

**STRENX<sup>®</sup>**  
PERFORMANCE STEEL



# LA BELLA



**SSAB**

LA BELLEZZA DI STRENX:

# PIÙ FORTE E PIÙ LEGGERO

POSSO RISPARMIARE  
CARBURANTE



POSSO SOLLEVARE  
PIÙ IN ALTO



Nel tentativo di migliorare le performance dei prodotti in acciaio, la riduzione di peso risulta essere la chiave vincente.

Per ottenere prodotti più leggeri, c'è bisogno di un acciaio più forte e, allo stesso tempo, più sottile. L'acciaio strutturale altoresistenziale Strenx® è la nostra risposta a questa sfida.

Con Strenx, i produttori di rimorchi possono aumentare la capacità di carico dei loro mezzi. I proprietari di camion possono ridurre il consumo di carburante e le emissioni di CO<sub>2</sub>. Gli operatori di gru possono migliorare la propria attività arrivando più in alto e più lontano. Gli agricoltori possono lavorare più ettari ogni giorno.

Questa è la bellezza dell'acciaio Strenx: Qualsiasi sia il vostro impiego, Strenx vi offre nuove possibilità per migliorare le sue prestazioni.

POSSO CARICARE DI PIÙ



POSSO LAVORARE  
IN SICUREZZA





LA BELLEZZA DI STRENX:

# ACCIAIO CON ASSISTENZA INCLUSA

L'acciaio strutturale Strenx ha un grande potenziale per rendere i vostri prodotti più resistenti, più leggeri, più sicuri, più competitivi e più sostenibili. Quando coniugate l'elevata qualità di questo acciaio con le conoscenze e le risorse fornite da SSAB, i vostri prodotti potranno raggiungere nuovi livelli di prestazioni.







SSAB ha una lunga tradizione nell'assistenza ai propri clienti relativamente allo sviluppo dei prodotti, all'innovazione e alla progettazione; includendo la scelta del materiale, il calcolo dei costi del ciclo di vita, le soluzioni logistiche e le raccomandazioni di lavorazione.

In poche parole, come clienti dell'acciaio Strenx avete accesso a tre aree di servizio e di assistenza:

#### SUPPORTO TECNICO SSAB

Il Supporto Tecnico è composto da ingegneri esperti ai quali vi potete rivolgere per qualsiasi domanda, e vi forniranno assistenza nella vostra lingua o in inglese. Il Supporto Tecnico è in grado di risolvere i vostri problemi riguardanti la scelta dei materiali, i parametri di saldatura, i processi produttivi e molto altro. Potete contattare il Supporto Tecnico per telefono o mediante l'help desk SSAB. Potete trovare maggiori informazioni riguardanti il Supporto Tecnico su [ssab.com](http://ssab.com).

#### SSAB Shape

Fornisce consulenze ingegneristiche, di produzione e logistiche a complemento delle vostre risorse in modo da incrementare l'efficienza e l'economicità totale della produzione. SSAB SHAPE ha inoltre accesso a una rete di centri di servizio equipaggiati con macchinari avanzati per la lavorazione dell'acciaio Strenx. SSAB SHAPE è in grado di fornire parti semilavorate e kits pronti per l'assemblaggio con disegni e istruzioni direttamente alle vostre linee di produzione. Ulteriori informazioni su SSAB SHAPE possono essere consultate a pagina 14-15.

#### SSAB Knowledge Service Center

Una risorsa impareggiabile per lo sviluppo di nuovi prodotti. Lo scopo dei nostri specialisti nella produzione e nei materiali è di rendere i vostri prodotti più facili da fabbricare, in grado di trasportare più carico utile, di durare di più e di richiedere minor manutenzione. Il Knowledge Service Center SSAB è composto da gruppi di esperti che assistono i nostri clienti in diverse aree:

##### Tecnologia strutturale

È specializzata in soluzioni di progettazione avanzate e affidabilità strutturale relativamente all'impiego dell'acciaio altoresistenziale in strutture resistenti e leggere.

##### Tecnologia di formatura

L'obiettivo principale del gruppo di tecnologia di formatura è di fornire assistenza ai clienti riguardo ai migliori procedimenti per il taglio e la formatura dell'acciaio altoresistenziale.

##### Tecnologia di giuntura e taglio termico

Fornisce ai nostri clienti assistenza tecnica e informazioni qualificate riguardo alla saldatura e al taglio termico di acciaio altoresistenziale.

##### Efficienza produttiva

Effettua analisi del ciclo produttivo e ottimizzazione dei processi allo scopo di individuare risparmi nei costi di produzione.



“

Think  
thinner  
and get  
stronger

”



LA BELLEZZA DI STRENX:

# SFIDE E VANTAGGI PER I PROGETTISTI

L'acciaio strutturale Strenx rende  
assai più interessante la caccia di  
percentuali. Non solo come spettatori,  
ma anche come partecipanti.

In mano a progettisti capaci e ambiziosi, l'acciaio Strenx può produrre risultati eccezionali. A seconda del punto di partenza i progettisti possono conseguire dei record personali e mondiali tagliando del 20, 30, 40 per cento e più il peso delle strutture di acciaio e nello stesso tempo ottenere prestazioni più alte e una vita di servizio più lunga.

“Pensa più sottile – diventa più forte” è il messaggio basilare per mettere a punto soluzioni più leggere e più resistenti in una vasta gamma di impieghi. L'acciaio con snervamento pari o superiore a 600 MPa è rivoluzionario soprattutto nel settore dei trasporti e del sollevamento.

Se la vostra progettazione attuale funziona bene con acciaio a media resistenza, il passaggio all'acciaio Strenx la renderà ancora migliore. Tuttavia, se intraprendete un approccio più radicale, partendo da nuovi progetti, il potenziale diventa anche maggiore.

Raramente si comincia da zero. I prodotti, i macchinari e altri aspetti pratici già esistenti ci portano a cercare soluzioni che puntino ad ottimizzarli. Cionondimeno, una sana dose di pensiero libero può rivelarci nuove idee per prodotti più resistenti, più leggeri e più competitivi. Prodotti Strenx, se lo desiderate.

Lavorare con acciaio tra 600 e 1300 MPa sicuramente farà vacillare taluni preconcetti nella progettazione. In taluni casi è come avere a che fare con un materiale completamente nuovo.

A supporto delle vostre nuove idee vi invitiamo a scoprire le nostre risorse di progettazione e di innovazione presso il Knowledge Service Center SSAB. Le nuove soluzioni di progettazione possono essere testate virtualmente con l'ausilio di simulazioni al computer in merito sia alla distribuzione dello sforzo, che alle condizioni di indebolimento e altri criteri di progettazione.

E ora andiamo a vedere le percentuali...





LA BELLEZZA DI STRENX:

DA  
600  
A  
1300\*  
MPa

Se pensate che tutti gli acciai siano uguali, l'acciaio strutturale Strenx cambierà il vostro modo di pensare. L'acciaio Strenx è resistente e affidabile dalla superficie agli strati profondi.

La prima cosa che noterete è la qualità superficiale dell'acciaio Strenx. La tolleranza di spessore e planarità è straordinaria e attestata dalle garanzie Strenx.

Le proprietà meccaniche dell'acciaio, come lo snervamento e il carico di rottura, il raggio di piega e la resilienza, sono anch'esse accuratamente testate per assicurare affidabilità e continuità a ciascuna fornitura.

\*al momento della stampa, possibile di cambiamenti

## LA GAMMA STRENX IN LAMIERA DA TRENO, LAMIERA DA COILS, TUBI E PROFILI

| Laminati a caldo Strenx |               |                                                |                                               |                          |                                                                                                   |                                                                                              |                                          |
|-------------------------|---------------|------------------------------------------------|-----------------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------|
| Nome                    | Spessore [mm] | Snervamento <sup>1)</sup><br>Rp 0,2, min [MPa] | Carico di rottura <sup>1)</sup><br>Rm min MPa | Allungamento<br>A5 min % | Piega Minimo Raggio<br>del punzone R/t,<br>direzione di lamina-<br>zione trasversale,<br>t < 8 mm | CET/CEV <sub>Tipico</sub><br>Lamiera a t = 10 mm<br>eccetto per Strenx<br>1300 dove t = 8 mm | Resilienza<br>[J]<br>Classe E<br>a -40°C |
| Strenx 700              | 4-53          | 700                                            | 780-930                                       | 14                       | 1.5                                                                                               | 0.29/0.43                                                                                    | 69                                       |
|                         | (53)-100      | 650                                            | 780-930                                       | 14                       |                                                                                                   |                                                                                              |                                          |
|                         | (100)-160     | 650                                            | 710-900                                       | 14                       |                                                                                                   |                                                                                              |                                          |
| Strenx 900              | 4-53          | 900                                            | 940-1100                                      | 12                       | 2.5                                                                                               | 0.36/0.55                                                                                    | 27                                       |
|                         | (53)-100      | 830                                            | 880-1100                                      | 12                       |                                                                                                   |                                                                                              |                                          |
| Strenx 960              | 4-53          | 960                                            | 980-1150                                      | 12                       | 2.5                                                                                               | 0.36/0.55                                                                                    | 40                                       |
|                         | (53)-100      | 850                                            | 900-1100                                      | 10                       |                                                                                                   |                                                                                              |                                          |
| Strenx 1100             | 4-(5)         | 1100                                           | 1250-1550                                     | 8                        |                                                                                                   |                                                                                              |                                          |
|                         | 5-40          | 1100                                           | 1250-1550                                     | 10                       | 3.0                                                                                               | 0.36/0.55                                                                                    | 27                                       |
| Strenx 1300             | 4-10          | 1300                                           | 1400-1700                                     | 8                        | 4.0                                                                                               | 0.42/0.65                                                                                    | 27                                       |

| Lamiere da coils laminate a caldo Strenx |               |                                                |                                                 |                                 |                       |                           |                              |
|------------------------------------------|---------------|------------------------------------------------|-------------------------------------------------|---------------------------------|-----------------------|---------------------------|------------------------------|
| Nome                                     | Spessore [mm] | Snervamento <sup>1)</sup><br>Rp 0,2, min [MPa] | Carico di rottura <sup>1)</sup><br>Rm min [MPa] | Carico di rottura 1<br>A5 min % | Piega<br>3 < t ≤ 6 mm | CET/CEV <sub>Tipico</sub> | Resilienza<br>[J]<br>a -40°C |
| MC Strenx 600                            | 2-10          | 600                                            | 650-820                                         | 16                              | 1.1                   | 0.21/0.33                 | 27                           |
| MC Strenx 650                            | 2-10          | 650                                            | 700-880                                         | 14                              | 1.2                   | 0.22/0.34                 | 27                           |
| MC Strenx 700                            | 2-10          | 700                                            | 750-950                                         | 12                              | 1.2                   | 0.25/0.39                 | 27                           |
| MC Plus Strenx 700                       | 3-12          | 700                                            | 750-950                                         | 13                              | 1.0                   | 0.24/0.38                 | 40 (-60°C)                   |
| MC Strenx 900                            | 3-10          | 900                                            | 950/1200                                        | 8                               | 3.0                   | 0.25/0.50                 | 27                           |
| MC Strenx 960                            | 3-10          | 960                                            | 1000-1250                                       | 7                               | 3.5                   | 0.28/0.51                 | 27                           |
| MC Strenx 1100                           | 3-8           | 1100                                           | 1250-1450                                       | 7                               | 4.0                   | 0.56/0.33                 | 27 (-40°C)                   |

| Prodotti Strenx laminati a freddo |               |                                                |                                                 |                           |       |                           |  |
|-----------------------------------|---------------|------------------------------------------------|-------------------------------------------------|---------------------------|-------|---------------------------|--|
| Nome                              | Spessore [mm] | Snervamento <sup>1)</sup><br>Rp 0,2, min [MPa] | Carico di rottura <sup>1)</sup><br>Rm min [MPa] | Allungamento<br>A80 min % | Piega | CET/CEV <sub>Tipico</sub> |  |
| CR Strenx 700                     | 0.7-2.1       | 700                                            | 1000-1200                                       | 7                         | 2.0   | 0.29/0.40                 |  |
| CR Strenx 960                     | 0.7-2.1       | 960                                            | 1200-1400                                       | 3                         | 3.5   | 0.28/0.39                 |  |
| CR Strenx 1100                    | 0.7-2.1       | 1100                                           | 1300-1500                                       | 3                         | 3.5   | 0.30/0.41                 |  |

| Tubi e profili Strenx |               |                                                            |                                                |                                                 |                          |                           |                           |
|-----------------------|---------------|------------------------------------------------------------|------------------------------------------------|-------------------------------------------------|--------------------------|---------------------------|---------------------------|
| Nome                  | Spessore (mm) | Dimensioni esterne<br>(mm)                                 | Snervamento <sup>1)</sup><br>Rp 0,2, min [MPa] | Carico di rottura <sup>1)</sup><br>Rm min [MPa] | Allungamento<br>A5 min % | CET/CEV <sub>Tipico</sub> | Resilienza<br>[J] a -20°C |
| Tubo Strenx 700       | 3-10          | 33.7 - 323.9<br>30 x 30 - 300 x 300<br>50 x 30 - 400 x 200 | 700                                            | 750-950                                         | 10                       | 0.24/0.38                 | 40                        |
| Tubo Strenx 900       | 4-6           | 76.1 - 219.1<br>70 x 70 - 160 x 160<br>80 x 60 - 200 x 120 | 900                                            | 930-1200                                        | 7                        | 0.25/0.50                 | 40                        |
| Tubo Strenx 960       | 4-6           | 76.1 - 219.1<br>70 x 70 - 160 x 160<br>80 x 60 - 200 x 120 | 960                                            | 980-1250                                        | 6                        | 0.28/0.51                 | 40                        |
| Sezione Strenx 650    | 2.5-10        |                                                            | 650                                            | 700-880                                         | 12                       | 0.22/0.34                 | 40                        |
| Sezione Strenx 700    | 3-10          |                                                            | 700                                            | 750-950                                         | 12                       | 0.24/0.38                 | 40                        |
| Sezione Strenx 900    | 3-6           |                                                            | 900                                            | 930-1200                                        | 8                        | 0.28/0.51                 | 40                        |

Le proprietà Strenx sono coperte dalle garanzie Strenx. Per informazioni sulle singole qualità vi preghiamo di far riferimento alla documentazione riportata sul sito [ssab.com](http://ssab.com) o al materiale che potrete ottenere dal venditore SSAB. SSAB si riserva il diritto di modificare le specifiche senza preavviso. Le tabelle sono soltanto indicative.

# POTENZIALI APPLICAZIONI

Gru con braccio telescopico e articolato

Gru a pantografo

Gru autocarrate

Carrelli elevatori telescopici

Gru con pompa per calcestruzzo

Gru mobili

Carrelli elevatori merci

Rimorchi per container

Rimorchi per pianale

Rimorchi furgonati

Rimorchi per legname

Rimorchi ribaltabili

Rimorchi per merci sfuse e serbatoi

Bisarche

Vagoni treni merci

Treni passeggeri

Treni leggeri

Autobus e autocarri leggeri

Mietitrici

Forwarder forestali

Ribaltabili e rimorchi agricoli

Caricatori frontali e accessori

Telai e bracci per l'irrorazione

Piloni per piattaforme di perforazione

Piloni

Gru marine e offshore

Paranchi per scialuppe di salvataggio

Winch e attrezzature da coperta

Scalette, deck e sportelli

Ingranaggi e cremagliere





LA BELLEZZA DI STRENX:

# UNA GRANDE VARIETA' DI APPLICAZIONI

Qualsiasi sia la vostra applicazione, l'acciaio Strenx vi offre nuove possibilità per migliorare le sue prestazioni. Qui di seguito presentiamo alcuni prodotti che traggono beneficio dall'uso di acciaio altoresistenziale per ridurre il peso delle strutture.

## Potete ottenere molto di più

L'acciaio strutturale altoresistenziale Strenx può rendere i mezzi di sollevamento più competitivi aumentandone la portata sia in altezza che in distanza. La progettazione all'avanguardia utilizza l'acciaio Strenx ad alto snervamento per ottenere maggiori prestazioni senza compromettere gli alti livelli di sicurezza personale richiesti dai mezzi di sollevamento. Ciò è possibile senza rendere il mezzo troppo pesante durante la sua circolazione in strada.

## Caricate di più e consumate meno carburante

Il settore dei trasporti è costantemente alla ricerca di modi per aumentare il carico utile e migliorare l'efficienza del carburante per ciascuna tonnellata, unità o passeggero caricato. Si presenta la necessità di rendere camion, rimorchi, treni e autobus più leggeri senza sacrificare le prestazioni, la sicurezza e la durata in servizio. La risposta è Strenx che, con uno snervamento tra 600 e 1300 MPa, mantiene tuttavia le stesse ottime caratteristiche di lavorabilità dei macchinari tradizionali.

## Buone notizie per l'agricoltura e l'industria forestale

Alte capacità di carico e peso ridotto sono le esigenze comuni in agricoltura e nell'industria forestale. Il miglioramento della capacità di carico ha un impatto diretto sul risultato finanziario. Il peso ridotto del macchinario minimizza la compattazione del terreno sui campi coltivati nonché i danni per il suolo nelle foreste. Una mietitrice forte e leggera, sia essa destinata a raccogliere colture o legname, significa minor consumo di carburante, minor usura e meno ore di lavoro per ottenere lo stesso risultato. Buone notizie per il titolare e buone notizie per il conducente.

## Sicuro e resistente per strutture marine e offshore

L'acciaio Strenx è la scelta sicura per strutture robuste e leggere destinate a operare in ambienti critici come quello marino e offshore. Grazie alla sua unica combinazione di robustezza, durezza, compattezza e saldabilità, esso supera i più esigenti standard di classificazione. L'estrema purezza dell'acciaio Strenx assicura un'elevata durezza a basse temperature e ciò garantisce il più alto grado di sicurezza possibile negli impieghi critici.

LA BELLEZZA DI STRENX:

# BENVENUTO AL WORKSHOP

Quando ci si spinge al limite della progettazione è indispensabile un'elevata compattezza e precisione dell'acciaio per garantire la sicurezza del prodotto.

Grazie a un incessante processo di perfezionamento siamo in grado di fornire l'acciaio Strenx con una ineguagliata serie di garanzie quanto a spessore, planarità e proprietà di piega. Le garanzie Strenx sono la vostra salvaguardia per una produzione senza inconvenienti giorno dopo giorno, anno dopo anno. E il materiale può essere lavorato con lo stesso tipo di macchine e di tecniche impiegati per l'acciaio convenzionale.

SSAB è il produttore con maggiore esperienza al mondo negli acciai altoresistenziali bonificati. L'estrema purezza, la bassa soluzione della lega e i processi di lavorazione di alta qualità dell'acciaio Strenx hanno un grande impatto sulla tenacità, la resistenza all'indebolimento e le prestazioni a temperature inferiori allo zero.

Dal momento che Strenx è più resistente, esso può essere impiegato in dimensioni più sottili per creare strutture più leggere. Esso migliora il prodotto finale apportando benefici collaterali. Un materiale più sottile di solito significa meno saldature e maggiore rapidità di esecuzione. La movimentazione quotidiana in officina diventa più agevole e c'è meno acciaio che occupa spazio in magazzino.

Quando una nuova progettazione e soluzioni innovative richiedono metodi nuovi e più avanzati di produzione, potete sempre rivolgervi al Supporto Tecnico SSAB per consigli e suggerimenti. Noi siamo lieti di fornirvi la consulenza di esperti in merito a materiali e lavorazioni quando state sviluppando applicazioni nuove e più avanzate.

## Garanzie Strenx

Le garanzie Strenx si estendono alle tolleranze di spessore, planarità e raggio di piega.

### Garanzia di spessore

Le tolleranze di spessore sono più elevate di quelle specificate nei relativi standard EN per ciascun gruppo di prodotti.

### Garanzia di planarità

Strenx ha cinque classi di tolleranze di planarità a seconda del tipo di prodotto e dalla resistenza del materiale. Tutte le classi sono conformi o sono più restrittive di quanto specificato nell'EN 10 029. Anche le classi A e B sono conformi o sono più restrittive di quanto specificato nell'EN 10 051.

### Garanzia del raggio di piega

La garanzia del raggio di piega dipende dal carico di snervamento della qualità dell'acciaio ed è sempre conforme o più restrittiva dei corrispondenti requisiti indicati nello standard EN per ciascun prodotto.

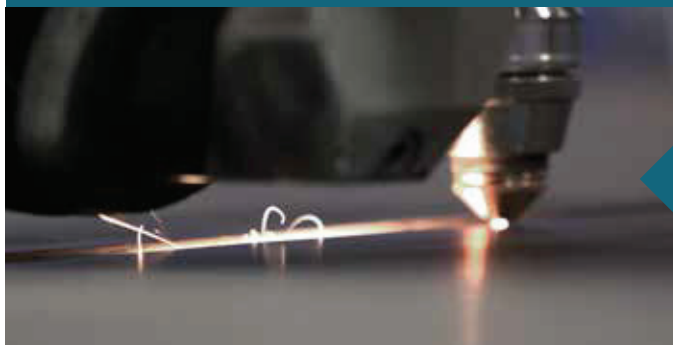
## Saldatura

Strenx si può saldare impiegando qualsiasi metodo convenzionale. La saldatura MAG è oggi la tecnica più diffusa, essendo assai facile da automatizzare per ottenere un'alta produttività. Altri metodi appropriati sono la saldatura MMA, la saldatura TIG, la saldatura al plasma, la saldatura ad arco sommerso e al laser.



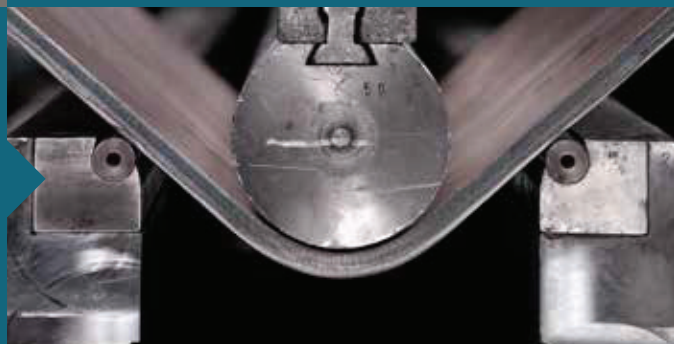
## Taglio termico

La finitura superficiale della lamiera Strenx la rende perfetta per il taglio laser senza alcuna ulteriore preparazione della superficie. Il taglio termico delle lamiere Strenx laminate a caldo viene eseguito con ossitaglio, plasma e laser.



## Piegatura

La piegatura delle lamiere Strenx può essere eseguita con macchine piegatrici standard. Proprietà uniformi, rigide tolleranze di spessore e alta qualità della superficie consentono un processo di piegatura prevedibile.



## Taglio meccanico

Il metodo migliore per effettuare il taglio meccanico di Strenx è quello mediante cesoia a ghigliottina. Considerare con attenzione le impostazioni della macchina di taglio. I fattori più importanti sono lo spazio, l'angolo di taglio e la durezza della lama. Bisognerebbe permettere alla lamiera di riscaldarsi completamente fino a circa +20°C prima di effettuare il taglio.



## Lavorazioni meccaniche

L'acciaio Strenx può essere lavorato senza ricorrere a macchinari speciali. Per operazioni di foratura, svasatura, filettatura e zigrinatura si raccomanda l'utilizzo di macchinario fisso equipaggiato con utensili di acciaio e carburo ad alta velocità.

