23rd June 1953.

TEMPORARY
STD AI

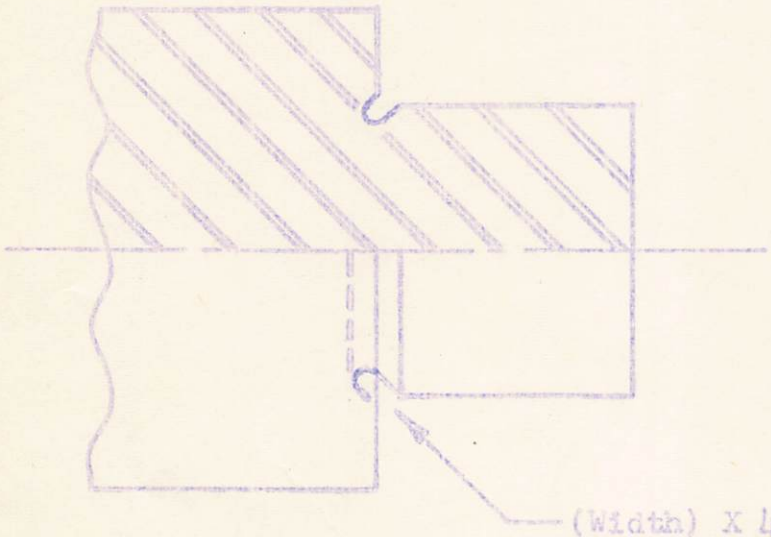
STANDARD PRACTICE BULLETIN
TOOL DESIGN SECTION - # 4733

TOOL DESIGN STANDARDS

SUBJECT: STANDARD UNDERCUTS

Effective immediately, wherever possible, all undercuts are to be shown on drawings at 45° to face and diameter of components, as shown in sketch below. This will provide clearance for grinding both surfaces and will help to eliminate radii caused by breakdown of the corners of grinding wheels.

EXAMPLE



A. G. Bailey,
Group Leader - Standards,
Master Mechanic's Dept. C/T.

TEMPORARY
STD. A1

April 10th. 1952.

TO: TOOL DESIGN PERSONNEL (SECTION 4735)
MASTER MECHANIC DEPARTMENT

SUBJECT: USE OF WELDING IN TOOL MANUFACTURE

In view of the present urgency of the Tool Design and Tool Manufacturing program, more attention must be paid toward eliminating unnecessary machining operations in the manufacture of details.

In this respect, Arc Welding can be used to advantage in the design of such details as Clamps and other odd shaped pieces made of low carbon steel. Structural shapes such as Angles, Channels and Pipe can often be used to accomplish the desired result.

Welding and Hot Rolled steel construction should also be considered, and in many cases is more desirable than the use of Castings, in the design of fixtures of which only one or two are to be ordered. The delay in getting the job into work in the Tool Room due to uncertain casting delivery can thus be eliminated and this advantage more than offsets the slightly inferior appearance of the welded structure, especially when so many tools are on "RUSH" orders.

In the case of Welded Members which are stressed in tension or bending, care must be taken to develop the full strength of the parent metal by notching from both sides to centre at the joint and calling up "continious weld".

Fillet Welding or partial notching is usually sufficient for parts in compression. An end view or cross section should show pictorially the depth to which the weld should penetrate. In rare cases where a welding spec. must be adhered to, the A.W.S.C. code would have to be used.

To reduce welding stresses and possibility of subsequent distortion, the note "STRESS RELIEVE BEFORE FINISH M/C" should appear under each welded assembly. The largest furnaces capable of this heat treatment in the plant are as follows: (1400° F max.)

50" wide x 36" high x 96" deep (box)
60" dia. x 48" deep (pit)

Machining allowances on welded structures can be slightly less than are used on castings of equivalent size. Welded Designs should be based on the use of standard bar sizes and structural shapes and simple flame cut pieces of standard H.R.S. plate thickness.

Consideration of the above points and wider use of welding on "one off" fixtures should materially reduce the elapsed time between drawing board and the finished tool. This is daily becoming more critical and is definitely part of the Tool Design responsibility.

E. C. Busby
Chief Tool Designer - G.T.

ECB:vs

October 19th, 1953.

TEMPORARY
STD. A3

STANDARD PRACTICE BULLETIN
TOOL DESIGN SECTION #4233

TOOL DESIGN STANDARDS

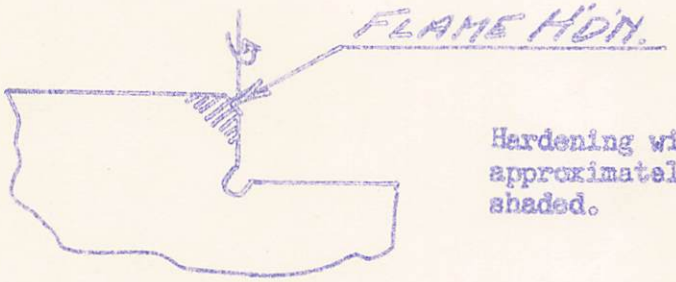
SUBJECT: DESIGN OF FLAT TYPE TURNING FIXTURE FOR VERTICAL TURRET LATHE

Sometime ago a range of Flat Disc and Ring Castings (Std. B1-1 and Std. B1-11) in GA Meehanite was introduced as Mill Supply stock for use in making the subject type of Fixture.

Following are a few points that should be understood, relative to the use of this material in design of the above mentioned toolings:

(1) In MF and First Operation Fixtures for steel or aluminum "pot" forgings or castings, hardened locating diameters and surfaces are very seldom necessary. The Meehanite base is quite adequate in the stress relieved condition for this type of service.

(2) In Secondary Operations where normal wear on the locating diameter of the Fixture would affect concentricity requirements, a hardened spigot should be considered. In these cases the hardenability of Meehanite can be utilized by calling for flame hardening of the top corner of the spigot and subsequent grinding. Hardness of Rockwell C-45 (425 Brinell) can be obtained in this manner. See Sketch:



Hardening will penetrate approximately as shown shaded.

The extra turning, drilling and tapping of attaching separate hardened rings can thus be eliminated in most cases.

(3) In cases where an abnormal amount of machining is required on the inside diameter of "pot" forgings or castings (such as heavy plunge cuts) some means must be provided for easy removal of chips and coolant. First consideration should be given to castings from existing Pattern Numbers PTD 559, 562, 563 and STD B1-7 Castings.

If these are not suitable, the STD B1 Castings can be used by adding a ring with generous scallops to form ports for chip removal.

It should be born in mind that GA Meehanite Castings can also be heat treated to the aforementioned hardness in their entirety by furnace heating. This should be used sparingly however, as excessive grinding would probably be necessary to achieve final accuracy.

E. C. Busby
Chief Tool Designer,
Master Mechanic Dept., G.T.

ECB:vs

16 March 1954

TEMPORARY
STD. A-3

TOOL DESIGN STANDARDS

SUBJECT: Heat Treatment of Mild Steel

The practice of specifying heat treatment for tooling when material is H.R.S. (Hot Rolled Steel), is to be discontinued immediately.

When heat treatment is necessary, the material must be a tool steel or special machinery steel such as Atlas C.M., Atlas S.P.S. 245, Atlas Impacto, etc., or equivilant.

REASON - Hot Rolled Steel and also Boiler Plate, cannot be relied upon to sufficiently maintain its' shape after heat treatment.

In future, the use of hot rolled steel is permissable only when heat treatment will not be applied.

The use of the symbol "M.S." for mild steel or machinery steel, is to be discontinued, as M.S. does not sufficiently designate the type of steel required. In its' place, H.R.S. or a special machinery steel, as mentioned above, is to be specified.

A. G. Bailey
Group Leader - Standards
Master Mechanic Dept., G.T.

AGB:mh

Approved By:

G. M. Purvis
Chief Tool Designer
Master Mechanic Dept., G.T.

A. V. ROE CANADA LIMITED

INTER-DEPARTMENTAL MEMORANDUM

TEMPORARY
STD. A4

DATE: April 1st. 1953.
TO: T. M. Palonka, Chief Process Engineer, G. T.
FROM: E. C. Busby
SUBJECT: STANDARD GAUGES (SG NUMBERS)
Std. Nos. refer to pages in Std. Practice Manual.

(1) SHALLOW I.D. & O.D. DIAL GAUGES

An improved design of Dial Gauges for large shallow internal and external diameters is in existance, replacing the former design (Std. G-19 and G-32) which proved to be difficult to manufacture and set to the required accuracy.

The new gauges will be made in length increments of one inch and each gauge can be set to any dimension within its one inch range. They are intended for use on diameters over 12.000 inch with total tolerance of less than .005, or .003 per ten inches of diameter, and a depth range of .060 to .300.

In order to prevent possible duplication of similar dimension gauges, and to facilitate the reuse of cancelled gauges, "SG" numbers have been allotted to these as set out below. These numbers are obtainable from Mr. G. Hally of the Gauge Design Group.

1-SG-6100 series - Shallow I.D. Dial Gauges

1-SG-6200 " - " O.D. " "

e.g:
1-SG-6115-1 could be for 15.593 ± .003 I.D.
= .000

1-SG-6132-4 " " " 32.0020 ± .009 I.D.
= .0000

1-SG-6226-3 " " " 26.9995 ± .0000 O.D.
= .0025

The last two digits of the basic number indicate the size range and a dash number is used for each different setting in that range.

Tentatively these gauges will be set in the Standards Room and a small set block provided with the gauge for the operator's periodic check. No setting master need be called up on O.T.R.'s until further advice.

(2) I.D. & O.D. BAR GAUGES (FIXED)

This type of gauge (Std. G-9 and G-26) although not adjustable, can be reworked to other dimensions, and are applicable to diameters over 8.000" with tolerances greater than those specified for the aforementioned Dial Gauges. For the same reasons given in Article 1, "SG" numbers have been set up for these gauges and

should be used in future. Two depths are available - up to 1" and up to 2" (subject to limitations or obstructions in the part) and are designated as follows:

1-SG-6300 series	-	I.D. Bar Gauges	-	1"	depth
1-SG-6300D "	-	I.D. " "	-	2"	"
1-SG-6400 "	-	O.D. " "	-	1"	"
1-SG-6400D "	-	O.D. " "	-	2"	"

The second two digits and dash numbers follow the same system as for the Dial Gauges.

(3) DIAL SNAP GAUGES (CALIPER TYPE)

In sizes over 12" (Std. G-31) this type of gauge becomes unweildly and difficult to "feel" and therefore very unpopular in use.

Coupled with the uncertain availability of the frames and distant delivery promises at best, it would seem advisable to discontinue use of this type of gauge in these sizes (Tool Numbers 1-SG-1301 to 1318), unless it is impossible to gauge the part otherwise. This is especially true in sizes over 14".

(4) DIAL BORE GAUGES

In sizes under .500 diameter, the mortality and repair factor in this type of gauge is very high. An easily reconditioned style of Plug Gauge has therefore been instituted to gauge close tolerance holes (less than .0005 total tolerance) under the 1-SG-0100R series.

The above deviations from existing Standard Gauge design as illustrated in the Standard Practice Manual are the result of experience gained in the Production Shop and should be followed on all new or revised work. Please see summarized sheet attached.

ECB:vs

E. C. Busby
Chief Tool Designer,
Master Mechanic Dept., G.T.

April 1st. 1953.

TEMPORARY
STD. A4

SUMMARY OF CHANGES IN GAUGE DESIGN POLICY

(1) FOR CLOSE TOLERANCE SHALLOW DIAMETERS OVER 12.000"

(Total tolerance of less than .005, or .003 per 10 inches of diameter, and depths up to .300) use:

(Replacing Std. G-19 & G-32)

1-SG-61XX-X series for I.D.'s
1-SG-62XX-X " " O.D.'s

(2) FOR NORMAL TOLERANCE DIAMETERS OVER 8.000"

(Total tolerance of .003 or more per 10 inches of diameter - minimum .005) use:

1-SG-63XX-X series for I.D.'s to depth of 1"
1-SG-63XXD-X " " I.D.'s " " " 2"
1-SG-64XX-X " " O.D.'s " " " 1"
1-SG-64XXD-X " " O.D.'s " " " 2"

(3) FOR CLOSE TOLERANCE O.D.'s OVER 12.000"

Discontinue use of Dial Snap Gauges - Std. G-31 (1-SG-1301-1318) wherever possible. Use 1-SG-6400 series where applicable, or modification of same within reason.

(4) FOR CLOSE TOLERANCE HOLES UNDER .500

(Total tolerance of less than .0005):

Discontinue use of Dial Bore Gauge - Std. G-16 (1-SG-1233 and 1234). Use reclaimable type of Plug Gauge.

1-SG-0100R-XX

ECB:vs

E. C. Busby
Chief Tool Designer,
Master Mechanic Dept., G.T.

TEMPORARY
STD. A4

April 28th. 1952.

NEW GAUGE TOLERANCE
STANDARD PRACTICE

(1) No wear allowance on any Gauge

(2) Gaugemakers tolerance to be 10% of part tolerance. (Max. Gaugemakers tolerance = .002)

(3) Direction of Gaugemakers tolerance for Inspection Gauges to be reverse of Shop Gauges - i.e. Outside of part dimension.

(4) Since practically all gauges may be called up for either Shop or Inspection, it will be necessary to show two dimensions on all gauging sizes - thus

Shop Gauge - 1.500 plus .000 & minus .001
Inspection Gauge - 1.500 plus .001 & minus .000

Only exception to this will be B.O.F. Inspection Gauges.

A. K. Tait
J. C. Burley

TOOL DESIGN STANDARDS MANUAL

MASTER MECHANIC DEPT. GAS TURBINE DIVISION

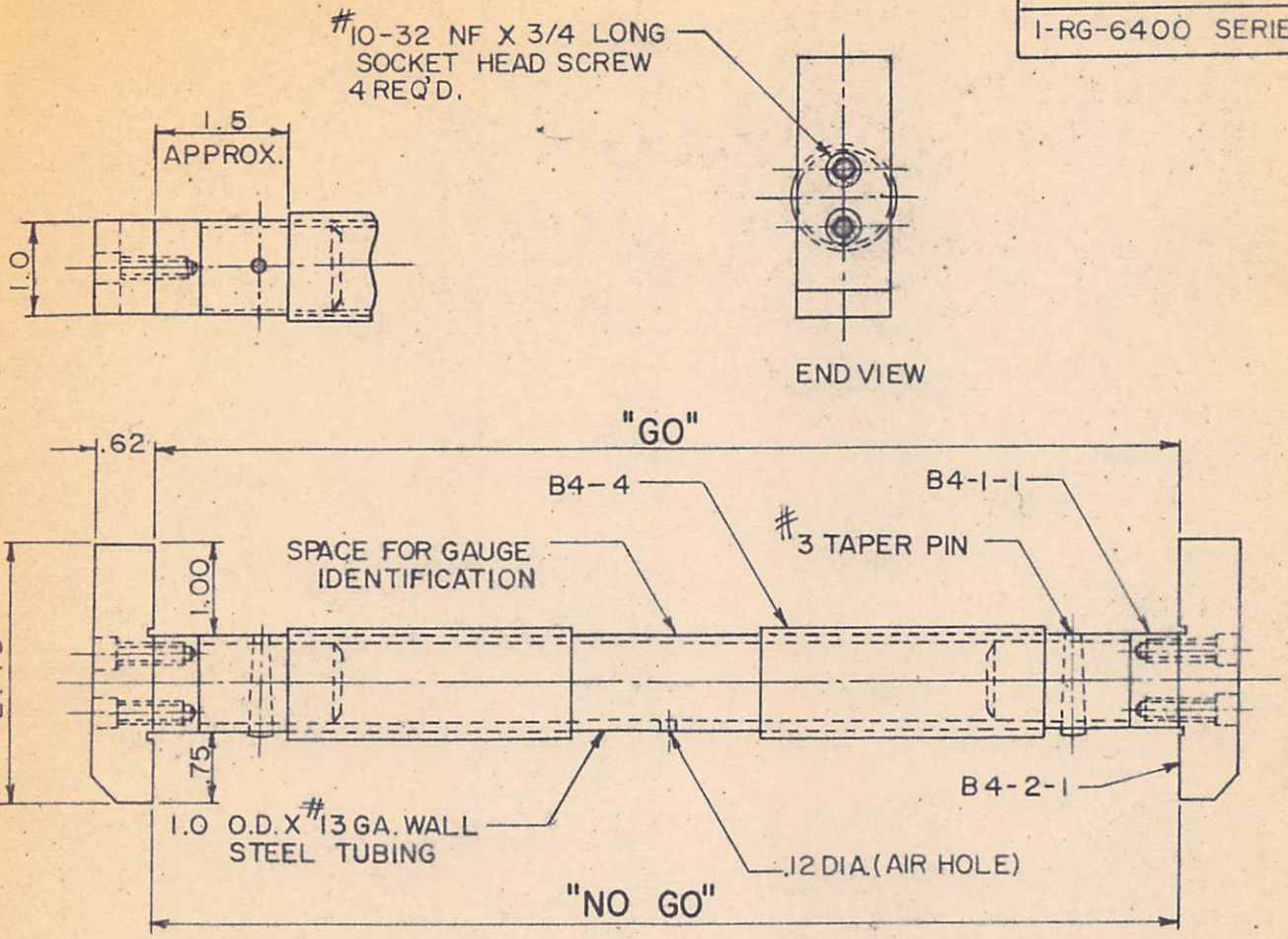
A.V. ROE CANADA LIMITED

STD. A4-1-1

SHEET 1

REFERENCE

1-RG-6400 SERIES



RANGE & GAUGING TOLERANCES	
DIAMETERS ABOVE TO INCLUSIVE	MINIMUM PART TOLERANCE
12.000 — 17.000	.005
17.000 — 20.000	.006
20.000 — 25.000	.007
25.000 — 30.000	.008
30.000 — AND UP	.010

WHEN PART TOLERANCE IS LESS THAN THE ABOVE MINIMUMS — A DIAL GAUGE IS REQUIRED.

