

# ***HOLLOW STRUCTURAL SECTIONS***

**PRINCIPAL PRODUCERS AND CAPABILITIES**



**Steel Tube  
Institute**  
OF NORTH AMERICA

2 0 0 5   R E V I S E D   E D I T I O N

# What Is HSS?

The term "HSS" stands for Hollow Structural Sections. HSS is a cold-formed welded steel tube used for welded or bolted construction of buildings, bridges and other structures and a wide variety of manufactured products. It is produced in square, rectangular and round shapes to meet design requirements.

In recent years, HSS has experienced

significant growth. Its flexibility has opened up exciting new design concepts...in everything from airport terminals to shopping malls, office buildings to domed stadiums, convention centers to residential housing. It's being called the design material of the 21st Century.

Building construction isn't the only market for HSS. It's just the fastest growing

one. Hollow structural sections have been used for years in bridges, highway signs, guard rails, power transmission towers, oil rigs and other structures. They're also an important material in autos and trucks, construction equipment, farm machinery, railroad cars, office furniture, recreation equipment, warehouse rack and storage systems, plus many other applications.

# Benefits of HSS

Here are some principal benefits that you can count on from the use of HSS in construction and other applications:

- Strength - HSS has high strength-to-weight ratios, excellent compression support characteristics and excellent torsional resistance.
- Appearance - In exposed applications, round, square and rectangular HSS becomes an exciting, visual part of the design of buildings and other structures.
- Uniformity - HSS provides a uniformity of size, shape, strength and tolerances that makes its use totally predictable.
- Ease of Fabrication - HSS can be readily bent, formed, punched and drilled. And new, improved methods to fasten HSS to itself or to other materials are making its use simpler and faster.
- Cost Effectiveness - Because of its superior strength-to-weight ratios, HSS can provide significant weight and cost reductions. Reduced weight can also mean additional savings in fabrication, erection and shipping costs.

- Resistant/Consistent - HSS is fire resistant, dry rot and mildew resistant, as well as termite and carpenter ant resistant.

- Environmentally Friendly - HSS is made from steel, one of the world's most recyclable and recycled materials.



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# STI/HSS Member Companies

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## **Bull Moose Tube Company**

1819 Clarkson Road, Suite 100  
Chesterfield, MO 63017  
Telephone: (636) 537-2600  
(800) 325-4467  
Fax: (636) 537-5848

## **Columbia Structural Tubing**

8735 N Harborgate ST  
Portland, OR 97203  
Telephone: (503) 737-1200  
(877) 737-1202  
Fax: (503) 737-1202

## **IPSCO Tubulars Inc.**

P.O. Box 18, 2011 7th Avenue  
Camanche, IA 52730  
Telephone: (563) 242-0000  
(800) 945-8936  
Fax: (563) 242-9137

## **Maruichi American Corp.**

P.O. Box 3187  
11529 Greenstone Ave.  
Santa Fe Springs, CA 90670  
Telephone: (562) 903-8600  
(800) 654-5495  
Fax: (562) 903-8601

## **Prolamsa**

*(Mexico Headquarters)*  
Carretera a Colombia Km. 5.75  
Escobedo, N.L.,  
Mexico C.P. 45560  
Tel +52 (81) 8154-0200  
Fax +52 (81) 8901-1709

## **Prolamsa USA, Inc.**

*(U.S. Headquarters)*  
770 South Post Oak Lane  
Suite 200, Houston, TX 77056  
Tel (281) 494-0900  
Fax (281) 494-0990

## **Southland Tube Inc.**

P.O. Box 2425  
Birmingham, AL 35201-2425  
Telephone: (205) 251-1884  
(800) 543-9024  
FAX: (205) 251-1553

## **Valmont Industries**

*(Structural Tube Division)*  
HWY 275, P.O. Box 358  
Valley, NB 68064  
Telephone: (800) 345-6825  
Fax: (402) 359-4481

## **Vest, Incorporated**

6023 Alcoa Avenue  
Los Angeles, CA 90058  
Telephone: (323) 581-8823  
(800) 421-6370  
Fax: (323) 581-3465

## **Welded Tube**

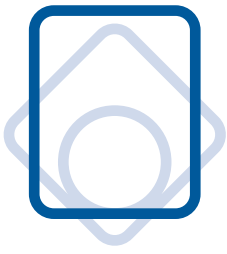
111 Rayette Road  
Concord, Ontario,  
Canada L4K 2E9  
Telephone: (905) 669-1111  
(800) 565-8823  
Fax: (905) 669-8570

