Side Impact Beams
Safer, Lighter and More Cost-Effective

Docol Advanced High Strength Steel (AHSS) from SSAB
Building safer and more environmentally friendly cars has become a top priority in the automotive industry. For manufacturers and suppliers of car parts, this means adopting a new trend — producing products that are safer, lighter and more cost-effective. Every little improvement can make the difference.

Across the globe, more and more companies are turning to the strongest cold-forming steel on the market — Docol Advanced High Strength Steel (AHSS) from SSAB. With its Knowledge Service Center, SSAB offers automotive customers the highest level of technical expertise right from the start of product development.

With over 30 years in the automotive industry, Docol AHSS has become the material that can help side impact beam manufacturers meet the industry’s new demands. And it can be found in cars from nearly every OEM worldwide.

The Italian company Frigostamp is a leading supplier of door modules and structures for the automotive industry. Working closely with SSAB, Frigostamp in collaboration with Fiat Group Automobiles has developed many products from Docol AHSS including this double-headed side impact beam made from Docol 1000 DPZE.
Advantages of Docol AHSS

TOP CRASH TEST RATING, HALF THE WEIGHT

The unique strength of Docol AHSS will increase the chances of obtaining the highest possible crash rating, while reducing vehicle weight. Its best in class energy absorption and outstanding strength will also provide many environmental benefits. In today’s market, this directly translates to greater competitiveness and higher sales.

Whether you are looking to change steel grades or begin using Docol AHSS, you can be rewarded with weight reductions of up to 50 percent. Furthermore, you can reduce material consumption and cost through thinner grades of steel.

Using alternative materials like aluminum can require up to three times the thickness of Docol AHSS in order to match its strength.

Cost savings with Docol AHSS:
- Less material used – thinner steel, same strength
- Cold forming as opposed to expensive hot stamped boron steel
- More cost-efficient than other materials like aluminum
- Simplified production processes
- Retaining current production machinery
- Recycling materials
- Reduction of overall cost of final product.

Docol AHSS exhibit a pronounced yield strength increase of about 150 MPa or more, after work-hardening and bake-hardening. In addition, Docol AHSS exhibit a strain rate hardening effect. This effect corresponds to an increase of about 100 MPa at the high strain rates that are involved locally in a side crash. These advantages make Docol AHSS optimal in the production of side impact beams.

Docol AHSS benefits at a glance:
- The most consistent AHSS coming from the same mill in Sweden
- Excellent welding properties due to a lean chemical composition
- Can be welded with all common methods
- Can be formed in one or several steps
- Can be formed to very tight radii
- Pronounced work-hardening and bake-hardening when formed and painted
- Withstands severe deformation without cracking
- Withstands higher stresses and a high deformation speed
- Enough residual plasticity after forming.

WHO IS ALREADY BENEFITING?

Docol Advanced High Strength Steel is becoming the material of choice for side impact beams as across the globe more and more automotive companies are making the switch.

CHANG’AN LINGYUN CHINA – CUSTOMER CASE

The Chinese company Chang’an Lingyun is one of the leading manufacturers of car parts and components in Asia. They recently developed a new side impact beam for Ford Focus car doors using Docol 1200 M. Previously, the beam was made from boron steel, but the switch to Docol AHSS from SSAB has brought with it a significant reduction in costs without sacrificing strength, as well as many other benefits.

Chang’an Lingyun discovered that working with Docol 1200 M greatly simplifies the production of their beams. No longer is it necessary to add extra facility or machinery to a normal production line. They also realized that cold-formed parts do not need to be hardened in order to get phase transformations that result in increased strength. This means that the processes of heating, laser cutting and shot blasting can be removed. Now, production can be done in four simple steps: blanking, forming, cutting, and flanging plus calibration.
The best technical expertise, every step of the way

Choosing Docol AHSS is a good start, but how do you utilize your new material in the right way and choose a thickness and design that will ensure the most successful product? This is where the SSAB Knowledge Service Center comes into the picture, offering detailed knowledge on AHSS with the highest level of technical expertise.

