SPIROL'S COMPRESSION LIMITERS

SPIROL offers a range of both formed and machined Compression Limiters including split seam, molded in, oval and solid wall designs. All formed Compression Limiters, except the Series CL220, are zinc plated and have a supplementary coating of trivalent passivation and an organic sealant for corrosion resistance. This finish provides 144 hours to white corrosion, and 384 hours to red corrosion when salt spray tested in accordance with ASTM B117. SPIROL's Series CL220 Compression Limiters are coated with ArmorGalv®, a zinc alloy thermal diffusion coating complimented with two sealers that provides a minimum of 1000 hours corrosion resistance to red rust. Machined Limiters are manufactured from aluminum and brass, both of which have inherent corrosion resistant properties and thus do not require supplementary finishing. Each series of Compression Limiter is designed to meet specific proof loads and accommodate a variety of installation methods.

The clearance between the bolt and the inside diameter of the installed Compression Limiter is typically adequate to meet normal misalignment. The Compression Limiter's length should be designed to ensure it will bottom out against the surface under the bolt's head and mating component. The appropriate length and length tolerance is application dependent. While the standard tolerance is sufficient to meet most needs, verification is recommended. SPIROL's Applications Engineers are available to assist in this process. If it is determined that a special Compression Limiter is required, then a documented recommendation will be provided.

The following details the unique features for each standard series:

- **Series CL220 Split Seam:** The Series CL220 Compression Limiter is produced from high carbon steel and intended for post-mould installation. The spring force generated during installation provides self-retention in the assembly. The flexible diameter accommodates wide hole tolerances, and the gap is designed such that the parts will not interlock in the free state. Once installed, the CL220 provides a minimum clearance of 1mm around the bolt diameter to compensate for misalignment. The CL220 is the only standard Compression Limiter finished with a protective coating of ArmorGalv®, a zinc alloy thermal diffusion coating complimented with two sealers that provides 1000+ hours of salt spray protection for highly corrosive applications such as automotive, marine, mining and industrial manufacturing. Additional benefits of ArmorGalv® include no insignificant surfaces as the entire inner diameter (ID) of the Limiter receives full coating and protection. The CL220 is rated for use up to ISO Class 8.8 bolts. The CL220 offers the widest range of standard diameter and length combinations to accommodate a variety of application requirements.

- **Series CL200 Split Seam - Slim Profile:** Similar to the Series CL220, the CL200 Slim Profile Compression Limiter has a smaller inner diameter (ID) after insertion and a reduced overall profile with less clearance around the bolt. Once installed, the CL200 provides a minimum clearance of 0.5mm as compared to the larger minimum clearance of 1mm provided by the CL220. The CL200 is rated for use up to ISO Class 8.8 bolts.

- **Series CL350 Split Seam - Heavy Wall:** The CL350 was designed with a thicker wall for increased bearing surface when clamped against soft mating materials. Generous bolt clearance also aids in positional alignment when multiple Compression Limiters are used in an assembly. The CL350 is rated for use up to ISO Class 10.9 bolts.

- **Series CL400 Split Seam - Oval:** Produced from high carbon steel, the oval Series CL400 accommodates 2.25mm extra clearance on one axis, providing additional flexibility over round Compression Limiters for centerline and stack-up tolerancing. This split-seam oval Limiter is formed, and it is spring tension that provides positive retention in the hole. The roll-forming manufacturing method yields substantial cost savings over machined products with similar features and characteristics. The CL400 is rated for use up to ISO Class 8.8 bolts.

- **Series CL460 Moulded-In - Oval:** The CL460 Series is similar to the oval Series CL400, but produced with a butted-seam so as to prevent plastic from entering the inner diameter during the moulding process. This series also accommodates 2.25mm extra clearance on one axis. The CL460 is rated for use up to ISO Class 8.8 bolts.

- **Series CL500 Moulded-In:** The Series CL500 is produced from low carbon steel with a butted seam to prevent plastic from entering the inner diameter of the Compression Limiter during the moulding process. This also provides an anti-rotation feature once in the assembly. The radial grooves provide axial retention. The CL500 is rated for use up to ISO Class 8.8/Grade 5 bolts.

