

# Bosch

## Guide to Angle Grinders + Accessories





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### Course Objectives

After completing this course, learners will understand:

- The basics of Angle Grinders and Grinder Accessories
- Angle Grinder User Categories
- Standard Mounting Challenge
- The Bosch X-Lock Solution

-  Sections or Chapter Slides
-  Activity Slides
-  Knowledge Check Slides
-  Video

Slide #	Menu Title	Narration	Onscreen Slide Content	Graphics/media	Notes
<b>Resources Tab</b>		<ul style="list-style-type: none"> <li>Grinders Page: <a href="https://www.boschtools.com/us/en/boschtools-ocs/grinders-and-metalworking-23412-c/">https://www.boschtools.com/us/en/boschtools-ocs/grinders-and-metalworking-23412-c/</a></li> <li>Grinders Catalog (PDF)</li> <li>Deep Dive: Bonded vs Coated, Fiber &amp; Flap Disc (PDF)</li> <li>Grip Orientation (PDF)</li> </ul>			
<b>1</b>	<b>Introduction</b>	<p>Angle grinders are invaluable tools for the workers who use them in a large variety of trades. From metal to concrete, these versatile tools are used for hours on end.</p> <p>Over the years, these tools have seen enhancements in performance and ergonomics, and most recently are becoming better at performing in the cordless arena.</p>	<p>[intro video ]</p> <p><b>GUIDE TO ANGLE GRINDERS AND ACCESSORIES</b></p>	 <p>Bosch Logo Animation</p> <p>Hero shot of Grinder</p> <p>Design similar to:</p>	Auto advance to next slide.

					
2	<b>Objectives</b>	<p>By following along with this course, you'll learn about the basics of angle grinders and their accessories, as well as the users of angle grinders, and the standard mounting challenge users experience when working with grinders.</p> <p>Click Next to begin.</p>	<p><b>Objectives</b></p> <p>Describe the basics of angle grinders and grinder accessories</p> <p>Discuss angle grinder user categories</p> <p>Explain standard mounting interface challenge</p> <p>Click Next to begin.</p>	Application shot of standard grinder	Manually advance
3	<b>Part 1: Angle Grinders 101</b>		Angle Grinders 101		
4	<b>Grinder Beginnings</b>	<p>Invented in the mid-20<sup>th</sup> century, angle grinders answered the need for handheld grinding and cutting in the manufacturing, fabrication, and construction industries. Initially, pneumatic tools dominated these industries, but over the years light and powerful electric grinders have taken over, with increasing demand for cordless grinders.</p> <p>The paddle-switch, which was common on pneumatic tools, is still preferred by metal</p>	<p><b>Grinder Beginnings</b></p> <p>Angle grinders provide handheld grinding and cutting</p> <p>Metal workers prefer the paddle-switch</p> <p>Other groups prefer the slide-switch</p>	Images of paddle and slides, Photos of applications	

workers due to the frequency of starts and stops they cycle through, while other workers may prefer the slide-switch, which locks on for long stretches of continuous use.

**5  
Grinder  
Anatomy**

Most angle grinders have similar component configurations.

Accessories for grinders are attached to the spindle of the grinder and most times held in place by a threaded retaining nut. The spindle can be locked with a button to hold it still, enabling the nut to be taken off or tightened with a spanner wrench

The motor typically resides in the handle, where a slide switch or paddle switch activates power from a battery or cord. A side handle offers extra control and application of pressure.

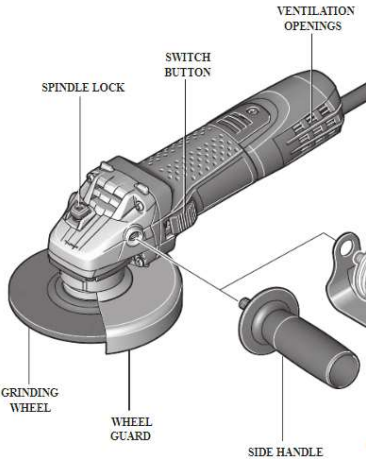
While using cutting accessories, a cutting wheel guard is used to deflect debris and sparks. It also protects the user in the instance of the cutting wheel breaking and wheel debris being projected towards the user.

