ROCKFORD SYSTEMS, LLC

GOT DIE SAFETY BLOCKS? GET SAFEGUARDING!

DEMYSTIFYING DIE SAFETY BLOCKS

Die safety blocks are called by many names: safety blocks, ram blocks, die blocks or prop blocks. Regardless of the term, die safety blocks all have the same purpose: provide protection to anyone working in the die area from a free-falling upper die/slide. This all-too-common accident happens in the event of a brake or counterbalance failure, broken pitman or adjusting screw, or a sudden loss of hydraulic pressure on presses. While die safety blocks are on the surface simple devices, there are many factors to consider in choosing what type of to use, as well as how many to use or where to put them. As a result many organizations struggle with this topic.

OSHA REGULATIONS

Die safety blocks are required by OSHA CFR 29, Subpart O, 1910.217 (d)(9)(iv) Mechanical Power Presses which states, "The employer shall provide and enforce the use of safety blocks for use whenever dies are being adjusted or repaired in the press." OSHA does not require the use of safety blocks during die setting; however, companies may include them during die setting procedures as a **best safety practice**. Proper use of die safety blocks also satisfies OSHA's **lockout/tagout requirements for controlling mechanical energy.**

Anytime an employee needs to put their hands in the die area of a press or is required to work on the die, they must follow OSHA regulations without exception. At no time should the employee make any adjustments or service within the die space area without taking proper protection measures that meet OSHA and ANSI requirements. Regardless of how time-consuming, the company is responsible—and liable—for these procedures in a press shop.

With the press motor off and the flywheel at rest (for mechanical presses), safety blocks are placed between the die punch and holder with the machine stroke up. The number of safety blocks is determined by the size of the press bed and the weight the blocks must support. On larger presses, the total slide weight must then be distributed among the quantity of safety blocks required. In some applications, as many as four safety blocks may be required.

The ram is usually adjustable; therefore, wedges or the adjustable screw device is offered to provide a proper fit. If the die takes up most of the space on the die set, it may be difficult to find a place to insert the block. To avoid accidentally stroking the press or leaving the safety block in the die after use, an electrical power cut-off interlock system should be used.

According to ANSI B11.19-2003, safety blocks "shall be interlocked with the machine to prevent actuation of hazardous motion of the machine." The **electrical interlock system for die safety blocks must be interfaced into the control system so that when the plug is pulled, the power to the main drive motor and control is disconnected.** If the machine has a mechanical energy source, such as a flywheel, it must come to rest before the die block can be inserted.

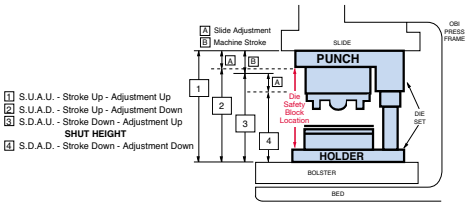
DIE SAFETY BLOCK CALCULATIONS

Three factors need to be determined to guide your selection of safety blocks: static load, block length and block size.

1. Determine Static Load

The actual static load that the die safety block(s) will support is determined by adding the actual weights of the press slide and slide components (ram-adjustment assembly, connection rod[s] or pitman arm[s], and the upper die).

If this weight cannot be determined, an **approximate static load** can be calculated using the formula below. Allow 2000 pounds of static load for each cubic foot displaced in the press bed area (front to back x right to left) multiplied by the shut height (die space) of the press. *Note: When using this formula, the calculated approximated static load has a safety factor of two (2).*



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Static Load Formula:

- (Press Bed Area (sq in) x Shut Height (in))/(Cubic Inches/ Cubic Feet (1728 cu in/cu ft constant))
- Cubic feet displaced x 2000 lb/cubic foot = Total Static Load

Example:

- Press Bed Area = 48 in x 96 in
- Shut Height = 24 in
- (48 x 96 x 24)/1728 or 110,592/1728 = 64 cu ft
- 64 cubic feet displaced x 2000 lb/cu ft = 128,000 Total Cubic Static Load

2. Determine Block Length

With the machine at the top of its stroke; stroke up—adjustment up (S.U.A.U.), measure the space between the upper and lower die set plates (not the distance between the bolster and slide). This gives the maximum safety block length.

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To determine the stroke up—adjustment down (S.U.A.D.) measurement, subtract the ram adjustment from the S.U.A.U. figure. This provides the minimum length of the die safety block.

