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Molle per stampi

Die springs

Schraubendruckfedern

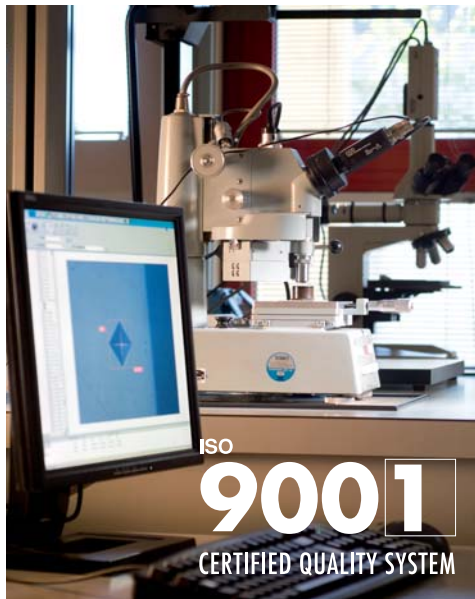
Ressorts de compression

Muelles para moldes

Molas para moldes

ISO 10243 : 2010



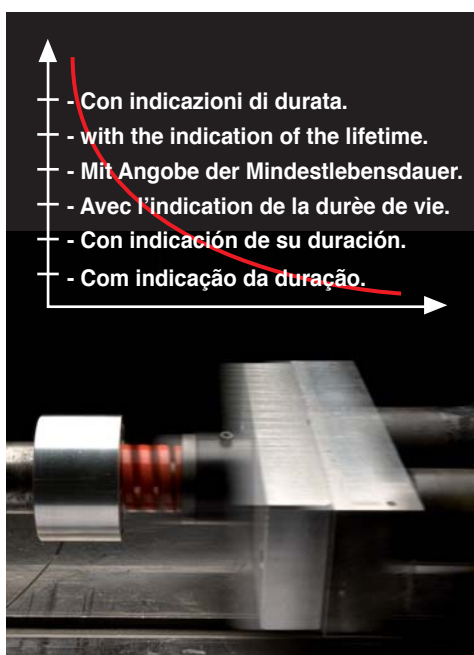


- IT** La continua attività di ricerca e sviluppo unitamente ai rigidi controlli di processo, secondo lo standard ISO 9001, garantiscono un prodotto con caratteristiche dimensionali, di durata e affidabilità superiori.
- EN** Ongoing research and development, along with strict quality assurance procedures in compliance with ISO 9001, ensure very high levels of dimensional accuracy, durability and reliability.
- DE** Ständige Forschung und Entwicklung, sowie strenge Kontrollen des Fertigungsprozesses nach dem Standard ISO 9001 garantieren ein Produkt mit her vorragenden Eigenschaften in Bezug auf Maßgenauigkeit, Haltbarkeit und Zuverlässigkeit.
- FR** L'activité permanente dans le domaine de la recherche et du développement, ainsi que des contrôles qualités du processus de fabrication selon la norme ISO 9001, garantissent l'obtention d'un produit ayant de meilleures caractéristiques dimensionnelles, de durée et de fiabilité.
- ES** La continuada actividad de investigación y desarrollo unida a los severos controles de proceso, según el estándar ISO 9001, garantizan un producto con características dimensionales, de duración y fiabilidad superiores.
- PT** A contínua atividade de pesquisa e desenvolvimento juntamente aos severos controles de processo, conforme o standard ISO 9001, garantem um produto com características dimensionais, de duração e confiabilidade superiores.

- IT** CAD SPRINGS, il primo e rivoluzionario software integrato di calcolo, selezione e generazione parametrica delle molle per stampi Special Springs, disponibile anche su partserver di CADenas.
- EN** CAD SPRINGS, the first and revolutionary integrated software to calculate, select and generate Special Springs' die springs, available also on CADenas Partserver library.
- DE** CAD SPRINGS, die erste revolutionäre Software zur Berechnung, Auswahl und Parametererzeugung von Federn für Formen von Special Springs, erhältlich auch auf Partserver von CADenas.
- FR** CAD SPRINGS, le premier logiciel révolutionnaire intégré de calcul, sélection et création paramétrique des ressorts pour moules Special Springs, également disponible sur partserver de CADenas.
- ES** CAD SPRINGS, el primer y revolucionario software integrado de cálculo, selección y creación paramétrica de los muelles para moldes Special Springs, disponible también sobre partserver de CADenas.
- PT** CAD SPRINGS, o primeiro e revolucionário software integrado de cálculo, seleção e geração paramétrica das molas para moldes Special Springs, disponível também em partserver de CADenas.

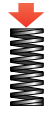















www.partserver.com



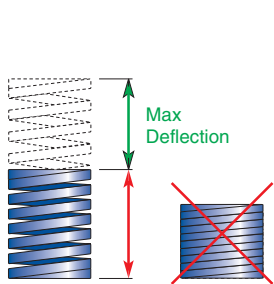
- IT** Continui tests interni di affidabilità hanno permesso di indicare dei valori di durata in funzione delle deflessioni e delle raccomandazioni di utilizzo. Questi valori non sono garantiti a causa dell'elevato numero di variabili nelle reali condizioni di lavoro.
- EN** Ongoing in-house reliability tests allow Special Springs to provide a service life values of springs in compliance of working deflections and recommendations. The stated service life values are not guaranteed due to the impossibility to consider all variables on the real working conditions of the springs.
- DE** Firmeninterne Testreihen zur Zuverlässigkeit haben die Angabe von Werten für die Lebensdauer in Abhängigkeit von Federweg und Gebrauchsempfehlungen ermöglicht. Für diese Werte kann aufgrund der zahlreichen Variablen unter realen Arbeitsbedingungen nicht garantiert werden.
- FR** Des tests internes continus de fiabilité ont permis d'indiquer des valeurs de durée en fonction des déflexions et des recommandations d'utilisation. Ces valeurs ne sont pas garanties à cause du grand nombre de variables dans les conditions réelles de travail.
- ES** Continuados tests internos de fiabilidad han permitido indicar valores de duración en función de las deflexiones y de las recomendaciones de uso. Estos valores no son garantizados debido al elevado número de variables en las reales condiciones de trabajo.
- PT** Contínuos testes internos de confiabilidade permitiram indicar valores de duração em função das deflexões e das recomendações de utilização. Estes valores não são garantidos por causa do elevado número de variáveis nas reais condições de trabalho.

range summary

| Serie Series Série Série Série Série | Standard | Colore Color Kennfarbe Couleur Color Cor | Carico Load Belastung Charge Carga Carga |  + 3.000.000 cycles |  ~ 1.500.000 cycles |  300 - 500.000 cycles |  100 - 200.000 cycles | | |
|---|---|--|---|--|--|--|--|----------------------|---------------------------|
| VL | Special Springs Standard  | Verde chiaro Light green Hellgrün Verte claire Verde claro Verde claro (RAL6019) | Extra-leggero Extra-light Leichte Extra-légère Extra-ligero Extra-leve | 30 % L ₀ | 40% L ₀ | 45% L ₀ | 50% L ₀ | | |
| V | ISO 10243: 2010  | Verde Green Grün Verte Verde Verde (RAL 6002) | Leggero Light Normale Légère Ligero Leve | 25% L ₀ | 30% L ₀ | 35% L ₀ | 40% L ₀ | | |
| B | ISO 10243: 2010  | Blu Blue Blau Bleu Azul marino Azul (RAL 5003) | Medio Medium Mittlere Moyenne Medio Médio | 25% L ₀ | 30% L ₀ | 33.75% L ₀ | 37.5% L ₀ | | |
| R | ISO 10243: 2010  | Rosso Red Rot Rouge Rojo Vermelho (RAL 3000) | Forte Strong Hohe Forte Fuerte Forte | 20% L ₀ | 25% L ₀ | 27.5% L ₀ | 30% L ₀ | | |
| G | ISO 10243: 2010  | Giallo Yellow Gelb Jaune Amarillo Amarelo (RAL 1004) | Extra-Forte Extra-Strong Höchste Extra-Forte Extra-fuerte Extra-forte | 17% L ₀ | 20% L ₀ | 22.5% L ₀ | 25% L ₀ | | |
| A | Special Springs Standard  | Argento Silver Silber Argent | Plateado Prata (RAL 9006) | Ultra-Forte Ultra-Strong Ultra-Hohe Ultra-Forte | Ultra-fuerte Ultra-forte | 10% L ₀ | 12% L ₀ | 13.5% L ₀ | 15% L ₀ |
| W | | Bianco White Weiß blanc | blanco branco (RAL 9016) | Iper-forte Hyper-strong Hyper-Starke | Hyper-forte Hyper-fuerte Carga-hiper | 5% L ₀ | 6,5% L ₀ | 7,5% L ₀ | 8,3 - 14 % L ₀ |
| TV | Special Springs Standard  | Verde Green Grün Verte Verde Verde (RAL 6002) | Leggero Light Normale Légère Ligero Leve | 25% L ₀ | 30% L ₀ | 35% L ₀ | 40% L ₀ | | |
| TB | Special Springs Standard  | Blu Blue Blau Bleu Azul marino Azul (RAL 5003) | Medio Medium Mittlere Moyenne Medio Médio | 25% L ₀ | 30% L ₀ | 33.75% L ₀ | 37.5% L ₀ | | |
| TR | Special Springs Standard  | Rosso Red Rot Rouge Rojo Vermelho (RAL 3000) | Forte Strong Hohe Forte Fuerte Forte | 20% L ₀ | 25% L ₀ | 27.5% L ₀ | 30% L ₀ | | |
| L | Special Springs Standard  | Molle non colorate Not painted springs Unlackierte Federn Ressorts non-peints Muelles no pintados Molas não coloridas | - | 16% L ₀ | 24% L ₀ | - | 32% L ₀ | | |
| Peugeot - Citroën Standard  | | | | Sistemi precompressi, carico medio e forte Precompressed unit, medium and strong load Mittlere und starke Vorspannsysteme Ensembles précomprimés, charge moyenne et forte Sistemas pre-tensados carga mediana y fuerte Sistemas pré-comprimidos carga média e forte | | | | | |

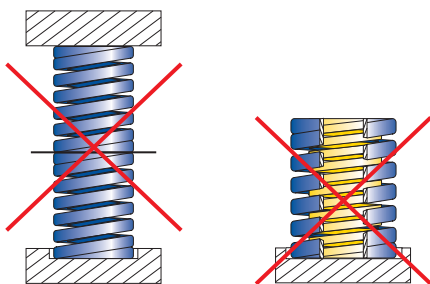
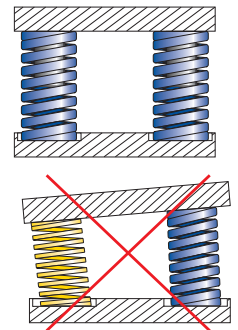
use recommendations

- IT** L' utilizzo corretto delle molle Special Springs assicura prestazioni ben superiori alle indicazioni di durata fornite. Prima di utilizzare le molle, leggere attentamente tutte le raccomandazioni. Usi scorretti riducono significativamente i valori di durata e sono causa di pericolo e danni.
- EN** The correct use of 'Special Springs' die springs assure performance levels well above the lifetime values indicated. Before using the springs, carefully read all the recommendations. Incorrect use can significantly reduce the expected lifetime and may cause damages or injury.
- DE** Der korrekte Gebrauch der Federn Special Springs garantiert für Leistungen, die deutlich über der angegebenen Lebensdauer liegen. Vor Gebrauch der Federn müssen die Gebrauchsempfehlungen aufmerksam gelesen werden. Ein nicht korrekter Gebrauch reduziert die Lebensdauer der Federn deutlich und kann zu Gefahren und Schäden führen.
- FR** L'utilisation correcte des ressorts Special Springs assure des performances bien supérieures aux indications de durée fournies. Avant d'utiliser les ressorts, lire attentivement toutes les recommandations. Des utilisations incorrectes réduisent significativement les valeurs de durée et sont la cause de danger et de dommages.
- ES** El uso correcto de los muelles Special Springs asegura prestaciones mucho más elevadas que las indicaciones de duración proporcionadas. Antes de utilizar los muelles, leer atentamente todas las recomendaciones. Usos incorrectos reducen significativamente los valores de duración y pueden provocar situaciones de peligro y daños.
- PT** A utilização correta das molas Special Springs assegura prestações bem superiores às indicações de duração fornecidas. Antes de utilizar as molas, ler atentamente todas as recomendações. Usos incorretos reduzem significativamente os valores de duração e são causa de perigo e danos.



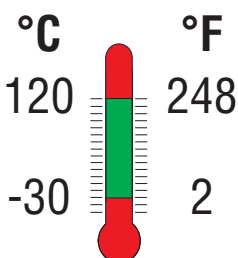
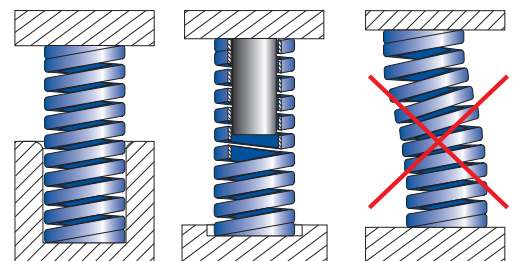
- IT** Non utilizzare le molle oltre la massima deflessione, si evitano così cedimenti improvvisi e danni allo stampo.
- EN** Do not exceed the maximum deflection as it may cause sudden failure of the springs and damages on the tool.
- DE** Do not store springs in compressed state for long time as it may cause abnormal fatigue to the springs.
- FR** Ne pas utiliser les ressorts au-delà de la déflexion maximum, on évite ainsi des affaissements subits et des dommages au moule. Ne pas stocker les ressorts en position comprimée pendant longtemps, on évite ainsi des stress anormaux et des affaissements subits.
- ES** No utilizar los muelles más allá de la máxima deflexión, de esa manera se evitan aflojamientos repentinos y daños al molde. No almacenar los muelles en posición comprimida durante mucho tiempo, de esa manera se evitan estrés anormales y aflojamientos repentinos.
- PT** Não utilizar as molas além da máxima deflexão, desta forma se evitam cedimentos repentinos danos no molde. Não armazenar as molas em posição comprimida por muito tempo, desta forma se evitam estresses normais e cedimentos repentinos.

- IT** Se utilizzate molle diverse simultaneamente, assicurarsi che le deflessioni e le forze siano bilanciate. Garantire la massima perpendicolarità ai piani di contatto per evitare prematuri cedimenti delle molle.
- EN** When using different type of springs in parallel simultaneously ensure that overall deflection and force guarantee a balanced load. When setting the springs ensure the best perpendicularity to the working surface to avoid early failure of the springs.
- DE** Wenn gleichzeitig mehrere Federn verwendet werden, muss sichergestellt werden, dass Federweg und Kräfte ausgeglichen sind. Es muss für eine perfekte Rechtwinkligkeit zu den Auflageflächen garantiert sein, um ein vorzeitiges Nachgeben der Federn zu vermeiden.
- FR** Eviter l'utilisation de ressorts superposés non-complètement guidés ou insérés les uns dans les autres. Danger de dommages aux personnes ou aux choses.
- ES** Si utilizan muelles diferentes simultáneamente, comprueben que las deflexiones y las fuerzas estén equilibradas. Garantizan la máxima perpendicularidad a los planos de contacto para evitar prematuros aflojamientos de los muelles.
- PT** Se molas diferentes forem utilizadas ao mesmo tempo, assegure-se que as deflexões e as forças sejam equilibradas. Garantir a máxima perpendicularidade aos planos de contato a fim de evitar prematuros cedimentos das molas.



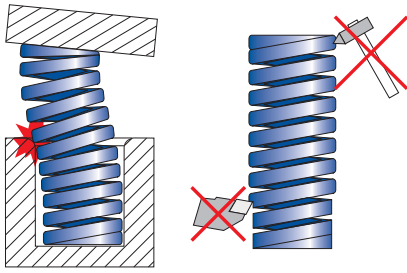
- IT** Evitare l'uso di molle sovrapposte non completamente guidate o inserite le une nelle altre. Pericolo di danni a persone o cose.
- EN** Avoid to using springs in vertical group not fully guided or using springs inserted in each other as it may cause serious damage or injury.
- DE** Die Federn nicht ohne vollständige Führung übereinander gesetzt oder ineinander gesetzt verwenden, da dies zu Sach- und Personenschäden führen kann!
- FR** Ne pas stocker les ressorts en position comprimée pendant longtemps, on évite ainsi des stress anormaux et des affaissements subits.
- ES** Evitar el uso de muelles superpuestos que no estén completamente guiados o insertados los unos en los otros. Peligro de daños a personas o cosas.
- PT** Evitar o uso de molas sobrepostas não completamente guiadas ou inseridas uma dentro da outra. Perigo de danos a pessoas ou objetos.

- IT** Maggiore è il guidaggio maggiore sarà la durata delle molle. È assolutamente necessario guidare tutte le molle con un rapporto lunghezza/diametro maggiore di 3,5.
- EN** The bigger the guide the longer the lifetime. It is essential to guide all springs with a free length /diameter ratio exceeding 3.5.
- DE** Je größer die Führung ist, desto länger ist die Lebensdauer der Federn. Alle Federn müssen mit einem Verhältnis von Länge zu Durchmesser von mehr als 3,5 geführt werden!
- FR** Plus le guidage est important et plus la durée des ressorts sera longue. Il est absolument nécessaire de guider tous les ressorts avec un rapport longueur/diamètre supérieur à 3,5.
- ES** Cuanto mayor sea el conjunto de dispositivos de guía, mayor será la duración de los muelles. Es absolutamente necesario guiar todos los muelles con una relación de longitud/diámetro mayor de 3,5.
- PT** Quanto maior será a guiação, maior a duração das molas. É absolutamente necessário guiar todas as molas com relação de comprimento/diâmetro maior que 3,5.



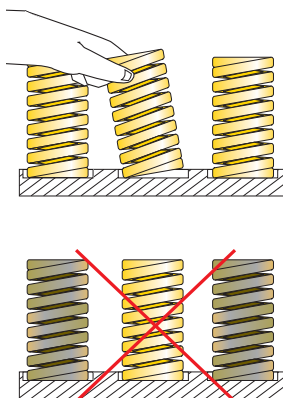
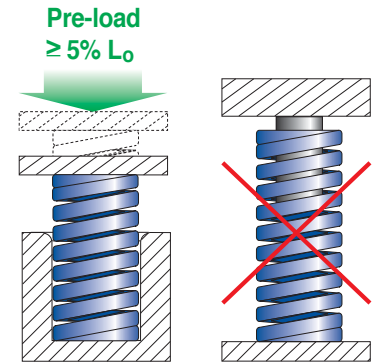
- IT** Temperatura di utilizzo - 30 °C e +120 °C. Oltre i 120 °C e fino ad un massimo di 250 °C considerare una perdita di carico del 1% circa ogni 40 °C.
- EN** Best working temperature - 30°C + 120°C. Over 120°C and up to 250°C should be considered an average loss of 1% on springs rate for every 40°C.
- DE** Betriebstemperatur -30°C bis +120°C. Bei Temperaturen von 120°C bis maximal 250°C muss ein Spannungsverlust von 1% ca. alle 40°C berücksichtigt werden.
- FR** Température d'utilisation - 30 °C e +120 °C. Au-delà de 120 °C et jusqu'à un maximum 250 °C il faut considérer une perte de charge de 1% environ tous les 40 °C.
- ES** Temperatura de utilización - 30 °C y +120 °C. Más allá de los 120 °C y hasta un máximo de 250 °C, hay que tener en cuenta una pérdida de carga del 1% aproximadamente cada 40 °C.
- PT** Temperatura de utilização - 30 °C e +120 °C. Além de 120 °C e até um máximo de 250 °C, considerar uma perda de carga de cerca 1% cada 40 °C.

use recommendations



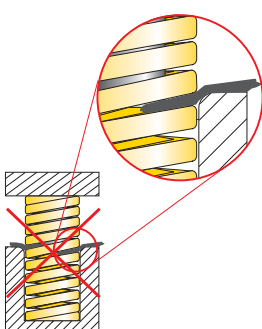
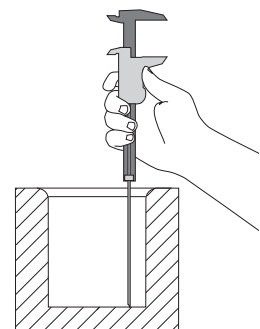
- IT** Qualsiasi danno sulla superficie delle molle (tagli, abrasioni, molature) può ridurre significativamente la durata attesa. Sostituire sempre le molle danneggiate.
- EN** Any alteration on the surface of the springs (cutting, grinding, scratches, etc.) may significantly reduce the expected lifetime. Always replace the damaged springs with new ones.
- DE** Schäden gleich welcher Art auf der Oberfläche der Federn (Schnitte, Abschürfungen, Abrieb) können die erwartete Lebensdauer deutlich reduzieren. Beschädigte Federn müssen ausgetauscht werden.
- FR** Tout dommage sur la surface des ressorts (coupures, abrasions, meulages) peut réduire significativement la durée prévue. Il faut toujours remplacer les ressorts endommagés.
- ES** Cualquier daño sobre la superficie de los muelles (cortes, abrasiones, amoladuras) puede reducir significativamente la esperada duración. Sustituir siempre los muelles dañados.
- PT** Qualquer dano na superfície das molas (cortes, abrasões, amoladuras) pode reduzir consideravelmente a duração esperada. Substituir sempre as molas danificadas.