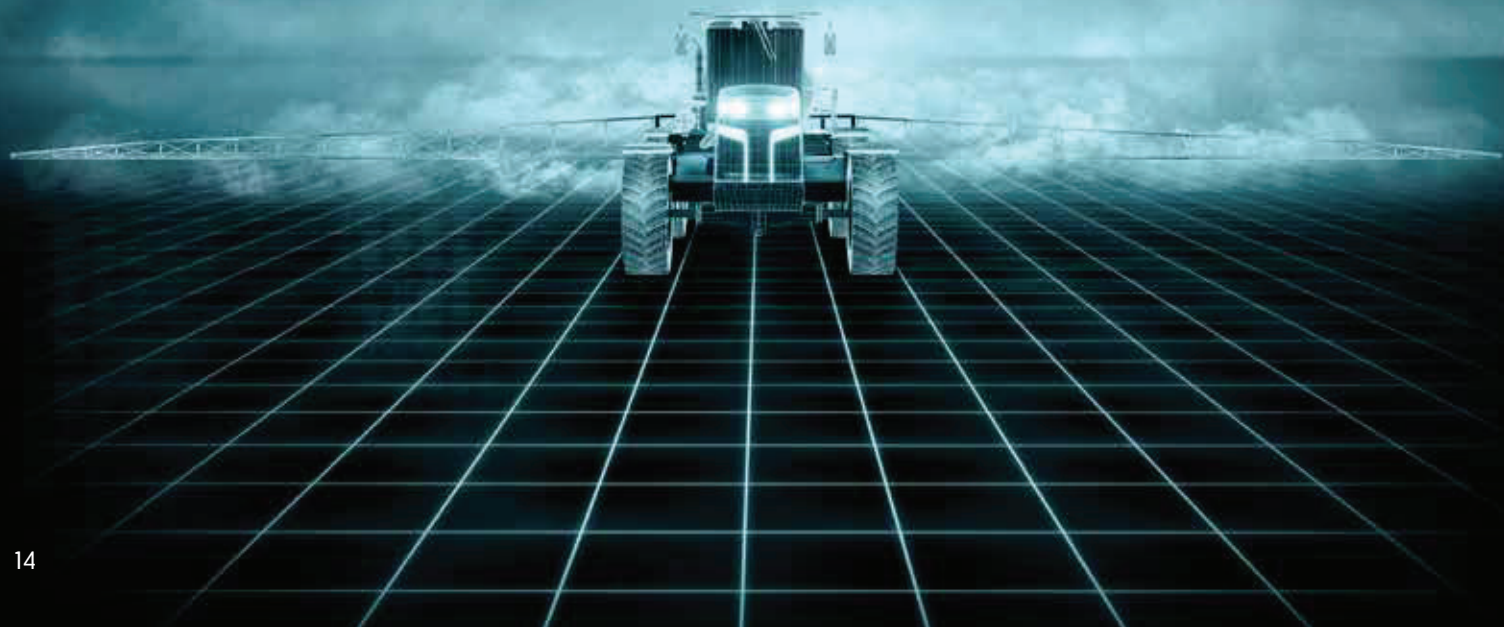


Potrete trovare istruzioni più dettagliate per la lavorazione dell'acciaio Strenx sul sito [strenx.com](http://strenx.com).



LA BELLEZZA DI STRENX:

# SOLUZIONI SU MISURA PER LE VOSTRE NECESSITA





SSAB Shape lavora l'acciaio strutturale altoresistenziale Strenx rispondendo alle vostre particolari esigenze. Progettisti, ingegneri e produttori possono rivolgersi a SSAB Shape per ottenere soluzioni personalizzate il sollevamento, trasporto, macchine agricole e di altro impiego ultraspecializzato.

SSAB Shape offre un'ampia gamma di servizi per facilitare lo sviluppo e la produzione di prodotti in acciaio altoresistenziale. Grazie a SSAB Shape, gli utilizzatori di acciaio Strenx di tutto il mondo possono accrescere la propria competitività attraverso progetti congiunti. I nostri ingegneri sono a vostra disposizione per assistervi nei processi di produzione, con parti preprocessate e semilavorate o con kit prodotti ad hoc e consegnati just-in-time.

#### Lavorazioni fornite da SSAB Shape

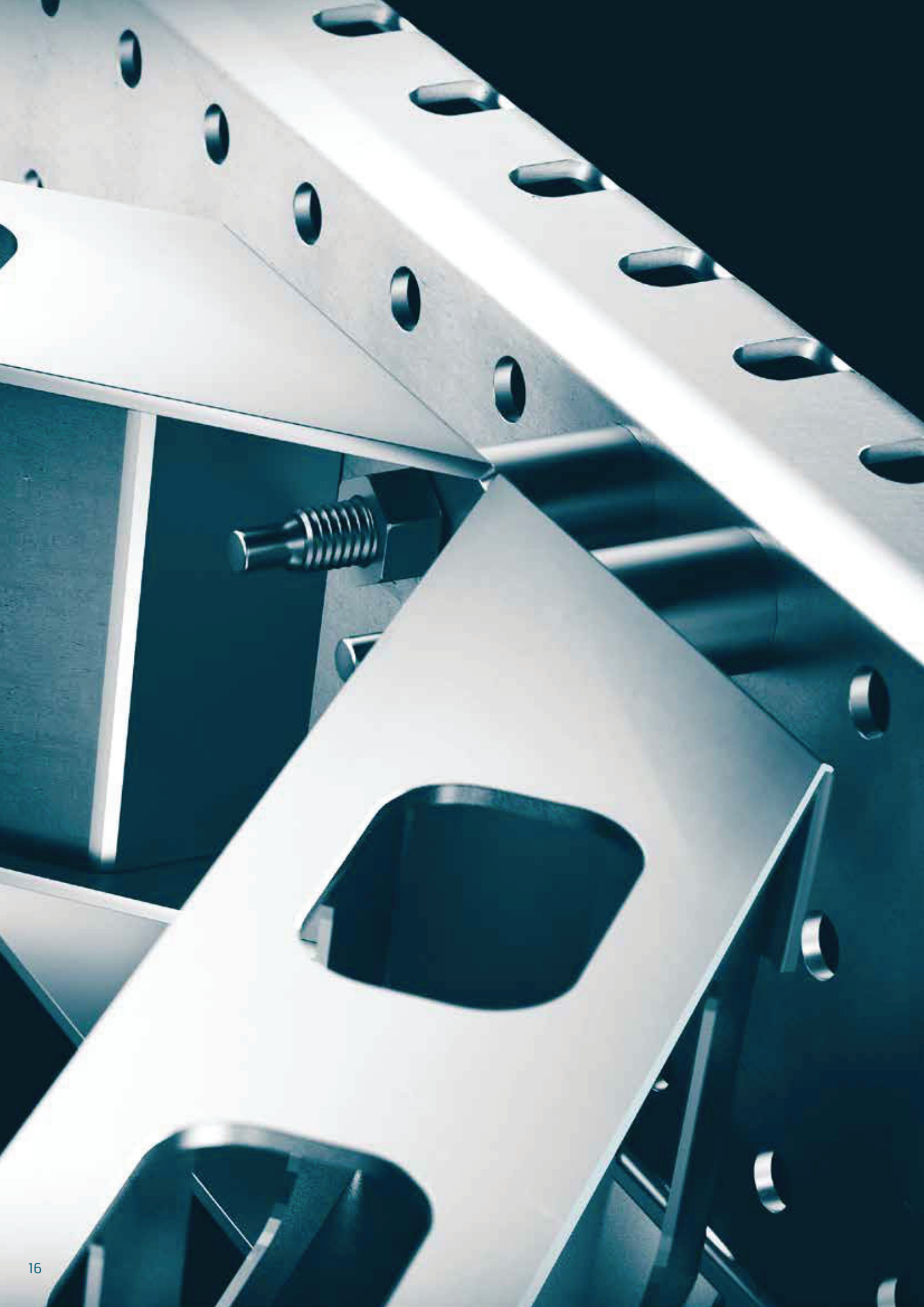
SSAB Shape è in grado di elaborare tutte le qualità di lamiere da treno e da coil Strenx in lunghezze superiori a 20 metri e con forze di piega di oltre 4.000 tonnellate.

Utilizzare la strumentazione di alto livello che possiede SSAB Shape costituisce un indubbio vantaggio economico. Così avete accesso alla capacità produttiva senza dover investire in nuovi macchinari per la produzione interna e siete in grado di ridurre i tempi di esecuzione.

I macchinari e la tecnologia forniti da SSAB Shape soddisfano praticamente ogni tipo di esigenza:

- Taglio laser
- Saldatura laser
- Ossitaglio
- Piegatura
- Taglio al plasma
- Trancitura a cesoia
- Taglio con segatrice industriale
- Profilatura
- Piegatura a rulli
- Lavorazioni meccaniche
- Taglio







LA BELLEZZA DI STRENX:

# JUST-IN-TIME E JUST RIGHT

L'acciaio Strenx viene consegnato mediante una catena di fornitura collaudata e affidabile basata su sistemi logistici avanzati che garantiscono che riceviate il materiale nel posto giusto, al momento giusto e nelle condizioni adeguate.

Le qualità e le dimensioni di acciaio Strenx disponibili dal pronto, possono essere consegnate entro 48 ore direttamente dal magazzino locale.

La logistica di SSAB può essere adattata in modo confacente alla vostra produzione, in relazione ai volumi e alla dislocazione della produzione. Le soluzioni di consegna includono la gestione della fornitura e delle scorte, JIT e VMI (Vendor Managed inventory).

L'acciaio Strenx è prodotto in base a rigide specifiche di qualità. Ogni lamiera, foglio, coil e tubo è tracciabile, quindi è possibile risalire alla produzione per garantirvi la nostra qualità.

## Controllo e documentazione

Un capillare controllo meccanico e a ultrasuoni viene effettuato prima della consegna in modo da garantire che il materiale soddisfi le specifiche. Ogni fornitura è totalmente documentata mediante il sistema di certificazione SSAB che produce, distribuisce e registra tutti i tipi di documenti di ispezione in formato elettronico. Ciascun documento si riferisce a una lamiera. Il sistema di certificazione permette l'esame dei documenti ispettivi in maniera facile e rapida.

## Gestione della qualità

Il sistema di gestione della qualità di SSAB si basa sulla norma EN ISO 9001:2000 ed è descritto nel nostro "Manuale operativo per la qualità e l'ambiente". Un organismo di controllo accreditato certifica il sistema, che è inoltre certificato conformemente ai requisiti AQAP 2110:2. I prodotti SSAB sono conformi ai requisiti per la marcatura CE secondo le disposizioni della Direttiva UE sui prodotti da costruzione (89/106/CEE).

## Protezioni, imballaggio e marcatura

L'acciaio Strenx è disponibile in una vasta gamma di opzioni di protezione, imballaggio e marcatura, come il primer anticorrosione, l'avvolgimento in plastica durevole, la protezione dei bordi, l'etichettatura autoadesiva e la marcatura indelebile per l'identificazione del prodotto.

LA BELLEZZA DI STRENX:

# SUPPORTA L'ECCELLENZA

My Inner Strenx è un programma che permette ai produttori di macchinari di alta gamma di diventare più forti e avere maggiore successo. È anche un modo per gli utenti di avere prodotti costruiti con acciaio superiore e tecniche di produzione a qualità controllata.

L'esser membro di My Inner Strenx comporta numerosi vantaggi per le società che si propongono di produrre i migliori prodotti possibili impiegando l'acciaio strutturale altoresistenziale Strenx.

I membri delle nuove società hanno priorità di accesso a una vasta gamma di servizi e risorse SSAB per la progettazione, lo sviluppo e la produzione di prodotti nuovi e già esistenti. L'Assistenza tecnica SSAB mette a disposizione delle società aderenti le conoscenze più aggiornate relative allo sviluppo dei prodotti e ai processi di lavorazione. I membri hanno inoltre accesso prioritario al Knowledge Service Center SSAB per scoprire metodologie innovative per la progettazione con l'acciaio altoresistenziale Strenx.

Tra gli altri vantaggi per i membri ricordiamo una linea diretta al Supporto Tecnico, la possibilità di partecipare a seminari tecnici e di progettazione sugli impieghi Strenx, l'accesso diretto a SSAB Shape e il supporto marketing.

Per essere ammessi come membri, bisogna essere valutati e approvati da SSAB. Visualizzare la targa My Inner Strenx apposta su determinati prodotti, costituisce un'attestazione di qualità e prestazioni.

Il marchio certifica ai clienti che il prodotto è stato ottimizzato per essere robusto e leggero, realizzato con acciaio strutturale Strenx e costruito in conformità con il progetto e le specifiche del materiale SSAB.

My Inner Strenx è un buon affare per tutte le parti coinvolte.  
Candidatevi ora.









SSAB è un'acciaieria con sede nei Paesi Nordici e negli Stati Uniti. SSAB offre prodotti e servizi ad alto valore aggiunto, sviluppati in stretta collaborazione con i propri clienti per un mondo più forte, più leggero e più sostenibile. SSAB ha dipendenti in oltre 50 Paesi. SSAB ha stabilimenti produttivi in Svezia, Finlandia e negli Stati Uniti. SSAB è quotata al Nasdaq OMX Nordic Exchange di Stoccolma e al Nasdaq OMX di Helsinki. [www.ssab.com](http://www.ssab.com).

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**[strenx.com](http://strenx.com)**

**SSAB**



## STRENX 600 MC

### STRENX 600 MC

#### General Product Description

The high-strength structural steel at 600 MPa

Strenx™ 600 MC is a hot-rolled structural steel made for cold forming, with a minimum yield strength of 600 MPa for stronger and lighter structures.

Strenx 600 MC meets or exceeds the requirements of S600MC in EN 10149-2.

Typical applications include a wide range of components and parts, such as demanding load-bearing structures. Strenx 600 MC comes in coils, slit coils or cut-to-length sheets.

#### Dimension Range

Strenx 600 MC is available in thicknesses of 2.00-10.00 mm and widths up to 1600 mm as coils, slit coils or cut to length sheets in lengths up to 16 meters.

#### Mechanical Properties

| Thickness (mm) | Yield strength $R_{eH}$ <sup>1)</sup> (min MPa) | Tensile strength $R_m$ (MPa) | Elongation $A_{80}$ <sup>2)</sup> (min %) | Elongation $A_5$ (min %) | Min. inner bending radius for a 90° bend <sup>4)</sup> |
|----------------|-------------------------------------------------|------------------------------|-------------------------------------------|--------------------------|--------------------------------------------------------|
| 2.00- 3.00     | 600                                             | 650- 820                     | 13                                        | 16 <sup>3)</sup>         | 0.7 x t                                                |
| 3.01- 6        | 600                                             | 650- 820                     |                                           | 16                       | 1.1 x t                                                |
| 6.01- 10       | 600                                             | 650- 820                     |                                           | 16                       | 1.4 x t                                                |

The mechanical properties are tested in the longitudinal direction.

1) If  $R_{eH}$  is not applicable then  $R_{p0.2}$  is used.

2)  $A_{80}$  value applies for thicknesses < 3.00 mm

3)  $A_5$  value applies for sheet thickness  $t \geq 3$  mm.

4) For both longitudinal and transverse direction.

# STRENX 600 MC

## Impact Properties

| Grade    | Min. impact energy for longitudinal testing Charpy V 10x10 mm test specimens | Test temperature |
|----------|------------------------------------------------------------------------------|------------------|
| 600 MC D | 40 J                                                                         | -20 °C           |
| 600 MC E | 27 J                                                                         | -40 °C           |

Impact testing according to EN ISO 148-1 is performed on thicknesses  $\geq 6$  mm. The specified minimum value corresponds to a full-size specimen.

## Chemical Composition (ladle analysis)

| C<br>(max %) | Si <sup>1)</sup><br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al <sub>tot</sub><br>(min %) | Nb <sup>2)</sup><br>(max %) | V <sup>2)</sup><br>(max %) | Ti <sup>2)</sup><br>(max %) |
|--------------|-----------------------------|---------------|--------------|--------------|------------------------------|-----------------------------|----------------------------|-----------------------------|
| 0.12         | 0.21                        | 1.90          | 0.025        | 0.010        | 0.015                        | 0.09                        | 0.20                       | 0.15                        |

<sup>1)</sup> If the material is to be hot-dip galvanized according to category A or category B in EN 10149-2 this must be specified at the time of order. Other galvanizing classes with higher Si-content are available after agreement.

<sup>2)</sup> Sum of Nb, V and Ti = max 0.22%

The steel is grain refined.

## Carbon equivalent CET(CEV)

| Thickness<br>(mm)    | 2 - 10 mm   |
|----------------------|-------------|
| Typical CET<br>(CEV) | 0.21 (0.33) |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees offer considerably narrower thickness tolerances compared to EN 10 051.

### Length and Width

Width and length tolerances according to SSAB standard. The SSAB standard offer narrower width and length tolerances compared to EN 10 051. Length tolerances only apply for cut to length sheets.

### Shape

Tolerances according to EN 10 051. Narrower tolerances according to the SSAB standard are available on request.

### Flatness

Tolerances according to Strenx Flatness Guarantees™ Class A. Strenx Flatness Guarantees offer narrower tolerances compared to EN 10 051. Flatness guarantees only apply for cut to length sheets.



# STRENX 600 MC

## Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

## Delivery Conditions

Thermomechanically Rolled. Strenx 600 MC is available in as rolled or pickled surface condition with mill or cut edge.

## Fabrication and Other Recommendations

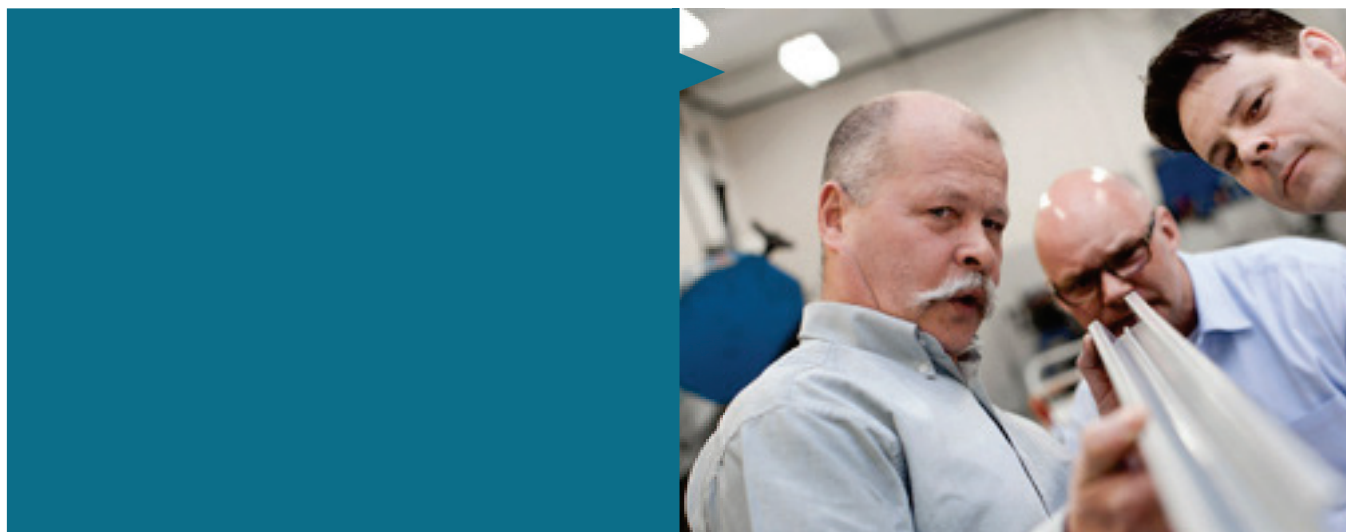
### Welding, bending and machining

Strenx 600 MC has good welding, cold forming and cutting performance.

Strenx 600 MC is a cold forming steel not suited for heat treatments at temperatures above 580°C since the material then may lose its guaranteed properties.

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



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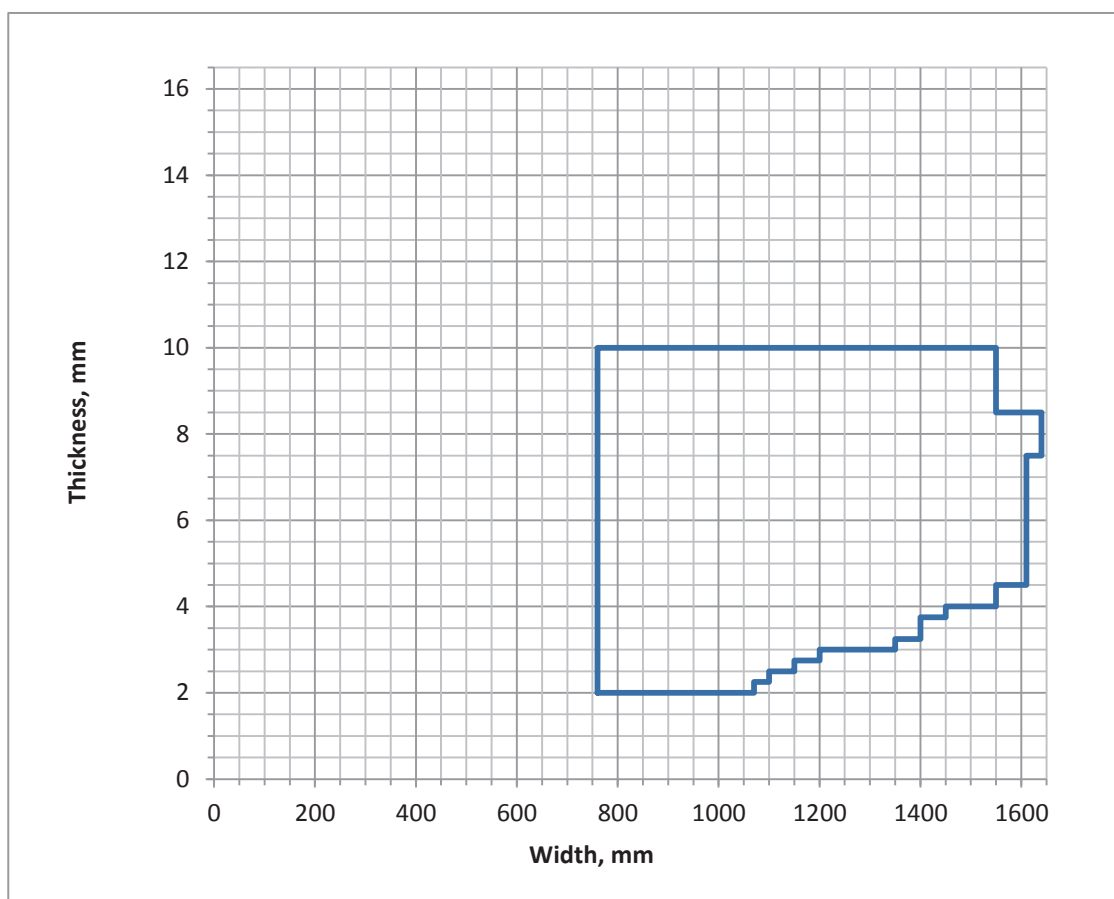
# Product program

## STRENX 600 MC D

Hot rolled wide strip in sheets can be provided with respect to the following requirements

- Steel grade..... STRENX 600 MC D
- Edge condition..... Mill edge
- Surface condition..... As rolled

In dimensions according to the following diagram:



Other requirements may impose further restrictions in addition to what have been specified above.



## STRENX 650 MC

### General Product Description

The high-strength structural steel at 650 MPa

Strenx™ 650 MC is a hot-rolled structural steel made for cold forming, with a minimum yield strength of 650 MPa for stronger and lighter structures.

Strenx 650 MC meets or exceeds the requirements of S650MC in EN 10149-2.

Typical applications include a wide range of components and parts, such as demanding load-bearing structures. Strenx 650 MC comes in coils, slit coils or cut-to-length sheets.

### Dimension Range

Strenx 650 MC is available in thicknesses of 2.00-10.00 mm and widths up to 1600 mm as coils, slit coils or cut to length sheets in lengths up to 16 meters.

### Mechanical Properties

| Thickness (mm) | Yield strength $R_{eH}^{1)2)}$ (min MPa) | Tensile strength $R_m$ (MPa) | Elongation $A_{80}^{3)}$ (min %) | Elongation $A_5$ (min %) | Min. inner bending radius for a 90 ° bend <sup>5)</sup> |
|----------------|------------------------------------------|------------------------------|----------------------------------|--------------------------|---------------------------------------------------------|
| 2 - 3          | 650                                      | 700 - 850                    | 12                               | 14 <sup>4)</sup>         | 0.8 x t                                                 |
| 3.01 - 6       | 650                                      | 700 - 850                    |                                  | 14                       | 1.2 x t                                                 |
| 6.01 - 10      | 650                                      | 700 - 850                    |                                  | 14                       | 1.5 x t                                                 |

The mechanical properties are tested in the longitudinal direction.

<sup>1)</sup> If  $R_{eH}$  is not applicable then  $R_p 0,2$  is used.

<sup>2)</sup> On thicknesses >8 mm the minimum yield strength may be 20MPa lower.

<sup>3)</sup>  $A_{80}$  value applies for thicknesses < 3.00 mm.

<sup>4)</sup>  $A_5$  value applies for sheet thickness  $t \geq 3$ mm.

<sup>5)</sup> For both longitudinal and transverse direction.



# STRENX 650 MC

## Impact Properties

| Grade           | Min. impact energy for longitudinal testing Charpy V 10x10 mm test specimens | Test temperature |
|-----------------|------------------------------------------------------------------------------|------------------|
| Strenx 650 MC D | 40 J                                                                         | -20 °C           |
| Strenx 650 MC E | 27 J                                                                         | -40 °C           |

Impact testing according to EN ISO 148-1 is performed on thicknesses  $\geq 6$  mm. The specified minimum value corresponds to a full-size specimen.

