ASME B5.56M 94 ■ 0759670 0550732 TT9 ■

ASME B5.56M-1994

Specification and Performance Standard, Power Shears

AN AMERICAN NATIONAL STANDARD



The American Society of Mechanical Engineers

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

AN AMERICAN NATIONAL STANDARD

Specification and Performance Standard, Power Shears

ASME B5.56M-1994



The American Society of Mechanical Engineers

345 East 47th Street, New York, N.Y. 10017

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

Date of Issuance: December 9, 1994

This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda or written interpretations of the requirements of this Standard issued to this Edition.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Consensus Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment which provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable Letters Patent, nor assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations issued in accordance with governing ASME procedures and policies which preclude the issuance of interpretations by individual volunteers.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

Copyright © 1994 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All Rights Reserved
Printed in U.S.A.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

FOREWORD

(This Foreword is not part of ASME B5.56M-1994.)

Recognizing the need for an industry standard for power shears, the American Society of Mechanical Engineers Committee on Machine Tools and Components (B5) established in February 1990 a technical committee, B5 TC31, to develop the first American standard relating to this equipment. In the latter part of February 1990 an organizational meeting was held to develop this Standard. The make-up of this committee consists of power shears manufacturers, distributors, and users.

The technical committee's objective was to develop a standard to define and describe power shear specification and performance.

To accomplish this objective, the committee approached this task by inviting the North American shear manufacturers and users to submit basic data relative to the subject of this Standard so the committee could study, determine the variations, and obtain a consensus definition for a standard for power shears. This committee has adhered to the ANSI B5.51M-1987 Preferred Metric SI units for Machine Tools in the preparation of this Standard.

Following approval by ASME, the document was submitted to the American National Standards Institute, and was approved as an American National Standard on August 18, 1994.

Suggestions for improvement of this Standard are welcomed. They should be addressed to the Secretary, ASME B5 Committee, United Engineering Center, 345 E. 47th St., New York, N.Y. 10017.

POWER SHEAR SAFETY REQUIREMENTS

The ASME B5.56M-1994 does not cover safety. Safety requirements for the construction, care, and use of power shears are specified in the latest edition of the American National Standard B11.4.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

ASME STANDARDS COMMITTEE B5
Machine Tools — Components, Elements, Performance, and Equipment

(The following is the roster of the Committee at the time of approval of this Standard.)

OFFICERS

H. Cooper, *Chairman*
P. Stumpf, *Secretary*

COMMITTEE PERSONNEL

A. M. Bratkovich, P.E., National Machine Tool Builders Association, McLean, Virginia
D. L. Lewis, Kennametal, Inc., Raleigh, North Carolina
D. Lovett, U. S. Department of Commerce, National Bureau of Standards, Gaithersburg, Maryland
G. R. Rawlinson, P.E., Rawlinson & Associates, Crossville, Illinois
W. S. Roorda, P.E., Alcona Associates, Inc., Venice, Florida

TECHNICAL COMMITTEE 31 — PRESS BRAKES AND SHEARS

G. Rawlinson, P.E., *Chairman,* Rawlinson & Associates, Inc.
R. L. Wonsetler, *Vice Chairman,* R. W. Engineering Ltd.
R. M. Stein, P.E., *Secretary,* RMS Engineering
W. S. Bamford, Niagara Machine and Tool Works
A. M. Bratkovich, P.E., The Association for Manufacturing Technology
R. R. Jelinek, Wysong & Miles Co.
G. W. Kelly, Caterpillar, Inc.
L. W. Mathis, G.E. Mathis Co.
G. W. Munschauer, Niagara Machine and Tool Works
J. E. Walker, Pearl Equipment Co.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

CONTENTS

Foreword iii
Standards Committee Roster v

1 Scope, Purpose, and Application 1
2 Definitions and Terminology 1
3 Units of Dimension and Capacity 1
4 Machine Characteristics 2
5 Tooling Interface 2
6 Ergonomics 2
7 Acceptance Conditions 2
8 Provision for Information and Instruction 4
9 Manufacturer Declaration of Compliance 6
10 Reference Standards 6

Figures

1 Shear Terminology 1
2 Shear Knife Cross-Section 2
3 Shear Knife Interface 4
4 Identification Data Location 6
5 Sample Identification Data Plate 6