- IT** A parità di deflessione totale, maggiore è il precarico, maggiore sarà la durata delle molle, quindi molle di lunghezza maggiore a parità di forza totale garantiscono maggiore durata. Si consiglia un precarico minimo del 5% della lunghezza libera.
- EN** The bigger the pre-load the longer the lifetime of the springs for the same total deflection (% of Lo). Thus longer springs with bigger pre-load will assure longer lifetime. It is recommended to apply a minimum pre-load of 5% of the free length.
- DE** Bei gleichem Gesamtfederweg gilt, dass die Lebensdauer der Federn umso höher ist, je größer die Vorspannung für eine längere Lebensdauer. Es wird zu einer Mindestvorspannung von 5% der freien Länge geraten.
- FR** A égalité de déflexion totale, plus la précharge est importante, et plus la durée des ressorts sera longue, donc des ressorts de longueur plus importante à égalité de force totale garantissent une plus longue durée. Nous conseillons une précharge minimum de 5% de la longueur libre.
- ES** A paridad de deflexión total, cuanto mayor es la precarga, mayor será la duración de los muelles, por lo tanto los muelles de mayor longitud a paridad de fuerza total garantizan una mayor duración. Aconsejamos una precarga mínima del 5% de la longitud libre.
- PT** Em igualdade de deflexão total, quanto maior será a pré-carga, maior será a duração das molas, portanto molas mais longas, em igualdade de força total, garantem maior duração. Aconselha-se uma pré-carga mínima de 5% do comprimento livre.



- IT** Una molla collassata crea uno sbilanciamento dei carichi con danni alle altre molle o allo stampo. Sostituire tutte le molle. Una sostituzione programmata delle molle in funzione della durata indicata nelle tabelle previene danni e riduce costi.
- EN** If one spring collapses, an imbalanced load will occur, possibly damaging the other springs. Replace all springs. An advance planned maintenance according to the indicated lifetime of the springs will benefit in avoiding damages and saving of money.
- DE** Durch eine defekte Feder entsteht ein Ungleichgewicht der Spannungen, durch das die anderen Federn oder die Form beschädigt werden. Es müssen immer alle Federn ausgetauscht werden. Ein geplantes Auswechseln der Federn anhand der in den Tabellen angegebenen Lebensdauer beugt Schäden vor und hilft dabei, Kosten zu senken.
- FR** Un ressort affaissé crée un déséquilibre des charges avec des dommages aux autres ressorts et au moule. Remplacer tous les ressorts. Un remplacement programmé des ressorts en fonction de la durée indiquée sur les tableaux évite des dommages et réduit les coûts.
- ES** Un muelle colapsado crea un desequilibrio de las cargas con daños a los demás muelles o al molde. Sustituir todos los muelles. Una sustitución programada de los muelles en función de la duración indicada en las tablas previene daños y reduce costes.
- PT** Uma mola que cedeu provoca um desequilíbrio das cargas provocando danos nas outras molas e no molde. Substituir todas as molas. A substituição programada das molas em função da duração indicada nas tabelas previne danos e reduz custos.

- IT** Le manutenzioni dello stampo possono modificare la deflessione di lavoro originale delle molle. controllare sempre le reali deflessioni per evitare prematuri cedimenti delle molle o danni allo stampo.
- EN** Tool maintenance can vary the original working deflection of the springs. Please always check the real working stroke of the springs to avoid early failure of the springs or damages in the tool.
- DE** Wartungseingriffe an der Form können den ursprünglichen Federweg der Federn ändern. Die tatsächlichen Federwege müssen immer kontrolliert werden, um einem vorzeitigen Nachgeben der Federn oder Schäden an der Form vorzubeugen.
- FR** Les entretiens du moule peuvent modifier la déflexion du travail original des ressorts. Il faut toujours contrôler les déflexions réelles pour éviter des affaissements prématurés des ressorts ou des dommages au moule.
- ES** Las manipulaciones del molde pueden modificar la deflexión de trabajo original de los muelles. Controlar siempre las reales deflexiones para evitar prematuros aflojamientos de los muelles o daños al molde.
- PT** As manutenções do molde podem modificar a deflexão de trabalho original das molas. Verifique sempre as reais deflexões para evitar prematuros cedimentos das molas ou danos no molde.



- IT** La presenza di corpi estranei tra le spire delle molle causa riduzioni di corsa, sovraccarichi e rotture delle molle con danni allo stampo. Fare il possibile per evitarlo.
- EN** The presence of scraps or any solid piece between coils causes a reduction of springs deflection with overloads and early failure of the springs with damage in the tool. Take care to avoid that.
- DE** Das Vorhandensein von Fremdkörpern zwischen den Windungen der Federn führt zu einer Reduzierung vom Weg, zu Überlastungen und zum Bruch der Federn und damit zu Schäden an der Form und ist daher möglichst zu vermeiden.
- FR** La présence de corps étrangers entre les spires des ressorts provoque des réductions de course, des surcharges et des ruptures des ressorts avec des dommages au moule. Il faut faire le possible pour l'éviter.
- ES** La presencia de cuerpos extraños entre las espiras de los muelles provoca reducciones de carrera, sobrecargas y rupturas de los muelles con daños al molde. Hacer lo posible para evitarlo.
- PT** A presença de corpos estranhos entre as espiras das molas provoca reduções de curso, sobrecargas e rupturas das molas com danos no molde. Faça o possível para evitá-lo.

springs selection

RECTANGULAR WIRE SECTION

| Estimated Life | Hole diameter (mm) | | | | | | | | | Series |
|---------------------|--------------------|------|-----|------|------|-------|-------|-------|-------|--------|
| | 10 | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | |
| + 3.000.000 cycles | Load (N) | | | | | | | | | |
| | - | - | - | 220 | 410 | 485 | 745 | 1560 | - | VL |
| | 70 | 130 | 185 | 315 | 560 | 830 | 1130 | 2320 | 3250 | V |
| | 110 | 190 | 330 | 525 | 845 | 1520 | 2030 | 3050 | 5310 | B |
| | 125 | 200 | 380 | 935 | 1560 | 2530 | 3270 | 4860 | 8440 | R |
| | 145 | 230 | 455 | 1090 | 1760 | 2800 | 4770 | 6820 | 11890 | G |
| - | - | - | - | 4090 | 6350 | 7700 | 12280 | - | A | |
| ~ 1.500.000 cycles | Load (N) | | | | | | | | | |
| | - | - | - | 290 | 540 | 650 | 1000 | 2120 | - | VL |
| | 80 | 150 | 220 | 380 | 675 | 990 | 1360 | 2780 | 3900 | V |
| | 130 | 230 | 400 | 625 | 1010 | 1830 | 2430 | 3660 | 6370 | B |
| | 155 | 250 | 480 | 1170 | 1950 | 3170 | 4090 | 6070 | 10560 | R |
| | 170 | 270 | 535 | 1280 | 2070 | 3290 | 5610 | 8030 | 13990 | G |
| - | - | - | - | 4910 | 7620 | 9240 | 14730 | - | A | |
| 300 -500.000 cycles | Load (N) | | | | | | | | | |
| | - | - | - | 330 | 610 | 730 | 1120 | 2380 | - | VL |
| | 95 | 180 | 260 | 440 | 780 | 1160 | 1590 | 3240 | 4540 | V |
| | 150 | 255 | 450 | 705 | 1140 | 2060 | 2730 | 4120 | 7170 | B |
| | 170 | 275 | 525 | 1290 | 2140 | 3480 | 4490 | 6670 | 11610 | R |
| | 195 | 305 | 605 | 1440 | 2320 | 3700 | 6300 | 9020 | 15740 | G |
| - | - | - | - | 5530 | 8570 | 10400 | 16580 | - | A | |
| 100 -200.000 cycles | Load (N) | | | | | | | | | |
| | - | - | - | 365 | 680 | 810 | 1250 | 2650 | - | VL |
| | 110 | 200 | 300 | 500 | 890 | 1320 | 1810 | 3710 | 5190 | V |
| | 170 | 280 | 500 | 780 | 1260 | 2280 | 3040 | 4580 | 7960 | B |
| | 185 | 300 | 570 | 1400 | 2340 | 3800 | 4900 | 7280 | 12660 | R |
| | 215 | 340 | 670 | 1605 | 2585 | 4120 | 7010 | 10040 | 17330 | G |
| - | - | - | - | 6140 | 9520 | 11550 | 18420 | - | A | |



IT

I valori di durata indicati nella tabella sono ottenuti da prove interne e non sono garantiti a causa dell'elevato numero di variabili nelle reali condizioni di lavoro. Il metodo indicato per la selezione delle molle è approssimativo, si consiglia sempre di fare riferimento alle tabelle per la selezione.

EN

The stated service life values are obtained from in-house reliability tests and are not guaranteed due to the impossibility to consider all variables on the real working conditions of the springs. The selecting guide-line is an approximate method of spring selection, it is always recommended to refer to the standard tabs before using the spring.

DE

Die in der Tabelle angegebenen Werte für die Lebensdauer wurden empirisch in firmeninternen Tests ermittelt und können aufgrund der hohen Anzahl an Variablen und tatsächlichen Arbeitsbedingungen nicht garantiert werden. Das angegebene Verfahren zur Auswahl der Federn dient nur als Anhaltswert. Es wird dazu geraten, die Auswahl immer anhand der Tabellen durchzuführen.

FR

Les valeurs de durée indiquées sur le tableau sont obtenues à partir de tests internes qui ne sont pas garantis à cause du grand nombre de variables dans les conditions de travail réelles. La méthode indiquée pour la sélection des ressorts est approximative, nous conseillons toujours de se référer aux tableaux pour la sélection.

ES

Los valores de duración indicados en la tabla se obtienen por pruebas internas y no son garantizados debido al elevado número de variables en las reales condiciones de trabajo. El método indicado para la selección de los muelles es aproximativo, por eso aconsejamos hacer siempre referencia a las tablas para la selección.

PT

Os valores de duração indicados na tabela são obtidos por testes internos e não são garantidos por causa do elevado número de variáveis nas reais condições de trabalho. O método indicado para seleção das molas é aproximativo, aconselha-se sempre ter como referência as tabelas para a seleção.

springs selection

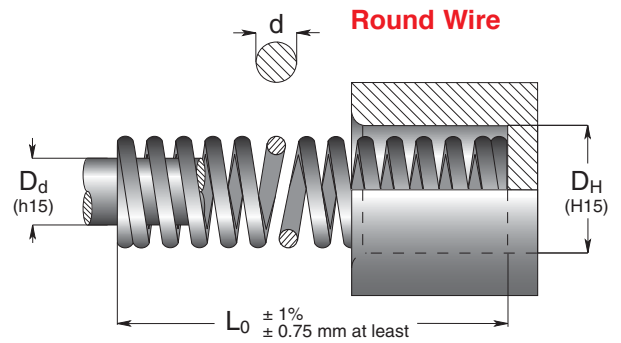
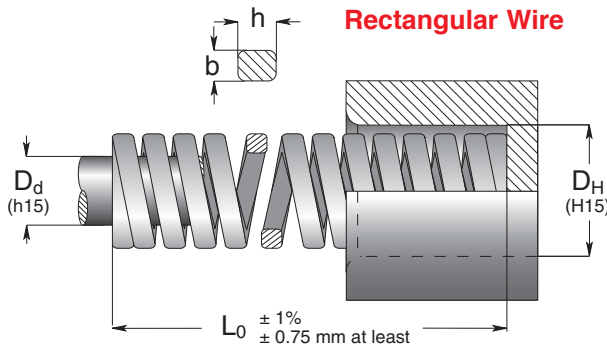
ROUND WIRE SECTION

| Estimated Life | Hole diameter (mm) | | | | | | | | | Series |
|---------------------------|--------------------|------|-----|----|----|----|----|----|----|--------|
| | 10 | 12.5 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | |
| +3.000.000 cycles | Load (N) | | | | | | | | | |
| | 25 | 50 | 100 | - | - | - | - | - | - | TV |
| | 70 | 130 | 175 | - | - | - | - | - | - | TB |
| | 100 | 175 | 360 | - | - | - | - | - | - | TR |
| ~1.500.000 cycles | Load (N) | | | | | | | | | |
| | 30 | 60 | 115 | - | - | - | - | - | - | TV |
| | 90 | 150 | 210 | - | - | - | - | - | - | TB |
| | 120 | 220 | 450 | - | - | - | - | - | - | TR |
| 300.000 500.000 cycles | Load (N) | | | | | | | | | |
| | 35 | 70 | 135 | - | - | - | - | - | - | TV |
| | 100 | 170 | 240 | - | - | - | - | - | - | TB |
| | 135 | 240 | 500 | - | - | - | - | - | - | TR |
| 100.000 200.000 cycles | Load (N) | | | | | | | | | |
| | 40 | 80 | 150 | - | - | - | - | - | - | TV |
| | 110 | 190 | 290 | - | - | - | - | - | - | TB |
| | 150 | 260 | 545 | - | - | - | - | - | - | TR |



- IT** I valori di durata indicati nella tabella sono ottenuti da prove interne e non sono garantiti a causa dell'elevato numero di variabili nelle reali condizioni di lavoro. Il metodo indicato per la selezione delle molle è approssimativo, si consiglia sempre di fare riferimento alle tabelle per la selezione.
- EN** The stated service life values are obtained from in-house reliability tests and are not guaranteed due to the impossibility to consider all variables on the real working conditions of the springs. The selecting guide-line is an approximate method of spring selection, it is always recommended to refer to the standard tabs before using the spring.
- DE** Die in der Tabelle angegebenen Werte für die Lebensdauer wurden empirisch in firmeninternen Tests ermittelt und können aufgrund der hohen Anzahl an Variablen und tatsächlichen Arbeitsbedingungen nicht garantiert werden. Das angegebene Verfahren zur Auswahl der Federn dient nur als Anhaltswert. Es wird dazu geraten, die Auswahl immer anhand der Tabellen durchzuführen.
- FR** Les valeurs de durée indiquées sur le tableau sont obtenues à partir de tests internes qui ne sont pas garantis à cause du grand nombre de variables dans les conditions de travail réelles. La méthode indiquée pour la sélection des ressorts est approximative, nous conseillons toujours de se référer aux tableaux pour la sélection.
- ES** Los valores de duración indicados en la tabla se obtienen por pruebas internas y no son garantizados debido al elevado número de variables en las reales condiciones de trabajo. El método indicado para la selección de los muelles es aproximativo, por eso aconsejamos hacer siempre referencia a las tablas para la selección.
- PT** Os valores de duração indicados na tabela são obtidos por testes internos e não são garantidos por causa do elevado número de variáveis nas reais condições de trabalho. O método indicado para seleção das molas é aproximativo, aconselha-se sempre ter como referência as tabelas para a seleção.

how to read



| Code | D _H | D _d | L ₀ | R | A | B | C | D | E | | |
|------|----------------|----------------|----------------|-----------------|------------------|------------------|------------------|------------------|------------------|---------|--|
| | Hole Diameter | Rod Diameter | Free Length | Spring Constant | % L ₀ | % L ₀ | % L ₀ | % L ₀ | % L ₀ | approx. | |
| | b x h, d | | | ± 10% | + 3.000.000 | ~ 1.500.000 | 300 - 500.000 | 100 - 200.000 | do not use | Pcs | |
| | mm | mm | mm | N/mm | mm | N | mm | N | mm | | |

D_H diametro del foro di alloggiamento.
hole diameter.
Außenführungsdurchmesser.
diamètre du trou de logement.
diámetro del agujero de alojamiento.
diâmetro do furo de alojamento.

D_d diametro della spina di guida.
rod diameter.
Innenführungsdurchmesser.
diamètre de l'arbre de guidage.
diámetro de la clavija de guía.
diâmetro da tomada de guia.

b x h sezione del profilo.
d cross wire section.
Profilquerschnitt.
section du profilé.
sección del perfil.
seção do perfil.

L₀ lunghezza libera della molla.
spring free length.
Länge der unbelasteten Feder.
longueur libre du ressort.
longitud libre del muelle.
comprimento livre da mola.

R carico (N) necessario per deflettere la molla di 1 millimetro.
spring rate (load required for 1mm deflection).
Federrate.
charge exigée pour comprimer le ressort 1mm.
carga (N) necesaria para desviar el muelle de 1 milímetro.
carga (N) necessária para defletir a mola de 1 milímetro.

A deflessione totale consigliata per una durata della molla maggiore a 3.000.000 di cicli.
advised working deflection for more than 3.000.000 cycles.
Empfohlener Gesamtfederweg für eine Lebensdauer der Feder von mehr als 3.000.000 Zyklen.
déflexion totale conseillée pour une durée du ressort supérieure à 3.000.000 de cycles.
deflexión total aconsejada para una duración del muelle superior a 3.000.000 de ciclos.
deflexão total aconselhada para duração da mola superior a 3.000.000 de ciclos.

B deflessione totale consigliata per una durata della molla di circa 1.500.000 di cicli.
advised working deflection for about 1.500.000 cycles.
Empfohlener Gesamtfederweg für eine Lebensdauer der Feder für eine durchschnittliche Lebensdauer von 1.500.000 Zyklen.
déflexion totale conseillée pour une durée du ressort d'environ 1.500.000 cycles.
deflexión total aconsejada para una duración del muelle de aproximadamente 1.500.000 de ciclos.
deflexão total aconselhada para duração da mola de cerca 1.500.000 de ciclos.

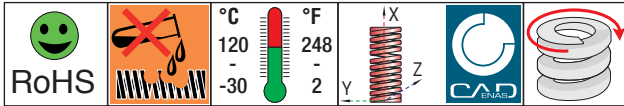
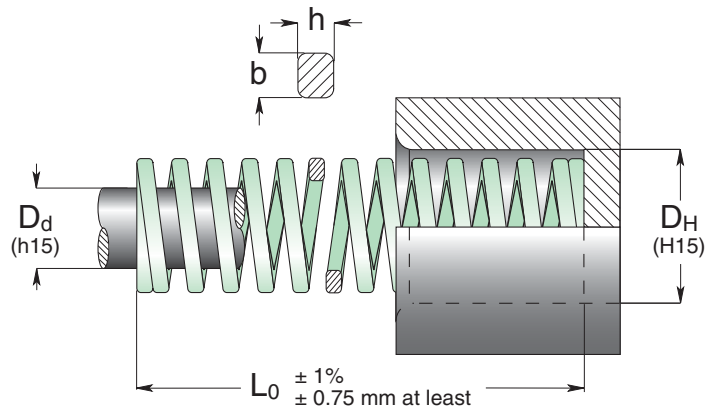
C deflessione totale consigliata per una durata della molla di circa 300.000 - 500.000 cicli.
advised working deflection for about 300.000 - 500.000 cycles.
Empfohlener Gesamtfederweg für eine Lebensdauer der Feder von ca. 300.000 bis 500.000 Zyklen.
déflexion totale conseillée pour une durée du ressort d'environ 300.000 - 500.000 cycles.
deflexión total aconsejada para una duración del muelle de aproximadamente 300.000 - 500.000 ciclos.
deflexão total aconselhada para duração da mola de cerca 300.000 - 500.000 ciclos.

D deflessione totale massima per una durata della molla di circa 100.000 - 200.000 cicli.
advised working deflection for about 100.000 - 200.000 cycles.
Maximaler Gesamtfederweg für eine Lebensdauer der Feder von ca. 100.000 bis 200.000 Zyklen.
déflexion totale maximum pour une durée du ressort d'environ 100.000 - 200.000 cycles.
deflexión total máxima para una duración del muelle de aproximadamente 100.000 - 200.000 ciclos.
deflexão total máxima para duração da mola de cerca 100.000 - 200.000 ciclos.

E deflessione approssimativa per molla a blocco.
solid deflection (approximate value).
Näherungswert Federweg für Blockfeder.
 approx. déflexion approximative pour ressort à bloc.
deflexión aproximada por muelle a bloque.
deflexão aproximativa por mola a bloco.

numero di pezzi per confezione.
quantity for standard packaging.
Stück pro Packung.
nombre de pièces par boîte.
número de piezas por confección.
número de peças por embalagem.

