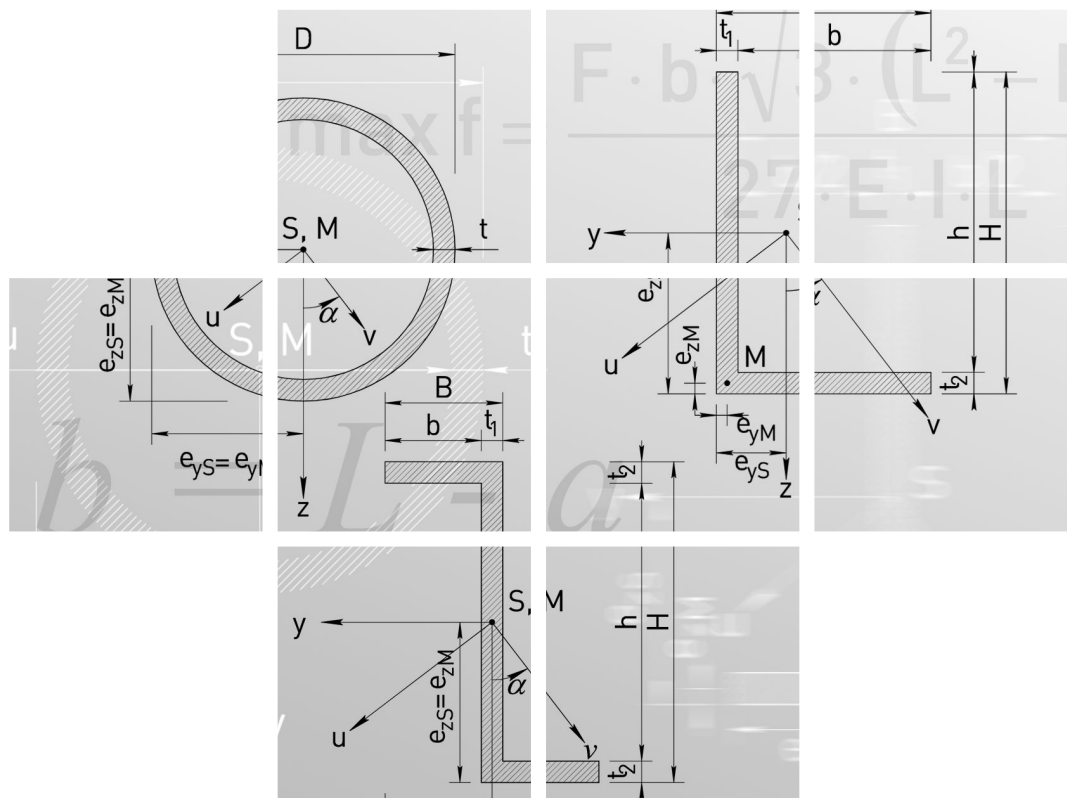


Einfache Spannungsnachweise



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1. Einführung

Im Rahmen einer Vorbemessung ist es oft sinnvoll, mit Hilfe eines einfachen Biegespannungsnachweises eine erste Abschätzung bezüglich der erforderlichen Querschnittabmessungen zu erhalten. Hierbei ist allerdings zu beachten, dass die nachfolgend beschriebenen vereinfachten Nachweise lediglich die Biegung um eine Achse berücksichtigen. Die Nachweisführung für zweiachsige Biegung - mit oder ohne Normalkraft, für sehr dünnwandige Querschnitte, bei denen Teilbereiche ebener Querschnittteile ausbeulen können oder aber auch für torsionsbeanspruchte Querschnitte (insbesondere bei unsymmetrischen L-, Z- und C-Profilen, bei denen die Wirkungslinien der Querkräfte nicht durch den Schubmittelpunkt des Querschnittes verlaufen) - würde den Rahmen dieses Merkblattes sprengen. Für diese Fälle muss auf weiterführendes Schrifttum oder auf entsprechende Auskunft von Fachleuten verwiesen werden.

Grundsätzlich gilt, dass die sich aus der äußeren Belastung ergebenden Biegespannungen **vorh** σ nicht größer sein dürfen als die für die verwendete Aluminiumlegierung festgelegte zulässige Spannung **zul** σ . Mathematisch ausgedrückt lautet dies

$$\text{vorh } \sigma \leq \text{zul } \sigma$$

Infolge einer Biegebeanspruchung um die y-Achse ergibt sich die vorhandene Normalspannung **vorh** σ aus der Beziehung

$$\text{vorh } \sigma = \frac{M_y}{I_y} \cdot z$$

worin M_y das Biegemoment und I_y das Trägheitsmoment bezüglich der y-Achse sowie z der Abstand der zu betrachtenden Querschnittsstelle zu dieser Achse ist. Mit der Abkürzung für das Widerstandsmoment (W_y)

$$W_y = \frac{I_y}{z}$$

folgt unmittelbar

$$\text{vorh } \sigma = \frac{M_y}{W_y}$$

und analog hierzu bei Biegung um die z-Achse

$$\text{vorh } \sigma = -\frac{M_z}{I_z} \cdot y = -\frac{M_z}{W_z}$$

Negative Spannungen sind Druckspannungen, positive Spannungen sind Zugspannungen. Die Trägheitsmomente I_y und I_z sind absolute und für die jeweilige Querschnittsform feste Größen, wohingegen die Widerstandsmomente W_y und W_z von der zu betrachtenden Querschnittsstelle abhängen. Anhand der Definition der Widerstandsmomente

$$W_y = \frac{I_y}{z} \quad \text{bzw.} \quad W_z = \frac{I_z}{y}$$

lässt sich leicht feststellen, dass diese mit größer werdendem Abstand z bzw. y kleiner werden. Die größten Spannungen ergeben sich somit an den Querschnittsrändern. Insbesondere bei unsymmetrischen Querschnitten ist darauf zu achten, dass sich die Extremalwerte (Minima und Maxima) der Widerstandsmomente ($W_{y,\max}$ und $W_{y,\min}$ bzw. $W_{z,\max}$ und $W_{z,\min}$) nicht nur in ihren Vorzeichen, sondern auch in ihren Beträgen unterscheiden.

Analog zur Querschnittsfläche A sind die Trägheitsmomente I , wie auch die Widerstandsmomente W , geometrische Größen und hängen nur von der Querschnittsform ab. Sie sind unabhängig vom Werkstoff. Bei identischen Querschnittabmessungen ist zum Beispiel das Trägheitsmoment I_y - und somit auch die sich hieraus ergebenden Widerstandsmomente W_y - eines Winkelprofils aus Aluminium identisch den entsprechenden Werten eines Winkelprofils aus Stahl.

Die Biegemomente sind von der Art der Belastung, den Lagerungsbedingungen und der Stützweite L abhängig und in zahlreichen Veröffentlichungen tabellarisch dargestellt. Für die gängigen Belastungs- und Lagerungssituationen eines einfeldrigen Trägers sind in Tabelle 1 die maximalen Biegemomente angegeben. Dort sind ebenfalls die Maximalwerte **max** f der sich jeweils ergebenden Durchbiegung aufgeführt. Die maximalen Durchbiegungen stellen sich nicht zwangsläufig - insbesondere bei unsymmetrischer Belastung - an der Lasteinleitungsstelle ein.

Die zulässigen Spannungen, die nicht überschritten werden dürfen, werden durch Werkstoff- oder Anwendungsnormen festgelegt. Für die gängigen Legierungen ist nachfolgend eine Auswahl von zulässigen Spannungen (DIN 4113-1/A1:2002-09) aufgeführt. An dieser Stelle sei jedoch darauf hingewiesen, dass die zulässigen Spannungen nicht nur von der Legierung und dem Werkstoffzustand, sondern auch von der Erzeugnisform (Profil oder Walzprodukt) abhängig sind.

Werkstoffe und Werkstoffzustände	zul σ [N/mm ²]
EN AW-7020 T6/T651 (AlZn4,5Mg1)	160
EN AW-6082 T6/T651 (AlSi1MgMn)	145
EN AW-6082 T5/T61 (AlSi1MgMn)	115
EN AW-6060 T6 (AlMgSi)	80
EN AW-6060 T66 (AlMgSi)	88
EN AW-6063 T6 (AlMg0,7Si)	95
EN AW-6063 T66 (AlMg0,7Si)	105
EN AW-5083 O/H111 (AlMg4,5Mn0,7)	64/74
EN AW-5049 H14 (AlMg2Mn0,8)	110
EN AW-5754 H24/H34 (AlMg3)	95

In vielen Fällen ist es notwendig, nicht nur die zulässige Spannung einzuhalten, sondern auch eine vorgeschriebene Durchbiegung nicht zu überschreiten:

$$\text{vorh } f \leq \text{grenz } f$$

Die sich ergebende Durchbiegung **vorh** f hängt von der Belastung, den Lagerungsbedingungen, der Stützweite L , dem Elastizitätsmodul E und dem Trägheitsmoment I ab. Das Elastizitätsmodul E ist eine Materialkonstante. Für Aluminium und seine Legierungen ist der Rechenwert des Elastizitätsmoduls E einheitlich festgelegt mit $E = 70000 \text{ N/mm}^2$.

Anmerkung:

Bei der Anwendung sowohl der Formeln für den Biegespannungsnachweis als auch für die Durchbiegung ist genau darauf zu achten, dass die Zahlenwerte dimensionshomogen eingesetzt und weiterbehandelt werden. Weisen die Ausgangswerte verschiedene Dimensionen auf, ist es sinnvoll, diese zu Beginn der Berechnung in gleiche Dimensionen umzurechnen.

Die für die Bemessung erforderlichen Querschnittswerte können entweder Tabellenwerken entnommen oder selbst berechnet werden. Für die gängigen Standardprofile (einschließlich Doppel-T-Profile) sind in den Tabellen 2-1 bis 2-10 die Querschnittswerte Gewicht (G), Querschnittfläche (A), Schwerpunktabstände (e_{yS} , e_{zS}), Lagen des Schubmittelpunktes (e_{yM} , e_{zM}), die Trägheitsmomente bezüglich der Achsen y - y und z - z (I_y , I_z), die Extremalwert e der Widerstandsmomente bezüglich der Achsen y - y und z - z ($W_{y,max}$, $W_{y,min}$, $W_{z,max}$, $W_{z,min}$) sowie die Hauptträgheitsmomente (I_u , I_v) und der Hauptachseneckwinkel α angegeben. Alternativ lassen sich diese aber auch mit den in den Tabellen 3-1 bis 3-10 angegebenen Formeln berechnen.

Die Tabellenwerte für Querschnittfläche, Metergewicht (Masse je Meter Länge) und die statischen Werte sind nach dem Nennquerschnitt errechnet. Zulässige Maßabweichungen und Längskantenabrundungen blieben unberücksichtigt. Die Metergewichte basieren auf der Dichte $2,70 \text{ g/cm}^3$.

Die Verfügbarkeit der angegebenen Querschnitte ist vor der endgültigen Auslegung beim Lieferanten zu erfragen, da nicht alle Querschnitte bevorratet werden können. Die in Tabelle 2-5 aufgeführten Doppel-T-Profile werden in der Regel nicht bevorratet bzw. hergestellt. Sie lassen sich jedoch durch Längsver Schweißung zweier T-Profile leicht herstellen. Durch Längsver Schweißung der Stege zweier T-Profile mit den Abmessungen $15 \times 15 \times 1,5 \text{ mm}$ erhält man zum Beispiel ein Doppel-T-Profil mit den Abmessungen $30 \times 15 \times 1,5 \text{ mm}$. Hierbei ist jedoch zu beachten, dass im Bereich der Schweißnähte besondere Nachweise (maximale Schubspannungen und reduzierte zulässige Spannungen) zu führen sind.

2. Rechenbeispiele

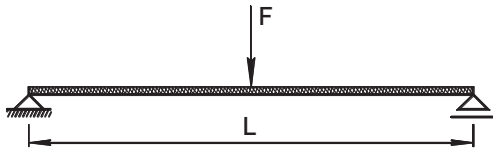
Die Bemessung eines Biegeträgers kann sich aus verschiedenen Fragestellungen ergeben, welche nachfolgend anhand einfacher Beispiele exemplarisch skizziert werden. Die maximale Durchbiegung sei auf **grenz** $f = L/300$ begrenzt.

Als Werkstoff wird in allen Fällen von der Standardlegierung EN AW-6063 T6 (AlMg0,7Si) ausgegangen, welche bezüglich ihrer zulässigen Spannung mit **zul** $\sigma = 95 \text{ N/mm}^2$ der bisher weit verbreiteten Legierung AlMgSi0,5 - F22 entspricht. Im Zuge der europäischen Harmonisierung wurde die bisherige Standardlegierung für Strangpressprofile (AlMgSi0,5) neu klassifiziert. Deren Bezeichnung lautet nach DIN EN 573-3 jetzt EN AW-6060 (EN AW-AlMgSi). Die nach DIN 4113-1/A1 maximal zulässige Spannung für diese Legierung im Zustand T66 beträgt **zul** $\sigma = 88 \text{ N/mm}^2$. Für weitere Informationen bezüglich der sich durch die Umstellung ergebenden Änderungen sei auf den Artikel von R. Gitter¹ hingewiesen.

¹ R. Gitter: "Aluminium-Strangpresslegierungen im konstruktiven Ingenieur-, Maschinen- und Apparatebau – Zur Umstellung von DIN 1748-1 auf EN 755-2"; Stahlbau 67 (1998) Sonderheft Aluminium; auch erhältlich als Sonderdruck beim Gesamtverband der Aluminiumindustrie.

Beispiel 1:

Die Belastung und die Stützweite sind bekannt. Es ist ein erforderlicher Querschnitt (Rechteckrohr) festzulegen.



System: Einfeldträger mit Einzellast in Feldmitte

$$F = 5 \text{ kN} = 5000 \text{ N}$$

$$L = 3,00 \text{ m} = 3000 \text{ mm}$$

Spannungsnachweis:

Aus der Bestimmungsgleichung

$$\text{vorh } \sigma = \frac{M}{\text{erf } W} = \frac{F \cdot L}{4 \cdot \text{erf } W} \leq \text{zul } \sigma$$

ergibt sich mit $\text{zul } \sigma = 95 \text{ N/mm}^2$ unmittelbar das erforderliche Widerstandsmoment $\text{erf } W$ zu:

$$\begin{aligned} \text{erf } W &\geq \frac{F \cdot L}{4 \cdot \text{zul } \sigma} = \frac{5000 \text{ N} \cdot 3000 \text{ mm}}{4 \cdot 95 \text{ N/mm}^2} \\ &= 39474 \text{ mm}^3 \approx 39,5 \text{ cm}^3 \end{aligned}$$

Gewählt wird ein Rechteckrohr 120 x 40 x 5 mm (Definition B, H, t_1, t_2, h, b siehe Zeichnungen auf Seite 38).

$$\begin{aligned} W &= \frac{I_y}{e_{zS}} = \frac{B \cdot H^3 - (B - 2 \cdot t_1) \cdot (H - 2 \cdot t_2)^3}{12} \cdot \frac{2}{H} \\ &= \frac{B \cdot H^3 - b \cdot h^3}{6 \cdot H} \\ &= \frac{40 \text{ mm} \cdot 120^3 \text{ mm}^3 - 30 \text{ mm} \cdot 110^3 \text{ mm}^3}{6 \cdot 120 \text{ mm}} \\ &= 40542 \text{ mm}^3 \approx 40,5 \text{ cm}^3 \end{aligned}$$

Das Widerstandsmoment W des gewählten Querschnittes ist größer als das erforderliche Widerstandsmoment $\text{erf } W$. Die zulässige Spannung wird somit nicht überschritten.

Durchbiegungsnachweis:

Aus der Bestimmungsgleichung

$$\text{vorh } f = \frac{F \cdot L^3}{48 \cdot EI} \leq \text{grenz } f$$

ergibt sich mit einer angenommenen maximal zulässigen Durchbiegung $\text{grenz } f = L/300 \text{ N/mm}^2$ und dem Elastizitätsmoduls $E = 70000 \text{ N/mm}^2$ unmittelbar das erforderliche Trägheitsmoment $\text{erf } I$ zu:

$$\begin{aligned} \text{erf } I &\geq \frac{F \cdot L^3}{48 \cdot E \cdot \frac{L}{300}} \\ &= \frac{300 \cdot 5000 \text{ N} \cdot 3000^3 \text{ mm}^3}{48 \cdot 70000 \text{ N/mm}^2 \cdot 3000 \text{ mm}} \\ &= 4017857 \text{ mm}^4 \approx 402 \text{ cm}^4 \end{aligned}$$

Das Trägheitsmoment des zuvor gewählten Rechteckrohres 120 x 40 x 5 mm ist mit

$$\begin{aligned} I &= \frac{B \cdot H^3 - (B - 2 \cdot t_1) \cdot (H - 2 \cdot t_2)^3}{12} = \frac{B \cdot H^3 - b \cdot h^3}{12} \\ &= \frac{40 \text{ mm} \cdot 120^3 \text{ mm}^3 - 30 \text{ mm} \cdot 110^3 \text{ mm}^3}{12} \\ &= 2432500 \text{ mm}^4 \approx 243 \text{ cm}^4 \end{aligned}$$

zu gering. Es muss ein größerer Querschnitt gewählt werden. Da die Querschnittshöhe mit der Hochzahl 3 in die Gleichung zur Ermittlung des Trägheitsmomentes eingeht, empfiehlt es sich, diese Abmessungen zu vergrößern.

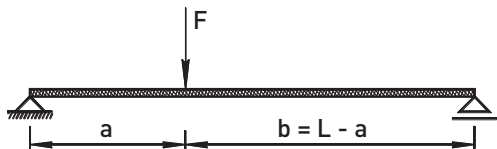
Gewählt wird nun ein Rechteckrohr 150 x 40 x 5 mm. Das Trägheitsmoment dieses Querschnittes beträgt

$$\begin{aligned} I &= \frac{B \cdot H^3 - (B - 2 \cdot t_1) \cdot (H - 2 \cdot t_2)^3}{12} = \frac{B \cdot H^3 - b \cdot h^3}{12} \\ &= \frac{40 \text{ mm} \cdot 150^3 \text{ mm}^3 - 30 \text{ mm} \cdot 140^3 \text{ mm}^3}{12} \\ &= 4390000 \text{ mm}^4 = 439 \text{ cm}^4 \end{aligned}$$

und ist somit größer als das erforderliche Trägheitsmoment $\text{erf } I$. Die Querschnittshöhe muss also um 30 mm auf 150 mm vergrößert werden, um auch die Grenzdurchbiegung einzuhalten.

Beispiel 2:

Der Querschnitt und die Stützweite sind bekannt. Es ist die maximal mögliche Belastung zu ermitteln.



System: Einfeldträger mit nichtmittiger Einzellast
 Rechteckrohr 100 x 40 x 4 mm
 $a = 1,00 \text{ m} = 1000 \text{ mm}$
 $b = 1,50 \text{ m} = 1500 \text{ mm}$

Spannungsnachweis:

Aus der Bestimmungsgleichung

$$\text{vorh } \sigma = \frac{M}{W} = \frac{F \cdot a \cdot b}{L \cdot W} \leq \text{zul } \sigma$$

ergibt sich mit $\text{zul } \sigma = 95 \text{ N/mm}^2$ und $W = 25,137 \text{ cm}^3$ unmittelbar die maximal mögliche Belastung $\text{max } F$ zu:

$$\begin{aligned} \text{max } F &\leq \frac{(a+b) \cdot W \cdot \text{zul } \sigma}{a \cdot b} \\ &= \frac{(1,50 \text{ m} + 1,00 \text{ m}) \cdot 25,137 \text{ cm}^3 \cdot 95 \text{ N/mm}^2}{1,50 \text{ m} \cdot 1,00 \text{ m}} \\ &= 3980 \text{ N} = 3,98 \text{ kN} \end{aligned}$$

Durchbiegungsnachweis:

Mit $I = 125,683 \text{ cm}^4$, $E = 70000 \text{ N/mm}^2$ und $\text{max } f = L/300$ folgt aus

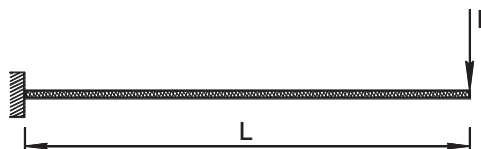
$$\begin{aligned} \text{max } f &= \frac{F \cdot b \cdot \sqrt{3 \cdot (L^2 - b^2)^3}}{27 \cdot E \cdot I \cdot L} \\ &= \frac{3,98 \text{ kN} \cdot 1,50 \text{ m} \cdot \sqrt{3 \cdot (2,50^2 \text{ m}^2 - 1,00^2 \text{ m}^2)^3}}{27 \cdot 70000 \text{ N/mm}^2 \cdot 125,683 \text{ cm}^4 \cdot 2,50 \text{ m}} \\ &\approx 14 \text{ mm} \end{aligned}$$

Die maximal zulässige Durchbiegung von $L/300 = 8,33 \text{ mm}$ ist somit überschritten. Da die Belastung in der Formel zur Ermittlung der Durchbiegung linear eingeht, reicht es aus, die sich aus dem Spannungsnachweis ergebende maximale Belastung $\text{max } F = 3,98 \text{ kN}$ im Verhältnis $8,33 \text{ mm}/14 \text{ mm}$ zu reduzieren. Es ergibt sich somit die resultierende maximale Belastung zu:

$$\begin{aligned} \text{max } F &= 3,98 \text{ kN} \cdot \frac{8,33 \text{ mm}}{14 \text{ mm}} \\ &= 2,37 \text{ kN} \end{aligned}$$

Beispiel 3:

Die Belastung und der Querschnitt sind bekannt. Es ist die maximal mögliche Stützweite zu ermitteln.



System: Kragträger mit Einzellast
 Rechteckrohr 200 x 100 x 4 mm
 $F = 2,50 \text{ kN} = 2500 \text{ N}$

Auskragende Träger sind sehr "biegeweich". Somit ist zu erwarten, dass der Durchbiegungsnachweis maßgebend wird. Aus diesem Grunde wird der Träger zuerst bezüglich der maximalen Durchbiegung bemessen und erst im nachfolgenden Schritt hinsichtlich der zulässigen Spannung nachgewiesen.

Durchbiegungsnachweis:

Mit $I = 1240,286 \text{ cm}^4$, $E = 70000 \text{ N/mm}^2$ und $\text{max } f = L/300$ ergibt sich aus

$$\text{max } f = \frac{F \cdot L^3}{3 \cdot E \cdot I} \leq \frac{L}{300}$$

unmittelbar

$$\begin{aligned} \text{max } L &\leq \sqrt{\frac{E \cdot I}{100 \cdot F}} \\ &= \sqrt{\frac{70000 \text{ N/mm}^2 \cdot 1240,286 \cdot 10^4 \text{ mm}^4}{100 \cdot 2500 \text{ N}}} \\ &= 1863 \text{ mm} \approx 1,86 \text{ m} \end{aligned}$$

Spannungsnachweis:

Aus der Bestimmungsgleichung

$$\text{vorh } \sigma = \frac{M}{W} = \frac{F \cdot L}{W}$$

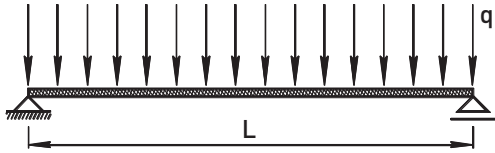
folgt mit $W = 124,03 \text{ cm}^3$

$$\begin{aligned} \text{vorh } \sigma &= \frac{2500 \text{ N} \cdot 1863 \text{ mm}}{124,03 \cdot 10^3 \text{ mm}^3} \\ &= 37,6 \text{ N/mm}^2 \end{aligned}$$

Die vorhandene Spannung ist somit kleiner als die zulässige Spannung.

Beispiel 4:

Die Belastung, die Stützweite und der Querschnitt sind bekannt. Es ist die Ausnutzung bzw. verbleibende Sicherheit zu ermitteln.



System: Einfeldträger mit Streckenlast
 Rechteckrohr 200 x 100 x 4 mm
 $L = 3,00 \text{ m} = 3000 \text{ mm}$
 $q = 10,0 \text{ kN/m} = 10,0 \text{ N/mm}$

Ermittlung der maximalen Spannung:

$$\begin{aligned} \text{vorh } \sigma &= \frac{M}{W} = \frac{q \cdot L^2}{8 \cdot W} \\ &= \frac{10,0 \text{ N/mm} \cdot 3000^2 \text{ mm}^2}{8 \cdot 124,03 \cdot 10^3 \text{ mm}^3} \\ &\approx 90,7 \text{ N/mm}^2 \end{aligned}$$

Ermittlung der maximalen Durchbiegung:

$$\begin{aligned} \max f &= \frac{5 \cdot q \cdot L^4}{384 \cdot E \cdot I} \\ &= \frac{5 \cdot 10,0 \text{ N/mm} \cdot 3000^4 \text{ mm}^4}{384 \cdot 70000 \text{ N/mm}^2 \cdot 1240,29 \cdot 10^4 \text{ mm}^4} \\ &\approx 12,1 \text{ mm} \end{aligned}$$

Bezüglich der zulässigen Spannung ist der Querschnitt zu ca. 96% - also optimal - ausgenutzt. Die maximal zulässige Durchbiegung von $L/300 = 10 \text{ mm}$ wird jedoch geringfügig überschritten. Da im Gegensatz zu den zulässigen Spannungen die maximalen Durchbiegungen jedoch nicht derart restriktiv festgelegt sind, kann diese geringfügige Überschreitung toleriert werden, sofern hierdurch die Gebrauchstauglichkeit weiterhin sichergestellt ist.

3. Biegemomente und Durchbiegungen

Tabelle 1

	$\max M = \frac{F \cdot L}{4}$
	$\max f = \frac{F \cdot L^3}{48 \cdot E \cdot I}$
	$\max M = \frac{F \cdot a \cdot b}{L}$
	$\max f = \frac{F \cdot a \cdot \sqrt{3 \cdot (L^2 - a^2)^3}}{27 \cdot E \cdot I \cdot L} \quad \text{für } a \leq b$
	$\max f = \frac{F \cdot b \cdot \sqrt{3 \cdot (L^2 - b^2)^3}}{27 \cdot E \cdot I \cdot L} \quad \text{für } a \geq b$
	$\max M = F \cdot a$
	$\max f = \frac{F \cdot L^3 \cdot a \cdot \left(3 - 4 \cdot \frac{a^2}{L^2}\right)}{24 \cdot E \cdot I}$
	$\max M = \frac{q \cdot L^2}{8}$
	$\max f = \frac{5 \cdot q \cdot L^4}{384 \cdot E \cdot I}$
	$\max M = F \cdot L$
	$\max f = \frac{F \cdot L^3}{3 \cdot E \cdot I}$
	$\max M = \frac{q \cdot L^2}{2}$
	$\max f = \frac{q \cdot L^4}{8 \cdot E \cdot I}$

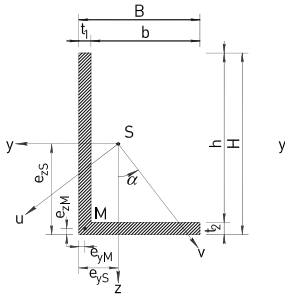


Tabelle 2-1 | Teil 1 von 3

L-Profile

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{ys} [cm]	e _{zs} [cm]	e _{ym} [cm]	e _{zm} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
10 x 10 x 2	0,360	0,097	0,322	0,322	0,100	0,100	0,031	0,098	-0,046	0,295	0,031	0,098	-0,046	0,295	-0,018	45,000	0,049	0,014	
15 x 10 x 2	0,460	0,124	0,274	0,524	0,100	0,100	0,101	0,193	-0,103	0,468	0,036	0,130	-0,049	0,278	-0,034	23,054	0,115	0,021	
15 x 15 x 2	0,560	0,151	0,448	0,448	0,100	0,100	0,116	0,259	-0,110	0,455	0,116	0,259	-0,110	0,455	-0,068	45,000	0,184	0,048	
15 x 15 x 3	0,810	0,219	0,483	0,483	0,150	0,150	0,159	0,329	-0,156	0,443	0,159	0,329	-0,156	0,443	-0,090	45,000	0,249	0,069	
20 x 10 x 2	0,560	0,151	0,243	0,743	0,100	0,100	0,226	0,305	-0,180	0,636	0,038	0,158	-0,051	0,262	-0,051	14,342	0,240	0,025	
20 x 15 x 2	0,660	0,178	0,395	0,645	0,100	0,100	0,262	0,406	-0,193	0,630	0,127	0,320	-0,115	0,438	-0,106	28,776	0,320	0,068	
20 x 15 x 2,5	0,813	0,219	0,413	0,663	0,125	0,125	0,316	0,476	-0,236	0,623	0,151	0,366	-0,139	0,432	-0,126	28,488	0,384	0,083	
20 x 15 x 3	0,960	0,259	0,431	0,681	0,150	0,150	0,365	0,536	-0,277	0,617	0,174	0,404	-0,163	0,426	-0,143	28,172	0,442	0,097	
20 x 20 x 1,5	0,578	0,156	0,556	0,556	0,075	0,075	0,224	0,403	-0,155	0,623	0,224	0,403	-0,155	0,623	-0,133	45,000	0,357	0,091	
20 x 20 x 2	0,760	0,205	0,574	0,574	0,100	0,100	0,288	0,502	-0,202	0,616	0,288	0,502	-0,202	0,616	-0,171	45,000	0,459	0,117	
20 x 20 x 3	1,110	0,300	0,609	0,609	0,150	0,150	0,403	0,661	-0,290	0,603	0,403	0,661	-0,290	0,603	-0,234	45,000	0,637	0,169	
20 x 20 x 4	1,440	0,389	0,644	0,644	0,200	0,200	0,503	0,780	-0,371	0,591	0,503	0,780	-0,371	0,591	-0,284	45,000	0,787	0,218	
25 x 10 x 2	0,660	0,178	0,221	0,971	0,100	0,100	0,421	0,434	-0,276	0,799	0,041	0,183	-0,052	0,248	-0,070	10,054	0,434	0,028	
25 x 15 x 2	0,760	0,205	0,357	0,857	0,100	0,100	0,488	0,569	-0,297	0,801	0,135	0,377	-0,118	0,421	-0,148	19,946	0,541	0,081	
25 x 15 x 2,5	0,938	0,253	0,375	0,875	0,125	0,125	0,591	0,675	-0,364	0,794	0,161	0,430	-0,143	0,415	-0,176	19,645	0,654	0,098	
25 x 15 x 3	1,110	0,300	0,393	0,893	0,150	0,150	0,688	0,770	-0,428	0,787	0,186	0,472	-0,168	0,409	-0,201	19,321	0,758	0,115	
25 x 20 x 2	0,860	0,232	0,519	0,769	0,100	0,100	0,538	0,701	-0,311	0,791	0,308	0,594	-0,208	0,599	-0,241	32,219	0,690	0,156	
25 x 20 x 3	1,260	0,340	0,555	0,805	0,150	0,150	0,762	0,947	-0,449	0,778	0,432	0,779	-0,299	0,586	-0,334	31,861	0,969	0,224	
25 x 25 x 2	0,960	0,259	0,699	0,699	0,100	0,100	0,579	0,828	-0,321	0,776	0,579	0,828	-0,321	0,776	-0,344	45,000	0,923	0,234	
25 x 25 x 3	1,410	0,381	0,735	0,735	0,150	0,150	0,820	1,116	-0,465	0,763	0,820	1,116	-0,465	0,763	-0,483	45,000	1,303	0,338	
25 x 25 x 4	1,840	0,497	0,771	0,771	0,200	0,200	1,035	1,343	-0,599	0,750	1,035	1,343	-0,599	0,750	-0,599	45,000	1,635	0,436	
30 x 10 x 2	0,760	0,205	0,205	1,205	0,100	0,100	0,698	0,579	-0,389	0,958	0,042	0,205	-0,053	0,235	-0,088	7,543	0,710	0,030	
30 x 15 x 2	0,860	0,232	0,327	1,077	0,100	0,100	0,806	0,749	-0,419	0,968	0,141	0,430	-0,120	0,404	-0,190	14,889	0,857	0,090	
30 x 15 x 3	1,260	0,340	0,364	1,114	0,150	0,150	1,146	1,029	-0,608	0,954	0,195	0,534	-0,171	0,393	-0,260	14,342	1,213	0,128	
30 x 20 x 2	0,960	0,259	0,475	0,975	0,100	0,100	0,892	0,915	-0,441	0,964	0,324	0,683	-0,213	0,581	-0,315	23,981	1,032	0,184	
30 x 20 x 2,5	1,188	0,321	0,493	0,993	0,125	0,125	1,087	1,094	-0,542	0,957	0,392	0,794	-0,260	0,574	-0,380	23,770	1,255	0,225	
30 x 20 x 3	1,410	0,381	0,512	1,012	0,150	0,150	1,272	1,257	-0,640	0,950	0,455	0,889	-0,306	0,568	-0,439	23,546	1,464	0,264	
30 x 20 x 4	1,840	0,497	0,548	1,048	0,200	0,200	1,614	1,540	-0,827	0,937	0,570	1,040	-0,392	0,557	-0,543	23,054	1,845	0,339	
30 x 25 x 2	1,060	0,286	0,642	0,892	0,100	0,100	0,962	1,078	-0,456	0,953	0,612	0,952	-0,329	0,760	-0,456	34,488	1,275	0,299	
30 x 25 x 3	1,560	0,421	0,679	0,929	0,150	0,150	1,374	1,479	-0,663	0,938	0,868	1,278	-0,477	0,746	-0,643	34,254	1,811	0,430	
30 x 30 x 2	1,160	0,313	0,824	0,824	0,100	0,100	1,020	1,237	-0,469	0,938	1,020	1,237	-0,469	0,938	-0,608	45,000	1,628	0,411	
30 x 30 x 3	1,710	0,462	0,861	0,861	0,150	0,150	1,458	1,694	-0,681	0,923	1,458	1,694	-0,681	0,923	-0,863	45,000	2,321	0,595	
30 x 30 x 4	2,240	0,605	0,896	0,896	0,200	0,200	1,855	2,070	-0,882	0,910	1,855	2,070	-0,882	0,910	-1,086	45,000	2,942	0,769	
30 x 30 x 5	2,750	0,743	0,932	0,932	0,250	0,250	2,216	2,379	-1,072	0,898	2,216	2,379	-1,072	0,898	-1,278	45,000	3,495	0,938	
35 x 20 x 2	1,060	0,286	0,440	1,190	0,100	0,100	1,363	1,146	-0,590	1,134	0,337	0,767	-0,216	0,564	-0,392	18,705	1,496	0,204	
35 x 20 x 3	1,560	0,421	0,477	1,227	0,150	0,150	1,954	1,593	-0,860	1,119	0,474	0,994	-0,311	0,551	-0,549	18,287	2,136	0,292	
35 x 25 x 3	1,710	0,462	0,632	1,132	0,150	0,150	2,114	1,867	-0,893	1,112	0,907	1,435	-0,486	0,728	-0,811	26,665	2,521	0,500	
35 x 35 x 2	1,360	0,367	0,949	0,949	0,100	0,100	1,642	1,729	-0,644	1,099	1,642	1,729	-0,644	1,099	-0,981	45,000	2,623	0,661	
35 x 35 x 3	2,010	0,543	0,986	0,986	0,150	0,150	2,363	2,397	-0,940	1,084	2,363	2,397	-0,940	1,084	-1,404	45,000	3,767	0,959	
35 x 35 x 4	2,640	0,713	1,022	1,022	0,200	0,200	3,026	2,960	-1,221	1,071	3,026	2,960	-1,221	1,071	-1,784	45,000	4,809	1,242	
35 x 35 x 5	3,250	0,878	1,058	1,058	0,250	0,250	3,635	3,437	-1,488	1,058	3,635	3,437	-1,488	1,058	-2,120	45,000	5,755	1,515	
40 x 10 x 2	0,960	0,259	0,183	1,683	0,100	0,100	1,549	0,920	-0,668	1,270	0,045	0,243	-0,055	0,215	-0,127	4,781	1,559	0,034	
40 x 15 x 2	1,060	0,286	0,284	1,534	0,100	0,100	1,776	1,158	-0,720	1,294	0,150	0,527	-0,123	0,376	-0,280	9,489	1,823	0,103	
40 x 20 x 2	1,160	0,313	0,410	1,410	0,100	0,100	1,964	1,393	-0,758	1,301	0,348	0,848	-0,219	0,548	-0,472	15,139	2,092	0,221	
40 x 20 x 2,5	1,438	0,388	0,429	1,429	0,125	0,125	2,406	1,683	-0,936	1,294	0,421	0,981	-0,268	0,541	-0,571	14,953	2,558	0,269	
40 x 20 x 3	1,710	0,462	0,448	1,448	0,150	0,150	2,829	1,953	-1,109	1,286	0,490	1,093	-0,316	0,535	-0,662	14,758	3,003	0,315	
40 x 20 x 4	2,240	0,605	0,486	1,486	0,200	0,200	3,623	2,439	-1,441	1,272	0,615	1,266	-0,406	0,524	-0,823	14,342	3,833	0,405	
40 x 25 x 2	1,260	0,340	0,556	1,306	0,100	0,100	2,123	1,625	-0,788	1,298	0,662	1,190	-0,340	0,725	-0,694	21,761	2,399	0,385	
40 x 25 x 3	1,860	0,502	0,594	1,344	0,150	0,150	3,062	2,279	-1,153	1,283	0,941	1,585	-0,493	0,711	-0,985	21,433	3,449	0,554	
40 x 25 x 4	2,440	0,659	0,630	1,380	0,200	0,200	3,929	2,847	-1,500	1,269	1,191	1,889	-0,637	0,699	-1,239	21,075	4,407	0,713	
40 x 30 x 2	1,360	0,367	0,718	1,218	0,100	0,100	2,258	1,854	-0,811	1,288	1,110	1,546	-0,486	0,903	-0,939	29,279	2,784	0,583	
40 x 30 x 3	2,010	0,543	0,754	1,254	0,150	0,150	3,261	2,600	-1,188	1,274	1,589	2,106	-0,708	0,889	-1,342	29,039	4,006	0,844	
40 x 30 x 4	2,640	0,713	0,791	1,291	0,200	0,200	4,189	3,245	-1,546	1,260	2,025	2,561	-0,917	0,876	-1,702	28,776	5,124	1,091	
40 x 40 x 2	1,560	0,421	1,074	1,074	0,100	0,100	2,476	2,305	-0,846	1,260	2,476	2,305	-0,846	1,260	-1,481	45,000	3,957	0,995	
40 x 40 x 3	2,310	0,624	1,111	1,111	0,150	0,150	3,582	3,224	-1,240	1,245	3,582	3,224	-1,240	1,245	-2,134	45,000	5,715	1,448	
40 x 40 x 4	3,040	0,821	1,147	1,147	0,200	0,200	4,608	4,016	-1,615	1,231	4,608	4,016	-1,615	1,231	-2,728	45,000	7,337	1,880	
40 x 40 x 5	3,750	1,013	1,183	1,183	0,250	0,250	5,561	4,700	-1,974	1,218	5,561	4,700	-1,974	1,218	-3,267	45,000	8,828	2,295	
45 x 10 x 2	1,060	0,286	0,175	1,925	0,100	0,100	2,147	1,115	-0,834	1,423	0,045	0,259	-0,055	0,207	-0,146	3,956	2,157	0,035	