Tables

1 Machine Capacity, mm (in.) 3
2 Cut Length, mm (in.) 3
3 Preferred Knife Dimensions, mm (in.) 5
4 Parallelism Tolerance, mm (in.) 5
5 Part Tolerance, mm/300 mm (in./ft) 5

Appendices

A Glossary of Terms 9
B Metric/English Conversion Tables 13

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

SPECIFICATION AND PERFORMANCE STANDARD, POWER SHEARS

1 SCOPE, PURPOSE, AND APPLICATION

1.1 Scope

The requirements of this Standard apply to power shears used to cut metal by shearing, utilizing a fixed lower knife(s) and a non-rotary, moving upper knife(s).

This Standard applies to those shears commonly referred to as squaring, guillotine, gap, plate, pivot blade (swing beam), and slitting (non-rotary).

This Standard specifically excludes machines referred to as right angle, alligator, cut to length, crop, slitting (rotary), nibblers, portable hand tools, coil slitters, rotary blade slitters, iron workers, angle, bar, beam, channel, notching, rotary drum, flying, and billet shears.

1.2 Purpose

The purpose of this Standard is to define and describe shear size, capacity, and performance.

1.3 Application

Any shear referred to as an American National Standard Power Shear shall comply with all the requirements of this Standard.

2 DEFINITIONS AND TERMINOLOGY

The glossary provided in Appendix A contains a list of definitions associated with the power shear industry and may or may not be referenced in this Standard (see Fig. 1).

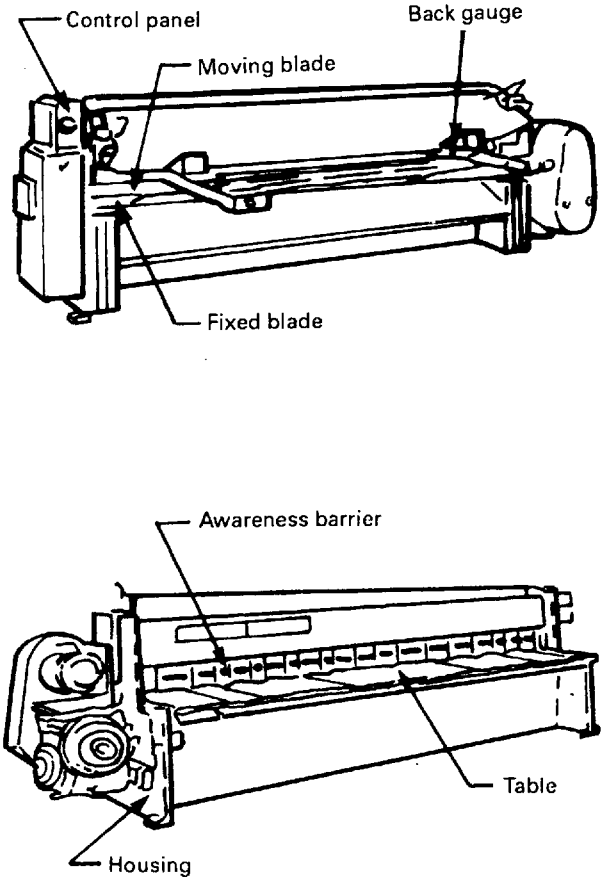


FIG. 1 SHEAR TERMINOLOGY

3 UNITS OF DIMENSION AND CAPACITY

3.1 Metrication

All units of dimension and capacity are per ANSI B5.51M-1979 (R1987), Preferred SI Units for Machine Tools. Equivalent English unit rating is shown in parentheses.

3.2 Conversion

A reference Metric/English Conversion Table is provided in Appendix B of this Standard.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

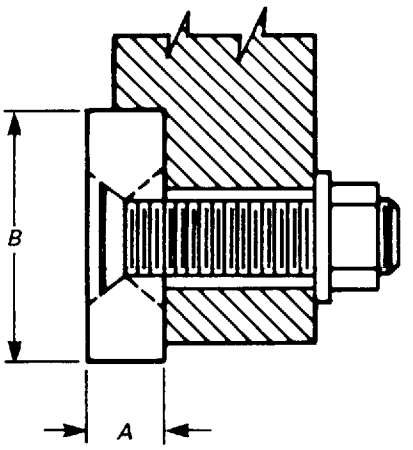


FIG. 2 SHEAR KNIFE CROSS-SECTION

4 MACHINE CHARACTERISTICS

4.1 Capacity

This Standard defines power shear sizes ranging from 1.5 mm to 25 mm (.06–1.00 in.) shearing capacity. Eleven standard sizes are defined in Table 1. Equipment falling between two standard capacity sizes will be grouped with the lower standard size for designation.

