

CASE-HARDENING AND HEAT-TREATABLE STEELS

Steel Grades

C10E

C15E

16MnCr5

C45E

C45E – Special Agreement

C50E

1050

C60E

HcK60Cr

HcK67Cr

HcK67

SAE8667Mod.

Ck75

1074

DUROSTAT® B2

DUROSTAT® B4

CASE-HARDENING STEELS

Case-hardening steels are structural steels with a relatively low carbon content which are used for components whose surface layer prior to hardening is usually carburized or carbonitrided. For some of these steel grades the aluminium content is strictly limited to avoid formation of soft spots.

LOW CARBON CONTENT

Special steel grades have been developed, delivery is performed e.g. in accordance with EN 10084.

STEEL GRADES

COMPARISON TABLE

Comparison Table

| Steel Grade | EUROP. STANDARD 10084 | Germany | France | Italy | United Kingdom | Material No. |
|-------------|-----------------------|---------|--------|---------|----------------|--------------|
| C10E | C10E | Ck10 | XC10 | C10 | 045M10 | 1.1121 |
| C15E | C15E | Ck15 | – | C15 | – | 1.1141 |
| 16MnCr5 | 16MnCr5 | 16MnCr5 | 16MC5 | 16MnCr5 | 590M17 | 1.7131 |

CHEMICAL COMPOSITION

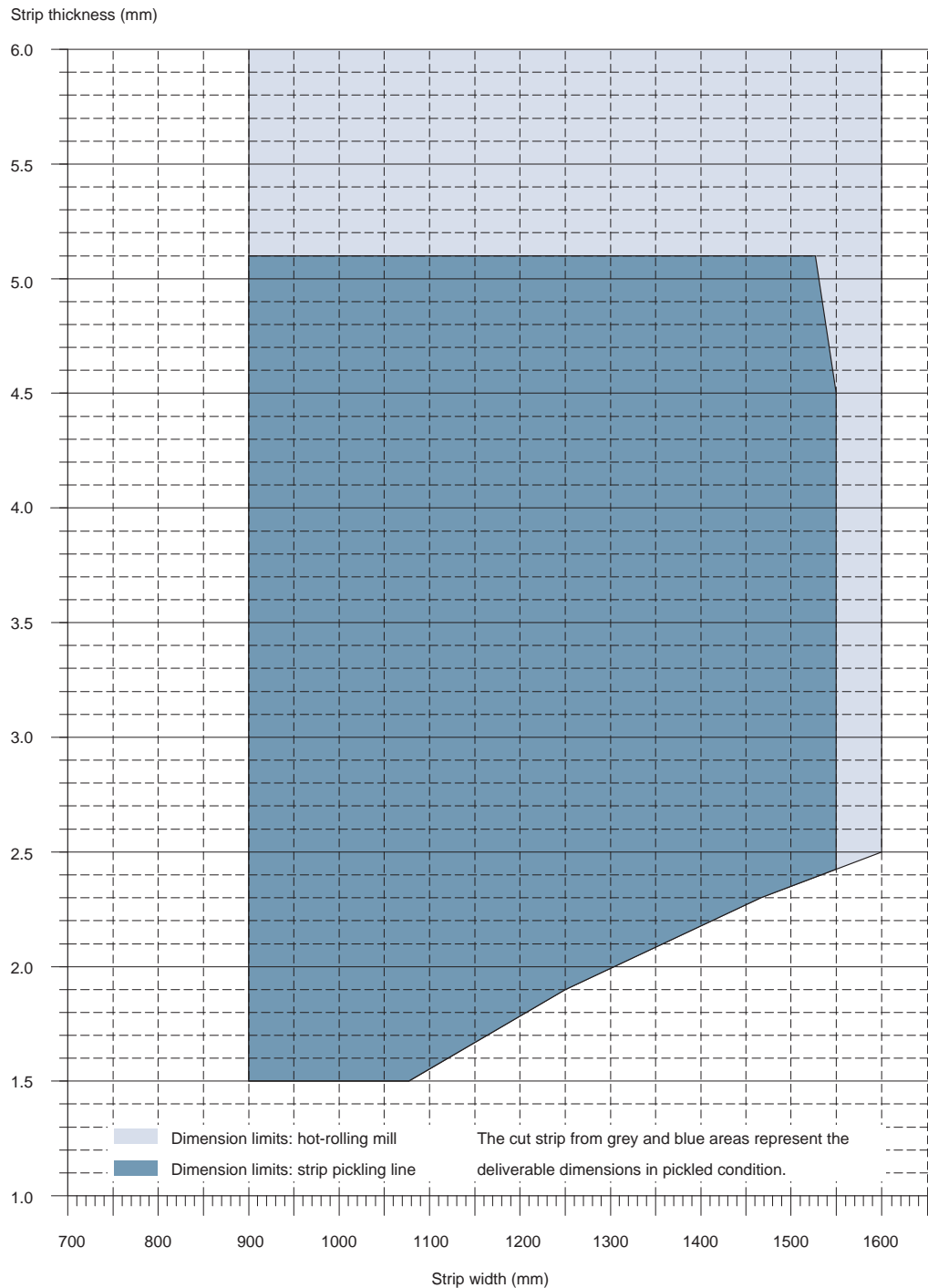
CHEMICAL COMPOSITION

Guaranteed values of heat analysis in %

| Steel Grade | C | Si max. | Mn | P max. | S max. | Cr |
|-------------|-------------|---------|-------------|--------|--------|-------------|
| C10E | 0.07 – 0.13 | 0.40 | 0.30 – 0.60 | 0.035 | 0.035 | – |
| C15E | 0.12 – 0.18 | 0.40 | 0.30 – 0.60 | 0.035 | 0.035 | – |
| 16MnCr5 | 0.14 – 0.19 | 0.40 | 1.00 – 1.30 | 0.035 | 0.035 | 0.80 – 1.10 |