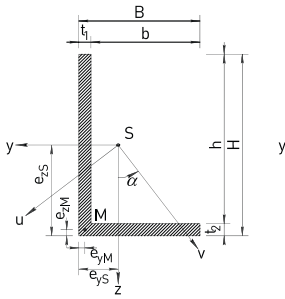


Tabelle 2-1 | Teil 2 von 3

L-Profile

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
45 x 30 x 3	2,160	0,583	0,713	1,463	0,150	0,150	4,517	3,088	-1,487	1,446	1,641	2,304	-0,717	0,872	-1,595	23,981	5,226	0,932	
45 x 45 x 2	1,760	0,475	1,199	1,199	0,100	0,100	3,554	2,963	-1,077	1,421	3,554	2,963	-1,077	1,421	-2,127	45,000	5,682	1,427	
45 x 45 x 4	3,440	0,929	1,273	1,273	0,200	0,200	6,666	5,238	-2,065	1,392	6,666	5,238	-2,065	1,392	-3,958	45,000	10,624	2,708	
45 x 45 x 5	4,250	1,148	1,309	1,309	0,250	0,250	8,074	6,169	-2,530	1,378	8,074	6,169	-2,530	1,378	-4,765	45,000	12,839	3,309	
50 x 15 x 2	1,260	0,340	0,255	2,005	0,100	0,100	3,273	1,632	-1,093	1,612	0,156	0,612	-0,125	0,352	-0,371	6,703	3,316	0,112	
50 x 15 x 3	1,860	0,502	0,295	2,045	0,150	0,150	4,731	2,313	-1,601	1,595	0,218	0,738	-0,181	0,342	-0,512	6,388	4,788	0,160	
50 x 20 x 2	1,360	0,367	0,365	1,865	0,100	0,100	3,609	1,936	-1,151	1,629	0,365	1,001	-0,223	0,518	-0,635	10,694	3,729	0,245	
50 x 20 x 2,5	1,688	0,456	0,384	1,884	0,125	0,125	4,434	2,353	-1,423	1,621	0,442	1,151	-0,274	0,512	-0,770	10,543	4,578	0,299	
50 x 20 x 3	2,010	0,543	0,404	1,904	0,150	0,150	5,231	2,748	-1,689	1,613	0,515	1,275	-0,322	0,506	-0,894	10,386	5,395	0,351	
50 x 25 x 2	1,460	0,394	0,494	1,744	0,100	0,100	3,900	2,236	-1,198	1,634	0,698	1,414	-0,348	0,692	-0,945	15,281	4,158	0,440	
50 x 25 x 2,5	1,813	0,489	0,513	1,763	0,125	0,125	4,795	2,720	-1,481	1,627	0,850	1,657	-0,428	0,685	-1,152	15,139	5,107	0,538	
50 x 25 x 3	2,160	0,583	0,532	1,782	0,150	0,150	5,661	3,177	-1,759	1,619	0,994	1,868	-0,505	0,678	-1,346	14,990	6,022	0,633	
50 x 25 x 4	2,840	0,767	0,570	1,820	0,200	0,200	7,307	4,016	-2,298	1,604	1,260	2,211	-0,653	0,666	-1,701	14,678	7,753	0,814	
50 x 30 x 2	1,560	0,421	0,638	1,638	0,100	0,100	4,153	2,535	-1,235	1,632	1,177	1,843	-0,498	0,869	-1,292	20,487	4,636	0,694	
50 x 30 x 3	2,310	0,624	0,676	1,676	0,150	0,150	6,036	3,601	-1,816	1,616	1,687	2,495	-0,726	0,855	-1,854	20,226	6,719	1,004	
50 x 30 x 4	3,040	0,821	0,713	1,713	0,200	0,200	7,800	4,553	-2,373	1,602	2,152	3,018	-0,941	0,841	-2,361	19,946	8,657	1,295	
50 x 30 x 5	3,750	1,013	0,750	1,750	0,250	0,250	9,453	5,402	-2,909	1,588	2,578	3,438	-1,146	0,829	-2,813	19,645	10,457	1,574	
50 x 40 x 2	1,760	0,475	0,964	1,464	0,100	0,100	4,573	3,125	-1,293	1,612	2,645	2,745	-0,871	1,226	-2,073	32,529	5,895	1,323	
50 x 40 x 3	2,610	0,705	1,001	1,501	0,150	0,150	6,656	4,436	-1,902	1,597	3,829	3,827	-1,277	1,211	-2,998	32,380	8,558	1,928	
50 x 40 x 4	3,440	0,929	1,037	1,537	0,200	0,200	8,615	5,604	-2,488	1,582	4,931	4,754	-1,664	1,197	-3,851	32,219	11,042	2,504	
50 x 40 x 5	4,250	1,148	1,074	1,574	0,250	0,250	10,456	6,645	-3,052	1,569	5,956	5,548	-2,035	1,184	-4,632	32,047	13,356	3,056	
50 x 50 x 2	1,960	0,529	1,324	1,324	0,100	0,100	4,908	3,705	-1,335	1,582	4,908	3,705	-1,335	1,582	-2,939	45,000	7,847	1,969	
50 x 50 x 3	2,910	0,786	1,361	1,361	0,150	0,150	7,149	5,252	-1,965	1,567	7,149	5,252	-1,965	1,567	-4,270	45,000	11,419	2,879	
50 x 50 x 4	3,840	1,037	1,398	1,398	0,200	0,200	9,261	6,625	-2,571	1,553	9,261	6,625	-2,571	1,553	-5,510	45,000	14,771	3,750	
50 x 50 x 5	4,750	1,283	1,434	1,434	0,250	0,250	11,250	7,844	-3,155	1,539	11,250	7,844	-3,155	1,539	-6,661	45,000	17,911	4,589	
50 x 50 x 6	5,640	1,523	1,470	1,470	0,300	0,300	13,126	8,928	-3,719	1,526	13,126	8,928	-3,719	1,526	-7,723	45,000	20,849	5,402	
50 x 50 x 8	7,360	1,987	1,541	1,541	0,400	0,400	16,566	10,748	-4,790	1,500	16,566	10,748	-4,790	1,500	-9,587	45,000	26,153	6,979	
50 x 50 x 10	9,000	2,430	1,611	1,611	0,500	0,500	19,639	12,190	-5,795	1,477	19,639	12,190	-5,795	1,477	-11,111	45,000	30,750	8,528	
60 x 15 x 2	1,460	0,394	0,234	2,484	0,100	0,100	5,398	2,174	-1,535	1,923	0,161	0,689	-0,127	0,332	-0,465	5,032	5,439	0,120	
60 x 20 x 2	1,560	0,421	0,331	2,331	0,100	0,100	5,930	2,544	-1,616	1,950	0,378	1,143	-0,227	0,492	-0,803	8,067	6,044	0,264	
60 x 20 x 2,5	1,938	0,523	0,351	2,351	0,125	0,125	7,302	3,106	-2,001	1,941	0,458	1,306	-0,278	0,486	-0,974	7,943	7,438	0,322	
60 x 20 x 3	2,310	0,624	0,371	2,371	0,150	0,150	8,632	3,641	-2,378	1,933	0,534	1,439	-0,328	0,481	-1,133	7,814	8,787	0,378	
60 x 25 x 2,5	2,063	0,557	0,466	2,216	0,125	0,125	7,884	3,558	-2,084	1,955	0,884	1,898	-0,435	0,655	-1,470	11,392	8,181	0,588	
60 x 25 x 3	2,460	0,664	0,485	2,235	0,150	0,150	9,328	4,173	-2,478	1,947	1,034	2,131	-0,513	0,648	-1,720	11,267	9,670	0,692	
60 x 30 x 2	1,760	0,475	0,577	2,077	0,100	0,100	6,813	3,280	-1,737	1,967	1,229	2,129	-0,507	0,836	-1,661	15,374	7,270	0,772	
60 x 30 x 3	2,610	0,705	0,616	2,116	0,150	0,150	9,943	4,700	-2,560	1,952	1,762	2,863	-0,739	0,822	-2,388	15,139	10,590	1,116	
60 x 30 x 4	3,440	0,929	0,653	2,153	0,200	0,200	12,902	5,991	-3,354	1,937	2,250	3,444	-0,959	0,809	-3,047	14,889	13,713	1,440	
60 x 30 x 5	4,250	1,148	0,691	2,191	0,250	0,250	15,699	7,165	-4,122	1,922	2,699	3,905	-1,169	0,797	-3,640	14,623	16,648	1,749	
60 x 40 x 2	1,960	0,529	0,876	1,876	0,100	0,100	7,516	4,007	-1,822	1,958	2,780	3,175	-0,890	1,191	-2,699	24,368	8,738	1,557	
60 x 40 x 3	2,910	0,786	0,913	1,913	0,150	0,150	10,985	5,743	-2,688	1,943	4,026	4,410	-1,304	1,176	-3,914	24,180	12,742	2,269	
60 x 40 x 4	3,840	1,037	0,950	1,950	0,200	0,200	14,275	7,321	-3,525	1,928	5,187	5,460	-1,701	1,162	-5,040	23,981	16,517	2,945	
60 x 40 x 5	4,750	1,283	0,987	1,987	0,250	0,250	17,395	8,755	-4,334	1,914	6,270	6,354	-2,081	1,149	-6,079	23,770	20,072	3,593	
60 x 40 x 6	5,640	1,523	1,023	2,023	0,300	0,300	20,354	10,059	-5,118	1,900	7,282	7,115	-2,446	1,136	-7,031	23,546	23,418	4,218	
60 x 60 x 2	2,360	0,637	1,575	1,575	0,100	0,100	8,564	5,439	-1,935	1,905	8,564	5,439	-1,935	1,905	-5,132	45,000	13,696	3,433	
60 x 60 x 2,5	2,938	0,793	1,593	1,593	0,125	0,125	10,575	6,638	-2,400	1,897	10,575	6,638	-2,400	1,897	-6,331	45,000	16,906	4,244	
60 x 60 x 3	3,510	0,948	1,612	1,612	0,150	0,150	12,536	7,779	-2,856	1,890	12,536	7,779	-2,856	1,890	-7,498	45,000	20,033	5,038	
60 x 60 x 4	4,640	1,253	1,648	1,648	0,200	0,200	16,313	9,897	-3,749	1,875	16,313	9,897	-3,749	1,875	-9,732	45,000	26,046	6,581	
60 x 60 x 5	5,750	1,553	1,685	1,685	0,250	0,250	19,908	11,816	-4,613	1,861	19,908	11,816	-4,613	1,861	-11,837	45,000	31,745	8,071	
60 x 60 x 6	6,840	1,847	1,721	1,721	0,300	0,300	23,329	13,555	-5,452	1,847	23,329	13,555	-5,452	1,847	-13,813	45,000	37,141	9,516	
60 x 60 x 8	8,960	2,419	1,793	1,793	0,400	0,400	29,687	16,558	-7,056	1,820	29,687	16,558	-7,056	1,820	-17,383	45,000	47,070	12,304	
60 x 60 x 10	11,000	2,970	1,864	1,864	0,500	0,500	35,462	19,028	-8,573	1,796	35,462	19,028	-8,573	1,796	-20,455	45,000	55,917	15,008	
70 x 15 x 2	1,660	0,448	0,217	2,967	0,100	0,100	8,252	2,781	-2,046	2,230	0,165	0,757	-0,128	0,315	-0,559	3,936	8,291	0,126	
70 x 20 x 2	1,760	0,475	0,305	2,805	0,100	0,100	9,028	3,219	-2,152	2,265	0,388	1,275	-0,229	0,470	-0,974	6,351	9,137	0,280	
70 x 25 x 2,5	2,313	0,624	0,429	2,679	0,125	0,125	11,997	4,478	-2,777	2,278	0,912	2,125	-0,440	0,628	-1,796	8,976	12,281	0,628	
70 x 30 x 2	1,960	0,529	0,529	2,529	0,100	0,100	10,343	4,090	-2,313	2,297	1,271	2,404	-0,514	0,805	-2,070	12,108	10,780	0,833	
70 x 30 x 3	2,910	0,786	0,568	2,568	0,150	0,150	15,141	5,897	-3,416	2,281	1,823	3,212	-0,749	0,791	-2,937	11,901	15,760	1,204	
70 x 70 x 2,5	3,438	0,928	1,843	1,843	0,125	0,125	16,940	9,191	-3,285	2,220	16,940	9,191	-3,285	2,220	-10,148	45,000	27,088	6,792	
70 x 70 x 5	6,750	1,823	1,935	1,935	0,250	0,250	32,159	16,618	-6,350	2,183	32,159</								

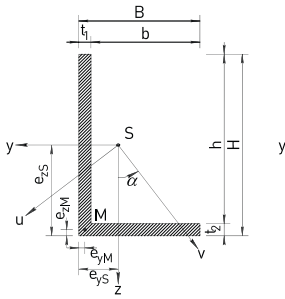


Tabelle 2-1 | Teil 3 von 3

L-Profile

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z								Hauptträgheitsmomente			
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]
80 x 15 x 2	1,860	0,502	0,205	3,455	0,100	0,100	11,936	3,455	-2,626	2,533	0,168	0,819	-0,130	0,300	-0,654	3,172	11,972	0,132
80 x 20 x 2	1,960	0,529	0,284	3,284	0,100	0,100	13,004	3,960	-2,757	2,576	0,396	1,397	-0,231	0,450	-1,146	5,152	13,108	0,293
80 x 25 x 2	2,060	0,556	0,379	3,129	0,100	0,100	13,969	4,464	-2,868	2,604	0,766	2,021	-0,361	0,610	-1,742	7,390	14,195	0,540
80 x 25 x 2,5	2,563	0,692	0,399	3,149	0,125	0,125	17,262	5,481	-3,559	2,595	0,934	2,338	-0,444	0,604	-2,127	7,300	17,534	0,661
80 x 30 x 3	3,210	0,867	0,529	3,029	0,150	0,150	21,783	7,193	-4,382	2,605	1,873	3,543	-0,758	0,764	-3,497	9,679	22,379	1,276
80 x 40 x 2	2,360	0,637	0,744	2,744	0,100	0,100	16,373	5,967	-3,115	2,634	2,981	4,006	-0,916	1,124	-4,019	15,486	17,486	1,867
80 x 40 x 3	3,510	0,948	0,782	2,782	0,150	0,150	24,058	8,646	-4,611	2,618	4,320	5,521	-1,343	1,109	-5,844	15,316	25,659	2,720
80 x 40 x 4	4,640	1,253	0,821	2,821	0,200	0,200	31,426	11,141	-6,068	2,602	5,570	6,787	-1,752	1,096	-7,548	15,139	33,468	3,528
80 x 40 x 5	5,750	1,553	0,859	2,859	0,250	0,250	38,489	13,464	-7,486	2,587	6,739	7,848	-2,145	1,083	-9,130	14,953	40,928	4,301
80 x 40 x 6	6,840	1,847	0,896	2,896	0,300	0,300	45,260	15,626	-8,868	2,572	7,836	8,740	-2,525	1,070	-10,594	14,758	48,050	5,045
80 x 50 x 5	6,250	1,688	1,150	2,650	0,250	0,250	41,630	15,710	-7,781	2,581	12,880	11,200	-3,346	1,436	-13,500	21,601	46,976	7,535
80 x 50 x 6	7,440	2,009	1,187	2,687	0,300	0,300	48,996	18,234	-9,222	2,566	15,048	12,677	-3,947	1,422	-15,755	21,433	55,181	8,864
80 x 60 x 4	5,440	1,469	1,435	2,435	0,200	0,200	36,123	14,833	-6,492	2,577	17,755	12,371	-3,890	1,807	-15,021	29,279	44,546	9,333
80 x 60 x 6	8,040	2,171	1,509	2,509	0,300	0,300	52,178	20,797	-9,502	2,548	25,426	16,850	-5,662	1,778	-21,471	29,039	64,099	13,505
80 x 80 x 3	4,710	1,272	2,112	2,112	0,150	0,150	30,264	14,331	-5,140	2,535	30,264	14,331	-5,140	2,535	-18,127	45,000	48,391	12,138
80 x 80 x 4	6,240	1,685	2,149	2,149	0,200	0,200	39,619	18,438	-6,771	2,520	39,619	18,438	-6,771	2,520	-23,696	45,000	63,315	15,922
80 x 80 x 5	7,750	2,093	2,185	2,185	0,250	0,250	48,629	22,251	-8,363	2,505	48,629	22,251	-8,363	2,505	-29,032	45,000	77,661	19,597
80 x 80 x 6	9,240	2,495	2,222	2,222	0,300	0,300	57,309	25,791	-9,919	2,490	57,309	25,791	-9,919	2,490	-34,136	45,000	91,445	23,173
80 x 80 x 8	12,160	3,283	2,295	2,295	0,400	0,400	73,730	32,130	-12,923	2,462	73,730	32,130	-12,923	2,462	-43,655	45,000	117,385	30,075
80 x 80 x 10	15,000	4,050	2,367	2,367	0,500	0,500	88,983	37,599	-15,796	2,436	88,983	37,599	-15,796	2,436	-52,267	45,000	141,250	36,717
100 x 20 x 2	2,360	0,637	0,253	4,253	0,100	0,100	23,993	5,642	-4,175	3,188	0,409	1,619	-0,234	0,416	-1,495	3,613	24,087	0,315
100 x 30 x 3	3,810	1,029	0,469	3,969	0,150	0,150	40,009	10,081	-6,634	3,241	1,950	4,158	-0,770	0,715	-4,640	6,852	40,566	1,392
100 x 40 x 3	4,110	1,110	0,690	3,690	0,150	0,150	44,067	11,942	-6,984	3,274	4,530	6,563	-1,369	1,050	-7,859	10,840	45,572	3,025
100 x 40 x 4	5,440	1,469	0,729	3,729	0,200	0,200	57,748	15,484	-9,209	3,258	5,844	8,012	-1,787	1,036	-10,165	10,694	59,667	3,924
100 x 50 x 3	4,410	1,191	0,949	3,449	0,150	0,150	47,573	13,792	-7,262	3,284	8,613	9,073	-2,126	1,398	-11,630	15,419	50,781	5,405
100 x 50 x 4	5,840	1,577	0,988	3,488	0,200	0,200	62,395	17,890	-9,581	3,269	11,175	11,314	-2,785	1,383	-15,123	15,281	66,527	7,043
100 x 50 x 5	7,250	1,958	1,026	3,526	0,250	0,250	76,724	21,760	-11,851	3,253	13,599	13,256	-3,422	1,370	-18,427	15,139	81,710	8,614
100 x 50 x 6	8,640	2,333	1,064	3,564	0,300	0,300	90,578	25,415	-14,073	3,238	15,898	14,943	-4,039	1,356	-21,542	14,990	96,346	10,129
100 x 50 x 8	11,360	3,067	1,139	3,639	0,400	0,400	116,915	32,124	-18,381	3,208	20,155	17,688	-5,221	1,332	-27,211	14,678	124,042	13,027
100 x 50 x 10	14,000	3,780	1,214	3,714	0,500	0,500	141,524	38,103	-22,515	3,179	24,024	19,784	-6,346	1,310	-32,143	14,342	149,742	15,806
100 x 60 x 6	9,240	2,495	1,352	3,352	0,300	0,300	96,572	28,811	-14,526	3,233	26,988	19,963	-5,806	1,709	-29,665	20,226	107,502	16,058
100 x 100 x 4	7,840	2,117	2,649	2,649	0,200	0,200	78,524	29,643	-10,682	3,165	78,524	29,643	-10,682	3,165	-47,020	45,000	125,545	31,504
100 x 100 x 6	11,640	3,143	2,723	2,723	0,300	0,300	114,390	42,014	-15,719	3,135	114,390	42,014	-15,719	3,135	-68,320	45,000	182,709	46,070
100 x 100 x 8	15,360	4,147	2,796	2,796	0,400	0,400	148,173	52,998	-20,568	3,106	148,173	52,998	-20,568	3,106	-88,167	45,000	236,339	60,006
100 x 100 x 9	17,190	4,641	2,832	2,832	0,450	0,450	164,324	58,020	-22,925	3,092	164,324	58,020	-22,925	3,092	-97,551	45,000	261,875	66,773
100 x 100 x 10	19,000	5,130	2,868	2,868	0,500	0,500	180,004	62,754	-25,240	3,078	180,004	62,754	-25,240	3,078	-106,579	45,000	286,583	73,425
110 x 30 x 2	2,760	0,745	0,404	4,404	0,100	0,100	35,202	7,992	-5,337	3,571	1,378	3,407	-0,531	0,706	-3,616	6,034	35,584	0,995
120 x 20 x 2	2,760	0,745	0,230	5,230	0,100	0,100	39,698	7,590	-5,864	3,793	0,418	1,815	-0,236	0,389	-1,847	2,686	39,785	0,332
120 x 40 x 4	6,240	1,685	0,662	4,662	0,200	0,200	94,882	20,354	-12,929	3,899	6,050	9,145	-1,812	0,985	-12,849	8,067	96,703	4,229
120 x 50 x 5	8,250	2,228	0,932	4,432	0,250	0,250	126,149	28,464	-16,668	3,910	14,149	15,184	-3,478	1,310	-23,523	11,392	130,889	9,409
120 x 60 x 6	10,440	2,819	1,231	4,231	0,300	0,300	159,096	37,602	-20,478	3,904	28,200	22,907	-5,913	1,644	-38,210	15,139	169,433	17,862
120 x 60 x 8	13,760	3,715	1,307	4,307	0,400	0,400	206,439	47,931	-26,835	3,873	36,007	27,550	-7,672	1,618	-48,759	14,889	219,402	23,043
120 x 80 x 10	19,000	5,130	1,974	3,974	0,500	0,500	278,320	70,041	-34,676	3,827	100,320	50,829	-16,647	2,298	-97,263	23,770	321,158	57,483
120 x 120 x 8	18,560	5,011	3,297	3,297	0,400	0,400	261,015	79,178	-29,990	3,750	261,015	79,178	-29,990	3,750	-155,719	45,000	416,734	105,297
120 x 120 x 10	23,000	6,210	3,370	3,370	0,500	0,500	318,525	94,530	-36,907	3,721	318,525	94,530	-36,907	3,721	-189,391	45,000	507,917	129,134
130 x 30 x 3	4,710	1,272	0,408	5,408	0,150	0,150	81,975	15,158	-10,798	4,172	2,030	4,977	-0,783	0,657	-6,388	4,540	82,483	1,523
140 x 40 x 3	5,310	1,434	0,568	5,568	0,150	0,150	109,805	19,720	-13,022	4,547	4,810	8,467	-1,401	0,952	-12,028	6,452	111,165	3,449
150 x 50 x 4	7,840	2,117	0,787	5,787	0,200	0,200	187,566	32,413	-20,358	4,891	12,126	15,413	-2,878	1,244	-25,699	8,164	191,253	8,439
150 x 75 x 8	17,360	4,687	1,558	5,308	0,400	0,400	412,058	77,632	-42,515	4,872	72,793	46,727	-12,250	2,048	-98,647	15,090	438,657	46,195
150 x 75 x 10	21,500	5,805	1,634	5,384	0,500	0,500	504,001	93,616	-52,411	4,842	87,907	53,808	-14,985	2,022	-119,041	14,889	535,650	56,258
150 x 100 x 5	12,250	3,308	2,189	4,689	0,250	0,250	293,584	62,614	-28,472	4,896	108,584	49,610	-13,901	2,977	-105,421	24,368	341,333	60,835
150 x 100 x 10	24,000	6,480	2,375	4,875	0,500	0,500	557,625	114,385	-55,074	4,820	202,625	85,316	-26,574	2,906	-196,875	23,981	645,202	115,048
180 x 150 x 6	19,440	5,249	3,633	5,133	0,300	0,300	655,171	127,631	-50,920	5,805	419,623	115,493	-36,917	4,646	-313,200	34,696	872,009	202,786
200 x 100 x 10	29,000	7,830	2,052	7,052	0,500	0,500	1227,589	174,084	-94,807	6,506	217,589	106,052	-27,376	2,739	-294,828	15,139	1307,353	137,826

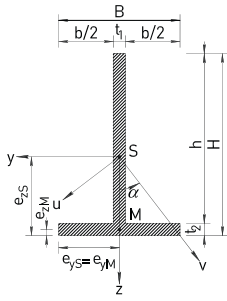


Tabelle 2-2 | Teil 1 von 1
T-Profile

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
15 x 15 x 1,5	0,428	0,115	0,750	0,430	0,750	0,075	0,091	0,212	-0,085	0,462	0,043	0,057	-0,057	0,316	0,000	0,000	0,091	0,043	
15 x 15 x 2	0,560	0,151	0,750	0,448	0,750	0,100	0,116	0,259	-0,110	0,455	0,057	0,076	-0,076	0,320	0,000	0,000	0,116	0,057	
15 x 30 x 3	1,260	0,340	1,500	0,364	1,500	0,150	0,195	0,534	-0,171	0,393	0,678	0,452	-0,452	0,734	0,000	0,000	0,195	0,678	
20 x 20 x 1,5	0,578	0,156	1,000	0,556	1,000	0,075	0,224	0,403	-0,155	0,623	0,101	0,101	-0,101	0,417	0,000	0,000	0,224	0,101	
20 x 20 x 2	0,760	0,205	1,000	0,574	1,000	0,100	0,288	0,502	-0,202	0,616	0,135	0,135	-0,135	0,421	0,000	0,000	0,288	0,135	
20 x 20 x 3	1,110	0,300	1,000	0,609	1,000	0,150	0,403	0,661	-0,290	0,603	0,205	0,205	-0,205	0,429	0,000	0,000	0,403	0,205	
20 x 20 x 6	2,040	0,551	1,000	0,712	1,000	0,300	0,667	0,938	-0,518	0,572	0,436	0,436	-0,436	0,462	0,000	0,000	0,667	0,436	
20 x 30 x 3	1,410	0,381	1,500	0,512	1,500	0,150	0,455	0,889	-0,306	0,568	0,680	0,453	-0,453	0,694	0,000	0,000	0,455	0,680	
20 x 40 x 2	1,160	0,313	2,000	0,410	2,000	0,100	0,348	0,848	-0,219	0,548	1,068	0,534	-0,534	0,960	0,000	0,000	0,348	1,068	
25 x 25 x 2	0,960	0,259	1,250	0,699	1,250	0,100	0,579	0,828	-0,321	0,776	0,262	0,210	-0,210	0,522	0,000	0,000	0,579	0,262	
25 x 25 x 3	1,410	0,381	1,250	0,735	1,250	0,150	0,820	1,116	-0,465	0,763	0,396	0,317	-0,317	0,530	0,000	0,000	0,820	0,396	
25 x 40 x 2	1,260	0,340	2,000	0,556	2,000	0,100	0,662	1,190	-0,340	0,725	1,068	0,534	-0,534	0,921	0,000	0,000	0,662	1,068	
25 x 40 x 4	2,440	0,659	2,000	0,630	2,000	0,200	1,191	1,889	-0,637	0,699	2,147	1,073	-1,073	0,938	0,000	0,000	1,191	2,147	
30 x 20 x 3	1,410	0,381	1,000	1,012	1,000	0,150	1,272	1,257	-0,640	0,950	0,207	0,207	-0,207	0,383	0,000	0,000	1,272	0,207	
30 x 30 x 2	1,160	0,313	1,500	0,824	1,500	0,100	1,020	1,237	-0,469	0,938	0,452	0,301	-0,301	0,624	0,000	0,000	1,020	0,452	
30 x 30 x 3	1,710	0,462	1,500	0,861	1,500	0,150	1,458	1,694	-0,681	0,923	0,682	0,455	-0,455	0,631	0,000	0,000	1,458	0,682	
30 x 40 x 3	2,010	0,543	2,000	0,754	2,000	0,150	1,589	2,106	-0,708	0,889	1,607	0,803	-0,803	0,894	0,000	0,000	1,589	1,607	
30 x 40 x 4	2,640	0,713	2,000	0,791	2,000	0,200	2,025	2,561	-0,917	0,876	2,149	1,075	-1,075	0,902	0,000	0,000	2,025	2,149	
35 x 35 x 3	2,010	0,543	1,750	0,986	1,750	0,150	2,363	2,397	-0,940	1,084	1,080	0,617	-0,617	0,733	0,000	0,000	2,363	1,080	
35 x 35 x 5	3,250	0,878	1,750	1,058	1,750	0,250	3,635	3,437	-1,488	1,058	1,823	1,042	-1,042	0,749	0,000	0,000	3,635	1,823	
35 x 40 x 3	2,160	0,583	2,000	0,928	2,000	0,150	2,462	2,653	-0,957	1,068	1,608	0,804	-0,804	0,863	0,000	0,000	2,462	1,608	
35 x 60 x 4	3,640	0,983	3,000	0,796	3,000	0,200	3,529	4,432	-1,305	0,985	7,219	2,406	-2,406	1,408	0,000	0,000	3,529	7,219	
40 x 20 x 2	1,160	0,313	1,000	1,410	1,000	0,100	1,964	1,393	-0,758	1,301	0,136	0,136	-0,136	0,342	0,000	0,000	1,964	0,136	
40 x 25 x 3	1,860	0,502	1,250	1,344	1,250	0,150	3,062	2,279	-1,153	1,283	0,400	0,320	-0,320	0,464	0,000	0,000	3,062	0,400	
40 x 30 x 3	2,010	0,543	1,500	1,254	1,500	0,150	3,261	2,600	-1,188	1,274	0,684	0,456	-0,456	0,583	0,000	0,000	3,261	0,684	
40 x 40 x 3	2,310	0,624	2,000	1,111	2,000	0,150	3,582	3,224	-1,240	1,245	1,609	0,805	-0,805	0,835	0,000	0,000	3,582	1,609	
40 x 40 x 4	3,040	0,821	2,000	1,147	2,000	0,200	4,608	4,016	-1,615	1,231	2,155	1,077	-1,077	0,842	0,000	0,000	4,608	2,155	
40 x 40 x 5	3,750	1,013	2,000	1,183	2,000	0,250	5,561	4,700	-1,974	1,218	2,708	1,354	-1,354	0,850	0,000	0,000	5,561	2,708	
40 x 50 x 4	3,440	0,929	2,500	1,037	2,500	0,200	4,931	4,754	-1,664	1,197	4,188	1,675	-1,675	1,103	0,000	0,000	4,931	4,188	
40 x 50 x 5	4,250	1,148	2,500	1,074	2,500	0,250	5,956	5,548	-2,035	1,184	5,250	2,100	-2,100	1,111	0,000	0,000	5,956	5,250	
40 x 60 x 6	5,640	1,523	3,000	1,023	3,000	0,300	7,282	7,115	-2,446	1,136	10,872	3,624	-3,624	1,388	0,000	0,000	7,282	10,872	
45 x 45 x 3	2,610	0,705	2,250	1,236	2,250	0,150	5,162	4,175	-1,581	1,406	2,288	1,017	-1,017	0,936	0,000	0,000	5,162	2,288	
45 x 50 x 5	4,500	1,215	2,500	1,250	2,500	0,250	8,344	6,675	-2,567	1,362	5,255	2,102	-2,102	1,081	0,000	0,000	8,344	5,255	
45 x 80 x 5	6,000	1,620	4,000	1,000	4,000	0,250	9,500	9,500	-2,714	1,258	21,380	5,345	-5,345	1,888	0,000	0,000	9,500	21,380	
50 x 35 x 4	3,240	0,875	1,750	1,620	1,750	0,200	8,232	5,082	-2,435	1,594	1,456	0,832	-0,832	0,670	0,000	0,000	8,232	1,456	
50 x 40 x 5	4,250	1,148	2,000	1,574	2,000	0,250	10,456	6,645	-3,052	1,569	2,719	1,359	-1,359	0,800	0,000	0,000	10,456	2,719	
50 x 50 x 2	1,960	0,529	2,500	1,324	2,500	0,100	4,908	3,705	-1,335	1,582	2,087	0,835	-0,835	1,032	0,000	0,000	4,908	2,087	
50 x 50 x 4	3,840	1,037	2,500	1,398	2,500	0,200	9,261	6,625	-2,571	1,553	4,193	1,677	-1,677	1,045	0,000	0,000	9,261	4,193	
50 x 50 x 5	4,750	1,283	2,500	1,434	2,500	0,250	11,250	7,844	-3,155	1,539	5,260	2,104	-2,104	1,052	0,000	0,000	11,250	5,260	
50 x 50 x 6	5,640	1,523	2,500	1,470	2,500	0,300	13,126	8,928	-3,719	1,526	6,340	2,536	-2,536	1,060	0,000	0,000	13,126	6,340	
50 x 60 x 5	5,250	1,418	3,000	1,321	3,000	0,250	11,895	9,002	-3,234	1,505	9,052	3,017	-3,017	1,313	0,000	0,000	11,895	9,052	
50 x 80 x 2	2,560	0,691	4,000	1,038	4,000	0,100	5,599	5,396	-1,413	1,479	8,537	2,134	-2,134	1,826	0,000	0,000	5,599	8,537	
50 x 80 x 3	3,810	1,029	4,000	1,075	4,000	0,150	8,165	7,594	-2,080	1,464	12,811	3,203	-3,203	1,834	0,000	0,000	8,165	12,811	
50 x 80 x 6	7,440	2,009	4,000	1,187	4,000	0,300	15,048	12,677	-3,947	1,422	25,690	6,423	-6,423	1,858	0,000	0,000	15,048	25,690	
50 x 100 x 2	2,960	0,799	5,000	0,911	5,000	0,100	5,904	6,482	-1,444	1,412	16,670	3,334	-3,334	2,373	0,000	0,000	5,904	16,670	
60 x 40 x 3	2,910	0,786	2,000	1,913	2,000	0,150	10,985	5,743	-2,688	1,943	1,614	0,807	-0,807	0,745	0,000	0,000	10,985	1,614	
60 x 60 x 4	4,640	1,253	3,000	1,648	3,000	0,200	16,313	9,897	-3,749	1,875	7,232	2,411	-2,411	1,248	0,000	0,000	16,313	7,232	
60 x 60 x 5	5,750	1,553	3,000	1,685	3,000	0,250	19,908	11,816	-4,613	1,861	9,063	3,021	-3,021	1,255	0,000	0,000	19,908	9,063	
60 x 60 x 6	6,840	1,847	3,000	1,721	3,000	0,300	23,329	13,555	-5,452	1,847	10,908	3,636	-3,636	1,263	0,000	0,000	23,329	10,908	
60 x 100 x 5	7,750	2,093	5,000	1,315	5,000	0,250	23,004	17,500	-4,910	1,723	41,729	8,346	-8,346	2,320	0,000	0,000	23,004	41,729	
60 x 100 x 6	9,240	2,495	5,000	1,352	5,000	0,300	26,988	19,963	-5,806	1,709	50,108	10,022	-10,022	2,329	0,000	0,000	26,988	50,108	
70 x 70 x 8	10,560	2,851	3,500	2,044	3,500	0,400	48,408	23,684	-9,768	2,141	23,165	6,619	-6,619	1,481	0,000	0,000	48,408	23,165	
80 x 80 x 7	10,710	2,892	4,000	2,258	4,000	0,350	65,672	29,078	-11,438	2,476	30,095	7,524	-7,524	1,676	0,000	0,000	65,672	30,095	
100 x 60 x 5	7,750	2,093	3,000	3,315	3,000	0,250	81,754	24,666	-12,229	3,248	9,104	3,035	-3,035	1,084	0,000	0,000	81,754	9,104	
100 x 80 x 5	8,750	2,363	4,000	2,964	4,000	0,250	90,093	30,393	-12,805	3,209	21,438	5,359	-5,359	1,565	0,000	0,000	90,093	21,438	