4.2 Length

Equipment conforming to this Standard shall have an overall knife length as defined in ANSI B94.53-1984. When specifying equipment, shearing length should be selected from one of the preferred standard lengths shown in Table 2. Equipment falling between two standard capacity sizes will be grouped with the lower standard size for designation.

4.3 Bed Height

The distance from the floor to the top of the bed shall be no less than 750 mm (30 in.) and not greater than 1050 mm (42 in.).

4.4 Stroke/Cut Rate

Stroke rate and cut rate are not interchangeable.

4.4.1 Stroke Rate. Stroke rate is the number of stroke cycles completed in one minute of continuous shear operation at maximum length with the absence of material and the rake angle adjusted to provide rated shear capacity.

4.4.2 Cut Rate. Cut rate is the number of cuts completed in one minute of continuous shear operation shearing the maximum length of the rated material with the rake angle adjusted to provide rated shear capacity.

4.5 Table Slot Design

When provided to aid in material handling, table slots in the bed top shall be 75 mm (3.0 in.) wide and 12.5 mm (.50 in.) deep.

5 TOOLING INTERFACE

Shear knives, per ANSI B94.53, are to be provided with a table and ram interface that will provide secure mounting and seating.

The dimensions listed in this section are preferred/recommended at this time. The intent of this Standard is to make these dimensions mandatory at a later date.

5.1 Preferred Knife Dimensions

Power shears complying with this Standard will use knives with the cross section shown in Fig. 2 and Table 3.

5.2 Preferred Knife Interface

Power shears complying with this Standard should accept solid steel shear knives with cross section, length, hole size, and hole spacing as recommended in ANSI B94.53, shown in Fig. 3 and Table 3.

5.3 Knife Coding

Knives provided for shears which comply with this Standard shall be identified as follows:

B5.56M - 25 × 3100 × 100

Knife Thickness (A)
Overall Length (L)
Knife Height (B)

6 ERGONOMICS

6.1 Operator Control Locations

Operator controls shall comply with ANSI B11.4.

7 ACCEPTANCE CONDITIONS

7.1 General Conditions

Prior to testing, the power shear shall be installed on a suitable foundation in accordance with the manufac-

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

TABLE 1 MACHINE CAPACITY, mm (in.)

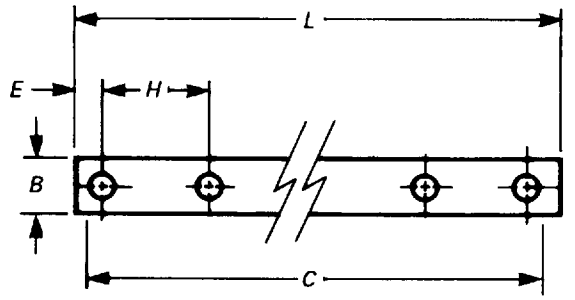
Standard Size No.	Mild Steel AISI 1018 410 MPa, (60,000 psi)	Structural Steel ASTM A36 550 MPa (80,000 psi)	Stainless Steel 300 Series 690 MPa (100,000 psi)
1	1.5 (.062)		
2	2.5 (.105)		2.00 (.075)
3	3.5 (.134)		3.00 (.119)
4		6.00 (.250)	5.00 (.187)
5		8.00 (.312)	6.00 (.250)
6		10.0 (.375)	8.00 (.312)
7		12.0 (.500)	10.0 (.375)
8		16.0 (.625)	12.0 (.500)
9		19.0 (.750)	16.0 (.625)
10		25.0 (1.00)	19.0 (.750)

TABLE 2 CUT LENGTH, mm (in.)