As-delivered condition: normalised rolled
 upon request, soft-annealed

AVAILABLE DIMENSIONS CASE HARDENING STEELS C10E

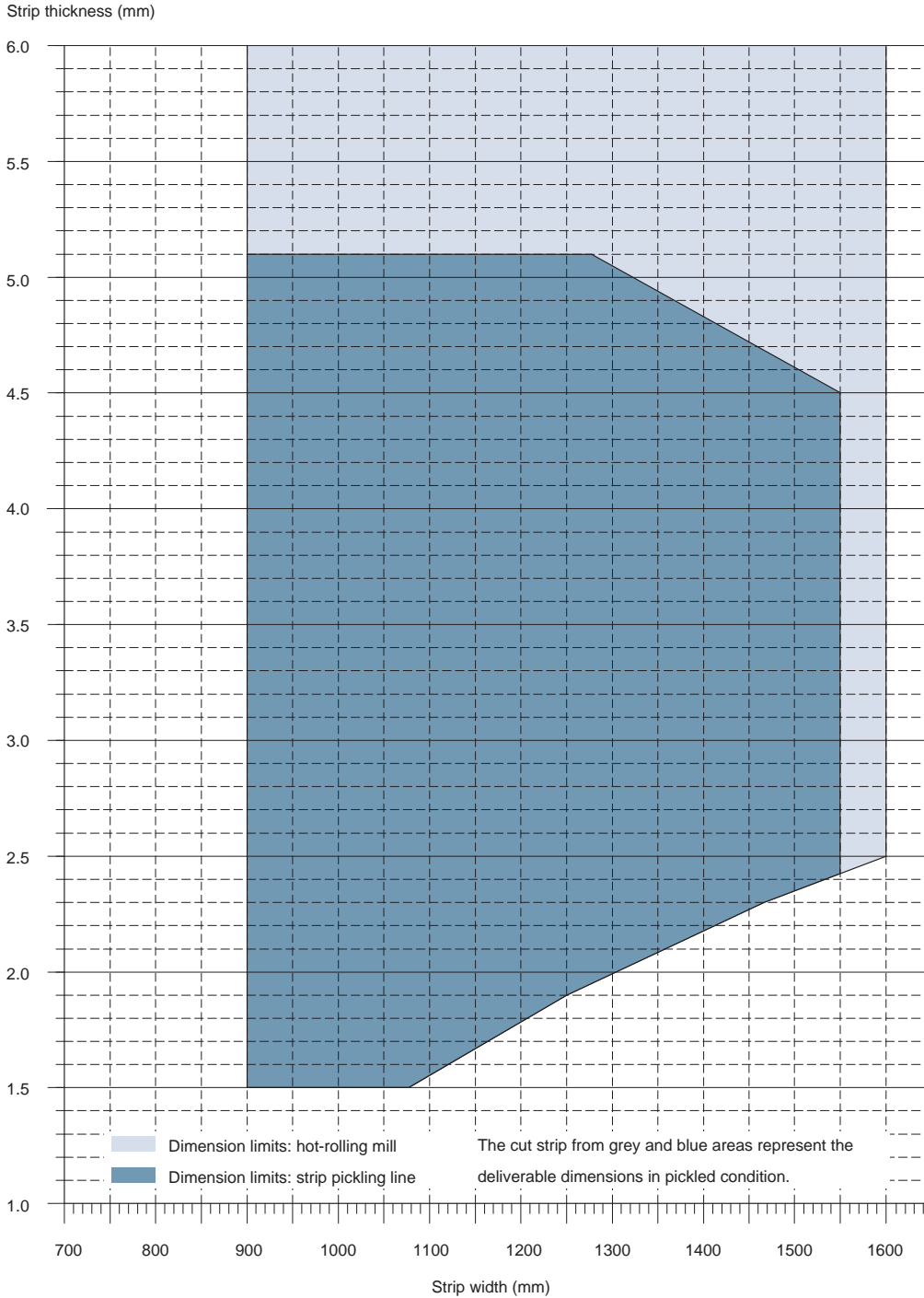


The graphs represent thickness with symmetric tolerances.

Please contact our sales departments for dimensions in thicknesses below 900 mm (production in transverse and longitudinal slitting lines).

