UNIGUARD Machine Guards

UNIGUARD DISTRIBUTOR RESOURCE

MACHINE GUARDING SOLUTIONS

www.uniguardmgc.com

MEETS OR EXCEEDS OSHA REQUIREMENTS

MADE IN U.S.A.

TOUGH SAFE SIMPLE

UNIGUARD
DISTRIBUTOR RESOURCES

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UNIGUARD BROCHURES

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SAFE
SIMPLE

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Machine Guards

MACHINE GUARDING SOLUTIONS

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TOUGH

Nonmetallic Machine Guarding

Uniguard Machine Guards are designed to last in the roughest of environments. These guards are built **TOUGH** for durability, from premium grade UV stabilized High Density Polyethylene (black) and UV stabalized Ultra High Molecular Weight Polyethylene (orange/yellow). Mounting brackets are also made from UHMW-PE. All fastener hardware is 304 or 316 stainless steel to withstand corrosive and outdoor applications.

Continuous service temperature range from -40°F (-40°C) to 180°F (82°C); intermittent service temperatures up to 240°F (116°C).

Uniguards are designed to be **SAFE**. Safer than metal guards, these rugged OSHA-compliant guards are smooth-edged with no holes larger than ¼". The Thru-Color **Safety Orange** or **Safety Yellow** is highly visible, will not rust or require painting. Every guard is supplied with ANSI Z535.4-2011 compliant safety label(s). All Uniguard products are impact resistant and will flex and return to original shape, and not dent like metallic guards. Perfect for corrosive and outdoor environments, Uniguards are chemical, corrosion, UV and impact resistant. When properly applied Uniguard meets safety compliance standards around the world.

Uniguards are also **SIMPLE**; simple to size, simple to order, simple to modify, simple to install and maintain.

Simply put, we are the best option available for all of your machinery, power transmission and rotating equipment guarding needs.

Uniguards are **TOUGH** yet lightweight when compared to metal guards; this can dramatically improve the efficiency of routine maintenance task.

OSHA 29 CFR 1910.219 - **Uniguard Machine Guards** are designed to meet criteria expressed in OSHA Safety regulation 29 CFR 1910.219, however it is the sole responsibility of the end user to meet safety compliance with the relevant safety standards organizations applicable or subscribed to.

Uniguard Machine Guards are designed to keep body parts out of rotating equipment. Uniguard Machine Guards are not designed to withstand catastrophic equipment failures that can result in objects being ejected from the equipment and possibly cause bodily harm.

Stock GDSA Guard

Uniguard GDSA Coupling Guards are nonmetallic, lightweight guards that feature an adjustable length that make installations quick and simple. This guard features a one-piece split design that remains connected on top and opens like a clam-shell for easy installation. Simply locate the shaft holes and field drill with a hole saw, mount the guard to the base, extend to correct length to cover all rotating components and you're done.

GDSA Guards are one piece with a split along the black end material.

GDSA guards can be used to safely guard access to dangerous moving parts on many different types of equipment such as pumps, motors, gear boxes, couplings, chains, belts, clutches and more.

SAFE

Polyethylene plastic material will not spark if metal tools, equipment, or objects strike the material as some metal guards can. *

Stock Barrel Guard

Our flagship guard, the Barrel Guard is cantilever designed to bolt directly to the bearing frame of the pump and eliminates a guard foot and drilling the base to mount the guard.

Uniguard has many standard designs to fit select Goulds, Durco, Sulzer and other ANSI pumps.

Inspection windows are optional.

[+] Inspections windows are an optional feature that greatly improve coupling inspection and maintenance efficiency.

Our Barrel Guards can be easily modified for custom applications.

Check with your sales associate to determine if a guard is available for your ANSI pump.

Stock CGU Kit Guard

The Uniguard CGU Kit Guard is our most economical guarding solution, in stock and ready to ship. The CGU Kit is a one-piece dog house style guard that easily slips over the equipment shafts and is supplied with customizable panels to fill the space underneath the shaft.

[+] Always verify shaft size and location to assure a correct and complaint fit.

The CGU Kit guard comes in standard sizes and is easily modified in both the overall length and height to fit many applications.

**Uniguard Machine Guards are not recommended if static charge concerns exist. Please contact your sales associate for details.*

SIMPLE

Light weight materials, easy field modification and quick installation, save time making Uniguard a great choice.

Stock Belt/Chain Machine Guard

Belt/Chain Machine Guards come in two varieties Horizontal or Vertical. The one-piece Vertical Machine guard incorporates solid panels front and rear that are vertically split up the center. The Horizontal Machine guard comes standard with a vented front panel and a solid removable rear panel. Shaft holes are easily located and field drilled with a hole saw. These guards easily slip on over the equipment maintaining safety compliance.

[+] Lifting Handles are an optional feature that greatly improve maneuvering and lifting of the Belt Guards.

Our Belt Guards can be easily modified for custom applications.

Stock UniClear Guard™

The UniClear Guard™ is specifically developed to ensure employee safety and meet compliance of government regulations stipulating that all rotating machinery must be guarded. Designed for simple installation, to allow visual inspection, and keep hands out. UniClear Guard™ is a very economical solution.

The UniClear Guard™ is made from corrosion resistant polycarbonate (shield), high density polyethylene (frame) and stainless steel fasteners.

[+] Replacement shields are available in polycarbonate or orange polyethylene material for applications where the polycarbonate cover is not chemically compatible with the environment.

Many sizes of **UniClear Guard™** are available.

UniClear Guard™ are available for certain Goulds, Durco, Sulzer, and other ANSI pumps.

Check with your sales associate to determine if a UniClear Guard™ is available for your specific model.

Custom Designed Guards

Uniguard Custom Machine Guards are made with the same rugged features that we build into all of our guards. Uniguard can custom design a variety of Horizontal Belt Guards, Vertical Belt Guards, Tapered Belt Guards, Jack Shaft Guards, CLGU, Split Case Guard, Panel Guards, CG Split, and UniClear Seal Guards.

Large custom guards can be assembled from smaller modular sections for lightweight handling and installation. *Options include: yellow material, inspection windows, access panels, removable fronts, lifting handles, ventilation slots and shaft spacers.* Ask your Uniguard representative for more information about custom guards for your specific needs.

Uniguard can design a safety complaint custom machine guard for almost any application. All that is required for us to build a custom guard is accurate dimensions and any known constraints for the installation.

Horizontal Belt – is designed to have a slip-on or fixed back with fixed or removable vented or non-vented front panels. We can incorporate access panel, lifting handles, inspection window or access panels.

Vertical Belt – is vertical split belt/chain guard that can incorporate inspection windows, access panels, ventilation panels and lifting handles.

Tapered Belt - is designed to have a center split vented or non-vented front or rear panels, solid or center split flanged back and can incorporate lifting handles and inspection windows.

Jack Shaft - are typically a 2-piece guard designed to protect long coupling guards. Based on sizes, they are built with multiple sections and can incorporated access panel, lifting handles, inspection window or access panels.

CLGU - a vertically split two-piece coupling guard that's easy to install and maintain. The CLGU features a clear polycarbonate window that's easy to remove for strobe-scope, coupling, inspection and lubrication.
The window is easily cleaned with mild soap and water and can be mounted on the top or both sides of the guard.

CG Split - Uniguard CG Split Guards are vertically split one-piece guards that remain connected on top and open like a clam-shell for easy installation. Field modifications are easy and do not require special tools.

Panel - Panel Guards can incorporate polyethylene or aluminum frames and may have solid or vented polythreonine or polycarbonate panels.

Split Case - Split Case Guards are typically a one-piece design with a solid polyethylene end plate and open on the impeller side. (Shaft openings are normally field modified)

About Us

Uniguard™ Machine Guards manufactures both standard and custom equipment guards. We believe in providing a safe, simple and economical product designed to comply with OSHA, ASME, MSHA, ANSI and other safety regulations. We believe that we are the best solution available. Put us to the test and let us prove it.

Scan or visit to find your distributor.

Contact Information

https://www.uniguardmgc.com/distributors/

1-888-549-4622

sales@uniguardmgc.com

www.uniguardmgc.com

1115 Pleasant Ridge Road
Greensboro, N.C. 27409

@UniguardMGC

Made in the U.S.A.

TM.UGD.BR.8.7.20

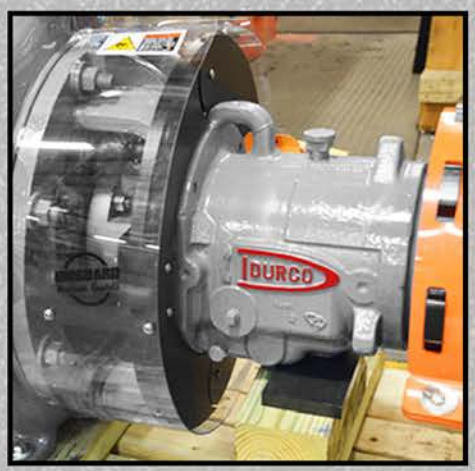
UNIGUARD
UNICLEAR

Type **UniClear™ Guard**

The **UniClear Guard™** is specifically developed to ensure employee safety and meet compliance of government regulations stipulating that all rotating machinery must be guarded. Designed for simple installation, to allow visual inspection, and keep hands out. **UniClear Guard™** is a very economical solution.

The **UniClear Guard™** is made from corrosion resistant polycarbonate (shield), high density polyethylene (frame) and stainless steel fasteners.

Many sizes of **UniClear Guards** are available.



UniClear Guards are available for all sizes of Goulds Pumps 3196 ANSI Standard Dimension Process Centrifugal Pumps, and many Durco and Sulzer ANSI Pump Models.

[+] ***UniClear Vertical Turbine Head Shields*** *are a custom item available.*

Ask your Uniguard Sales Associate to determine if one can be designed for your particualar application.

[+] ***Replacement shields*** *are available in polycarbonate or orange polyethylene material for applications where the polycarbonate cover is not chemically compatible with the environment.*

UNIGUARD INSPECTION WINDOWS

Accessory - **Inspection Windows**

The **Uniguard Inspection Window** accessory is an additional feature that allows visibility and controlled access to the coupling area. This provides the convenience of rotating element access without complete guard removal. This is useful for coupling types that require lubrication.

The **Uniguard Inspection Window** come in two types; ***rounded*** and ***flat***. The rounded frame type is for use on barrel and rounded guards. The flat frame type is for use on guards with flat areas.

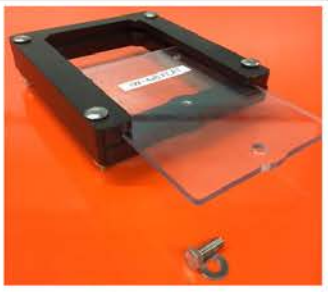
One of the many benefits of the **Inspection Window** is coupling lubrication access without guard removal.

Uniguard Inspection Windows are available for all sizes of ANSI barrel Guards.

Model #	Matched Barrel Guard
IW-8	A-3196-STX/i,
IW-11	A-3196-MT, MTX/LTX, MTi/LTi
IW-16	A-3196-XLTX, 3175 (S,M), 3410 (S,M,L)
IW-19.5	Goulds 3175L

Flat Uniguard Inspection Windows are designed to fit all flat style machine guards and will save you time and make coupling maintenance easier.

They are easy to install, economical and allow for visual inspection of the rotating element without removing the guard. **Available Sizes: 3" x 4", 4" x 6", 8" x 8".**



UNIGUARD
SAMPLE KIT

Uniguard Sample Kit

The **Uniguard Sample Kit** offers a conveneint way to carry and display the various types of Uniguard Types available.

Nothing compares to having a guard in your hand when explaining the features, benefits and value of the Uniguard Machinery Guard.

Sample Kit contains:
1 - UniClear
1 - Barrel Guard
1 - GDSA with Inspection Widnow
1 - CG Split
1 - Vertical Belt Guard
1 - Horizontal Belt Guard

SAFETY STANDARDS

This section will contain the ANSIZ535.4-2011 Product Safety Signs and Labels

ANSI Z535.4-2011
Product Safety Signs and Labels

Uniguard Safety Labels conform to ANSI Z535.4-2011
Section 4.12.2.1 - Permanent Safety Sign or Label:
A sign that is to be permanently affixed to the product so that it cannot be easily removed. Permanent safety signs typically provide information about potential exposure to hazards inherent in the normal use associated with the product, or which might be created during other reasonably anticipated product use or misuse.

B3.3.8 - Choice of Type Style
B3.3.9 - Choice of Type Spacing
B3.3.11 - Choice of Type Color
B3.3.12 - Comprehension
B3.3.13 - Letter Size
B3.3.14 - Minimum Letter Height Calculations
B5.2 - Horizontal Formats
B5.3 - Signal Word Panel Arrangement
B5.4 - Letter Size
E3.4 - Severity
E3.5 - Probability of Harm
E4 - Signal Word Selection

For more information refer to NEMA Standards Publication

UNIGUARD
OSHA STANDARD 1910.212
GENERAL REQUIREMENTS

This section will contain the OSHA Standard 1910.212 General Requirements Document with Permission.

- Part Number: 1910
- Part Title: Occupational Safety and Health Standards
- Subpart: O
- Subpart Title: Machinery and Machine Guarding
- Standard Number: 1910.212
- Title: General requirements for all machines.
- GPO Source: e-CFR

1910.212(a)
Machine guarding.

1910.212(a)(1)
Types of guarding. One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods are-barrier guards, two-hand tripping devices,electronic safety devices, etc.

1910.212(a)(2)
General requirements for machine guards. Guards shall be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard shall be such that it does not offer an accident hazard in itself.

1910.212(a)(3)
Point of operation guarding.

1910.212(a)(3)(i)
Point of operation is the area on a machine where work is actually performed upon the material being processed.

1910.212(a)(3)(ii)
The point of operation of machines whose operation exposes an employee to injury, shall be guarded. The guarding device shall be in conformity with any appropriate standards therefor, or, in the absence of applicable specific standards, shall be so designed and constructed as to prevent the operator from having any part of his body in the danger zone during the operating cycle.

1910.212(a)(3)(iii)
Special handtools for placing and removing material shall be such as to permit easy handling of material without the operator placing a hand in the danger zone. Such tools shall not be in lieu of other guarding required by this section, but can only be used to supplement protection provided.

1910.212(a)(3)(iv)
The following are some of the machines which usually require point of operation guarding:

1910.212(a)(3)(iv)(a)
Guillotine cutters.

1910.212(a)(3)(iv)(b)
Shears.

1910.212(a)(3)(iv)(c)
Alligator shears.

1910.212(a)(3)(iv)(d)
Power presses.

1910.212(a)(3)(iv)(e)
Milling machines.

1910.212(a)(3)(iv)(f)
Power saws.

1910.212(a)(3)(iv)(g)
Jointers.

1910.212(a)(3)(iv)(h)
Portable power tools.

1910.212(a)(3)(iv)(i)
Forming rolls and calenders.

1910.212(a)(4)
Barrels, containers, and drums. Revolving drums, barrels, and containers shall be guarded by an enclosure which is interlocked with the drive mechanism, so that the barrel, drum, or container cannot revolve unless the guard enclosure is in place.

1910.212(a)(5)
Exposure of blades. When the periphery of the blades of a fan is less than seven (7) feet above the floor or working level, the blades shall be guarded. The guard shall have openings no larger than one-half (1/2) inch.

1910.212(b)
Anchoring fixed machinery. Machines designed for a fixed location shall be securely anchored to prevent walking or moving.

UNIGUARD
OSHA STANDARD 1910.219
MECHANICAL POWER

This section will contain the OSHA Standard 1910.219 Mechanical Power Document with Permission.

- Part Number: 1910
- Part Title: Occupational Safety and Health Standards
- Subpart: O
- Subpart Title: Machinery and Machine Guarding
- Standard Number: 1910.219
- Title: Mechanical power-transmission apparatus.
- GPO Source: e-CFR

1910.219(a)
General requirements.

1910.219(a)(1)
This section covers all types and shapes of power-transmission belts, except the following when operating at two hundred and fifty (250) feet per minute or less:

1910.219(a)(1)(i)
Flat belts one (1) inch or less in width,

1910.219(a)(1)(ii)
flat belts two (2) inches or less in width which are free from metal lacings or fasteners,

1910.219(a)(1)(iii)
round belts one-half (1/2) inch or less in diameter; and

1910.219(a)(1)(iv)
single strand V-belts, the width of which is thirteen thirty-seconds (13/32) inch or less.

1910.219(a)(2)
Vertical and inclined belts (paragraphs (e) (3) and (4) of this section) if not more than two and one-half (2 1/2) inches wide and running at a speed of less than one thousand (1,000) feet per minute, and if free from metal lacings or fastenings may be guarded with a nip-point belt and pulley guard.

1910.219(a)(3)
For the Textile Industry, because of the presence of excessive deposits of lint, which constitute a serious fire hazard, the sides and face sections only of nip-point belt and pulley guards are required, provided the guard shall extend at least six (6) inches beyond the rim of the pulley on the in-running and off-running sides of the belt and at least two (2) inches away from the rim and face of the pulley in all other directions.

1910.219(a)(4)
This section covers the principal features with which power transmission safeguards shall comply.

1910.219(b)
Prime-mover guards -

1910.219(b)(1)
Flywheels. Flywheels located so that any part is seven (7) feet or less above floor or platform shall be guarded in accordance with the requirements of this subparagraph:

1910.219(b)(1)(i)
With an enclosure of sheet, perforated, or expanded metal, or woven wire;

1910.219(b)(1)(ii)
With guard rails placed not less than fifteen (15) inches nor more than twenty (20) inches from rim. When flywheel extends into pit or is within 12 inches of floor, a standard toeboard shall also be provided;

1910.219(b)(1)(iii)
When the upper rim of flywheel protrudes through a working floor, it shall be entirely enclosed or surrounded by a guardrail and toeboard.

1910.219(b)(1)(iv)
For flywheels with smooth rims five (5) feet or less in diameter, where the preceding methods cannot be applied, the following may be used: A disk attached to the flywheel in such manner as to cover the spokes of the wheel on the exposed side and present a smooth surface and edge, at the same time providing means for periodic inspection. An open space, not exceeding four (4) inches in width, may be left between the outside edge of the disk and the rim of the wheel if desired, to facilitate turning the wheel over. Where a disk is used, the keys or other dangerous projections not covered by disk shall be cut off or covered. This subdivision does not apply to flywheels with solid web centers.

1910.219(b)(1)(v)
Adjustable guard to be used for starting engine or for running adjustment may be provided at the flywheel of gas or oil engines. A slot opening for jack bar will be permitted.

1910.219(b)(1)(vi)
Wherever flywheels are above working areas, guards shall be installed having sufficient strength to hold the weight of the flywheel in the event of a shaft or wheel mounting failure.

1910.219(b)(2)
Cranks and connecting rods. Cranks and connecting rods, when exposed to contact, shall be guarded in accordance with paragraphs (m) and (n) of this section, or by a guardrail as described in paragraph (o)(5) of this section.

1910.219(b)(3)
Tail rods or extension piston rods. Tail rods or extension piston rods shall be guarded in accordance with paragraphs (m) and (o) of this section, or by a guardrail on sides and end, with a clearance of not less than fifteen (15) nor more than twenty (20) inches when rod is fully extended.

1910.219(c)
Shafting -

1910.219(c)(1)
Installation.

1910.219(c)(1)(i)
Each continuous line of shafting shall be secured in position against excessive endwise movement.

1910.219(c)(1)(ii)
Inclined and vertical shafts, particularly inclined idler shafts, shall be securely held in position against endwise thrust.

1910.219(c)(2)
Guarding horizontal shafting.

1910.219(c)(2)(i)
All exposed parts of horizontal shafting seven (7) feet or less from floor or working platform, excepting runways used exclusively for oiling, or running adjustments, shall be protected by a stationary casing enclosing shafting completely or by a trough enclosing sides and top or sides and bottom of shafting as location requires.

1910.219(c)(2)(ii)
Shafting under bench machines shall be enclosed by a stationary casing, or by a trough at sides and top or sides and bottom, as location requires. The sides of the trough shall come within at least six (6) inches of the underside of table, or if shafting is located near floor within six (6) inches of floor. In every case the sides of trough shall extend at least two (2) inches beyond the shafting or protuberance.

1910.219(c)(3)
Guarding vertical and inclined shafting. Vertical and inclined shafting seven (7) feet or less from floor or working platform, excepting maintenance runways, shall be enclosed with a stationary casing in accordance with requirements of paragraphs (m) and (o) of this section.

1910.219(c)(4)
Projecting shaft ends.

1910.219(c)(4)(i)
Projecting shaft ends shall present a smooth edge and end and shall not project more than one-half the diameter of the shaft unless guarded by nonrotating caps or safety sleeves.

1910.219(c)(4)(ii)
Unused keyways shall be filled up or covered.

1910.219(c)(5)
Power-transmission apparatus located in basements. All mechanical power transmission apparatus located in basements, towers, and rooms used exclusively for power transmission equipment shall be guarded in accordance with this section, except that the requirements for safeguarding belts, pulleys, and shafting need not be complied with when the following requirements are met:

1910.219(c)(5)(i)
The basement, tower, or room occupied by transmission equipment is locked against unauthorized entrance.

1910.219(c)(5)(ii)
The vertical clearance in passageways between the floor and power transmission beams, ceiling, or any other objects, is not less than five feet six inches (5 ft. 6 in.).

1910.219(c)(5)(iii)
The intensity of illumination conforms to the requirements of ANSI A11.1-1965 (R-1970), which is incorporated by reference as specified in Sec. 1910.6.

1910.219(c)(5)(iv)
[Reserved]

1910.219(c)(5)(v)
The route followed by the oiler is protected in such manner as to prevent accident.

1910.219(d)
Pulleys -

1910.219(d)(1)
Guarding. Pulleys, any parts of which are seven (7) feet or less from the floor or working platform, shall be guarded in accordance with the standards specified in paragraphs (m) and (o) of this section. Pulleys serving as balance wheels (e.g., punch presses) on which the point of contact between belt and pulley is more than six feet six inches (6 ft. 6 in.) from the floor or platform may be guarded with a disk covering the spokes.

1910.219(d)(2)
Location of pulleys.

1910.219(d)(2)(i)
Unless the distance to the nearest fixed pulley, clutch, or hanger exceeds the width of the belt used, a guide shall be provided to prevent the belt from leaving the pulley on the side where insufficient clearance exists.

1910.219(d)(2)(ii)
[Reserved]

1910.219(d)(3)
Broken pulleys. Pulleys with cracks, or pieces broken out of rims, shall not be used.

1910.219(d)(4)
Pulley speeds. Pulleys intended to operate at rim speed in excess of manufacturers normal recommendations shall be specially designed and carefully balanced for the speed at which they are to operate.

1910.219(e)
Belt, rope, and chain drives -

1910.219(e)(1)
Horizontal belts and ropes.

1910.219(e)(1)(i)
Where both runs of horizontal belts are seven (7) feet or less from the floor level, the guard shall extend to at least fifteen (15) inches above the belt or to a standard height, except that where both runs of a horizontal belt are 42 inches or less from the floor, the belt shall be fully enclosed in accordance with paragraphs (m) and (o) of this section.

1910.219(e)(1)(ii)
In powerplants or power-development rooms, a guardrail may be used in lieu of the guard required by subdivision (i) of this subparagraph.

1910.219(e)(2)
Overhead horizontal belts.

1910.219(e)(2)(i)
Overhead horizontal belts, with lower parts seven (7) feet or less from the floor or platform, shall be guarded on sides and bottom in accordance with paragraph (o)(3) of this section.

1910.219(e)(2)(ii)
Horizontal overhead belts more than seven (7) feet above floor or platform shall be guarded for their entire length under the following conditions:

1910.219(e)(2)(ii)(a)
If located over passageways or work places and traveling 1,800 feet or more per minute.

1910.219(e)(2)(ii)(b)
If center to center distance between pulleys is ten (10) feet or more.

1910.219(e)(2)(ii)(c)
If belt is eight (8) inches or more in width.

1910.219(e)(2)(iii)
Where the upper and lower runs of horizontal belts are so located that passage of persons between them would be possible, the passage shall be either:

1910.219(e)(2)(iii)(a)
Completely barred by a guardrail or other barrier in accordance with paragraphs (m) and (o) of this section; or

1910.219(e)(2)(iii)(b)
Where passage is regarded as necessary, there shall be a platform over the lower run guarded on either side by a railing completely filled in with wire mesh or other filler, or by a solid barrier. The upper run shall be so guarded as to prevent contact therewith either by the worker or by objects carried by him. In powerplants only the lower run of the belt need be guarded.

1910.219(e)(2)(iv)
Overhead chain and link belt drives are governed by the same rules as overhead horizontal belts and shall be guarded in the same manner as belts.

1910.219(e)(3)
Vertical and inclined belts.

1910.219(e)(3)(i)
Vertical and inclined belts shall be enclosed by a guard conforming to standards in paragraphs (m) and (o) of this section.

1910.219(e)(3)(ii)
All guards for inclined belts shall be arranged in such a manner that a minimum clearance of seven (7) feet is maintained between belt and floor at any point outside of guard.

1910.219(e)(4)
Vertical belts. Vertical belts running over a lower pulley more than seven (7) feet above floor or platform shall be guarded at the bottom in the same manner as horizontal overhead belts, if conditions are as stated in paragraphs (e)(2)(ii) (a) and (c) of this section.

1910.219(e)(5)
Cone-pulley belts.

1910.219(e)(5)(i)
The cone belt and pulley shall be equipped with a belt shifter so constructed as to adequately guard the nip point of the belt and pulley. If the frame of the belt shifter does not adequately guard the nip point of the belt and pulley, the nip point shall be further protected by means of a vertical guard placed in front of the pulley and extending at least to the top of the largest step of the cone.

1910.219(e)(5)(ii)
If the belt is of the endless type or laced with rawhide laces, and a belt shifter is not desired, the belt will be considered guarded if the nip point of the belt and pulley is protected by a nip point guard located in front of the cone extending at least to the top of the largest step of the cone, and formed to show the contour of the cone in order to give the nip point of the belt and pulley the maximum protection.

1910.219(e)(5)(iii)
If the cone is located less than 3 feet from the floor or working platform, the cone pulley and belt shall be guarded to a height of 3 feet regardless of whether the belt is endless or laced with rawhide.

1910.219(e)(6)
Belt tighteners.

1910.219(e)(6)(i)
Suspended counterbalanced tighteners and all parts thereof shall be of substantial construction and securely fastened; the bearings shall be securely capped. Means must be provided to prevent tightener from falling, in case the belt breaks.

1910.219(e)(6)(ii)
Where suspended counterweights are used and not guarded by location, they shall be so encased as to prevent accident.

1910.219(f)
Gears, sprockets, and chains -

1910.219(f)(1)
Gears. Gears shall be guarded in accordance with one of the following methods:

1910.219(f)(1)(i)
By a complete enclosure; or

1910.219(f)(1)(ii)
By a standard guard as described in paragraph (o) of this section, at least seven (7) feet high extending six (6) inches above the mesh point of the gears; or

1910.219(f)(1)(iii)
By a band guard covering the face of gear and having flanges extended inward beyond the root of the teeth on the exposed side or sides. Where any portion of the train of gears guarded by a band guard is less than six (6) feet from the floor a disk guard or a complete enclosure to the height of six (6) feet shall be required.

1910.219(f)(2)
Hand-operated gears. Paragraph (f)(1) of this section does not apply to hand-operated gears used only to adjust machine parts and which do not continue to move after hand power is removed. However, the guarding of these gears is highly recommended.

1910.219(f)(3)
Sprockets and chains. All sprocket wheels and chains shall be enclosed unless they are more than seven (7) feet above the floor or platform. Where the drive extends over other machine or working areas, protection against falling shall be provided. This subparagraph does not apply to manually operated sprockets.

1910.219(f)(4)
Openings for oiling. When frequent oiling must be done, openings with hinged or sliding self-closing covers shall be provided. All points not readily accessible shall have oil feed tubes if lubricant is to be added while machinery is in motion.

1910.219(g)
Guarding friction drives. The driving point of all friction drives when exposed to contact shall be guarded, all arm or spoke friction drives and all web friction drives with holes in the web shall be entirely enclosed, and all projecting belts on friction drives where exposed to contact shall be guarded.

1910.219(h)
Keys, setscrews, and other projections.

1910.219(h)(1)
All projecting keys, setscrews, and other projections in revolving parts shall be removed or made flush or guarded by metal cover. This subparagraph does not apply to keys or setscrews within gear or sprocket casings or other enclosures, nor to keys, setscrews, or oilcups in hubs of pulleys less than twenty (20) inches in diameter where they are within the plane of the rim of the pulley.

1910.219(h)(2)
It is recommended, however, that no projecting setscrews or oilcups be used in any revolving pulley or part of machinery.

1910.219(i)
Collars and couplings -

1910.219(i)(1)
Collars. All revolving collars, including split collars, shall be cylindrical, and screws or bolts used in collars shall not project beyond the largest periphery of the collar.

1910.219(i)(2)
Couplings. Shaft couplings shall be so constructed as to present no hazard from bolts, nuts, setscrews, or revolving surfaces. Bolts, nuts, and setscrews will, however, be permitted where they are covered with safety sleeves or where they are used parallel with the shafting and are countersunk or else do not extend beyond the flange of the coupling.

1910.219(j)
Bearings and facilities for oiling. All drip cups and pans shall be securely fastened.

1910.219(k)
Guarding of clutches, cutoff couplings, and clutch pulleys -

1910.219(k)(1)
Guards. Clutches, cutoff couplings, or clutch pulleys having projecting parts, where such clutches are located seven (7) feet or less above the floor or working platform, shall be enclosed by a stationary guard constructed in accordance with this section. A “U” type guard is permissible.

1910.219(k)(2)
Engine rooms. In engine rooms a guardrail, preferably with toeboard, may be used instead of the guard required by paragraph (k)(1) of this section, provided such a room is occupied only by engine room attendants.

1910.219(l)
Belt shifters, clutches, shippers, poles, perches, and fasteners -

1910.219(l)(1)
Belt shifters.

1910.219(l)(1)(i)
Tight and loose pulleys on all new installations made on or after August 31, 1971, shall be equipped with a permanent belt shifter provided with mechanical means to prevent belt from creeping from loose to tight pulley. It is recommended that old installations be changed to conform to this rule.

1910.219(l)(1)(ii)
Belt shifter and clutch handles shall be rounded and be located as far as possible from danger of accidental contact, but within easy reach of the operator. Where belt shifters are not directly located over a machine or bench, the handles shall be cut off six feet six inches (6 ft. 6 in.) above floor level.

1910.219(l)(2)
Belt shippers and shipper poles. The use of belt poles as substitutes for mechanical shifters is not recommended.

1910.219(l)(3)
Belt perches. Where loose pulleys or idlers are not practicable, belt perches in form of brackets, rollers, etc., shall be used to keep idle belts away from the shafts.

1910.219(l)(4)
Belt fasteners. Belts which of necessity must be shifted by hand and belts within seven (7) feet of the floor or working platform which are not guarded in accordance with this section shall not be fastened with metal in any case, nor with any other fastening which by construction or wear will constitute an accident hazard.

1910.219(m)
Standard guards-general requirements -

1910.219(m)(1)
Materials.

1910.219(m)(1)(i)
Standard conditions shall be secured by the use of the following materials. Expanded metal, perforated or solid sheet metal, wire mesh on a frame of angle iron, or iron pipe securely fastened to floor or to frame of machine.

1910.219(m)(1)(ii)
All metal should be free from burrs and sharp edges.

1910.219(m)(2)
Methods of manufacture.

1910.219(m)(2)(i)
Expanded metal, sheet or perforated metal, and wire mesh shall be securely fastened to frame.

1910.219(n)
[Reserved]

1910.219(o)
Approved materials -

1910.219(o)(1)
Minimum requirements. The materials and dimensions specified in this paragraph shall apply to all guards, except horizontal overhead belts, rope, cable, or chain guards more than seven (7) feet above floor, or platform.

1910.219(o)(1)(i)
[Reserved]

1910.219(o)(1)(i)(a)
All guards shall be rigidly braced every three (3) feet or fractional part of their height to some fixed part of machinery or building structure. Where guard is exposed to contact with moving equipment additional strength may be necessary.

1910.219(o)(2)
Wood guards.

1910.219(o)(2)(i)
Wood guards may be used in the woodworking and chemical industries, in industries where the presence of fumes or where manufacturing conditions would cause the rapid deterioration of metal guards; also in construction work and in locations outdoors where extreme cold or extreme heat make metal guards and railings undesirable. In all other industries, wood guards shall not be used.

1910.219(o)(3)
Guards for horizontal overhead belts.

1910.219(o)(3)(i)
Guards for horizontal overhead belts shall run the entire length of the belt and follow the line of the pulley to the ceiling or be carried to the nearest wall, thus enclosing the belt effectively. Where belts are so located as to make it impracticable to carry the guard to wall or ceiling, construction of guard shall be such as to enclose completely the top and bottom runs of belt and the face of pulleys.

1910.219(o)(3)(ii)
[Reserved]

1910.219(o)(3)(iii)
Suitable reinforcement shall be provided for the ceiling rafters or overhead floor beams, where such is necessary, to sustain safely the weight and stress likely to be imposed by the guard. The interior surface of all guards, by which is meant the surface of the guard with which a belt will come in contact, shall be smooth and free from all projections of any character, except where construction demands it; protruding shallow roundhead rivets may be used. Overhead belt guards shall be at least one-quarter wider than belt which they protect, except that this clearance need not in any case exceed six (6) inches on each side. Overhead rope drive and block and roller-chain-drive guards shall be not less than six (6) inches wider than the drive on each side. In overhead silent chain-drive guards where the chain is held from lateral displacement on the sprockets, the side clearances required on drives of twenty (20) inch centers or under shall be not less than one-fourth inch from the nearest moving chain part, and on drives of over twenty (20) inch centers a minimum of one-half inch from the nearest moving chain part.

