

# Angel Hair® Stainless Steel

Angel Hair Stainless Steel utilizes a patented process and precision-controlled machinery to etch an exceptionally smooth and refined finish, offering up the most uniform light-diffusion available for stainless steel. This incredible finish scatters light, and reduces concentrated heat and blinding reflections, all while retaining a lustrous and velvety appearance.

## MAIN FEATURES AND CHARACTERISTICS

- Perfectly uniform finish - precision machinery eliminates unwanted variability between sheets.
- Stainless steel construction means minimal change in appearance, even after decades of weathering.
- Availability in a wide variety of sheet thicknesses, sizes and order quantities to fit almost any project and budget.
- 100% metal construction means a familiar and common fabrication techniques, a non-combustible surface, and easy recyclability at end-of-life.

## AVAILABLE ALLOYS, THICKNESSES AND SIZES

Angel Hair Stainless Steel is available in both 304 and 316 alloys, is supplied in a variety of sheet thicknesses and sizes, and is available as either a single- or double-sided product.

Refer to the table below for more detailed information.

### ANGEL HAIR STAINLESS STEEL - THICKNESS AND SIZE AVAILABILITY

Thicknesses	Sheet Sizes					
	4' x 8'	4' x 10'	4' x 12'	5' x 8'	5' x 10'	5' x 12'
20 ga [0.038"]	available single-sided only					
18 ga [0.050"]						
16 ga [0.063"]						
14 ga [0.078"]						
12 ga [0.109"]	available single- or double-sided					
11 ga [0.125"]						
3/16" [0.188"]	not available					

## DIMENSIONS AND TOLERANCES

Dimensional tolerances for Angel Hair Stainless Steel are provided in the table below.

### ANGEL HAIR STAINLESS STEEL - DIMENSIONAL TOLERANCES

Property	Unit	Value
Width	in	+1/8, -0
Length	in	+3/8, -0
Flatness <sup>1</sup>	in	0.4

<sup>1</sup> Maximum deviation from a horizontal, flat surface.

## PATTERN AND COLOR

Angel Hair Stainless Steel is made using Zahner's patented Angel Hair process and precision-controlled machinery. This ensures an almost perfectly uniform finish across the sheet, and minimizes variation between sheets.

Due to the nature of the edge conditions present on stainless steel sheet, the Angel Hair process will not consistently apply the Angel Hair finish within 1" of all edges. Factor this reduced coverage into any design considerations or take-off calculations.

Naturally occurring color variations within and between lots of stainless steel are beyond Zahner's control and will not be the basis of rejection.

## MATERIAL HEALTH AND TRANSPARENCY

Angel Hair Stainless Steel is qualified under the International Living Future Institute's Declare label program and is free of toxic ingredients as defined by the ILFI Red List.

## MATERIAL AND PHYSICAL PROPERTIES

Angel Hair Stainless Steel is a cold-rolled stainless steel. Select material and physical properties are presented in the table below.

### ANGEL HAIR STAINLESS STEEL - SELECT MATERIAL AND PHYSICAL PROPERTIES

Property	Unit	Value
Density	lbs/ft <sup>3</sup>	483
Coefficient of Thermal Expansion	in/in/°F	9.6 × 10 <sup>-6</sup>

## FLAMMABILITY

Angel Hair Stainless Steel is 100% monolithic stainless steel and is a non-combustible material.

## OUTDOOR USE AND LIMITATIONS

Angel Hair Stainless Steel can be used in most exterior applications. Certain horizontal applications, such as exterior counters or seating, are discouraged due to the potential for water to pool and create spotting or other staining effects.

## FABRICATION GUIDELINES

Please follow the below guidelines for fabricating sheets of Angel Hair Stainless Steel.

### General notes for all fabrication

- Follow best-practices in regards to proper occupational health and safety measures, such as the wearing of eye protection, and the use of respirator devices when grinding or polishing.
- Prior to fabrication for your project, it is strongly recommended that any fabrication steps be tested on sample material or fall-off.

## Cutting and Drilling

Use High Speed Steel, Heavy Duty Machine Drill bits at the proper speed when drilling holes.

