

SANITARY WELD REVIEW AND ACCEPTABILITY

**“Views of Regulatory Authorities
on the Criteria for Acceptance of
Welds”**

May 15, 2012 3-A Education Program

Milwaukee, WI

Steven Sims, FDA/CFSAN

Milk Safety Team



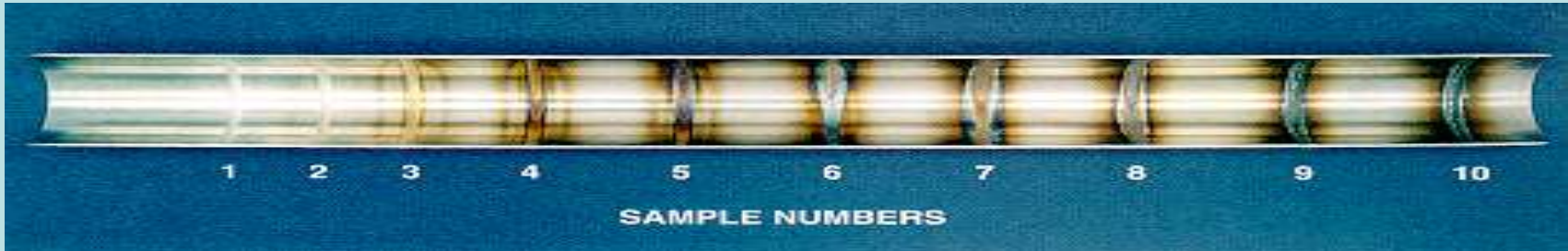
General requirements for welds and for limitations for welded surface roughness can be found in all 3-A sanitary standards where welding might be used



The details of 3-A requirements for the acceptance of sanitary welds were described in Mr. Avery's presentation

These included such things as:

Tint -- (oxygen in inert gas purge)



AWS D18.1/D18.2 Specification for welding of austenitic stainless steel tube and pipe systems in sanitary (hygienic) applications. This standard was written by the AWS in cooperation with 3-A to replace the previous 3-A standard for welding of tubing and pipe in dairy and food product processing plants.



For equipment for which a 3-A certificate of compliance has been issued

Conformance to all applicable 3-A welding and 3-A welded surface texture requirements are verified under the 3-A third party certification program



**For Equipment that has a 3-A
certificate of compliance, FDA
will accept that certification;
or**



If there appears to be a
significant problem

Use the 3-A Report of Alleged
Noncompliance (RAN) process

HOWEVER...Some equipment is fabricated in the field such as welded pipelines fabricated from sanitary tubing, etc.

and is not the subject of a 3-A certificate of compliance...

FOR EQUIPMENT FABRICATED IN THE FIELD SUCH AS PIPELINES, ETC.

- Representative welds -- inspected upon installation (in an unpolished state)
- This may be accomplished by:
 - Use of a borescope or video borescope,



or;



FOR EQUIPMENT FABRICATED IN THE FIELD SUCH AS PIPELINES, ETC.

- Representative welds -- inspected upon installation (in an unpolished state)
- This may be accomplished by:
 - By physically removing representative welds from the pipeline for close visual inspection



**FOR EQUIPMENT FABRICATED
IN THE FIELD SUCH AS
PIPELINES, ETC.**



close visual inspection

FOR EQUIPMENT FABRICATED IN THE FIELD SUCH AS PIPELINES, ETC.

- The acceptance criteria for field fabricated welds is based on whether:
 - the weld will be sound, (No leaks, cracks, crevices, pits, or protruding metal)
 - smooth/easily cleanable and
 - the welded joint and associated piping are drainable

FOR EQUIPMENT FABRICATED IN THE FIELD SUCH AS PIPELINES, ETC.

- Unacceptable welding flaws include:
 - Problems related to in appropriate inert gas purge
 - Pits and “skips” in welded joints
 - Piping misalignments and slope

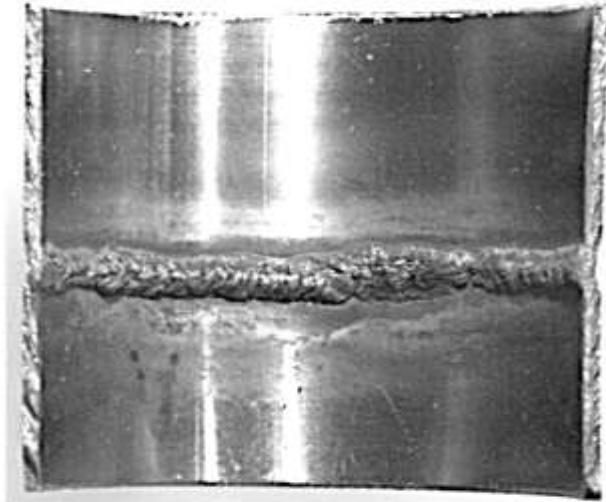
FOR EQUIPMENT FABRICATED IN THE FIELD SUCH AS PIPELINES, ETC.

