



What.
How.
When.



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01

Ball bearing slides explained

The fundamental principles behind a good quality ball bearing slide, such as an Accuride® product, are well thought-out design, the use of good engineering materials, sound manufacturing techniques and procedures coupled with constant testing and quality controls, all with a desire to produce something that will perform to high standards and last for a lifetime.

Accuride has been producing such products since the early 1960s. We have continually developed and improved the family of ball bearing slides, from the humble beginnings of the 35mm profile inner and outer members (which are still in current use), to the multi-member complex shape profiles, made in a variety of materials, that we see today. And this development never stops.

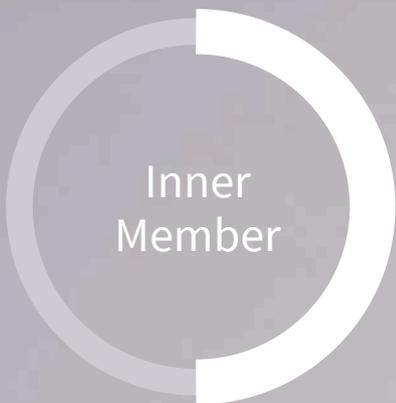
The following is a compilation of technical advice gathered over many years designing, testing and manufacturing ball bearing slides and answering customers' questions to help ensure that they have the correct product for their needs.

We hope this information helps.

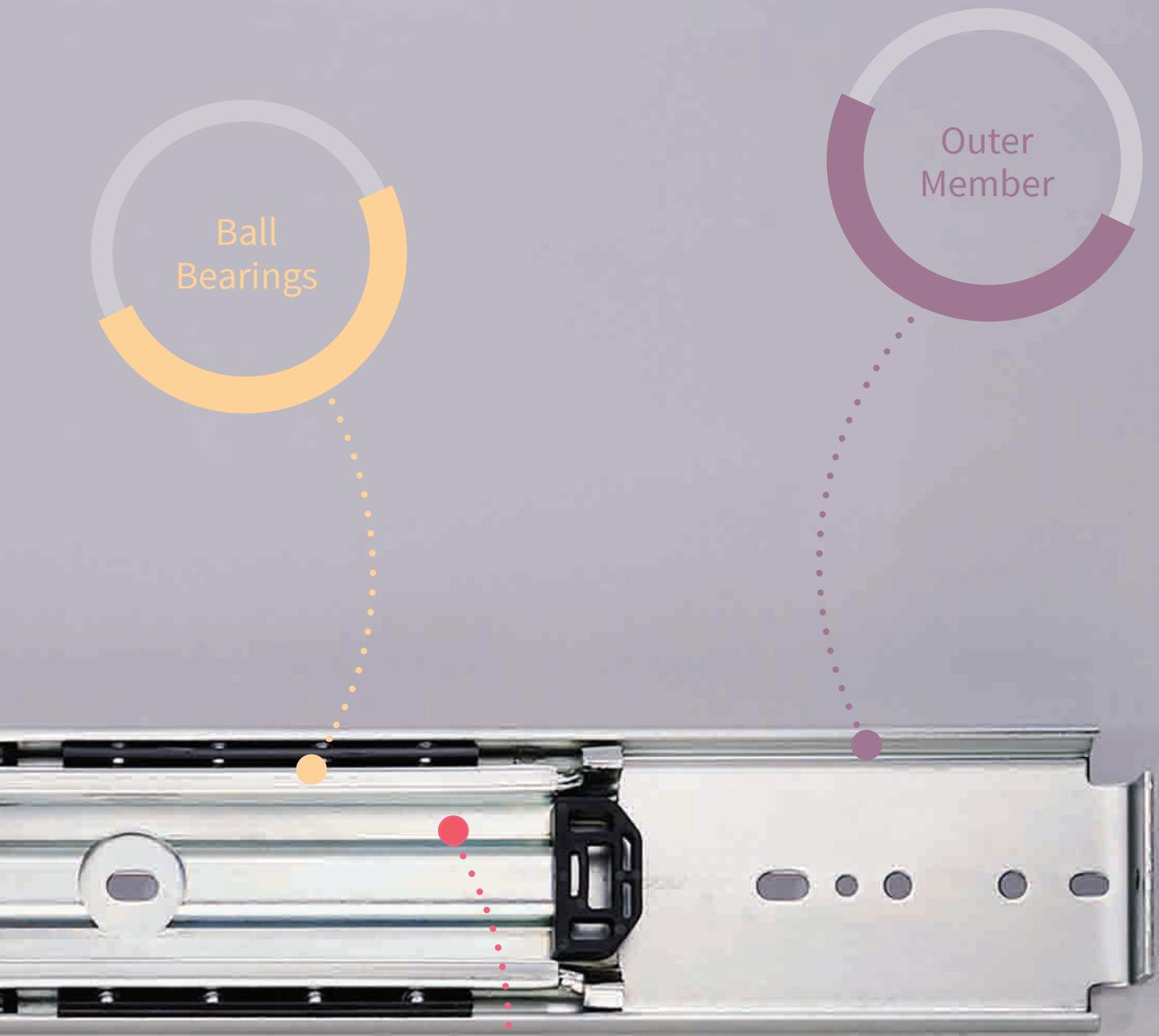
02

What is a ball bearing slide?

Drawer runners, linear slides, telescopic ball bearing slides... whatever you wish to call them, they are all basically products that move things up and down, backwards and forwards, position things in the correct place and give access.



Inner
Member



Ball Bearings

Outer Member

Intermediate Member

The ball bearings are controlled by a ball retainer. This holds the ball bearings in place & allows the members of the slide to move relative to each other. With precise design and manufacture the members and the retainers move at a ratio of 2:1. This is further explained in the section about [inching](#).

03

Understanding the different extension options

75%



Extension or travel refers to how far the slide allows the application to move.

100%

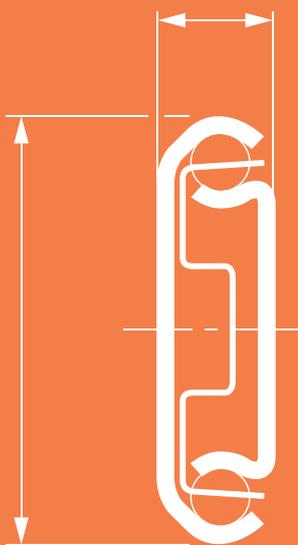


In some cases the value for extension and travel are different. Where the fixed and moving elements of a slide are the same length, then travel and extension will be the same. If these elements are of different lengths then the values will be different.

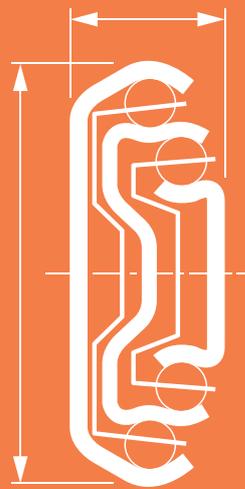
100%+



As a general rule all of the values in our catalogue show the slide travel



75% extension slides are made up of 2 sections, outer and inner members.



The addition of an intermediate member allows the slide 100% travel or over travel (100%+).

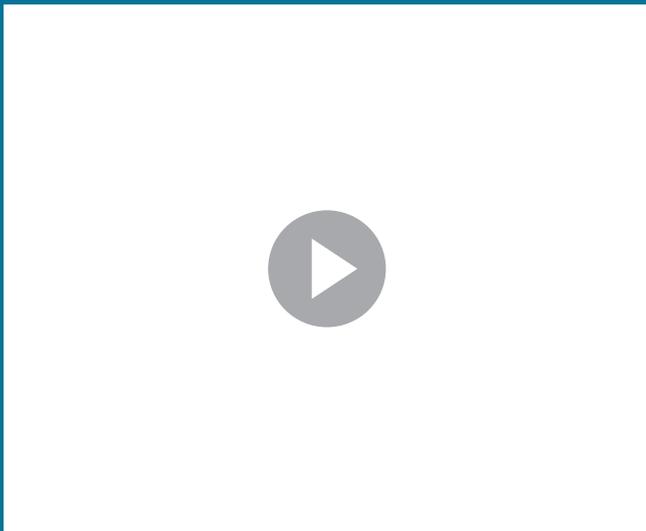




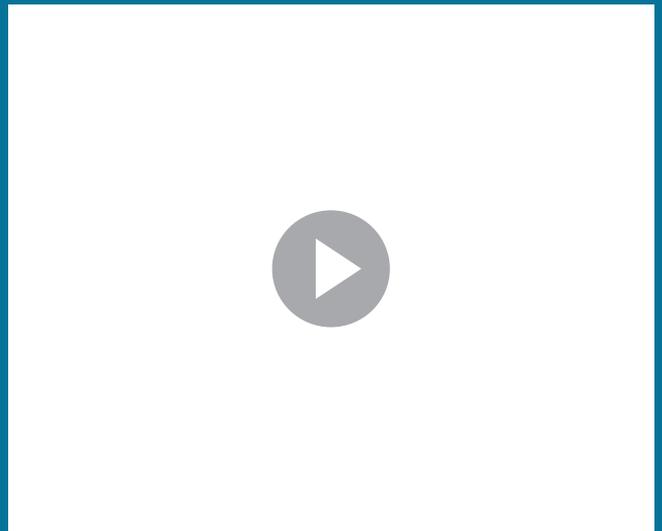
04

What's the difference between linear and telescopic slides?

▶ Watch Videos



The moving element of a linear slide moves within the length of the fixed member and can be either a traditional ball bearing slide with a full ball retainer or a recirculating slide design where the balls are contained within the length of the moving element.



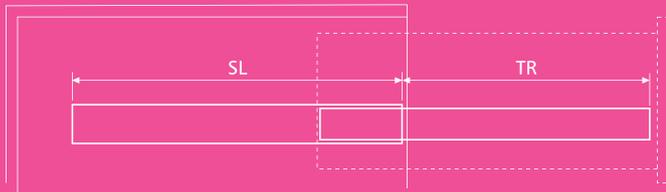
A telescopic slide can have either partial or full extension, where the fixed member remains within the confines of the application and the moving member carries the moving element out of the application, to give access to it.

The slide length is measured as the longest distance of a fully closed slide. As a rule, always use the maximum length allowable in the application.

05

Choosing the correct extension slide

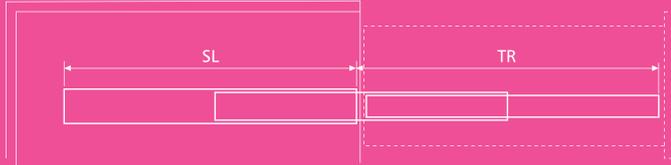
75%



Use 75% extension

- When space limited within and around cabinet
- Limited access required
- Safety: anti-tilt

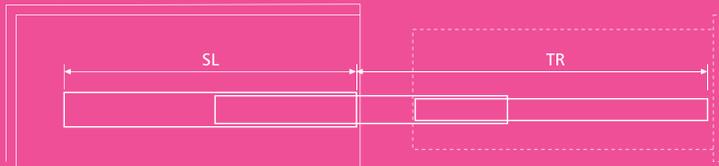
100%



Use 100% extension

- When full access is required

100+%

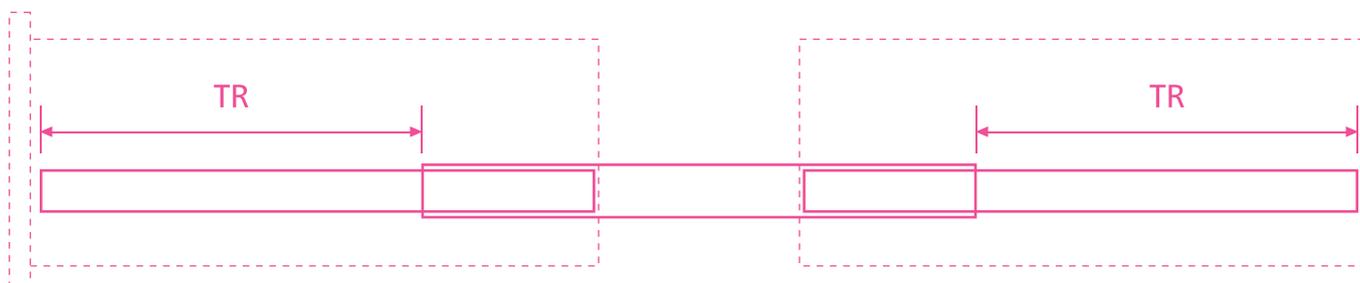


Use 100%+ extension

- To accommodate thickness of drawer front
- For access at rear of drawer

Two-way travel

- To pull trough from both sides
- 75% and 100% extension options



Linear



06

Slides are rated by load but what does this mean?

