MORE NITRIC ACID WITH LESS RISK

SANDVIK 2RE10, BIMETALLIC AND OTHER HIGH-PERFORMANCE TUBE FOR DEMANDING NITRIC ACID APPLICATIONS.
As a producer of nitric acid for fertilizers, chemicals or other products, there’s both good news and bad news. The good news is that growing global demand for fertilizers with nitrogen as an active ingredient is expected to boost the demand for nitric acid. Quite simply, fertilizer is needed to help grow crops and feed the world.

The bad news is that you face increasingly fierce price competition in this commodity-driven business. To win this battle, you need to drive down manufacturing costs and extend the service life of your plant. Indeed, with the cost of a new nitrogenous fertilizer plant with an annual capacity of 1 million metric tons estimated at $700 million to $1 billion, your focus needs to be on maximizing your investments and avoiding risks.

DEFEATING PROCESS CORROSION

One key challenge when refurbishing your plant is to combat the highly corrosive nature of nitric acid. This is particularly true in your cooler-condenser or tail gas preheater. Here, hot process gases will start to corrode traditional 304 or 304L tube at temperatures of 120°C (250°F) and higher concentrations of nitric acid. Clearly, you need a more cost-effective and highly alloyed steel tube that can defeat corrosion in the condenser’s reboiling zone.

RISK-REDUCING NITRIC ACID PORTFOLIO

That is why, based on 60 years of providing high-quality tube to the urea and fertilizer industries and more than 150 years of steelmaking, we developed Sandvik 2RE10. With 24.5% chromium, 20% nickel and extra-low impurity levels, it’s ideally suited to resist general corrosion. In addition, we offer several other suitable tubes in our nitric acid tube portfolio, including a new bimetallic tube with an inner component of zirconium. We call these tubes “risk reducers” because that’s exactly what they do.

HELLO PROFITABILITY, GOODBYE RISK

SANDVIK HIGH-PERFORMANCE TUBE FOR NITRIC ACID PLANTS

<table>
<thead>
<tr>
<th>GRADE</th>
<th>MATERIAL TYPE</th>
<th>UNS NO.</th>
<th>BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SANDVIK 3R12</td>
<td>Austenitic</td>
<td>S30403</td>
<td>Capable of handling nitric acid over a wide range of temperatures. Moderate general corrosion resistance.</td>
</tr>
<tr>
<td>SANDVIK 2RE10</td>
<td>Austenitic</td>
<td>S31002</td>
<td>With 24.5% chromium, 20% nickel and extremely low carbon and impurity levels, it offers high resistance to general corrosion. Good weldability.</td>
</tr>
<tr>
<td>SANDVIK SAF 2304™</td>
<td>Lean duplex (austenitic/ferritic)</td>
<td>S32304</td>
<td>Strong material with extended resistance to chloride-induced stress corrosion cracking (SCC).</td>
</tr>
<tr>
<td>BIMETALLIC</td>
<td>Outer tube: Sandvik 2RE10; Inner tube: Sandvik ZR702</td>
<td>S31002 R60702</td>
<td>Ideal for concentrations over 65% and high temperatures. Offers similar corrosion resistance as zirconium tube. Outer component offers compatibility with stainless steel tube sheet and removes the need for welding zirconium.</td>
</tr>
</tbody>
</table>

“Without fertilizer increasing the productivity of the soil we would need 50% more farmland – the equivalent of converting almost a quarter of the global forest reserves.”

Agrium
Fouling. Plugging. Cleaning. You’ve seen it all before. Together such factors cause a gradual decline in plant efficiency, making it harder to increase uptime and maximize plant efficiency. So what exactly is all this costing you in terms of lost production?

“Many of these costs are hidden,” said a senior consultant specializing in heat exchanger design. “They relate to design and fabrication errors, pressure drops, material selection, flow issues, insufficient velocity or heat transfer and more.” Some of our relatively new customers admit that they were previously losing millions of dollars annually due to plugging, unscheduled maintenance and other issues.

FOULING IN THE HEAT EXCHANGER

Sometimes fouling is so severe that tubes need to be plugged inside or filled between the shell-side ligaments. This is sometimes seen when bundles from a refinery are sent to be repaired. In fact, some experts report that actual fouling can be much higher than the allowable specifications made by the Tubular Exchange Manufacturer’s Association (TEMA).