1910.219(o)(4)
Guards for horizontal overhead rope and chain drives. Overhead-rope and chain-drive guard construction shall conform to the rules for overhead-belt guard.

1910.219(o)(5)
Guardrails and toeboards.

1910.219(o)(5)(i)
Guardrail shall be forty-two (42) inches in height, with midrail between top rail and floor.

1910.219(o)(5)(ii)
Posts shall be not more than eight (8) feet apart; they are to be permanent and substantial, smooth, and free from protruding nails, bolts, and splinters. If made of pipe, the post shall be one and one-fourth (1 1/4) inches inside diameter, or larger. If made of metal shapes or bars, their section shall be equal in strength to that of one and one-half (1 1/2) by one and one-half (1 1/2) by three-sixteenths (3/16) inch angle iron. If made of wood, the posts shall be two by four (2 X 4) inches or larger. The upper rail shall be two by four (2 X 4) inches, or two one by four (1 X 4) strips, one at the top and one at the side of posts. The midrail may be one by four (1 X 4) inches or more. Where panels are fitted with expanded metal or wire mesh the middle rails may be omitted. Where guard is exposed to contact with moving equipment, additional strength may be necessary.

1910.219(o)(5)(iii)
Toeboards shall be four (4) inches or more in height, of wood, metal, or of metal grill not exceeding one (1) inch mesh.

1910.219(p)
Care of equipment -

1910.219(p)(1)
General. All power-transmission equipment shall be inspected at intervals not exceeding 60 days and be kept in good working condition at all times.

1910.219(p)(2)
Shafting.

1910.219(p)(2)(i)
Shafting shall be kept in alignment, free from rust and excess oil or grease.

1910.219(p)(2)(ii)
Where explosives, explosive dusts, flammable vapors or flammable liquids exist, the hazard of static sparks from shafting shall be carefully considered.

1910.219(p)(3)
Bearings. Bearings shall be kept in alignment and properly adjusted.

1910.219(p)(4)
Hangers. Hangers shall be inspected to make certain that all supporting bolts and screws are tight and that supports of hanger boxes are adjusted properly.

1910.219(p)(5)
Pulleys.

1910.219(p)(5)(i)
Pulleys shall be kept in proper alignment to prevent belts from running off.

1910.219(p)(6)
Care of belts.

1910.219(p)(6)(i)
[Reserved]

1910.219(p)(6)(ii)
Inspection shall be made of belts, lacings, and fasteners and such equipment kept in good repair.

1910.219(p)(7)
Lubrication. The regular oilers shall wear tight-fitting clothing. Machinery shall be oiled when not in motion, wherever possible.

[39 FR 23502, June 27, 1974, as amended at 43 FR 49750, Oct. 24, 1978; 43 FR 51760; Nov. 7, 1978; 49 FR 5323, Feb. 10, 1984; 61 FR 9227, March 7, 1996; 69 FR 31882, June 8, 2004]

UNIGUARD
MSHA STANDARD 56.14107
MOVING MACHINE PARTS

This section will contain the MSHA Standard 56.14107 Moving Machine Parts Document with Permission.

§ 56.14107 Moving machine parts.

(a) Moving machine parts shall be guarded to protect persons from contacting gears, sprockets, chains, drive, head, tail, and takeup pulleys, flywheels, couplings, shafts, fan blades, and similar moving parts that can cause injury.

(b) Guards shall not be required where the exposed moving parts are at least seven feet away from walking or working surfaces.

UNIGUARD
MSHA STANDARD 75.1722
MECHANICAL EQUIPMENT GUARDS

This section will contain the MSHA Standard 75.1722 Mechanical Equipment Guards Document with Permission.

§ 75.1722 Mechanical equipment guards.

(a) Gears; sprockets; chains; drive, head, tail, and takeup pulleys; flywheels; couplings, shafts; sawblades; fan inlets; and similar exposed moving machine parts which may be contacted by persons, and which may cause injury to persons shall be guarded.

(b) Guards at conveyor-drive, conveyor-head, and conveyor-tail pulleys shall extend a distance sufficient to prevent a person from reaching behind the guard and becoming caught between the belt and the pulley.

(c) Except when testing the machinery, guards shall be securely in place while machinery is being operated.

[38 FR 4976, Feb. 23, 1973]

UNIGUARD
MSHA STANDARD 77.400
MECHANICAL EQUIPMENT GUARDS

This section will contain the MSHA Standard 77.400 Mechanical Equipment Guards Document with Permission.

§ 77.400 Mechanical equipment guards.

(a) Gears; sprockets; chains; drive, head, tail, and takeup pulleys; flywheels; couplings; shafts; sawblades; fan inlets; and similar exposed moving machine parts which may be contacted by persons, and which may cause injury to persons shall be guarded.

(b) Overhead belts shall be guarded if the whipping action from a broken line would be hazardous to persons below.

(c) Guards at conveyor-drive, conveyor-head, and conveyor-tail pulleys shall extend a distance sufficient to prevent a person from reaching behind the guard and becoming caught between the belt and the pulley.

(d) Except when testing the machinery, guards shall be securely in place while machinery is being operated.

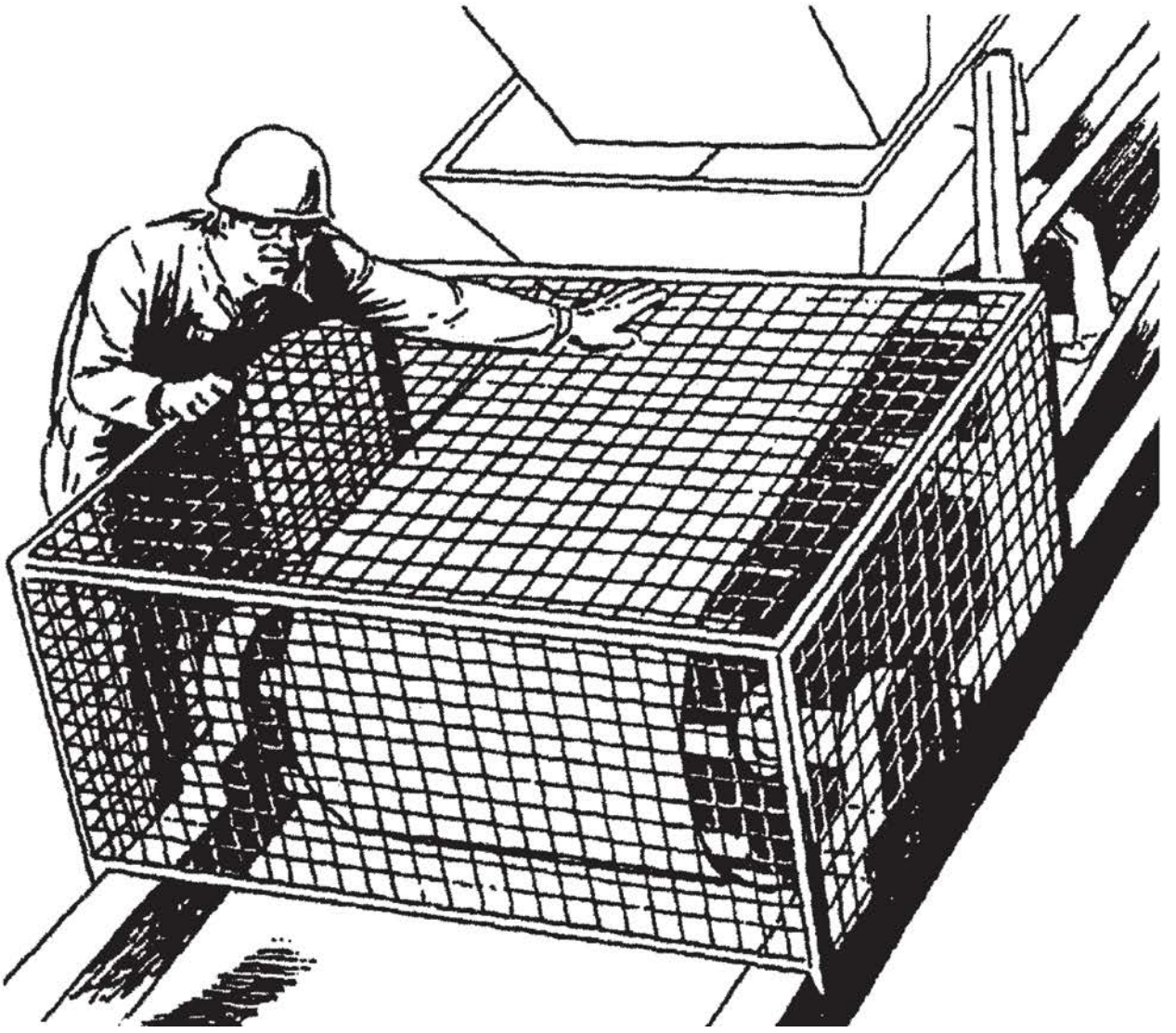
MSHA's Guide to Equipment Guarding

MSHA's Guide to Equipment Guarding

U.S. Department of Labor
Mine Safety and Health Administration

Other Training Material
OT 3

Revised 2004



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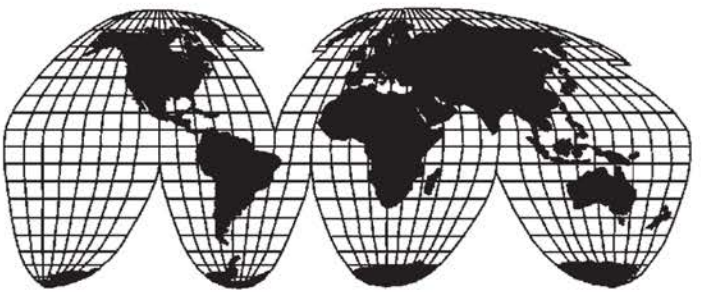

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Introduction

This guide is provided to assist the mining community with designing, installing and maintaining equipment guards to prevent miners from contacting hazardous moving machine parts. Contact with machine parts may result in serious accidents or death. Proper equipment guarding is essential to reduce this risk of injury.

This guide provides examples of commonly used point-of-contact guards which are guards for individual hazards and area guards which are guards for individual or multiple hazards. These examples are intended for guidance only and alternate designs may be acceptable if the relevant MSHA guarding standards are met.

Training

Miners need to understand the types of guards and systems at the mine. Specific training is a crucial part of any effective equipment guarding system. Training should involve instruction and/or hands-on training in the following:

- ✔ Identify and describe the hazards associated with specific equipment.
- ✔ How do the equipment guards provide protection for this specific equipment
- ✔ How, and under what circumstances, can the equipment guards be safely removed and when must the equipment guards be replaced
- ✔ What to do if an equipment guard is damaged or missing.

This kind of safety training is necessary for new miners and maintenance personnel. Additional training or retraining is necessary when changes are made to guarding systems. Training may be required when miners are assigned to different equipment and/or locations.

Guarding Considerations and Recommendations

This section is written as a brief discussion of effective guard design and use and is not a requirement for compliance.

The input and ideas of miners, equipment manufacturers, machine operators, maintenance personnel, and supervisors can enhance the design, construction and installation of equipment guards.

- Do the design, construction, selection of materials and guard installation prevent contact with all moving machine part hazards?
- Does the guard provide protection by itself, and not rely on visual or tactile awareness of a hazard, administrative controls or procedures such as warnings, signs, lights, training, supervision or personal protective equipment?
- Are the guard material(s), fastening methods, and construction suitable to withstand the wear, corrosion, vibration and shock of normal operations?
- If drive belts inside a guard fail, will the whipping action of broken belts be contained?
- Is the guard recognizable as a guard?
- Is the guard installed securely?
- Is the guard design adequate for the application and specific hazard(s)?
- Are openings in the guard material such that contact with the hazard is prevented by the distance between the guard and the hazard?
- Does the guard interfere with the normal operation, inspection, lubrication or servicing of the equipment?
- Is the guard designed and constructed so that adjustments to the guarded components can be made without loss of protection or modifying the guard?

- Do the design, materials and guard construction prevent the guard from being a hazard itself (i.e. free of burrs, sharp edges, pinch points, etc.)?
- Is the guard of a size, shape, weight and balance which permits safe manual handling when it is removed or replaced. Alternately, if it is too large for manual handling, is it accessible and amenable for safe handling with mechanical tools or equipment?
- Is the guard constructed so that it cannot be circumvented, by-passed or overcome?
- Can the guarded components be inspected without removing the guard?
- Is the guard constructed and located so as not to hinder clean-up efforts?
- Is the guard maintained in serviceable condition?
- Have you considered the use of new technology, if applicable?

Many of the illustrations contained in this guidebook show the use of expanded metal. MSHA requirements are based on the level of protection provided, not the choice of materials for guard construction.

Figure 1 shows an inadequate conveyor tail pulley guard. The rear and top of the pulley are fully exposed providing access to moving machine parts.

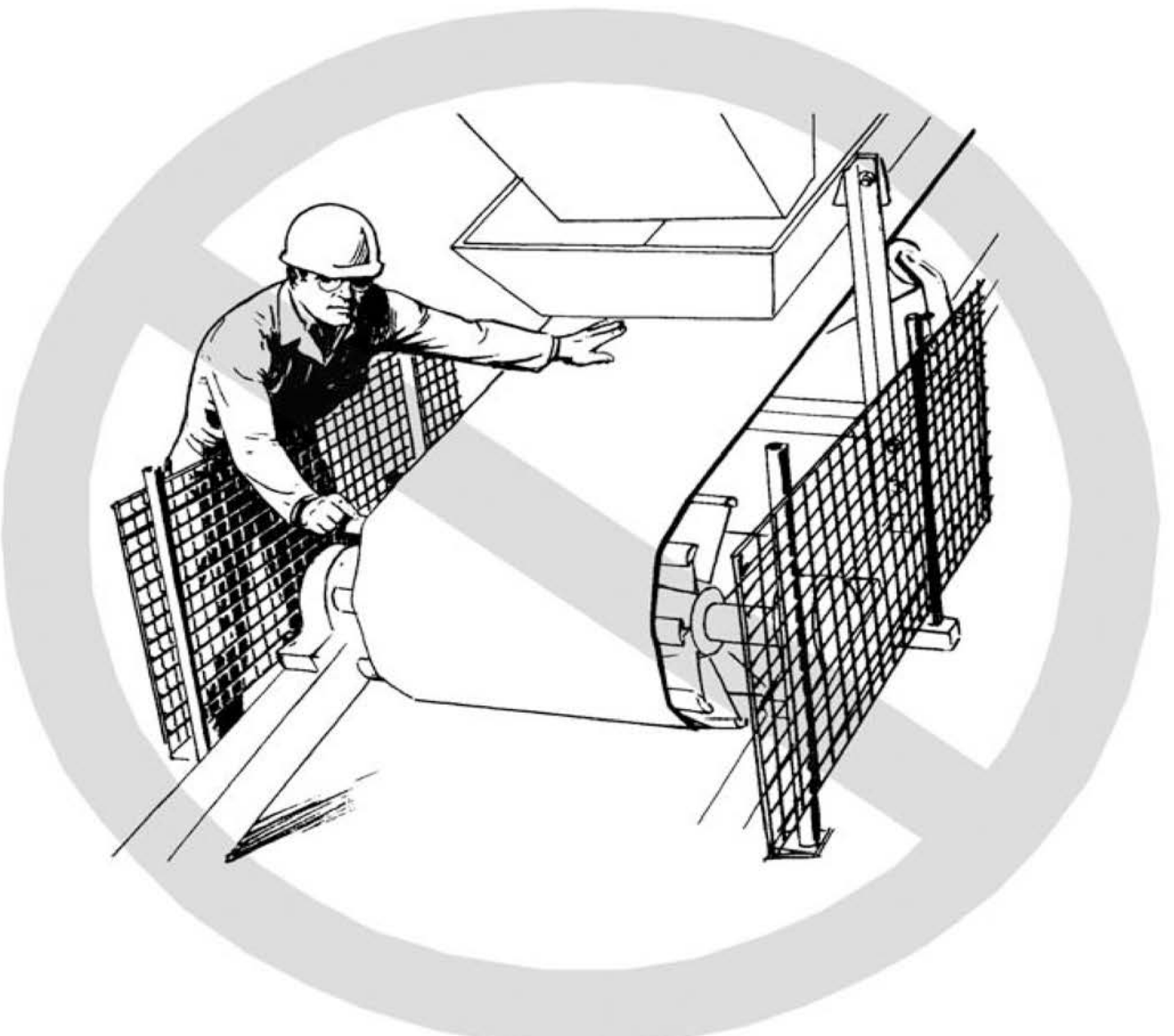


Figure 1

The guard in Figure 2 covers the pinch point and the moving parts of the tail pulley. If properly maintained, this design can prove effective in preventing contact during work-related activities.

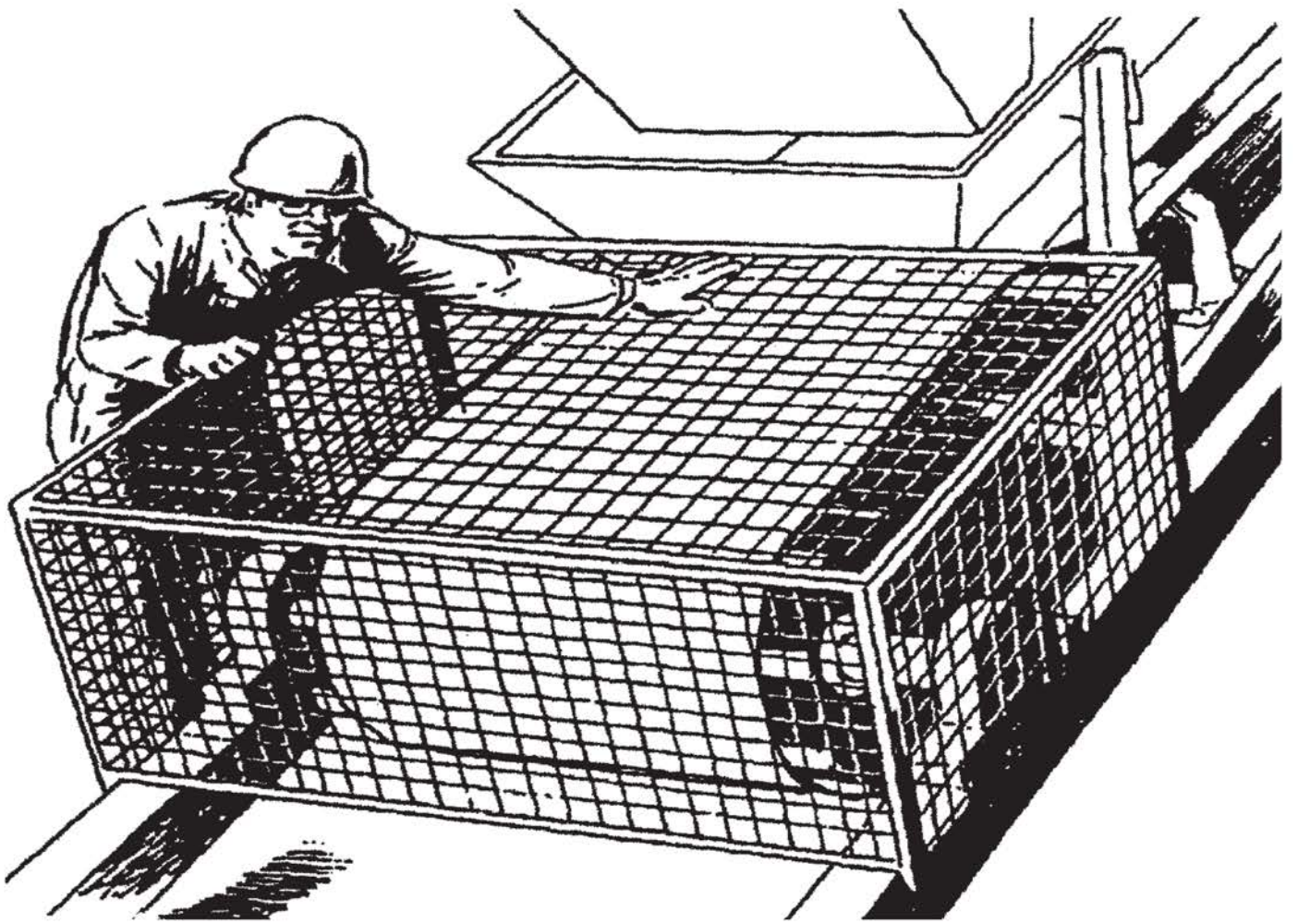


Figure 2

Figure 3 shows an elevated tail pulley. Because the underside of the pulley is accessible, it needs to be guarded. The guard may have openings large enough to allow fines to fall through, but not large enough to allow a miner to reach the moving machine parts.

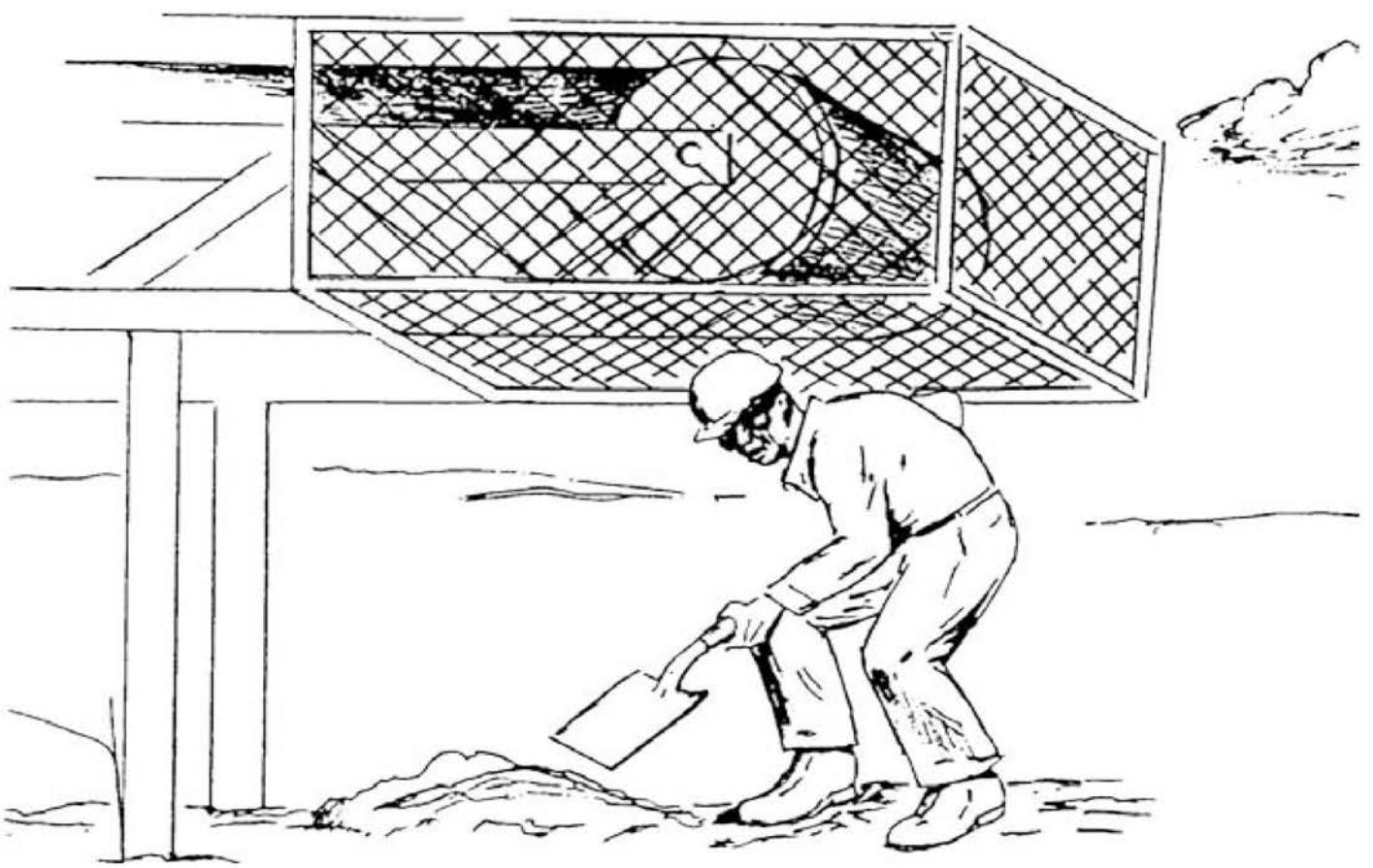


Figure 3

The reason for guarding return idlers is shown in Figure 4.

Return idlers should be guarded wherever miners could contact them. Guarding return idlers may be required where miners work or travel beneath the belt.

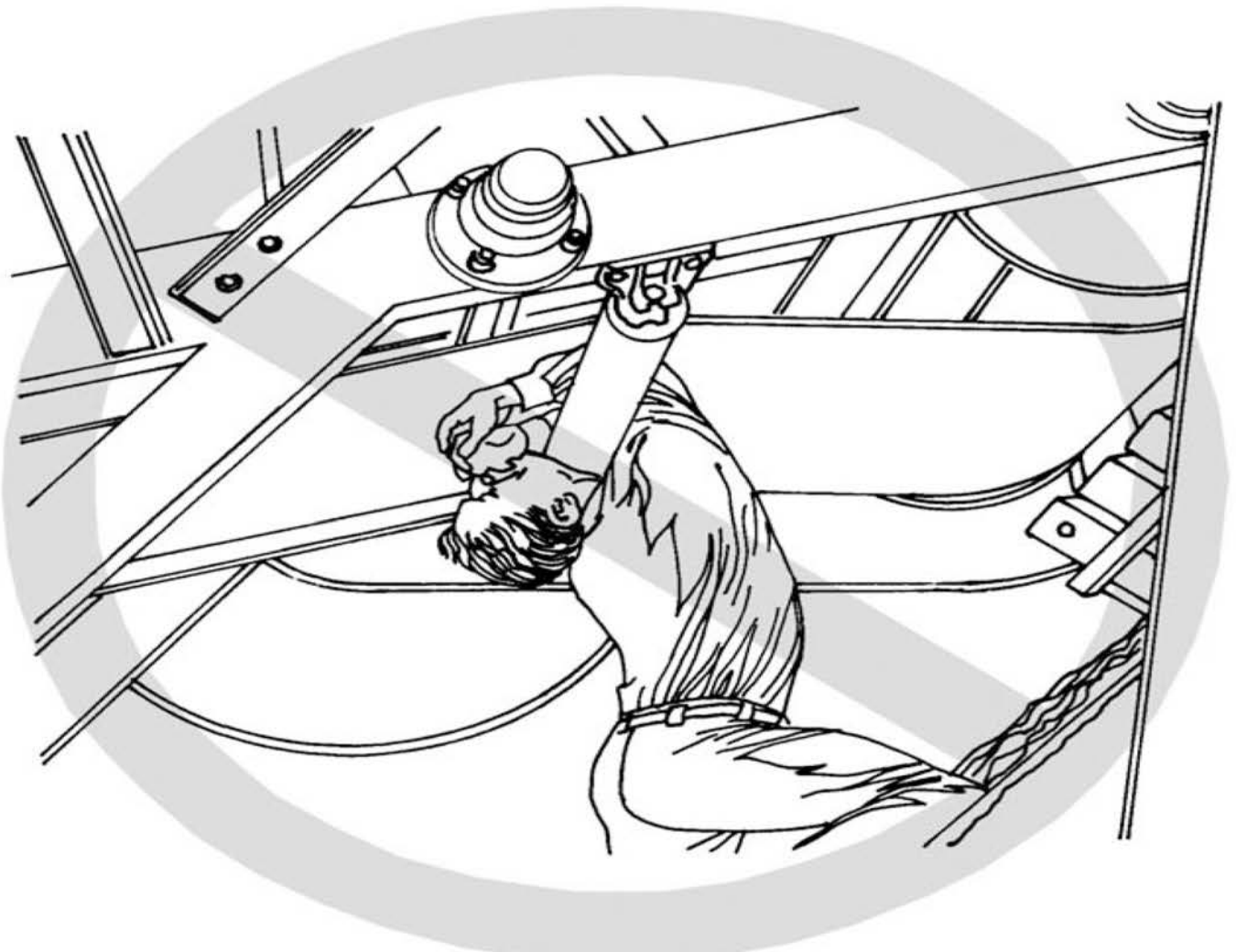


Figure 4

If return idlers require guarding, the figures below show three examples of guards for return idlers. Notice that the grease fittings can be accessed without removing the guard. The guards may have openings large enough to allow fines to fall through, but not large enough to allow a miner to reach the moving machine parts.

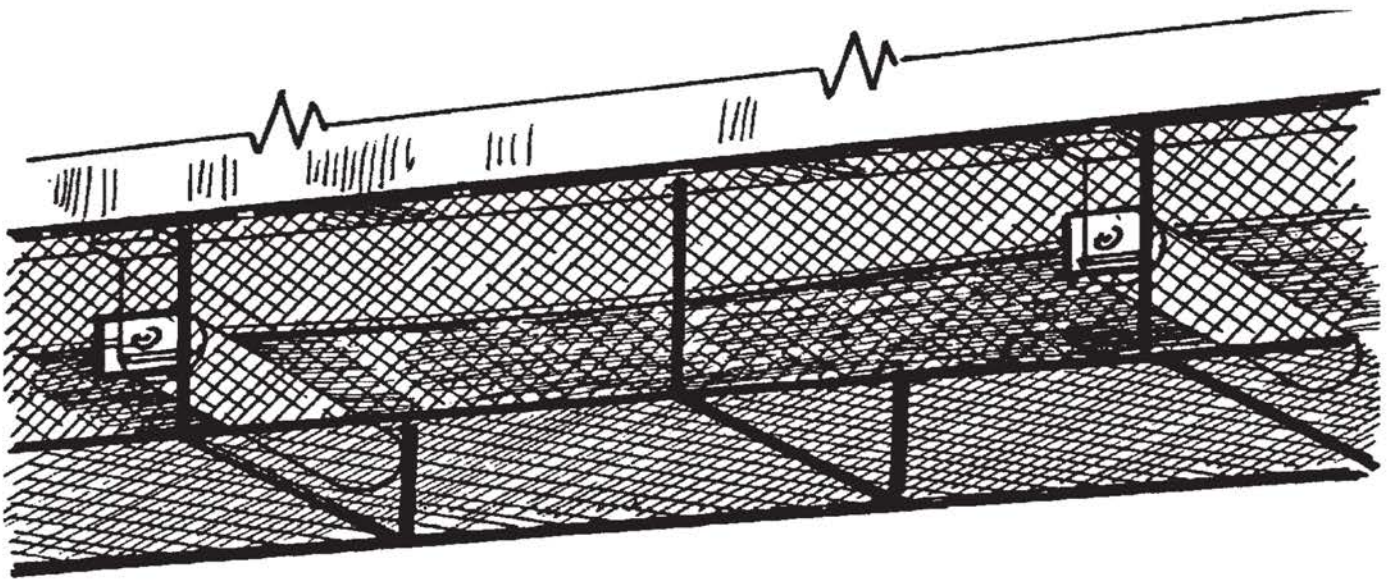


Figure 5

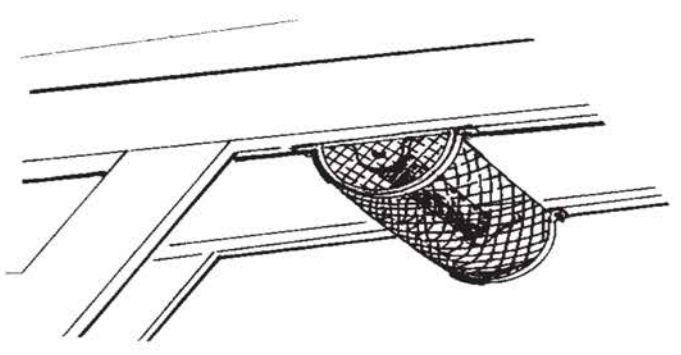


Figure 6

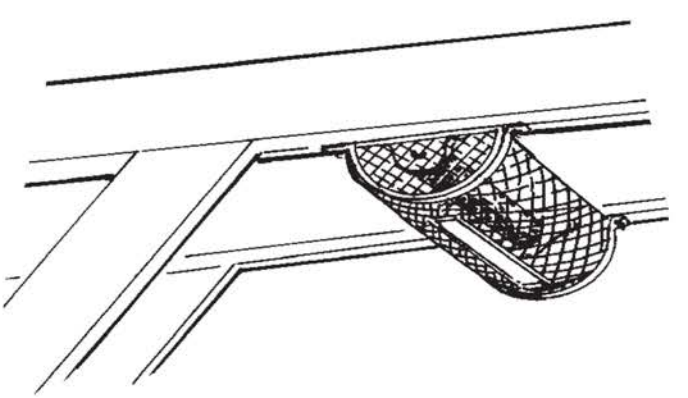


Figure 7

An unguarded head pulley and drive unit are shown in Figure 8. The conveyor pulley, drive pulleys, and belts are exposed, allowing access to hazards.