TOOL NUMBER SIGNIFICANCE

EXAMPLE - TOOL NO. 1 - RG - 6414 - 3

RG - ROE GAUGE (DESIGNED BY A.V. ROE)

64 - 6400 TOOL NO. SERIES (THIS DESIGN)

14 - SIGNIFIES GAUGING DIMENSION IS WITHIN RANGE 14.000 — 14.999

3 - THIRD GAUGE ISSUED IN THIS RANGE

DO NOT DRAW

USE STANDARD FORM DRAWING SF-17

ISSUE	CHANGE	BY	CKD.	DATE

TITLE: **STANDARD O.D. BAR GAUGE GO AND NO GO FOR ABOVE 12.000 DIA. 3/4" MAXIMUM GAUGING DEPTH**

DRN.	CKD.	APPD.	DATE
A. PONTING	W.G. Bailey	G. McInnis	11 JAN. 54

ORENDA ENGINES LIMITED
MALTON ONTARIO

TOOL DESIGN STANDARDS MANUAL
MANUFACTURING DIVISION

STD. NO. MDS-14-100

DATE 20 AUG 1956 | SHT. NO.

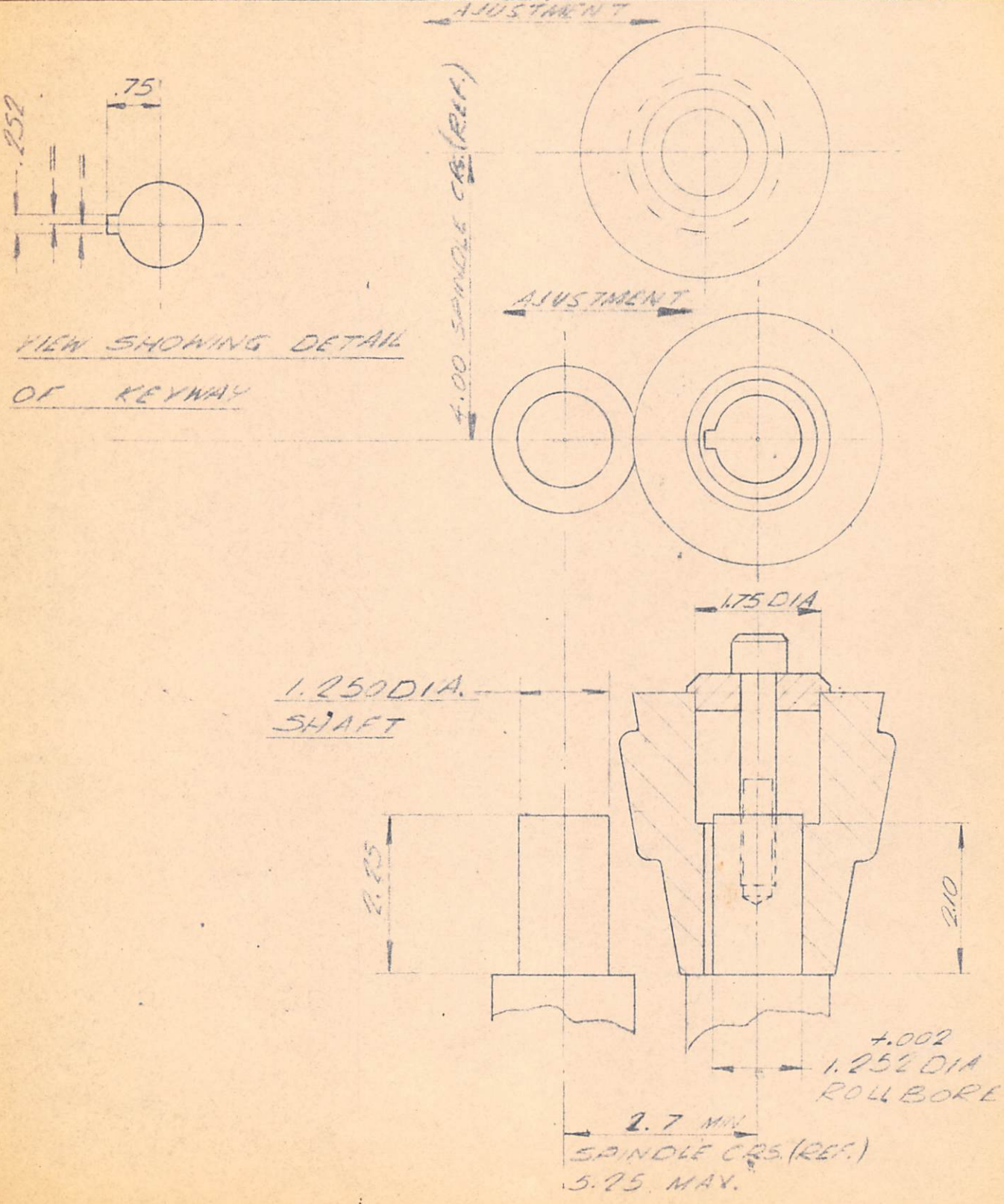
SUBJECT STD. DIMS FOR ROLLS USED ON ORENDA POWER ROLLS IN PLANT #1

REFERENCE

K MACDONALD

APPD. C.A. Sullam 22 Aug. 56

M FENTON
E TAYLOR



ORENDA

ORENDA ENGINES LIMITED

MALTON ONTARIO

TOOL DESIGN STANDARDS MANUAL

MANUFACTURING DIVISION

STD. NO. F.SK.209.

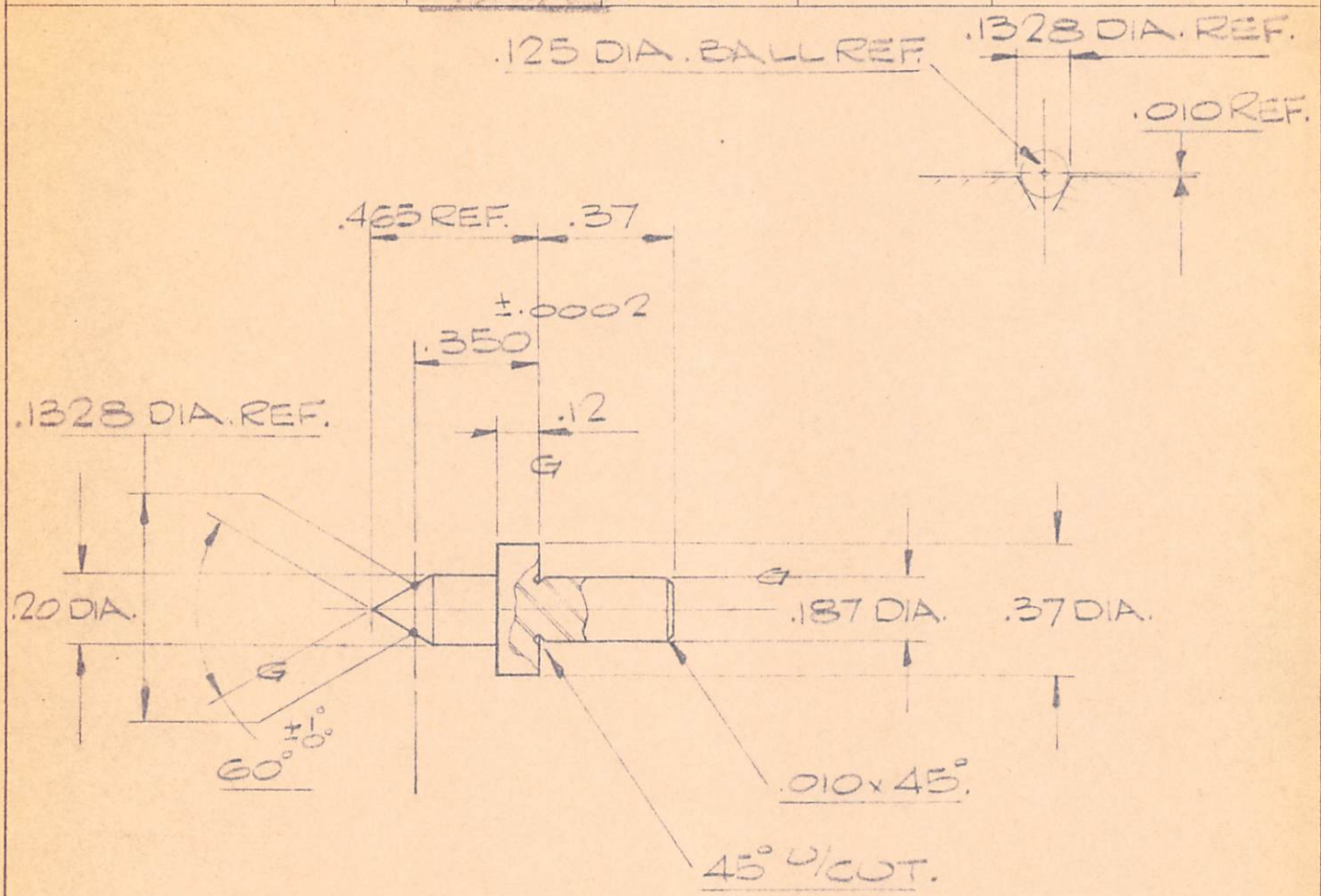
DATE 6 JUNE'56 SHT. NO.

SUBJECT

STD. FIXED CENTRE-BLADE TOOLING.

REFERENCE

APPD. 6 JUNE'56



NOTE!

ECCENTRICITY BETWEEN CENTRE & .187 DIA. NOT TO EXCEED .0002 T.I.R.

MAT'L O.1.

HON. & GR. ROC'C' 55-60.

SCALE - TWICE FULL.

OEL - 1004

ORENDA ENGINES LIMITED
MALTON ONTARIO

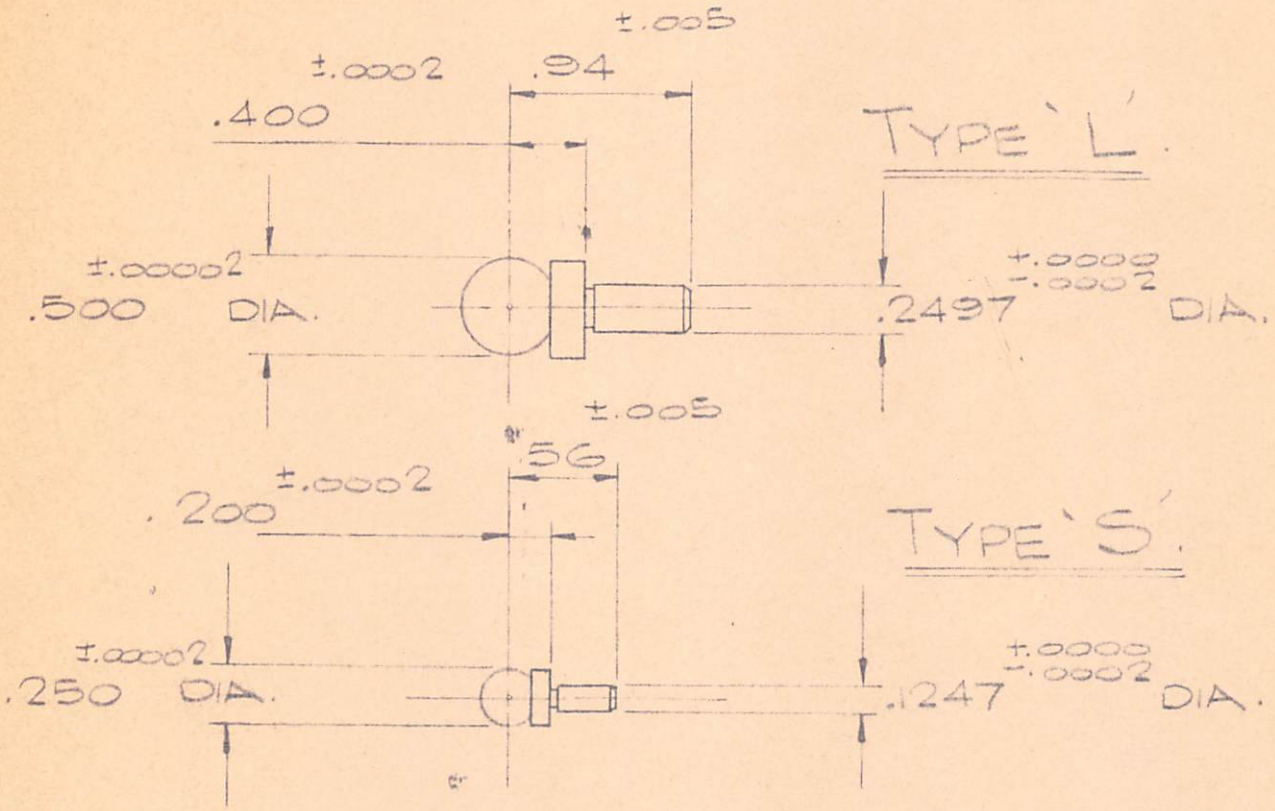
TOOL DESIGN STANDARDS MANUAL
MANUFACTURING DIVISION

STD. NO. F.SK. 210.
DATE 6 JUNE '56. SHT. NO.

SUBJECT
CHECKING BALL
TYPES - L & S.

REFERENCE
TYPE 448-IND
TECTONICS INC.

APPD. [illegible] 6TH JUNE 56.



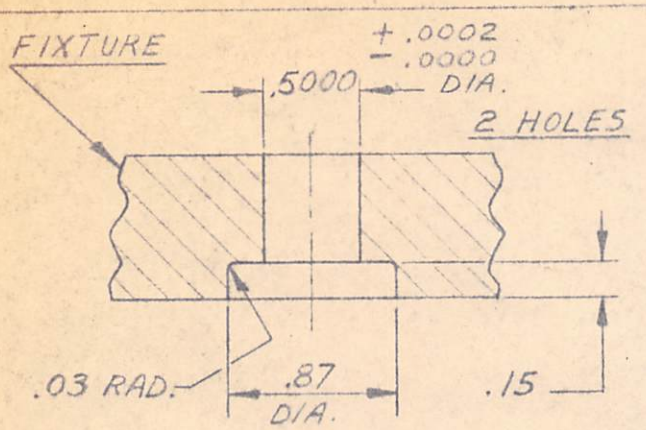
MAT'L STAINLESS STEEL.
HON. ROC. 'C' 55-58.

OEL - 1004

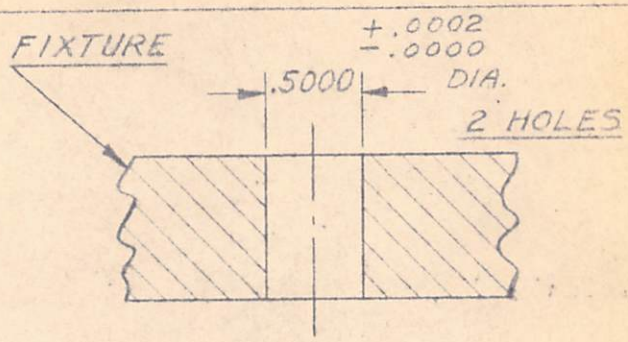
STANDARD PRACTICE MANUAL
GAS TURBINE PRODUCTION ENGINEERING
A.V. ROE CANADA LIMITED

STD. P-1
SHEET 1

HOLES IN FIXTURES - REQUIRED FOR LOCATING PINS.



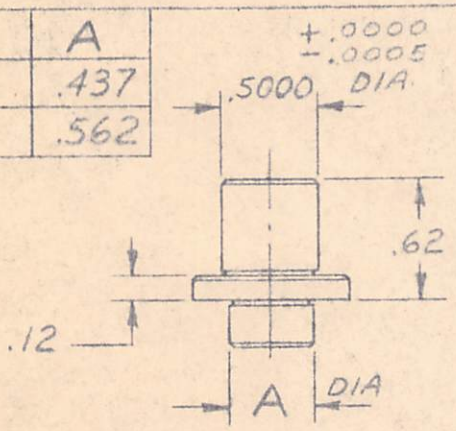
TYPE OF HOLE FOR PINS - PTD. 624 & PTD. 625



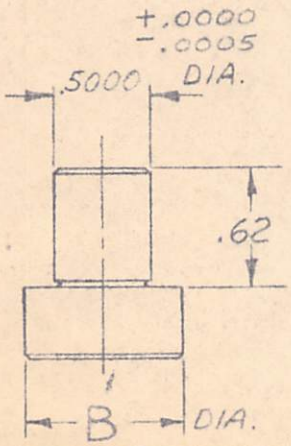
TYPE OF HOLE FOR PINS - PTD. 626, PTD. 627, PTD. 628 & PTD. 629

TYPES OF LOCATING PINS.

PIN NO	A
PTD. 624	.437
PTD. 625	.562

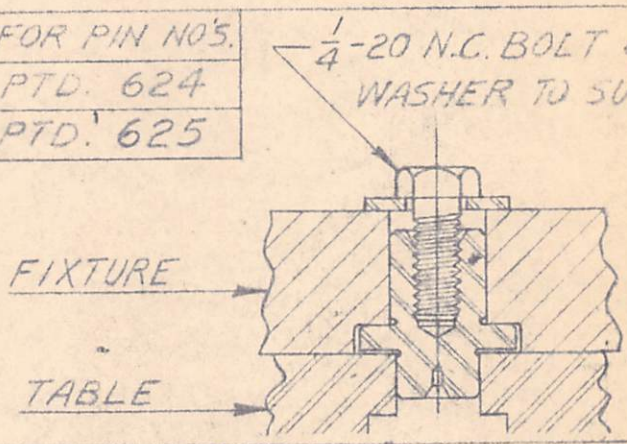


PIN NO.	B
PTD. 626	.687
PTD. 627	.812
PTD. 628	1.062
PTD. 629	1.312

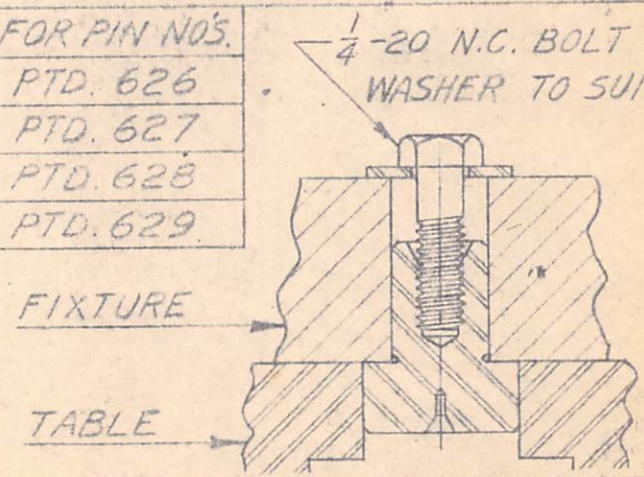


ARRANGEMENTS OF PINS ASSEMBLED IN FIXTURES.