- **Series CL600 Aluminium:** The Series CL600 is machined from 2024 aluminium as this grade provides the best combination of strength, corrosion resistance, machineability and cost. Additional advantages of aluminium are that it is lightweight (1/3 the weight of brass), it is 40% stronger than brass, and it is lead free. These Limiters can be moulded in or pressed into the assembly. The precision machined ID tolerance allows proper seating on the core pin when moulding into the assembly. When pressed into the assembly, they are designed with a pilot that allows the part to stand freely in the hole prior to completing the installation. Once installed, the knurl provides retention within the hole. The CL600 is rated for use up to ISO Class 10.9/ Grade 8 bolts.

- **Series CL601 Headed Aluminium:** The CL601 headed aluminium Compression Limiter is the same as the CL600, with the addition of a head. The head provides extra bearing surface on the mating component when a flanged bolt or a washer is not used.

- **Series CL800 Brass:** The Series CL800 is machined from 360 brass. Similar to the CL600, the CL800 can be moulded in or pressed into an assembly. The applications for SPIROL's brass and aluminium Compression Limiters are very similar, however to accommodate the same class/grade bolt, the brass Limiters have a larger wall thickness due to the material's lower yield strength. While this increases the size and weight of the Limiter as compared to the CL600, the thicker wall does provide more bearing surface for the mating component. The most common reason a designer may choose the CL800 is for those applications that require a shift away from aluminium on the galvanic series chart to make the Limiter more noble. The CL800 is rated for use up to ISO Class 10.9/Grade 8 bolts.

- **Series CL801 Headed Brass:** The CL801 headed brass Compression Limiters are the same as the CL800 with the addition of a head. Similar to the CL601, the head provides extra bearing surface on the mating component when a flanged bolt or a washer is not used.

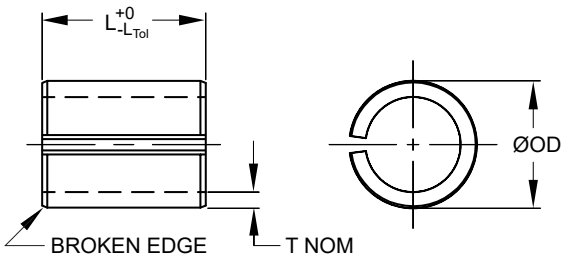
STANDARD OFFERING BREAKDOWN & MATERIALS

SERIES	DIA. RANGE	INSTALL METHOD	MATERIAL		BOLT RATING		RETENTION FEATURE / ATTRIBUTES
			TYPE	GRADE	CLASS	GRADE	
CL220	M4 - M12	Press-In	B - High Carbon Steel	UNS G10700 / G10740 CS67S (1.1231) / CS75S (1.1248)	8.8	5	Radial Tension / ArmorGalv®
CL200	M4 - M8	Press-In			8.8	5	Radial Tension / Reduced Profile
CL350	M6 - M8	Press-In			10.9	8	Radial Tension / Heavy Wall
CL400	M6 - M8	Press-In			8.8	5	Radial Tension / Oval
CL460	M6 - M8	Mould-In			8.8	5	Radial Groove / Oval
CL500	M6 - M8 / #10 - 5/16	Mould-In	F- Low Carbon Steel	UNS G10060 / G10100 EN10139 DC04 (1.0338) / DC01 (1.0330)	8.8	5	Radial Groove / Round
CL600	M3 - M8 / #4 - 5/16	Either Press-In or Mould-In	A - Aluminum	ASTM B211 2024 ISO AlCu4Mg1	10.9	8	Knurled / Solid Wall / Lightweight / Lead Free
CL601							CL600 w/ Head
CL800			E - Brass	UNS C36000 EN 12164 CW603N CuZn36Pb3			Knurled / Solid Wall / Cathodic Alt. to Aluminium
CL801							CL800 w/ Head

Other diameters available upon request.

SPIROL® SPLIT SEAM – COMPRESSION LIMITERS

Series CL220



MATERIAL
B High Carbon Steel

FINISH
H ArmorGalv®

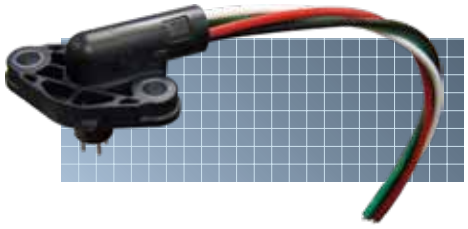
DIMENSIONAL DATA

NOMINAL BOLT SIZE ▶		M4	M5	M6	M8	M10	M12
Min. ØID Installed		5.0	6.0	7.0	9.0	11.0	13.0
Wall Thickness "T"		0.85	1.00	1.10	1.50	1.85	2.25
Length Tolerance "L_{Tol}"		0.15	0.15	0.15	0.20	0.25	0.25
Outer Diameter ØOD		7.17/7.34	8.47/8.64	9.67/9.89	12.52/12.79	15.27/15.59	18.07/18.44
Recommended Ø Hole Size		7.00/7.10	8.30/8.40	9.50/9.60	12.35/12.45	15.10/15.20	17.90/18.00
LENGTH	6						
	8						
	10						
	12						
	15						
	20						
	25						
	30						