Ventilation openings draw in fresh air and exhaust heat from the motor.

The spindle and ventilation openings are both areas prone to dust and debris exposure, which can cause overheating with standard grinders.

**Grinder Anatomy**


- [callouts]
- Grinding Accessory
- Wheel Guard
- Spindle Lock
- Switch (or Paddle)
- Motor (inside handle)
- Ventilation Openings
- Battery or Cord
- Side Handle





6	<b>Grinder Basics</b>	<p>Grinders come in a variety of model types, based on accessory size, switch type, speed, and power.</p> <p>Accessory sizes range from 4-1/2" to 9", with 1000 to 2600 watts of power, and spinning from 6,000 RPM to over 11,000 RPM.</p> <p>Typically, the higher torque tools spin bigger accessories at lower RPM for heavy duty applications, while the lighter tools spin smaller accessories faster, delivering quicker cuts.</p>	<p><b>Grinder Basics</b></p> <p>Models based on accessory size, speed and power</p> <p>Bigger accessories need more torque, smaller accessories need less</p> <p>Lower RPM = Higher Torque Higher RPM = Lower Torque</p>	<p>Animated diagram of Torque/RPM Dynamic</p> <p>Images of different size grinders</p>	
7	<b>Grinder Applications</b>	<p>This variety of performance capabilities across grinder models is due to the many types of work they're needed for.</p> <p>Light-duty 4-1/2" grinders running high RPMs with 7-10 amps are used on metal and concrete, mainly for detail work in light structural and decorative tasks.</p> <p>Metal workers in fabrication and structural applications prefer working with 10-13 amp 4-1/2" and 5" grinders running high RPMs with paddle switches.</p> <p>Workers cutting concrete, flooring, and masonry use similar 10-13 amp 5" grinders with slide switches, and they switch to higher torque 5" models for surfacing the same materials.</p>	<p><b>Grinder Applications</b></p> <p><b>4-1/2" – 7-10 Amps – High RPM – Paddle/Slide</b></p> <p><u>Metal</u></p> <p>Decorative wrought iron Small structural steel General contractor/maintenance/repair</p> <p><u>Concrete</u></p> <p>Concrete contractor Decorative Concrete maintenance/repair</p> <p><b>4-1/2"/5" – 10-13 Amps – High RPM – Paddle</b></p> <p><u>Metal</u></p> <p>Equipment manufacturing MRO/Factory maintenance</p>		

		<p>Specialty contractors performing structural metal work use larger 6" high torque grinders with paddle switches.</p> <p>Finally, for heavy duty metal and concrete grinding and cutting, contractors use 7" and 9" 15-amp grinders where larger wheels and more performance is needed.</p>	<p>Shipyards Structural Steel Oil/Gas/Bridge/Iron</p> <p><b>5" – 10-13 Amps – High RPM – Slide</b> <u>Concrete</u> Concrete Cutting Epoxy Flooring Surface Prep Masonry</p> <p><b>5" – 10-13 Amps – High Torque – Slide</b> <u>Concrete</u> Concrete Surfacing Epoxy Flooring Surface Prep Masonry</p> <p><b>6" – 13 Amps – Paddle</b> <u>Metal</u> Mechanical contractor Specialty Some Structural Steel Bridge/Iron</p> <p><b>7"/9" – 15 Amps – High Torque</b> <u>Metal + Concrete</u> Concrete Surfacing/Cutting Metal Surface Prep/Cutting</p>		
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8	<b>Knowledge Check</b>	<p>Let's pause to review what you've learned so far.</p> <p>Read the question, select all that apply, then click 'SUBMIT' for feedback.</p>	<p>Which of the following statements about torque, RPM, and accessory size are true?</p> <p>High RPM tools use bigger accessories</p> <p>The biggest accessories need higher torque</p> <p>High speed tools need higher torque</p> <p>The smallest accessories cut the slowest</p> <p>High torque tools run slower RPMs</p>		
8.1	<b>Knowledge Check Correct</b>	That's right!	That's right!	Keep correct answer visible	
8.2	<b>Knowledge Check Incorrect</b>	Not quite. The higher torque tools spin bigger accessories at slower RPMs.	Not quite.	Show correct answer	
9	<b>Why Bosch?</b>	<p>Workers have come to trust Bosch tools and accessories to deliver the highest quality and a long tool life, and our grinders are no exception.</p> <p>Heat is the number one cause of grinder failure, so Bosch grinders are designed to channel air to cool the motor from the rear of the grinder, directing airflow away from key</p>	<p><b>Why Bosch?</b></p> <p>Bosch tools and accessories deliver the highest quality</p> <p>Heat is leading cause of grinder failure</p>		