- Obvious objectionable conditions include:
 - Problems related to in appropriate inert gas purge

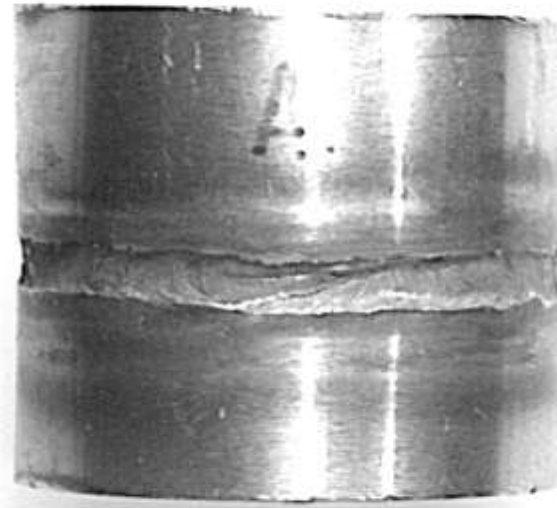
Judging Unpolished Welds

Unacceptable

(inside)

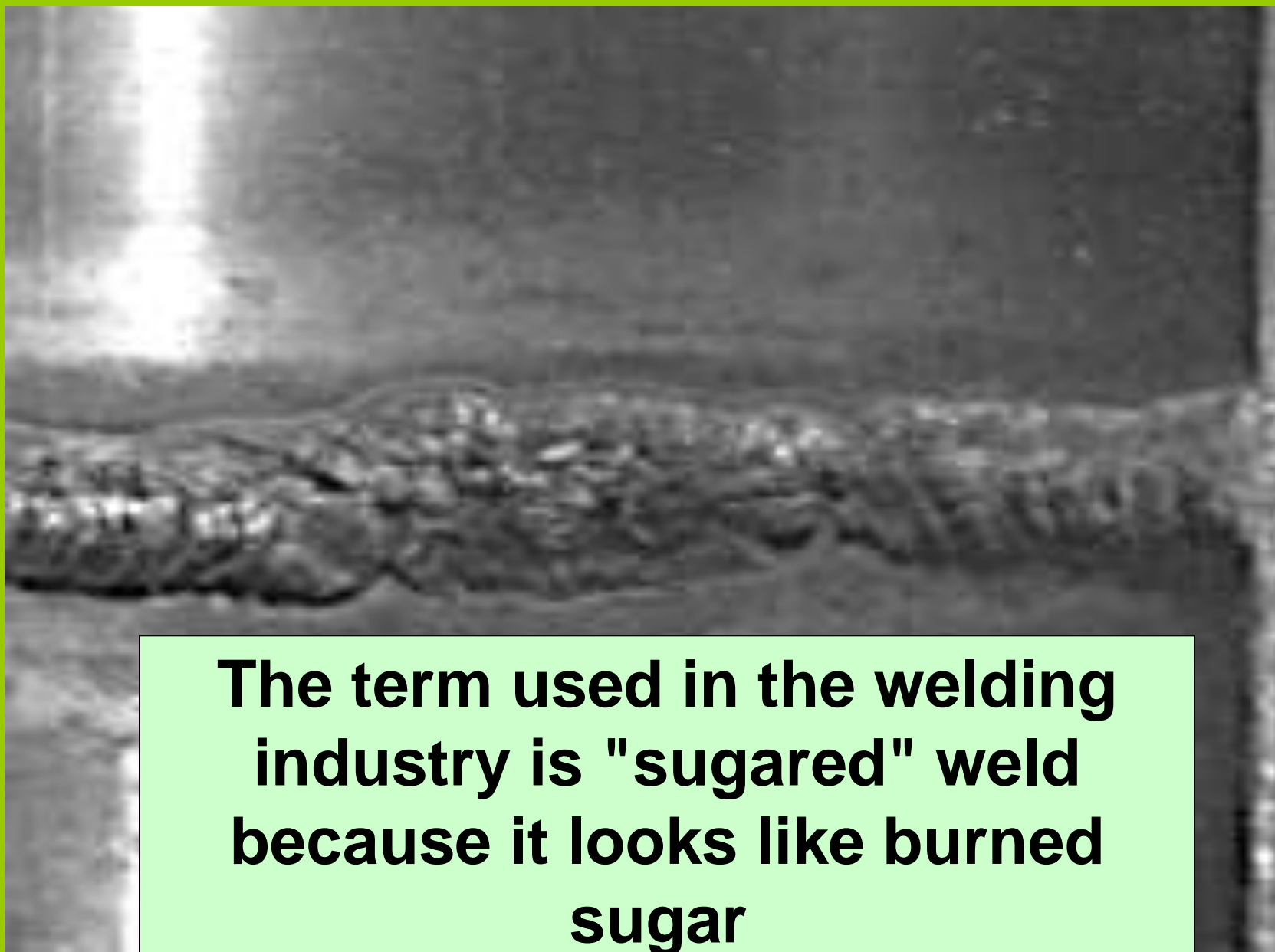


(outside)



Weld badly sunken from the outside – heavy oxidation crusted in weld area.