## Chemical Composition (ladle analysis)

| C<br>(max %) | Si <sup>1)</sup><br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al <sub>tot</sub><br>(min %) | Nb <sup>2)</sup><br>(max %) | V <sup>2)</sup><br>(max %) | Ti <sup>2)</sup><br>(max %) |
|--------------|-----------------------------|---------------|--------------|--------------|------------------------------|-----------------------------|----------------------------|-----------------------------|
| 0.12         | 0.21                        | 2.00          | 0.025        | 0.010        | 0.015                        | 0.09                        | 0.20                       | 0.15                        |

<sup>1)</sup> If the material is to be hot-dip galvanized according to category A or category B in EN 10149-2 this must be specified at the time of order. Other galvanizing classes with higher Si-content are available after agreement.

<sup>2)</sup> Sum of Nb, V and Ti = max 0.22%

The steel is grain refined.

## Carbon equivalent CET(CEV)

| Thickness<br>(mm) | 2 - 10 mm   |
|-------------------|-------------|
| CET<br>(CEV)      | 0.22 (.034) |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees offer considerably narrower thickness tolerances compared to EN 10 051.

### Length and Width

Width and length tolerances according to SSAB standard. The SSAB standard offer narrower width and length tolerances compared to EN 10 051. Length tolerances only apply for cut to length sheets.

### Shape

Tolerances according to EN 10 051. Narrower tolerances according to the SSAB standard are available on request.

### Flatness

Tolerances according to Strenx Flatness Guarantees™ Class A. Strenx Flatness Guarantees offer narrower tolerances compared to EN 10 051. Flatness guarantees only apply for cut to length sheets.

# STRENX 650 MC

## Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

## Delivery Conditions

Thermomechanically Rolled. Strenx 650 MC is available in as rolled or pickled surface condition with mill or cut edge.

## Fabrication and Other Recommendations

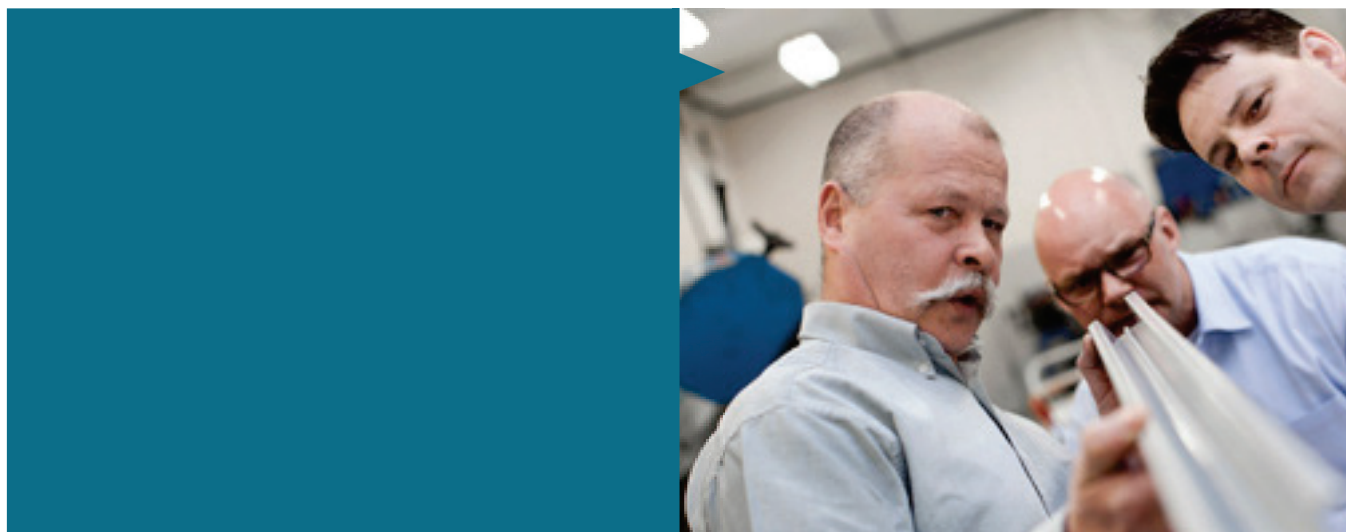
### Welding, bending and machining

Strenx 650 MC has good welding, cold forming and cutting performance.

Strenx 650 MC is a cold forming steel not suited for heat treatments at temperatures above 580°C since the material then may lose its guaranteed properties.

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



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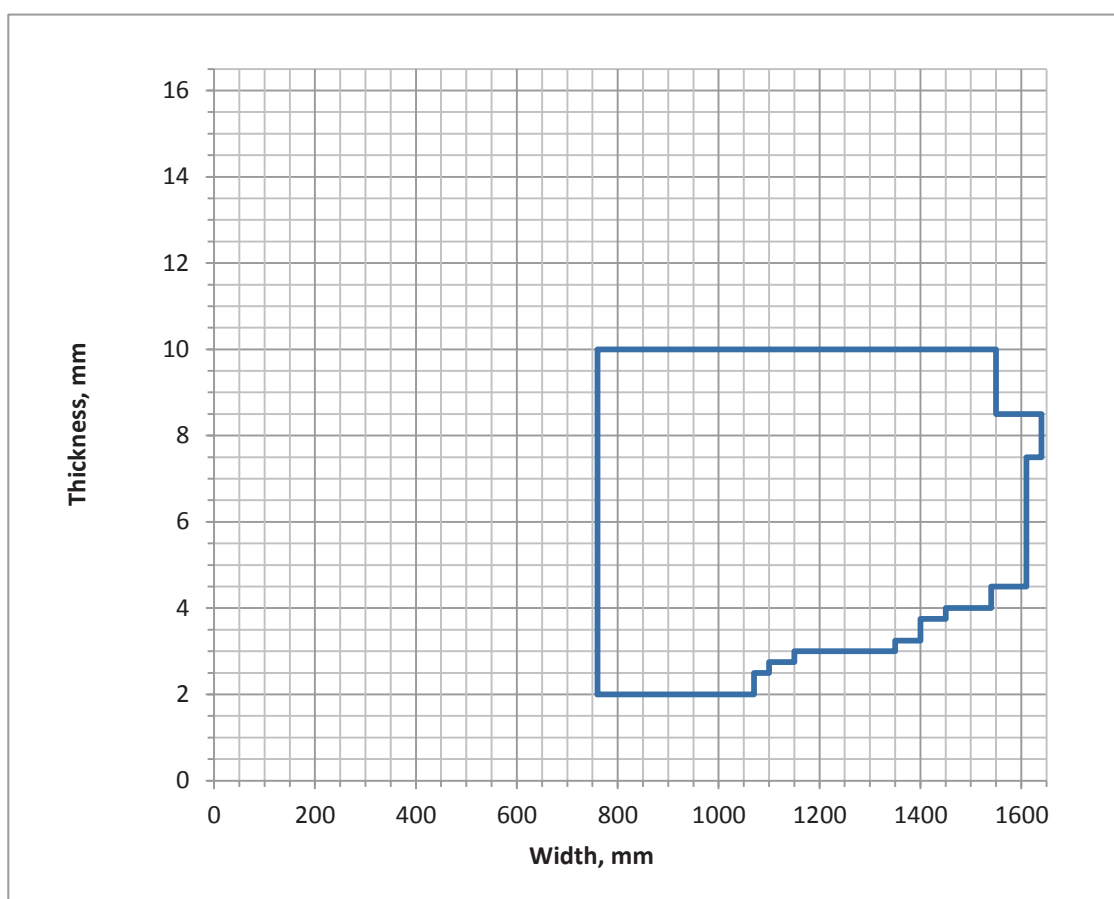
# Product program

## STRENX 650 MC D

Hot rolled wide strip in sheets can be provided with respect to the following requirements

- Steel grade..... STRENX 650 MC D
- Edge condition..... Mill edge
- Surface condition..... As rolled

In dimensions according to the following diagram:



Other requirements may impose further restrictions in addition to what have been specified above. The SSAB product configurator provides information about available options





## STRENX 700

### General Product Description

The high-strength structural steel at 650-700 MPa

Strenx™ 700 is a structural steel with a minimum yield strength of 650-700 MPa depending on thickness.

Strenx 700 meets the requirements of EN 10 025-6 for the S690 grade and thicknesses. Typical applications include demanding load-bearing structures.

Strenx 700 E (complies with S 690 QL) is available in plate thicknesses of 4–160 mm, while Strenx 700 F (complies with S 690 QL1) is available in plate thicknesses of 4–130 mm.

Benefits include:

- Superior bendability and surface quality
- Weldability with excellent HAZ strength and toughness
- Exceptional consistency within a plate guaranteed by close tolerances
- High impact toughness which provides for good resistance to fractures

### Dimension Range

Strenx 700 E is available in plate thicknesses of 4 – 160 mm and Strenx 700 F is available in plate thicknesses of 4- 130 mm. Both grades are available in widths up to 3350 mm and lengths up to 14630 mm depending on thickness. More detailed information on dimensions is provided in the dimension program

### Mechanical Properties

| Thickness (mm) | Yield strength <sup>1)</sup> R <sub>p0.2</sub> (min Mpa) | Tensile strength <sup>1)</sup> R <sub>m</sub> (Mpa) | Elongation A <sub>5</sub> (min %) |
|----------------|----------------------------------------------------------|-----------------------------------------------------|-----------------------------------|
| 4.0- 53.0      | 700                                                      | 780- 930                                            | 14                                |
| 53.1- 100.0    | 650                                                      | 780- 930                                            | 14                                |
| 100.1- 160.0   | 650                                                      | 710- 900                                            | 14                                |

<sup>1)</sup> For transverse test pieces according to EN 10 025.

# STRENX 700

## Impact Properties

| Grade        | Min transverse test, impact energy, Charpy V 10x10 mm tests specimens <sup>1)</sup> | Meet Requirements For |
|--------------|-------------------------------------------------------------------------------------|-----------------------|
| Strenx 700 E | 69 J/-40 °C                                                                         | S 690 QL              |
| Strenx 700 F | 27J/-60 °C                                                                          | S 690 QL1             |

<sup>1)</sup> Unless otherwise agreed, transverse impact testing according to EN 10025-6 option 30 will apply. For thicknesses between 6 - 11.9 mm, sub-size Charpy V-specimens are used. The specified minimum value is then proportional to the cross-sectional area of the specimen compared to a full-size specimen (10 x 10 mm).

## Chemical Composition (ladle analysis)

| C <sup>*)</sup><br>(max %) | Si <sup>*)</sup><br>(max %) | Mn <sup>*)</sup><br>(max %) | P<br>(max %) | S<br>(max %) | Cr <sup>*)</sup><br>(max %) | Cu <sup>*)</sup><br>(max %) | Ni <sup>*)</sup><br>(max %) | Mo <sup>*)</sup><br>(max %) | B <sup>*)</sup><br>(max %) |
|----------------------------|-----------------------------|-----------------------------|--------------|--------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|
| 0.20                       | 0.60                        | 1.60                        | 0.020        | 0.010        | 0.80                        | 0.30                        | 2.0                         | 0.70                        | 0.005                      |

The steel is grain refined. <sup>\*)</sup> Intentional alloying elements.

## Maximum Carbon Equivalent CET(CEV)

| Thickness (mm) | 4.0 - 5.0   | 5.1 - 30.0  | 30.1 - 60.0 | 60.1 - 100.0 | 100.1 - 130.0 | 130.1 - 160 |
|----------------|-------------|-------------|-------------|--------------|---------------|-------------|
| 700 E CET(CEV) | 0.34 (0.48) | 0.32 (0.49) | 0.36 (0.52) | 0.39 (0.58)  | 0.41 (0.67)   | 0.43 (0.73) |
| 700 F CET(CEV) | 0.38 (0.57) | 0.38 (0.57) | 0.39 (0.58) | 0.39 (0.58)  | 0.41 (0.67)   | -           |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given in SSAB's brochures 41-General product information Strenx, Hardox, Armox and Toolox-UK and Strenx™ Guarantees or on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees.

Strenx Guarantees meet the requirements of EN 10 029 Class A, but offers narrower tolerances.

### Length and Width

According to SSAB's dimension program. Tolerances conform with EN 10 029 or to SSAB's standard after agreement.

### Shape

SSAB offers tolerances according to EN 10 029

### Flatness

Tolerances according to Strenx Flatness Guarantee Class C, which are more narrow than EN 10 029 Class N.

## Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

# STRENX 700

## Bending

Tolerances according to Strenx Bending Guarantee Class A.

## Delivery Conditions

The delivery condition is Q+T (Quenched and Tempered). The plates are delivered with sheared or thermally cut edges. Untrimmed edges after agreement. Delivery requirements can be found in SSAB's brochure 41-General product information Strenx, Hardox, Armox and Toolox-UK or on [www.ssab.com](http://www.ssab.com).

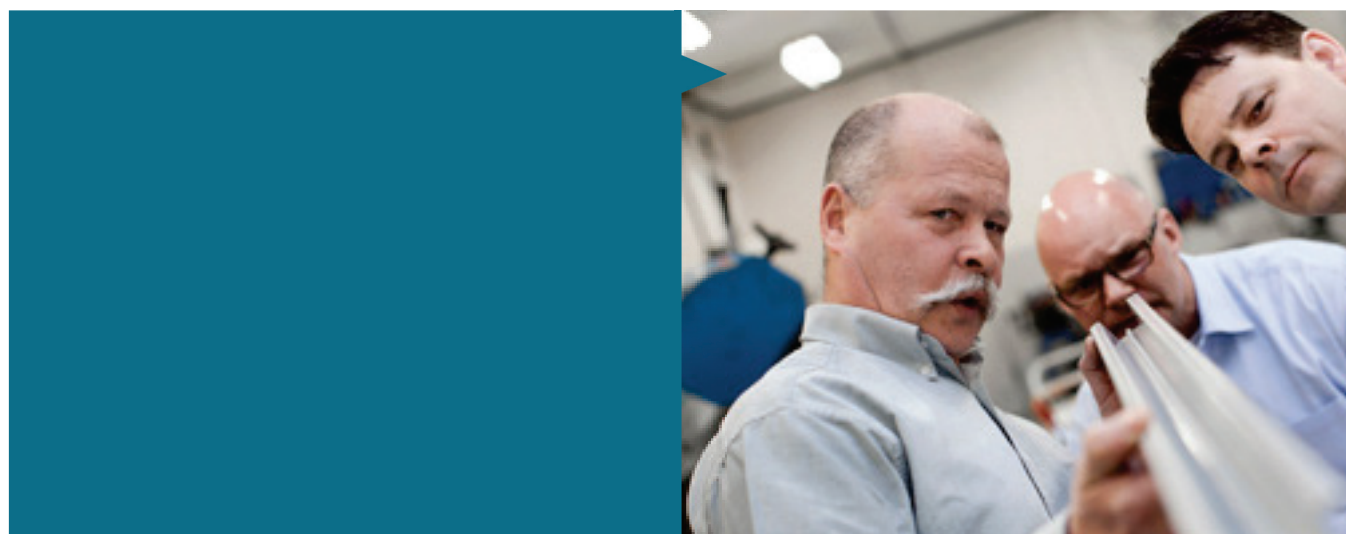
## Fabrication and Other Recommendations

### Welding, bending and machining

Recommendations are found in SSAB's brochures at [www.ssab.com](http://www.ssab.com) or consult Tech Support, [techsupport@ssab.com](mailto:techsupport@ssab.com).

Strenx 700 has obtained its mechanical properties by quenching and subsequent tempering. The properties of the delivery condition cannot be retained after exposure to temperatures in excess of 580°C.

Appropriate health and safety precautions must be taken when welding, cutting, grinding or otherwise working on this product. Grinding, especially of primer coated plates, may produce dust with a high particle concentration.



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The table shows available dimensions for direct order including the maximum length (mm)



Some restrictions, contact your local sales representative for more information

Only 1650 mm width, mill edges. Other dimensions must be approved by Product Manager Strenx  
For thermally cut edges, contact local sales force

Outside the range of dimensions

Minimum length: 2000 mm  
Minimum quantities:  
Thickness: Minimum position weight:  
3.0- 60.0 2.5 tons  
60.1-100.0 3.5 tons  
100.1-120.0 4.0 tons  
120.1- 5.0 tons

| Width (mm)     | 1000- | -1351 | 1500  | 1501  | 1600  | -1601 | -1700 | 1800  | -1801 | -1901 | -2001 | -2101 | -2201 | -2301 | -2401 | -2501 | -2601 | -2701 | -2801 | -2901 | -3001 | -3101 | -3201 | -3301 |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Thickness (mm) | 1350  | 1499  | 1500  | 1599  |       | 1699  | 1800  | 1900  | 1901  | 2000  | 2100  | 2200  | 2300  | 2400  | 2500  | 2600  | 2700  | 2800  | 2900  | 3000  | 3100  | 3200  | 3300  | 3350  |
| 3.0 - 3.9      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 4.0 - 4.7      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 4.8 - 5.7      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 5.8 - 6.0      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 6.1 - 6.7      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 6.8 - 7.7      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 7.8 - 8.7      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 8.8 - 10.0     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 10.1 - 25.0    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 25.1 - 26.0    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 26.1 - 27.0    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 27.1 - 28.0    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 28.1 - 29.0    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 29.1 - 30.0    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 30.1 - 31.0    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 31.1 - 32.0    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 32.1 - 33.0    | 14200 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 33.1 - 34.0    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 34.1 - 35.0    | 13800 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 35.1 - 36.0    | 13100 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 36.1 - 37.0    | 12700 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 37.1 - 38.0    | 12400 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 38.1 - 39.0    | 12000 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 39.1 - 40.0    | 11700 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 40.1 - 45.0    | 10400 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 45.1 - 50.0    | 9400  |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 50.1 - 55.0    | 9000  |       |       | 14400 | 14400 | 13600 | 12800 | 12100 | 11500 | 11500 | 11000 | 10500 | 10000 | 9600  | 9200  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9700  |
| 55.1 - 60.0    | 8600  | 14100 | 13200 | 13200 | 13200 | 12400 | 11700 | 11100 | 10600 | 10600 | 10100 | 9600  | 9200  | 8800  | 8400  | 8000  | 8000  | 8000  | 8000  | 8000  | 8000  | 8000  | 8000  | 9500  |
| 60.1 - 65.0    | 7900  | 13000 | 12100 | 11200 | 11200 | 11200 | 10800 | 10300 | 9700  | 9700  | 9300  | 9000  | 8600  | 8200  | 7900  | 7500  | 7500  | 7500  | 7500  | 7500  | 7500  | 7500  | 7500  | 8400  |
| 65.1 - 70.0    | 7300  | 12100 | 12100 | 11200 | 11200 | 11000 | 10100 | 9500  | 9000  | 9000  | 8700  | 8300  | 8000  | 7600  | 7300  | 7000  | 7000  | 7000  | 7000  | 7000  | 7000  | 7000  | 7000  | 7600  |
| 70.1 - 75.0    | 6800  | 11300 | 11300 | 10600 | 10600 | 11000 | 9400  | 9000  | 8500  | 8500  | 8100  | 7700  | 7400  | 7100  | 6800  | 6500  | 6500  | 6500  | 6500  | 6500  | 6500  | 6500  | 6500  | 7000  |
| 75.1 - 80.0    | 6300  | 10600 | 10600 | 9900  | 9900  | 11000 | 8900  | 8400  | 8000  | 8000  | 7600  | 7300  | 6900  | 6600  | 6300  | 6000  | 6000  | 6000  | 6000  | 6000  | 6000  | 6000  | 6000  | 6300  |
| 80.1 - 85.0    | 5900  | 9900  | 9900  | 9300  | 9300  | 11000 | 8800  | 8400  | 8000  | 8000  | 7600  | 7300  | 6900  | 6600  | 6300  | 5800  | 5800  | 5800  | 5800  | 5800  | 5800  | 5800  | 5800  | 6300  |
| 85.1 - 90.0    | 5500  | 9400  | 9400  | 9000  | 9000  | 11000 | 8300  | 7900  | 7500  | 7500  | 7200  | 6800  | 6500  | 6200  | 5900  | 5400  | 5400  | 5400  | 5400  | 5400  | 5400  | 5400  | 5400  | 6300  |
| 90.1 - 95.0    | 5200  | 9000  | 9000  | 8800  | 8800  | 11000 | 7900  | 7400  | 7100  | 7100  | 6700  | 6400  | 6200  | 5900  | 5700  | 5400  | 5400  | 5400  | 5400  | 5400  | 5400  | 5400  | 5400  | 6300  |
| 95.1 - 100.0   | 4900  | 8900  | 8900  | 8300  | 8300  | 10500 | 7400  | 7000  | 6700  | 6700  | 6400  | 6100  | 5800  | 5600  | 5300  | 5100  | 4900  | 4800  | 4800  | 4800  | 4800  | 4800  | 4800  | 6300  |
| 100.1 - 105.0  | 4700  | 8400  | 8400  | 7900  | 7900  | 10500 | 7100  | 6700  | 6400  | 6400  | 6100  | 5800  | 5500  | 5300  | 5100  | 4900  | 4700  | 4500  | 4500  | 4500  | 4500  | 4500  | 4500  | 6300  |
| 105.1 - 110.0  | 4400  | 8000  | 8000  | 7500  | 7500  | 10500 | 6700  | 6400  | 6000  | 6000  | 5800  | 5500  | 5200  | 5000  | 4800  | 4600  | 4400  | 4300  | 4300  | 4300  | 4300  | 4300  | 4300  | 6300  |
| 110.1 - 115.0  | 4200  | 7600  | 7600  | 7200  | 7200  | 10500 | 6400  | 6100  | 5800  | 5800  | 5500  | 5200  | 5000  | 4800  | 4600  | 4400  | 4200  | 4100  | 4100  | 4100  | 4100  | 4100  | 4100  | 6300  |
| 115.1 - 120.0  | 4000  | 7300  | 7300  | 6800  | 6800  | 10500 | 6100  | 5800  | 5500  | 5500  | 5200  | 5000  | 4800  | 4600  | 4400  | 4200  | 4000  | 3900  | 3900  | 3900  | 3900  | 3900  | 3900  | 6300  |
| 120.1 - 125.0  | 3800  | 7000  | 7000  | 6600  | 6600  | 10500 | 5800  | 5500  | 5200  | 5200  | 5000  | 4800  | 4500  | 4400  | 4200  | 4000  | 3800  | 3700  | 3700  | 3700  | 3700  | 3700  | 3700  | 6300  |
| 125.1 - 130.0  | 3700  | 6700  | 6700  | 6300  | 6300  | 10500 | 5600  | 5300  | 5000  | 5000  | 4800  | 4600  | 4400  | 4200  | 4000  | 3800  | 3700  | 3700  | 3700  | 3700  | 3700  | 3700  | 3700  | 6300  |
| 130.1 - 135.0  |       | 6400  | 6400  | 6000  | 6000  | 9900  | 5400  | 5100  | 4800  | 4800  | 4600  | 4400  | 4200  | 4000  | 3800  | 3700  | 3700  | 3700  | 3700  | 3700  | 3700  | 3700  | 3700  | 6300  |
| 135.1 - 140.0  |       | 6200  | 6200  | 5800  | 5800  | 9900  | 5200  | 4900  | 4600  | 4600  | 4400  | 4200  | 4000  | 3800  | 3700  | 3700  | 3700  | 3700  | 3700  | 3700  | 3700  | 3700  | 3700  | 6300  |
| 140.1 - 145.0  |       |       |       |       |       | 9300  |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 6300  |
| 145.1 - 150.0  |       |       |       |       |       | 9300  |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 6300  |
| 150.1 - 155.0  |       |       |       |       |       | 8700  |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 6300  |
| 155.1 - 160.0  |       |       |       |       |       | 8700  |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 6300  |





## STRENX 700 MC

### General Product Description

The high-strength structural steel at 700 MPa

Strenx™ 700 MC is a hot-rolled structural steel made for cold forming, with a minimum yield strength of 700 MPa for stronger and lighter structures.

Strenx 700 MC meets or exceeds the requirements of S700MC in EN 10149-2. Typical applications include a wide range of components and parts in demanding load-bearing structures.

Strenx 700 MC comes in coils, slit coils or cut-to-length sheets.

### Dimension Range

Strenx 700 MC is available in thicknesses of 2.00-10.00 mm and widths up to 1600 mm as coils, slit coils or cut to length sheets in lengths up to 16 meters.