- CL220 rated for use up to ISO Class 8.8 bolts.
- Special lengths and sizes available upon request.

SPIROL® Split Seam Compression Limiters
can be installed with **SPIROL** installation equipment or simply pressed in.

To Order: CMPL, Nominal Bolt Diameter, Length, Material, Finish, Series
Example: CMPL 6 X 6 BH CL220



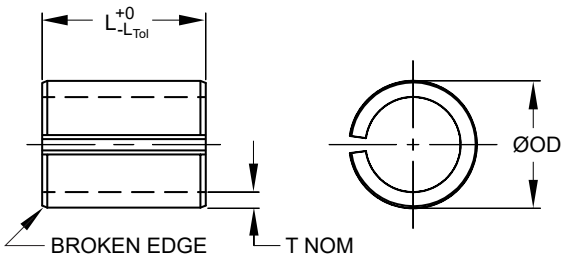
What is ArmorGalv®?
ArmorGalv® is a zinc alloy thermal diffusion coating covered by ASTM A1059M-08(2013). ArmorGalv® provides uniform deposition of coating on all surfaces of the part. There are no insignificant surfaces and the entire inner diameter receives full coating and protection. ArmorGalv® and two complimentary sealers offers a minimum of 1,000 hours corrosion resistance to red rust, and is an ideal coating for some of the most aggressive environments such as marine, automotive, mining, agriculture and industrial manufacturing.

ArmorGalv® Coated

Electroplated Zinc

SPIROL® SPLIT SEAM – SLIM PROFILE COMPRESSION LIMITERS

Series CL200



MATERIAL
B High Carbon Steel

FINISH
T Trivalent Zinc Plated

DIMENSIONAL DATA

NOMINAL BOLT SIZE ▶		M4	M6	M8
Min. ØID Installed		4.5	6.5	8.5
Wall Thickness "T"		0.85	1.10	1.50
Length Tolerance "L_{Tol}"		0.15	0.15	0.20
Outer Diameter ØOD		6.65/6.75	9.15/9.33	11.90/12.20
Recommended Ø Hole Size		6.50/6.60	9.00/9.10	11.75/11.85
LENGTH	8			
	10			
	12			
	15			
	20			
	25			

- All dimensions apply prior to plating. *Thicker finishes, such as ArmorGalv® and dip coatings, may require adjusted dimensions to ensure form, fit and function. Please consult SPIROL Engineering if considering these types of finishes for the CL200.*
- CL200 rated for use up to ISO Class 8.8 bolts.
- Heat treated versions available to order for use up to ISO Class 12.9/Grade 8 bolts.
- Special lengths and sizes available upon request.

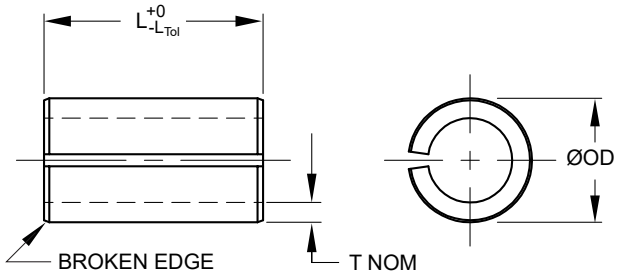
SPIROL® Split Seam Compression Limiters
can be installed with **SPIROL** installation equipment or simply pressed in.