Drawer slide manufacturers always give a maximum load rating for their products and you may be wondering what this means. This is the maximum load that a pair of slides can carry, but only IF you mount them as instructed and don't exceed their cycle rating. The stated load ratings are a gross load, so don't forget to add the weight of the drawer construction materials to your calculations.

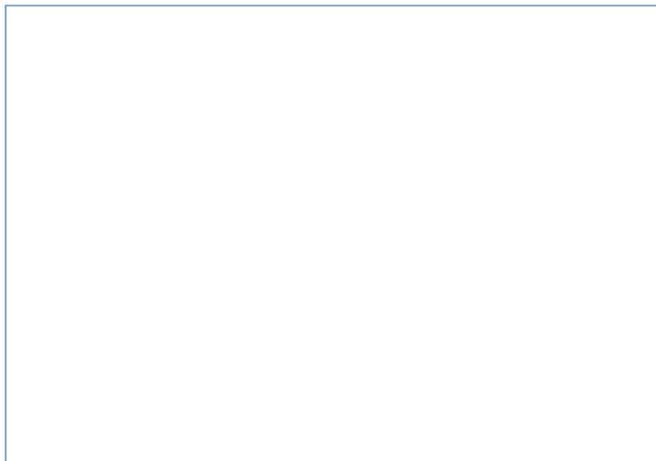
'Cycle rate' is another term that we should explain. When slides are tested they are set up in a test rig with a drawer, or in their application environment and 'cycled' in and out a number of times. One cycle = a complete open and close.

The cycle test is a dynamic load test. Different cycle rates are used depending on the type of slide and the expected application. For example, in applications for the Industrial and electronic market sector, the cycle rate will typically be between 2,000 and 10,000 cycles and for the furniture market sector, the cycle rate will typically be between 50,000 and 80,000 cycles.

All our products are subjected to a static load test at full extension of the sliding elements. The load applied will typically be at least twice that of the dynamic load test. This means the slide will have a 100% static load safety factor in the extended position.

Deflection of the drawer and sliding element are measured during the dynamic test phase and this is correlated to the load and number of test cycles completed. Din 68 858 details the allowable percentage of the extension this deflection can be.





Drawer deflection

Accuride tests all of its standard slides in the same way so that you can compare 'like for like'. Remember that the tests have been devised for the drawer and component together. There are no standard tests just for slides. If you have an application that is not a drawer, and Accuride slides can be found in many and varied types of applications, then we would recommend that you test the slides in your own situation.

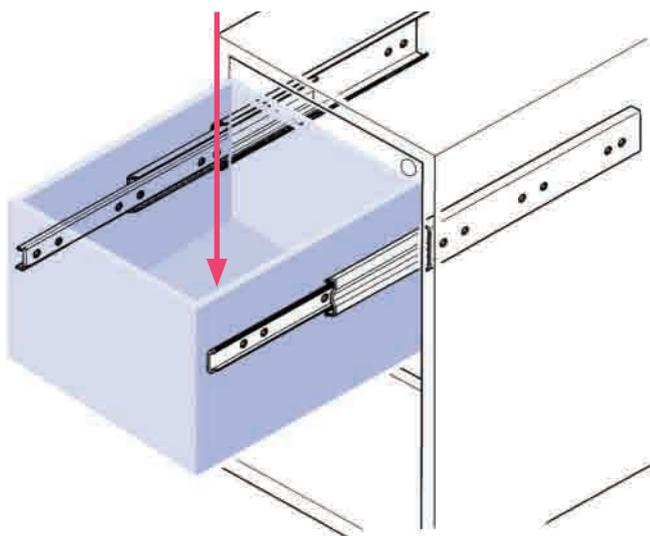
When you look at a product page you will see that we give a load per length, state the cycle rate used for the test and the load rate where flat mounting is available.

Testing methods

The tests are conducted in our in-house laboratories, which are based in each of our design and manufacturing sites around the globe.

The slides are typically mounted 450mm apart and the load is placed with its centre of gravity in the centre of drawer.

Measurements are taken and the test rig is then started and will run through the cycles, with further measurements and checks made along the way. As previously mentioned, we test furniture sector slides up to 80,000 cycles and industrial sector slides up to 10,000 cycles, but there are variations. Look at the datasheets for detailed information.



Centre of gravity in the centre of the drawer





A wider drawer has a negative effect on slide performance and choosing the wrong slide can result in a side-to-side racking movement that feels loose and unstable. Some of our slides are designed specifically for wider drawer applications and are therefore tested further apart. These are detailed in our product catalogue and website.

Our product is also subjected to slam open and slam shut test elements, which entail slamming the drawer / slide against the open and closed end stops. This test is carried out for 10 slams in both directions at a speed of between 1.25 and 1.85 m/sec dependant upon load applied. Different applications may have their own set of standards for testing and we can accommodate customer requests.

Our general test standards come from a range of national and international sources, such as; BIFMA, ANSI, ISO, BS and Din, etc.

We can also set up tests for a customer's project. Sometimes we may need to take the test out of house, for example, crash testing for automotive applications.

If your drawer or cabinet is lightweight or flexible, the slide can contribute to the structural rigidity of the unit. But make sure that the slide can take the additional support it is being subjected to by selecting a model with a slightly higher load rating and larger cross section than you would normally need for an application with a more rigid structure.

07

Mounting a slide for the best performance

To get the best out of your slides always read instructions supplied by the manufacturer.

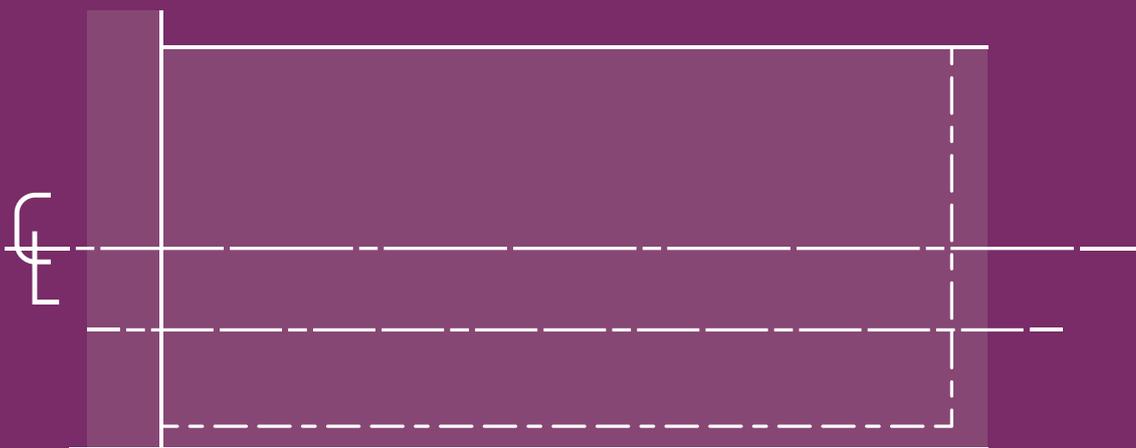
All fixing positions must be used to achieve the maximum load rating. Only those holes shown on the drawings with dimensions are to be used for mounting.

Non-dimensioned holes are tooling holes that often vary in shape and location on the slide members. Please refer to the 2D CAD drawings for dimensional tolerances. You can also go on-line and download the CAD drawings.

Most slides are designed to be mounted in pairs. Make sure that they are mounted parallel to each other, in both vertical and horizontal axes.

Where on a drawer side should I mount the slide... middle, top or bottom?

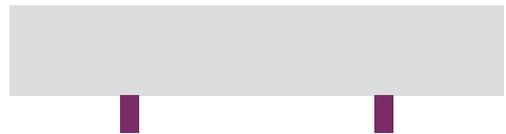
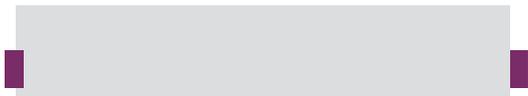
We have found, through tests and experience, that the optimum position is between a third and two thirds distance from the base of the drawer. Therefore the ideal position is on or just below the centreline as illustrated.



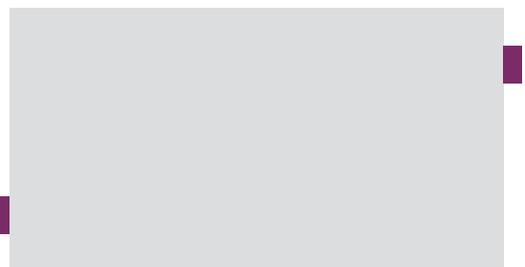
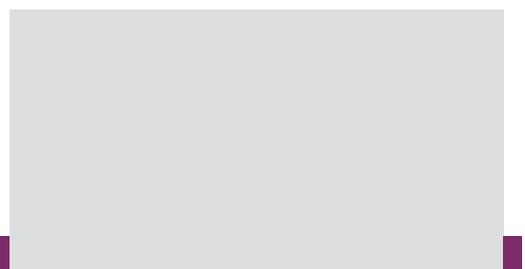
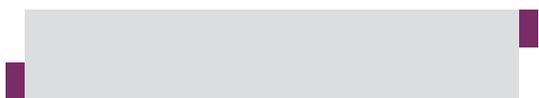
This will give you maximum stability for your drawer project.

However, there are many and varied ways to mount your projects on slides, from the **good** the **bad** and the downright **dangerous...**

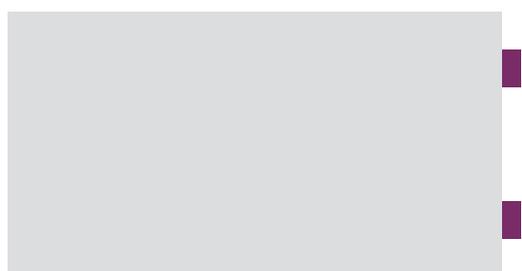
Let's start with the **good...**



The following are okay, but not perfect



Now for the 'not so good'. In other words, the **bad...**



And now for the downright
dangerous... unless you're
using 0115RC or 0116RC



We recommend that slides are tested in their intended application before committing to production and ordering.

08

Understanding side space

The distance between the cabinet and drawer is critical if you intend to use a ball bearing drawer slide. Most slide manufacturers refer to this as ‘side space tolerance’ and it will vary depending on the slide you chose. Always refer to the manufacturers’ installation guides; we can only talk here about the side space needed for Accuride drawer slides.

First you need to know the slide thickness

Look at the cross section drawings or the slide thickness measurements given for each of the slides. For best performance it is important that the slide has room to move freely.

However, it is also important to understand that ball bearing slides cannot absorb large gap deviations between the cabinet and drawer. The space must be consistent along the whole length of the slide. Also, it must not be too large; this will pull the slide members apart and cause movement problems and early product failure.

Side space must always be greater than the slide thickness

We recommend that you allow between +0.2mm and +0.5mm over the slide thickness.

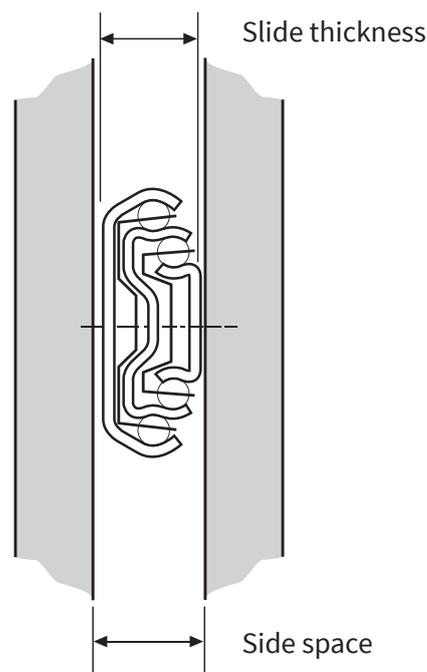
For example, the 3832 slide is 12.7mm thick, therefore the side space should be between 12.9 and 13.2mm. However, there are some slides that will need a different formula for working out the slide space.