- IT** Molle carico extra-leggero
- EN** Extra-light load springs
- DE** Federn für leichte Spannung
- FR** Ressorts charge extra-légère
- ES** Muelles carga extra-ligera
- PT** Molas carga extra-leve



| Code | D _H D _d | | L ₀ | R | A | B | C | D | E | Pcs | | | | |
|-------------|-------------------------------|--------------|----------------|-----------------|--------------------|--------------------|--------------------|--------------------|------------|-----|------|-----|------|----|
| | Hole Diameter | Rod Diameter | | | | | | | | | | | | |
| | b x h | | Free Length | Spring Constant | 30% L ₀ | 40% L ₀ | 45% L ₀ | 50% L ₀ | approx. | | | | | |
| | mm | mm | mm | ± 10% N/mm | + 3.000.000 mm N | ~ 1.500.000 mm N | 300 - 500.000 mm N | 100 - 200.000 mm N | do not use | | | | | |
| VL 20 - 025 | 20 | 10 | 25 | 29.4 | 7.5 | 221 | 10.0 | 294 | 11.3 | 331 | 12.5 | 368 | 13.9 | 50 |
| VL 20 - 032 | | | 32 | 22.6 | 9.6 | 217 | 12.8 | 289 | 14.4 | 325 | 16.0 | 362 | 18.2 | 50 |
| VL 20 - 038 | | | 38 | 18.6 | 11.4 | 212 | 15.2 | 283 | 17.1 | 318 | 19.0 | 353 | 22.0 | 25 |
| VL 20 - 044 | | | 44 | 15.7 | 13.2 | 207 | 17.6 | 276 | 19.8 | 311 | 22.0 | 345 | 25.8 | 25 |
| VL 20 - 051 | | | 51 | 13.7 | 15.3 | 210 | 20.4 | 279 | 23.0 | 314 | 25.5 | 349 | 30.3 | 25 |
| VL 20 - 064 | | | 64 | 11.3 | 19.2 | 217 | 25.6 | 289 | 28.8 | 325 | 32.0 | 362 | 38.9 | 25 |
| VL 20 - 076 | | | 76 | 9.8 | 22.8 | 223 | 30.4 | 298 | 34.2 | 335 | 38.0 | 372 | 47.0 | 25 |
| VL 20 - 089 | | | 89 | 8.3 | 26.7 | 222 | 35.6 | 295 | 40.1 | 332 | 44.5 | 369 | 55.7 | 20 |
| VL 20 - 102 | | | 102 | 7.4 | 30.6 | 226 | 40.8 | 302 | 45.9 | 340 | 51.0 | 377 | 64.2 | 20 |
| VL 20 - 115 | | | 115 | 6.4 | 34.5 | 221 | 46.0 | 294 | 51.8 | 331 | 57.5 | 368 | 72.9 | 10 |
| VL 20 - 127 | | | 127 | 5.9 | 38.1 | 225 | 50.8 | 300 | 57.2 | 337 | 63.5 | 375 | 80.7 | 10 |
| VL 20 - 139 | | | 139 | 5.4 | 41.7 | 225 | 55.6 | 300 | 62.6 | 338 | 69.5 | 375 | 88.4 | 10 |
| VL 20 - 152 | 152 | 4.9 | 45.6 | 223 | 60.8 | 298 | 68.4 | 335 | 76.0 | 372 | 96.7 | 10 | | |
| VL 20 - 305 | 3.9 x 1.7 | 305 | 2.5 | 91.5 | 229 | 122 | 305 | 137 | 343 | 153 | 381 | 196 | 10 | |
| VL 25 - 025 | 25 | 12.5 | 25 | 53.9 | 7.5 | 404 | 10.0 | 539 | 11.3 | 606 | 12.5 | 674 | 12.9 | 50 |
| VL 25 - 032 | | | 32 | 42.2 | 9.6 | 405 | 12.8 | 540 | 14.4 | 608 | 16.0 | 675 | 17.2 | 25 |
| VL 25 - 038 | | | 38 | 35.8 | 11.4 | 408 | 15.2 | 544 | 17.1 | 612 | 19.0 | 680 | 20.7 | 25 |
| VL 25 - 044 | | | 44 | 31.4 | 13.2 | 414 | 17.6 | 553 | 19.8 | 622 | 22.0 | 691 | 24.4 | 25 |
| VL 25 - 051 | | | 51 | 27.0 | 15.3 | 413 | 20.4 | 551 | 23.0 | 620 | 25.5 | 689 | 28.5 | 25 |
| VL 25 - 064 | | | 64 | 21.6 | 19.2 | 415 | 25.6 | 553 | 28.8 | 622 | 32.0 | 691 | 36.5 | 25 |
| VL 25 - 076 | | | 76 | 18.1 | 22.8 | 413 | 30.4 | 550 | 34.2 | 619 | 38.0 | 688 | 43.9 | 20 |
| VL 25 - 089 | | | 89 | 15.2 | 26.7 | 406 | 35.6 | 541 | 40.1 | 609 | 44.5 | 676 | 51.4 | 20 |
| VL 25 - 102 | | | 102 | 13.2 | 30.6 | 404 | 40.8 | 539 | 45.9 | 606 | 51.0 | 673 | 59.3 | 20 |
| VL 25 - 115 | | | 115 | 11.8 | 34.5 | 407 | 46.0 | 543 | 51.8 | 611 | 57.5 | 679 | 67.2 | 10 |
| VL 25 - 127 | | | 127 | 10.6 | 38.1 | 404 | 50.8 | 538 | 57.2 | 606 | 63.5 | 673 | 74.4 | 10 |
| VL 25 - 139 | | | 139 | 9.6 | 41.7 | 400 | 55.6 | 534 | 62.6 | 600 | 69.5 | 667 | 81.6 | 10 |
| VL 25 - 152 | 152 | 8.8 | 45.6 | 401 | 60.8 | 535 | 68.4 | 602 | 76.0 | 669 | 89.5 | 10 | | |
| VL 25 - 178 | 178 | 7.6 | 53.4 | 406 | 71.2 | 541 | 80.1 | 609 | 89.0 | 676 | 105 | 10 | | |
| VL 25 - 203 | 203 | 6.7 | 60.9 | 408 | 81.2 | 544 | 91.4 | 612 | 102 | 680 | 121 | 10 | | |
| VL 25 - 305 | 5.4 x 2.2 | 305 | 4.4 | 91.5 | 403 | 122 | 537 | 137 | 604 | 153 | 671 | 182 | 5 | |
| VL 32 - 038 | 32 | 16 | 38 | 43.1 | 11.4 | 491 | 15.2 | 655 | 17.1 | 737 | 19.0 | 819 | 19.9 | 20 |
| VL 32 - 044 | | | 44 | 37.3 | 13.2 | 492 | 17.6 | 656 | 19.8 | 739 | 22.0 | 821 | 23.5 | 20 |
| VL 32 - 051 | | | 51 | 32.4 | 15.3 | 496 | 20.4 | 661 | 23.0 | 744 | 25.5 | 826 | 27.6 | 20 |
| VL 32 - 064 | | | 64 | 25.5 | 19.2 | 490 | 25.6 | 653 | 28.8 | 734 | 32.0 | 816 | 35.2 | 20 |
| VL 32 - 076 | | | 76 | 21.6 | 22.8 | 492 | 30.4 | 657 | 34.2 | 739 | 38.0 | 821 | 42.4 | 20 |
| VL 32 - 089 | | | 89 | 18.1 | 26.7 | 483 | 35.6 | 644 | 40.1 | 725 | 44.5 | 805 | 50.0 | 10 |
| VL 32 - 102 | | | 102 | 15.7 | 30.6 | 480 | 40.8 | 641 | 45.9 | 721 | 51.0 | 801 | 57.6 | 10 |
| VL 32 - 115 | | | 115 | 14.2 | 34.5 | 490 | 46.0 | 653 | 51.8 | 735 | 57.5 | 817 | 65.5 | 10 |
| VL 32 - 127 | | | 127 | 12.7 | 38.1 | 484 | 50.8 | 645 | 57.2 | 726 | 63.5 | 806 | 72.5 | 10 |
| VL 32 - 139 | | | 139 | 11.6 | 41.7 | 484 | 55.6 | 645 | 62.6 | 726 | 69.5 | 806 | 79.4 | 10 |
| VL 32 - 152 | | | 152 | 10.6 | 45.6 | 483 | 60.8 | 644 | 68.4 | 725 | 76.0 | 806 | 87.3 | 10 |
| VL 32 - 178 | | | 178 | 9.0 | 53.4 | 481 | 71.2 | 641 | 80.1 | 721 | 89.0 | 801 | 103 | 5 |
| VL 32 - 203 | 203 | 7.8 | 60.9 | 475 | 81.2 | 633 | 91.4 | 713 | 102 | 792 | 118 | 5 | | |
| VL 32 - 254 | 254 | 6.4 | 76.2 | 488 | 102 | 650 | 114 | 732 | 127 | 813 | 148 | 5 | | |
| VL 32 - 305 | 6.5 x 2.6 | 305 | 5.3 | 91.5 | 485 | 122 | 647 | 137 | 727 | 153 | 808 | 178 | 5 | |



Special Springs Standard

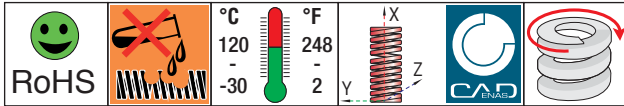
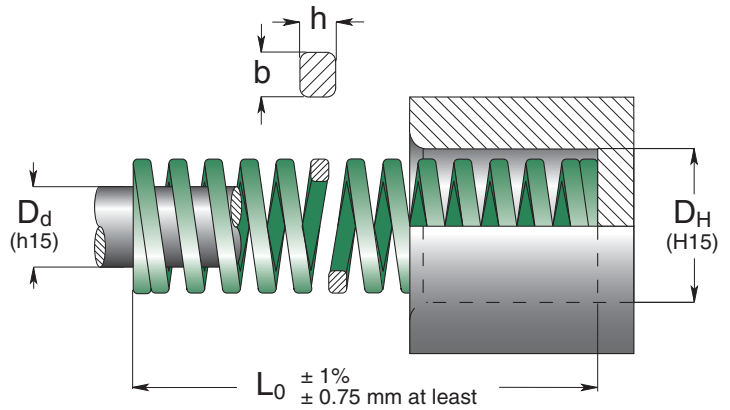
SERIES VL

| Code | D _H | D _d | L ₀ | R | A | B | C | D | E | Pcs | | | | | |
|-------------|----------------|----------------|----------------|-----------------|--------------------|--------------------|--------------------|--------------------|--------------------|------|------|------|------|------|------|
| | Hole Diameter | Rod Diameter | Free Length | Spring Constant | 30% L ₀ | 40% L ₀ | 45% L ₀ | 50% L ₀ | approx. do not use | | | | | | |
| b x h | | | | ± 10% | + 3.000.000 | ~ 1.500.000 | 300 - 500.000 | 100 - 200.000 | | | | | | | |
| mm x mm | | mm | mm | N/mm | mm N | mm N | mm N | mm N | mm | | | | | | |
| VL 40 - 051 | 40 | 20 | 51 | 48.1 | 15.3 | 736 | 20.4 | 981 | 23.0 | 1104 | 25.5 | 1227 | 28.0 | 20 | |
| VL 40 - 064 | | | 64 | 39.2 | 19.2 | 753 | 25.6 | 1004 | 28.8 | 1129 | 32.0 | 1254 | 36.2 | 10 | |
| VL 40 - 076 | | | 76 | 33.3 | 22.8 | 759 | 30.4 | 1012 | 34.2 | 1139 | 38.0 | 1265 | 43.7 | 10 | |
| VL 40 - 089 | | | 89 | 28.4 | 26.7 | 758 | 35.6 | 1011 | 40.1 | 1137 | 44.5 | 1264 | 51.7 | 10 | |
| VL 40 - 102 | | | 102 | 24.5 | 30.6 | 750 | 40.8 | 1000 | 45.9 | 1125 | 51.0 | 1250 | 59.8 | 10 | |
| VL 40 - 115 | | | 115 | 22.1 | 34.5 | 762 | 46.0 | 1017 | 51.8 | 1144 | 57.5 | 1271 | 67.9 | 10 | |
| VL 40 - 127 | | | 127 | 19.6 | 38.1 | 747 | 50.8 | 996 | 57.2 | 1120 | 63.5 | 1245 | 75.2 | 5 | |
| VL 40 - 139 | | | 139 | 17.7 | 41.7 | 738 | 55.6 | 984 | 62.6 | 1107 | 69.5 | 1230 | 82.4 | 5 | |
| VL 40 - 152 | | | 152 | 16.2 | 45.6 | 739 | 60.8 | 985 | 68.4 | 1108 | 76.0 | 1231 | 90.6 | 5 | |
| VL 40 - 178 | | | 178 | 13.7 | 53.4 | 732 | 71.2 | 975 | 80.1 | 1097 | 89.0 | 1219 | 106 | 5 | |
| VL 40 - 203 | | | 203 | 12.3 | 60.9 | 749 | 81.2 | 999 | 91.4 | 1124 | 101 | 1248 | 122 | 5 | |
| VL 40 - 254 | | | 254 | 9.8 | 76.2 | 747 | 102 | 996 | 114 | 1120 | 127 | 1245 | 154 | 2 | |
| VL 40 - 305 | | | 8.0 x 3.4 | 305 | 8.3 | 91.5 | 759 | 122 | 1013 | 137 | 1139 | 152 | 1266 | 185 | 2 |
| VL 50 - 064 | | | 50 | 25 | 64 | 86.3 | 19.2 | 1657 | 25.6 | 2209 | 28.8 | 2485 | 32.0 | 2762 | 35.1 |
| VL 50 - 076 | 76 | 70.6 | | | 22.8 | 1610 | 30.4 | 2146 | 34.2 | 2415 | 38.0 | 2683 | 42.2 | 5 | |
| VL 50 - 089 | 89 | 59.8 | | | 26.7 | 1597 | 35.6 | 2129 | 40.1 | 2395 | 44.5 | 2661 | 50.3 | 5 | |
| VL 50 - 102 | 102 | 52.0 | | | 30.6 | 1591 | 40.8 | 2122 | 45.9 | 2387 | 51.0 | 2652 | 58.4 | 5 | |
| VL 50 - 115 | 115 | 46.1 | | | 34.5 | 1590 | 46.0 | 2121 | 51.8 | 2386 | 57.5 | 2651 | 66.1 | 5 | |
| VL 50 - 127 | 127 | 42.2 | | | 38.1 | 1608 | 50.8 | 2144 | 57.2 | 2412 | 63.5 | 2680 | 73.8 | 5 | |
| VL 50 - 139 | 139 | 38.2 | | | 41.7 | 1593 | 55.6 | 2124 | 62.6 | 2389 | 69.5 | 2655 | 80.9 | 5 | |
| VL 50 - 152 | 152 | 34.3 | | | 45.6 | 1564 | 60.8 | 2085 | 68.4 | 2346 | 76.0 | 2607 | 89.0 | 2 | |
| VL 50 - 178 | 178 | 29.4 | | | 53.4 | 1570 | 71.2 | 2093 | 80.1 | 2355 | 89.0 | 2617 | 105 | 2 | |
| VL 50 - 203 | 203 | 25.5 | | | 60.9 | 1553 | 81.2 | 2071 | 91.4 | 2329 | 101 | 2588 | 121 | 2 | |
| VL 50 - 254 | 254 | 20.6 | | | 76.2 | 1570 | 102 | 2093 | 114 | 2355 | 127 | 2616 | 152 | 2 | |
| VL 50 - 305 | 10.5 x 4.1 | 305 | | | 17.2 | 91.5 | 1574 | 122 | 2098 | 137 | 2361 | 152 | 2623 | 184 | 2 |

VL

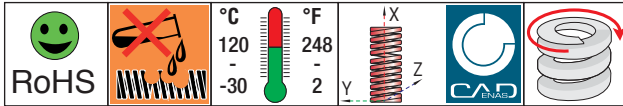
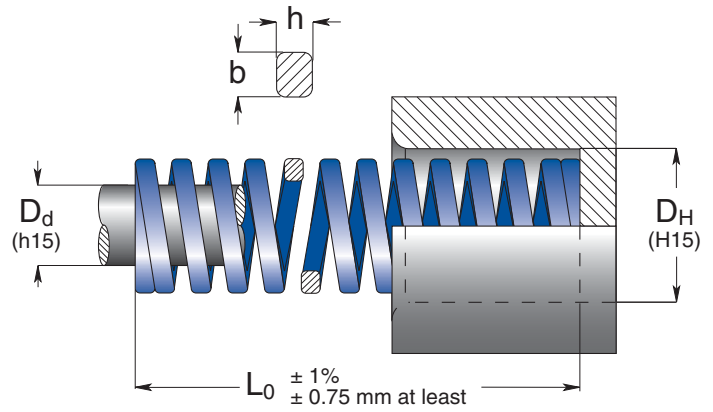


- IT** Molle carico leggero
- EN** Light load springs
- DE** Federn für normale Spannung
- FR** Ressorts charge légère
- ES** Muelles carga ligera
- PT** Molas carga leve



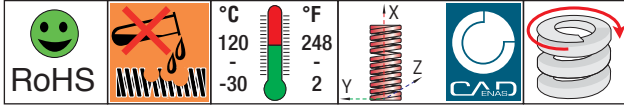
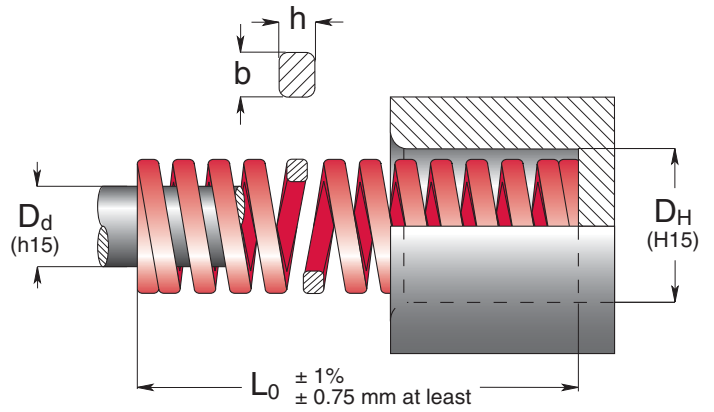
| Series | H d | | 0 ± 10% | Spring Constant | A | B | C | D | E | Pcs | | | | | | | |
|--------|---------------|--------------|---------|-----------------|------|------|------|-----|------|-----|-------------|-----------------|--------------------|--------------------|--------------------|--------------------|------------|
| | Hole Diameter | Rod Diameter | | | | | | | | | Free Length | Spring Constant | 25% L ₀ | 30% L ₀ | 35% L ₀ | 40% L ₀ | do not use |
| | mm | mm | | | | | | | | | mm | N/mm | mm | mm | mm | mm | mm |
| V 10 | 10 | 5 | 25 | 10 | 6.3 | 63 | 7.5 | 75 | 8.8 | 88 | 10.0 | 100 | 13.5 | 50 | | | |
| | | | 32 | 8.5 | 8.0 | 68 | 9.6 | 82 | 11.2 | 95 | 12.8 | 109 | 17.5 | 50 | | | |
| | | | 38 | 6.8 | 9.5 | 65 | 11.4 | 78 | 13.3 | 90 | 15.2 | 103 | 20.8 | 50 | | | |
| | | | 44 | 6.0 | 11.0 | 66 | 13.2 | 79 | 15.4 | 92 | 17.6 | 106 | 23.9 | 50 | | | |
| | | | 51 | 5.0 | 12.8 | 64 | 15.3 | 77 | 17.9 | 89 | 20.4 | 102 | 28.9 | 25 | | | |
| | | | 64 | 4.3 | 16.0 | 69 | 19.2 | 83 | 22.4 | 96 | 25.6 | 110 | 36.1 | 25 | | | |
| | | | 76 | 3.2 | 19.0 | 61 | 22.8 | 73 | 26.6 | 85 | 30.4 | 97 | 43.2 | 25 | | | |
| | | | 305 | 1.7 x 1.1 | 305 | 1.1 | 76.3 | 84 | 91.5 | 101 | 107 | 117 | 122 | 134 | 178 | 10 | |
| V 13 | 12.5 | 6.3 | 25 | 17.9 | 6.3 | 113 | 7.5 | 134 | 8.8 | 157 | 10.0 | 179 | 13.2 | 50 | | | |
| | | | 32 | 16.4 | 8.0 | 131 | 9.6 | 157 | 11.2 | 184 | 12.8 | 210 | 18.0 | 50 | | | |
| | | | 38 | 13.6 | 9.5 | 129 | 11.4 | 155 | 13.3 | 181 | 15.2 | 207 | 21.0 | 50 | | | |
| | | | 44 | 12.1 | 11.0 | 133 | 13.2 | 160 | 15.4 | 186 | 17.6 | 213 | 24.0 | 25 | | | |
| | | | 51 | 11.4 | 12.8 | 146 | 15.3 | 174 | 17.9 | 203 | 20.4 | 233 | 28.7 | 25 | | | |
| | | | 64 | 9.3 | 16.0 | 149 | 19.2 | 179 | 22.4 | 208 | 25.6 | 238 | 35.8 | 25 | | | |
| | | | 76 | 7.1 | 19.0 | 135 | 22.8 | 162 | 26.6 | 189 | 30.4 | 216 | 42.7 | 25 | | | |
| | | | 305 | 2.4 x 1.4 | 305 | 1.4 | 76.3 | 107 | 91.5 | 128 | 107 | 149 | 122 | 171 | 172 | 10 | |
| V 16 | 16 | 8 | 25 | 23.4 | 6.3 | 147 | 7.5 | 176 | 8.8 | 205 | 10.0 | 234 | 12.6 | 50 | | | |
| | | | 32 | 22.9 | 8.0 | 183 | 9.6 | 220 | 11.2 | 256 | 12.8 | 293 | 16.4 | 50 | | | |
| | | | 38 | 19.3 | 9.5 | 183 | 11.4 | 220 | 13.3 | 257 | 15.2 | 293 | 19.7 | 25 | | | |
| | | | 44 | 17.1 | 11.0 | 188 | 13.2 | 226 | 15.4 | 263 | 17.6 | 301 | 22.5 | 25 | | | |
| | | | 51 | 15.7 | 12.8 | 201 | 15.3 | 240 | 17.9 | 280 | 20.4 | 320 | 26.3 | 25 | | | |
| | | | 64 | 10.7 | 16.0 | 171 | 19.2 | 205 | 22.4 | 240 | 25.6 | 274 | 33.3 | 25 | | | |
| | | | 76 | 10.0 | 19.0 | 190 | 22.8 | 228 | 26.6 | 266 | 30.4 | 304 | 40.2 | 20 | | | |
| | | | 305 | 3.2 x 1.5 | 305 | 2.5 | 76.3 | 191 | 91.5 | 229 | 107 | 267 | 122 | 305 | 165 | 10 | |
| V 20 | 20 | 10 | 25 | 55.8 | 6.3 | 352 | 7.5 | 419 | 8.8 | 488 | 10.0 | 558 | 12.1 | 50 | | | |
| | | | 32 | 45.0 | 8.0 | 360 | 9.6 | 432 | 11.2 | 504 | 12.8 | 576 | 15.3 | 50 | | | |
| | | | 38 | 33.3 | 9.5 | 316 | 11.4 | 380 | 13.3 | 443 | 15.2 | 506 | 18.9 | 25 | | | |
| | | | 44 | 30.0 | 11.0 | 330 | 13.2 | 396 | 15.4 | 462 | 17.6 | 528 | 21.5 | 25 | | | |
| | | | 51 | 24.5 | 12.8 | 314 | 15.3 | 375 | 17.9 | 437 | 20.4 | 500 | 25.0 | 25 | | | |
| | | | 64 | 20.0 | 16.0 | 320 | 19.2 | 384 | 22.4 | 448 | 25.6 | 512 | 31.1 | 25 | | | |
| | | | 76 | 16.0 | 19.0 | 304 | 22.8 | 365 | 26.6 | 426 | 30.4 | 486 | 37.3 | 25 | | | |
| | | | 89 | 14.0 | 22.3 | 312 | 26.7 | 374 | 31.2 | 436 | 35.6 | 498 | 44.5 | 20 | | | |
| | | | 102 | 12.0 | 25.5 | 306 | 30.6 | 367 | 35.7 | 428 | 40.8 | 490 | 51.1 | 20 | | | |
| | | | 115 | 10.9 | 28.8 | 314 | 34.5 | 376 | 40.3 | 439 | 46.0 | 501 | 58.2 | 10 | | | |
| | | | 127 | 9.5 | 31.8 | 302 | 38.1 | 362 | 44.5 | 422 | 50.8 | 483 | 64.9 | 10 | | | |
| | | | 139 | 8.4 | 35.0 | 294 | 42.0 | 353 | 48.7 | 409 | 56.0 | 470 | 71.5 | 10 | | | |
| 305 | 4.0 x 2.1 | 305 | 4.0 | 76.3 | 305 | 91.5 | 366 | 107 | 427 | 122 | 488 | 157 | 10 | | | | |