To Order: CMPL, Nominal Bolt Diameter, Length, Material, Finish, Series
Example: CMPL 10 X 12 BT CL200

SPIROL®

SPLIT SEAM – HEAVY WALL COMPRESSION LIMITERS

Series CL350



MATERIAL

B High Carbon Steel

FINISH

T Trivalent Zinc Plated

DIMENSIONAL DATA

NOMINAL BOLT SIZE ▶		M6	M8
Min. ØID Installed		6.8	8.8
Wall Thickness "T"		1.50	2.00
Length Tolerance "L_{Tol}"		0.15	0.20
Outer Diameter ØOD		10.08/10.28	13.25/13.52
Recommended Ø Hole Size		9.95/10.05	13.05/13.20
LENGTH	10		
	12		
	15		
	20		
	25		

- All dimensions apply prior to plating.
- CL350 rated for use up to ISO Class 10.9 bolts.
- Special lengths and inch sizes available upon request.

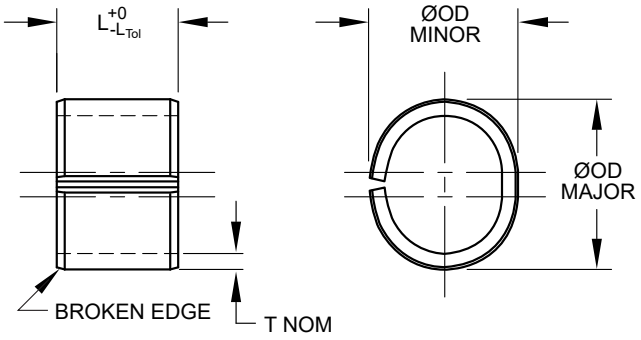
SPIROL® Split Seam Compression Limiters
can be installed with **SPIROL** installation equipment or simply pressed in.

To Order: CMPL, Nominal Bolt Diameter, Length, Material, Finish, Series
Example: CMPL 6 X 15 BT CL350

SPIROL®

SPLIT SEAM – OVAL COMPRESSION LIMITERS

Series CL400



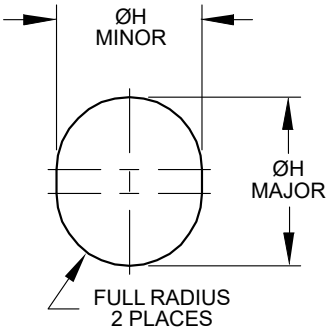
MATERIAL
B High Carbon Steel

FINISH
T Trivalent Zinc Plated

DIMENSIONAL DATA

NOMINAL BOLT SIZE ▶		M6	M8
Min. ØID		6.8	8.8
Wall Thickness "T"		1.10	1.50
Length Tolerance "L_{Tol}"		0.15	0.20
Outer Diameter ØOD Major		11.45/11.70	14.30/14.60
Outer Diameter ØOD Minor		9.40/9.60	12.25/12.50
Recommended Ø Hole Size	H Major	11.55/11.70	14.45/14.60
	H Minor	9.20/9.30	12.05/12.15
LENGTH	8		
	10		
	12		
	15		
	20		

HOLE SPECIFICATIONS



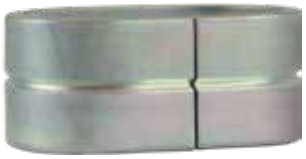
- All dimensions apply prior to plating.
- CL400 rated for use up to ISO Class 8.8 bolts.
- Special lengths and inch sizes available upon request.

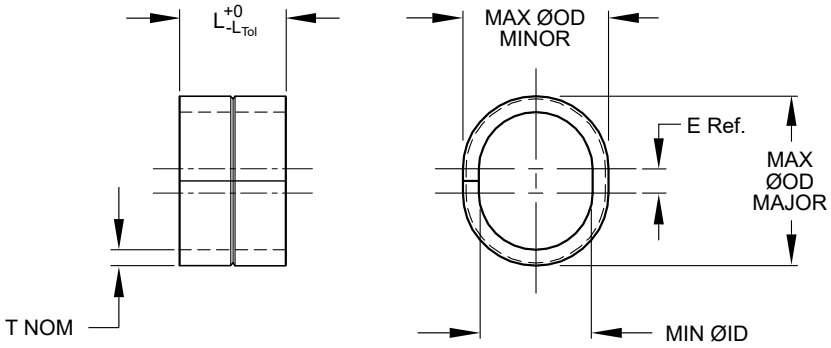
SPIROL® Oval Split Seam Compression Limiters
can be installed with **SPIROL** installation equipment or simply pressed in.