Reason: Inadequate gas (inert gas) purge.

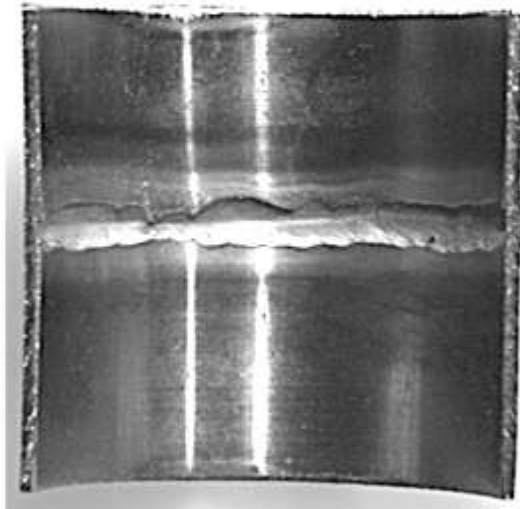


The term used in the welding industry is "sugared" weld because it looks like burned sugar

Judging Unpolished Welds

Unacceptable

(inside)

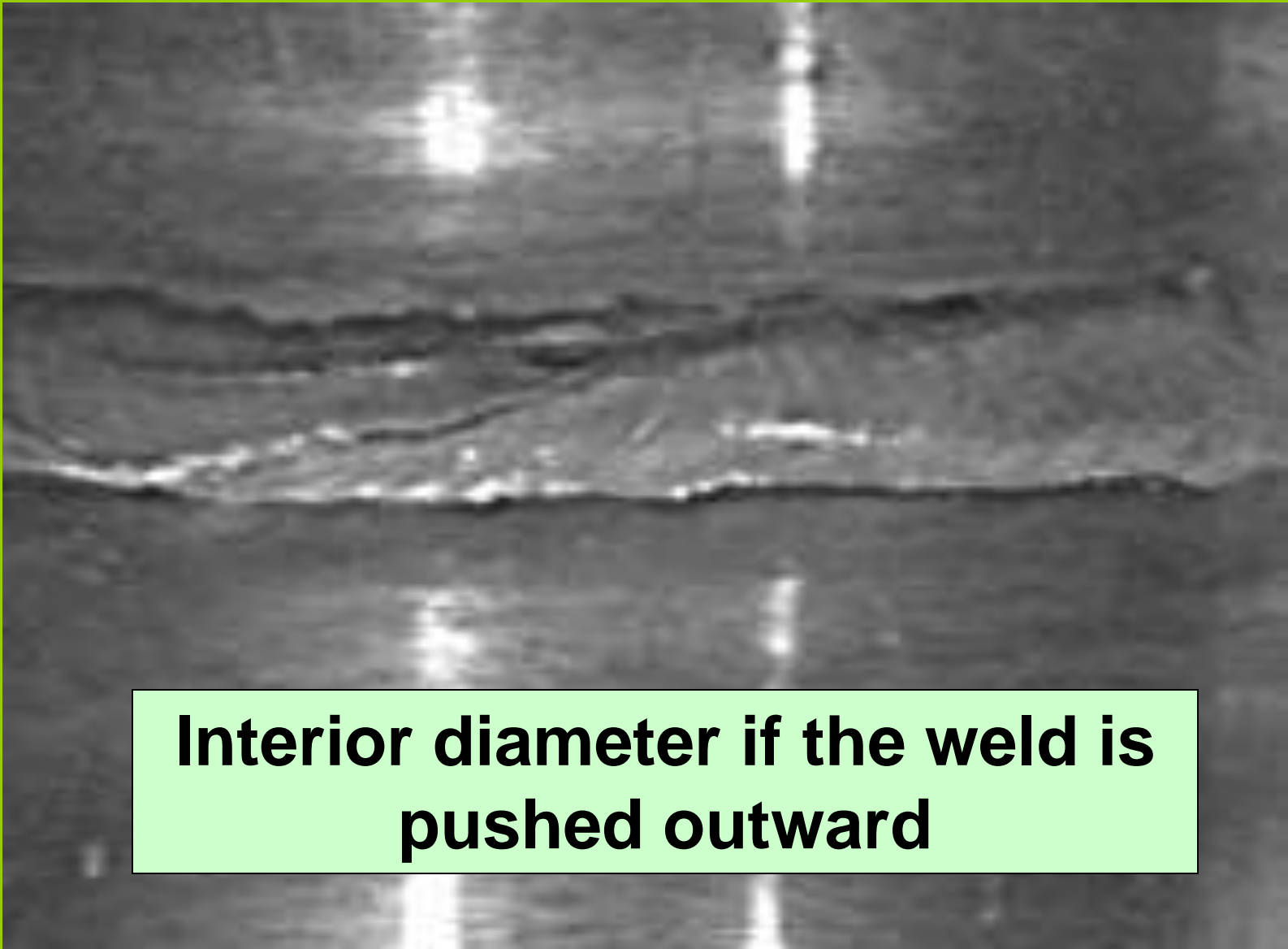


(outside)



Weld pushed outward.