- IT** Molle carico medio
- EN** Medium load springs
- DE** Federn für mittlere Spannung
- FR** Ressorts charge moyenne
- ES** Muelles carga mediana
- PT** Molas carga média



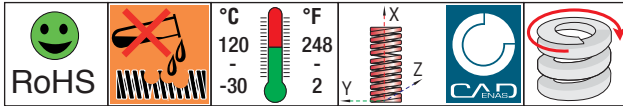
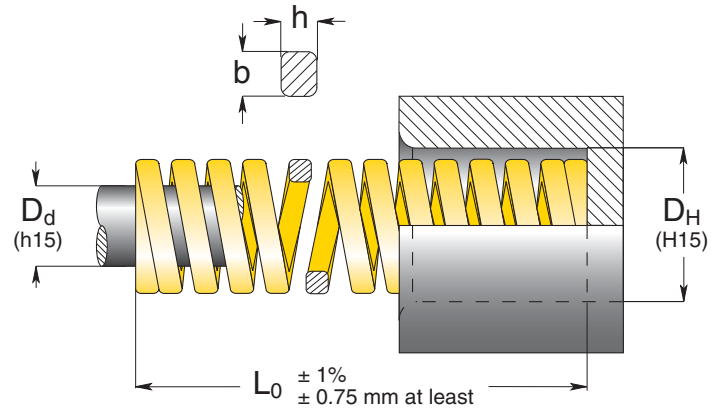
| Code | D _H | | L ₀ | R | A | B | C | D | E | Pcs | | | | | | | |
|------------|----------------|-----|----------------|------|------|-----|------|-----|------|-----|-------------|-----------------|--------------------|--------------------|-----------------------|----------------------|--------------------|
| | Hole Diameter | | | | | | | | | | Free Length | Spring Constant | 25% L ₀ | 30% L ₀ | 33.75% L ₀ | 37.5% L ₀ | approx. do not use |
| | b | h | | | | | | | | | | | | | | | |
| B 10 - 025 | 10 | 5 | 25 | 16.0 | 6.3 | 101 | 7.5 | 120 | 8.4 | 135 | 9.4 | 150 | 10.2 | 50 | | | |
| B 10 - 032 | | | 32 | 13.0 | 8.0 | 104 | 9.6 | 125 | 10.8 | 140 | 12.0 | 156 | 14.2 | 50 | | | |
| B 10 - 038 | | | 38 | 11.9 | 9.5 | 113 | 11.4 | 136 | 12.8 | 153 | 14.3 | 170 | 16.8 | 50 | | | |
| B 10 - 044 | | | 44 | 10.3 | 11.0 | 113 | 13.2 | 136 | 14.9 | 153 | 16.5 | 170 | 19.4 | 50 | | | |
| B 10 - 051 | | | 51 | 8.9 | 12.8 | 114 | 15.3 | 136 | 17.2 | 153 | 19.1 | 170 | 23.4 | 25 | | | |
| B 10 - 064 | | | 64 | 7.5 | 16.0 | 120 | 19.2 | 144 | 21.6 | 162 | 24.0 | 180 | 28.2 | 25 | | | |
| B 10 - 076 | | | 76 | 5.3 | 19.0 | 101 | 22.8 | 121 | 25.7 | 136 | 28.5 | 151 | 34.2 | 25 | | | |
| B 10 - 305 | 1.9 x 1.3 | | 305 | 1.6 | 76.3 | 122 | 91.5 | 146 | 103 | 165 | 114 | 183 | 134 | 10 | | | |
| B 13 - 025 | 12.5 | 6.3 | 25 | 30.0 | 6.3 | 189 | 7.5 | 225 | 8.4 | 253 | 9.4 | 282 | 11.9 | 50 | | | |
| B 13 - 032 | | | 32 | 24.8 | 8.0 | 198 | 9.6 | 238 | 10.8 | 268 | 12.0 | 298 | 16.2 | 50 | | | |
| B 13 - 038 | | | 38 | 21.4 | 9.5 | 203 | 11.4 | 244 | 12.8 | 274 | 14.3 | 306 | 18.7 | 50 | | | |
| B 13 - 044 | | | 44 | 18.5 | 11.0 | 204 | 13.2 | 244 | 14.9 | 275 | 16.5 | 305 | 21.3 | 25 | | | |
| B 13 - 051 | | | 51 | 15.5 | 12.8 | 198 | 15.3 | 237 | 17.2 | 267 | 19.1 | 296 | 25.6 | 25 | | | |
| B 13 - 064 | | | 64 | 12.1 | 16.0 | 194 | 19.2 | 232 | 21.6 | 261 | 24.0 | 290 | 32.4 | 25 | | | |
| B 13 - 076 | | | 76 | 10.2 | 19.0 | 194 | 22.8 | 233 | 25.7 | 262 | 28.5 | 291 | 39.0 | 25 | | | |
| B 13 - 089 | | | 89 | 8.4 | 22.3 | 187 | 26.7 | 224 | 30.0 | 252 | 33.4 | 281 | 45.9 | 20 | | | |
| B 13 - 102 | | | 102 | 6.3 | 25.5 | 161 | 30.6 | 193 | 34.4 | 217 | 38.3 | 241 | 52.3 | 10 | | | |
| B 13 - 305 | 2.5 x 1.5 | | 305 | 2.1 | 76.3 | 160 | 91.5 | 192 | 103 | 216 | 114 | 240 | 153 | 10 | | | |
| B 16 - 025 | 16 | 8 | 25 | 49.4 | 6.3 | 311 | 7.5 | 371 | 8.4 | 417 | 9.4 | 464 | 10.5 | 50 | | | |
| B 16 - 032 | | | 32 | 37.1 | 8.0 | 297 | 9.6 | 356 | 10.8 | 401 | 12.0 | 445 | 13.2 | 50 | | | |
| B 16 - 038 | | | 38 | 33.9 | 9.5 | 322 | 11.4 | 386 | 12.8 | 435 | 14.3 | 485 | 17.2 | 25 | | | |
| B 16 - 044 | | | 44 | 30.0 | 11.0 | 330 | 13.2 | 396 | 14.9 | 446 | 16.5 | 495 | 19.4 | 25 | | | |
| B 16 - 051 | | | 51 | 26.4 | 12.8 | 338 | 15.3 | 404 | 17.2 | 454 | 19.1 | 504 | 24.2 | 25 | | | |
| B 16 - 064 | | | 64 | 20.5 | 16.0 | 328 | 19.2 | 394 | 21.6 | 443 | 24.0 | 492 | 29.2 | 25 | | | |
| B 16 - 076 | | | 76 | 17.8 | 19.0 | 338 | 22.8 | 406 | 25.7 | 457 | 28.5 | 507 | 36.3 | 20 | | | |
| B 16 - 089 | | | 89 | 15.2 | 22.3 | 339 | 26.7 | 406 | 30.0 | 457 | 33.4 | 508 | 41.7 | 20 | | | |
| B 16 - 102 | | | 102 | 13.5 | 25.5 | 344 | 30.6 | 413 | 34.4 | 465 | 38.3 | 517 | 48.9 | 20 | | | |
| B 16 - 115 | | | 115 | 11.8 | 28.8 | 340 | 34.5 | 407 | 38.8 | 458 | 43.1 | 509 | 53.1 | 10 | | | |
| B 16 - 305 | 3.2 x 2.0 | | 305 | 4.8 | 76.3 | 366 | 91.5 | 439 | 103 | 494 | 114 | 549 | 142 | 10 | | | |
| B 20 - 025 | 20 | 10 | 25 | 98.0 | 6.3 | 617 | 7.5 | 735 | 8.4 | 827 | 9.4 | 921 | 10.5 | 50 | | | |
| B 20 - 032 | | | 32 | 72.6 | 8.0 | 581 | 9.6 | 697 | 10.8 | 784 | 12.0 | 871 | 13.9 | 50 | | | |
| B 20 - 038 | | | 38 | 56.0 | 9.5 | 532 | 11.4 | 638 | 12.8 | 718 | 14.3 | 801 | 16.6 | 25 | | | |
| B 20 - 044 | | | 44 | 47.5 | 11.0 | 523 | 13.2 | 627 | 14.9 | 705 | 16.5 | 784 | 18.8 | 25 | | | |
| B 20 - 051 | | | 51 | 41.7 | 12.8 | 534 | 15.3 | 638 | 17.2 | 718 | 19.1 | 796 | 23.1 | 25 | | | |
| B 20 - 064 | | | 64 | 32.3 | 16.0 | 517 | 19.2 | 620 | 21.6 | 698 | 24.0 | 775 | 27.5 | 25 | | | |
| B 20 - 076 | | | 76 | 25.1 | 19.0 | 477 | 22.8 | 572 | 25.7 | 644 | 28.5 | 715 | 33.8 | 25 | | | |
| B 20 - 089 | | | 89 | 22.0 | 22.3 | 491 | 26.7 | 587 | 30.0 | 661 | 33.4 | 735 | 39.7 | 20 | | | |
| B 20 - 102 | | | 102 | 19.8 | 25.5 | 505 | 30.6 | 606 | 34.4 | 682 | 38.3 | 758 | 47.3 | 20 | | | |
| B 20 - 115 | | | 115 | 18.1 | 28.8 | 521 | 34.5 | 624 | 38.8 | 703 | 43.1 | 780 | 52.5 | 10 | | | |
| B 20 - 127 | | | 127 | 16.6 | 31.8 | 528 | 38.1 | 632 | 42.9 | 712 | 47.6 | 790 | 56.9 | 10 | | | |
| B 20 - 139 | | | 139 | 15.1 | 35.0 | 529 | 42.0 | 634 | 46.9 | 708 | 52.5 | 793 | 62.1 | 10 | | | |
| B 20 - 152 | | | 152 | 13.2 | 38.0 | 500 | 45.6 | 600 | 51.3 | 677 | 57.0 | 750 | 67.6 | 10 | | | |
| B 20 - 305 | | | 4.1 x 2.4 | | 305 | 6.1 | 76.3 | 465 | 91.5 | 558 | 103 | 628 | 114 | 698 | 143 | 10 | |

- IT** Molle carico forte
- EN** Strong load springs
- DE** Federn für hohe Spannung
- FR** Ressorts charge forte
- ES** Muelles carga fuerte
- PT** Molas carga forte



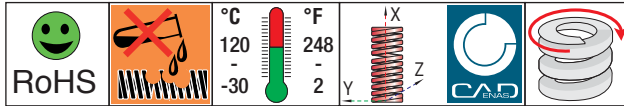
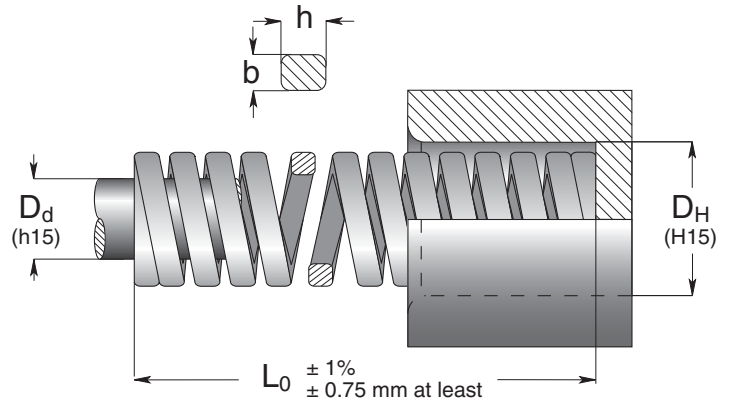
| Code | D _H | D _d | L ₀ | R | A | B | C | D | E | Pcs | | | | |
|------------|----------------|----------------|----------------|-------|-------------|-------------|---------------|---------------|------------|------|---------------|--------------|-------------|-----------------|
| | | | | | | | | | | | Hole Diameter | Rod Diameter | Free Length | Spring Constant |
| b x h | | | | ± 10% | + 3.000.000 | ~ 1.500.000 | 300 - 500.000 | 100 - 200.000 | do not use | | | | | |
| mm mm | | mm | N/mm | mm | N | mm | N | mm | N | mm | | | | |
| R 10 - 025 | 10 | 5 | 25 | 22.1 | 5.0 | 111 | 6.3 | 139 | 6.9 | 152 | 7.5 | 166 | 9.2 | 50 |
| R 10 - 032 | | | 32 | 17.5 | 6.4 | 112 | 8.0 | 140 | 8.8 | 154 | 9.6 | 168 | 12.1 | 50 |
| R 10 - 038 | | | 38 | 17.1 | 7.6 | 130 | 9.5 | 162 | 10.5 | 179 | 11.4 | 195 | 13.2 | 50 |
| R 10 - 044 | | | 44 | 15.0 | 8.8 | 132 | 11.0 | 165 | 12.1 | 182 | 13.2 | 198 | 15.1 | 50 |
| R 10 - 051 | | | 51 | 12.8 | 10.2 | 131 | 12.8 | 164 | 14.0 | 180 | 15.3 | 196 | 19.5 | 25 |
| R 10 - 064 | | | 64 | 10.7 | 12.8 | 137 | 16.0 | 171 | 17.6 | 188 | 19.2 | 205 | 21.8 | 25 |
| R 10 - 076 | | | 76 | 7.5 | 15.2 | 114 | 19.0 | 143 | 20.9 | 157 | 22.8 | 171 | 27.9 | 25 |
| R 10 - 305 | 1.9 x 1.5 | | 305 | 2.1 | 61.0 | 128 | 76.3 | 160 | 83.9 | 176 | 91.5 | 192 | 127 | 10 |
| R 13 - 025 | 12.5 | 6.3 | 25 | 42.1 | 5.0 | 211 | 6.3 | 265 | 6.9 | 289 | 7.5 | 316 | 9.8 | 50 |
| R 13 - 032 | | | 32 | 33.2 | 6.4 | 212 | 8.0 | 266 | 8.8 | 292 | 9.6 | 319 | 13.6 | 50 |
| R 13 - 038 | | | 38 | 29.3 | 7.6 | 223 | 9.5 | 278 | 10.5 | 306 | 11.4 | 334 | 14.6 | 50 |
| R 13 - 044 | | | 44 | 24.6 | 8.8 | 216 | 11.0 | 271 | 12.1 | 298 | 13.2 | 325 | 18.1 | 25 |
| R 13 - 051 | | | 51 | 19.6 | 10.2 | 200 | 12.8 | 251 | 14.0 | 275 | 15.3 | 300 | 22.3 | 25 |
| R 13 - 064 | | | 64 | 15.0 | 12.8 | 192 | 16.0 | 240 | 17.6 | 264 | 19.2 | 288 | 27.3 | 25 |
| R 13 - 076 | | | 76 | 13.2 | 15.2 | 201 | 19.0 | 251 | 20.9 | 276 | 22.8 | 301 | 33.1 | 25 |
| R 13 - 089 | 89 | 11.4 | 17.8 | 203 | 22.3 | 254 | 24.5 | 279 | 26.7 | 304 | 38.9 | 20 | | |
| R 13 - 102 | 102 | 8.4 | 20.4 | 171 | 25.5 | 214 | 28.1 | 236 | 30.6 | 257 | 43.8 | 10 | | |
| R 13 - 305 | 2.4 x 1.9 | | 305 | 2.8 | 61.0 | 171 | 76.3 | 214 | 83.9 | 235 | 91.5 | 256 | 140 | 10 |
| R 16 - 025 | 16 | 8 | 25 | 75.7 | 5.0 | 379 | 6.3 | 477 | 6.9 | 520 | 7.5 | 568 | 8.4 | 50 |
| R 16 - 032 | | | 32 | 52.8 | 6.4 | 338 | 8.0 | 422 | 8.8 | 465 | 9.6 | 507 | 10.5 | 50 |
| R 16 - 038 | | | 38 | 48.5 | 7.6 | 369 | 9.5 | 461 | 10.5 | 507 | 11.4 | 553 | 13.6 | 25 |
| R 16 - 044 | | | 44 | 42.8 | 8.8 | 377 | 11.0 | 471 | 12.1 | 518 | 13.2 | 565 | 15.9 | 25 |
| R 16 - 051 | | | 51 | 37.1 | 10.2 | 378 | 12.8 | 475 | 14.0 | 520 | 15.3 | 568 | 18.9 | 25 |
| R 16 - 064 | | | 64 | 30.3 | 12.8 | 388 | 16.0 | 485 | 17.6 | 533 | 19.2 | 582 | 24.9 | 25 |
| R 16 - 076 | | | 76 | 25.7 | 15.2 | 391 | 19.0 | 488 | 20.9 | 537 | 22.8 | 586 | 29.2 | 20 |
| R 16 - 089 | 89 | 21.7 | 17.8 | 386 | 22.3 | 484 | 24.5 | 531 | 26.7 | 579 | 34.5 | 20 | | |
| R 16 - 102 | 102 | 19.3 | 20.4 | 394 | 25.5 | 492 | 28.1 | 541 | 30.6 | 591 | 39.1 | 20 | | |
| R 16 - 115 | 115 | 15.7 | 23.0 | 361 | 28.8 | 452 | 31.6 | 497 | 34.5 | 542 | 44.0 | 10 | | |
| R 16 - 305 | 3.1 x 2.5 | | 305 | 7.1 | 61.0 | 433 | 76.3 | 542 | 83.9 | 596 | 91.5 | 650 | 104 | 10 |
| R 20 - 025 | 20 | 10 | 25 | 216 | 5.0 | 1080 | 6.3 | 1361 | 6.9 | 1485 | 7.5 | 1620 | 8.3 | 50 |
| R 20 - 032 | | | 32 | 168 | 6.4 | 1075 | 8.0 | 1344 | 8.8 | 1478 | 9.6 | 1613 | 10.9 | 50 |
| R 20 - 038 | | | 38 | 129 | 7.6 | 980 | 9.5 | 1226 | 10.5 | 1348 | 11.4 | 1471 | 12.5 | 25 |
| R 20 - 044 | | | 44 | 112 | 8.8 | 986 | 11.0 | 1232 | 12.1 | 1355 | 13.2 | 1478 | 15.0 | 25 |
| R 20 - 051 | | | 51 | 94.0 | 10.2 | 959 | 12.8 | 1203 | 14.0 | 1318 | 15.3 | 1438 | 17.6 | 25 |
| R 20 - 064 | | | 64 | 72.1 | 12.8 | 923 | 16.0 | 1154 | 17.6 | 1269 | 19.2 | 1384 | 22.6 | 25 |
| R 20 - 076 | | | 76 | 59.7 | 15.2 | 907 | 19.0 | 1134 | 20.9 | 1248 | 22.8 | 1361 | 27.5 | 25 |
| R 20 - 089 | 89 | 50.5 | 17.8 | 899 | 22.3 | 1126 | 24.5 | 1236 | 26.7 | 1348 | 31.7 | 20 | | |
| R 20 - 102 | 102 | 44.2 | 20.4 | 902 | 25.5 | 1127 | 28.1 | 1240 | 30.6 | 1353 | 37.5 | 20 | | |
| R 20 - 115 | 115 | 38.4 | 23.0 | 883 | 28.8 | 1106 | 31.6 | 1214 | 34.5 | 1325 | 42.6 | 10 | | |
| R 20 - 127 | 127 | 34.1 | 25.4 | 866 | 31.8 | 1084 | 34.9 | 1191 | 38.1 | 1299 | 45.5 | 10 | | |
| R 20 - 139 | 139 | 31.0 | 28.0 | 868 | 35.0 | 1085 | 38.2 | 1185 | 42.0 | 1302 | 50.1 | 10 | | |
| R 20 - 152 | 152 | 28.2 | 30.4 | 857 | 38.0 | 1072 | 41.8 | 1179 | 45.6 | 1286 | 55.8 | 10 | | |
| R 20 - 305 | 4.0 x 3.3 | | 305 | 15.0 | 61.0 | 915 | 76.3 | 1145 | 83.9 | 1258 | 91.5 | 1373 | 114 | 10 |