To Order: CMPL, Nominal Bolt Diameter, Length, Material, Finish, Series
Example: CMPL 6 X 12 BT CL400

MOULDED-IN – OVAL COMPRESSION LIMITERS

Series CL460





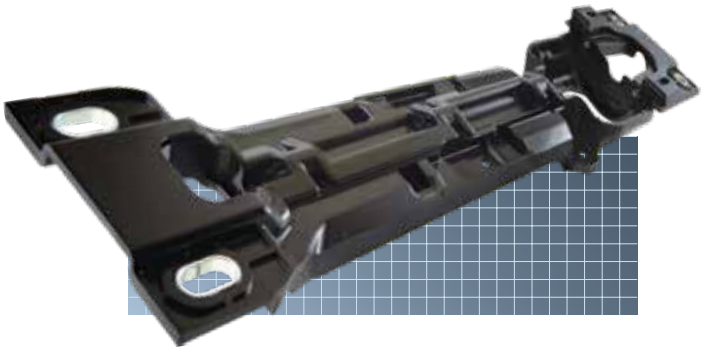
MATERIAL
B High Carbon Steel

FINISH
T Trivalent Zinc Plated

DIMENSIONAL DATA

NOMINAL BOLT SIZE ▶		M6	M8
Min. ØID		6.8	8.8
Wall Thickness "T"		1.10	1.50
Elongation "E"		2.25	2.25
Length Tolerance "L_{Tol}"		0.15	0.20
Max. Outer Diameter ØOD Major		11.65	14.50
Max. Outer Diameter ØOD Minor		9.40	12.25
LENGTH	6		
	8		
	10		
	12		
	15		

- All dimensions apply prior to plating.
- CL460 rated for use up to ISO Class 8.8 bolts.
- Special lengths and inch sizes available upon request.

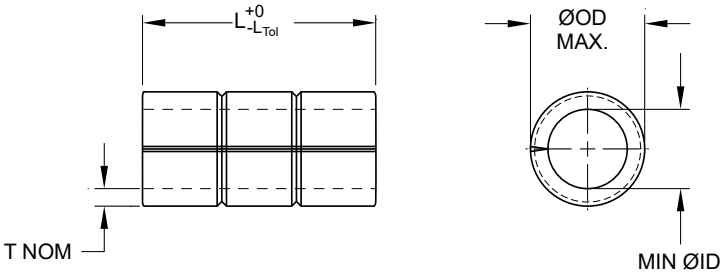


SPIROL® Oval Moulded-In Compression Limiters
can be moulded in using industry standard core pins.

To Order: CMPL, Nominal Bolt Diameter, Length, Material, Finish, Series
Example: CMPL 8 X 10 BT CL460

SPIROL® MOULDED-IN COMPRESSION LIMITERS

Series CL500



Parts less than 20mm (.750") long will have a single groove.

MATERIAL

F Low Carbon Steel

FINISH

T Trivalent Zinc Plated

DIMENSIONAL DATA

NOMINAL BOLT SIZE ▶		M6	M8
Min. ØID		6.8	8.8
Wall Thickness "T"		1.50	2.00
Length Tolerance "L_{Tol}"		0.15	0.20
Outer Diameter ØOD Max.		10.25	13.25
LENGTH	10		
	12		
	15		
	20		
	25		

NOMINAL BOLT SIZE ▶		#10	1/4	5/16
Min. ØID		.221	.281	.344
Wall Thickness T		.043	.059	.078
Length Tolerance "L_{Tol}"		.006	.006	.008
Outer Diameter ØOD Max.		.323	.417	.518
LENGTH	.312			
	.375			
	.500			
	.625			
	.750			
	1.000			

- All dimensions apply prior to plating.
- CL500 rated for use up to ISO Class 8.8/Grade 5 bolts.
- Special lengths and sizes available upon request.

SPIROL® Moulded-In Compression Limiters

can be moulded in using industry standard core pins.

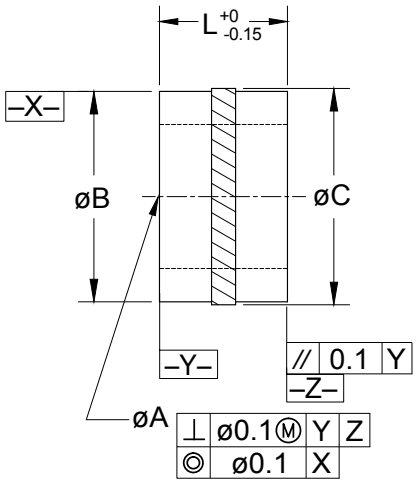
Plastic removed to show Compression Limiter.

