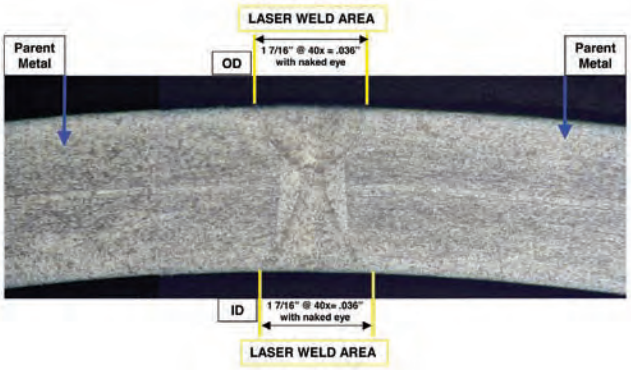
HIGH PURITY STAINLESS STEEL TUBING

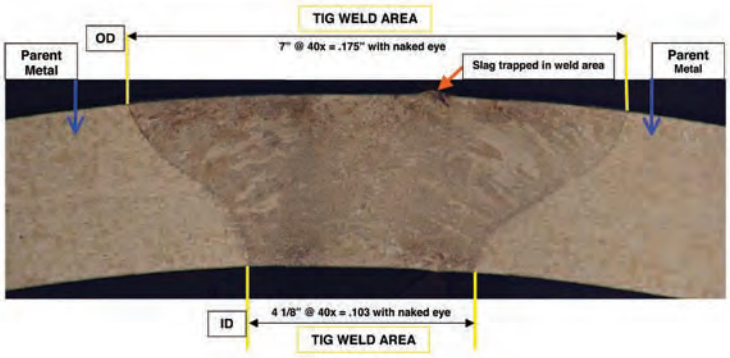
CLICK HERE for an in-depth discussion of Laser Welding via webcast from "Pharmaceutical Manufacturing"

Laser-Welded Tubing Sets Standard for Excellence

Demanding application environments call for the highest quality tubing. It has been proven that laser-welded tubing outperforms TIG welded tubes. United Industries has been perfecting its laser welding capabilities since 1992. We are using a fourth generation laser process that has set the standard for laser welded stainless steel tubing.

It's All In The Weld





At a magnification of 40 times the actual size, the laser welded tube exhibits a narrow deeply penetrated weld compared to the wide shallow weld typical of a TIG welded stainless steel tube.

Laser welds are superior to TIG welds in the following ways:

- **Less potential for corrosion in weld area**
  The narrower heat-affected zone of the laser weld reduces the corrosion potential along the weld. The exact power concentration of the laser minimizes grain growth and reduces Cr and Ni depletion near the weld. This results in a stronger weld.
- **Full finished tube appearance**
  Welds are cold worked and annealed to result in a full finished tube that has a straighter weld and finer grain structure. Tubes are finished to the highest standards of ASME BPE, with welds that consistently exhibit grain recrystalization close to the characteristics of the parent metal.
- **Superior performance**
  The narrow weld bead produced by a high-powered laser source has greater strength and ductility, thus outperforming a TIG weld. The S7 ASTM test shows that laser-welded tubes consistently demonstrate less corrosion potential.

UNITED INDUSTRIES

United Industries, Inc. 1546 Henry Avenue Beloit, Wisconsin 53511 Phone 608.365.8891 Fax 608.365.1259 www.unitedindustries.com

The Standard of Excellence

HIGH PURITY STAINLESS STEEL TUBING

Pharmaceutical and Food Processing Environments Require Seamless Quality

For sanitary applications, like pharmaceutical and food processing, it is critical that the weld area not have the potential to entrap contaminants. The narrow, deeply penetrated weld found in laser welding minimizes the chance for contamination.

United Industries has invested in the best technology available to offer 1/2" – 6" stainless steel tubing for pharmaceutical and food processing applications that outperform TIG welding and other laser welds. We offer a broad range of products in a variety of stainless steels. We adhere to the highest industry standards:

- Fully compliant with 3A, BPE, ASME, and ASTM, or applicable customer specifications
- Adheres to ISO 9001:2000, ISO/TS16949:2002 Registered Quality Management System (RQMS) standards

ASTM Chemical Composition Requirements (Max.)

ELEMENTS	304L	T316L
(C) Carbon, max.	0.030	0.030
(Mn) Manganese, max.	2.000	2.000
(P) Phosphorus, max.	0.045	0.045
(S) Sulphur, A270-S2	N/A	0.005-.017
(Si) Silicon, max.	0.750	0.750
(Ni) Nickel	8.0-12.0	10.0-14.0
(Cr) Chromium	18.0-20.0	16.0-18.0
(Mo) Molybdenum	N/A	2.0-3.0

MECHANICAL TESTS:
United Industries performs all required ASTM A270/A1016 testing. In addition, we also perform flare, flatten, flange, and reverse bend tests. Surface roughness is measured per ASME/ANSI B46.1 requirements. These measurements are derived from four (4) readings taken at cross sections approximately 90 degrees apart.

PHARMACEUTICAL FINISHES:
Pharmaceutical A270-S2 ASME BPE:
SF1 (Mechanical Polish) 20Ra max. (0.5µm) ID, 32Ra max. (0.8µm) OD
SF4 (Electro Polish) 15Ra max. (0.4µm), 32Ra max. (0.8µm) OD

SANITARY FINISHES:
Sanitary A270 (3A) TPV Certified: Bright Annealed, ID-only, OD-only, ID & OD.
Mechanical Polish = 32 Ra OD, 20 Ra ID.

All mechanical polished tubes meet or exceed A270, 3A, A270-S2, ASME BPE.

ISO/TS16949:2002 Registered Quality Management System

UNITED INDUSTRIES

The Standard of Excellence