

Aplicación a Estructuras Soldadas

LPM -GME

Complejidades por Soldadura

- Anomalías geométricas
- *Mismatch* de propiedades mecánicas
 - Metal base
 - Metal de aporte
 - Zona afectada por el calor
 - ▶ Zonas frágiles locales
 - *Pop-in*
 - ▶ Desvío de los campos de tensiones teóricos
- Tensiones residuales

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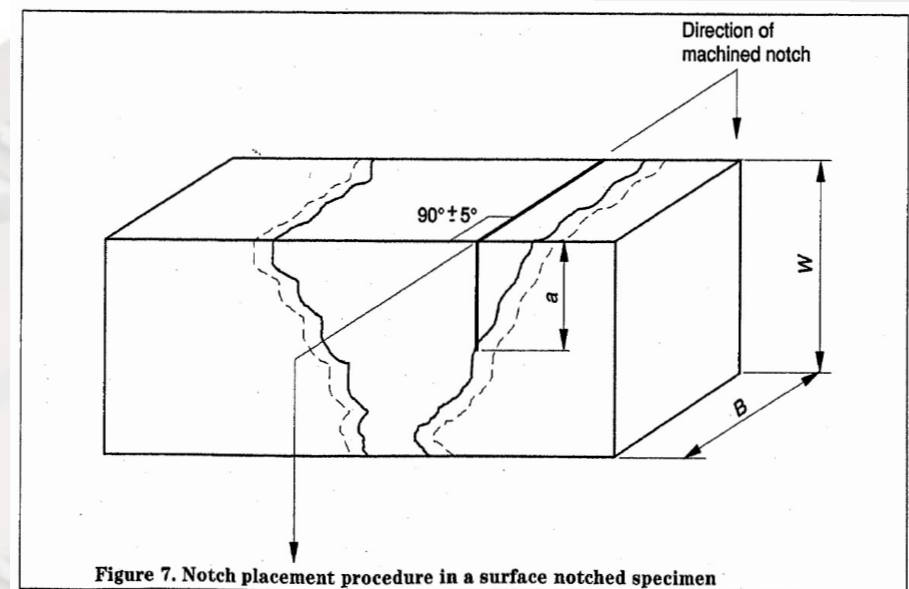
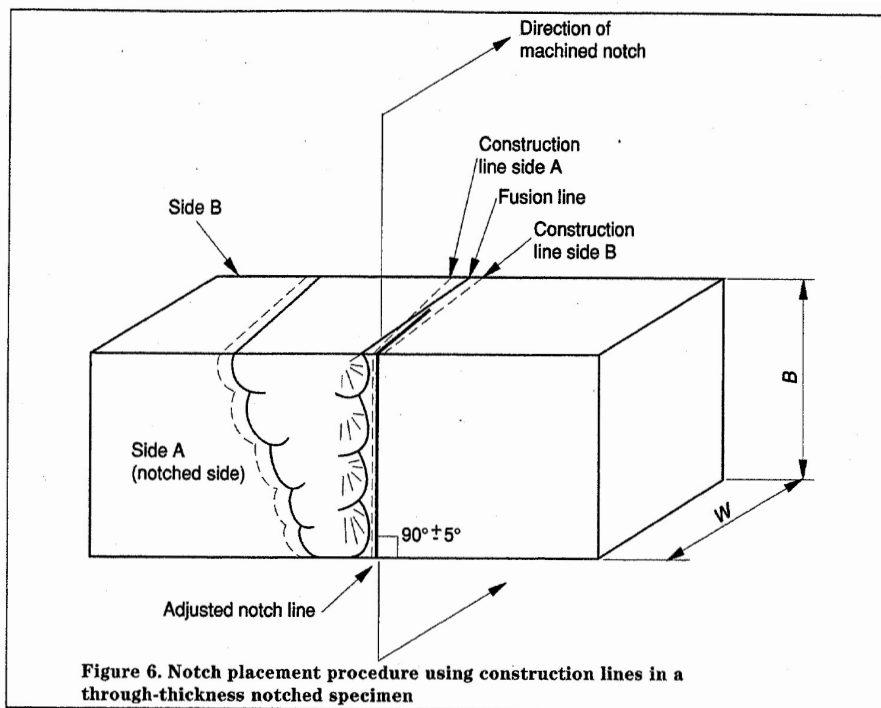
Particularidades

