

## 3 Hot-dip galvanised sheet

1. Hot rolled sheet and strip
2. Cold rolled sheet
3. Hot-dip galvanised sheet
4. Electrolytic zinc coated sheet
5. Hot aluminised sheet

### Grades and properties

Limitations, parameters for testing and exceptional arrangements are to be taken from the pertinent standard.

#### Mild steel grades

continuous hot-dip galvanised strip and sheet for cold forming, DIN EN 10346 (Z/ZF/ZA/AZ)

| Designation to |                         |  | Mechanical properties               |                                     |                          |        |        | Chemical composition |             |             |            |            |             |
|----------------|-------------------------|--|-------------------------------------|-------------------------------------|--------------------------|--------|--------|----------------------|-------------|-------------|------------|------------|-------------|
| EN 10346       | EN 10027-2 Material No. | Symbol for the type of hot-dip coating | R <sub>e</sub> [N/mm <sup>2</sup> ] | R <sub>m</sub> [N/mm <sup>2</sup> ] | A <sub>80</sub> [%] min. | r min. | n min. | C [%] max.           | Si [%] max. | Mn [%] max. | P [%] max. | S [%] max. | Ti [%] max. |
| DX51D          | 1.0226                  | +Z, +ZA, +AZ                           | –                                   | 270 to 500                          | 22                       | –      | –      | 0.18                 | 0.50        | 1.20        | 0.12       | 0.045      | 0.30        |
| DX51D          | 1.0226                  | +ZF                                    | –                                   | 270 to 500                          | 22                       | –      | –      | 0.18                 | 0.50        | 1.20        | 0.12       | 0.045      | 0.30        |
| DX52D          | 1.0350                  | +Z, +ZA, +AZ                           | 140 to 300 *                        | 270 to 420                          | 26                       | –      | –      | 0.12                 | 0.50        | 0.60        | 0.10       | 0.045      | 0.30        |
| DX52D          | 1.0350                  | +ZF                                    | 140 to 300 *                        | 270 to 420                          | 26                       | –      | –      | 0.12                 | 0.50        | 0.60        | 0.10       | 0.045      | 0.30        |
| DX53D          | 1.0355                  | +Z, +ZA, +AZ                           | 140 to 260                          | 270 to 380                          | 30                       | –      | –      | 0.12                 | 0.50        | 0.60        | 0.10       | 0.045      | 0.30        |
| DX53D          | 1.0355                  | +ZF                                    | 140 to 260                          | 270 to 380                          | 30                       | –      | –      | 0.12                 | 0.50        | 0.60        | 0.10       | 0.045      | 0.30        |
| DX54D          | 1.0306                  | +Z, +ZA                                | 120 to 220                          | 260 to 350                          | 36                       | 1.6    | 0.18   | 0.12                 | 0.50        | 0.60        | 0.10       | 0.045      | 0.30        |
| DX54D          | 1.0306                  | +ZF                                    | 120 to 220                          | 260 to 350                          | 34                       | 1.4    | 0.18   | 0.12                 | 0.50        | 0.60        | 0.10       | 0.045      | 0.30        |
| DX54D          | 1.0306                  | +AZ                                    | 120 to 220                          | 260 to 350                          | 36                       | –      | –      | 0.12                 | 0.50        | 0.60        | 0.10       | 0.045      | 0.30        |
| DX56D          | 1.0322                  | +Z, +ZA                                | 120 to 180                          | 260 to 350                          | 39                       | 1.9    | 0.21   | 0.12                 | 0.50        | 0.60        | 0.10       | 0.045      | 0.30        |
| DX56D          | 1.0322                  | +ZF                                    | 120 to 180                          | 260 to 350                          | 37                       | 1.7    | 0.20   | 0.12                 | 0.50        | 0.60        | 0.10       | 0.045      | 0.30        |
| DX57D          | 1.0853                  | +Z, +ZA                                | 120 to 170                          | 260 to 350                          | 41                       | 2.1    | 0.22   | 0.12                 | 0.50        | 0.60        | 0.10       | 0.045      | 0.30        |
| DX57D          | 1.0853                  | +ZF                                    | 120 to 170                          | 260 to 350                          | 39                       | 1.9    | 0.21   | 0.12                 | 0.50        | 0.60        | 0.10       | 0.045      | 0.30        |