FOR PIN NO'S.
PTD. 624
PTD. 625



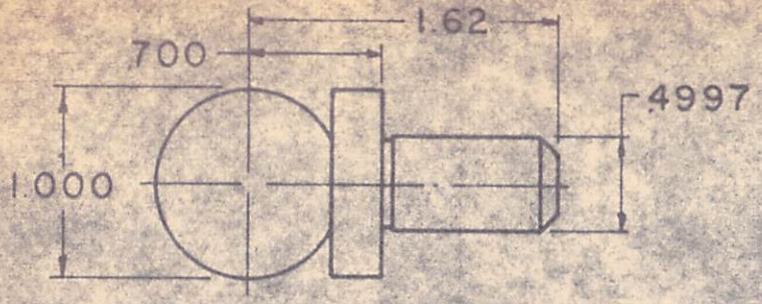
FOR PIN NO'S.
PTD. 626
PTD. 627
PTD. 628
PTD. 629

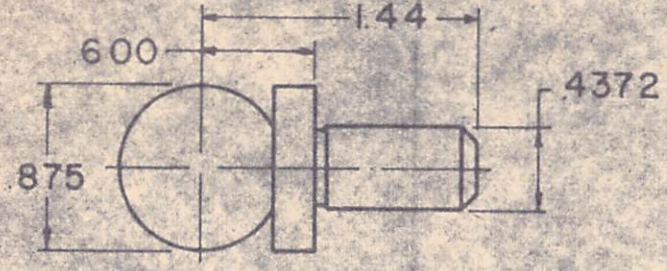


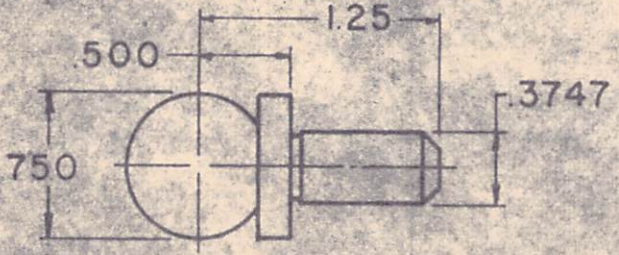
NO	CHANGE	BY	DATE	ISSUE

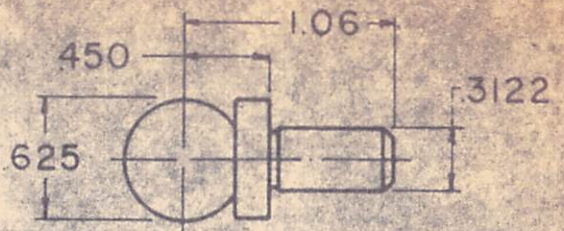
FIXTURE LOCATING PINS FOR STD T-SLOTS
SIZES - 7/16, 9/16, 11/16, 13/16, 1 1/16 & 1 5/16.

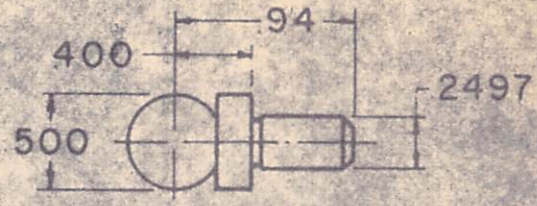
DRAWN A.G. BAILEY | APP'D. | DATE NOV. 27-51

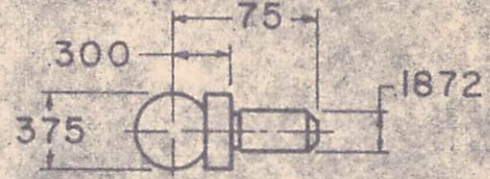


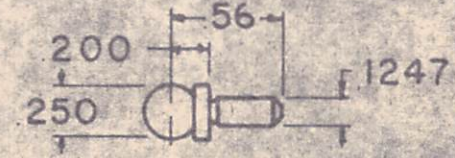




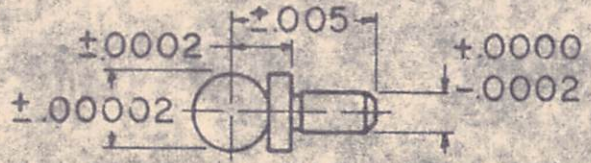








TOLERANCES



ECCENTRICITY .0002 T.I.R.

TYPE 440 C
STAINLESS STEEL
55-58 ROCKWELL C

CHECKING BALL
TYPE 448

INDUSTRIAL TECTONICS INC.
ANN ARBOR, MICH.

A. V. ROE CANADA LIMITED

INTER-DEPARTMENTAL MEMORANDUM

TEMPORARY
STD. B

DATE: August 20th. 1953.
TO: Tool Design Group Leaders (Section 4733)
FROM: A. G. Bailey
SUBJECT: PTD TOOLING MAINTAINED IN STOCK OR TO BE ORDERED

The following is a list of Standard PTD Tools and Tool Details of which a minimum stock is maintained in our Tool Cribs.

PTD 500	Standard Turning Fixture Pilot
523-1	Standard Fixture Locating Ring for Bullard V.T.L.
523-3	Standard Fixture Locating Ring for 52" King V.T.L.
565	Comb. Stylus Pins for Tracer Lathes (All sizes shown on Drawing)
567-1	Standard Gooseneck Clamp
637	Spigot for Standard O.D. & I.D. Bar Gauge
638	Cap for Standard O.D. Bar Gauge
639	Cap for Standard I.D. Bar Gauge
640	Hand Grip for Standard Bar Gauge
657	Standard Stylus Pins (All sizes as shown on Drawing)
663	Cap (Long) for Standard O.D. Bar Gauge
664	Standard Key for Bullard Chuck Jaws
665	Standard Key for King Chuck Jaws
666	Standard convertible Keys for Bullard & King Chuck Jaws
669	Indicator end of Int. & Ext. Gauge
670	Adjustable end of Int. & Ext. Gauge
672	Burring Tool Sleeves
673	Scribing Disc

When PTD Tools, other than those listed herein, are required, please contact the undersigned to insure that sufficient stock is on hand or that necessary quantities are ordered.

A. G. Bailey

AGB:vs

A. G. Bailey
Group Leader - Standards
Master Mechanic Dept., G/T.

TEMPORARY STD. B1

TOOL DESIGN STANDARDS MANUAL

MASTER MECHANIC DEPT.
GAS TURBINE DIVISION

SECTION B : STANDARD DETAILS
SUB-SECT. B1 : FERROUS CASTINGS

Herewith the first sheets in a temporary form, of a re-indexed Tool Design Standards Manual which will eventually replace the existing "Standard Practice Manual".

The new manual will be divided into five main sections as follows:

"A" - Design Standards
"B" - Standard Details
"C" - Tool Materials & Tool Room Processes
"D" - Machine Capacities
"E" - Drafting Standards

The subject of Cutting Tool Design Data may be an added section, but will more likely be incorporated in a catalog of AVRO Standard Cutting Tools now being compiled by Mr. H. Storey.

The sheets attached hereto, cover a range of standard shape castings which lend themselves to wide use in the tooling of engine parts. They will be stocked in Mill Supply and are to be our first consideration in the design of tools requiring details of these general shapes.

Method of calling up in "Bill of Material" is as follows:

10	1	STD. B1-1-13 CASTING	MEEHANITE
DET. NO.	QTY. REQ'D.	STOCK SIZE	MATERIAL

Additional sheets will be issued in this temporary form as standards are developed.

Please retain in "STANDARDS" folder.

This material is not listed in the Mill Supply Stock Book which covers items having no standard numbers.

E. C. Busby
Chief Tool Designer,
Master Mechanic Dept., G.T.

ECB:vs

April 8th. 1953.

9 APRIL 1953

STD B1-1
(TEMPORARY ISSUE)

FLAT DISC BLANKS

ADD NOTE TO DWG. -
"STRESS RELIEVE BEFORE FINISH MACHINING"

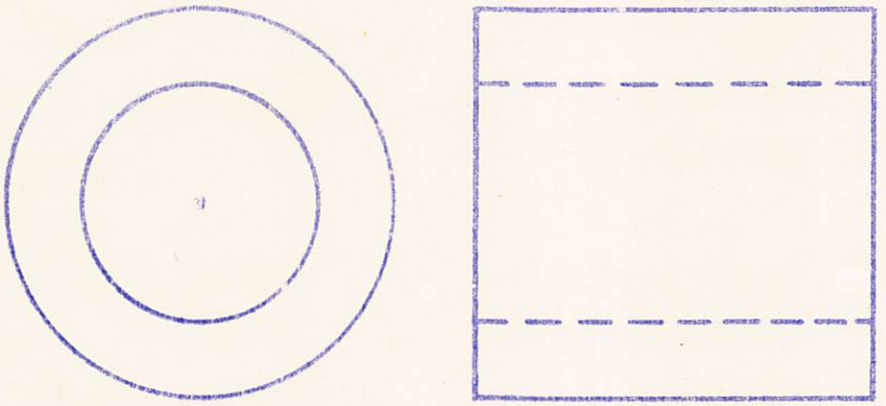
MATERIAL - TYPE "GA" MEEHANITE.
ALL SIZES ARE "AS CAST".

THICKNESS	DIAMETER	STANDARD NUMBER	APPROX. WEIGHT (LBS.)
1½	8	B1-1-1	20
1½	10	B1-1-2	31
1½	12	B1-1-3	45
1½	14	B1-1-4	61
1½	16	B1-1-5	80
2	14	B1-1-6	81
2	16	B1-1-7	106
2	18	B1-1-8	134
2	20	B1-1-9	166
2	22	B1-1-10	201
2½	21	B1-1-11	229
2½	24	B1-1-12	299
2½	27	B1-1-13	378
2½	30	B1-1-14	467
3	26	B1-1-15	421
3	29	B1-1-16	523
3	32	B1-1-17	637
3	35	B1-1-18	762

10 APRIL 1953

STD. B1-3
(TEMPORARY ISSUE)

CORED CYLINDER BLANKS



MATERIAL - TYPE "GA" MEEHANITE.
ALL SIZES ARE "AS CAST."

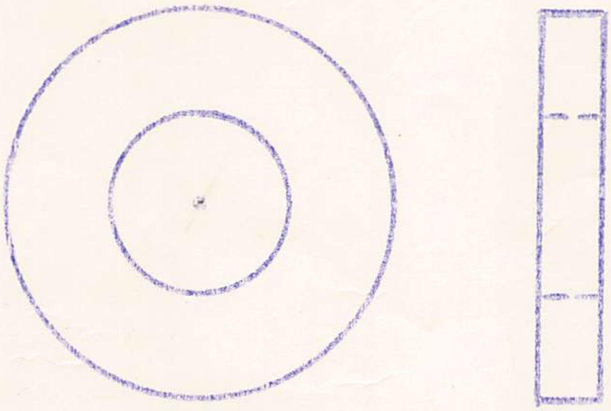
OUTSIDE DIA.	INSIDE DIA.	LENGTH	STANDARD NUMBER	APPROX. WEIGHT (LBS.)
6	3	16	B1-3-1	90
7 1/2	3	16	B1-3-2	157
9	5 1/2	16	B1-3-3	168
11	7	12	B1-3-4	179
13	8	12	B1-3-5	261
16	11	12	B1-3-6	336

10 APRIL 1953

STD. B1-11
(TEMPORARY ISSUE)

FLAT RING BLANKS

44.12



MATERIAL - TYPE "GA" MEEHANITE.
ALL SIZES ARE "AS CAST."

OUTSIDE DIA.	INSIDE DIA.	THICKNESS	STANDARD NUMBER	APPROX. WEIGHT (LBS.)
36	14	3	B1-11-1	684
40	14	3	B1-11-2	873
44	14	3	B1-11-3	1082
48	14	3	B1-11-4	1311