AVAILABLE DIMENSIONS CASE HARDENING STEELS

C15E

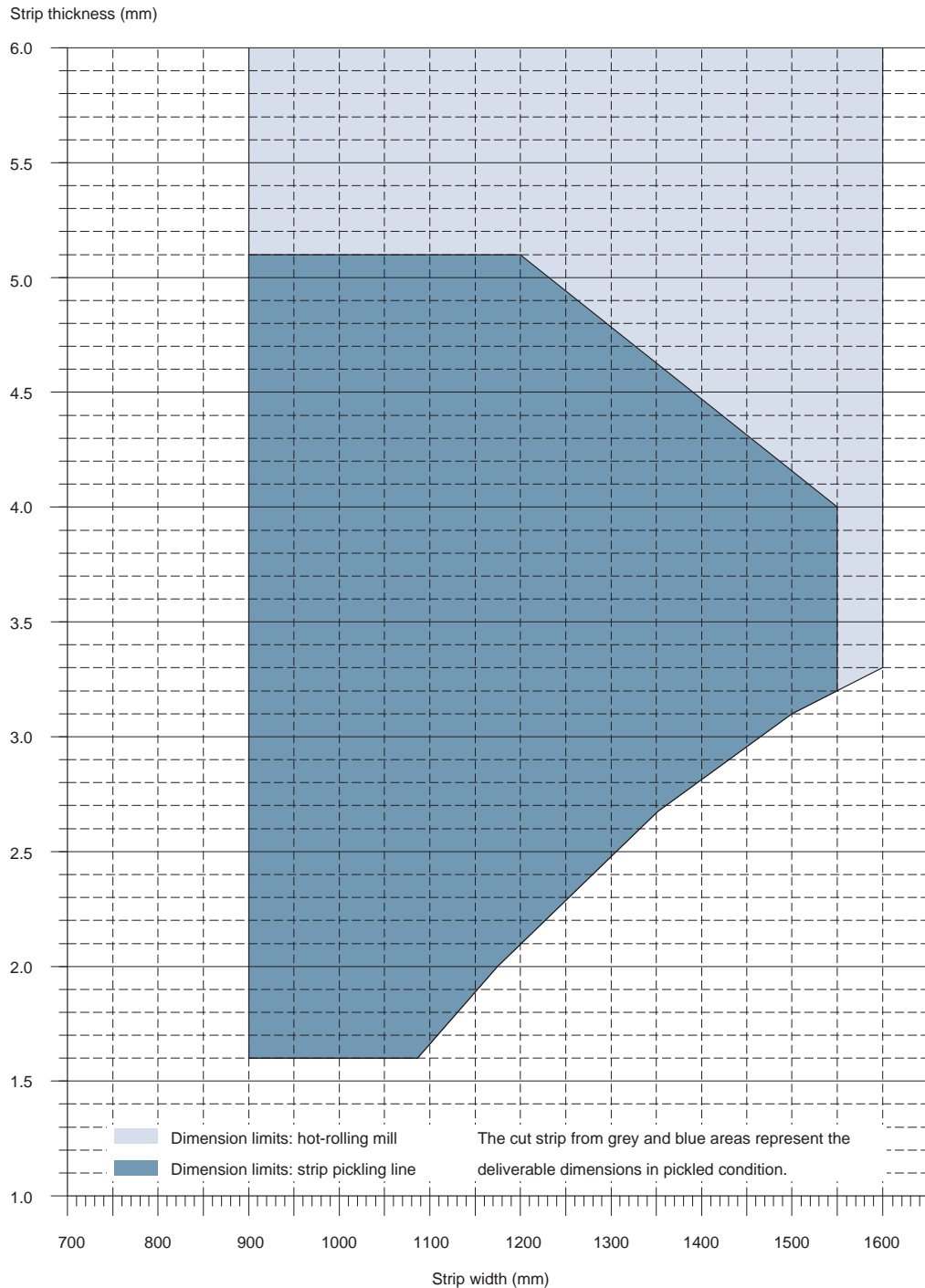


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AVAILABLE DIMENSIONS CASE HARDENING STEELS

16MnCr5



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HEAT-TREATABLE STEELS

Heat-treatable steels are steels for mechanical engineering which as a result of their chemical composition are suitable for hardening and in heat-treated condition show good toughness characteristics for a given tensile strength.

**SUITABLE FOR
HARDENING**

In general, the steels are used in soft condition to produce parts which subsequently are subjected to heat treatment to obtain the desired functional properties.

From the series of unalloyed heat-treatable steels we have developed a standard programme which is composed of the steel grades contained in EN 10083 and various special grades.

STEEL GRADES

COMPARISON TABLE

Comparison Table

| Steel Grade | Germany | France | Italy | United Kingdom | SAE | Material No. |
|-------------|---------|--------|-------|----------------|------|--------------|
| C45E | Ck45 | XC45 | C45 | 080M46 | 1045 | 1.1191 |
| C50E | Ck50 | XC48H1 | C50 | 080M50 | 1050 | 1.1206 |
| C60E | Ck60 | XC60 | C60 | 060A62 | 1060 | 1.1221 |
| HCK67 | Ck67 | XC68 | C70 | 060A67 | 1067 | 1.1231 |
| Ck75 | Ck75 | XC75 | C75 | 060A78 | 1074 | 1.1248 |

| Steel Grade | Standard | Specification No. | Rev. |
|------------------------|---------------|-------------------|------|
| C45E | EN 10083-1:96 | 01 | 01 |
| C45E-Special Agreement | EN 10083-1:96 | 02 | 01 |
| C50E | EN 10083-1:96 | 03 | 01 |
| 1050 | SAE J 403-95 | 04 | 01 |
| C60E | EN 10083-1:96 | 05 | 01 |
| HCK60Cr | special grade | 06 | 01 |
| HCK67Cr | special grade | 07 | 01 |
| HCK67 | special grade | 08 | 01 |
| SAE8667Mod. | special grade | 09 | 02 |
| Ck75 | special grade | 10 | 01 |
| 1074 | SAE J 403/95 | 11 | 01 |