Normas de aplicación

- **BSI 7448** *Fracture mechanics toughness tests. Part 2. Method for determination of K_{IC} , critical CTOD and critical J values of welds in metallic materials.*
- **ASTM E2818 - 11.** *Standard Practice for Determination of Quasistatic Fracture Toughness of Welds.*
- **ISO 15653.** *Metallic materials - Method of test for the determination of quasistatic fracture toughness of welds (ISO/DIS 15653:2006)*

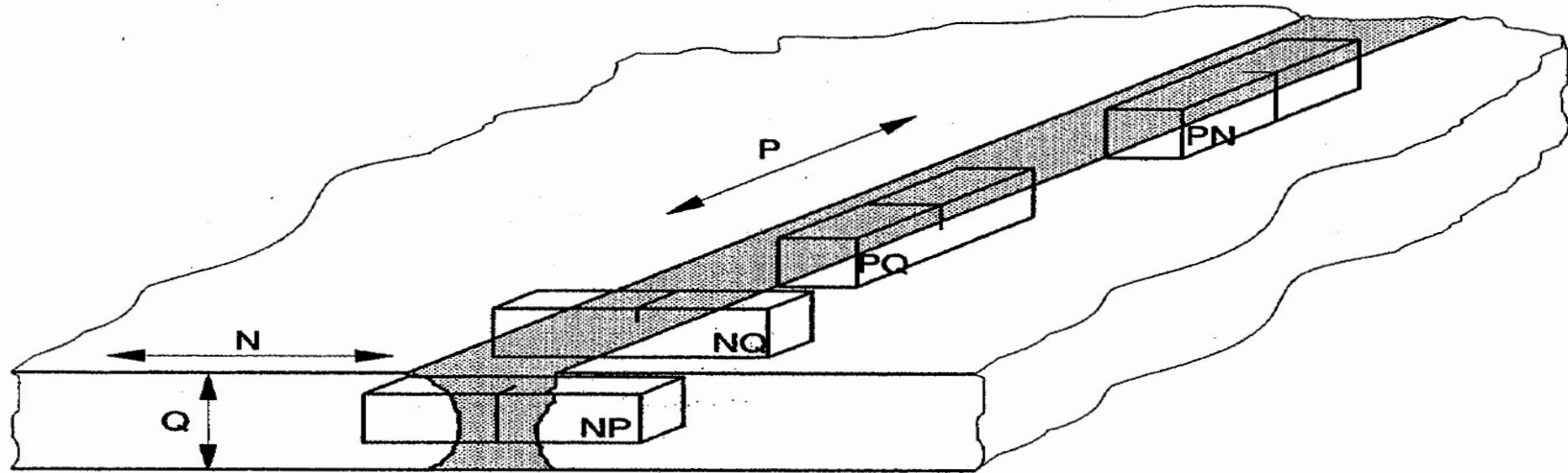
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Tipos de juntas



LPM-GMI

Extracción de probetas



N = Normal to weld direction
P = Parallel to weld direction
Q = Weld thickness direction