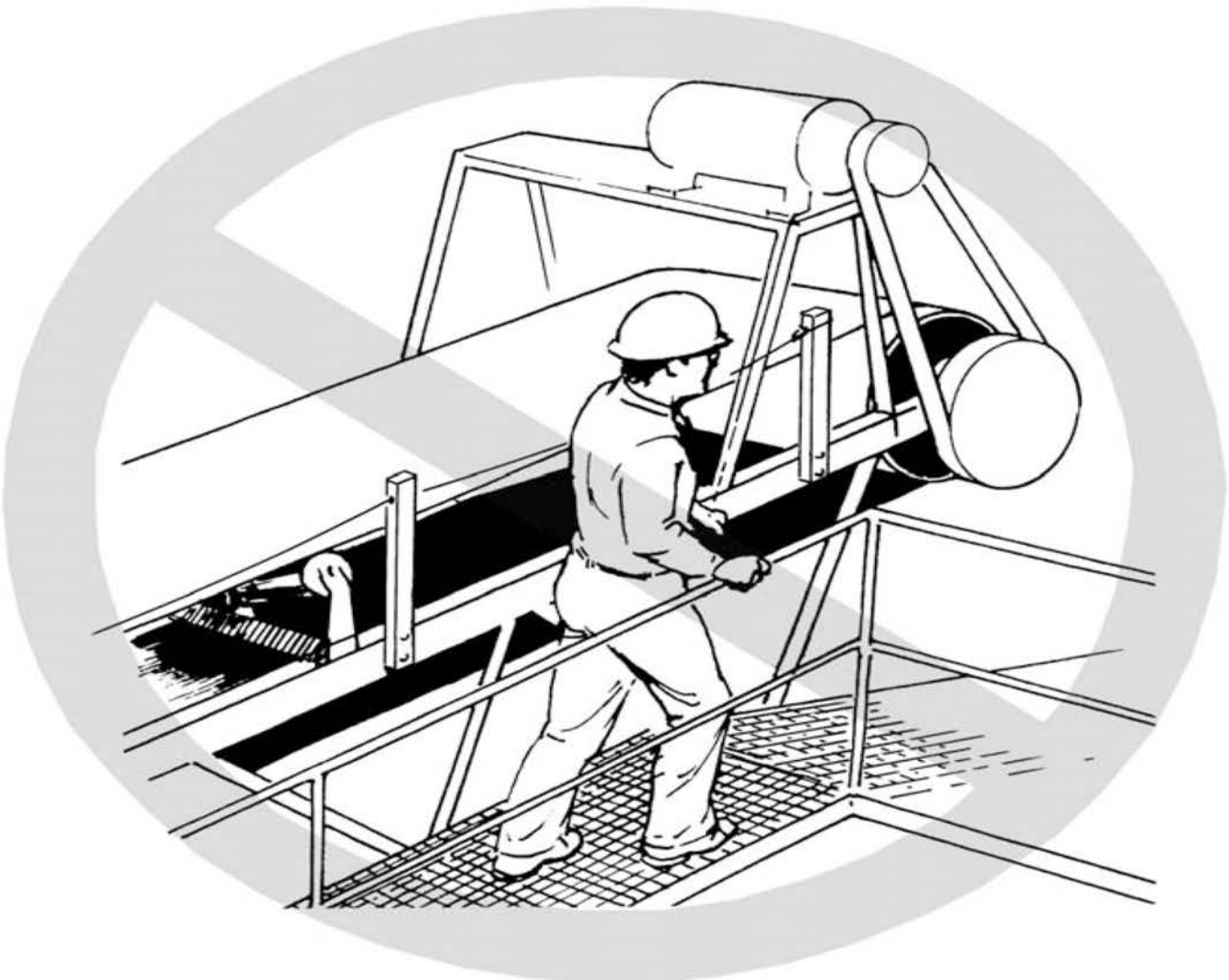


Figure 8

The head pulley and drive guards in Figure 9 are constructed to protect the miner from the pinch points, drive shafts and V-belts.

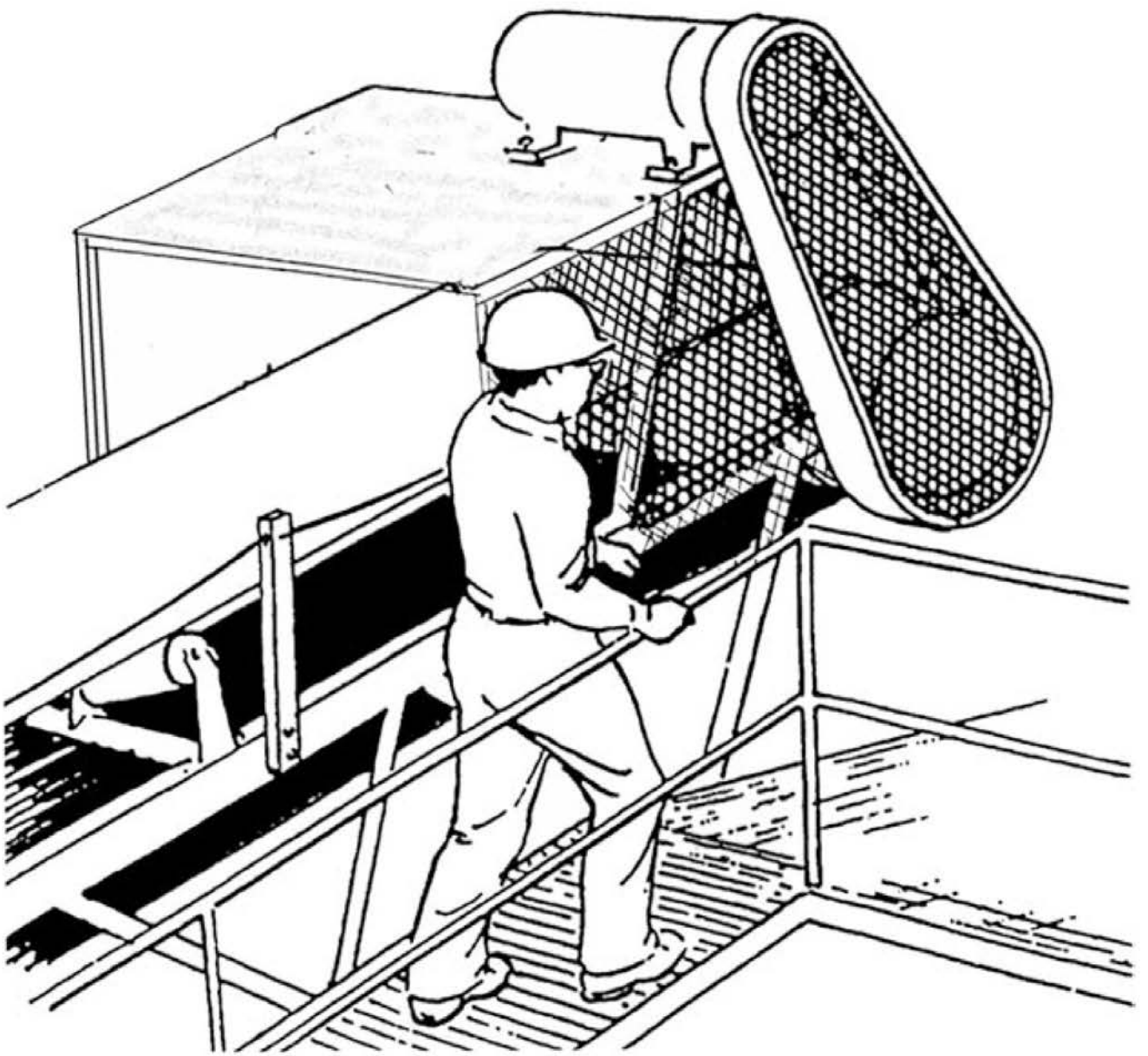


Figure 9

Unguarded conveyors next to travel ways must be equipped with emergency stop cords (FOR METAL/NONMETAL ONLY: a railing is an acceptable alternative to a stop cord).

The emergency stop cord must be sufficiently tight to assure the conveyor drive motor will be deactivated when the cord is pulled. There is no specific location required for the stop cord, however it should be located so that a person falling on or against the conveyor can activate the stop cord.

Figure 10 shows an emergency stop cord along a conveyor belt with a walkway.

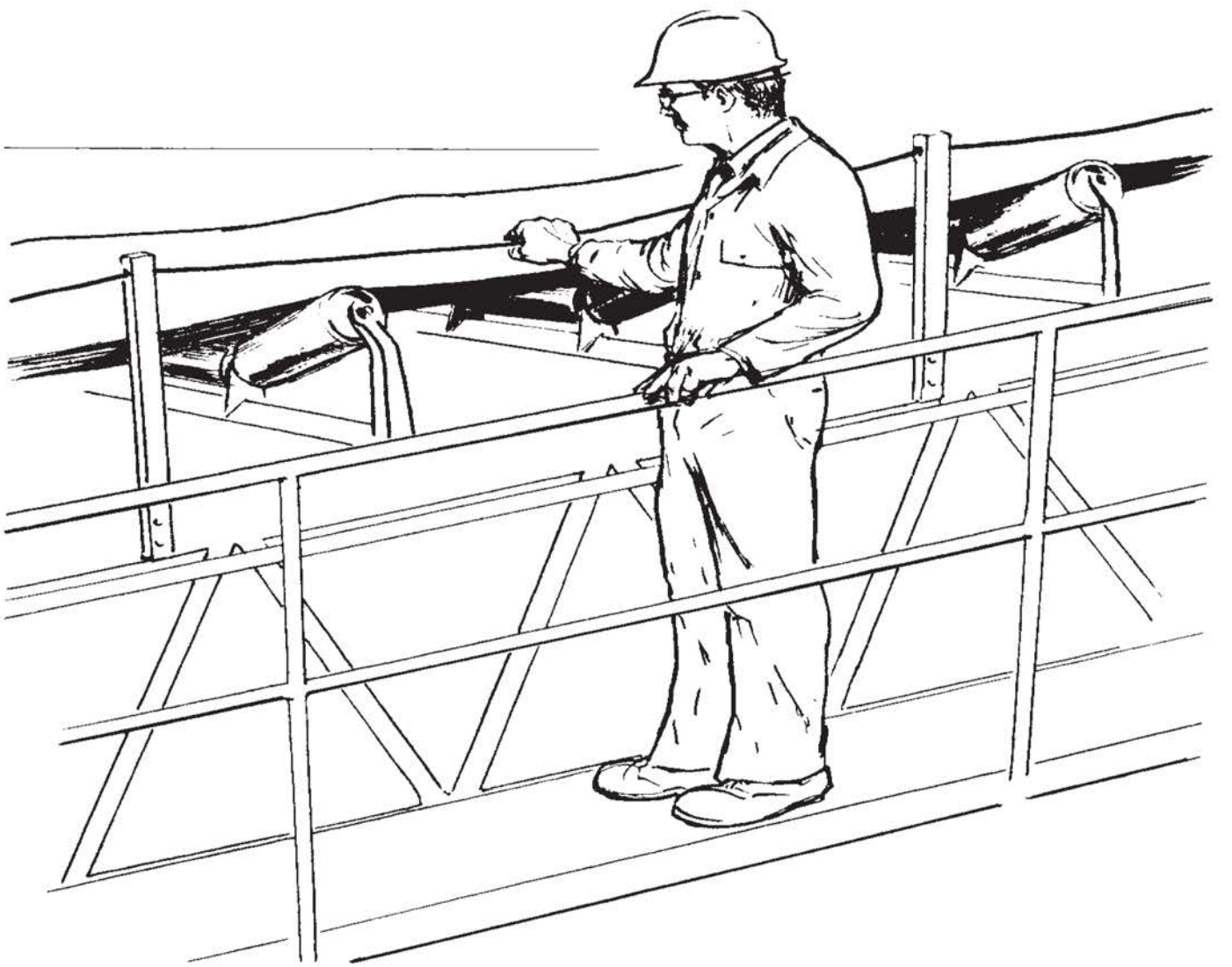


Figure 10

FOR METAL & NONMETAL ONLY

Figure 11 shows a railing installed along the conveyor in lieu of an emergency stop cord. The railing is positioned to prevent persons from falling on or against the conveyor.

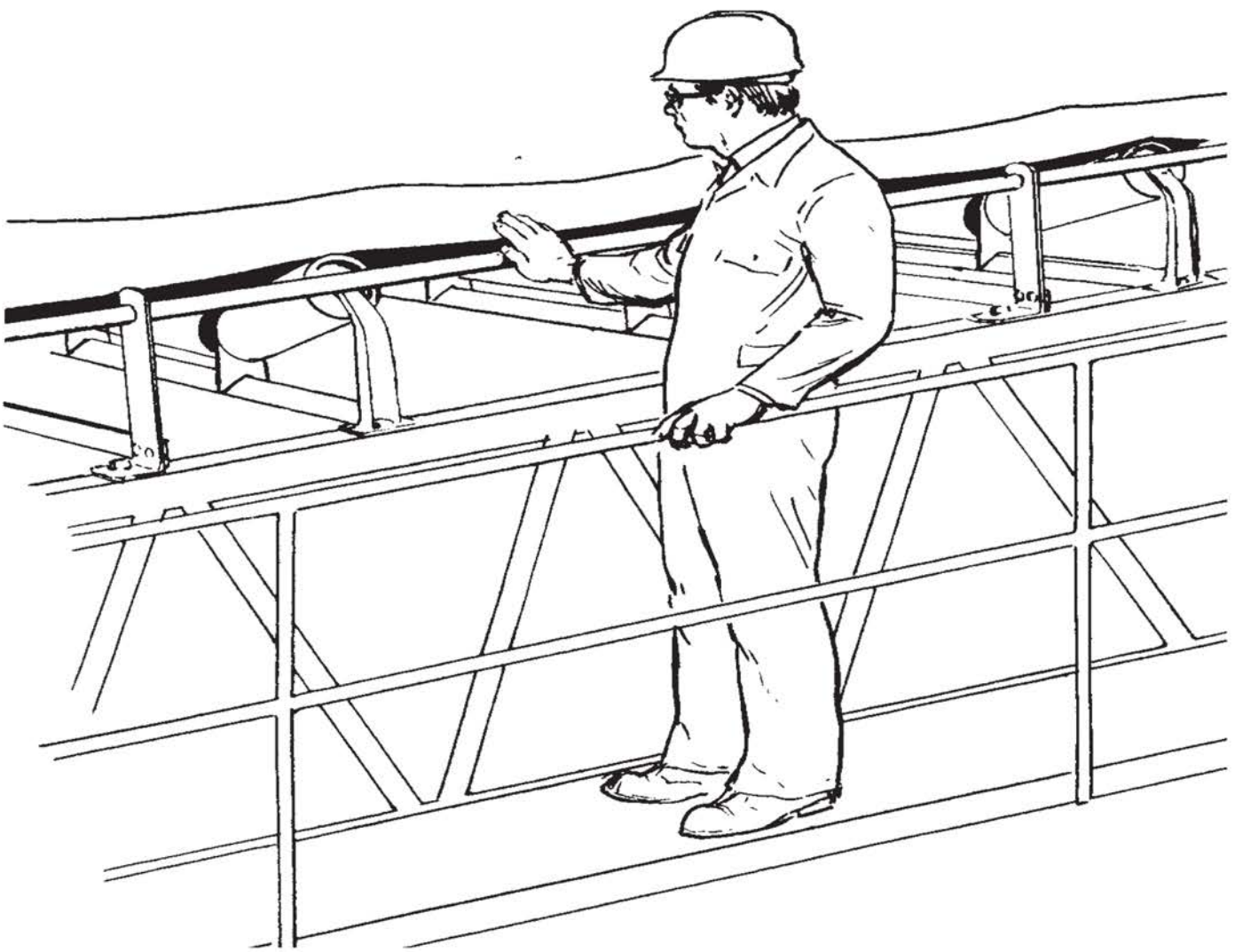


Figure 11

Figure 12 shows an unguarded take-up pulley system. The figure shows exposed bend pulleys and a take up pulley which can easily be contacted. This conveyor structure does not provide a sufficient guard.

Figure 12

Guards can be installed to prevent access to the take-up pulleys (Figure 13). The guard needs to prevent access to pinch points and moving machine parts.

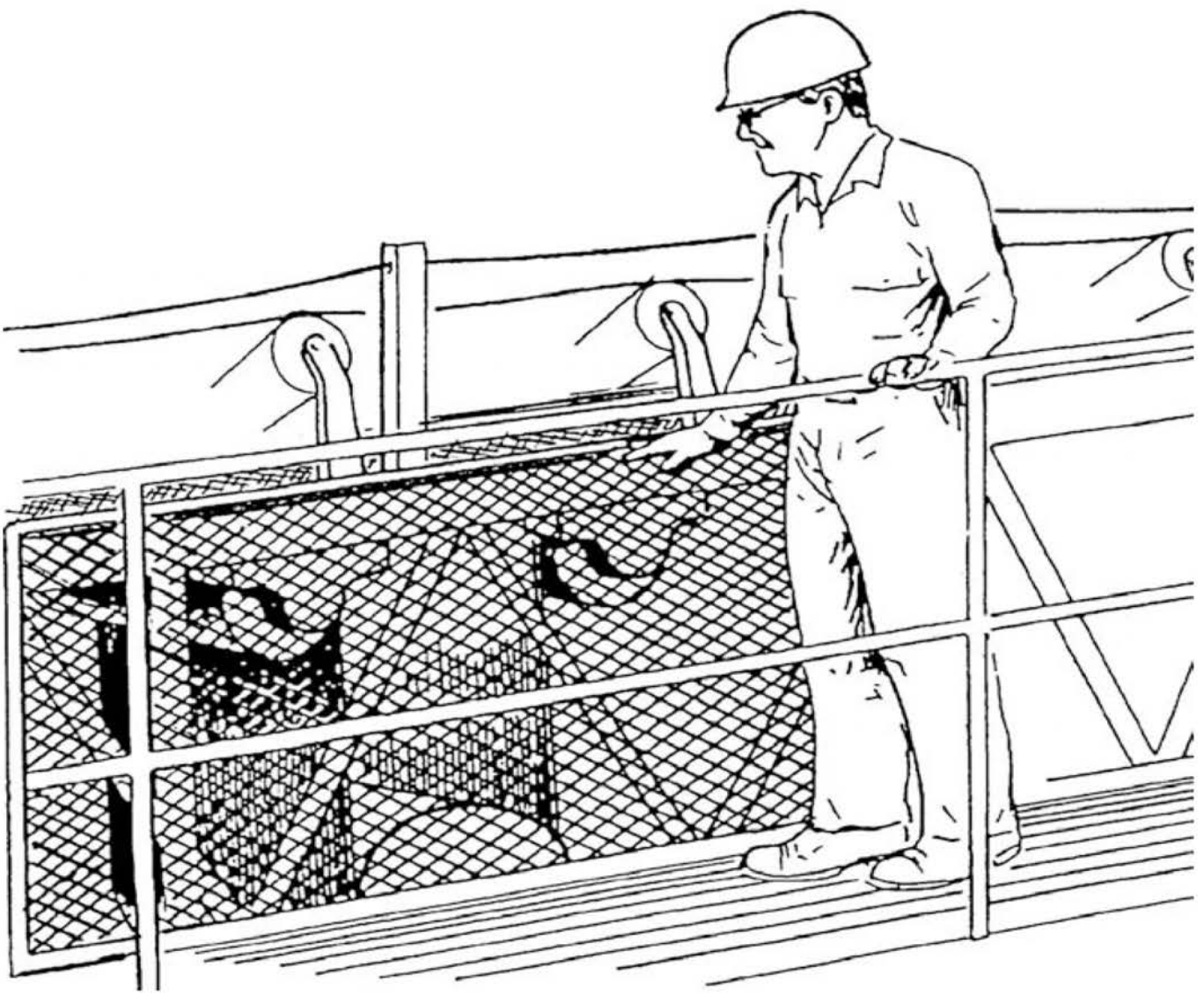


Figure 13

The moving machine parts of take-up pulleys are often located a sufficient distance above the ground to prevent contact, and are therefore considered "guarded by location." They may be equipped with heavy counterweights that pose a suspended load hazard. Precautions such as a barricade, railings or a guard (Figure 14) should be taken to prevent access below the suspended load. An acceptable alternative for some counterweights would be the use of wire ropes to prevent dropping hazards.

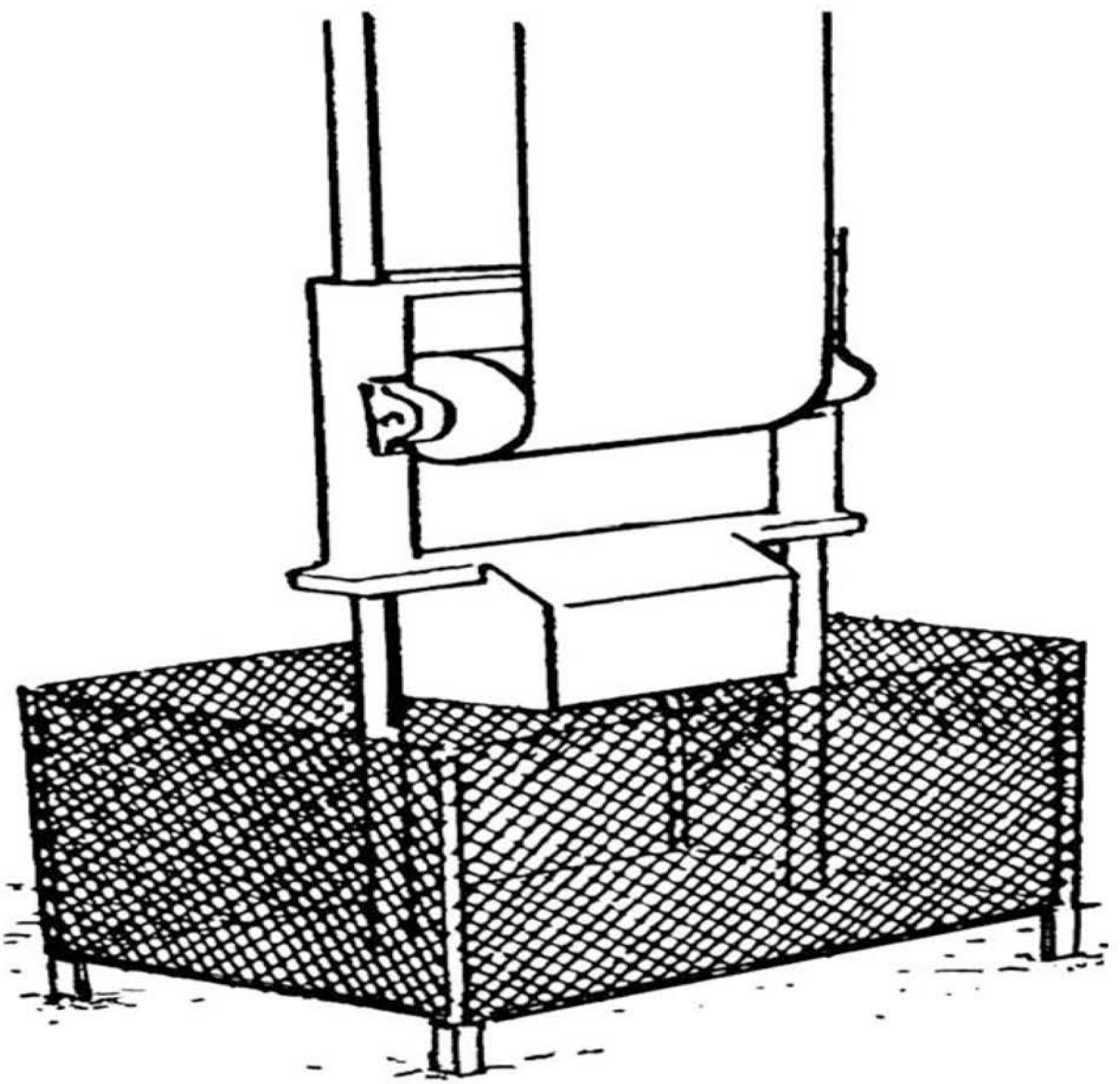


Figure 14

Shafts and shaft ends need guarding if they present a hazard. Rotation speed, size, location, keyways, burrs and other factors need to be considered when determining which shafts need guarding. Not all shafts and shaft ends require guarding. The examples shown in Figure 15 contain protruding bolts, keys, and couplings and should be guarded. Figure 16 shows examples of guards for rotating shafts and shaft ends.

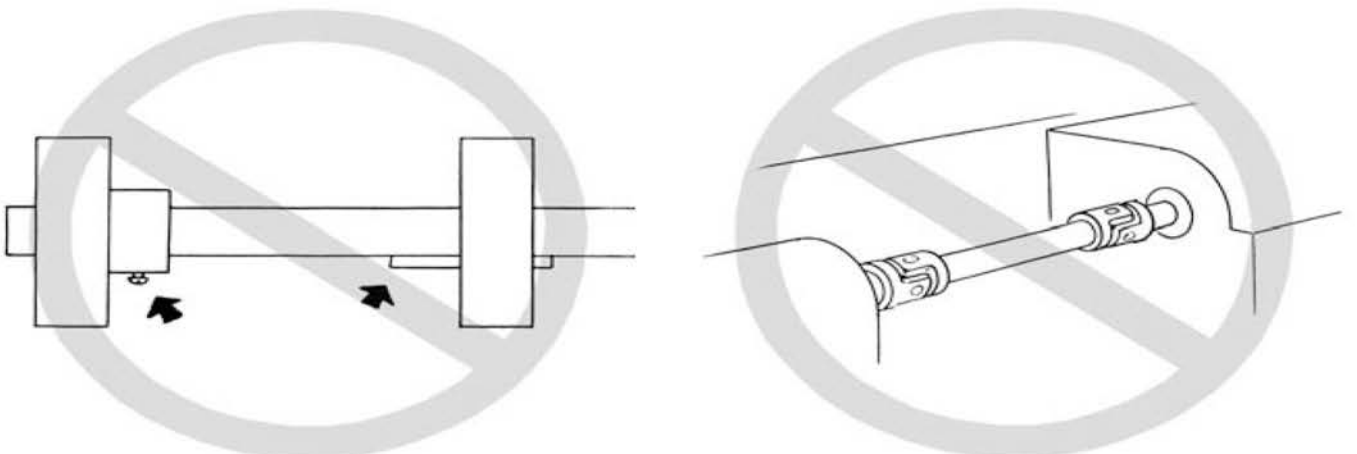


Figure 15

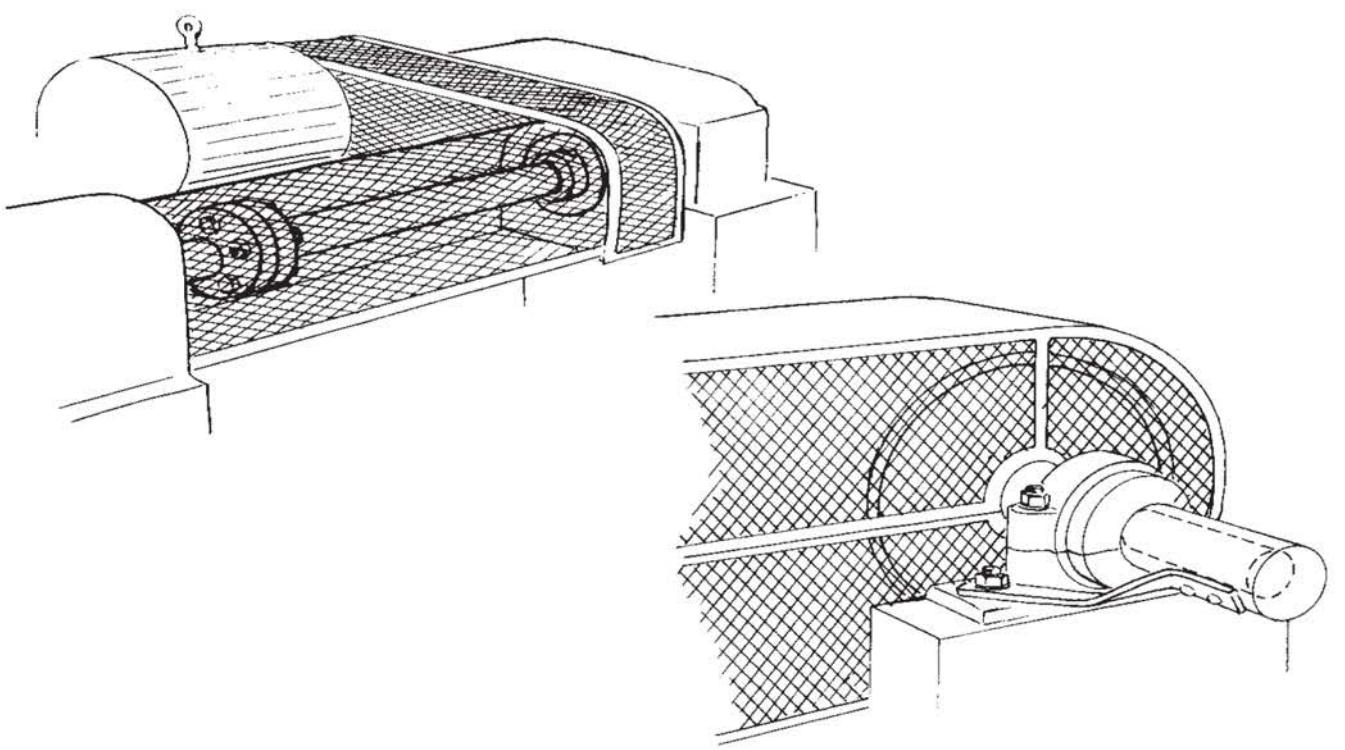


Figure 16

Figure 17 shows a drive coupling. Couplings need to be enclosed to prevent contact. An example guard is shown in Figure 18.

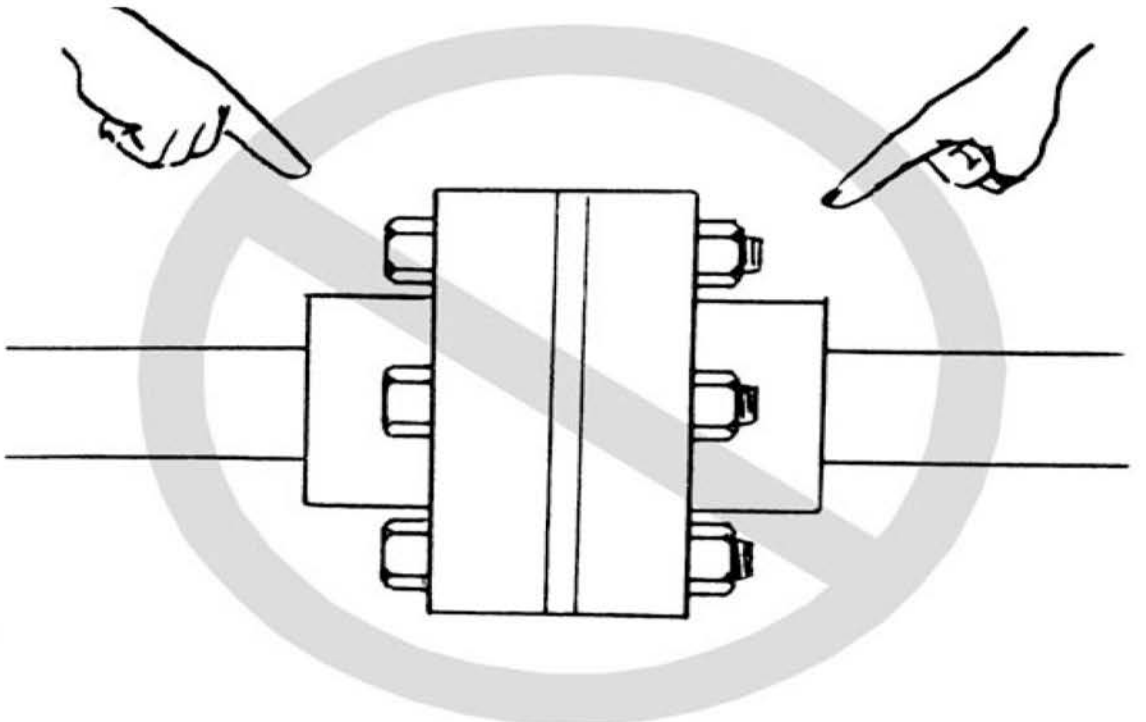


Figure 17

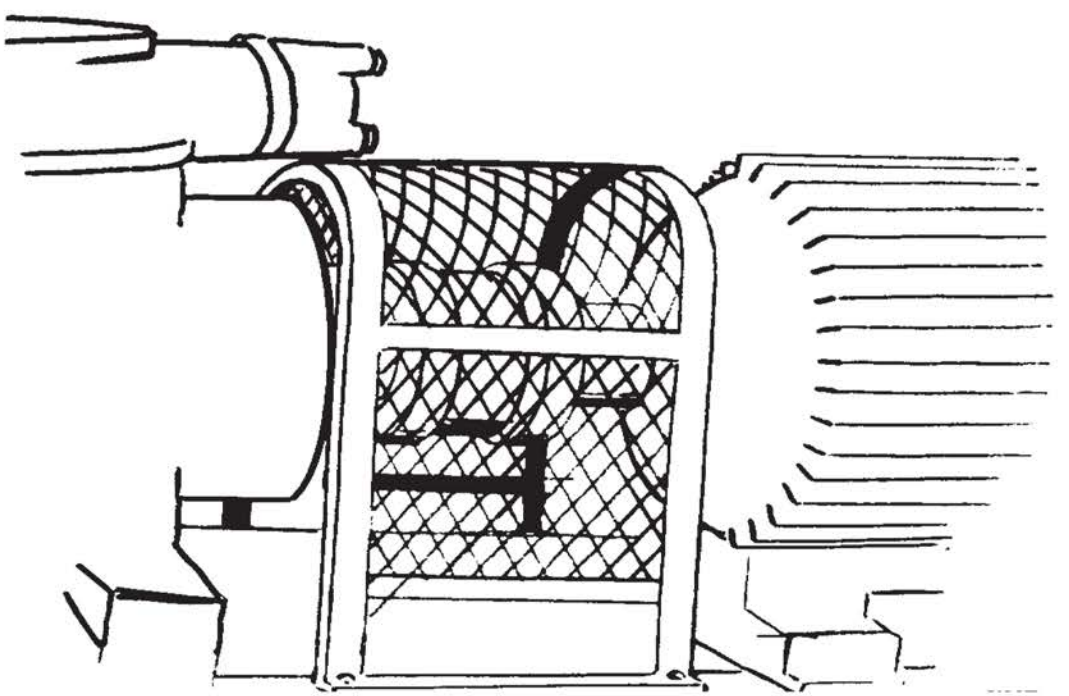


Figure 18

Figure 19 shows an unacceptable guard for a drive belt and pulleys. The belt and pulleys can still be contacted by a miner.

