots that may be connected, in a straight line in the centre of the width of the weld image.

Offset or mismatch (Hi-Lo).



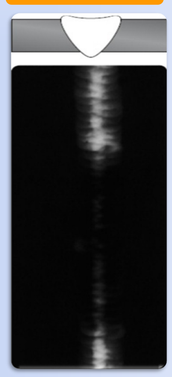
An abrupt change in film density across the width of the weld image.

Offset with Lack of penetration



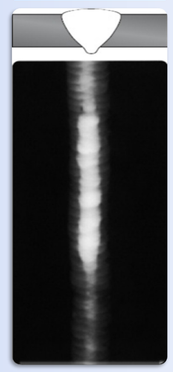
An abrupt density change across the width of the weld image with a straight longitudinal darker density line at the centre of the width of the weld image along the edge of the density change.

External concavity.



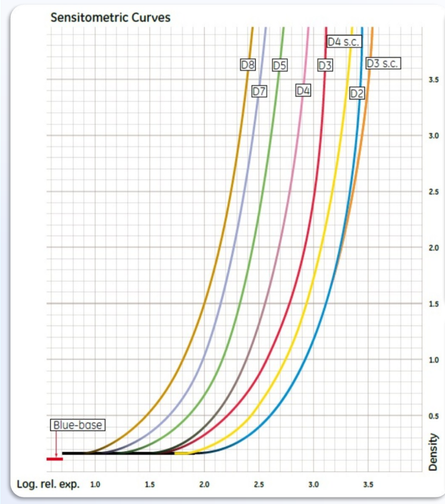
The weld density is darker than the density of the pieces welded and extending across the full width of the weld.

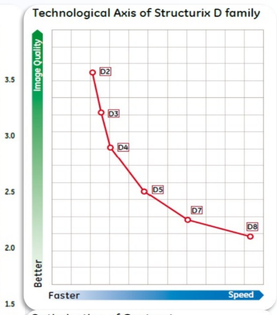
Excessive penetration.

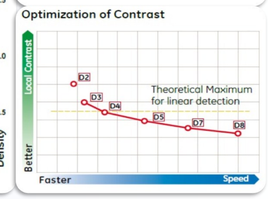


A lighter density in the centre of the width of the weld image. Either extended along the weld or in isolated circular drops.

Performance characteristics





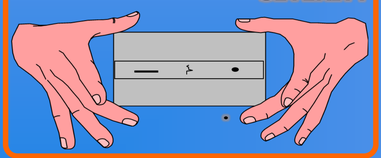


Radiographic Films for industrial X-Ray Use — Product Guide

BRAND				CLASSICICATION			AVAILABLE FORMATS				Specification	Application
							sheets		Rolls			
Agfa	Kodak	Fuji	Foma	EN584	ISO11699	ASTME1815	Non-interleaved	Ready-Pack	NIF Rolls (bulk)	Lead Pack Ready Pack		
D2	DR50	IX25	R2	C1	T1	Special	●				• Extremely fine grain • Very High Contrast	• Electronic Componenet • Composite Metals
D3	M100	No Film	R3	C2	T1	Class I	●	●	●	●	• Ultra fine grain • Very High Contrast	• Very high quality welds • Nuclear quality
D4	MX125	IX50	R4	C3	T2	Class I	●	●	●	● ●	• Extra fine grain • Very High Contrast	• Very high quality welds • Defence and nuclear industry
D5	T200	IX80	R5	C4	T2	Class I	●			●	• Very fine grain • High Contrast	• Welding & Casting • Multiple film tenchnique
D7	AA400	IX100	R7	C5	T3	Class II	●	●	●	● ●	• Fine grain • High Contrast	• Welding & Casting • Defence industry
D8/F8	CX	IX150	R8	C6	-	-	●			●	• Medium grain • High Contrast	• Concrete • Casting