Reason: Too much purge (inert gas) pressure.



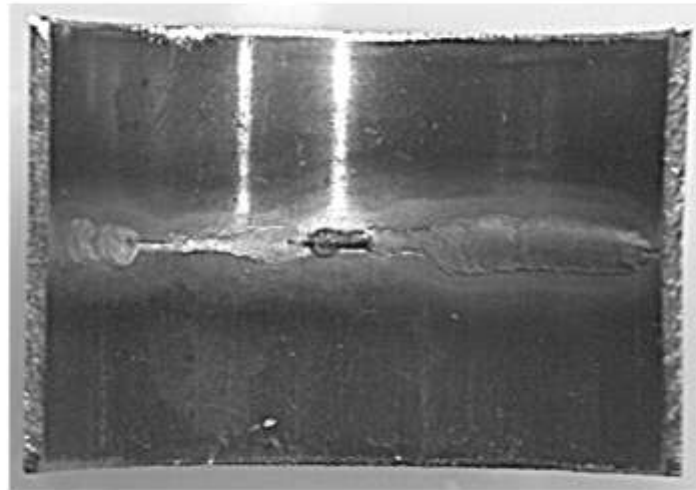
**Interior diameter if the weld is
pushed outward**

FOR EQUIPMENT FABRICATED IN THE FIELD SUCH AS PIPELINES, ETC.