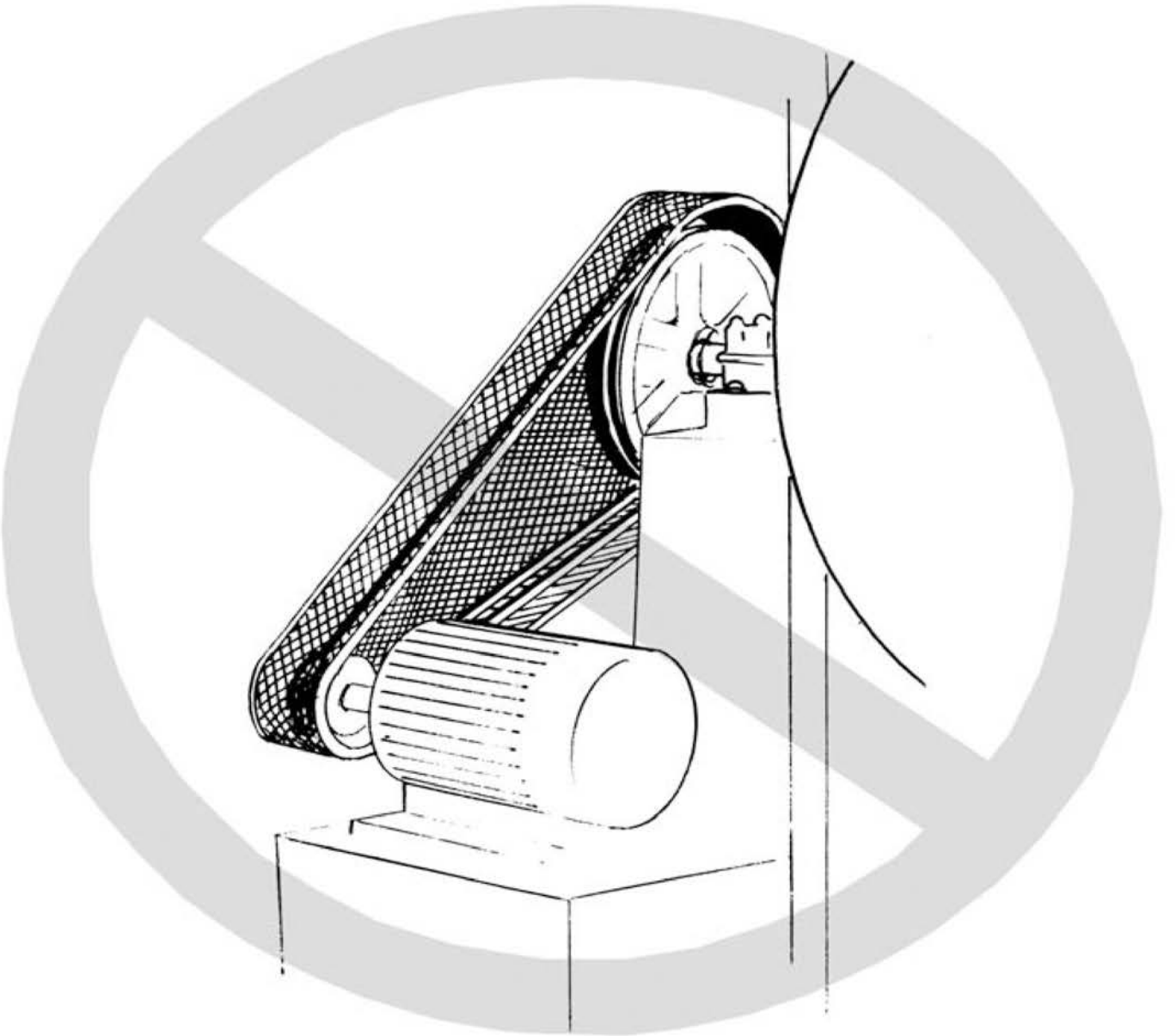


Figure 19

Where contact with belts, pulleys, sprockets, chains, etc., is possible from both sides, they must be guarded to prevent contact from either side. An example is shown in Figure 20.

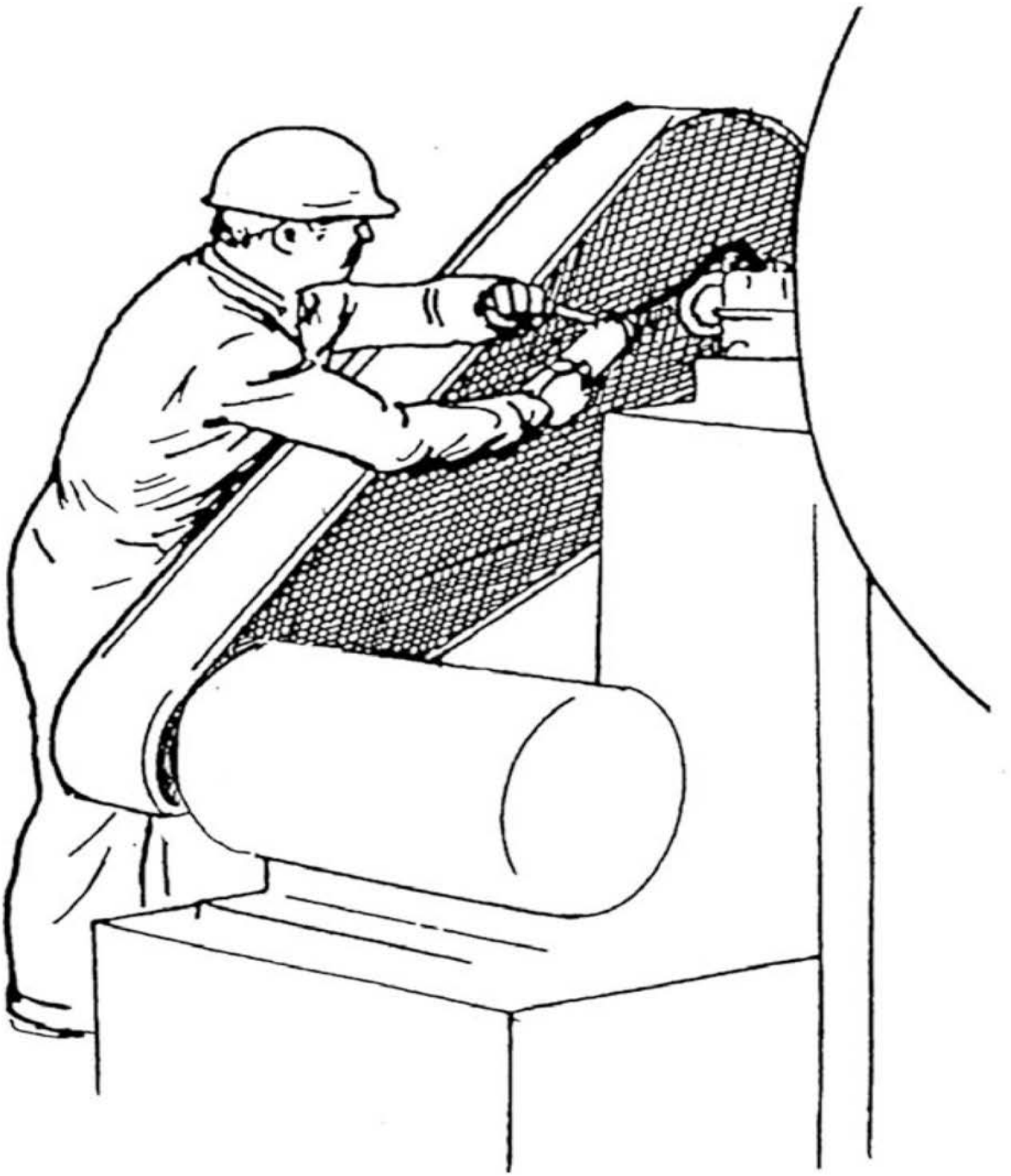


Figure 20

Where hazards are created by belt breakage, (Figure 21), a guard must be provided to contain the broken belt. An example is shown in Figure 22.

Figure 21

Figure 22

Fan blades need to be guarded where they can be contacted (Figure 23).

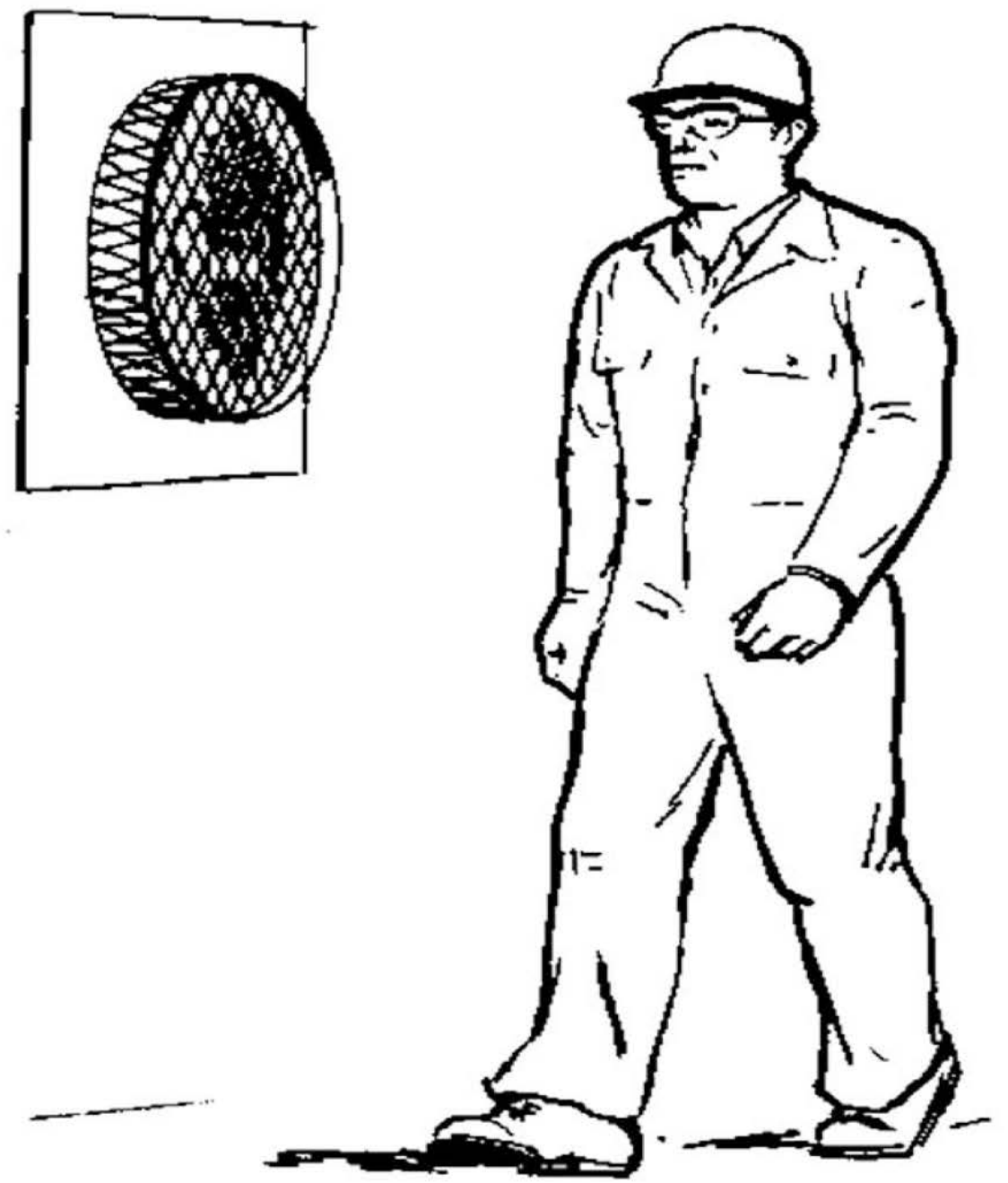


Figure 23

Figure 24 shows a flywheel guarded by location. Build-up of material may place the flywheel within easy reach, as shown in Figure 25. To protect miners from contacting the flywheel, the build-up must be removed or the flywheel must be guarded. An example guard is shown in Figure 26.

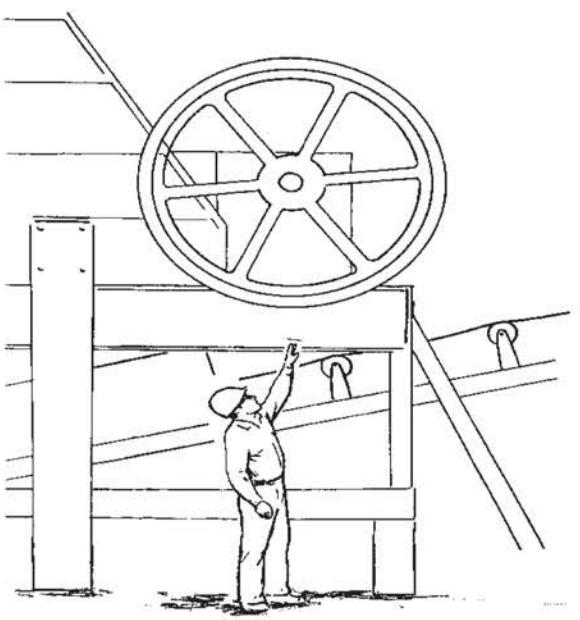


Figure 24

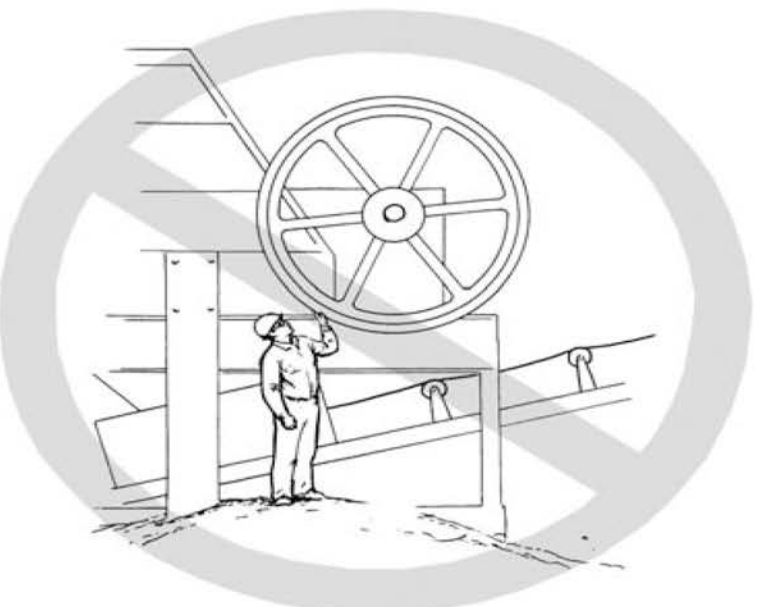


Figure 25

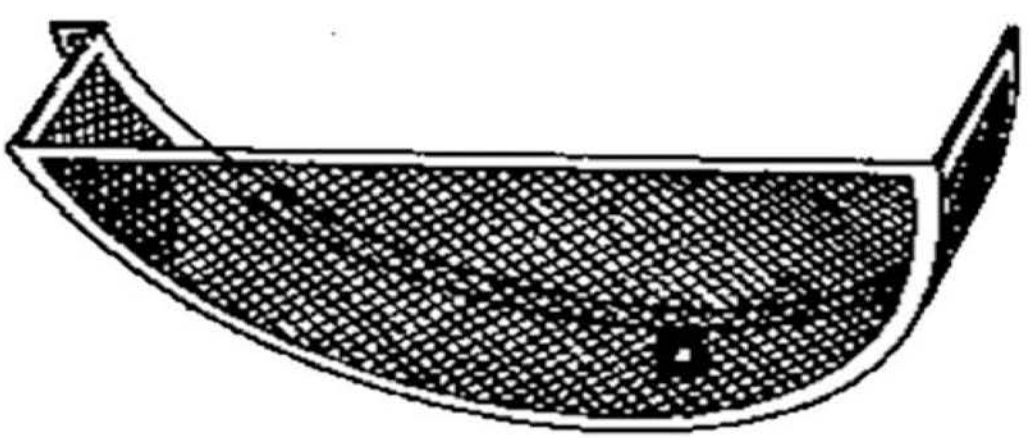


Figure 26

Figure 27 is an example of two separately controlled conveyors that are protected by a single guard. In this case a single guard covers the pinch points and moving machine parts of both belt conveyors. Before removing this guard, both belts would need to be secured.

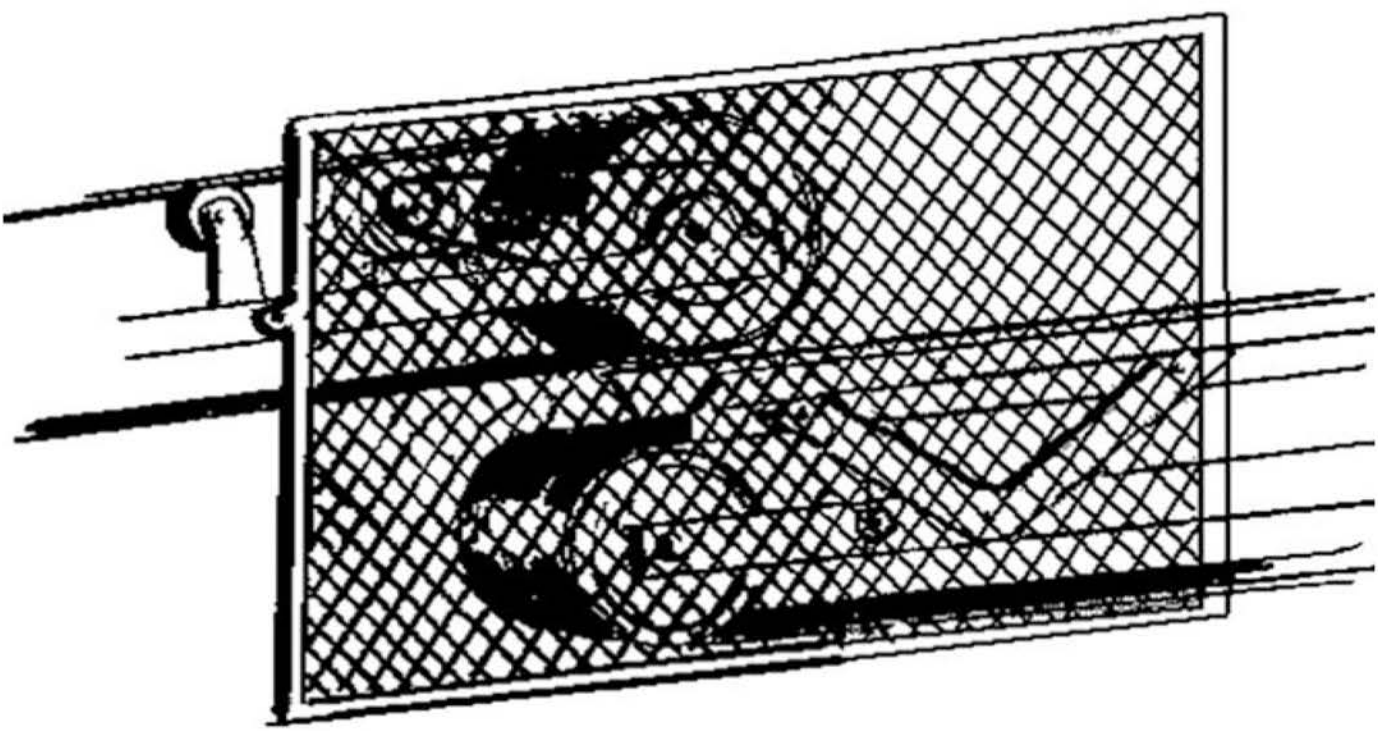


Figure 27

Moving machine parts on mobile equipment may need to be guarded to prevent contact. For example, Figure 28 shows a guard provided to prevent contact with the cooling fan, alternator, and fan belts of a front-end loader. In cases where moving machine parts are located under hoods, behind doors, guarded by location and/or covered by maintenance panels, additional guarding may not be necessary.

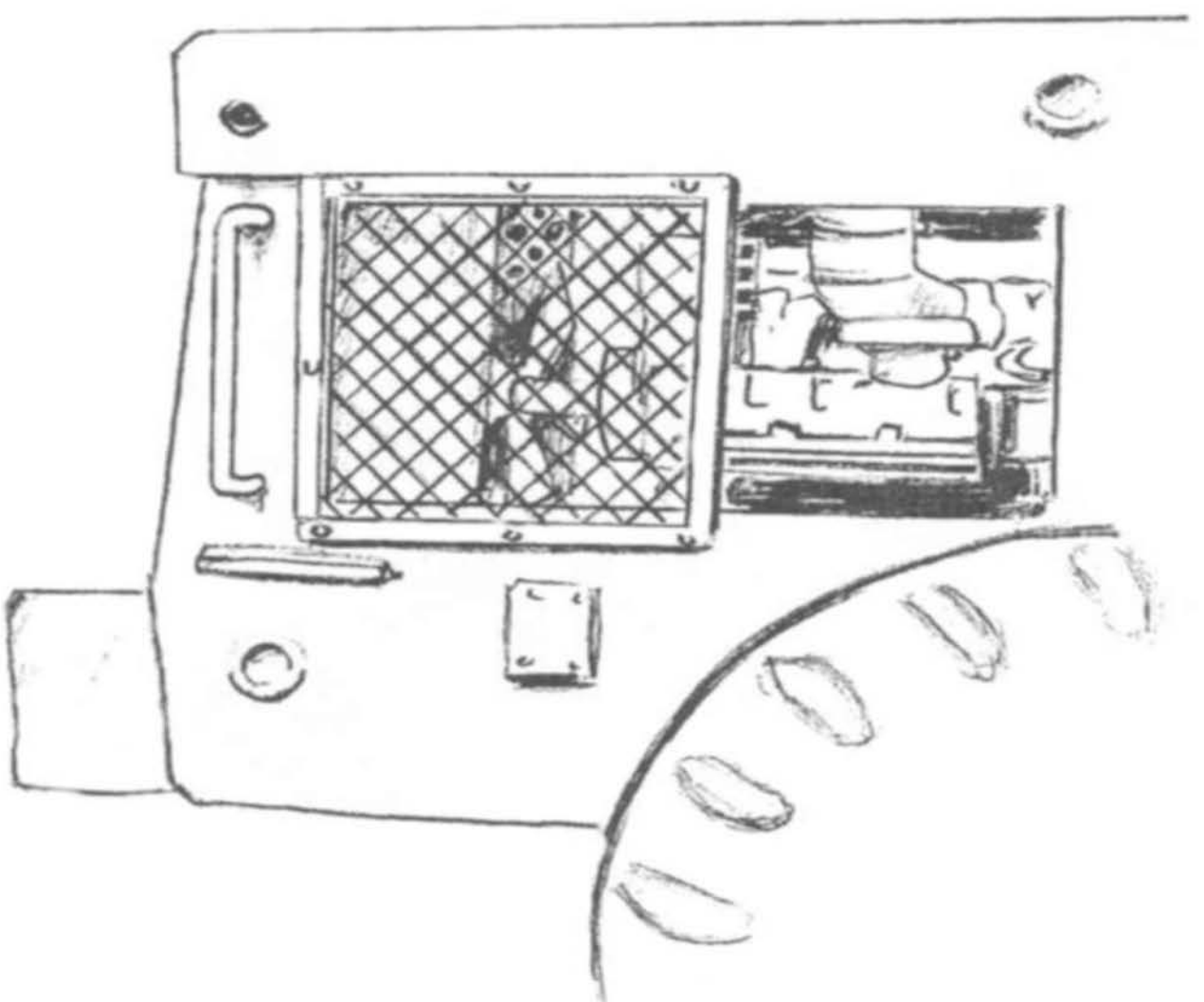


Figure 28

Figure 29 shows a kiln with a railing restricting access to the trunnion area. This railing is unacceptable as a guard because miners access the area beyond the railing while the kiln is in operation. The rotating trunnions are exposed, presenting a hazard to miners.

The railing is not easily recognizable as a guard, is easily defeated and does not secure the area from entry.

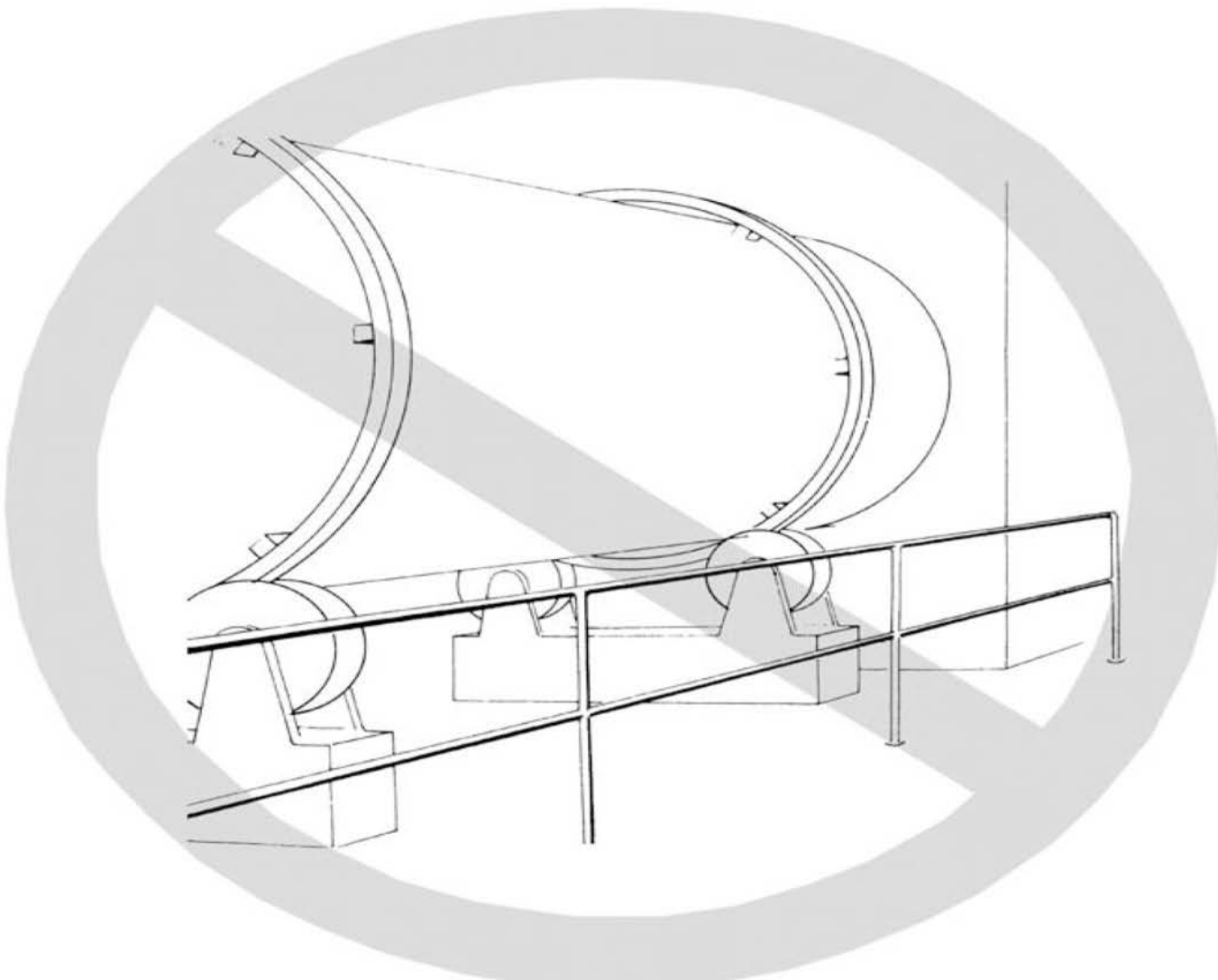


Figure 29

Figure 30 shows the trunnions with point-of-contact guards. This method of guarding permits easy access, yet protects against contacting the moving machine parts. If the lubricating system is accessible with the guard in place, servicing can be done while the kiln is in motion.

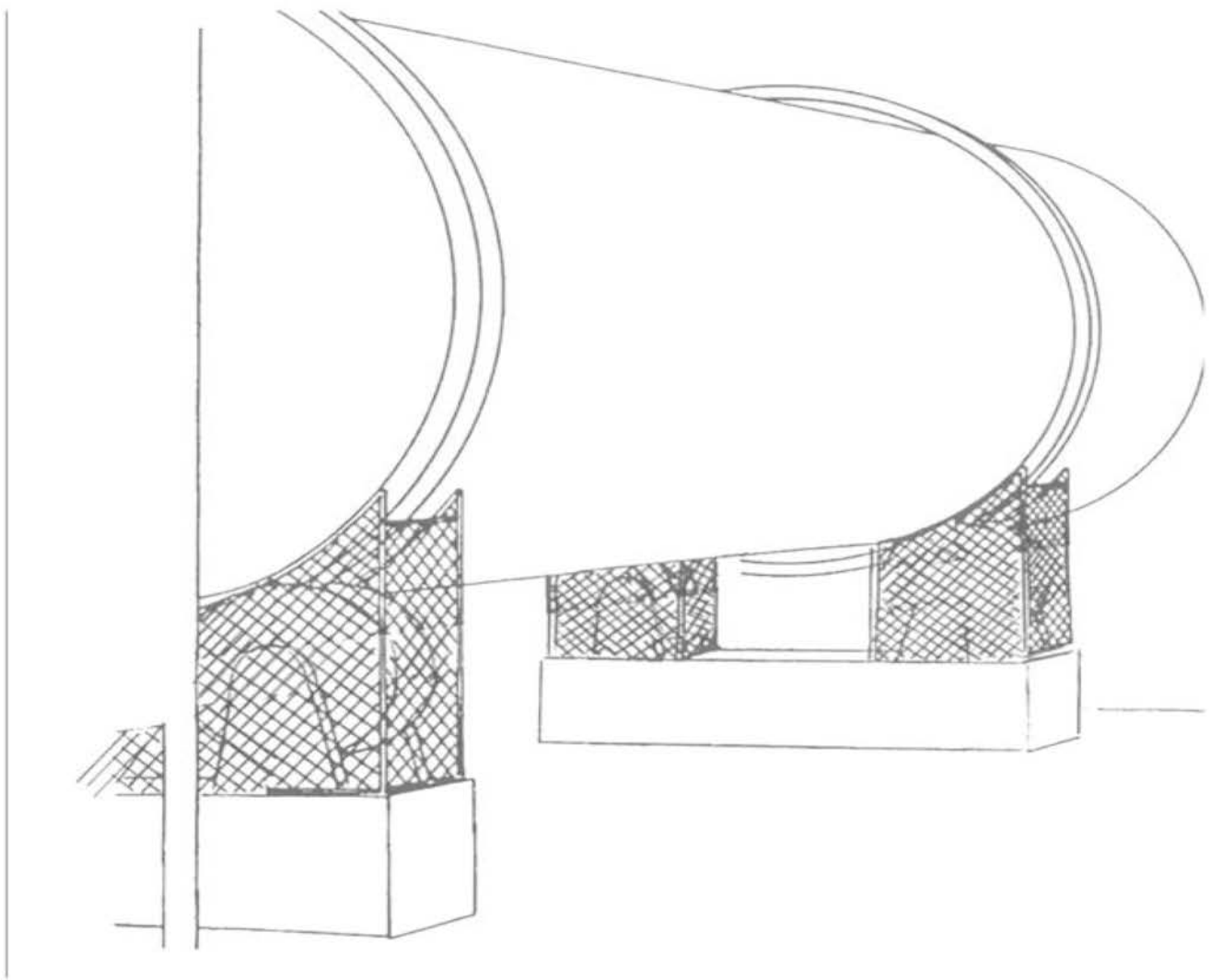


Figure 30

Area Guarding

An area guard is a barrier which prevents entry of a miner into an area containing moving machine parts, thus preventing contact with the moving parts. Effective area guards may require additional practices and provisions such as signage, locks, color coding, etc., in addition to the physical barrier. When designing, installing and/or using area guards, consider:

- Security of the area
  - ➔ Is the area guard difficult to defeat?
  - ➔ Is it locked or bolted?
  - ➔ Does the guard prevent entry into the area and is the guard difficult to defeat?
- How will the moving machine parts be shut down before entry?
  - ➔ Will the guard be interlocked with the hazardous equipment so entry will automatically shut down the moving parts?
  - ➔ Will manual shutdown be used?
- Is the area guard easily recognized as a guard?
  - ➔ Are warning signs or color coding in use?
- Frequency of entry into the guarded area
  - ➔ Frequently accessed areas may not be suitable for area guarding
- Number of people requiring access into guarded area
  - ➔ If a large number of people need access to an area, then area guarding may not be suitable.
  - ➔ Education and training in proper procedures
  - ➔ Does the work force understand who may enter area guards?
  - ➔ Have lock-out, tag-out procedures been addressed?

