



Fabricated Parts Drawing Specifications

This standard applies to ALL machine shops that produce fabricated parts for Douglas Machine Inc. This includes but is not limited to all raw material stock, modified components, fabricated components, and finishes produced by a contract vendor and parts made within Douglas Machine. If there are any questions that are not directly addressed by this document, contact a Douglas representative for further clarification.

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I. Intent

- To provide fabricators the information to correctly produce parts to the latest and current Douglas Machine specifications.
- To define expectation of parts.
- To define legacy drawings intent.
- Quickly respond to print and standard changes that could affect legacy prints and prints that are currently in process.

II. Responsibility

- It is the responsibility of the document owner and process owner of this Standard to inform Purchasing and Production control of any changes to this standard.
- It is the responsibility of Purchasing and Production control to inform all vendors / suppliers that produce fabricated parts for Douglas of any changes to this standard and ensure current version of this document is available
- It is the responsibility of all manufactures of Douglas Fabricated parts to ensure they fully understand this standard and conform to these requirements.

III. Conflicting Information

- All Douglas Machine parts shall be made to the following specification, unless otherwise indicated on the print. Always contact a Douglas Machine Inc. representative should there be any question as to part requirements.
- **If information in this document is to supersede any print requirement, it will be stated as so.**

Section A – Material Requirement Statement

- All raw material and parts fabricated from raw material shall meet the requirements that are identified on the print.
 - ASTM A29/29M - Steel Bars, Carbon and Alloy, Hot-Wrought and Cold-Finished,
 - ASTM 107 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
 - ASTM A311/A311M - Standard Specification for Cold-Drawn, Stress-Relieved Carbon Steel Bars Subject to Mechanical Property Requirements
 - ASTM A484/A484M - Standard Specification for General Requirements for Stainless Steel Bars, Billets, and Forgings
- All fabricated parts must be free of adhered raw material and manufactures labels
- All fabricated parts must be free of surface paint and general markings.

Section B- Drawing and Parts Standards Statement

Processes and requirements have changed thru the years, and we continue to service all Douglas machines. Situations may arise in which the print is not controlled to our latest level of engineering standards. However, parts can still be manufactured to the print, and this document.

The following areas are maintained to supplement print requirements and further explain our requirements and expectations.

IV. Tapped Holes

- Tapped holes (Legacy Cadra Drawings, F #) should have a depth two (2) times the major diameter of full usable threads if the depth is not called out. Solid Works Drawings, depth will be called out, if no depth is called out, threads are required to go thru the part.

V. Counter bores / Counter sinks

- Prints that call out specific requirements shall be done per print.
- When prints do not contain fully defined counter bore and counter sink requirements. (Legacy Cadra Drawings, F #), please refer to [standard 442](#), (Counter sinks, Counter bores and Through Holes), for countersink and counter-bore hole size requirements.

VI. Thread Milling

- When threading rod, (Legacy Cadra Drawings, F #) turn material down to major diameter, then turn threads to pitch diameter. Pitch diameter will be I/A/W machinist handbook.

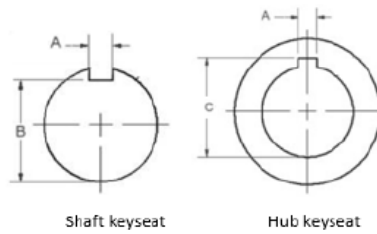
VII. Part marking

- See Part marking specification

VIII. Tolerances for Keyways and Keyseats.

- Keyseats and keyways are indicated by their nominal size assuming the following tolerances before plating.
- Keyseat tolerances are exactly +0.002 and -0.000, Key tolerances are +0.001 and -0.000
- Orientation of keysets are not critical and can be rotated randomly unless otherwise dimensioned or noted on the drawing.
- (Legacy Cadra Drawings, F #), use tables below for standard depth and width. Solid works drawings should be calling out limit dimensions of these features.

Keyseat tolerances.



8/15/2016- Added HP (High Phos Electroless Nickel) keyseat tolerance

| | SHAFT DIA | HP Finish | | | | | SHAFT DIA | HP Finish | | | |
|---------------|-----------|-----------|--------|-------|-------|------|-----------|-----------|-------|-------|--|
| | | A | A | B | C | | A | A | B | C | |
| | 0.50 | 0.1260 | 0.1250 | 0.430 | 0.560 | 1.38 | 0.3135 | 0.3125 | 1.201 | 1.518 | |
| | | 0.1285 | 0.1275 | 0.415 | 0.570 | | 0.3160 | 0.3150 | 1.188 | 1.528 | |
| | 0.63 | 0.1885 | 0.1875 | 0.517 | 0.709 | 1.44 | 0.3760 | 0.3750 | 1.225 | 1.605 | |
| | | 0.1910 | 0.1900 | 0.502 | 0.719 | | 0.3785 | 0.3775 | 1.210 | 1.615 | |
| | 0.75 | 0.1885 | 0.1875 | 0.644 | 0.837 | 1.50 | 0.3760 | 0.3750 | 1.289 | 1.669 | |
| | | 0.1910 | 0.1900 | 0.629 | 0.847 | | 0.3785 | 0.3775 | 1.274 | 1.679 | |
| | 0.88 | 0.1885 | 0.1875 | 0.771 | 0.964 | 1.75 | 0.3760 | 0.3750 | 1.542 | 1.922 | |
| | | 0.1910 | 0.1900 | 0.756 | 0.974 | | 0.3785 | 0.3775 | 1.527 | 1.932 | |
| | 1.00 | 0.2510 | 0.2500 | 0.859 | 1.114 | 2.00 | 0.5010 | 0.4990 | 1.718 | 2.223 | |
| | | 0.2535 | 0.2525 | 0.844 | 1.124 | | 0.5035 | 0.5025 | 1.703 | 2.233 | |
| | 1.12 | 0.2510 | 0.2500 | 0.986 | 1.241 | 2.25 | 0.5010 | 0.4990 | 1.972 | 2.477 | |
| | | 0.2535 | 0.2525 | 0.971 | 1.251 | | 0.5035 | 0.5025 | 1.957 | 2.487 | |
| Added 7/10/15 | 1.19 | 0.2510 | 0.2500 | 1.049 | 1.304 | 2.44 | 0.6260 | 0.6240 | 2.084 | 2.714 | |
| | | 0.2535 | 0.2525 | 1.034 | 1.314 | | 0.6285 | 0.6275 | 2.069 | 2.724 | |
| | 1.25 | 0.2510 | 0.2500 | 1.112 | 1.367 | | | | | | |
| | | 0.2535 | 0.2525 | 1.097 | 1.377 | | | | | | |