Some slides are designed to allow a little bit of side space tolerance, which is often needed in woodworking projects. Look out for slides with breathing tabs, a small tongue of metal with a U slot around it. This allows the tip of the tongue to bend just a little bit to help absorb those tricky tolerances.

Technical hint:

Always read the manufacturer's installation guide. Not all slides will need the same side space allowance.



09

How can I install drawer slides so that they line up and work properly?

The main thing is to get the slides parallel. Your project needs to be perfectly square and parallel - this makes life easier for measuring. In other words, take care to build cabinets and drawer boxes as accurately as possible.

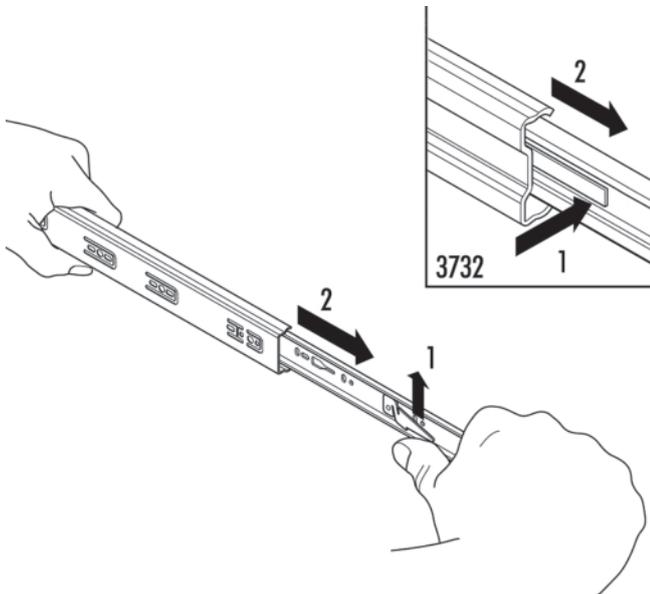
The other issue is side space; the space between the cabinet and drawer where the slide will be fitted. This must be constant and parallel, and just larger than the width of the slide, usually by +0.2 mm to +0.5 mm.

Getting the slides in the correct position and level can be a challenge, especially if you're working on a fully assembled unit from the inside and at the back of a cabinet. Accurately pre-drilling the panels before assembly can eliminate this issue, but accuracy of manufacture and assembly is the key to a successful build.

Using slides that have a disconnect feature, such as the 3832 series (illustration 01), will allow the slide to be disassembled to separate the cabinet and drawer members.

The part (outer member) that fits to the cabinet can then be easily fitted to the cabinet and the part (inner member) that fits to the drawer can be easily fitted in its correct position.

01



Showing the 3832 disconnect lever

Illustration 01

02

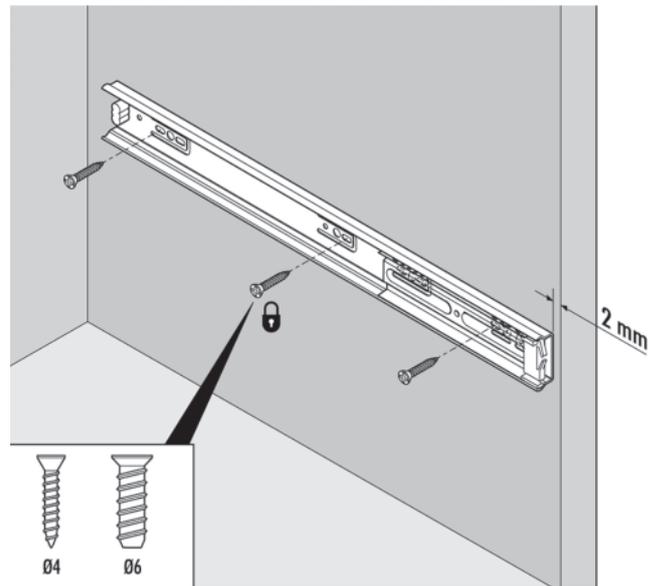


Illustration 02

Mark the position of the slides on the inside of the cabinet and fit using the slotted holes to give a little bit of adjustment. Don't fully tighten the screws just yet. Set the slide 2mm back from the front of the cabinet edge.

(The 2mm set back dimension ensures that the drawer front, if fitted, does not hit the slide members, when the unit is closed)

03

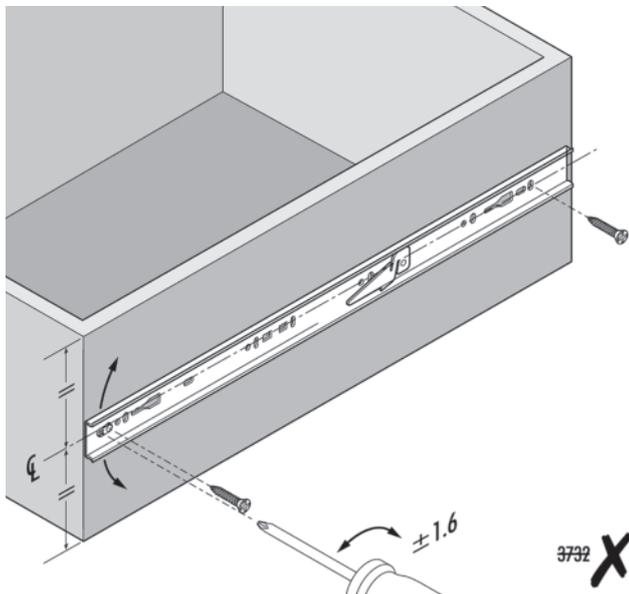
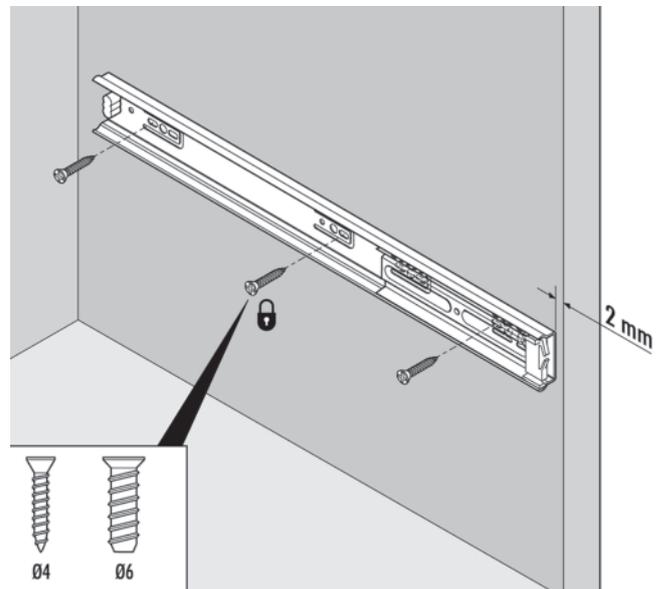


Illustration 03

Now fit the inner member to the side of the drawer, either on or just below the centre line for optimum stability. The front of the slide member should be set back 2mm from the front of the drawer.

Level up and fix using the round holes and tighten all screws. Some slides have a cam adjuster at the front of the slide to give some up/down adjustment.

04



Re-fitting the drawer

Illustration 04

When fitting the drawer into the unit it is important that the ball bearing retainer is in the forward position during initial installation. Hold the drawer level and slot the slide members inside each other. Gently push the drawer closed. The ball retainer will start to move to the rear. Continue to push the drawer closed. Open and close fully a few times to ensure that everything is operating correctly.

These directions are for a drawer or moving element with either no front panel or for an overlaid front panel.

Using a front panel

If an inset front panel is required, then the setback dimension should be increased by the thickness of the front panel. Don't forget the recommended 2mm set back dimension.

Using a non-disconnect slide

Many of our slide series do not have a disconnect feature and consequently, installation of these slides can be a little bit more demanding. Fitting the slide to the cabinet is almost the same as described above, with the exception that the drawer or moving member is still attached to the fixed member. Access slots are always provided in the slides to allow the installer to fix the slide using all possible fixing points.

Fitting the drawer or moving element to the slide is a task that will employ more hands. The drawer or moving element should be accurately marked up and, if possible, pre drilled to ease assembly. The slide needs to be pulled open to its full extension to expose all the available fixing points. Again, some of these may only be exposed by virtue of an access slot in the slide member. Fixing screws are then applied to the application in much the same way as described above.

Once the assembly is complete, open and close the application fully a few times, to ensure that everything is operating correctly. If a drawer does not move easily, something is incorrect in either:

- **The manufacture of the equipment**
- **The way the slide was installed**

Check to make sure the fit is correct

Is there too much or too little side space?

Is the drawer out of square?

Is there some obstruction in the ball track?

Any other external obstruction?

You can download fitting instructions for specific slides from our online Document Library.

10

Fixing recommendations

0115RC	M4 countersunk screw/4mm countersunk wood screw	
0115RS	M5	
0116RC	M6 countersunk screw	
0201	M4 screw	Max. head. Ht.2.5mm/Ø9.6mm
0204	M4 screw	Max. head. Ht.2.5mm/Ø9.6mm
0301	M4 screw	Max. head. Ht.2.5mm/Ø9.6mm
0305	M4 screw	Max. head. Ht.2.5mm/Ø9.6mm
0330	M4 screw	Max. head. Ht.2.5mm/Ø9.6mm
0522	M6 screws on the inner extending member, M8 screws on the outer fixed member	
1234	4mm wood screw (supplied) 6mm Euro screw	
1312	M4 screw/4mm wood screw	
1319/1316	4mm wood screw/6mm Euro screw	
2002	M4 screw/4mm wood screw	Max. head. Ht.2.5mm/Ø9.6mm
2026	M4 screw/4mm wood screw	Max. head. Ht.2.5mm/Ø9.6mm
2028	M4 screw	Max. head. Ht.2.5mm/Ø9.6mm
2109	Fixing hardware included	Max. head. Ht.2.5mm/Ø9.6mm
2132 Series	M4 screw/4mm wood screw/6mm Euro screw	Max. head. Ht.2.5mm/Ø9.6mm
2415	M3 screw	
2421	M3 screw/3mm wood screw	Max. head. Ht.1.8mm/Ø5.6mm
2431	M3 screw/3mm wood screw	Max. head. Ht.1.8mm/Ø5.6mm
2601	M4 screw/6mm Euro screw/4mm wood screw	Max. head. Ht. 2mm/Ø7.8mm