First letter: the direction normal to the crack plane

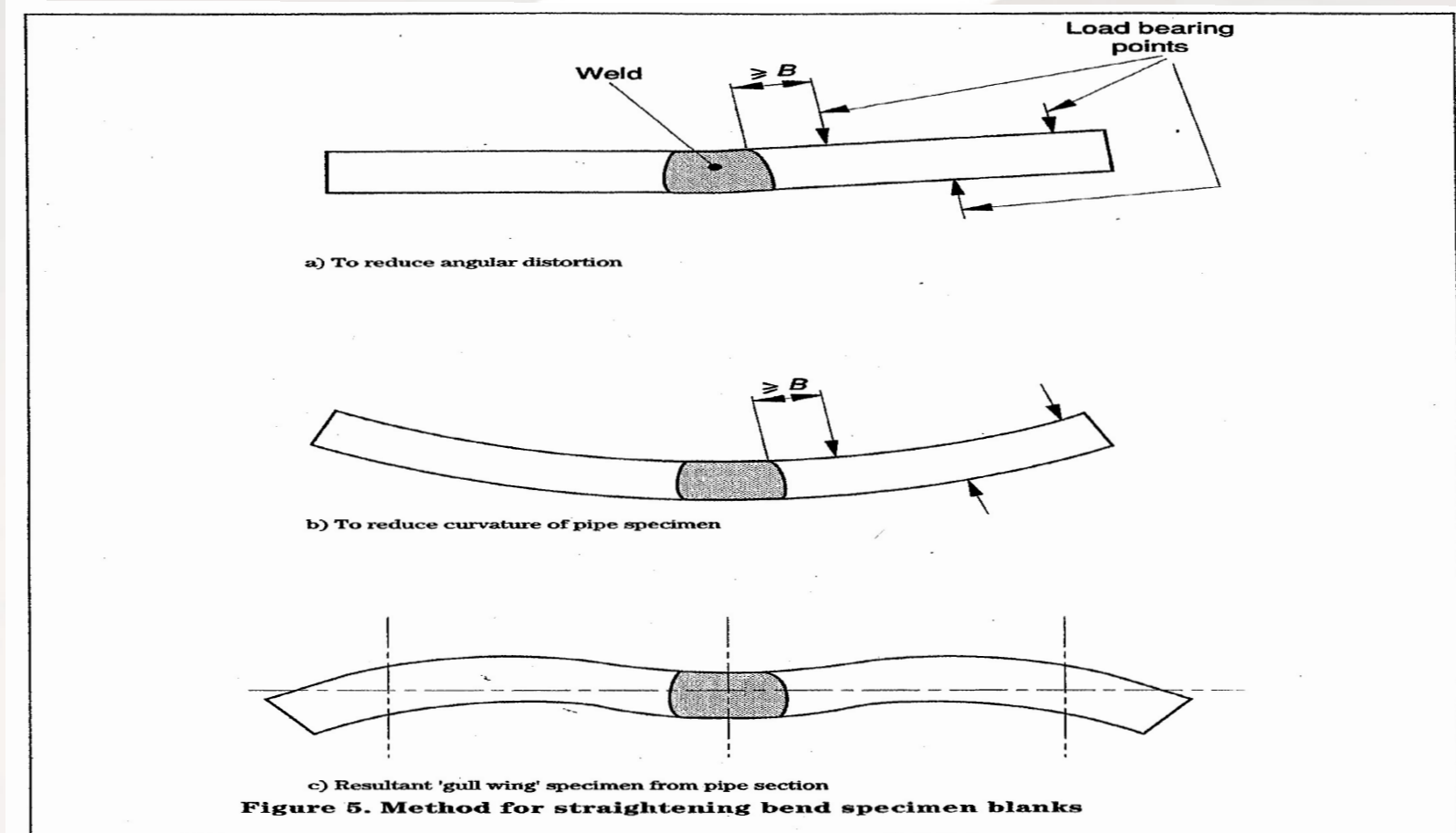
Second letter: the expected direction of crack propagation

A subscript X or Y is added to the N direction to indicate whether this direction is parallel or transverse to the primary grain flow direction in the parent material when testing the HAZ, e.g. if N is parallel to the primary grain flow direction, the NP specimen is defined as N_XP , and N_YP if the primary grain flow direction is perpendicular to N.