### ***Please Note:***

*We've tried to make this brochure as comprehensive and factual as possible.  
However, some information may have been updated since the time of printing.  
Your HSS producer is your best source for up-to-date information.*



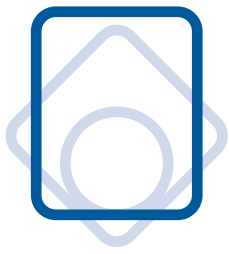




# RECTANGULAR HSS

	12 x 10			12 x 8					12 x 6					12 x 4					12x3½		12 x 3			12 x 2			10 x 8					10 x 6									
	1/2	3/8	1/4	5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	3/8	5/16	5/16	1/4	3/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	
Atlas Tube, Inc.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Bull Moose Tube Co.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Columbia Structural Tubing					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Copperweld				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
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Hannibal Industries, Inc.																																									
Independence Tube Corp.				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
IPSCO Tubulars Inc.**																																									
Maruichi American Corp.					•	•	•	•																																	
Novamerican																																									
Prolamsa																																									
Southland Tube Inc.					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Valmont Industries																																									
Vest, Incorporated**					•	•	•	•	•																																
Welded Tube of Canada Ltd.																																									

	10 x 5				10 x 4					10x3½					10 x 3					10 x 2					9 x 7					9 x 5											
	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8	5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16		
Atlas Tube, Inc.	•	•	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Bull Moose Tube Co.	•	•	•	•		•	•	•	•	•	•			•	•	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Columbia Structural Tubing						•	•	•	•	•																															
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Welded Tube of Canada Ltd.						•	•	•	•	•																															



# RECTANGULAR HSS

	9 x 3				8 x 6					8 x 4					8 x 3					8 x 2					7 x 5								
	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16
Atlas Tube, Inc.						•	•	•	•	•		•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	
Bull Moose Tube Co.			•	•	•	•	•	•	•	•		•	•	•	•	•	•		•	•	•	•		•	•	•	•	•	•	•	•	•	
Columbia Structural Tubing							•	•	•	•		•	•	•	•	•		•	•	•	•		•	•	•	•	•	•	•	•	•	•	
Copperweld		•	•	•	•	•	•	•	•	•		•	•	•	•	•		•	•	•	•		•	•	•	•	•	•	•	•	•	•	
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Independence Tube Corp.	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•		•	•	•	•		•	•	•	•	•	•	•	•	•	•	
IPSCO Tubulars Inc.**							•	•	•	•		•	•	•	•								•	•	•	•		•	•	•	•	•	
Maruichi American Corp.							•	•	•	•		•	•	•	•			•	•	•	•		•	•	•	•		•	•	•	•	•	
Novamerican													•	•	•	•												•	•	•	•	•	
Prolamsa																																	
Southland Tube Inc.	•	•	•	•	•		•	•	•	•		•	•	•	•	•							•	•	•	•	•		•	•	•	•	
Valmont Industries																																	
Vest, Incorporated**							•	•	•	•		•	•	•	•	•		•	•	•	•		•	•	•	•		•	•	•	•	•	
Welded Tube of Canada Ltd.		•	•	•	•		•	•	•	•		•	•	•	•	•		•	•	•	•		•	•	•	•		•	•	•	•	•	

	7 x 4					7 x 3					6 x 5					6 x 4					6 x 3					6 x 2							
	1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16
Atlas Tube, Inc.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Bull Moose Tube Co.	•	•	•	•	•	•			•	•	•	•	•	•	•	•	•					•	•	•	•			•	•	•	•	•	
Columbia Structural Tubing	•	•	•	•	•			•	•	•	•			•	•	•	•					•	•	•	•			•	•	•	•	•	
Copperweld	•	•	•	•	•	•	•	•	•	•	•			•	•	•	•					•	•	•	•			•	•	•	•	•	
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Welded Tube of Canada Ltd.		•	•	•	•	•		•	•	•	•		•	•	•	•		•	•	•	•		•	•	•	•		•	•	•	•	•	

\*\*Wall thickness for tubing listed as 1/8" is 11 gauge, or .120".