Standard Size No.	Standard Length Letter for Bed and Ram							
	A	*B*	*C*	*D*	*E*	*F*	*G*	*H*
	1220 (48)	1830 (72)	2440 (96)	3050 (120)	3660 (144)	4270 (168)	4880 (192)	6100 (240)
1	X	X						
2	X	X	X					
3	X	X	X	X				
4		X	X	X	X			
5				X	X			
6				X	X			
7				X	X	X	X	X
8				X	X	X	X	X
9				X	X	X	X	X
10					X	X	X	X
Minimum Distance Between Side Gauges	1270 (50)	1880 (74)	2490 (98)	3100 (122)	3710 (146)	4320 (170)	4930 (194)	6150 (242)

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale



B – Knife height
H – Hole spacing
E – End to first hole
C – Cut length
L – Overall length = *C* + *B*

FIG. 3 SHEAR KNIFE INTERFACE

turers specifications with all the necessary services connected.

7.2 Dimensional Conformance

The tolerances specified shall be absolute values independent of statistical analysis.

7.2.1 Knife Parallelism. Set the knife gap in accordance with the manufacturer's specification. Lower the ram until the knife closure point is 150 mm from the side gauge. Shut off power to the machine and, using a feeler gauge, measure the knife gap. Repeat procedure taking measurements every 150 mm. Variations between measurements should not exceed the values shown in Table 4.

7.2.2 Parallelism of Backgauge to Lower Knife. Set the backgauge 100 mm from the lower knife. Shut power off to the machine and, using a depth micrometer, measure the distance from the lower knife to the face of the backstop. Repeat procedure taking measurements every 300 mm.

Tolerance:

0.1 mm (.004 in.)

7.2.3 Part Accuracy. The following tests are performed, first, by shearing material matching the rated capacity of the machine, and second, shearing material approximately 20% the rated capacity of the machine. The values measured for both materials shall be within the limits specified in Table 5. Trim shearing of the part should be done before the start of any test.

7.2.3.1 Straightness. Shear a part of maximum shear length with a width no less than 20 times the thickness of the material or 80 mm, whichever is greater. Place the part on a qualified surface with the part perpendicular to the surface and the concave edge of the part resting on the surface. Using a feeler gauge, measure the gap between the surface and the part edge.

7.2.3.2 Parallelism. Shear a part of maximum shear length with a width no less than 20 times the thickness of the material or 80 mm, whichever is greater. Using a micrometer, measure the width of the part at each end and in the center.

7.2.3.3 Squareness. Shear a rectangular part which is no smaller than 300 mm on a side. Place the part on a qualified surface with the part perpendicular to the surface and an inspection quality angle resting against one of the vertical edges of the part. Using a feeler gauge, measure the gap between the inspection angle and the part edge.

8 PROVISION FOR INFORMATION AND INSTRUCTION

8.1 Information

8.1.1 Nameplate. The manufacturer shall provide an identification data plate of durable metal. The data plate is to be permanently attached to the outside of the right hand side frame at a height not to exceed 2000 mm (80 in.) from floor level, as shown in Fig. 4. The data plate shall display all information relative to the equipment, per Fig. 5.

In addition to the data plate, the equipment serial number shall be stamped on the left end of the bed adjacent to side gauge in letters and numerals at least 6 mm (.25 in.) high.

8.1.2 Machine Designation. Machines conforming to this Standard will utilize a two character suffix addition to the model designation. The suffix will be comprised of the standard size number from Table 1 and the standard length letter from Table 2.

Example:

Model 1025–4 D
Standard size from Table 1
Standard length from Table 2

8.1.3 Documentation Package. The manufacturer shall establish and maintain a file defining the shear configuration at the time of construction. This file shall, at the minimum, include the principal physical features of the machine, description of power and control systems (electrical, electronic, hydraulic, pneumatic), and en-

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

TABLE 3 PREFERRED KNIFE DIMENSIONS, mm (in.)

Standard Size	*A*	*B*	*H*	*E*
1	12 (.50)	50 (2.00)	200 (8.00)	25.0 (1.00)
2	20 (.75)	75 (3.00)	200 (8.00)	37.5 (1.50)
3	25 (1.00)	75 (3.00)	200 (8.00)	37.5 (1.50)
4, 5, 6	25 (1.00)	100 (4.00)	200 (8.00)	50.0 (2.00)
7, 8	30 (1.25)	125 (5.00)	200 (8.00)	62.5 (2.50)
9, 10	40 (1.50)	140 (5.50)	200 (8.00)	70.0 (2.75)

TABLE 4 PARALLELISM TOLERANCE, mm (in.)