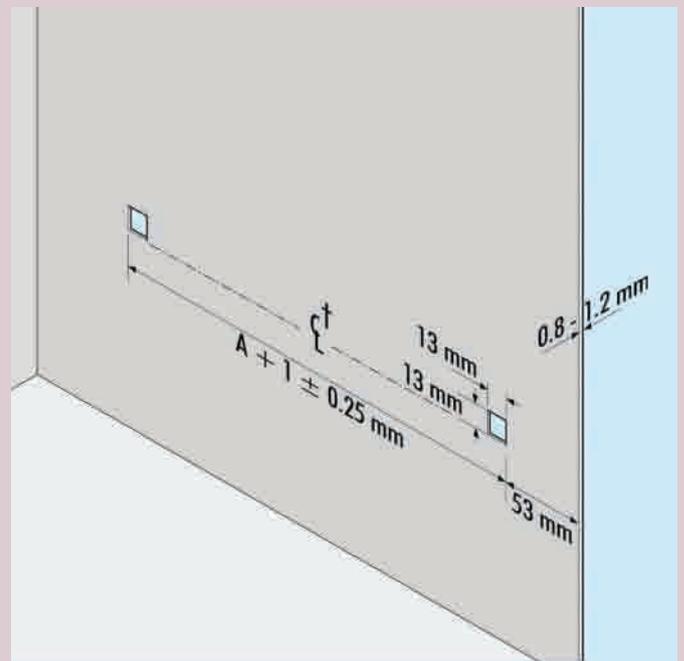
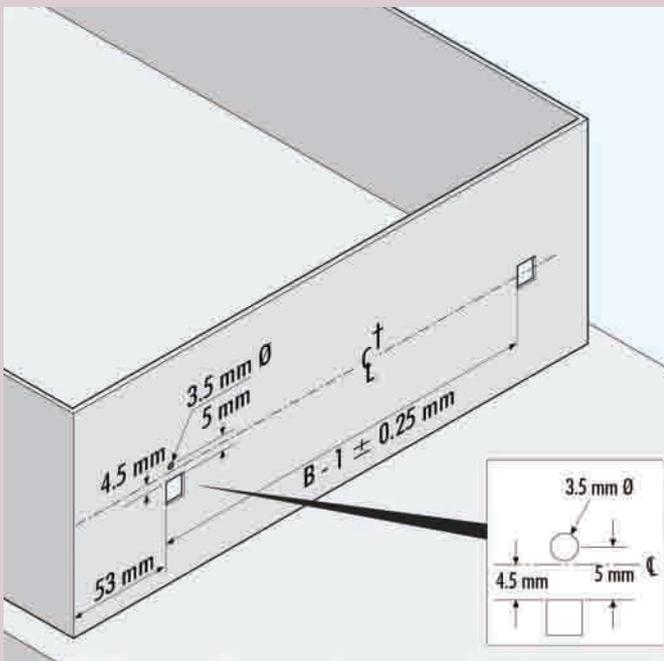
2642	M4 screw/6mm Euro screw/4mm wood screw	Max. head. Ht. 2mm/Ø7.8mm
2728	M4 screw/4mm wood screw	Max. head. Ht.2.5mm/Ø9.6mm
2907	M4 screw	Max. head. Ht.2.5mm/Ø9.6mm
3031	M4 screw	Max. head. Ht.2.5mm/Ø9.6mm
3301	Fixing hardware included	
3301-60	4mm wood screw/6mm Euro screw	Max. head. Ht.2.5mm/Ø9.6mm
3307	Fixing hardware included	
3308	Fixing hardware included	
3507	M4 screw	Max. head. Ht.2.5mm/Ø9.6mm
3607	Fixing hardware included	
3630	M4 screw/4mm wood screw	Max. head. Ht.2.5mm/Ø9.6mm
3657	Fixing hardware included	
3732	M4 screw/4mm wood screw/6mm Euro screw	Max. head. Ht.2.5mm/Ø9.6mm
3832 Series	M4 screw/4mm wood screw/6mm Euro screw	Max. head. Ht.2.5mm/Ø9.6mm
4120	M8 screw	
4140	M8 screw	
4160	M6/M8 screw	
4190	M8 countersunk screw (for Unistrut channel)	
5321 Series	M5 countersunk/6mm countersunk Euro screw	
5321-60	4mm wood screw/6mm countersunk Euro screw	
5322	M5 countersunk/6mm countersunk Euro screw	
5343/5344	4mm countersunk woodscrew / 6mm Euro screw	
5417 Series	4mm wood screw/M4 countersunk screw	Max. head. Ht.2.5mm/Ø9.6mm
5517-60	4mm wood screw/6mm Euro screw	Max. head. Ht.2.5mm/Ø9.6mm
6026	M4 screw/4mm wood screw	Max. head. Ht.2.5mm/Ø9.6mm
7957	M5/M6 countersunk screw	
9300 Series	M5/M6 screw/carriage bolt	Max. head ht. 4.8mm/Ø 12.7mm
DBHAND	M5 screw	
DBLOCK10EL	M4 screw/4mm wood screw/6mm Euro screw	

11

How do I attach the drawer slides to metal cabinets and drawers?

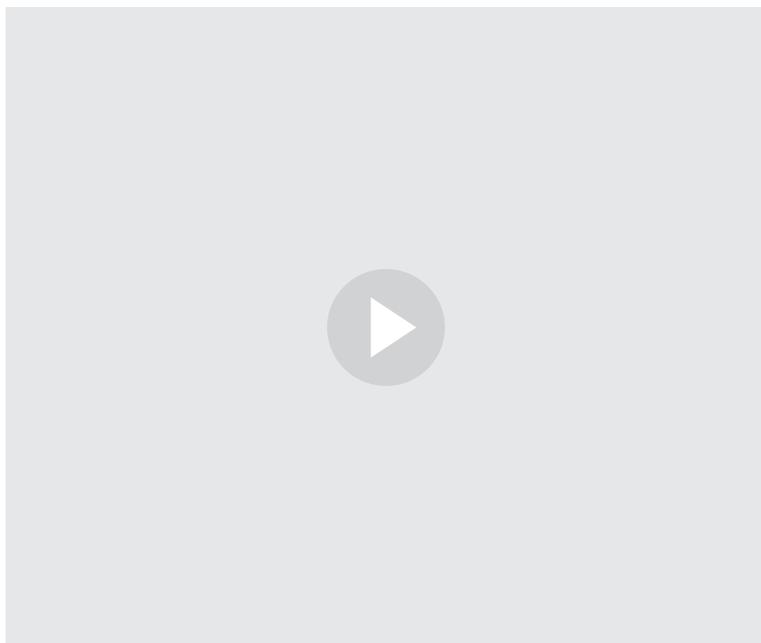
The easiest and most popular way of fitting slides into metal cabinets is by using runners with bayonet lancements. Accuride stock 3 slides: 7400-50SC, 5517-50 and 3320-50.

The bayonet lancements on both the cabinet and drawer members fit snugly into pre-cut square slots. The dimensions change depending on the slide series so download the correct installation guide from the website for more help.

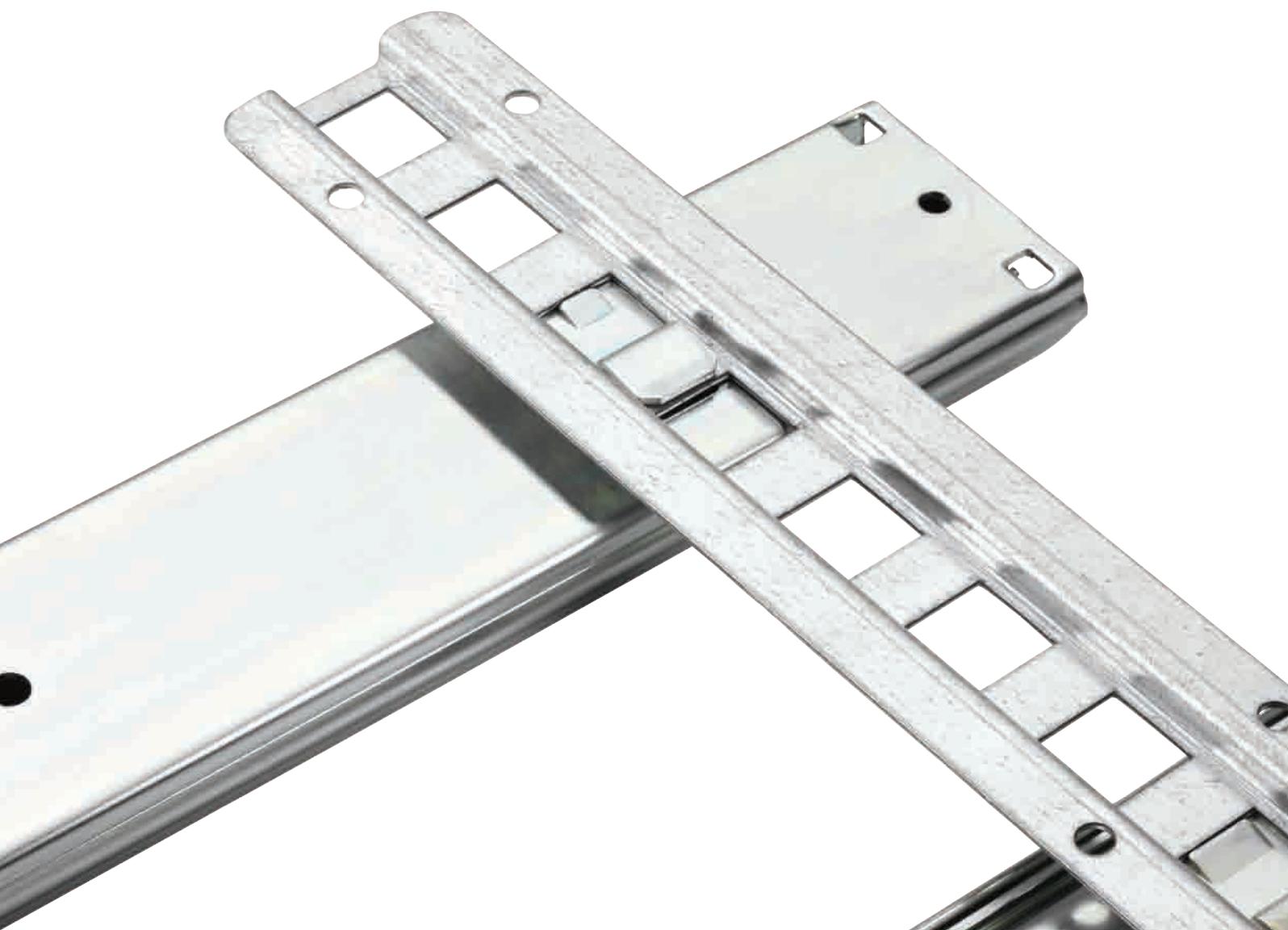


Note dimensions A and B on the manufacturing illustrations for the cut outs on the drawer and cabinet. These dimensions have a +1mm or -1 mm factor. This allows for the easy installation of the bayonets and for the front bayonet to be the controlling feature for positional accuracy.

▶ Watch Video



The DZLADD brackets can also be used inside the cabinet - these provide ready-made slots for the lancings to fit into. Watch this video to find out how the ladder brackets work.



12

How to choose a slide for flat (horizontal) mounting

We are often asked the question, **“Which of Accuride’s slides can be flat mounted?”**

It is an important question since not all slides work well in this orientation.

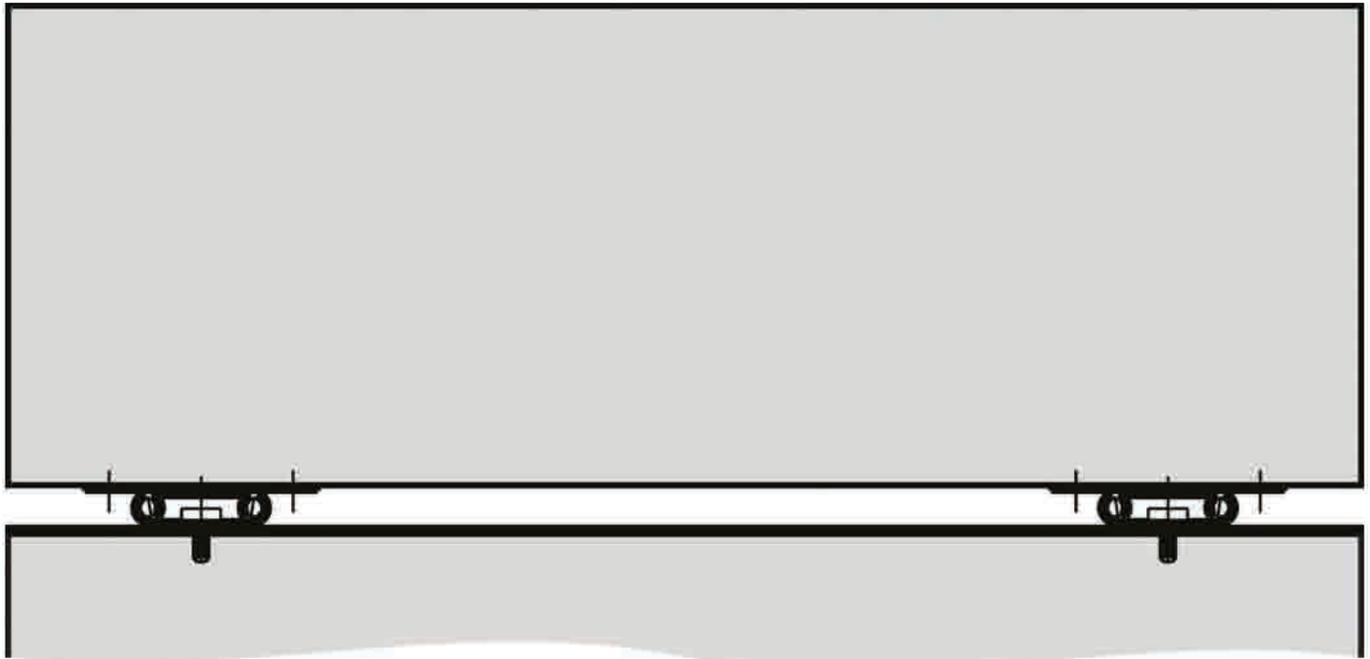
Most ball bearing telescopic slides are designed to be mounted in pairs vertically, on the sides of drawers or the moving unit. There are some slides that can be mounted flat beneath the moving unit.