NOTE — LOCATING ADAPTER PTD. 570
MAY BE USED WITH THESE CASTINGS

TOOL DESIGN STANDARDS MANUAL

MASTER MECHANIC DEPT. GAS TURBINE DIVISION

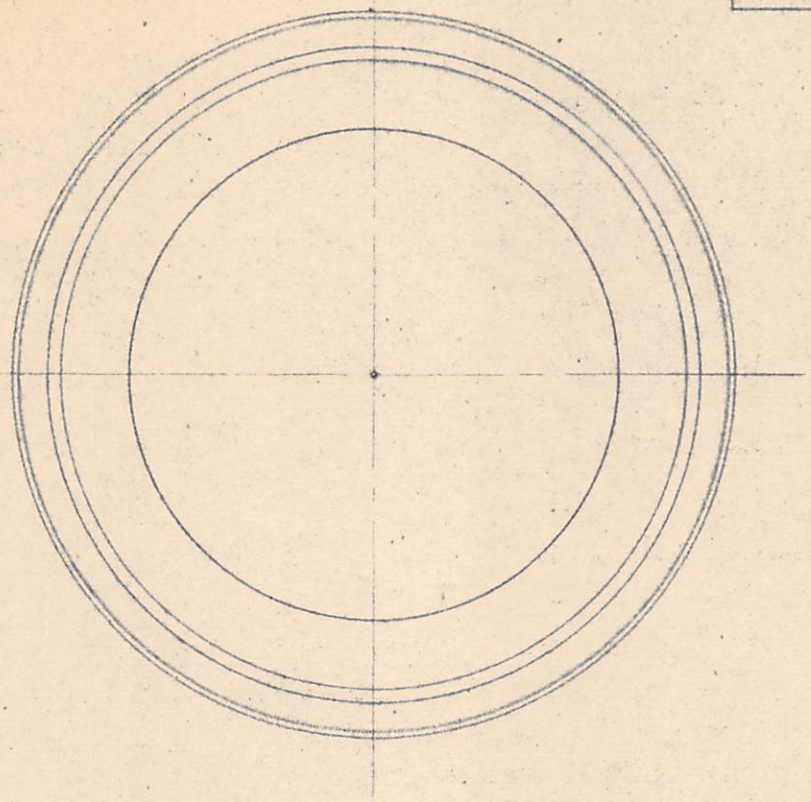
A.V. ROE CANADA LIMITED

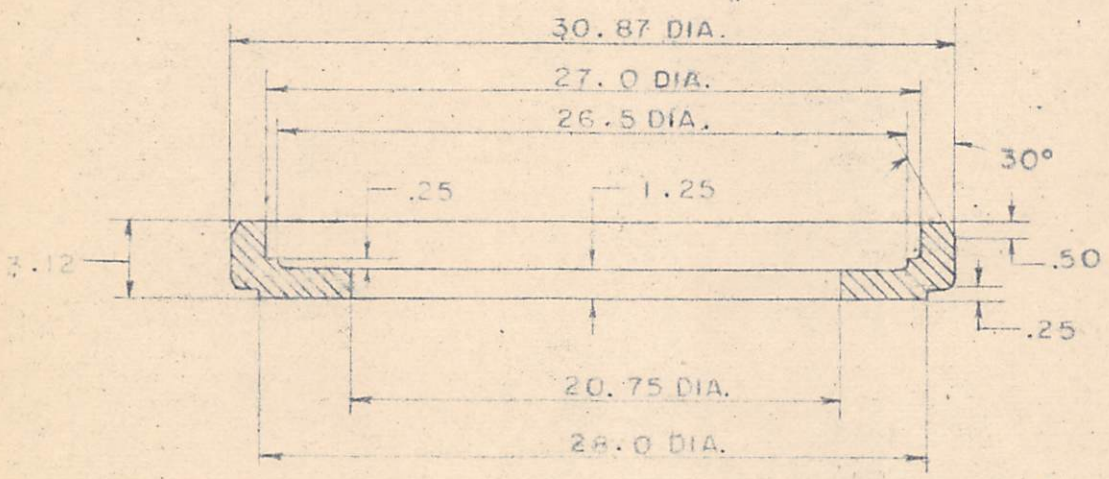
STD. B1-4-1

SHEET 1

REFERENCE

WKG. DWG. B1-4-1





THIS CASTING STOCKED IN MILL SUPPLY
IN "AS CAST" CONDITION.
MATERIAL - NICKEL CAST IRON

ISSUE	CHANGE	BY	CKD.	DATE

TITLE

STANDARD OUTSIDE DIAMETER LOCATING RING

DRN.	CKD.	APPD.	DATE
A. SCHLING	W.G. Bailey	E.C.B.	2 OCT 53

TOOL DESIGN STANDARDS MANUAL

MASTER MECHANIC DEPT. GAS TURBINE DIVISION

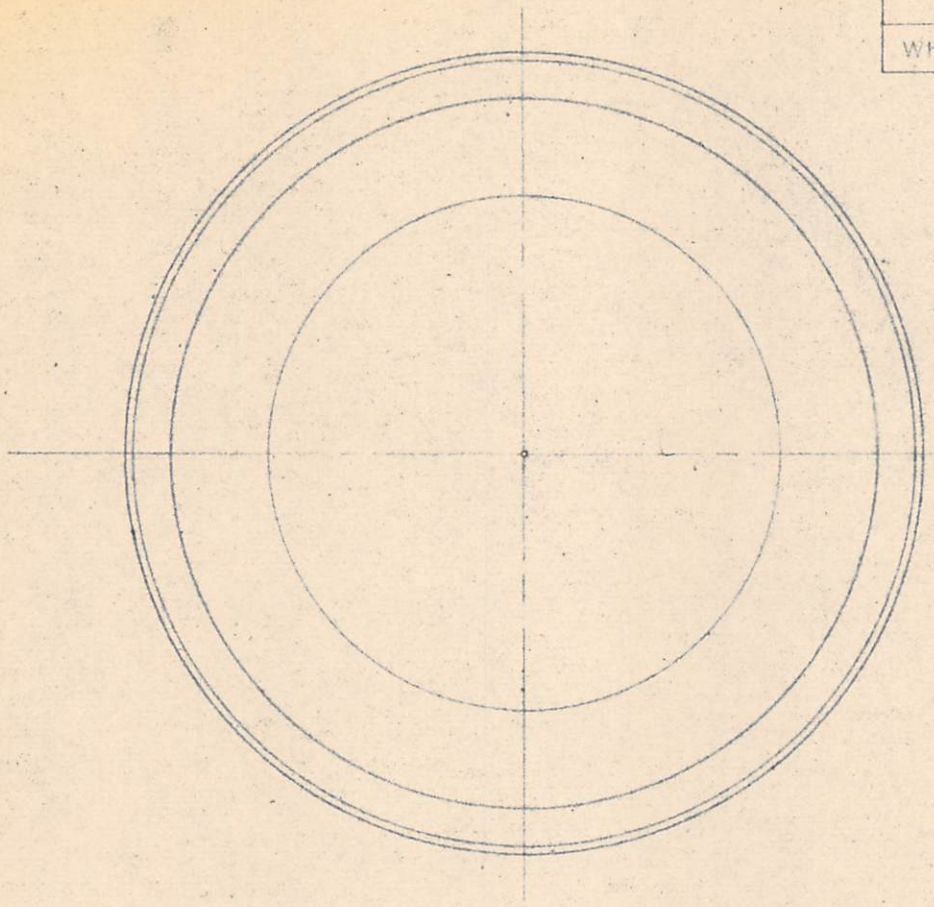
A.V. ROE CANADA LIMITED

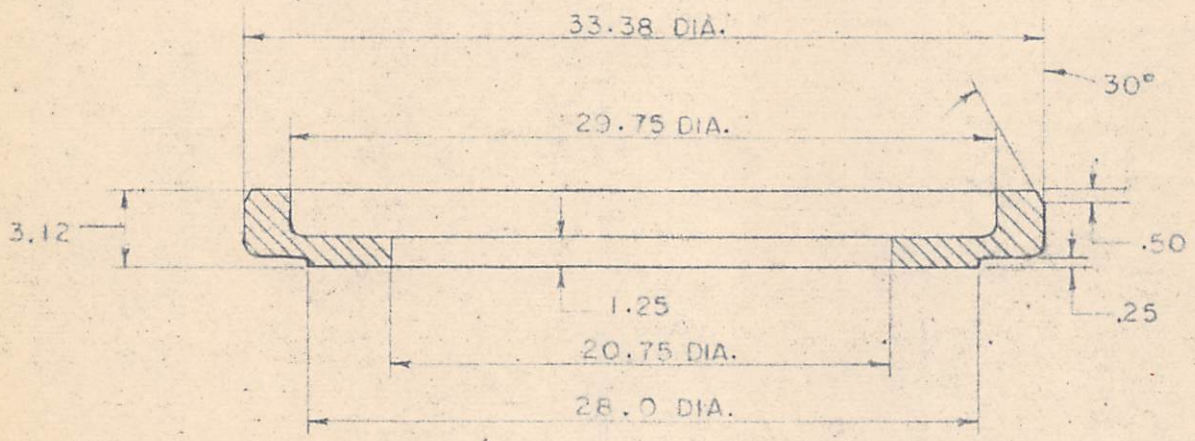
STD. B1-4-2

SHEET 1

REFERENCE

WKG.DWG. B1-4-2





THIS CASTING STOCKED IN MILL SUPPLY IN "AS CAST" CONDITION

MATERIAL - NICKEL CAST IRON

ISSUE	CHANGE	BY	CKD.	DATE

TITLE

STANDARD OUTSIDE DIAMETER LOCATING RING

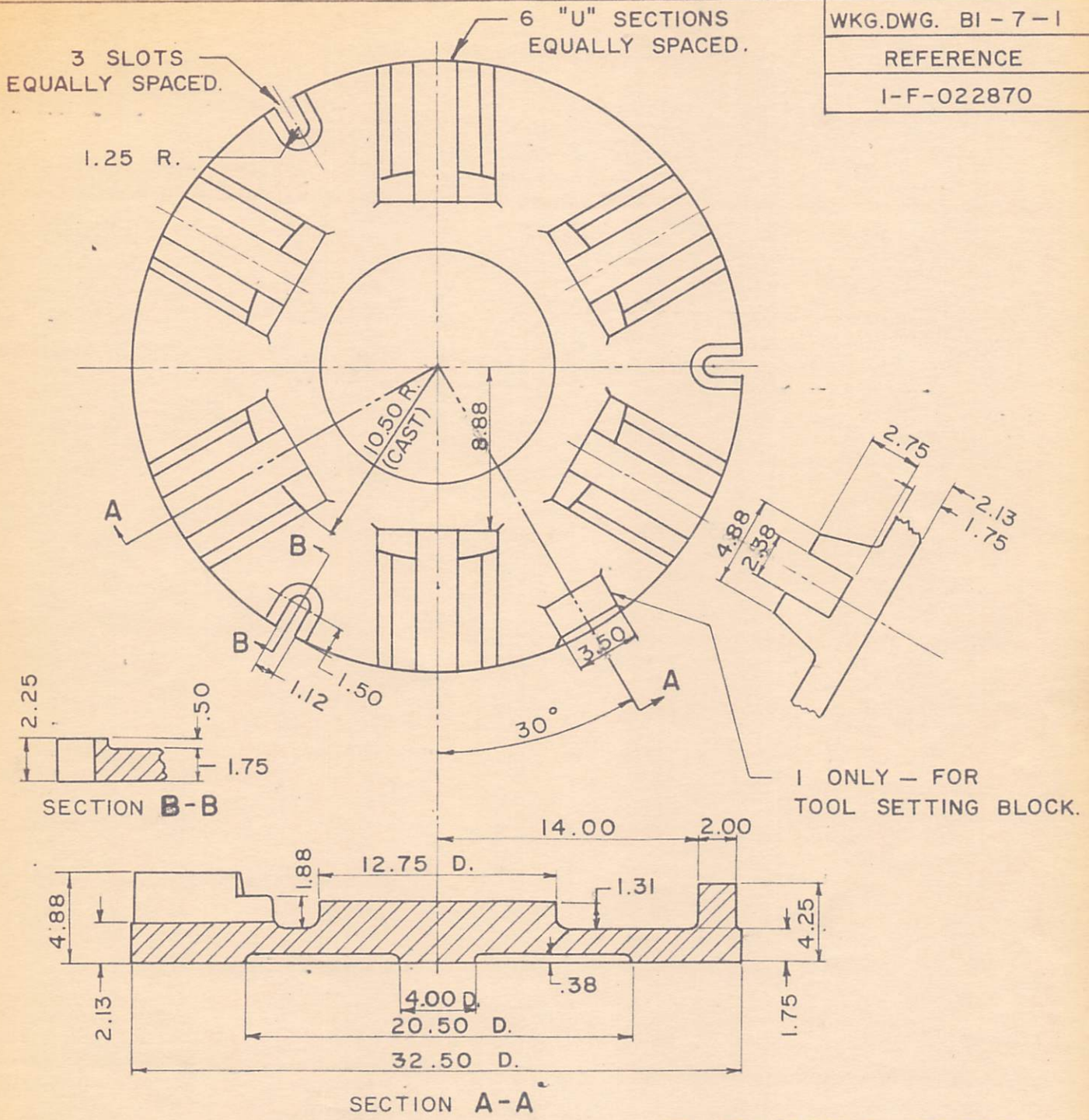
DRN.	CKD.	APPD.	DATE
A. PONTING	A.L. Bailey	[illegible]	5 OCT. 53

TOOL DESIGN STANDARDS MANUAL

MASTER MECHANIC DEPT. GAS TURBINE DIVISION

A.V. ROE CANADA LIMITED

STD. BI-7-1
SHEET 1
WKG.DWG. BI-7-1
REFERENCE
I-F-022870



7 IN MILL SUPPLY

AS OF 16 MAR. 1954

THIS CASTING NOT STOCKED.
PURCHASE IN "AS CAST" CONDITION.
PATTERN NO. BI-7-1
MATERIAL — NICKEL CAST IRON.

ISSUE	CHANGE	BY	CKD.	DATE

TITLE FIXTURE BASE CASTING (35.5 DIA.) WITH BASE FOR TOOL SETTING BLOCK & 6 "U" SECTIONS FOR PINCH CLAMPS.

DRN.	CKD.	APD.	DATE
A. PONTING.	W.G. Bailey	G.M. Lewis	4 MAR 54

TOOL DESIGN STANDARDS MANUAL

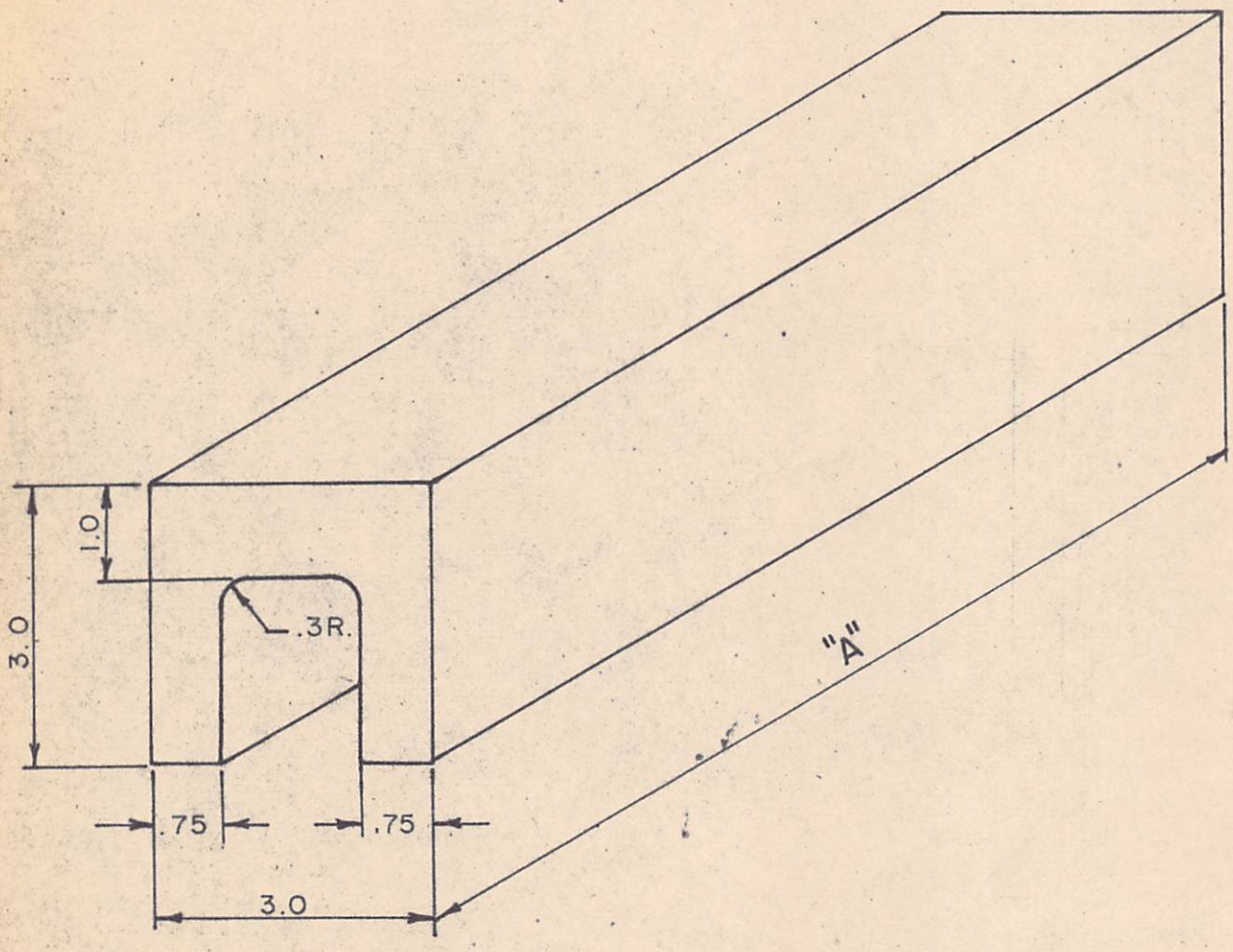
MASTER MECHANIC DEPT. GAS TURBINE DIVISION

A.V. ROE CANADA LIMITED

STD. BI-14

SHEET 1

REFERENCE
I-SG-6116-1
I-SG-6220-3



"A" LENGTH	STANDARD NUMBER
12"	BI-14-1
18"	BI-14-2
24"	BI-14-3
30"	BI-14-4
36"	BI-14-5
42"	BI-14-6

REF. USED AS BASES FOR GAUGE SETTING MASTERS.

THESE CASTINGS STOCKED IN MILL SUPPLY IN "AS CAST" CONDITION MATERIAL.- TYPE GA MEEHANITE

ISSUE	CHANGE	BY	CKD.	DATE

TITLE

CHANNELS

TYPE GA MEEHANITE

DRN.	CKD.	APPD.	DATE
A. PONTING	A.G. Bailey	G.M. Lewis	7 JAN. 54

TEMPORARY
STD. B3

9th February 1953

STANDARD PRACTICE BULIETIN
TOOL DESIGN SECTION #4733

TOOL DESIGN STANDARDS

SUBJECT: STANDARD KEYS FOR BULLARD & KING CHUCK JAWS

In order to provide a constant stock of keys for Bullard and King chuck jaws, the following three (3) types of standard keys have been designed and are now in the Production Machine Shop Equipment Crib.

(1) Std. key for Bullard Chuck Jaws - Tool No. PTD 664

(2) Std. key for King Chuck Jaws - Tool No. PTD 665

(3) Std. convertible key for Bullard & King Chuck Jaws - Tool No. PTD 666

Reference: The above convertible key is used for mounting a Bullard Chuck Jaw onto a King table or for mounting a King Chuck Jaw onto a Bullard table.

A.G. Bailey

AGB*el

A.G. Bailey,
Group Leader - Standards
Master Mechanic Dept. G/T.

cc: Messrs.
A. Bassett
L. Chapman
A. Alexander
E.C. Busby
T. Palonka
E. Taylor
S. Rooke
W. Yowart
K. O'Neil
F. Warren
W. Mollison
F. Ronald
A. Dodds
E. Allen
L. Hanna
W. Benzie

TEMPORARY
STD B3-1

June 29th, 1953.

TO: TOOL DESIGN PERSONNEL - SECTION 4733.
MASTER MECHANIC'S DEPARTMENT, G/T.

SUBJECT: STANDARD DRILL BUSHINGS
(STD. B3-1 TO B3-7, INCL.)

Now that each draftsman has been issued with Standard sheets covering the method of coding drill bushings, it should be unnecessary to detail a bushing or raise a Tool Detail Order to have bushings purchased.

For all normal practice, the bushing code can be altered to suit the required needs. However, if a special type of bushing is required, the subject should be referred to your Group Leader before either detailing same or requesting purchase of bushing by issuing a Tool Detail Order.

A. G. Bailey,
Group Leader - Standards,
Master Mechanic's Dept., G/T.

STEEL CODE FOR ORENDA TOOL ROOM -PLANT #2 & SOME ACCEPTABLE STEELS OF EACH CLASS

CODE NO.*	ATLAS	VANADIUM	Wm. JESSOP	JESSOP (Canada)	COLOUR CODE
	GREEN	ALUM	BLACK	RED & WHITE	
T.1.	SPARTON 7	RED CUT SUPERIOR	TRIUMPH SUPERB	SUPREMUS	RED
T.2.	TROJAN	E.V.M.		SUPREMUS EXTRA	BROWN AND YELLOW
T.15		VASCO SUPREME			ALUM
O.1. **	KEEWATIN	COLONIAL #6	SUPERIOR O.H.	TRUFORM	BLUE
A.2.	CROMOLOY	AIR HARD			PINK
D.3.	N.N.	CROCAR	W.P.S.	CNS-2	BLACK
D.2.	F.N.S.	OHIO DIE	H-42	CNS-1	YELLOW
S.5.	MONARK 2	SILMAN			GREEN
W.1.	COMMERCIAL GRADE DRILL ROD ONLY STOCKED IN THIS CLASS.				
3170		NIKRO "M"			BLUE AND BROWN
3140	SPS 245				BROWN
3140 HT ***	BRAKE DIE				WHITE
4615	IMPACTO (AVRO SPL)				PURPLE
1020 → SPECIFY EITHER HR. OR C.R.	H.R. STEEL AND C.R. STEEL - CARBON CONTENT .25 MAXIMUM.				

* - FOR FURTHER INFORMATION SEE S.A.E. HANDBOOK.

** - GROUND STOCK TO BE SUPPLIED IN THIS CLASS.

*** - HEAT TREATED 3140 STEEL

ISSUE NO.	ISSUE DATE
1	FEB 24-55
2	JESSOP (CANADA) WAS RED IS NOW RED & WHITE. MAR 14-55.

ORENDA

TOOL DESIGN
MANUFACTURING DIVISION
ORENDA ENGINES LIMITED
MALTON ONTARIO

TITLE: STEEL CODE FOR ORENDA TOOL ROOM - PLANT #2

PART NAME:

DESIGNED DATE | DRAWN DATE | CHECKED DATE | APP'D. KEN O'NEILL DATE | APP'D. DATE

SCALE | PROJECT No. | DWG. SIZE A | PART No. | TOOL No. | OPER. No.

SHEET OF SHEETS

3256

SECTION B : STANDARD DETAILS
SUB-SECT. B3 : DRILL JIG BUSHINGS.

THE FOLLOWING IS THE STANDARD METHOD FOR CODING ALL STANDARD DRILL BUSHINGS.