- Obvious objectionable conditions include:
 - Pits and “skips” in welded joints

Judging Unpolished Welds

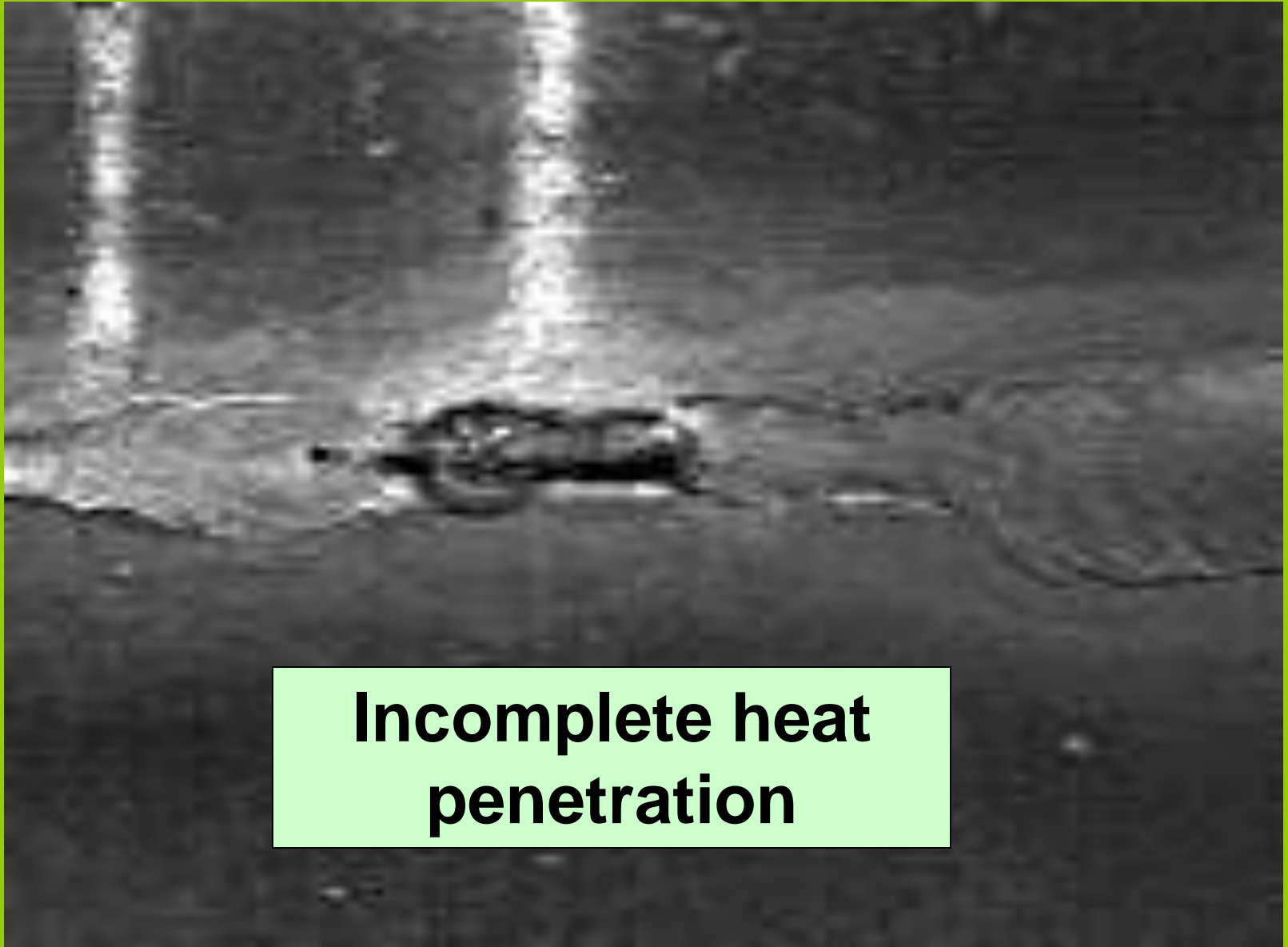
Unacceptable



(inside)

**Heat penetration too light --Incomplete
in some spots – causing misses or skips.**

Reason: Weld speed irregular, too fast or low amps.



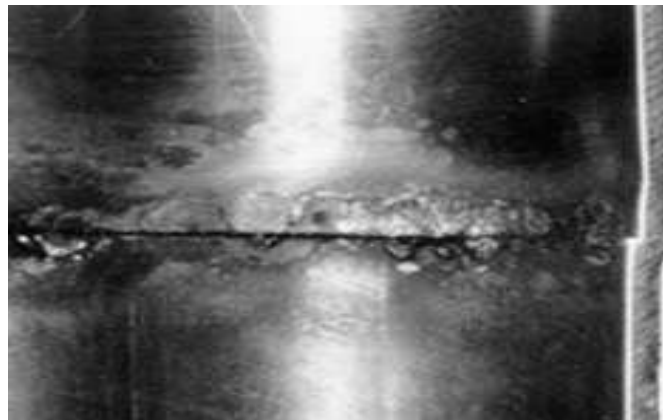
**Incomplete heat
penetration**

FOR EQUIPMENT FABRICATED IN THE FIELD SUCH AS PIPELINES, ETC.