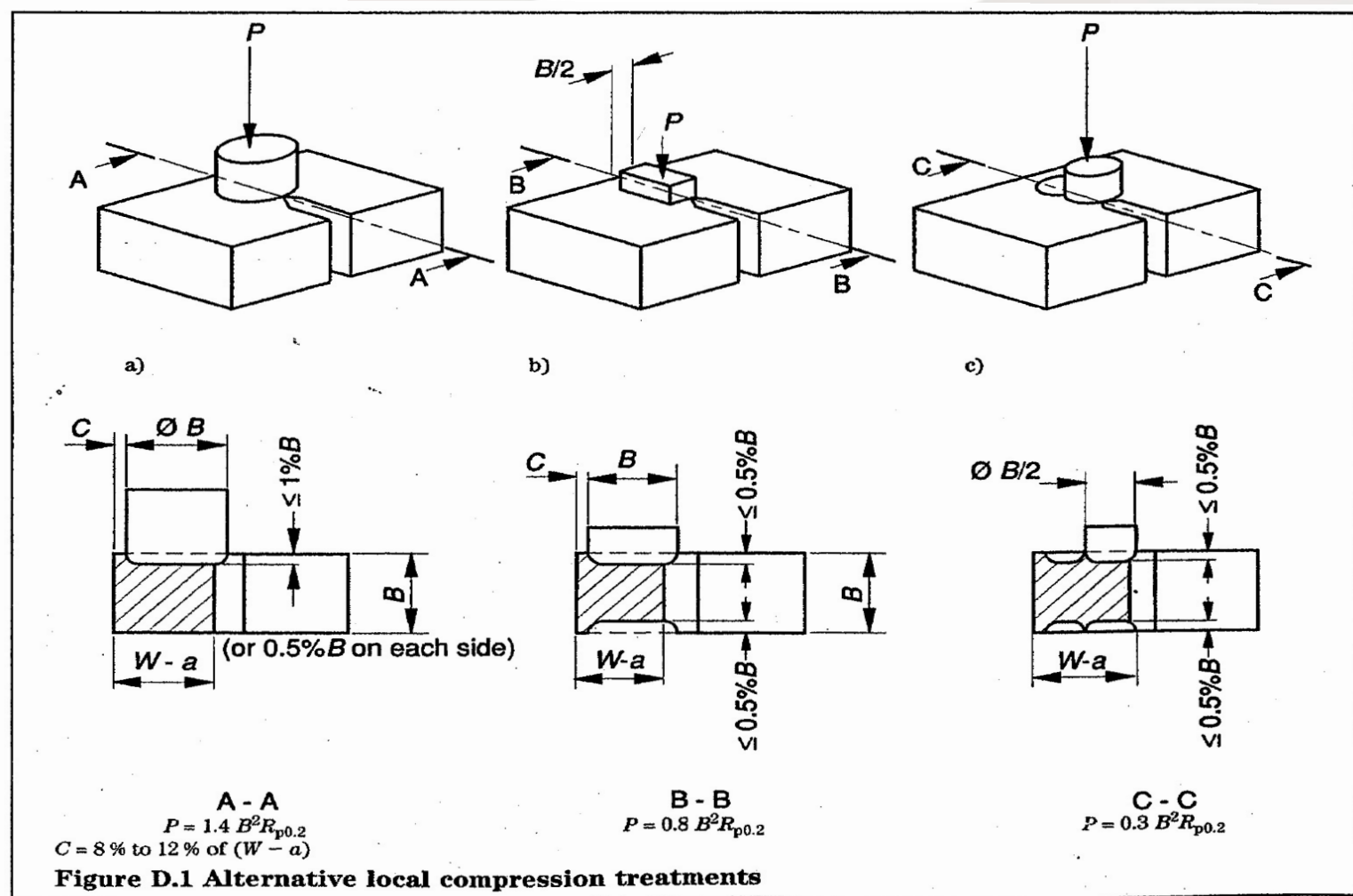
Specimen orientations NP and PN shall be referred to as through-thickness notched, whilst specimen orientations NQ and PQ shall be referred to as surface notched.

Figure 2. Crack plane orientation code for welded fracture toughness specimens (defined relative to weld direction)