THIS CODE INDICATES THE TYPE OF BUSHING, ITS LENGTH, OUTSIDE DIAMETER AND INSIDE DIAMETER, AS FOLLOWS :

TYPE OF BUSHING	CODE FOR TYPE	STD. Nº
PRESS FIT BUSHING	B	B3 - 1
HEADED PRESS FIT BUSHING	HB	B3 - 2
LINER	L	B3 - 3
HEADED LINER	HL	B3 - 4
SLIP RENEWABLE	SR	B3 - 5
FIXED RENEWABLE	FR	B3 - 6
LOCK SCREWS FOR BUSHINGS	—	B3 - 7

DEFINITION OF COMPLETE CODE

TYPE	INSIDE DIA. IN DECIMALS	OUTSIDE DIA. IN 1/64 THS. (EXCLUDING HEAD)	LENGTH IN 1/16 THS (EXCLUDING HEAD)
SR	.3750	48	16

THE ABOVE CODE (SR-.3750-48-16) INDICATES A SLIP RENEWABLE BUSHING HAVING A 3/8" DIA. DRILL HOLE, A 3/4" O. DIA. (EXCLUDING HEAD) AND A LENGTH OF ONE INCH, (EXCLUDING HEAD). EXCEPT HEADED LINERS - WHEREIN LENGTH IS OVERALL.

METHOD OF CALLING UP BUSHING IN "BILL OF MATERIAL":

NON-STOCK	7	4	BUSH. SR-.3750-48-16	STD. B3-5
	DET. NO.	QTY. REQD.	STOCK SIZE	MATERIAL

THE FOLLOWING SHEETS LIST THE STANDARD BUSHINGS WHICH ARE STOCKED IN MILL SUPPLY.

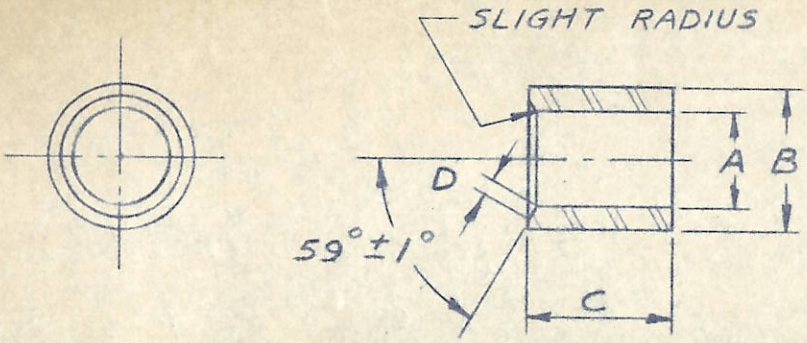
WHEN AN OFF-STANDARD BUSHING IS REQUIRED, IT IS PERMISSABLE TO BILL IT THE SAME AS A STD. BUSHING, PROVIDING ONLY THE INSIDE DIA., THE OUTSIDE DIA. AND/OR THE LENGTH ARE MODIFIED. OTHERWISE, BUSHING WILL BE A SPECIAL, REQUIRING A DETAILED DRAWING AND WILL BE A DETAIL OF THE TOOL FOR WHICH IT IS DESIGNED.

NO CODE NUMBER WILL BE ALLOTTED TO SPECIAL BUSHINGS.

NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
METHOD OF CODING

DRAWN	DATE	APP'D.	DATE
A.G. BAILEY	2 MAY 53		5 MAY 53



MATERIAL - O.H.T.S.

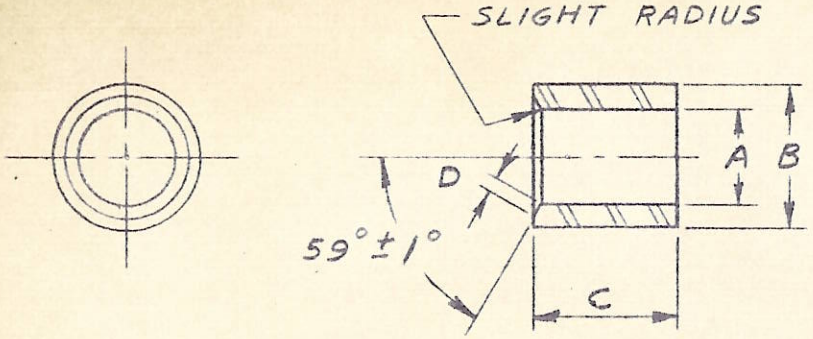
HARDNESS - ROC. C58-62

A		B		C	D	CODE NUMBER
HOLE SIZE	HOLE LIMITS	O.DIA. NOMINAL	GRIND'G. ALLOW'CE.	LENGTH	CHAMFER	
.1250		.2500	+.005 +.010	.31		B-.1250-16-5
				.50		B-.1250-16-8
.1406				.50		B-.1406-20-8
				.75	.03	B-.1406-20-12
.1495		.3125		.50		B-.1495-20-8
				.75		B-.1495-20-12
.1770				.50		B-.1770-20-8
				.75		B-.1770-20-12
	+.0004		+.010	.50		B-.2040-26-8
.2040	+.0001		+.015	.75		B-.2040-26-12
				1.38		B-.2040-26-22
				.50		B-.2188-26-8
.2188		.4062		.75	.06	B-.2188-26-12
				1.38		B-.2188-26-22
				.50		B-.2500-26-8
.2500				.75		B-.2500-26-12
				1.38		B-.2500-26-22
				.50		B-.2660-32-8
.2660				.75		B-.2660-32-12
				1.38		B-.2660-32-22
				.50		B-.2813-32-8
.2813		.5000		.75	.08	B-.2813-32-12
				1.38		B-.2813-32-22
				.50		B-.3125-32-8
.3125	+.0005		+.015	.75		B-.3125-32-12
	+.0001		+.020	1.38		B-.3125-32-22
				.75		B-.3320-40-12
.3320				1.00		B-.3320-40-16
				1.75		B-.3320-40-28
		.6250		.75	.09	B-.3438-40-12
.3438				1.00		B-.3438-40-16
				1.75		B-.3438-40-28

NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
HEADLESS PRESS FIT. STD. TYPE "B"

DWN. A.G.BAILEY. CKD. [illegible] APPD. [illegible] DATE 5 MAY 53



MATERIAL – O.H.T.S.

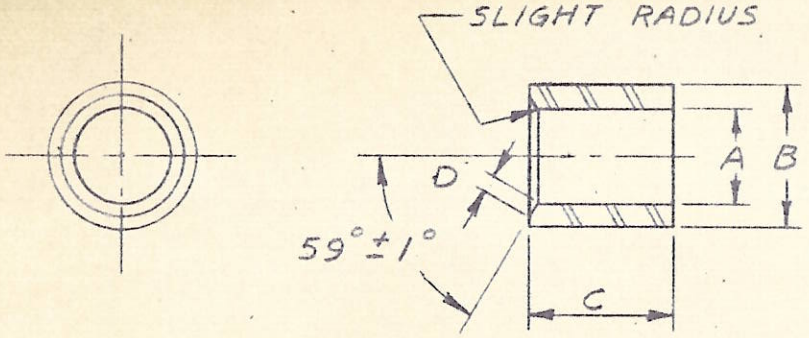
HARDNESS – ROC. C58-62

A		B		C	D	
HOLE SIZE	HOLE LIMITS	O. DIA. NOMINAL	GRIND'G. ALLOW'CE	LENGTH	CHAMFER	CODE NUMBER
.3680				.75		B-.3680-40-12
				1.00		B-.3680-40-16
				1.75		B-.3680-40-28
.3750				.75		B-.3750-40-12
		.6250		1.00	.09	B-.3750-40-16
				1.75		B-.3750-40-28
.4040				.75		B-.4040-40-12
				1.00		B-.4040-40-16
				1.75		B-.4040-40-28
.4375				.75		B-.4375-48-12
				1.00		B-.4375-48-16
				1.75		B-.4375-48-28
.4688	+.0005 +.0001	.7500		.75		B-.4688-48-12
				1.00		B-.4688-48-16
				1.75		B-.4688-48-28
.5000			+.015 +.020	.75		B-.5000-48-12
				1.00		B-.5000-48-16
				1.75	.11	B-.5000-48-28
.5625				1.38		B-.5625-56-22
		.8750		2.13		B-.5625-56-34
.6250				1.38		B-.6250-56-22
				2.13		B-.6250-56-34
.6875				1.38		B-.6875-64-22
		1.0000		2.13		B-.6575-64-34
.7500				1.38		B-.7500-64-22
				2.13		B-.7500-64-34
.8125				1.38		B-.8125-88-22
				2.13		B-.8125-88-34
.8750	+.0006 +.0002	1.3750		1.38		B-.8750-88-22
				2.13	.14	B-.8750-88-34
.9375				1.38		B-.9375-88-22
				2.13		B-.9375-88-34

NO.	CHANGE	BY	DATE	ISSUE
	GRIND ALLOW'CE-REVISED	A.G.B	3 NOV 53	2

DRILL JIG BUSHINGS
HEADLESS PRESS FIT. STD TYPE "B"

DWN. A.G. BAILEY | CKD. [illegible] | APPD. [illegible] | DATE 5 MAY 53



MATERIAL - O.H.T.S.

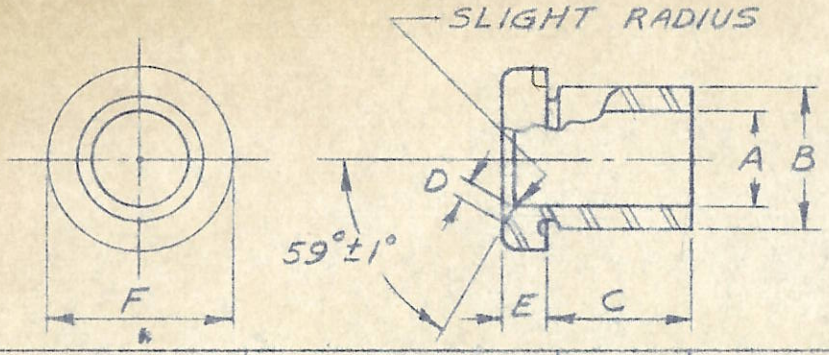
HARDNESS - ROC. C58-62

A		B		C	D	
HOLE SIZE	HOLE LIMITS	O.DIA. NOMINAL	GRIND'G. ALLOW'CE	LENGTH	CHAMFER	CODE NUMBER
1.0000	+.0006 +.0002	1.3750	+.015 +.020	1.38	.14	B-1.0000-88-22
				2.13		B-1.0000-88-34
1.1250		1.7500		1.75		B-1.1250-112-28
				2.50		B-1.1250-112-40
1.2500				1.75		B-1.2500-112-28
				2.50		B-1.2500-112-40
1.3750				1.75		B-1.3750-112-28
				2.50		B-1.3750-112-40

NO.	CHANGE	BY	DATE	ISSUE
	GRIND ALLOWCE REVISED	A.G.B	3 NOV 53	2

DRILL JIG BUSHINGS
HEADLESS PRESS FIT. STD. TYPE "B"

DWN. A.G.BAILEY | CKD. [illegible] | APPD. [illegible] | DATE 5 MAY 53.



THE HEAD DESIGN SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRACTICE

MATERIAL:-
O.H.T.S.

HARDNESS-
ROC. C58-62

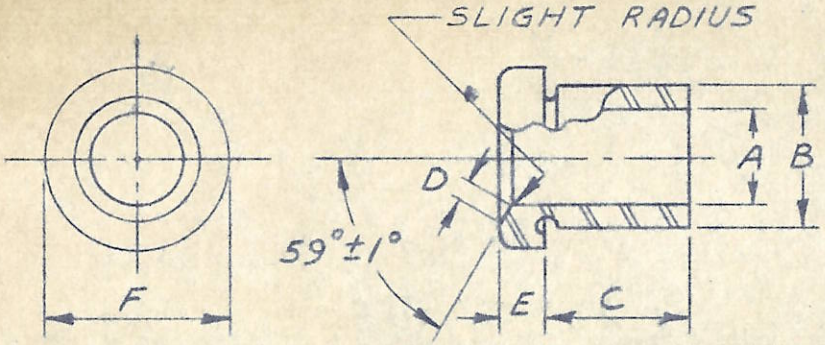
A		B		C	D	E	F	
HOLE SIZE	HOLE LIMITS	O.D. NOMINAL	GRIND'G. ALLOW'CE	LENGTH	CHAMFER	HEAD HEIGHT	HEAD DIA.	CODE NUMBER
.1250		.2500	+.005 +.010	.31	.03	.09	.38	HB-.1250-16-5
				.50				HB-.1250-16-8
.1406		.3125		.50		.13	.44	HB-.1406-20-8
				.75				HB-.1406-20-12
.1495				.50				HB-.1495-20-8
				.75				HB-.1495-20-12
.1770	+.0004 +.0001			.50				HB-.1770-20-8
			+.010 +.015	.75				HB-.1770-20-12
.1875		.4062		.75	.06	.16	.50	HB-.1875-26-12
				1.38				HB-.1875-26-22
.2188				.75				HB-.2188-26-12
				1.38				HB-.2188-26-22
.2500				.75				HB-.2500-26-12
				1.38				HB-.2500-26-22
.2660		.5000		.75	.08	.22	.63	HB-.2660-32-12
				1.38				HB-.2660-32-22
.2813				.75				HB-.2813-32-12
				1.38				HB-.2813-32-22
.3125				.75				HB-.3125-32-12
				1.38				HB-.3125-32-22
.3320		.6250		.75	.09		.81	HB-.3320-40-12
				1.00				HB-.3320-40-16
	+.0005 +.0001		+.015 +.020	1.75				HB-.3320-40-28
.3438				.75				HB-.3438-40-12
				1.00				HB-.3438-40-16
				1.75				HB-.3438-40-28
.3750				.75				HB-.3750-40-12
				1.00				HB-.3750-40-16
				1.75				HB-.3750-40-28
.3840 (R)				.75				HB-.3840-40-12
				1.00				HB-.3840-40-16
				1.75				HB-.3840-40-28

(R)-FOR ROSAN INSERT COUNTERBORES

NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
HEADED PRESS FIT. STD. TYPE "HB"

DWN.	CKD.	APPD.	DATE
A.G. BAILEY	A.G.B.	[illegible]	9 MAY 53



THE HEAD DESIGN SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRACTICE

MATERIAL – O. H. T. S.

HARDNESS – ROC. C58-62

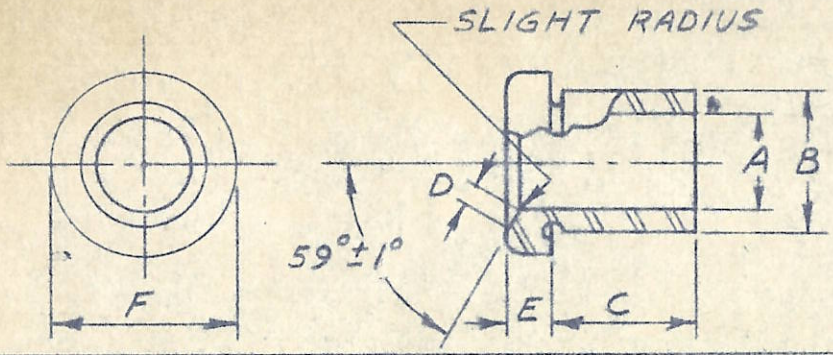
A		B		C	D	E	F	
HOLE SIZE	HOLE LIMITS	O.D. NOMINAL	GRIND'G. ALLOW'CE	LENGTH	CHAMFER	HEAD HEIGHT	HEAD DIA.	CODE NUMBER
.4040		.6250		.75	.09		.81	HB-.4040-40-12
				1.00				HB-.4040-40-16
				1.75				HB-.4040-40-28
.4375				.75				HB-.4375-48-12
				1.00				HB-.4375-48-16
				1.75				HB-.4375-48-28
(R) .4510				.75				HB-.4510-48-12
				1.00				HB-.4510-48-16
				1.75				HB-.4510-48-28
.4688		.7500		.75		.22		HB-.4688-48-12
				1.00			.94	HB-.4688-48-16
				1.75				HB-.4688-48-28
(R) .4980	+.0005 +.0001		+.015 +.020	.75				HB-.4980-48-12
				1.00				HB-.4980-48-16
				1.75				HB-.4980-48-28
.5000				.75	.11			HB-.5000-48-12
				1.00				HB-.5000-48-16
				1.75				HB-.5000-48-28
(R) .5290		.8750		1.38		.25	1.13	HB-.5290-56-22
				2.13				HB-.5290-56-34
.5625				1.38				HB-.5625-56-22
				2.13				HB-.5625-56-34
(R) .6040				1.38				HB-.6040-56-22
				2.13				HB-.6040-56-34
.6250				1.38				HB-.6250-56-22
				2.13				HB-.6250-56-34
.6875		1.0000		1.38		.31	1.25	HB-.6875-64-22
				2.13				HB-.6875-64-34
(R) .7500				1.38				HB-.7500-64-22
				2.13				HB-.7500-64-34
.8125	+.0006 +.0002	1.3750		1.38	.14	.38	1.63	HB-.8125-88-22
				2.13				HB-.8125-88-34

(R) - FOR ROSAN INSERT COUNTERBORES

NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
HEADED PRESS FIT. STD. TYPE "HB"

DWN. A.G.BAILEY | CKD. [illegible] | APPD. [illegible] | DATE 9 MAY 53



THE HEAD DESIGN SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRACTICE

MATERIAL - O.H.T.S.

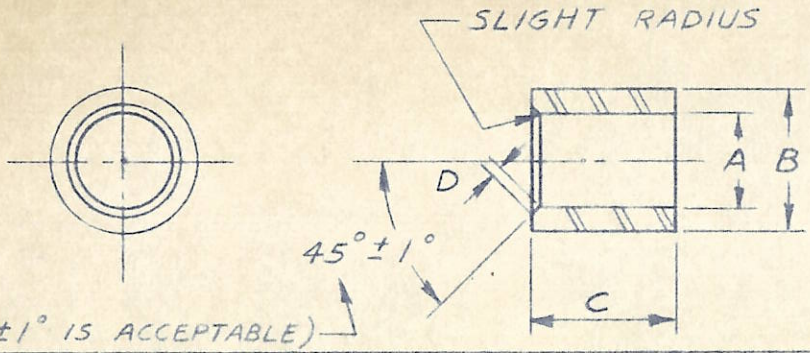
HARDNESS - ROC. C58-62

A		B		C	D	E	F	
HOLE SIZE	HOLE LIMITS	O.D. NOMINAL	GRIND'G. ALLOW'CE	LENGTH	CHAMFER	HEAD HEIGHT	HEAD DIA.	CODE NUMBER
.8750	+.0006 +.0002	1.3750	+.015 +.020	1.38	.14	.38	1.63	HB-.8750-88-22
				2.18				HB-.8750-88-34
.9375				1.38				HB-.9375-88-22
				2.13				HB-.9375-88-34
1.0000				1.38				HB-1.0000-88-22
				2.13				HB-1.0000-88-34
1.1250		1.7500		1.75			2.00	HB-1.1250-112-28
				2.50				HB-1.1250-112-40
1.2500				1.75				HB-1.2500-112-28
				2.50				HB-1.2500-112-40
1.3750				1.75				HB-1.3750-112-28
				2.50				HB-1.3750-112-40

NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
HEADED PRESS FIT. STD. TYPE "HB"

DWN.	CKD.	APPD.	DATE
A.G.BAILEY			9 MAY 53



MATERIAL -
O.H.T.S.