To Order: CMPL, Nominal Bolt Size x Length, Material, Finish, Series
Example: CMPL 6 X 20 FT CL500

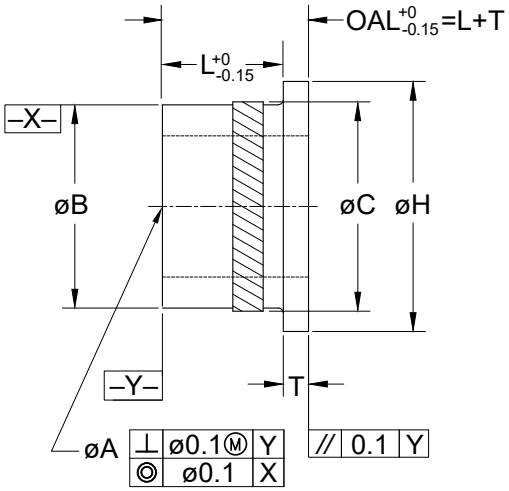
SPIROL®

ALUMINIUM – METRIC COMPRESSION LIMITERS

Series CL600
Knurled



Series CL601
Headed



MATERIAL
A Aluminium

FINISH
K Plain

DIMENSIONAL DATA

NOMINAL BOLT SIZE ▸		M3	M4	M5	M6	M8
Inner Diameter ØA		4.05/4.15	5.05/5.15	6.05/6.15	7.05/7.15	9.05/9.15
Body Diameter ØB		5.42/5.58	6.95/7.11	8.47/8.63	10.00/10.16	13.36/13.52
Knurl Diameter ØC Ref.		5.78	7.32	8.82	10.38	13.72
Head Diameter ØH		7.35/7.60	8.95/9.20	10.55/10.80	12.15/12.40	15.35/15.60
Head Thickness "T" Ref.		1.00	1.00	1.00	1.25	1.25
Recommended Ø Hole Size		5.60/5.70	7.13/7.23	8.64/8.74	10.18/10.28	13.53/13.63
LENGTH	**3**					
	4					
	5					
	6					
	8					

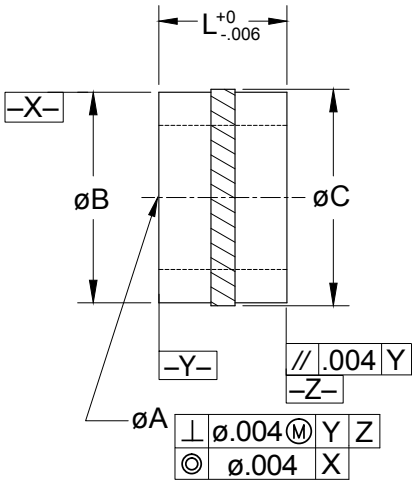
- CL600 / CL601 rated for use up to ISO Class 10.9 bolts.
- The knurl will always be larger than the maximum hole.
- Additional diameters and special lengths available upon request.

SPIROL® Knurled CL600 and CL601 Compression Limiters
are perfect for press-in and moulded-in applications.

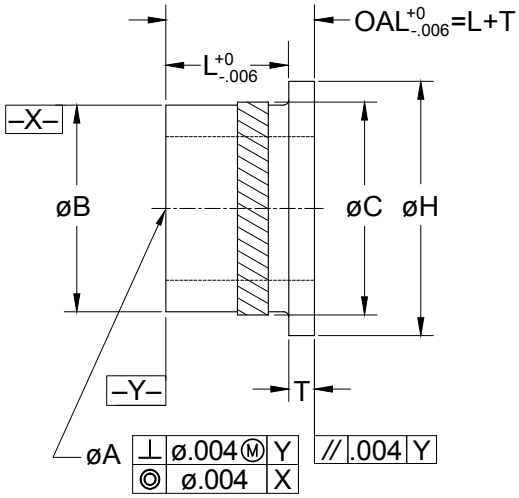
To Order: CMPL, Nominal Bolt Size x Length, Material, Finish, Series
Example: CMPL 6 X 8 AK CL600

