

## Docol 1000DP

### General Product Description

Developed for increased safety in cars. Docol 1000DP steels have excellent forming and welding properties. These steels undergo special heat treatment, producing mainly two phase structure. Ferrite that imparts unique forming properties represents one phase, and martensite that accounts for the strength represents the other phase. Bainite may be present as complementary phase.

### Dimension Range

Cold rolled / UC, EG: thickness 0.50-2.10 mm, width up to 1527 mm.

Cold rolled / GI, GA, ZA: thickness 0.80-2.00 mm, width up to 1460 mm.

Slit strip and cut to length sheets are available upon request.

Grade and coating specific restrictions on available dimensions may occur.

### Mechanical Properties

| Steel grade                 | Standard         | Coating                 | Test direction | Yield strength<br>R <sub>p0.2</sub><br>(MPa) | Tensile strength R <sub>m</sub><br>(MPa) | Elongation A <sub>80</sub><br>(min %) | BH <sub>2</sub><br>(min MPa) | Min. inner bending radius<br>for 90° <sup>1)</sup> |
|-----------------------------|------------------|-------------------------|----------------|--|--|---------------------------------------|------------------------------|--|
| Docol CR590Y<br>980T-DP     | VDA239-100:2016  | UC, EG, GI, GA, ZA      | L              | 590 - 740                                    | 980 - 1130                               | 10 <sup>2)</sup>                      | 30                           | UC,EG 2.0xt<br>GI,GA,ZA 3.0xt                      |
| Docol CR700Y<br>980T-DP     | VDA239-100:2016  | UC, EG, GI, GA,*<br>ZA* | L              | 700 - 850                                    | 980 - 1130                               | 8 <sup>2)</sup>                       | 30                           | UC,EG 2.0xt<br>GI,GA,ZA 3.0xt                      |
| Docol CR700Y<br>980T-DP-LCE | SSAB             | UC, EG                  | L              | 700 - 900                                    | 980 - 1130                               | 8                                     | -                            | 2.0 xt   |
| Docol CR700Y<br>980T-DP-LCE | VDA 239-100:2016 | GI, GA*, ZA*            | L              | 700 - 850                                    | 980 - 1130                               | 8 <sup>2)</sup>                       | 30                           | 2.5 xt   |
| Docol CR700Y<br>1000T-DP    | SSAB             | UC, EG                  | T              | 700 - 950                                    | 1000 - 1200                              | 7 <sup>3)</sup>                       | -                            | 2.0 xt   |
| Docol 1000<br>DPX           | SSAB             | GI, GA*                 | T              | 800 - 1000                                   | 1000 - 1200                              | 6                                     | 30                           | 2.5 xt   |

The testing of mechanical properties of electro galvanized products is conducted without coating.

\* Available upon request.

<sup>1)</sup> In some cases tight bending radius may cause micro-cracking of the coating in the bend area. Where design permits, users are encouraged to employ larger radius.

<sup>2)</sup> For GA coatings the minimum elongation value is reduced by 2 units.

<sup>3)</sup> For thickness ≤ 0.70mm minimum elongation value is reduced by 2 units.

## Chemical Composition (Ladle analysis)

| Steel grade              | Coating    | C (max %) | Si (max %) | Mn (max %) | P (max %) | S (max %) | Al (%)       | Nb+Ti (max %) | Cr+Mo (max %) | B (max %) | Cu (max %) |
|--------------------------|------------|-----------|------------|------------|-----------|-----------|--------------|---------------|---------------|-----------|------------|
| Docol CR 590Y980T-DP     | UC, EG     | 0.18      | 0.60       | 1.80       | 0.020     | 0.010     | 0.015 - 1.00 | 0.10          | 1.40          | 0.005     | 0.20       |
| Docol CR 590Y980T-DP     | GI, GA, ZA | 0.20      | 1.00       | 2.90       | 0.050     | 0.010     | 0.015 - 1.00 | 0.15          | 1.40          | 0.005     | 0.20       |
| Docol CR 700Y980T-DP     | UC, EG     | 0.16      | 0.40       | 1.80       | 0.020     | 0.010     | 0.015 - 1.00 | 0.10          | 0.15          | 0.005     | 0.20       |
| Docol CR 700Y980T-DP     | GI, GA, ZA | 0.23      | 1.00       | 2.90       | 0.050     | 0.010     | 0.015 - 1.00 | 0.15          | 1.40          | 0.005     | 0.20       |
| Docol CR 700Y980T-DP-LCE | UC, EG     | 0.11      | 0.30       | 2.60       | 0.020     | 0.005     | 0.015        | 0.10          | 0.15          | 0.0035    | 0.10       |
| Docol CR 700Y980T-DP-LCE | GI, GA, ZA | 0.15      | 0.8        | 2.9        | 0.02      | 0.005     | 0.01 - 1.0   | 0.15          | 1.4           | 0.005     | 0.2        |
| Docol CR 700Y 1000T-DP   | UC, EG     | 0.18      | 0.80       | 1.80       | 0.020     | 0.010     | 0.015 - 1.00 | 0.10          | 1.40          | 0.005     | 0.20       |
| Docol 1000DPX            | GI, GA     | 0.23      | 1.00       | 2.70       | 0.050     | 0.010     | 0.015 - 1.00 | 0.15          | 1.00          | 0.005     | 0.20       |

## Tolerances

Cold rolled (UC, EG): Tolerances in accordance to EN10131.