CHEMICAL COMPOSITION

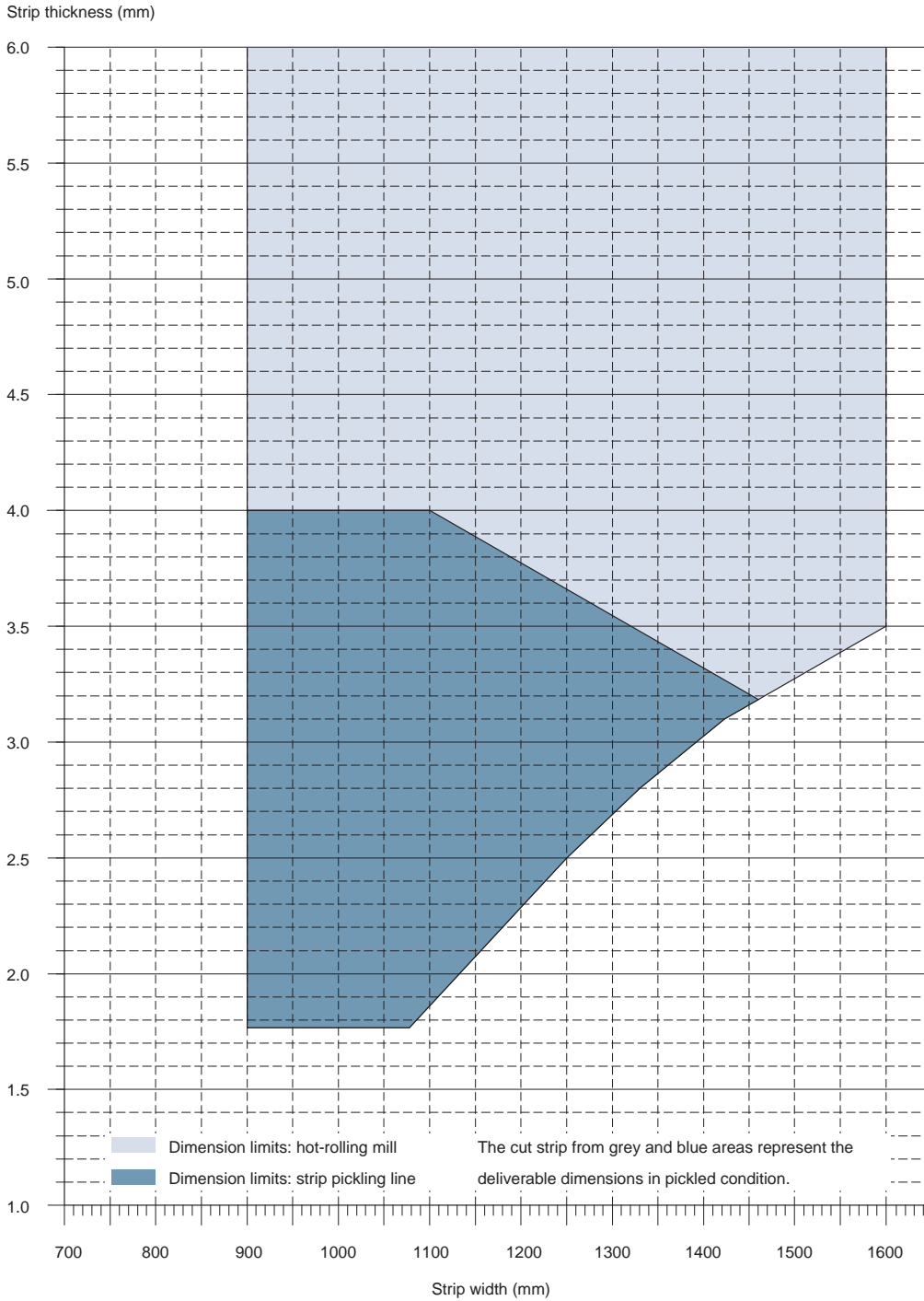
Guaranteed values of heat analysis in %

| Steel Grade | C | Si | Mn | P max. | S max. | Cr | Ni | Mo |
|------------------------|-------|-------|-------|-----------|-----------|-------|-------|-------|
| C45E | 0.42– | max. | 0.50– | 0.035 | 0.035 | max. | max. | – |
| | 0.50 | 0.40 | 0.80 | | | 0.40 | 0.40 | |
| C45E-Special Agreement | 0.42– | max. | 0.50– | 0.035 | 0.035 | 0.15– | max. | – |
| | 0.50 | 0.40 | 0.80 | | | 0.40 | 0.40 | |
| C50E | 0.47– | max. | 0.60– | 0.035 | 0.035 | max. | max. | – |
| | 0.55 | 0.40 | 0.90 | | | 0.40 | 0.40 | |
| 1050 | 0.48– | 0.15– | 0.60– | 0.040 | 0.050 | – | – | – |
| | 0.55 | 0.35 | 0.90 | | | | | |
| C60E | 0.57– | max. | 0.60– | 0.035 | 0.035 | max. | max. | – |
| | 0.65 | 0.40 | 0.90 | | | 0.40 | 0.40 | |
| HCK60Cr | 0.57– | max. | 0.60– | 0.035 | 0.035 | 0.20– | max. | – |
| | 0.65 | 0.40 | 0.90 | | | 0.40 | 0.40 | |
| HCK67Cr | 0.65– | 0.15– | 0.60– | 0.035 | 0.035 | 0.20– | – | – |
| | 0.72 | 0.35 | 0.90 | | | 0.40 | | |
| HCK67 | 0.65– | 0.15– | 0.60– | 0.035 | 0.035 | – | – | – |
| | 0.72 | 0.35 | 0.90 | | | | | |
| SAE8667Mod. | 0.61– | 0.20– | 0.30– | 0.025 | 0.015 | 0.20– | 0.20– | 0.08– |
| | 0.72 | 0.35 | 0.50 | | | 0.35 | 0.35 | 0.15 |
| Ck75 | 0.70– | 0.15– | 0.60– | 0.035 | 0.035 | – | – | – |
| | 0.80 | 0.35 | 0.80 | | | | | |
| 1074 | 0.69– | 0.15– | 0.50– | 0.030 | 0.035 | – | – | – |
| | 0.80 | 0.35 | 0.80 | | | | | |