- IT** Molle carico extra-forte
- EN** Extra-strong load springs
- DE** Federn für höchste Spannung
- FR** Ressorts charge extra-forte
- ES** Muelles carga extra-fuerte
- PT** Molas carga extra-forte



| Code | D _H D _d | | L ₀ | R | Spring Constant | A | | B | | C | | D | | E | Pcs | |
|------------|-------------------------------|--------------|----------------|------|-----------------|-------------|-------|-------------|-------------|---------------|---------------|------------|------|------|-----|----|
| | Hole Diameter | Rod Diameter | | | | Free Length | ± 10% | + 3.000.000 | ~ 1.500.000 | 300 - 500.000 | 100 - 200.000 | do not use | | | | |
| | b x h | | mm | N/mm | mm | N | mm | N | mm | N | mm | N | mm | | | |
| G 10 - 025 | 10 | 5 | 25 | 36.8 | 4.3 | 158 | 5.0 | 184 | 5.6 | 207 | 6.3 | 232 | 7.7 | 50 | | |
| G 10 - 032 | | | 32 | 27.9 | 5.4 | 151 | 6.4 | 179 | 7.2 | 201 | 8.0 | 223 | 10.6 | 50 | | |
| G 10 - 038 | | | 38 | 23.7 | 6.5 | 154 | 7.6 | 180 | 8.6 | 203 | 9.5 | 225 | 12.6 | 50 | | |
| G 10 - 044 | | | 44 | 19.2 | 7.5 | 144 | 8.8 | 169 | 9.9 | 190 | 11.0 | 211 | 13.8 | 50 | | |
| G 10 - 051 | | | 51 | 16.5 | 8.7 | 144 | 10.2 | 168 | 11.5 | 189 | 12.8 | 211 | 16.2 | 25 | | |
| G 10 - 064 | | | 64 | 13.2 | 10.9 | 144 | 12.8 | 169 | 14.4 | 190 | 16.0 | 211 | 20.4 | 25 | | |
| G 10 - 076 | | | 76 | 10.9 | 12.9 | 141 | 15.2 | 166 | 17.1 | 186 | 19.0 | 207 | 25.2 | 25 | | |
| G 10 - 305 | 1.9 x 1.6 | | 305 | 2.6 | 51.9 | 135 | 61.0 | 159 | 68.6 | 178 | 76.3 | 198 | 111 | 10 | | |
| G 13 - 025 | 12.5 | 6.3 | 25 | 58.5 | 4.3 | 252 | 5.0 | 293 | 5.6 | 329 | 6.3 | 369 | 8.1 | 50 | | |
| G 13 - 032 | | | 32 | 43.9 | 5.4 | 237 | 6.4 | 281 | 7.2 | 316 | 8.0 | 351 | 9.9 | 50 | | |
| G 13 - 038 | | | 38 | 36.0 | 6.5 | 234 | 7.6 | 274 | 8.6 | 308 | 9.5 | 342 | 12.9 | 50 | | |
| G 13 - 044 | | | 44 | 30.3 | 7.5 | 227 | 8.8 | 267 | 9.9 | 300 | 11.0 | 333 | 14.1 | 25 | | |
| G 13 - 051 | | | 51 | 26.2 | 8.7 | 228 | 10.2 | 267 | 11.5 | 301 | 12.8 | 335 | 17.4 | 25 | | |
| G 13 - 064 | | | 64 | 21.2 | 10.9 | 231 | 12.8 | 271 | 14.4 | 305 | 16.0 | 339 | 21.0 | 25 | | |
| G 13 - 076 | | | 76 | 17.1 | 12.9 | 221 | 15.2 | 260 | 17.1 | 292 | 19.0 | 325 | 26.4 | 25 | | |
| G 13 - 089 | | | 89 | 14.5 | 15.1 | 219 | 17.8 | 258 | 20.0 | 290 | 22.3 | 323 | 31.5 | 20 | | |
| G 13 - 102 | 102 | 12.7 | 17.3 | 220 | 20.4 | 259 | 23.0 | 291 | 25.5 | 324 | 36.0 | 10 | | | | |
| G 13 - 305 | 2.6 x 2.0 | | 305 | 4.3 | 51.9 | 223 | 61.0 | 262 | 68.6 | 295 | 76.3 | 328 | 111 | 10 | | |
| G 16 - 025 | 16 | 8 | 25 | 118 | 4.3 | 507 | 5.0 | 590 | 5.6 | 664 | 6.3 | 743 | 8.5 | 50 | | |
| G 16 - 032 | | | 32 | 89.0 | 5.4 | 481 | 6.4 | 570 | 7.2 | 641 | 8.0 | 712 | 11.0 | 50 | | |
| G 16 - 038 | | | 38 | 72.1 | 6.5 | 469 | 7.6 | 548 | 8.6 | 616 | 9.5 | 685 | 13.2 | 25 | | |
| G 16 - 044 | | | 44 | 60.9 | 7.5 | 457 | 8.8 | 536 | 9.9 | 603 | 11.0 | 670 | 14.7 | 25 | | |
| G 16 - 051 | | | 51 | 52.3 | 8.7 | 455 | 10.2 | 533 | 11.5 | 600 | 12.8 | 669 | 17.7 | 25 | | |
| G 16 - 064 | | | 64 | 41.2 | 10.9 | 449 | 12.8 | 527 | 14.4 | 593 | 16.0 | 659 | 21.9 | 25 | | |
| G 16 - 076 | | | 76 | 34.1 | 12.9 | 440 | 15.2 | 518 | 17.1 | 583 | 19.0 | 648 | 27.8 | 20 | | |
| G 16 - 089 | | | 89 | 29.5 | 15.1 | 445 | 17.8 | 525 | 20.0 | 591 | 22.3 | 658 | 31.2 | 20 | | |
| G 16 - 102 | | | 102 | 25.6 | 17.3 | 443 | 20.4 | 522 | 23.0 | 588 | 25.5 | 653 | 37.9 | 20 | | |
| G 16 - 115 | | | 115 | 22.4 | 19.6 | 439 | 23.0 | 515 | 25.9 | 580 | 28.8 | 645 | 44.5 | 10 | | |
| G 16 - 305 | 3.2 x 2.9 | | 305 | 8.4 | 51.9 | 436 | 61.0 | 512 | 68.6 | 576 | 76.3 | 641 | 113 | 10 | | |
| G 20 - 025 | 20 | 10 | 25 | 293 | 4.3 | 1260 | 5.0 | 1465 | 5.6 | 1648 | 6.3 | 1846 | 6.9 | 50 | | |
| G 20 - 032 | | | 32 | 224 | 5.4 | 1210 | 6.4 | 1434 | 7.2 | 1613 | 8.0 | 1792 | 9.4 | 50 | | |
| G 20 - 038 | | | 38 | 177 | 6.5 | 1151 | 7.6 | 1345 | 8.6 | 1513 | 9.5 | 1682 | 12.0 | 25 | | |
| G 20 - 044 | | | 44 | 149 | 7.5 | 1118 | 8.8 | 1311 | 9.9 | 1475 | 11.0 | 1639 | 13.5 | 25 | | |
| G 20 - 051 | | | 51 | 128 | 8.7 | 1114 | 10.2 | 1306 | 11.5 | 1469 | 12.8 | 1638 | 16.2 | 25 | | |
| G 20 - 064 | | | 64 | 99.0 | 10.9 | 1079 | 12.8 | 1267 | 14.4 | 1426 | 16.0 | 1584 | 21.2 | 25 | | |
| G 20 - 076 | | | 76 | 81.7 | 12.9 | 1054 | 15.2 | 1242 | 17.1 | 1397 | 19.0 | 1552 | 24.7 | 25 | | |
| G 20 - 089 | | | 89 | 69.5 | 15.1 | 1049 | 17.8 | 1237 | 20.0 | 1392 | 22.3 | 1550 | 28.8 | 20 | | |
| G 20 - 102 | | | 102 | 60.6 | 17.3 | 1048 | 20.4 | 1236 | 23.0 | 1391 | 25.5 | 1545 | 34.8 | 20 | | |
| G 20 - 115 | | | 115 | 53.0 | 19.6 | 1039 | 23.0 | 1219 | 25.9 | 1371 | 28.8 | 1526 | 39.0 | 10 | | |
| G 20 - 127 | | | 127 | 47.5 | 21.6 | 1026 | 25.4 | 1207 | 28.6 | 1357 | 31.8 | 1511 | 43.0 | 10 | | |
| G 20 - 139 | | | 139 | 43.0 | 23.8 | 1023 | 28.0 | 1204 | 31.3 | 1345 | 35.0 | 1505 | 45.3 | 10 | | |
| G 20 - 152 | | | 152 | 39.0 | 25.8 | 1006 | 30.4 | 1186 | 34.2 | 1334 | 38.0 | 1482 | 50.4 | 10 | | |
| G 20 - 305 | | | 4.1 x 3.8 | | 305 | 21.2 | 51.9 | 1100 | 61.0 | 1293 | 68.6 | 1455 | 76.3 | 1618 | 103 | 10 |

- IT** Molle carico ultra-forte
- EN** Ultra-strong load springs
- DE** Federn für ultra-hohe Spannung
- FR** Ressorts charge ultra-forte
- ES** Muelles carga ultra-fuerte
- PT** Molas carga ultra-forte

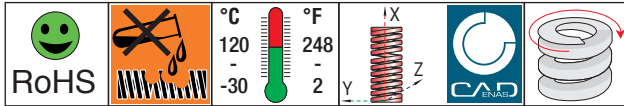
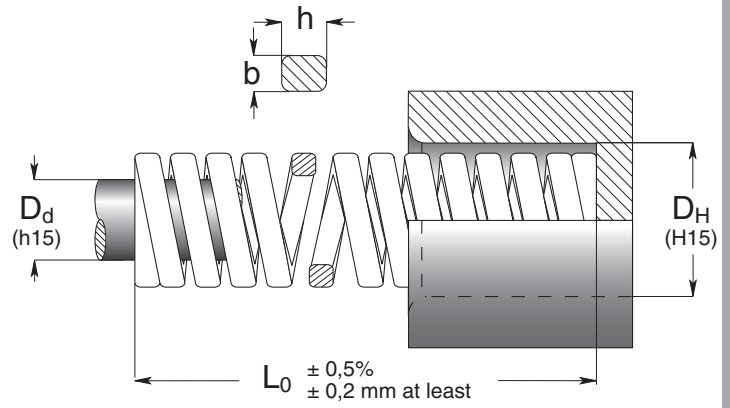


| Code | D _H | | L ₀ | R | A | B | C | D | E | Pcs | | | | |
|------------|----------------|--------------|----------------|-----------------|--------------------|--------------------|----------------------|--------------------|--------------------|-------|-------|-------|-------|----|
| | Hole Diameter | Rod Diameter | | | | | | | | | | | | |
| | b x h | | Free Length | Spring Constant | 10% L ₀ | 12% L ₀ | 13.5% L ₀ | 15% L ₀ | approx. do not use | | | | | |
| | mm | mm | mm | ± 10% N/mm | + 3.000.000 mm N | ~ 1.500.000 mm N | 300 - 500.000 mm N | 100 - 200.000 mm N | mm | | | | | |
| A 25 - 064 | 25 | 12.5 | 64 | 644 | 6.4 | 4122 | 7.7 | 4959 | 8.6 | 5564 | 9.6 | 6182 | 13 | 25 |
| A 25 - 076 | | | 76 | 556 | 7.6 | 4226 | 9.1 | 5060 | 10.3 | 5705 | 11.4 | 6338 | 16 | 20 |
| A 25 - 089 | | | 89 | 462 | 8.9 | 4112 | 10.7 | 4943 | 12.0 | 5551 | 13.4 | 6168 | 20 | 20 |
| A 25 - 102 | | | 102 | 390 | 10.2 | 3978 | 12.2 | 4758 | 13.8 | 5370 | 15.3 | 5967 | 23 | 20 |
| A 25 - 115 | | | 115 | 360 | 11.5 | 4140 | 13.8 | 4968 | 15.5 | 5589 | 17.3 | 6210 | 26 | 10 |
| A 25 - 127 | | | 127 | 326 | 12.7 | 4140 | 15.2 | 4955 | 17.1 | 5589 | 19.1 | 6210 | 28 | 10 |
| A 25 - 152 | | | 152 | 255 | 15.2 | 3876 | 18.2 | 4641 | 20.5 | 5233 | 22.8 | 5814 | 34 | 10 |
| A 25 - 178 | | | 178 | 230 | 17.8 | 4094 | 21.4 | 4922 | 24.0 | 5527 | 26.7 | 6141 | 39 | 10 |
| A 25 - 203 | | | 203 | 202 | 20.3 | 4101 | 24.4 | 4929 | 27.4 | 5536 | 30.5 | 6151 | 45 | 10 |
| A 25 - 305 | 5.6 x 7.5 | 305 | 136 | 30.5 | 4148 | 36.6 | 4978 | 41.2 | 5600 | 45.8 | 6222 | 63 | 5 | |
| A 32 - 064 | 32 | 16 | 64 | 1077 | 6.4 | 6892 | 7.7 | 8270 | 8.6 | 9305 | 9.6 | 10337 | 13 | 20 |
| A 32 - 076 | | | 76 | 874 | 7.6 | 6642 | 9.1 | 7971 | 10.3 | 8967 | 11.4 | 9964 | 16 | 20 |
| A 32 - 089 | | | 89 | 721 | 8.9 | 6419 | 11 | 7702 | 12.0 | 8663 | 13.3 | 9628 | 20 | 10 |
| A 32 - 102 | | | 102 | 620 | 10 | 6324 | 12 | 7589 | 13.8 | 8537 | 15.3 | 9486 | 23 | 10 |
| A 32 - 115 | | | 115 | 560 | 12 | 6440 | 14 | 7728 | 15.5 | 8694 | 17.2 | 9660 | 26 | 10 |
| A 32 - 127 | | | 127 | 496 | 13 | 6299 | 15 | 7559 | 17.1 | 8504 | 19.0 | 9449 | 28 | 10 |
| A 32 - 152 | | | 152 | 408 | 15 | 6202 | 18 | 7442 | 20.5 | 8372 | 22.8 | 9302 | 34 | 10 |
| A 32 - 178 | | | 178 | 353 | 18 | 6280 | 21 | 7536 | 24.0 | 8483 | 26.7 | 9420 | 39 | 5 |
| A 32 - 203 | | | 203 | 304 | 20 | 6171 | 24 | 7405 | 27.4 | 8331 | 30.4 | 9257 | 45 | 5 |
| A 32 - 254 | 254 | 243 | 25 | 6177 | 30 | 7413 | 34.3 | 8332 | 38.1 | 9266 | 62 | 5 | | |
| A 32 - 305 | 7.5 x 9.2 | 305 | 196 | 31 | 5978 | 37 | 7174 | 41.2 | 8070 | 45.7 | 8967 | 75 | 5 | |
| A 40 - 089 | 40 | 20 | 89 | 880 | 8.9 | 7832 | 10.7 | 9416 | 12.0 | 10573 | 13.4 | 11748 | 20 | 10 |
| A 40 - 102 | | | 102 | 762 | 10.2 | 7772 | 12.2 | 9296 | 13.8 | 10493 | 15.3 | 11659 | 23 | 10 |
| A 40 - 115 | | | 115 | 679 | 11.5 | 7809 | 13.8 | 9370 | 15.5 | 10541 | 17.3 | 11713 | 26 | 10 |
| A 40 - 127 | | | 127 | 622 | 12.7 | 7899 | 15.2 | 9454 | 17.1 | 10664 | 19.1 | 11849 | 28 | 5 |
| A 40 - 152 | | | 152 | 509 | 22.8 | 7737 | 18.2 | 9264 | 20.5 | 10445 | 22.8 | 11605 | 36 | 5 |
| A 40 - 178 | | | 178 | 429 | 17.8 | 7636 | 21.4 | 9181 | 24.0 | 10309 | 26.7 | 11454 | 43 | 5 |
| A 40 - 203 | | | 203 | 374 | 20.3 | 7592 | 24.4 | 9126 | 27.4 | 10249 | 30.5 | 11388 | 49 | 5 |
| A 40 - 254 | | | 254 | 296 | 25.4 | 7518 | 30.5 | 9028 | 34.3 | 10150 | 38.1 | 11278 | 62 | 2 |
| A 40 - 305 | | | 8.5 x 11.0 | 305 | 246 | 30.5 | 7530 | 36.6 | 9004 | 41.2 | 10129 | 45.8 | 11255 | 75 |
| A 50 - 089 | 50 | 25 | 89 | 1410 | 8.9 | 12549 | 10.7 | 15087 | 12.0 | 16941 | 13.4 | 18824 | 19 | 5 |
| A 50 - 102 | | | 102 | 1215 | 10.2 | 12393 | 12.2 | 14823 | 13.8 | 16731 | 15.3 | 18590 | 22 | 5 |
| A 50 - 115 | | | 115 | 1076 | 11.5 | 12374 | 13.8 | 14849 | 15.5 | 16705 | 17.3 | 18561 | 25 | 5 |
| A 50 - 127 | | | 127 | 968 | 12.7 | 12294 | 15.2 | 14714 | 17.1 | 16596 | 19.1 | 18440 | 28 | 5 |
| A 50 - 152 | | | 152 | 806 | 15.2 | 12251 | 18.2 | 14669 | 20.5 | 16539 | 22.8 | 18377 | 34 | 2 |
| A 50 - 178 | | | 178 | 698 | 17.8 | 12424 | 21.4 | 14937 | 24.0 | 16773 | 26.7 | 18637 | 40 | 2 |
| A 50 - 203 | | | 203 | 612 | 20.3 | 12424 | 24.4 | 14933 | 27.4 | 16772 | 30.5 | 18635 | 45 | 2 |
| A 50 - 254 | | | 254 | 472 | 25.4 | 11989 | 30.5 | 14396 | 34.3 | 16185 | 38.1 | 17983 | 58 | 2 |
| A 50 - 305 | | | 11.8 x 13.5 | 305 | 388 | 30.5 | 11834 | 36.6 | 14201 | 41.2 | 15976 | 45.8 | 17751 | 70 |

Special Springs Standard

SERIES W

- IT** Iper-forte
- EN** Hyper-strong
- DE** Hyper-starke
- FR** Hyper-forte
- ES** Hyper-fuerte
- PT** Carga-hiper



| Code | D_H D_d | | L_0 | R | F_{max} | F_{approx} | Pcs | |
|------------|---------------|--------------|-------|------------|-----------|--------------|------|----|
| | Hole Diameter | Rod Diameter | | | | | | |
| | $b \times h$ | | | $\pm 10\%$ | | | | |
| | mm | mm | mm | N/mm | mm | mm | | |
| W 16 - 020 | 16 | 6,3 | 20 | 1.818 | 2,2 | 4.000 | 3,0 | 16 |
| W 16 - 035 | | | 35 | 1.000 | 4,0 | | 5,5 | 16 |
| W 16 - 050 | | | 50 | 615 | 6,5 | | 8,0 | 12 |
| W 16 - 075 | | | 75 | 400 | 10,0 | | 12,5 | 8 |
| W 16 - 100 | | | 100 | 286 | 14,0 | | 16,3 | 8 |
| | 4,6 x 5,0 | | | | | | | |
| W 19 - 025 | 19 | 8 | 25 | 2.400 | 2,5 | 6.000 | 3,4 | 16 |
| W 19 - 040 | | | 40 | 1.333 | 4,5 | | 5,9 | 16 |
| W 19 - 050 | | | 50 | 1.000 | 6,0 | | 7,8 | 12 |
| W 19 - 075 | | | 75 | 600 | 10,0 | | 12,4 | 8 |
| W 19 - 100 | | | 100 | 429 | 14,0 | | 16,5 | 8 |
| | 5,1 x 6,5 | | | | | | | |
| W 25 - 030 | 25 | 10 | 30 | 4.800 | 2,5 | 12.000 | 3,0 | 10 |
| W 25 - 050 | | | 50 | 2.400 | 5,0 | | 5,9 | 10 |
| W 25 - 075 | | | 75 | 1.500 | 8,0 | | 9,5 | 4 |
| W 25 - 100 | | | 100 | 1.000 | 12,0 | | 14,7 | 4 |
| W 25 - 125 | | | 125 | 857 | 14,0 | | 16,9 | 4 |
| | 6,9 x 9,1 | | | | | | | |
| W 32 - 035 | 32 | 12,5 | 35 | 6.667 | 3,0 | 20.000 | 3,7 | 8 |
| W 32 - 050 | | | 50 | 3.636 | 5,5 | | 6,3 | 8 |
| W 32 - 075 | | | 75 | 2.222 | 9,0 | | 11,3 | 4 |
| W 32 - 100 | | | 100 | 1.538 | 13,0 | | 14,9 | 4 |
| W 32 - 125 | | | 125 | 1.250 | 16,0 | | 18,3 | 2 |
| W 32 - 150 | 150 | 1.053 | 19,0 | 21,7 | 2 | | | |
| | 9,25 x 10,8 | | | | | | | |
| W 38 - 040 | 38 | 16 | 40 | 7.143 | 3,5 | 25.000 | 4,5 | 4 |
| W 38 - 050 | | | 50 | 5.000 | 5,0 | | 5,9 | 4 |
| W 38 - 075 | | | 75 | 2.778 | 9,0 | | 10,4 | 4 |
| W 38 - 100 | | | 100 | 1.923 | 13,0 | | 15,0 | 2 |
| W 38 - 150 | | | 150 | 1.316 | 19,0 | | 22,4 | 2 |
| W 38 - 200 | | | 200 | 926 | 27,0 | | 29,9 | 2 |
| | 10,5 x 12,6 | | | | | | | |

IT Caratteristiche uniche sul mercato, grazie alla superiore tecnologia di produzione Special Springs:

- CARICO MASSIMO FINO A 6 VOLTE LA SERIE EXTRA-FORTE (colore giallo) ISO
- CARICO MASSIMO OLTRE 2 VOLTE LA SERIE SUPER-FORTE (colore argento) - STANDARD SPECIAL SPRINGS

Ideali per applicazioni dove sono richiesti carichi estremamente elevati con piccole corse di lavoro, dove serve la massima durata senza manutenzione, in ambienti difficili con grande presenza di contaminanti e temperature elevate.