From our decades supplying the automotive industry, our Knowledge Service Center provides you with material data and offers support in every step of your product development, from design, to the finished product, something rare in the steel industry.

In creating a partnership we will work closely with you, in complete confidentiality and provide comprehensive support consisting of:

- Initial meeting to present challenges and determine objectives
- Creation of project plans
- Design and product development together with SSAB technical advisors
- Forming simulations
- Energy absorption simulations
- Optimizing and testing
- Presentation of results and design changes
- Recommendations and support to help you realize the full potential of Docol AHSS.

Docol AHSS can be adapted to the standards of car manufacturers by request. Some examples of this are the Toyota TSG3100G, Honda HES C052-00, Nissan M 2032, Fiat S2815, Renault RNUR 11-04-002 and GM GMW 339M-ST-S. The table below shows Docol AHSS steel grades.

All steel grades required to meet the specifications of a specific car manufacturer need to be evaluated case by case.

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<tr>
<th>TYPE OF STEEL</th>
<th>HOT-ROLLED STEELS</th>
<th>COLD-ROLLED STEELS</th>
<th>HOT-DIP GALVANIZED STEELS</th>
<th>ELECTRO GALVANIZED STEELS</th>
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<td>Micro-alloyed steels</td>
<td>Docol 800 DP</td>
<td>Dogal H 700 LAD²</td>
<td>Dogal 1000 DPX</td>
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<td>Docol 980 DP</td>
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<td>Docol Roll 1000 LCE</td>
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1. HAD = hot-rolled substrate. 2. Available by request. 3. Under development.

Other Docol AHSS steel grades can be obtained with electro-galvanized coating upon request.

DIMENSION RANGE

Thickness: Docol 0.50–2.10 mm, Dogal 0.50–2.00 mm (some Dogal grades up to 2.50 mm), Domex 2.00–10.00 mm
Max width: Docol 1500 mm, Dogal 1500 mm, Domex 1600 mm
SSAB worldwide reach

SSAB is the largest steel producer in Northern Europe. We are market leaders in the field of Advanced High Strength Steel products, with more than 100 years of market success and have offices in over 45 countries around the world.

SSAB is a pioneer within the field of Advanced High Strength Steel (AHSS) and works closely with automotive OEM, Tier 1, 2 and 3 suppliers across the entire world. All of the steel supplied to companies in the automotive segment comes from the same mill, located in Sweden. This ensures the highest quality and consistency in every coil we produce.

CERTIFICATES

Over the years, SSAB has been awarded numerous international certificates for our efforts to uphold regulations and reduce our impact on the environment including:

• SS-EN ISO 9001 – for a quality management system that meets all regulations and for continual improvements in customer satisfaction.
• ISO/TS 16949 – for meeting quality management system requirements for automotive related products.
• SS-EN ISO 14001 – for establishing, implementing, maintaining and improving an environmental management system.

TAKE THE NEXT STEP

We believe that Docol AHSS can benefit your company and there are many ways to learn why making the switch is right for you. We offer technical and in-house seminars that explain our range of AHSS steels in detail and we also offer a trial material program that allows you to begin initial testing to see the benefits of using Docol AHSS first-hand. The test and prototyping material stock is unique within the industry, providing SSAB with the ability to deliver the right test material in most often used thicknesses.

No matter where in the world you are located, SSAB technical advisors are available to answer your questions and meet you for a face-to-face meeting. Find out more about how you can gain a competitive edge with Docol Advanced High Strength Steel from SSAB.
SSAB is a Nordic and US-based steel company. SSAB offers value added products and services developed in close cooperation with its customers to create a stronger, lighter and more sustainable world. SSAB has employees in over 50 countries. SSAB has production facilities in Sweden, Finland and the US. SSAB is listed on the NASDAQ OMX Nordic Exchange in Stockholm and has a secondary listing on the NASDAQ OMX in Helsinki. www.ssab.com.