Figure 31 shows an example of an area guard used to prevent contact with multiple belt tailpieces. Figure 32 shows a similar situation using point-of-contact guards.

An advantage of the area guard is that it may be less expensive. A disadvantage is that both belts need to be locked-out and tagged-out before entering the guarded area.

The advantages of the point-of-contact guards are that one belt can be maintained while the other belt continues to run, the belts can be cleaned around without lock-out/tag-out and maintenance on the chutes is possible without lock-out/tag-out.

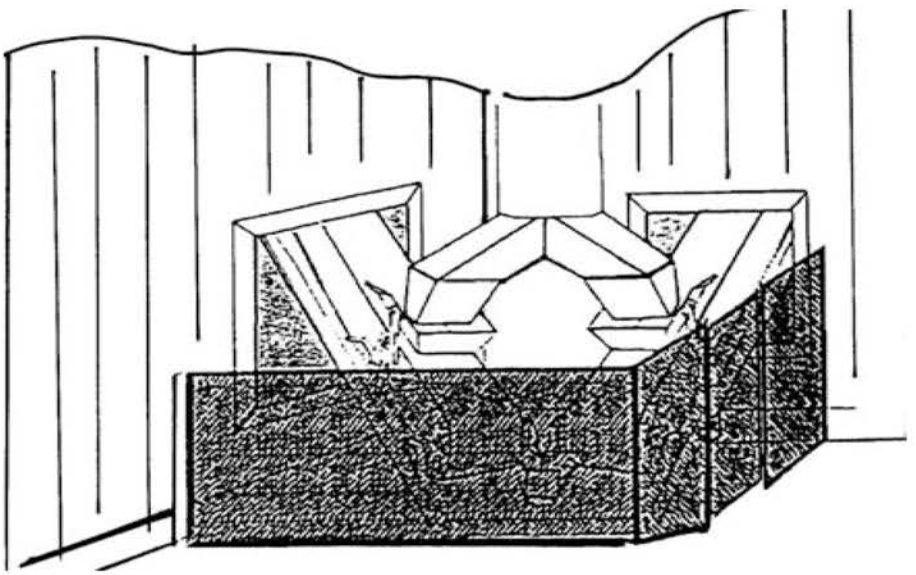


Figure 31

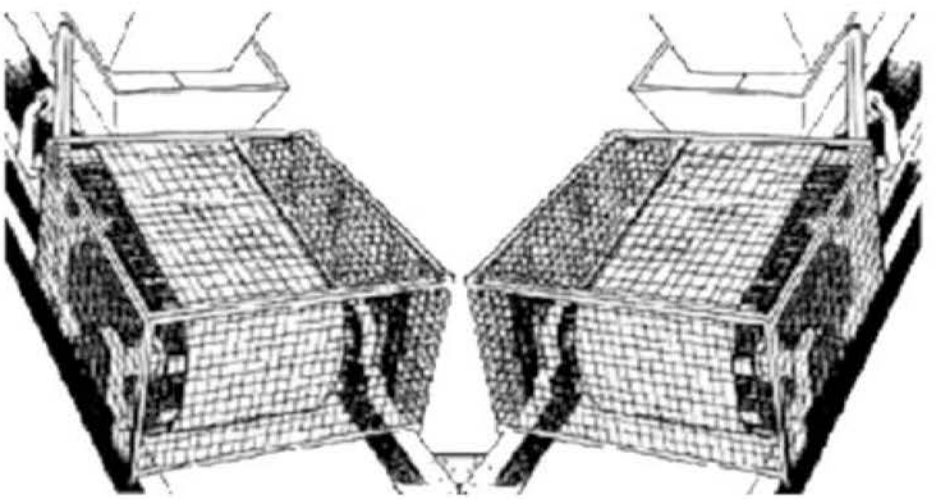


Figure 32

The example guard designs shown in Figures 33 and 34 protect the miner from contacting the pinch points, the moving machine parts of the head pulley, and the moving shafts and drive pulleys and belts.

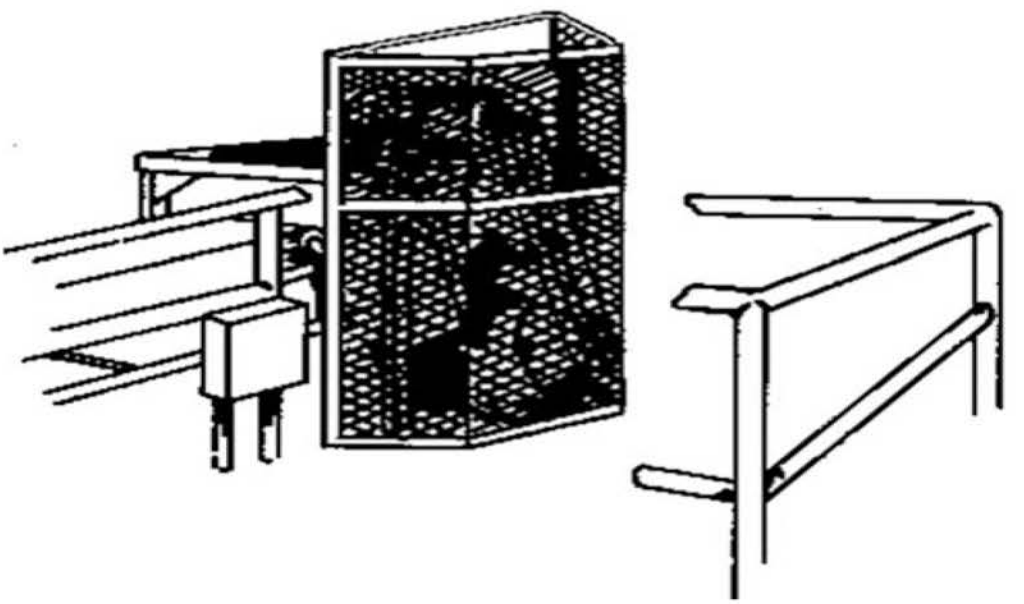


Figure 33

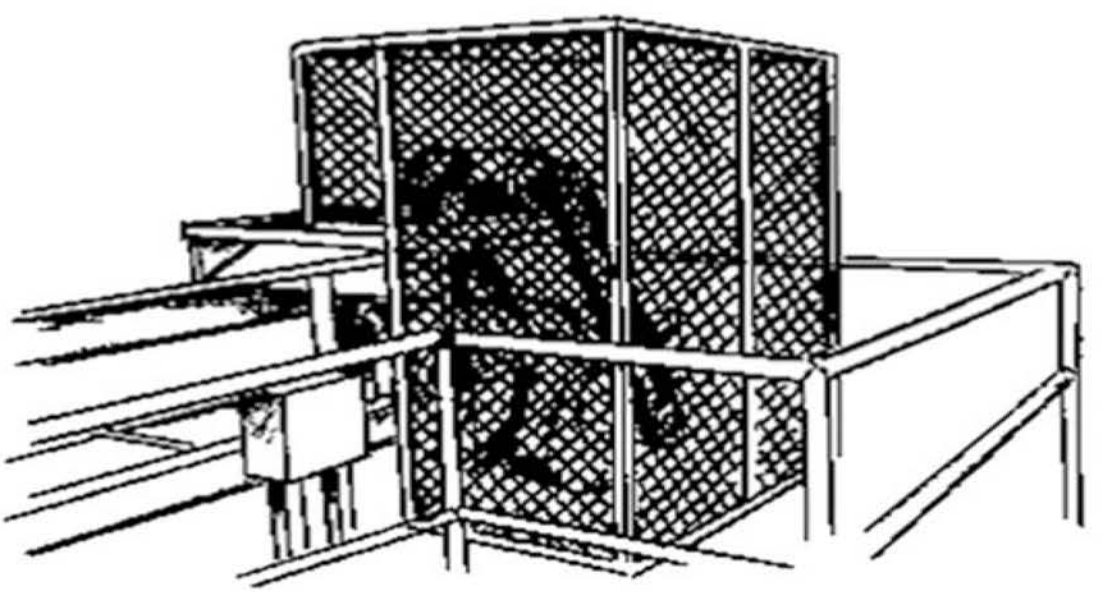


Figure 34

Figure 35 shows classifiers guarded to prevent persons from coming in contact with the screws. This guard adequately protects the miner because it is tall enough and far enough from the hazard to prevent contact during work-related activities.

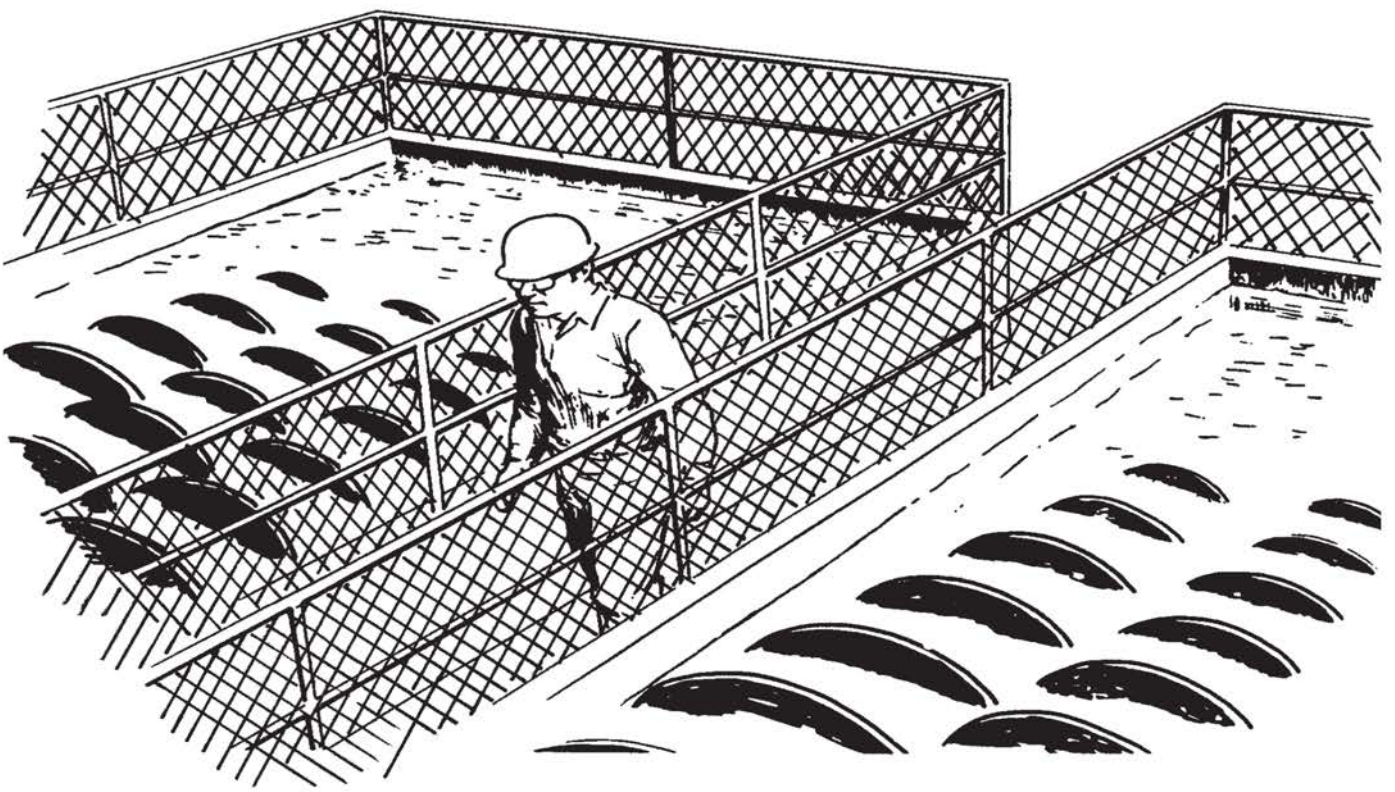


Figure 35

New Technology

New technologies may provide alternative means of guarding. As new technologies are developed and alternative ways of protecting miners become available, their use and application may provide a level of protection equal to, or surpassing, conventional guards.

Several new technologies show promise:

- ✔ Laser beams may be effective at long range. They can monitor area perimeters and detect when entry into a hazardous area occurs.
- ✔ Pulsed infrared light curtain systems may be useful as area guards. They are particularly useful in dusty environments.
- ✔ Infrared scanners can detect changes in the reflective field of a monitored area.
- ✔ Pressure plates can be equipped with sensors that detect changes in a radio frequency field or electrical capacitance. They can guard an area by sensing a person's approach through contact with the plate.
- ✔ Mechanical pressure mats open electrical contacts to stop a motor when someone steps on the mat in a hazardous area.
- ✔ Interlock systems are available with multiple contacts. Multiple contacts or zones can be used to trigger a warning alarm for entry into an area but shut a system down if the person continues past the warning and approaches a hazard too closely.

While new technologies may be suitable in some situations, you should also be aware of the pitfalls in systems that use these alternative guarding systems. The following types of questions should be asked:

- ➔ Does the system react quickly and at sufficient distance to prevent contact with the machine parts before their motion has stopped?
- ➔ Is the system redundant?
- ➔ Can it be by-passed, such as ducking under a laser beam?
- ➔ Is there regular and frequent testing?
- ➔ Will the system fail safe?

REMEMBER

The best guard will not protect miners if it is not properly installed and maintained.

APPLICATION PHOTOS

UNIGUARD
APPLICATION PHOTOS

Horizontal Belt Guards Featuring Lifting Handles and Vent Holes.

Barrel Guards Featuring Vents and Inspection Window.

UNIGUARD
APPLICATION PHOTOS

ANSI Barrel Guards and UniClear Guards.

CGLU on the Drive Unit of a Gearbox.

UNIGUARD
APPLICATION PHOTOS

CGU-Kit Guard

CG Split Slotted Guard

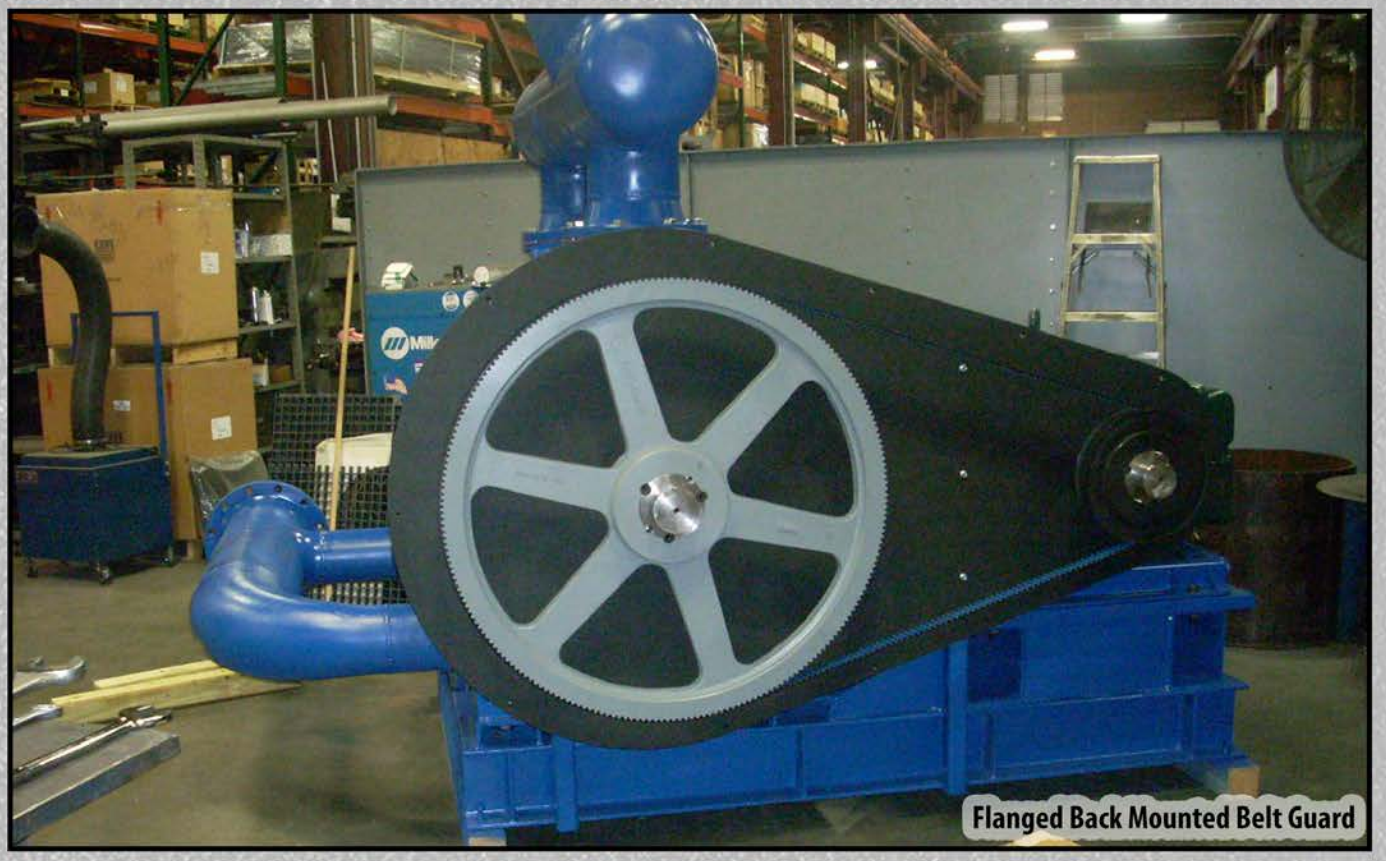
UNIGUARD
APPLICATION PHOTOS


Custom Vertical Belt Guard

Vertical Belt Guard


Custom Modular Guard

UNIGUARD
APPLICATION PHOTOS

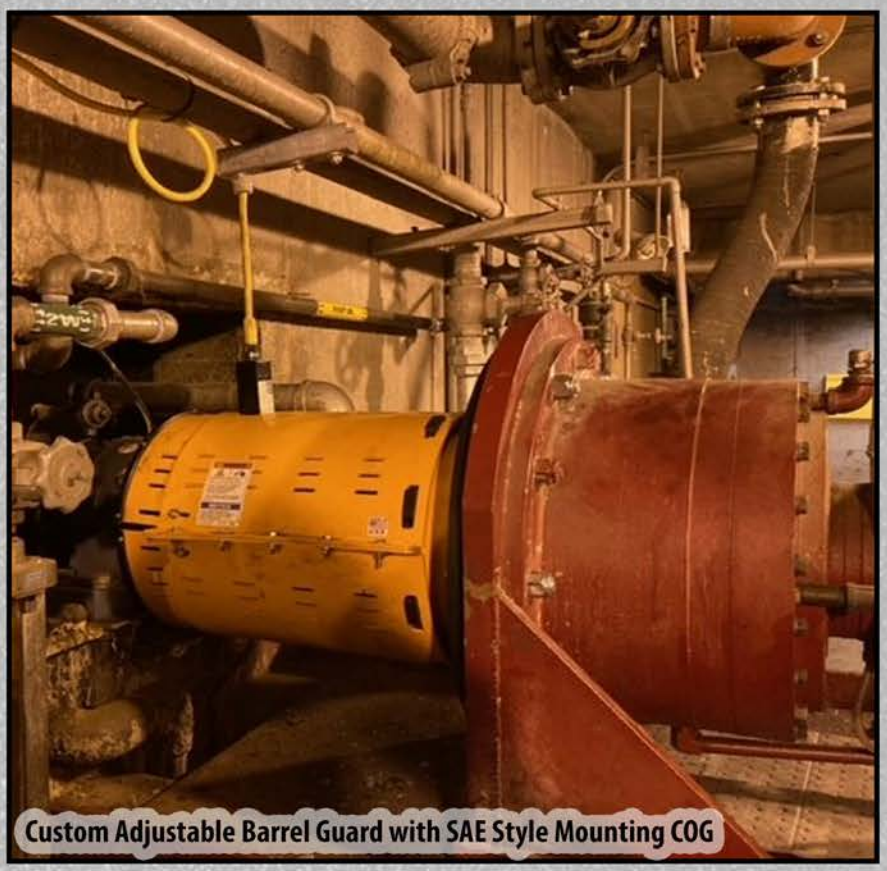


Flanged Back Mounted Belt Guard

Completed Flanged Back Mounted Belt Guard

UNIGUARD
APPLICATION PHOTOS

Vertical ANSI Barrel Guard



Custom Adjustable Barrel Guard with SAE Style Mounting COG

Split Case Design Guard

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APPLICATION PHOTOS

Adjustable Wrap Guard

ANSI Uniclear Guard

Panel Guard

UNIGUARD
APPLICATION PHOTOS

Panel Guard


Panel Guard


Jackshaft Adjustable Length Guard

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APPLICATION PHOTOS

Horizontal Belt/Chain Guard


Horizontal Belt/Chain Guard

Horizontal Belt/Chain Guard

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APPLICATION PHOTOS


Custom Vertical Belt Guard

Tapered Belt Guard


Custom Belt Guard

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APPLICATION PHOTOS

Vertical Jackshaft Guard

Uniclear Panel Guard

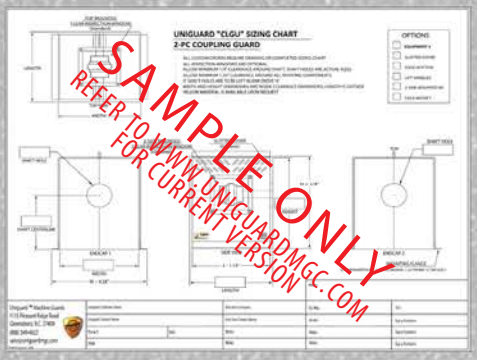
Split Case Design Guard

UNIGUARD
APPLICATION PHOTOS

CLGU with Side Inspection Windows and Shaft Spacers

ANSI Barrel & Uniclear Guard

UNIGUARD
CUSTOM SIZING CHART



Uniguard custom sizing charts are available for distributors to record dimensions, guard options and other notes relevant for Uniguard production.

As new options and improvements are added to the Uniguard products these will also be added to the sizing charts.

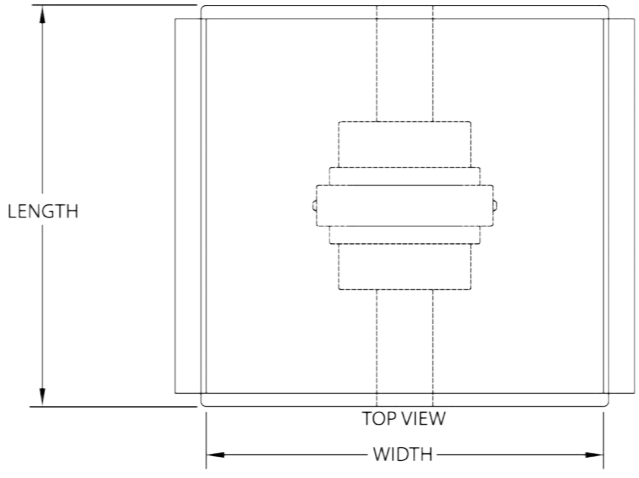
It is recommended that all distributors obtain the Uniguard custom sizing charts from the Uniguard web site at time of use to ensure the most recent version of the form is used.

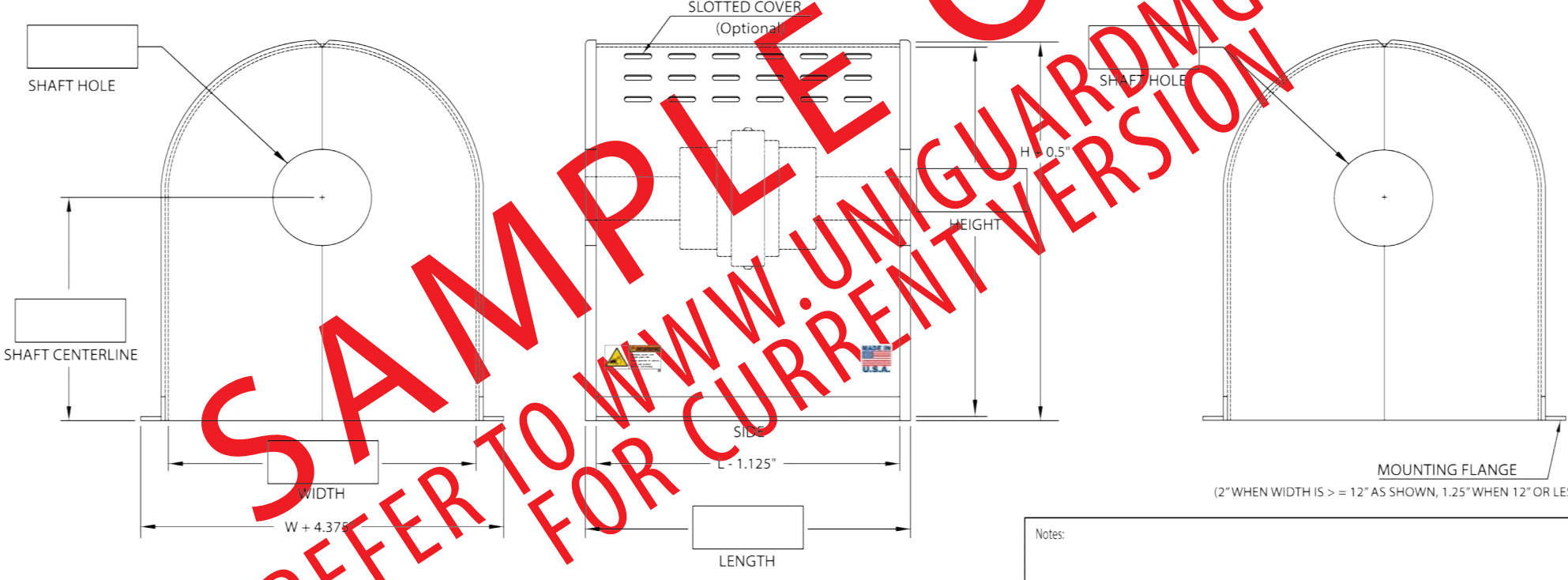
UNIGUARD "CG-SPLIT" SIZING CHART
1-PC COUPLING GUARD

- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- ALLOW MINIMUM 1/4" CLEARANCE AROUND SHAFT, SHAFT HOLES ARE ACTUAL SIZES
- ALLOW MINIMUM 2" CLEARANCE AROUND ALL ROTATING COMPONENTS
- IF SHAFT HOLES ARE TO BE LEFT BLANK ENTER "0"
- WIDTH AND HEIGHT DIMENSIONS ARE INSIDE CLEARANCE DIMENSIONS, LENGTH IS OUTSIDE.
- YELLOW MATERIAL IS AVAILABLE UPON REQUEST
- HEIGHT IS EQUAL TO SHAFT CENTERLINE PLUS HALF OF GUARD WIDTH
- ***FLAT INSPECTION WINDOWS ARE NOT RECOMMENDED ON CG-SPLIT GUARDS***
- ***PRIOR TO INSTALLATION VERIFY YOU HAVE ENOUGH SPACE TO EXTEND GUARD AROUND SHAFT ON LEFT AND RIGHT SIDES***

OPTIONS

- ☐ EQUIPMENT #
- ☐ SLOTTED COVER
- ☐ SOLID BOTTOM
- ☐ LIFT HANDLES
- ☐ FIELD MODIFY





Notes:

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sales@uniguardmgc.com

TM.RFQ.CGS.8.31.2020

Uniguard Customer Name:	End User Company:	Eq. Mfg.:	Qty:
Uniguard Contact Name:	End User Contact Name:	Model:	Equip Numbers:
Phone #: Date:	Notes:	Notes:	Equip Numbers:
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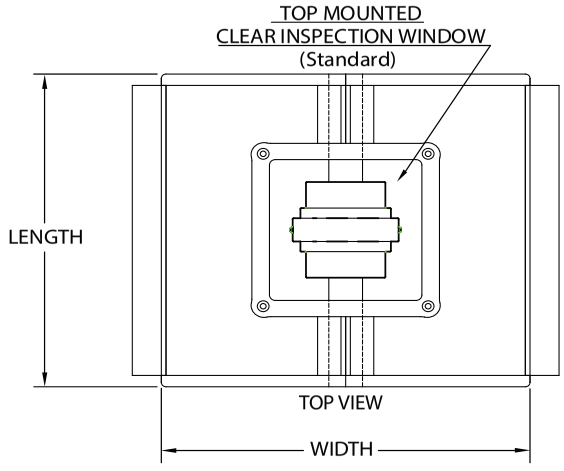
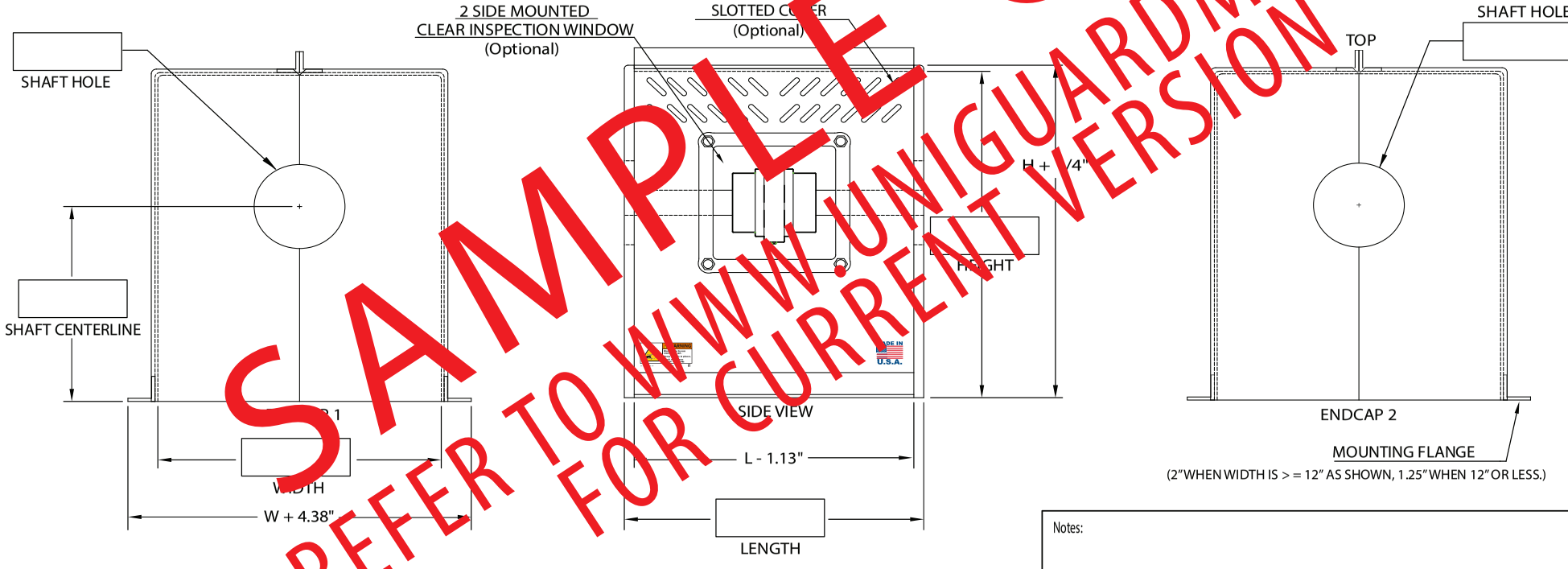


UNIGUARD "CLGU" SIZING CHART
2-PC COUPLING GUARD

- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- ALL INSPECTION WINDOWS ARE OPTIONAL
- ALLOW MINIMUM 1/4" CLEARANCE AROUND SHAFT, SHAFT HOLES ARE ACTUAL SIZES
- ALLOW MINIMUM 1.50" CLEARANCE AROUND ALL ROTATING COMPONENTS
- IF SHAFT HOLES ARE TO BE LEFT BLANK ENTER "0"
- WIDTH AND HEIGHT DIMENSIONS ARE INSIDE CLEARANCE DIMENSIONS, LENGTH IS OUTSIDE
- YELLOW MATERIAL IS AVAILABLE UPON REQUEST

OPTIONS

- EQUIPMENT #
- SLOTTED COVER
- SOLID BOTTOM
- LIFT HANDLES
- 2 SIDE MOUNTED IW
- FIELD MODIFY



Notes:

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TM.RFQ.CLGU.8.31.2020

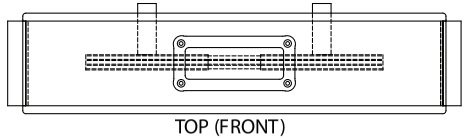
Uniguard Customer Name:	End User Company:	Eq. Mfg.:	Qty:
Uniguard Contact Name:	End User Contact Name:	Model:	Equip Numbers:
Phone #: Date:	Notes:	Notes:	Equip Numbers:
EMail:	Notes:	Notes:	Equip Numbers:

UNIGUARD "HBG" SIZING CHART
HORIZONTAL BELT GUARD

SHAFT OPTIONS

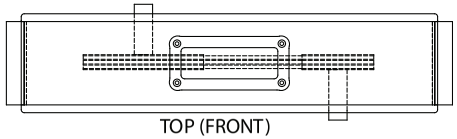
STANDARD SHAFT CONFIGURATION

☐ Z1



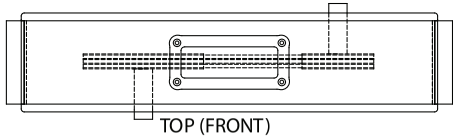
TOP (FRONT)

☐ Z2



TOP (FRONT)

☐ Z3



TOP (FRONT)

- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- ALL INSPECTION WINDOWS ARE OPTIONAL
- ALLOW MINIIMUM 1/4" CLEARANCE AROUND SHAFT, SHAFT HOLES ARE ACTUAL SIZES
- ALLOW MINIMUM 2.00" CLEARANCE AROUND ALL ROTATING COMPONENTS
- IF SHAFT HOLES ARE TO BE LEFT BLANK ENTER "0"
- SELECT HSA OPTIONS FOR HORIZONTAL SHAFT ADJUSTMENT (+/- 1.50" Typ.)
- YELLOW MATERIAL IS AVAILABLE UPON REQUEST
- IF SHAFT HOLES ARE SPECIFIED
  - THE REAR PANEL WILL BE A SLIP ON BACK FOR SHAFT SLOTS
  - THE REAR PANEL WILL INCLUDE SHAFT SLOTS AND FILLER PANELS
- IF SHAFT HOLES ARE NOT SPECIFIED
  - THE REAR PANEL WILL BE FIXED
  - THE REAR PANEL WILL BE SOLID WITHOUT SHAFT HOLES OR FILLER PANELS
  - THE SHAFT HOLES WILL HAVE TO BE CUT AND THE SHEAVES WILL HAVE TO BE REMOVED AND SHAFT HOLES CUT DURING INSTALLATION OF GUARD
  - FLANGED BACK CAN BE SLIP-ON OR FIXED
  - FLANGE BACK IS ATTACHED TO THE EQUIPMENT FOR SUPPORT

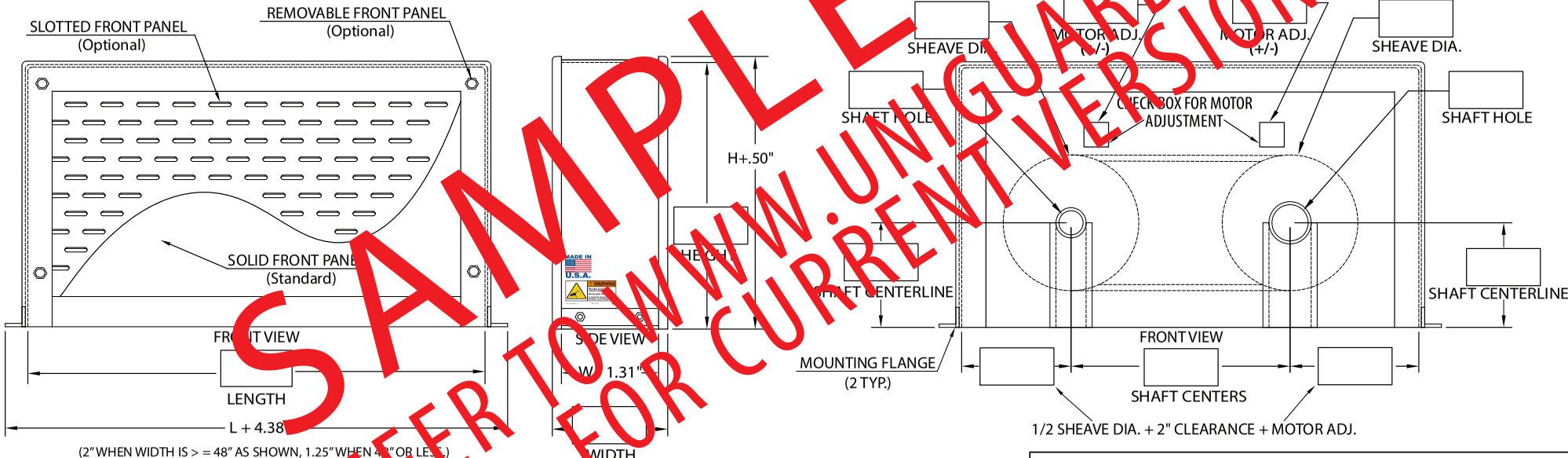
OPTIONS

☐ EQUIPMENT #

CHOOSE ONE:
- ☐ SHAFT HOLES
- ☐ SHAFT SLOTS WITH FILLER PANELS

CHOOSE ONE:
- ☐ SLIP-ON-BACK
- ☐ FIXED BACK
- ☐ FLANGED BACK

- ☐ SLOTTED FRONT PANEL
- ☐ SLOTTED TOP WIDTH PANEL
- ☐ SLOTTED DEPTH/WIDTH PANEL
- ☐ REMOVABLE FRONT PANEL
- ☐ LIFT HANDLES
- ☐ TOP WIDTH INSPECTION WINDOW
- ☐ FRONT INSPECTION WINDOW
- ☐ TAPERED DOWN TO LOWER SHAFT
- ☐ FIELD MODIFY



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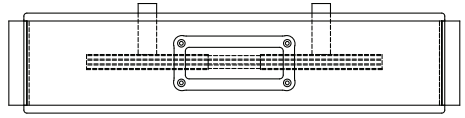
Uniguard Customer Name:	End User Company:	Eq. Mfg.:	Qty:
Uniguard Contact Name:	End User Contact Name:	Model:	Equip Numbers:
Phone #: Date:	Notes:	Notes:	Equip Numbers:
EMail:	Notes:	Notes:	Equip Numbers:

UNIGUARD "HBG" SIZING CHART
HORIZONTAL BELT GUARD

SHAFT OPTIONS

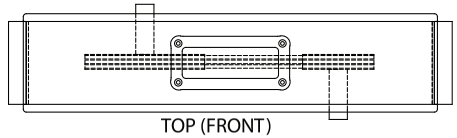
STANDARD SHAFT CONFIGURATION

☐ Z1



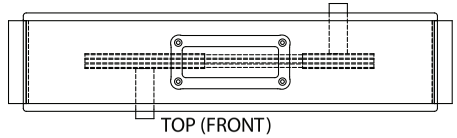
TOP (FRONT)

☐ Z2



TOP (FRONT)

☐ Z3



TOP (FRONT)

- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- ALL INSPECTION WINDOWS ARE OPTIONAL
- ALLOW MINIIMUM 1/4" CLEARANCE AROUND SHAFT, SHAFT HOLES ARE ACTUAL SIZES
- ALLOW MINIMUM 2.00" CLEARANCE AROUND ALL ROTATING COMPONENTS
- IF SHAFT HOLES ARE TO BE LEFT BLANK ENTER "0"
- SELECT HSA OPTIONS FOR HORIZONTAL SHAFT ADJUSTMENT (+/- 1.50" Typ.)
- YELLOW MATERIAL IS AVAILABLE UPON REQUEST
- IF SHAFT HOLES ARE SPECIFIED
  - THE REAR PANEL WILL BE A SLIP ON BACK FOR SHAFT SLOTS
  - THE REAR PANEL WILL INCLUDE SHAFT SLOTS AND FILLER PANELS
- IF SHAFT HOLES ARE NOT SPECIFIED
  - THE REAR PANEL WILL BE FIXED
  - THE REAR PANEL WILL BE SOLID WITHOUT SHAFT HOLES OR FILLER PANELS
  - THE SHAFT HOLES WILL HAVE TO BE CUT AND THE SHEAVES WILL HAVE TO BE REMOVED AND SHAFT HOLES CUT DURING INSTALLATION OF GUARD
  - FLANGED BACK CAN BE SLIP-ON OR FIXED
  - FLANGE BACK IS ATTACHED TO THE EQUIPMENT FOR SUPPORT

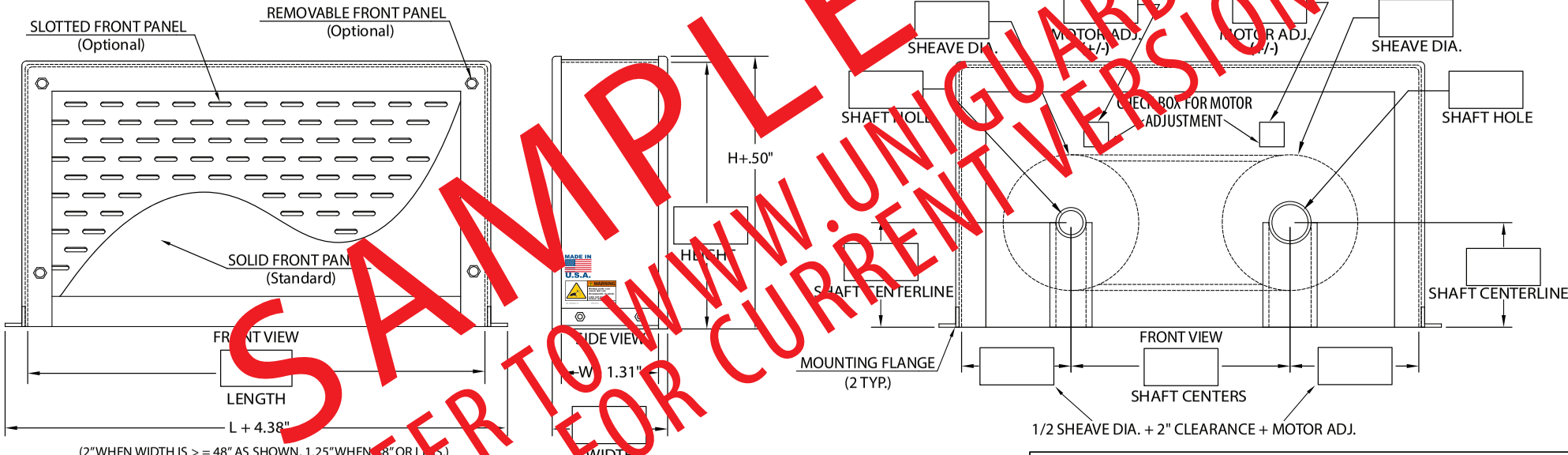
OPTIONS

☐ EQUIPMENT #

CHOOSE ONE:
- ☐ SHAFT HOLES
- ☐ SHAFT SLOTS WITH FILLER PANELS

CHOOSE ONE:
- ☐ SLIP-ON-BACK
- ☐ FIXED BACK
- ☐ FLANGED BACK

- ☐ SLOTTED FRONT PANEL
- ☐ SLOTTED TOP WIDTH PANEL
- ☐ SLOTTED DEPTH WIDTH PANEL
- ☐ REMOVABLE FRONT PANEL
- ☐ LIFT HANDLES
- ☐ TOP WIDTH INSPECTION WINDOW
- ☐ FRONT INSPECTION WINDOW
- ☐ TAPERED DOWN TO LOWER SHAFT
- ☐ FIELD MODIFY



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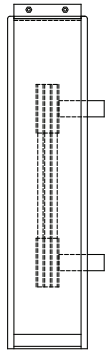
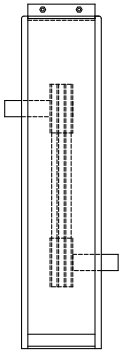
Uniguard Contact Name:	End User Contact Name:	Model:	Equip Numbers:
Phone #: Date:	Notes:	Notes:	Equip Numbers:
EMail:	Notes:	Notes:	Equip Numbers:

SHAFT OPTIONS

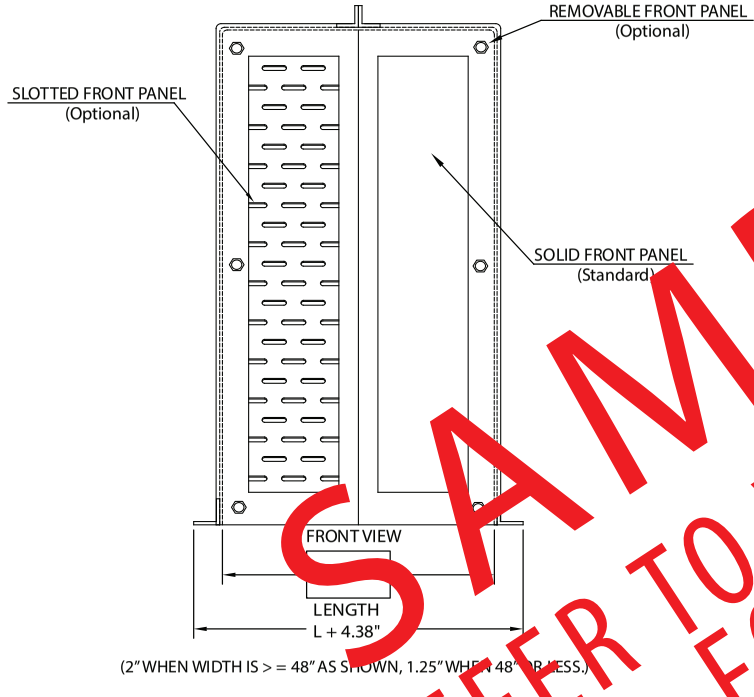
" C DRIVE" (STANDARD)	" Z DRIVE"
☐ C1  SIDE VIEW	☐ Z1  SIDE VIEW

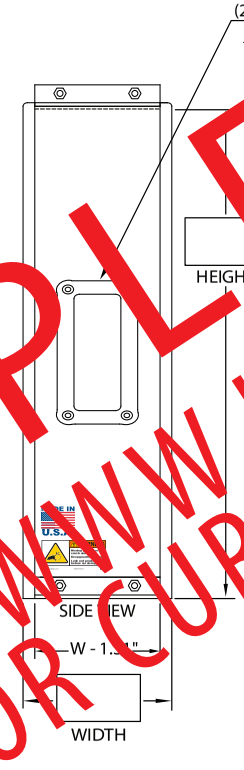
UNIGUARD "VBG" SIZING CHART
VERTICAL BELT GUARD

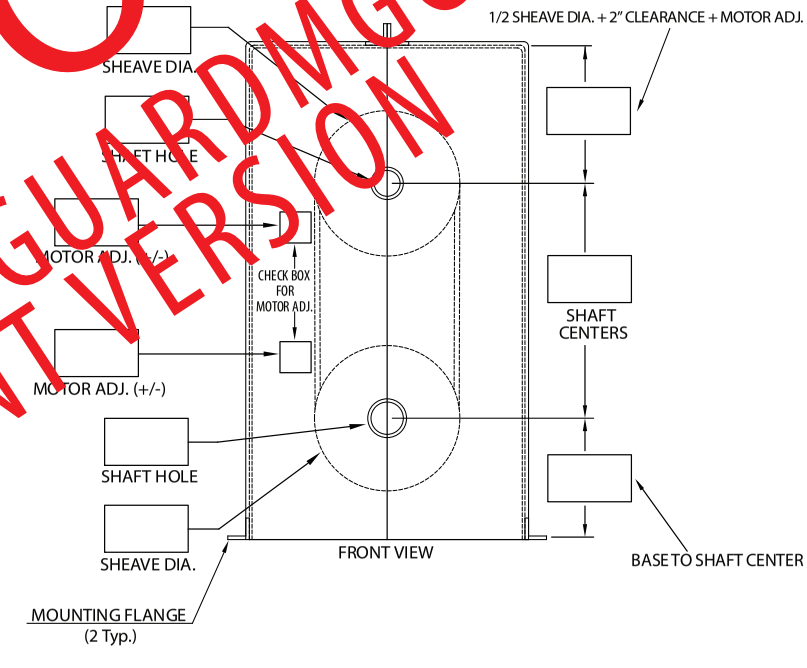
- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- ALL INSPECTION WINDOWS ARE OPTIONAL
- ALLOW MINIMUM 1/4" CLEARANCE AROUND SHAFT, SHAFT HOLES ARE ACTUAL SIZES
- ALLOW MINIMUM 2.00" CLEARANCE AROUND ALL ROTATING COMPONENTS
- IF SHAFT HOLES ARE TO BE LEFT BLANK ENTER "0"
- DEFAULT FRONT PANEL IS SOLID
- SELECT VSA OPTIONS FOR VERTICAL SHAFT ADJUSTMENT (+/- 1.50" Typ.)
- YELLOW MATERIAL IS AVAILABLE UPON REQUEST
- LENGTH = LARGEST SHEAVE + 2" CLEARANCE ON EACH SIDE
- HEIGHT = 1/2 TOP SHEAVE + TOP SHEAVE MOTOR ADJUSTMENT + S[illegible]CENTERS + LOWER SHAFT FROM BASE

OPTIONS

- ☐ EQUIPMENT #
- ☐ SLOTTED FRONT PANEL
- ☐ SLOTTED TOP WIDTH PANEL
- ☐ SL[illegible]TTED DEPTH WIDTH PANEL
- ☐ RE[illegible]OVABLE FRONT PANEL
- ☐ [illegible]HANDLES
- ☐ TOP [illegible]TH INSPECTION WINDOW
- ☐ FRONT INSPECTION W[illegible]DOW
- ☐ FRONT MOUNTIN[illegible]RACKET REQUIRED
- ☐ SPLIT FLA[illegible]GED BACI
- ☐ 2 SI[illegible]E INSPECTION WINDOW
- ☐ FIELD M[illegible]DIFY





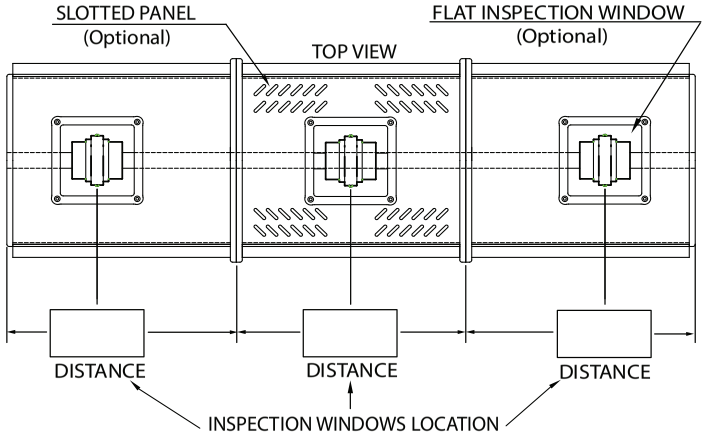


Notes:

Uniguard ™ Machine Guards
1115 Pleasant Ridge Road
Greensboro, N.C. 27409
(888) 549-4622
sales@uniguardmgc.com

TM.RFQ.VBG.8.31.2020

Uniguard Customer Name:		End User Company:	Eq. Mfg.:	Qty:
Uniguard Contact Name:		End User Contact Name:	Model:	Equip Numbers:
Phone #:	Date:	Notes:	Notes:	Equip Numbers:
EMail:		Notes:	Notes:	Equip Numbers:



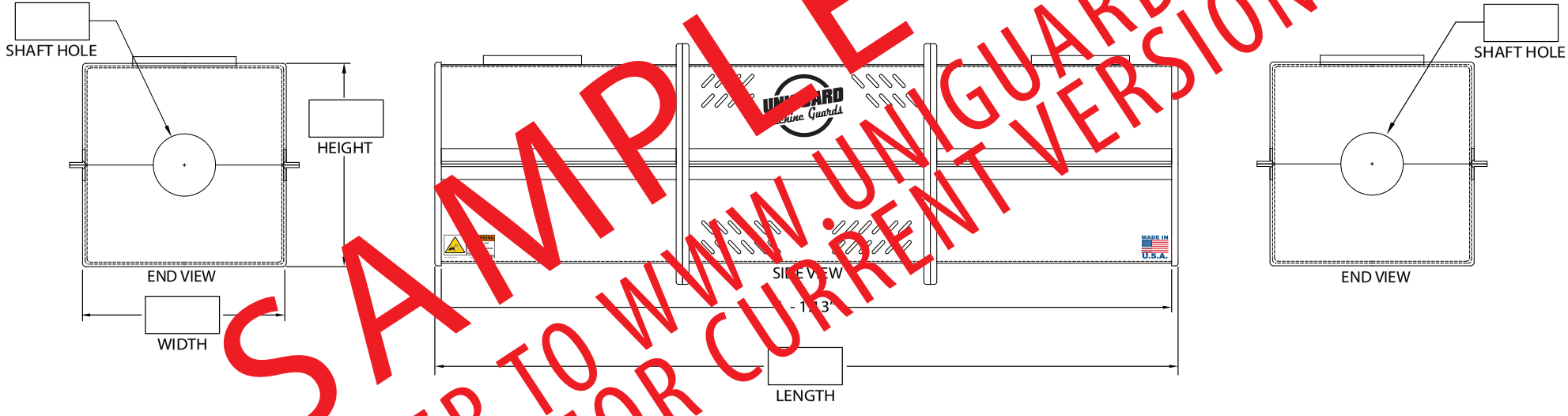
UNIGUARD "JSG" SIZING CHART

JACK SHAFT GUARD

- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- ALL INSPECTION WINDOWS ARE OPTIONAL
- ALLOW MINIMUM 1/4" CLEARANCE AROUND SHAFT, SHAFT HOLES ARE ACTUAL SIZES
- ALLOW MINIMUM 2.00" CLEARANCE AROUND ALL ROTATING COMPONENTS
- CUSTOM BRACKETS ARE TYPICALLY FABRICATED FOR MOUNTING DURING INSTALLATION
- IF SHAFT HOLES ARE TO BE LEFT BLANK ENTER "0"
- IF ADJUSTABLE ENTER MINIMUM/MAXIMUM LENGTHS
- DEFAULT FRONT PANELS ARE SOLID
- YELLOW MATERIAL IS AVAILABLE UPON REQUEST

OPTIONS

- ☐ EQUIPMENT #
- ☐ SLOTTED PANELS (NOTE LOCATION IN NOTES FIELD BELOW)
- ☐ INSPECTION WINDOW (NOTE LOCATION IN NOTES FIELD BELOW)
- ☐ LIFT HANDLES
- ☐ ADJUSTABLE LENGTH ____ MIN ____ MAX
- ☐ 3X4" FLAT INSPECTION WINDOW
- ☐ 4X6" FLAT INSPECTION WINDOW
- ☐ 6X8" FLAT INSPECTION WINDOW
- ☐ FIELD MODIFY



Notes:

Uniguard ™ Machine Guards
1115 Pleasant Ridge Road
Greensboro, N.C. 27409
(888) 549-4622
sales@uniguardmgc.com

TM.RFQ.JSG.9.2.2020

Uniguard Customer Name:	End User Company:	Eq. Mfg.:	Qty:
Uniguard Contact Name:	End User Contact Name:	Model:	Equip Numbers:
Phone #: Date:	Notes:	Notes:	Equip Numbers:
EMail:	Notes:	Notes:	Equip Numbers:

UNIGUARD "ABG" SIZING CHART
ADJUSTABLE BARREL GUARD

- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- SLOTTED COVERS ARE STANDARD
- ALLOW MINIMUM 1.50" CLEARANCE AROUND ALL ROTATING COMPONENTS
- LENGTH, WIDTH AND HEIGHT DIMENSIONS ARE OUTSIDE DIMENSIONS
- YELLOW MATERIAL IS AVAILABLE UPON REQUEST
- BOLT HOLE WILL BE DETERMINED BY EQUIPMENT
- IF YOU DO NOT PROVIDE A BOLT HOLE PATTERN YOU WILL RECEIVE A BLANK COG END PLATE

OPTIONS

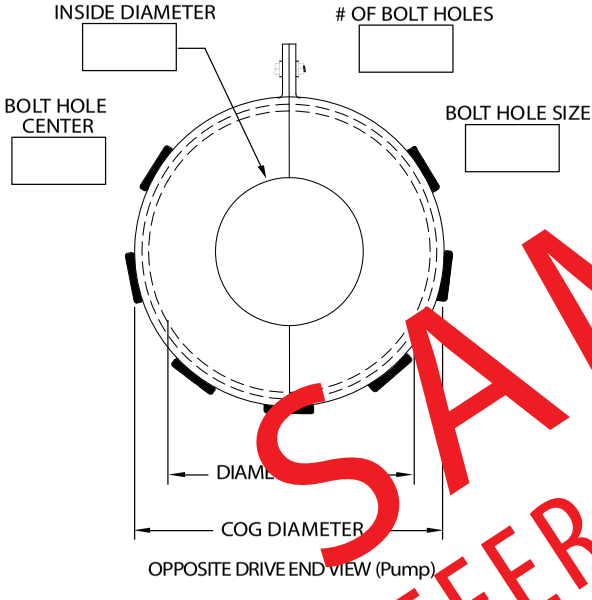
CHOOSE ONE:

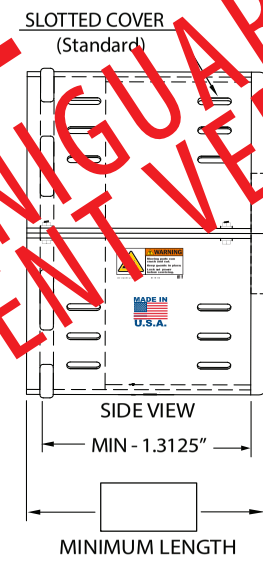
- ☐ 8" DIAMETER (IW-8)
- ☐ 11" DIAMETER (IW-10)
- ☐ 14" DIAMETER (IW-16)
- ☐ 16.5" DIAMETER (IW-16)
- ☐ 19.5" DIAMETER (IW-20)

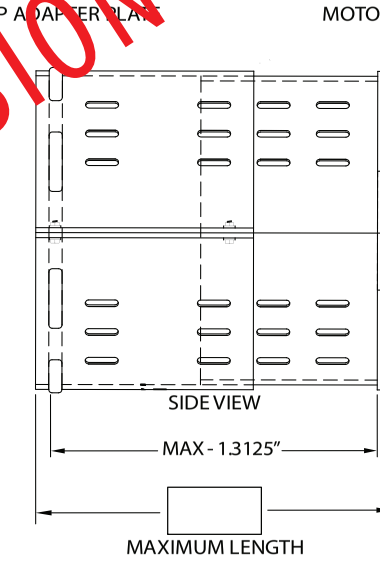
- ☐ EQUIPMENT
- ☐ INSPECTION WINDOW
- ☐ SOLID COVER (Optional)
- ☐ FIELD MODIFY COG END PLATE
- ☐ FIELD MODIFY MOTOR END PLATE
- ☐ UNICLEAR MATERIAL

End Cap Dimensions		
Diameter	Standard End Cap	End Cap ID
8.00"	EC-8	4.00"
11.00"	EC-11	4.50"
14.00"	EC-14	6.50"
16.50"	EC-16.5	9.00"
19.50"	EC-19.5	9.75"

* PLEASE PROVIDE BOLTING PATTERN NEEDED FOR CUSTOM COG END PLATE







Notes:

Uniguard ™ Machine Guards
1115 Pleasant Ridge Road
Greensboro, N.C. 27409
(888) 549-4622
sales@uniguardmgc.com

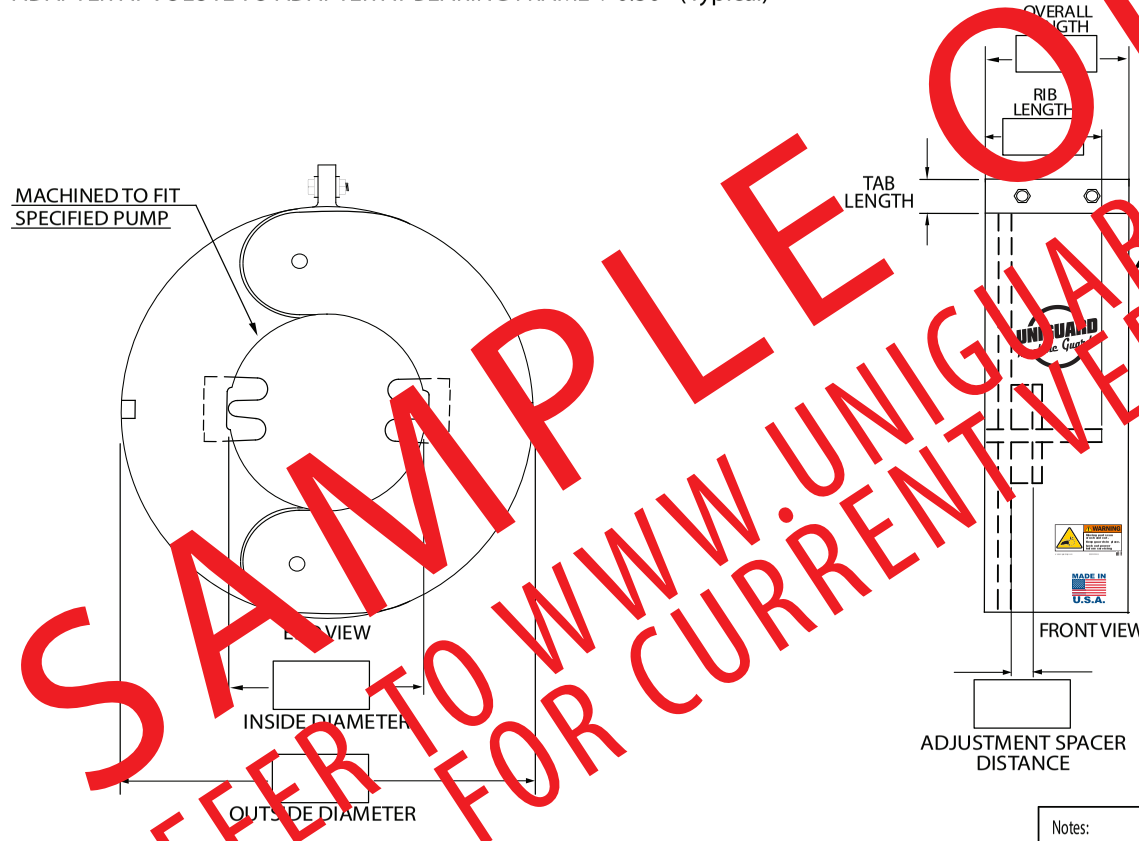
Uniguard Customer Name:		End User Company:	Eq. Mfg.:	Qty:
Uniguard Contact Name:		End User Contact Name:	Model:	Equip Numbers:
Phone #:	Date:	Notes:	Notes:	Equip Numbers:
EMail:		Notes:	Notes:	Equip Numbers:

UNIGUARD "USG" SIZING CHART
UNICLEAR SEAL GUARD

- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- UNICLEAR MATERIALS ARE STANDARD
- ALLOW MINIMUM 1.50" CLEARANCE AROUND ALL ROTATING COMPONENTS
- YELLOW MATERIAL IS AVAILABLE UPON REQUEST
- TAB LENGTH = 1.125"
- RIB LENGTH = OVERALL COVER LENGTH - 3/4" (Typical)
- COVER LENGTH = ADAPTER AT VOLUTE TO ADAPTER AT BEARING FRAME + 0.50" (Typical)

OPTIONS

- ☐ EQUIPMENT #
- ☐ SOLID UNICLEAR MATERIAL (Standard)
- ☐ SOLID ORANGE MATERIAL
- ☐ SLOTTED UNICLEAR MATERIAL
- ☐ SLOTTED ORANGE MATERIAL
- ☐ FIELD MODIFY



Notes:

Uniguard ™ Machine Guards
1115 Pleasant Ridge Road
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(888) 549-4622
sales@uniguardmgc.com

TM.RFQ.USG.9.23.2020

Uniguard Customer Name:		End User Company:	Eq. Mfg.:	Qty:
Uniguard Contact Name:		End User Contact Name:	Model:	Equip Numbers:
Phone #:	Date:	Notes:	Notes:	Equip Numbers:
EMail:		Notes:	Notes:	Equip Numbers:

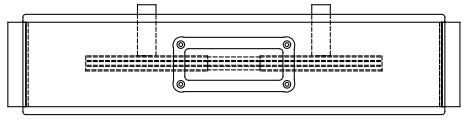
UNIGUARD "MBG" SIZING CHART

MOUNTED BELT GUARD

SHAFT OPTIONS

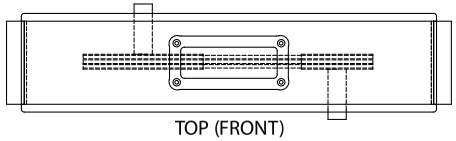
STANDARD SHAFT CONFIGURATION

Z1



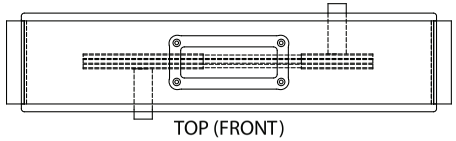
TOP (FRONT)

Z2



TOP (FRONT)

Z3



TOP (FRONT)