EN Features that are unparalleled on the market thanks to the superior Special Springs production technology.

- MAXIMUM FORCE UP TO 6 TIMES THE EXTRA STRONG SPRINGS (ISO standard yellow color).
- MAXIMUM FORCE OVER 2 TIMES THE ULTRA STRONG SPRINGS (Special Springs standard silver coulor).

Ideal for applications that involve extremely large loads with short working strokes and that have to go for as long as possible without maintenance, in difficult environments with large amounts of contaminants and high temperatures.

DE Einzigartige Eigenschaften auf dem Markt dank der hochentwickelten Produktionstechnik von Special Springs:

- MAXIMALE DRUCKKRÄFTE BIS ZU 6 MAL HÖHER ALS DIE EXTRA SCHWER BELASTBARE FEDER (ISO Standard Farbe GELB)
- MAXIMALE DRUCKKRÄFTE MEHR ALS 2 MAL HÖHER ALS DIE ULTRA SCHWER BELASTBARE FEDER (Special Springs Standard Farbe SILBER)

Ideal für Anwendungen, bei denen extrem hohe Druckkräfte bei kurzen Hüben und eine maximale wartungsfreie Lebensdauer unter schwierigen Bedingungen bei Vorhandensein von kontaminierenden Stoffen und hohen Temperaturen benötigt werden.

FR Des caractéristiques uniques sur le marché grâce à la technologie de production supérieure Special Springs :

- CHARGE MAXIMUM JUSQU'À 6 FOIS LES RESSORTS EXTRA-FORT (ISO standard couleur jaune)
- CHARGE MAXIMUM PLUS DE 2 FOIS LES RESSORTS ULTRA-FORT (Special Springs standard couleur argent)

L'idéal pour des applications qui exigent des charges extrêmement élevées et des courses de travail réduites ainsi qu'une longévité maximale sans entretien, dans des milieux difficiles marqués par une présence élevée de contaminants et des températures élevées.

ES Características únicas en el mercado, gracias a la superior tecnología de producción de Special Springs:

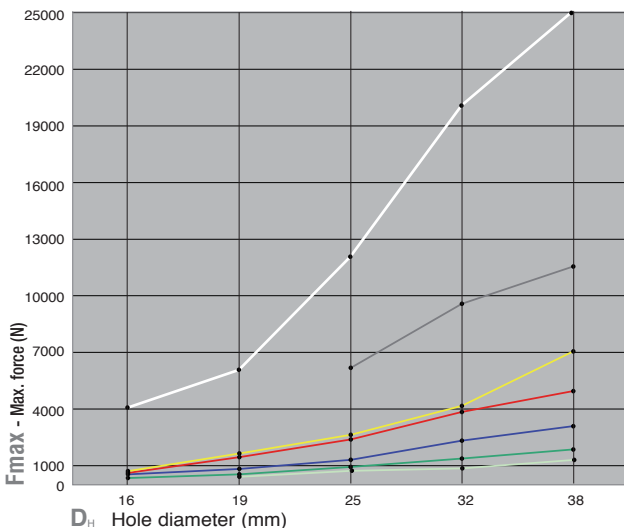
- MÁXIMA CARGA HASTA 6 VECES LA SERIE EXTRA-FUERTE (ISO standard color amarillo)
- MÁXIMA CARGA MÁS DE 2 VECES LA SERIE ULTRA-FUERTE (Special Springs standard color plata)

Ideales para aplicaciones que requieren cargas muy altas con recorridos de trabajo cortos, allí donde se necesita la máxima duración sin mantenimiento, en ambientes difíciles con intensa presencia de contaminantes y altas temperaturas.

PT Características únicas no mercado, graças à tecnologia superior de produção Special Springs:

- CARGA MÁXIMA 6 VEZES MAIS QUE AS MOLAS EXTRA-FORTES (ISO standard cor amarela)
- CARGA MÁXIMA 2 VEZES MAIS QUE AS MOLAS ULTRA-FORTES (Special Springs standard cor prateada)

Ideais para aplicações onde são exigidas cargas extremamente elevadas com pequenos cursos de trabalho, onde é necessária a máxima duração sem manutenção, em ambientes difíceis com grande presença de contaminantes e temperaturas elevadas.



| | SERIES | STANDARD | LOAD |
|--|--------|-----------------|--------------|
| | VL | Special Springs | Extra-light |
| | V | ISO | Light |
| | B | ISO | Medium |
| | R | ISO | Strong |
| | G | ISO | Extra-Strong |
| | A | Special Springs | Ultra-Strong |
| | W | Special Springs | Hyper-strong |

1 N = 0.1 daN = 0.102 kgf

Load (N) = R (N/mm) x Deflection (mm)

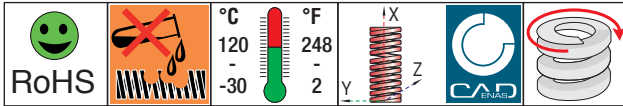
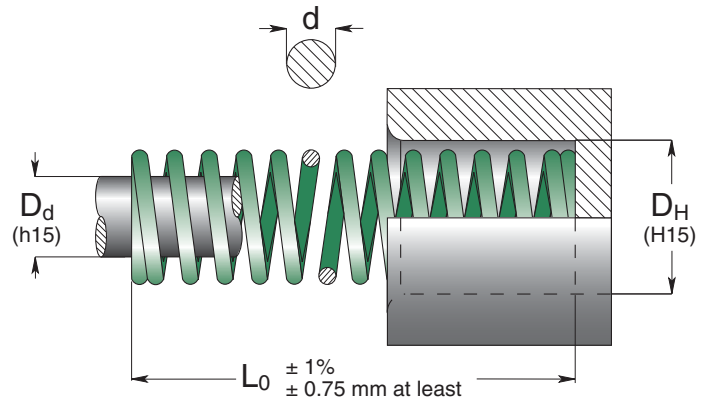


G 50 - 152

(Series) D_H - L_0

Special Springs 21-012

- IT** Molle carico leggero
- EN** Light load springs
- DE** Federn für normale Spannung
- FR** Ressorts charge légère
- ES** Muelles carga ligera
- PT** Molas carga leve

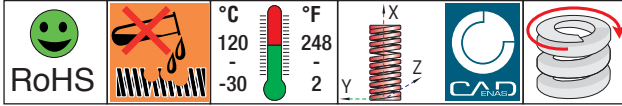
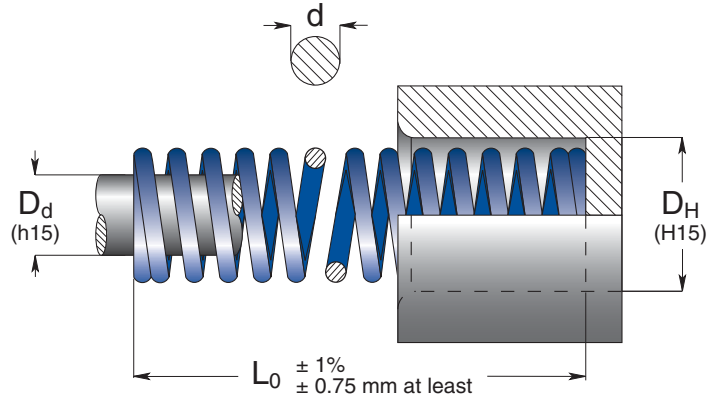


| Code | D _H | | L ₀ | R | A | | B | | C | | D | | E | Pcs |
|-------------|----------------|--------------|----------------|-------|-------------|-----------------|--------------------|--------------------|--------------------|--------------------|--------------------|------------|------|-----|
| | Hole Diameter | Rod Diameter | | | Free Length | Spring Constant | 25% L ₀ | 30% L ₀ | 35% L ₀ | 40% L ₀ | do not use approx. | | | |
| | d | d | ± 10% | ± 10% | + 3.000.000 | ~ 1.500.000 | 300 - 500.000 | 100 - 200.000 | do not use | do not use | do not use | do not use | | |
| | mm | mm | mm | N/mm | mm | N | mm | N | mm | N | mm | N | mm | |
| TV 10 - 025 | 10 | 5 | 25 | 4.4 | 6.3 | 28 | 7.5 | 33 | 8.8 | 39 | 10.0 | 44 | 13.2 | 50 |
| TV 10 - 032 | | | 32 | 3.4 | 8.0 | 27 | 9.6 | 33 | 11.2 | 38 | 12.8 | 44 | 16.5 | 50 |
| TV 10 - 038 | | | 38 | 2.8 | 9.5 | 26 | 11.4 | 32 | 13.3 | 37 | 15.2 | 42 | 19.8 | 50 |
| TV 10 - 044 | | | 44 | 2.4 | 11.0 | 26 | 13.2 | 31 | 15.4 | 37 | 17.6 | 42 | 23.1 | 50 |
| TV 10 - 051 | | | 51 | 2.1 | 12.8 | 27 | 15.3 | 32 | 17.9 | 37 | 20.4 | 43 | 26.9 | 25 |
| TV 10 - 064 | | | 64 | 1.6 | 16.0 | 26 | 19.2 | 31 | 22.4 | 36 | 25.6 | 42 | 33.3 | 25 |
| TV 10 - 076 | | | 76 | 1.3 | 19.0 | 25 | 22.8 | 30 | 26.6 | 35 | 30.4 | 40 | 39.6 | 25 |
| TV 10 - 305 | 1.1 | | 305 | 0.3 | 76.3 | 24 | 91.5 | 29 | 107 | 32 | 122 | 38 | 157 | 10 |
| TV 13 - 025 | 12.5 | 6.3 | 25 | 8.5 | 6.3 | 53 | 7.5 | 64 | 8.8 | 74 | 10.0 | 85 | 13.5 | 50 |
| TV 13 - 032 | | | 32 | 6.5 | 8.0 | 52 | 9.6 | 62 | 11.2 | 73 | 12.8 | 83 | 16.8 | 50 |
| TV 13 - 038 | | | 38 | 5.3 | 9.5 | 51 | 11.4 | 61 | 13.3 | 70 | 15.2 | 81 | 20.3 | 50 |
| TV 13 - 044 | | | 44 | 4.4 | 11.0 | 49 | 13.2 | 59 | 15.4 | 68 | 17.6 | 78 | 23.9 | 25 |
| TV 13 - 051 | | | 51 | 3.8 | 12.8 | 48 | 15.3 | 58 | 17.9 | 68 | 20.4 | 78 | 26.9 | 25 |
| TV 13 - 064 | | | 64 | 2.9 | 16.0 | 47 | 19.2 | 56 | 22.4 | 65 | 25.6 | 75 | 33.3 | 25 |
| TV 13 - 076 | | | 76 | 2.5 | 19.0 | 48 | 22.8 | 57 | 26.6 | 67 | 30.4 | 76 | 41.1 | 25 |
| TV 13 - 089 | 89 | 2.1 | 22.3 | 48 | 26.7 | 57 | 31.2 | 65 | 35.6 | 76 | 48.3 | 20 | | |
| TV 13 - 305 | 1.5 | | 305 | 0.6 | 76.3 | 45 | 91.5 | 54 | 107 | 64 | 122 | 73 | 163 | 10 |
| TV 16 - 025 | 16 | 8 | 25 | 17.9 | 6.3 | 112 | 7.5 | 134 | 8.8 | 157 | 10.0 | 179 | 14.7 | 50 |
| TV 16 - 032 | | | 32 | 13.5 | 8.0 | 108 | 9.6 | 129 | 11.2 | 151 | 12.8 | 173 | 18.5 | 50 |
| TV 16 - 038 | | | 38 | 10.5 | 9.5 | 100 | 11.4 | 120 | 13.3 | 140 | 15.2 | 160 | 22.4 | 25 |
| TV 16 - 044 | | | 44 | 8.8 | 11.0 | 96 | 13.2 | 116 | 15.4 | 136 | 17.6 | 154 | 25.9 | 25 |
| TV 16 - 051 | | | 51 | 7.6 | 12.8 | 97 | 15.3 | 116 | 17.9 | 136 | 20.4 | 155 | 30.0 | 25 |
| TV 16 - 064 | | | 64 | 5.9 | 16.0 | 95 | 19.2 | 114 | 22.4 | 132 | 25.6 | 152 | 37.8 | 25 |
| TV 16 - 076 | | | 76 | 4.8 | 19.0 | 91 | 22.8 | 109 | 26.6 | 128 | 30.4 | 145 | 45.2 | 20 |
| TV 16 - 089 | 89 | 4.0 | 22.3 | 90 | 26.7 | 108 | 31.2 | 125 | 35.6 | 144 | 52.8 | 20 | | |
| TV 16 - 102 | 102 | 3.5 | 25.5 | 90 | 30.6 | 108 | 35.7 | 125 | 40.8 | 144 | 60.7 | 20 | | |
| TV 16 - 305 | 2 | | 305 | 1.1 | 76.3 | 85 | 91.5 | 103 | 107 | 117 | 122 | 137 | 184 | 10 |

Round Wire

SERIES TB

- IT** Molle carico medio
- EN** Medium load springs
- DE** Federn für mittlere Spannung
- FR** Ressorts charge moyenne
- ES** Muelles carga mediana
- PT** Molas carga média



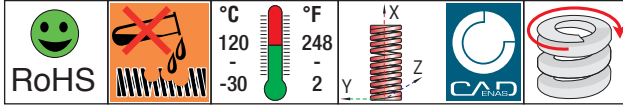
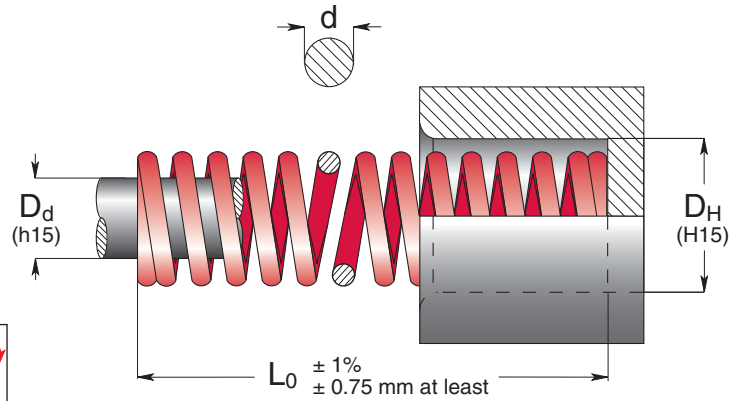
| Code | D _H Hole Diameter | D _d Rod Diameter | L ₀ Free Length | R Spring Constant | A 25% L ₀ | | B 30% L ₀ | | C 33.75% L ₀ | | D 37.5% L ₀ | | E do not use approx. | Pcs |
|-------------|---------------------------------|--------------------------------|-------------------------------|----------------------|-------------------------|-------------|-------------------------|---------------|----------------------------|-----|---------------------------|-----|-------------------------|-----|
| | | | | | mm | N | mm | N | mm | N | mm | N | | |
| | d | | | ± 10% | + 3.000.000 | ~ 1.500.000 | 300 - 500.000 | 100 - 200.000 | | | | | | |
| | mm | mm | mm | N/mm | mm | N | mm | N | mm | N | mm | N | mm | |
| TB 10 - 025 | 10 | 5 | 25 | 12.3 | 6.3 | 77 | 7.5 | 92 | 8.4 | 104 | 9.4 | 115 | 10.4 | 50 |
| TB 10 - 032 | | | 32 | 9.5 | 8.0 | 76 | 9.6 | 91 | 10.8 | 103 | 12.0 | 113 | 13.2 | 50 |
| TB 10 - 038 | | | 38 | 7.8 | 9.5 | 74 | 11.4 | 88 | 12.8 | 100 | 14.3 | 111 | 16.0 | 50 |
| TB 10 - 044 | | | 44 | 6.5 | 11.0 | 72 | 13.2 | 86 | 14.9 | 97 | 16.5 | 108 | 18.5 | 50 |
| TB 10 - 051 | | | 51 | 5.6 | 12.8 | 72 | 15.3 | 86 | 17.2 | 96 | 19.1 | 108 | 21.1 | 25 |
| TB 10 - 064 | | | 64 | 4.5 | 16.0 | 71 | 19.2 | 86 | 21.6 | 97 | 24.0 | 107 | 26.4 | 25 |
| TB 10 - 076 | | | 76 | 3.7 | 19.0 | 70 | 22.8 | 84 | 25.7 | 95 | 28.5 | 105 | 31.8 | 25 |
| TB 10 - 305 | | | 305 | 1.5 | 305 | 0.9 | 76.3 | 68 | 91.5 | 82 | 103 | 93 | 114 | 102 |
| TB 13 - 025 | 12.5 | 6.3 | 25 | 21.7 | 6.3 | 136 | 7.5 | 163 | 8.4 | 183 | 9.4 | 204 | 11.2 | 50 |
| TB 13 - 032 | | | 32 | 16.8 | 8.0 | 134 | 9.6 | 161 | 10.8 | 181 | 12.0 | 202 | 14.0 | 50 |
| TB 13 - 038 | | | 38 | 13.8 | 9.5 | 131 | 11.4 | 158 | 12.8 | 177 | 14.3 | 197 | 17.3 | 50 |
| TB 13 - 044 | | | 44 | 11.6 | 11.0 | 127 | 13.2 | 153 | 14.9 | 172 | 16.5 | 191 | 19.8 | 25 |
| TB 13 - 051 | | | 51 | 10.0 | 12.8 | 127 | 15.3 | 153 | 17.2 | 172 | 19.1 | 191 | 22.9 | 25 |
| TB 13 - 064 | | | 64 | 7.8 | 16.0 | 125 | 19.2 | 150 | 21.6 | 168 | 24.0 | 187 | 28.4 | 25 |
| TB 13 - 076 | | | 76 | 6.4 | 19.0 | 122 | 22.8 | 146 | 25.7 | 164 | 28.5 | 183 | 34.3 | 25 |
| TB 13 - 089 | | | 89 | 5.6 | 22.3 | 125 | 26.7 | 150 | 30.0 | 168 | 33.4 | 188 | 41.4 | 20 |
| TB 13 - 305 | 305 | 1.8 | 305 | 1.5 | 76.3 | 118 | 91.5 | 141 | 103 | 154 | 114 | 176 | 139 | 10 |
| TB 16 - 025 | 16 | 8 | 25 | 31.9 | 6.3 | 199 | 7.5 | 239 | 8.4 | 269 | 9.4 | 299 | 10.9 | 50 |
| TB 16 - 032 | | | 32 | 24.0 | 8.0 | 192 | 9.6 | 230 | 10.8 | 259 | 12.0 | 288 | 13.7 | 50 |
| TB 16 - 038 | | | 38 | 19.4 | 9.5 | 185 | 11.4 | 222 | 12.8 | 249 | 14.3 | 277 | 16.5 | 25 |
| TB 16 - 044 | | | 44 | 16.1 | 11.0 | 177 | 13.2 | 213 | 14.9 | 239 | 16.5 | 266 | 19.3 | 25 |
| TB 16 - 051 | | | 51 | 13.8 | 12.8 | 176 | 15.3 | 212 | 17.2 | 238 | 19.1 | 265 | 22.1 | 25 |
| TB 16 - 064 | | | 64 | 10.7 | 16.0 | 171 | 19.2 | 205 | 21.6 | 231 | 24.0 | 256 | 27.4 | 25 |
| TB 16 - 076 | | | 76 | 8.8 | 19.0 | 166 | 22.8 | 200 | 25.7 | 226 | 28.5 | 250 | 33.0 | 20 |
| TB 16 - 089 | | | 89 | 7.5 | 22.3 | 167 | 26.7 | 200 | 30.0 | 225 | 33.4 | 250 | 38.6 | 20 |
| TB 16 - 102 | 102 | 6.5 | 25.5 | 167 | 30.6 | 200 | 34.4 | 224 | 38.3 | 250 | 44.5 | 20 | | |
| TB 16 - 305 | 305 | 2.2 | 305 | 2.1 | 76.3 | 159 | 91.5 | 191 | 103 | 216 | 114 | 238 | 134 | 10 |

TV

TB



- IT** Molle carico forte
- EN** Strong load springs
- DE** Federn für hohe Spannung
- FR** Ressorts charge forte
- ES** Muelles carga fuerte
- PT** Molas carga forte