### Mechanical Properties

| Thickness (mm) | Yield strength $R_{eH}^{1)2)}$ (min MPa) | Tensile strength $R_m$ (MPa) | Elongation $A_{80}^{4)}$ (min %) | Elongation $A_5$ (min %) | Min. inner bending radius for a 90° bend <sup>3)</sup> |
|----------------|------------------------------------------|------------------------------|----------------------------------|--------------------------|--------------------------------------------------------|
| 2 - 3          | 700                                      | 750 - 950                    | 10                               | 12 <sup>5)</sup>         | 0.8 x t                                                |
| 3.01 - 6       | 700                                      | 750 - 950                    |                                  | 12                       | 1.2 x t                                                |
| 6.01 - 10      | 700                                      | 750 - 950                    |                                  | 12                       | 1.6 x t                                                |

The mechanical properties are tested in the longitudinal direction.

<sup>1)</sup> If ReH is not applicable then Rp 0,2 is used.

<sup>2)</sup> On thicknesses >8 mm the minimum yield strength may be 20MPa lower.

<sup>3)</sup> For both longitudinal and transverse direction.

<sup>4)</sup>  $A_{80}$  value applies for sheet thickness < 3.00 mm

<sup>5)</sup>  $A_5$  value applies for sheet thickness  $t \geq 3$ mm.

# STRENX 700 MC

## Impact Properties

| Grade    | Min. impact energy for longitudinal testing Charpy V 10x10 mm test specimens | Test temperature |
|----------|------------------------------------------------------------------------------|------------------|
| 700 MC D | 40 J                                                                         | -20 °C           |
| 700 MC E | 27 J                                                                         | -40 °C           |

Impact testing according to EN ISO 148-1 is performed on thicknesses  $\geq 6$  mm. The specified minimum value corresponds to a full-size specimen.

## Chemical Composition (ladle analysis)

| C<br>(max %) | Si <sup>1)</sup><br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al <sub>tot</sub><br>(min %) | Nb <sup>2)</sup><br>(max %) | V <sup>2)</sup><br>(max %) | Ti <sup>2)</sup><br>(max %) |
|--------------|-----------------------------|---------------|--------------|--------------|------------------------------|-----------------------------|----------------------------|-----------------------------|
| 0.12         | 0.21                        | 2.10          | 0.020        | 0.010        | 0.015                        | 0.09                        | 0.20                       | 0.15                        |

<sup>1)</sup> If the material is to be hot-dip galvanized according to category A or category B in EN 10149-2 this must be specified at the time of order. Other galvanizing classes with higher Si-content are available after agreement.

<sup>2)</sup> Sum of Nb, V and Ti = max 0.22%

The steel is grain refined.

## Carbon equivalent CET(CEV)

| Thickness<br>(mm)    | 2 - 10      |
|----------------------|-------------|
| Typical CET<br>(CEV) | 0.25 (0.39) |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees offer considerably narrower thickness tolerances compared to EN 10 051.

### Length and Width

Width and length tolerances according to SSAB standard. The SSAB standard offer narrower width and length tolerances compared to EN 10 051. Length tolerances only apply for cut to length sheets.

### Shape

Tolerances according to EN 10 051. Narrower tolerances according to the SSAB standard are available on request.

### Flatness

Tolerances according to Strenx Flatness Guarantees Class A. Strenx Flatness Guarantees offer narrower tolerances compared to EN 10 051. Flatness guarantees only apply for cut to length sheets.

# STRENX 700 MC

## Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

## Delivery Conditions

Thermomechanically Rolled. Strenx 700 MC is available in as rolled or pickled surface condition with mill or cut edge.

## Fabrication and Other Recommendations

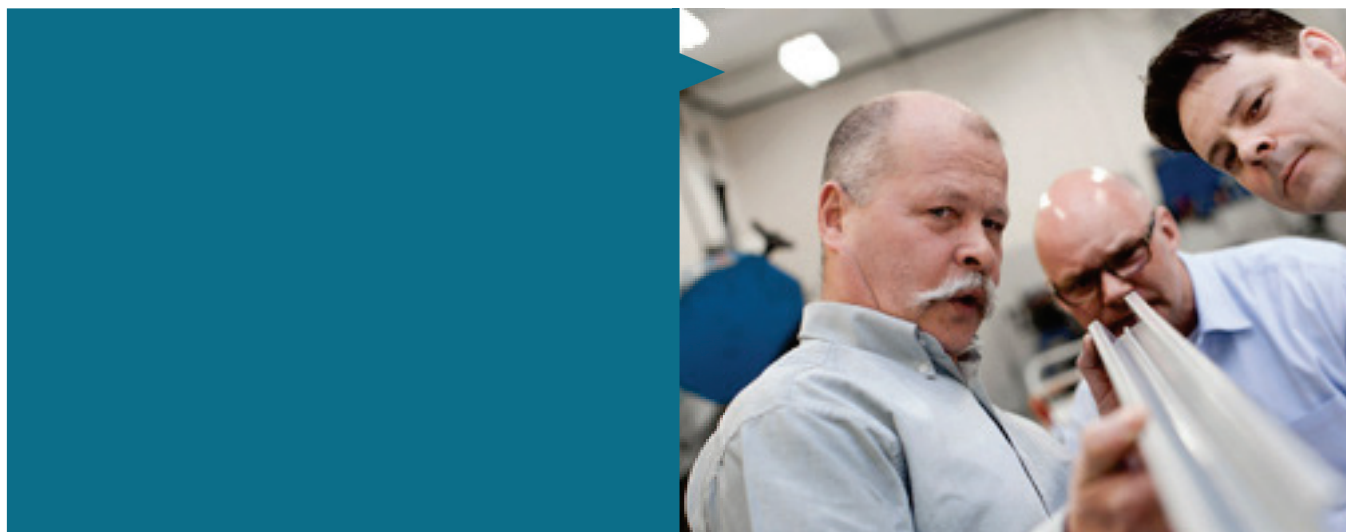
### Welding, bending and machining

Strenx 700 MC has good welding, cold forming and cutting performance.

Strenx 700 MC is a cold forming steel not suited for heat treatments at temperatures above 580°C since the material then may lose its guaranteed properties.

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.



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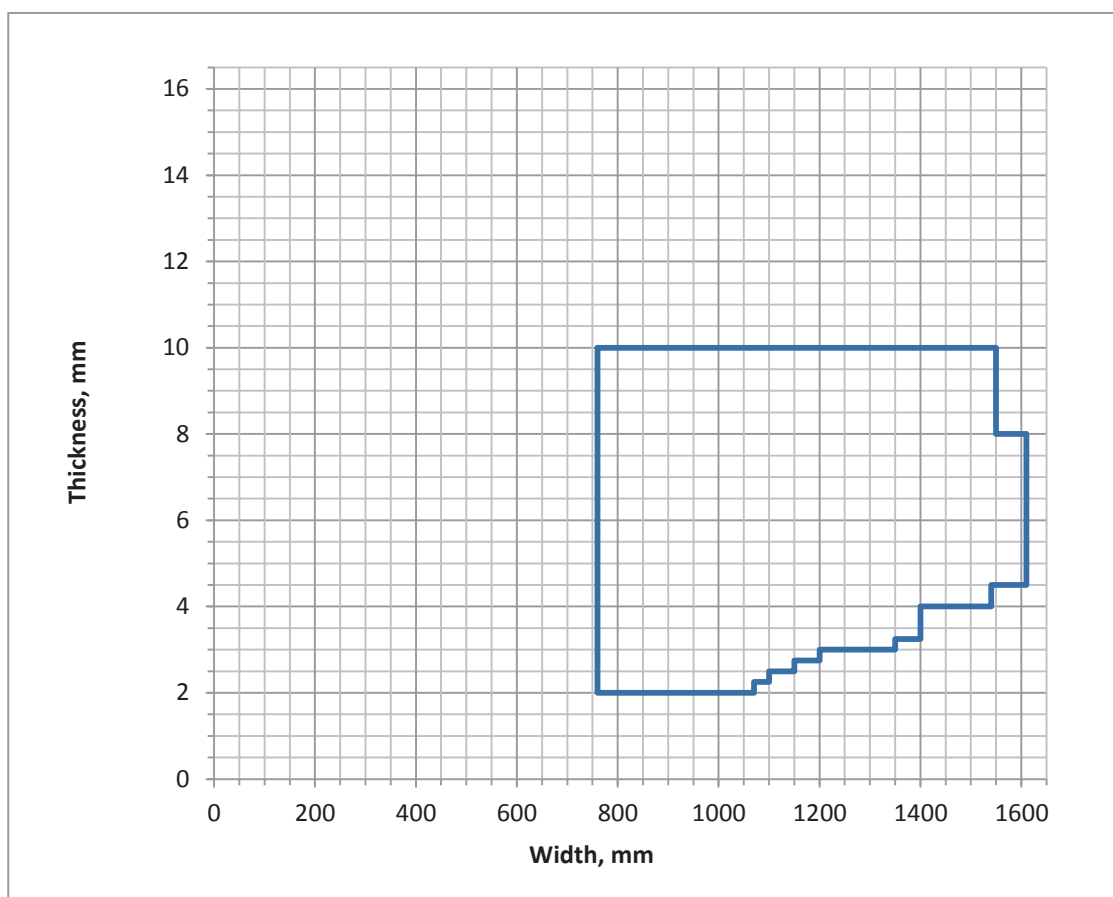
# Product program

## STRENX 700 MC D

Hot rolled wide strip in sheets can be provided with respect to the following requirements

- Steel grade..... STRENX 700 MC D
- Edge condition..... Mill edge
- Surface condition..... As rolled

In dimensions according to the following diagram:



Other requirements may impose further restrictions in addition to what have been specified above.





## STRENX 700 MC PLUS

### STRENX 700 MC PLUS

#### General Product Description

The high-strength structural steel with excellent formability

Strenx™ 700 MC Plus is a high-strength structural steel with advanced cold formability and impact toughness for highly demanding applications.

Strenx 700 MC Plus meets or exceeds the requirements of S700MC in EN 10149-2. It is typically used in highly demanding applications that require superior bendability, high impact toughness in cold conditions and the ability to cut mechanically. Strenx 700 MC Plus comes in cut-to-length sheets.

#### Dimension Range

Strenx 700 MC Plus is available as cut to length sheets in thicknesses of 3.00-12.00 mm, widths up to 1525 mm and lengths up to 13 meters.

#### Mechanical Properties

| Thickness (mm) | Yield strength $R_{eH}^{1)2)}$ (min MPa) | Tensile strength $R_m$ (MPa) | Elongation $A_5$ (min %) | Min. inner bending radius for a 90° bend <sup>3)</sup> |
|----------------|------------------------------------------|------------------------------|--------------------------|--------------------------------------------------------|
| 3- 10          | 700                                      | 750- 950                     | 13                       | 1.0 x t                                                |
| 10.01- 12      | 700                                      | 750- 950                     | 13                       | 1.5 x t                                                |

The mechanical properties are tested in the longitudinal direction.

<sup>1)</sup> If ReH is not applicable then Rp 0,2 is used.

<sup>2)</sup> On thicknesses >8 mm the minimum yield strength may be 20MPa lower.

<sup>3)</sup> For both longitudinal and transverse direction.

#### Impact Properties

| Minimum energy for test on longitudinal Charpy V 10x10 mm test specimens | Test temperature |
|--------------------------------------------------------------------------|------------------|
| 40 J                                                                     | -60 °C           |

Impact testing in the transverse direction is available if specified at the time of order.

Impact testing according to EN ISO 148-1 is performed on thicknesses ≥ 5mm. The specified minimum value corresponds to a full-size specimen.

# STRENX 700 MC PLUS

## Chemical Composition (ladle analysis)

| C<br>(max %) | Si<br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al <sub>tot</sub><br>(min %) | Nb <sup>1)</sup><br>(max %) | V <sup>1)</sup><br>(max %) | Ti <sup>1)</sup><br>(max %) |
|--------------|---------------|---------------|--------------|--------------|------------------------------|-----------------------------|----------------------------|-----------------------------|
| 0.12         | 0.25          | 2.10          | 0.020        | 0.010        | 0.015                        | 0.09                        | 0.20                       | 0.15                        |

The steel is grain refined.

<sup>1)</sup>Sum of Nb, V and Ti = max 0.22%

## Carbon equivalent CET(CEV)

| Thickness<br>(mm)    | 3 - 11.49   | 11.50 - 12  |
|----------------------|-------------|-------------|
| Typical CET<br>(CEV) | 0.24 (0.38) | 0.26 (0.40) |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees offer considerably narrower thickness tolerances compared to EN 10 051.

### Length and Width

Width and length tolerances according to SSAB standard. The SSAB standard offer narrower width and length tolerances compared to EN 10 051. Length tolerances only apply for cut to length sheets.

### Shape

Tolerances according to EN 10 051. Narrower tolerances according to the SSAB standard are available on request.

### Flatness

Tolerances according to Strenx Flatness Guarantees Class A. Strenx Flatness Guarantees offer narrower tolerances compared to EN 10 051. Flatness guarantees only apply for cut to length sheets.

### Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

## Delivery Conditions

Thermomechanically Rolled. Strenx 700 MC Plus is available in as rolled or pickled surface condition.

## Fabrication and Other Recommendations

### Welding, bending and machining

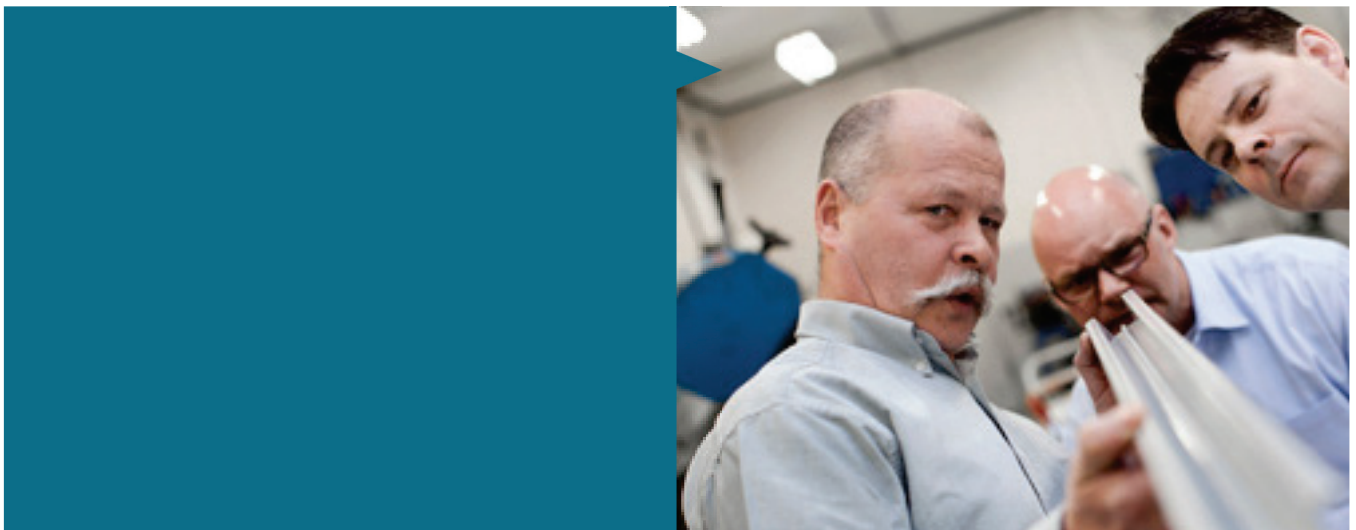
# STRENX 700 MC PLUS

Strenx 700 MC Plus has good welding, cold forming and cutting performance.

Strenx 700 MC Plus is a cold forming steel not suited for heat treatments at temperatures above 580°C since the material then may lose its guaranteed properties.

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.



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# Product program

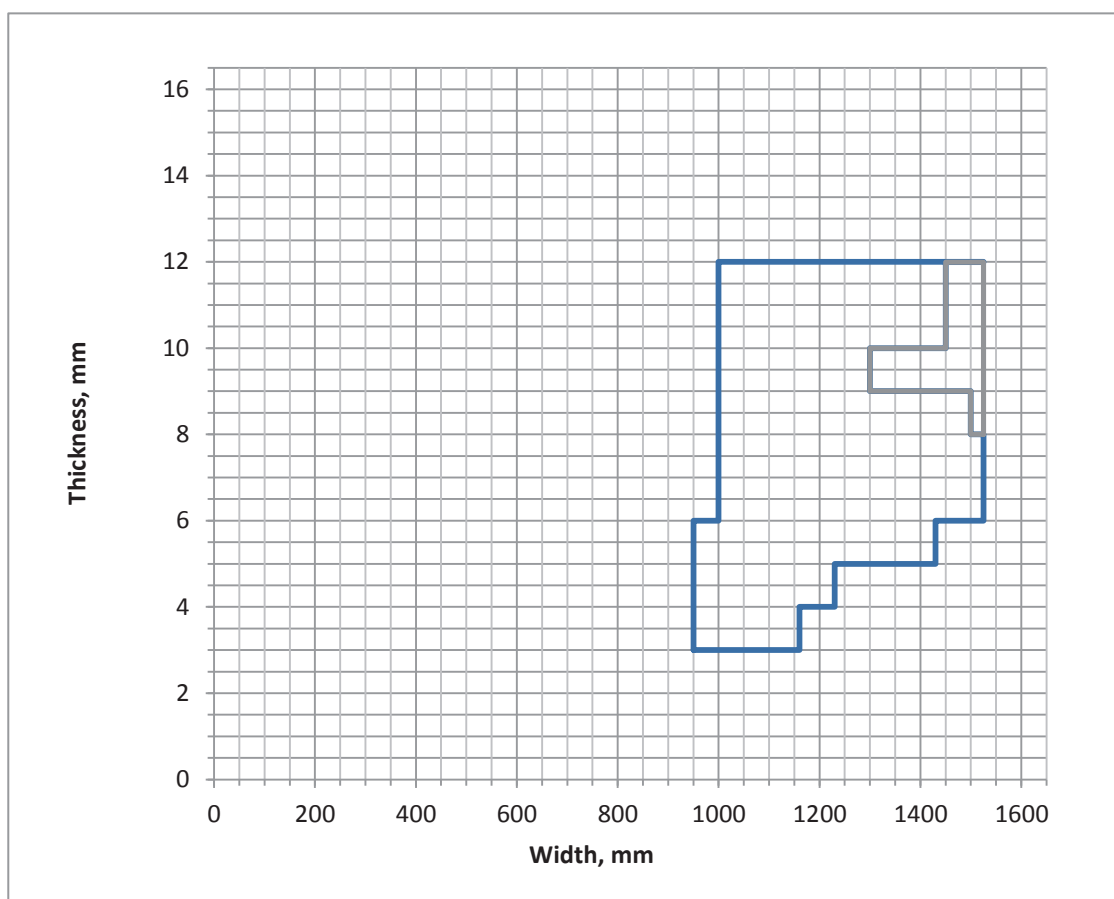
## STRENX 700 MC Plus

Hot rolled wide strip in sheets can be provided with respect to the following requirements

- Steel grade..... STRENX 700 MC Plus
- Edge condition..... Mill edge
- Surface condition..... As rolled

 Some restrictions

In dimensions according to the following diagram:



Other requirements may impose further restrictions in addition to what have been specified above.





## STRENX 700 CR

### General Product Description

The high-strength structural steel at 700 MPa

Strenx 700 CR is a cold-rolled structural steel with a minimum yield strength of 700 MPa used to produce stronger and lighter structures.

Strenx 700 CR comes in cut-to-length sheets. Typical applications include a wide range of components and parts, for example load-bearing structures.

### Dimension Range

Strenx 700 CR is available as cut to length sheets in thicknesses of 0.70-2.10 mm, widths up to 1500 mm and in lengths up to 8.5 meters.

### Mechanical Properties

| Yield strength $R_{p0.2}$<br>(min MPa) | Tensile strength $R_m$<br>(MPa) | Elongation $A_{80}$<br>(min %) | Min. inner bending radius for<br>a 90° bend <sup>1)</sup> |
|----------------------------------------|---------------------------------|--------------------------------|-----------------------------------------------------------|
| 700                                    | 1000- 1200                      | 7                              | 2.0 x t                                                   |

The mechanical properties are tested in the longitudinal direction.

The mechanical properties are guaranteed in coil condition.

1) For both longitudinal and transverse direction.

### Chemical Composition (ladle analysis)

| C<br>(max %) | Si<br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al<br>(min %) | Nb+Ti<br>(max %) |
|--------------|---------------|---------------|--------------|--------------|---------------|------------------|
| 0.16         | 0.40          | 1.80          | 0.020        | 0.010        | 0.015         | 0.10             |

### Carbon equivalent CET(CEV)

| Thickness<br>(mm)    | 0.7 - 2.1   |
|----------------------|-------------|
| Typical CET<br>(CEV) | 0.29 (0.40) |

# STRENX 700 CR

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Thickness guarantees meet the normal thickness tolerance requirements of EN 10131.

### Length and Width

Tolerances according to EN 10131. Narrower tolerances according to the SSAB standard are available on request. Length tolerances only apply for cut to length sheets.

## Delivery Conditions

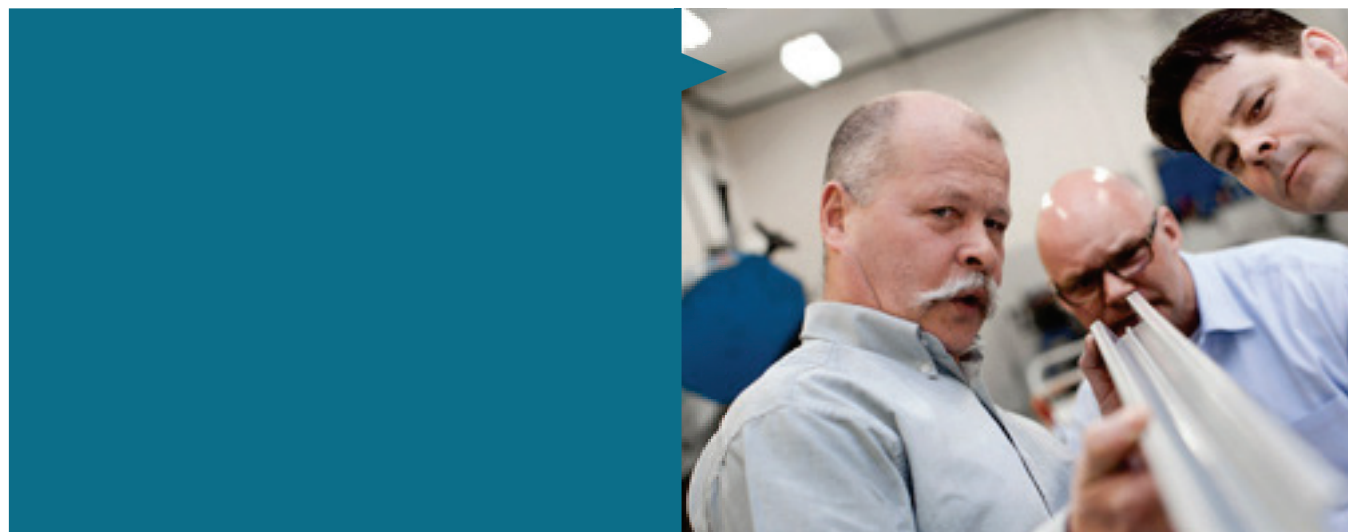
Cold rolled. Strenx 700 CR is available with mill or cut edge.

## Fabrication and Other Recommendations

### Welding, bending and machining

Strenx 700 CR has good cold forming, welding and cutting performance.

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.



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## STRENX 700 OME

### General Product Description

A structural steel developed for use in demanding load-bearing structures within the Offshore and Marine Industry. Strenx™ 700 OME exceeds the requirements of S690QL, EN 10 025-6. Strenx 700 OME can be ordered with dual steel grades certificate, where the additional steel grade is defined and approved by one of the Classification Societies listed below. The dual certification offers You the benefits of excellent mechanical properties, extra tight tolerances, formability and consistency of SSAB Strenx Guarantees.

#### Classification society:

- American Bureau of Shipping      AB EQ70, 4.8 to 130 mm thickness.
- DNV- GL                                  NV E690, VL E690, 6 to 80 mm thickness.
- Lloyds Register                        LR EH 69, 8 to 80 mm thickness.

#### Dimension Range

Strenx 700 OME is available in plate thicknesses of 4 – 130 mm and available in widths up to 3350 mm and lengths up to 14630 mm depending on thickness. More detailed information on dimensions is provided in the dimension program at [www.ssab.com](http://www.ssab.com).