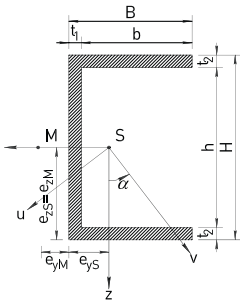


Tabelle 2-3 | Teil 1 von 2

C-Profile

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			eyS [cm]	ezS [cm]	eyM [cm]	ezM [cm]	Iy [cm ⁴]	Wy,max [cm ³]	Wy,min [cm ³]	iy [cm]	Iz [cm ⁴]	Wz,max [cm ³]	Wz,min [cm ³]	iz [cm]	Iyz [cm ⁴]	α [°]	Iu [cm ⁴]	Iv [cm ⁴]	
10 x 10 x 1,5	0,405	0,109	0,390	0,500	0,326	0,500	0,059	0,118	-0,118	0,382	0,039	0,101	-0,064	0,311	0,000	0,000	0,059	0,039	
10 x 10 x 2	0,520	0,140	0,408	0,500	0,292	0,500	0,069	0,138	-0,138	0,364	0,049	0,119	-0,082	0,305	0,000	0,000	0,069	0,049	
10 x 15 x 2	0,720	0,194	0,642	0,500	0,539	0,500	0,102	0,203	-0,203	0,376	0,155	0,242	-0,181	0,464	0,000	0,000	0,102	0,155	
12 x 12 x 2	0,640	0,173	0,475	0,600	0,378	0,600	0,130	0,217	-0,217	0,451	0,088	0,186	-0,122	0,371	0,000	0,000	0,130	0,088	
14 x 12 x 2	0,680	0,184	0,453	0,700	0,365	0,700	0,191	0,273	-0,273	0,530	0,094	0,207	-0,125	0,371	0,000	0,000	0,191	0,094	
15 x 15 x 1,5	0,630	0,170	0,557	0,750	0,540	0,750	0,227	0,303	-0,303	0,601	0,143	0,257	-0,152	0,477	0,000	0,000	0,227	0,143	
15 x 15 x 2	0,820	0,221	0,576	0,750	0,506	0,750	0,278	0,370	-0,370	0,582	0,181	0,315	-0,196	0,470	0,000	0,000	0,278	0,181	
15 x 20 x 1,5	0,780	0,211	0,787	0,750	0,787	0,750	0,296	0,395	-0,395	0,616	0,319	0,405	-0,263	0,639	0,000	0,000	0,296	0,319	
15 x 20 x 2	1,020	0,275	0,806	0,750	0,753	0,750	0,363	0,484	-0,484	0,596	0,407	0,505	-0,341	0,632	0,000	0,000	0,363	0,407	
15 x 20 x 3	1,470	0,397	0,844	0,750	0,685	0,750	0,459	0,612	-0,612	0,559	0,561	0,665	-0,485	0,618	0,000	0,000	0,459	0,561	
20 x 10 x 1,5	0,555	0,150	0,305	1,000	0,272	1,000	0,319	0,319	-0,319	0,758	0,050	0,165	-0,072	0,301	0,000	0,000	0,319	0,050	
20 x 15 x 2	0,920	0,248	0,524	1,000	0,476	1,000	0,556	0,556	-0,556	0,778	0,202	0,385	-0,207	0,468	0,000	0,000	0,556	0,202	
20 x 20 x 1,5	0,855	0,231	0,724	1,000	0,755	1,000	0,576	0,576	-0,576	0,821	0,354	0,488	-0,277	0,643	0,000	0,000	0,576	0,354	
20 x 20 x 2	1,120	0,302	0,743	1,000	0,720	1,000	0,719	0,719	-0,719	0,801	0,453	0,610	-0,360	0,636	0,000	0,000	0,719	0,453	
20 x 20 x 3	1,620	0,437	0,780	1,000	0,652	1,000	0,945	0,945	-0,945	0,764	0,628	0,805	-0,515	0,623	0,000	0,000	0,945	0,628	
20 x 25 x 1,5	1,005	0,271	0,952	1,000	1,001	1,000	0,705	0,705	-0,705	0,837	0,654	0,687	-0,422	0,807	0,000	0,000	0,705	0,654	
20 x 30 x 1,5	1,155	0,312	1,185	1,000	1,248	1,000	0,833	0,833	-0,833	0,849	1,079	0,910	-0,595	0,967	0,000	0,000	0,833	1,079	
20 x 30 x 2	1,520	0,410	1,205	1,000	1,214	1,000	1,044	1,044	-1,044	0,829	1,396	1,158	-0,778	0,958	0,000	0,000	1,044	1,396	
20 x 30 x 2,5	1,875	0,506	1,225	1,000	1,180	1,000	1,227	1,227	-1,227	0,809	1,694	1,383	-0,954	0,951	0,000	0,000	1,227	1,694	
20 x 40 x 2	1,920	0,518	1,683	1,000	1,711	1,000	1,370	1,370	-1,370	0,845	3,097	1,840	-1,337	1,270	0,000	0,000	1,370	3,097	
20 x 40 x 2,5	2,375	0,641	1,704	1,000	1,677	1,000	1,612	1,612	-1,612	0,824	3,779	2,218	-1,646	1,261	0,000	0,000	1,612	3,779	
20 x 40 x 4	3,680	0,994	1,765	1,000	1,575	1,000	2,148	2,148	-2,148	0,764	5,625	3,187	-2,517	1,236	0,000	0,000	2,148	5,625	
23 x 23 x 1,5	0,990	0,267	0,824	1,150	0,883	1,150	0,899	0,781	-0,781	0,953	0,546	0,663	-0,370	0,743	0,000	0,000	0,899	0,546	
25 x 15 x 1,5	0,780	0,211	0,464	1,250	0,484	1,250	0,755	0,604	-0,604	0,984	0,172	0,370	-0,166	0,469	0,000	0,000	0,755	0,172	
25 x 15 x 2	1,020	0,275	0,482	1,250	0,450	1,250	0,950	0,760	-0,760	0,965	0,218	0,453	-0,214	0,463	0,000	0,000	0,950	0,218	
25 x 20 x 2	1,220	0,329	0,690	1,250	0,691	1,250	1,215	0,972	-0,972	0,998	0,491	0,712	-0,375	0,634	0,000	0,000	1,215	0,491	
25 x 25 x 2	1,420	0,383	0,910	1,250	0,935	1,250	1,480	1,184	-1,184	1,021	0,913	1,004	-0,574	0,802	0,000	0,000	1,480	0,913	
25 x 25 x 3	2,070	0,559	0,947	1,250	0,866	1,250	1,998	1,598	-1,598	0,982	1,285	1,357	-0,828	0,788	0,000	0,000	1,998	1,285	
30 x 15 x 2	1,120	0,302	0,448	1,500	0,425	1,500	1,471	0,981	-0,981	1,146	0,232	0,517	-0,221	0,455	0,000	0,000	1,471	0,232	
30 x 15 x 3	1,620	0,437	0,483	1,500	0,356	1,500	1,993	1,328	-1,328	1,109	0,318	0,658	-0,313	0,443	0,000	0,000	1,993	0,318	
30 x 20 x 2	1,320	0,356	0,645	1,500	0,663	1,500	1,864	1,242	-1,242	1,188	0,524	0,811	-0,387	0,630	0,000	0,000	1,864	0,524	
30 x 20 x 3	1,920	0,518	0,681	1,500	0,594	1,500	2,542	1,694	-1,694	1,151	0,731	1,072	-0,554	0,617	0,000	0,000	2,542	0,731	
30 x 20 x 5	3,000	0,810	0,750	1,500	0,457	1,500	3,500	2,333	-2,333	1,080	1,063	1,417	-0,850	0,595	0,000	0,000	3,500	1,063	
30 x 30 x 2	1,720	0,464	1,077	1,500	1,149	1,500	2,649	1,766	-1,766	1,241	1,613	1,498	-0,839	0,968	0,000	0,000	2,649	1,613	
30 x 30 x 3	2,520	0,680	1,114	1,500	1,081	1,500	3,640	2,426	-2,426	1,202	2,293	2,058	-1,216	0,954	0,000	0,000	3,640	2,293	
30 x 30 x 5	4,000	1,080	1,188	1,500	0,944	1,500	5,083	3,389	-3,389	1,127	3,443	2,899	-1,899	0,928	0,000	0,000	5,083	3,443	
30 x 40 x 3	3,120	0,842	1,573	1,500	1,574	1,500	4,738	3,158	-3,158	1,232	5,101	3,243	-2,102	1,279	0,000	0,000	4,738	5,101	
35 x 20 x 3	2,070	0,559	0,643	1,750	0,568	1,750	3,691	2,109	-2,109	1,335	0,771	1,199	-0,568	0,610	0,000	0,000	3,691	0,771	
35 x 35 x 2	2,020	0,545	1,244	1,750	1,363	1,750	4,313	2,464	-2,464	1,461	2,601	2,092	-1,153	1,135	0,000	0,000	4,313	2,601	
35 x 35 x 3	2,970	0,802	1,281	1,750	1,295	1,750	6,001	3,429	-3,429	1,422	3,725	2,907	-1,679	1,120	0,000	0,000	6,001	3,725	
40 x 20 x 2	1,520	0,410	0,574	2,000	0,613	2,000	3,668	1,834	-1,834	1,553	0,576	1,004	-0,404	0,616	0,000	0,000	3,668	0,576	
40 x 20 x 2,5	1,875	0,506	0,592	2,000	0,578	2,000	4,414	2,207	-2,207	1,534	0,695	1,175	-0,494	0,609	0,000	0,000	4,414	0,695	
40 x 20 x 3	2,220	0,599	0,609	2,000	0,544	2,000	5,099	2,549	-2,549	1,515	0,806	1,322	-0,580	0,603	0,000	0,000	5,099	0,806	
40 x 25 x 3	2,520	0,680	0,805	2,000	0,781	2,000	6,128	3,064	-3,064	1,559	1,524	1,893	-0,899	0,778	0,000	0,000	6,128	1,524	
40 x 30 x 3	2,820	0,761	1,012	2,000	1,022	2,000	7,157	3,578	-3,578	1,593	2,544	2,515	-1,280	0,950	0,000	0,000	7,157	2,544	
40 x 30 x 4	3,680	0,994	1,048	2,000	0,953	2,000	8,900	4,450	-4,450	1,555	3,228	3,081	-1,653	0,937	0,000	0,000	8,900	3,228	
40 x 40 x 2	2,320	0,626	1,410	2,000	1,578	2,000	6,559	3,279	-3,279	1,681	3,928	2,785	-1,517	1,301	0,000	0,000	6,559	3,928	
40 x 40 x 2,5	2,875	0,776	1,429	2,000	1,543	2,000	7,935	3,967	-3,967	1,661	4,811	3,366	-1,872	1,294	0,000	0,000	7,935	4,811	
40 x 40 x 3	3,420	0,923	1,448	2,000	1,509	2,000	9,215	4,607	-4,607	1,641	5,657	3,906	-2,217	1,286	0,000	0,000	9,215	5,657	
40 x 40 x 4	4,480	1,210	1,486	2,000	1,441	2,000	11,503	5,751	-5,751	1,602	7,246	4,877	-2,882	1,272	0,000	0,000	11,503	7,246	
40 x 40 x 5	5,500	1,485	1,523	2,000	1,373	2,000	13,458	6,729	-6,729	1,564	8,705	5,717	-3,514	1,258	0,000	0,000	13,458	8,705	
50 x 20 x 2	1,720	0,464	0,519	2,500	0,569	2,500	6,233	2,493	-2,493	1,904	0,616	1,188	-0,416	0,599	0,000	0,000	6,233	0,616	
50 x 25 x 2,5	2,375	0,641	0,717	2,500	0,766	2,500	8,956	3,582	-3,582	1,942	1,406	1,961	-0,789	0,769	0,000	0,000	8,956	1,406	
50 x 25 x 3	2,820	0,761	0,735	2,500	0,731	2,500	10,425	4,170	-4,170	1,923	1,641	2,232	-0,930	0,763	0,000	0,000	10,425	1,641	
50 x 25 x 4	3,680	0,994	0,771	2,500	0,663	2,500	13,076	5,231	-5,231	1,885	2,071	2,687	-1,197	0,750	0,000	0,000	13,076	2,071	
50 x 30 x 2	2,120	0,572	0,892	2,500	1,036	2,500	8,538	3,415	-3,415	2,007	1,924	2,156	-0,913	0,953	0,000	0,000	8,538	1,924	
50 x 30 x 3	3,120	0,842	0,929	2,500	0,968	2,500	12,084	4,833	-4,833	1,968	2,748	2,958	-1,327	0,938	0,000	0,000	12,084	2,748	
50 x 30 x 4	4,080	1,102	0,965	2,500	0,899	2,500	15,198	6,079	-6,079	1,930	3,493	3,620	-1,716	0,925	0,000	0,000	15,198	3,493	
50 x 40 x 4	4,880	1,318	1,380	2,500	1,381	2,500	19,440	7,776	-7,776										

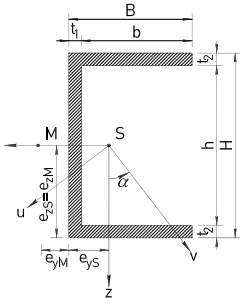


Tabelle 2-3 | Teil 2 von 2
C-Profile

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			eyS [cm]	ezS [cm]	eyM [cm]	ezM [cm]	Iy [cm ⁴]	Wy,max [cm ³]	Wy,min [cm ³]	iy [cm]	Iz [cm ⁴]	Wz,max [cm ³]	Wz,min [cm ³]	iz [cm]	Iyz [cm ⁴]	α [°]	Iu [cm ⁴]	Iv [cm ⁴]	
50 x 50 x 2	2,920	0,788	1,744	2,500	2,006	2,500	13,149	5,260	-5,260	2,122	7,799	4,473	-2,395	1,634	0,000	0,000	13,149	7,799	
50 x 50 x 3	4,320	1,166	1,782	2,500	1,938	2,500	18,720	7,488	-7,488	2,082	11,322	6,354	-3,518	1,619	0,000	0,000	18,720	11,322	
50 x 50 x 4	5,680	1,534	1,820	2,500	1,869	2,500	23,683	9,473	-9,473	2,042	14,614	8,031	-4,595	1,604	0,000	0,000	23,683	14,614	
50 x 50 x 5	7,000	1,890	1,857	2,500	1,801	2,500	28,083	11,233	-11,233	2,003	17,690	9,526	-5,629	1,590	0,000	0,000	28,083	17,690	
55 x 45 x 2	2,820	0,761	1,472	2,750	1,732	2,750	14,857	5,403	-5,403	2,295	6,050	4,109	-1,998	1,465	0,000	0,000	14,857	6,050	
60 x 20 x 2	1,920	0,518	0,475	3,000	0,530	3,000	9,658	3,219	-3,219	2,243	0,648	1,365	-0,425	0,581	0,000	0,000	9,658	0,648	
60 x 30 x 3	3,420	0,923	0,861	3,000	0,919	3,000	18,571	6,190	-6,190	2,330	2,916	3,389	-1,363	0,923	0,000	0,000	18,571	2,916	
60 x 40 x 2,5	3,375	0,911	1,236	3,000	1,428	3,000	20,008	6,669	-6,669	2,435	5,538	4,481	-2,004	1,281	0,000	0,000	20,008	5,538	
60 x 40 x 3	4,020	1,085	1,254	3,000	1,394	3,000	23,449	7,816	-7,816	2,415	6,522	5,199	-2,376	1,274	0,000	0,000	23,449	6,522	
60 x 40 x 4	5,280	1,426	1,291	3,000	1,325	3,000	29,818	9,939	-9,939	2,376	8,379	6,491	-3,093	1,260	0,000	0,000	29,818	8,379	
60 x 40 x 5	6,500	1,755	1,327	3,000	1,257	3,000	35,542	11,847	-11,847	2,338	10,097	7,609	-3,777	1,246	0,000	0,000	35,542	10,097	
60 x 50 x 2	3,120	0,842	1,638	3,000	1,946	3,000	19,754	6,585	-6,585	2,516	8,306	5,069	-2,471	1,632	0,000	0,000	19,754	8,306	
60 x 50 x 3	4,620	1,247	1,676	3,000	1,878	3,000	28,327	9,442	-9,442	2,476	12,072	7,203	-3,632	1,616	0,000	0,000	28,327	12,072	
60 x 60 x 4	6,880	1,858	2,153	3,000	2,298	3,000	42,383	14,128	-14,128	2,482	25,805	11,983	-6,709	1,937	0,000	0,000	42,383	25,805	
60 x 60 x 5	8,500	2,295	2,191	3,000	2,230	3,000	50,708	16,903	-16,903	2,442	31,398	14,329	-8,243	1,922	0,000	0,000	50,708	31,398	
65 x 25 x 2,5	2,750	0,743	0,636	3,250	0,700	3,250	16,714	5,143	-5,143	2,465	1,522	2,391	-0,817	0,744	0,000	0,000	16,714	1,522	
65 x 30 x 3	3,570	0,964	0,831	3,250	0,896	3,250	22,446	6,906	-6,906	2,507	2,990	3,599	-1,378	0,915	0,000	0,000	22,446	2,990	
65 x 55 x 2,5	4,250	1,148	1,824	3,250	2,126	3,250	31,370	9,652	-9,652	2,717	13,628	7,473	-3,707	1,791	0,000	0,000	31,370	13,628	
65 x 55 x 3	5,070	1,369	1,842	3,250	2,092	3,250	36,872	11,345	-11,345	2,697	16,120	8,750	-4,407	1,783	0,000	0,000	36,872	16,120	
70 x 25 x 5	5,500	1,485	0,705	3,500	0,509	3,500	35,458	10,131	-10,131	2,539	7,228	3,872	-1,520	0,704	0,000	0,000	35,458	2,728	
70 x 40 x 3	4,320	1,166	1,178	3,500	1,342	3,500	33,506	9,573	-9,573	2,785	6,865	5,829	-2,433	1,261	0,000	0,000	33,506	6,865	
70 x 40 x 4	5,680	1,534	1,214	3,500	1,273	3,500	42,835	12,239	-12,239	2,746	8,827	7,270	-3,168	1,247	0,000	0,000	42,835	8,827	
70 x 60 x 4	7,280	1,966	2,046	3,500	2,238	3,500	60,280	17,223	-17,223	2,878	27,253	13,319	-6,893	1,935	0,000	0,000	60,280	27,253	
80 x 20 x 2	2,320	0,626	0,410	4,000	0,464	4,000	19,487	4,872	-4,872	2,898	0,696	1,697	-0,438	0,548	0,000	0,000	19,487	0,696	
80 x 30 x 3	4,020	1,085	0,754	4,000	0,833	4,000	36,825	9,206	-9,206	3,027	3,178	4,213	-1,415	0,889	0,000	0,000	36,825	3,178	
80 x 40 x 3	4,620	1,247	1,111	4,000	1,294	4,000	45,723	11,431	-11,431	3,146	7,164	6,448	-2,480	1,245	0,000	0,000	45,723	7,164	
80 x 40 x 4	6,080	1,642	1,147	4,000	1,225	4,000	58,692	14,673	-14,673	3,107	9,216	8,032	-3,231	1,231	0,000	0,000	58,692	9,216	
80 x 40 x 5	7,500	2,025	1,183	4,000	1,156	4,000	70,625	17,656	-17,656	3,069	11,123	9,400	-3,949	1,218	0,000	0,000	70,625	11,123	
80 x 40 x 6	8,880	2,398	1,219	4,000	1,088	4,000	81,578	20,394	-20,394	3,031	12,896	10,580	-4,637	1,205	0,000	0,000	81,578	12,896	
80 x 45 x 6	9,480	2,560	1,411	4,000	1,323	4,000	89,810	22,452	-22,452	3,078	18,072	12,810	-5,850	1,381	0,000	0,000	89,810	18,072	
80 x 50 x 5	8,500	2,295	1,574	4,000	1,630	4,000	84,708	21,177	-21,177	3,157	20,912	13,290	-6,103	1,569	0,000	0,000	84,708	20,912	
85 x 40 x 3	4,770	1,288	1,081	4,250	1,271	4,250	52,688	12,397	-12,397	3,324	7,299	6,753	-2,500	1,237	0,000	0,000	52,688	7,299	
86 x 40 x 3	4,800	1,296	1,075	4,300	1,266	4,300	54,152	12,593	-12,593	3,359	7,325	6,814	-2,504	1,235	0,000	0,000	54,152	7,325	
88 x 50 x 3	5,460	1,474	1,441	4,400	1,727	4,400	67,994	15,453	-15,453	3,529	13,733	9,529	-3,859	1,586	0,000	0,000	67,994	13,733	
90 x 40 x 3	4,920	1,328	1,052	4,500	1,248	4,500	60,250	13,389	-13,389	3,499	7,426	7,056	-2,519	1,229	0,000	0,000	60,250	7,426	
100 x 20 x 2	2,720	0,734	0,365	5,000	0,411	5,000	33,956	6,791	-6,791	3,533	0,730	2,003	-0,447	0,518	0,000	0,000	33,956	0,730	
100 x 40 x 3	5,220	1,409	1,001	5,000	1,206	5,000	77,237	15,447	-15,447	3,847	7,659	7,654	-2,553	1,211	0,000	0,000	77,237	7,659	
100 x 50 x 5	9,500	2,565	1,434	5,000	1,531	5,000	143,292	28,658	-28,658	3,884	22,501	15,688	-6,310	1,539	0,000	0,000	143,292	22,501	
106 x 40 x 3	5,400	1,458	0,972	5,300	1,181	5,300	88,672	16,731	-16,731	4,052	7,786	8,008	-2,571	1,201	0,000	0,000	88,672	7,786	
120 x 40 x 3	5,820	1,571	0,913	6,000	1,128	6,000	119,191	19,865	-19,865	4,525	8,052	8,821	-2,608	1,176	0,000	0,000	119,191	8,052	
120 x 60 x 8	17,920	4,838	1,793	6,000	1,700	6,000	376,559	62,760	-62,760	4,584	59,374	33,117	-14,113	1,820	0,000	0,000	376,559	59,374	
125 x 80 x 8	21,520	5,810	2,541	6,250	2,624	6,250	525,066	84,011	-84,011	4,940	135,950	53,497	-24,905	2,513	0,000	0,000	525,066	135,950	
140 x 40 x 3	6,420	1,733	0,842	7,000	1,058	7,000	172,785	24,684	-24,684	5,188	8,373	9,950	-2,651	1,142	0,000	0,000	172,785	8,373	
160 x 80 x 10	30,000	8,100	2,367	8,000	2,313	8,000	1130,000	141,250	-141,250	6,137	177,967	75,197	-31,592	2,436	0,000	0,000	1130,000	177,967	

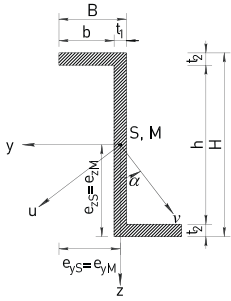


Tabelle 2-4 | Teil 1 von 2

Z-Profile

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z								Hauptträgheitsmomente			
			eyS [cm]	ezS [cm]	eyM [cm]	ezM [cm]	Iy [cm ⁴]	Wy,max [cm ³]	Wy,min [cm ³]	Iy [cm]	Iz [cm ⁴]	Wz,max [cm ³]	Wz,min [cm ³]	Iz [cm]	Iyz [cm ⁴]	α [°]	Iu [cm ⁴]	Iv [cm ⁴]
10 x 12 x 2	0,600	0,162	1,100	0,500	1,100	0,500	0,082	0,164	-0,164	0,370	0,178	0,162	-0,162	0,545	-0,096	-31,686	0,023	0,238
10 x 15 x 2	0,720	0,194	1,400	0,500	1,400	0,500	0,102	0,203	-0,203	0,376	0,367	0,262	-0,262	0,714	-0,156	-24,825	0,029	0,439
12 x 8 x 2	0,480	0,130	0,700	0,600	0,700	0,600	0,090	0,149	-0,149	0,432	0,047	0,067	-0,067	0,312	-0,048	32,952	0,121	0,016
15 x 15 x 2	0,820	0,221	1,400	0,750	1,400	0,750	0,278	0,370	-0,370	0,582	0,367	0,262	-0,262	0,669	-0,254	-40,004	0,065	0,580
15 x 25 x 3	1,770	0,478	2,350	0,750	2,350	0,750	0,569	0,759	-0,759	0,567	2,600	1,106	-1,106	1,212	-0,990	-22,142	0,167	3,002
16 x 25 x 1,5	0,945	0,255	2,425	0,800	2,425	0,800	0,423	0,529	-0,529	0,669	1,427	0,588	-0,588	1,229	-0,639	-25,929	0,112	1,737
16 x 25 x 3	1,800	0,486	2,350	0,800	2,350	0,800	0,670	0,838	-0,838	0,610	2,600	1,106	-1,106	1,202	-1,073	-24,011	0,192	3,078
18 x 12 x 2,5	0,925	0,250	1,075	0,900	1,075	0,900	0,409	0,455	-0,455	0,665	0,210	0,195	-0,195	0,476	-0,221	32,845	0,552	0,067
18 x 21 x 2	1,120	0,302	2,000	0,900	2,000	0,900	0,586	0,651	-0,651	0,723	1,068	0,534	-0,534	0,977	-0,638	-34,662	0,145	1,509
18 x 21 x 3	1,620	0,437	1,950	0,900	1,950	0,900	0,761	0,846	-0,846	0,686	1,488	0,763	-0,763	0,958	-0,851	-33,439	0,200	2,049
18 x 25 x 2	1,280	0,346	2,400	0,900	2,400	0,900	0,689	0,766	-0,766	0,734	1,845	0,769	-0,769	1,200	-0,920	-28,936	0,180	2,353
20 x 15 x 2	0,920	0,248	1,400	1,000	1,400	1,000	0,556	0,556	-0,556	0,778	0,367	0,262	-0,262	0,632	-0,351	37,468	0,825	0,098
20 x 20 x 2	1,120	0,302	1,900	1,000	1,900	1,000	0,719	0,719	-0,719	0,801	0,916	0,482	-0,482	0,904	-0,648	-40,677	0,162	1,473
20 x 25 x 1,5	1,005	0,271	2,425	1,000	2,425	1,000	0,705	0,705	-0,705	0,837	1,427	0,588	-0,588	1,191	-0,815	-33,055	0,174	1,957
20 x 25 x 2,5	1,625	0,439	2,375	1,000	2,375	1,000	1,034	1,034	-1,034	0,798	2,236	0,941	-0,941	1,173	-1,230	-31,985	0,265	3,004
22 x 20 x 2	1,160	0,313	1,900	1,100	1,900	1,100	0,900	0,818	-0,818	0,881	0,916	0,482	-0,482	0,889	-0,720	-44,676	0,188	1,628
25 x 15 x 2	1,020	0,275	1,400	1,250	1,400	1,250	0,950	0,760	-0,760	0,965	0,368	0,263	-0,263	0,600	-0,449	28,508	1,193	0,124
25 x 15 x 2,5	1,250	0,338	1,375	1,250	1,375	1,250	1,120	0,896	-0,896	0,946	0,437	0,318	-0,318	0,591	-0,527	28,538	1,407	0,150
25 x 17 x 2	1,100	0,297	1,600	1,250	1,600	1,250	1,056	0,845	-0,845	0,980	0,548	0,342	-0,342	0,706	-0,587	33,292	1,441	0,163
25 x 20 x 2	1,220	0,329	1,900	1,250	1,900	1,250	1,215	0,972	-0,972	0,998	0,916	0,482	-0,482	0,867	-0,828	39,888	1,907	0,224
25 x 25 x 2	1,420	0,383	2,400	1,250	2,400	1,250	1,480	1,184	-1,184	1,021	1,845	0,769	-0,769	1,140	-1,323	-41,073	0,328	2,998
25 x 25 x 3	2,070	0,559	2,350	1,250	2,350	1,250	1,998	1,598	-1,598	0,982	2,602	1,107	-1,107	1,121	-1,815	-40,275	0,460	4,140
27 x 17 x 2	1,140	0,308	1,600	1,350	1,600	1,350	1,268	0,939	-0,939	1,054	0,548	0,343	-0,343	0,693	-0,638	30,282	1,640	0,176
30 x 20 x 3	1,920	0,518	1,850	1,500	1,850	1,500	2,542	1,694	-1,694	1,151	1,274	0,689	-0,689	0,815	-1,377	32,640	3,424	0,392
30 x 20 x 3,5	2,205	0,595	1,825	1,500	1,825	1,500	2,827	1,885	-1,885	1,132	1,430	0,784	-0,784	0,805	-1,530	32,735	3,811	0,446
30 x 25 x 3	2,220	0,599	2,350	1,500	2,350	1,500	3,091	2,060	-2,060	1,180	2,603	1,108	-1,108	1,083	-2,228	41,877	5,088	0,606
30 x 28 x 2	1,640	0,443	2,700	1,500	2,700	1,500	2,492	1,661	-1,661	1,233	2,627	0,973	-0,973	1,266	-2,038	-44,054	0,520	4,599
30 x 30 x 3	2,520	0,680	2,850	1,500	2,850	1,500	3,640	2,426	-2,426	1,202	4,637	1,627	-1,627	1,357	-3,281	-40,677	0,820	7,457
32 x 17 x 3	1,800	0,486	1,550	1,600	1,550	1,600	2,592	1,620	-1,620	1,200	0,753	0,486	-0,486	0,647	-1,035	24,195	3,057	0,287
33 x 25 x 3	2,310	0,624	2,350	1,650	2,350	1,650	3,878	2,351	-2,351	1,296	2,604	1,108	-1,108	1,062	-2,475	37,780	5,797	0,685
33 x 30 x 3	2,610	0,705	2,850	1,650	2,850	1,650	4,556	2,761	-2,761	1,321	4,638	1,627	-1,627	1,333	-3,645	-44,676	0,952	8,242
34 x 17 x 2	1,280	0,346	1,600	1,700	1,600	1,700	2,193	1,290	-1,290	1,309	0,549	0,343	-0,343	0,655	-0,816	22,390	2,529	0,212
35 x 20 x 2	1,420	0,383	1,900	1,750	1,900	1,750	2,677	1,530	-1,530	1,373	0,917	0,483	-0,483	0,804	-1,188	26,734	3,276	0,319
35 x 30 x 3	2,670	0,721	2,850	1,750	2,850	1,750	5,231	2,989	-2,989	1,400	4,638	1,628	-1,628	1,318	-3,888	42,820	8,834	1,036
40 x 15 x 2	1,320	0,356	1,400	2,000	1,400	2,000	2,946	1,473	-1,473	1,494	0,369	0,263	-0,263	0,528	-0,741	14,952	3,143	0,171
40 x 20 x 2	1,520	0,410	1,900	2,000	1,900	2,000	3,668	1,834	-1,834	1,553	0,917	0,483	-0,483	0,777	-1,368	22,422	4,233	0,353
40 x 20 x 4	2,880	0,778	1,800	2,000	1,800	2,000	6,298	3,149	-3,149	1,479	1,579	0,877	-0,877	0,740	-2,304	22,159	7,236	0,640
40 x 28 x 2	1,840	0,497	2,700	2,000	2,700	2,000	4,825	2,412	-2,412	1,619	2,627	0,973	-0,973	1,195	-2,766	34,170	6,702	0,749
40 x 30 x 2	1,920	0,518	2,900	2,000	2,900	2,000	5,114	2,557	-2,557	1,632	3,255	1,122	-1,122	1,302	-3,192	36,883	7,509	0,860
40 x 30 x 4	3,680	0,994	2,800	2,000	2,800	2,000	8,900	4,450	-4,450	1,555	5,877	2,099	-2,099	1,264	-5,616	37,468	13,205	1,573
40 x 40 x 3	3,420	0,923	3,850	2,000	3,850	2,000	9,215	4,607	-4,607	1,641	11,423	2,967	-2,967	1,828	-8,214	-41,172	2,031	18,607
43 x 18 x 3	2,190	0,591	1,650	2,150	1,650	2,150	5,594	2,602	-2,602	1,598	0,909	0,551	-0,551	0,644	-1,620	17,331	6,100	0,403
43 x 40 x 3	3,510	0,948	3,850	2,150	3,850	2,150	10,884	5,062	-5,062	1,761	11,424	2,967	-2,967	1,804	-8,880	-44,130	2,270	20,038
45 x 15 x 2,5	1,750	0,473	1,375	2,250	1,375	2,250	4,724	2,100	-2,100	1,643	0,439	0,320	-0,320	0,501	-0,996	12,469	4,944	0,219
45 x 35 x 3	3,270	0,883	3,350	2,250	3,350	2,250	10,760	4,782	-4,782	1,814	7,530	2,248	-2,248	1,517	-7,056	38,554	16,383	1,906
46 x 18 x 3	2,280	0,616	1,650	2,300	1,650	2,300	6,600	2,870	-2,870	1,701	0,909	0,551	-0,551	0,632	-1,742	15,734	7,091	0,419
50 x 25 x 2	1,920	0,518	2,400	2,500	2,400	2,500	7,386	2,954	-2,954	1,961	1,847	0,769	-0,769	0,981	-2,760	22,451	8,526	0,706
50 x 30 x 3	3,120	0,842	2,850	2,500	2,850	2,500	12,084	4,833	-4,833	1,968	4,642	1,629	-1,629	1,220	-5,711	28,456	15,178	1,547
50 x 30 x 5	5,000	1,350	2,750	2,500	2,750	2,500	17,917	7,167	-7,167	1,893	6,990	2,542	-2,542	1,182	-8,438	28,538	22,505	2,401
50 x 35 x 3	3,420	0,923	3,350	2,500	3,350	2,500	13,743	5,497	-5,497	2,005	7,531	2,248	-2,248	1,484	-7,896	34,264	19,122	2,152
50 x 40 x 1,5	1,905	0,514	3,925	2,500	3,925	2,500	8,357	3,343	-3,343	2,094	6,048	1,541	-1,541	1,782	-5,602	39,178	12,922	1,483
60 x 24 x 4	4,000	1,080	2,200	3,000	2,200	3,000	19,765	6,588	-6,588	2,223	2,874	1,306	-1,306	0,848	-5,376	16,239	21,331	1,308
60 x 30 x 3	3,420	0,923	2,850	3,000	2,850	3,000	18,571	6,190	-6,190	2,330	4,644	1,629	-1,629	1,165	-6,926	22,422	21,428	1,786
60 x 40 x 4	5,280	1,426	3,800	3,000	3,800	3,000	29,818	9,939	-9,939	2,376	14,667	3,860	-3,860	1,667	-16,128	32,420	40,061	4,424
64 x 24 x 4	4,160	1,123	2,200	3,200	2,200	3,200	23,159	7,237	-7,237	2,359	2,876	1,307	-1,307	0,831	-5,760	14,797	24,681	1,354

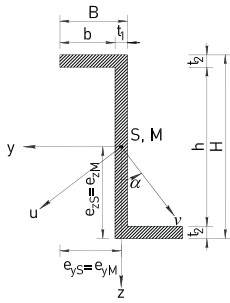


Tabelle 2-4 | Teil 2 von 2

Z-Profile

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
70 x 20 x 1,8	1,915	0,517	1,910	3,500	1,910	3,500	12,766	3,647	-3,647	2,582	0,840	0,440	-0,440	0,662	-2,234	10,270	13,170	0,435	
80 x 20 x 1,8	2,095	0,566	1,910	4,000	1,910	4,000	17,699	4,425	-4,425	2,906	0,840	0,440	-0,440	0,633	-2,562	8,453	18,079	0,459	
90 x 20 x 1,8	2,275	0,614	1,910	4,500	1,910	4,500	23,679	5,262	-5,262	3,226	0,841	0,440	-0,440	0,608	-2,889	7,100	24,039	0,481	
150 x 45 x 4	9,280	2,506	4,300	7,500	4,300	7,500	287,335	38,311	-38,311	5,564	21,284	4,950	-4,950	1,514	-53,874	11,024	297,830	10,789	
190 x 50 x 3	8,520	2,300	4,850	9,500	4,850	9,500	418,028	44,003	-44,003	7,005	22,860	4,713	-4,713	1,638	-65,918	9,225	428,733	12,155	