		<p>components that could be affected by dust and debris.</p> <p>Reducing friction also reduces heat. The spiral beveled gears used in Bosch grinders cut friction and assure a smoother transmission of power, and they're protected from dust by extra bearing seals. Inside the motor, where appropriate, the field is epoxy-coated, keeping the motor windings cleaner and preventing debris from building up.</p> <p>All Bosch power tools offer exceptional ergonomic design. Our grinder handles can be rotated in relation with the switch, and have been designed to provide the smallest, lightest hand grip.</p>	<p>Bosch design protects the internal components</p> <p>Reduced friction cuts heat and wear</p> <p>Ergonomic handle offers optimum grip</p>		
10	Part 2: Grinder Accessories 101		Grinder Accessories 101		
11	Accessory Basics	<p>Many types of grinding, cutting, and finishing accessories have been developed for angle grinders, from grinding discs, cutting wheels, and blades, to finishing discs and cup brushes.</p> <p>Different applications or performance levels require different abrasives:          Aluminum is used for general purpose applications,          Zirconia Aluminum is common for heavy duty applications, and ceramic and diamond are used for jobs demanding high performance.</p>	<p><b>Accessory Basics Overview</b></p> <p>Different applications require different abrasives</p> <p>Aluminum: General Purpose          Zirconia Alumina: Heavy Duty          Ceramic and Diamond: High Performance</p> <p>Using the right disc optimizes performance and accessory lifetime</p>		Is this picture just a filler?


		<p>Mounting a disc that is too large for a grinder is not only dangerous, it negatively affects accessory performance.</p> <p>Using the right size disc on the right size grinder will optimize the performance and lifespan of your accessories.</p>			
12	<b>Accessory User Groups</b>	<p>There are two primary groups of angle grinder users: Those working with metal, and those working with concrete, stone, and tile.</p> <p>Click each user category to learn more.</p>	<p><b>Accessory User Groups</b></p> <p><b>Metal</b></p> <p><b>Concrete</b></p>		<p>Branching click to reveal</p> <p>Clicking metal goes to slide 13</p> <p>Clicking concrete goes to slide 18</p>
12.1	<b>WAIT</b>		<p>WAIT. Please view both categories to continue.</p>		
12.2	<b>COMPLETE</b>		<p>Click NEXT to go on.</p>		
13	<b>Metal Accessory Types</b>	<p>There are three primary types of accessories that are most used by metal workers: <b>bonded abrasive wheels, fiber discs, and flap discs.</b></p>	<p><b>Metal Accessory Types</b></p> <p>Bonded Abrasive Wheels [+image]</p> <p>Fiber Discs [+image]</p> <p>Flap Discs [+image]</p>	<p>Visually similar to:</p> 	




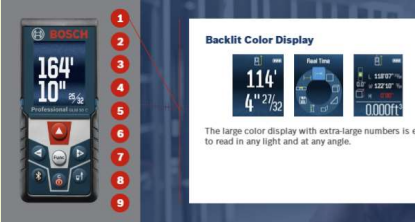
				Call out Accessory Line-up chart in Resources	
14	<b>Bonded Abrasive Wheels</b>	<p>Bonded abrasive wheels are good for heavy jobs needing aggressive material removal and cutting.</p> <p>They're best in the hands of a skilled operator who knows how to prevent damage, gouging, and undercutting.</p> <p>Such aggressive cutting is useful on interior and exterior corner welds.</p>	<p><b>Bonded Abrasive Wheels</b></p> <p>Heavy jobs, with most aggressive material removal</p> <p>Skill is needed to prevent damage</p>		
15	<b>Coated Abrasive Fiber Discs</b>	<p>Fiber discs are ideal for weld preparation or for blending and finishing applications where the cut rate is the primary concern.</p> <p>They excel at quicker disc changes and dealing with overhead work.</p>	<p><b>Coated Abrasive Fiber Discs</b></p> <p>Ideal for weld preparation or for blending and finishing</p> <p>Quicker disc changes and dealing with overhead work</p>		
16	<b>Coated Abrasive Flap Discs</b>	<p>Flap discs are lightweight, easy to maneuver, and require fewer changes over time.</p> <p>These versatile discs grind, blend, and finish with less vibration and noise, while offering cooler cutting with minimal scratching.</p>	<p><b>Coated Abrasive Flap Discs</b></p> <p>Lightweight and easy to maneuver</p> <p>Less vibration and noise with cooler cutting</p>		
17	<b>Metal Accessory Applications</b>	<p>For cutting, type 1A thin cutting bonded wheels are typically used.</p>	<p>Flap Discs [+image]</p> <p>Fiber Discs [+image]</p> <p>Bonded Wheels [+image]</p>		