# ROUND HSS

	20.000		18.000		16.000				14.000				12.750		12.313				11.250				10.750			10.000					
	0.500	0.375	0.500	0.375	0.625	0.500	0.438	0.375	0.312	0.250	0.625	0.500	0.375	0.312	0.250	0.625	0.500	0.375	0.312	0.250	0.188	0.625	0.500	0.375	0.250	0.625	0.500	0.375	0.312	0.250	0.188
Atlas Tube, Inc.					•	•	•	•	•	•	•	•	•	•	•	•	•							•	•	•					
Bull Moose Tube Co.																															
Columbia Structural Tubing																															
Copperweld	•	•	•	•		•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•
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Hannibal Industries, Inc.																															
Independence Tube Corp.																															
IPSCO Tubulars Inc.**	•	•	•	•							•					•	•	•							•	•					
Maruichi American Corp.																•	•	•							•	•	•				
Novamerican																															
Prolamsa																															
Southland Tube Inc.																•	•	•						•	•	•	•	•	•	•	•
Valmont Industries																													•	•	•
Vest, Incorporated**																															
Welded Tube of Canada Ltd.																									•	•	•		•	•	•

	9.625					8.750				8.625					7.625		7.500				7.000				6.875				6.625															
	0.500	0.375	0.312	0.250	0.188	0.500	0.375	0.312	0.250	0.188	0.625	0.500	0.375	0.322	0.250	0.188	0.375	0.328	0.500	0.375	0.312	0.250	0.188	0.500	0.375	0.312	0.250	0.188	0.125	0.500	0.375	0.312	0.250	0.188	0.500	0.432	0.375	0.312	0.280	0.250	0.188	0.125		
Atlas Tube, Inc.	•	•	•	•	•						•	•	•	•	•								•	•	•	•	•																	
Bull Moose Tube Co.																																												
Columbia Structural Tubing																																												
Copperweld						•	•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
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Southland Tube Inc.						•	•	•	•	•	•	•	•	•	•				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Valmont Industries																																												
Vest, Incorporated**																																												
Welded Tube of Canada Ltd.	•	•	•	•	•																																							

Tubing is also furnished in most gauges between 5 and 11 in most of the sizes shown.

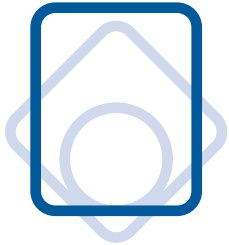


# METRIC SIZES OF HSS

The following tables show the STI's member companies that produce hard metric sizes. All HSS sizes listed in this publication can be converted to soft metric.

The HSS Committee of the Steel Tube Institute also produces two publications, relating to metrics, *Recommendations for Soft Conversion of HSS Sizes from U.S. Customary Units to Metric (SI) Units* and *Metric Dimensions and Section Properties*. Both are available on the Steel Tube Institute website ([www.steeltubeinstitute.org](http://www.steeltubeinstitute.org)) or by contacting the Steel Tube Institute: (440) 974-6990, fax: (440) 974-6994, e-mail: [sti@apk.net](mailto:sti@apk.net).

The STI member companies are the best sources for production capabilities and up-to-date information about metric size HSS.



## Rectangular HSS

### Minimum and Maximum Thickness

	30 x 60		30 x 90		40 x 60		40 x 100		40 x 120		45 x 75		50 x 120		60 x 80		60 x 120		80 x 140		90 x 100	
	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T
Bull Moose Tube Co.	1.6	4.0	2.0	3.0	1.6	6.0	2.0	3.0	3.0	6.0	2.0	3.0	4.0	6.0	6.0	6.0	3.0	6.3	5.0	6.0	5.0	6.0
LTV Copperweld																						

	98 x 118		100 x 150		100 x 180		100 x 200		100 x 250		100 x 300		100 x 400		150 x 200		150 x 250		150 x 350		150 x 450	
	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T
Bull Moose Tube Co.	10.0	11.0	5.0	12.5	5.0	12.5	5.0	12.5	5.0	12.5	5.0	12.5	5.0	12.5	5.0	16.0	5.0	16.0	5.0	16.0	6.0	16.0
Copperweld			5.0	12.0			5.0	12.0									5.0	12.0				

	200 x 300		200 x 400		250 x 350	
	Min T	Max T	Min T	Max T	Min T	Max T
Bull Moose Tube Co.	5.0	16.0	6.0	16.0	6.0	16.0
Copperweld	5.0	12.0				