IX. Welds


- Welds and surrounding areas must be filled, free of weld splatter and voids upon delivery.
- All angles on welded parts are 90° unless otherwise specified
- TIG welding is acceptable on 1/4" or thinner material. Any material over 1/4" should be wire welded for good penetration.
- Stainless steel welds and surrounding areas shall be clean, free of discoloration, and free of weld splatter upon delivery. Additionally, welds must be free of voids and must be filled. Furthermore, to minimize carbon contamination, all abrasive and grinding tools used to clean up stainless steel welds must be segregated from tools used to clean cold rolled metal products.

X. Title Blocks

Douglas has implemented several title blocks over the years. Reamed holes and bored holes tolerances were previously controlled thru a title block. Dimensional tolerance based upon decimal place has also changed.

- For all reamed and Bored holes, please go by the title block tolerance
- For all Decimal tolerance, please go by the current print of the part that is being manufactured.
- **As of 5/1/2022, the dimension requirement for deburring and removing sharp edges has changed to link to this document.**

| | | | | | | | | | |
|--|--------|---|------|------------------------------|---------|--|--|--|--|
| PR-X | 21 | | | | | | | | |
| 1 | 187211 | 1 | INCL | QTY 1=1/2 RD 1.498/1.497 5/7 | 7/21/05 | | | | |
| BILL OF MATERIAL | | | | | | | | | |
| THIS DRAWING AND THE INFORMATION IT CONTAINS IS THE SOLE PROPERTY OF DOUGLAS MACHINE INC. IT IS NOT TO BE REPRODUCED, COPIED, OR DISTRIBUTED IN WHOLE OR IN PART WITHOUT THE PRIOR WRITTEN CONSENT OF DOUGLAS MACHINE INC. | | | | | | | | | |
| NAME: SHAFT | | | | | | | | | |
| SCALE: 1/2 DRAWN BY: KOCH DATE: 7/27/05 | | | | | | | | | |
| ENGINEERING CONTACT: DRAWING NO: F199428HF | | | | | | | | | |
| PART # SHAFT DWG SIZE: A | | | | | | | | | |



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TOLERANCES
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

| DIMENSIONS | REAMS & BORES |
|--------------|--------------------|
| .00 ± .010 | + .0001 TO + .0006 |
| .000 ± .005 | FOR I.D. OF |
| FRAC ± 1/64 | BRONZE BUSHING |
| ANGLE ± 1/2° | + .0005 TO + .0010 |
| | FOR ALL OTHERS |

UNLESS OTHERWISE SPECIFIED,
REMOVE ALL BURRS & SHARP EDGES




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DRAWING INTERPRETED PER
ASME Y14.5-2009, AWS A2.4-2007
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
DIMENSIONAL LIMITS APPLY
BEFORE APPLYING FINISH

ASTM MATERIAL STANDARD

| TOLERANCES | THIRD ANGLE PROJECTION |
|-----------------|---|
| .00 ± .03 |  |
| .000 ± .010 | |
| ANGLE ± 5° | |
| WELD SIZE ± .06 | |

REMOVE ALL BURRS & SHARP EDGES
.002-.040 RADIUS OR CHAMFER



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ASTM MATERIAL STANDARD


| TOLERANCES | THIRD ANGLE PROJECTION |
|-----------------|---|
| .00 ± .03 |  |
| .000 ± .010 | |
| ANGLE ± 5° | |
| WELD SIZE ± .06 | |

REMOVE ALL BURRS & SHARP EDGES
.002-.040 RADIUS OR CHAMFER

3d

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DIMENSIONS ARE IN INCHES
DIMENSIONAL LIMITS APPLY
BEFORE APPLYING FINISH

ASTM MATERIAL STANDARD

| TOLERANCES | THIRD ANGLE PROJECTION |
|-----------------|---|
| .00 ± .03 |  |
| .000 ± .010 | |
| ANGLE ± 5° | |
| WELD SIZE ± .06 | |

REMOVE ALL BURRS & SHARP EDGES
.002-.040 RAD OR CHAMF ON MAT'L ≤ .156 THICK
.015-.045 RAD OR CHAMF ON MAT'L > .156 THICK

XI. Deburring

As of 5/1/2022 to address safety issues and reduce the chance of injury, the following requirement will supersede ALL previous title block requirements.

REMOVE ALL BURRS & SHARP EDGES
.002-.040 RAD OR CHAMF ON MAT'L ≤ .156 THICK
.015-.045 RAD OR CHAMF ON MAT'L > .156 THICK

XII. Metal Chain Assembly

- Connector links on all steel and hydroservice chain must be oiled with 30W multipurpose oil before assembling. This is to protect the metal and prevent rust.