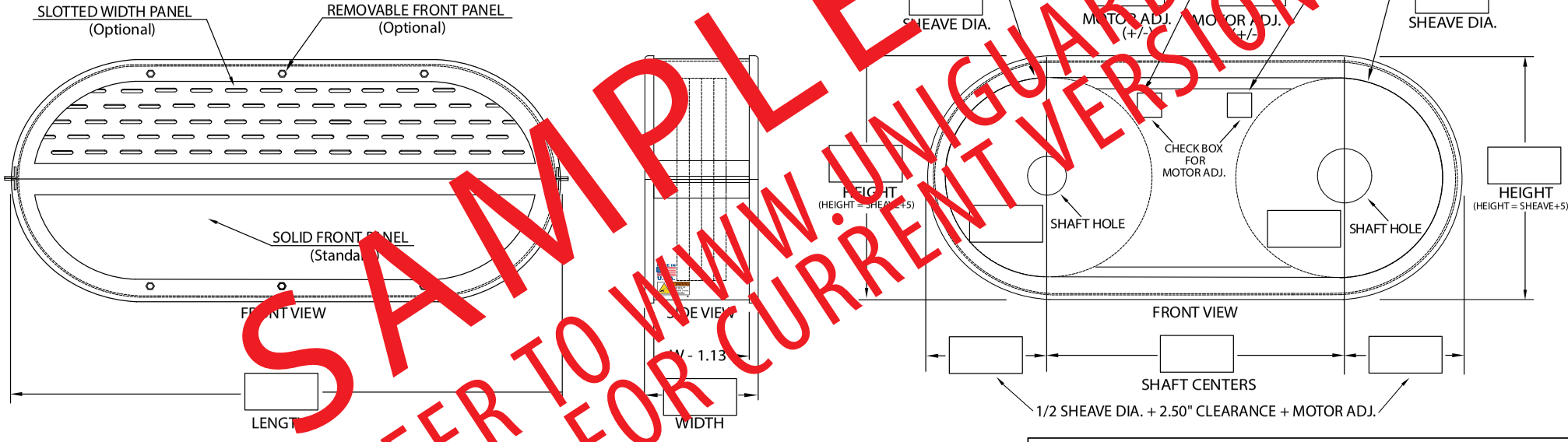
- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- ALL INSPECTION WINDOWS ARE OPTIONAL
- ALLOW MINIMUM 1/4" CLEARANCE AROUND SHAFT, SHAFT HOLES ARE ACTUAL SIZES
- ALLOW MINIMUM 2.50" CLEARANCE AROUND ALL ROTATING COMPONENTS
- SELECT HSA OPTIONS FOR HORIZONTAL SHAFT ADJUSTMENT (+/- 1.50" Typ.)
- CUSTOM BRACKETS ARE TYPICALLY FABRICATED FOR MOUNTING DURING INSTALLATION
- IF SHAFT HOLES ARE TO BE LEFT BLANK ENTER "0"
- DEFAULT FRONT PANEL IS SOLID
- YELLOW MATERIAL IS AVAILABLE UPON REQUEST
- LENGTH = LARGE SHEAVE/2 + SHAFT CENTER + SMALL SHEAVE/2 + 5
- HEIGHT = SHEAVE + 5
- IF SHAFT HOLES ARE NOT SPECIFIED
  - THE REAR PANEL WILL BE SOLID WITHOUT SHAFT HOLES
  - THE SHAFT HOLES WILL HAVE TO BE CUT AND THE SHEAVES WILL HAVE TO BE REMOVED DURING INSTALLATION OF GUARD

OPTIONS

CHOOSE ONE:

- ☐ CENTER SPLIT (STANDARD)
- ☐ SOLID FLANGED BACK (OPTIONAL)
- ☐ CENTER SPLIT FLANGED BACK (OPTIONAL)

- ☐ EQUIPMENT #
- ☐ SLOTTED FRONT PANEL
- ☐ SLOTTED WIDTH PANEL
- ☐ REMOVABLE FRONT PANEL
- ☐ LIFT HANDLES
- ☐ 1 DEPTH WIDTH CENTER INSPECTION WINDOW
- ☐ 2 SHEAVE WIDTH INSPECTION WINDOWS
- ☐ 2 FRONT SHAFT INSPECTION WINDOWS
- ☐ 1 FRONT CENTER BELT INSPECTION WINDOW
- ☐ NEED MODIFY



Length = ½ Drive Sheave + ½ Driven Sheave + Shaft Centers + Motor Adjustment + 5.0

Notes:

Uniguard ™ Machine Guards
1115 Pleasant Ridge Road
Greensboro, N.C. 27409
(888) 549-4622
sales@uniguardmgc.com

TM.RFQ.MBG.9.14.2020

Uniguard Customer Name:	End User Company:	Eq. Mfg.:	Qty:
Uniguard Contact Name:	End User Contact Name:	Model:	Equip Numbers:
Phone #: Date:	Notes:	Notes:	Equip Numbers:
EMail:	Notes:	Notes:	Equip Numbers:

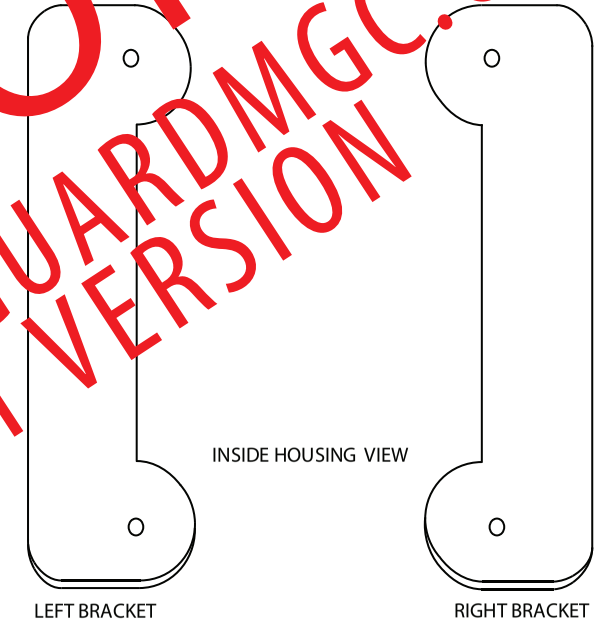
UNIGUARD "UPG" SIZING CHART
UNICLEAR PANEL GUARD

- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- UNICLEAR SOLID PANEL MATERIALS ARE STANDARD
- ORANGE/YELLOW PANEL MATERIAL IS AVAILABLE UPON REQUEST (Slotted Optional)
- SLOTTED OPTION NOT RECOMMENDED ON UNICLEAR MATERIAL
- SLOT LOCATIONS ARE CALCULATED BASED ON OPENING DIMENSIONS
- 1" STANDARD FOR ADJUSTMENT SLOTS (Typically)

OPTIONS

CHOOSE ONE: (HOUSING CURVE)

- ☐ HORIZONTAL
- ☐ VERTICAL
- ☐ EQUIPMENT
- ☐ SLOTTED
- ☐ FIELD MODIFY



Notes:

Uniguard ™ Machine Guards
1115 Pleasant Ridge Road
Greensboro, N.C. 27409
(888) 549-4622
sales@uniguardmgc.com

TM.RFQ.UPG.9.29.2020

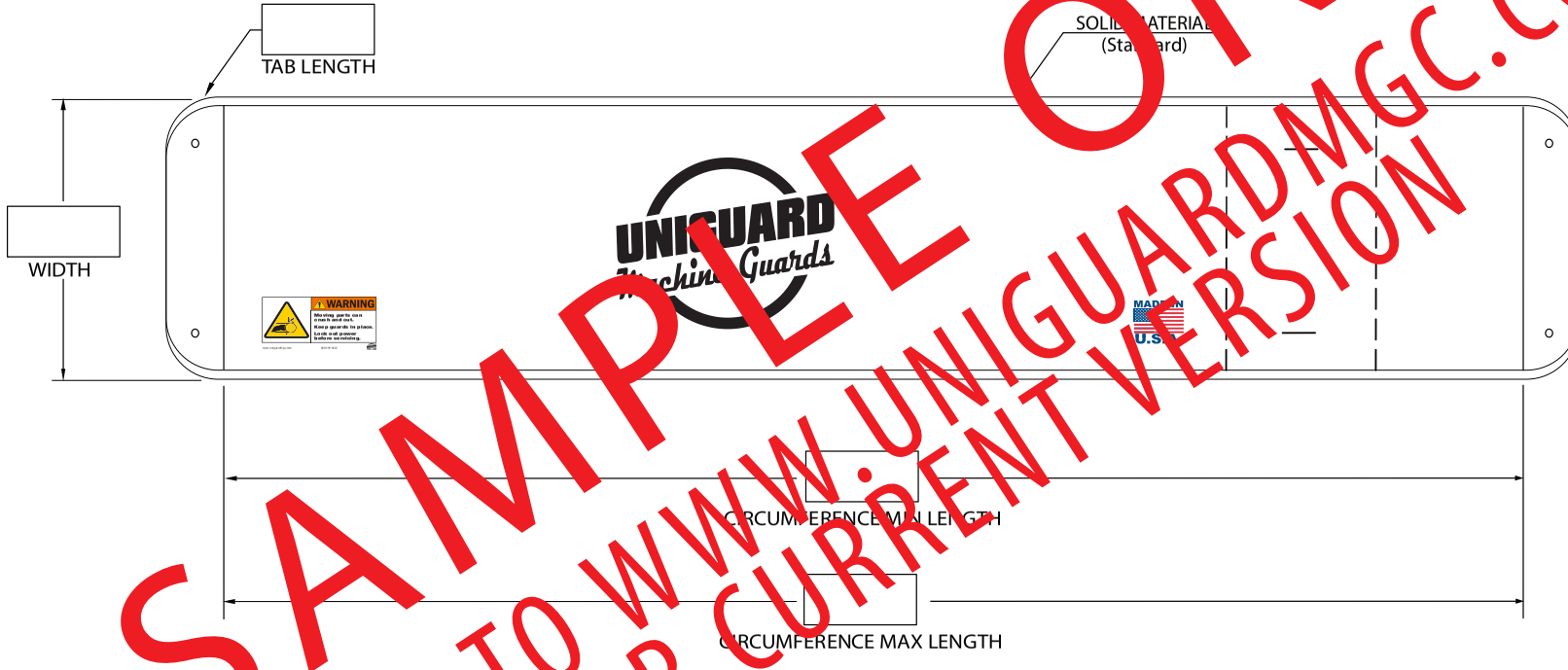
Uniguard Customer Name:	End User Company:	Eq. Mfg.:	Qty:
Uniguard Contact Name:	End User Contact Name:	Model:	Equip Numbers:
Phone #: Date:	Notes:	Notes:	Equip Numbers:
EMail:	Notes:	Notes:	Equip Numbers:

UNIGUARD "AWG" SIZING CHART
ADJUSTABLE WRAP GUARD

- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- UNICLEAR MATERIALS ARE STANDARD
- YELLOW MATERIAL IS AVAILABLE UPON REQUEST
- TAB LENGTH = 1.125" (Typical)

OPTIONS

- ☐ EQUIPMENT #
- ☐ UNICLEAR MATERIAL
- ☐ ORANGE MATERIAL
- ☐ SLOTTED
- ☐ FIELD MODIFY



Notes:

Uniguard ™ Machine Guards
1115 Pleasant Ridge Road
Greensboro, N.C. 27409
(888) 549-4622
sales@uniguardmgc.com

Uniguard Customer Name:		End User Company:	Eq. Mfg.:	Qty:
Uniguard Contact Name:		End User Contact Name:	Model:	Equip Numbers:
Phone #:	Date:	Notes:	Notes:	Equip Numbers:
EMail:		Notes:	Notes:	Equip Numbers:

UNIGUARD "SCD" SIZING CHART
SPLIT CASE DESIGN GUARD

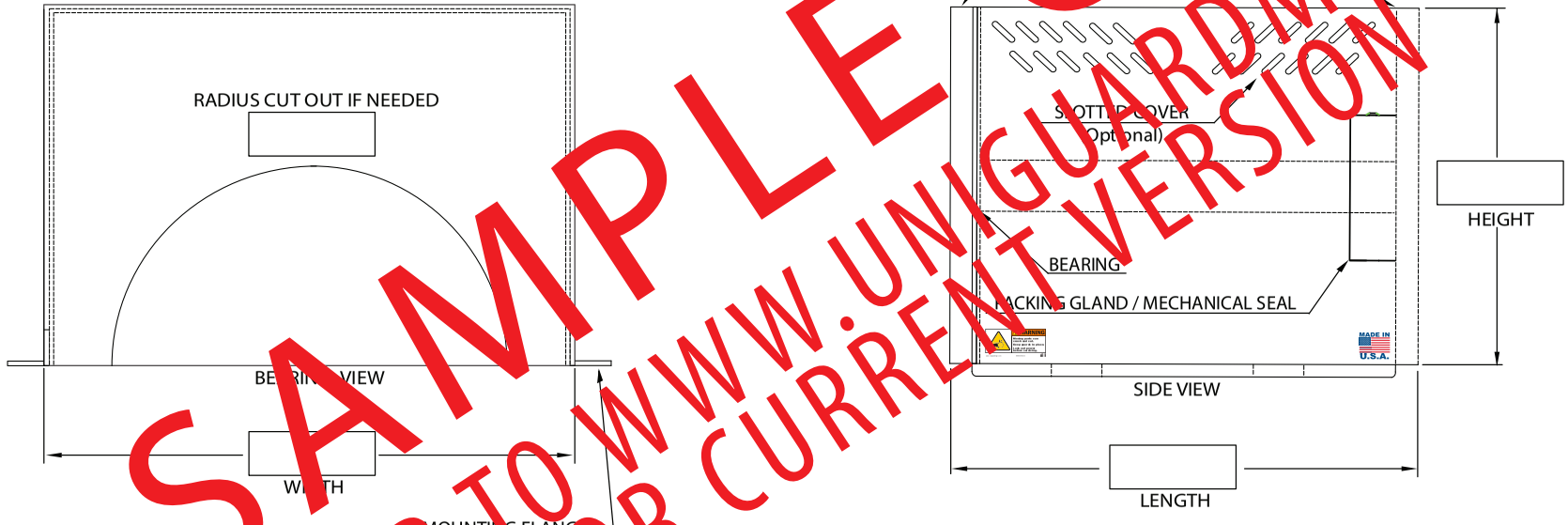
- ALL CUSTOM ORDERS REQUIRE DRAWING OR COMPLETED SIZING CHART
- SOLID COVERS ARE STANDARD
- ALLOW MINIMUM 1.50" CLEARANCE AROUND ALL ROTATING COMPONENTS
- LENGTH, WIDTH AND HEIGHT DIMENSIONS ARE OUTSIDE DIMENSIONS
- YELLOW MATERIAL IS AVAILABLE UPON REQUEST
- PRICED TO PER EQUIPMENT NUMBER OR SET

OPTIONS

CHOOSE ONE:

- ☐ 1 SOLID - OPEN END PLATE (Standard)
- ☐ 2 SOLID END PLATES (Optional)

- ☐ **EQUIPMENT #**
- ☐ SLOTTED COVER (Optional)
- ☐ FIELD MODIFY BEARING END PLATE
- ☐ FIELD MOD[illegible]AND / SEAL
- ☐ [illegible] 1 GUARD NEEDED



Notes:

Uniguard ™ Machine Guards
1115 Pleasant Ridge Road
Greensboro, N.C. 27409
(888) 549-4622
sales@uniguardmgc.com

Uniguard Customer Name:	End User Company:	Eq. Mfg.:	Qty:
Uniguard Contact Name:	End User Contact Name:	Model:	Equip Numbers:
Phone #: Date:	Notes:	Notes:	Equip Numbers:
EMail:	Notes:	Notes:	Equip Numbers:

UNIGUARD
STOCK GUARD DRAWINGS

Uniguard manufacturer's various stock guards that have been pre-determined to fit existing equipment. The names and descriptions of these stock guards are available in this section.

ANSI Pump Barrel Guard - Designed to bolt directly to the bearing frame of the pump and eliminates a guard foot and drilling the base to mount the guard. Available in sizes of 8.50"-26.75" in length and 8" - 19.50" in diameter.

CGU Kit Guard - One-piece dog house style guard that easily slips over the equipment shafts and is supplied with customizable panels to fill the space underneath the shaft. Availble in sizes of 4"- 20" in length and 6"-24" in height.

GDSA Guard - Features an adjustable length that makes installations quick and simple. Available in sizes of 6"-18" in length and 9"- 18" in diameter.

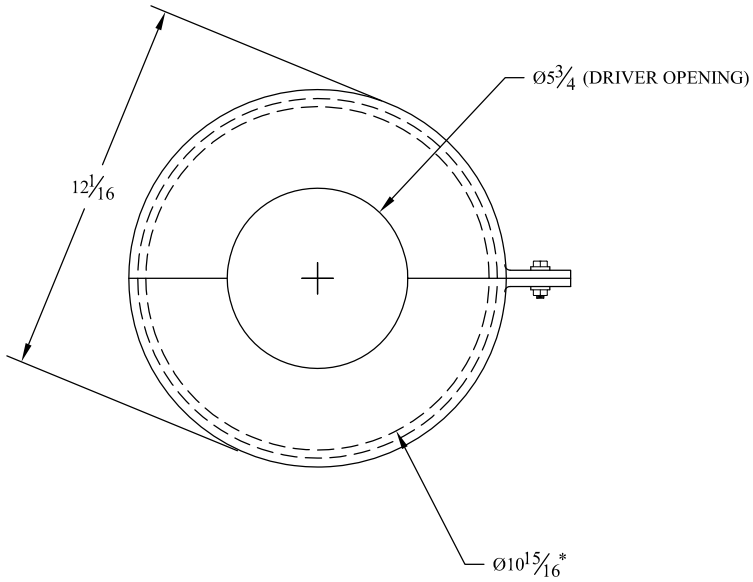
Belt/Chain Machine Guard(GHS-Horizontal/GVS-Vertical) - GVS vertical guard incorporates solid panels front and rear that are vertically split up the center. The GHS horizontal guard comes standard with a vented front panel and a solid removable rear panel. GHS is available in sizes of 26"- 42" in length and 12"- 24" in height. GVS is available in sizes of 12"- 18" in length and 32"- 42" in height.

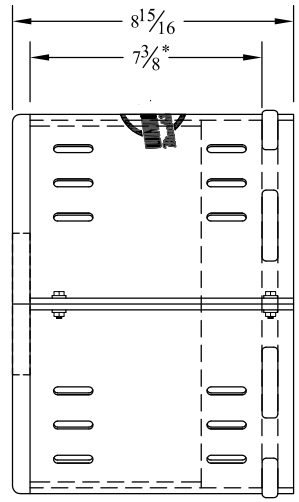
UniClear Guard - Clear Guard that is designed for visual inspection of equipment. Available in multiple sizes to fit your rotating equipment.

UNIGUARD Machine Guards™

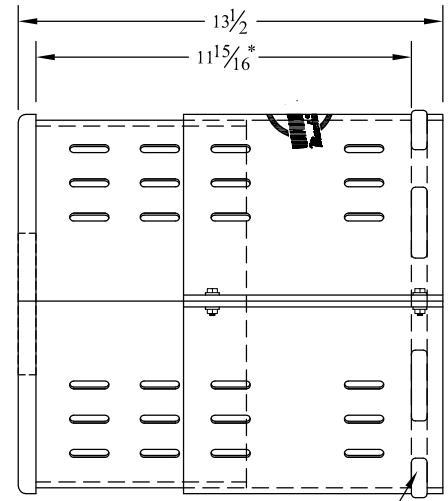
Engineered For Safety!

TYPE: BARREL GUARD





MIN WIDTH



MAX WIDTH

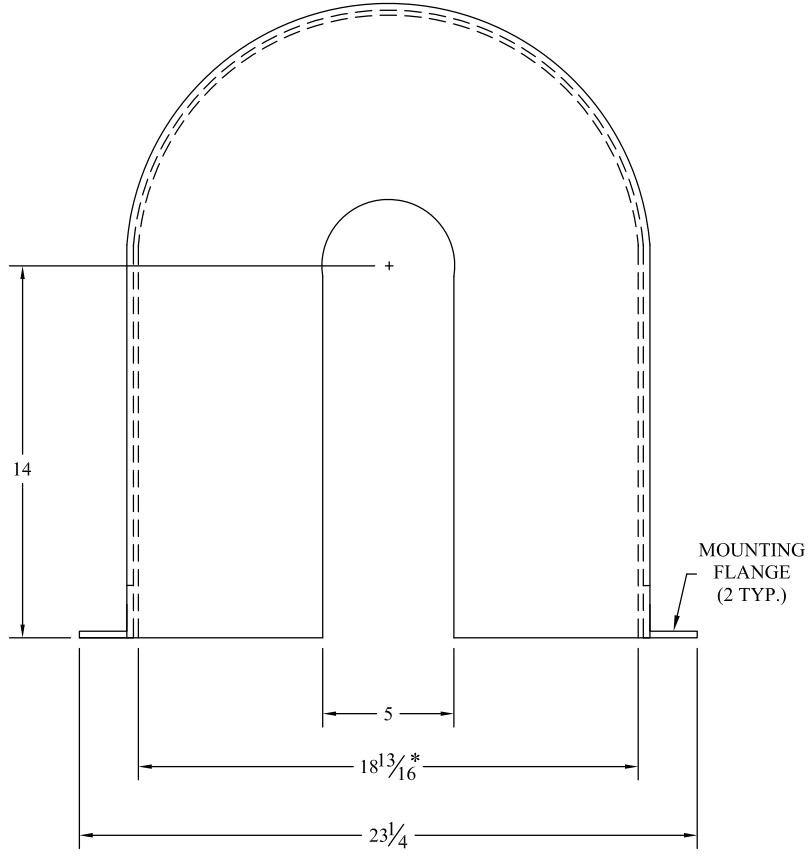
PUMP ADAPTER PLATE

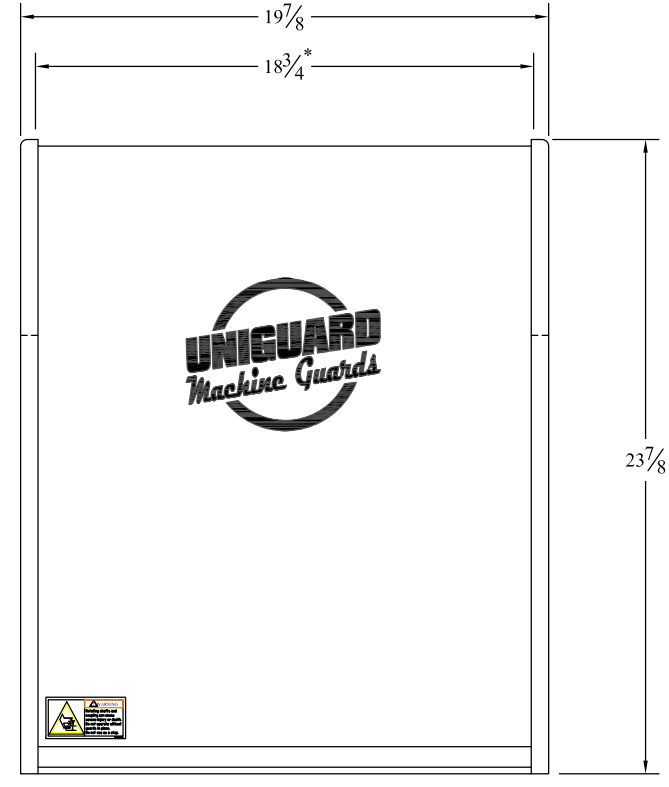
ITEM #	A-3196-MTX/LTX
COMPANY:	
EQ.#	
QTY.	

* INSIDE DIMENSION

Engineered For Safety!

TYPE: KIT GUARD



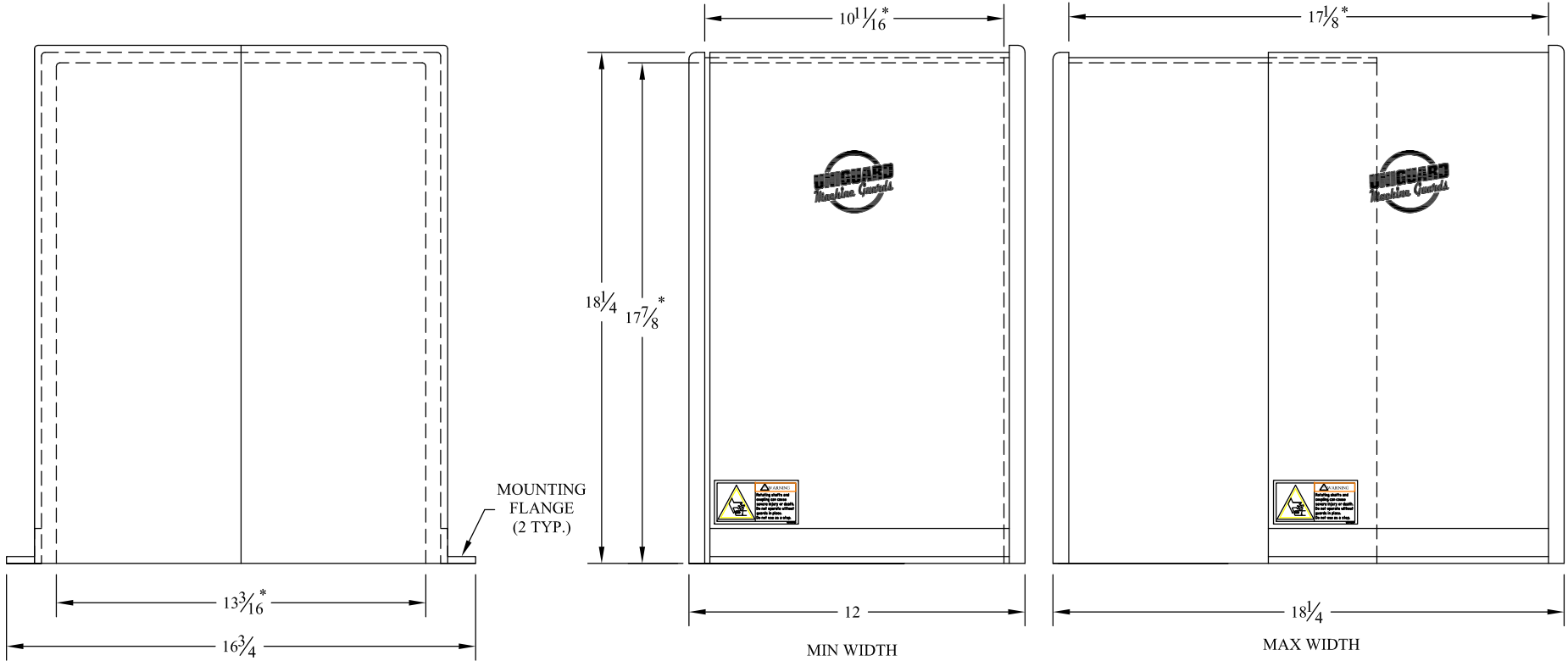


ITEM #	CGU-20
COMPANY:	
EQ.#	
QTY.	

* INSIDE DIMENSION

Engineered For Safety!

TYPE: ADJ. WIDTH



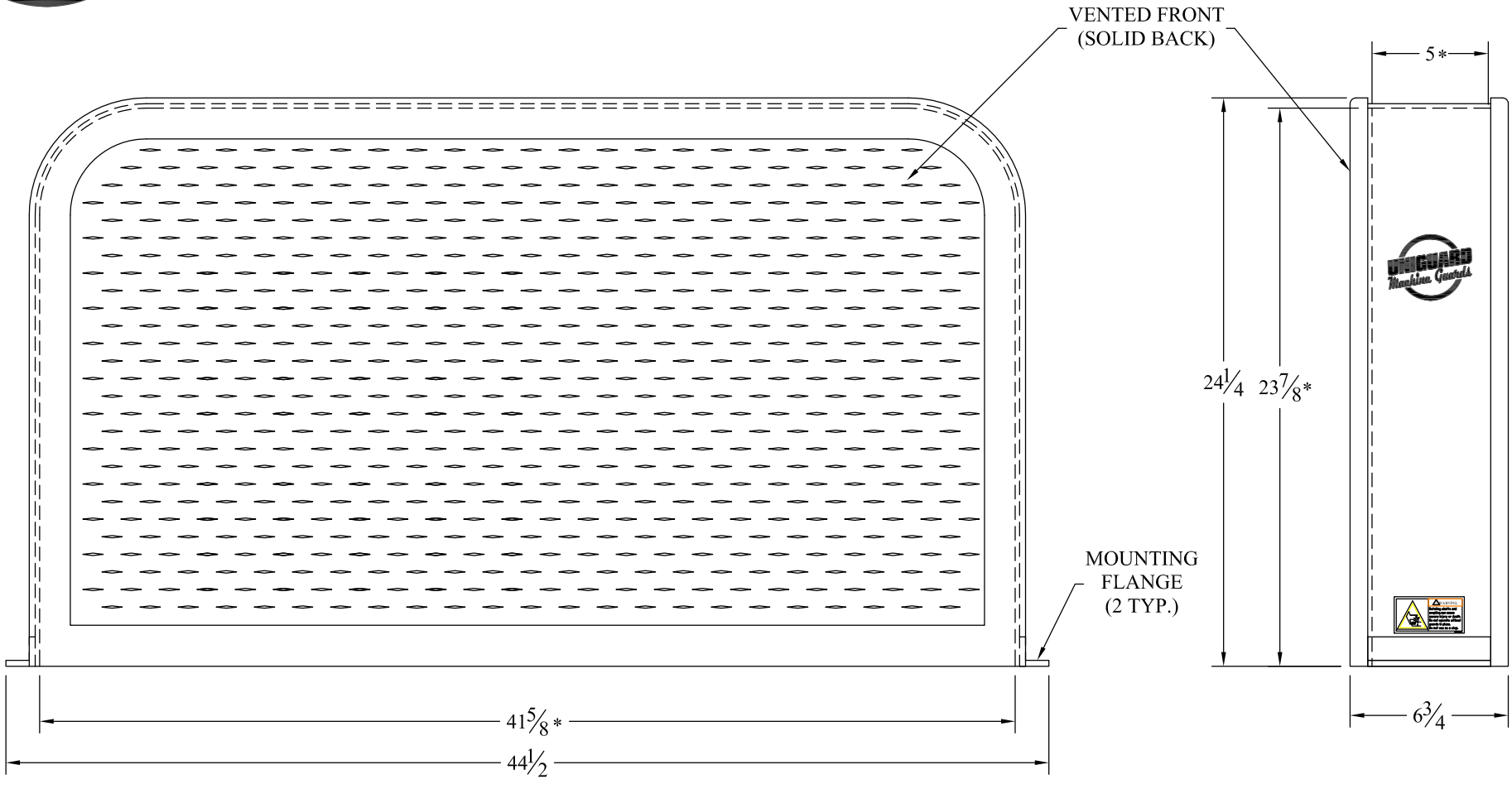
ITEM #	GDSA181418
COMPANY:	
EQ.#	
QTY.	

* INSIDE DIMENSION

UNIGUARD Machine Guards™

Engineered For Safety!

TYPE: HORIZONTAL-BG



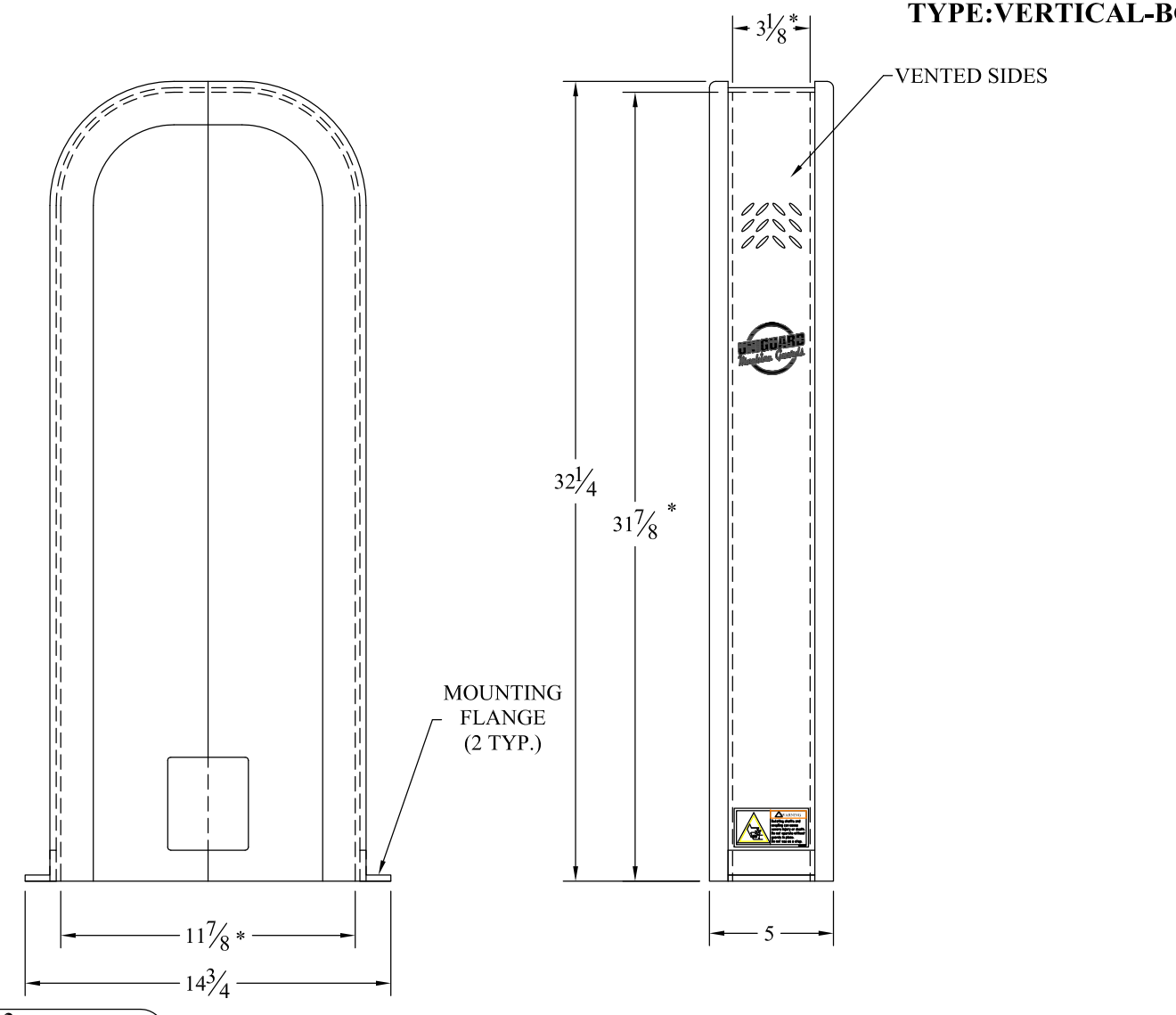
ITEM #	GHS422405
COMPANY:	
EQ.#	
QTY.	

* INSIDE DIMENSION

UNIGUARD Machine Guards™

Engineered For Safety!