As-delivered condition: normalised rolled
upon request, soft-annealed

AVAILABLE DIMENSIONS HEAT-TREATABLE STEELS

C45E

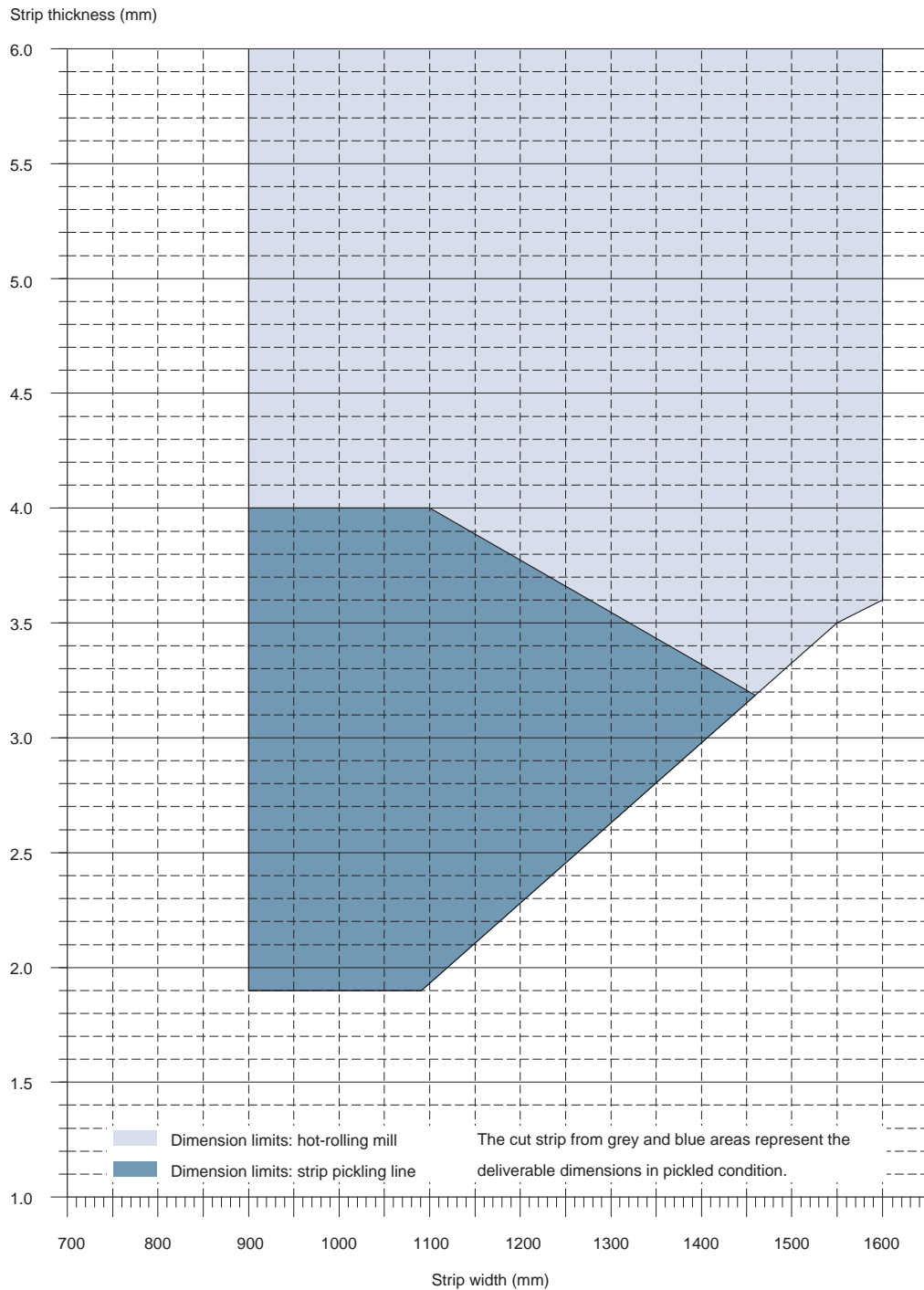


The graphs represent thickness with symmetric tolerances.

Please contact our sales departments for dimensions in thicknesses below 900 mm (production in transverse and longitudinal slitting lines).