## Square HSS

### Minimum and Maximum Thickness

	60 x 60		90 x 90		100 x 100		125 x 125		140 x 140		150 x 150		160 x 160		180 x 180		200 x 200		250 x 250		300 x 300	
	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T	Min T	Max T
Bull Moose Tube Co.	1.6	4.0	2.0	3.0	3.0	12.5	5.0	12.5	5.0	12.5	5.0	12.5	6.0	12.5	5.0	16.0	5.0	16.0	5.0	16.0	6.0	16.0
Copperweld	3.0	5.0			5.0	12.0	5.0	12.0			5.0	12.0					5.0	12.0	5.0	12.0		

All nominal dimensions are in millimeters.

Nominal thickness, T, may be specified equal to or greater than Min T and equal to or less than Max T.

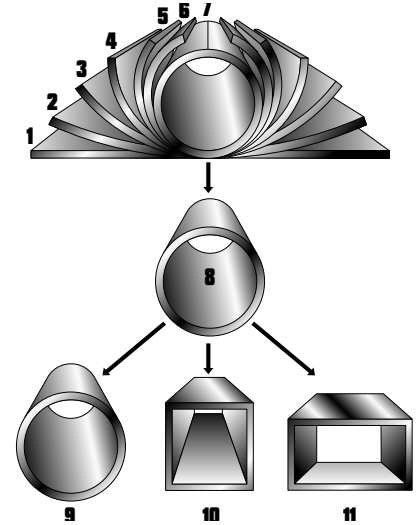
Availability of metric size HSS should be confirmed with the producing mill.

## HSS Manufacturing Methods

The transformation of steel strip into hollow structural sections (HSS) is the result of operations including forming, welding and sizing. Currently three methods are being used in North America for the manufacture of HSS. These methods, including two ERW methods and an SAW method, are described below. Both ERW methods meet ASTM A 500 and CSA G-40.21 requirements for the manufacture of HSS, and the ERW sizes included in this publication may be produced to either standard. The SAW method is not included as a manufacturing process in the ASTM or CSA specification. SAW sizes listed in this publication can be specified to meet desired physical and dimensional criteria of ASTM A500 and CSA G-40.21

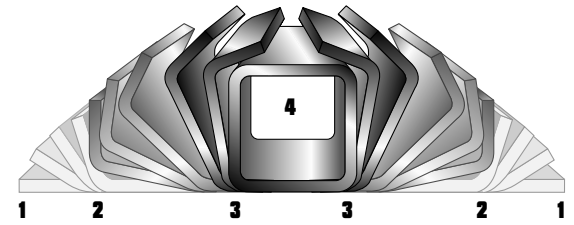
### ***Electric Resistance Welding (ERW) Process***

In the tube mill, flat steel strip (1) is formed continuously around its longitudinal axis to produce a round tube. This is done by moving the strip through a progressive set of rolls (2-6). The strip edges (7) are heated by either high frequency induction or contact welding and then forged together by weld rolls to create a continuous longitudinal weld without the addition of filler metal. The weld seam (8) is then cooled and processed through a set of sizing/shaping rolls which cold-form it into a round (9), square (10) or rectangular (11) section.



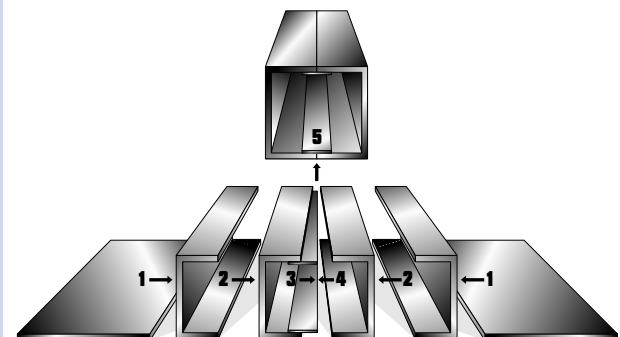
### ***Form-Square Weld-Square (ERW) Process***

In the weld mill, driven forming dies progressively shape the flat strip (1) by forming the top two corners (2) of the square or rectangular tube in the initial forming station. Subsequent stations form the bottom two corners (3) of the shape. No cold working of the sides of the shape is performed, and the shape's seam is welded by high-frequency contacts when the tube is near its final shape and size. The welded tube (4) is cooled and then driven through a series of sizing stations which qualifies the tube's final dimensions.



