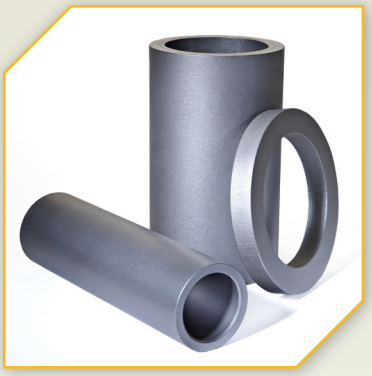
ATI 690™ ALLOY TREX

ATI Nuclear Energy

Product Sheet



ATI 690™ Alloy TREX produced in various sizes from tube hollows

ATI 690™ Alloy Tube Reduced Extrusion (TREX) is available in varying lengths, outer diameter (OD), and wall thickness (WT). This nickel alloy material is manufactured to, and intended to be used in the production of nuclear grade tube meeting the requirements outlined in this specification for ASTM B-163 and EPRI Guidelines for PWR Steam Generator Tubing.

Melt Practice

Material will be melted by VIM and ESR processes.

Typical Chemistry

Element	Composition (wt. %)	Element	Composition (wt. %)
Nickel, min	58.00	Sulfur, max	0.002
Chromium	28.50 to 31.00	Phosphorus, max	0.015
Iron	9.00 to 11.00	Copper, max	0.05
Carbon	0.015 to 0.025	Cobalt, max	0.014
Aluminum, max	0.40	Nitrogen, max	0.030
Titanium, max	0.35	Boron, max	0.002
Manganese, max	0.50	Nb + Ta, max	0.1
Silicon, max	0.50	Molybdenum, max	0.1

Standard Size of TREX

50.8 mm OD x 4.75 mm WT (2.0" OD x 0.187" WT)
Other sizes are available upon request.

Grain Size of TREX

ASTM Standard 4.0 or finer (ASTM E 112)

Dimensional Tolerances

Outside Diameter	± 1.5%
Wall Thickness	± 12.5%
Eccentricity	± 7.5%
Straightness	2.5 mm/m (0.030 in/ft)

Welding

Weld repairs are prohibited.

QUALITY TESTING

Tensile

One sample per lot would be randomly selected for room temperature tensile testing. Tensile Strength [MPa or Ksi], Yield Strength (at 0.2% Offset) [MPa or Ksi], and Elongation % will be reported for information only.

Hardness

One bulk material Rockwell B hardness value would be provided for each lot for information only.

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Inclusion	Thin	Thick
A	1	0.5
B	3.0	1
C	0.5	0.5
D	1.5	1
Titanium carbides and titanium nitrides		
Inclusion	**Thin**	**Thick**
B	3	3
D	4	3

Ultrasonic

All TREX product would be ultrasonically inspected by a method and standard mutually agreed upon.

Microcleanliness

Microcleanliness testing and rating would be performed on ATI 690™ TREX in accordance with ASTM E45 procedure, Method A.

FINAL PRODUCT

Thermal Treatment

TREX product is provided in the fully annealed condition, unless otherwise requested.

Finish Condition

Both lead and tail ends would be cropped, squared, and de-burred. The TREX product would be supplied in a clean, descaled, and pickled condition free of oxides, and foreign material. The TREX product will be free of injurious external and internal imperfections, cracks, laps, and folds.

Surface Roughness

TREX product would have a surface roughness of 3.2µm Ra (125 micro inches) or better for both ID and OD. Defects up to 0.25mm (0.010 inches) in depth are acceptable, but will be minimized.

Product Marking

Unless otherwise agreed to between manufacturer and purchaser, each length of TREX product would be legibly marked with ATI Wah Chang as the manufacturer, ATI 690™ Alloy, specification number, lot number, and unique tube number.

Packaging and Package Marking

The tube would be packaged in accordance with the manufacturer's standard practice unless otherwise agreed upon between the manufacturer and the purchaser and so stated in the purchase order.

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