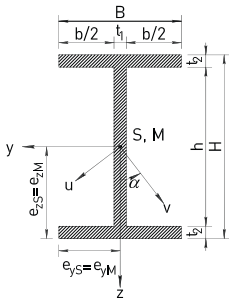


Tabelle 2-5 | Teil 1 von 1
Doppel-T-Profile

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
30 x 15 x 1,5	0,855	0,231	0,750	1,500	0,750	1,500	1,161	0,774	-0,774	1,165	0,085	0,114	-0,114	0,316	0,000	0,000	1,161	0,085	
30 x 15 x 2	1,120	0,302	0,750	1,500	0,750	1,500	1,471	0,981	-0,981	1,146	0,114	0,152	-0,152	0,319	0,000	0,000	1,471	0,114	
30 x 30 x 3	2,520	0,680	1,500	1,500	1,500	1,500	3,640	2,426	-2,426	1,202	1,355	0,904	-0,904	0,733	0,000	0,000	3,640	1,355	
40 x 20 x 1,5	1,155	0,312	1,000	2,000	1,000	2,000	2,858	1,429	-1,429	1,573	0,201	0,201	-0,201	0,417	0,000	0,000	2,858	0,201	
40 x 20 x 2	1,520	0,410	1,000	2,000	1,000	2,000	3,668	1,834	-1,834	1,553	0,269	0,269	-0,269	0,421	0,000	0,000	3,668	0,269	
40 x 20 x 3	2,220	0,599	1,000	2,000	1,000	2,000	5,099	2,549	-2,549	1,515	0,408	0,408	-0,408	0,429	0,000	0,000	5,099	0,408	
40 x 20 x 6	4,080	1,102	1,000	2,000	1,000	2,000	8,106	4,053	-4,053	1,409	0,850	0,850	-0,850	0,457	0,000	0,000	8,106	0,850	
40 x 30 x 3	2,820	0,761	1,500	2,000	1,500	2,000	7,157	3,578	-3,578	1,593	1,358	0,905	-0,905	0,694	0,000	0,000	7,157	1,358	
40 x 40 x 2	2,320	0,626	2,000	2,000	2,000	2,000	6,559	3,279	-3,279	1,681	2,136	1,068	-1,068	0,959	0,000	0,000	6,559	2,136	
50 x 25 x 2	1,920	0,518	1,250	2,500	1,250	2,500	7,386	2,954	-2,954	1,961	0,524	0,419	-0,419	0,522	0,000	0,000	7,386	0,524	
50 x 25 x 3	2,820	0,761	1,250	2,500	1,250	2,500	10,425	4,170	-4,170	1,923	0,791	0,633	-0,633	0,530	0,000	0,000	10,425	0,791	
50 x 40 x 2	2,520	0,680	2,000	2,500	2,000	2,500	10,844	4,337	-4,337	2,074	2,136	1,068	-1,068	0,921	0,000	0,000	10,844	2,136	
50 x 40 x 4	4,880	1,318	2,000	2,500	2,000	2,500	19,440	7,776	-7,776	1,996	4,289	2,145	-2,145	0,938	0,000	0,000	19,440	4,289	
60 x 20 x 3	2,820	0,761	1,000	3,000	1,000	3,000	13,693	4,564	-4,564	2,204	0,412	0,412	-0,412	0,382	0,000	0,000	13,693	0,412	
60 x 30 x 2	2,320	0,626	1,500	3,000	1,500	3,000	13,023	4,341	-4,341	2,369	0,904	0,602	-0,602	0,624	0,000	0,000	13,023	0,904	
60 x 30 x 3	3,420	0,923	1,500	3,000	1,500	3,000	18,571	6,190	-6,190	2,330	1,362	0,908	-0,908	0,631	0,000	0,000	18,571	1,362	
60 x 40 x 3	4,020	1,085	2,000	3,000	2,000	3,000	23,449	7,816	-7,816	2,415	3,212	1,606	-1,606	0,894	0,000	0,000	23,449	3,212	
60 x 40 x 4	5,280	1,426	2,000	3,000	2,000	3,000	29,818	9,939	-9,939	2,376	4,294	2,147	-2,147	0,902	0,000	0,000	29,818	4,294	
70 x 35 x 3	4,020	1,085	1,750	3,500	1,750	3,500	30,137	8,610	-8,610	2,738	2,158	1,233	-1,233	0,733	0,000	0,000	30,137	2,158	
70 x 35 x 5	6,500	1,755	1,750	3,500	1,750	3,500	46,042	13,155	-13,155	2,661	3,635	2,077	-2,077	0,748	0,000	0,000	46,042	3,635	
70 x 40 x 3	4,320	1,166	2,000	3,500	2,000	3,500	33,506	9,573	-9,573	2,785	3,214	1,607	-1,607	0,863	0,000	0,000	33,506	3,214	
70 x 60 x 4	7,280	1,966	3,000	3,500	3,000	3,500	60,280	17,223	-17,223	2,878	14,433	4,811	-4,811	1,408	0,000	0,000	60,280	14,433	
80 x 20 x 2	2,320	0,626	1,000	4,000	1,000	4,000	19,487	4,872	-4,872	2,898	0,272	0,272	-0,272	0,342	0,000	0,000	19,487	0,272	
80 x 25 x 3	3,720	1,004	1,250	4,000	1,250	4,000	32,376	8,094	-8,094	2,950	0,798	0,638	-0,638	0,463	0,000	0,000	32,376	0,798	
80 x 30 x 3	4,020	1,085	1,500	4,000	1,500	4,000	36,825	9,206	-9,206	3,027	0,911	0,911	-0,911	0,583	0,000	0,000	36,825	1,367	
80 x 40 x 3	4,620	1,247	2,000	4,000	2,000	4,000	45,723	11,431	-11,431	3,146	3,217	1,608	-1,608	0,834	0,000	0,000	45,723	3,217	
80 x 40 x 4	6,080	1,642	2,000	4,000	2,000	4,000	58,692	14,673	-14,673	3,107	4,305	2,153	-2,153	0,841	0,000	0,000	58,692	4,305	
80 x 40 x 5	7,500	2,025	2,000	4,000	2,000	4,000	70,625	17,656	-17,656	3,069	5,406	2,703	-2,703	0,849	0,000	0,000	70,625	5,406	
80 x 50 x 4	6,880	1,858	2,500	4,000	2,500	4,000	70,255	17,564	-17,564	3,196	8,372	3,349	-3,349	1,103	0,000	0,000	70,255	8,372	
80 x 50 x 5	8,500	2,295	2,500	4,000	2,500	4,000	84,708	21,177	-21,177	3,157	10,490	4,196	-4,196	1,111	0,000	0,000	84,708	10,490	
80 x 60 x 6	11,280	3,046	3,000	4,000	3,000	4,000	114,506	28,626	-28,626	3,186	21,722	7,241	-7,241	1,388	0,000	0,000	114,506	21,722	
90 x 45 x 3	5,220	1,409	2,250	4,500	2,250	4,500	65,929	14,651	-14,651	3,554	4,575	2,033	-2,033	0,936	0,000	0,000	65,929	4,575	
90 x 50 x 5	9,000	2,430	2,500	4,500	2,500	4,500	111,750	24,833	-24,833	3,524	10,500	4,200	-4,200	1,080	0,000	0,000	111,750	10,500	
90 x 80 x 5	12,000	3,240	4,000	4,500	4,000	4,500	166,000	36,889	-36,889	3,719	42,750	10,688	-10,688	1,887	0,000	0,000	166,000	42,750	
100 x 35 x 4	6,480	1,750	1,750	5,000	1,750	5,000	90,506	18,101	-18,101	3,737	2,907	1,661	-1,661	0,670	0,000	0,000	90,506	2,907	
100 x 40 x 5	8,500	2,295	2,000	5,000	2,000	5,000	120,708	24,142	-24,142	3,768	5,427	2,714	-2,714	0,799	0,000	0,000	120,708	5,427	
100 x 50 x 2	3,920	1,058	2,500	5,000	2,500	5,000	62,772	12,554	-12,554	4,002	4,173	1,669	-1,669	1,032	0,000	0,000	62,772	4,173	
100 x 50 x 4	7,680	2,074	2,500	5,000	2,500	5,000	118,170	23,634	-23,634	3,923	8,382	3,353	-3,353	1,045	0,000	0,000	118,170	8,382	
100 x 50 x 5	9,500	2,565	2,500	5,000	2,500	5,000	143,292	28,658	-28,658	3,884	10,510	4,204	-4,204	1,052	0,000	0,000	143,292	10,510	
100 x 50 x 6	11,280	3,046	2,500	5,000	2,500	5,000	166,794	33,359	-33,359	3,845	12,658	5,063	-5,063	1,059	0,000	0,000	166,794	12,658	
100 x 60 x 5	10,500	2,835	3,000	5,000	3,000	5,000	165,875	33,175	-33,175	3,975	18,094	6,031	-6,031	1,313	0,000	0,000	165,875	18,094	
100 x 80 x 2	5,120	1,382	4,000	5,000	4,000	5,000	91,588	18,318	-18,318	4,229	17,073	4,268	-4,268	1,826	0,000	0,000	91,588	17,073	
100 x 80 x 3	7,620	2,057	4,000	5,000	4,000	5,000	133,709	26,742	-26,742	4,189	25,621	6,405	-6,405	1,834	0,000	0,000	133,709	25,621	
100 x 80 x 6	14,880	4,018	4,000	5,000	4,000	5,000	246,426	49,285	-49,285	4,070	51,358	12,840	-12,840	1,858	0,000	0,000	246,426	51,358	
100 x 100 x 2	5,920	1,598	5,000	5,000	5,000	5,000	110,799	22,160	-22,160	4,326	33,340	6,668	-6,668	2,373	0,000	0,000	110,799	33,340	
120 x 40 x 3	5,820	1,571	2,000	6,000	2,000	6,000	119,191	19,865	-19,865	4,525	3,226	1,613	-1,613	0,744	0,000	0,000	119,191	3,226	
120 x 60 x 4	9,280	2,506	3,000	6,000	3,000	6,000	208,367	34,728	-34,728	4,738	14,460	4,820	-4,820	1,248	0,000	0,000	208,367	14,460	
120 x 60 x 5	11,500	3,105	3,000	6,000	3,000	6,000	253,958	42,326	-42,326	4,699	18,115	6,038	-6,038	1,255	0,000	0,000	253,958	18,115	
120 x 60 x 6	13,680	3,694	3,000	6,000	3,000	6,000	297,130	49,522	-49,522	4,660	21,794	7,265	-7,265	1,262	0,000	0,000	297,130	21,794	
120 x 100 x 5	15,500	4,185	5,000	6,000	5,000	6,000	386,292	64,382	-64,382	4,992	83,448	16,690	-16,690	2,320	0,000	0,000	386,292	83,448	
120 x 100 x 6	18,480	4,990	5,000	6,000	5,000	6,000	453,226	75,538	-75,538	4,952	100,194	20,039	-20,039	2,328	0,000	0,000	453,226	100,194	
140 x 70 x 8	21,120	5,702	3,500	7,000	3,500	7,000	615,578	87,940	-87,940	5,399	46,262	13,218	-13,218	1,480	0,000	0,000	615,578	46,262	
160 x 80 x 7	21,420	5,783	4,000	8,000	4,000	8,000	837,451	104,681	-104,681	6,253	60,151	15,038	-15,038	1,676	0,000	0,000	837,451	60,151	
200 x 60 x 5	15,500	4,185	3,000	10,000	3,000	10,000	856,292	85,629	-85,629	7,433	18,198	6,066	-6,066	1,084	0,000	0,000	856,292	18,198	
200 x 80 x 5	17,500	4,725	4,000	10,000	4,000	10,000	1046,458	104,646	-104,646	7,733	42,865	10,716	-10,716	1,565	0,000	0,000	1046,458	42,865	

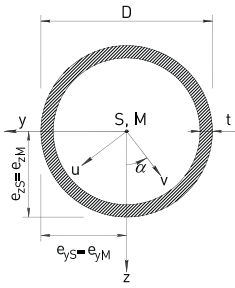


Tabelle 2-6 | Teil 1 von 4

Rund-Rohre

Abmessungen D x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
6 x 1	0,157	0,042	0,300	0,300	0,300	0,300	0,005	0,017	-0,017	0,180	0,005	0,017	-0,017	0,180	0,000	0,000	0,005	0,005	
8 x 1	0,220	0,059	0,400	0,400	0,400	0,400	0,014	0,034	-0,034	0,250	0,014	0,034	-0,034	0,250	0,000	0,000	0,014	0,014	
8 x 2	0,377	0,102	0,400	0,400	0,400	0,400	0,019	0,047	-0,047	0,224	0,019	0,047	-0,047	0,224	0,000	0,000	0,019	0,019	
8 x 2,5	0,432	0,117	0,400	0,400	0,400	0,400	0,020	0,049	-0,049	0,214	0,020	0,049	-0,049	0,214	0,000	0,000	0,020	0,020	
10 x 1	0,283	0,076	0,500	0,500	0,500	0,500	0,029	0,058	-0,058	0,320	0,029	0,058	-0,058	0,320	0,000	0,000	0,029	0,029	
10 x 1,5	0,401	0,108	0,500	0,500	0,500	0,500	0,037	0,075	-0,075	0,305	0,037	0,075	-0,075	0,305	0,000	0,000	0,037	0,037	
10 x 2	0,503	0,136	0,500	0,500	0,500	0,500	0,043	0,085	-0,085	0,292	0,043	0,085	-0,085	0,292	0,000	0,000	0,043	0,043	
12 x 1	0,346	0,093	0,600	0,600	0,600	0,600	0,053	0,088	-0,088	0,391	0,053	0,088	-0,088	0,391	0,000	0,000	0,053	0,053	
12 x 1,5	0,495	0,134	0,600	0,600	0,600	0,600	0,070	0,116	-0,116	0,375	0,070	0,116	-0,116	0,375	0,000	0,000	0,070	0,070	
12 x 2	0,628	0,170	0,600	0,600	0,600	0,600	0,082	0,136	-0,136	0,361	0,082	0,136	-0,136	0,361	0,000	0,000	0,082	0,082	
13 x 1,5	0,542	0,146	0,650	0,650	0,650	0,650	0,091	0,140	-0,140	0,410	0,091	0,140	-0,140	0,410	0,000	0,000	0,091	0,091	
14 x 1	0,408	0,110	0,700	0,700	0,700	0,700	0,087	0,124	-0,124	0,461	0,087	0,124	-0,124	0,461	0,000	0,000	0,087	0,087	
14 x 2	0,754	0,204	0,700	0,700	0,700	0,700	0,139	0,199	-0,199	0,430	0,139	0,199	-0,199	0,430	0,000	0,000	0,139	0,139	
15 x 1	0,440	0,119	0,750	0,750	0,750	0,750	0,108	0,144	-0,144	0,496	0,108	0,144	-0,144	0,496	0,000	0,000	0,108	0,108	
15 x 1,5	0,636	0,172	0,750	0,750	0,750	0,750	0,147	0,196	-0,196	0,480	0,147	0,196	-0,196	0,480	0,000	0,000	0,147	0,147	
15 x 2	0,817	0,221	0,750	0,750	0,750	0,750	0,177	0,236	-0,236	0,465	0,177	0,236	-0,236	0,465	0,000	0,000	0,177	0,177	
16 x 1	0,471	0,127	0,800	0,800	0,800	0,800	0,133	0,166	-0,166	0,532	0,133	0,166	-0,166	0,532	0,000	0,000	0,133	0,133	
16 x 1,5	0,683	0,184	0,800	0,800	0,800	0,800	0,182	0,227	-0,227	0,515	0,182	0,227	-0,227	0,515	0,000	0,000	0,182	0,182	
16 x 2	0,880	0,238	0,800	0,800	0,800	0,800	0,220	0,275	-0,275	0,500	0,220	0,275	-0,275	0,500	0,000	0,000	0,220	0,220	
16 x 3	1,225	0,331	0,800	0,800	0,800	0,800	0,273	0,341	-0,341	0,472	0,273	0,341	-0,341	0,472	0,000	0,000	0,273	0,273	
18 x 1	0,534	0,144	0,900	0,900	0,900	0,900	0,194	0,215	-0,215	0,602	0,194	0,215	-0,215	0,602	0,000	0,000	0,194	0,194	
18 x 1,5	0,778	0,210	0,900	0,900	0,900	0,900	0,267	0,296	-0,296	0,586	0,267	0,296	-0,296	0,586	0,000	0,000	0,267	0,267	
18 x 2	1,005	0,271	0,900	0,900	0,900	0,900	0,327	0,363	-0,363	0,570	0,327	0,363	-0,363	0,570	0,000	0,000	0,327	0,327	
20 x 1	0,597	0,161	1,000	1,000	1,000	1,000	0,270	0,270	-0,270	0,673	0,270	0,270	-0,270	0,673	0,000	0,000	0,270	0,270	
20 x 1,5	0,872	0,235	1,000	1,000	1,000	1,000	0,375	0,375	-0,375	0,656	0,375	0,375	-0,375	0,656	0,000	0,000	0,375	0,375	
20 x 2	1,131	0,305	1,000	1,000	1,000	1,000	0,464	0,464	-0,464	0,640	0,464	0,464	-0,464	0,640	0,000	0,000	0,464	0,464	
20 x 2,5	1,374	0,371	1,000	1,000	1,000	1,000	0,537	0,537	-0,537	0,625	0,537	0,537	-0,537	0,625	0,000	0,000	0,537	0,537	
20 x 3	1,602	0,433	1,000	1,000	1,000	1,000	0,597	0,597	-0,597	0,610	0,597	0,597	-0,597	0,610	0,000	0,000	0,597	0,597	
20 x 5	2,356	0,636	1,000	1,000	1,000	1,000	0,736	0,736	-0,736	0,559	0,736	0,736	-0,736	0,559	0,000	0,000	0,736	0,736	
22 x 1,5	0,966	0,261	1,100	1,100	1,100	1,100	0,510	0,464	-0,464	0,727	0,510	0,464	-0,464	0,727	0,000	0,000	0,510	0,510	
22 x 2	1,257	0,339	1,100	1,100	1,100	1,100	0,635	0,577	-0,577	0,711	0,635	0,577	-0,577	0,711	0,000	0,000	0,635	0,635	
24 x 2	1,382	0,373	1,200	1,200	1,200	1,200	0,843	0,703	-0,703	0,781	0,843	0,703	-0,703	0,781	0,000	0,000	0,843	0,843	
25 x 1	0,754	0,204	1,250	1,250	1,250	1,250	0,544	0,435	-0,435	0,849	0,544	0,435	-0,435	0,849	0,000	0,000	0,544	0,544	
25 x 1,5	1,107	0,299	1,250	1,250	1,250	1,250	0,768	0,614	-0,614	0,833	0,768	0,614	-0,614	0,833	0,000	0,000	0,768	0,768	
25 x 2	1,445	0,390	1,250	1,250	1,250	1,250	0,963	0,770	-0,770	0,816	0,963	0,770	-0,770	0,816	0,000	0,000	0,963	0,963	
25 x 2,5	1,767	0,477	1,250	1,250	1,250	1,250	1,132	0,906	-0,906	0,800	1,132	0,906	-0,906	0,800	0,000	0,000	1,132	1,132	
25 x 3	2,073	0,560	1,250	1,250	1,250	1,250	1,278	1,022	-1,022	0,785	1,278	1,022	-1,022	0,785	0,000	0,000	1,278	1,278	
25 x 5	3,142	0,848	1,250	1,250	1,250	1,250	1,669	1,335	-1,335	0,729	1,669	1,335	-1,335	0,729	0,000	0,000	1,669	1,669	
27 x 2	1,571	0,424	1,350	1,350	1,350	1,350	1,235	0,915	-0,915	0,887	1,235	0,915	-0,915	0,887	0,000	0,000	1,235	1,235	
28 x 1,5	1,249	0,337	1,400	1,400	1,400	1,400	1,100	0,786	-0,786	0,938	1,100	0,786	-0,786	0,938	0,000	0,000	1,100	1,100	
28 x 2	1,634	0,441	1,400	1,400	1,400	1,400	1,389	0,992	-0,992	0,922	1,389	0,992	-0,992	0,922	0,000	0,000	1,389	1,389	
28 x 2,5	2,003	0,541	1,400	1,400	1,400	1,400	1,644	1,174	-1,174	0,906	1,644	1,174	-1,174	0,906	0,000	0,000	1,644	1,644	
28 x 4	3,016	0,814	1,400	1,400	1,400	1,400	2,232	1,594	-1,594	0,860	2,232	1,594	-1,594	0,860	0,000	0,000	2,232	2,232	
30 x 1	0,911	0,246	1,500	1,500	1,500	1,500	0,959	0,639	-0,639	1,026	0,959	0,639	-0,639	1,026	0,000	0,000	0,959	0,959	
30 x 1,5	1,343	0,363	1,500	1,500	1,500	1,500	1,367	0,912	-0,912	1,009	1,367	0,912	-0,912	1,009	0,000	0,000	1,367	1,367	
30 x 2	1,759	0,475	1,500	1,500	1,500	1,500	1,733	1,155	-1,155	0,992	1,733	1,155	-1,155	0,992	0,000	0,000	1,733	1,733	
30 x 2,5	2,160	0,583	1,500	1,500	1,500	1,500	2,059	1,372	-1,372	0,976	2,059	1,372	-1,372	0,976	0,000	0,000	2,059	2,059	
30 x 3	2,545	0,687	1,500	1,500	1,500	1,500	2,347	1,565	-1,565	0,960	2,347	1,565	-1,565	0,960	0,000	0,000	2,347	2,347	
30 x 4	3,267	0,882	1,500	1,500	1,500	1,500	2,826	1,884	-1,884	0,930	2,826	1,884	-1,884	0,930	0,000	0,000	2,826	2,826	
30 x 5	3,927	1,060	1,500	1,500	1,500	1,500	3,191	2,127	-2,127	0,901	3,191	2,127	-2,127	0,901	0,000	0,000	3,191	3,191	
30 x 6	4,524	1,221	1,500	1,500	1,500	1,500	3,461	2,307	-2,307	0,875	3,461	2,307	-2,307	0,875	0,000	0,000	3,461	3,461	
30 x 7,5	5,301	1,431	1,500	1,500	1,500	1,500	3,728	2,485	-2,485	0,839	3,728	2,485	-2,485	0,839	0,000	0,000	3,728	3,728	
32 x 1,5	1,437	0,388	1,600	1,600	1,600	1,600	1,675	1,047	-1,047	1,080	1,675	1,047	-1,047	1,080	0,000	0,000	1,675	1,675	
32 x 2	1,885	0,509	1,600	1,600	1,600	1,600	2,130	1,331	-1,331	1,063	2,130	1,331	-1,331	1,063	0,000	0,000	2,130	2,130	
32 x 3	2,733	0,738	1,600	1,600	1,600	1,600	2,904	1,815	-1,815	1,031	2,904	1,815	-1,815	1,031	0,000	0,000	2,904	2,904	
33 x 4	3,644	0,984	1,650	1,650	1,650	1,650	3,904	2,366	-2,366	1,035	3,904	2,366	-2,366	1,035	0,000	0,000	3,904	3,904	

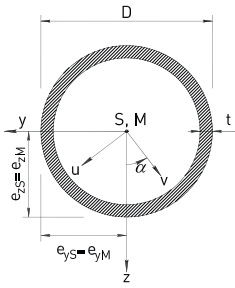


Tabelle 2-6 | Teil 2 von 4

Rund-Rohre

Abmessungen D x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
34 x 5	4,555	1,230	1,700	1,700	1,700	1,700	4,931	2,901	-2,901	1,040	4,931	2,901	-2,901	1,040	0,000	0,000	4,931	4,931	
35 x 1,5	1,579	0,426	1,750	1,750	1,750	1,750	2,219	1,268	-1,268	1,186	2,219	1,268	-1,268	1,186	0,000	0,000	2,219	2,219	
35 x 2	2,073	0,560	1,750	1,750	1,750	1,750	2,833	1,619	-1,619	1,169	2,833	1,619	-1,619	1,169	0,000	0,000	2,833	2,833	
35 x 2,5	2,553	0,689	1,750	1,750	1,750	1,750	3,390	1,937	-1,937	1,152	3,390	1,937	-1,937	1,152	0,000	0,000	3,390	3,390	
35 x 3	3,016	0,814	1,750	1,750	1,750	1,750	3,894	2,225	-2,225	1,136	3,894	2,225	-2,225	1,136	0,000	0,000	3,894	3,894	
35 x 4	3,896	1,052	1,750	1,750	1,750	1,750	4,757	2,719	-2,719	1,105	4,757	2,719	-2,719	1,105	0,000	0,000	4,757	4,757	
35 x 5	4,712	1,272	1,750	1,750	1,750	1,750	5,449	3,114	-3,114	1,075	5,449	3,114	-3,114	1,075	0,000	0,000	5,449	5,449	
35 x 10	7,854	2,121	1,750	1,750	1,750	1,750	7,118	4,067	-4,067	0,952	7,118	4,067	-4,067	0,952	0,000	0,000	7,118	7,118	
38 x 1,5	1,720	0,464	1,900	1,900	1,900	1,900	2,869	1,510	-1,510	1,292	2,869	1,510	-1,510	1,292	0,000	0,000	2,869	2,869	
38 x 2	2,262	0,611	1,900	1,900	1,900	1,900	3,676	1,935	-1,935	1,275	3,676	1,935	-1,935	1,275	0,000	0,000	3,676	3,676	
38 x 3	3,299	0,891	1,900	1,900	1,900	1,900	5,088	2,678	-2,678	1,242	5,088	2,678	-2,678	1,242	0,000	0,000	5,088	5,088	
38 x 4	4,273	1,154	1,900	1,900	1,900	1,900	6,259	3,294	-3,294	1,210	6,259	3,294	-3,294	1,210	0,000	0,000	6,259	6,259	
40 x 1,5	1,814	0,490	2,000	2,000	2,000	2,000	3,367	1,683	-1,683	1,362	3,367	1,683	-1,683	1,362	0,000	0,000	3,367	3,367	
40 x 2	2,388	0,645	2,000	2,000	2,000	2,000	4,322	2,161	-2,161	1,345	4,322	2,161	-2,161	1,345	0,000	0,000	4,322	4,322	
40 x 2,5	2,945	0,795	2,000	2,000	2,000	2,000	5,200	2,600	-2,600	1,329	5,200	2,600	-2,600	1,329	0,000	0,000	5,200	5,200	
40 x 3	3,487	0,942	2,000	2,000	2,000	2,000	6,007	3,003	-3,003	1,312	6,007	3,003	-3,003	1,312	0,000	0,000	6,007	6,007	
40 x 4	4,524	1,221	2,000	2,000	2,000	2,000	7,419	3,710	-3,710	1,281	7,419	3,710	-3,710	1,281	0,000	0,000	7,419	7,419	
40 x 5	5,498	1,484	2,000	2,000	2,000	2,000	8,590	4,295	-4,295	1,250	8,590	4,295	-4,295	1,250	0,000	0,000	8,590	8,590	
40 x 8	8,042	2,171	2,000	2,000	2,000	2,000	10,938	5,469	-5,469	1,166	10,938	5,469	-5,469	1,166	0,000	0,000	10,938	10,938	
40 x 10	9,425	2,545	2,000	2,000	2,000	2,000	11,781	5,890	-5,890	1,118	11,781	5,890	-5,890	1,118	0,000	0,000	11,781	11,781	
42 x 2	2,513	0,679	2,100	2,100	2,100	2,100	5,039	2,400	-2,400	1,416	5,039	2,400	-2,400	1,416	0,000	0,000	5,039	5,039	
42 x 3	3,676	0,992	2,100	2,100	2,100	2,100	7,030	3,347	-3,347	1,383	7,030	3,347	-3,347	1,383	0,000	0,000	7,030	7,030	
42 x 4	4,775	1,289	2,100	2,100	2,100	2,100	8,715	4,150	-4,150	1,351	8,715	4,150	-4,150	1,351	0,000	0,000	8,715	8,715	
45 x 1,5	2,050	0,553	2,250	2,250	2,250	2,250	4,854	2,158	-2,158	1,539	4,854	2,158	-2,158	1,539	0,000	0,000	4,854	4,854	
45 x 2	2,702	0,729	2,250	2,250	2,250	2,250	6,258	2,781	-2,781	1,522	6,258	2,781	-2,781	1,522	0,000	0,000	6,258	6,258	
45 x 2,5	3,338	0,901	2,250	2,250	2,250	2,250	7,563	3,361	-3,361	1,505	7,563	3,361	-3,361	1,505	0,000	0,000	7,563	7,563	
45 x 3	3,958	1,069	2,250	2,250	2,250	2,250	8,773	3,899	-3,899	1,489	8,773	3,899	-3,899	1,489	0,000	0,000	8,773	8,773	
45 x 4	5,152	1,391	2,250	2,250	2,250	2,250	10,929	4,857	-4,857	1,456	10,929	4,857	-4,857	1,456	0,000	0,000	10,929	10,929	
45 x 5	6,283	1,696	2,250	2,250	2,250	2,250	12,763	5,672	-5,672	1,425	12,763	5,672	-5,672	1,425	0,000	0,000	12,763	12,763	
46 x 3	4,053	1,094	2,300	2,300	2,300	2,300	9,412	4,092	-4,092	1,524	9,412	4,092	-4,092	1,524	0,000	0,000	9,412	9,412	
48 x 2	2,890	0,780	2,400	2,400	2,400	2,400	7,659	3,191	-3,191	1,628	7,659	3,191	-3,191	1,628	0,000	0,000	7,659	7,659	
48 x 2,5	3,574	0,965	2,400	2,400	2,400	2,400	9,276	3,865	-3,865	1,611	9,276	3,865	-3,865	1,611	0,000	0,000	9,276	9,276	
48 x 3	4,241	1,145	2,400	2,400	2,400	2,400	10,783	4,493	-4,493	1,595	10,783	4,493	-4,493	1,595	0,000	0,000	10,783	10,783	
48 x 4	5,529	1,493	2,400	2,400	2,400	2,400	13,491	5,621	-5,621	1,562	13,491	5,621	-5,621	1,562	0,000	0,000	13,491	13,491	
50 x 1,5	2,286	0,617	2,500	2,500	2,500	2,500	6,727	2,691	-2,691	1,716	6,727	2,691	-2,691	1,716	0,000	0,000	6,727	6,727	
50 x 2	3,016	0,814	2,500	2,500	2,500	2,500	8,701	3,480	-3,480	1,699	8,701	3,480	-3,480	1,699	0,000	0,000	8,701	8,701	
50 x 2,5	3,731	1,007	2,500	2,500	2,500	2,500	10,551	4,220	-4,220	1,682	10,551	4,220	-4,220	1,682	0,000	0,000	10,551	10,551	
50 x 3	4,430	1,196	2,500	2,500	2,500	2,500	12,281	4,912	-4,912	1,665	12,281	4,912	-4,912	1,665	0,000	0,000	12,281	12,281	
50 x 4	5,781	1,561	2,500	2,500	2,500	2,500	15,405	6,162	-6,162	1,632	15,405	6,162	-6,162	1,632	0,000	0,000	15,405	15,405	
50 x 5	7,069	1,909	2,500	2,500	2,500	2,500	18,113	7,245	-7,245	1,601	18,113	7,245	-7,245	1,601	0,000	0,000	18,113	18,113	
50 x 10	12,566	3,393	2,500	2,500	2,500	2,500	26,704	10,681	-10,681	1,458	26,704	10,681	-10,681	1,458	0,000	0,000	26,704	26,704	
54 x 2	3,267	0,882	2,700	2,700	2,700	2,700	11,060	4,096	-4,096	1,840	11,060	4,096	-4,096	1,840	0,000	0,000	11,060	11,060	
55 x 2,5	4,123	1,113	2,750	2,750	2,750	2,750	14,238	5,178	-5,178	1,858	14,238	5,178	-5,178	1,858	0,000	0,000	14,238	14,238	
55 x 5	7,854	2,121	2,750	2,750	2,750	2,750	24,789	9,014	-9,014	1,777	24,789	9,014	-9,014	1,777	0,000	0,000	24,789	24,789	
55 x 10	14,137	3,817	2,750	2,750	2,750	2,750	37,552	13,655	-13,655	1,630	37,552	13,655	-13,655	1,630	0,000	0,000	37,552	37,552	
56 x 3	4,995	1,349	2,800	2,800	2,800	2,800	17,595	6,284	-6,284	1,877	17,595	6,284	-6,284	1,877	0,000	0,000	17,595	17,595	
60 x 1	1,854	0,500	3,000	3,000	3,000	3,000	8,068	2,689	-2,689	2,086	8,068	2,689	-2,689	2,086	0,000	0,000	8,068	8,068	
60 x 1,5	2,757	0,744	3,000	3,000	3,000	3,000	11,801	3,934	-3,934	2,069	11,801	3,934	-3,934	2,069	0,000	0,000	11,801	11,801	
60 x 2	3,644	0,984	3,000	3,000	3,000	3,000	15,342	5,114	-5,114	2,052	15,342	5,114	-5,114	2,052	0,000	0,000	15,342	15,342	
60 x 2,5	4,516	1,219	3,000	3,000	3,000	3,000	18,699	6,233	-6,233	2,035	18,699	6,233	-6,233	2,035	0,000	0,000	18,699	18,699	
60 x 3	5,372	1,450	3,000	3,000	3,000	3,000	21,878	7,293	-7,293	2,018	21,878	7,293	-7,293	2,018	0,000	0,000	21,878	21,878	
60 x 4	7,037	1,900	3,000	3,000	3,000	3,000	27,726	9,242	-9,242	1,985	27,726	9,242	-9,242	1,985	0,000	0,000	27,726	27,726	
60 x 5	8,639	2,333	3,000	3,000	3,000	3,000	32,938	10,979	-10,979	1,953	32,938	10,979	-10,979	1,953	0,000	0,000	32,938	32,938	
60 x 6	10,179	2,748	3,000	3,000	3,000	3,000	37,560	12,520	-12,520	1,921	37,560	12,520	-12,520	1,921	0,000	0,000	37,560	37,560	
60 x 10	15,708	4,241	3,000	3,000	3,000	3,000	51,051	17,017	-17,017	1,803	51,051	17,017	-17,017	1,803	0,000	0,000	51,051	51,051	
60 x 15	21,206	5,726	3,000	3,000	3,000	3,000	59,641	19,880	-19,880	1,677	59,641	19,880	-19,880	1,677	0,000	0,000	59,641	59,641	
65 x 2	3,958	1,069	3,250	3,250	3,250	3,250	19,658	6,049	-6,049	2,229	19,658	6,049	-6,049	2,229	0,000	0,000	19,658	19,658	

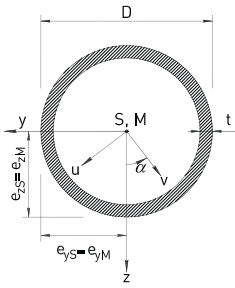


Tabelle 2-6 | Teil 3 von 4

Rund-Rohre

Abmessungen D x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
65 x 2,5	4,909	1,325	3,250	3,250	3,250	3,250	24,007	7,387	-7,387	2,211	24,007	7,387	-7,387	2,211	0,000	0,000	24,007	24,007	
65 x 5	9,425	2,545	3,250	3,250	3,250	3,250	42,706	13,140	-13,140	2,129	42,706	13,140	-13,140	2,129	0,000	0,000	42,706	42,706	
70 x 2	4,273	1,154	3,500	3,500	3,500	3,500	24,717	7,062	-7,062	2,405	24,717	7,062	-7,062	2,405	0,000	0,000	24,717	24,717	
70 x 3	6,315	1,705	3,500	3,500	3,500	3,500	35,504	10,144	-10,144	2,371	35,504	10,144	-10,144	2,371	0,000	0,000	35,504	35,504	
70 x 4	8,294	2,239	3,500	3,500	3,500	3,500	45,326	12,950	-12,950	2,338	45,326	12,950	-12,950	2,338	0,000	0,000	45,326	45,326	
70 x 5	10,210	2,757	3,500	3,500	3,500	3,500	54,242	15,498	-15,498	2,305	54,242	15,498	-15,498	2,305	0,000	0,000	54,242	54,242	
70 x 10	18,850	5,089	3,500	3,500	3,500	3,500	87,179	24,908	-24,908	2,151	87,179	24,908	-24,908	2,151	0,000	0,000	87,179	87,179	
70 x 15	25,918	6,998	3,500	3,500	3,500	3,500	105,292	30,084	-30,084	2,016	105,292	30,084	-30,084	2,016	0,000	0,000	105,292	105,292	
75 x 2,5	5,694	1,537	3,750	3,750	3,750	3,750	37,457	9,988	-9,988	2,565	37,457	9,988	-9,988	2,565	0,000	0,000	37,457	37,457	
75 x 5	10,996	2,969	3,750	3,750	3,750	3,750	67,692	18,051	-18,051	2,481	67,692	18,051	-18,051	2,481	0,000	0,000	67,692	67,692	
76 x 2,5	5,773	1,559	3,800	3,800	3,800	3,800	39,027	10,270	-10,270	2,600	39,027	10,270	-10,270	2,600	0,000	0,000	39,027	39,027	
76 x 3	6,880	1,858	3,800	3,800	3,800	3,800	45,907	12,081	-12,081	2,583	45,907	12,081	-12,081	2,583	0,000	0,000	45,907	45,907	
80 x 2	4,901	1,323	4,000	4,000	4,000	4,000	37,296	9,324	-9,324	2,759	37,296	9,324	-9,324	2,759	0,000	0,000	37,296	37,296	
80 x 2,5	6,087	1,643	4,000	4,000	4,000	4,000	45,746	11,437	-11,437	2,741	45,746	11,437	-11,437	2,741	0,000	0,000	45,746	45,746	
80 x 3	7,257	1,959	4,000	4,000	4,000	4,000	53,866	13,466	-13,466	2,724	53,866	13,466	-13,466	2,724	0,000	0,000	53,866	53,866	
80 x 4	9,550	2,579	4,000	4,000	4,000	4,000	69,145	17,286	-17,286	2,691	69,145	17,286	-17,286	2,691	0,000	0,000	69,145	69,145	
80 x 5	11,781	3,181	4,000	4,000	4,000	4,000	83,203	20,801	-20,801	2,658	83,203	20,801	-20,801	2,658	0,000	0,000	83,203	83,203	
80 x 10	21,991	5,938	4,000	4,000	4,000	4,000	137,445	34,361	-34,361	2,500	137,445	34,361	-34,361	2,500	0,000	0,000	137,445	137,445	
80 x 15	30,631	8,270	4,000	4,000	4,000	4,000	170,382	42,596	-42,596	2,358	170,382	42,596	-42,596	2,358	0,000	0,000	170,382	170,382	
80 x 20	37,699	10,179	4,000	4,000	4,000	4,000	188,496	47,124	-47,124	2,236	188,496	47,124	-47,124	2,236	0,000	0,000	188,496	188,496	
84 x 2	5,152	1,391	4,200	4,200	4,200	4,200	43,330	10,317	-10,317	2,900	43,330	10,317	-10,317	2,900	0,000	0,000	43,330	43,330	
85 x 3	7,728	2,087	4,250	4,250	4,250	4,250	65,043	15,304	-15,304	2,901	65,043	15,304	-15,304	2,901	0,000	0,000	65,043	65,043	
86 x 3	7,823	2,112	4,300	4,300	4,300	4,300	67,450	15,686	-15,686	2,936	67,450	15,686	-15,686	2,936	0,000	0,000	67,450	67,450	
90 x 2	5,529	1,493	4,500	4,500	4,500	4,500	53,550	11,900	-11,900	3,112	53,550	11,900	-11,900	3,112	0,000	0,000	53,550	53,550	
90 x 3	8,200	2,214	4,500	4,500	4,500	4,500	77,670	17,260	-17,260	3,078	77,670	17,260	-17,260	3,078	0,000	0,000	77,670	77,670	
90 x 5	13,352	3,605	4,500	4,500	4,500	4,500	121,000	26,889	-26,889	3,010	121,000	26,889	-26,889	3,010	0,000	0,000	121,000	121,000	
90 x 8	20,609	5,564	4,500	4,500	4,500	4,500	174,866	38,859	-38,859	2,913	174,866	38,859	-38,859	2,913	0,000	0,000	174,866	174,866	
90 x 10	25,133	6,786	4,500	4,500	4,500	4,500	204,204	45,379	-45,379	2,850	204,204	45,379	-45,379	2,850	0,000	0,000	204,204	204,204	
90 x 15	35,343	9,543	4,500	4,500	4,500	4,500	258,445	57,432	-57,432	2,704	258,445	57,432	-57,432	2,704	0,000	0,000	258,445	258,445	
100 x 2	6,158	1,663	5,000	5,000	5,000	5,000	73,952	14,790	-14,790	3,466	73,952	14,790	-14,790	3,466	0,000	0,000	73,952	73,952	
100 x 2,5	7,658	2,068	5,000	5,000	5,000	5,000	91,054	18,211	-18,211	3,448	91,054	18,211	-18,211	3,448	0,000	0,000	91,054	91,054	
100 x 3	9,142	2,468	5,000	5,000	5,000	5,000	107,625	21,525	-21,525	3,431	107,625	21,525	-21,525	3,431	0,000	0,000	107,625	107,625	
100 x 4	12,064	3,257	5,000	5,000	5,000	5,000	139,215	27,843	-27,843	3,397	139,215	27,843	-27,843	3,397	0,000	0,000	139,215	139,215	
100 x 5	14,923	4,029	5,000	5,000	5,000	5,000	168,812	33,762	-33,762	3,363	168,812	33,762	-33,762	3,363	0,000	0,000	168,812	168,812	
100 x 10	28,274	7,634	5,000	5,000	5,000	5,000	289,812	57,962	-57,962	3,202	289,812	57,962	-57,962	3,202	0,000	0,000	289,812	289,812	
100 x 15	40,055	10,815	5,000	5,000	5,000	5,000	373,015	74,603	-74,603	3,052	373,015	74,603	-74,603	3,052	0,000	0,000	373,015	373,015	
100 x 20	50,265	13,572	5,000	5,000	5,000	5,000	427,257	85,451	-85,451	2,915	427,257	85,451	-85,451	2,915	0,000	0,000	427,257	427,257	
100 x 30	65,973	17,813	5,000	5,000	5,000	5,000	478,307	95,661	-95,661	2,693	478,307	95,661	-95,661	2,693	0,000	0,000	478,307	478,307	
106 x 3	9,708	2,621	5,300	5,300	5,300	5,300	128,843	24,310	-24,310	3,643	128,843	24,310	-24,310	3,643	0,000	0,000	128,843	128,843	
108 x 3	9,896	2,672	5,400	5,400	5,400	5,400	136,491	25,276	-25,276	3,714	136,491	25,276	-25,276	3,714	0,000	0,000	136,491	136,491	
108 x 4	13,069	3,529	5,400	5,400	5,400	5,400	176,955	32,769	-32,769	3,680	176,955	32,769	-32,769	3,680	0,000	0,000	176,955	176,955	
110 x 3	10,085	2,723	5,500	5,500	5,500	5,500	144,435	26,261	-26,261	3,785	144,435	26,261	-26,261	3,785	0,000	0,000	144,435	144,435	
110 x 5	16,493	4,453	5,500	5,500	5,500	5,500	227,815	41,421	-41,421	3,717	227,815	41,421	-41,421	3,717	0,000	0,000	227,815	227,815	
110 x 15	44,768	12,087	5,500	5,500	5,500	5,500	517,626	94,114	-94,114	3,400	517,626	94,114	-94,114	3,400	0,000	0,000	517,626	517,626	
115 x 5	17,279	4,665	5,750	5,750	5,750	5,750	261,881	45,545	-45,545	3,893	261,881	45,545	-45,545	3,893	0,000	0,000	261,881	261,881	
120 x 3	11,027	2,977	6,000	6,000	6,000	6,000	188,810	31,468	-31,468	4,138	188,810	31,468	-31,468	4,138	0,000	0,000	188,810	188,810	
120 x 5	18,064	4,877	6,000	6,000	6,000	6,000	299,188	49,865	-49,865	4,070	299,188	49,865	-49,865	4,070	0,000	0,000	299,188	299,188	
120 x 10	34,558	9,331	6,000	6,000	6,000	6,000	527,002	87,834	-87,834	3,905	527,002	87,834	-87,834	3,905	0,000	0,000	527,002	527,002	
120 x 20	62,832	16,965	6,000	6,000	6,000	6,000	816,814	136,136	-136,136	3,606	816,814	136,136	-136,136	3,606	0,000	0,000	816,814	816,814	
125 x 5	18,850	5,089	6,250	6,250	6,250	6,250	339,881	54,381	-54,381	4,246	339,881	54,381	-54,381	4,246	0,000	0,000	339,881	339,881	
130 x 3	11,969	3,232	6,500	6,500	6,500	6,500	241,454	37,147	-37,147	4,491	241,454	37,147	-37,147	4,491	0,000	0,000	241,454	241,454	
130 x 5	19,635	5,301	6,500	6,500	6,500	6,500	384,109	59,094	-59,094	4,423	384,109	59,094	-59,094	4,423	0,000	0,000	384,109	384,109	
140 x 3	12,912	3,486	7,000	7,000	7,000	7,000	303,076	43,297	-43,297	4,845	303,076	43,297	-43,297	4,845	0,000	0,000	303,076	303,076	
140 x 5	21,206	5,726	7,000	7,000	7,000	7,000	483,756	69,108	-69,108	4,776	483,756	69,108	-69,108	4,776	0,000	0,000	483,756	483,756	
140 x 20	75,398	20,358	7,000	7,000	7,000	7,000	1394,867	199,267	-199,267	4,301	1394,867	199,267	-199,267	4,301	0,000	0,000	1394,867	1394,867	