AVAILABLE DIMENSIONS HEAT-TREATABLE STEELS

C50E, 1050

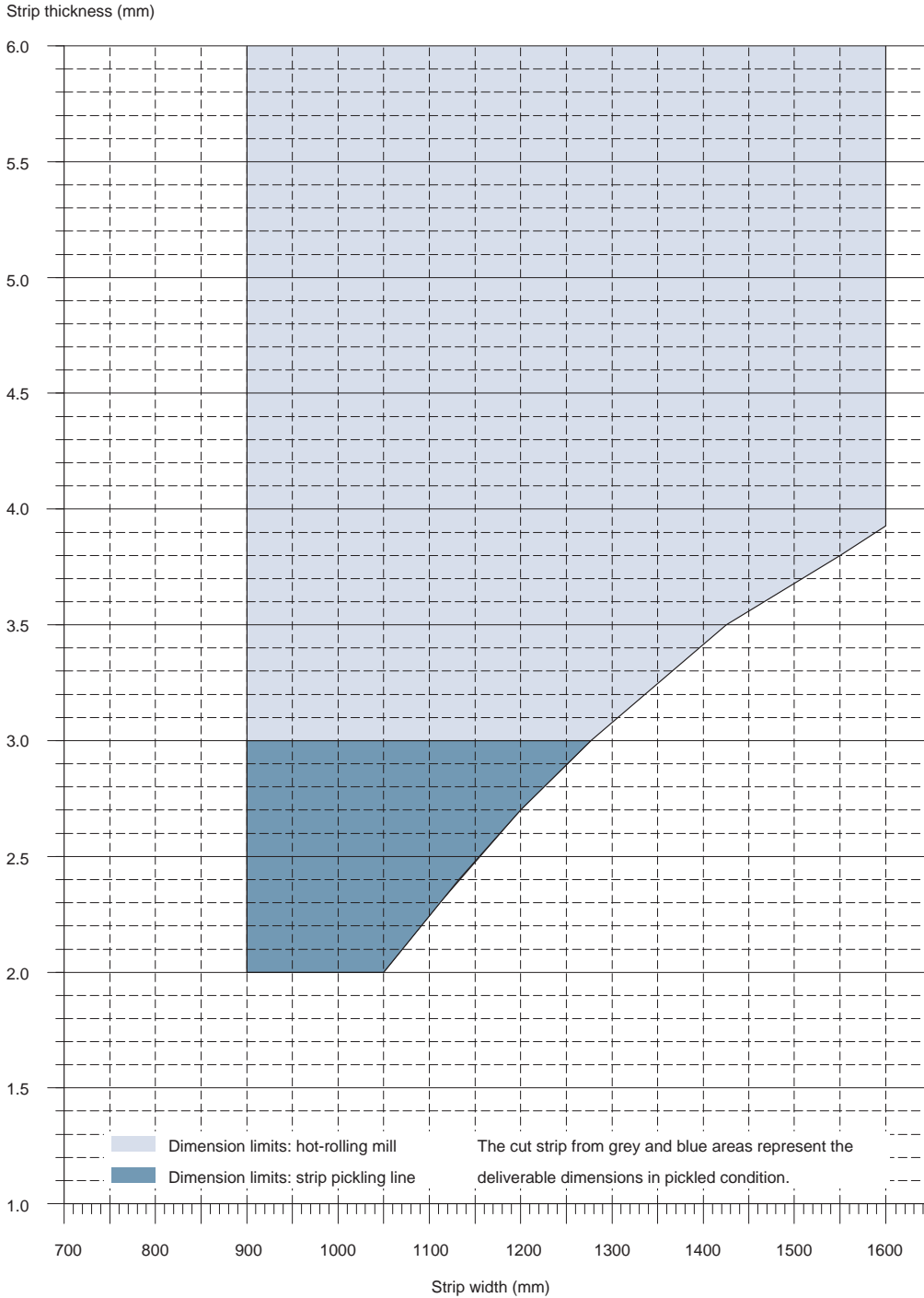


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AVAILABLE DIMENSIONS HEAT-TREATABLE STEELS

C60E

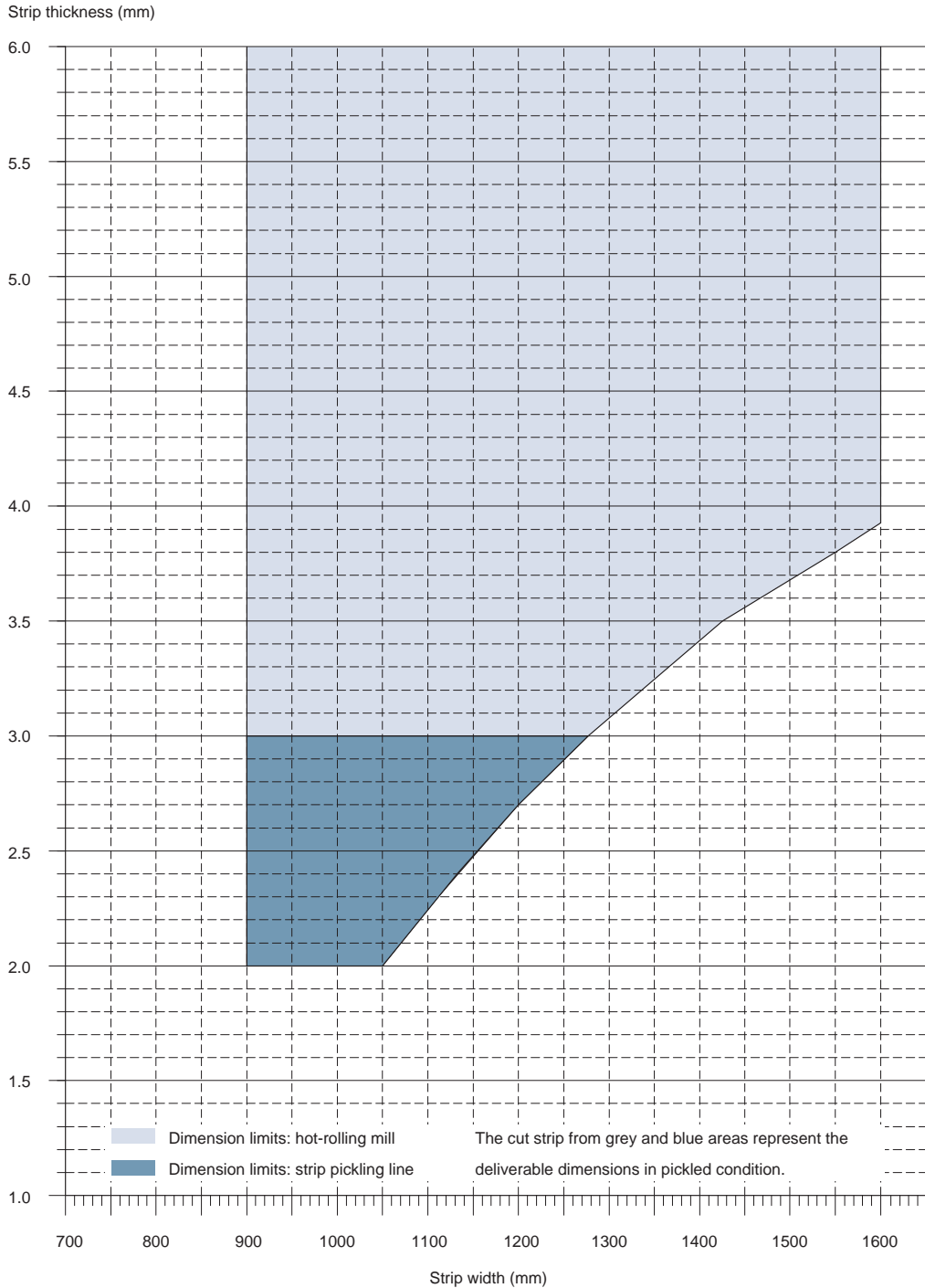