		<p>Bonded abrasive grinding wheels and flap and fiber discs are the best choice for deburring and molding sheet metal and pipe.</p> <p>Grinding wheels and flap discs are also ideal for beveling and preparing seams for welding.</p> <p>Finishing work on welds, spatter, and corners is handled with abrasive grinding wheels, flap and fiber discs, and cup brushes and wire wheels.</p>	<p>Cutting metal pipes, plates, steel beams Cutting Wheel (Type 1A; .040 thick)</p> <p>Deburring, molding, metal tubes, pipes, sheet metal Grinding Wheel (Type 27) Flap Disc (Type 29) Fiber Sanding Disc</p> <p>Beveling, Preparing welding seams Grinding Wheel (Type 27) Flap Disc (Type 29)</p> <p>Finishing of welding seams, spatter, corners Grinding Wheel (Type 27) Flap Disc (Type 29) Fiber Sanding Disc Cup Brush/Wire Wheel</p> <p>[CALL OUT] Check out the Grinders catalog in the Resources tab for the full accessory line-up chart.</p>		
18	<b>Concrete Accessory Types</b>	<p>There are several types of cutting blades that are most used by concrete, stone, and tile workers: continuous rim blades, segmented rim blades, and turbo rim blades.</p>	<p><b>Concrete, Stone, and Tile Accessory Types</b></p> <p>Continuous Rim Blades[+image] Segmented Rim Blades [+image] Turbo Rim Blades [+image]</p>		

19	<b>Continuous Rim Blades</b>	<p>Continuous rim blades provide the best quality cut finish, but those cuts take the longest time.</p> <p>These blades have a continuous, softer edge and are best suited for wet cutting.</p>	<p><b>Continuous Rim Blades</b></p> <p>Best quality cut, but slowest</p>		
20	<b>Segmented Rim Blades</b>	<p>Segmented rim blades are the fastest for cutting, but leave the roughest cut finish.</p> <p>These blades can have harder bonds, which are applicable for both wet and dry cutting.</p>	<p><b>Segmented Rim Blades</b></p> <p>Fastest cut, but lowest quality finish</p>		
21	<b>Turbo Rim Blades</b>	<p>Turbo rim blades offer a combination of fast cutting, while leaving a decent cut finish.</p> <p>These blades have a continuous rim with a serrated edge, allowing for faster cutting speeds. They're typically utilized for more general cutting applications.</p>	<p><b>Turbo Rim Blades</b></p> <p>Combination of fast cut and decent finish</p>		
22	<b>Concrete Accessory Applications</b>	<p>Segmented rim and turbo rim blades are the best choice for concrete and mortar applications. For stonework, use turbo rim blades.</p> <p>Segmented rim blades are also ideal for cutting hard concrete, hard mortar, asphalt, green concrete, and soft mortar.</p>	<p>Cutting concrete, brick Segmented Rim (Premium) Turbo Rim (Premium, Standard)</p> <p>Stone Turbo Rim (Premium, Standard)</p> <p>Hard concrete, hard mortar, asphalt, green concrete, soft mortar Segmented Rim (Standard)</p>		

		Use continuous rim blades for clean cuts on porcelain, ceramic, granite, marble, and slate, as well as glass and ceramic tiles.	<p>Cutting reinforced concrete, hard mortar, asphalt, green concrete, masonry Segmented Rim (Standard)</p> <p>Clean cuts of porcelain, granite, marble, glass tile, ceramic tile Continuous Rim (Premium)</p> <p>Clean cuts of ceramic, slate Continuous Rim (Standard)</p> <p>[CALL OUT] Check out the Grinders catalog in the Resources tab for the full accessory line-up chart.</p>		
23	<b>Additional Accessories</b>	<p>Bosch also manufactures grinders and blades for these specialty trades:</p> <p>For tuckpointing, Bosch has grinders and diamond blades designed for cleanly removing old mortar.</p> <p>For workers doing concrete crack repair, Bosch makes high performance V-Groove blades that excel at chasing cracks.</p> <p>And for concrete surface grinding, Bosch has developed a concrete surface grinder and high-quality diamond cup wheels that grind quick and keep dust contained.</p>	<p><b>Additional Accessories</b></p> <p>Tuckpointing – Tuckpoint Grinders and Diamond Blades</p> <p>Concrete Crack Repair – V-Groove Blades</p> <p>Concrete Surface Grinding – Concrete Surface Grinder and Diamond Cup Wheels</p>		

					
24	<b>Knowledge Check</b>	Let's pause again to review what you've learned so far.  Read the question, select the correct answer, then click 'SUBMIT' for feedback.	Which metal grinding accessory type offers the most aggressive material removal?  <b>Coated Flap Discs</b> <b>Bonded Abrasive Wheels</b> <b>Coated Fiber Discs</b>		Multiple choice
24.1	<b>Knowledge Check Correct</b>	That's right!	That's right!	Keep correct answers visible	
24.2	<b>Knowledge Check Incorrect</b>	Not quite. Bonded Abrasive Wheels offer the most aggressive material removal.	Not quite.	Show correct answers	
25	<b>Part 3: Accessory Interface Innovation</b>		Accessory Interface Innovation		
26	<b>Standard Interface Mounting</b>	Replacing accessories on grinders still requires the same process that was used on the first angle grinders decades ago – and it involves multiple steps with a lot of moving parts!	<b>Standard Interface Mounting</b>  Replacing accessories on grinders involves multiple steps.	Images/video of standard disc swap being completed, loose parts. (Need source)	Click markers. Click each accessory type to learn more.

		Click each step to learn more about the process.	Select each of the steps to replace an accessory.	Image of grinder, spindle-up, numbered marker hotspots. Similar to:  Balloons show images of parts.	
26.1	1		1- Loosen the flange nut with a wrench		
26.2	2		2- Fully unscrew nut from the spindle		
26.3	3		3- Remove the current accessory and place on surface		
26.4	4		4- Place new accessory on spindle		
26.5	5		5- Thread the nut back on		
26.6	6		6- Tighten nut again with <b>spanner wrench</b>		
26.7	WAIT		WAIT. Please view all steps before continuing.		

27	<b>Introducing X-LOCK</b>	Bosch has simplified this process with the innovative X-LOCK system!	<b>Introducing X-LOCK</b> [X-LOCK logo] [video]  [arrow pointing to resources] Learn more with our new course on the innovative X-LOCK system!	 Video: 3081_2018_09_07_Bosch_XLock_RollOut_EN_16-09.mp4	
28	<b>Conclusion</b>		<b>Conclusion</b>		
29	<b>Key Takeaways</b>	Today, you've learned about the basics of angle grinders and their accessories, as well as the users of angle grinders, and the standard mounting challenge users experience when working with grinders.	<b>Key Takeaways</b>  The basics of angle grinders and grinder accessories  Angle grinder user categories  Standard mounting interface challenge		
30	<b>Resources</b>	To learn more about angle grinders and download line-up sheets of accessories and grinder models, click on the Resources tab, or visit Boschtools.com.	<b>Resources</b> For more information click on the Resources tab  Visit Boschtools.com	Bosch X-LOCK site screenshot  	Links to pages from Prelaunch PDF
31	<b>Thank You</b>	Thank you for your time and participation today. This concludes the training.  You may now close this window and launch the quiz.	<b>Thank You!</b>		