HIDDEN COST IN INTEGRATED PLANT

One reason that such costs are not always immediately apparent is that nitric acid is often consumed on site for the production of other chemical products, including fertilizers, plastics and resins, and explosives. In such integrated processes, the costs for electricity, labor and materials are more acutely apparent than the cost of nitric acid being produced upstream.

USD 64 MILLION LOSS OVER 5 YEARS

Yet the fact is that the loss in output of just a few percentage points can lead to significant annual reductions. In the accompanying table, you can see how this impacts both a medium-size and larger nitric acid plant. In the worst case, over a five-year period, assuming a 10% annual drop-off in production, it adds up to a whopping USD 64 million!

<table>
<thead>
<tr>
<th>Plant production capacity</th>
<th>Loss of output (5%)</th>
<th>Loss of output (10%)</th>
<th>Lost production, tons per yr (10%)</th>
<th>Lost production, tons per yr (10%)</th>
<th>Lost production, tons per yr (10%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium-sized plant (500 tpd)</td>
<td>25 tpd</td>
<td>50 tpd</td>
<td>15,250 tpy</td>
<td>$6,387,500</td>
<td>$31,947,500</td>
</tr>
<tr>
<td>Larger plant (1,000 tpd)</td>
<td>50 tpd</td>
<td>100 tpd</td>
<td>36,500 tpy</td>
<td>$12,775,000</td>
<td>$63,875,000</td>
</tr>
</tbody>
</table>

Source: Sandvik calculation based on a nitric acid concentration of 60% and a unit price of USD 350 per ton.

PLUG YOUR RISK, NOT YOUR CONDENSER
TAMING CORROSION IN THE REBOILING ZONE

Have you noticed it too? When you process nitric acid at higher temperatures and concentrations, you tend to get corrosion in the hot inlet of the cooler-condenser or tail gas preheater. Just to make this trouble spot crystal clear, we’ve made it very big on this page.

You don’t need to be a metallurgist to understand that increasingly hot process gases will accelerate corrosion. This is particularly true in heat exchangers where the hot gas meets the cold tubing and forms condensation, followed by reboiling. In the past, the main reason to select 304 or 304L stainless tubing was the lower cost. But at high pressures and temperatures up to 120°C (250°F) with higher concentrations of nitric acid, corrosion becomes a real issue.

**WANTED: LOW IMPURITIES**

Even 310L, 310L Mod or UNS S31008 tubes are susceptible to corrosion due to the presence of impurities. This problem is very common and normally occurs near the inlet where temperatures are highest. The good news is that you can detect corrosion issues fairly early by regularly inspecting the bore in the hot end. Fortunately, re-tubing with a higher alloyed material will dramatically prolong your service life.

**SEVEN-YEAR SERVICE LIFE VERSUS ONE**

That is why we developed Sandvik 2RE10 (UNS S31002), which we call “the risk reducer”. That’s because, with 24.5% chromium, 20% nickel and very low carbon and impurity levels, it lets you handle approximately 25°C (77°F) higher temperatures than 304L with 65% $\text{HNO}_3$ concentrations (see diagram). To give an example, in a plant where the service life for 304L was one year, Sandvik 2RE10 performed well for more than seven years. Often you can simply re-tube the heat exchanger and maintain the existing tube sheets.

**SANDVIK 2RE10 OFFERS A “FLEXIBLE WINDOW” OF OPERATION AT ACCEPTABLE CORROSION RATES**

When hot nitric acid vapor enters the cooler-condenser, it condenses and reboils at a higher temperature just inside the tube sheet. Depending on the concentration, this often leads to accelerated corrosion rates and thus general intergranular corrosion. Sandvik 2RE10 (UNS S31002), with its 24% chromium and 20% nickel content, as well as extremely low carbon and impurity levels, is well suited to avoid this problem.