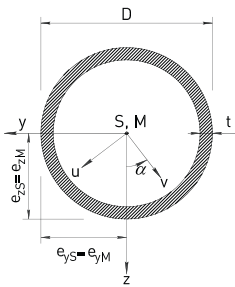


Tabelle 2-6 | Teil 4 von 4

Rund-Rohre

Abmessungen D x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
150 x 3	13,854	3,741	7,500	7,500	7,500	7,500	374,381	49,917	-49,917	5,198	374,381	49,917	-49,917	5,198	0,000	0,000	374,381	374,381	
150 x 5	22,777	6,150	7,500	7,500	7,500	7,500	599,308	79,908	-79,908	5,130	599,308	79,908	-79,908	5,130	0,000	0,000	599,308	599,308	
150 x 10	43,982	11,875	7,500	7,500	7,500	7,500	1083,064	144,409	-144,409	4,962	1083,064	144,409	-144,409	4,962	0,000	0,000	1083,064	1083,064	
156 x 3	14,420	3,893	7,800	7,800	7,800	7,800	422,107	54,116	-54,116	5,410	422,107	54,116	-54,116	5,410	0,000	0,000	422,107	422,107	
160 x 3	14,797	3,995	8,000	8,000	8,000	8,000	456,077	57,010	-57,010	5,552	456,077	57,010	-57,010	5,552	0,000	0,000	456,077	456,077	
160 x 5	24,347	6,574	8,000	8,000	8,000	8,000	731,942	91,493	-91,493	5,483	731,942	91,493	-91,493	5,483	0,000	0,000	731,942	731,942	
180 x 5	27,489	7,422	9,000	9,000	9,000	9,000	1053,170	117,019	-117,019	6,190	1053,170	117,019	-117,019	6,190	0,000	0,000	1053,170	1053,170	
200 x 5	30,631	8,270	10,000	10,000	10,000	10,000	1456,865	145,686	-145,686	6,897	1456,865	145,686	-145,686	6,897	0,000	0,000	1456,865	1456,865	
200 x 10	59,690	16,116	10,000	10,000	10,000	10,000	2700,984	270,098	-270,098	6,727	2700,984	270,098	-270,098	6,727	0,000	0,000	2700,984	2700,984	
250 x 5	38,485	10,391	12,500	12,500	12,500	12,500	2888,744	231,099	-231,099	8,664	2888,744	231,099	-231,099	8,664	0,000	0,000	2888,744	2888,744	

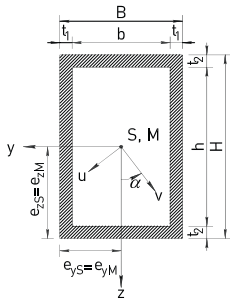


Tabelle 2-7 | Teil 1 von 4
Rechteck-Rohre

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
10 x 10 x 1	0,360	0,097	0,500	0,500	0,500	0,500	0,049	0,098	-0,098	0,370	0,049	0,098	-0,098	0,370	0,000	0,000	0,049	0,049	
15 x 15 x 1,5	0,810	0,219	0,750	0,750	0,750	0,750	0,249	0,332	-0,332	0,555	0,249	0,332	-0,332	0,555	0,000	0,000	0,249	0,249	
15 x 15 x 2	1,040	0,281	0,750	0,750	0,750	0,750	0,300	0,400	-0,400	0,537	0,300	0,400	-0,400	0,537	0,000	0,000	0,300	0,300	
20 x 10 x 1,5	0,810	0,219	0,500	1,000	0,500	1,000	0,380	0,380	-0,380	0,685	0,118	0,236	-0,236	0,382	0,000	0,000	0,380	0,118	
20 x 10 x 2	1,040	0,281	0,500	1,000	0,500	1,000	0,462	0,462	-0,462	0,666	0,138	0,276	-0,276	0,364	0,000	0,000	0,462	0,138	
20 x 12 x 2	1,120	0,302	0,600	1,000	0,600	1,000	0,527	0,527	-0,527	0,686	0,220	0,366	-0,366	0,443	0,000	0,000	0,527	0,220	
20 x 15 x 1	0,660	0,178	0,750	1,000	0,750	1,000	0,368	0,368	-0,368	0,747	0,233	0,311	-0,311	0,594	0,000	0,000	0,368	0,233	
20 x 15 x 2	1,240	0,335	0,750	1,000	0,750	1,000	0,625	0,625	-0,625	0,710	0,385	0,513	-0,513	0,557	0,000	0,000	0,625	0,385	
20 x 20 x 1,5	1,110	0,300	1,000	1,000	1,000	1,000	0,637	0,637	-0,637	0,758	0,637	0,637	-0,637	0,758	0,000	0,000	0,637	0,637	
20 x 20 x 2	1,440	0,389	1,000	1,000	1,000	1,000	0,787	0,787	-0,787	0,739	0,787	0,787	-0,787	0,739	0,000	0,000	0,787	0,787	
20 x 20 x 3	2,040	0,551	1,000	1,000	1,000	1,000	1,013	1,013	-1,013	0,705	1,013	1,013	-1,013	0,705	0,000	0,000	1,013	1,013	
25 x 15 x 1	0,760	0,205	0,750	1,250	0,750	1,250	0,635	0,508	-0,508	0,914	0,282	0,376	-0,376	0,609	0,000	0,000	0,635	0,282	
25 x 15 x 1,5	1,110	0,300	0,750	1,250	0,750	1,250	0,888	0,711	-0,711	0,895	0,386	0,515	-0,515	0,590	0,000	0,000	0,888	0,386	
25 x 15 x 2	1,440	0,389	0,750	1,250	0,750	1,250	1,104	0,883	-0,883	0,876	0,470	0,627	-0,627	0,571	0,000	0,000	1,104	0,470	
25 x 20 x 2	1,640	0,443	1,000	1,250	1,000	1,250	1,369	1,095	-1,095	0,914	0,950	0,950	-0,950	0,761	0,000	0,000	1,369	0,950	
25 x 25 x 1,5	1,410	0,381	1,250	1,250	1,250	1,250	1,303	1,042	-1,042	0,961	1,303	1,042	-1,042	0,961	0,000	0,000	1,303	1,303	
25 x 25 x 2	1,840	0,497	1,250	1,250	1,250	1,250	1,635	1,308	-1,308	0,943	1,635	1,308	-1,308	0,943	0,000	0,000	1,635	1,635	
25 x 25 x 3	2,640	0,713	1,250	1,250	1,250	1,250	2,169	1,735	-1,735	0,906	2,169	1,735	-1,735	0,906	0,000	0,000	2,169	2,169	
30 x 10 x 1,5	1,110	0,300	0,500	1,500	0,500	1,500	1,102	0,735	-0,735	0,996	0,173	0,346	-0,346	0,395	0,000	0,000	1,102	0,173	
30 x 15 x 1,5	1,260	0,340	0,750	1,500	0,750	1,500	1,407	0,938	-0,938	1,057	0,455	0,607	-0,607	0,601	0,000	0,000	1,407	0,455	
30 x 15 x 2	1,640	0,443	0,750	1,500	0,750	1,500	1,764	1,176	-1,176	1,037	0,555	0,740	-0,740	0,582	0,000	0,000	1,764	0,555	
30 x 20 x 1,5	1,410	0,381	1,000	1,500	1,000	1,500	1,712	1,141	-1,141	1,102	0,895	0,895	-0,895	0,797	0,000	0,000	1,712	0,895	
30 x 20 x 2	1,840	0,497	1,000	1,500	1,000	1,500	2,157	1,438	-1,438	1,083	1,113	1,113	-1,113	0,778	0,000	0,000	2,157	1,113	
30 x 20 x 3	2,640	0,713	1,000	1,500	1,000	1,500	2,887	1,925	-1,925	1,046	1,451	1,451	-1,451	0,741	0,000	0,000	2,887	1,451	
30 x 25 x 2	2,040	0,551	1,250	1,500	1,250	1,500	2,549	1,699	-1,699	1,118	1,900	1,520	-1,520	0,965	0,000	0,000	2,549	1,900	
30 x 30 x 2	2,240	0,605	1,500	1,500	1,500	1,500	2,942	1,961	-1,961	1,146	2,942	1,961	-1,961	1,146	0,000	0,000	2,942	2,942	
30 x 30 x 2,5	2,750	0,743	1,500	1,500	1,500	1,500	3,495	2,330	-2,330	1,127	3,495	2,330	-2,330	1,127	0,000	0,000	3,495	3,495	
30 x 30 x 3	3,240	0,875	1,500	1,500	1,500	1,500	3,985	2,657	-2,657	1,109	3,985	2,657	-2,657	1,109	0,000	0,000	3,985	3,985	
34 x 20 x 2	2,000	0,540	1,000	1,700	1,000	1,700	2,951	1,736	-1,736	1,215	1,243	1,243	-1,243	0,788	0,000	0,000	2,951	1,243	
34 x 20 x 3	2,880	0,778	1,000	1,700	1,000	1,700	3,990	2,347	-2,347	1,177	1,626	1,626	-1,626	0,751	0,000	0,000	3,990	1,626	
34 x 34 x 2	2,560	0,691	1,700	1,700	1,700	1,700	4,386	2,580	-2,580	1,309	4,386	2,580	-2,580	1,309	0,000	0,000	4,386	4,386	
34 x 34 x 3	3,720	1,004	1,700	1,700	1,700	1,700	6,014	3,538	-3,538	1,271	6,014	3,538	-3,538	1,271	0,000	0,000	6,014	6,014	
35 x 15 x 2	1,840	0,497	0,750	1,750	0,750	1,750	2,629	1,502	-1,502	1,195	0,641	0,854	-0,854	0,590	0,000	0,000	2,629	0,641	
35 x 20 x 2	2,040	0,551	1,000	1,750	1,000	1,750	3,174	1,814	-1,814	1,247	1,275	1,275	-1,275	0,791	0,000	0,000	3,174	1,275	
35 x 25 x 1,5	1,710	0,462	1,250	1,750	1,250	1,750	2,925	1,671	-1,671	1,308	1,718	1,374	-1,374	1,002	0,000	0,000	2,925	1,718	
35 x 25 x 2	2,240	0,605	1,250	1,750	1,250	1,750	3,719	2,125	-2,125	1,288	2,165	1,732	-1,732	0,983	0,000	0,000	3,719	2,165	
35 x 35 x 2	2,640	0,713	1,750	1,750	1,750	1,750	4,809	2,748	-2,748	1,350	4,809	2,748	-2,748	1,350	0,000	0,000	4,809	4,809	
35 x 35 x 3	3,840	1,037	1,750	1,750	1,750	1,750	6,611	3,778	-3,778	1,312	6,611	3,778	-3,778	1,312	0,000	0,000	6,611	6,611	
40 x 15 x 2	2,040	0,551	0,750	2,000	0,750	2,000	3,723	1,862	-1,862	1,351	0,726	0,968	-0,968	0,596	0,000	0,000	3,723	0,726	
40 x 20 x 1,5	1,710	0,462	1,000	2,000	1,000	2,000	3,491	1,745	-1,745	1,429	1,152	1,152	-1,152	0,821	0,000	0,000	3,491	1,152	
40 x 20 x 2	2,240	0,605	1,000	2,000	1,000	2,000	4,446	2,223	-2,223	1,409	1,438	1,438	-1,438	0,801	0,000	0,000	4,446	1,438	
40 x 20 x 2,5	2,750	0,743	1,000	2,000	1,000	2,000	5,307	2,654	-2,654	1,389	1,682	1,682	-1,682	0,782	0,000	0,000	5,307	1,682	
40 x 20 x 3	3,240	0,875	1,000	2,000	1,000	2,000	6,081	3,041	-3,041	1,370	1,889	1,889	-1,889	0,764	0,000	0,000	6,081	1,889	
40 x 20 x 4	4,160	1,123	1,000	2,000	1,000	2,000	7,390	3,695	-3,695	1,333	2,206	2,206	-2,206	0,728	0,000	0,000	7,390	2,206	
40 x 25 x 2	2,440	0,659	1,250	2,000	1,250	2,000	5,169	2,584	-2,584	1,455	2,430	1,944	-1,944	0,998	0,000	0,000	5,169	2,430	
40 x 25 x 3	3,540	0,956	1,250	2,000	1,250	2,000	7,110	3,555	-3,555	1,417	3,265	2,612	-2,612	0,960	0,000	0,000	7,110	3,265	
40 x 30 x 2	2,640	0,713	1,500	2,000	1,500	2,000	5,891	2,946	-2,946	1,494	3,727	2,485	-2,485	1,188	0,000	0,000	5,891	3,727	
40 x 30 x 2,5	3,250	0,878	1,500	2,000	1,500	2,000	7,068	3,534	-3,534	1,475	4,443	2,962	-2,962	1,169	0,000	0,000	7,068	4,443	
40 x 30 x 3	3,840	1,037	1,500	2,000	1,500	2,000	8,139	4,070	-4,070	1,456	5,083	3,389	-3,389	1,151	0,000	0,000	8,139	5,083	
40 x 30 x 4	4,960	1,339	1,500	2,000	1,500	2,000	9,993	4,996	-4,996	1,419	6,161	4,107	-4,107	1,114	0,000	0,000	9,993	6,161	
40 x 40 x 1,5	2,310	0,624	2,000	2,000	2,000	2,000	5,715	2,858	-2,858	1,573	5,715	2,858	-2,858	1,573	0,000	0,000	5,715	5,715	
40 x 40 x 2	3,040	0,821	2,000	2,000	2,000	2,000	7,337	3,668	-3,668	1,553	7,337	3,668	-3,668	1,553	0,000	0,000	7,337	7,337	
40 x 40 x 2,5	3,750	1,013	2,000	2,000	2,000	2,000	8,828	4,414	-4,414	1,534	8,828	4,414	-4,414	1,534	0,000	0,000	8,828	8,828	
40 x 40 x 3	4,440	1,199	2,000	2,000	2,000	2,000	10,197	5,099	-5,099	1,515	10,197	5,099	-5,099	1,515	0,000	0,000	10,197	10,197	
40 x 40 x 4	5,760	1,555	2,000	2,000	2,000	2,000	12,595	6,298	-6,298	1,479	12,595	6,298	-6,298	1,479	0,000	0,000	12,595	12,595	
45 x 20 x 2	2,440	0,659	1,000	2,250	1,000	2,250	5,998	2,666	-2,666	1,568	1,601	1,601	-1,601	0,810	0,000	0,000	5,998	1,601	
45 x 25 x 2	2,640	0,713	1,250	2,250	1,250	2,250	6,923	3,077	-3,077	1,619	2,695	2,156	-2,156	1,010	0,000	0,000	6,923	2,695	
45 x 45 x 2	3,440	0,929	2,250	2,250	2,250	2,250	10,624	4,722	-4,722	1,757	10,624	4,722	-4,722	1,757	0,000	0,000	10,624	10,624	
50 x 15 x 2	2,440	0,659	0,750	2															

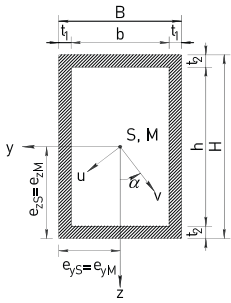


Tabelle 2-7 | Teil 2 von 4
Rechteck-Rohre

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{ys} [cm]	e _{zs} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
50 x 20 x 2	2,640	0,713	1,000	2,500	1,000	2,500	7,855	3,142	-3,142	1,725	1,763	1,763	-1,763	0,817	0,000	0,000	7,855	1,763	
50 x 20 x 3	3,840	1,037	1,000	2,500	1,000	2,500	10,895	4,358	-4,358	1,684	2,327	2,327	-2,327	0,778	0,000	0,000	10,895	2,327	
50 x 20 x 4	4,960	1,339	1,000	2,500	1,000	2,500	13,425	5,370	-5,370	1,645	2,729	2,729	-2,729	0,742	0,000	0,000	13,425	2,729	
50 x 25 x 1,5	2,160	0,583	1,250	2,500	1,250	2,500	7,007	2,803	-2,803	1,801	2,340	1,872	-1,872	1,041	0,000	0,000	7,007	2,340	
50 x 25 x 2	2,840	0,767	1,250	2,500	1,250	2,500	9,008	3,603	-3,603	1,781	2,960	2,368	-2,368	1,021	0,000	0,000	9,008	2,960	
50 x 25 x 3	4,140	1,118	1,250	2,500	1,250	2,500	12,554	5,022	-5,022	1,741	3,995	3,196	-3,196	0,982	0,000	0,000	12,554	3,995	
50 x 30 x 2	3,040	0,821	1,500	2,500	1,500	2,500	10,161	4,064	-4,064	1,828	4,513	3,008	-3,008	1,218	0,000	0,000	10,161	4,513	
50 x 30 x 2,5	3,750	1,013	1,500	2,500	1,500	2,500	12,266	4,906	-4,906	1,809	5,391	3,594	-3,594	1,199	0,000	0,000	12,266	5,391	
50 x 30 x 3	4,440	1,199	1,500	2,500	1,500	2,500	14,213	5,685	-5,685	1,789	6,181	4,121	-4,121	1,180	0,000	0,000	14,213	6,181	
50 x 34 x 1,5	2,430	0,656	1,700	2,500	1,700	2,500	8,596	3,438	-3,438	1,881	4,709	2,770	-2,770	1,392	0,000	0,000	8,596	4,709	
50 x 34 x 3	4,680	1,264	1,700	2,500	1,700	2,500	15,540	6,216	-6,216	1,822	8,328	4,899	-4,899	1,334	0,000	0,000	15,540	8,328	
50 x 40 x 2	3,440	0,929	2,000	2,500	2,000	2,500	12,466	4,986	-4,986	1,904	8,782	4,391	-4,391	1,598	0,000	0,000	12,466	8,782	
50 x 40 x 2,5	4,250	1,148	2,000	2,500	2,000	2,500	15,089	6,035	-6,035	1,884	10,589	5,294	-5,294	1,578	0,000	0,000	15,089	10,589	
50 x 40 x 3	5,040	1,361	2,000	2,500	2,000	2,500	17,531	7,012	-7,012	1,865	12,255	6,128	-6,128	1,559	0,000	0,000	17,531	12,255	
50 x 40 x 4	6,560	1,771	2,000	2,500	2,000	2,500	21,910	8,764	-8,764	1,828	15,198	7,599	-7,599	1,522	0,000	0,000	21,910	15,198	
50 x 50 x 2	3,840	1,037	2,500	2,500	2,500	2,500	14,771	5,908	-5,908	1,961	14,771	5,908	-5,908	1,961	0,000	0,000	14,771	14,771	
50 x 50 x 2,5	4,750	1,283	2,500	2,500	2,500	2,500	17,911	7,165	-7,165	1,942	17,911	7,165	-7,165	1,942	0,000	0,000	17,911	17,911	
50 x 50 x 3	5,640	1,523	2,500	2,500	2,500	2,500	20,849	8,340	-8,340	1,923	20,849	8,340	-8,340	1,923	0,000	0,000	20,849	20,849	
50 x 50 x 4	7,360	1,987	2,500	2,500	2,500	2,500	26,153	10,461	-10,461	1,885	26,153	10,461	-10,461	1,885	0,000	0,000	26,153	26,153	
50 x 50 x 5	9,000	2,430	2,500	2,500	2,500	2,500	30,750	12,300	-12,300	1,848	30,750	12,300	-12,300	1,848	0,000	0,000	30,750	30,750	
55 x 55 x 2	4,240	1,145	2,750	2,750	2,750	2,750	19,879	7,229	-7,229	2,165	19,879	7,229	-7,229	2,165	0,000	0,000	19,879	19,879	
60 x 20 x 2	3,040	0,821	1,000	3,000	1,000	3,000	12,585	4,195	-4,195	2,035	2,089	2,089	-2,089	0,829	0,000	0,000	12,585	2,089	
60 x 20 x 3	4,440	1,199	1,000	3,000	1,000	3,000	17,629	5,876	-5,876	1,993	2,765	2,765	-2,765	0,789	0,000	0,000	17,629	2,765	
60 x 25 x 2	3,240	0,875	1,250	3,000	1,250	3,000	14,267	4,756	-4,756	2,098	3,491	2,793	-2,793	1,038	0,000	0,000	14,267	3,491	
60 x 25 x 3	4,740	1,280	1,250	3,000	1,250	3,000	20,068	6,689	-6,689	2,058	4,726	3,781	-3,781	0,999	0,000	0,000	20,068	4,726	
60 x 30 x 2	3,440	0,929	1,500	3,000	1,500	3,000	15,950	5,317	-5,317	2,153	5,298	3,532	-3,532	1,241	0,000	0,000	15,950	5,298	
60 x 30 x 3	5,040	1,361	1,500	3,000	1,500	3,000	22,507	7,502	-7,502	2,113	7,279	4,853	-4,853	1,202	0,000	0,000	22,507	7,279	
60 x 34 x 3	5,280	1,426	1,700	3,000	1,700	3,000	24,458	8,153	-8,153	2,152	9,774	5,749	-5,749	1,361	0,000	0,000	24,458	9,774	
60 x 40 x 2	3,840	1,037	2,000	3,000	2,000	3,000	19,315	6,438	-6,438	2,243	24,167	5,114	-5,114	1,632	0,000	0,000	19,315	10,227	
60 x 40 x 2,5	4,750	1,283	2,000	3,000	2,000	3,000	23,474	7,825	-7,825	2,223	12,349	6,174	-6,174	1,612	0,000	0,000	23,474	12,349	
60 x 40 x 3	5,640	1,523	2,000	3,000	2,000	3,000	27,385	9,128	-9,128	2,204	14,313	7,157	-7,157	1,593	0,000	0,000	27,385	14,313	
60 x 40 x 4	7,360	1,987	2,000	3,000	2,000	3,000	34,505	11,502	-11,502	2,165	17,801	8,900	-8,900	1,555	0,000	0,000	34,505	17,801	
60 x 50 x 3	6,240	1,685	2,500	3,000	2,500	3,000	32,263	10,754	-10,754	2,274	24,167	9,667	-9,667	1,968	0,000	0,000	32,263	24,167	
60 x 50 x 4	8,160	2,203	2,500	3,000	2,500	3,000	40,787	13,596	-13,596	2,236	30,395	12,158	-12,158	1,930	0,000	0,000	40,787	30,395	
60 x 60 x 2	4,640	1,253	3,000	3,000	3,000	3,000	26,046	8,682	-8,682	2,369	26,046	8,682	-8,682	2,369	0,000	0,000	26,046	26,046	
60 x 60 x 3	6,840	1,847	3,000	3,000	3,000	3,000	37,141	12,380	-12,380	2,330	37,141	12,380	-12,380	2,330	0,000	0,000	37,141	37,141	
60 x 60 x 4	8,960	2,419	3,000	3,000	3,000	3,000	47,070	15,690	-15,690	2,292	47,070	15,690	-15,690	2,292	0,000	0,000	47,070	47,070	
70 x 20 x 2	3,440	0,929	1,000	3,500	1,000	3,500	18,834	5,381	-5,381	2,340	2,414	2,414	-2,414	0,838	0,000	0,000	18,834	2,414	
70 x 30 x 2	3,840	1,037	1,500	3,500	1,500	3,500	23,459	6,703	-6,703	2,472	6,083	4,055	-4,055	1,259	0,000	0,000	23,459	6,083	
70 x 30 x 3	5,640	1,523	1,500	3,500	1,500	3,500	33,321	9,520	-9,520	2,431	8,377	5,585	-5,585	1,219	0,000	0,000	33,321	8,377	
70 x 40 x 3	6,240	1,685	2,000	3,500	2,000	3,500	40,059	11,445	-11,445	2,534	16,371	8,186	-8,186	1,620	0,000	0,000	40,059	16,371	
70 x 70 x 2	5,440	1,469	3,500	3,500	3,500	3,500	41,961	11,989	-11,989	2,777	41,961	11,989	-11,989	2,777	0,000	0,000	41,961	41,961	
70 x 70 x 4	10,560	2,851	3,500	3,500	3,500	3,500	76,947	21,985	-21,985	2,699	76,947	21,985	-21,985	2,699	0,000	0,000	76,947	76,947	
75 x 50 x 3	7,140	1,928	2,500	3,750	2,500	3,750	55,328	14,754	-14,754	2,784	29,144	11,658	-11,658	2,020	0,000	0,000	55,328	29,144	
80 x 20 x 2	3,840	1,037	1,000	4,000	1,000	4,000	26,803	6,701	-6,701	2,642	2,739	2,739	-2,739	0,845	0,000	0,000	26,803	2,739	
80 x 20 x 2,5	4,750	1,283	1,000	4,000	1,000	4,000	32,599	8,150	-8,150	2,620	3,224	3,224	-3,224	0,824	0,000	0,000	32,599	3,224	
80 x 25 x 2	4,040	1,091	1,250	4,000	1,250	4,000	29,846	7,461	-7,461	2,718	4,551	3,641	-3,641	1,061	0,000	0,000	29,846	4,551	
80 x 30 x 2	4,240	1,145	1,500	4,000	1,500	4,000	32,889	8,222	-8,222	2,785	6,869	4,579	-4,579	1,273	0,000	0,000	32,889	6,869	
80 x 30 x 3	6,240	1,685	1,500	4,000	1,500	4,000	46,955	11,739	-11,739	2,743	9,475	6,317	-6,317	1,232	0,000	0,000	46,955	9,475	
80 x 40 x 2	4,640	1,253	2,000	4,000	2,000	4,000	38,974	9,743	-9,743	2,898	13,118	6,559	-6,559	1,681	0,000	0,000	38,974	13,118	
80 x 40 x 2,5	5,750	1,553	2,000	4,000	2,000	4,000	47,620	11,905	-11,905	2,878	15,870	7,935	-7,935	1,661	0,000	0,000	47,620	15,870	
80 x 40 x 3	6,840	1,847	2,000	4,000	2,000	4,000	55,853	13,963	-13,963	2,858	18,429	9,215	-9,215	1,641	0,000	0,000	55,853	18,429	
80 x 40 x 4	8,960	2,419	2,000	4,000	2,000	4,000	71,134	17,783	-17,783	2,818	23,006	11,503	-11,503	1,602	0,000	0,000	71,134	23,006	
80 x 50 x 2	5,040	1,361	2,500	4,000	2,500	4,000	45,059	11,265	-11,265	2,990	21,687	8,675	-8,675	2,074	0,000	0,000	45,059	21,687	
80 x 50 x 3	7,440	2,009	2,500	4,000	2,500	4,000	64,751	16,188	-16,188	2,950	30,803	12,321	-12,321	2,035	0,000	0,000	64,751	30,803	
80 x 50 x 4	9,760	2,635	2,500	4,000	2,500	4,000	82,697	20,674	-20,674	2,911	38,881	15,552	-15,552	1,996	0,000	0,000	82,697	38,881	
80 x 60 x 3	8,040	2,171	3,000	4,000	3,000	4,000	73,649	18,412	-18,412	3,027	46,897	15,632	-15,632	2,415	0,000	0,000	73,649	46,897	
80 x 60 x 4	10,560	2,85																	

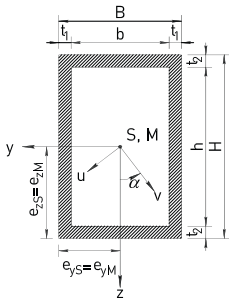


Tabelle 2-7 | Teil 3 von 4
Rechteck-Rohre

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			eyS [cm]	ezS [cm]	eyM [cm]	ezM [cm]	Iy [cm ⁴]	Wy,max [cm ³]	Wy,min [cm ³]	Iy [cm ⁴]	Iz [cm ⁴]	Wz,max [cm ³]	Wz,min [cm ³]	Iz [cm ⁴]	Iyz [cm ⁴]	α [°]	Iu [cm ⁴]	Iv [cm ⁴]	
80 x 80 x 5	15,000	4,050	4,000	4,000	4,000	4,000	141,250	35,313	-35,313	3,069	141,250	35,313	-35,313	3,069	0,000	0,000	141,250	141,250	
80 x 80 x 6	17,760	4,795	4,000	4,000	4,000	4,000	163,155	40,789	-40,789	3,031	163,155	40,789	-40,789	3,031	0,000	0,000	163,155	163,155	
90 x 90 x 4	13,760	3,715	4,500	4,500	4,500	4,500	169,982	37,774	-37,774	3,515	169,982	37,774	-37,774	3,515	0,000	0,000	169,982	169,982	
100 x 18 x 2	4,560	1,231	0,900	5,000	0,900	5,000	46,781	9,356	-9,356	3,203	2,665	2,961	-2,961	0,764	0,000	0,000	46,781	2,665	
100 x 20 x 2	4,640	1,253	1,000	5,000	1,000	5,000	48,702	9,740	-9,740	3,240	3,390	3,390	-3,390	0,855	0,000	0,000	48,702	3,390	
100 x 20 x 3	6,840	1,847	1,000	5,000	1,000	5,000	69,765	13,953	-13,953	3,194	4,517	4,517	-4,517	0,813	0,000	0,000	69,765	4,517	
100 x 25 x 2	4,840	1,307	1,250	5,000	1,250	5,000	53,505	10,701	-10,701	3,325	5,612	4,490	-4,490	1,077	0,000	0,000	53,505	5,612	
100 x 30 x 2	5,040	1,361	1,500	5,000	1,500	5,000	58,307	11,661	-11,661	3,401	8,439	5,626	-5,626	1,294	0,000	0,000	58,307	8,439	
100 x 30 x 3	7,440	2,009	1,500	5,000	1,500	5,000	83,883	16,777	-16,777	3,358	11,671	7,781	-7,781	1,252	0,000	0,000	83,883	11,671	
100 x 40 x 2	5,440	1,469	2,000	5,000	2,000	5,000	67,913	13,583	-13,583	3,533	16,009	8,004	-8,004	1,715	0,000	0,000	67,913	16,009	
100 x 40 x 2,5	6,750	1,823	2,000	5,000	2,000	5,000	83,266	16,653	-16,653	3,512	19,391	9,695	-9,695	1,695	0,000	0,000	83,266	19,391	
100 x 40 x 3	8,040	2,171	2,000	5,000	2,000	5,000	98,001	19,600	-19,600	3,491	22,545	11,273	-11,273	1,675	0,000	0,000	98,001	22,545	
100 x 40 x 4	10,560	2,851	2,000	5,000	2,000	5,000	125,683	25,137	-25,137	3,450	28,211	14,106	-14,106	1,634	0,000	0,000	125,683	28,211	
100 x 50 x 2	5,840	1,577	2,500	5,000	2,500	5,000	77,518	15,504	-15,504	3,643	26,298	10,519	-10,519	2,122	0,000	0,000	77,518	26,298	
100 x 50 x 3	8,640	2,333	2,500	5,000	2,500	5,000	112,119	22,424	-22,424	3,602	37,439	14,976	-14,976	2,082	0,000	0,000	112,119	37,439	
100 x 50 x 4	11,360	3,067	2,500	5,000	2,500	5,000	144,126	28,825	-28,825	3,562	47,366	18,946	-18,946	2,042	0,000	0,000	144,126	47,366	
100 x 50 x 5	14,000	3,780	2,500	5,000	2,500	5,000	173,667	34,733	-34,733	3,522	56,167	22,467	-22,467	2,003	0,000	0,000	173,667	56,167	
100 x 60 x 2	6,240	1,685	3,000	5,000	3,000	5,000	87,123	17,425	-17,425	3,737	39,507	13,169	-13,169	2,516	0,000	0,000	87,123	39,507	
100 x 60 x 2,5	7,750	2,093	3,000	5,000	3,000	5,000	107,036	21,407	-21,407	3,716	48,286	16,095	-16,095	2,496	0,000	0,000	107,036	48,286	
100 x 60 x 3	9,240	2,495	3,000	5,000	3,000	5,000	126,237	25,247	-25,247	3,696	56,653	18,884	-18,884	2,476	0,000	0,000	126,237	56,653	
100 x 60 x 4	12,160	3,283	3,000	5,000	3,000	5,000	162,569	32,514	-32,514	3,656	72,201	24,067	-24,067	2,437	0,000	0,000	162,569	72,201	
100 x 80 x 3	10,440	2,819	4,000	5,000	4,000	5,000	154,473	30,895	-30,895	3,847	109,241	27,310	-27,310	3,235	0,000	0,000	154,473	109,241	
100 x 100 x 2	7,840	2,117	5,000	5,000	5,000	5,000	125,545	25,109	-25,109	4,002	125,545	25,109	-25,109	4,002	0,000	0,000	125,545	125,545	
100 x 100 x 2,5	9,750	2,633	5,000	5,000	5,000	5,000	154,578	30,916	-30,916	3,982	154,578	30,916	-30,916	3,982	0,000	0,000	154,578	154,578	
100 x 100 x 3	11,640	3,143	5,000	5,000	5,000	5,000	182,709	36,542	-36,542	3,962	182,709	36,542	-36,542	3,962	0,000	0,000	182,709	182,709	
100 x 100 x 4	15,360	4,147	5,000	5,000	5,000	5,000	236,339	47,268	-47,268	3,923	236,339	47,268	-47,268	3,923	0,000	0,000	236,339	236,339	
110 x 60 x 4	12,960	3,499	3,000	5,500	3,000	5,500	205,643	37,390	-37,390	3,983	78,483	26,161	-26,161	2,461	0,000	0,000	205,643	78,483	
110 x 110 x 4	16,960	4,579	5,500	5,500	5,500	5,500	318,057	57,828	-57,828	4,331	318,057	57,828	-57,828	4,331	0,000	0,000	318,057	318,057	
120 x 20 x 2	5,440	1,469	1,000	6,000	1,000	6,000	79,881	13,313	-13,313	3,832	4,041	4,041	-4,041	0,862	0,000	0,000	79,881	4,041	
120 x 30 x 2	5,840	1,577	1,500	6,000	1,500	6,000	93,806	15,634	-15,634	4,008	10,010	6,673	-6,673	1,309	0,000	0,000	93,806	10,010	
120 x 30 x 3	8,640	2,333	1,500	6,000	1,500	6,000	135,691	22,615	-22,615	3,963	13,867	9,245	-9,245	1,267	0,000	0,000	135,691	13,867	
120 x 40 x 2	6,240	1,685	2,000	6,000	2,000	6,000	107,731	17,955	-17,955	4,155	18,899	9,450	-9,450	1,740	0,000	0,000	107,731	18,899	
120 x 40 x 4	12,160	3,283	2,000	6,000	2,000	6,000	201,353	33,559	-33,559	4,069	33,417	16,708	-16,708	1,658	0,000	0,000	201,353	33,417	
120 x 50 x 3	9,840	2,657	2,500	6,000	2,500	6,000	176,767	29,461	-29,461	4,238	44,075	17,630	-17,630	2,116	0,000	0,000	176,767	44,075	
120 x 50 x 4	12,960	3,499	2,500	6,000	2,500	6,000	228,275	38,046	-38,046	4,197	55,851	22,340	-22,340	2,076	0,000	0,000	228,275	55,851	
120 x 60 x 3	10,440	2,819	3,000	6,000	3,000	6,000	197,305	32,884	-32,884	4,347	66,409	22,136	-22,136	2,522	0,000	0,000	197,305	66,409	
120 x 60 x 4	13,760	3,715	3,000	6,000	3,000	6,000	255,198	42,533	-42,533	4,307	84,766	28,255	-28,255	2,482	0,000	0,000	255,198	84,766	
120 x 80 x 3	11,640	3,143	4,000	6,000	4,000	6,000	238,381	39,730	-39,730	4,525	127,037	31,759	-31,759	3,304	0,000	0,000	238,381	127,037	
120 x 120 x 2,5	11,750	3,173	6,000	6,000	6,000	6,000	270,495	45,082	-45,082	4,798	270,495	45,082	-45,082	4,798	0,000	0,000	270,495	270,495	
120 x 120 x 5	23,000	6,210	6,000	6,000	6,000	6,000	507,917	84,653	-84,653	4,699	507,917	84,653	-84,653	4,699	0,000	0,000	507,917	507,917	
140 x 40 x 4	13,760	3,715	2,000	7,000	2,000	7,000	301,342	43,049	-43,049	4,680	38,622	19,311	-19,311	1,675	0,000	0,000	301,342	38,622	
140 x 60 x 4	15,360	4,147	3,000	7,000	3,000	7,000	375,347	53,621	-53,621	4,943	97,331	32,444	-32,444	2,517	0,000	0,000	375,347	97,331	
140 x 80 x 4	16,960	4,579	4,000	7,000	4,000	7,000	449,353	64,193	-64,193	5,147	186,761	46,690	-46,690	3,318	0,000	0,000	449,353	186,761	
150 x 40 x 4	14,560	3,931	2,000	7,500	2,000	7,500	361,457	48,194	-48,194	4,983	41,225	20,612	-20,612	1,683	0,000	0,000	361,457	41,225	
150 x 50 x 4	15,360	4,147	2,500	7,500	2,500	7,500	404,099	53,880	-53,880	5,129	68,579	27,432	-27,432	2,113	0,000	0,000	404,099	68,579	
150 x 60 x 4	16,160	4,363	3,000	7,500	3,000	7,500	446,742	59,566	-59,566	5,258	103,614	34,538	-34,538	2,532	0,000	0,000	446,742	103,614	
150 x 60 x 5	20,000	5,400	3,000	7,500	3,000	7,500	544,167	72,556	-72,556	5,216	124,167	41,389	-41,389	2,492	0,000	0,000	544,167	124,167	
150 x 100 x 3	14,640	3,953	5,000	7,500	5,000	7,500	473,479	63,131	-63,131	5,687	253,299	50,660	-50,660	4,160	0,000	0,000	473,479	253,299	
150 x 100 x 5	24,000	6,480	5,000	7,500	5,000	7,500	754,500	100,600	-100,600	5,607	399,500	79,900	-79,900	4,080	0,000	0,000	754,500	399,500	
160 x 40 x 2	7,840	2,117	2,000	8,000	2,000	8,000	226,409	28,301	-28,301	5,374	24,681	12,340	-12,340	1,774	0,000	0,000	226,409	24,681	
160 x 60 x 4	16,960	4,579	3,000	8,000	3,000	8,000	526,217	65,777	-65,777	5,570	109,897	36,632	-36,632	2,546	0,000	0,000	526,217	109,897	
160 x 60 x 5	21,000	5,670	3,000	8,000	3,000	8,000	641,750	80,219	-80,219	5,528	131,750	43,917	-43,917	2,505	0,000	0,000	641,750	131,750	
160 x 80 x 4	18,560	5,011	4,000	8,000	4,000	8,000	623,582	77,948	-77,948	5,796	209,886	52,471	-52,471	3,363	0,000	0,000	623,582	209,886	
170 x 70 x 4	18,560	5,011	3,500	8,500	3,500	8,500	669,294	78,740	-78,740	6,005	164,174	46,907	-46,907	2,974	0,000	0,000	669,294	164,174	
180 x 40 x 4	16,960	4,579	2,000	9,000	2,000	9,000	587,081	65,231	-65,231	5,884	49,033	24,516	-24,516	1,700	0,000	0,000	587,081	49,033	
180 x 50 x 4	17,760	4,795	2,500	9,000	2,500	9,000	649,043	72,116	-72,116	6,045	81,307	32,523	-32,523						