The graphs represent thickness with symmetric tolerances.

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AVAILABLE DIMENSIONS HEAT-TREATABLE STEELS

HcK60Cr, HcK67, HcK67Cr

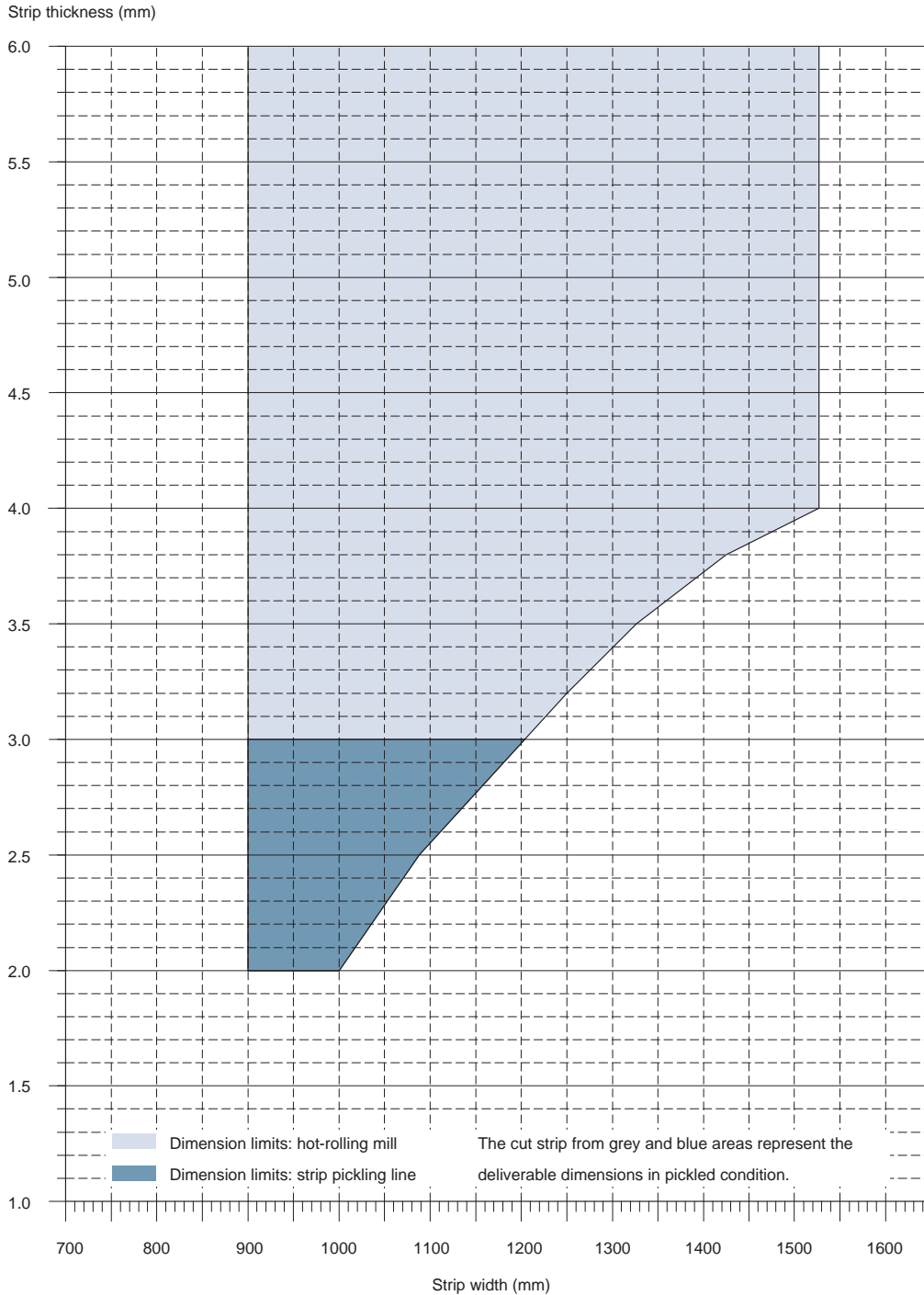


The graphs represent thickness with symmetric tolerances.