SPIROL® ALUMINIUM – INCH COMPRESSION LIMITERS

Series CL600
Knurled



Series CL601
Headed



MATERIAL
A Aluminium

FINISH
K Plain

DIMENSIONAL DATA

NOMINAL BOLT SIZE ▸		#4	#6	#8	#10	1/4	5/16
Inner Diameter ØA		.159/.163	.179/.183	.199/.203	.238/.242	.277/.281	.356/.360
Body Diameter ØB		.213/.219	.249/.255	.274/.280	.334/.340	.394/.400	.526/532
Knurl Diameter ØC Ref.		.228	.263	.288	.347	.409	.540
Head Diameter ØH		.289/.299	.321/.331	.352/.362	.415/.425	.478/.488	.604/.614
Head Thickness "T" Ref.		.039	.039	.039	.039	.049	.049
Recommended Ø Hole Size		.221/.224	.256/.259	.281/.284	.341/.344	.401/.404	.533/.536
LENGTH	**.125**						
	.156						
	.187						
	.250						
	.312						

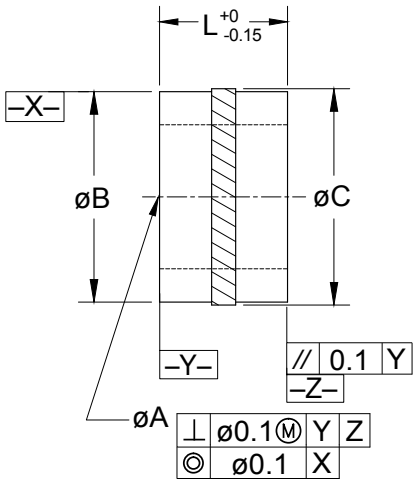
- CL600 / CL601 rated for use up to SAE Grade 8 bolts.
- The knurl will always be larger than the maximum hole.
- Additional diameters and special lengths available upon request.

SPIROL® Knurled CL600 and CL601 Compression Limiters
are perfect for press-in and moulded-in applications.

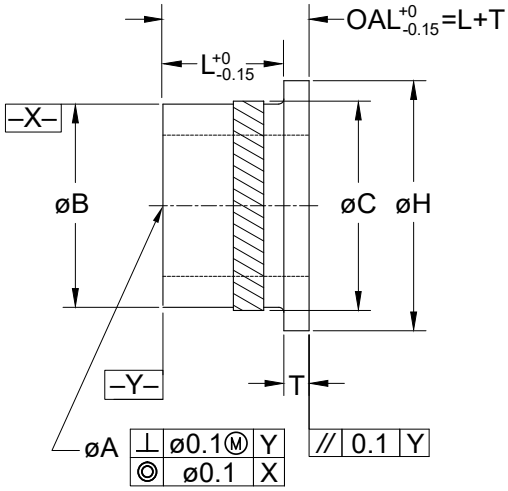
To Order: CMPL, Nominal Bolt Size x Length, Material, Finish, Series
Example: CMPL .250 X .312 AK CL601

BRASS – METRIC COMPRESSION LIMITERS

Series CL800
Knurled



Series CL801
Headed



MATERIAL
E Brass

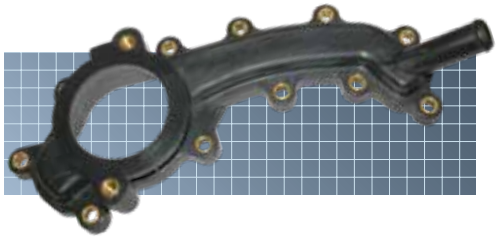
FINISH
K Plain

DIMENSIONAL DATA

NOMINAL BOLT SIZE ▸		M3	M4	M5	M6	M8
Inner Diameter ØA		4.05/4.15	5.05/5.15	6.05/6.15	7.05/7.15	9.05/9.15
Body Diameter ØB		6.03/6.19	7.56/7.72	9.09/9.25	10.92/11.08	14.58/14.74
Knurl Diameter ØC Ref.		6.40	7.92	9.45	11.29	14.96
Head Diameter ØH		7.75/8.00	9.35/9.60	10.95/11.20	13.35/13.60	17.35/17.60
Head Thickness "T" Ref.		1.00	1.00	1.00	1.25	1.25
Recommended Ø Hole Size		6.20/6.30	7.74/7.84	9.27/9.37	11.10/11.20	14.76/14.86
LENGTH	**3**					
	4					
	5					
	6					
	8					

- CL800 / CL801 rated for use up to ISO Class 10.9 bolts.
- The knurl will always be larger than the maximum hole.
- Additional diameters and special lengths available upon request.