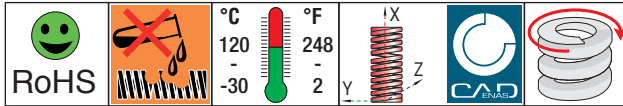
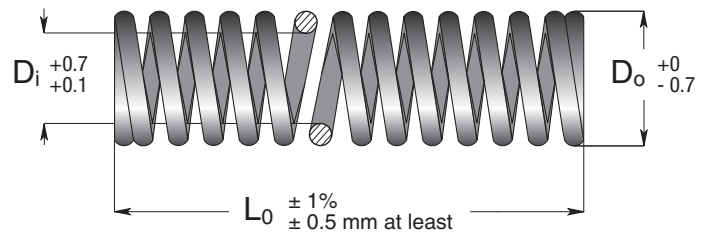
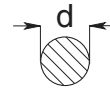


| Code | D_H Hole Diameter | D_d Rod Diameter | L_0 Free Length | R Spring Constant | | A | | B | | C | | D | | E | Pcs |
|---|------------------------|-----------------------|----------------------|----------------------|------|-----------|------|-----------|------|-------------|------|-----------|------|---------------------------|-----|
| | | | | | | 20% L_0 | | 25% L_0 | | 27.5% L_0 | | 30% L_0 | | approx. do not use | |
| | | | | | | mm | N | mm | N | mm | N | mm | N | | |
| <div style="display: flex; justify-content: space-between;"> $\pm 10\%$ $\pm 3.000.000$ $\sim 1.500.000$ $300 - 500.000$ $100 - 200.000$ </div> | | | | | | | | | | | | | | | |
| | d | | | | | | | | | | | | | | |
| | mm | mm | mm | N/mm | mm | N | mm | N | mm | N | mm | N | mm | | |
| TR 10 - 025 | 10 | 5 | 25 | 20.7 | 5.0 | 103 | 6.3 | 129 | 6.9 | 142 | 7.5 | 155 | 8.6 | 50 | |
| TR 10 - 032 | | | 32 | 16.1 | 6.4 | 103 | 8.0 | 129 | 8.8 | 142 | 9.6 | 155 | 10.9 | 50 | |
| TR 10 - 038 | | | 38 | 13.0 | 7.6 | 98 | 9.5 | 123 | 10.5 | 136 | 11.4 | 148 | 13.2 | 50 | |
| TR 10 - 044 | | | 44 | 10.9 | 8.8 | 96 | 11.0 | 119 | 12.1 | 132 | 13.2 | 143 | 14.7 | 50 | |
| TR 10 - 051 | | | 51 | 9.6 | 10.2 | 98 | 12.8 | 123 | 14.0 | 135 | 15.3 | 147 | 17.8 | 25 | |
| TR 10 - 064 | | | 64 | 7.7 | 12.8 | 98 | 16.0 | 123 | 17.6 | 136 | 19.2 | 147 | 22.9 | 25 | |
| TR 10 - 076 | | | 76 | 6.3 | 15.2 | 96 | 19.0 | 119 | 20.9 | 132 | 22.8 | 143 | 26.9 | 25 | |
| TR 10 - 305 | 1.6 | | 305 | 1.5 | 61.0 | 93 | 76.3 | 116 | 83.9 | 126 | 91.5 | 139 | 110 | 10 | |
| TR 13 - 025 | 12.5 | 6.3 | 25 | 37.5 | 5.0 | 187 | 6.3 | 234 | 6.9 | 258 | 7.5 | 281 | 8.9 | 50 | |
| TR 13 - 032 | | | 32 | 28.9 | 6.4 | 185 | 8.0 | 231 | 8.8 | 254 | 9.6 | 277 | 11.2 | 50 | |
| TR 13 - 038 | | | 38 | 23.5 | 7.6 | 178 | 9.5 | 223 | 10.5 | 246 | 11.4 | 268 | 13.7 | 50 | |
| TR 13 - 044 | | | 44 | 19.6 | 8.8 | 173 | 11.0 | 216 | 12.1 | 237 | 13.2 | 259 | 15.7 | 25 | |
| TR 13 - 051 | | | 51 | 17.3 | 10.2 | 177 | 12.8 | 221 | 14.0 | 243 | 15.3 | 265 | 18.8 | 25 | |
| TR 13 - 064 | | | 64 | 13.5 | 12.8 | 173 | 16.0 | 216 | 17.6 | 238 | 19.2 | 259 | 23.6 | 25 | |
| TR 13 - 076 | | | 76 | 11.2 | 15.2 | 170 | 19.0 | 213 | 20.9 | 234 | 22.8 | 256 | 28.4 | 25 | |
| TR 13 - 089 | 89 | 9.5 | 17.8 | 168 | 22.3 | 210 | 24.5 | 233 | 26.7 | 252 | 33.0 | 20 | | | |
| TR 13 - 305 | 2.2 | | 305 | 2.7 | 61.0 | 162 | 76.3 | 203 | 83.9 | 226 | 91.5 | 244 | 114 | 10 | |
| TR 16 - 025 | 16 | 8 | 25 | 81.6 | 5.0 | 408 | 6.3 | 510 | 6.9 | 561 | 7.5 | 612 | 9.1 | 50 | |
| TR 16 - 032 | | | 32 | 61.3 | 6.4 | 392 | 8.0 | 490 | 8.8 | 539 | 9.6 | 588 | 11.4 | 50 | |
| TR 16 - 038 | | | 38 | 49.9 | 7.6 | 379 | 9.5 | 474 | 10.5 | 521 | 11.4 | 569 | 14.2 | 25 | |
| TR 16 - 044 | | | 44 | 40.8 | 8.8 | 359 | 11.0 | 449 | 12.1 | 494 | 13.2 | 539 | 16.3 | 25 | |
| TR 16 - 051 | | | 51 | 35.6 | 10.2 | 363 | 12.8 | 453 | 14.0 | 499 | 15.3 | 544 | 18.8 | 25 | |
| TR 16 - 064 | | | 64 | 27.8 | 12.8 | 356 | 16.0 | 446 | 17.6 | 489 | 19.2 | 535 | 23.9 | 25 | |
| TR 16 - 076 | | | 76 | 22.8 | 15.2 | 346 | 19.0 | 433 | 20.9 | 477 | 22.8 | 519 | 29.0 | 20 | |
| TR 16 - 089 | 89 | 19.6 | 17.8 | 349 | 22.3 | 436 | 24.5 | 480 | 26.7 | 524 | 34.3 | 20 | | | |
| TR 16 - 102 | 102 | 17.0 | 20.4 | 347 | 25.5 | 433 | 28.1 | 477 | 30.6 | 520 | 39.4 | 20 | | | |
| TR 16 - 305 | 2.8 | | 305 | 5.4 | 61.0 | 330 | 76.3 | 413 | 83.9 | 453 | 91.5 | 495 | 119 | 10 | |

Round Wire

SERIES L

- IT** Molle non colorate con oliatura antiruggine.
- EN** Not painted with anti-rust lubricant.
- DE** Unlackierte Federn mit Rostschutzölung.
- FR** Ressorts non-peints avec huilage antirouille.
- ES** Muelles no pintados con lubricación antióxido.
- PT** Molas não coloridas com oleamento anti-ferrugem.



D_o diametro esterno della molla.
spring outside diameter.
Außendurchmesser Feder.
diamètre extérieur du ressort.
diámetro externo del muelle.
diâmetro exterior da mola.

D_i diametro interno della molla.
spring inside diameter.
Innendurchmesser Feder.
diamètre intérieur du ressort.
diámetro interior del muelle.
diâmetro interno da mola.

d diametro del filo.
wire diameter.
Drahtdurchmesser.
diamètre du fil.
diámetro del hilo.
diâmetro de fio.

L₀ lunghezza libera della molla.
spring free length.
Länge der unbelasteten Feder.
longueur libre du ressort.
longitud libre del muelle.
comprimento livre da mola.

R carico (N) necessario per deflettere la molla di 1 mm.
spring rate, load (N) required for 1 mm deflection.
Federrate, erforderliche Spannung für 1 mm Federweg.
charge (N) exigée pour comprimer le ressort 1mm.
carga (N) necesaria para desviar el muelle de 1 milímetro.
carga (N) necessária para defletir a mola de 1 milímetro.

A deflessione consigliata per una lunga durata della molla.
advised working deflection for long spring life.
Empfohlener Federweg für eine lange Lebensdauer der Feder.
course conseillée pour une longue durée du ressort.
deflexión aconsejada para una larga duración del muelle.
deflexão recomendado para uma longa duração da mola.

B deflessione consigliata per una media durata della molla.
advised working deflection for medium spring life.
Empfohlener Federweg für eine mittlere Lebensdauer der Feder.
course conseillée pour durée moyenne du ressort.
deflexión aconsejada para una media duración del muelle.
deflexão recomendado para uma média duração da mola.

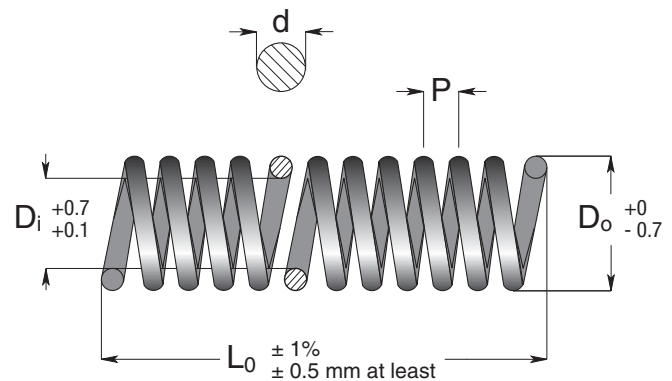
C deflessione massima consentita.
maximum operating deflection.
Maximaler Federweg.
course maximale pour le fonctionnement.
deflexión máxima permitida.
deflexão máxima.

| Code | D _o / D _i | | L ₀ | R | A | | B | | C | |
|-----------|---------------------------------|-----------------|----------------|-------|-------------|-----------------|--------------------|------|--------------------|------|
| | Outside Diameter | Inside Diameter | | | Free Length | Spring Constant | 16% L ₀ | N | 24% L ₀ | N |
| | d | | | ± 10% | mm | N | mm | N | mm | N |
| | mm | mm | mm | N/mm | mm | N | mm | N | mm | N |
| L 3 - 010 | | | 10 | 2.94 | 1.6 | 4.4 | 2.4 | 6.62 | 3.2 | 8.8 |
| L 3 - 015 | 3 | 2 | 15 | 1.96 | 2.4 | 4.4 | 3.6 | 6.62 | 4.8 | 8.8 |
| L 3 - 020 | | | 20 | 0.98 | 3.2 | 4.4 | 4.8 | 6.62 | 6.4 | 8.8 |
| L 3 - 025 | | 0.4 | 25 | 0.98 | 4.0 | 4.4 | 6.0 | 6.62 | 8.0 | 8.8 |
| L 4 - 010 | | | 10 | 4.9 | 1.6 | 7.8 | 2.4 | 11.6 | 3.2 | 15.7 |
| L 4 - 015 | 4 | 2.6 | 15 | 2.94 | 2.4 | 7.8 | 3.6 | 11.6 | 4.8 | 15.7 |
| L 4 - 020 | | | 20 | 2.94 | 3.2 | 7.8 | 4.8 | 11.6 | 6.4 | 15.7 |
| L 4 - 025 | | | 25 | 1.96 | 4.0 | 7.8 | 6.0 | 11.6 | 8.0 | 15.7 |
| L 4 - 030 | | 0.6 | 30 | 1.96 | 4.8 | 7.8 | 7.2 | 11.6 | 9.6 | 15.7 |
| L 6 - 015 | | | 15 | 7.85 | 2.4 | 17.7 | 3.6 | 26.5 | 4.8 | 35.5 |
| L 6 - 020 | 6 | 4 | 20 | 5.88 | 3.2 | 17.7 | 4.8 | 26.5 | 6.4 | 35.5 |
| L 6 - 025 | | | 25 | 4.90 | 4.0 | 17.7 | 6.0 | 26.5 | 8.0 | 35.5 |
| L 6 - 030 | | | 30 | 3.92 | 4.8 | 17.7 | 7.2 | 26.5 | 9.6 | 35.5 |
| L 6 - 035 | | 0.9 | 35 | 2.94 | 5.6 | 17.7 | 8.4 | 26.5 | 11.2 | 35.5 |

| Code | D _o | D _i | L ₀ | R | A | | B | | C | | |
|------------|------------------|-----------------|----------------|-----------------|--------------------|-------|--------------------|-------|--------------------|-------|-------|
| | Outside Diameter | Inside Diameter | Free Length | Spring Constant | 16% L ₀ | | 24% L ₀ | | 32% L ₀ | | |
| | d | | mm | ± 10% N/mm | + 3.000.000 | | ~ 1.500.000 | | 100 - 200.000 | | |
| mm | mm | mm | | | N | mm | N | mm | N | | |
| L 8 - 015 | 8 | 5.4 | 15 | 12.75 | 2.4 | 31.4 | 3.6 | 47.1 | 4.8 | 62.8 | |
| L 8 - 020 | | | 20 | 9.81 | 3.2 | 31.4 | 4.8 | 47.1 | 6.4 | 62.8 | |
| L 8 - 025 | | | 25 | 7.85 | 4.0 | 31.4 | 6.0 | 47.1 | 8.0 | 62.8 | |
| L 8 - 030 | | | 30 | 6.86 | 4.8 | 31.4 | 7.2 | 47.1 | 9.6 | 62.8 | |
| L 8 - 035 | | | 35 | 5.88 | 5.6 | 31.4 | 8.4 | 47.1 | 11.2 | 62.8 | |
| L 8 - 040 | 1.2 | 40 | 4.90 | 6.4 | 31.4 | 9.6 | 47.1 | 12.8 | 62.8 | | |
| L 10 - 025 | 10 | 6.5 | 25 | 12.75 | 4.0 | 49.0 | 6.0 | 73.6 | 8.0 | 98 | |
| L 10 - 030 | | | 30 | 9.81 | 4.8 | 49.0 | 7.2 | 73.6 | 9.6 | 98 | |
| L 10 - 035 | | | 35 | 8.83 | 5.6 | 49.0 | 8.4 | 73.6 | 11.2 | 98 | |
| L 10 - 040 | | | 40 | 7.85 | 6.4 | 49.0 | 9.6 | 73.6 | 12.8 | 98 | |
| L 10 - 045 | | | 45 | 6.86 | 7.2 | 49.0 | 10.8 | 73.6 | 14.4 | 98 | |
| L 10 - 050 | 1.5 | 50 | 5.88 | 8.0 | 49.0 | 12.0 | 73.6 | 16.0 | 98 | | |
| L 12 - 025 | 12 | 8 | 25 | 17.65 | 4.0 | 70.6 | 6.0 | 106.9 | 8.0 | 141.2 | |
| L 12 - 030 | | | 30 | 14.71 | 4.8 | 70.6 | 7.2 | 106.9 | 9.6 | 141.2 | |
| L 12 - 035 | | | 35 | 12.75 | 5.6 | 70.6 | 8.4 | 106.9 | 11.2 | 141.2 | |
| L 12 - 040 | | | 40 | 10.79 | 6.4 | 70.6 | 9.6 | 106.9 | 12.8 | 141.2 | |
| L 12 - 045 | | | 45 | 9.81 | 7.2 | 70.6 | 10.8 | 106.9 | 14.4 | 141.2 | |
| L 12 - 050 | 1.8 | 50 | 8.83 | 8.0 | 70.6 | 12.0 | 106.9 | 16.0 | 141.2 | | |
| L 12 - 055 | | 55 | 7.85 | 8.8 | 70.6 | 13.2 | 106.9 | 17.6 | 141.2 | | |
| L 12 - 060 | | 60 | 7.85 | 9.6 | 70.6 | 14.4 | 106.9 | 19.2 | 141.2 | | |
| L 14 - 025 | | 14 | 9.3 | 25 | 24.52 | 4.0 | 96.1 | 6.0 | 144.2 | 8.0 | 192.2 |
| L 14 - 030 | | | | 30 | 19.61 | 4.8 | 96.1 | 7.2 | 144.2 | 9.4 | 192.2 |
| L 14 - 035 | 35 | | | 17.65 | 5.6 | 96.1 | 8.4 | 144.2 | 11.2 | 192.2 | |
| L 14 - 040 | 40 | | | 14.71 | 6.4 | 96.1 | 9.6 | 144.2 | 12.8 | 192.2 | |
| L 14 - 045 | 45 | | | 13.73 | 7.2 | 96.1 | 10.8 | 144.2 | 14.4 | 192.2 | |
| L 14 - 050 | 2.2 | 50 | 11.77 | 8.0 | 96.1 | 12.0 | 144.2 | 16.0 | 192.2 | | |
| L 14 - 055 | | 55 | 10.79 | 8.8 | 96.1 | 13.2 | 144.2 | 17.6 | 192.2 | | |
| L 14 - 060 | | 60 | 9.81 | 9.6 | 96.1 | 14.4 | 144.2 | 19.2 | 192.2 | | |
| L 14 - 065 | | 65 | 8.83 | 10.4 | 96.1 | 15.6 | 144.2 | 20.8 | 192.2 | | |
| L 14 - 070 | | 70 | 8.83 | 11.2 | 96.1 | 16.8 | 144.2 | 22.4 | 192.2 | | |
| L 16 - 025 | 16 | 10.7 | 25 | 31.38 | 4.0 | 125.5 | 6.0 | 188.3 | 8.0 | 251.1 | |
| L 16 - 030 | | | 30 | 26.48 | 4.8 | 125.5 | 7.2 | 188.3 | 9.4 | 251.1 | |
| L 16 - 035 | | | 35 | 22.56 | 5.6 | 125.5 | 8.4 | 188.3 | 11.2 | 251.1 | |
| L 16 - 040 | | | 40 | 19.61 | 6.4 | 125.5 | 9.6 | 188.3 | 12.8 | 251.1 | |
| L 16 - 045 | | | 45 | 17.65 | 7.2 | 125.5 | 10.8 | 188.3 | 14.4 | 251.1 | |
| L 16 - 050 | 2.4 | 50 | 15.69 | 8.0 | 125.5 | 12.0 | 188.3 | 16.0 | 251.1 | | |
| L 16 - 055 | | 55 | 14.71 | 8.8 | 125.5 | 13.2 | 188.3 | 17.6 | 251.1 | | |
| L 16 - 060 | | 60 | 12.75 | 9.6 | 125.5 | 14.4 | 188.3 | 19.2 | 251.1 | | |
| L 16 - 065 | | 65 | 11.77 | 10.4 | 125.5 | 15.6 | 188.3 | 20.8 | 251.1 | | |
| L 16 - 070 | | 70 | 10.79 | 11.2 | 125.5 | 16.8 | 188.3 | 22.4 | 251.1 | | |
| L 16 - 075 | 2.8 | 75 | 10.79 | 12.0 | 125.5 | 18.0 | 188.3 | 24.0 | 251.1 | | |
| L 16 - 080 | | 80 | 9.81 | 12.8 | 125.5 | 19.2 | 188.3 | 25.6 | 251.1 | | |
| L 18 - 025 | | 18 | 12 | 25 | 40.21 | 4.0 | 158.9 | 6.0 | 238.3 | 8.0 | 317.7 |
| L 18 - 030 | | | | 30 | 33.34 | 4.8 | 158.9 | 7.2 | 238.3 | 9.4 | 317.7 |
| L 18 - 035 | | | | 35 | 28.44 | 5.6 | 158.9 | 8.4 | 238.3 | 11.2 | 317.7 |
| L 18 - 040 | 40 | | | 24.52 | 6.4 | 158.9 | 9.6 | 238.3 | 12.8 | 317.7 | |
| L 18 - 045 | 45 | | | 22.56 | 7.2 | 158.9 | 10.8 | 238.3 | 14.4 | 317.7 | |
| L 18 - 050 | 2.8 | 50 | 19.61 | 8.0 | 158.9 | 12.0 | 238.3 | 16.0 | 317.7 | | |
| L 18 - 055 | | 55 | 17.65 | 8.8 | 158.9 | 13.2 | 238.3 | 17.6 | 317.7 | | |
| L 18 - 060 | | 60 | 16.67 | 9.6 | 158.9 | 14.4 | 238.3 | 19.2 | 317.7 | | |
| L 18 - 065 | | 65 | 15.69 | 10.4 | 158.9 | 15.6 | 238.3 | 20.8 | 317.7 | | |
| L 18 - 070 | | 70 | 14.71 | 11.2 | 158.9 | 16.8 | 238.3 | 22.4 | 317.7 | | |
| L 18 - 075 | 3 | 75 | 13.73 | 12.0 | 158.9 | 18.0 | 238.3 | 24.0 | 317.7 | | |
| L 18 - 080 | | 80 | 12.75 | 12.8 | 158.9 | 19.2 | 238.3 | 25.6 | 317.7 | | |
| L 18 - 090 | | 90 | 10.79 | 14.4 | 158.9 | 21.6 | 238.3 | 28.8 | 317.7 | | |
| L 20 - 025 | | 20 | 13.5 | 25 | 49.03 | 4.0 | 196.1 | 6.0 | 294.2 | 8.0 | 392.3 |
| L 20 - 030 | | | | 30 | 41.19 | 4.8 | 196.1 | 7.2 | 294.2 | 9.4 | 392.3 |
| L 20 - 035 | 35 | | | 35.30 | 5.6 | 196.1 | 8.4 | 294.2 | 11.2 | 392.3 | |
| L 20 - 040 | 40 | | | 30.40 | 6.4 | 196.1 | 9.6 | 294.2 | 12.8 | 392.3 | |
| L 20 - 045 | 45 | | | 27.46 | 7.2 | 196.1 | 10.8 | 294.2 | 14.4 | 392.3 | |
| L 20 - 050 | 3 | 50 | 24.52 | 8.0 | 196.1 | 12.0 | 294.2 | 16.0 | 392.3 | | |
| L 20 - 055 | | 55 | 22.56 | 8.8 | 196.1 | 13.2 | 294.2 | 17.6 | 392.3 | | |
| L 20 - 060 | | 60 | 20.59 | 9.6 | 196.1 | 14.4 | 294.2 | 19.2 | 392.3 | | |
| L 20 - 065 | | 65 | 18.63 | 10.4 | 196.1 | 15.6 | 294.2 | 20.8 | 392.3 | | |
| L 20 - 070 | | 70 | 17.65 | 11.2 | 196.1 | 16.8 | 294.2 | 22.4 | 392.3 | | |
| L 20 - 075 | 3 | 75 | 16.67 | 12.0 | 196.1 | 18.0 | 294.2 | 24.0 | 392.3 | | |
| L 20 - 080 | | 80 | 15.69 | 12.8 | 196.1 | 19.2 | 294.2 | 25.6 | 392.3 | | |
| L 20 - 090 | | 90 | 13.73 | 14.4 | 196.1 | 21.6 | 294.2 | 28.8 | 392.3 | | |
| L 20 - 100 | | 100 | 12.75 | 16.0 | 196.1 | 24.0 | 294.2 | 32.0 | 392.3 | | |