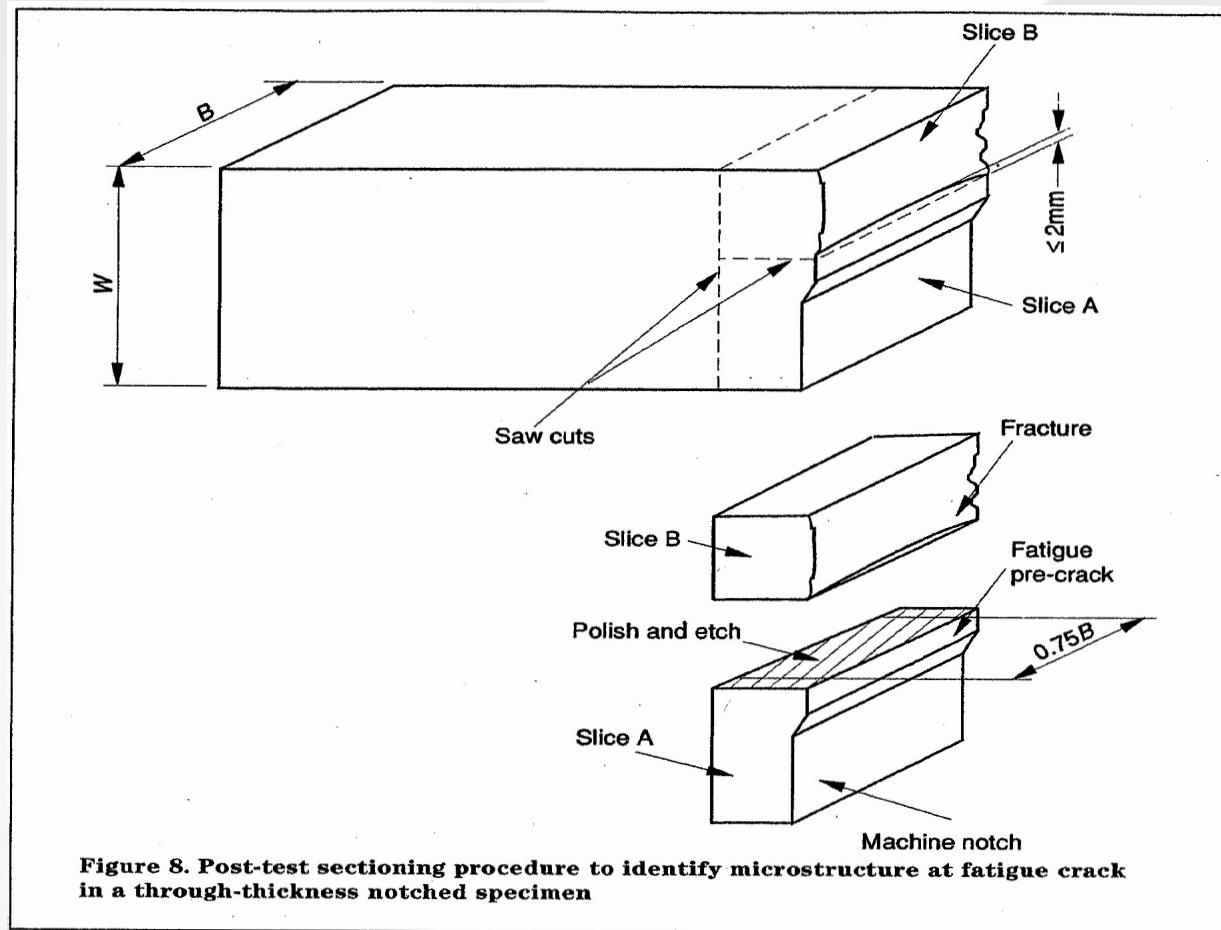
Enderezado de probetas



Precompresión lateral local



Verificación post-test



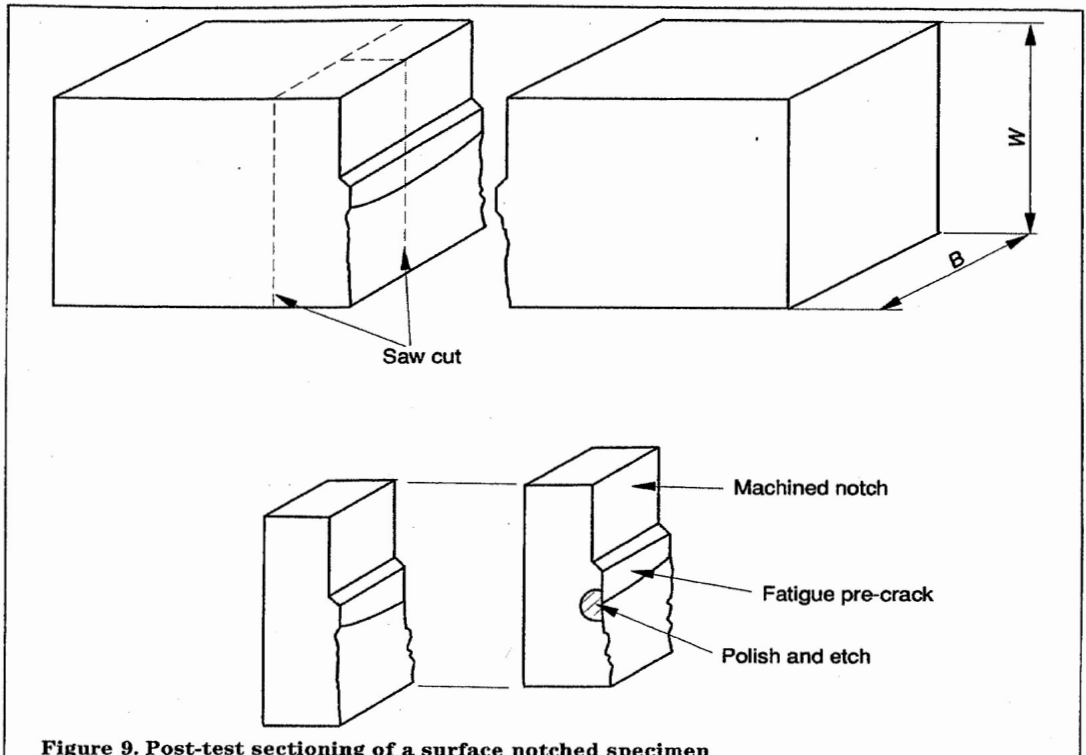


Figure 9. Post-test sectioning of a surface notched specimen