TYPE:VERTICAL-BG

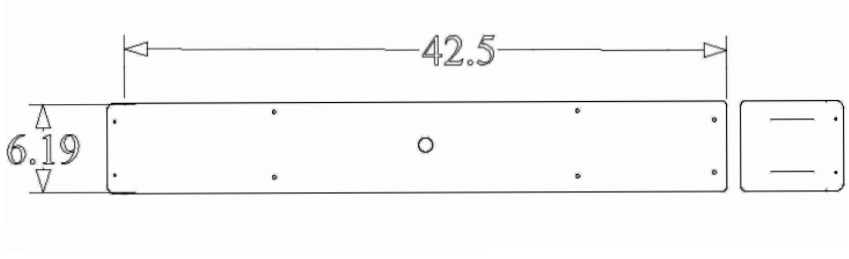


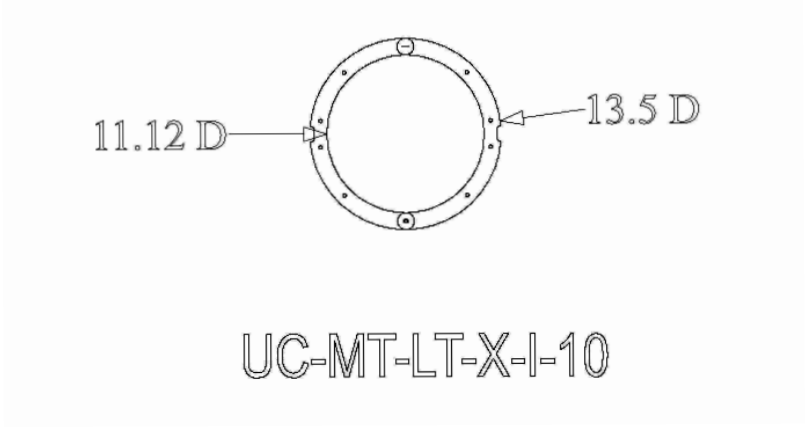
ITEM #	GVS321203
COMPANY:	
EQ.#	
QTY.	

* INSIDE DIMENSION

Engineered For Safety!

TYPE: UNICLEAR GUARD





ITEM #	A-3196-MTX/LTX
COMPANY:	
EQ.#	
QTY.	

* INSIDE DIMENSION

UNIGUARD
MATERIALS OF CONSTRUCTION

HDPE
CHEMICAL RESISTANCE AND COMPATIBILITY CHART

UNIGUARD
MATERIALS OF CONSTRUCTION
CHEMICAL RESISTANCE & COMPATIBILITY CHART
Uniguard-HDPE (Black Material)

HDPE TECHNICAL INFORMATION

Property*	ASTM Test Method	Typical Values	
		English Units	Metric Units
Physical Properties			
Density	D1505	59.6 lbs/ft^3	0.955 g/cc
Melt Index, Condition 190 ^{0}C / 2.16 kg	D1238	-	0.25 g/10 min
Polyethylene Classification	D4976	Group 2, Class 3, Grade 5	Group 2, Class 3, Grade 5
Mechanical Properties			
Tensile Strength @ Yield	D638	4000 psi	27.6 MPa
Ultimate Elongation	D638	> 600%	> 600%
Tensile IMPact Strength	D1822	70 ft-lbf/in^2	147 KJ/m^2
Notched Izod IMPact Strength	D256	2.99 ft-lbf/in	159 J/m
Compressive Stress @Yield	D695	1,500 psi	10.3 MPa
ESCR, Condition A (10% Igepal), F_{50}	D1693	45 hours	45 hours
ESCR, Condition B (100% Igepal), F_{50}	D1693	35 hours	35 hours
Durometer Hardness	D2240	64 Shore D	64 Shore D
Flexural Modulus	D790	200,000 psi	1379 MPa
Coefficient of Friction, Static	D1894	0.31	0.31
Coefficient of Friction, Kinetic	D1894	0.22	0.22
Thermal Properties			
Coefficient of Linear Thermal Expansion	E831	7 X 10^{-5} in/in/^{o}F	1.26 X 10^{-4} cm/cm/^{o}C
Decomposition Temperature	Union Carbide	~ 650 ^{o}F	~ 345 ^{o}C
Vicat Softening Temperature	D1525	257 ^{o}F	125 ^{o}C
Heat Deflection Temperature @66 psi	D648	171 ^{o}F	77 ^{o}C
Brittleness Temperature	D746	< -120 ^{o}F	< -84 ^{o}C
Glass Transition Temperature	Union Carbide	-193 ^{o}F	-125 ^{o}C
Continuous Use Temperature	---	-100 ^{o}F to 180 ^{o}F	-73 ^{o}C to 82 ^{o}C
Thermal Conductivity	Private Test	2.5 Btu-in/h-ft^2-^{o}F	.35 W/m-^{o}K
Burn Rate	D635	1 in/min	25.4 mm/min
Ignition Temperature, Flash Conditions	D1929	645 ^{o}F	341 ^{o}C
Ignition Temperature, Self Ignition Conditions	D1929	660 ^{o}F	349 ^{o}C
Flame Spread	E84 Tunnel Test	98	98
Smoke Developed	E84 Tunnel Test	350	350
Fire Rating	Underwriters Labs	UL94HB	UL94HB
ElectricalProperties			
Dielectric Strength	D149	510 V/mil	20.1 KV/mm
Dielectric Constant	D150	2.35	2.35
Volume Resistivity	D257	> 2.3 X 10^{15} ohm-in	> 6 X 10^{15} ohm-cm

*The nominal properties reported herein are typical of the product but do not reflect normal testing variance and therefore should not be used for specification purposes.
Typical Properties reported herein were determined on compression molded samples prepared in accordance with Procedure C of ASTM D4703, Annex A1.

HDPE CHEMICAL RESISTANCE CHART

Chemical resistance	G
Acetaldehyde	+
Acetic acid	+
Acetone	+
Acrylonitrile	+
Allyl alcohol	96 +
Aluminum chloride	A +
Ammonia	A +
Ammonium chloride	A +
Aniline	+
Benzaldehyde	+
Benzene	/
Benzyl alcohol	+
Bleach (Chlorine)	–
Boric acid	A +
Butanol	+
Butyl acetate	+
Calcium chloride	+
Carbon disulphide	/
Carbon tetrachloride	/ M –
Chlorine gas	–
Chlorobenzene	/
Chloroform	–
Chromic acid	10 +
Citric acid	+
Cyclohexanol	+
Cyclohexanone	+
Dekalin	+
Dibutyl phthalate	+
Diesel fuel	+
Diethyl ether	/
Dioxane	+
Ethanol	96 +
Ethyl acetate	+
Ethylene chloride	/
Ethylene diamine	+
Ferric chloride	A +
Fluorine	–
Formaldehyde	40 +
Formic acid	+
Furfurol	+

Chemical resistance	G
Glycerine	+
Hydrochloric acid	+
Hydrogen peroxide	/
Hydrogen sulphide	+
Lactic acid	+
Magnesium chloride	A +
Mercury	+
Methanol	+
Methyl ethyl ketone	+
Methylene chloride	/
Mineral oil	+
Motor oil	+
Nitric acid	25 /
Nitrobenzene	+
Oleic acid	+
Ozone	/
Perchloric acid	/
Petroleum	+
Phenol	+
Phosphoric acid	+
Potassium chromate	40 +
Potassium hydroxide	30 +
Potassium nitrate	A +
Potassium permanganate	+
Pyridine	+
Sea water	+
Sodium carbonate	A +
Sodium chloride	50 +
Sodium hydroxide	A +
Sulphuric acid	80 +
Tallow	+
Tetrahydrofurane	–
Tetralin	+
Thionyl chloride	–
Toluene	/
Transformer oil	+
Trichlorethylene	–
Urea, aqueous	33 +
Water	+
Zinc chloride	A +

(HDPE)
Extrusion welding melt temperature: 395°F–446°F
Hot gas welding temperature: 608°F
Thermoforming temperature range: 285°F–300°F

Values obtained at room temperature. Call for high or low temperature applications.
Number indicates concentration if < 100 %. M = Values may change under mechanical stress. A = Aqueous solution.

+ = Specimen is resistant ..... Swelling < 3% or weight loss < 0.5 %. Break elongation not significantly altered.
/ = Specimen has limited resistance ..... Swelling 3-8% or weight loss 0.5-5 % and/or break elongation decreased by < 50%.
– = Specimen is not resistant..... Swelling > 8% or weight loss > 5 % and/or break elongation decreased by > 50%.

UNIGUARD
MATERIALS OF CONSTRUCTION

VHMW-PE
CHEMICAL RESISTANCE
AND COMPATIBILITY CHART

UNIGUARD
MATERIALS OF CONSTRUCTION
CHEMICAL RESISTANCE & COMPATIBILITY CHART

Uniguard-VHMW-PE (Orange Material Standard) | **Uniguard-VHMW-PE (Yellow Material Optional)**

VHMW-PE TECHNICAL INFORMATION

Property*	ASTM Test Method	Typical Values	
		English Units	Metric Units
Density	D1505	59.2 lbs/ft^3	0.948 g/cc
Melt Flow Rate (HLMI), Condition 190 °C / 21.6 kg	D1238	---	10 g / 10 min
Polyethylene Classification	D4976	Group 2, Class 3, Grade 5	Group 2, Class 3, Grade 5
Potable Water Standards	NSF International	Meets Standards 14 & 61	Meets Standards 14 & 61
Tensile Strength @ Yield	D638	3,600 psi	24.8 MPa
Elongation at Break	D638	700%	700%
Flexural Modulus	D790	175,000 psi	1207 MPa
ESCR, Condition A & B (100% Igepal), F_{50}	D1693	> 600 hours	> 600 hours
Durometer Hardness	D2240	68 Shore D	68 Shore D
Vicat Softening Temperature	D1525	258 °F	126 °C
Heat Deflection Temperature @ 66 psi	D648	173 °F	78 °C
Brittleness Temperature	D746	< -103 °F	< -75 °C
Tensile Impact Strength	D1822	90 ft-lbf/in^2	190 KJ/m^2
Fire Rating	---	UL94HB	UL94 HB

*The nominal properties reported herein are typical of the product but do not reflect normal testing variance and therefore should not be used for specification purposes.
Typical Properties reported herein were determined on compression molded samples prepared in accordance with Procedure C of ASTM D4703, Annex A1.

VHMW-PE CHEMICAL RESISTANCE CHART LEGEND

+= Specimen is resistant.....Swelling <3% or weight loss <0.5%. Break elongation not significantly altered.
/= Specimen has limited resistance...Swelling 3-8% or weight loss 0.5-5% and/or break elongation decreased by <50%
-= Specimen is not resistant.....Swelling > 8% or weight loss > 5% and/or break elongation decreased by >50%

All information and recommendations regarding properties and applications are based upon tests and data believed accurate. Any particular application is the sole responsibility of the user. No warranty is expressed or implied. Under no circumstances shall we be liable for incidential or consequential loss.

UNIGUARD
MATERIALS OF CONSTRUCTION
CHEMICAL RESISTANCE & COMPATIBILITY CHART

Uniguard-VHMW-PE (Orange Material Standard) | Uniguard-VHMW-PE (Yellow Material Optional)

VHMW-PE CHEMICAL RESISTANCE CHART

CHEMICAL NAME	RATING
Acetaldehyde	+
Acetic acid	+
Acetone	+
Acrylonitrile	+
Allyl alcohol	96+
Aluminum chloride	A+
Ammonia	A+
Ammonium chloride	A+
Aniline	+
Benzaldehyde	+
Benzene	/
Benzyl alcohol	+
Bleach (Chlorine)	-
Boric acid	A+
Butanol	+
Butyl acetate	+
Calcium chloride	+
Carbon disulphide	/
Carbon tetrachloride	/M-
Chlorine gas	/
Chlorobenzene	/
Chloroform	/M-
Chromic acid	10+
Citric acid	+
Cyclohexanol	+
Cyclohexanone	+
Dekalin	+
Dibutyl phthalate	+
Diesel oil	+
Diethyl ether	+to/
Dioxane	+
Ethanol	96+
Ethyl acetate	+
Ethylene chloride	/
Ethylene diamine	+
Ferric chloride	A+
Fluorine	-
Formaldehyde	40+
Formic acid	+

UNIGUARD
MATERIALS OF CONSTRUCTION

CHEMICAL RESISTANCE & COMPATIBILITY CHART

Uniguard-VHMW-PE (Orange Material Standard) | **Uniguard-VHMW-PE (Yellow Material Optional)**

VHMW-PE CHEMICAL RESISTANCE CHART

Furfurol	+
Glycerine	+
Hydrochloric acid	+
Hydrogen peroxide	+
Hydrogen sulphide	+
Lactic acid	+
Magnesium chloride	A+
Mercury	+
Methanol	+
Methyl ethyl ketone	+
Methylene chloride	/
Mineral oil	+
Nitric acid	+to/
Nitrobenzene	+
Oleic acid	+
Ozone	/
Perchloric acid	50+
Petroleum	+
Phenol	+
Phosphoric acid	+
Potassium bichromate	40+
Potassium hydroxide	30+
Potassium nitrate	+
Potassium permanganate	+
Pyridine	+
Sea water	+
Sodium carbonate	10+
Sodium chloride	10+
Sodium hydroxide	60+
Sodium sulphite	-
Sulphuric acid	75+
Tallow	+
Tetrahydrofurane	+M-
Tetralin	+
Thionyl chloride	-
Toluene	/
Transformer oil	+
Trichlorethylene	+M-
Urea, aqueous	33+
Water	+
Zinc chloride	A+

Values obtained at room temperature. Call for high or low temperature applications. Number indicates concentration if < 100%. M= Values may change under mechanical stress G=Gaseous state. A=Aqueous solution. S=Soluble.

UNIGUARD
MATERIALS OF CONSTRUCTION

POLYCARBONATE CHEMICAL RESISTANCE AND COMPATIBILITY CHART

POLYCARBONATE-TECHNICAL INFORMATION

TYPICAL UNICLEAR© POLYCARBONATE SHEET PROPERTIES

Property	UNICLEAR©	Units	Test Method
General			
Specific gravity	1.2	-	ASTM D-792
Water Absorption 24 hrs.	0.15	%	ASTM D-570
Refractive Index	1.586	-	ASTM D-542
Mechanical			
Tensile Strength, Yield, .125˝	9,000	psi	ASTM D-638
Tensile Strength, Ultimate	9,500	psi	ASTM D-638
Tensile Modulus	345,000	psi	ASTM D-638
Shear Strength	6,000	psi	ASTM D-732
Compressive Strength	12,500	psi	ASTM D-695
Flexural Strength at 5% Strain	13,500	psi	ASTM D-790
Flexural Modulus .125˝	345,000	psi	ASTM D-790
Izod Impact Notched .125˝	12-16	ft.lb/in of notch	ASTM D-256
Rockwell Hardness	118	R Scale	ASTM D-785
Gardner Impact 1/2˝ Diameter Dart .125˝	>320	in.lbs	ASTM D-5420
Instrumented Impact .125˝	>45	ft.lbs	ASTM D-3763
Thermal			
Heat Deflection Temperature 264 psi	270	°F	ASTM D-648
Heat Deflection Temperature 68 psi	280	°F	ASTM D-648
Coefficient of Thermal Expansion	3.75×10^{-5}	in/in/°F	ASTM D-696
Coefficient of Thermal Conductivity	1.35	BTU/hr/ft²/°F	ASTM D-177
Smoke Density	68	-	ASTM D-2843
Shading Coefficient Clear .125˝	1.02	-	ASHRAE
Shading Coefficient Gray/Bronze .125˝	.70	-	ASHRAE
Shading Coefficient Dark Gray .125˝	.58	-	ASHRAE
Brittle Temperature	-200	°F	ASTM D-746
Flammability			
Horizontal Burn, AEB .125˝	<1	in	ASTM D-635
Horizontal Burn, ATB .125˝	<1	min	ASTM D-635
Self Ignition Temperature	1070	°F	ASTM D-1929
Flash Ignition Temperature	800	°F	ASTM D-1929
UL 94 Clear ≥ .060˝	V-2	-	UL 94
UL 94 Clear ≥ .250˝	V-0	-	UL 94
Optical			
Transmittance Clear .125˝	>88	%	ASTM D-1003
Haze Clear .125˝	<1	%	ASTM D-1003
Electrical			
Dielectric Constant 10 Hz	2.96	-	ASTM D-150
Dielectric Constant 60 Hz	3.17	-	ASTM D-150
Volume Resistivity	8.2×10^{16}	ohm-cm	ASTM D-257
Dissipation Factor 60 Hz	0.0009	-	ASTM D-150
Dissipation Factor 1 MHz	0.010	-	ASTM D-150
Arc Resistance			
Stainless Steel Strip Electrodes	10-11	sec	ASTM D-495
Tungsten Electrodes	120	sec	ASTM D-495

POLYCARBONATE SHEET COMBUSTIBILITY

Although the least combustible glazing material, Polycarbonate Sheet will ignite when exposed to an ignition source over 800°F.

CHEMICAL RESISTANCE OF POLYCARBONATE MATERIAL
(UNICLEAR & INSPECTION WINDOWS)

UniClear© POLYCARBONATE SHEET IS RESISTANT AT 70°F AND 0% STRAIN TO:

CHEMICALS:

Amyl Alcohol	Chromic Acid (20%)	Lactic Acid (20%)	Potassium Bromate	Sodium Chloride
Aluminum Chloride	Citric Acid (40%)	Magnesium Chloride	Potassium Bromide	Sodium Hypochlorite
Aluminum Sulfate	Copper Chloride	Magnesium Sulfate	Potassium Nitrate	Sodium Sulfate
Ammonium Chloride	Copper Sulfate	Manganese Sulfate	Potassium Perchlorate	Stannous Chloride
Ammonium Nitrate	Formic Acid (10%)	Mercuric Chloride	Potassium Permanganate	Sulfur
Ammonium Sulfate	Formalin (30%)	Nickel Sulfate	Potassium Persulfate	Sulfuric Acid (10%)*
Antimony Trichloride	Glycerine	Nitric Acid (10%)	Potassium Sulfate	Sulfuric Acid (50%)
Arsenic Acid	Heptane	Nitric Acid (20%)	Silicone Oil	Tartaric Acid (30%)
Butyl Alcohol	Hydrochloric Acid (10%)	Oleic Acid	Silver Nitrate	Zinc Chloride
Calcium Nitrate	Hydrogen Peroxide (30%)	Oxalic acid	Sodium Bicarbonate	Zinc Sulfate
Chlorinated Lime Paste	Hydrofluoric Acid (10%)	Pentane	Sodium Bisulfate	
Chrome Alum	Isopropanol	Phosphoric Acid (10%)	Sodium Carbonate	

*Sulfuric Acid at 1% attacks polycarbonate sheet

COMMON HOUSEHOLD MATERIALS UniClear© POLYCARBONATE IS RESISTANT TO:

CHEMICALS:

Borax	Joy Liquid Detergent	Rum
Cocoa	Insulating Tape	Salad Oil
Cement	Linseed Oil	Salt Solution (10%)
Chocolate	Liquor	Soap (Soft/Hard)
Cod Liver Oil	Milk	Table Vinegar
Cognac	Mineral Water	Tincture of Iodine (5%)
Coffee	Mustard	Tomato Juice
Detergents	Olive Oil	Vodka
Fish Oil	Onions	Washing Soap
Fruit Syrup	Orange Juice	Water
Grapefruit Juice	Paraffin Oil	Wine
Gypsum	Rapeseed Oil	

PETROLEUM PRODUCTS UniClear© POLYCARBONATE SHEET IS RESISTANT TO:

Compressor Oil	Spindle Oil
Diesel Oil	Transformer Oil
Kerosene	Vacuum Pump Oil
Refined Oil	

Note: Elevated temperature and/or strain significantly alters resistance to industrial petroleum products.

LIMITED RESISTANCE AT 70°F AND 0% STRAIN TO:

Antifreeze	Hydrochloric Acid (conc.)
Calcium Chloride	Milk or Lime (CaOH)
Cyclohexanol	Nitric Acid (conc.)
Ethylene Glycol	Sulfuric Acid (conc.)

UniClear© POLYCARBONATE SHEET IS NOT RESISTANT TO:

CHEMICALS:

Acetaldehyde	Benzyl Alcohol	Chlorobenzene	Formic Acid (conc.)	Phosphorus Trichloride
Acetic Acid (conc.)	Brake Fluid	Chlorothene	Freon (refrigerant/propellant)	Proplonic Acid
Acetone	Bromobenzene	Cutting Oils	Gasoline	Sodium Sulfide
Acrylonitrile	Butylic Acid	Cyclo Hexanone	Lacquer Thinner	Sodium Hydroxide
Ammonia	Carbon Tetrachloride	Cyclohexene	Methyl Alcohol	Sodium Nitrate
Ammonium Fluoride	Carbon Disulfide	Dimethyl Formamide	Nitrobenzene	Tetrahydronaphthalene
Ammonium Hydroxide	Carbolic Acid	Ethane Tetrachloride	Nitrocellulose Lacquer	Thiophene
Ammonium Sulfide	Caustic Potash Sol. (5%)	Ethylamine	Ozone	Toluene
Benzene	Caustic Soda Sol. (5%)	Ethyl Ether	Phenol	Turpentine
Benzoic Acid	Chloride	Ethylene Chlorohydrin	Phosphorus Hydroxy	Xylene

UniClear© POLYCARBONATE SHEET IS DISSOLVED BY:

Chloroform, Cresol, Dioxane, Ethylene Dichloride,Methylene Chloride, Pyridine

EFFECTS OF MOISTURE ON UniClear© POLYCARBONATE SHEET:

UniClear© Polycarbonate Sheet has good resistance to water up to approximately 150°F. Above this temperature, the effect of moisture is time-temperature related. Exposing UniClear© Polycarbonate Sheet to repeated steam cleaning or dishwashing can create hydraulic crazing. The result can be a clouding of the surface and ultimately a loss of physical strength properties.

POLYCARBONATE CHEMICAL RESISTANCE CHART LEGEND

General chemical behavior:

The chemical resistance of **UniClear**© depends on the concentration of the substance, the temperature, the contact time, and the internal tension level of the polycarbonate sheet due to fabrication, etc.

Several types of damage can arise, some more than one at a time.

Dissolving/Swelling
Low-molecular, aromatic, halogenated, and polar components migrate into the plastic. The damage can range from a sticky surface to complete dissolving.

Stress Cracking
Some chemicals migrate to a minor extend and in very low quantity into the surface, and lead to relaxation of tensions in the material. This results in stress cracking, which can be optically disturbing. Because of increased notch occurrence, some mechanical properties are negatively influenced. Stress cracking is usually easy to see in transparent sheets.

Molecular reduction
Some properties of materials are determined by the molecular weight. If a substance initiates a molecular reduction through a chemical reaction, the impact resistance and elastic properties of the material will be influenced. Electrical properties are almost not influenced; thermal properties are only slightly influenced by molecular weight.

Examples
Solvents not resistant to – Methylene chloride/Toluene/Chloroform/Xylene
Swelling agents – Benzene/Chlorine Benzene/Acetone
Not influenced by or resistant to - diluted mineral acids, many organic acids, oxidizing or reducing agents, neutral and acid salt solutions, and waxes.

In the following table you can find the resistance of **UniClear**©

The test results have been obtained at samples with low internal tensions, which have been stored during 6 months in the substance at a temperature of 20 degrees C (68°F), without any mechanical load.

Apart from the nature of the substances, the chemical resistance is also depending on the concentration of the substance, the temperature during the contact, the contact time and the internal tension of the tested specimen.

This means that our products can be resistant to a number of chemical for short contracts, but are not resistant in case of long exposure, such as performed in these tests.

Therefore, it is always recommendable to execute a test under application conditions, if these differ from the test environment described above.

The tested substances have been chosen as a function of their importance in several areas. In a lot of cases it is possible to deduct results to other, chemically comparable, substances, even if these have not been tested.

Scratch resistance materials **UniClear**© show improved chemical resistance, as long as the sheet surface remains intact.

Legend

Explanation of the symbols:
+ Resistant
O Partially resistant
- Not Resistant

The results shown in the sections 2 up to 10, and especially the commercial products marked with ®, are based on a one-time test. Change in the composition by the producers of these substances can influence the product properties.

POLYCARBONATE CHEMICAL RESISTANCE CHART

1. CHEMICALS

Acetaldehyde	-	Citric acid	+
Acetic acid, up to 10% solution	+	Copper sulphate, saturated aqueous solution	+
Acetone	-	Cresol	-
Acetylene	+	Cupric chloride, saturated aqueous solution	+
Acrylonitrile	-	Cuprous chloride, saturated aqueous solution	+
Allylalcohol	O	Cyclo hexane	-
Alum	+	Cyclo hexanol	O
Aluminum chloride, saturated aqueous solution	+	Cyclo hexanone	-
Aluminum oxalate	+	Dekaline	+
Aluminum sulphate, saturated aqueous solution	+	Diamyl phthalate	-
Ammonia	-	Dibutyl phthalate (plasticizer)	-
Ammoniacal liquor	-	Diethylene glykol	+
Ammonium chloride, saturated aqueous solution	+	Diethylether	-
Ammonium nitrate, saturated aqueous solution	+	Diglycolic acid, saturated aqueous solution	+
Ammonium sulphate, saturated aqueous solution	+	Dimethyl formamide	-
Ammonium sulphide, saturated aqueous solution	-	Dinonyl phthalate (plasticizer)	O
Amylo acetate	-	Dioctyl phthalate (plasticizer)	O
Aniline	-	Dioxane	-
Antimony chloride, saturated aqueous solution	+	Diphyl 5, 3	O
Arsenic acid, 20% solution	+	Ether	-
Benzaldehyde	-	Ethyl alcohol, 96% pure	+
Benzene	-	Ethyl amine	-
Benzoic acid	-	Ethyl bromide	-
Benzyl alcohol	-	Ethylene chloride	-
Borax, saturated aqueous solution	+	Ethylene chlorohydrine	-
Boric acid	+	Ethylene glykol	+
Bromic benzene	-	Ferritrichloride, saturated aqueous solution	+
Bromine	-	Ferro bisulphate	+
Butane (liquid or gaseous)	+	Formaline, 10%ig	+
Butanol	+	Formic acid, 30%	O
Butyl acetate	-	Gasoline	+
Butylene glycol	+	Glycerine	O
Butyric acid	-	Glycol	+
Calcium chloride, saturated aqueous solution	+	Heptane	+
Calcium hypochloride	+	Hexane	+
Calcium nitrate, saturated aqueous solution	+	Hydrochloric acid, 20%	+
Calcium-soap, fat/pure	+	Hydrochloric acid, conc.	-
Carbon acid, wet	+	Hydrofluoric acid, 5%	+
Carbon disulphide	-	Hydrofluoric acid, conc.	-
Carbon monoxide	+	Hydrofluorosilicic acid, 30%	+
Chlorine benzene	-	Hydrogen peroxide, 30%	+
Chlorine gas, dry	O	Hydrogen sulphide	+
Chlorine gas, wet	-	Iodine	-
Chlorine lime slurry	+	Isoamyl alcohol	O
Chlorine lime, 2% in water	+	Isopropyl alcohol	+
Chloroform	-	Lactic acid, 10% in water	+
Chrom alum, saturated aqueous solution	+	Lead tetraethylene, 10% in gasoline	O
Chromic acid, 20% in water	+	Lighting gas	+

POLYCARBONATE CHEMICAL RESISTANCE CHART

Ligroin (hydrocarbon compound)	+	Potassium sulphate, saturated aqueous solution	+
Lime milk, 30% in water	O	Propane gas	+
Magnesium chloride, saturated aqueous solution	+	Propargyl alcohol	+
Magnesium sulphate, saturated aqueous solution	+	Propionic acid, 20%	+
Manganous sulphate, saturated aqueous solution	+	Propionic acid, conc.	-
Mercuro chloride, saturated aqueous solution	+	Propyl alcohol	+
Mercury	+	Pyridine	-
Methacrylic acid	-	Resorcin oil solution, 1%	+
Methane	+	Soda	+
Methanol	-	Sodium bicarbonate, saturated aqueous solution	+
methyester (MMA)	-	Sodium bisulphate, saturated aqueous solution	+
Methyl amine	-	Sodium bisulphide, saturated aqueous solution	+
Methyl ethyl ketone (MEK)	-	Sodium carbonate, saturated aqueous solution	+
Methylene chloride	-	Sodium chlorate, saturated aqueous solution	+
Nitric acid, 10%	+	Sodium chloride, saturated aqueous solution	+
Nitric acid, 10-20%	O	Sodium hydroxide	-
Nitric acid, 20%	-	Sodium hypochloride, 5% in water	+
Nitric Gas, dry	-	Sodium sulphate, saturated aqueous solution	+
Nitrobenzene	-	Sodium sulphide, saturated aqueous solution	O
Oxalic acid, 10% in water	+	Styrene	-
Oxygen	+	Sublimate, saturated aqueous solution	+
Ozone	+	Sulphur	+
Pentane	+	Sulphur dioxide	O
Perchloric acid, 10% in water	+	Sulphuric acid, 50%	+
Perchloric acid, concentrated	O	Sulphuric acid, 70%	O
Perchloro ethylene	-	Sulphuric acid, conc.	-
Perhydrol, 30%	+	Sulphurous acid, 10%	-
Petroleum	O	Sulphuryl chloride	-
Petroleum ether	O	Tartaric acid, 10%	+
Petroleum spirit	+	Tetrachlorocarbon	-
Phenol	-	Tetrachloroethane	-
Phenyl ethyl alcohol	-	Tetrahydrofurane	-
Phosphor trichloride	-	Tetraline	-
Phosphoric acid, conc.	+	Thiophene	-
Phosphoric oxichloride	-	Toluene	-
Potassium aluminum sulpate, saturated aqueous solution	+	Trichloro acetic acid, 10%	O
		Trichloroethyl amine	-
Potassium bichromate, saturated aqueous solution	+	Trichloroethyl phosphate (plasticizer)	O
Potassium bromide, saturated aqueous solution	+	Trichloroethylene	-
Potassium carbonate, saturated aqueous solution	+	Tricresyl phosphate (plasticizer)	-
Potassium chloride, saturated aqueous solution	+	Urea, saturated aqueous solution	+
Potassium cyanide	-	Water	+
Potassium hydroxide	-	Xylene	-
Potassium metabisulphide, 4% in water	+	Zinc chloride, saturated aqueous solution	+
Potassium nitrate, saturated aqueous solution	+	Zinc oxide	+
Potassium perchlorate, 10% in water	+	Zinc sulphate, saturated aqueous solution	+
Potassium permanganate, 10% in water	+		
Potassium persulphate, 10% in water	+		
Potassium rhodanide, saturated aqueous solution	+		

POLYCARBONATE CHEMICAL RESISTANCE CHART

2. DISINFECTANTS

Baktol®, 5%	+
Carbolic acid	-
Chloroamine	+
DDT	-
Delegol ®, 5%	+
Dimamin T, 5%	O
Hydrogen peroxide	+
Iodine tincture	O
Lysoform, 2%	+
Maktol ®	+
Merfen ®, 2%	+
Oktozon ®, 1%	+
Perhydrol	+
Resorcinol solutions, 1%	+
Sagrotan ®, 5%	O
Spirit, pure	+
Sublimate	+
TB-Lysoform	-
Trosilin G extra ®, 1, 5%	+
Zephirol ®	O

3. PHARMACEUTICS, COSMETICS

Blood plasma	+
Delial-Sunmilk ®	+
Hydroplex	+
Iodine tincture	O
Klosterbalsam	+
Lanoline	+
Menthol, 90% in Alcohol	O
Nail polish	-
Nail polish remover	-
Odol-mouthwater ®	+
Periston blood substitute ®	+
Vaseline	+
Vick-Vaporub ®	+

4. NUTRITION

All-spice	-
Apple juice	+
Beef sebum	+
Beer	+
Beets syrup	+
Brandy, 38%	+
Butter	+
Chocolate	+
Cinnamon	+
Clove	-
Cod-liver oil	+
Coffee	+
Common salt	+
Fish	+
Fruit juice	+
Fruit syrup (Raspberry)	+
Gherkins	+
Grape sugar	+
Grapefruit juice	+
Juniper berry	+
Lard	O
Linseed oil	+
Liquor	+
Margarine	+
Meat	+
Milk	+
Mineral water	+
Mustard	+
Nutmeg	-
Onion	+
Orange juice	+
Paprika	+
Pepper	+
Rum	+
Salad oil	+
Syrup	+
Sugar solution, saturated aqueous solution	+
Tea	+
Tobacco	+
Tomato juice	+
Tomato puree	+
Vanilla	+
Vegetable juice	+
Vegetable oils	+
Vinegar	+
Vodka	+
Water	+
Wine	+
Worcester-Sauce	+

POLYCARBONATE CHEMICAL RESISTANCE CHART

5. WASHING / CLEANING AGENTS

Household soap	+
Top Job, Joy®	+
Palmolive Liquid®	+

6. TECHNICAL OILS AND FATS

Camphor oil	-
Castor oil	+
Cod-liver oil	+
Drilling oil	-
Fish oil	+
Fuel oil	O
Lubricant based on paraffin	+
Paraffin oil	+
Sodium soap fat	+

7. MISCELLANEOUS

Battery acid	+
Blood	+
Castor oil	+
Cement	+
Freon ® 113	+
Gasoline	O
Natural rubber	+
Oleic acid, conc.	+
Polishing wax	+
Polyethylene	+
Polyvinylchloride, (containing plasticizer)	O
Sea water	+
Starch	+
Weak acid >4.7 pH	+
Weak base <9.5 pH	O
Tannic acid	-