- Crack
- Lack of Fusion
- Lack of Penetration
- Inclusion
  - Aligned Slag Inclusion
  - Metallic Inclusion
  - Non-Metallic Inclusion
- Pores / Cavities
  - Worm Hole
  - Piping
  - Cluster
  - Blow Hole
  - Gas Pocket

SEVERITY



Acceptance / Rejection Criteria

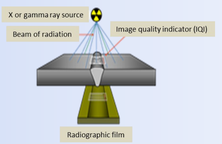
Radiographic Testing Method

According to ASME Sec VIII . Dev1, UW51, App4 (2007), API650

Radiographic Examination Of Weld

- **Rounded Indication**
  - **Isolate**
    - $\frac{1}{4}t$ or (4mm) Whichever is Smaller
    - $\frac{1}{3}t$ or (6mm) When Separated by Adjacent ind. by 25mm or more
    - Dia. >100mm for t >50mm
  - **Aligned**
    - $\sum Dia. > t$ in 12t of weld
    - Groups of aligned Round Indication
    - 6mm for t <19mm; $\frac{1}{3}t$ for 19mm < t < 57mm; 19mm for t > 57mm
  - **Cluster**
    - Greater than 2t or 25mm
    - $\sum Cluster > 25mm$ in 150mm Length of Weld
    - Space with isolate < 25mm
  - **Random**
    - For t < 3mm more than 12 indication in150mm Length of the weld
- **Linear Indication**
  - **Volumetric**
    - **Isolate**
      - 6mm for t <19mm
      - $\frac{1}{3}t$ for 19mm < t <57mm
      - 19mm for t > 57mm
    - **Group of Aligned Indication**
      - $\sum Length > t$ in 12t of weld
      - Indication Separated by Less than 3L
  - **Planer (Crack, LOP, LOF)**
    - Unacceptable

Radiography Techniques



Single Wall, Single Image **(SWSI)**

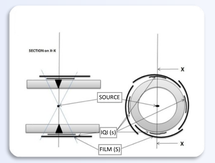
$SFD_{min} = OFD\ (1+F/\ U_g)$

SFD: Source to Film Distance
OFD: Object to Film Distance
F: size of the radiation source
U_g= 0.25 for Critical Examination
U_g= 0.5 for General purpose Examination

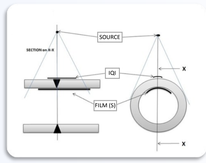
For Critical Examination
$SFD_{practical} \geq 1.4\ L$

For General Examination
$SFD_{practical} \geq 1.1\ L$
L: Length of plate

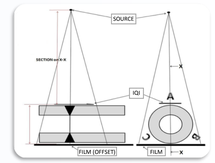
$SFD \geq max\ (SFD_{min}, SFD_{practical})$



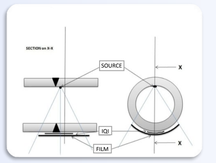
Single Wall, Single Image **(SWSI)**
Panoramic radiographic technique
$SFD_{min} < R$



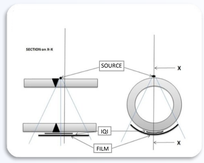
Single Wall, Single Image **(SWSI)**
Film inside, source outside arrangement



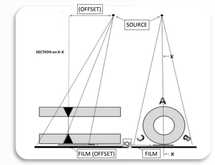
Double Wall, Double Image **(DWDI)**
Super impose radiographic technique.
$SFD_{min} >> D$ & OD / ID ≥1.4



Single Wall, Single Image **(SWSI)**
Film outside, source inside arrangement
$R < SFD_{min} < D$



Double Wall, Single Image **(DWSI)**
$SFD_{min} \geq D$
at least 3 Exposures 120 deg to each other for complete coverage.



Double Wall, Double Image **(DWDI)**
Super impose radiographic technique.
$SFD_{min} >> D$ & OD / ID <1.4
at least 2 exposures at 90 deg to each other for