- Obvious objectionable conditions include:
 - Piping misalignments and slope

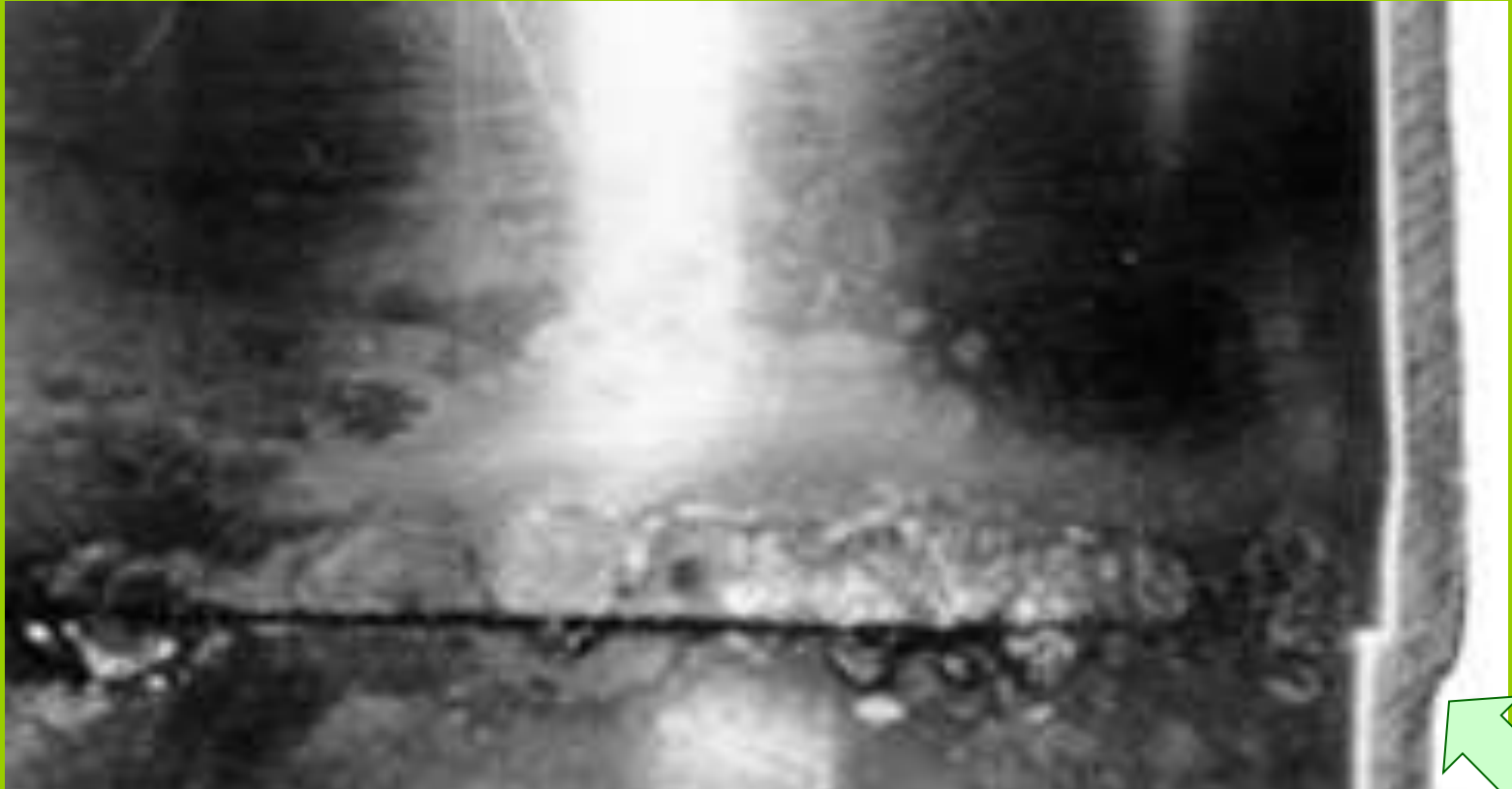
Judging Unpolished Welds

Unacceptable

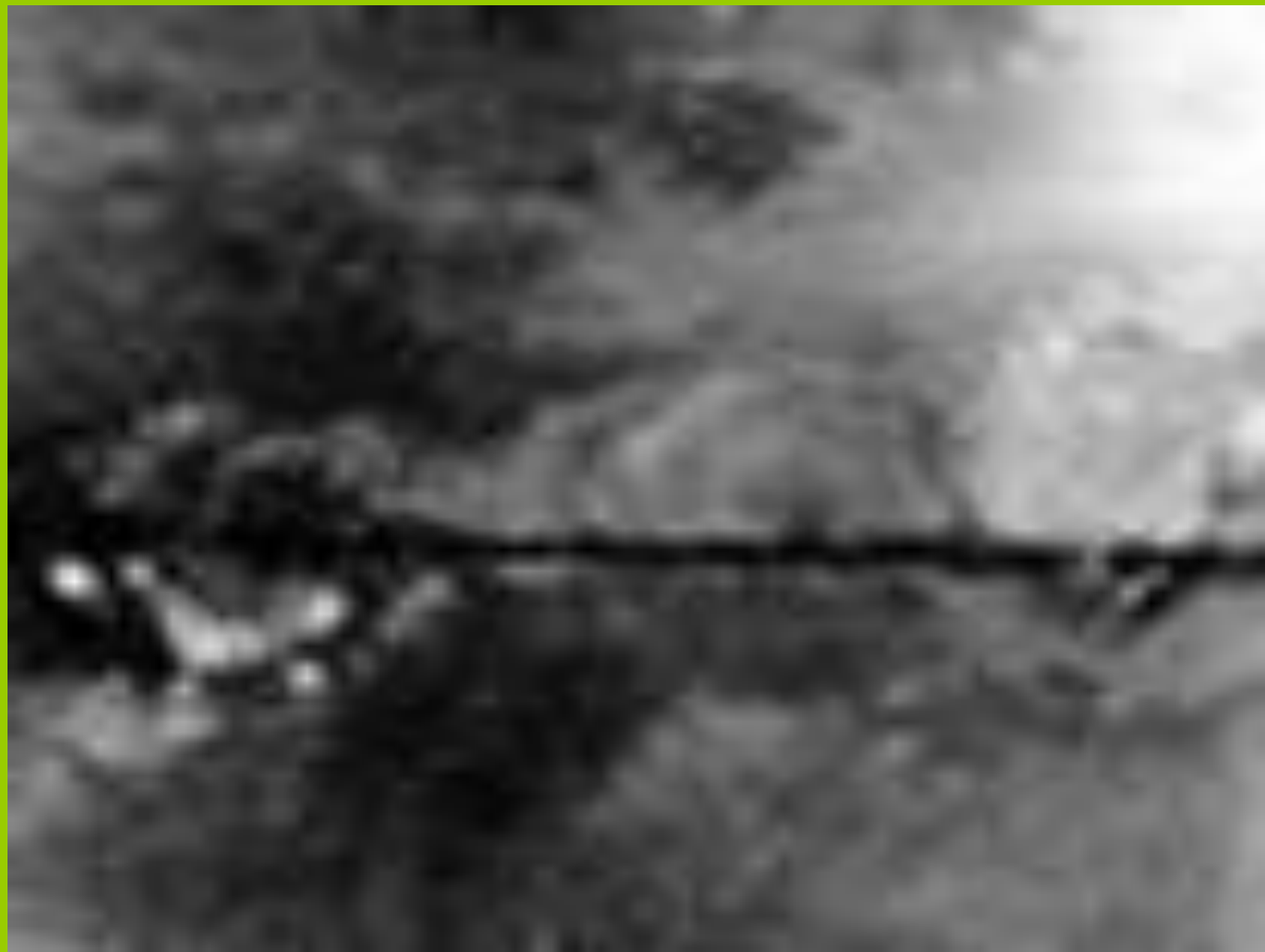