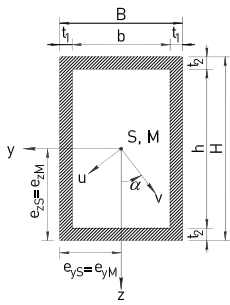


Tabelle 2-7 | Teil 4 von 4

Rechteck-Rohre

Abmessungen H x B x t [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
200 x 60 x 4	20,160	5,443	3,000	10,000	3,000	10,000	932,915	93,292	-93,292	6,803	135,027	45,009	-45,009	2,588	0,000	0,000	932,915	135,027	
200 x 80 x 4	21,760	5,875	4,000	10,000	4,000	10,000	1086,601	108,660	-108,660	7,067	256,137	64,034	-64,034	3,431	0,000	0,000	1086,601	256,137	
200 x 100 x 4	23,360	6,307	5,000	10,000	5,000	10,000	1240,286	124,029	-124,029	7,287	420,766	84,153	-84,153	4,244	0,000	0,000	1240,286	420,766	

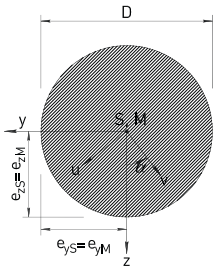


Tabelle 2-8 | Teil 1 von 2

Rund-Stangen

Abmessungen	Fläche	Gewicht	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e_{yS}	e_{zS}	e_{yM}	e_{zM}	I_y	$W_{y,max}$	$W_{y,min}$	i_y	I_z	$W_{z,max}$	$W_{z,min}$	i_z	I_{yz}	α	I_u	I_v	
D [mm]	A [cm ²]	G [kg/m]	[cm]	[cm]	[cm]	[cm]	[cm ⁴]	[cm ³]	[cm ³]	[cm]	[cm ⁴]	[cm ³]	[cm ³]	[cm]	[cm ⁴]	[°]	[cm ⁴]	[cm ⁴]	
4	0,126	0,034	0,200	0,200	0,200	0,200	0,001	0,006	-0,006	0,100	0,001	0,006	-0,006	0,100	0,000	0,000	0,001	0,001	
5	0,196	0,053	0,250	0,250	0,250	0,250	0,003	0,012	-0,012	0,125	0,003	0,012	-0,012	0,125	0,000	0,000	0,003	0,003	
6	0,283	0,076	0,300	0,300	0,300	0,300	0,006	0,021	-0,021	0,150	0,006	0,021	-0,021	0,150	0,000	0,000	0,006	0,006	
7	0,385	0,104	0,350	0,350	0,350	0,350	0,012	0,034	-0,034	0,175	0,012	0,034	-0,034	0,175	0,000	0,000	0,012	0,012	
8	0,503	0,136	0,400	0,400	0,400	0,400	0,020	0,050	-0,050	0,200	0,020	0,050	-0,050	0,200	0,000	0,000	0,020	0,020	
10	0,785	0,212	0,500	0,500	0,500	0,500	0,049	0,098	-0,098	0,250	0,049	0,098	-0,098	0,250	0,000	0,000	0,049	0,049	
12	1,131	0,305	0,600	0,600	0,600	0,600	0,102	0,170	-0,170	0,300	0,102	0,170	-0,170	0,300	0,000	0,000	0,102	0,102	
12,5	1,227	0,331	0,625	0,625	0,625	0,625	0,120	0,192	-0,192	0,313	0,120	0,192	-0,192	0,313	0,000	0,000	0,120	0,120	
13	1,327	0,358	0,650	0,650	0,650	0,650	0,140	0,216	-0,216	0,325	0,140	0,216	-0,216	0,325	0,000	0,000	0,140	0,140	
14	1,539	0,416	0,700	0,700	0,700	0,700	0,189	0,269	-0,269	0,350	0,189	0,269	-0,269	0,350	0,000	0,000	0,189	0,189	
15	1,767	0,477	0,750	0,750	0,750	0,750	0,249	0,331	-0,331	0,375	0,249	0,331	-0,331	0,375	0,000	0,000	0,249	0,249	
16	2,011	0,543	0,800	0,800	0,800	0,800	0,322	0,402	-0,402	0,400	0,322	0,402	-0,402	0,400	0,000	0,000	0,322	0,322	
16,5	2,138	0,577	0,825	0,825	0,825	0,825	0,364	0,441	-0,441	0,413	0,364	0,441	-0,441	0,413	0,000	0,000	0,364	0,364	
17	2,270	0,613	0,850	0,850	0,850	0,850	0,410	0,482	-0,482	0,425	0,410	0,482	-0,482	0,425	0,000	0,000	0,410	0,410	
18	2,545	0,687	0,900	0,900	0,900	0,900	0,515	0,573	-0,573	0,450	0,515	0,573	-0,573	0,450	0,000	0,000	0,515	0,515	
19	2,835	0,766	0,950	0,950	0,950	0,950	0,640	0,673	-0,673	0,475	0,640	0,673	-0,673	0,475	0,000	0,000	0,640	0,640	
20	3,142	0,848	1,000	1,000	1,000	1,000	0,785	0,785	-0,785	0,500	0,785	0,785	-0,785	0,500	0,000	0,000	0,785	0,785	
21	3,464	0,935	1,050	1,050	1,050	1,050	0,955	0,909	-0,909	0,525	0,955	0,909	-0,909	0,525	0,000	0,000	0,955	0,955	
22	3,801	1,026	1,100	1,100	1,100	1,100	1,150	1,045	-1,045	0,550	1,150	1,045	-1,045	0,550	0,000	0,000	1,150	1,150	
23	4,155	1,122	1,150	1,150	1,150	1,150	1,374	1,194	-1,194	0,575	1,374	1,194	-1,194	0,575	0,000	0,000	1,374	1,374	
24	4,524	1,221	1,200	1,200	1,200	1,200	1,629	1,357	-1,357	0,600	1,629	1,357	-1,357	0,600	0,000	0,000	1,629	1,629	
24,5	4,714	1,273	1,225	1,225	1,225	1,225	1,769	1,444	-1,444	0,613	1,769	1,444	-1,444	0,613	0,000	0,000	1,769	1,769	
25	4,909	1,325	1,250	1,250	1,250	1,250	1,917	1,534	-1,534	0,625	1,917	1,534	-1,534	0,625	0,000	0,000	1,917	1,917	
26	5,309	1,434	1,300	1,300	1,300	1,300	2,243	1,726	-1,726	0,650	2,243	1,726	-1,726	0,650	0,000	0,000	2,243	2,243	
27	5,726	1,546	1,350	1,350	1,350	1,350	2,609	1,932	-1,932	0,675	2,609	1,932	-1,932	0,675	0,000	0,000	2,609	2,609	
28	6,158	1,663	1,400	1,400	1,400	1,400	3,017	2,155	-2,155	0,700	3,017	2,155	-2,155	0,700	0,000	0,000	3,017	3,017	
29	6,605	1,783	1,450	1,450	1,450	1,450	3,472	2,394	-2,394	0,725	3,472	2,394	-2,394	0,725	0,000	0,000	3,472	3,472	
30	7,069	1,909	1,500	1,500	1,500	1,500	3,976	2,651	-2,651	0,750	3,976	2,651	-2,651	0,750	0,000	0,000	3,976	3,976	
31	7,548	2,038	1,550	1,550	1,550	1,550	4,533	2,925	-2,925	0,775	4,533	2,925	-2,925	0,775	0,000	0,000	4,533	4,533	
32	8,042	2,171	1,600	1,600	1,600	1,600	5,147	3,217	-3,217	0,800	5,147	3,217	-3,217	0,800	0,000	0,000	5,147	5,147	
33	8,553	2,309	1,650	1,650	1,650	1,650	5,821	3,528	-3,528	0,825	5,821	3,528	-3,528	0,825	0,000	0,000	5,821	5,821	
34	9,079	2,451	1,700	1,700	1,700	1,700	6,560	3,859	-3,859	0,850	6,560	3,859	-3,859	0,850	0,000	0,000	6,560	6,560	
35	9,621	2,598	1,750	1,750	1,750	1,750	7,366	4,209	-4,209	0,875	7,366	4,209	-4,209	0,875	0,000	0,000	7,366	7,366	
36	10,179	2,748	1,800	1,800	1,800	1,800	8,245	4,580	-4,580	0,900	8,245	4,580	-4,580	0,900	0,000	0,000	8,245	8,245	
37	10,752	2,903	1,850	1,850	1,850	1,850	9,200	4,973	-4,973	0,925	9,200	4,973	-4,973	0,925	0,000	0,000	9,200	9,200	
38	11,341	3,062	1,900	1,900	1,900	1,900	10,235	5,387	-5,387	0,950	10,235	5,387	-5,387	0,950	0,000	0,000	10,235	10,235	
40	12,566	3,393	2,000	2,000	2,000	2,000	12,566	6,283	-6,283	1,000	12,566	6,283	-6,283	1,000	0,000	0,000	12,566	12,566	
41	13,203	3,565	2,050	2,050	2,050	2,050	13,871	6,766	-6,766	1,025	13,871	6,766	-6,766	1,025	0,000	0,000	13,871	13,871	
42	13,854	3,741	2,100	2,100	2,100	2,100	15,275	7,274	-7,274	1,050	15,275	7,274	-7,274	1,050	0,000	0,000	15,275	15,275	
43	14,522	3,921	2,150	2,150	2,150	2,150	16,782	7,806	-7,806	1,075	16,782	7,806	-7,806	1,075	0,000	0,000	16,782	16,782	
44	15,205	4,105	2,200	2,200	2,200	2,200	18,398	8,363	-8,363	1,100	18,398	8,363	-8,363	1,100	0,000	0,000	18,398	18,398	
45	15,904	4,294	2,250	2,250	2,250	2,250	20,129	8,946	-8,946	1,125	20,129	8,946	-8,946	1,125	0,000	0,000	20,129	20,129	
46	16,619	4,487	2,300	2,300	2,300	2,300	21,979	9,556	-9,556	1,150	21,979	9,556	-9,556	1,150	0,000	0,000	21,979	21,979	
47	17,349	4,684	2,350	2,350	2,350	2,350	23,953	10,193	-10,193	1,175	23,953	10,193	-10,193	1,175	0,000	0,000	23,953	23,953	
48	18,096	4,886	2,400	2,400	2,400	2,400	26,058	10,857	-10,857	1,200	26,058	10,857	-10,857	1,200	0,000	0,000	26,058	26,058	
49	18,857	5,092	2,450	2,450	2,450	2,450	28,298	11,550	-11,550	1,225	28,298	11,550	-11,550	1,225	0,000	0,000	28,298	28,298	
50	19,635	5,301	2,500	2,500	2,500	2,500	30,680	12,272	-12,272	1,250	30,680	12,272	-12,272	1,250	0,000	0,000	30,680	30,680	
55	23,758	6,415	2,750	2,750	2,750	2,750	44,918	16,334	-16,334	1,375	44,918	16,334	-16,334	1,375	0,000	0,000	44,918	44,918	
60	28,274	7,634	3,000	3,000	3,000	3,000	63,617	21,206	-21,206	1,500	63,617	21,206	-21,206	1,500	0,000	0,000	63,617	63,617	
65	33,183	8,959	3,250	3,250	3,250	3,250	87,624	26,961	-26,961	1,625	87,624	26,961	-26,961	1,625	0,000	0,000	87,624	87,624	
70	38,485	10,391	3,500	3,500	3,500	3,500	117,859	33,674	-33,674	1,750	117,859	33,674	-33,674	1,750	0,000	0,000	117,859	117,859	
75	44,179	11,928	3,750	3,750	3,750	3,750	155,316	41,417	-41,417	1,875	155,316	41,417	-41,417	1,875	0,000	0,000	155,316	155,316	
80	50,265	13,572	4,000	4,000	4,000	4,000	201,062	50,265	-50,265	2,000	201,062	50,265	-50,265	2,000	0,000	0,000	201,062	201,062	
85	56,745	15,321	4,250	4,250	4,250	4,250	256,239	60,292	-60,292	2,125	256,239	60,292	-60,292	2,125	0,000	0,000	256,239	256,239	
90	63,617	17,177	4,500	4,500	4,500	4,500	322,062	71,569	-71,569	2,250	322,062	71,569	-71,569	2,250	0,000	0,000	322,062	322,062	
100	78,540	21,206	5,000	5,000	5,000	5,000	490,874	98,175	-98,175	2,500	490,874	98,175	-98,175	2,500	0,000	0,000	490,874	490,874	
105	86,590	23,379	5,250	5,250	5,250	5,250	596,660	113,650	-113,650	2,625	596,660	113,650	-113,650	2,625	0,000	0,000	596,660	596,660	
110	95,033	25,659	5,500	5,500	5,500	5,500	718,688	130,671	-130,671	2,750	718,688	130,671	-130,671	2,750	0,000	0,000	718,688	718,688	

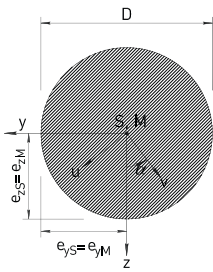


Tabelle 2-8 | Teil 2 von 2

Rund-Stangen

Abmessungen	Fläche	Gewicht	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z								Hauptträgheitsmomente			
			e_{yS}	e_{zS}	e_{yM}	e_{zM}	I_y	$W_{y,max}$	$W_{y,min}$	i_y	I_z	$W_{z,max}$	$W_{z,min}$	i_z	I_{yz}	α	I_u	I_v
D [mm]	A [cm ²]	G [kg/m]	[cm]	[cm]	[cm]	[cm]	[cm ⁴]	[cm ³]	[cm ³]	[cm]	[cm ⁴]	[cm ³]	[cm ³]	[cm]	[cm ⁴]	[°]	[cm ⁴]	[cm ⁴]
115	103,869	28,045	5,750	5,750	5,750	5,750	858,541	149,312	-149,312	2,875	858,541	149,312	-149,312	2,875	0,000	0,000	858,541	858,541
120	113,097	30,536	6,000	6,000	6,000	6,000	1017,876	169,646	-169,646	3,000	1017,876	169,646	-169,646	3,000	0,000	0,000	1017,876	1017,876
125	122,718	33,134	6,250	6,250	6,250	6,250	1198,422	191,748	-191,748	3,125	1198,422	191,748	-191,748	3,125	0,000	0,000	1198,422	1198,422
130	132,732	35,838	6,500	6,500	6,500	6,500	1401,985	215,690	-215,690	3,250	1401,985	215,690	-215,690	3,250	0,000	0,000	1401,985	1401,985
140	153,938	41,563	7,000	7,000	7,000	7,000	1885,741	269,392	-269,392	3,500	1885,741	269,392	-269,392	3,500	0,000	0,000	1885,741	1885,741
150	176,715	47,713	7,500	7,500	7,500	7,500	2485,049	331,340	-331,340	3,750	2485,049	331,340	-331,340	3,750	0,000	0,000	2485,049	2485,049
160	201,062	54,287	8,000	8,000	8,000	8,000	3216,991	402,124	-402,124	4,000	3216,991	402,124	-402,124	4,000	0,000	0,000	3216,991	3216,991
165	213,825	57,733	8,250	8,250	8,250	8,250	3638,360	441,013	-441,013	4,125	3638,360	441,013	-441,013	4,125	0,000	0,000	3638,360	3638,360
170	226,980	61,285	8,500	8,500	8,500	8,500	4099,828	482,333	-482,333	4,250	4099,828	482,333	-482,333	4,250	0,000	0,000	4099,828	4099,828
180	254,469	68,707	9,000	9,000	9,000	9,000	5152,997	572,555	-572,555	4,500	5152,997	572,555	-572,555	4,500	0,000	0,000	5152,997	5152,997
190	283,529	76,553	9,500	9,500	9,500	9,500	6397,117	673,381	-673,381	4,750	6397,117	673,381	-673,381	4,750	0,000	0,000	6397,117	6397,117
200	314,159	84,823	10,000	10,000	10,000	10,000	7853,982	785,398	-785,398	5,000	7853,982	785,398	-785,398	5,000	0,000	0,000	7853,982	7853,982

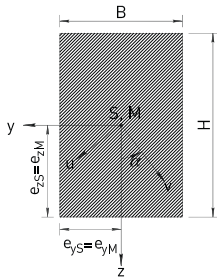


Tabelle 2-9 | Teil 1 von 6
Vierkant-Stangen

Abmessungen H x B [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
6 x 6	0,360	0,097	0,300	0,300	0,300	0,300	0,011	0,036	-0,036	0,173	0,011	0,036	-0,036	0,173	0,000	0,000	0,011	0,011	
8 x 8	0,640	0,173	0,400	0,400	0,400	0,400	0,034	0,085	-0,085	0,231	0,034	0,085	-0,085	0,231	0,000	0,000	0,034	0,034	
10 x 2	0,200	0,054	0,100	0,500	0,100	0,500	0,017	0,033	-0,033	0,289	0,001	0,007	-0,007	0,058	0,000	0,000	0,017	0,001	
10 x 3	0,300	0,081	0,150	0,500	0,150	0,500	0,025	0,050	-0,050	0,289	0,002	0,015	-0,015	0,087	0,000	0,000	0,025	0,002	
10 x 4	0,400	0,108	0,200	0,500	0,200	0,500	0,033	0,067	-0,067	0,289	0,005	0,027	-0,027	0,115	0,000	0,000	0,033	0,005	
10 x 5	0,500	0,135	0,250	0,500	0,250	0,500	0,042	0,083	-0,083	0,289	0,010	0,042	-0,042	0,144	0,000	0,000	0,042	0,010	
10 x 6	0,600	0,162	0,300	0,500	0,300	0,500	0,050	0,100	-0,100	0,289	0,018	0,060	-0,060	0,173	0,000	0,000	0,050	0,018	
10 x 8	0,800	0,216	0,400	0,500	0,400	0,500	0,067	0,133	-0,133	0,289	0,043	0,107	-0,107	0,231	0,000	0,000	0,067	0,043	
10 x 10	1,000	0,270	0,500	0,500	0,500	0,500	0,083	0,167	-0,167	0,289	0,083	0,167	-0,167	0,289	0,000	0,000	0,083	0,083	
12 x 3	0,360	0,097	0,150	0,600	0,150	0,600	0,043	0,072	-0,072	0,346	0,003	0,018	-0,018	0,087	0,000	0,000	0,043	0,003	
12 x 4	0,480	0,130	0,200	0,600	0,200	0,600	0,058	0,096	-0,096	0,346	0,006	0,032	-0,032	0,115	0,000	0,000	0,058	0,006	
12 x 5	0,600	0,162	0,250	0,600	0,250	0,600	0,072	0,120	-0,120	0,346	0,013	0,050	-0,050	0,144	0,000	0,000	0,072	0,013	
12 x 6	0,720	0,194	0,300	0,600	0,300	0,600	0,086	0,144	-0,144	0,346	0,022	0,072	-0,072	0,173	0,000	0,000	0,086	0,022	
12 x 8	0,960	0,259	0,400	0,600	0,400	0,600	0,115	0,192	-0,192	0,346	0,051	0,128	-0,128	0,231	0,000	0,000	0,115	0,051	
12 x 10	1,200	0,324	0,500	0,600	0,500	0,600	0,144	0,240	-0,240	0,346	0,100	0,200	-0,200	0,289	0,000	0,000	0,144	0,100	
12 x 12	1,440	0,389	0,600	0,600	0,600	0,600	0,173	0,288	-0,288	0,346	0,173	0,288	-0,288	0,346	0,000	0,000	0,173	0,173	
14 x 4	0,560	0,151	0,200	0,700	0,200	0,700	0,091	0,131	-0,131	0,404	0,007	0,037	-0,037	0,115	0,000	0,000	0,091	0,007	
14 x 12	1,680	0,454	0,600	0,700	0,600	0,700	0,274	0,392	-0,392	0,404	0,202	0,336	-0,336	0,346	0,000	0,000	0,274	0,202	
14 x 14	1,960	0,529	0,700	0,700	0,700	0,700	0,320	0,457	-0,457	0,404	0,320	0,457	-0,457	0,404	0,000	0,000	0,320	0,320	
15 x 2	0,300	0,081	0,100	0,750	0,100	0,750	0,056	0,075	-0,075	0,433	0,001	0,010	-0,010	0,058	0,000	0,000	0,056	0,001	
15 x 3	0,450	0,122	0,150	0,750	0,150	0,750	0,084	0,113	-0,113	0,433	0,003	0,023	-0,023	0,087	0,000	0,000	0,084	0,003	
15 x 4	0,600	0,162	0,200	0,750	0,200	0,750	0,113	0,150	-0,150	0,433	0,008	0,040	-0,040	0,115	0,000	0,000	0,113	0,008	
15 x 5	0,750	0,203	0,250	0,750	0,250	0,750	0,141	0,188	-0,188	0,433	0,016	0,063	-0,063	0,144	0,000	0,000	0,141	0,016	
15 x 6	0,900	0,243	0,300	0,750	0,300	0,750	0,169	0,225	-0,225	0,433	0,027	0,090	-0,090	0,173	0,000	0,000	0,169	0,027	
15 x 8	1,200	0,324	0,400	0,750	0,400	0,750	0,225	0,300	-0,300	0,433	0,064	0,160	-0,160	0,231	0,000	0,000	0,225	0,064	
15 x 10	1,500	0,405	0,500	0,750	0,500	0,750	0,281	0,375	-0,375	0,433	0,125	0,250	-0,250	0,289	0,000	0,000	0,281	0,125	
15 x 12	1,800	0,486	0,600	0,750	0,600	0,750	0,338	0,450	-0,450	0,433	0,216	0,360	-0,360	0,346	0,000	0,000	0,338	0,216	
15 x 15	2,250	0,608	0,750	0,750	0,750	0,750	0,422	0,563	-0,563	0,433	0,422	0,563	-0,563	0,433	0,000	0,000	0,422	0,422	
16 x 5	0,800	0,216	0,250	0,800	0,250	0,800	0,171	0,213	-0,213	0,462	0,017	0,067	-0,067	0,144	0,000	0,000	0,171	0,017	
16 x 8	1,280	0,346	0,400	0,800	0,400	0,800	0,273	0,341	-0,341	0,462	0,068	0,171	-0,171	0,231	0,000	0,000	0,273	0,068	
16 x 10	1,600	0,432	0,500	0,800	0,500	0,800	0,341	0,427	-0,427	0,462	0,133	0,267	-0,267	0,289	0,000	0,000	0,341	0,133	
16 x 14	2,240	0,605	0,700	0,800	0,700	0,800	0,478	0,597	-0,597	0,462	0,366	0,523	-0,523	0,404	0,000	0,000	0,478	0,366	
16 x 16	2,560	0,691	0,800	0,800	0,800	0,800	0,546	0,683	-0,683	0,462	0,546	0,683	-0,683	0,462	0,000	0,000	0,546	0,546	
18 x 4	0,720	0,194	0,200	0,900	0,200	0,900	0,194	0,216	-0,216	0,520	0,010	0,048	-0,048	0,115	0,000	0,000	0,194	0,010	
18 x 7	1,260	0,340	0,350	0,900	0,350	0,900	0,340	0,378	-0,378	0,520	0,051	0,147	-0,147	0,202	0,000	0,000	0,340	0,051	
18 x 10	1,800	0,486	0,500	0,900	0,500	0,900	0,486	0,540	-0,540	0,520	0,150	0,300	-0,300	0,289	0,000	0,000	0,486	0,150	
18 x 12	2,160	0,583	0,600	0,900	0,600	0,900	0,583	0,648	-0,648	0,520	0,259	0,432	-0,432	0,346	0,000	0,000	0,583	0,259	
18 x 14	2,520	0,680	0,700	0,900	0,700	0,900	0,680	0,756	-0,756	0,520	0,412	0,588	-0,588	0,404	0,000	0,000	0,680	0,412	
18 x 16	2,880	0,778	0,800	0,900	0,800	0,900	0,778	0,864	-0,864	0,520	0,614	0,768	-0,768	0,462	0,000	0,000	0,778	0,614	
18 x 18	3,240	0,875	0,900	0,900	0,900	0,900	0,875	0,972	-0,972	0,520	0,875	0,972	-0,972	0,520	0,000	0,000	0,875	0,875	
20 x 2	0,400	0,108	0,100	1,000	0,100	1,000	0,133	0,133	-0,133	0,577	0,001	0,013	-0,013	0,058	0,000	0,000	0,133	0,001	
20 x 3	0,600	0,162	0,150	1,000	0,150	1,000	0,200	0,200	-0,200	0,577	0,005	0,030	-0,030	0,087	0,000	0,000	0,200	0,005	
20 x 4	0,800	0,216	0,200	1,000	0,200	1,000	0,267	0,267	-0,267	0,577	0,011	0,053	-0,053	0,115	0,000	0,000	0,267	0,011	
20 x 5	1,000	0,270	0,250	1,000	0,250	1,000	0,333	0,333	-0,333	0,577	0,021	0,083	-0,083	0,144	0,000	0,000	0,333	0,021	
20 x 6	1,200	0,324	0,300	1,000	0,300	1,000	0,400	0,400	-0,400	0,577	0,036	0,120	-0,120	0,173	0,000	0,000	0,400	0,036	
20 x 8	1,600	0,432	0,400	1,000	0,400	1,000	0,533	0,533	-0,533	0,577	0,085	0,213	-0,213	0,231	0,000	0,000	0,533	0,085	
20 x 10	2,000	0,540	0,500	1,000	0,500	1,000	0,667	0,667	-0,667	0,577	0,167	0,333	-0,333	0,289	0,000	0,000	0,667	0,167	
20 x 12	2,400	0,648	0,600	1,000	0,600	1,000	0,800	0,800	-0,800	0,577	0,288	0,480	-0,480	0,346	0,000	0,000	0,800	0,288	
20 x 14	2,800	0,756	0,700	1,000	0,700	1,000	0,933	0,933	-0,933	0,577	0,457	0,653	-0,653	0,404	0,000	0,000	0,933	0,457	
20 x 15	3,000	0,810	0,750	1,000	0,750	1,000	1,000	1,000	-1,000	0,577	0,563	0,750	-0,750	0,433	0,000	0,000	1,000	0,563	
20 x 20	4,000	1,080	1,000	1,000	1,000	1,000	1,333	1,333	-1,333	0,577	1,333	1,333	-1,333	0,577	0,000	0,000	1,333	1,333	
22 x 22	4,840	1,307	1,100	1,100	1,100	1,100	1,952	1,775	-1,775	0,635	1,952	1,775	-1,775	0,635	0,000	0,000	1,952	1,952	
25 x 2	0,500	0,135	0,100	1,250	0,100	1,250	0,260	0,208	-0,208	0,722	0,002	0,017	-0,017	0,058	0,000	0,000	0,260	0,002	
25 x 3	0,750	0,203	0,150	1,250	0,150	1,250	0,391	0,313	-0,313	0,722	0,006	0,038	-0,038	0,087	0,000	0,000	0,391	0,006	
25 x 4	1,000	0,270	0,200	1,250	0,200	1,250	0,521	0,417	-0,417	0,722	0,013	0,067	-0,067	0,115	0,000	0,000	0,521	0,013	
25 x 5	1,250	0,338	0,250	1,250	0,250	1,250	0,651	0,521	-0,521	0,722	0,026	0,104	-0,104	0,144	0,000	0,000	0,651	0,026	
25 x 6	1,500	0,405	0,300	1,250	0,300	1,250	0,781	0,625	-0,625	0,722	0,045	0,150	-0,150	0,173	0,000	0,000	0,781	0,045	
25 x 8	2,000	0,540	0,400	1,250	0,400	1,250	1,042	0,833	-0,833	0,722	0,107	0,267	-0,267	0,231	0,000	0,000	1,042	0,107	
25 x 10	2,500	0,675	0,500	1,250	0,500	1,250	1,302	1,042	-1,042	0,722	0,208	0,417	-0,417	0,289	0,000	0,000	1,302	0,208	