Material Thickness	Gap tolerance
up to 2.5 (0.098)	.025 (.001)
2.5–8.0 (.089–.315)	.05 (.002)
over 8.0 (0.315)	.08 (.003)

TABLE 5 PART TOLERANCE, mm/300 mm (in./ft)

Standard Size	Part Tolerances mm/300 mm (in./ft)		
	Straightness	Parallelism	Squareness
1–3	.025 (.001)	.025 (.001)	.025 (.001)
4–5	.05 (.002)	.05 (.002)	.05 (.002)
6–7	.05 (.002)	.05 (.002)	.05 (.002)
8	.1 (.004)	.1 (.004)	.05 (.002)
9	.2 (.008)	.1 (.004)	.075 (.003)
10	.25 (.010)	.1 (.004)	.075 (.003)

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

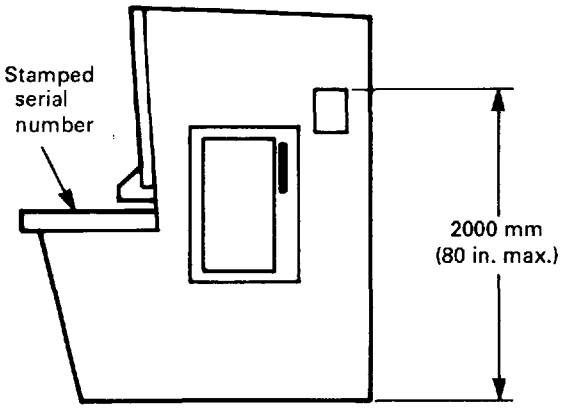


FIG. 4 IDENTIFICATION DATA LOCATION

gineering documentation of all related components and systems.

8.2 Instruction Manual

The manufacturer shall provide a minimum of two copies of the instruction manual containing information relevant to proper installation, operator and supervisor training, safety, and maintenance of the equipment. The manuals shall be printed in English and bound as a permanent reference document for the equipment.

9 MANUFACTURER DECLARATION OF COMPLIANCE

9.1 Certificate of Compliance.

Upon request, the machine manufacturer shall provide a certificate of compliance with this Standard. The certificate is to include the following information:

Title: B5.56M Compliance

Manufacturer -

Machine Model -

Machine Serial No. -

Date -

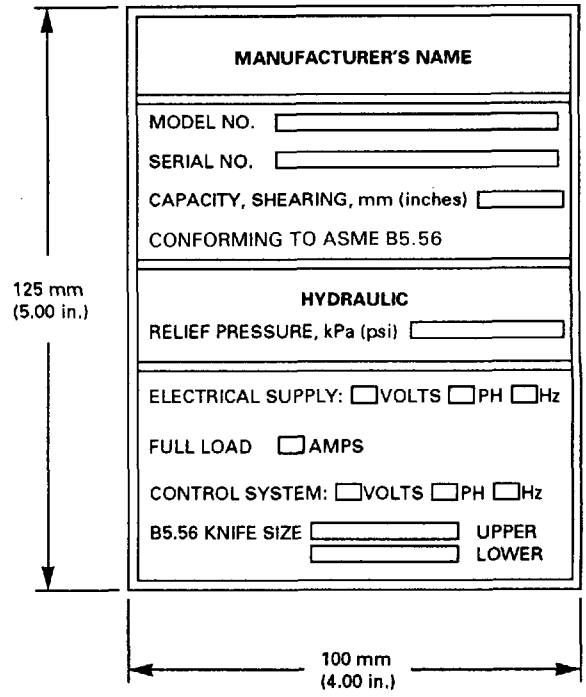


FIG. 5 SAMPLE IDENTIFICATION DATA PLATE

10 REFERENCE STANDARDS

10.1 Safety and Health

ANSI B11.4, Safety Requirements for the Construction, Care, and Use of Shears

ANSI B11.19, Performance Criteria for the Design, Construction, Care, and Operation of Safeguarding When Referenced by the Other B11 Standards