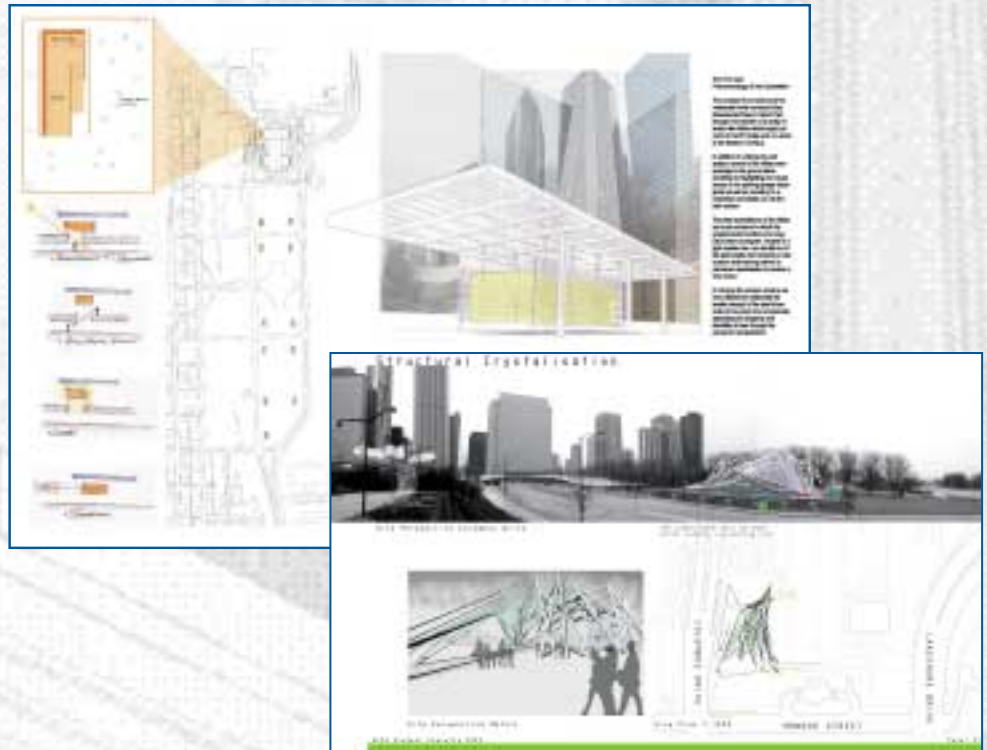
### ***Submerged Arc Weld (SAW) Process***

Two identical pieces of flat strip (1) are placed in a press brake and formed into two identical halves (2) of a finished tube size. A backup bar is tack welded to each leg of one of the half-sections (3). The two half-sections are fitted together toe-to-toe (4) and welded by the submerged arc process to complete the square or rectangular section (5).



# The Design & Engineering Challenge

Each year, the HSS Committee of the Steel Tube Institute sponsors a student design competition in conjunction at the Association of Collegiate Schools of Architecture's Annual Meeting. Next year's competition will be held in Salt Lake City, in March 2006. The winners of this year's Design and Engineering Challenge, and their winning projects, can be viewed on the Steel Tube Institute's website by clicking here. ▶



## HSS Design Aids

The Steel Tube Institute offers a wide variety of technical publications, load tables and design aids. They are available on the STI website, [www.steeltubeinstitute.org](http://www.steeltubeinstitute.org). The Steel Tube Institute also employs a Technical Consultant who is available to answer questions and assist with technical data. Contact Fred Palmer: Fax: 412-221-9119 or Email: [fjpalmerpe@aol.com](mailto:fjpalmerpe@aol.com)

## HSS Applications

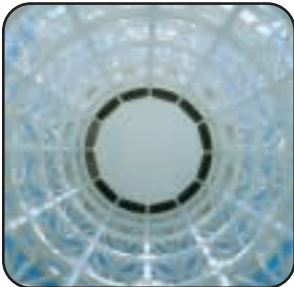
The Steel Tube Institute has produced a series of case studies that show a variety of HSS applications and benefits. They are available at no charge on the STI website, [www.steeltubeinstitute.org](http://www.steeltubeinstitute.org).





# HSS APPLICATIONS

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