\* only valid for surface qualities B and C

#### Micro-alloyed grades

continuous hot-dip galvanised high yield strength steel strip and sheet for cold forming, DIN EN 10346

| Designation to |                         |  | Mechanical properties                      |  |  |                                 |               | Chemical composition |            |             |             |            |            |         |             |             |
|----------------|-------------------------|--|--|--|--|---------------------------------|---------------|----------------------|------------|-------------|-------------|------------|------------|---------|-------------|-------------|
| EN 10346       | EN 10027-2 Material No. | Symbol for the type of hot-dip coating | R <sub>e</sub> [N/mm <sup>2</sup> ] across | BH <sub>2</sub> [N/mm <sup>2</sup> ] across min. | R <sub>m</sub> [N/mm <sup>2</sup> ] across | A <sub>80</sub> [%] across min. | r across min. | n across min.        | C [%] max. | Si [%] max. | Mn [%] max. | P [%] max. | S [%] max. | Al [%]  | Ti [%] max. | Nb [%] max. |
| HX160YD        | 1.0910                  | +Z, +ZF, +ZA, +AZ                      | 160 to 220                                 | –  | 300 to 360                                 | 37                              | 1,9           | 0.20                 | 0.01       | 0.15        | 0.70        | 0.06       | 0.025      | ≤ 0.10  | 0.12        | 0.09        |
| HX180YD        | 1.0921                  | +Z, +ZF, +ZA, +AZ                      | 180 to 240                                 | –  | 340 to 400                                 | 34                              | 1.7           | 0.18                 | 0.01       | 0.15        | 0.70        | 0.06       | 0.025      | ≤ 0.10  | 0.12        | 0.09        |
| HX180BD        | 1.0914                  | +Z, +ZF, +ZA, +AZ                      | 180 to 240                                 | 35   | 290 to 360                                 | 34                              | 1.5           | 0.16                 | 0.10       | 0.50        | 0.70        | 0.06       | 0.025      | ≤ 0.10  | 0.12        | 0.09        |
| HX220YD        | 1.0923                  | +Z, +ZF, +ZA, +AZ                      | 220 to 280                                 | –  | 340 to 420                                 | 32                              | 1.5           | 0.17                 | 0.01       | 0.20        | 0.90        | 0.08       | 0.025      | ≤ 0.10  | 0.12        | 0.09        |
| HX220PD*       | 1.0358                  | +Z, +ZF, +ZA, +AZ                      | 220 to 280                                 | –  | 340 to 400                                 | 32                              | 1.3           | 0.15                 | 0.06       | 0.50        | 0.70        | 0.08       | 0.025      | ≥ 0.02  | –           | –           |
| HX220BD        | 1.0919                  | +Z, +ZF, +ZA, +AZ                      | 220 to 280                                 | 35   | 320 to 400                                 | 32                              | 1.2           | 0.15                 | 0.10       | 0.50        | 0.70        | 0.08       | 0.025      | ≤ 0.10  | 0.12        | 0.09        |
| HX260YD        | 1.0926                  | +Z, +ZF, +ZA, +AZ                      | 260 to 320                                 | –  | 380 to 440                                 | 30                              | 1.4           | 0.16                 | 0.01       | 0.25        | 1.60        | 0.10       | 0.025      | ≤ 0.10  | 0.12        | 0.09        |
| HX260PD*       | 1.0431                  | +Z, +ZF, +ZA, +AZ                      | 260 to 320                                 | –  | 380 to 440                                 | 28                              | –             | –                    | 0.11       | 0.50        | 0.70        | 0.10       | 0.025      | ≥ 0.02  | –           | –           |
| HX260BD        | 1.0924                  | +Z, +ZF, +ZA, +AZ                      | 260 to 320                                 | 35   | 360 to 440                                 | 28                              | –             | –                    | 0.10       | 0.50        | 0.80        | 0.10       | 0.025      | ≤ 0.10  | 0.12        | 0.09        |
| HX260LAD       | 1.0929                  | +Z, +ZF, +ZA, +AZ                      | 260 to 330                                 | –  | 350 to 430                                 | 26                              | –             | –                    | 0.12       | 0.50        | 0.60        | 0.030      | 0.025      | ≥ 0.015 | 0.12        | 0.09        |
| HX300PD*       | 1.0443                  | +Z, +ZF, +ZA, +AZ                      | 300 to 360                                 | –  | 400 to 480                                 | 26                              | –             | –                    | 0.11       | 0.50        | 0.70        | 0.12       | 0.025      | ≥ 0.02  | –           | –           |
| HX300YD        | 1.0927                  | +Z, +ZF, +ZA, +AZ                      | 300 to 360                                 | –  | 390 to 470                                 | 27                              | 1.3           | 0.15                 | 0.01       | 0.30        | 1.30        | 0.10       | 0.025      | ≤ 0.10  | 0.12        | 0.09        |
| HX300BD        | 1.0930                  | +Z, +ZF, +ZA, +AZ                      | 300 to 360                                 | 35   | 400 to 480                                 | 26                              | –             | –                    | 0.11       | 0.50        | 0.80        | 0.12       | 0.025      | ≤ 0.10  | 0.12        | 0.09        |
| HX300LAD       | 1.0932                  | +Z, +ZF, +ZA, +AZ                      | 300 to 380                                 | –  | 380 to 480                                 | 23                              | –             | –                    | 0.11       | 0.50        | 1.00        | 0.030      | 0.025      | ≥ 0.015 | 0.15        | 0.09        |
| HX340LAD       | 1.0933                  | +Z, +ZF, +ZA, +AZ                      | 340 to 420                                 | –  | 410 to 510                                 | 21                              | –             | –                    | 0.11       | 0.50        | 1.00        | 0.030      | 0.025      | ≥ 0.015 | 0.15        | 0.09        |
| HX380LAD       | 1.0934                  | +Z, +ZF, +ZA, +AZ                      | 380 to 480                                 | –  | 440 to 560                                 | 19                              | –             | –                    | 0.11       | 0.50        | 1.40        | 0.030      | 0.025      | ≥ 0.015 | 0.15        | 0.09        |
| HX420LAD       | 1.0935                  | +Z, +ZF, +ZA, +AZ                      | 420 to 520                                 | –  | 470 to 590                                 | 17                              | –             | –                    | 0.11       | 0.50        | 1.40        | 0.030      | 0.025      | ≥ 0.015 | 0.15        | 0.09        |
| HX460LAD       | 1.0990                  | +Z, +ZF, +ZA, +AZ                      | 460 to 560                                 | –  | 500 to 640                                 | 15                              | –             | –                    | 0.15       | 0.50        | 1.70        | 0.030      | 0.025      | ≥ 0.015 | 0.15        | 0.09        |
| HX500LAD       | 1.0991                  | +Z, +ZF, +ZA, +AZ                      | 500 to 620                                 | –  | 530 to 690                                 | 13                              | –             | –                    | 0.15       | 0.50        | 1.70        | 0.030      | 0.025      | ≥ 0.015 | 0.15        | 0.09        |