Angel Hair Stainless Steel may be cut using a shear for simple linear cuts. The use of cardboard or other surface protection measures are recommended to protect the surface from oils and other debris.

For the cutting of simple curves and forms, manual cutting methods appropriate for stainless steel, eg, a cutting wheel, or jigsaw with the proper blade, will suffice.

For the cutting of complex and/or detailed shapes, CNC methods, such a laser cutting machine capable of cutting stainless steel, or water jet, is recommended. For appropriate cutting parameters (speed, power, etc), please reference the manufacturer's recommended settings for stainless steel.

## Bending

Angel Hair Stainless Steel can be bent to a variety of forms using commonly practiced sheet-metal bending techniques. To maintain the appearance of the Angel Hair Stainless Steel surface, the following best-practices are recommended:

- DO use a brake-press with a properly sized punch and die.
- DO use Rhino Hide or an equivalent aid to protect the surface.
- DO NOT bend to an outside radius less than 2.5x the thickness of the sheet.

## Welding and Soldering

Angel Hair Stainless Steel is compatible with all stainless steel welding methods, including stud welding techniques.

Note that the surface of the welds will not match the Angel Hair finish. Therefore, it is recommended that designs that require welding take this into account and locate the welds where they will be hidden from view.

## Gluing

Angel Hair Stainless Steel is compatible with a variety of common adhesives designed for metals. Follow the manufacturer's recommended procedures for steel/metal when bonding Angel Hair Stainless Steel to other materials.

## STORAGE AND HANDLING

Angel Hair Stainless Steel should be stored in its original packaging in a dry, indoor location away from direct sunlight. Store the product on flat, level ground. Keep in a low-traffic location to help protect all edges from incidental damage. Any protective masking, if applied, should be removed within 6 months of the date of shipment.

- Do not store outside, in direct sunlight, or in wet environments.
- Do not stack objects on top of the products or packaging.

### Handling

When handling Angel Hair Stainless Steel, the wearing of cotton, nitrile or latex gloves is recommended to prevent dirt and oils from contaminating the finish. When carrying or manually transporting, take all necessary precautions to prevent denting, scratching or other damage to the finish. If temporarily setting sheets of Angel Hair Stainless Steel on an edge, the use of wood blocking and/or shop towels is recommended between the sheet's edge and the ground in order to prevent denting or deforming of the edge.

## CLEANING

Clean Angel Hair Stainless Steel at least once per year to ensure the initial appearance is retained. Use warm soapy water and a clean, soft cotton cloth, followed by a thorough rinse using clean water. Wipe dry with a clean, soft cotton cloth.

If a more aggressive cleaning solution is required, Isopropyl Alcohol, Windex® Original Glass Cleaner, or Windex Vinegar Glass Cleaner can also be used. Clean and wipe dry with a clean, soft cotton cloth.

Commercially available cleaners for stainless steel, such as Sprayway® or ZEP® Stainless Steel Cleaner, can be used. However, note that these typically contain oils that will penetrate into the Angel Hair finish and change its appearance. If these cleaners are used, cleaning of any adjacent sheets may also be required in order to maintain a consistent appearance between sheets.

**Do not** use cleaners that contain chlorides (such as bleaches) or abrasives, as these will damage the Angel Hair finish and/or the underlying stainless steel.

Whenever cleaning Angel Hair Stainless Steel for the first time, test in an inconspicuous area. If a successful result is obtained, cleaning the rest of the surfaces can begin. Clean the entire surface equally - clean all the way to any edged or joints - to avoid visible differences in appearance.

## REFINISHING

Minor scuffs and scratches will initially appear bright, but will passivate/oxidize and blend in with the original finish over time.

Spot or 'touch-up' sanding is discouraged as it will create a region of finish that does not match the original.

If refinishing the sheet is required, use an orbital sander with a 3M Scotch-Brite™ 7447 Pro pad. Refinish the entire visible surface to avoid a mis-match between the sanded finish and the original.

## END OF LIFE AND DISPOSAL

Angel Hair Stainless Steel is 100% monolithic stainless steel and can be recycled at end of life using the existing scrap and recycling streams for metals.