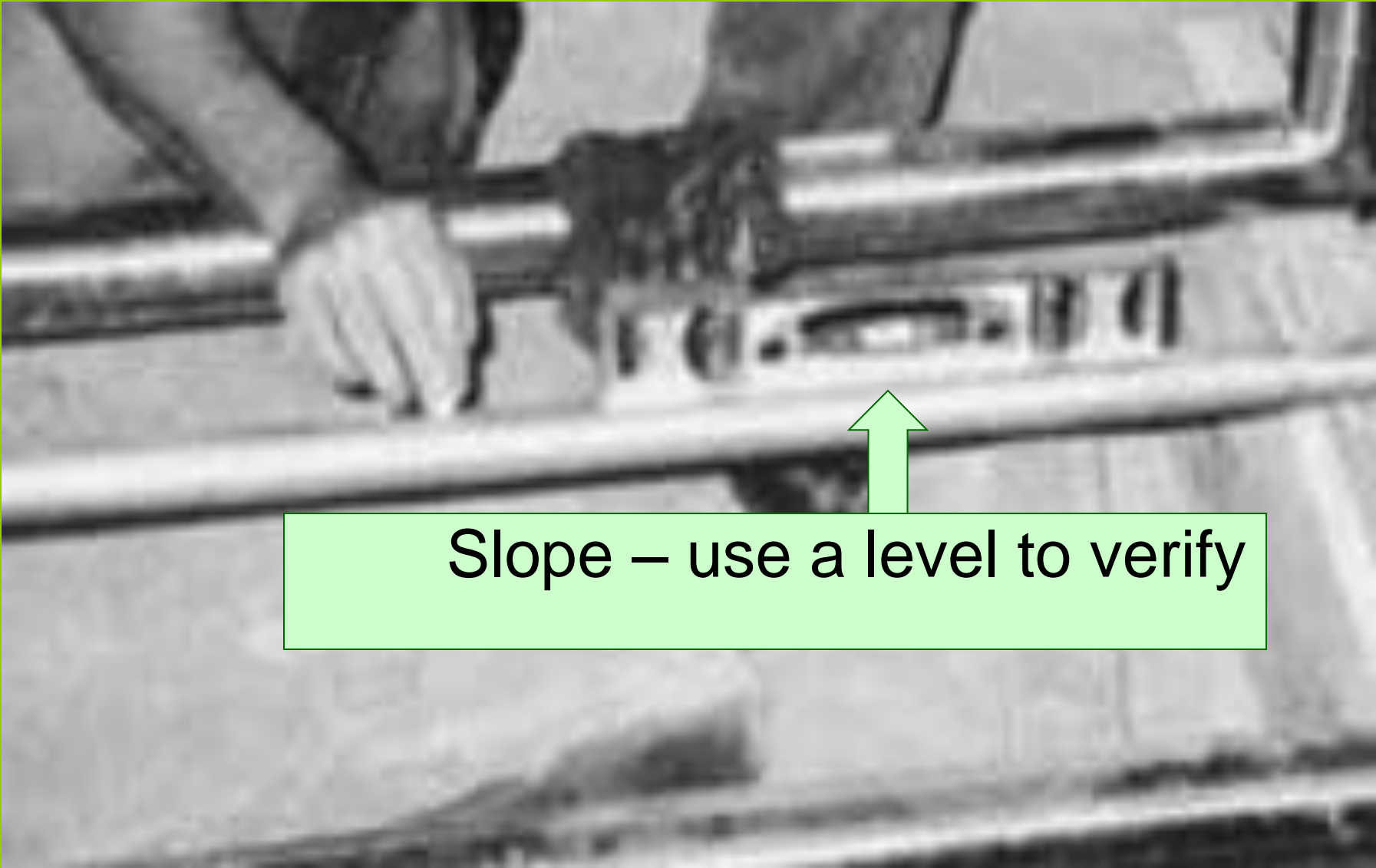
(inside)

**Reason: Piping misalignment
–(Incomplete heat penetration also present)**



Piping misalignments are normally obvious from the outside but shall be confirmed by internal inspection