**B** bake hardening    **P** phosphorous alloyed    **Y** interstitial-free (IF Steel)    **LA** low alloy (micro-alloyed)    \* Grade not included in the latest norm (formerly: DIN EN 10292:2000)

## Structural steels

continuous hot-dip galvanised structural steel strip and sheet for cold forming, DIN EN 10346 (Z/ZF/ZA/AZ)

| Designation to |                         |  | Mechanical properties                    |  |                          | Chemical composition |             |             |            |            |
|----------------|-------------------------|--|--|--|--------------------------|----------------------|-------------|-------------|------------|------------|
| EN 10346       | EN 10027-2 Material No. | Symbol for the type of hot-dip coating | R <sub>e</sub> [N/mm <sup>2</sup> ] min. | R <sub>m</sub> [N/mm <sup>2</sup> ] min. | A <sub>80</sub> [%] min. | C [%] max.           | Si [%] max. | Mn [%] max. | P [%] max. | S [%] max. |
| S220GD         | 1.0241                  | +Z, +ZA                                | 220                                      | 300                                      | 20                       | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |
| S220GD         | 1.0241                  | +ZF, +AZ                               | 220                                      | 300                                      | 20                       | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |
| S250GD         | 1.0242                  | +Z, +ZA                                | 250                                      | 330                                      | 19                       | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |
| S250GD         | 1.0242                  | +ZF, +AZ                               | 250                                      | 330                                      | 19                       | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |
| S280GD         | 1.0244                  | +Z, +ZA                                | 280                                      | 360                                      | 18                       | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |
| S280GD         | 1.0244                  | +ZF, +AZ                               | 280                                      | 360                                      | 18                       | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |
| S320GD         | 1.0250                  | +Z, +ZA                                | 320                                      | 390                                      | 17                       | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |
| S320GD         | 1.0250                  | +ZF, +AZ                               | 320                                      | 390                                      | 17                       | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |
| S350GD         | 1.0529                  | +Z, +ZA                                | 350                                      | 420                                      | 16                       | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |
| S350GD         | 1.0529                  | +ZF, +AZ                               | 350                                      | 420                                      | 16                       | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |
| S550GD         | 1.0531                  | +Z, +ZA                                | 550                                      | 560                                      | –                        | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |
| S550GD         | 1.0531                  | +ZF, +AZ                               | 550                                      | 560                                      | –                        | 0.2                  | 0.6         | 1.70        | 0.10       | 0.045      |