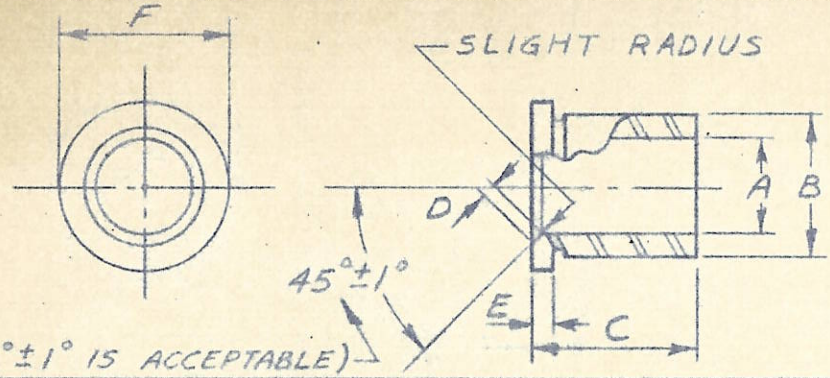
HARDNESS -
ROC. C58-62

A		B		C	D	
HOLE SIZE NOMINAL	HOLE LIMITS	O. DIA. NOMINAL	GRIND'G. ALLOW'CE	LENGTH	CHAMFER	CODE NUMBER
.3125	+.0004 +.0001	.5000		.50		L-.3125-32-8
				.75		L-.3125-32-12
.5000	+.0005 +.0002	.7500		.75		L-.5000-48-12
				1.00	.05	L-.5000-48-16
				1.38		L-.5000-48-22
.7500	+.0006 +.0003	1.0000	+.015 +.020	.75		L-.7500-64-12
				1.00		L-.7500-64-16
				1.38		L-.7500-64-22
1.0000	+.0007 +.0004	1.3750		1.38		L-1.0000-88-22
				2.13	.13	L-1.0000-88-34
1.3750	+.0010 +.0006	1.7500		1.38		L-1.3750-112-22
				2.13		L-1.3750-112-34
1.7500	+.0012 +.0008	2.2500		1.75	.17	L-1.7500-144-28
				2.50		L-1.7500-144-40

DRILL JIG BUSHINGS
HEADLESS LINER. STD. TYPE "L"

NO.	CHANGE	BY	DATE	ISSUE

DWN. A. G. BAILEY | CKD. | APPD. | DATE 14 MAY 53



THE HEAD DESIGN SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRACTICE

MATERIAL – O.H.T.S.

HARDNESS – ROC. C58-62

A		B		C	D	E	F	
HOLE SIZE NOMINAL	HOLE LIMITS	O.D. NOMINAL	GRIND'G. ALLOW'CE.	OVERALL LENGTH	CHAMFER	HEAD HEIGHT	HEAD DIA.	CODE NUMBER
.3125	+.0004 +.0001	.5000	+.020 +.015	.50	.05	.09	.63	HL-.3125-32-8
				.75				HL-.3125-32-12
.5000	+.0005 +.0002	.7500		.75			.88	HL-.5000-48-12
				1.38				HL-.5000-48-22
.7500	+.0006 +.0003	1.0000		.50		.13	1.13	HL-.7500-64-8
				1.00				HL-.7500-64-16
				1.38				HL-.7500-64-22
				1.75				HL-.7500-64-28
1.0000	+.0007 +.0004	1.3750		1.38	.13		1.50	HL-1.0000-88-22
				1.75				HL-1.0000-88-28
				2.13				HL-1.0000-88-34
1.3750	+.0010 +.0006	1.7500		1.00		.19	1.88	HL-1.3750-112-16
				1.38				HL-1.3750-112-22
				2.13				HL-1.3750-112-34
1.7500	+.0012 +.0008	2.2500		1.75	.17		2.38	HL-1.7500-144-28
				2.50				HL-1.7500-144-40
2.2500.	+.0015 +.0010	2.7500		3.00			2.88	HL-2.2500-176-48

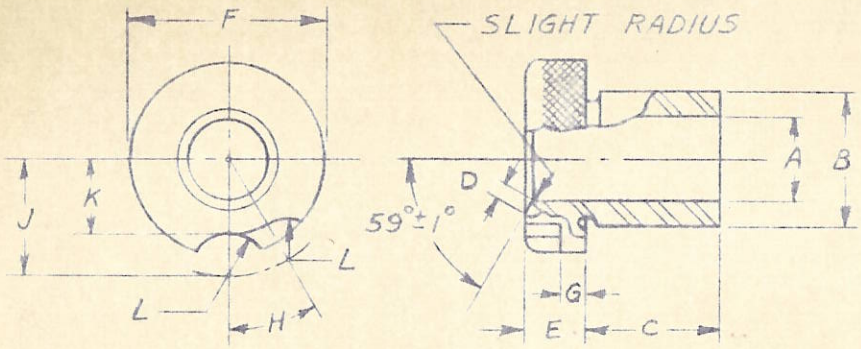
NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
HEADED LINER STD. TYPE "HL"

DWN. A.G.BAILEY. CKD. APPD. DATE 19 MAY 53

TOOL DESIGN STANDARDS MANUAL
MASTER MECHANIC DEPT
GAS TURBINE DIV. A.V.ROE CANADA LTD.

STD. B3-5
SHEET 1



THE HEAD DESIGN SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRACTICE

MATERIAL - O.H.T.S.

HARDNESS - ROC. C58-62

A		B		C	D	E	F	G	H	J	K	L	CODE NUMBER
HOLE SIZE	HOLE LIMITS	BODY DIAMETER MAX	BODY DIAMETER MIN.	DIM	DIM.	DIM.	DIA	DIM.	DEG.	RAD.	RAD.	RAD.	
.1250		.3125	.3123	.50 .75	.03	.38	.56			.50	.17		SR-.1250-20-8 SR-.1250-20-12
.1406		.5000	.4998	.75 1.38	.08	.44	.81			.63	.30		SR-.1406-32-12 SR-.1406-32-22
.1495		.3125	.3123	.50 .75	.03	.38	.56			.50	.17		SR-.1495-20-8 SR-.1495-20-12
.1563	+.0004 +.0001			.50 .75									SR-.1563-20-8 SR-.1563-20-12
.1770				.75 1.38					65°				SR-.1770-32-12 SR-.1770-32-22
.2040				.75 1.38									SR-.2040-32-12 SR-.2040-32-22
.2188		.5000	.4998	.75 1.38	.08		.81			.63	.30		SR-.2188-32-12 SR-.2188-32-22
.2500				.75 1.38				.13				.33	SR-.2500-32-12 SR-.2500-32-22
.2660				.75 1.38									SR-.2660-32-12 SR-.2660-32-22
		.7500	.7498	1.00 1.75	.11	.44	1.06		50°	.75	.42		SR-.2660-48-16 SR-.2660-48-28
.2813		.5000	.4998	.75 1.38	.08		.81		65°	.63	.30		SR-.2813-32-12 SR-.2813-32-22
.3125	+.0005 +.0001			.75 1.38									SR-.3125-32-12 SR-.3125-32-22
.3320				.75 1.38									SR-.3320-32-12 SR-.3320-32-22
		.7500	.7498	1.00 1.75	.11		1.06		50°	.75	.42		SR-.3320-48-16 SR-.3320-48-28
.3438		.5000	.4998	.75 1.38	.08		.81		65°	.63	.30		SR-.3438-32-12 SR-.3438-32-22
		.7500	.7498	1.00 1.75	.11		1.06		50°	.75	.42		SR-.3438-48-16 SR-.3438-48-28

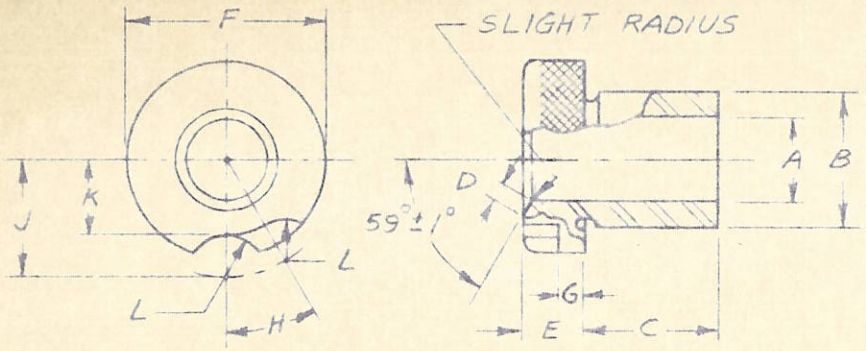
NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
SLIP RENEWABLE STD. TYPE "SR"

DWN. A.G. BAILEY | CKD. A.G.B. | APPD. | DATE 27 MAY 53

TOOL DESIGN STANDARDS MANUAL
MASTER MECHANIC DEPT.
GAS TURBINE DIV. A.V. ROE CANADA LTD.

STD. B3-5
SHEET 2



THE HEAD DESIGN SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRACTICE

MATERIAL – O.H.T.S.

HARDNESS – ROC. C58-62

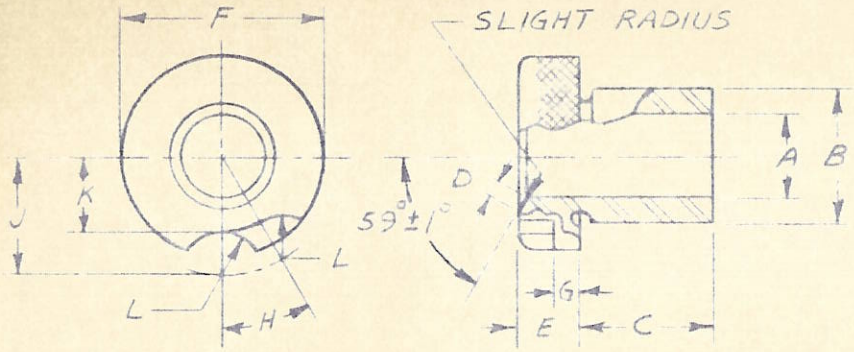
A		B		C	D	E	F	G	H	J	K	L	CODE NUMBER
HOLE SIZE	HOLE LIMITS	BODY DIAMETER MAX	BODY DIAMETER MIN	DIM.	DIM.	DIM.	DIA	DIM.	DEG.	RAD.	RAD	RAD	
.3750		.7500	.7498	1.00	.11	.44	1.06	.13	50°	.75	.42	.33	SR-.3750-48-16
				1.75									SR-.3750-48-28
.3840 (R)				1.00									SR-.3840-48-16
				1.75									SR-.3840-48-28
.4040				1.00									SR-.4040-48-16
				1.75									SR-.4040-48-28
		1.0000	.9998	1.38			1.44	.19	35°	.92	.59		SR-.4040-64-22
				2.13									SR-.4040-64-34
.4375		.7500	.7498	1.00			1.06	.13	50°	.75	.42		SR-.4375-48-16
				1.75									SR-.4375-48-28
.4510 (R)				1.00									SR-.4510-48-16
				1.75									SR-.4510-48-28
.4688				1.00									SR-.4688-48-16
				1.75									SR-.4688-48-28
.4844	+.0005 +.0001			1.00									SR-.4844-48-16
				1.75									SR-.4844-48-28
.4980 (R)				1.00									SR-.4980-48-16
				1.75									SR-.4980-48-28
.5000				1.00									SR-.5000-48-16
				1.75									SR-.5000-48-28
.5290 (R)		1.0000	.9998	1.38			1.44	.19	35°	.92	.59		SR-.5290-64-22
				2.13									SR-.5290-64-34
.5625				1.38									SR-.5625-64-22
				2.13									SR-.5625-64-34
.6040 (R)				1.38									SR-.6040-64-22
				2.13									SR-.6040-64-34
.6250				1.38									SR-.6250-64-22
				2.13									SR-.6250-64-34
.6875				1.38									SR-.6875-64-22
				2.13									SR-.6875-64-34
.7187				1.38									SR-.7187-64-22
				2.13									SR-.7187-64-34

(R) – FOR ROSAN INSERT COUNTERBORES

NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
SLIP RENEWABLE STD. TYPE "SR"

DWN A.G. BAILEY | CKD | APPD | DATE 27 MAY 53



THE HEAD DESIGN SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRACTICE

MATERIAL - O.H.T.S.

HARDNESS - ROC. C58-62

A		B		C	D	E	F	G	H	J	K	L	CODE NUMBER
HOLE SIZE	HOLE LIMITS	BODY DIAMETER MAX.	BODY DIAMETER MIN.	DIM.	DIM	DIM.	DIA.	DIM.	DEG.	RAD.	RAD.	RAD.	
.7500 (R)	+.0005 +.0001	1.0000	.9998	1.38	.11		1.44		35°	.92	.59		SR-.7500-64-22
				2.13									SR-.7500-64-34
.8125				1.38									SR-.8125-88-22
				2.13									SR-.8125-88-34
.8750				1.38		.44						.33	SR-.8750-88-22
		1.3750	1.3747	2.13			1.81			1.11	.78		SR-.8750-88-34
.9375				1.38									SR-.9375-88-22
				2.13				.19					SR-.9375-88-34
1.0000	+.0006 +.0002			1.38	.14				30°				SR-1.0000-88-22
				2.13									SR-1.0000-88-34
1.1250				1.75									SR-1.1250-112-28
				2.50									SR-1.1250-112-40
1.2500				1.75									SR-1.2500-112-28
		1.7500	1.7497	2.50		.63	2.31			1.39	1.00	.39	SR-1.2500-112-40
1.3750				1.75									SR-1.3750-112-28
				2.50									SR-1.3750-112-40

(R) - FOR ROSAN INSERT COUNTERBORES

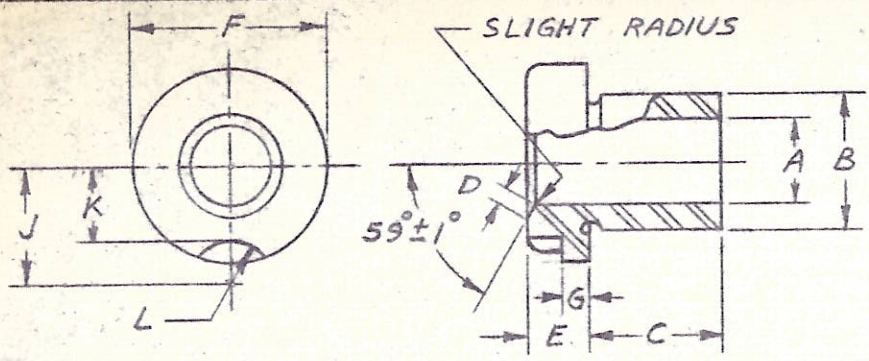
NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
SLIP RENEWABLE STD. TYPE "SR"

DWN A. J. BAILEY CKD A.W. APPD. DATE 27 MAY 53

TOOL DESIGN STANDARDS MANUAL
MASTER MECHANIC DEPT.
GAS TURBINE DIV. A.V. ROE CANADA LTD.

STD. B3-6
SHEET 1



THE HEAD DESIGN SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRACTICE

MATERIAL – O.H.T.S.

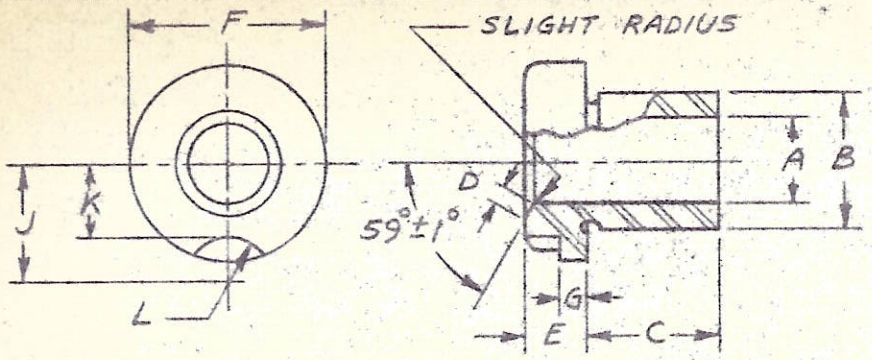
HARDNESS – ROC. C58-62

A		B		C	D	E	F	G	J	K	L	CODE NUMBER
HOLE SIZE	HOLE LIMITS	BODY DIAMETER MAX.	BODY DIAMETER MIN.	LENGTH	DIM.	DIM.	DIA.	DIM.	DIM.	DIM.	RAD.	
.1250	+.0004 +.0001	.3125	.3123	.75	.03		.56		.50	.17		FR-.1250-20-12
				1.00								FR-.1250-20-16
.1406		.5000	.4998	.75	.08		.81		.63	.30		FR-.1406-32-12
				1.38								FR-.1406-32-22
.1495		.3125	.3123	.75	.03		.56		.50	.17		FR-.1495-20-12
				1.00								FR-.1495-20-16
.1563				.75								FR-.1563-20-12
				1.00								FR-.1563-20-16
.1770		.5000	.4998	.75	.08	.25	.81	.13	.63	.30	.33	FR-.1770-32-12
				1.38								FR-.1770-32-22
.2040				.75								FR-.2040-32-12
				1.38								FR-.2040-32-22
.2188				.75								FR-.2188-32-12
				1.38								FR-.2188-32-22
.2500				.75								FR-.2500-32-12
				1.38								FR-.2500-32-22
.2660	+.0005 +.0001			.75								FR-.2660-32-12
				1.38								FR-.2660-32-22
.2813				.75								FR-.2813-32-12
				1.38								FR-.2813-32-22
.3125				.75								FR-.3125-32-12
				1.38								FR-.3125-32-22
.3320				.75								FR-.3320-32-12
				1.38								FR-.3320-32-22
.3438		.7500	.7498	.75	.11		1.06		.75	.42		FR-.3438-48-12
				1.00								FR-.3438-48-16
				1.38								FR-.3438-48-22
.3750				.75								FR-.3750-48-12
				1.00								FR-.3750-48-16
				1.38								FR-.3750-48-22

NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
FIXED RENEWABLE STD. TYPE "FR"

DWN. A.G. BAILEY | CKD. | APPD. | DATE 1 JUN. 53



THE HEAD DESIGN SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRACTICE

MATERIAL— O. H. T. S.

HARDNESS ROC. C58-62

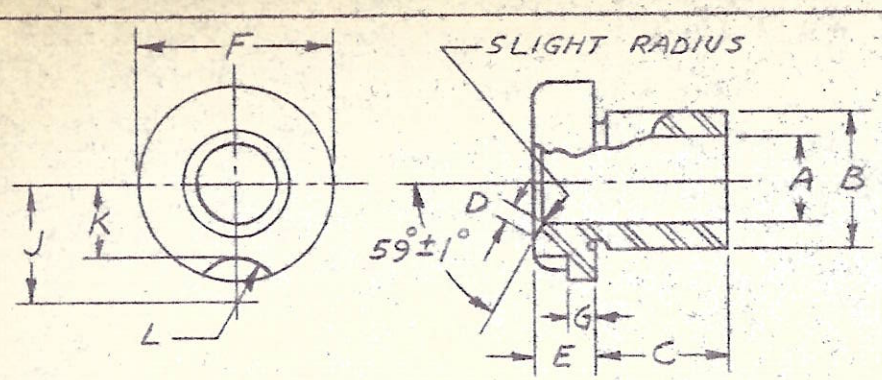
A		B		C	D	E	F	G	J	K	L	CODE NUMBER
HOLE SIZE	HOLE LIMITS	BODY DIAMETER MAX.	BODY DIAMETER MIN.	LENGTH	DIM.	DIM.	DIA	DIM.	DIM.	DIM.	RAD.	
.3840 (R)				.75								FR-.3840-48-12
				1.00								FR-.3840-48-16
				1.38								FR-.3840-48-22
.4040				.75								FR-.4040-48-12
				1.00								FR-.4040-48-16
				1.38								FR-.4040-48-22
.4375				.75								FR-.4375-48-12
				1.00								FR-.4375-48-16
				1.38								FR-.4375-48-22
.4510 (R)		.7500	.7498	.75		.25	1.06	.13	.75	.42		FR-.4510-48-12
				1.00								FR-.4510-48-16
				1.38								FR-.4510-48-22
.4688				.75								FR-.4688-48-12
				1.00								FR-.4688-48-16
				1.38								FR-.4688-48-22
.4844	+.0005 +.0001			.75	.11						.33	FR-.4844-48-12
				1.00								FR-.4844-48-16
				1.38								FR-.4844-48-22
.4980 (R)				.75								FR-.4980-48-12
				1.00								FR-.4980-48-16
				1.38								FR-.4980-48-22
.5000				.75								FR-.5000-48-12
				1.00								FR-.5000-48-16
				1.38								FR-.5000-48-22
.5290 (R)				1.38								FR-.5290-64-22
				2.13								FR-.5290-64-34
.5625				1.38								FR-.5625-64-22
		1.0000	.9998	2.13		.38	1.44	.19	.92	.59		FR-.5625-64-34
.5930				1.38								FR-.5930-64-22
				2.13								FR-.5930-64-34
.6040 (R)				1.38								FR-.6040-64-22
				2.13								FR-.6040-64-34

(R) - FOR ROSAN INSERT COUNTERBORES

NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
FIXED RENEWABLE STD. TYPE "FR"

DWN. A.G.BAILEY. CKD. A.G.B. APPD. E.C.B. DATE 1 JUN.53



THE HEAD DESIGN SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRACTICE

MATERIAL – O.H.T.S.

HARDNESS – ROC. C58-62

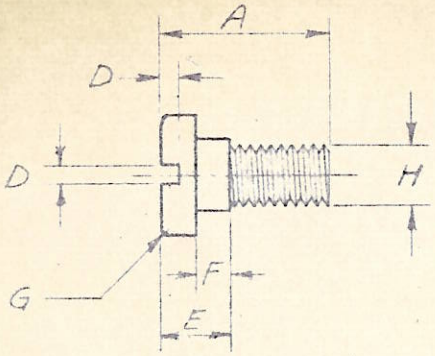
A		B		C	D	E	F	G	J	K	L	CODE NUMBER
HOLE SIZE	HOLE LIMITS	BODY DIAMETER MAX.	BODY DIAMETER MIN.	LENGTH	DIM.	DIM.	DIA.	DIM.	DIM.	DIM.	RAD.	
.6250	+.0005 +.0001	1.0000	.9998	1.38	.11		1.44		.92	.59		FR-.6250-64-22
				2.13								FR-.6250-64-34
.6875				1.38								FR-.6875-64-22
				2.13								FR-.6875-64-34
.7500 (R)				1.38								FR-.7500-64-22
				2.13								FR-.7500-64-34
.8126	+.0006 +.0002	1.3750	1.3747	1.38	.14	.38	1.81	.19	1.11	.78	.33	FR-.8126-88-22
				2.13								FR-.8126-88-34
.8750				1.38								FR-.8750-88-22
				2.13								FR-.8750-88-34
.9375				1.38								FR-.9375-88-22
				2.13								FR-.9375-88-34
1.0000				1.38								FR-1.0000-88-22
				2.13								FR-1.0000-88-34
1.1250		1.7500	1.7497	1.75			2.31		1.39	1.00	.39	FR-1.1250-112-28
				2.50								FR-1.1250-112-40
1.2500				1.75								FR-1.2500-112-28
				2.50								FR-1.2500-112-40
1.3750				1.75								FR-1.3750-112-28
				2.50								FR-1.3750-112-40

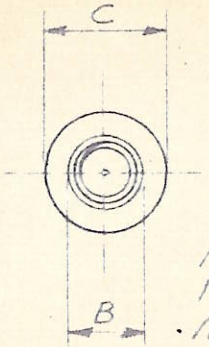
(R) – FOR ROSAN INSERT COUNTERBORES

NO.	CHANGE	BY	DATE	ISSUE

DRILL JIG BUSHINGS
FIXED RENEWABLE STD TYPE "FR"

DWN.	CKD.	APPD.	DATE
A.G. BAILEY			1 JUN. 53





MATERIAL - M.I.L. STEEL IN ACCORDANCE WITH THE MANUFACTURER'S PRACTICE

LOCK SCREW Nº	A LENGTH OVERALL	B SHOULDER DIA.	C HEAD DIA	D SLOT	E HEAD HEIGHT	F SHOULDER LENGTH	G RAD	H N.C. THREAD	STANDARD NUMBER
1	.63	.38	.63	.06	.25	.138 .132	.03	5/16-18	B3-7-1
2	.50	.38	.63	.09	.38	.200 .194	.03	5/16-18	B3-7-2
3	1.00	.44	.75	.13	.38	.200 .194	.03	3/8-16	B3-7-3

SIZE OF LOCK SCREW REQUIRED

BUSHING OUTSIDE DIAMETER	LOCK SCREW NUMBER	SPECIFY STD. NUMBER IN BILL OF MATERIAL
.3125	#1	B3-7-1
.5000		
.7500		
1.0000	#2	B3-7-2
1.3750		
1.7500	#3	B3-7-3

NO	CHANGE	BY	DATE	ISSUE
	CHART RE-SIZE-ADDED	A.G.B.	3 NOV. 55	2

LOCK SCREWS
FOR RENEWABLE DRILL BUSHINGS

DWN A.G. BAILEY | CKD | APPD | DATE 4 JUL. 53

SID 83-8

cc: Dunbar, E. C. Busby
R. Parish
K. O'Neill
S. Rooke
W. Yowart
L. J. Hance
L. Garth
L. Dalley
S. Southern
L. Foster
W. Denzie
D. Stewart

TOOL DESIGN STANDARDS MANUAL

MASTER MECHANIC DEPT. GAS TURBINE DIVISION

A.V. ROE CANADA LIMITED

STD. B3 - 8 - 1

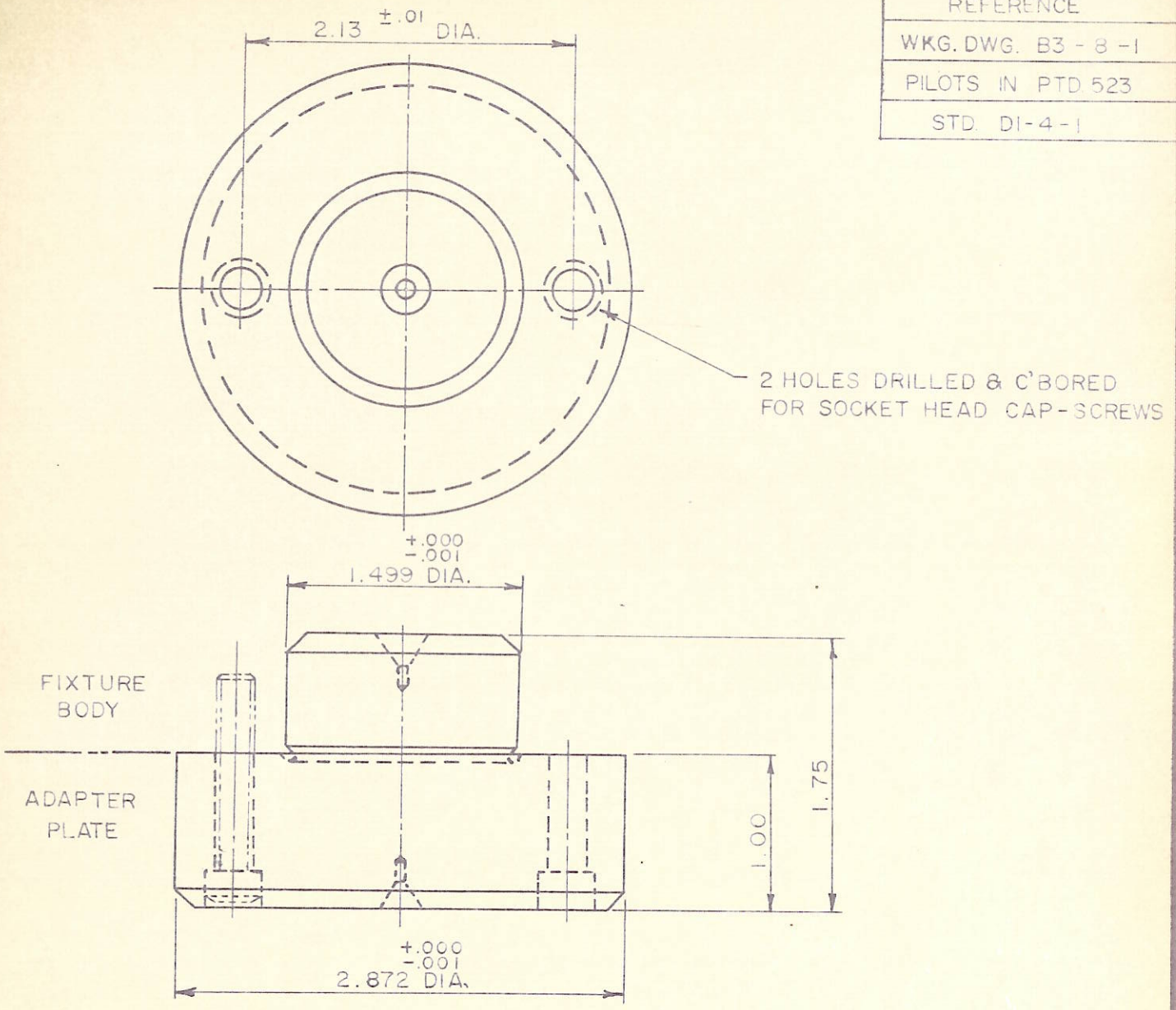
SHEET 1

REFERENCE

WKG. DWG. B3 - 8 - 1

PILOTS IN PTD 523

STD. DI - 4 - 1



FIXTURE DIMENSIONS

HOLE SIZE FOR SPIGOT 1.500 $^{+.001}_{-.000}$ DIA.
TAPPED HOLES FOR 2 SCREWS 1/4 - 20 NC. THREAD
CAP-SCREWS 1-1/4 INCHES LONG

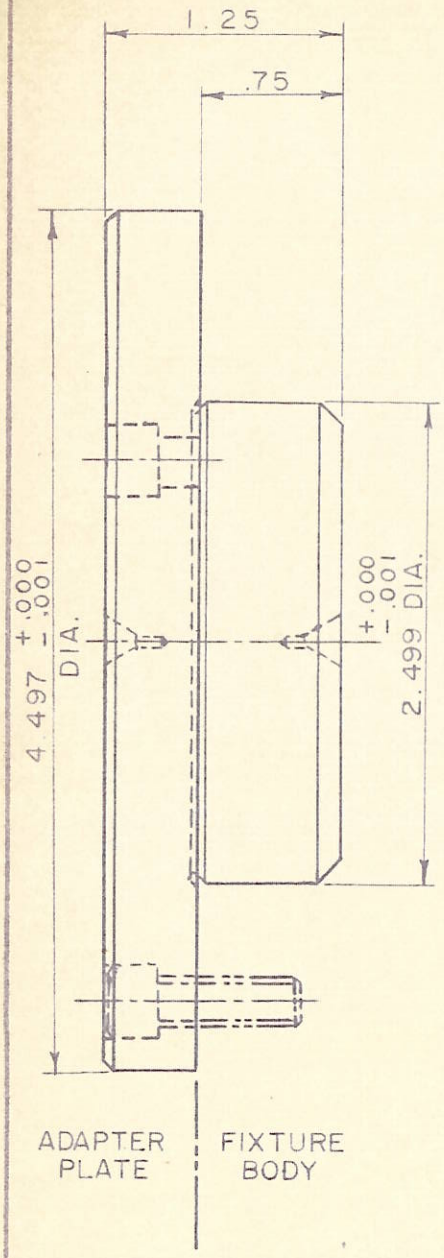
THIS SPIGOT STOCKED IN TOOL CRIB
MATERIAL - ATLAS IMPACTO
HARDNESS - CARBURIZED, DEPTH OF CASE .020 MIN.