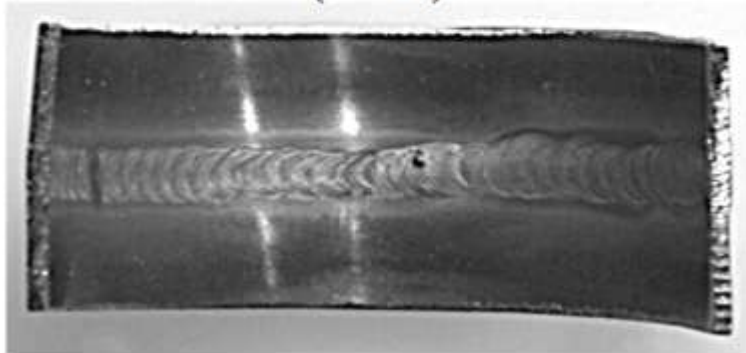


Slope – use a level to verify

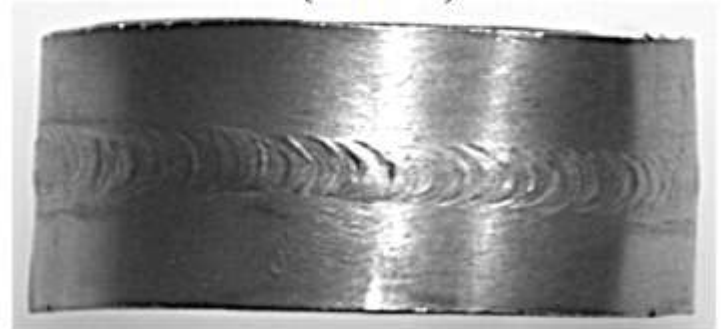
Judging Unpolished Welds

Acceptable

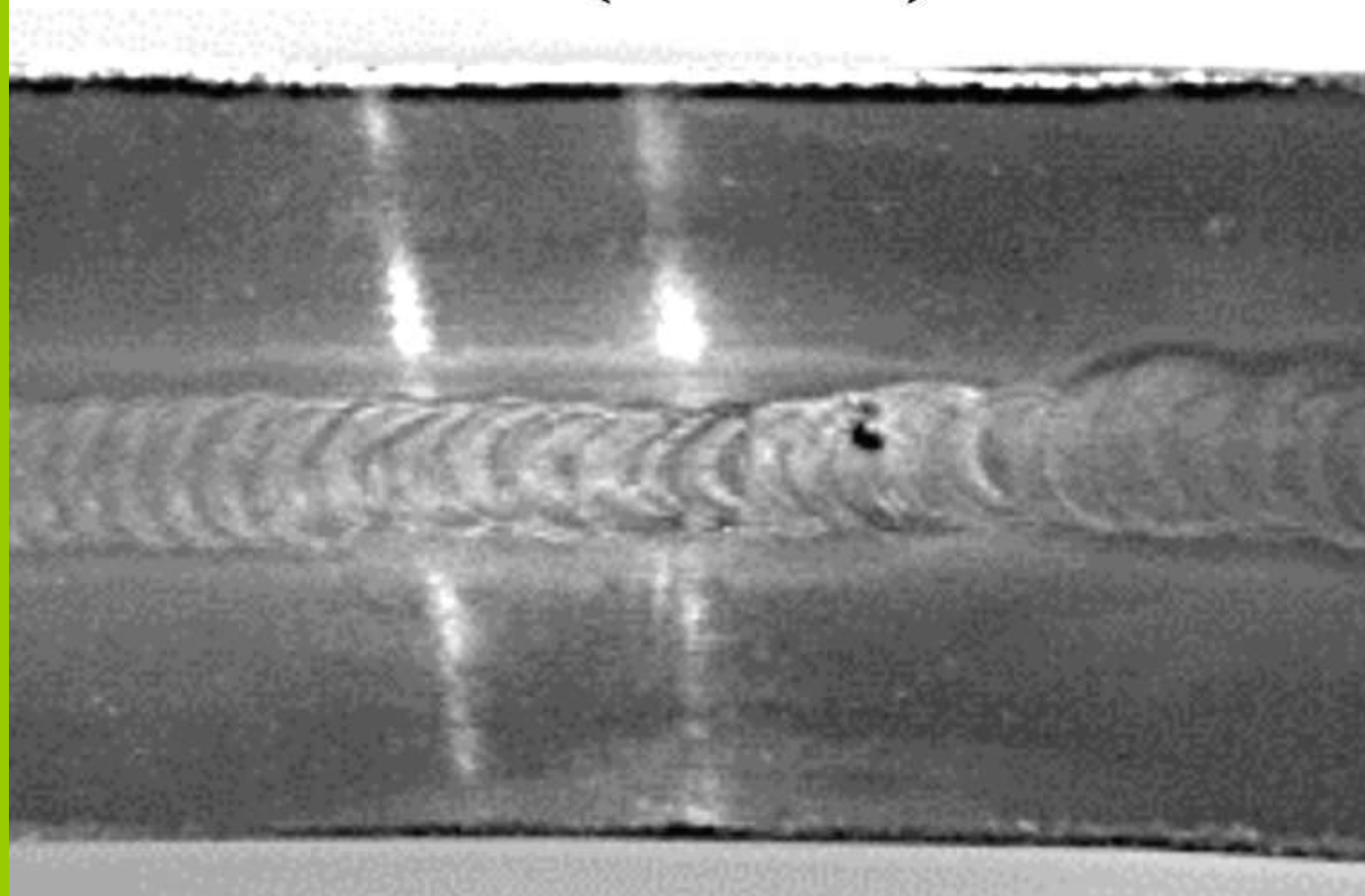
(inside)



(outside)



(inside)



(inside)



Questions

?