## Multi-phase steel

continuous hot-dip galvanised multi-phase steel for cold forming, DIN EN 10346

| Designation to |                         |  | Mechanical properties                      |  |   |  |               |            | Chemical composition |             |            |            |             |             |                |                |            |            |  |
|----------------|-------------------------|--|--|--|---|--|---------------|------------|----------------------|-------------|------------|------------|-------------|-------------|----------------|----------------|------------|------------|--|
| EN 10346       | EN 10027-2 Material No. | Symbol for the type of hot-dip coating | R <sub>e</sub> [N/mm <sup>2</sup> ] across | BH <sub>2</sub> [N/mm <sup>2</sup> ] across min. | R <sub>m</sub> [N/mm <sup>2</sup> ] across min. | A <sub>80</sub> [N/mm <sup>2</sup> ] across min. | n across min. | C [%] max. | Si [%] max.          | Mn [%] max. | P [%] max. | S [%] max. | Al [%] min. | Al [%] max. | Cr+Mo [%] max. | Nb+Ti [%] max. | V [%] max. | B [%] max. |  |
| FB-Steel       |                         |  |  |  |   |  |               |            |                      |             |            |            |             |             |                |                |            |            |  |
| HDT450F        | 1.0961                  | +Z, +ZF                                | 320 to 420                                 | 30   | 450   | 23   | –             | 0.180      | 0.500                | 1.200       | 0.030      | 0.010      | 0.015       | –           | 0.30           | 0.05           | 0.15       | 0.005      |  |
| HDT560F        | 1.0959                  | +Z, +ZF                                | 460 to 570                                 | 30   | 560   | 16   | –             | 0.180      | 0.500                | 1.800       | 0.025      | 0.010      | 0.015       | –           | 0.30           | 0.15           | 0.15       | 0.005      |  |
| DP-Steel       |                         |  |  |  |   |  |               |            |                      |             |            |            |             |             |                |                |            |            |  |
| HCT450X        | 1.0937                  | +Z, +ZF                                | 260 to 340                                 | 30   | 450   | 27   | 0.16          | 0.140      | 0.800                | 2.000       | 0.080      | 0.015      | –           | 2.00        | 1.00           | 0.15           | 0.20       | 0.005      |  |
| HCT500X        | 1.0939                  | +Z, +ZF                                | 300 to 380                                 | 30   | 500   | 23   | 0.15          | 0.140      | 0.800                | 2.000       | 0.080      | 0.015      | –           | 2.00        | 1.00           | 0.15           | 0.20       | 0.005      |  |
| HCT600X        | 1.0941                  | +Z, +ZF                                | 340 to 420                                 | 30   | 600   | 20   | 0.14          | 0.170      | 0.800                | 2.200       | 0.080      | 0.015      | –           | 2.00        | 1.00           | 0.15           | 0.20       | 0.005      |  |
| HDT580X        | 1.0936                  | +Z, +ZF                                | 330 to 460                                 | 30   | 580   | 19   | 0.13          | 0.170      | 0.800                | 2.200       | 0.080      | 0.015      | –           | 2.00        | 1.00           | 0.15           | 0.20       | 0.005      |  |
| HCT780X        | 1.0943                  | +Z, +ZF                                | 450 to 560                                 | 30   | 780   | 14   | –             | 0.180      | 0.800                | 2.500       | 0.080      | 0.015      | –           | 2.00        | 1.00           | 0.15           | 0.20       | 0.005      |  |
| HCT980X        | 1.0944                  | +Z, +ZF                                | 600 to 750                                 | 30   | 980   | 10   | –             | 0.230      | 0.800                | 2.500       | 0.080      | 0.015      | –           | 2.00        | 1.00           | 0.15           | 0.20       | 0.005      |  |
| TRIP-Steel     |                         |  |  |  |   |  |               |            |                      |             |            |            |             |             |                |                |            |            |  |
| HCT690T        | 1.0947                  | +Z, +ZF                                | 430 to 550                                 | 40   | 690   | 23   | 0.18          | 0.320      | 2.200                | 2.500       | 0.120      | 0.015      | –           | 2.00        | 0.60           | 0.20           | 0.20       | 0.005      |  |