ANSI B15.1, Safety Standard for Mechanical Power Transmission Apparatus

ANSI Z44.1, Lockout Tagout

NFPA 79, Electrical Standard for Industrial Machinery

OSHA 1910.95, Occupational Noise Exposure

OSHA 1910.211, Machinery and Machine Guarding, Definitions

OSHA 1910.212, Machinery and Machine Guarding, General Requirements for All Machines

OSHA 1910.219, Machinery and Machine Guarding, Mechanical Power Transmission Apparatus

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

10.2 Other References

ANSI B5.51M-1987, Preferred SI Units for Machine Tools

ANSI B94.53-1984, Solid Steel Rectangular Metal Cutting Squaring Shear Knives Dimensional Tolerances

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

APPENDIX A
GLOSSARY OF TERMS

(This Appendix is an integral part of ASME B5.55M-1994 and is placed after the main text for convenience.)

Terms relevant to this Standard and its application are as follows:

actuating means (controls) — see *control, hand; control, foot or PSD; control, pedal (treadle); two hand trip*

anti-repeat — that function of the control system designed to limit the shear to a single cycle (stroke) if the tripping or actuating means is held operated

automatic (full) — see *continuous*

awareness barrier — an attachment that by physical contact warns personnel of an approaching or present hazard

awareness device — a signal or device that, by means of audible sound or visual light, warns of a present or approaching hazard

barrier — a physical boundary to a hazard

bed — the stationary member of the (shear) that supports the (fixed blade) and other associated equipment

blade (knife) — a tool having a cutting edge(s) used in the manufacture of production parts

bow — a curvature of the face of the workpiece which prevents it from laying flat on the shear table

brake — a mechanism for stopping, slowing, or preventing motion

camber — a curvature of the edge of the workpiece which prevents continuous contact to a gauge stop

caution — see *warning*

clutch — an assembly, that when engaged, transmits torque to impart motion from a driving member to a driven member

clutch, part revolution — a type of clutch that may be engaged or disengaged during the shear cycle (stroke)

clutch, full revolution — a type of clutch that, when engaged, cannot be disengaged until the shear has completed a full cycle (stroke)

connection (connecting rod) (pitman) — the part of the shear that transmits motion and force from the revolving crank or eccentric to the ram

continuous (automatic) (full automatic) — uninterrupted, multiple cycles (strokes) without intervening stops at the end of an individual cycle (stroke)

control, foot — a foot operated mechanism (other than a mechanical pedal) for use with the shear control system

control, foot pedal, (mechanical) — a foot operated lever designed to actuate and engage the clutch and disengage the brake to cause ram motion

control, hand — a hand operated mechanism for use with shear control system

control, numerical — a shear controller or control system that is capable of logic and information processing without manual intervention

control, operator — a pushbutton, switch, lever, handwheel, or other device activated by the operator which initiates, cycles, controls, or stops motion of the shear

control, presence sensing device (PSD) — a presence sensing device (PSD) is used as an actuating means

control, emergency (master) stop — a control that, when actuated, initiates immediate or controlled stopping action of the hazardous motion of the shear

control, stop or return — a control that, when actuated, initiates immediate or controlled stopping action of the hazardous motion and causes the slide(s) (ram) to return to its initial open position

control, two hand — a control arrangement that requires the concurrent use of both of the operators hands to initiate or continue the shear cycle (stroke)

counterbalance (system) — means provided to balance the reciprocating weight of the ram, drive members, and slide (ram) attachments

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

ASME B5.56M 94 ■ 0759670 0550746 593 ■

cycle (work, machine or single cycle; single stroke) — a complete movement from the initial start position back to the same start position of the ram shear which may include loading and unloading

device, barrier gate (safety) — a mechanism that is designed to allow compacted parts to pass through it to the point of operation but restricts the entry of the operator to the point of operation

device, hold out (restraint) (safety) — a device including attachments for the operators hands and wrists that prevents the operator from reaching the pont of operation

device, presence sensing (safety) — a device designed, constructed, and arranged to create a sensing field, area, or plane that will detect the presence of the operators or others hand or other body part and send a signal to the shear control system