If slides are mounted horizontally (flat mount) the load rating is decreased to approximately 25% of the vertical load rating. Some slides may have a lower or higher percentage.

Look at the individual product datasheets or in the e-catalogue for this symbol:



Linear slides such as the 1312 and 0115RS perform better when flat mounted because the moving member is fully supported on ball bearings at all times.



The 0115RC uses re-circulating ball carriages and is ideally suited for this orientation of mounting; see the datasheet for details of load ratings.

Mounting slides in different configurations will affect performance and load rating and we always recommend that you test the slide in the intended application.

Some slides should not be flat mounted

Problems can arise with deflection, especially with heavy loads on longer lengths, and with interference between the slide components, which can cause sliding components to grind together where clearances are minimal.

Some ranges have been designed, for example, with minimal wrap on the intermediate member (IMM), or the shape of the outer member (OM) has a flatter shape allowing lateral movement when flat mounted.

These cross sections have no problem handling loads in vertical/side applications, but when used flat, the members and ball retainer could easily disengage from the mating members, or grind / rub together.

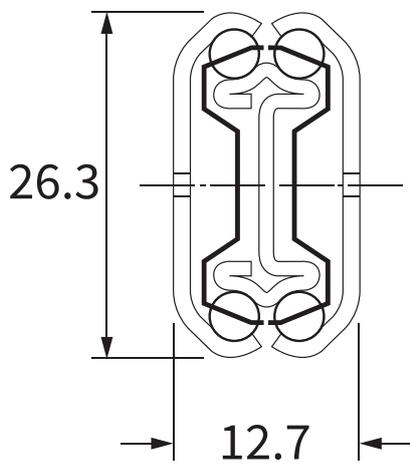
Slides suitable for flat (horizontal) mounting

Maximum load rating kg*

Model	Side mounted	Flat mounted
0115RC DA	See datasheet	See datasheet
0115RS	50	60
0116RC DA	See datasheet	See datasheet
0201	50	12.5
0204	65	16.25
0301	70	17.5
0305	70	17.5
0305 DS	70	17.5
0330 DS (80,000 cycles)	65	16.25
0330 DS (10,000 cycles)	80	20
1312	50	60
2026	50	12.5
2028 DS (80,000 cycles)	60	15
2028 DS (10,000 cycles)	65	16.25
2415	18.5	18.5
2728 DS	20	5
3301	68	17
3031 DS	80	20
3307	68	17
3308	68	17
3507	82	20.5
4120 DA (10,000 cycles)	438	219
4120 DA (5,000 cycles)	550	275
5417 (80,000 cycles)	90	22.5
5417 (10,000 cycles)	100	25
7957	160	40
9301	227	45

*Load ratings quoted are the maximum for a pair of slides installed 450mm apart, unless otherwise stated. Load ratings will change according to the length of the slides. See individual datasheets for details.

Why can't the 2601/2642 series slides be flat mounted? The main reason we do not recommend the 2601 or 2642 slides be used in flat mount applications is the minimal ball wrap on the intermediate member.



The I-beam construction of the intermediate member allows the 2600 cross section to handle loads in vertical/side mount applications when the force is applied directly into the ball race.

If used in flat mount applications, the outer member and ball retainer could easily pop out of the intermediate member when the forces are directed away from the ball race and into the ball wrap. This is possible even if the stated load rating were reduced by 75%. Minimal material thickness, ball size, outer ball wrap are other design components that reduce these slides' ability to handle loads in the flat mount position.



13

Potential problems of using slides on wide and deep drawers, and ball migration and inching issues

The trend for wider and deeper cabinet drawers is continuing to grow. And we can see why. Originally only seen in lateral filing systems, wide and deep drawers are now found in residential applications, especially kitchens. Commercial applications include display and storage for retail, catering, industrial and electronic and, of course, office files.

Drawer racking

When selecting the slides for your wide drawer project be careful to read the manufacturer's technical details. Maximum drawer widths should be given for each type of slide; this is most likely to be described in the load rating and testing descriptions. If the slide has been tested on a drawer of 450mm wide, then it may not work well on your 1m wide project.

The slide manufacturer should have tested each slide model to determine the maximum drawer width it will safely carry. Choosing slides based on the drawer width, as well as the load, is the best way to ensure good movement and reliable performance.

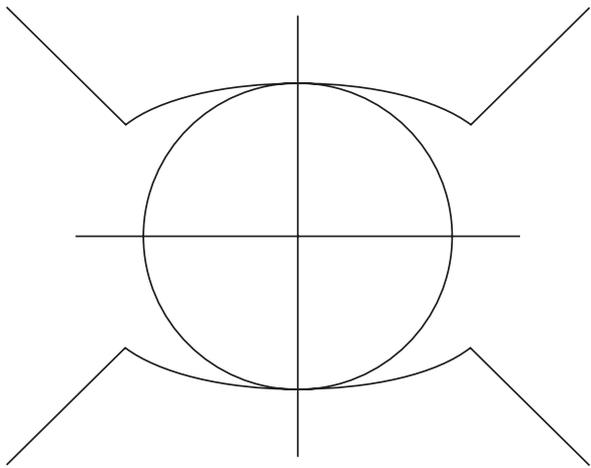
Drawer width is especially important in situations where the drawer box is wider than it is deep. This construction puts more stress on the drawer and slides, causing a halting and a racking or side to side movement.

We would generally recommend that the slide length is equal to or slightly longer than the drawer width. We have some slide products that have been specifically tested for wider drawer applications.

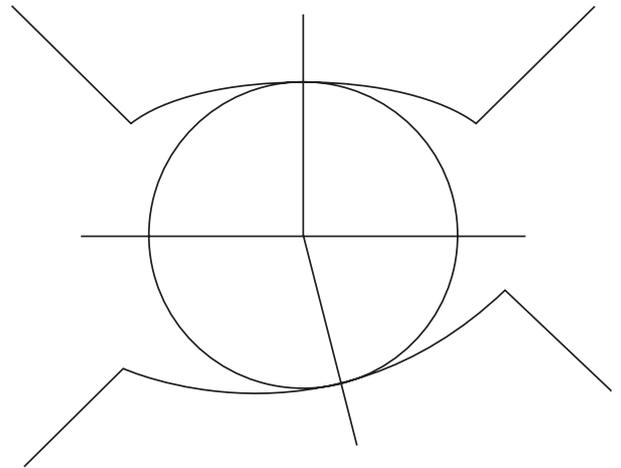
Looser slide movements can accentuate this racking. This is caused by greater freedom within the slide and the force applied to the slides when a drawer is opened or closed with an offset pull or push by the user.

We advise, where design restraints allow, that you use a central pull handle on wide drawers. Where two handles, or one very long handle exist, the temptation is to try and open the drawer from one side only. This puts a strain on the slides and will eventually lead to problems within the slide





True Rotation



Offset Rotation

Inching

Inching or ball migration is a condition where the ball retainers in the slides move at different speeds and distances causing them to get out of sync with each other and with the slide members that they support.

Inching is a common problem with the design of ball bearing slides that all manufacturers have to deal with. Accuride works continually on the design of the ball track shape to keep this problem under control.

It is important that each set of balls roll effectively in their tracks and that the movement between the members and the ball retainers is always kept at a 2:1 ratio.

We check and test the design of the ball track to maintain this finite shape and achieve a true single ball contact through the ball diameter so that true rotation of the ball bearings is realized.

Technical hint:

It is always best to choose a slide that meets your drawer width requirements, even though the slide load rating may be greater than what is needed for the project.

14

Ball migration: A common issue with ball bearing slides

We recently received an interesting question from a company looking for drawer slides. Their worry concerned something they called ‘drawer creep’

The problem mainly occurs when the drawer is repeatedly partly opened and not to the full extent of its travel.

When this happens often enough the ball cages (retainers) start to shift out of position and because the ball retainers form part of the slide’s stopping arrangement this causes the drawer to stop in the wrong place. This generally means that the slide will stop short of its fully open position. Sometimes the slide will neither open nor close fully, but mostly it is the open position that is affected.

If the slide does stop in the wrong place then the only way to overcome this is by forcing the moving element to its fully open or closed position by pulling sharply on the slide or by slamming it. This should overcome the non rolling friction of the balls and force the slide back into the correct position.

We more commonly call this problem ‘ball migration’ and unfortunately this is a characteristic of all ball bearing slides, not just Accuride slides.

How to prevent ball migration

When drawer slides are repeatedly opened to their full extension, the balls and retainers will stay in their correct position within the tracks and the slides will continue to give perfect service.

If partial openings are common practice, then it would be good practice to occasionally cycle the moving element (normally a drawer) to its full extent. This will ensure that the balls and retainers are put back into their correct orientation as a stopping element of the slide design.



The ball cage (retainer) holds the ball bearings in place & allows the members of the slide to move relative to each other

15

When choosing the correct slide for your application you will need to consider the types of features you need

Disconnect options

A slide with a disconnect feature is extremely useful. It allows the drawer member to be separated from the rest of slide.

This has benefits both for the assembly of the application and also for the end user. First it means that you can take the drawer member and mount it to the moving part of the application – such as a drawer, possibly in a separate part of the manufacturer's facility.

The remainder of the slide, commonly the cabinet and intermediate member, can be fixed into the cabinet. It is then a simple matter of bringing the two parts of the application back together and assembling the moving element into the cabinet, making the slide fitting and installation very easy.

Secondly, while in use, the drawer / moving element can be easily removed for maintenance, cleaning or replacement, etc. and then reinserted.

- **Lever:** Release an internal lever and pull the drawer outward and away from the cabinet
- **Push Latch:** Press the latch up or down (the slides are unhandeD) to release

To reconnect the parts watch this video. It is important that the ball retainer is pulled forward when re-inserting the inner member. Push firmly until the two parts are fully engaged and open and close a few times.

Watch Video



When you don't want a slide with disconnect

There are times when you either don't want this disconnect feature or you have some procedure in place to ensure the safety of the user. Imagine mounting a heavy piece of equipment on a slide such as the 9301. With a heavy load you would not want a slide that disconnected. The last thing you need is a slide that can come apart and dump the equipment on your feet.

Also, if you are mounting something that is very wide and / or heavy, you must consider the health and safety aspects of disconnection. It is likely that you will not be able to release both of the disconnect levers and easily hold the application with both hands.

Where a medium duty slide with disconnect, such as our 3657 series (up to 124 kg) is used, you should have procedures in place to ensure the safe disconnection of heavier loads. Or simply choose non-disconnect slides.