| HCT780T        | 1.0948                  | +Z, +ZF                                | 470 to 600                                 | 40   | 780   | 21   | 0.16          | 0.320      | 2.200                | 2.500       | 0.120      | 0.015      | –           | 2.00        | 0.60           | 0.20           | 0.20       | 0.005      |  |
| CP-Steel       |                         |  |  |  |   |  |               |            |                      |             |            |            |             |             |                |                |            |            |  |
| HCT600C        | 1.0953                  | +Z, +ZF                                | 350 to 500                                 | 30   | 600   | 16   | –             | 0.180      | 0.800                | 2.200       | 0.080      | 0.015      | –           | 2.00        | 1.00           | 0.15           | 0.20       | 0.005      |  |
| HDT750C        | 1.0956                  | +Z, +ZF                                | 620 to 760                                 | 30   | 750   | 10   | –             | 0.180      | 0.800                | 2.200       | 0.080      | 0.015      | –           | 2.00        | 1.00           | 0.15           | 0.20       | 0.005      |  |
| HCT780C        | 1.0954                  | +Z, +ZF                                | 500 to 700                                 | 30   | 780   | 10   | –             | 0.180      | 0.800                | 2.200       | 0.080      | 0.015      | –           | 2.00        | 1.00           | 0.15           | 0.20       | 0.005      |  |
| HDT780C        | 1.0957                  | +Z, +ZF                                | 680 to 830                                 | 30   | 780   | 10   | –             | 0.180      | 0.800                | 2.200       | 0.080      | 0.015      | –           | 2.00        | 1.00           | 0.15           | 0.20       | 0.005      |  |
| HDT950C        | 1.0958                  | +Z, +ZF                                | 720 to 920                                 | 30   | 950   | 9  | –             | 0.250      | 0.800                | 2.200       | 0.080      | 0.015      | –           | 2.00        | 1.20           | 0.15           | 0.20       | 0.005      |  |
| HCT980C        | 1.0955                  | +Z, +ZF                                | 700 to 900                                 | 30   | 980   | 7  | –             | 0.250      | 0.800                | 2.200       | 0.080      | 0.015      | –           | 2.00        | 1.20           | 0.15           | 0.22       | 0.005      |  |
| MS-Steel       |                         |  |  |  |   |  |               |            |                      |             |            |            |             |             |                |                |            |            |  |
| HDT1200M       | 1.0665                  | +Z, +ZF                                | 900 to 1150                                | 30   | 1200  | 5  | –             | 0.250      | 0.800                | 2.000       | 0.060      | 0.015      | –           | 2.00        | 1.20           | 0.15           | 0.22       | 0.005      |  |

Grade availability has to be checked individually.

| Type of hot-dip coating |                     |   | Surface finish   |
|-------------------------|---------------------|---|--|
| Z                       | hot-dip zinc coated | zinc coat with 5% Al                        | <b>NA:</b> unaffected solidification with differing bloom size, normal surface           |
| ZA                      | Galfan              | zinc coat with 5% Al                        | <b>MA:</b> targeted effect on the solidification with reduced bloom size, normal surface |
| AZ                      | Galvalume           | zinc coat with 55% Al to 1.6% Si, rest zinc | <b>MB:</b> targeted effect on the solidification, cold re-rolled, best surface           |
|                         |                     |   | <b>MC:</b> targeted effect on the solidification, cold re-rolled, best surface           |
| ZF                      | galvannealed        | homogenised coating of zinc-iron            | <b>RA:</b> normal surface  |
|                         |                     |   | <b>RB:</b> improved surface  |
|                         |                     |   | <b>RC:</b> best surface  |

#### After treatment (Surface protection)

|    |                                 |
|----|---------------------------------|
| C  | chemically passivated           |
| O  | oiled                           |
| CO | chemically passivated and oiled |
| S  | sealed                          |
| U  | untreated                       |