Have you noticed it too? When you process nitric acid at higher temperatures and concentrations, you tend to get corrosion in the hot inlet of the cooler-condenser or tail gas preheater. Just to make this trouble spot crystal clear, we’ve made it very big on this page.
ZIRCONIUM-LEVEL PERFORMANCE, NOW AFFORDABLE

Sometimes referred to as “the gold standard” for nitric acid heat exchangers, zirconium offers excellent corrosion resistance to nitric acid in all concentrations up to 90% and higher temperatures (see diagram). The only problem is that retrofitting a shell-and-tube heat exchanger or other process equipment with 100-percent zirconium tube is a very costly undertaking.

So the challenge was how to provide zirconium-level performance at an affordable price. This led to the development of a bimetallic tube with an inner tube made of zirconium and an outer tube in Sandvik 2RE10. The inner liner prevents corrosion while the outer tube ensures structural integrity and positive welding properties. The bimetallic tube also allows the use of a stainless steel tube plate or even re-tubing of an entire stainless steel heat exchanger. And since welding is purely stainless-to-stainless, no post-weld heat treatment is necessary.

TOUGH CORROSION RESISTANCE
The strength of this new bimetallic tube is that you get all the benefits of pure zirconium in the inner wall, without its considerably higher price tag. You also gain the positive metallurgical properties of our well-proven Sandvik 2RE10 tube on the outside. The benefits of zirconium can be seen in the diagram below, which shows its exceptional corrosion resistance.

THE BEST OF TWO METALLURGICAL WORLDS
In short, Sandvik will soon be able to offer you the best of two metallurgical worlds. Product development of this new bimetallic tube is ongoing and expected to be completed shortly. If this sounds interesting, please contact us to receive updates and further details.
If you fabricate shell and tube heat exchangers or other components for nitric acid plants, you are under pressure to deliver top-quality products – to budget and on time. Your customers will be inspecting every weld, checking every seam, to verify that their design specs are being met. This is where it pays to work with materials that are easy to weld and cold bend, even for tight bending radii.

You’ll be happy to know that our tube will not only ensure a high quality standard, but streamline your fabrication process. You can work quickly and confidently with the knowledge that you’ve got a material at the top of all parameters within a standard – from ovality, roundness, cleanliness and consistency to wall thickness, chemical composition and welding consumables. You also gain access to our in-depth R&D knowledge, with some 2,700 materials experts in our group.

**HIGH BATCH-TO-BATCH CONSISTENCY**

One aspect that many fabricators tell us they appreciate is our batch-to-batch consistency. This fact is reinforced by tests we did on 20 heats on Sandvik 2RE10 over a ten-year period. As shown in the table, we were always at the top of the standard, with very little variations in chemical composition. In other words, you can rest assured that you get an extremely pure, homogenous material that’s perfect for fighting corrosion and lives up to our promises.

**THE RIGHT WELDING CONSUMABLE**

When selecting welding consumables, it’s also nice to know that, as the maker of the base material, we can offer filler material with just the right composition. For Sandvik 2RE10, we recommend Sandvik 25.20.L as the filler material for gas shielded arc welding. For manual metal-arc welding, covered electrodes Sandvik 25.20LR are recommended. Whether you’re using MIG or TIG, and depending on the tube grade you are using, we’d be happy to offer further advice. Just ask your local representative for a copy of the Sandvik Welding Handbook.

---

**SANDVIK 2RE10 - SMALL VARIATIONS IN CHEMICAL COMPOSITION IN 20 HEATS MADE BETWEEN 1992 AND 2002**

<table>
<thead>
<tr>
<th>UNS No.</th>
<th>C</th>
<th>Si</th>
<th>P</th>
<th>S</th>
<th>Cr</th>
<th>Ni</th>
<th>Mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>S310102</td>
<td>0.011</td>
<td>0.016</td>
<td>0.000</td>
<td>0.001</td>
<td>24.3</td>
<td>20.2</td>
<td>0.07</td>
</tr>
<tr>
<td>Sandvik 2RE10 average</td>
<td>0.004</td>
<td>0.002</td>
<td>0.001</td>
<td>0.004</td>
<td>0.08</td>
<td>0.11</td>
<td>0.02</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>0.004</td>
<td>0.002</td>
<td>0.001</td>
<td>0.004</td>
<td>0.08</td>
<td>0.11</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Cooler-condenser under fabrication prior to shipping.
Over the past few decades, we’ve provided literally million of meters of high-quality tube to the urea and nitric acid industry. Our customers are demanding and include some of the largest global producers as well as fabricators. You know the names. All share a common interest: to boost their profitability.