device, safeguarding (safety) — a means that detects or prevents inadvertent access to a hazard

drive (mechanical) — the source of mechanical energy for shear motion

drive, direct — the type of driving arrangement which does not use a clutch

eccentric — the offset portion of the main shaft or main gear that governs the distance that the ram travels

ejector — a mechanism for removing a workpiece or material from the point of operation

ergonomics — the study of the worker/machine interface for the purpose of adapting the workplace, machine, and job to fit the worker

feeding — the process of loading or removing material or workpieces into or from the shear

frame — the basic and primary structure of the shear

gauge, material position — a stop against which the material or workpiece is placed to locate it within the point of operation

gap — see *throat*

gauge, back — a stop against which the workpiece edge, furthest from the operator, is placed to determine part size

gauge, front — a stop against which the workpiece edge, closest to the operator, is placed to determine part size

gauge, side — a stop against which the workpiece edge, located to either the left or right of the operator, is placed

gibs — the machine members used for guiding the ram (slide)

guard — a barrier which prevents entry into the point of operation or other hazard area (zone)

guard, fixed barrier — a guard affixed to the frame, bolster, or other surface in such a manner so as to enclose all or part of the point of operation or other hazard area (zone)

guard, holddown — a guard which prevents entry to the pinch point hazard caused by the hold down(s)

guard, perimeter — a physical barrier located at the perimeter or segment of the shear (or within the system or cell)

handling slot — a recess below the table surface that aids in the handling or positioning of the material or workpieces

holddown — a mechanism that restrains movement of the workpiece during the shearing action

housing — see the side *frame*

inch — to impart momentary motion to the shear by manual means

jog — see *inch*

knife — see *blade*

manual (operation) — the operation of the shear requires the operator initiate and maintain the motion of the machine during the cycle (stroke) or a portion of the cycle (stroke) by use of the actuating means

mode — the state or condition of the control system which allows specific operations of the shear

operator — an individual who performs production work and who controls the shear

pedal (treadle), foot — a foot actuated lever designed to operate the mechanical linkage

plate — flat material having dimensions of over 5 mm (7 gauge) thickness and 228 mm (9 in.) or more in width

point of entry — the opening(s) of a shear through which the material or a workpiece is placed (inserted) for processing

point of operation — the location in the shear where the material or workpiece is positioned and work is performed

probe — a device that indicates the presence of material or workpiece by pressure, contact, electronic or electro-optical means

programmable logic control (PLC) — an electronic system which performs logical, decision making, or arithmetic functions by executing instructions in a specific manner. A PLC usually includes input and output elements (ports) and is usually reprogrammable.

rake — the inclination of one blade with respect to the other in the shearing plane, commonly expressed in degrees

ram — the linear moving machine member

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

run — single or continuous cycling (stroking) of a shear

safeguarding — methods for protection of personnel from hazards using guards, safety devices, or safe work procedures

safeguarding, safe distance — a method of workpiece positioning and operator location that eliminates the need for the operator to be in or near the hazardous area during the hazardous portion of the shear cycle (stroke)

scrap — fragments of stock removed in the manufacturing; process waste or discarded material

selector, mode (stroking) (operating mode) — one or more means used to establish the shear operating sequence

setup — the process of adjusting the shear and the installation and adjustment of work holding devices or tooling and appropriate safeguarding to ensure proper and safe operation of the shear

sheet — flat material having dimensions less than or equal to 5 mm (7 gauge) thickness and 228 mm (9 in.) or more in width

single stroke (cycle) capability — a mechanism or control arrangement used to automatically initiate stopping action of the shear (slide) (ram) at the completion of the cycle (stroke)

speed, cut rate — the number of ram cycles completed in one minute while shearing a specified material of a given length

speed, ram — the number of ram cycles completed in one minute without shearing material

squaring, arm — a stop against which the workpiece edge, located to either the left or right of the operator, is placed to establish a right angle between the edge and the lower blade

station, work — the area on the machine where shearing is performed

stop control, emergency — see *control, (emergency) (master) stop*

stop, top (cycle) (stroke) — an operator control used to stop continuous cycling (stroking) at the end of the cycle (stroke) or at another predetermined point

support arm — an extension mounted to the shear table to increase the area available for support of the workpiece

support, ball — a workpiece support which rolls against the bottom of the workpiece to improve handling and reduce marring

table — that part of the shear on which material or workpieces are positioned

throat (gap) — an opening or recess in the frame (housing) to permit the positioning of material or workpieces

treadle bar (foot) — the operating bar that extends the full length of the shear and to which a foot pedal (treadle) may be attached

trip (tripping) — the momentary actuation of the shear control or mechanism to initiate the shear cycle (stroke)

twist — a helical curvature of the workpiece

two hand trip — an actuating means that requires concurrent use of both hands of the operator to trip the shear