Total Length of Die Safety Block Required _____"

EXCEPTIONS:

1. If wedges will be used, subtract 11/2" maximum. This is an allowance for variation in the stopping point of the crankshaft or adjustment of the ram.

Total Length of Die Safety Block Required _____"

1. When an adjustable screw is added to an octagonal safety block, the minimum length of the aluminum portion of the safety block is as follows:

When an adjustable screw device is added to an octagonal safety block and the screw is all the way inside of the safety block, it will add 2" to the overall length of small and medium safety blocks and 21/2" to the overall length of large safety blocks. Therefore, subtract 2" for small or medium blocks and 21/2" for large blocks to determine the length of the aluminum portion of the die block.

Example:

- If the minimum overall length of the small or medium safety block required is 101/2" with any size adjustable screw device, the aluminum portion of the safety block would be 81/2" (101/2" – 2"= 81/2").

Example:

- If the minimum overall length of the large safety block required is 16" with any size adjustable screw device, the aluminum portion of the safety block would be 131/2" (16" – 21/2"= 131/2").

Total Length of the Aluminum Portion of the Die Safety Block _____"

3. Determine Block Size

The size of the die safety block (small, medium, large) is determined by one or both of the following factors:

1. The size of the block itself and the area available in the die.
2. The static load capacity of the block (small, medium, large) versus the total static load being supported.

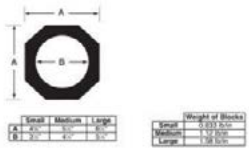
ROCKFORD SYSTEMS CAN HELP

Rockford Systems offers a variety of die safety blocks, electrical interlock systems, accessories and operator safety resources. Our line of high-strength, aluminum wedge die safety blocks that are lightweight and come in several shapes (x-shape, u-shape, octagon shape) and sizes (small, medium, large) to meet every press application. The unique shape and mechanical properties of the 6063-T5 aluminum have been calculated according to stringent structural aluminum design analysis standards to provide high strength. Blocks are sold in standard 9' lengths or can be cut to any size.

Wedge Safety Blocks

Rockford Systems also offers adjustable die safety blocks. These adjustable die safety blocks feature a tough malleable-iron bell-bottom base. The blocks also have a convenient handle for lifting and precision-cut acme threads for easy adjustment and extra rigidity. The adjusting screw can be easily adjusted up or down by hand. Turning holes are also provided in the screw neck to faciliDie Block-Octagon Static Loadtate the use of a turning bar, if required.

All Rockford Systems static load charts, (see example below) are found on www.rockfordsystems.com on die block product pages.



Block Length	Maximum Approximate Static Load Per Block in Pounds (Tons)* Small	Medium	Large
1"-24"	190,000 (95)	275,500 (137)	288,500 (144)
24½"-30"	170,000 (86)	256,000 (129)	258,000 (129)
30½"-36"	169,500 (84)	244,000 (122)	245,000 (122)
36½"-42"	164,500 (82)	232,000 (116)	234,500 (117)
42½"-48"	158,000 (79)	226,000 (113)	223,500 (111)
48½"-54"	156,500 (77)	226,000 (113)	211,000 (106)
54½"-60"	155,000 (77)	218,500 (109)	210,500 (105)

*The approximate static loads shown in this chart have a built-in safety factor of two.

Die Block Electrical Interlock System

Unlike most competitors, Rockford Systems offers electrically interlocked systems. The interlock system is available in a yellow plug with one contact (KTS518) or an orange plug with two contacts (KTS533). The electrical interlock system for die safety blocks includes the plug, a 24-inch long chain, a receptacle, and an electrical mounting box.

Additional die block accessories available from Rockford Systems include lifting handles, holders and bases. Our octagon shape safety block comes with an optional heavy-duty steel, adjustable screw device to prevent any space between the block and die when various dies are used or when the slide is adjusted.

DANGER SIGN FOR DIE SAFETY BLOCKS

Don't forget to post the appropriate danger signs near all machinery in the plant. The purpose of danger signs is to warn personnel of the danger of bodily injury or death. The suggested procedure for mounting this sign is as follows:

1. Sign must be clearly visible to the operator and other personnel
2. Sign must be at or near eye level
3. Sign must be PERMANENTLY fastened with bolts or rivets

Please call 1-800-922-7533 or visit www.rockfordsystems.com for more information.