| Code | D _o Outside Diameter | D _i Inside Diameter | L ₀ Free Length | R Spring Constant | A 16% L ₀ | | B 24% L ₀ | | C 32% L ₀ | |
|------------|------------------------------------|-----------------------------------|-------------------------------|----------------------|-------------------------|-------|-------------------------|-------|-------------------------|-------|
| | | | | | ± 10% + 3.000.000 | | ~ 1.500.000 | | 100 - 200.000 | |
| | | | | | mm | N | mm | N | mm | N |
| L 22 - 025 | 22 | 14.7 | 25 | 59.82 | 4.0 | 237.3 | 6.0 | 356 | 8.0 | 474.6 |
| L 22 - 030 | | | 30 | 49.03 | 4.8 | 237.3 | 7.2 | 356 | 9.4 | 474.6 |
| L 22 - 035 | | | 35 | 42.17 | 5.6 | 237.3 | 8.4 | 356 | 11.2 | 474.6 |
| L 22 - 040 | | | 40 | 37.27 | 6.4 | 237.3 | 9.6 | 356 | 12.8 | 474.6 |
| L 22 - 045 | | | 45 | 33.34 | 7.2 | 237.3 | 10.8 | 356 | 14.4 | 474.6 |
| L 22 - 050 | | | 50 | 29.42 | 8.0 | 237.3 | 12.0 | 356 | 16.0 | 474.6 |
| L 22 - 055 | | | 55 | 27.46 | 8.8 | 237.3 | 13.2 | 356 | 17.6 | 474.6 |
| L 22 - 060 | | | 60 | 24.52 | 9.6 | 237.3 | 14.4 | 356 | 19.2 | 474.6 |
| L 22 - 065 | | | 65 | 22.56 | 10.4 | 237.3 | 15.6 | 356 | 20.8 | 474.6 |
| L 22 - 070 | | | 70 | 21.57 | 11.2 | 237.3 | 16.8 | 356 | 22.4 | 474.6 |
| L 22 - 075 | 75 | 19.61 | 12.0 | 237.3 | 18.0 | 356 | 24.0 | 474.6 | | |
| L 22 - 080 | 80 | 18.63 | 12.8 | 237.3 | 19.2 | 356 | 25.6 | 474.6 | | |
| L 22 - 090 | 90 | 16.67 | 14.4 | 237.3 | 21.6 | 356 | 28.8 | 474.6 | | |
| L 22 - 100 | 3.4 | 100 | 14.71 | 16.0 | 237.3 | 24.0 | 356 | 32.0 | 474.6 | |
| L 25 - 025 | 25 | 17 | 25 | 76.49 | 4.0 | 307 | 6.0 | 459.9 | 8.0 | 613.9 |
| L 25 - 030 | | | 30 | 63.74 | 4.8 | 307 | 7.2 | 459.9 | 9.6 | 613.9 |
| L 25 - 035 | | | 35 | 54.92 | 5.6 | 307 | 8.4 | 459.9 | 11.2 | 613.9 |
| L 25 - 040 | | | 40 | 48.05 | 6.4 | 307 | 9.6 | 459.9 | 12.8 | 613.9 |
| L 25 - 045 | | | 45 | 42.17 | 7.2 | 307 | 10.8 | 459.9 | 14.4 | 613.9 |
| L 25 - 050 | | | 50 | 38.25 | 8.0 | 307 | 12.0 | 459.9 | 16.0 | 613.9 |
| L 25 - 055 | | | 55 | 35.30 | 8.8 | 307 | 13.2 | 459.9 | 17.6 | 613.9 |
| L 25 - 060 | | | 60 | 32.36 | 9.6 | 307 | 14.4 | 459.9 | 19.2 | 613.9 |
| L 25 - 065 | | | 65 | 29.42 | 10.4 | 307 | 15.6 | 459.9 | 20.8 | 613.9 |
| L 25 - 070 | | | 70 | 27.46 | 11.2 | 307 | 16.8 | 459.9 | 22.4 | 613.9 |
| L 25 - 075 | 75 | 25.50 | 12.0 | 307 | 18.0 | 459.9 | 24.0 | 613.9 | | |
| L 25 - 080 | 80 | 23.54 | 12.8 | 307 | 19.2 | 459.9 | 25.6 | 613.9 | | |
| L 25 - 090 | 90 | 21.57 | 14.4 | 307 | 21.6 | 459.9 | 28.8 | 613.9 | | |
| L 25 - 100 | 3.8 | 100 | 19.61 | 16.0 | 307 | 24.0 | 459.9 | 32.0 | 613.9 | |
| L 30 - 050 | 30 | 20 | 50 | 51.94 | 8.0 | 414 | 12.0 | 621 | 16.0 | 828 |
| L 30 - 060 | | | 60 | 44.10 | 9.6 | 414 | 14.4 | 621 | 19.2 | 828 |
| L 30 - 070 | | | 70 | 37.24 | 11.2 | 414 | 16.8 | 621 | 22.4 | 828 |
| L 30 - 080 | | | 80 | 32.34 | 12.8 | 414 | 19.2 | 621 | 25.6 | 828 |
| L 30 - 090 | | | 90 | 28.42 | 14.4 | 414 | 21.6 | 621 | 28.8 | 828 |
| L 30 - 100 | 100 | 25.48 | 16.0 | 414 | 24.0 | 621 | 32.0 | 828 | | |
| L 30 - 125 | 4.5 | 125 | 20.58 | 20.0 | 414 | 30.0 | 621 | 40.0 | 828 | |

- IT** Spezzoni con terminali aperti
- EN** Long size open ends
- DE** Meterware
- FR** Ressorts avec longueur ébauché
- ES** Piezas desmochadas con terminales abiertos
- PT** Pontas de refugo com terminais abertos



RoHS

°C 120
-30

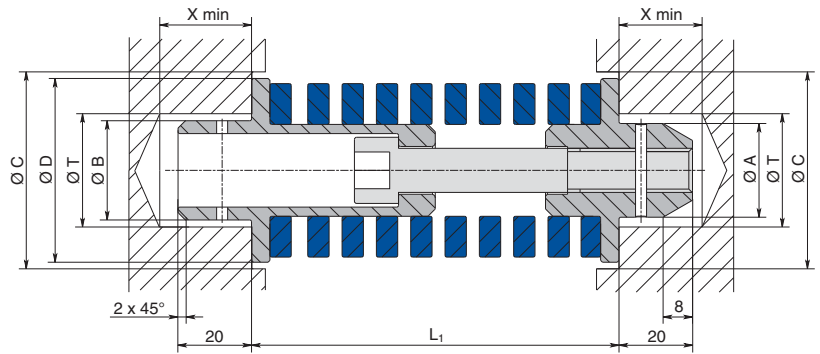
°F 248
2

| Code | D _o Outside Diameter | D _i Inside Diameter | d Wire Diameter | L ₀ Free Length | P Pitch |
|------------|------------------------------------|-----------------------------------|--------------------|-------------------------------|------------|
| | mm | mm | mm | mm | mm |
| L 03 - 300 | 3 | 2.0 | 0.4 | 300 | 1.04 |
| L 04 - 300 | 4 | 2.6 | 0.6 | 300 | 1.50 |
| L 06 - 300 | 6 | 4.0 | 0.9 | 300 | 2.00 |
| L 08 - 300 | 8 | 5.4 | 1.2 | 300 | 2.80 |
| L 10 - 300 | 10 | 6.5 | 1.5 | 300 | 3.50 |
| L 12 - 300 | 12 | 8.0 | 1.8 | 300 | 4.30 |
| L 14 - 300 | 14 | 9.3 | 2.2 | 300 | 4.80 |
| L 16 - 300 | 16 | 10.7 | 2.4 | 300 | 5.50 |
| L 18 - 300 | 18 | 12.0 | 2.8 | 300 | 5.30 |
| L 20 - 300 | 20 | 13.5 | 3.0 | 300 | 6.80 |
| L 22 - 300 | 22 | 14.7 | 3.4 | 300 | 6.70 |
| L 25 - 300 | 25 | 17.0 | 3.8 | 300 | 8.20 |

Precompressed Unit

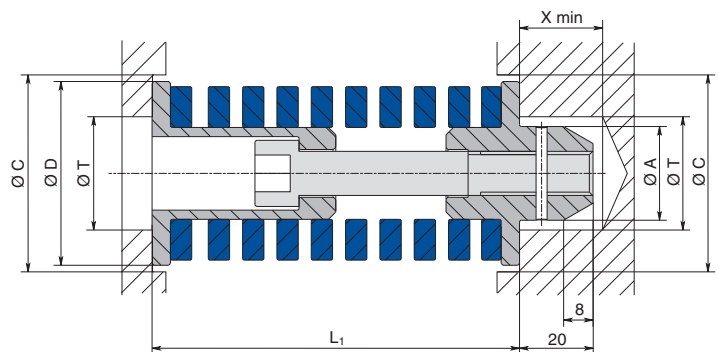
Peugeot - Citroën Standard

- IT** Sistema precompresso, carico medio, doppia spina
- EN** Precompressed unit, medium load, double pin
- DE** Vorspannungssystem, mittlere Spannung, Doppelstecker
- FR** Ensemble precomprime, charge moyenne, deux tetons
- ES** Sistema pretensado, carga mediana, doble clavija
- PT** Sistema pré-comprimido, carga média, dupla tomada



| Code Special Springs | Code PSA Mabec | L1 | ØA | ØB | ØD | Spring | Initial Force | 25% Lo | 32% Lo | ØC | ØT | X min | Spring data | | | | |
|----------------------|----------------|-----|------|----|----|--------|---------------|--------|--------|----|------|-------|----------------|----------------|------|-----|------|
| | | | | | | | | | | | | | D _H | L ₀ | R | | |
| 15 02 B40069 | X 346 590 070 | 69 | 20.5 | 22 | 40 | 17 | 1836 | 3 | 2160 | 42 | 22.5 | 25 | 40 | 76 | 108 | | |
| 15 02 B40076 | X 346 590 071 | 76 | | | | 10 | 1080 | 10 | 2160 | | | | | 15 | 2700 | 76 | 108 |
| 15 02 B40100 | X 346 590 072 | 100 | | | | 12 | 972 | 13 | 2025 | | | | | 20 | 2592 | 102 | 81 |
| 15 02 B40122 | X 346 590 073 | 122 | | | | 15 | 941 | 17 | 2006 | | | | | 25 | 2508 | 127 | 62.7 |
| 15 02 B40143 | X 346 590 074 | 143 | | | | 19 | 981 | 19 | 1961 | | | | | 30 | 2528 | 152 | 51.6 |
| 15 02 B40188 | X 346 590 075 | 188 | | | | 25 | 918 | 25 | 1835 | | | | | 40 | 2373 | 203 | 36.7 |
| 15 02 B50088 | X 346 590 076 | 88 | 25.5 | 27 | 50 | 24 | 2856 | - | - | 52 | 27.5 | 25 | 50 | 102 | 119 | | |
| 15 02 B50100 | X 346 590 077 | 100 | | | | 12 | 1428 | 13 | 2975 | | | | | 20 | 3808 | 102 | 119 |
| 15 02 B50122 | X 346 590 078 | 122 | | | | 15 | 1455 | 17 | 3104 | | | | | 25 | 3880 | 127 | 97 |
| 15 02 B50143 | X 346 590 079 | 143 | | | | 19 | 1520 | 19 | 3040 | | | | | 30 | 3920 | 152 | 80 |
| 15 02 B50188 | X 346 590 080 | 188 | | | | 25 | 1495 | 25 | 2990 | | | | | 40 | 3887 | 203 | 59.8 |
| 15 02 B50232 | X 346 590 081 | 232 | | | | 32 | 1405 | 31 | 2766 | | | | | 50 | 3600 | 254 | 43.9 |
| 15 02 B63105 | X 346 590 082 | 105 | 36.5 | 38 | 63 | 32 | 5376 | - | - | 65 | 38.5 | 25 | 63 | 127 | 168 | | |
| 15 02 B63122 | X 346 590 083 | 122 | | | | 15 | 2520 | 17 | 5376 | | | | | 25 | 6720 | 127 | 168 |
| 15 02 B63143 | X 346 590 084 | 143 | | | | 19 | 2584 | 19 | 5168 | | | | | 30 | 6664 | 152 | 136 |
| 15 02 B63188 | X 346 590 085 | 188 | | | | 25 | 2500 | 25 | 5000 | | | | | 40 | 6500 | 203 | 100 |
| 15 02 B63232 | X 346 590 086 | 232 | | | | 32 | 2509 | 31 | 4939 | | | | | 50 | 6429 | 254 | 78.4 |
| 15 02 B63277 | X 346 590 087 | 277 | | | | 38 | 2459 | 38 | 4917 | | | | | 60 | 6341 | 305 | 64.7 |

- IT** Sistema precompresso, carico medio, spina singola
- EN** Precompressed unit, medium load, single pin
- DE** Vorspannungssystem, mittlere Spannung, Einfachstecker
- FR** Ensemble precomprime, charge moyenne, un teton
- ES** Sistema pretensado, carga mediana, clavija individual
- PT** Sistema pré-comprimido, carga média, tomada simples



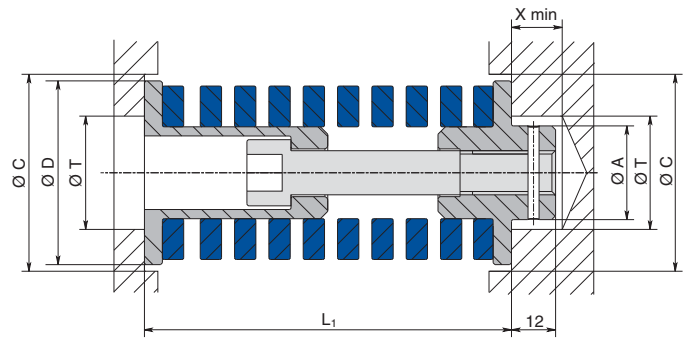
| Code Special Springs | Code PSA Mabec | L1 | ØA | ØB | ØD | Spring | Initial Force | 25% Lo | 32% Lo | ØC | ØT | X min | Spring data | | | | |
|----------------------|----------------|-----|------|------|----|--------|---------------|--------|--------|------|------|-------|----------------|----------------|------|-----|------|
| | | | | | | | | | | | | | D _H | L ₀ | R | | |
| 15 01 B40069 | X 346 590 063 | 69 | 20.5 | - | 40 | 17 | 1836 | 3 | 2160 | 42 | 22.5 | 25 | 40 | 76 | 108 | | |
| 15 01 B40076 | X 346 590 062 | 76 | | | | 10 | 1080 | 10 | 2160 | | | | | 15 | 2700 | 76 | 108 |
| 15 01 B40100 | X 346 590 061 | 100 | | | | 12 | 972 | 13 | 2025 | | | | | 20 | 2592 | 102 | 81 |
| 15 01 B40143 | X 346 590 059 | 143 | | | | 19 | 980 | 19 | 1961 | | | | | 30 | 2528 | 152 | 51.6 |
| 15 01 B40188 | X 346 590 058 | 188 | | | | 25 | 918 | 25 | 1835 | | | | | 40 | 2386 | 203 | 36.7 |
| 15 01 B50088 | X 346 590 057 | 88 | | | | 24 | 2856 | - | - | | | | | 8 | 3808 | 102 | 119 |
| 15 01 B50100 | X 346 590 056 | 100 | 12 | 1428 | 13 | 2975 | 20 | 3808 | 102 | 119 | | | | | | | |
| 15 01 B50143 | X 346 590 054 | 143 | 19 | 1520 | 19 | 3040 | 30 | 3920 | 152 | 80 | | | | | | | |
| 15 01 B50188 | X 346 590 053 | 188 | 25 | 1495 | 25 | 2990 | 40 | 3887 | 203 | 59.8 | | | | | | | |
| 15 01 B50232 | X 346 590 052 | 232 | 32 | 1405 | 31 | 2766 | 50 | 3600 | 254 | 43.9 | | | | | | | |
| 15 01 B63105 | X 346 590 051 | 105 | 32 | 5376 | - | - | 8 | 6720 | 127 | 168 | | | | | | | |
| 15 01 B63143 | X 346 590 049 | 143 | 19 | 2584 | 19 | 5168 | 30 | 6664 | 152 | 136 | | | | | | | |
| 15 01 B63188 | X 346 590 048 | 188 | 25 | 2500 | 25 | 5000 | 40 | 6500 | 203 | 100 | | | | | | | |
| 15 01 B63232 | X 346 590 047 | 232 | 32 | 2509 | 31 | 4939 | 50 | 6429 | 254 | 78.4 | | | | | | | |
| 15 01 B63277 | X 346 590 046 | 277 | 38 | 2459 | 38 | 4917 | 60 | 6341 | 305 | 64.7 | | | | | | | |



Precompressed Unit

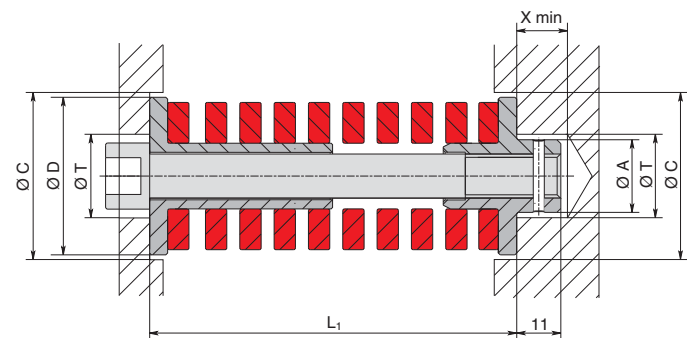
Peugeot - Citroën Standard

- IT** Sistema precompresso, carico medio, spina singola corta
- EN** Precompressed unit, medium load, short single pin
- DE** Vorspannungssystem, mittlere Spannung, kurzer Einfachstecker
- FR** Ensemble precomprime, charge moyenne, un teton court
- ES** Sistema pretensado, carga mediana, clavija individual corta
- PT** Sistema pré-comprimido, carga média, tomada simples curta



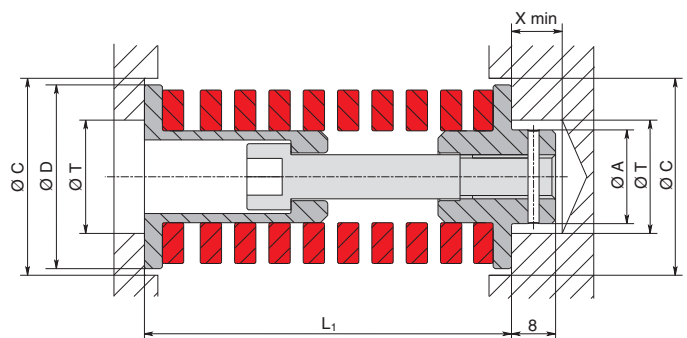
| Code Special Springs | Code PSA Mabec | L1 | ØA | ØB | ØD | Initial Force | 25% Lo | 32% Lo | ØC | ØT | X min | Spring data | | | | | |
|----------------------|----------------|-----|------|----|----|---------------|--------|--------|------|----|-------|----------------|----------------|----|----|-----|------|
| | | | | | | | | | | | | D _H | L ₀ | R | | | |
| 15 01 B40122 | X 346 590 060 | 122 | 20.5 | - | 40 | 15 | 940 | 17 | 2006 | 25 | 2508 | 42 | 22.5 | 13 | 40 | 127 | 62.7 |
| 15 01 B50122 | X 346 590 055 | 122 | 25.5 | - | 50 | 15 | 1455 | 17 | 3104 | 25 | 3880 | 52 | 27.5 | 13 | 50 | 127 | 97 |
| 15 01 B63122 | X 346 590 050 | 122 | 36.5 | - | 63 | 15 | 2520 | 17 | 5376 | 25 | 6720 | 65 | 38.5 | 13 | 63 | 127 | 168 |

- IT** Sistema precompresso, carico forte Ø25
- EN** Precompressed unit, strong load Ø25
- DE** Vorspannungssystem, starke Spannung Ø25
- FR** Ensemble precomprime, charge forte Ø25
- ES** Sistema pretensado, carga fuerte Ø25
- PT** Sistema pré-comprimido, carga pesada Ø25



| Code Special Springs | Code PSA Mabec | L1 | ØA | ØB | ØD | Initial Force | 20% Lo | 28% Lo | ØC | ØT | X min | Spring data | | | | | |
|----------------------|----------------|----|----|----|----|---------------|--------|--------|------|----|-------|----------------|----------------|----|----|----|-----|
| | | | | | | | | | | | | D _H | L ₀ | R | | | |
| 15 00 R25069 | X 346 590 045 | 69 | 13 | - | 25 | 2 | 246 | 11 | 1599 | 16 | 2214 | 27 | 14 | 14 | 25 | 64 | 123 |

- IT** Sistema precompresso, carico forte Ø32
- EN** Precompressed unit, strong load Ø32
- DE** Vorspannungssystem, starke Spannung Ø32
- FR** Ensemble precomprime, charge forte Ø32
- ES** Sistema pretensado, carga fuerte Ø32
- PT** Sistema pré-comprimido, carga pesada Ø32



| Code Special Springs | Code PSA Mabec | L1 | ØA | ØB | ØD | Initial Force | 20% Lo | 28% Lo | ØC | ØT | X min | Spring data | | | | | |
|----------------------|----------------|-----|----|----|----|---------------|--------|--------|------|------|-------|----------------|----------------|----|-----|-----|-----|
| | | | | | | | | | | | | D _H | L ₀ | R | | | |
| 15 00 R32088 | X 346 590 044 | 88 | 13 | - | 33 | 21 | 2562 | - | 8 | 3528 | 34 | 14 | 8 | 32 | 102 | 122 | |
| 15 00 R32108 | X 346 590 043 | 108 | 13 | - | 33 | 14 | 1498 | 9 | 2461 | 18 | 3424 | 34 | 14 | 8 | 32 | 115 | 107 |

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