As the industry becomes more competitive, it is increasingly clear that superior materials can make a big impact on extending plant life and minimizing unscheduled maintenance. In some cases, the difference can be substantial. For example, in the urea industry we set a world record when Sandvik 2RE69 tubes were used in a urea stripper for up to 36 years without any problems. There are many other similar cases from nitric acid plants around the world.

**NO TWO PLANTS ARE THE SAME**
Every plant is different and has different challenges, depending on the type of production, concentrations of nitric acid, pressure, temperature and more. That is why we offer a range of high-performance tube grades, each with its own specific advantages (see selection guide on pages 18-19).

**SUPERIOR RESULTS IN HUEY TEST**
In the accompanying table, you can see how our version of 304L, called Sandvik 3R12, reaches its limits in terms of corrosion resistance. In this Huey test, several tube samples in delivery condition were placed in boiling nitric acid at 65% for five times 48 hours with service conditions similar to a nitric acid condenser. As shown, Sandvik 2RE10 sustained the least amount of corrosion deterioration by far of all the grades.

<table>
<thead>
<tr>
<th>Tube Material</th>
<th>Corrosion Rate [mm/year]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandvik 2RE10</td>
<td>0.25</td>
</tr>
<tr>
<td>Sandvik 3R12</td>
<td>0.30</td>
</tr>
<tr>
<td>Sandvik SAF 2906™</td>
<td>0.35</td>
</tr>
<tr>
<td>Sandvik SAF 2304™</td>
<td>0.40</td>
</tr>
</tbody>
</table>

**YOUR PROFITABILITY IS OUR TOP PRIORITY**
When you purchase tube from us, you can rest assured that every meter is produced from a single high-quality melt in Sweden, quality guaranteed by our 150-year steelmaking tradition. Our own quality requirements are higher than those required by ASTM or others. This means that the tube you receive will often set a “standard within the standard.”

Naturally, we also have tube plants and subsidiaries all over the world, but the original melt is produced in one of the most advanced steelmaking plants in the world – in Sandviken, Sweden. Here we use high-quality recycled stainless steel, alloying elements and state-of-the-art production methods to make some of the world’s most advanced corrosion-resistant tubing. We carry out detailed tests of the chemical composition and microstructure as well as a battery of corrosion and mechanical tests (tensile, hardness, impact, flattening).

FULL TRACEABILITY IN EVERY BATCH
In our tube mills, we conduct a range of inspections and tests, including ultrasonic and eddy current non-destructive tests, destructive tests and optical measurement. Every nitric acid tube has full traceability and a unique batch number.

OBSESSSED WITH QUALITY
As specialists in nitric acid products, we’ve naturally received dozens of quality assurance certificates over the years: ASME, ISO, PED, ASTM and more. Our quality management routines are approved and accredited by all internationally recognized organizations. We also have product and/or shop approvals from bodies such as TüV, JIS, DNV and Lloyd’s Register. But more than just having all the certificates, we have an internal culture that is committed to Zero Defects and a nearly fanatical obsession for quality.

Every nitric acid tube from Sandvik is fully traceable back to its original batch number.
When you meet your local Sandvik representative, you should know that they are backed by a global organization with in-depth materials know-how. Having served the urea and nitric acid industries for 60 years, we’ve seen a lot. And we staff one of the largest R&D operations in Europe. So whether you’re facing a corrosion challenge or welding issue, we encourage you to put our knowledge to work.

Unlike a local tube distributor or reseller, we actually produce our own steel products and have often pioneered the development of certain key grades. This means that our R&D team and technical experts are well equipped to provide valuable tips and materials advice for improving your production.

8,000 PATENTS AND 900 MATERIALS
Some of our newer customers are often surprised to learn that our R&D team has developed many advanced materials from scratch over the years and as a group we currently hold some 8,000 active patents. A total of 900 different grades are included in the overall program, where each material has its own customized properties adapted for a specific purpose and application.