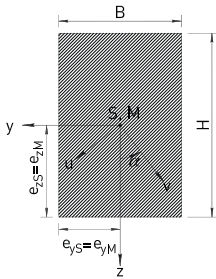


Tabelle 2-9 | Teil 2 von 6
Vierkant-Stangen

Abmessungen H x B [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
25 x 12	3,000	0,810	0,600	1,250	0,600	1,250	1,563	1,250	-1,250	0,722	0,360	0,600	-0,600	0,346	0,000	0,000	1,563	0,360	
25 x 15	3,750	1,013	0,750	1,250	0,750	1,250	1,953	1,563	-1,563	0,722	0,703	0,938	-0,938	0,433	0,000	0,000	1,953	0,703	
25 x 20	5,000	1,350	1,000	1,250	1,000	1,250	2,604	2,083	-2,083	0,722	1,667	1,667	-1,667	0,577	0,000	0,000	2,604	1,667	
25 x 25	6,250	1,688	1,250	1,250	1,250	1,250	3,255	2,604	-2,604	0,722	3,255	2,604	-2,604	0,722	0,000	0,000	3,255	3,255	
28 x 28	7,840	2,117	1,400	1,400	1,400	1,400	5,122	3,659	-3,659	0,808	5,122	3,659	-3,659	0,808	0,000	0,000	5,122	5,122	
30 x 2	0,600	0,162	0,100	1,500	0,100	1,500	0,450	0,300	-0,300	0,866	0,002	0,020	-0,020	0,058	0,000	0,000	0,450	0,002	
30 x 3	0,900	0,243	0,150	1,500	0,150	1,500	0,675	0,450	-0,450	0,866	0,007	0,045	-0,045	0,087	0,000	0,000	0,675	0,007	
30 x 4	1,200	0,324	0,200	1,500	0,200	1,500	0,900	0,600	-0,600	0,866	0,016	0,080	-0,080	0,115	0,000	0,000	0,900	0,016	
30 x 5	1,500	0,405	0,250	1,500	0,250	1,500	1,125	0,750	-0,750	0,866	0,031	0,125	-0,125	0,144	0,000	0,000	1,125	0,031	
30 x 6	1,800	0,486	0,300	1,500	0,300	1,500	1,350	0,900	-0,900	0,866	0,054	0,180	-0,180	0,173	0,000	0,000	1,350	0,054	
30 x 8	2,400	0,648	0,400	1,500	0,400	1,500	1,800	1,200	-1,200	0,866	0,128	0,320	-0,320	0,231	0,000	0,000	1,800	0,128	
30 x 10	3,000	0,810	0,500	1,500	0,500	1,500	2,250	1,500	-1,500	0,866	0,250	0,500	-0,500	0,289	0,000	0,000	2,250	0,250	
30 x 12	3,600	0,972	0,600	1,500	0,600	1,500	2,700	1,800	-1,800	0,866	0,432	0,720	-0,720	0,346	0,000	0,000	2,700	0,432	
30 x 15	4,500	1,215	0,750	1,500	0,750	1,500	3,375	2,250	-2,250	0,866	0,844	1,125	-1,125	0,433	0,000	0,000	3,375	0,844	
30 x 20	6,000	1,620	1,000	1,500	1,000	1,500	4,500	3,000	-3,000	0,866	2,000	2,000	-2,000	0,577	0,000	0,000	4,500	2,000	
30 x 25	7,500	2,025	1,250	1,500	1,250	1,500	5,625	3,750	-3,750	0,866	3,906	3,125	-3,125	0,722	0,000	0,000	5,625	3,906	
30 x 30	9,000	2,430	1,500	1,500	1,500	1,500	6,750	4,500	-4,500	0,866	6,750	4,500	-4,500	0,866	0,000	0,000	6,750	6,750	
32 x 32	10,240	2,765	1,600	1,600	1,600	1,600	8,738	5,461	-5,461	0,924	8,738	5,461	-5,461	0,924	0,000	0,000	8,738	8,738	
35 x 3	1,050	0,284	0,150	1,750	0,150	1,750	1,072	0,613	-0,613	1,010	0,008	0,053	-0,053	0,087	0,000	0,000	1,072	0,008	
35 x 4	1,400	0,378	0,200	1,750	0,200	1,750	1,429	0,817	-0,817	1,010	0,019	0,093	-0,093	0,115	0,000	0,000	1,429	0,019	
35 x 5	1,750	0,473	0,250	1,750	0,250	1,750	1,786	1,021	-1,021	1,010	0,036	0,146	-0,146	0,144	0,000	0,000	1,786	0,036	
35 x 6	2,100	0,567	0,300	1,750	0,300	1,750	2,144	1,225	-1,225	1,010	0,063	0,210	-0,210	0,173	0,000	0,000	2,144	0,063	
35 x 8	2,800	0,756	0,400	1,750	0,400	1,750	2,858	1,633	-1,633	1,010	0,149	0,373	-0,373	0,231	0,000	0,000	2,858	0,149	
35 x 10	3,500	0,945	0,500	1,750	0,500	1,750	3,573	2,042	-2,042	1,010	0,292	0,583	-0,583	0,289	0,000	0,000	3,573	0,292	
35 x 12	4,200	1,134	0,600	1,750	0,600	1,750	4,288	2,450	-2,450	1,010	0,504	0,840	-0,840	0,346	0,000	0,000	4,288	0,346	
35 x 15	5,250	1,418	0,750	1,750	0,750	1,750	5,359	3,063	-3,063	1,010	0,984	1,313	-1,313	0,433	0,000	0,000	5,359	0,984	
35 x 20	7,000	1,890	1,000	1,750	1,000	1,750	7,146	4,083	-4,083	1,010	2,333	2,333	-2,333	0,577	0,000	0,000	7,146	2,333	
35 x 25	8,750	2,363	1,250	1,750	1,250	1,750	8,932	5,104	-5,104	1,010	4,557	3,646	-3,646	0,722	0,000	0,000	8,932	4,557	
35 x 30	10,500	2,835	1,500	1,750	1,500	1,750	10,719	6,125	-6,125	1,010	7,875	5,250	-5,250	0,866	0,000	0,000	10,719	7,875	
35 x 35	12,250	3,308	1,750	1,750	1,750	1,750	12,505	7,146	-7,146	1,010	12,505	7,146	-7,146	1,010	0,000	0,000	12,505	12,505	
36 x 36	12,960	3,499	1,800	1,800	1,800	1,800	13,997	7,776	-7,776	1,039	13,997	7,776	-7,776	1,039	0,000	0,000	13,997	13,997	
40 x 2	0,800	0,216	0,100	2,000	0,100	2,000	1,067	0,533	-0,533	1,155	0,003	0,027	-0,027	0,058	0,000	0,000	1,067	0,003	
40 x 3	1,200	0,324	0,150	2,000	0,150	2,000	1,600	0,800	-0,800	1,155	0,009	0,060	-0,060	0,087	0,000	0,000	1,600	0,009	
40 x 4	1,600	0,432	0,200	2,000	0,200	2,000	2,133	1,067	-1,067	1,155	0,021	0,107	-0,107	0,115	0,000	0,000	2,133	0,021	
40 x 5	2,000	0,540	0,250	2,000	0,250	2,000	2,667	1,333	-1,333	1,155	0,042	0,167	-0,167	0,144	0,000	0,000	2,667	0,042	
40 x 6	2,400	0,648	0,300	2,000	0,300	2,000	3,200	1,600	-1,600	1,155	0,072	0,240	-0,240	0,173	0,000	0,000	3,200	0,072	
40 x 8	3,200	0,864	0,400	2,000	0,400	2,000	4,267	2,133	-2,133	1,155	0,171	0,427	-0,427	0,231	0,000	0,000	4,267	0,171	
40 x 10	4,000	1,080	0,500	2,000	0,500	2,000	5,333	2,667	-2,667	1,155	0,333	0,667	-0,667	0,289	0,000	0,000	5,333	0,333	
40 x 12	4,800	1,296	0,600	2,000	0,600	2,000	6,400	3,200	-3,200	1,155	0,576	0,960	-0,960	0,346	0,000	0,000	6,400	0,346	
40 x 15	6,000	1,620	0,750	2,000	0,750	2,000	8,000	4,000	-4,000	1,155	1,125	1,500	-1,500	0,433	0,000	0,000	8,000	1,125	
40 x 20	8,000	2,160	1,000	2,000	1,000	2,000	10,667	5,333	-5,333	1,155	2,667	2,667	-2,667	0,577	0,000	0,000	10,667	2,667	
40 x 25	10,000	2,700	1,250	2,000	1,250	2,000	13,333	6,667	-6,667	1,155	5,208	4,167	-4,167	0,722	0,000	0,000	13,333	5,208	
40 x 30	12,000	3,240	1,500	2,000	1,500	2,000	16,000	8,000	-8,000	1,155	9,000	6,000	-6,000	0,866	0,000	0,000	16,000	9,000	
40 x 40	16,000	4,320	2,000	2,000	2,000	2,000	21,333	10,667	-10,667	1,155	21,333	10,667	-10,667	1,155	0,000	0,000	21,333	21,333	
45 x 3	1,350	0,365	0,150	2,250	0,150	2,250	2,278	1,013	-1,013	1,299	0,010	0,068	-0,068	0,087	0,000	0,000	2,278	0,010	
45 x 4	1,800	0,486	0,200	2,250	0,200	2,250	3,038	1,350	-1,350	1,299	0,024	0,120	-0,120	0,115	0,000	0,000	3,038	0,024	
45 x 5	2,250	0,608	0,250	2,250	0,250	2,250	3,797	1,688	-1,688	1,299	0,047	0,188	-0,188	0,144	0,000	0,000	3,797	0,047	
45 x 6	2,700	0,729	0,300	2,250	0,300	2,250	4,556	2,025	-2,025	1,299	0,081	0,270	-0,270	0,173	0,000	0,000	4,556	0,081	
45 x 8	3,600	0,972	0,400	2,250	0,400	2,250	6,075	2,700	-2,700	1,299	0,192	0,480	-0,480	0,231	0,000	0,000	6,075	0,192	
45 x 10	4,500	1,215	0,500	2,250	0,500	2,250	7,594	3,375	-3,375	1,299	0,375	0,750	-0,750	0,289	0,000	0,000	7,594	0,375	
45 x 15	6,750	1,823	0,750	2,250	0,750	2,250	11,391	5,063	-5,063	1,299	1,266	1,688	-1,688	0,433	0,000	0,000	11,391	1,266	
45 x 20	9,000	2,430	1,000	2,250	1,000	2,250	15,188	6,750	-6,750	1,299	3,000	3,000	-3,000	0,577	0,000	0,000	15,188	3,000	
45 x 25	11,250	3,038	1,250	2,250	1,250	2,250	18,984	8,438	-8,438	1,299	5,859	4,688	-4,688	0,722	0,000	0,000	18,984	5,859	
45 x 30	13,500	3,645	1,500	2,250	1,500	2,250	22,781	10,125	-10,125	1,299	10,125	6,750	-6,750	0,866	0,000	0,000	22,781	10,125	
45 x 45	20,250	5,468	2,250	2,250	2,250	2,250	34,172	15,188	-15,188	1,299	34,172	15,188	-15,188	1,299	0,000	0,000	34,172	34,172	
50 x 2	1,000	0,270	0,100	2,500	0,100	2,500	2,083	0,833	-0,833	1,443	0,003	0,033	-0,033	0,058	0,000	0,000	2,083	0,003	
50 x 3	1,500	0,405	0,150	2,500	0,150	2,500	3,125	1,250	-1,250	1,443	0,011	0,075	-0,075	0,087	0,000	0,000	3,125	0,011	
50 x 4	2,000	0,540	0,200	2,500	0,200	2,500	4,167	1,667	-1,667	1,443	0,027	0,133	-0,133	0,115	0,000	0,000	4,167	0,027	
50 x 5	2,500	0,675	0,250	2,500	0,250	2,500	5,208	2,083	-2,083	1,443	0,052	0,208	-0,208	0,144	0,000	0,000	5,208	0,052	

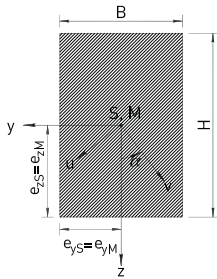


Tabelle 2-9 | Teil 3 von 6
Vierkant-Stangen

Abmessungen H x B [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
50 x 6	3,000	0,810	0,300	2,500	0,300	2,500	6,250	2,500	-2,500	1,443	0,090	0,300	-0,300	0,173	0,000	0,000	6,250	0,090	
50 x 8	4,000	1,080	0,400	2,500	0,400	2,500	8,333	3,333	-3,333	1,443	0,213	0,533	-0,533	0,231	0,000	0,000	8,333	0,213	
50 x 10	5,000	1,350	0,500	2,500	0,500	2,500	10,417	4,167	-4,167	1,443	0,417	0,833	-0,833	0,289	0,000	0,000	10,417	0,417	
50 x 12	6,000	1,620	0,600	2,500	0,600	2,500	12,500	5,000	-5,000	1,443	0,720	1,200	-1,200	0,346	0,000	0,000	12,500	0,720	
50 x 15	7,500	2,025	0,750	2,500	0,750	2,500	15,625	6,250	-6,250	1,443	1,406	1,875	-1,875	0,433	0,000	0,000	15,625	1,406	
50 x 20	10,000	2,700	1,000	2,500	1,000	2,500	20,833	8,333	-8,333	1,443	3,333	3,333	-3,333	0,577	0,000	0,000	20,833	3,333	
50 x 25	12,500	3,375	1,250	2,500	1,250	2,500	26,042	10,417	-10,417	1,443	6,510	5,208	-5,208	0,722	0,000	0,000	26,042	6,510	
50 x 30	15,000	4,050	1,500	2,500	1,500	2,500	31,250	12,500	-12,500	1,443	11,250	7,500	-7,500	0,866	0,000	0,000	31,250	11,250	
50 x 35	17,500	4,725	1,750	2,500	1,750	2,500	36,458	14,583	-14,583	1,443	17,865	10,208	-10,208	1,010	0,000	0,000	36,458	17,865	
50 x 40	20,000	5,400	2,000	2,500	2,000	2,500	41,667	16,667	-16,667	1,443	26,667	13,333	-13,333	1,155	0,000	0,000	41,667	26,667	
50 x 45	22,500	6,075	2,250	2,500	2,250	2,500	46,875	18,750	-18,750	1,443	37,969	16,875	-16,875	1,299	0,000	0,000	46,875	37,969	
50 x 50	25,000	6,750	2,500	2,500	2,500	2,500	52,083	20,833	-20,833	1,443	52,083	20,833	-20,833	1,443	0,000	0,000	52,083	52,083	
55 x 4	2,200	0,594	0,200	2,750	0,200	2,750	5,546	2,017	-2,017	1,588	0,029	0,147	-0,147	0,115	0,000	0,000	5,546	0,029	
55 x 6	3,300	0,891	0,300	2,750	0,300	2,750	8,319	3,025	-3,025	1,588	0,099	0,330	-0,330	0,173	0,000	0,000	8,319	0,099	
55 x 10	5,500	1,485	0,500	2,750	0,500	2,750	13,865	5,042	-5,042	1,588	0,458	0,917	-0,917	0,289	0,000	0,000	13,865	0,458	
55 x 15	8,250	2,228	0,750	2,750	0,750	2,750	20,797	7,563	-7,563	1,588	1,547	2,063	-2,063	0,433	0,000	0,000	20,797	1,547	
55 x 20	11,000	2,970	1,000	2,750	1,000	2,750	27,729	10,083	-10,083	1,588	3,667	3,667	-3,667	0,577	0,000	0,000	27,729	3,667	
55 x 25	13,750	3,713	1,250	2,750	1,250	2,750	34,661	12,604	-12,604	1,588	7,161	5,729	-5,729	0,722	0,000	0,000	34,661	7,161	
55 x 30	16,500	4,455	1,500	2,750	1,500	2,750	41,594	15,125	-15,125	1,588	12,375	8,250	-8,250	0,866	0,000	0,000	41,594	12,375	
55 x 40	22,000	5,940	2,000	2,750	2,000	2,750	55,458	20,167	-20,167	1,588	29,333	14,667	-14,667	1,155	0,000	0,000	55,458	29,333	
55 x 50	27,500	7,425	2,500	2,750	2,500	2,750	69,323	25,208	-25,208	1,588	57,292	22,917	-22,917	1,443	0,000	0,000	69,323	57,292	
55 x 55	30,250	8,168	2,750	2,750	2,750	2,750	76,255	27,729	-27,729	1,588	76,255	27,729	-27,729	1,588	0,000	0,000	76,255	76,255	
60 x 2	1,200	0,324	0,100	3,000	0,100	3,000	3,600	1,200	-1,200	1,732	0,004	0,040	-0,040	0,058	0,000	0,000	3,600	0,004	
60 x 3	1,800	0,486	0,150	3,000	0,150	3,000	5,400	1,800	-1,800	1,732	0,014	0,090	-0,090	0,087	0,000	0,000	5,400	0,014	
60 x 4	2,400	0,648	0,200	3,000	0,200	3,000	7,200	2,400	-2,400	1,732	0,032	0,160	-0,160	0,115	0,000	0,000	7,200	0,032	
60 x 5	3,000	0,810	0,250	3,000	0,250	3,000	9,000	3,000	-3,000	1,732	0,063	0,250	-0,250	0,144	0,000	0,000	9,000	0,063	
60 x 6	3,600	0,972	0,300	3,000	0,300	3,000	10,800	3,600	-3,600	1,732	0,108	0,360	-0,360	0,173	0,000	0,000	10,800	0,173	
60 x 8	4,800	1,296	0,400	3,000	0,400	3,000	14,400	4,800	-4,800	1,732	0,256	0,640	-0,640	0,231	0,000	0,000	14,400	0,256	
60 x 10	6,000	1,620	0,500	3,000	0,500	3,000	18,000	6,000	-6,000	1,732	0,500	1,000	-1,000	0,289	0,000	0,000	18,000	0,500	
60 x 12	7,200	1,944	0,600	3,000	0,600	3,000	21,600	7,200	-7,200	1,732	0,864	1,440	-1,440	0,346	0,000	0,000	21,600	0,864	
60 x 15	9,000	2,430	0,750	3,000	0,750	3,000	27,000	9,000	-9,000	1,732	1,688	2,250	-2,250	0,433	0,000	0,000	27,000	1,688	
60 x 20	12,000	3,240	1,000	3,000	1,000	3,000	36,000	12,000	-12,000	1,732	4,000	4,000	-4,000	0,577	0,000	0,000	36,000	4,000	
60 x 25	15,000	4,050	1,250	3,000	1,250	3,000	45,000	15,000	-15,000	1,732	7,813	6,250	-6,250	0,722	0,000	0,000	45,000	7,813	
60 x 30	18,000	4,860	1,500	3,000	1,500	3,000	54,000	18,000	-18,000	1,732	13,500	9,000	-9,000	0,866	0,000	0,000	54,000	13,500	
60 x 35	21,000	5,670	1,750	3,000	1,750	3,000	63,000	21,000	-21,000	1,732	21,438	12,250	-12,250	1,010	0,000	0,000	63,000	21,438	
60 x 40	24,000	6,480	2,000	3,000	2,000	3,000	72,000	24,000	-24,000	1,732	32,000	16,000	-16,000	1,155	0,000	0,000	72,000	32,000	
60 x 45	27,000	7,290	2,250	3,000	2,250	3,000	81,000	27,000	-27,000	1,732	45,563	20,250	-20,250	1,299	0,000	0,000	81,000	45,563	
60 x 50	30,000	8,100	2,500	3,000	2,500	3,000	90,000	30,000	-30,000	1,732	62,500	25,000	-25,000	1,443	0,000	0,000	90,000	62,500	
60 x 60	36,000	9,720	3,000	3,000	3,000	3,000	108,000	36,000	-36,000	1,732	108,000	36,000	-36,000	1,732	0,000	0,000	108,000	108,000	
65 x 4	2,600	0,702	0,200	3,250	0,200	3,250	9,154	2,817	-2,817	1,876	0,035	0,173	-0,173	0,115	0,000	0,000	9,154	0,035	
65 x 5	3,250	0,878	0,250	3,250	0,250	3,250	11,443	3,521	-3,521	1,876	0,068	0,271	-0,271	0,144	0,000	0,000	11,443	0,068	
65 x 10	6,500	1,755	0,500	3,250	0,500	3,250	22,885	7,042	-7,042	1,876	0,542	1,083	-1,083	0,289	0,000	0,000	22,885	0,542	
65 x 15	9,750	2,633	0,750	3,250	0,750	3,250	34,328	10,563	-10,563	1,876	1,828	2,438	-2,438	0,433	0,000	0,000	34,328	1,828	
65 x 20	13,000	3,510	1,000	3,250	1,000	3,250	45,771	14,083	-14,083	1,876	4,333	4,333	-4,333	0,577	0,000	0,000	45,771	4,333	
65 x 25	16,250	4,388	1,250	3,250	1,250	3,250	57,214	17,604	-17,604	1,876	8,464	6,771	-6,771	0,722	0,000	0,000	57,214	8,464	
65 x 30	19,500	5,265	1,500	3,250	1,500	3,250	68,656	21,125	-21,125	1,876	14,625	9,750	-9,750	0,866	0,000	0,000	68,656	14,625	
65 x 40	26,000	7,020	2,000	3,250	2,000	3,250	91,542	28,167	-28,167	1,876	34,667	17,333	-17,333	1,155	0,000	0,000	91,542	34,667	
65 x 65	42,250	11,408	3,250	3,250	3,250	3,250	148,755	45,771	-45,771	1,876	148,755	45,771	-45,771	1,876	0,000	0,000	148,755	148,755	
70 x 2	1,400	0,378	0,100	3,500	0,100	3,500	5,717	1,633	-1,633	2,021	0,005	0,047	-0,047	0,058	0,000	0,000	5,717	0,005	
70 x 3	2,100	0,567	0,150	3,500	0,150	3,500	8,575	2,450	-2,450	2,021	0,016	0,105	-0,105	0,087	0,000	0,000	8,575	0,016	
70 x 4	2,800	0,756	0,200	3,500	0,200	3,500	11,433	3,267	-3,267	2,021	0,037	0,187	-0,187	0,115	0,000	0,000	11,433	0,037	
70 x 5	3,500	0,945	0,250	3,500	0,250	3,500	14,292	4,083	-4,083	2,021	0,073	0,292	-0,292	0,144	0,000	0,000	14,292	0,073	
70 x 6	4,200	1,134	0,300	3,500	0,300	3,500	17,150	4,900	-4,900	2,021	0,126	0,420	-0,420	0,173	0,000	0,000	17,150	0,173	
70 x 8	5,600	1,512	0,400	3,500	0,400	3,500	22,867	6,533	-6,533	2,021	0,299	0,747	-0,747	0,231	0,000	0,000	22,867	0,299	
70 x 10	7,000	1,890	0,500	3,500	0,500	3,500	28,583	8,167	-8,167	2,021	0,583	1,167	-1,167	0,289	0,000	0,000	28,583	0,583	
70 x 12	8,400	2,268	0,600	3,500	0,600	3,500	34,300	9,800	-9,800	2,021	1,008	1,680	-1,680	0,346	0,000	0,000	34,300	1,008	
70 x 15	10,500	2,835	0,750	3,500	0,750	3,500	42,875	12,250	-12,250	2,021	1,969	2,625	-2,625	0,433	0,000	0,000	42,875	1,969	
70 x 20	14,000	3,780	1,000	3,500	1,000	3,500	57,167	16,333	-16,333	2,021	4,667	4,667	-4,667	0,577	0,000	0,000	57,167	4,667	
70 x 25	17,500	4,725	1,250	3,500	1,250	3,500	71,458	20,417	-20,417	2,0									

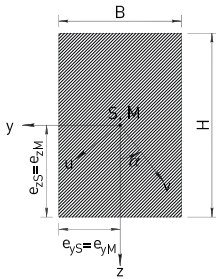


Tabelle 2-9 | Teil 4 von 6
Vierkant-Stangen

Abmessungen H x B [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
70 x 45	31,500	8,505	2,250	3,500	2,250	3,500	128,625	36,750	-36,750	2,021	53,156	23,625	-23,625	1,299	0,000	0,000	128,625	53,156	
70 x 50	35,000	9,450	2,500	3,500	2,500	3,500	142,917	40,833	-40,833	2,021	72,917	29,167	-29,167	1,443	0,000	0,000	142,917	72,917	
70 x 70	49,000	13,230	3,500	3,500	3,500	3,500	200,083	57,167	-57,167	2,021	200,083	57,167	-57,167	2,021	0,000	0,000	200,083	200,083	
75 x 5	3,750	1,013	0,250	3,750	0,250	3,750	17,578	4,688	-4,688	2,165	0,078	0,313	-0,313	0,144	0,000	0,000	17,578	0,078	
75 x 10	7,500	2,025	0,500	3,750	0,500	3,750	35,156	9,375	-9,375	2,165	0,625	1,250	-1,250	0,289	0,000	0,000	35,156	0,625	
75 x 15	11,250	3,038	0,750	3,750	0,750	3,750	52,734	14,063	-14,063	2,165	2,109	2,813	-2,813	0,433	0,000	0,000	52,734	2,109	
75 x 20	15,000	4,050	1,000	3,750	1,000	3,750	70,313	18,750	-18,750	2,165	5,000	5,000	-5,000	0,577	0,000	0,000	70,313	5,000	
75 x 25	18,750	5,063	1,250	3,750	1,250	3,750	87,891	23,438	-23,438	2,165	9,766	7,813	-7,813	0,722	0,000	0,000	87,891	9,766	
75 x 30	22,500	6,075	1,500	3,750	1,500	3,750	105,469	28,125	-28,125	2,165	16,875	11,250	-11,250	0,866	0,000	0,000	105,469	16,875	
75 x 35	26,250	7,088	1,750	3,750	1,750	3,750	123,047	32,813	-32,813	2,165	26,797	15,313	-15,313	1,010	0,000	0,000	123,047	26,797	
75 x 40	30,000	8,100	2,000	3,750	2,000	3,750	140,625	37,500	-37,500	2,165	40,000	20,000	-20,000	1,155	0,000	0,000	140,625	40,000	
75 x 46	34,500	9,315	2,300	3,750	2,300	3,750	161,719	43,125	-43,125	2,165	60,835	26,450	-26,450	1,328	0,000	0,000	161,719	60,835	
75 x 50	37,500	10,125	2,500	3,750	2,500	3,750	175,781	46,875	-46,875	2,165	78,125	31,250	-31,250	1,443	0,000	0,000	175,781	78,125	
75 x 75	56,250	15,188	3,750	3,750	3,750	3,750	263,672	70,313	-70,313	2,165	263,672	70,313	-70,313	2,165	0,000	0,000	263,672	263,672	
80 x 2	1,600	0,432	0,100	4,000	0,100	4,000	8,533	2,133	-2,133	2,309	0,005	0,053	-0,053	0,058	0,000	0,000	8,533	0,005	
80 x 3	2,400	0,648	0,150	4,000	0,150	4,000	12,800	3,200	-3,200	2,309	0,018	0,120	-0,120	0,087	0,000	0,000	12,800	0,018	
80 x 4	3,200	0,864	0,200	4,000	0,200	4,000	17,067	4,267	-4,267	2,309	0,043	0,213	-0,213	0,115	0,000	0,000	17,067	0,043	
80 x 5	4,000	1,080	0,250	4,000	0,250	4,000	21,333	5,333	-5,333	2,309	0,083	0,333	-0,333	0,144	0,000	0,000	21,333	0,083	
80 x 6	4,800	1,296	0,300	4,000	0,300	4,000	25,600	6,400	-6,400	2,309	0,144	0,480	-0,480	0,173	0,000	0,000	25,600	0,144	
80 x 8	6,400	1,728	0,400	4,000	0,400	4,000	34,133	8,533	-8,533	2,309	0,341	0,853	-0,853	0,231	0,000	0,000	34,133	0,231	
80 x 10	8,000	2,160	0,500	4,000	0,500	4,000	42,667	10,667	-10,667	2,309	0,667	1,333	-1,333	0,289	0,000	0,000	42,667	0,289	
80 x 12	9,600	2,592	0,600	4,000	0,600	4,000	51,200	12,800	-12,800	2,309	1,152	1,920	-1,920	0,346	0,000	0,000	51,200	0,346	
80 x 15	12,000	3,240	0,750	4,000	0,750	4,000	64,000	16,000	-16,000	2,309	2,250	3,000	-3,000	0,433	0,000	0,000	64,000	0,433	
80 x 16	12,800	3,456	0,800	4,000	0,800	4,000	68,267	17,067	-17,067	2,309	2,731	3,413	-3,413	0,462	0,000	0,000	68,267	0,462	
80 x 20	16,000	4,320	1,000	4,000	1,000	4,000	85,333	21,333	-21,333	2,309	5,333	5,333	-5,333	0,577	0,000	0,000	85,333	0,577	
80 x 25	20,000	5,400	1,250	4,000	1,250	4,000	106,667	26,667	-26,667	2,309	10,417	8,333	-8,333	0,722	0,000	0,000	106,667	0,722	
80 x 30	24,000	6,480	1,500	4,000	1,500	4,000	128,000	32,000	-32,000	2,309	18,000	12,000	-12,000	0,866	0,000	0,000	128,000	0,866	
80 x 35	28,000	7,560	1,750	4,000	1,750	4,000	149,333	37,333	-37,333	2,309	28,583	16,333	-16,333	1,010	0,000	0,000	149,333	1,010	
80 x 40	32,000	8,640	2,000	4,000	2,000	4,000	170,667	42,667	-42,667	2,309	42,667	21,333	-21,333	1,155	0,000	0,000	170,667	1,155	
80 x 50	40,000	10,800	2,500	4,000	2,500	4,000	213,333	53,333	-53,333	2,309	83,333	33,333	-33,333	1,443	0,000	0,000	213,333	1,443	
80 x 60	48,000	12,960	3,000	4,000	3,000	4,000	256,000	64,000	-64,000	2,309	144,000	48,000	-48,000	1,732	0,000	0,000	256,000	1,732	
80 x 80	64,000	17,280	4,000	4,000	4,000	4,000	341,333	85,333	-85,333	2,309	341,333	85,333	-85,333	2,309	0,000	0,000	341,333	2,309	
85 x 5	4,250	1,148	0,250	4,250	0,250	4,250	25,589	6,021	-6,021	2,454	0,089	0,354	-0,354	0,144	0,000	0,000	25,589	0,089	
85 x 10	8,500	2,295	0,500	4,250	0,500	4,250	51,177	12,042	-12,042	2,454	0,708	1,417	-1,417	0,289	0,000	0,000	51,177	0,289	
85 x 15	12,750	3,443	0,750	4,250	0,750	4,250	76,766	18,063	-18,063	2,454	2,391	3,188	-3,188	0,433	0,000	0,000	76,766	0,433	
85 x 20	17,000	4,590	1,000	4,250	1,000	4,250	102,354	24,083	-24,083	2,454	5,667	5,667	-5,667	0,577	0,000	0,000	102,354	0,577	
85 x 25	21,250	5,738	1,250	4,250	1,250	4,250	127,943	30,104	-30,104	2,454	11,068	8,854	-8,854	0,722	0,000	0,000	127,943	0,722	
85 x 30	25,500	6,885	1,500	4,250	1,500	4,250	153,531	36,125	-36,125	2,454	19,125	12,750	-12,750	0,866	0,000	0,000	153,531	0,866	
85 x 35	29,750	8,033	1,750	4,250	1,750	4,250	179,120	42,146	-42,146	2,454	30,370	17,354	-17,354	1,010	0,000	0,000	179,120	1,010	
85 x 40	34,000	9,180	2,000	4,250	2,000	4,250	204,708	48,167	-48,167	2,454	45,333	22,667	-22,667	1,155	0,000	0,000	204,708	1,155	
85 x 50	42,500	11,475	2,500	4,250	2,500	4,250	255,885	60,208	-60,208	2,454	88,542	35,417	-35,417	1,443	0,000	0,000	255,885	1,443	
90 x 3	2,700	0,729	0,150	4,500	0,150	4,500	18,225	4,050	-4,050	2,598	0,020	0,135	-0,135	0,087	0,000	0,000	18,225	0,020	
90 x 5	4,500	1,215	0,250	4,500	0,250	4,500	30,375	6,750	-6,750	2,598	0,094	0,375	-0,375	0,144	0,000	0,000	30,375	0,144	
90 x 8	7,200	1,944	0,400	4,500	0,400	4,500	48,600	10,800	-10,800	2,598	0,384	0,960	-0,960	0,231	0,000	0,000	48,600	0,231	
90 x 10	9,000	2,430	0,500	4,500	0,500	4,500	60,750	13,500	-13,500	2,598	0,750	1,500	-1,500	0,289	0,000	0,000	60,750	0,289	
90 x 12	10,800	2,916	0,600	4,500	0,600	4,500	72,900	16,200	-16,200	2,598	1,296	2,160	-2,160	0,346	0,000	0,000	72,900	0,346	
90 x 15	13,500	3,645	0,750	4,500	0,750	4,500	91,125	20,250	-20,250	2,598	2,531	3,375	-3,375	0,433	0,000	0,000	91,125	0,433	
90 x 20	18,000	4,860	1,000	4,500	1,000	4,500	121,500	27,000	-27,000	2,598	6,000	6,000	-6,000	0,577	0,000	0,000	121,500	0,577	
90 x 25	22,500	6,075	1,250	4,500	1,250	4,500	151,875	33,750	-33,750	2,598	11,719	9,375	-9,375	0,722	0,000	0,000	151,875	0,722	
90 x 30	27,000	7,290	1,500	4,500	1,500	4,500	182,250	40,500	-40,500	2,598	20,250	13,500	-13,500	0,866	0,000	0,000	182,250	0,866	
90 x 40	36,000	9,720	2,000	4,500	2,000	4,500	243,000	54,000	-54,000	2,598	48,000	24,000	-24,000	1,155	0,000	0,000	243,000	1,155	
90 x 50	45,000	12,150	2,500	4,500	2,500	4,500	303,750	67,500	-67,500	2,598	93,750	37,500	-37,500	1,443	0,000	0,000	303,750	1,443	
90 x 60	54,000	14,580	3,000	4,500	3,000	4,500	364,500	81,000	-81,000	2,598	162,000	54,000	-54,000	1,732	0,000	0,000	364,500	1,732	
90 x 90	81,000	21,870	4,500	4,500	4,500	4,500	546,750	121,500	-121,500	2,598	546,750	121,500	-121,500	2,598	0,000	0,000	546,750	2,598	
100 x 3	3,000	0,810	0,150	5,000	0,150	5,000	25,000	5,000	-5,000	2,887	0,023	0,150	-0,150	0,087	0,000	0,000	25,000	0,023	
100 x 4	4,000	1,080	0,200	5,000	0,200	5,000	33,333	6,667	-6,667	2,887	0,053	0,267	-0,267	0,115	0,000	0,000	33,333	0,053	
100 x 5	5,000	1,350	0,250	5,000	0,250	5,000	41,667	8,333	-8,333	2,887	0,104	0,417	-0,417	0,144	0,000	0,000	41,667	0,144	
100 x 6	6,000	1,620	0,300	5,000	0,300														

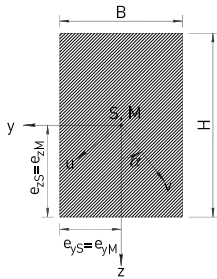


Tabelle 2-9 | Teil 5 von 6
Vierkant-Stangen

Abmessungen H x B [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e _{yS} [cm]	e _{zS} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]	
100 x 15	15,000	4,050	0,750	5,000	0,750	5,000	125,000	25,000	-25,000	2,887	2,813	3,750	-3,750	0,433	0,000	0,000	125,000	2,813	
100 x 20	20,000	5,400	1,000	5,000	1,000	5,000	166,667	33,333	-33,333	2,887	6,667	6,667	-6,667	0,577	0,000	0,000	166,667	6,667	
100 x 25	25,000	6,750	1,250	5,000	1,250	5,000	208,333	41,667	-41,667	2,887	13,021	10,417	-10,417	0,722	0,000	0,000	208,333	13,021	
100 x 30	30,000	8,100	1,500	5,000	1,500	5,000	250,000	50,000	-50,000	2,887	22,500	15,000	-15,000	0,866	0,000	0,000	250,000	22,500	
100 x 40	40,000	10,800	2,000	5,000	2,000	5,000	333,333	66,667	-66,667	2,887	53,333	26,667	-26,667	1,155	0,000	0,000	333,333	53,333	
100 x 50	50,000	13,500	2,500	5,000	2,500	5,000	416,667	83,333	-83,333	2,887	104,167	41,667	-41,667	1,443	0,000	0,000	416,667	104,167	
100 x 60	60,000	16,200	3,000	5,000	3,000	5,000	500,000	100,000	-100,000	2,887	180,000	60,000	-60,000	1,732	0,000	0,000	500,000	180,000	
100 x 80	80,000	21,600	4,000	5,000	4,000	5,000	666,667	133,333	-133,333	2,887	426,667	106,667	-106,667	2,309	0,000	0,000	666,667	426,667	
100 x 100	100,000	27,000	5,000	5,000	5,000	5,000	833,333	166,667	-166,667	2,887	833,333	166,667	-166,667	2,887	0,000	0,000	833,333	833,333	
110 x 10	11,000	2,970	0,500	5,500	0,500	5,500	110,917	20,167	-20,167	3,175	0,917	1,833	-1,833	0,289	0,000	0,000	110,917	0,917	
110 x 20	22,000	5,940	1,000	5,500	1,000	5,500	221,833	40,333	-40,333	3,175	7,333	7,333	-7,333	0,577	0,000	0,000	221,833	7,333	
110 x 30	33,000	8,910	1,500	5,500	1,500	5,500	332,750	60,500	-60,500	3,175	24,750	16,500	-16,500	0,866	0,000	0,000	332,750	24,750	
110 x 110	121,000	32,670	5,500	5,500	5,500	5,500	1220,083	221,833	-221,833	3,175	1220,083	221,833	-221,833	3,175	0,000	0,000	1220,083	1220,083	
120 x 3	3,600	0,972	0,150	6,000	0,150	6,000	43,200	7,200	-7,200	3,464	0,027	0,180	-0,180	0,087	0,000	0,000	43,200	0,027	
120 x 5	6,000	1,620	0,250	6,000	0,250	6,000	72,000	12,000	-12,000	3,464	0,125	0,500	-0,500	0,144	0,000	0,000	72,000	0,125	
120 x 6	7,200	1,944	0,300	6,000	0,300	6,000	86,400	14,400	-14,400	3,464	0,216	0,720	-0,720	0,173	0,000	0,000	86,400	0,216	
120 x 8	9,600	2,592	0,400	6,000	0,400	6,000	115,200	19,200	-19,200	3,464	0,512	1,280	-1,280	0,231	0,000	0,000	115,200	0,512	
120 x 10	12,000	3,240	0,500	6,000	0,500	6,000	144,000	24,000	-24,000	3,464	1,000	2,000	-2,000	0,289	0,000	0,000	144,000	1,000	
120 x 12	14,400	3,888	0,600	6,000	0,600	6,000	172,800	28,800	-28,800	3,464	1,728	2,880	-2,880	0,346	0,000	0,000	172,800	1,728	
120 x 15	18,000	4,860	0,750	6,000	0,750	6,000	216,000	36,000	-36,000	3,464	3,375	4,500	-4,500	0,433	0,000	0,000	216,000	3,375	
120 x 20	24,000	6,480	1,000	6,000	1,000	6,000	288,000	48,000	-48,000	3,464	8,000	8,000	-8,000	0,577	0,000	0,000	288,000	8,000	
120 x 30	36,000	9,720	1,500	6,000	1,500	6,000	432,000	72,000	-72,000	3,464	27,000	18,000	-18,000	0,866	0,000	0,000	432,000	27,000	
120 x 40	48,000	12,960	2,000	6,000	2,000	6,000	576,000	96,000	-96,000	3,464	64,000	32,000	-32,000	1,155	0,000	0,000	576,000	64,000	
120 x 50	60,000	16,200	2,500	6,000	2,500	6,000	720,000	120,000	-120,000	3,464	125,000	50,000	-50,000	1,443	0,000	0,000	720,000	125,000	
120 x 60	72,000	19,440	3,000	6,000	3,000	6,000	864,000	144,000	-144,000	3,464	216,000	72,000	-72,000	1,732	0,000	0,000	864,000	216,000	
120 x 120	144,000	38,880	6,000	6,000	6,000	6,000	1728,000	288,000	-288,000	3,464	1728,000	288,000	-288,000	3,464	0,000	0,000	1728,000	1728,000	
125 x 125	156,250	42,188	6,250	6,250	6,250	6,250	2034,505	325,521	-325,521	3,608	2034,505	325,521	-325,521	3,608	0,000	0,000	2034,505	2034,505	
130 x 8	10,400	2,808	0,400	6,500	0,400	6,500	146,467	22,533	-22,533	3,753	0,555	1,387	-1,387	0,231	0,000	0,000	146,467	0,555	
130 x 10	13,000	3,510	0,500	6,500	0,500	6,500	183,083	28,167	-28,167	3,753	1,083	2,167	-2,167	0,289	0,000	0,000	183,083	1,083	
130 x 20	26,000	7,020	1,000	6,500	1,000	6,500	366,167	56,333	-56,333	3,753	8,667	8,667	-8,667	0,577	0,000	0,000	366,167	8,667	
130 x 30	39,000	10,530	1,500	6,500	1,500	6,500	549,250	84,500	-84,500	3,753	29,250	19,500	-19,500	0,866	0,000	0,000	549,250	29,250	
130 x 40	52,000	14,040	2,000	6,500	2,000	6,500	732,333	112,667	-112,667	3,753	69,333	34,667	-34,667	1,155	0,000	0,000	732,333	69,333	
130 x 60	78,000	21,060	3,000	6,500	3,000	6,500	1098,500	169,000	-169,000	3,753	234,000	78,000	-78,000	1,732	0,000	0,000	1098,500	234,000	
130 x 130	169,000	45,630	6,500	6,500	6,500	6,500	2380,083	366,167	-366,167	3,753	2380,083	366,167	-366,167	3,753	0,000	0,000	2380,083	2380,083	
140 x 8	11,200	3,024	0,400	7,000	0,400	7,000	182,933	26,133	-26,133	4,041	0,597	1,493	-1,493	0,231	0,000	0,000	182,933	0,597	
140 x 10	14,000	3,780	0,500	7,000	0,500	7,000	228,667	32,667	-32,667	4,041	1,167	2,333	-2,333	0,289	0,000	0,000	228,667	1,167	
140 x 20	28,000	7,560	1,000	7,000	1,000	7,000	457,333	65,333	-65,333	4,041	9,333	9,333	-9,333	0,577	0,000	0,000	457,333	9,333	
140 x 30	42,000	11,340	1,500	7,000	1,500	7,000	686,000	98,000	-98,000	4,041	31,500	21,000	-21,000	0,866	0,000	0,000	686,000	31,500	
140 x 40	56,000	15,120	2,000	7,000	2,000	7,000	914,667	130,667	-130,667	4,041	74,667	37,333	-37,333	1,155	0,000	0,000	914,667	74,667	
140 x 60	84,000	22,680	3,000	7,000	3,000	7,000	1372,000	196,000	-196,000	4,041	252,000	84,000	-84,000	1,732	0,000	0,000	1372,000	252,000	
140 x 140	196,000	52,920	7,000	7,000	7,000	7,000	3201,333	457,333	-457,333	4,041	3201,333	457,333	-457,333	4,041	0,000	0,000	3201,333	3201,333	
150 x 5	7,500	2,025	0,250	7,500	0,250	7,500	140,625	18,750	-18,750	4,330	0,156	0,625	-0,625	0,144	0,000	0,000	140,625	0,156	
150 x 8	12,000	3,240	0,400	7,500	0,400	7,500	225,000	30,000	-30,000	4,330	0,640	1,600	-1,600	0,231	0,000	0,000	225,000	0,640	
150 x 10	15,000	4,050	0,500	7,500	0,500	7,500	281,250	37,500	-37,500	4,330	1,250	2,500	-2,500	0,289	0,000	0,000	281,250	1,250	
150 x 12	18,000	4,860	0,600	7,500	0,600	7,500	337,500	45,000	-45,000	4,330	2,160	3,600	-3,600	0,346	0,000	0,000	337,500	2,160	
150 x 15	22,500	6,075	0,750	7,500	0,750	7,500	421,875	56,250	-56,250	4,330	4,219	5,625	-5,625	0,433	0,000	0,000	421,875	4,219	
150 x 20	30,000	8,100	1,000	7,500	1,000	7,500	562,500	75,000	-75,000	4,330	10,000	10,000	-10,000	0,577	0,000	0,000	562,500	10,000	
150 x 30	45,000	12,150	1,500	7,500	1,500	7,500	843,750	112,500	-112,500	4,330	33,750	22,500	-22,500	0,866	0,000	0,000	843,750	33,750	
150 x 40	60,000	16,200	2,000	7,500	2,000	7,500	1125,000	150,000	-150,000	4,330	80,000	40,000	-40,000	1,155	0,000	0,000	1125,000	80,000	
150 x 50	75,000	20,250	2,500	7,500	2,500	7,500	1406,250	187,500	-187,500	4,330	156,250	62,500	-62,500	1,443	0,000	0,000	1406,250	156,250	
150 x 60	90,000	24,300	3,000	7,500	3,000	7,500	1687,500	225,000	-225,000	4,330	270,000	90,000	-90,000	1,732	0,000	0,000	1687,500	270,000	
150 x 150	225,000	60,750	7,500	7,500	7,500	7,500	4218,750	562,500	-562,500	4,330	4218,750	562,500	-562,500	4,330	0,000	0,000	4218,750	4218,750	
160 x 8	12,800	3,456	0,400	8,000	0,400	8,000	273,067	34,133	-34,133	4,619	0,683	1,707	-1,707	0,231	0,000	0,000	273,067	0,683	
160 x 10	16,000	4,320	0,500	8,000	0,500	8,000	341,333	42,667	-42,667	4,619	1,333	2,667	-2,667	0,289	0,000	0,000	341,333	1,333	
160 x 20	32,000	8,640	1,000	8,000	1,000	8,000	682,667	85,333	-85,333	4,619	10,667	10,667	-10,667	0,577	0,000	0,000	682,667	10,667	
160 x 30	48,000	12,960	1,500	8,000	1,500	8,000	1024,000	128,000	-128,000	4,619	36,000	24,000	-24,000	0,866	0,000	0,000	1024,000	36,000	
160 x 40	64,000																		