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AVAILABLE DIMENSIONS HEAT-TREATABLE STEELS

Ck75, 1074, SAE8667mod.



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BORON-CONTAINING HEAT-TREATABLE STEELS

IMPROVED HARDENABILITY Boron-containing heat-treatable steels are alloyed with a low mass percentage of boron to improve hardenability. Prior to the heat treatment, the steel grades show good cold-formability characteristics. Our standard programme contains the DUROSTAT® B2 and DUROSTAT® B4 steel grades.

Special steel grades have been developed; delivery is performed according to VA specification.

CHEMICAL COMPOSITION

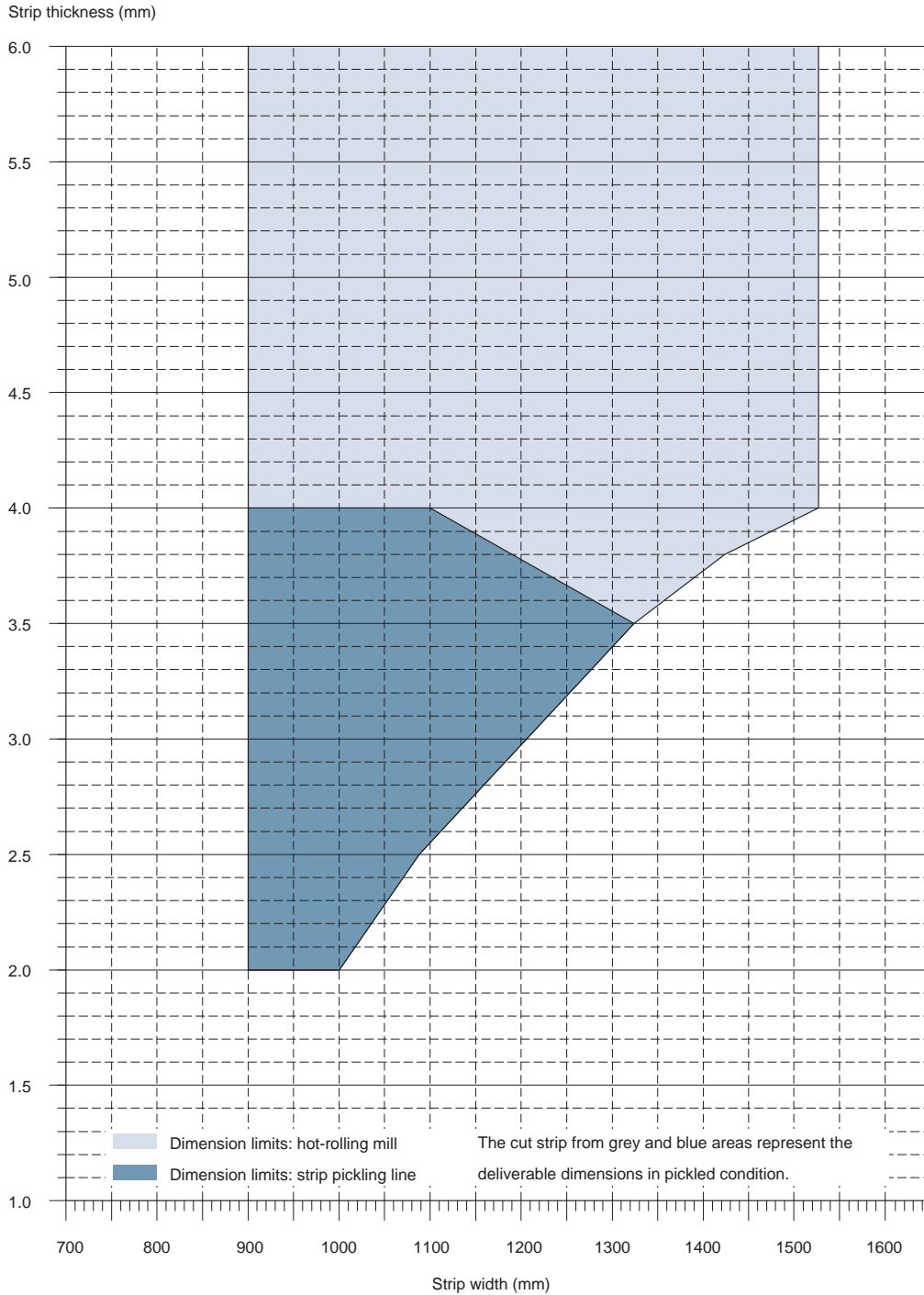
CHEMICAL COMPOSITION

Guaranteed values of heat analysis in %

| Steel Grade | C | Si | Mn | P max. | S max. | Cr | B |
|--------------|-------|-------|-------|-----------|-----------|-------|---------|
| DUROSTAT® B2 | 0.25– | 0.15– | 1.10– | 0.020 | 0.010 | 0.30– | 0.0015– |
| | 0.30 | 0.30 | 1.30 | | | 0.50 | 0.0040 |
| DUROSTAT® B4 | 0.38– | 0.15– | 1.10– | 0.025 | 0.025 | 0.30– | 0.0015– |
| | 0.42 | 0.30 | 1.30 | | | 0.50 | 0.0040 |

As-delivered condition: normalised rolled

AVAILABLE DIMENSIONS BORON-CONTAINING HEAT-TREATABLE STEELS DUROSTAT® B2, DUROSTAT® B4



The graphs represent thickness with symmetric tolerances.

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