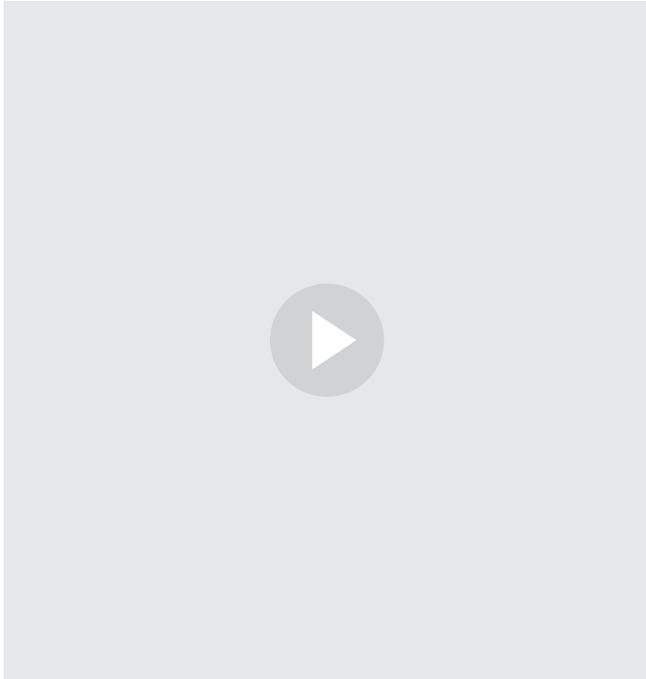
You would find it impossible to hold a fully loaded drawer in position to re-assemble the separated slide members. It is always best to factor in a two-person or mechanical procedure to assemble and disconnect the moving element of an application, especially if the full load is applied.

Hold-in detent

Our detent hold-in feature is fitted to many of our slide series and is simply a deflare bend on the end of the drawer member. When the slide is closed, this passes over a corresponding shape in a moulding fitted to the cabinet member. **This gives a small amount of friction to stop the slide from opening on its own***. **This feature is fine on static applications and some mobile applications, but if a unit is moved around with some force, then gravity or a centrifugal force could pull the drawer open over the hold-in force.**

***The user will have to use a small pull force to open the drawer; between approximately 5N and 7N**

Watch Videos



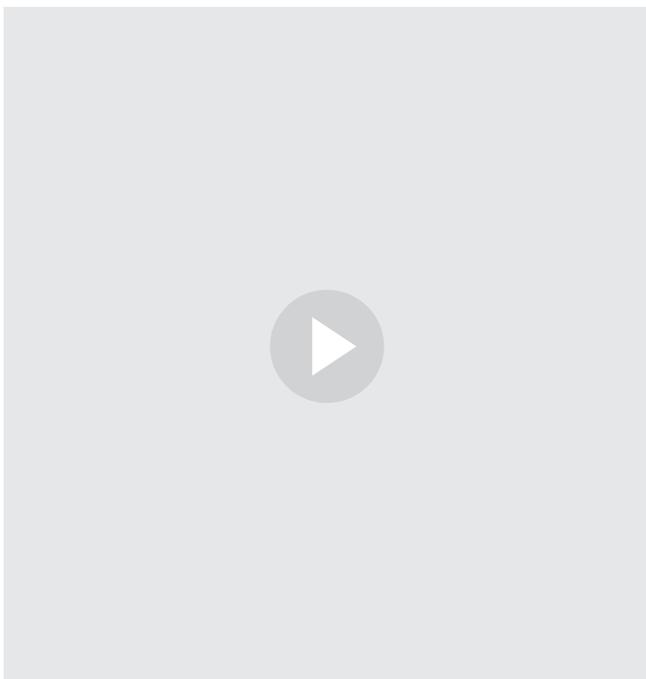
What's the difference between the 'hold-out', or 'detent out' and 'lock-out' features on a telescopic slide?

A hold-out, or detent out feature does exactly this; it holds the slide out in the fully opened position. But, it is not locked in this position. To overcome the hold you need to provide an additional force to the slide, by pushing firmly, and it will overcome the feature and move inward.

This is a useful feature for slides used on keyboard shelves, for example.

A lock out feature on a slide will be a physical lever or latch that has to be operated before the slide will move. For example, the 9308 has a lever at the front end and the 0305 has a push latch toward the centre of the slide mechanism.

Slides with lock-out are more usually used to support equipment that needs to be held fully open and static during maintenance, for example.



What is the difference between self-closing (-SC) and soft-closing (-EC) drawer slides?

Self-close and soft-close are similar mechanisms that provide the slide with two different styles of closing action.

A slide with self-close will close the slide by engaging the mechanism in the rear of the cabinet member using a pin element on the drawer member. The closing action is very positive and is performed by a spring that has no damping.

Slides can have different closing forces to pull in different loads. The mechanism also acts as a hold-in, by virtue of the spring pressure holding the slide closed – preventing the slide from bouncing open.

Because the mechanism requires a spring force to pull the load closed, this will also affect the opening force; the spring rate needs to be overcome while opening the drawer.

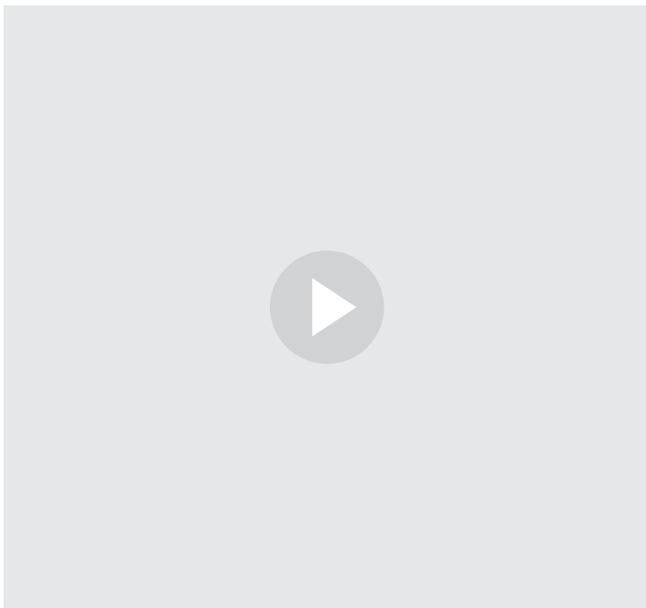
Let's imagine a self-close slide on a drawer. The user will feel a resistance from the spring while opening the drawer, but this will disappear once the slide has been released from the spring.

A soft-close has all the same benefits and attributes of a self-close, but with the added feature of a smooth dampened closing movement. This helps prevent the slide from slamming closed. The damper is normally positioned in the mechanism at the rear of the slide, similar to the self-close, and controls the closing action.

This mechanism also acts as a hold-in, stopping the slide from bouncing open. Because the mechanism requires a spring force to pull the load closed, it will also affect the opening force.



▶ Watch Videos



In conclusion:

- The self-close mechanism does not slow down the closing action of the drawer – it supplies a positive closure
- The soft-close mechanism also closes the drawer, but provides a controlled, slow and soft closure, and generally prevents slamming of the attached drawer

Why can't I get a dampened soft-close on a short telescopic slide?

One of the more popular features in slides today is the soft-close mechanism. This feature brings drawers to a gentle close and helps prevent slamming.

Soft-close mechanisms are fitted within the profile of the slide at the rear and typically can take up between 80 to 100 mm. This has an impact on the length of the intermediate member and the ball retainer lengths. This in turn has an impact on the load rating of the slide, the available space for fixing points and the ability to achieve the travel and extension requirements.

The main problem is lack of space within the slide. The movement in a telescopic slide is provided by ball bearings running in a ball retainer.

To get good movement and load rating, we need to maximise member length and get good ball coverage. This translates to: the more ball bearings, the higher the load.





To get good movement and load rating, we need to maximise member length and particularly get good ball coverage. This translates to - the more ball bearings, the higher the load.

Once you get to shorter slide lengths the space becomes restricted and there will be less room for fixing points at the rear of the slide. On our heavy duty soft-closing slides (5321EC and 5417EC) we have added extra fixing holes right at the back of the slide for this very reason.

The shortest soft-close slide we produce (3832EC) is 350mm long and the travel is restricted to 310mm. Slides shorter than this would not have enough space for the soft-close mechanism. The intermediate member is too short and we cannot fit in enough ball bearings to give a suitable load rating.

For slides shorter than 350mm, we suggest that you look out for an externally mounted, retro-fit, soft-close mechanism that can be fitted alongside the slide.

These pull the drawer closed for the last few cm and can be used either on one or both drawer slides depending on the load required.

There will still be a length of slide that is too short for any type of damper - unless you invent one; we'd be pleased to hear from you.

Use push-to-open slides for applications where you don't want to use handles

There are two factors driving the trend for handle free cabinet design. Firstly, the smooth clean lines designers are currently pursuing, especially in the retail and residential markets where the minimalist look has made a come-back.

To fulfil this demand drawer slide manufacturers are racing to the market with products that open the drawers in response to touch. Accuride International has developed a slide that needs no electrical power to open the drawer.

The 3832TR is push-to-open drawer runner that holds the drawer or shelf in the closed position until activated by touch. The user simply pushes on the drawer front to actuate the mechanism, which propels the drawer open about 100mm.

Secondly, is the need for accessibility. As populations age there is a greater need for accessibility in residential, commercial, institutional and public design and space planning.

Users who have difficulty grasping drawer handles, whether due to arthritis, diminished motor skills, or vision impairment find the push-to-open feature on this type of drawer easier to use.

With respect to public or institutional installations, there are increased safety and sanitary considerations with this type of drawer slide. Protruding handles and knobs are obstacles that can snag clothing or cause injury if bumped into.

From a cleanliness perspective, handles simply offer another surface to collect dirt and germs; clearly an undesirable condition in hospitals and clinics.

Apart from the traditional cabinetry applications for this push-to-open drawer slide there are further opportunities in portable cabinets and mobile equipment. A heavy duty version of the product is available for mobile applications such as recreational vehicles (motor homes or caravans) or marine interiors.



Additional features

Cam drawer adjust

Available on 2132 and 3832 slides. The cam mechanism provides up to 4.8mm of vertical adjustment

Brackets

Offer various mounting options

Shock blocks

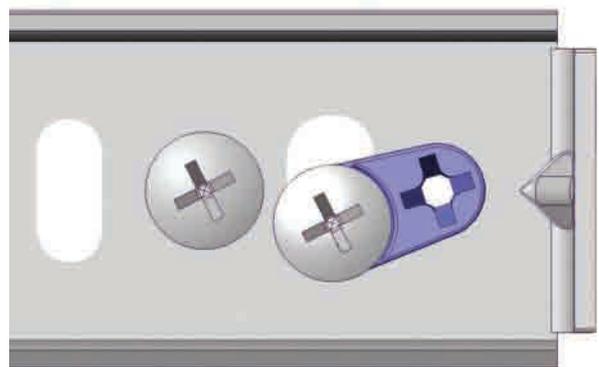
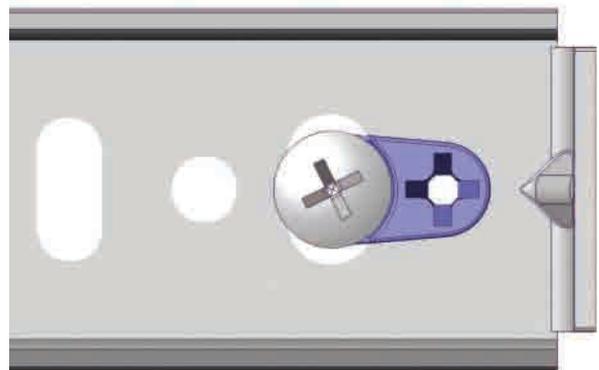
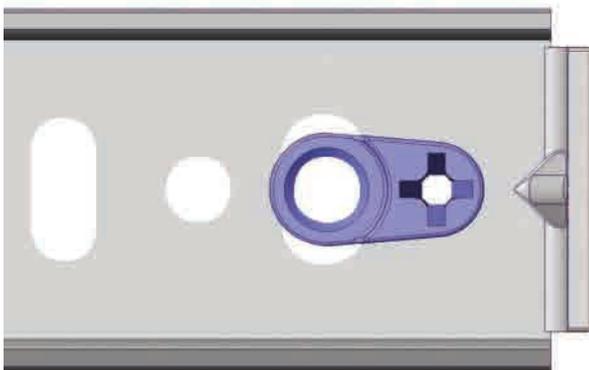
Fit between slide members to minimise vibration and shock in closed position

Anti tilt

Prevents cabinet tipping by ensuring only one drawer can be opened at a time

Some slides & accessories for specific applications

- Pocket door slides
- Electronic enclosure slides, brackets and cable guides
- Electronic locking slides
- Sliding door bracket kits



16

Materials and finishes

Slides are made from steel, stainless steel or aluminum.