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

APPENDIX B
METRIC/ENGLISH CONVERSION TABLES

(This Appendix is an integral part of ASME B5.56M-1994 and is placed after the main text for convenience.)

(See Table on following page.)

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

ASME B5.56M 94 ■ 0759670 0550749 2T2 ■

Length

Inches to Millimeters

Inches	mm
0.001	0.0254
0.005	0.1270
0.010	0.2540
0.015	0.3810
0.020	0.5080
0.030	0.7620
0.040	1.0160
0.050	1.2700
0.060	1.5230
0.070	1.7780
0.080	2.0320
0.090	2.2860
0.100	2.5400
0.125	3.1800
0.250	6.3500
0.500	12.7000
0.750	19.0500
1.000	25.4000
2.000	50.8000
3.000	76.2000
4.000	101.6000
5.000	127.0000
6.000	152.4000
7.000	177.8000
8.000	203.2000
9.000	228.6000
10.000	254.0000
20.000	508.0000
30.000	762.0000
40.000	1016.0000
50.000	1270.0000
100.000	2540.0000

Millimeters to Inches

mm	Inches
0.1	0.0039
0.5	0.0197
1.0	0.0394
1.5	0.0591
2.0	0.0787
2.5	0.0984
3.0	0.1181
3.5	0.1378
4.0	0.1575
4.5	0.1770
5.0	0.1970
6.0	0.2360
7.0	0.2760
8.0	0.3150
9.0	0.3540
10.0	0.3940
11.0	0.4330
12.0	0.4720
13.0	0.5120
14.0	0.5510
15.0	0.5910
16.0	0.6300
17.0	0.6690
18.0	0.7090
19.0	0.7480
20.0	0.7870
25.0	0.9840
50.0	1.9690
75.0	2.9530
100.0	3.9370
500.0	19.6850
1000.0	39.3700

Force

Tons to Kilonewtons

Tons	kN
1.0	8.9
5.0	44.5
10.0	89.0
20.0	178.0
30.0	267.0
40.0	365.0
50.0	445.0
100.0	890.0
500.0	4450.0
1000.0	8900.0

Kilonewtons to Tons

kN	Tons
1.0	0.1124
5.0	0.5620
10.0	1.1240
25.0	2.8100
50.0	5.6200
100.0	11.2400
250.0	28.1000
500.0	56.2000
1000.0	112.4000
2500.0	280.9000

Pressure

Pounds/Sq. Inch to Kilopascal

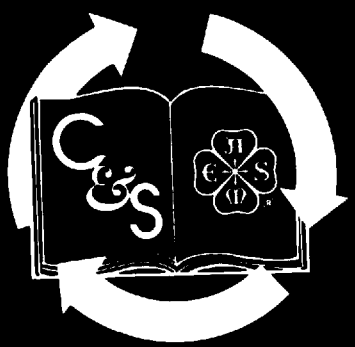
psi	kPa
1.0	6.90
5.0	34.48
10.0	68.95
20.0	137.90
30.0	206.85
40.0	275.80
50.0	344.80
100.0	689.50
250.0	1723.80
500.0	3447.50
1000.0	6895.00
2000.0	13790.00

Kilopascal to Pounds/Sq. Inch

kPa	psi
1.0	0.145
5.0	0.730
10.0	1.450
25.0	3.630
50.0	7.250
100.0	14.500
250.0	36.260
500.0	72.520
1000.0	145.000
2000.0	290.100
5000.0	725.200
10000.0	1450.300

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

ASME B5.56M 94 ■ 0759670 0550750 T14 ■



This document is printed
on 50% recycled paper.

ISBN #0-7918-2306-7

M15294

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale