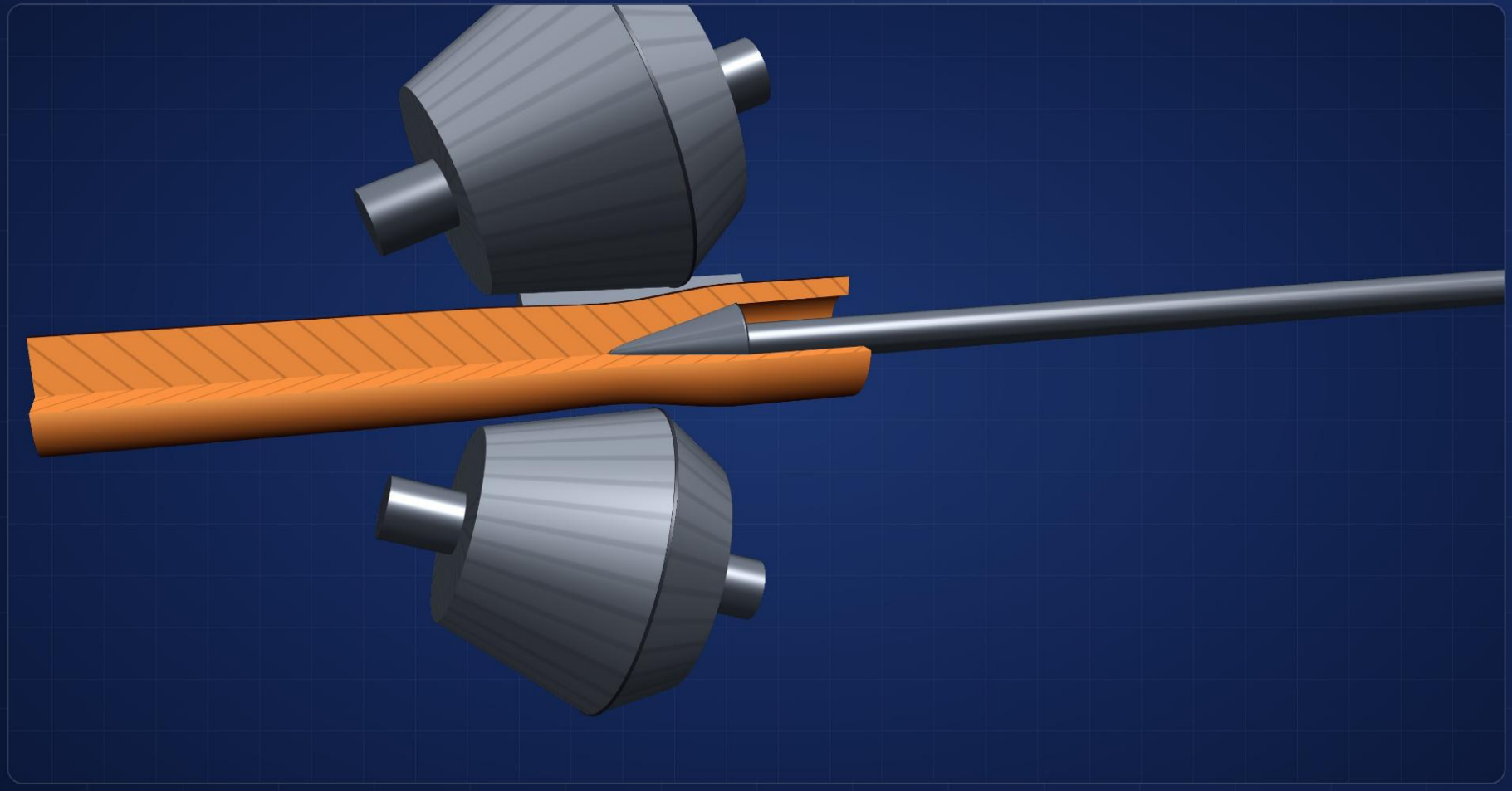
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FACT CHECK

HOT PIERCING VS HOT EXTRUSION

"Piercing is inferior." Is it?

An extrusion tube maker has published its case against hot piercing. We checked every claim against metallurgy, international standards and measured shop-floor data.



8 claims. 8 facts. Swipe →

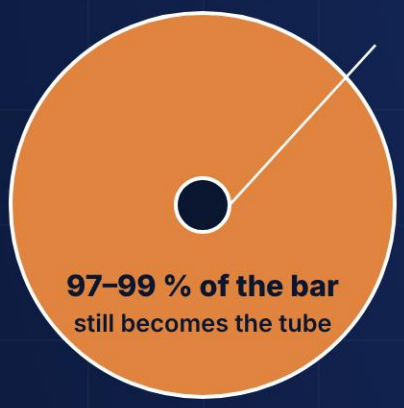
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THEY SAY

“Defects at the bar centre end up on the inside of a pierced tube.”

THE FACTS

Clean bars make clean bores — by either route.



1–3 %
of the bar's cross-section is all an extrusion pilot hole (10–16 % of diameter) removes

99.6 %
of 500 pierced hollows defect-free in a published case study



REAL **Bar macro-etch** — no visible casting defects at the centre



REAL **Pierced bore, 200×** — inside surface free of defects

- Drilling can't clean a dirty bar. **Clean tube starts with clean steel** — melt practice and bar inspection.
- ASTM A312 & A790 (pipe), A269 & A789 (tubing) require **NDT or hydrotest on every pipe and tube**, whatever the route.

Elayaperumal, Hot Rotary Piercing case study (2015) · ASTM A312, A790, A269, A789 **www.chandansteel.net**

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CLAIM 2 / 8

THEY SAY

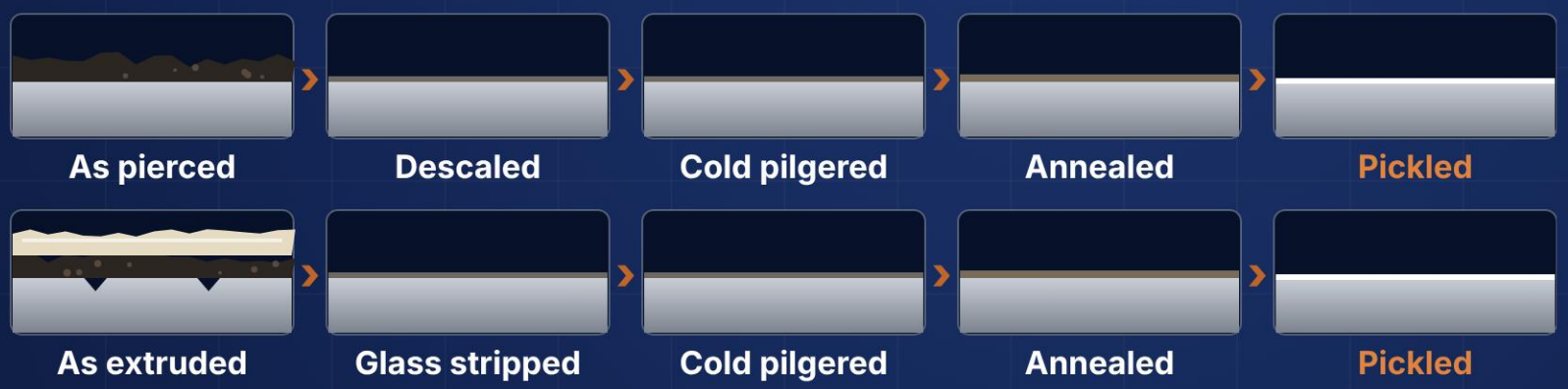
“Gas-furnace heating forms scale that gets trapped in the tube surface.”

THE FACTS

Scale never reaches the finished tube.

HOT SURFACE → FINISHED SURFACE then NDT / hydrotest on every tube

TUBE SURFACE, MAGNIFIED (SCHEMATIC)



Free of scale Required, whichever route: ASTM A312 & A790 pipe, A269 tubing (“pickled free of scale”), EN 10216-5 (“descaled, metallically clean”). Piercing heats once, extrusion twice.

- Extrusion lines also **heat billets in gas furnaces** before induction — and must then **strip glass from the bore**.
- The finished surface is made **downstream**, by either route.

⚠ BUYER ALERT

Some mills **skip the furnace soak and use induction heating alone**. Without a proper soak the billet core can stay colder than the surface — inviting **cracks, uneven walls and inconsistent structure**. Hidden defects like these put your plant's **performance and safety** at risk.

ASTM A312, A790, A269 · EN 10216-5 · Inco patent EP0128682 (glass removal)

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CLAIM 3 / 8

THEY SAY

“Furnace gases cause carburisation and sulphur pick-up in pierced tubes.”

THE FACTS

Controlled heat. Verified chemistry.

FUEL

Clean piped natural gas — a very low-sulphur fuel

HEATING

One controlled soak — atmosphere and time managed

SURFACE

Surface layer removed by pickling after annealing

PROOF

Chemistry + ASTM A262 intergranular corrosion tests

- Carbon and sulphur are **measured on the finished tube** — the test result decides, not the hot-forming route.
- Extrusion billets also see furnace or induction heat — **the same tests apply to them**.

ASTM A312/A312M · ASTM A262 practices for intergranular attack

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CLAIM 4 / 8

THEY SAY

“No lubricant in piercing means high friction, scuffing and micro-cracks.”

THE FACTS

Roll grip is the engine of piercing — by design.



- Cone-shaped rolls **need** grip to spin the bar forward over the plug. It's engineered, not accidental.
- The hot surface is later **cold pilgered, annealed and pickled**.
- Extrusion's glass has its own defects: **grooves, orange-peel and glass-related cracking** when glass flow is off.

Hayashi et al., J. Manuf. Sci. Eng. 121(3) 1999 · Procedia Manufacturing (2019), UNS N06625 tube lubrication

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CLAIM 5 / 8

THEY SAY

“Laminations form if piercing variables deviate, so it needs constant monitoring.”

THE FACTS

Every hot process needs control. That's the point.

PIERCING CONTROLS

Bar temperature
Roll angle & speed
Plug position
Piercing ratio

EXTRUSION CONTROLS

Two heating cycles
Glass viscosity & coating
Ram speed
Die & mandrel wear

0
radial cracks in 500 controlled piercings

2.6–3.2
piercing ratios achieved in the case study



REAL **Bar, 200×** — ASTM grain size 6–7



REAL **Pierced hollow, 200×** — ASTM 7–8, **finer**

- Out of control, extrusion has its own defects: **eccentric walls, glass marks, cracking**.

Elayaperumal, Hot Rotary Piercing case study (2015) · Procedia Manufacturing (2019) **www.chandansteel.net**

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CLAIM 6 / 8

THEY SAY

“Piercing takes 25–30 seconds. Extrusion takes about 4.”

THE FACTS

Count the whole route, not one stroke.

HOT PIERCING

Heat once | Pierce · ~20 s | Quench | Hollow ✓

HOT EXTRUSION

Drill | Heat | Press-pierce / expand | Reheat | Glass coat | Extrude · ~4 s | Strip glass | Cut butt | Hollow ✓

- The 4 seconds is **only the press stroke**. Drilling, two heatings and glass handling come on top.
- The pierced hollow is **quenched immediately** after a ~20 s pass.

Elayaperumal, Hot Rotary Piercing case study (2015)

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CLAIM 7 / 8

THEY SAY

“Piercing suits standard specifications. Demanding grades need extrusion.”

THE FACTS

Standards specify the tube, not the route.

1150–1250 °C
hot-working range of stainless steels

35 m
single lengths Chandan supplies

10–20k psi
pressure rating by grade & wall design

P = 2St / D
Barlow: strength, wall, diameter — no “route” term

- ASTM A312, A790, A269, A789 and EN 10216-5 set chemistry, properties and tests — **none requires extrusion**.
- Cone-type piercers were **developed for hard-to-work alloys**: stainless, duplex and nickel grades.

Prasad & Sasidhara, Hot Working Guide, ASM (1997) · Hayashi et al. 1999 · ASTM A312/A790/A269/A789 · EN 10216-5

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CLAIM 8 / 8

THEY SAY

“Induction heating, glass lubrication and compressive forming make extrusion superior.”

THE FACTS

Each “advantage” is an extra step.

INDUCTION HEATING

= a second heating of the same bar

GLASS LUBRICATION

= glass to buy, apply, strip and dispose of

COMPRESSIVE FORMING

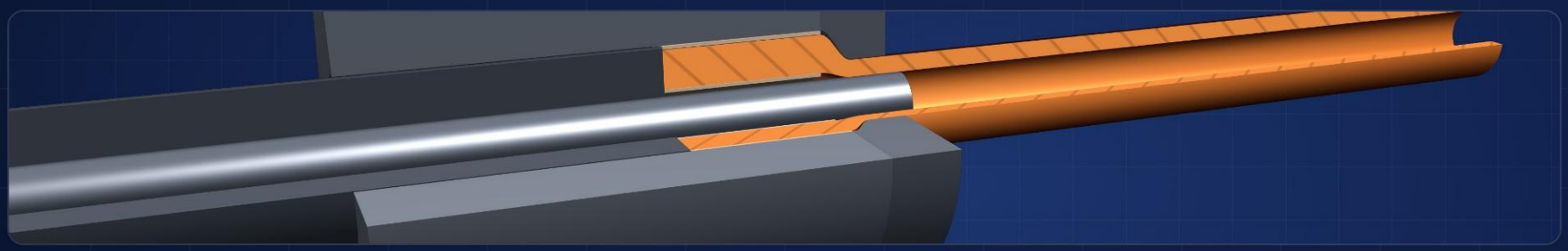
Final structure is set by cold work + annealing — in both routes

PILOT HOLE + PRESS

Extrusion has its own piercing step

15–25 % more cost

the extrusion premium — by its own promoters' figure. It pays for extra steps, not a better tube.



Published articles of an extrusion tube mill · Inco patent EP0128682

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THE VERDICT

The route doesn't decide quality. Process control does.

BEFORE YOU APPROVE ANY MILL, CHECK

01
The bar — cleanliness & soundness

02
The heating — control & records

03
The glass removal — if extruded

04
The testing — every tube

Approve the mill, not the route.

Only a handful of piercing mills worldwide go beyond global benchmarks.
Chandan Steel is one of them.