Finish options include: Clear zinc, black electroplate, white electrocoat and zinc with a weather-resistant coating **Members:** Cold rolled mild steel, cold rolled stainless steel or aluminium **Ball retainers:** Cold rolled zinc plated, stainless steel or plastic **Ball bearings:** Carbon chrome steel, stainless steel or polymer **Lubricant:** Hi-Lo temperature grease and food grade grease

Why would I buy slides with nylon balls rather than steel balls?

Steel balls provide the slide with its highest load carrying capacity. Slides with Nylon balls have a lower load rating but can be run without lubrication and therefore may be more suited to applications where the presence of a grease lubrication is an issue, for example in food preparation.

What do the slide ordering prefixes denote?

The following product prefixes denote the level of corrosion resistance according to the tested samples:

DZ - Commercial plating

No white rust is allowed on tested parts after 12 hours of exposure in the salt spray tester

DH - Higher resistant plating

Less than 5% white rust is allowed over tested parts after 96 hours of exposure in the salt spray tester

DB - Commercial black plating

No white rust is allowed over tested parts after 96 hours of exposure in the salt spray tester

DP - High resistance passivate plating

Less than 5% white rust is allowed over tested parts after 500 hours of exposure in the salt spray tester

DS - Stainless steel slides

Please note that our stainless steel slides are not completely non magnetic. The members are produced in 1.4301 austenitic stainless steel, which is a non magnetic material, with 1.4034 ferritic stainless steel balls.

The ferritic balls are harder than austenitic balls, but are slightly magnetic. We use them to get the correct performance from the slides; austenitic balls being too soft to achieve the required performance.

17

Salt spray testing

Customers need to be sure that the slides they buy will have a certain amount of resistance to corrosion. Part of our finish testing includes a salt spray chamber where slides are exposed to a 5% salt solution (similar to a salty fog) to test corrosion resistance. The test procedures and parameters are standardised under national and international standards, such as ASTM B 117 and ISO 9227. These standards lay down the required information to carry out these tests, covering the test parameters, such as the temperature, the air pressure of the sprayed solution, the preparation of the spraying solution, including the Ph concentration.

Slide test procedures

We have our own internal test laboratories and these include salt spray chambers. When we have a new product, we test each of the component parts as well as a complete assembly. These are placed in a chamber so that all parts are fully exposed to the sprayed solution. The solution must also be able to drain off the surfaces and not form pools.

After the required test period, the parts are dried and examined for traces of corrosion. The results are recorded on official test reports, which outline the test piece specification, the type of finish applied, the test standard used and the appearance of any corrosion.

Corrosion can range from none at all, through to white or red rust depending on the severity of the test and the finish used on the slide.

Minor white rust is a cosmetic effect and generally has no effect on the performance of the coating if the underlying zinc coating retains the specified coating thickness.

Corrosion resistance coatings

Accuride has three levels of corrosion resistance within our range of drawer slides, which include a resistance of 12 hours for the majority of our range, plus 96 hours and up to 500 hours for the high performance surface finishes. **Different coatings are used to achieve the standard and enhanced levels of corrosion resistance and these are applied to the electroplated zinc coat during the automated finishing process.**

18

Using slides in high temperatures

The following products have no plastic parts in their construction and can be used in temperatures between -20°C and 110°C

Product series	Extension	Max load rating kg
DZ0201	75%	50
DZ2026	2 way travel	50
DZ6026	2 way travel	100
DZ2415	Linear motion	18
DZ2421	75%	16
DZ2431	100%	20
DZ0301	100%	70
DZ0522	100%	180
DA4120	75%	438/550
DA4140	100%	400/600
DA4160	100%	300

Slides with plastic parts

Other product series have plastic parts in their construction, so are therefore restricted to a temperature range of -20°C to 70°C.

Slide series with Easy Close (EC) dampers are restricted to a temperature range of 10°C to 40°C. Accuride's electronic lock products (EL) are restricted to a temperature range of 0 to 50°C.

- Slides with plastic or rubber parts: -20°C to 70°C
- Slides without plastic or rubber parts: -20°C to 110°C
- Slides with soft-close dampers: +10°C to + 40°C

- Standard grease – mineral oil: -20°C to + 110°C
- Food grade grease (DS3031): -20°C to + 300°C
- EL products: 0°C to + 50°C

DS3031 stainless steel telescopic slide for high temperature applications

The DS3031 stainless steel telescopic slide has been designed especially for high temperatures and can be used in applications with a maximum temperature of 300°C.



19

How do I clean a ball bearing drawer slide?

Drawer slides should move in and out easily. But if the tracks start to get filled with dirt you could find that the slide is beginning to stick.

Accuride slides have self-cleaning ball retainers that protect the raceways by removing the foreign particles between the ball bearings. However, there are times when particles get stuck in the ball track.

Not all slides can be removed easily from your application. The removal can vary between manufacturers and products. Refer to the manufacturer's installation instructions.

Look for a disconnect lever or latch in the slide track. Or there may be a bracket or lancing holding the track. If you don't see any obvious removal method, try lifting the front of the drawer up then pulling the drawer out and up.

Wipe the dirt from the slide tracks with a clean lint-free cloth soaked in white spirit.

Some drawer slides have no disconnect feature, so you will have to clean them while still in place. Wipe the parts of the track that you can reach and use canned air to blow dirt from areas you can't.

Accuride slides have a lubricant that is sufficient for normal slide life, but if you do clean the slides this will need to be replaced with quality grease rated for extreme pressure.

Technical hint:

Do not use a solvent based product. This can affect the slide's internal plastic components.

20

How to identify an Accuride slide?

One of the most frequent questions we get asked is, “**Can you identify this product?**” and the question is usually accompanied by a photo of the number stamped into the slide.



10 = October
93 = 1993

Accuride do not stamp any of our products with the part numbers

Some slides, like the 3832 series, have a patent number on the member alongside the company name. For the other slides the first 4 digits relate to their time of manufacture.

For example, our most recent request was to identify the Accuride part number 10 93.

This is not an Accuride part number, but the date stamp for the time of manufacture, which in this case is 10 for October and 93 for the year 1993.

So please remember that the numbers are not related to the product series number, only to the date of manufacture. However, please keep your photos coming.

Make sure that they show the complete slide and all of its 'fit, form and function' detail and that you include the slide height, width, length and travel.

We will try to do our best to identify what we can and keep your applications moving forward.

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How do I choose the correct ball bearing slide for my application?

This is a difficult one to answer since there are so many different slides on the market and even more applications where slides can be used.

Have a look at our **market sector** and case study pages. You may find a similar application to yours.

Here are **10** useful tips to selecting the correct bearing slide from our engineering group.

01

Is a ball bearing slide the best option? If you have a restricted budget or just need a simple movement carrying very little weight, then don't forget to look into roller slides or simple friction systems.

02

Slides are categorised by load rating so think about the weight you expect the slide to carry. Remember to add the weight of all the elements to be moved, including the construction materials, into your calculations. This will give you a good starting point.

03

How far do you need your item to move?

This will give you the slide travel or extension. This is the difference in length between a closed and fully opened slide. Slides come in various extensions ranging from part extension, full extension, over travel and linear.

04

How much space do you have to accommodate the slide? Each type of slide has its own side space requirement, but you need to also take into account the profile height of the slide.

05

How far apart will the slides be positioned and will they be side or flat mounted?

Slides are typically tested for their catalogue load ratings at 450mm apart and some slides cannot be flat mounted. Those slides that can be flat mounted will have a reduced load rating.

06

What finish do you need? Zinc plated steel is standard, but we also do black, white, stainless steel, aluminium and corrosion resistant coatings.

07

Think about mounting options. How do you want to fix the slide into the application? The majority of slides have screw fixing hole patterns, but there are also slides with bayonet mounting options for fixing into steel cabinets. Or use our ladder strip mounting to allow bayonet slides to be mounted into wooden cabinets.

08

Does the application need a particular function? This will make you think about the additional features that you may need in or around the slide. There are a number of common options such as, detent hold in, disconnect, self close, easy close, lock in and lock out.

09

You can use our slide selector tool on the website to configure a product. You can also save slides to your own product library to compare features.

10

Can't see the slide you need? Then ask for help. We are happy to receive your application photos or drawings and give advice. Email your question to marketingeurope@accuride.com. You may also want to read our on-line page called **'How to select a ball bearing drawer slide'**.

22

What's the difference between ball bearing slides used for industrial and woodworking projects?

Accuride slides are typically used across many industries and applications and it doesn't really matter if these are industrial or woodworking projects.

However, we sometimes design slides specifically for an application and this is mainly when we are manufacturing bespoke slides. Some of our slides are more suited to one type of industry, for example, very heavy duty slides with shock blocks are used where vibration could be an issue, or some very thin slides are made for use in electronic servers.

Some of the features incorporated into the slides will pre-select where they will be used. The DS5322 series and the DZ0522 series have very specific mounting features, as do the slide series with bayonet mountings.

These features dictate the type of application and their suitability for mounting in steel applications, and so forth.

The majority of our slides are multi-purpose and have been tested to different cycle rates. Lower cycle rates and higher load rates are more indicative of Industrial applications and higher cycle rates and lower load rates are indicative of woodworking applications. These ratings are all shown on the datasheets within our catalogue.

23

Roller runners or ball bearing slides? Which type of slide is the best for my application?

An objective look at the difference between roller runners and ball bearing slides. In fact they essentially do the same thing, allowing a drawer to open and close smoothly. The answer to which is best really depends on several factors such as budget and what you want to achieve with the slide.

Roller runners

Roller runners are traditionally used for drawers in furniture and are fixed to the bottom edge of the drawer box. They come with either nylon or steel rollers and provide a reasonably stable movement with either full or partial extension. **Roller runner technology is very simple so they should present no operational problems and are good value for money. Rollers are normally used in the ‘budget’ furniture ranges, but there are some heavier weight rollers that can be used in other movement applications and where drawer removal is an important requirement, for example tool cabinets.** The roller runners that are made to carry larger loads start to get expensive and are physically larger than the equivalent ball bearing slide.



Easy to fit and good value.
Allow easy removal and
reinsertion of drawers. Quiet.



Rollers for heavier loads
are much larger than their
equivalent ball bearing slides
and can be expensive. Full
extension rollers have a tall
cross section.

Ball bearing telescopic slides

Ball bearing telescopic slides have hard steel balls (sometimes plastic balls for particular applications) that run in profiles. **This gives good lateral stability and the flexibility to make the profiles larger and therefore able to carry heavier loads. They also give part, full and over travel as well as two-way travel.**



They come in a very large range of sizes suitable for many applications outside of traditional furniture drawers.

They also have many fixing options including different types of bracket or bayonet lancements. The profiles can be made from heavier gauge steel and can be stacked to give huge load carrying ability.

Ball bearing slides have a much larger range of sizes and load capacities than roller slides. For heavier loads, the ball bearing slide will be smaller and often better value than roller runners.