Hot-dip metal coated (GI, GA, ZA): Tolerances in accordance to EN10143.

Customized dimensional and shape tolerances are available upon request.

## Coatings and Surface Treatments

### Coatings

The metal coating options for Docol products include:

**Hot-dip zinc coating (GI)** consists almost entirely of zinc (>99%). It is lead free, resulting in a small zinc spangle size. The coating provides good corrosion protection.

**Galvannealed coating (GA)** is a zinc-iron alloy coating having an iron content of approximately 10%. Galvannealed is produced by post-heat treatment in continuous hot-dip coating process. Galvannealed provides excellent resistance weldability and corrosion protection of painted products.

**Galfan coating (ZA)** is a zinc-aluminium alloy coating having the eutectic composition approximately of 95% Zn and 5% Al. Galfan is produced in continuous hot-dip coating process. Galfan has better anticorrosive and forming properties than conventional hot-dip zinc coating (GI).

**Electrogalvanized coating (EG)** is applied continuously by electro deposition. The coating consists of zinc (>99%). Electrogalvanized steel is characterized by its excellent surface quality and uniform coating thickness.

Grade specific availability of metal coatings for Docol products is given in the Mechanical properties table (Coating).

| Coating type | Coating class | Standard     | Closest in EN10346, informative | Coating mass per side, Single spot test (g/m <sup>2</sup> ) | Thickness per side, informative (µm) |
|--------------|---------------|--------------|---------------------------------|---|--------------------------------------|
| GI           | 40/40         | VDA239-100   | Z100                            | 40 - 60   | 5,6 - 8,5                            |
| GI           | 50/50         | VDA239-100   |                                 | 50 - 70   | 7,0 - 9,9                            |
| GI           | 60/60         | VDA239-100   | Z140                            | 60 - 90   | 8,5 - 12,7                           |
| GI           | 70/70         | VDA239-100   |                                 | 70 - 100  | 9,9 - 14,1                           |
| GI           | 85/85         | VDA239-100   |                                 | 85 - 115  | 12,0 - 16,2                          |
| GI           | 115/115       | VDA239-100   | Z275                            | 115 - 155   | 16,2 - 21,8                          |
| GA           | 40/40         | VDA239-100   | ZF100                           | 40 - 60   | 5,6 - 8,5                            |
| GA           | 50/50         | VDA239-100   | ZF120                           | 50 - 80   | 7,0 - 11,3                           |
| ZA           | 95            | Upon request | ZA95                            |   | 7 -                                  |
| ZA           | 130           | Upon request | ZA130                           |   | 10 -                                 |
| EG           | ZE25/25       | EN 10152     | -                               | 12 -  | 1,7 -                                |
| EG           | ZE50/50       | EN 10152     | -                               | 29 -  | 4,1 -                                |
| EG           | ZE75/75       | EN 10152     | -                               | 47 -  | 6,6 -                                |
| EG           | ZE100/100     | EN 10152     | -                               | 65 -  | 9,1 -                                |

Docol metal coated products are available with surface quality for unexposed applications.

In addition to these coating masses, OEM specific coatings and single sided EG coatings are available upon request.

### Surface Treatments

Uncoated (UC): available as oiled.

Hot-dip galvanized (GI, GA, ZA): available as oiled and/or chemically passivated.

Electrogalvanized (EG): available as oiled and/or chemically passivated or phosphated.

All surface treatments are in accordance with RoHS directive (2011/65/EU) and do not contain Chromium VI (Cr<sup>6+</sup>). Surface treatments provide only temporary surface protection during transportation and storage. In order to avoid corrosion damages, care must be taken to keep the products dry during transportation and storage. If they become wet, they must be separated and situated so that they are dried quickly.

### Fabrication and Other Recommendations

For information concerning fabrication, see SSAB's brochures on [www.ssab.com](http://www.ssab.com) or consult Tech Support, [techsupport@ssab.com](mailto:techsupport@ssab.com).

Appropriate health and safety precautions must be taken when bending, welding, cutting, grinding or otherwise working on the product.

### Contact Information

[www.ssab.com/contact](http://www.ssab.com/contact)