TOP 100 GLOBAL INNOVATORS
Several of these innovative materials, such as Sandvik 2RE10 and a new bimetallic zirconium tube now under development, are specifically designed for nitric acid applications. These are just two recent examples. But our desire to innovate and the results we’ve achieved for our customers have led Forbes business magazine to recently rank us as one of the world’s 100 most innovative companies on a number of parameters.

YOUR KNOWLEDGEABLE ADVISOR
In this sense, unlike a local distributor or reseller, we can act more as a knowledgeable material advisor and guide if you are refurbishing an older nitric acid facility or engineering condensers or other key components. Our R&D Knowledge Center has a lot of helpful information about various types of materials, welding procedures and more. We are happy to share this with you.
WHICH RISK-REDUCER IS BEST FOR YOUR NITRIC PLANT?

THE PRIME RISK-REDUCER FOR NITRIC ACID PRODUCTION

SANDVIK 2RE10 (UNS S31002) – CHEMICAL COMPOSITION (NOMINAL) %

<table>
<thead>
<tr>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Cr</th>
<th>Ni</th>
<th>Mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0.015</td>
<td>≤0.15</td>
<td>1.8</td>
<td>≤0.020</td>
<td>≤0.05</td>
<td>24.5</td>
<td>20</td>
<td>≤0.1</td>
</tr>
</tbody>
</table>

Developed specifically for demanding applications in the nitric acid industry, Sandvik 2RE10 is gaining a reputation for its ability to resist general corrosion at higher temperatures, enabling process equipment to last significantly longer than standard 304 or 304L tubing. It is especially well suited for the tubing used in cooler-condensers where reboiling can accelerate corrosion rates.

With 24.5% chromium and 20% nickel, it is highly resistant to corrosion as well as having extremely low carbon and impurity levels. Sandvik 2RE10 is available in outer diameters up to 80 mm (3.15 in). In addition, it offers good weldability and is easy to bend.

KEY BENEFITS
- Extremely low carbon and impurity levels
- Excellent resistance to corrosion in nitric cooler-condensers
- Excellent resistance to general intergranular corrosion
- Good weldability
- Very high consistency and tight tolerances

FOR HIGHER STRENGTH AND RISK REDUCTION IN NITRIC ACID PRODUCTION.

SANDVIK SAF 2304 (UNS S32304) – CHEMICAL COMPOSITION (NOMINAL) %

<table>
<thead>
<tr>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Cr</th>
<th>Ni</th>
<th>Mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0.030</td>
<td>≤1.0</td>
<td>≤2.0</td>
<td>≤0.035</td>
<td>≤0.015</td>
<td>22.5</td>
<td>4.5</td>
<td>0.3</td>
</tr>
</tbody>
</table>

This lean duplex (austenitic-ferritic) stainless steel offers very good resistance to stress corrosion cracking (SCC) and favorable resistance to general corrosion and pitting. As a duplex steel, it also offers very high mechanical strength - roughly double the yield strength of 304L steels. The mechanical strength allows for lighter constructions, more compact system design and less welding.

KEY BENEFITS
- Very good resistance to stress corrosion cracking
- Good resistance to general corrosion
- Double the yield strength of 304L
- Design advantages due to physical properties

THE ALL-ROUND RISK REDUCER FOR NITRIC ACID PLANTS

SANDVIK 3R12 (ASTM 304L/UNS S30403) – CHEMICAL COMPOSITION (NOMINAL) %

<table>
<thead>
<tr>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Cr</th>
<th>Ni</th>
<th>Mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0.030</td>
<td>0.4</td>
<td>1.3</td>
<td>≤0.040</td>
<td>≤0.030</td>
<td>18.5</td>
<td>9</td>
<td>–</td>
</tr>
</tbody>
</table>

Sandvik 3R12 (ASTM 304L) is our most widely used grade for nitric acid facilities with an extremely low carbon content. It is capable of handling a wide range of temperatures and concentrations up to about 60% at the atmospheric boiling point. As an austenitic chromium-nickel steel with versatile applications, it can handle most of the wet corrosion problems appearing after the ammonia converter. The tube is stocked in a range of sizes in the solution annealed and white pickled condition. Under certain conditions, such as higher chlorides, temperatures or acid concentrations, a higher alloyed grade is recommended.