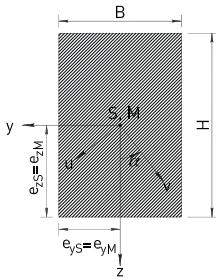


Tabelle 2-9 | Teil 6 von 6

Vierkant-Stangen

Abmessungen H x B [mm]	Fläche A [cm ²]	Gewicht G [kg/m]	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z								Hauptträgheitsmomente			
			e _{ys} [cm]	e _{zs} [cm]	e _{yM} [cm]	e _{zM} [cm]	I _y [cm ⁴]	W _{y,max} [cm ³]	W _{y,min} [cm ³]	i _y [cm]	I _z [cm ⁴]	W _{z,max} [cm ³]	W _{z,min} [cm ³]	i _z [cm]	I _{yz} [cm ⁴]	α [°]	I _u [cm ⁴]	I _v [cm ⁴]
170 x 10	17,000	4,590	0,500	8,500	0,500	8,500	409,417	48,167	-48,167	4,907	1,417	2,833	-2,833	0,289	0,000	0,000	409,417	1,417
170 x 20	34,000	9,180	1,000	8,500	1,000	8,500	818,833	96,333	-96,333	4,907	11,333	11,333	-11,333	0,577	0,000	0,000	818,833	11,333
170 x 30	51,000	13,770	1,500	8,500	1,500	8,500	1228,250	144,500	-144,500	4,907	38,250	25,500	-25,500	0,866	0,000	0,000	1228,250	38,250
170 x 40	68,000	18,360	2,000	8,500	2,000	8,500	1637,667	192,667	-192,667	4,907	90,667	45,333	-45,333	1,155	0,000	0,000	1637,667	90,667
170 x 60	102,000	27,540	3,000	8,500	3,000	8,500	2456,500	289,000	-289,000	4,907	306,000	102,000	-102,000	1,732	0,000	0,000	2456,500	306,000
180 x 10	18,000	4,860	0,500	9,000	0,500	9,000	486,000	54,000	-54,000	5,196	1,500	3,000	-3,000	0,289	0,000	0,000	486,000	1,500
180 x 20	36,000	9,720	1,000	9,000	1,000	9,000	972,000	108,000	-108,000	5,196	12,000	12,000	-12,000	0,577	0,000	0,000	972,000	12,000
180 x 30	54,000	14,580	1,500	9,000	1,500	9,000	1458,000	162,000	-162,000	5,196	40,500	27,000	-27,000	0,866	0,000	0,000	1458,000	40,500
180 x 40	72,000	19,440	2,000	9,000	2,000	9,000	1944,000	216,000	-216,000	5,196	96,000	48,000	-48,000	1,155	0,000	0,000	1944,000	96,000
180 x 60	108,000	29,160	3,000	9,000	3,000	9,000	2916,000	324,000	-324,000	5,196	324,000	108,000	-108,000	1,732	0,000	0,000	2916,000	324,000
180 x 180	324,000	87,480	9,000	9,000	9,000	9,000	8748,000	972,000	-972,000	5,196	8748,000	972,000	-972,000	5,196	0,000	0,000	8748,000	8748,000
190 x 190	361,000	97,470	9,500	9,500	9,500	9,500	10860,083	1143,167	-1143,167	5,485	10860,083	1143,167	-1143,167	5,485	0,000	0,000	10860,083	10860,083
200 x 5	10,000	2,700	0,250	10,000	0,250	10,000	333,333	33,333	-33,333	5,774	0,208	0,833	-0,833	0,144	0,000	0,000	333,333	0,208
200 x 8	16,000	4,320	0,400	10,000	0,400	10,000	533,333	53,333	-53,333	5,774	0,853	2,133	-2,133	0,231	0,000	0,000	533,333	0,853
200 x 10	20,000	5,400	0,500	10,000	0,500	10,000	666,667	66,667	-66,667	5,774	1,667	3,333	-3,333	0,289	0,000	0,000	666,667	1,667
200 x 15	30,000	8,100	0,750	10,000	0,750	10,000	1000,000	100,000	-100,000	5,774	5,625	7,500	-7,500	0,433	0,000	0,000	1000,000	5,625
200 x 20	40,000	10,800	1,000	10,000	1,000	10,000	1333,333	133,333	-133,333	5,774	13,333	13,333	-13,333	0,577	0,000	0,000	1333,333	13,333
200 x 30	60,000	16,200	1,500	10,000	1,500	10,000	2000,000	200,000	-200,000	5,774	45,000	30,000	-30,000	0,866	0,000	0,000	2000,000	45,000
200 x 40	80,000	21,600	2,000	10,000	2,000	10,000	2666,667	266,667	-266,667	5,774	106,667	53,333	-53,333	1,155	0,000	0,000	2666,667	106,667
200 x 60	120,000	32,400	3,000	10,000	3,000	10,000	4000,000	400,000	-400,000	5,774	360,000	120,000	-120,000	1,732	0,000	0,000	4000,000	360,000
200 x 200	400,000	108,000	10,000	10,000	10,000	10,000	13333,333	1333,333	-1333,333	5,774	13333,333	1333,333	-1333,333	5,774	0,000	0,000	13333,333	13333,333
220 x 10	22,000	5,940	0,500	11,000	0,500	11,000	887,333	80,667	-80,667	6,351	1,833	3,667	-3,667	0,289	0,000	0,000	887,333	1,833
220 x 20	44,000	11,880	1,000	11,000	1,000	11,000	1774,667	161,333	-161,333	6,351	14,667	14,667	-14,667	0,577	0,000	0,000	1774,667	14,667
220 x 30	66,000	17,820	1,500	11,000	1,500	11,000	2662,000	242,000	-242,000	6,351	49,500	33,000	-33,000	0,866	0,000	0,000	2662,000	49,500
220 x 40	88,000	23,760	2,000	11,000	2,000	11,000	3549,333	322,667	-322,667	6,351	117,333	58,667	-58,667	1,155	0,000	0,000	3549,333	117,333
220 x 60	132,000	35,640	3,000	11,000	3,000	11,000	5324,000	484,000	-484,000	6,351	396,000	132,000	-132,000	1,732	0,000	0,000	5324,000	396,000
250 x 10	25,000	6,750	0,500	12,500	0,500	12,500	1302,083	104,167	-104,167	7,217	2,083	4,167	-4,167	0,289	0,000	0,000	1302,083	2,083
250 x 20	50,000	13,500	1,000	12,500	1,000	12,500	2604,167	208,333	-208,333	7,217	16,667	16,667	-16,667	0,577	0,000	0,000	2604,167	16,667
250 x 30	75,000	20,250	1,500	12,500	1,500	12,500	3906,250	312,500	-312,500	7,217	56,250	37,500	-37,500	0,866	0,000	0,000	3906,250	56,250
250 x 40	100,000	27,000	2,000	12,500	2,000	12,500	5208,333	416,667	-416,667	7,217	133,333	66,667	-66,667	1,155	0,000	0,000	5208,333	133,333
250 x 60	150,000	40,500	3,000	12,500	3,000	12,500	7812,500	625,000	-625,000	7,217	450,000	150,000	-150,000	1,732	0,000	0,000	7812,500	450,000
250 x 250	625,000	168,750	12,500	12,500	12,500	12,500	32552,083	2604,167	-2604,167	7,217	32552,083	2604,167	-2604,167	7,217	0,000	0,000	32552,083	32552,083
300 x 10	30,000	8,100	0,500	15,000	0,500	15,000	2250,000	150,000	-150,000	8,660	2,500	5,000	-5,000	0,289	0,000	0,000	2250,000	2,500
300 x 20	60,000	16,200	1,000	15,000	1,000	15,000	4500,000	300,000	-300,000	8,660	20,000	20,000	-20,000	0,577	0,000	0,000	4500,000	20,000
300 x 30	90,000	24,300	1,500	15,000	1,500	15,000	6750,000	450,000	-450,000	8,660	67,500	45,000	-45,000	0,866	0,000	0,000	6750,000	67,500
300 x 40	120,000	32,400	2,000	15,000	2,000	15,000	9000,000	600,000	-600,000	8,660	160,000	80,000	-80,000	1,155	0,000	0,000	9000,000	160,000
300 x 60	180,000	48,600	3,000	15,000	3,000	15,000	13500,000	900,000	-900,000	8,660	540,000	180,000	-180,000	1,732	0,000	0,000	13500,000	540,000

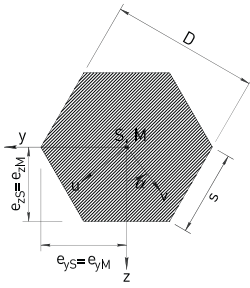


Tabelle 2-10 | Teil 1 von 1
Sechskant-Stangen

Abmessungen	Fläche	Gewicht	Lage des Schwer- und Schubmittelpunktes				Querschnittswerte bezüglich der Biegeachsen y-y und z-z										Hauptträgheitsmomente		
			e_{yS}	e_{zS}	e_{yM}	e_{zM}	I_y	$W_{y,max}$	$W_{y,min}$	i_y	I_z	$W_{z,max}$	$W_{z,min}$	i_z	I_{yz}	α	I_u	I_v	
D [mm]	A [cm ²]	G [kg/m]	[cm]	[cm]	[cm]	[cm]	[cm ⁴]	[cm ³]	[cm ³]	[cm]	[cm ⁴]	[cm ³]	[cm ³]	[cm]	[cm ⁴]	[°]	[cm ⁴]	[cm ⁴]	
7	0,424	0,115	0,404	0,350	0,404	0,350	0,014	0,041	-0,041	0,184	0,014	0,036	-0,036	0,184	0,000	0,000	0,014	0,014	
8	0,554	0,150	0,462	0,400	0,462	0,400	0,025	0,062	-0,062	0,211	0,025	0,053	-0,053	0,211	0,000	0,000	0,025	0,025	
10	0,866	0,234	0,577	0,500	0,577	0,500	0,060	0,120	-0,120	0,264	0,060	0,104	-0,104	0,264	0,000	0,000	0,060	0,060	
11	1,048	0,283	0,635	0,550	0,635	0,550	0,088	0,160	-0,160	0,290	0,088	0,139	-0,139	0,290	0,000	0,000	0,088	0,088	
12	1,247	0,337	0,693	0,600	0,693	0,600	0,125	0,208	-0,208	0,316	0,125	0,180	-0,180	0,316	0,000	0,000	0,125	0,125	
13	1,464	0,395	0,751	0,650	0,751	0,650	0,172	0,264	-0,264	0,343	0,172	0,229	-0,229	0,343	0,000	0,000	0,172	0,172	
14	1,697	0,458	0,808	0,700	0,808	0,700	0,231	0,330	-0,330	0,369	0,231	0,286	-0,286	0,369	0,000	0,000	0,231	0,231	
16	2,217	0,599	0,924	0,800	0,924	0,800	0,394	0,493	-0,493	0,422	0,394	0,427	-0,427	0,422	0,000	0,000	0,394	0,394	
17	2,503	0,676	0,981	0,850	0,981	0,850	0,502	0,591	-0,591	0,448	0,502	0,512	-0,512	0,448	0,000	0,000	0,502	0,502	
19	3,126	0,844	1,097	0,950	1,097	0,950	0,784	0,825	-0,825	0,501	0,784	0,714	-0,714	0,501	0,000	0,000	0,784	0,784	
21	3,819	1,031	1,212	1,050	1,212	1,050	1,170	1,114	-1,114	0,553	1,170	0,965	-0,965	0,553	0,000	0,000	1,170	1,170	
22	4,192	1,132	1,270	1,100	1,270	1,100	1,409	1,281	-1,281	0,580	1,409	1,109	-1,109	0,580	0,000	0,000	1,409	1,409	
24	4,988	1,347	1,386	1,200	1,386	1,200	1,995	1,663	-1,663	0,632	1,995	1,440	-1,440	0,632	0,000	0,000	1,995	1,995	
27	6,313	1,705	1,559	1,350	1,559	1,350	3,196	2,367	-2,367	0,712	3,196	2,050	-2,050	0,712	0,000	0,000	3,196	3,196	
30	7,794	2,104	1,732	1,500	1,732	1,500	4,871	3,248	-3,248	0,791	4,871	2,813	-2,813	0,791	0,000	0,000	4,871	4,871	
32	8,868	2,394	1,848	1,600	1,848	1,600	6,306	3,941	-3,941	0,843	6,306	3,413	-3,413	0,843	0,000	0,000	6,306	6,306	
36	11,224	3,030	2,078	1,800	2,078	1,800	10,101	5,612	-5,612	0,949	10,101	4,860	-4,860	0,949	0,000	0,000	10,101	10,101	
41	14,558	3,931	2,367	2,050	2,367	2,050	16,994	8,290	-8,290	1,080	16,994	7,179	-7,179	1,080	0,000	0,000	16,994	16,994	
46	18,325	4,948	2,656	2,300	2,656	2,300	26,928	11,708	-11,708	1,212	26,928	10,139	-10,139	1,212	0,000	0,000	26,928	26,928	
50	21,651	5,846	2,887	2,500	2,887	2,500	37,588	15,035	-15,035	1,318	37,588	13,021	-13,021	1,318	0,000	0,000	37,588	37,588	
60	31,177	8,418	3,464	3,000	3,464	3,000	77,942	25,981	-25,981	1,581	77,942	22,500	-22,500	1,581	0,000	0,000	77,942	77,942	

5. Rechenformeln

Der Umfang der in Abschnitt 4 aufgeführten Querschnitte entspricht dem zum Zeitpunkt der Drucklegung über den Handel beziehbaren Angebot. Da durch die besonders preisgünstige Strangpresstechnik oftmals auch kundenspezifische Profile hergestellt werden, ist für die wichtigsten Querschnittformen nachfolgend eine Zusammenstellung der Berechnungsformeln zur

Ermittlung der dann benötigten Querschnittswerte wiedergegeben. Die Formeln wurden so aufbereitet, dass sie unmittelbar unter Zuhilfenahme der Eingangsgrößen B , H , t_1 und t_2 in ein gängiges Tabellenkalkulationsprogramm übernommen werden können. Sofern es sinnvoll erschien, sind auch die Sonderfälle - z.B. bei gleichen Dicken t_1 und t_2 - für die Handrechnung angegeben.

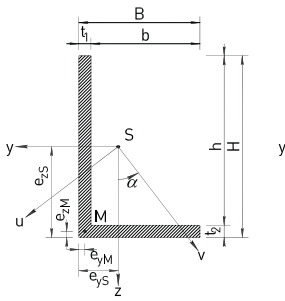


Tabelle 3-1
L-Profile

Allgemein	$b = B - t_1$	$h = H - t_2$	$A = t_2 \cdot B + t_1 \cdot (H - t_2)$
	$e_{yS} = \frac{1}{2} \cdot \frac{t_2 \cdot B^2 + t_1^2 \cdot (H - t_2)}{t_2 \cdot B + t_1 \cdot (H - t_2)}$	$e_{zS} = \frac{1}{2} \cdot \frac{t_1 \cdot H^2 + t_2^2 \cdot (B - t_1)}{t_2 \cdot B + t_1 \cdot (H - t_2)}$	$e_{yM} = \frac{t_1}{2}$ $e_{zM} = \frac{t_2}{2}$
	$I_y = \frac{1}{3} \cdot [t_1 \cdot H^3 + t_2^3 \cdot (B - t_1)] - e_{zS}^2 \cdot [t_2 \cdot B + t_1 \cdot (H - t_2)]$		$I_z = \frac{1}{3} \cdot [t_2 \cdot B^3 + t_1^3 \cdot (H - t_2)] - e_{yS}^2 \cdot [t_2 \cdot B + t_1 \cdot (H - t_2)]$
	$I_{yz} = t_1 \cdot H \cdot \left(e_{yS} - \frac{t_1}{2}\right) \cdot \left(e_{zS} - \frac{H}{2}\right) + t_2 \cdot (B - t_1) \cdot \left(e_{zS} - \frac{t_2}{2}\right) \cdot \left(e_{yS} - \frac{B + t_1}{2}\right)$		
	$W_{y,max} = \frac{I_y}{e_{zS}}$	$W_{y,min} = -\frac{I_y}{H - e_{zS}}$	$W_{z,max} = \frac{I_z}{e_{yS}}$ $W_{z,min} = -\frac{I_z}{B - e_{yS}}$
Sonderfall $t_1 = t_2 = t$	$b = B - t$	$h = H - t$	$A = t \cdot (B + H - t)$
	$e_{yS} = \frac{1}{2} \cdot \frac{B^2 + t \cdot (H - t)}{B + H - t}$	$e_{zS} = \frac{1}{2} \cdot \frac{H^2 + t \cdot (B - t)}{B + H - t}$	$e_{yM} = e_{zM} = \frac{t}{2}$
	$I_y = \frac{1}{3} \cdot t \cdot [H^3 + t^2 \cdot (B - t)] - e_{zS}^2 \cdot t \cdot (B + H - t)$		$I_z = \frac{1}{3} \cdot t \cdot [B^3 + t^2 \cdot (H - t)] - e_{yS}^2 \cdot t \cdot (B + H - t)$
	$I_{yz} = \frac{-t \cdot B \cdot (B - t) \cdot H \cdot (H - t)}{4 \cdot (B + H - t)}$		
Sonderfall $H = B$ $t_1 = t_2 = t$	$b = h = B - t$		$A = t \cdot (2 \cdot B - t)$
	$e_{yS} = e_{zS} = e = \frac{1}{2} \cdot \frac{B^2 + t \cdot (B - t)}{2 \cdot B - t}$	$e_{yM} = e_{zM} = \frac{t}{2}$	
	$I_y = I_z = \frac{1}{3} \cdot t \cdot [B^3 + t^2 \cdot (B - t)] - e^2 \cdot t \cdot (2 \cdot B - t)$		$I_{yz} = \frac{-t \cdot B^2 \cdot (B - t)^2}{4 \cdot (2 \cdot B - t)}$

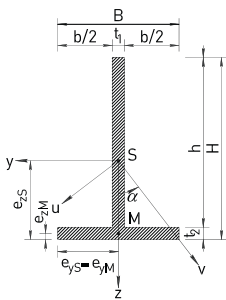


Tabelle 3-2
T-Profile

Allgemein	$b = B - t_1$	$h = H - t_2$	$A = t_2 \cdot B + t_1 \cdot (H - t_2)$
	$e_{yS} = \frac{B}{2}$	$e_{zS} = \frac{1}{2} \cdot \frac{t_1 \cdot H^2 + t_2^2 \cdot (B - t_1)}{t_1 \cdot H + t_2 \cdot (B - t_1)}$	$e_{yM} = \frac{B}{2}$ $e_{zM} = \frac{t_2}{2}$
	$I_y = \frac{1}{3} \cdot [t_1 \cdot H^3 + t_2^3 \cdot (B - t_1)] + e_{zS}^2 \cdot [t_1 \cdot H^3 + t_2 \cdot (B - t_1)] - e_{zS} \cdot [t_1 \cdot H^2 + t_2^2 \cdot (B - t_1)]$		$I_z = \frac{1}{12} \cdot [t_1^3 \cdot H + t_2 \cdot B^3]$ $I_{yz} = 0$
	$W_{y,max} = \frac{I_y}{e_{zS}}$	$W_{y,min} = -\frac{I_y}{H - e_{zS}}$	$W_{z,max} = \frac{I_z}{e_{yS}}$ $W_{z,min} = -\frac{I_z}{e_{yS}}$
Sonderfall $t_1 = t_2 = t$	$b = B - t$	$h = H - t$	$A = t \cdot (B + H - t)$
		$e_{zS} = \frac{1}{2} \cdot \frac{B \cdot t + H^2 - t^2}{B + H - t}$	$e_{zM} = \frac{t}{2}$
	$I_y = t \cdot \left[\frac{1}{3} \cdot (B \cdot t^2 + H^3 - t^3) + e_{zS}^2 \cdot (B + H - t) - e_{zS} \cdot (t \cdot B + H^2 - t^2) \right]$		$I_z = \frac{1}{12} \cdot t \cdot (H \cdot t^2 + B^3)$
Sonderfall $H = B$ $t_1 = t_2 = t$	$b = h = B - t$		$A = t \cdot (2 \cdot B - t)$
		$e_{zS} = \frac{1}{2} \cdot \frac{B \cdot t + B^2 - t^2}{2 \cdot B - t}$	$e_{zM} = \frac{t}{2}$
	$I_y = t \cdot \left[\frac{1}{3} \cdot (B \cdot t^2 + B^3 - t^3) + e_{zS}^2 \cdot (2 \cdot B - t) - e_{zS} \cdot (B \cdot t + H^2 - t^2) \right]$		$I_z = \frac{1}{12} \cdot B \cdot t \cdot [t^2 + B^2]$

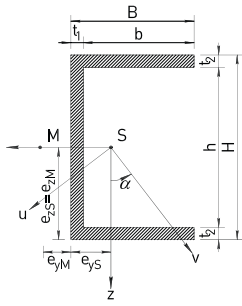


Tabelle 3-3
C-Profile

Allgemein	$b = B - t_1$ $e_{yS} = \frac{1}{2} \cdot \frac{2 \cdot t_2 \cdot B^2 + t_1^2 \cdot (H - 2 \cdot t_2)}{2 \cdot t_2 \cdot B + t_1 \cdot (H - 2 \cdot t_2)}$ $I_y = \frac{1}{12} \cdot [B \cdot H^3 - (B - t_1) \cdot (H - 2 \cdot t_2)^3]$ $W_{y,max} = \frac{I_y}{e_{zS}}$	$h = H - 2 \cdot t_2$ $e_{zS} = \frac{H}{2}$ $I_z = \frac{1}{3} \cdot [H \cdot e_{yS}^3 - (H - 2 \cdot t_2) \cdot (e_{yS} - t_1)^3 + 2 \cdot t_2 \cdot (B - e_{yS})^3]$ $W_{y,min} = -\frac{I_y}{e_{zS}}$	$A = 2 \cdot t_2 \cdot (B - t_1) + t_1 \cdot H$ $e_{yM} = \frac{1}{4} \cdot \frac{12 \cdot t_2 \cdot (B - t_1)^2 - t_1^2 \cdot (2 \cdot H + t_2)}{6 \cdot t_2 \cdot (B - t_1) + t_1 \cdot (H + 2 \cdot t_2)}$ $e_{yM} = \frac{1}{4} \cdot \frac{12 \cdot B^2 - 24 \cdot B \cdot t + 11 \cdot t^2 - 2 \cdot t \cdot H}{6 \cdot B - 4 \cdot t + H}$	$e_{zM} = \frac{H}{2}$ $I_{yz} = 0$ $W_{z,max} = \frac{I_z}{e_{yS}}$ $W_{z,min} = -\frac{I_z}{B - e_{yS}}$
Sonderfall $t_1 = t_2 = t$	$b = B - t$ $e_{yS} = \frac{1}{2} \cdot \frac{2 \cdot (B^2 - t^2) + t \cdot H}{H + 2 \cdot (B - t)}$ $I_y = \frac{1}{12} \cdot [B \cdot H^3 - (B - t) \cdot (H - 2 \cdot t)^3]$	$h = H - 2 \cdot t$ $I_z = \frac{1}{3} \cdot [H \cdot e_{yS}^3 - (H - 2 \cdot t) \cdot (e_{yS} - t)^3 + 2 \cdot t \cdot (B - e_{yS})^3]$	$A = t \cdot [2 \cdot (B - t) + H]$ $e_{yM} = \frac{1}{4} \cdot \frac{12 \cdot B^2 - 24 \cdot B \cdot t + 11 \cdot t^2 - 2 \cdot t \cdot H}{6 \cdot B - 4 \cdot t + H}$	
Sonderfall $H = B$ $t_1 = t_2 = t$	$b = B - t$ $e_{yS} = \frac{1}{2} \cdot \frac{2 \cdot (B^2 - t^2) + t \cdot B}{3 \cdot B - 2 \cdot t}$ $I_y = \frac{1}{12} \cdot [B^4 - (B - t) \cdot (B - 2 \cdot t)^3]$	$h = B - 2 \cdot t$ $I_z = \frac{1}{3} \cdot [B \cdot e_{yS}^3 - (B - 2 \cdot t) \cdot (e_{yS} - t)^3 + 2 \cdot t \cdot (B - e_{yS})^3]$	$A = t \cdot (3 \cdot B - 2 \cdot t)$ $e_{yM} = \frac{1}{4} \cdot \frac{12 \cdot B^2 - 26 \cdot B \cdot t + 11 \cdot t^2}{7 \cdot B - 4 \cdot t}$	

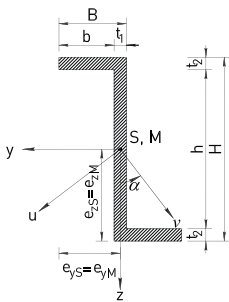


Tabelle 3-4
Z-Profile

Allgemein	$b = B - t_1$ $e_{yS} = B - \frac{t_1}{2}$ $I_y = \frac{1}{12} \cdot [2 \cdot B \cdot t_2^3 + t_1 \cdot (H - 2 \cdot t_2)^3] + 2 \cdot B \cdot t_2 \cdot \left(\frac{H - t_2}{2}\right)^2$ $W_{y,max} = \frac{I_y}{e_{zS}}$	$h = H - 2 \cdot t_2$ $e_{zS} = \frac{H}{2}$ $I_z = \frac{1}{12} \cdot [2 \cdot B^3 \cdot t_2 + H \cdot t_1^3] + 2 \cdot B \cdot t_2 \cdot \left(\frac{B - t_1}{2}\right)^2$ $W_{y,min} = -\frac{I_y}{e_{zS}}$	$A = 2 \cdot t_2 \cdot (B - t_1) + t_2 \cdot H$ $e_{yM} = B - \frac{t_1}{2}$ $W_{z,max} = \frac{I_z}{e_{yS}}$	$e_{zM} = \frac{H}{2}$ $I_{yz} = -\frac{1}{2} \cdot B \cdot t_2 \cdot (B - t_1) \cdot (H - t_2)$ $W_{z,min} = -\frac{I_z}{e_{yS}}$
Sonderfall $t_1 = t_2 = t$	$b = B - t$ $e_{yS} = B - \frac{t}{2}$ $I_y = \frac{1}{12} \cdot [2 \cdot B \cdot t^3 + t \cdot (H - 2 \cdot t)^3] + 2 \cdot B \cdot t \cdot \left(\frac{H - t}{2}\right)^2$	$h = H - 2 \cdot t$ $I_z = \frac{1}{12} \cdot [2 \cdot B^3 \cdot t + H \cdot t^3] + 2 \cdot B \cdot t \cdot \left(\frac{B - t}{2}\right)^2$	$A = t \cdot [2 \cdot (B - t) + H]$ $e_{yM} = \frac{t}{2}$	$I_{yz} = \frac{1}{2} \cdot B \cdot t \cdot (B - t) \cdot (H - t)$
Sonderfall $H = B$ $t_1 = t_2 = t$	$b = B - t$ $e_{yS} = B - \frac{t}{2}$ $I_y = \frac{1}{12} \cdot [2 \cdot B \cdot t^3 + t \cdot (B - 2 \cdot t)^3] + 2 \cdot B \cdot t \cdot \left(\frac{B - t}{2}\right)^2$	$h = B - 2 \cdot t$ $e_{zS} = \frac{B}{2}$ $I_z = \frac{1}{12} \cdot [2 \cdot B^3 \cdot t + B \cdot t^3] + 2 \cdot B \cdot t \cdot \left(\frac{B - t}{2}\right)^2$	$A = t \cdot (3 \cdot B - 2 \cdot t)$ $e_{yM} = \frac{t}{2}$	$e_{zM} = \frac{B}{2}$ $I_{yz} = \frac{1}{2} \cdot B \cdot t \cdot (B - t)^2$

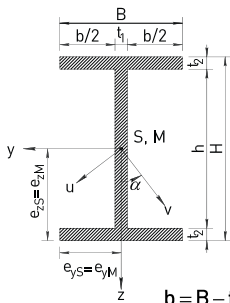


Tabelle 3-5

Doppel-T-Profile

	$b = B - t_1$	$h = H - 2 \cdot t_2$	$A = 2 \cdot t_2 \cdot (B - t_1) + t_1 \cdot H$	
Allgemein	$e_{yS} = \frac{B}{2}$	$e_{zS} = \frac{H}{2}$	$e_{yM} = \frac{B}{2}$	$e_{zM} = \frac{H}{2}$
	$I_y = \frac{1}{12} \cdot [2 \cdot B \cdot t_2^3 + t_1 \cdot (H - 2 \cdot t_2)^3] + 2 \cdot B \cdot t_2 \cdot \left(\frac{H - t_2}{2}\right)^2$		$I_z = \frac{1}{12} \cdot [2 \cdot B^3 \cdot t_2 + t_1^3 \cdot (H - 2 \cdot t_2)]$	$I_{yz} = 0$
	$W_{y,max} = \frac{I_y}{e_{zS}}$	$W_{y,min} = -\frac{I_y}{e_{zS}}$	$W_{z,max} = \frac{I_z}{e_{yS}}$	$W_{z,min} = -\frac{I_z}{e_{yS}}$
Sonderfall $t_1 = t_2 = t$	$b = B - t$	$h = H - 2 \cdot t$	$A = t \cdot [2 \cdot (B - t) + H]$	
	$I_y = \frac{1}{12} \cdot [2 \cdot B \cdot t^3 + t \cdot (H - 2 \cdot t)^3] + 2 \cdot B \cdot t \cdot \left(\frac{H - t}{2}\right)^2$		$I_z = \frac{1}{12} \cdot [2 \cdot B^3 \cdot t + t^3 \cdot (H - 2 \cdot t)]$	
Sonderfall $H = B$ $t_1 = t_2 = t$	$b = B - t$	$h = B - 2 \cdot t$	$A = t \cdot (3 \cdot B - 2 \cdot t)$	
	$I_y = \frac{1}{12} \cdot [2 \cdot B \cdot t^3 + t \cdot (B - 2 \cdot t)^3] + 2 \cdot B \cdot t \cdot \left(\frac{B - t}{2}\right)^2$		$I_z = \frac{1}{12} \cdot B \cdot t^3 + \frac{1}{6} \cdot t \cdot (B^3 - t^3)$	

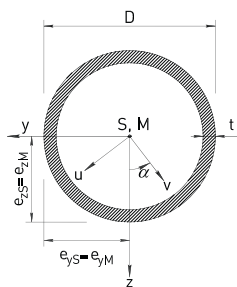


Tabelle 3-6

Rund-Rohre

Allgemein	$A = \pi \cdot t \cdot (D - t)$
	$e_{yS} = e_{zS} = e_{yM} = e_{zM} = e = \frac{D}{2}$
	$I_y = I_z = I = \frac{\pi}{64} \cdot [D^4 - (D - 2 \cdot t)^4] \quad I_{yz} = 0$
	$W_{y,max} = -W_{y,min} = W_{z,max} = -W_{z,min} = \frac{I}{e} = \frac{\pi \cdot [D^4 - (D - 2 \cdot t)^4]}{32 \cdot D}$

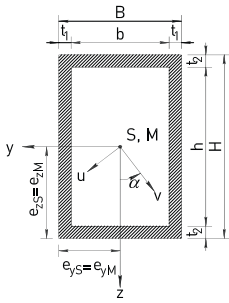


Tabelle 3-7

Rechteck-Rohre

Allgemein	$b = B - 2 \cdot t_1$ $e_{yS} = \frac{B}{2}$ $I_y = \frac{1}{12} \cdot [B \cdot H^3 - (B - 2 \cdot t_1) \cdot (H - 2 \cdot t_2)^3]$ $W_{y,max} = \frac{I_y}{e_{zS}}$	$h = H - 2 \cdot t_2$ $e_{zS} = \frac{H}{2}$ $W_{y,min} = -\frac{I_y}{e_{zS}}$	$A = 2 \cdot [B \cdot t_2 + t_1 \cdot (H - 2 \cdot t_2)]$ $e_{yM} = \frac{B}{2}$ $I_z = \frac{1}{12} \cdot [B^3 \cdot H - (B - 2 \cdot t_1)^3 \cdot (H - 2 \cdot t_2)]$ $W_{z,max} = \frac{I_z}{e_{yS}}$	$e_{zM} = \frac{H}{2}$ $I_{yz} = 0$ $W_{z,min} = -\frac{I_z}{e_{yS}}$
Sonderfall $t_1 = t_2 = t$	$b = B - 2 \cdot t$ $I_y = \frac{1}{12} \cdot [B \cdot H^3 - (B - 2 \cdot t) \cdot (H - 2 \cdot t)^3]$	$h = H - 2 \cdot t$	$A = 2 \cdot t \cdot (B + H - 2 \cdot t)$ $I_z = \frac{1}{12} \cdot [B^3 \cdot H - (B - 2 \cdot t)^3 \cdot (H - 2 \cdot t)]$	
Sonderfall $H = B$ $t_1 = t_2 = t$	$b = B - 2 \cdot t$ $I_y = I_z = \frac{1}{12} \cdot [B^4 - (B - 2 \cdot t)^4]$	$h = b - 2 \cdot t$	$A = 4 \cdot t \cdot (B - t)$	

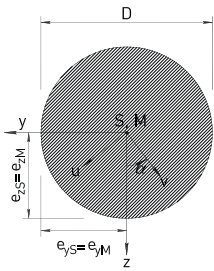


Tabelle 3-8

Rund-Stangen

Allgemein	$A = \pi \cdot \frac{D^2}{4}$ $e_{yS} = e_{zS} = e_{yM} = e_{zM} = e = \frac{D}{2}$ $I_y = I_z = I = \frac{\pi}{64} \cdot D^4$ $I_{yz} = 0$ $W_{y,max} = -W_{y,min} = W_{z,max} = -W_{z,min} = \frac{I}{e} = \frac{\pi}{32} \cdot D^3$
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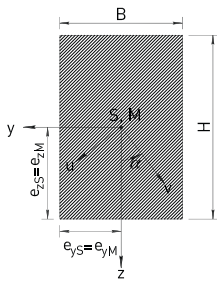


Tabelle 3-9

Vierkant-Stangen

Allgemein	$A = B \cdot H$			
	$e_{yS} = \frac{B}{2}$	$e_{zS} = \frac{H}{2}$	$e_{yM} = \frac{B}{2}$	$e_{zM} = \frac{H}{2}$
	$I_y = \frac{1}{12} \cdot B \cdot H^3$	$I_z = \frac{1}{12} \cdot B^3 \cdot H$	$I_{yz} = 0$	
	$W_{y,max} = \frac{I_y}{e_{zS}}$	$W_{y,min} = -\frac{I_y}{e_{zS}}$	$W_{z,max} = \frac{I_z}{e_{yS}}$	$W_{z,min} = -\frac{I_z}{e_{yS}}$
Sonderfall $H = B$	$A = B^2$ $e_{yS} = e_{zS} = e_{yM} = e_{zM} = \frac{B}{2}$ $I_y = I_z = \frac{1}{12} \cdot B^4$			

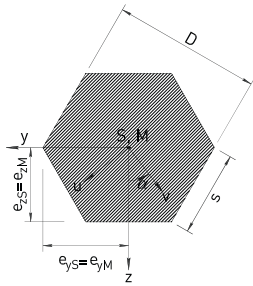


Tabelle 3-10

Sechskant-Stangen

Allgemein	$A = \frac{\sqrt{3}}{2} \cdot D^2$			
	$e_{yS} = \frac{D}{\sqrt{3}}$	$e_{zS} = \frac{D}{2}$	$e_{yM} = \frac{D}{\sqrt{3}}$	$e_{zM} = \frac{D}{2}$
	$I_y = I_z = \frac{5 \cdot \sqrt{3}}{144} \cdot D^4$	$I_{yz} = 0$		
	$W_{y,max} = -W_{y,min} = W_{z,max} = -W_{z,min} = \frac{5 \cdot \sqrt{3}}{72} \cdot D^3$			

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