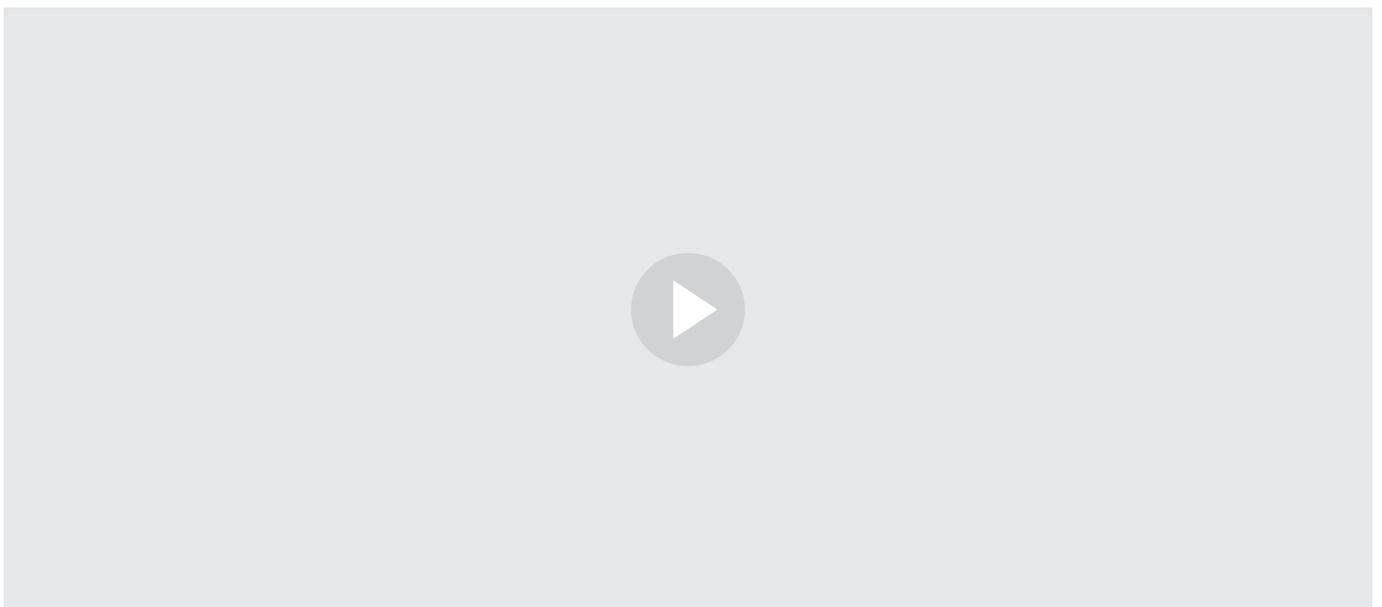
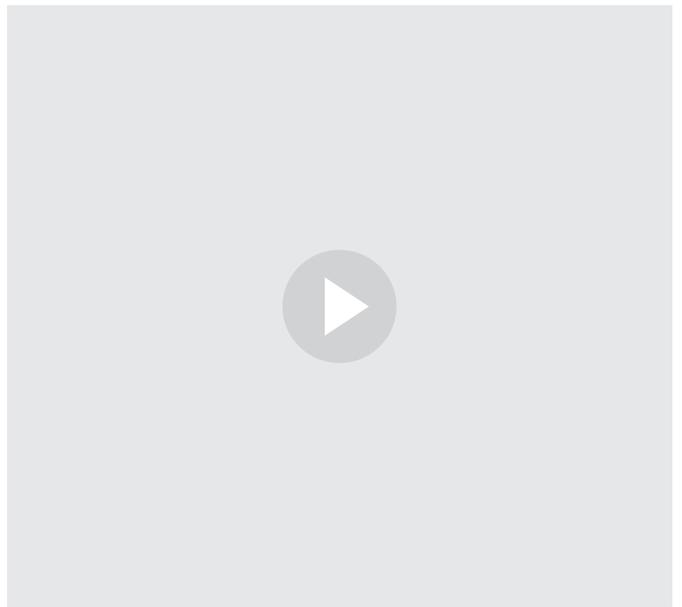
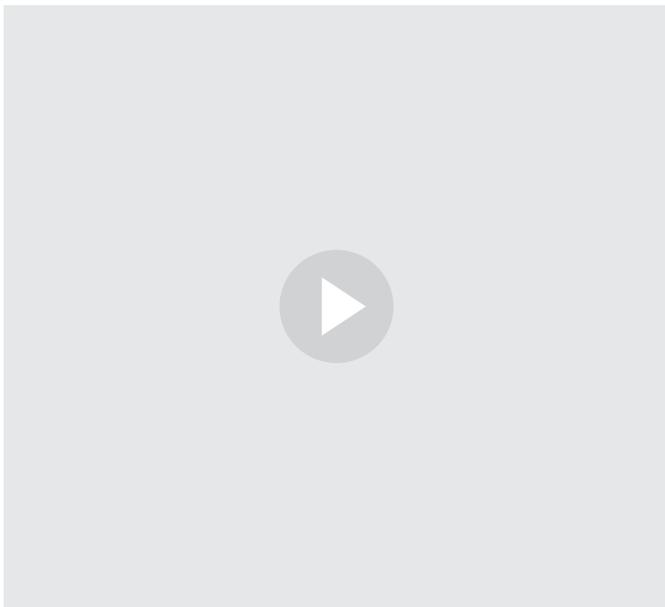
Can be over-specified, and therefore expensive, for some applications.

24 Bespoke slides

Not every sliding application problem can be solved by using an off-the-shelf telescopic or linear motion slide. Our engineering designers will work closely with you to find the right type of sliding system to address your particular challenge. We can use our standard slide components and add features - or we can develop a totally **bespoke sliding system** for you.

Case studies

View some typical and unexpected applications.



25

Glossary of terms

Anti-racking

A device to keep the ball retainer in a selected position during movement

Anti-tilt

A device used in filing cabinets that allows the user to open only one drawer at a time

Ball bearing slide

Ball bearings run in ball retainers to create the movement in telescopic and linear slides

Ball retainer

This holds the ball bearings in place inside the slide. See diagram

Bayonet fixing

A fixing method, especially for metal applications. A cut-out in the side of the slide is used as a hook to fit into a corresponding slot in the chassis or drawer

Cable carrier

Carriers designed to surround and guide flexible cables, especially in the rear of electronic racks

Cam drawer adjust

Available on 2132 and 3832 slides. The cam mechanism provides up to 4.8mm of vertical adjustment

Cycle

A cycle is measured as one complete opening and closing of a slide

Damped close

Slows the closing action down for a controlled and smooth operation

Deflection

This is the difference between a loaded and unloaded slide when fully extended, measured at the front end of the slide with an evenly distributed load

Detent

The detent holds the slide in a particular position until extra force is applied. See Hold-in and Hold-out

Disconnect

A way of separating the inner and outer members of the slide assembly

Drawer member

See diagram

Dynamic load

This is the moving load. All of Accuride's slides are cycled-tested, depending on the expected frequency for an industry

Easy close

The closing action is dampened. See Soft close

Enclosure mounting

Slides and bracket kits designed for use in electronic rack systems

Extension

See Travel

Flat mounting

Horizontal mounting of a slide. Not all slides can be used in this position. Also called undermount

Flipper door slide	This is a trademark name for Accuride's pocket door slides
Follower strip	Typically a block of wood used in pocket door systems that keeps the top and bottom slides synchronised
Front disconnect	A lever or push latch is positioned near the front of the slide for easy operation of the disconnect function
Full extension	The slide opens at least 100% of the closed slide length
Handed slide	A handed slide is either for use on the left or right. Unhanded slides can be used on either side
Hold-in	A detent that keeps the slide closed until extra force is applied
Hold-out	A detent that keeps the slide open until extra force is applied
Horizontal mounting	Flat mounting of a slide. Not all slides can be used in this position. Also called undermount
Intermediate member	See diagram
Lancing	A cut out in the slide used for fixing
Linear motion	Movement in a straight line and within the slide's own length
Load rate	The dynamic operating capacity. Slides are tested to determine the maximum load (kg) for a pair of 450mm long, side mounted slides installed 450mm apart
Lock-in	Locks the slide closed until a lever is used to release the lock
Lock-out	Locks the slide open until a lever is used to release the lock
Outer member	Or cabinet member. See diagram
Part extension	The slide has only 2 members and so can open only 75% of the closed slide length
Pocket door slide	A pocket door is a sliding door that slides along its length and disappears into a pocket between the side of the cabinet and the cabinet space.
Push to open	Opens with pressure to the front of the slide (TR)

Rail disconnect
Self-close
Shock blocks

A rail latch allows you to raise the drawer from the slide
 A spring attachment closes the slide and prevents bounce back. (SC)
 Are used to minimise the amplification of vibration and reduce the effects of shock with the slide in the closed position

Side mounting
Side space
Slide

Mounting the slide in the vertical plane
 The amount of space needed to accommodate the thickness of the slide.
 Synonym for ball bearing slide, telescopic slide, drawer runner, linear slide, rail, guide

Soft-close
Static load
Telescopic slide

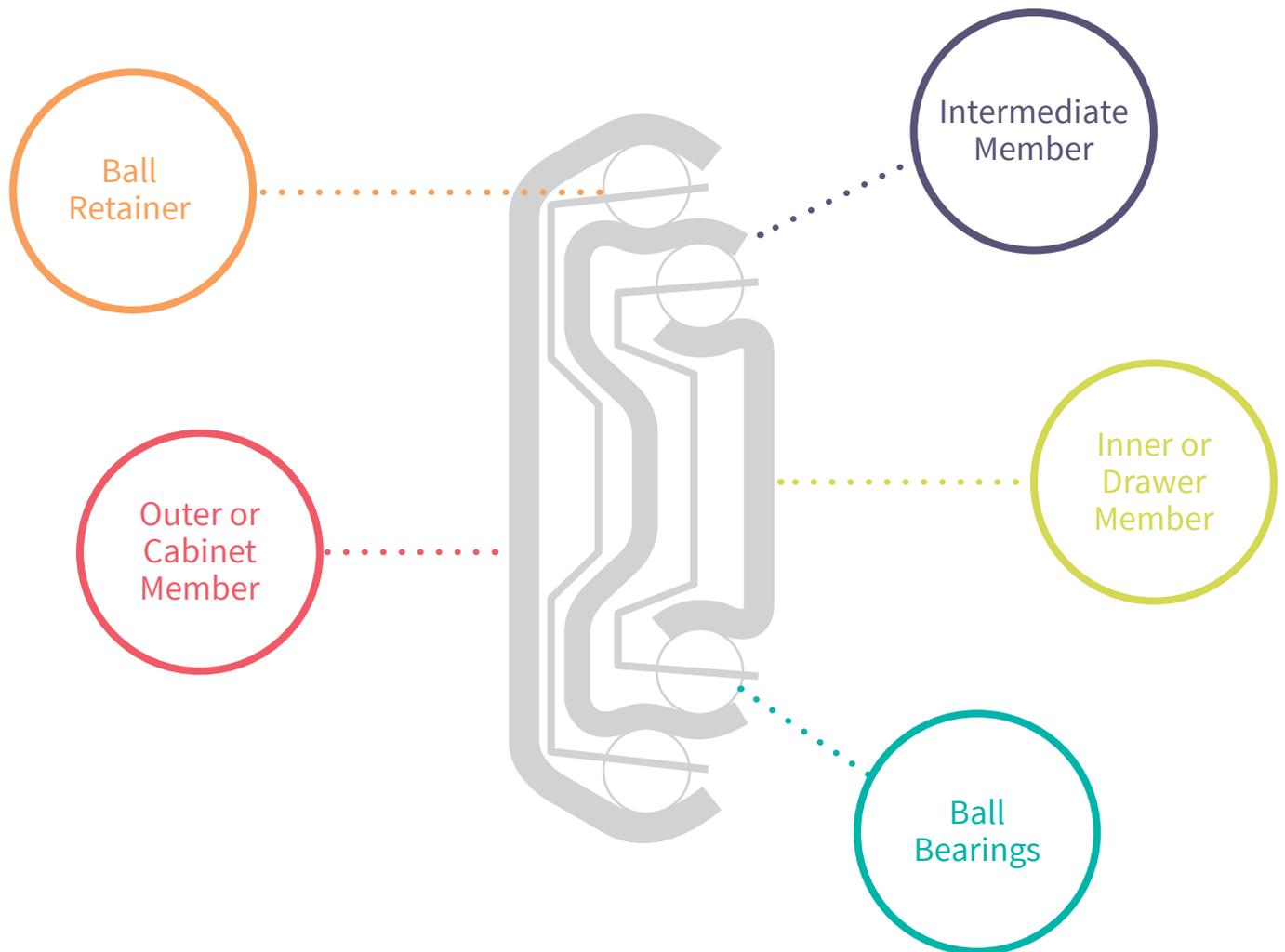
Slows the closing action down for a controlled and smooth operation. (EC)
 The resting load capacity
 A slide made up of 2 or 3 members to extend the reach beyond the length of the slide

Touch release
Travel

Opens with pressure to the front of the slide (push to open)
 This is the distance that the slide covers from the fully closed to the fully open position. Also called extension

Vertical mounting

Side mounting the slide in the vertical plane



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How you can contact us

If you need advice on which slide to use for your application,
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