KEY BENEFITS
- Resistant to general corrosion (oxidizing nitric acid)
- Improved machinability, tight tolerances

SANDVIK ZR 702 (UNS R60702) INNER TUBE CHEMICAL COMPOSITION (NOMINAL) %

<table>
<thead>
<tr>
<th>Zr+Hf</th>
<th>Hf</th>
<th>Fe+Cr</th>
<th>H</th>
<th>N</th>
<th>C</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0.052</td>
<td>≤0.4</td>
<td>≤2.0</td>
<td>≤0.05</td>
<td>≤0.025</td>
<td>≤0.05</td>
<td>≤0.16</td>
</tr>
</tbody>
</table>

This unique bimetallic tube offers you the best of two metallurgical worlds. The inner liner, made of Sandvik ZR 702, is characterized by superior corrosion resistance to acid condensates in the reboiling zone of cooler-condensers. Meanwhile, the outer tube, made of Sandvik 2RE10 ensures structural integrity and positive welding properties due to low levels of carbon and impurities. It also allows the use of a stainless steel tube sheet.

KEY BENEFITS
- Superior resistance to general corrosion (inner tube)
- Enables the use of a stainless steel tube sheet
- Positive welding properties
- Purpose made for nitric acid production

Note: Our bimetallic tube is currently in the final stages of development and will be available very shortly. The outer tube is specified as Sandvik 2RE10, but should you require a different material, please contact us.

SANDVIK 2RE10 (UNS S31002) OUTER TUBE CHEMICAL COMPOSITION (NOMINAL) %

<table>
<thead>
<tr>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Cr</th>
<th>Ni</th>
<th>Mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0.015</td>
<td>≤0.15</td>
<td>1.8</td>
<td>≤0.020</td>
<td>≤0.05</td>
<td>24.5</td>
<td>20</td>
<td>≤2.0</td>
</tr>
</tbody>
</table>

This bimetallic tube is over one hundred years old and has established itself as the prime risk-reducer for nitric acid production for higher strength and risk reduction in nitric acid production.

KEY BENEFITS
- Purpose made for nitric acid production

SANDVIK SAF 2304 (UNS S32304) – CHEMICAL COMPOSITION (NOMINAL) %

<table>
<thead>
<tr>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Cr</th>
<th>Ni</th>
<th>Mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0.030</td>
<td>≤1.0</td>
<td>≤2.0</td>
<td>≤0.035</td>
<td>≤0.015</td>
<td>22.5</td>
<td>4.5</td>
<td>0.3</td>
</tr>
</tbody>
</table>

This lean duplex (austenitic-ferritic) stainless steel offers very good resistance to stress corrosion cracking (SCC) and favorable resistance to general corrosion and pitting. As a duplex steel, it also offers very high mechanical strength - roughly double the yield strength of 304L steels. The mechanical strength allows for lighter constructions, more compact system design and less welding.

KEY BENEFITS
- Very good resistance to stress corrosion cracking
- Good resistance to general corrosion
- Double the yield strength of 304L
- Design advantages due to physical properties

SANDVIK 3R12 (ASTM 304L/UNS S30403) – CHEMICAL COMPOSITION (NOMINAL) %

<table>
<thead>
<tr>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Cr</th>
<th>Ni</th>
<th>Mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0.030</td>
<td>0.4</td>
<td>1.3</td>
<td>≤0.040</td>
<td>≤0.030</td>
<td>18.5</td>
<td>9</td>
<td>–</td>
</tr>
</tbody>
</table>

This lean duplex (austenitic-ferritic) stainless steel offers very good resistance to stress corrosion cracking (SCC) and favorable resistance to general corrosion and pitting. As a duplex steel, it also offers very high mechanical strength - roughly double the yield strength of 304L steels. The mechanical strength allows for lighter constructions, more compact system design and less welding.

KEY BENEFITS
- Very good resistance to stress corrosion cracking
- Good resistance to general corrosion
- Double the yield strength of 304L
- Design advantages due to physical properties

Note: Our bimetallic tube is currently in the final stages of development and will be available very shortly. The outer tube is specified as Sandvik 2RE10, but should you require a different material, please contact us.