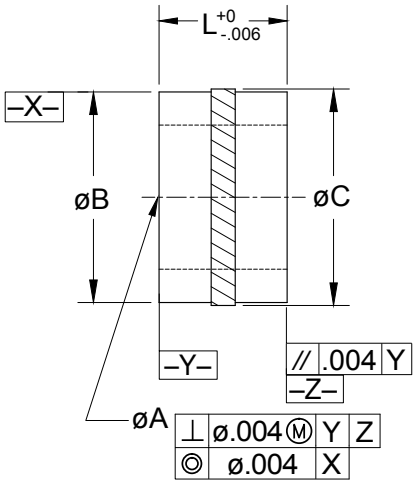
SPIROL® Knurled CL800 and CL801 Compression Limiters are perfect for press-in and moulded-in applications.



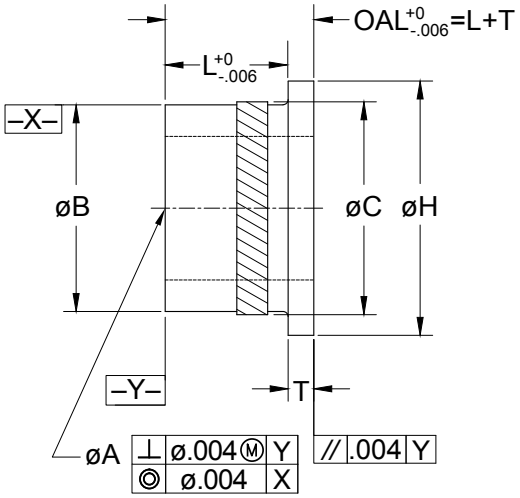
To Order: CMPL, Nominal Bolt Size x Length, Material, Finish, Series
Example: CMPL 5 X 6 EK CL800

SPIROL® BRASS – INCH COMPRESSION LIMITERS

Series CL800
Knurled



Series CL801
Headed



MATERIAL
E Brass

FINISH
K Plain

DIMENSIONAL DATA

NOMINAL BOLT SIZE ▸		#4	#6	#8	#10	1/4	5/16
Inner Diameter ØA		.159/.163	.179/.183	.199/.203	.238/.242	.277/.281	.356/.360
Body Diameter ØB		.238/.244	.262/.268	.298/.304	.358/.364	.430/.436	.574/.580
Knurl Diameter ØC Ref.		.252	.276	.312	.372	.445	.589
Head Diameter ØH		.305/.315	.336/.346	.367/.377	.430/.440	.524/.534	.680/.690
Head Thickness "T" Ref.		.039	.039	.039	.039	.049	.049
Recommended Ø Hole Size		.245/.248	.269/.272	.305/.308	.365/.368	.437/.440	.581/.584
LENGTH	.125						
	.156						
	.187						
	.250						
	.312						

- CL800 / CL801 rated for use up to SAE Grade 8 bolts.
- The knurl will always be larger than the maximum hole.
- Additional diameters and special lengths available upon request.

SPIROL® Knurled CL800 and CL801 Compression Limiters
are perfect for press-in and moulded-in applications.

To Order: CMPL, Nominal Bolt Size x Length, Material, Finish, Series
Example: CMPL .250 X .312 EK CL801

SPIROL®

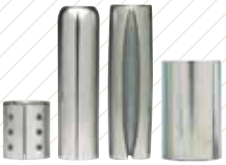
Innovative fastening solutions. Lower assembly costs.

Coiled Spring Pins

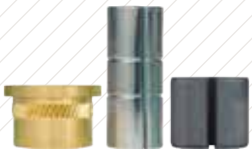
Slotted Spring Pins

Solid Pins

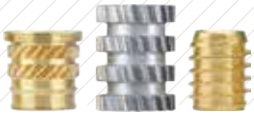
Alignment Dowels / Bushings



Spacers & Rolled Tubular Components



Compression Limiters



Threaded Inserts for Plastics

Railroad Nuts

Disc Springs

Precision Shims & Thin Metal Stampings

Precision Washers

Parts Feeding Technology

Pin Installation Technology

Insert Installation Technology

Compression Limiter Installation Technology

*Please refer to **www.SPIROL.co.uk** for current specifications and standard product offerings.*

SPIROL offers complimentary Application Engineering support! We will assist on new designs as well as help resolve issues, and recommend cost savings on existing designs. Let us help by visiting **Application Engineering Services** on **SPIROL**.co.uk.

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