### Mechanical Properties

| Thickness (mm) | Yield strength <sup>1)</sup> R <sub>p0.2</sub> (min MPa) | Tensile strength <sup>1)</sup> R <sub>m</sub> (MPa) | Elongation A <sub>5</sub> (min %) |
|----------------|----------------------------------------------------------|-----------------------------------------------------|-----------------------------------|
| 4.0- 130.0     | 700                                                      | 780- 930                                            | 14                                |

<sup>1)</sup> For transverse test pieces according to EN 10 025.

#### Impact Properties

| Grade          | Min transverse test, impact energy, Charpy V 10x10 mm tests specimens <sup>1)</sup> |
|----------------|-------------------------------------------------------------------------------------|
| Strenx 700 OME | 69 J/-40 °C                                                                         |

<sup>1)</sup> Unless otherwise agreed, only transverse impact testing.

# STRENX 700 OME

## Additional Options for Mechanical properties:

Option 1- Min guaranteed impact energy (J) for transverse testing Charpy V 10x10 mm tests specimens 50 J/-60°C.

Option 2- Improved deformation properties perpendicular to the surface. Through- thickness tensile testing according to EN 10 164, Class Z35, Z25 and Z15.

## Chemical Composition (ladle analysis)

| C *)<br>(max %) | Si *)<br>(%) | Mn *)<br>(max %) | P<br>(max %) | S<br>(max %) | Cr *)<br>(max %) | Cu*)<br>(max %) | Ni*)<br>(max %) | Mo*)<br>(max %) | B *)<br>(max %) |
|-----------------|--------------|------------------|--------------|--------------|------------------|-----------------|-----------------|-----------------|-----------------|
| 0.20            | 0.10- 0.55   | 1.60             | 0.015        | 0.003        | 0.80             | 0.30            | 2.0             | 0.70            | 0.005           |

The steel is grain refined. \*) Intentional alloying elements.

## Maximum Carbon Equivalent CET(CEV)

| Thickness<br>(mm)        | 4 - 30      | (30) - 100  | (100) - 130 |
|--------------------------|-------------|-------------|-------------|
| Strenx 700 OME: CET(CEV) | 0.38 (0.57) | 0.39 (0.58) | 0.41 (0.67) |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given in SSAB's brochures 41-General product information Strenx, Hardox, Armox and Toolox-UK and Strenx™ Guarantees or on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees.

Strenx Guarantees meet the requirements of EN 10 029 Class A, but offers narrower tolerances.

### Length and Width

According to SSAB's dimension program. Tolerances conform with EN 10 029 or to SSAB's standard after agreement.

### Shape

SSAB offers tolerances according to EN 10 029.

### Flatness

Tolerances according to Strenx Flatness Guarantee Class C, which are more narrow than EN 10 029 Class N.

### Surface Properties

According to EN 10 163-2 Class A, Subclass 3.



# STRENX 700 OME

## Bending

Tolerances according to Strenx Bending Guarantee Class A.

## Delivery Conditions

The delivery condition is Q+T (Quenched and Tempered). The plates are delivered with sheared or thermally cut edges. Untrimmed edges after agreement. Delivery requirements can be found in SSAB's brochure 41-General product information Strenx, Hardox, Armox and Toolox-UK or on [www.ssab.com](http://www.ssab.com).

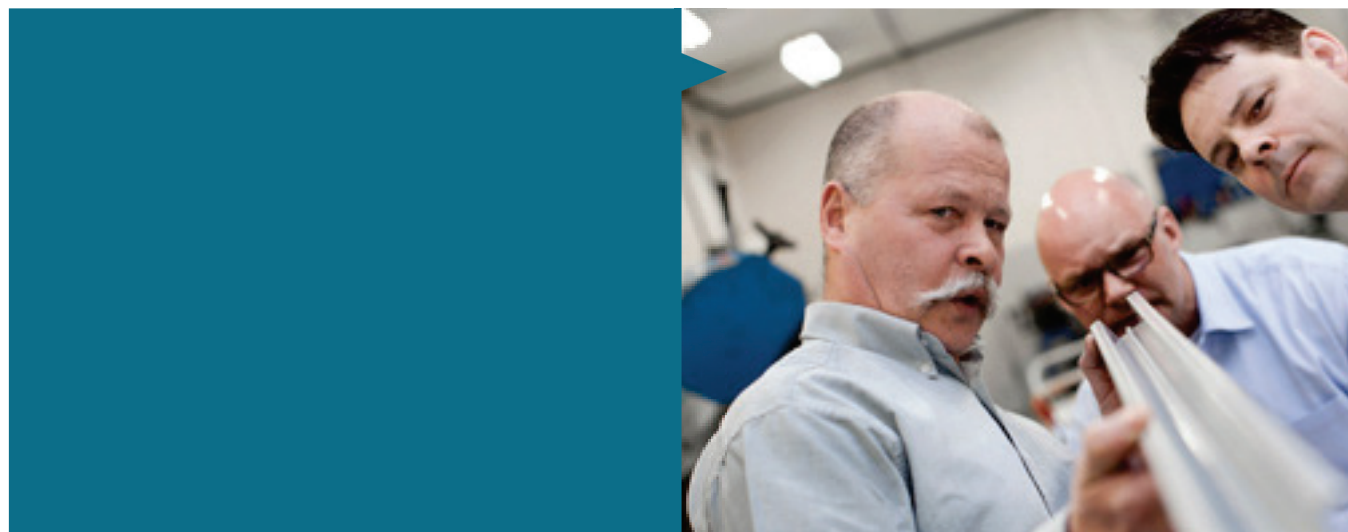
## Fabrication and Other Recommendations

### Welding, bending and machining.

Recommendations are found in SSAB's brochures at [www.ssab.com](http://www.ssab.com) or consult Tech Support, [techsupport@ssab.com](mailto:techsupport@ssab.com). Workshop guidelines for Strenx 700 OME refer to the same recommendations as for Strenx 700.

Strenx 700 OME has obtained its mechanical properties by quenching and subsequent tempering. The properties of the delivery condition cannot be retained after exposure to temperatures in excess of 580°C.

Appropriate health and safety precautions must be taken when welding, cutting, grinding or otherwise working on this product. Grinding, especially of primer coated plates, may produce dust with a high particle concentration.



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## STRENX 900

### General Product Description

The high-strength structural steel at 900 MPa

Strenx™ 900 is a structural steel that guarantees a minimum yield strength of up to 900 MPa depending on thickness.

Strenx 900 provides a unique combination of strength and toughness together with first-rate workshop properties. Typical applications include load-bearing structures, where low weight is needed.

Strenx 900 meets the requirements of EN 10 025-6 for the S890 grade and thicknesses. Strenx 900E (complies with S 890 QL) is available in plate thicknesses of 4–100 mm, while Strenx 900F (complies with S 890 QL1) is available in the thickness range up to 80 mm. Benefits include:

- High impact toughness which provides for good resistance to fractures
- Superior bendability and surface quality
- Weldability with excellent HAZ strength and toughness
- Exceptional consistency within a plate guaranteed by close tolerances

### Dimension Range

Strenx 900E is available in plate thicknesses of 4 – 100 mm and Strenx 900F is available in the thickness range up to 80 mm. Both grades are available in widths up to 3350 mm and lengths up to 14630 mm depending on thickness. More detailed information on dimensions is provided in the dimension program.

### Mechanical Properties

| Thickness (mm) | Yield strength $R_{p0.2}$ <sup>1)</sup> (min MPa) | Tensile strength $R_m$ <sup>1)</sup> (MPa) | Elongation $A_5$ (min %) |
|----------------|---------------------------------------------------|--------------------------------------------|--------------------------|
| 4.0- 53.0      | 900                                               | 940- 1100                                  | 12                       |
| 53.1- 100      | 830                                               | 880- 1100                                  | 12                       |

<sup>1)</sup> For transverse test pieces according to EN 10 025.

# STRENX 900

## Impact Properties

| Grade        | Min transverse test, impact energy, Charpy V 10x10 mm tests specimens <sup>2)</sup> | Meet Requirements For |
|--------------|-------------------------------------------------------------------------------------|-----------------------|
| Strenx 900 E | 27 J/- 40 °C                                                                        | S 890 QL              |
| Strenx 900 F | 27 J/- 60 °C                                                                        | S 890 QL1             |

<sup>2)</sup> Unless otherwise agreed, transverse impact testing according to EN 10025-6 option 30 will apply. For thicknesses between 6-11.9 mm, sub-size Charpy V-specimens are used. The specified min value is then proportional to the cross-sectional area of the specimen compared to a full-size specimen (10x10)

## Chemical Composition (ladle analysis)

| C *)<br>(max %) | Si *)<br>(max %) | Mn *)<br>(max %) | P<br>(max %) | S<br>(max %) | Cr *)<br>(max %) | Cu<br>(max %) | Ni*)<br>(max %) | Mo*)<br>(max %) | B *)<br>(max %) |
|-----------------|------------------|------------------|--------------|--------------|------------------|---------------|-----------------|-----------------|-----------------|
| 0.20            | 0.50             | 1.60             | 0.020        | 0.010        | 0.80             | 0.3           | 2.0             | 0.70            | 0.005           |

The steel is grain refined. \*) Intentional alloying elements.

## Maximum Carbon equivalent CET(CEV)

| Thickness<br>(mm) | 4.0 - 80.0 mm | 80.1 - 100.0 mm |
|-------------------|---------------|-----------------|
| CET(CEV)          | 0.39 (0.58)   | 0.41 (0.63)     |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given in SSAB's brochures 41-General product information Strenx, Hardox, Armox and Toolox-UK and Strenx™ Guarantees or on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees meets the requirements of EN 10 029 Class A, but offers narrower tolerances.

### Length and Width

According to SSAB's dimension program. Tolerances conform with EN 10 029 or to SSAB's standard after agreement.

### Shape

SSAB offers tolerances according to EN 10 029.

### Flatness

Tolerances according to Strenx Flatness Guarantee Class C, which are more narrow than EN 10 029 Class N.

## Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

### Bending

Tolerances according to Strenx Bending Guarantee Class B.

# STRENX 900

## Delivery Conditions

The delivery condition is Q+T (Quenched and Tempered). The plates are delivered with sheared or thermally cut edges. Untrimmed edges after agreement. Delivery requirements can be found in SSAB's brochure 41-General product information Strenx, Hardox, ArmoX and Toolox-UK or on [www.ssab.com](http://www.ssab.com).

## Fabrication and Other Recommendations

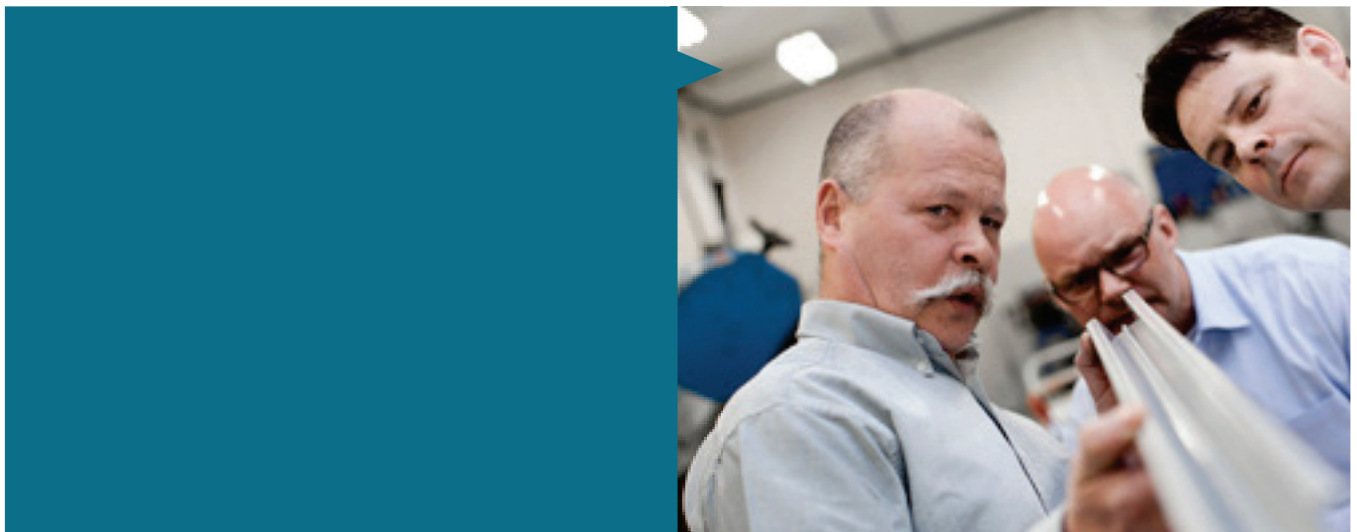
### **Welding, bending and machining**

Recommendations are found in SSAB's brochures at [www.ssab.com](http://www.ssab.com) or consult Tech Support, [techsupport@ssab.com](mailto:techsupport@ssab.com).

Strenx 900 has obtained its mechanical properties by quenching and subsequent tempering. The properties of the delivery condition cannot be retained after exposure to temperatures in excess of 550°C.

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

Grinding, especially of primer coated plates, may produce dust with a high particle concentration.



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The table shows available dimensions for direct order including the maximum length (mm)

Some restrictions, contact your local sales representative for more information

Only 1650 mm width, mill edges. Other dimensions must be approved by Product Manager Strenx  
For thermally cut edges, contact local sales force

Outside the range of dimensions

Minimum length: 2000 mm  
Minimum quantities:  
Thickness: Minimum position weight:  
3.0-60.0 2.5 tons  
60.1-100.0 3.5 tons  
100.1-120.0 4.0 tons  
120.1- 5.0 tons

| Width (mm)<br>Thickness (mm) | 1000-<br>1350 | 1351-<br>1499 | 1500-<br>1599 | 1600-<br>1699 | 1700-<br>1800 | 1801-<br>1900 | 1901-<br>2000 | 2001-<br>2100 | 2101-<br>2200 | 2201-<br>2300 | 2301-<br>2400 | 2401-<br>2500 | 2501-<br>2600 | 2601-<br>2700 | 2701-<br>2800 | 2801-<br>2900 | 2901-<br>3000 | 3001-<br>3100 | 3101-<br>3200 | 3201-<br>3300 | 3301-<br>3350 |
|------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 3.0 - 3.9                    |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 4.0 - 4.7                    |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 4.8 - 5.7                    |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 5.8 - 6.0                    |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 6.1 - 6.7                    |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 6.8 - 7.7                    |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 7.8 - 8.7                    |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 8.8 - 10.0                   |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 10.1 - 25.0                  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 25.1 - 26.0                  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 26.1 - 27.0                  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 27.1 - 28.0                  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 14600         |
| 28.1 - 29.0                  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 14000         |
| 29.1 - 30.0                  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 14200         |
| 30.1 - 31.0                  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 31.1 - 32.0                  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 32.1 - 33.0                  | 14200         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 33.1 - 34.0                  | 13800         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 34.1 - 35.0                  | 13400         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 35.1 - 36.0                  | 13100         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 36.1 - 37.0                  | 12700         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 37.1 - 38.0                  | 12400         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 38.1 - 39.0                  | 12000         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 39.1 - 40.0                  | 11700         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 40.1 - 45.0                  | 10400         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 45.1 - 50.0                  | 9400          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 50.1 - 55.0                  | 9000          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 55.1 - 60.0                  | 8600          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 60.1 - 65.0                  | 7900          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 65.1 - 70.0                  | 6800          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 70.1 - 75.0                  | 6300          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 75.1 - 80.0                  | 5900          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 80.1 - 85.0                  | 5400          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 85.1 - 90.0                  | 5000          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 90.1 - 95.0                  | 4600          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 95.1 - 100.0                 | 4200          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 100.1 - 105.0                | 3800          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 105.1 - 110.0                | 3400          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 110.1 - 115.0                | 3000          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 115.1 - 120.0                | 2600          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 120.1 - 125.0                | 2200          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 125.1 - 130.0                | 1800          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 130.1 - 135.0                | 1400          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |
| 135.1 - 140.0                | 1000          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 13700         |





## STRENX 900 MC

### General Product Description

The high-strength structural steel at 900 MPa

Strenx™ 900 MC is a hot-rolled structural steel made for cold forming, with a minimum yield strength of 900 MPa.

Strenx 900 MC meets and exceeds the requirements of S900MC in EN 10149-2. These cut-to-length sheets feature excellent thickness accuracy and surface quality in relation to strength level, providing an outstanding finish to the final products.

Typical applications include advanced lifting devices and lighter transport solutions and components.

### Dimension Range

Strenx 900 MC is available as cut to length sheets with mill edge in thicknesses of 3.00- 10.00 mm, widths up to 1600 mm and lengths up to 13 meters.

### Mechanical Properties

| Thickness (mm) | Yield strength $R_{eH}$ <sup>1)</sup> (min MPa) | Tensile strength $R_m$ (MPa) | Elongation $A_5$ (min %) | Min. inner bending radius for a 90° bend <sup>2)</sup> |
|----------------|-------------------------------------------------|------------------------------|--------------------------|--------------------------------------------------------|
| 3 - 8          | 900                                             | 930- 1200                    | 8                        | 3 x t                                                  |
| 8.01 - 10      | 900                                             | 930- 1200                    | 8                        | 3.5 x t                                                |

The mechanical properties are tested in the longitudinal direction.

<sup>1)</sup> If ReH is not applicable then Rp 0,2 is used.

<sup>2)</sup> For both longitudinal and transverse direction.

### Impact Properties

| Min. impact energy for longitudinal testing Charpy V 10x10 mm tests specimens | Test temperature |
|-------------------------------------------------------------------------------|------------------|
| 27 J                                                                          | -40 °C           |

Impact testing according to EN 10149-2 ( -20 °C /minimum 40J) is available if specified at the time of order.

Impact testing according to EN ISO 148-1 is performed on thicknesses ≥ 5mm. The specified minimum value corresponds to a full-size specimen.

# STRENX 900 MC

## Chemical Composition (ladle analysis)

| C<br>(max %) | Si<br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al <sub>tot</sub><br>(min %) | Nb <sup>1)</sup><br>(max %) | V <sup>1)</sup><br>(max %) | Ti <sup>1)</sup><br>(max %) |
|--------------|---------------|---------------|--------------|--------------|------------------------------|-----------------------------|----------------------------|-----------------------------|
| 0.10         | 0.25          | 1.30          | 0.020        | 0.010        | 0.015                        | 0.05                        | 0.05                       | 0.07                        |

The steel is grain refined.

<sup>1)</sup>Sum of Nb, V and Ti = max 0.18%

## Carbon equivalent CET(CEV)

| Thickness<br>(mm)    | 3 - 7.9     | 8 - 10      |
|----------------------|-------------|-------------|
| Typical CET<br>(CEV) | 0.25 (0.50) | 0.27 (0.53) |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees offer considerably narrower thickness tolerances compared to EN 10 051.

### Length and Width

Width and length tolerances according to SSAB standard. The SSAB standard offer narrower width and length tolerances compared to EN 10 051. Length tolerances only apply for cut to length sheets.

### Shape

Tolerances according to EN 10 051. Narrower tolerances according to the SSAB standard are available on request.

### Flatness

Tolerances according to Strenx Flatness Guarantees Class A. Strenx Flatness Guarantees offer narrower tolerances compared to EN 10 051. Flatness guarantees only apply for cut to length sheets.

### Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

## Delivery Conditions

Strenx 900 MC is supplied in as rolled surface condition, pickled surface is available in a limited thickness range. The product is thermomechanically rolled.

# STRENX 900 MC

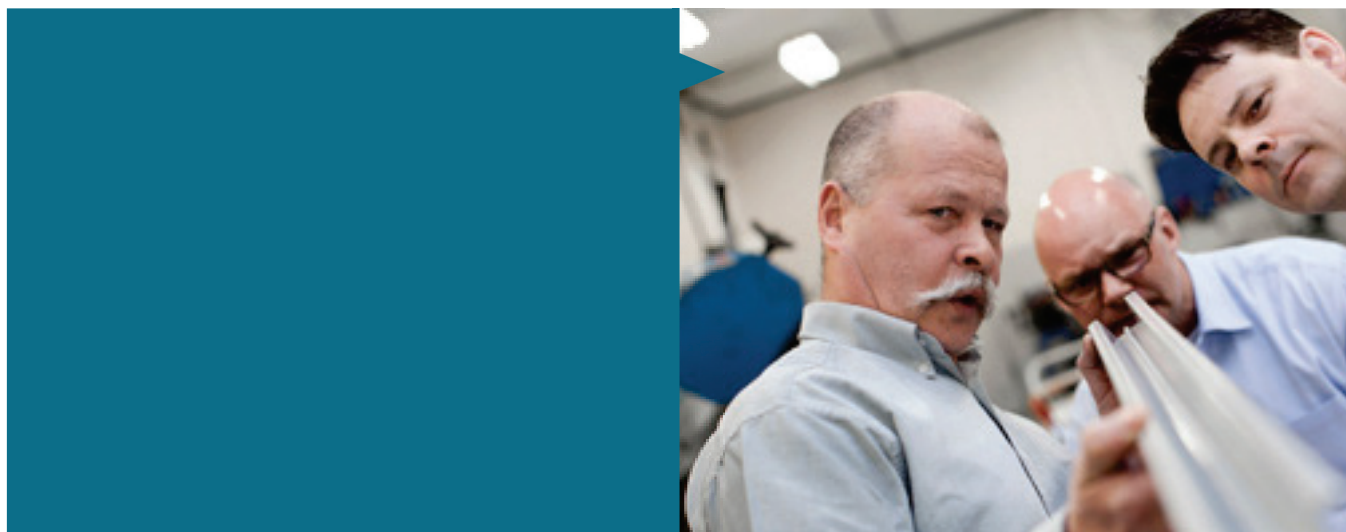
## Fabrication and Other Recommendations

### **Welding, bending and machining**

Strenx 900 MC has good welding, cold forming and cutting performance.

Strenx 900 MC is not suited for applications requiring hot working or heat treatments at temperatures above 400°C since the material then may lose its guaranteed properties.

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.



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# Product program

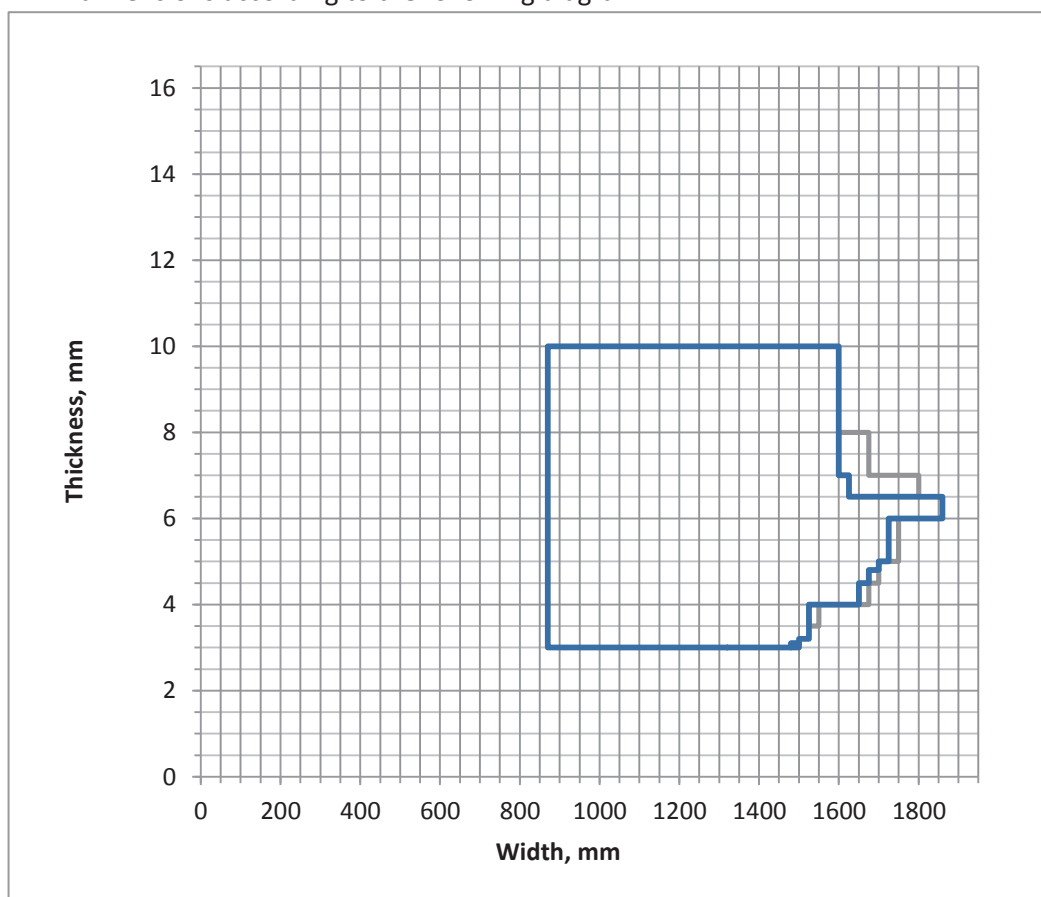
## STRENX 900 MC

Hot rolled wide strip in sheets can be provided with respect to the following requirements

- Steel grade..... STRENX 900 MC
- Edge condition..... Mill edge
- Surface condition..... As rolled

Some restrictions

In dimensions according to the following diagram:



Other requirements may impose further restrictions in addition to what have been specified above.



## STRENX 900 PLUS

### STRENX 900 PLUS

#### General Product Description

The high-strength structural steel at 900 MPa

Strenx™ 900 Plus is a hot-rolled structural strip steel made for cold forming, with a minimum yield strength of 900 MPa.

Strenx 900 Plus combines good weldability with good toughness and strength in the welds. These cut-to-length sheets feature excellent thickness accuracy in the strength level, providing an outstanding finish to the final products.

Typical applications include advanced lifting devices and lighter transport solutions and components.

#### Dimension Range

Strenx 900 Plus is available as cut to length sheets in thicknesses of 3.00- 6.00 mm, widths up to 1600 mm and lengths up to 16 meters.

#### Mechanical Properties

| Thickness (mm) | Yield strength $R_{eH}$ <sup>1)</sup> (min MPa) | Tensile strength $R_m$ (MPa) | Elongation $A_5$ (min %) | Min. inner bending radius for a 90° bend |
|----------------|-------------------------------------------------|------------------------------|--------------------------|------------------------------------------|
| 3 - 6          | 900                                             | 930 - 1200                   | 11                       | 3.0 xt                                   |

The mechanical properties are tested in the longitudinal direction.

Mechanical testing in the transverse direction is available after special agreement at order.

<sup>1)</sup> If ReH is not applicable then Rp 0,2 is used.

#### Impact Properties

| Min. impact energy for longitudinal testing Charpy V 10x10 mm tests specimens | Test temperature |
|-------------------------------------------------------------------------------|------------------|
| 27 J                                                                          | -40 °C           |

Impact testing according to EN ISO 148-1 is performed on thicknesses  $\geq 6$ mm. The specified minimum value corresponds to a full-size specimen.



# STRENX 900 PLUS

## Chemical Composition (ladle analysis)

| C<br>(max %) | Si<br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al <sub>tot</sub><br>(min %) |
|--------------|---------------|---------------|--------------|--------------|------------------------------|
| 0.18         | 0.50          | 2.10          | 0.020        | 0.010        | 0.018                        |

The steel is grain refined.

In addition Nb, V, Cr, Mo, B, Ti may be used.

## Carbon equivalent CET(CEV)

| Thickness<br>(mm)    |             |
|----------------------|-------------|
| Typical CET<br>(CEV) | 0.34 (0.50) |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees offer considerably narrower thickness tolerances compared to EN 10 051.

### Length and Width

Width and length tolerances according to SSAB standard. The SSAB standard offer narrower width and length tolerances compared to EN 10 051. Length tolerances only apply for cut to length sheets.

### Shape

Tolerances according to EN 10 051. Narrower tolerances according to the SSAB standard are available on request.

### Flatness

Tolerances according to Strenx Flatness Guarantees Class A. Strenx Flatness Guarantees offer narrower tolerances compared to EN 10 051. Flatness guarantees only apply for cut to length sheets.

### Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

## Delivery Conditions

Strenx 900 Plus is supplied in as rolled surface condition, pickled surface is available in a limited thickness range. The product is thermomechanically rolled and further processed for final properties.

# STRENX 900 PLUS

## Fabrication and Other Recommendations

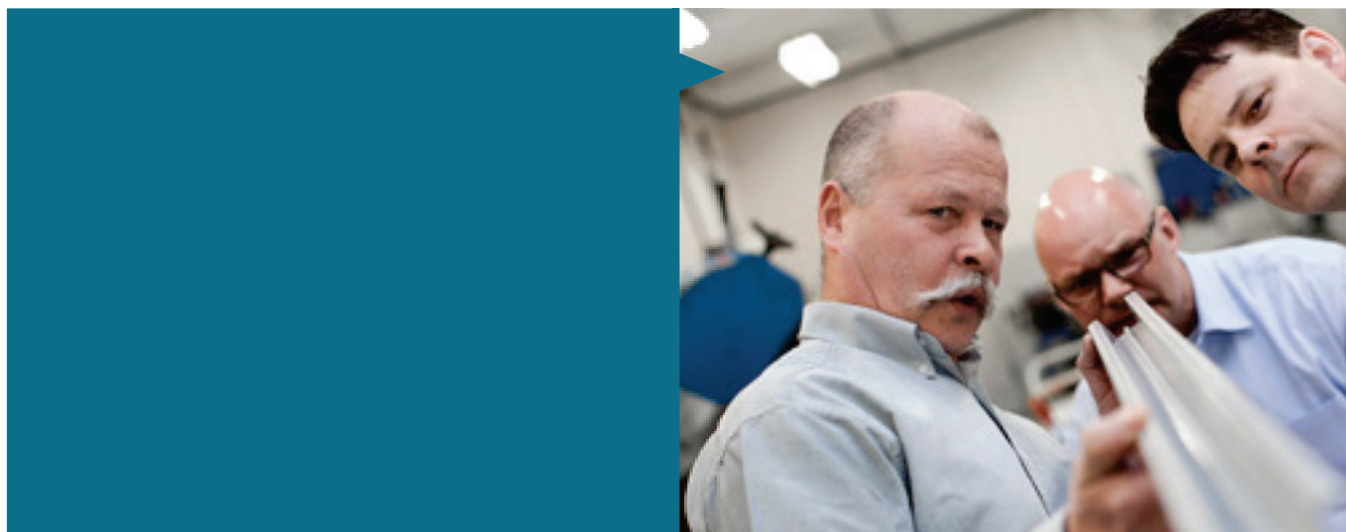
Strenx 900 Plus has very good weldability with good toughness and strength in the welds.

Strenx 900 Plus has good forming and cutting performance.

Strenx 900 Plus is not suited for applications requiring hot working or heat treatments at temperatures above 400°C, since the material then may lose its guaranteed properties.

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.



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# Product program

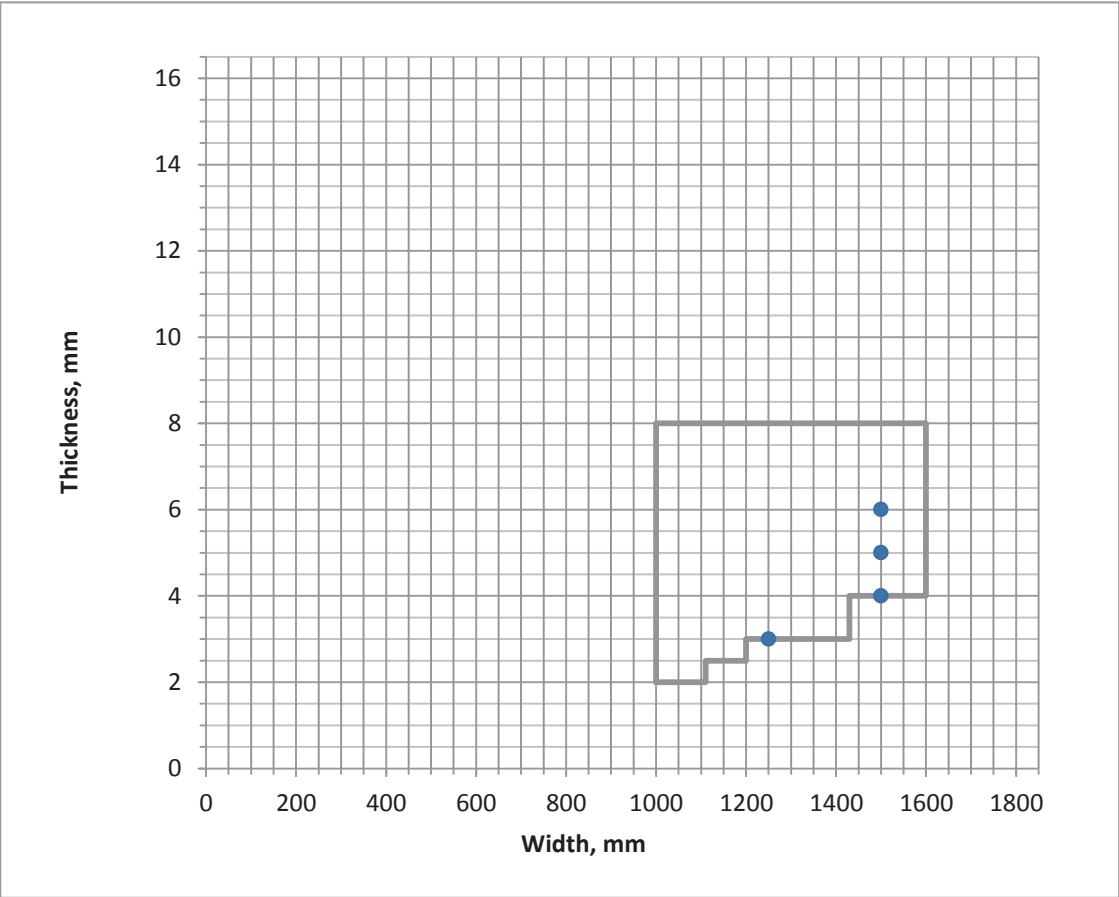
## STRENX 900 Plus

Hot rolled wide strip in sheets can be provided with respect to the following requirements

- Steel grade..... STRENX 900 Plus
- Edge condition..... Mill edge
- Surface condition..... As rolled

Some restrictions

In dimensions according to the following diagram:



Other requirements may impose further restrictions in addition to what have been specified above.



## STRENX 960

### General Product Description

The high-strength structural steel at 960 MPa

Strenx™ 960 is a structural steel that guarantees a minimum yield strength of up to 960 MPa depending on thickness.

Strenx 960 meets the requirements of EN 10 025-6 for the S960 QL grade and thicknesses. Typical applications include demanding load-bearing structures.

Strenx 960 benefits include:

- Exceptional consistency within a plate guaranteed by close tolerances
- High impact toughness which provides for good resistance to fractures
- Superior bendability and surface quality
- Weldability with excellent HAZ strength and toughness

### Dimension Range

Strenx 960 is available in plate thicknesses of 4 – 100 mm. Strenx 960 is available in widths up to 3350 mm and lengths up to 14630 mm depending on thickness. More detailed information on dimensions is provided in the dimension program

### Mechanical Properties

| Thickness (mm) | Yield strength $R_{p0.2}$ <sup>1)</sup> (min MPa) | Tensile strength <sup>1)</sup> $R_m$ (MPa) | Elongation $A_5$ (min %) |
|----------------|---------------------------------------------------|--------------------------------------------|--------------------------|
| 4.0- 53.0      | 960                                               | 980- 1150                                  | 12                       |
| 53.1- 100      | 850                                               | 900- 1100                                  | 10                       |

<sup>1)</sup> For transverse test pieces according to EN 10 025.

### Impact Properties

| Grade        | Min transverse test, impact energy, Charpy V 10x10 mm tests specimens <sup>2)</sup> | Exceeds the requirements for |
|--------------|-------------------------------------------------------------------------------------|------------------------------|
| Strenx 960 E | 40 J/- 40 °C                                                                        | S 960 QL                     |

<sup>2)</sup> Unless otherwise agreed, transverse impact testing according to EN 10025-6 option 30 will apply. For thicknesses between 6- 11.9 mm, sub-size Charpy V-specimens are used. The specified minimum value is then proportional to the cross-sectional area of the specimen compared to a full-size specimen (10 x 10 mm).

# STRENX 960

## Chemical Composition (ladle analysis)

| C <sup>*)</sup><br>(max %) | Si <sup>*)</sup><br>(max %) | Mn <sup>*)</sup><br>(max %) | P<br>(max %) | S<br>(max %) | Cr <sup>*)</sup><br>(max %) | Cu <sup>*)</sup><br>(max %) | Ni <sup>*)</sup><br>(max %) | Mo <sup>*)</sup><br>(max %) | B <sup>*)</sup><br>(max %) |
|----------------------------|-----------------------------|-----------------------------|--------------|--------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|
| 0.20                       | 0.50                        | 1.60                        | 0.020        | 0.010        | 0.80                        | 0.3                         | 2.0                         | 0.70                        | 0.005                      |

The steel is grain refined. <sup>\*)</sup> Intentional alloying elements.

## Maximum Carbon equivalent CET(CEV)

| Thickness<br>(mm) | 4.0 - 34.9 mm | 35.0 - 100.0 mm |
|-------------------|---------------|-----------------|
| CET(CEV)          | 0.38 (0.58)   | 0.41 (0.67)     |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given in SSAB's brochures 41-General product information Strenx, Hardox, Armox and Toolox-UK and Strenx™ Guarantees or on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees meets the requirements of EN 10 029 Class A, but offers narrower tolerances.

### Length and Width

According to SSAB's dimension program. Tolerances conform with EN 10 029.

### Shape

SSAB offers tolerances according to EN 10 029

### Flatness

Tolerances according to Strenx Flatness Guarantee Class C, which are more narrow than EN 10 029 Class N.

### Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

### Bending

Tolerances according to Strenx Bending Guarantee Class B.

## Delivery Conditions

The delivery condition is Q+T (Quenched and Tempered). The plates are delivered with sheared or thermally cut edges. Untrimmed edges after agreement. Delivery requirements can be found in SSAB's brochure 41-General product information Strenx, Hardox, Armox and Toolox-UK or on [www.ssab.com](http://www.ssab.com).



# STRENX 960

## Fabrication and Other Recommendations

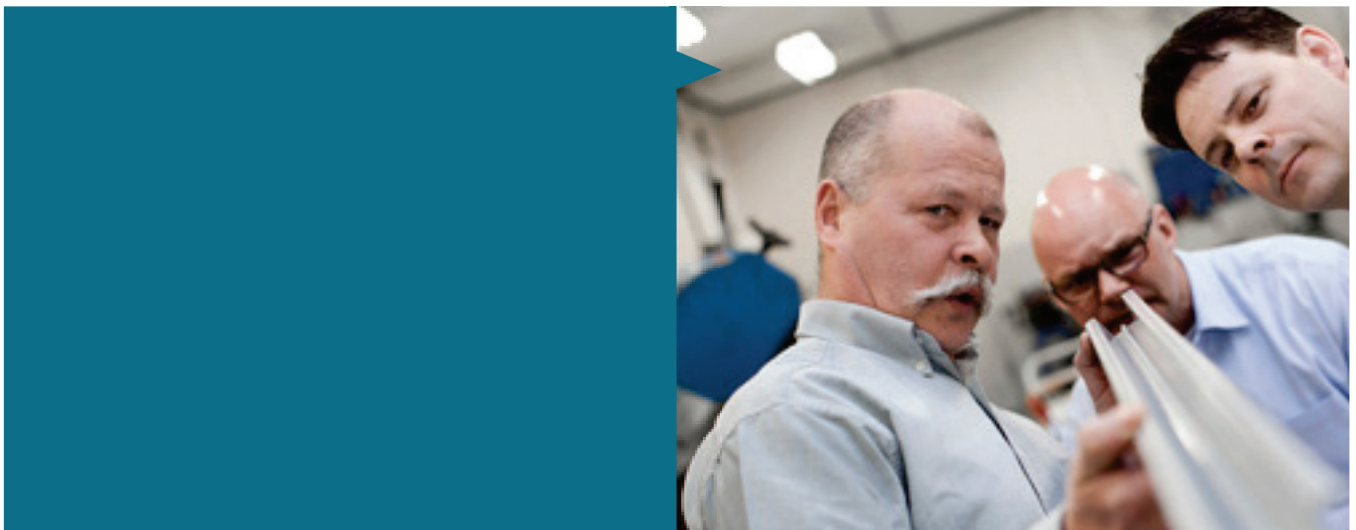
### **Welding, bending and machining**

Recommendations are found in SSAB's brochures at [www.ssab.com](http://www.ssab.com) or consult Tech Support, [techsupport@ssab.com](mailto:techsupport@ssab.com).

Strenx 960 has obtained its mechanical properties by quenching and subsequent tempering. The properties of the delivery condition cannot be retained after exposure to temperatures in excess of 550°C.

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

Grinding, especially of primer coated plates, may produce dust with a high particle concentration.



The UK English version of this document shall prevail in case of discrepancy. Download the latest version of this document at [www.ssab.com](http://www.ssab.com)  
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The table shows available dimensions for direct order including the maximum length (mm)

Some restrictions, contact your local sales representative for more information

Only 1650 mm width, mill edges. Other dimensions must be approved by Product Manager Strenx  
For thermally cut edges, contact local sales force  
Outside the range of dimensions

Minimum length: 2000 mm  
Minimum quantities:  
Thickness: Minimum position weight:  
4.0 - 60.0 2.5 tons  
60.1 - 100.0 3.5 tons

| Width (mm)     | 1000-1350 | 1500-1599 | 1600-1699 | 1700-1800 | 1801-1900 | 1901-2000 | 2001-2100 | 2101-2200  | 2201-2300   | 2301-2400   | 2401-2500   | 2501-2600   | 2601-2700   | 2701-2800   | 2801-2900   | 2901-3000   | 3001-3100   | 3101-3200   | 3201-3300   | 3301-3350   |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |              |               |               |               |               |               |               |               |               |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
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| Thickness (mm) | 3.0 - 3.9 | 4.0 - 4.7 | 4.8 - 5.7 | 5.8 - 6.0 | 6.1 - 6.7 | 6.8 - 7.7 | 7.8 - 8.7 | 8.8 - 10.0 | 10.1 - 25.0 | 25.1 - 26.0 | 26.1 - 27.0 | 27.1 - 28.0 | 28.1 - 29.0 | 29.1 - 30.0 | 30.1 - 31.0 | 31.1 - 32.0 | 32.1 - 33.0 | 33.1 - 34.0 | 34.1 - 35.0 | 35.1 - 36.0 | 36.1 - 37.0 | 37.1 - 38.0 | 38.1 - 39.0 | 39.1 - 40.0 | 40.1 - 45.0 | 45.1 - 50.0 | 50.1 - 55.0 | 55.1 - 60.0 | 60.1 - 65.0 | 65.1 - 70.0 | 70.1 - 75.0 | 75.1 - 80.0 | 80.1 - 85.0 | 85.1 - 90.0 | 90.1 - 95.0 | 95.1 - 100.0 | 100.1 - 105.0 | 105.1 - 110.0 | 110.1 - 115.0 | 115.1 - 120.0 | 120.1 - 125.0 | 125.1 - 130.0 | 130.1 - 135.0 | 135.1 - 140.0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                |           |           |           |           |           |           |           |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |              |               |               |               |               |               |               |               |               |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | </ |



## STRENX 960 MC

### General Product Description

The high-strength structural steel at 960 MPa

Strenx™ 960 MC is a hot-rolled structural steel made for cold forming, with a minimum yield strength of 960 MPa.

Strenx 960 MC meets and exceeds the requirements of S960MC in EN 10149-2. These cut-to-length sheets feature excellent thickness accuracy and surface quality in relation to strength level, providing an outstanding finish to the final products.

Typical applications include advanced lifting devices such as mobile cranes and lighter transport solutions and components.

### Dimension Range

Strenx 960 MC is available as cut to length with mill edge in thicknesses of 3.00- 10.00 mm, widths up to 1600 mm and lengths up to 13 meters.

### Mechanical Properties

| Thickness (mm) | Yield strength $R_{eH}$ <sup>1)</sup> (min MPa) | Tensile strength $R_m$ (MPa) | Elongation $A_5$ (min %) | Min. inner bending radius for a 90° bend <sup>2)</sup> |
|----------------|-------------------------------------------------|------------------------------|--------------------------|--------------------------------------------------------|
| 3- 10          | 960                                             | 980- 1250                    | 7                        | 3.5 xt                                                 |

The mechanical properties are tested in the longitudinal direction.

<sup>1)</sup> If ReH is not applicable then Rp 0,2 is used.

<sup>2)</sup> For both longitudinal and transverse direction.

### Impact Properties

| Min. impact energy for longitudinal testing Charpy V 10x10 mm tests specimens | Test temperature |
|-------------------------------------------------------------------------------|------------------|
| 27 J                                                                          | -40 °C           |

Impact testing according to EN 10149-2 ( -20 °C /minimum 40J) is available if specified at the time of order.

Impact testing according to EN ISO 148-1 is performed on thicknesses ≥ 5mm. The specified minimum value corresponds to a full-size specimen.

# STRENX 960 MC

## Chemical Composition (ladle analysis)

| C<br>(max %) | Si<br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al <sub>tot</sub><br>(min %) | Nb <sup>1)</sup><br>(max %) | V <sup>1)</sup><br>(max %) | Ti <sup>1)</sup><br>(max %) |
|--------------|---------------|---------------|--------------|--------------|------------------------------|-----------------------------|----------------------------|-----------------------------|
| 0.12         | 0.25          | 1.30          | 0.020        | 0.010        | 0.015                        | 0.05                        | 0.05                       | 0.07                        |

The steel is grain refined.

<sup>1)</sup>Sum of Nb, V and Ti = max 0.18%

## Carbon equivalent CET(CEV)

| Thickness<br>(mm)    | 3 - 7.99 mm | 8 - 10 mm   |
|----------------------|-------------|-------------|
| Typical CET<br>(CEV) | 0.28 (0.51) | 0.30 (0.57) |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees offer considerably narrower thickness tolerances compared to EN 10 051.

### Length and Width

Width and length tolerances according to SSAB standard. The SSAB standard offer narrower width and length tolerances compared to EN 10 051. Length tolerances only apply for cut to length sheets.

### Shape

Tolerances according to EN 10 051. Narrower tolerances according to the SSAB standard are available on request.

### Flatness

Tolerances according to Strenx Flatness Guarantees Class A. Strenx Flatness Guarantees offer narrower tolerances compared to EN 10 051. Flatness guarantees only apply for cut to length sheets.

### Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

## Delivery Conditions

Strenx 960 MC is supplied in as rolled surface condition, pickled surface is available in a limited thickness range. The product is thermomechanically rolled.

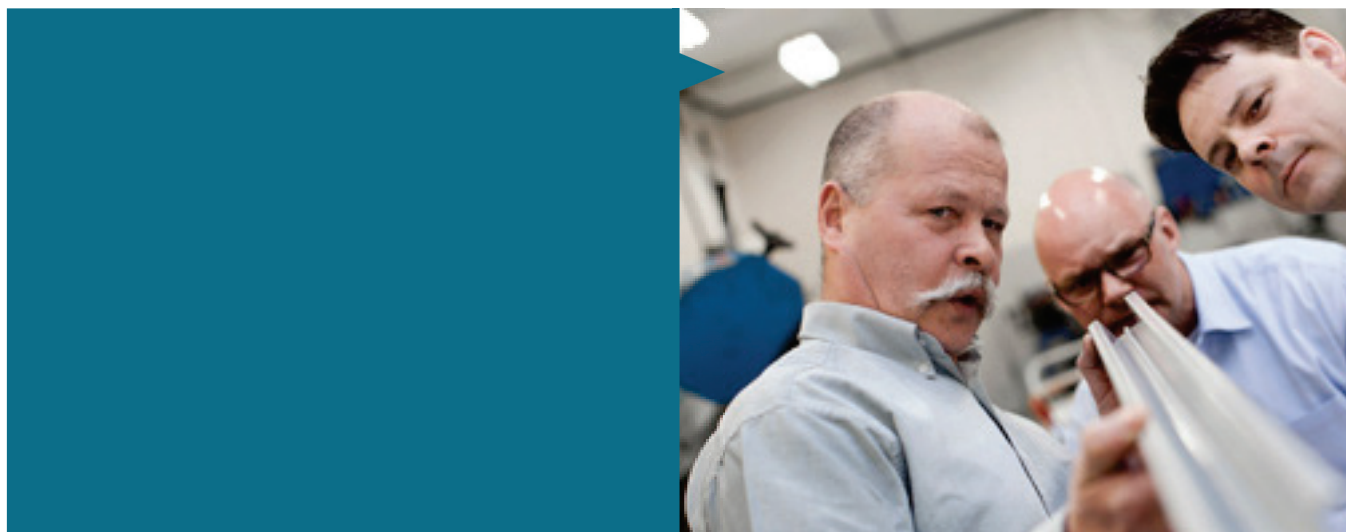
# STRENX 960 MC

## Fabrication and Other Recommendations

### **Strenx 960 MC has good welding, cold forming and cutting performance.**

Strenx 960 MC is not suited for applications requiring hot working or heat treatments at temperatures above 400°C since the material then may lose its guaranteed properties.

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.



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# Product program

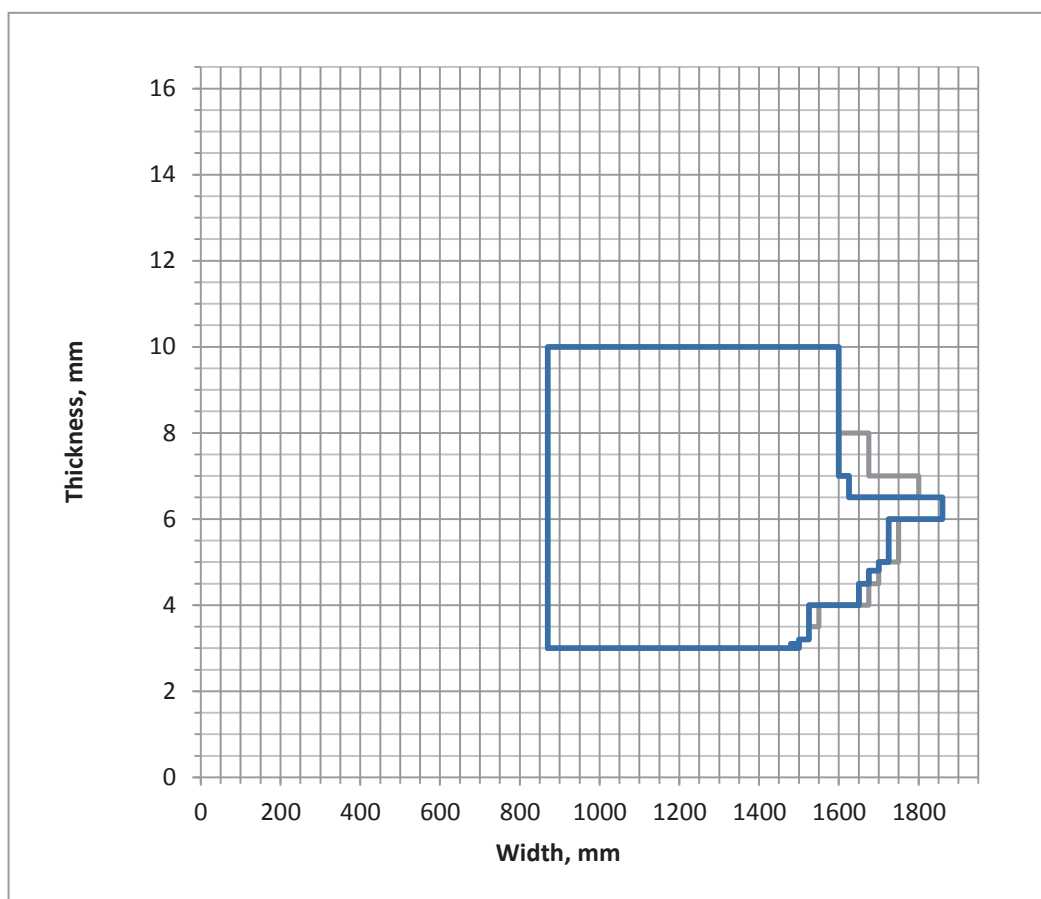
## STRENX 960 MC

Hot rolled wide strip in sheets can be provided with respect to the following requirements

- Steel grade..... STRENX 960 MC
- Edge condition..... Mill edge
- Surface condition..... As rolled

 Some restrictions

In dimensions according to the following diagram:



Other requirements may impose further restrictions in addition to what have been specified above.



## STRENX 960 PLUS

### General Product Description

The high-strength structural steel at 960 MPa

Strenx™ 960 Plus is a hot-rolled structural strip steel made for cold forming, with a minimum yield strength of 960 MPa.

Strenx 960 Plus combines good weldability with good toughness and strength in the welds. These cut-to-length sheets feature excellent thickness accuracy in the strength level, providing an outstanding finish to the final products.

Typical applications include advanced lifting devices and lighter transport solutions and components.

### Dimension Range

Strenx 960 Plus is available as cut to length sheets in thicknesses of 3.00- 6.00 mm, widths up to 1600 mm and lengths up to 16 meters.

### Mechanical Properties

| Yield strength $R_{eH}^{1)}$<br>(min MPa) | Tensile strength $R_m$<br>(MPa) | Elongation $A_5$<br>(min %) | Min. inner bending radius for<br>a 90° bend <sup>2)</sup> |
|-------------------------------------------|---------------------------------|-----------------------------|-----------------------------------------------------------|
| 960                                       | 980- 1250                       | 10                          | 3.5xt                                                     |

The mechanical properties are tested in the longitudinal direction.

Mechanical testing in the transverse direction is available after special agreement at order.

<sup>1)</sup> If ReH is not applicable then Rp0,2 is used.

<sup>2)</sup> For both longitudinal and transverse direction.

### Impact Properties

| Min. Impact energy for longitudinal test<br>Charpy V 10x10 mm test specimens | Test temperature |
|------------------------------------------------------------------------------|------------------|
| 27 J                                                                         | -40 °C           |

Impact testing according to EN ISO 148-1 is performed on thicknesses  $\geq 6$ mm. The specified minimum value corresponds to a full-size specimen.

# STRENX 960 PLUS

## Chemical Composition (ladle analysis)

| C<br>(max %) | Si<br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al <sub>tot</sub><br>(min %) |
|--------------|---------------|---------------|--------------|--------------|------------------------------|
| 0.18         | 0.50          | 2.10          | 0.020        | 0.010        | 0.018                        |

The steel is grain refined.

In addition Nb, V, Cr, Mo, B, Ti may be used.

## Carbon equivalent CET(CEV)

| Thickness<br>(mm)    | 3 - 6       |
|----------------------|-------------|
| Typical CET<br>(CEV) | 0.34 (0.50) |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees offer considerably narrower thickness tolerances compared to EN 10 051.

### Length and Width

Width and length tolerances according to SSAB standard. The SSAB standard offer narrower width and length tolerances compared to EN 10 051. Length tolerances only apply for cut to length sheets.

### Shape

Tolerances according to EN 10 051. Narrower tolerances according to the SSAB standard are available on request.

### Flatness

Tolerances according to Strenx Flatness Guarantees Class A. Strenx Flatness Guarantees offer narrower tolerances compared to EN 10 051. Flatness guarantees only apply for cut to length sheets.

### Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

## Delivery Conditions

Strenx 960 Plus is supplied in as rolled surface condition, pickled surface is available in a limited thickness range. The product is thermomechanically rolled and further processed for final properties.

# STRENX 960 PLUS

## Fabrication and Other Recommendations

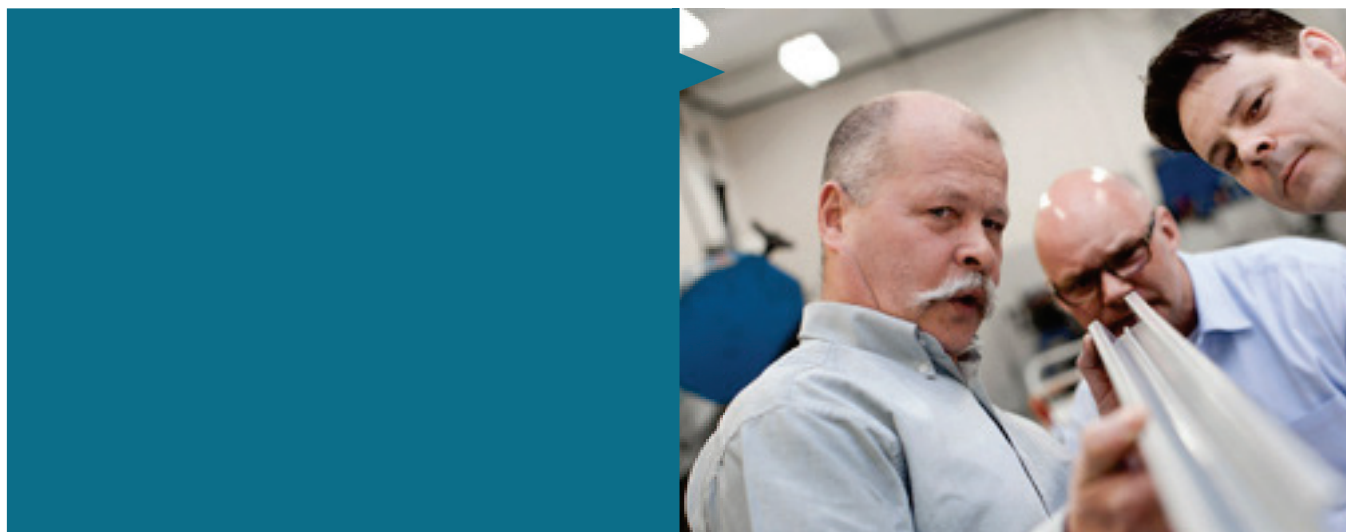
Strenx 960 Plus has very good weldability with good toughness and strength in the welds.

Strenx 960 Plus has good forming and cutting performance.

Strenx 960 Plus is not suited for applications requiring hot working or heat treatments at temperatures above 400°C, since the material then may lose its guaranteed properties.

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.



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# Product program

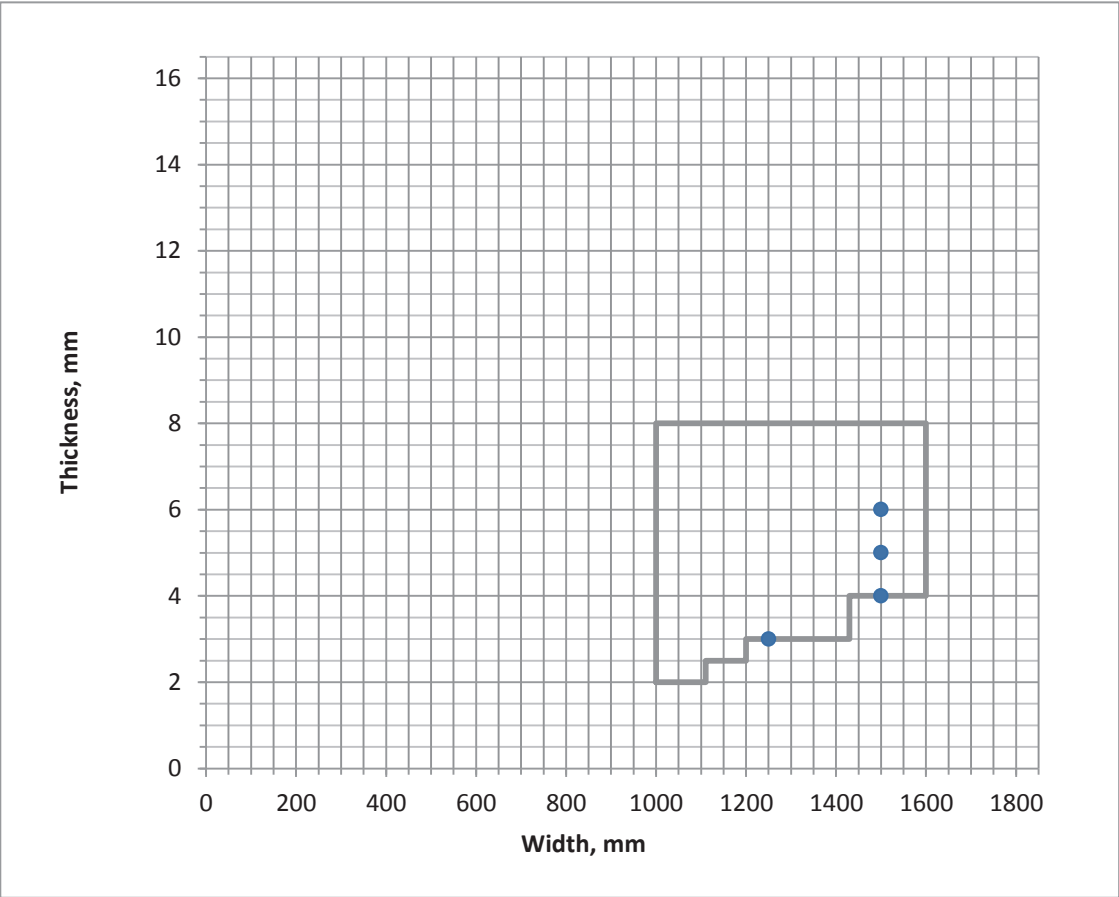
## STRENX 960 Plus

Hot rolled wide strip in sheets can be provided with respect to the following requirements

- Steel grade..... STRENX 960 Plus
- Edge condition..... Mill edge
- Surface condition..... As rolled

Some restrictions

In dimensions according to the following diagram:



Other requirements may impose further restrictions in addition to what have been specified above.





## STRENX 960 CR

### STRENX 960 CR

#### General Product Description

The high-strength structural steel at 960 MPa

Strenx™ 960 CR is a cold-rolled structural steel with a minimum yield strength of 960 MPa used to produce stronger and lighter structures.

Typical applications include a wide range of components and parts, for example load-bearing structures. Strenx 960 CR comes in cut-to-length sheets.

#### Dimension Range

Strenx 960 CR is available as cut to length sheets in thicknesses of 0.70-2.10 mm, widths up to 1500 mm and in lengths up to 8.5 meters.

#### Mechanical Properties

| Yield strength $R_{p0.2}$<br>(min MPa) | Tensile strength $R_m$<br>(MPa) | Elongation $A_{80}$<br>(min %) | Min. inner bending radius for<br>a 90° bend <sup>1)</sup> |
|----------------------------------------|---------------------------------|--------------------------------|-----------------------------------------------------------|
| 960                                    | 1200- 1400                      | 3                              | 3.5 x t                                                   |

The mechanical properties are tested in the longitudinal direction.

The mechanical properties are guaranteed in coil condition.

<sup>1)</sup> For both longitudinal and transverse direction.

#### Chemical Composition (ladle analysis)

| C<br>(max %) | Si<br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al<br>(min %) | Nb+Ti<br>(max %) |
|--------------|---------------|---------------|--------------|--------------|---------------|------------------|
| 0.14         | 0.40          | 2.00          | 0.020        | 0.010        | 0.015         | 0.10             |

#### Carbon equivalent CET(CEV)

| Thickness<br>(mm)    | 0.70 - 2.10 |
|----------------------|-------------|
| Typical CET<br>(CEV) | 0.28 (0.39) |

# STRENX 960 CR

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Thickness guarantees meet the normal thickness tolerance requirements of EN 10131.

### Length and Width

Tolerances according to EN 10131. Narrower tolerances according to the SSAB standard are available on request. Length tolerances only apply for cut to length sheets.

## Delivery Conditions

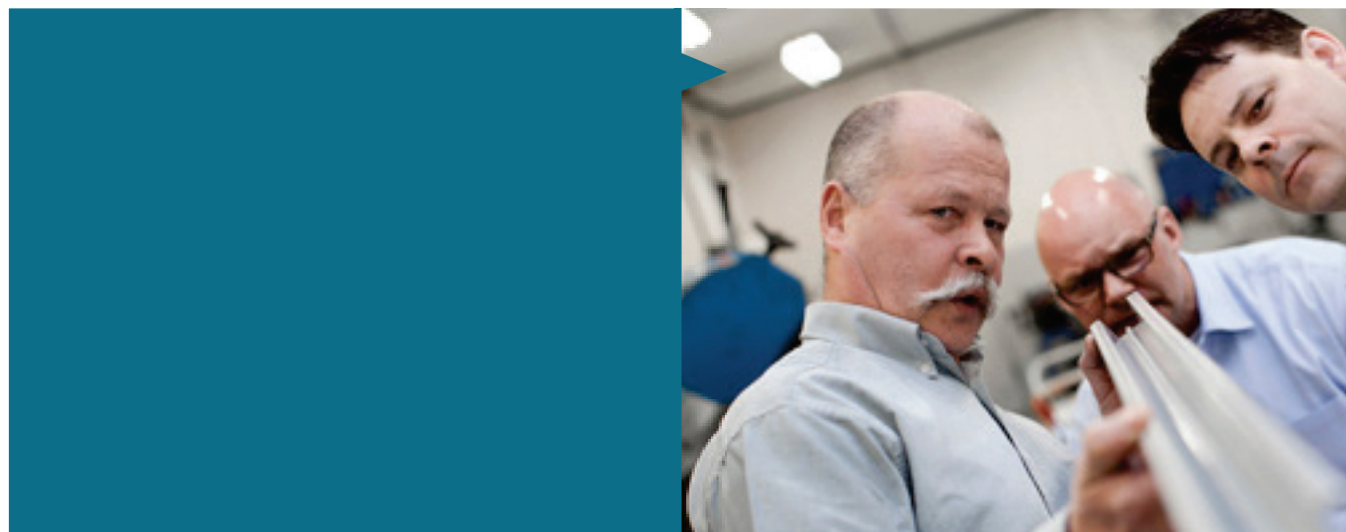
Cold rolled. Strenx 960 CR is available with mill or cut edge.

## Fabrication and Other Recommendations

### Welding, bending and machining

Strenx 960 CR has good cold forming, welding and cutting performance.

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.



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## STRENX 1100

### General Product Description

The high-strength structural steel at 1100 MPa

Strenx™ 1100 is a structural steel with a high yield strength at a minimum of 1100 MPa. Typical applications include demanding load-bearing structures.

Despite its strength, the material is surprisingly easy to weld and bend. Strenx 1100 benefits include:

- Good weldability with excellent HAZ strength and toughness
- Exceptional consistency within a plate guaranteed by close tolerances
- High impact toughness which provides for good resistance to fractures
- Superior bendability and surface quality

### Dimension Range

Strenx 1100 is available in plate thicknesses of 4 – 40 mm. Strenx 1100 is available in widths up to 3200 mm and lengths up to 14630 mm depending on thickness. More detailed information on dimensions is provided in the dimension program

### Mechanical Properties

| Thickness (mm) | Yield strength <sup>1)</sup> R <sub>p0.2</sub> (min MPa) | Tensile strength <sup>1)</sup> R <sub>m</sub> (MPa) | Elongation A <sub>5</sub> (min %) |
|----------------|----------------------------------------------------------|-----------------------------------------------------|-----------------------------------|
| 4.0- 4.9       | 1100                                                     | 1250- 1550                                          | 8                                 |
| 5.0- 40.0      | 1100                                                     | 1250- 1550                                          | 10                                |

<sup>1)</sup>For transverse test pieces according to EN 10 025.

### Impact Properties

| Grade         | Min transverse test, impact energy, Charpy V 10x10 mm tests specimens <sup>2)</sup> |
|---------------|-------------------------------------------------------------------------------------|
| Strenx 1100 E | 27 J/- 40 °C                                                                        |
| Strenx 1100 F | 27 J/- 60 °C                                                                        |

<sup>2)</sup> Unless otherwise agreed, transverse impact testing according to EN 10 025-6 option 30 will apply. For thicknesses between 6 - 11.9 mm, subsize Charpy V-specimens are used. The specified minimum value is then proportional to the cross-sectional area of the specimen compared to a full-size specimen (10 x 10 mm).

# STRENX 1100

## Chemical Composition (ladle analysis)

| C <sup>*)</sup><br>(max %) | Si <sup>*)</sup><br>(max %) | Mn <sup>*)</sup><br>(max %) | P<br>(max %) | S<br>(max %) | Cr <sup>*)</sup><br>(max %) | Cu<br>(max %) | Ni <sup>*)</sup><br>(max %) | Mo <sup>*)</sup><br>(max %) | B <sup>*)</sup><br>(max %) |
|----------------------------|-----------------------------|-----------------------------|--------------|--------------|-----------------------------|---------------|-----------------------------|-----------------------------|----------------------------|
| 0.21                       | 0.50                        | 1.40                        | 0.020        | 0.005        | 0.80                        | 0.30          | 3                           | 0.70                        | 0.005                      |

The steel is grain-refined. <sup>\*)</sup> Intentional alloying elements.

## Maximum Carbon equivalent CET(CEV)

| Thickness<br>(mm) | 4.0 - 4.9   | 5.0 - 7.9   | 8.0 - 14.9  | 15.0 - 40.0 |
|-------------------|-------------|-------------|-------------|-------------|
| 1100 E CET(CEV)   | 0.37 (0.57) | 0.38 (0.58) | 0.39 (0.62) | 0.42 (0.73) |
| 1100 F CET(CEV)   | -           | 0.40 (0.70) | 0.40 (0.70) | 0.42 (0.73) |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given in SSAB's brochures 41-General product information Strenx, Hardox, ArmoX and Toolox-UK and Strenx™ Guarantees or on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees meets the requirements of EN 10 029 Class A, but offers narrower tolerances.

### Length and Width

According to SSAB's dimension program. Tolerances conform to EN 10 029.

### Shape

SSAB offers tolerances according to EN 10 029.

### Flatness

Tolerances according to Strenx Flatness Guarantees Class D, which are narrower than EN 10 029 Class N.

### Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

### Bending

Tolerances according to Strenx Bending Guarantee Class C.

## Delivery Conditions

The delivery condition is Q or QT (Quenched or Quenched and Tempered at our discretion). The plates are delivered with sheared or thermally cut edges. Untrimmed edge after agreement. Delivery requirements can be found in SSAB's brochure 41-General product information Strenx, Hardox, ArmoX and Toolox-UK or on [www.ssab.com](http://www.ssab.com).

# STRENX 1100

## Fabrication and Other Recommendations

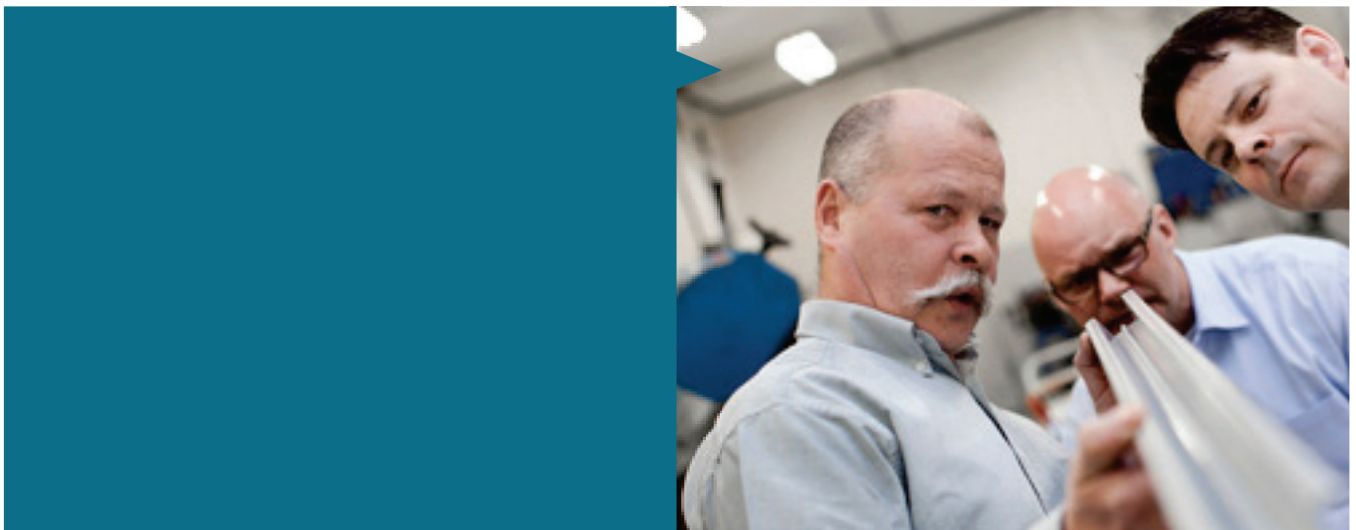
### **Welding, bending and machining**

Recommendations are found in SSAB's brochures on [www.ssab.com](http://www.ssab.com) or consult Tech Support, [techsupport@ssab.com](mailto:techsupport@ssab.com).

Strenx 1100 has obtained its mechanical properties by quenching and subsequent tempering. The properties of the delivery condition cannot be retained after exposure to temperatures in excess of 200°C.

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

Grinding, especially of primer coated plates, may produce dust with a high particle concentration.



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Strenx 1100

2015-12-03

The table shows available dimensions for direct order including the maximum length (mm)

Some restrictions, contact your local sales representative for more information

Outside the range of dimensions

Minimum length: 2000 mm  
Minimum quantities:  
Thickness: Minimum position weight:  
4.0-40.0 2.5 tons

| Width (mm)     | 1000- | 1351 | 1501 | 1600 | 1601 | 1700 | 1801 | 1901 | 2001 | 2101  | 2201  | 2301  | 2401  | 2501  | 2601 | 2701 | 2801 | 2901 | 3001 | 3101 | 3201 | 3301 |
|----------------|-------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| Thickness (mm) | 1350  | 1499 | 1599 |      | 1699 | 1800 | 1900 | 2000 | 2100 | 2200  | 2300  | 2400  | 2500  | 2600  | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3350 |
| 3.0 - 3.9      |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 4.0 - 4.7      |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 4.8 - 5.7      |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 5.8 - 6.0      |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 6.1 - 6.7      |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 6.8 - 7.7      |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 7.8 - 8.7      |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 8.8 - 10.0     |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 10.1 - 25.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 25.1 - 26.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 26.1 - 27.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 27.1 - 28.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 28.1 - 29.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 29.1 - 30.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 30.1 - 31.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 31.1 - 32.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 32.1 - 33.0    | 14200 |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 33.1 - 34.0    | 13800 |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 34.1 - 35.0    | 13400 |      |      |      |      |      |      |      |      |       |       |       |       | 14500 |      |      |      |      |      |      |      |      |
| 35.1 - 36.0    | 13100 |      |      |      |      |      |      |      |      |       |       |       | 14100 |       |      |      |      |      |      |      |      |      |
| 36.1 - 37.0    | 12700 |      |      |      |      |      |      |      |      |       |       | 14300 | 13700 |       |      |      |      |      |      |      |      |      |
| 37.1 - 38.0    | 12400 |      |      |      |      |      |      |      |      |       | 14500 | 13900 | 13400 |       |      |      |      |      |      |      |      |      |
| 38.1 - 39.0    | 12000 |      |      |      |      |      |      |      |      |       | 14200 | 13600 | 13000 |       |      |      |      |      |      |      |      |      |
| 39.1 - 40.0    | 11700 |      |      |      |      |      |      |      |      | 14400 | 13800 | 13200 | 12700 |       |      |      |      |      |      |      |      |      |
| 40.1 - 45.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 45.1 - 50.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 50.1 - 55.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 55.1 - 60.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 60.1 - 65.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 65.1 - 70.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 70.1 - 75.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |
| 75.1 - 80.0    |       |      |      |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |      |      |



## STRENX 1100 MC

### General Product Description

The high-strength structural steel at 1100 MPa

Strenx™ 1100 MC is a hot-rolled structural steel made for cold forming, with a minimum yield strength of 1100 MPa for stronger and lighter structures.

These cut-to-length sheets feature excellent thickness accuracy and surface quality in relation to strength level, providing an outstanding finish to the final products.

Typical applications include a wide range of parts and components such as demanding load-bearing structures.

### Dimension Range

Strenx 1100 MC is available as cut to length sheets in thicknesses of 3.00 to 8.00 mm, widths up to 1700mm and lengths up to 16 meters.

### Mechanical Properties

| Thickness (mm) | Yield strength $R_{eH}^{1)}$ (min MPa) | Tensile strength $R_m$ (MPa) | Elongation $A_5$ (min %) | Min. inner bending radius for a 90° bend <sup>2)</sup> |
|----------------|----------------------------------------|------------------------------|--------------------------|--------------------------------------------------------|
| 3 - 8          | 1100                                   | 1250 - 1450                  | 7                        | 4.0 x t                                                |

The mechanical properties are tested in the longitudinal direction.

<sup>1)</sup> If  $R_{eH}$  is not applicable then  $R_{p0.2}$  is used.

<sup>2)</sup> For both longitudinal and transverse direction.

### Impact Properties

| Minimum energy for test on longitudinal and transverse Charpy V 10x10 mm test specimens | Test temperature |
|-----------------------------------------------------------------------------------------|------------------|
| 27 J                                                                                    | -40 °C           |

Impact testing according to EN ISO 148-1 is performed on thicknesses  $\geq 6$ mm.

The specified minimum value corresponds to a full-size specimen.

# STRENX 1100 MC

## Chemical Composition (ladle analysis)

| C<br>(max %) | Si<br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al<br>(min %) |
|--------------|---------------|---------------|--------------|--------------|---------------|
| 0.15         | 0.5           | 1.8           | 0.020        | 0.005        | 0.015         |

The steel is grain refined.

In addition Nb, V, Cr, Mo, B and Ti may be used.

## Carbon equivalent CET(CEV)

| Thickness<br>(mm)    | 3 - 8 mm    |
|----------------------|-------------|
| Typical CET<br>(CEV) | 0.33 (0.56) |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees offer considerably narrower thickness tolerances compared to EN 10 051.

### Length and Width

Width and length tolerances according to SSAB standard. The SSAB standard offer narrower width and length tolerances compared to EN 10 051.

### Shape

Tolerances according to EN 10 051. Narrower tolerances according to the SSAB standard are available on request.

### Flatness

Tolerances according to Strenx Flatness Guarantees Class A. Strenx Flatness Guarantees offer narrower tolerances compared to EN 10 051. Flatness guarantees only apply for cut to length sheets.

### Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

## Delivery Conditions

Thermomechanically Rolled. Strenx 1100 MC is available in as rolled surface condition.

# STRENX 1100 MC

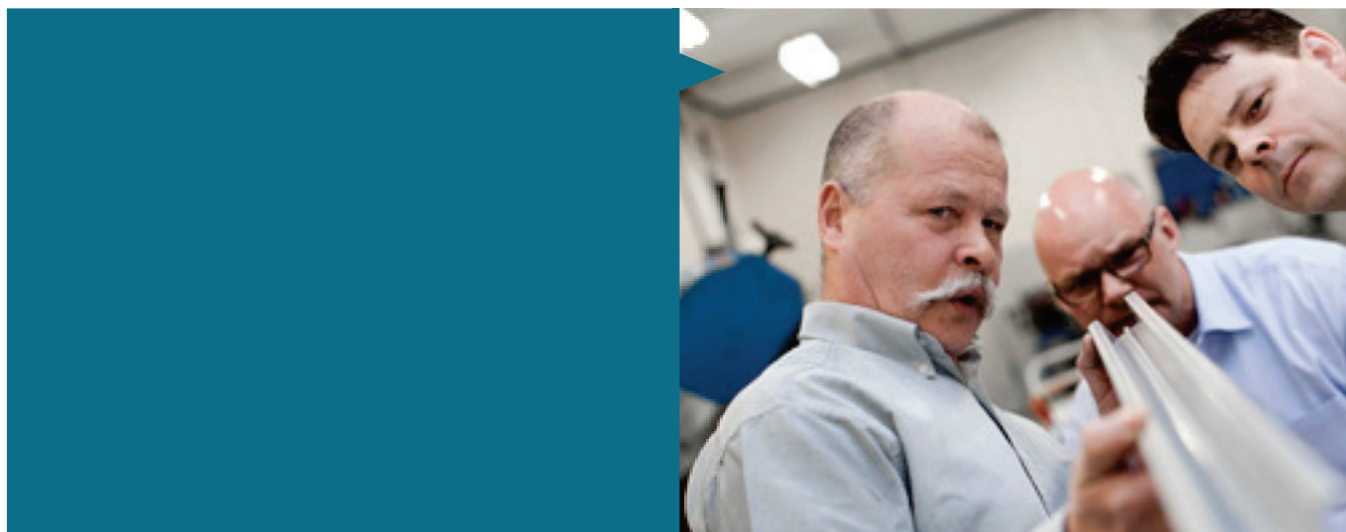
## Fabrication and Other Recommendations

Strenx 1100 MC has good welding, cold forming and cutting performance.

Strenx 1100 MC is not suited for applications requiring hot working or heat treatments at temperatures above 200°C since the material then may lose its guaranteed properties.

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.



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# Product program

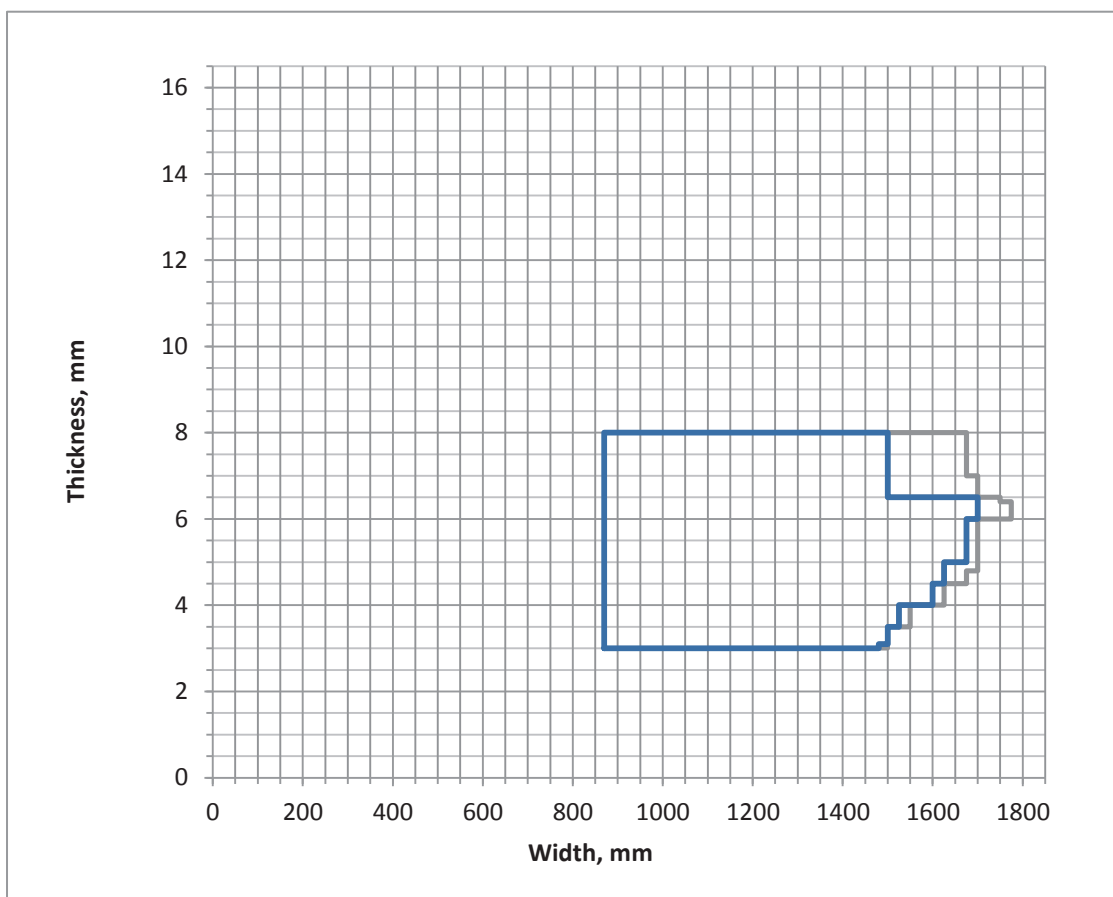
## STRENX 1100 MC

Hot rolled wide strip in sheets can be provided with respect to the following requirements

- Steel grade..... STRENX 1100 MC
- Edge condition..... Mill edge
- Surface condition..... As rolled

 Some restrictions

In dimensions according to the following diagram:



Other requirements may impose further restrictions in addition to what have been specified above.





## STRENX 1100 CR

### General Product Description

Cold-rolled structural steel at 1100 MPa

Strenx™ 1100 CR is a cold-rolled structural steel with a minimum yield strength of 1100 MPa for stronger and lighter structures.

Typical applications include a wide range of components and parts in the lightest possible load-bearing structures, for example in the lifting sector.

Strenx 1100 CR is available as cut-to-length sheets.

### Dimension Range

Strenx 1100 CR is available as cut to length sheets in thicknesses of 0.70-2.10 mm, widths up to 1500 mm and in lengths up to 8.5 meters.

### Mechanical Properties

| Yield strength $R_{p0.2}$<br>(min MPa) | Tensile strength $R_m$<br>(MPa) | Elongation $A_{80}$<br>(min %) | Min. inner bending radius for<br>a 90° bend <sup>1)</sup> |
|----------------------------------------|---------------------------------|--------------------------------|-----------------------------------------------------------|
| 1100                                   | 1300- 1500                      | 3                              | 3.5 x t                                                   |

The mechanical properties are tested in the longitudinal direction.

The mechanical properties are guaranteed in coil condition.

<sup>1)</sup> Bending properties for both longitudinal and transverse direction.

### Chemical Composition (ladle analysis)

| C<br>(max %) | Si<br>(max %) | Mn<br>(max %) | P<br>(max %) | S<br>(max %) | Al<br>(min %) | Nb+Ti<br>(max %) |
|--------------|---------------|---------------|--------------|--------------|---------------|------------------|
| 0.16         | 0.40          | 1.80          | 0.020        | 0.010        | 0.015         | 0.10             |

### Carbon equivalent CET(CEV)

| Thickness<br>(mm)    | 0.7 - 2.1   |
|----------------------|-------------|
| Typical CET<br>(CEV) | 0.30 (0.41) |

# STRENX 1100 CR

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Thickness guarantees meet the normal thickness tolerance requirements of EN 10131.

### Length and Width

Tolerances according to EN 10131. Narrower tolerances according to the SSAB standard are available on request. Length tolerances only apply for cut to length sheets.

## Delivery Conditions

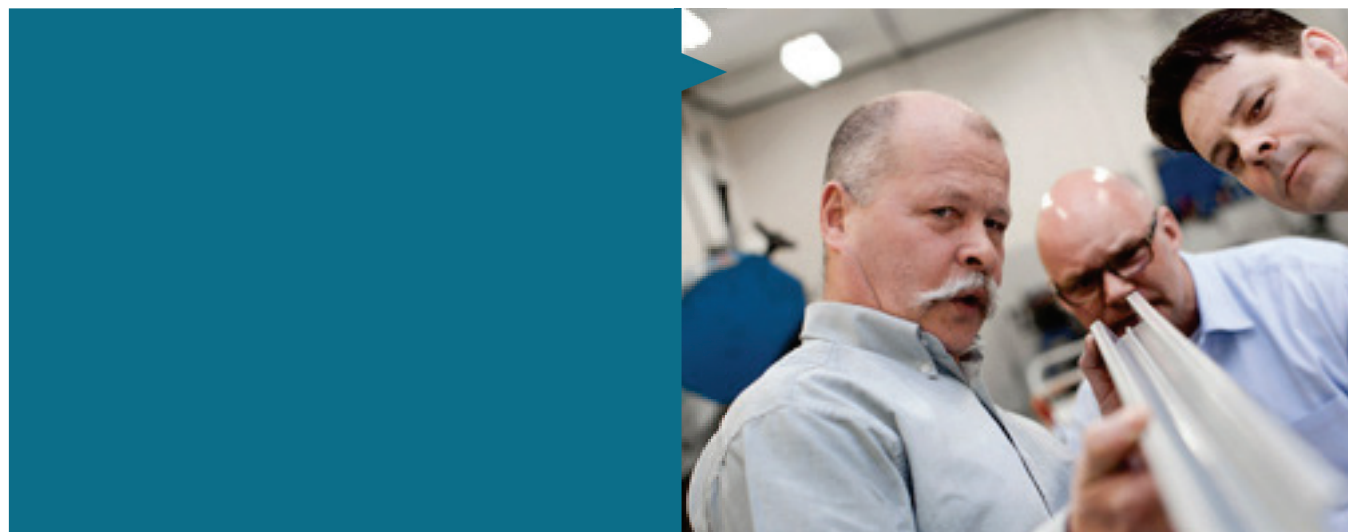
Cold rolled. Strenx 1100 CR is available with mill or cut edge.

## Fabrication and Other Recommendations

### Welding, bending and machining

Strenx 1100 CR has good cold forming, welding and cutting performance.

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.



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## STRENX 1300

### General Product Description

The ultra-high-strength steel at 1300 MPa

Strenx™ 1300 is an ultra-high-strength structural steel with a minimum yield strength of 1300 MPa.

Typical applications include load-carrying structures that place very high demands on low weight. SSAB developed Strenx 1300 for building the lightest possible steel solutions or providing an alternative to other materials.

Strenx 1300 benefits include:

- Good weldability with excellent HAZ strength and toughness
- Exceptional consistency within a plate guaranteed by close tolerances
- High impact toughness which provides for good resistance to fractures
- Superior bendability and surface quality

### Dimension Range

Strenx 1300 is available in plate thicknesses of 4 – 10 mm. Strenx 1300 is available in widths up to 2900 mm and lengths up to 14630 mm depending on thickness. More detailed information on dimensions is provided in the dimension program

### Mechanical Properties

| Thickness (mm) | Yield strength $R_{p0.2}$ <sup>1)</sup> (min MPa) | Tensile strength $R_m$ <sup>1)</sup> (min MPa) | Elongation $A_5$ (min %) |
|----------------|---------------------------------------------------|------------------------------------------------|--------------------------|
| 4.0- 10.0      | 1300                                              | 1400- 1700                                     | 8                        |

<sup>1)</sup> For transverse test pieces according to EN 10 025.

### Impact Properties

| Grade         | Min transverse test, impact energy, Charpy V 10x10 mm tests specimens <sup>2)</sup> |
|---------------|-------------------------------------------------------------------------------------|
| Strenx 1300 E | 27 J/- 40 °C                                                                        |
| Strenx 1300 F | 27 J/- 60 °C                                                                        |

<sup>2)</sup> Unless otherwise agreed, transverse impact testing according to EN 10025-6 option 30 will apply. For thicknesses between 6 - 11.9 mm, sub-size Charpy V-specimens are used. The specified min value is then proportional to the cross-sectional area of the specimen compared to a full-size specimen (10 x 10 mm).

# STRENX 1300

## Chemical Composition (ladle analysis)

| C *)<br>(max %) | Si *)<br>(max %) | Mn *)<br>(max %) | P<br>(max %) | S<br>(max %) | Cr *)<br>(max %) | Cu<br>(max %) | Ni*)<br>(max %) | Mo*)<br>(max %) | B *)<br>(max %) |
|-----------------|------------------|------------------|--------------|--------------|------------------|---------------|-----------------|-----------------|-----------------|
| 0.25            | 0.50             | 1.40             | 0.020        | 0.005        | 0.80             | 0.30          | 3.0             | 0.70            | 0.005           |

The steel is grain refined. \*) Intentional alloying elements.

## Maximum Carbon equivalent CET(CEV)

| Thickness<br>(mm) | 4.0 - 10.0 mm |
|-------------------|---------------|
| 1300 E CET(CEV)   | 0.43 (0.67)   |
| 1300 F CET(CEV)   | 0.43 (0.67)   |

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

More details are given in SSAB's brochures 41-General product information Strenx, Hardox, ArmoX and Toolox-UK and Strenx™ Guarantees or on [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Strenx Thickness Guarantees. Strenx Guarantees meet the requirements of EN 10 029 Class A, but offers narrower tolerances.

### Length and Width

According to SSAB's dimension program. Tolerances conforms with EN 10 029.

### Shape

SSAB offers tolerances according to EN 10 029.

### Flatness

Tolerances according to Strenx Flatness Guarantee Class D, which are narrower than EN 10 029 Class N.

### Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

### Bending

Tolerances according to Strenx Bending Guarantee Class D.

## Delivery Conditions

The delivery condition is Q or QT (Quenched or Quenched and Tempered at our discretion). The plates are delivered with sheared or thermally cut edges. Untrimmed edges after agreement. Delivery requirements can be found in SSAB's brochure 41-General product information Strenx, Hardox, ArmoX and Toolox-UK or on [www.ssab.com](http://www.ssab.com).

# STRENX 1300

## Fabrication and Other Recommendations

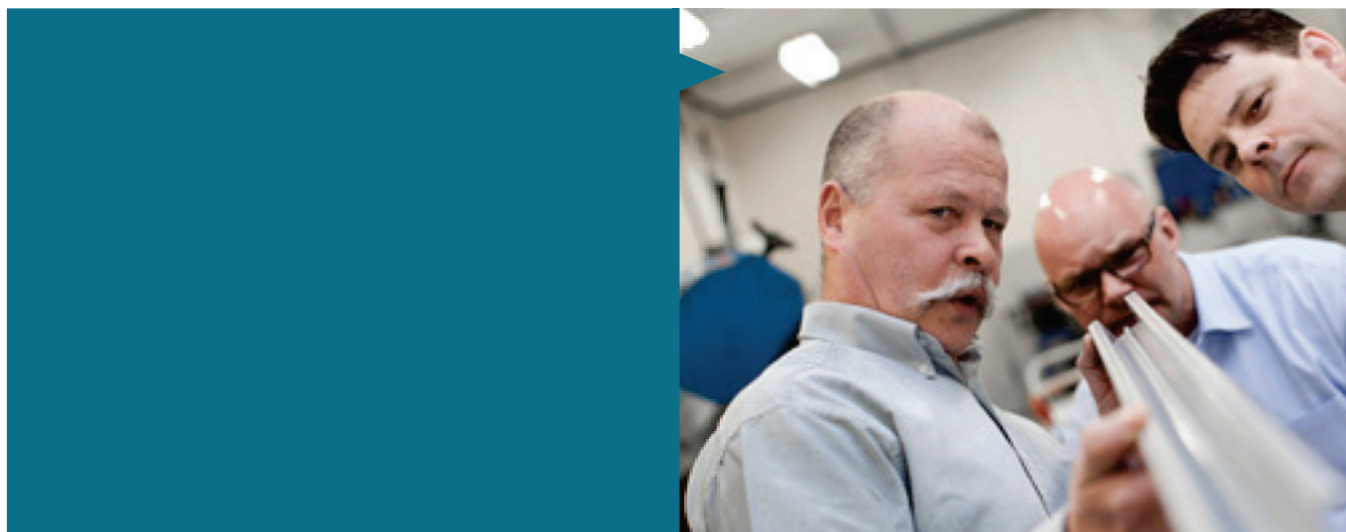
### **Welding, bending and machining**

Recommendations are found in SSAB's brochures on [www.ssab.com](http://www.ssab.com) or consult Tech Support, [techsupport@ssab.com](mailto:techsupport@ssab.com).

Strenx 1300 has obtained its mechanical properties by quenching, and at our discretion, subsequent tempering. The properties of the delivery condition cannot be retained after exposure to temperatures in excess of 200°C.

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

Grinding, especially of primer coated plates, may produce dust with a high particle concentration.



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# Strenx 1300

2015-06-08

Minimum length: 2000 mm  
Minimum quantities:  
Thickness: Minimum position weight:  
3.0-60.0 2.5 tons  
60.1-100.0 3.5 tons  
100.1-120.0 4.0 tons  
120.1- 5.0 tons

The table shows available dimensions for direct order including the maximum length (mm)

Some restrictions, contact your local sales representative for more information

Outside the range of dimensions

| Width [mm]     | 1000 - | 1351 - | 1501 - | 1601 - | 1701 - | 1801 - | 1901 - | 2001 - | 2101 - | 2201 - | 2301 - | 2401 - | 2501 - | 2601 - | 2701 - | 2801 - | 2901 - | 3001 - | 3101 - | 3201 - | 3301 - |
|----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Thickness [mm] | 1350   | 1500   | 1600   | 1700   | 1800   | 1900   | 2000   | 2100   | 2200   | 2300   | 2400   | 2500   | 2600   | 2700   | 2800   | 2900   | 3000   | 3100   | 3200   | 3300   | 3350   |
| 4.0 - 4.7      | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  |        |
| 4.8 - 5.7      | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  |        |
| 5.8 - 6.7      | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  |        |
| 6.8 - 7.7      | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  |        |
| 7.8 - 8.7      | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  |        |
| 8.8 - 10.0     | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  | 14630  |        |
| 10.1 - 15.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 15.1 - 20.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 20.1 - 25.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 25.1 - 30.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 30.1 - 35.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 35.1 - 40.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 40.1 - 45.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 45.1 - 50.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 50.1 - 55.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 55.1 - 60.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 60.1 - 65.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 65.1 - 70.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 70.1 - 75.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 75.1 - 80.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 80.1 - 85.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 85.1 - 90.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 90.1 - 95.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 95.1 - 100.0   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 100.1 - 105.0  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 105.1 - 110.0  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 110.1 - 115.0  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 115.1 - 120.0  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 120.1 - 125.0  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 125.1 - 130.0  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 130.1 - 135.0  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 135.1 - 140.0  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |