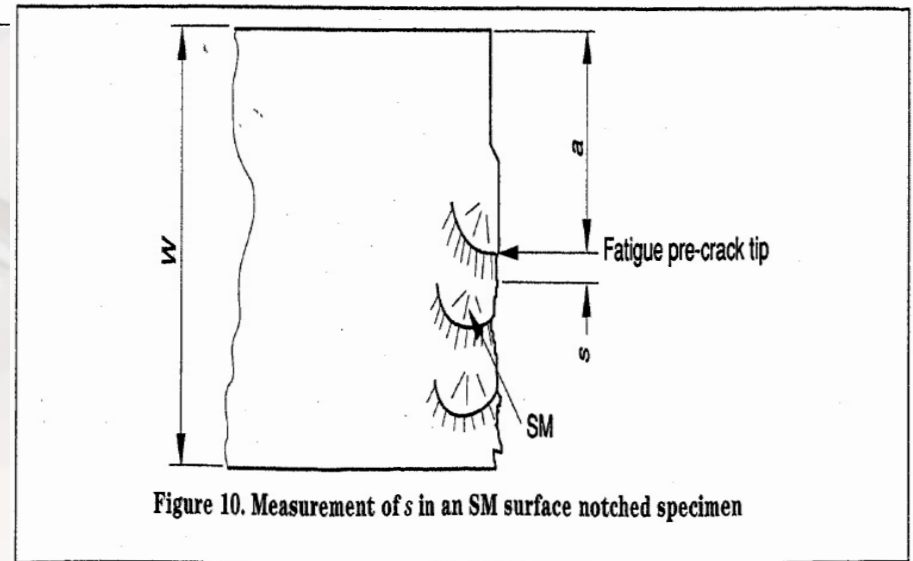
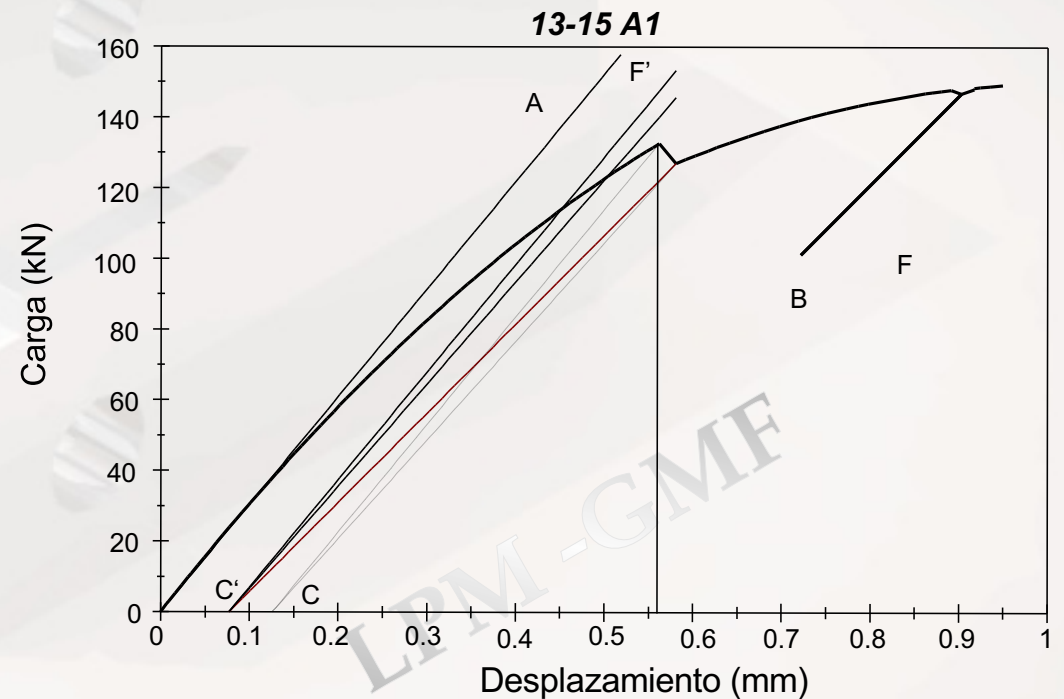
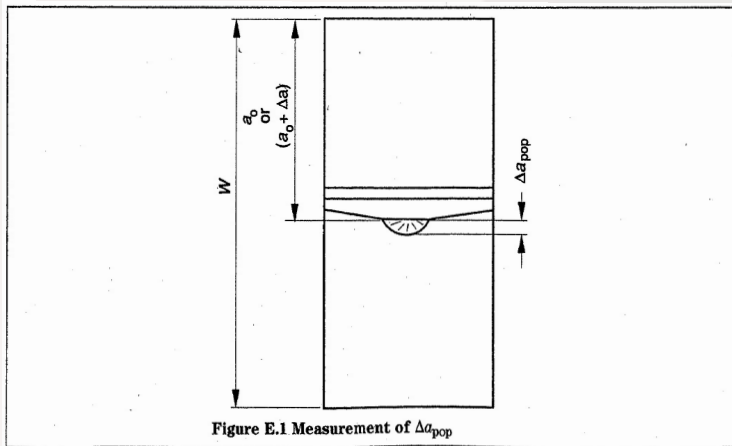


Figure 10. Measurement of s in an SM surface notched specimen

Pop-in

El *pop-in* surge por el disparo en forma frágil de una fisura desde una zona frágil local (ZFL). Se supone que esta fisura que avanza en forma frágil es luego arrestada por el material más tenaz que rodea la ZFL



Evaluación del *Pop-in*

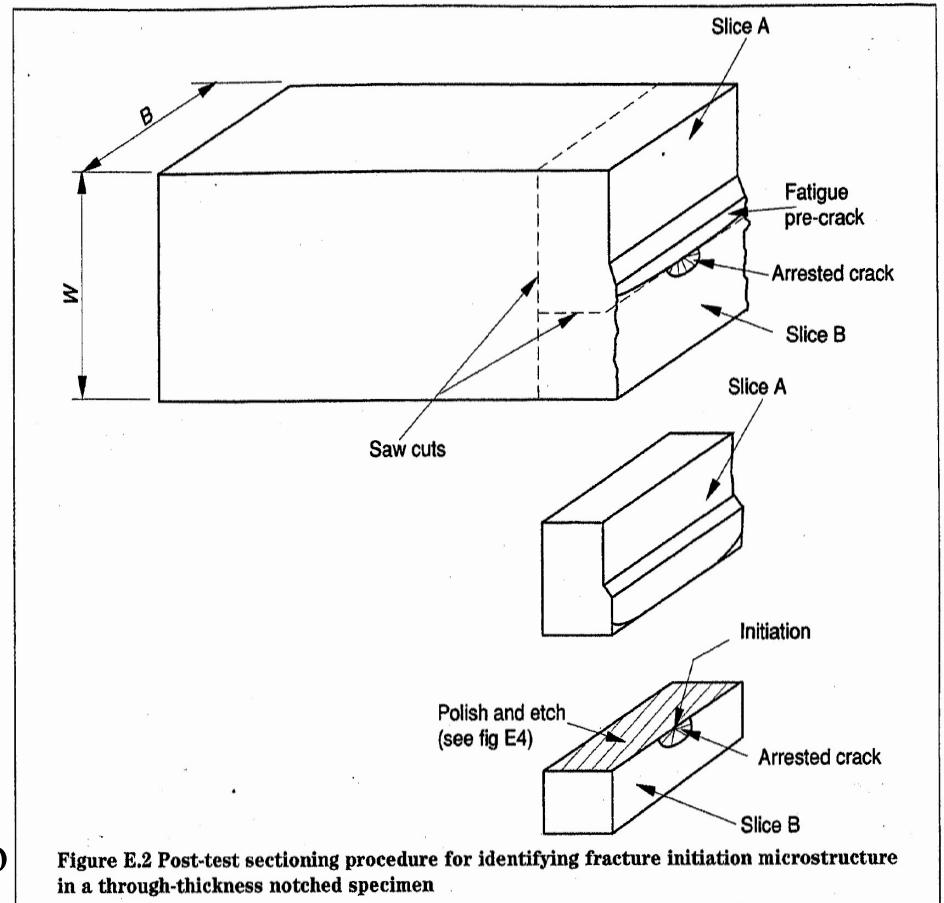
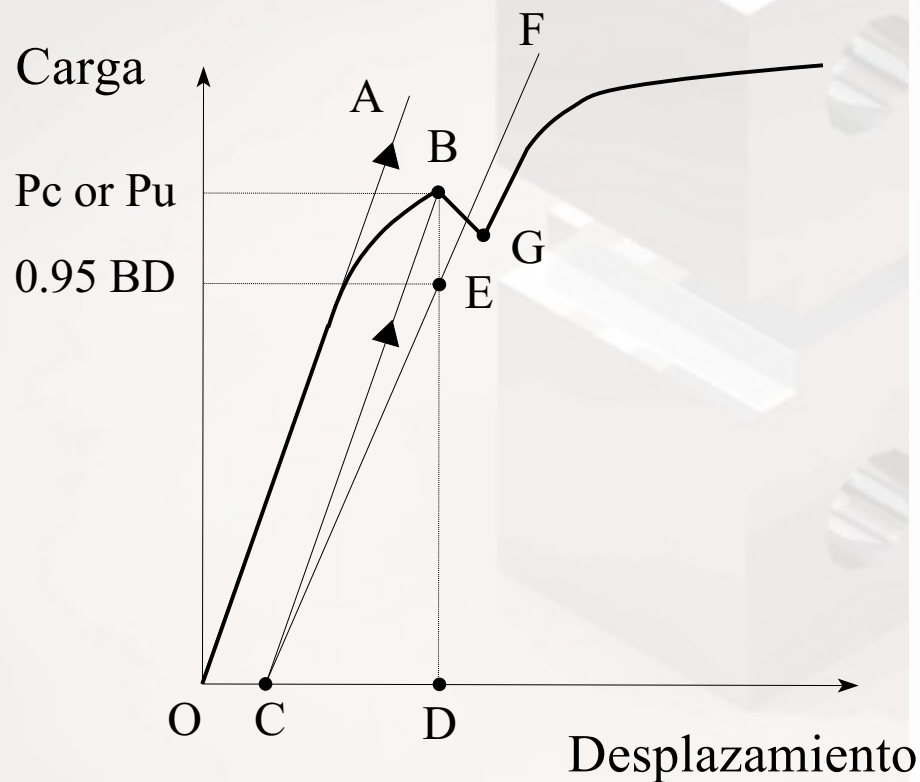


Figure E.2 Post-test sectioning procedure for identifying fracture initiation microstructure in a through-thickness notched specimen