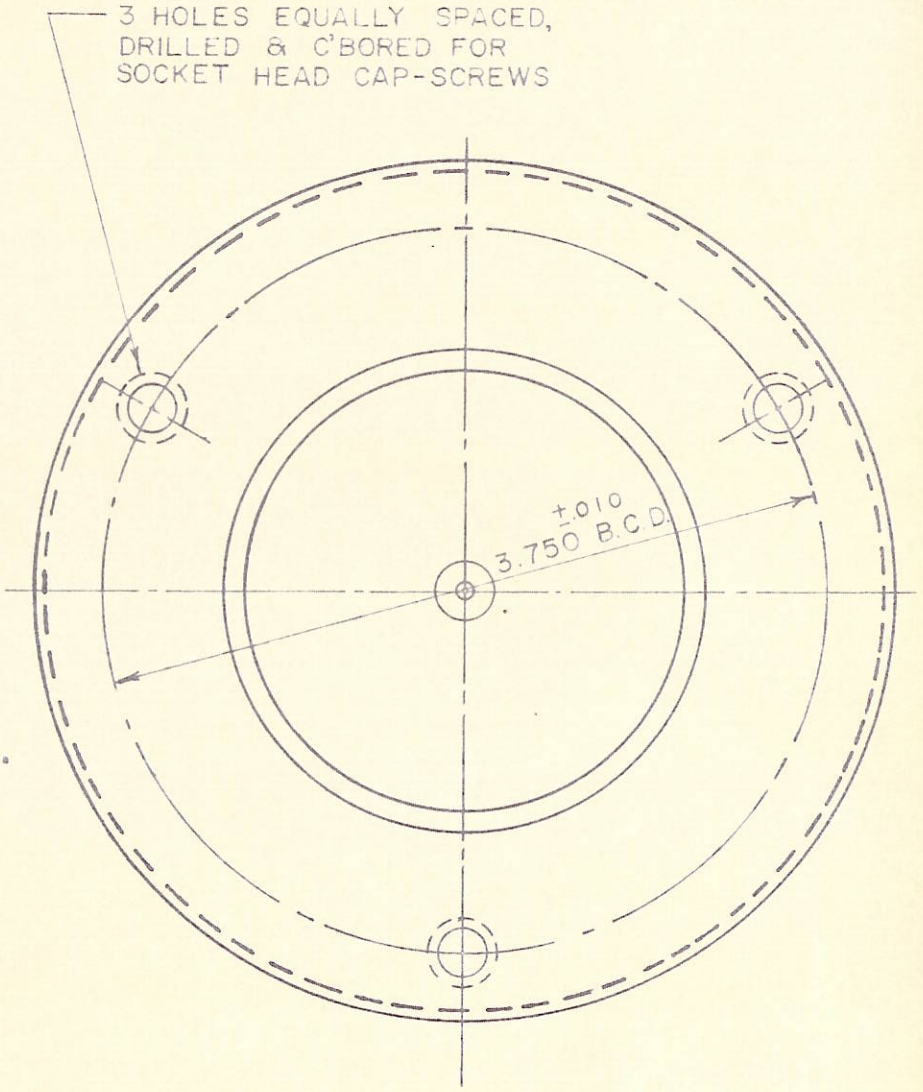
ISSUE	CHANGE	BY	CKD.	DATE

TITLE

STANDARD 2.875 DIA. SPIGOT FOR LOCATING TURNING FIXTURES ON VERTICAL TURRET LATHES

DRN.	CKD.	APPD.	DATE
A. PONTING	A.G. Bailey	E.M. Lewis	4 NOV. 53





FIXTURE DIMENSIONS

HOLE SIZE FOR SPIGOT 2.500 +.001 -.000 DIA.
TAPPED HOLES FOR 3 SCREWS 1/4 - 20 N.C. THREAD
CAP - SCREWS 3/4 INCH LONG

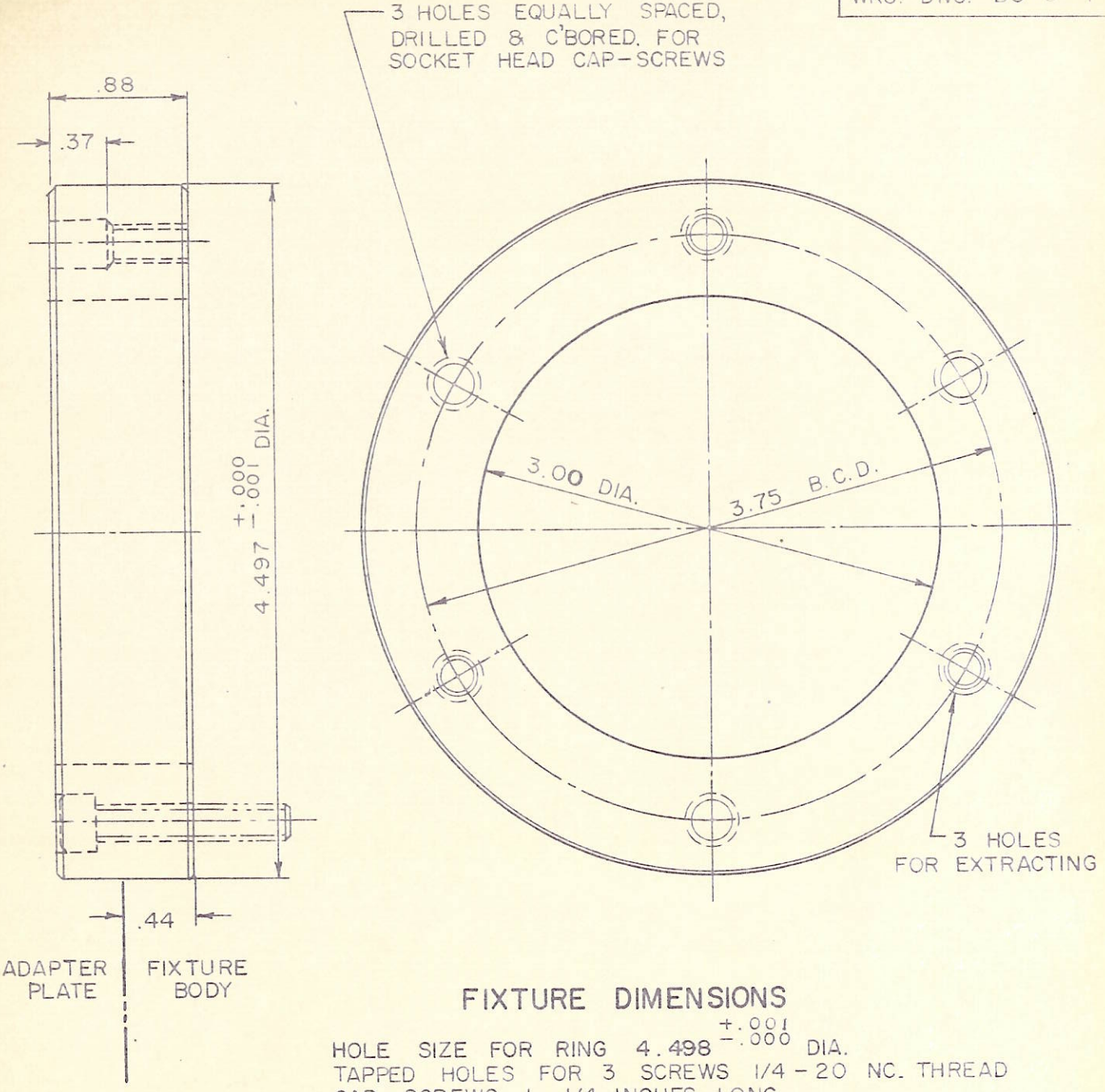
THIS SPIGOT STOCKED IN TOOL CRIB
MATERIAL - ATLAS IMPACTO
HARDNESS - CARBURIZED, DEPTH OF CASE .020 MIN.

ISSUE	CHANGE	BY	CKD.	DATE

TITLE
STANDARD 4.5" DIA. SPIGOT
FOR LOCATING TURNING FIXTURES

DRN.	CKD.	APPD.	DATE
A. PONTING	A.G. Bailey	G. M. Turner	5 NOV. 53

STD. B3-9-1
SHEET 1
REFERENCE
WKG. DWG. B3-9-1



FIXTURE DIMENSIONS

HOLE SIZE FOR RING 4.498 +.001 -.000 DIA.
TAPPED HOLES FOR 3 SCREWS 1/4-20 NC. THREAD
CAP-SCREWS 1-1/4 INCHES LONG

THIS RING STOCKED IN TOOL CRIB
MATERIAL - ATLAS KEEWATIN
HARDNESS - ROCKWELL C56-58

ISSUE	CHANGE	BY	CKD.	DATE

TITLE
STANDARD 4.5" O.D. RING FOR LOCATING FIXTURES ON TURRET LATHE WHEN USING PILOTED BARS

DRN. A. PONTING | CKD. A.L. Bailey | APPD. G.M. Evans | DATE 2 DEC. 53

A. V. ROE CANADA LIMITED

INTER-DEPARTMENTAL MEMORANDUM

TEMPORARY
STD. B4

DATE January 8th. 1953.
TO L. Hanna - Tool Cribs, Tool & Equipment Procurement Sec., G. T.
FROM E. C. Busby
SUBJECT DIAL SNAP GAUGES (NILSON)
AGENT: JAMES MORTON LIMITED, GALT, ONTARIO.

Please maintain the following quantities of Nillson Dial Snap Gauges in Master Tool Cribs. Orders should be placed to bring present stock up to quantities shown as "Initial Stock."

MODEL NO.	INITIAL STOCK	STOCK TO BE MAINTAINED MAX.	MIN.
55	2	2	1
95	3	1	1
115	3	1	1
175	8	3	1
185	12	4	2
205	5	3	1
265	2	2	1
285	4	4	1
Bench Type Master Holders	15	5	2

These are for use on close limit grinding application and will replace some of the frames used in existing gauges of the 1-SG-1203 and 1205 series. Setting orders will be issued, to be acted upon on delivery of gauges.

E. C. Busby
Chief Tool Designer,
Master Mechanic Dept., G. T.

ECB:vs

c.c. Messrs. A. Bassett
D. D. MacKinnon
W. Brown
T. Robb
H. Senior

TOOL DESIGN STANDARDS MANUAL

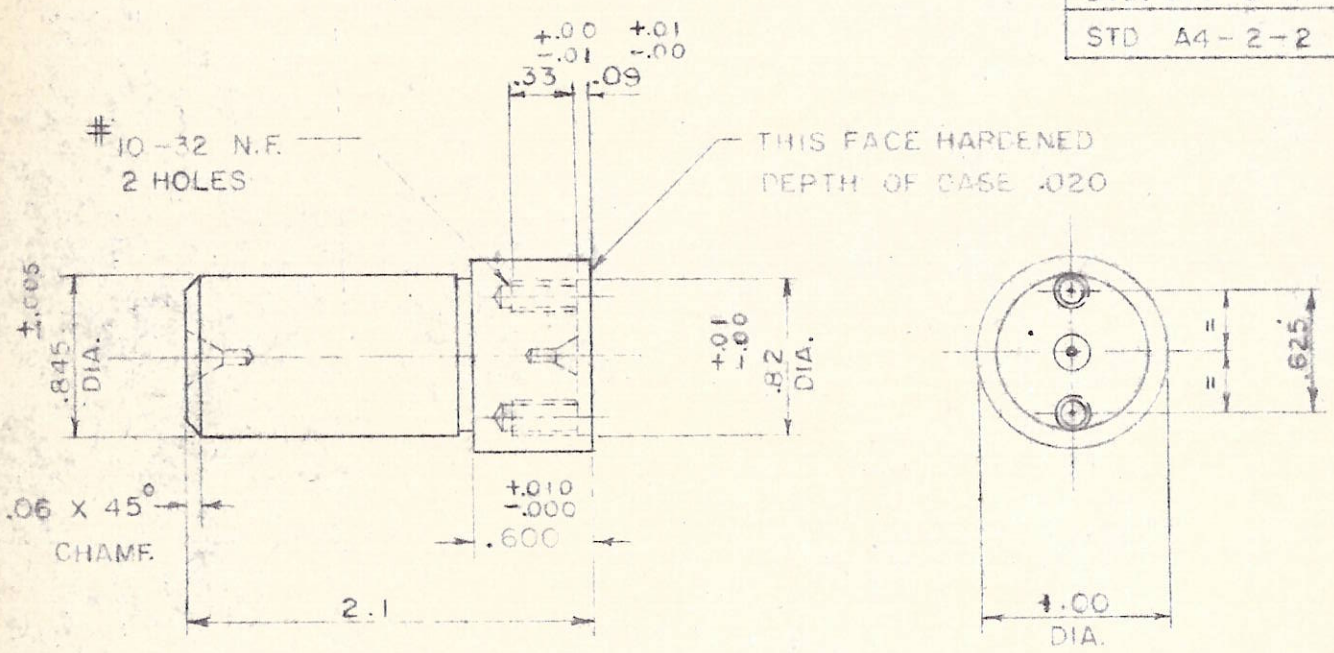
MASTER MECHANIC DEPT. GAS TURBINE DIVISION

A.V. ROE CANADA LIMITED

STD. B4-1-1

SHEET 1

REFERENCE
WKG. DWG. B4-1-1
STD. A4-1-1
STD. A4-1-2
STD. A4-2-1
STD A4-2-2



THIS SPIGOT STOCKED IN TOOL CRIB.

MATERIAL – ATLAS IMPACTO

ISSUE	CHANGE	BY	CKD.	DATE

TITLE

SPIGOT

FOR STD. O.D. & I.D. BAR GAUGE

DRN.	CKD.	APPD.	DATE
A.PONTING			7 OCT 53

TOOL DESIGN STANDARDS MANUAL

MASTER MECHANIC DEPT. GAS TURBINE DIVISION

A.V. ROE CANADA LIMITED

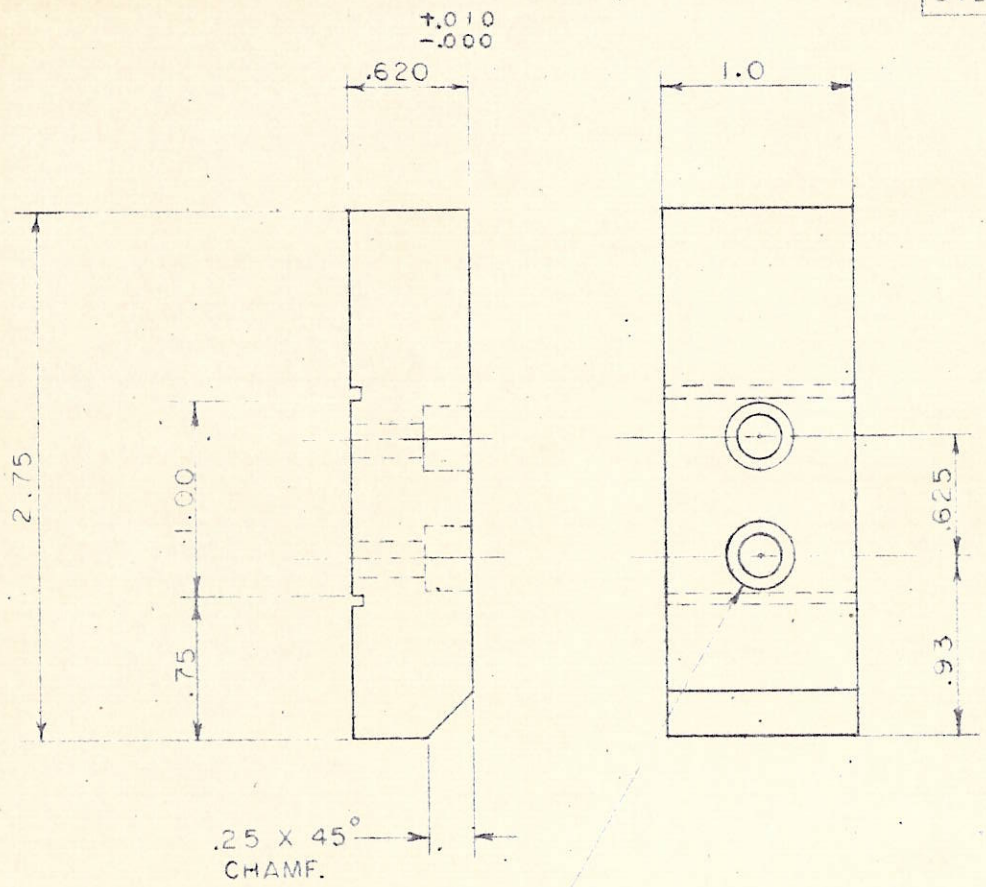
STD. B4-2-1

SHEET 1

REFERENCE

WKG. DWG. B4-2-1

STD. A4-1-1



THIS CAP STOCKED IN TOOL CRIB

MATERIAL — ATLAS KEEWATIN

HARDNESS — ROCK. C62-64

ISSUE	CHANGE	BY	CKD.	DATE

TITLE: CAP — SHORT FOR STANDARD O.D. BAR GAUGE

DRN. A. PONTING | CKD. | APPD. | DATE 7 OCT. 53

TOOL DESIGN STANDARDS MANUAL

MASTER MECHANIC DEPT. GAS TURBINE DIVISION

A.V. ROE CANADA LIMITED

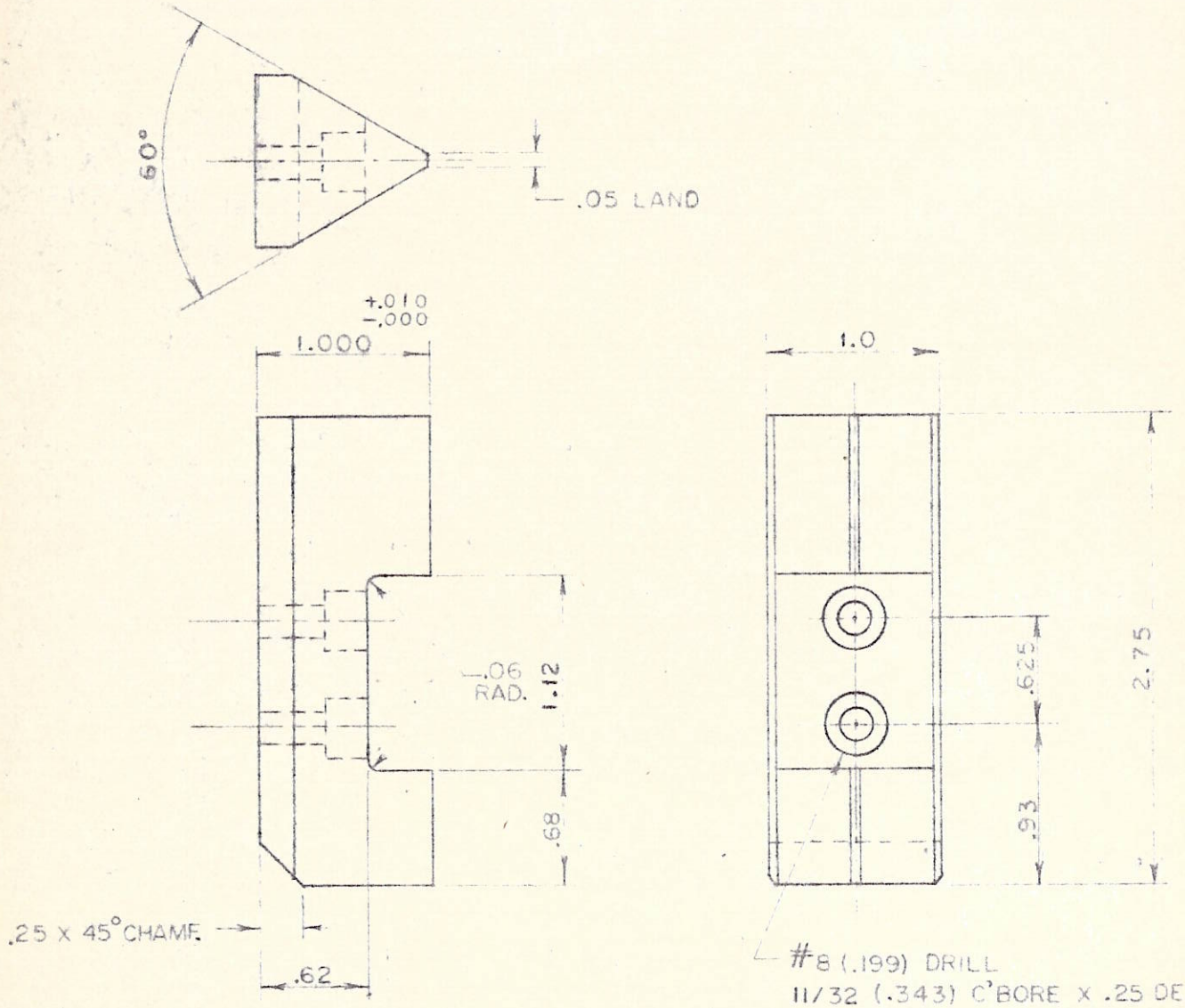
STD. B4-3-1

SHEET 1

REFERENCE

WKG. DWG. B4-3-1

STD. A4-2-1



THIS CAP STOCKED IN TOOL CRIB

MATERIAL - ATLAS KEEWATIN

HARDNESS - ROCK. C62-64

ISSUE	CHANGE	BY	CKD.	DATE

TITLE

CAP - SHORT

FOR STANDARD I.D. BAR GAUGE

DRN.	CKD.	APPD.	DATE
A. PONTING			15 OCT. 53

TOOL DESIGN STANDARDS MANUAL

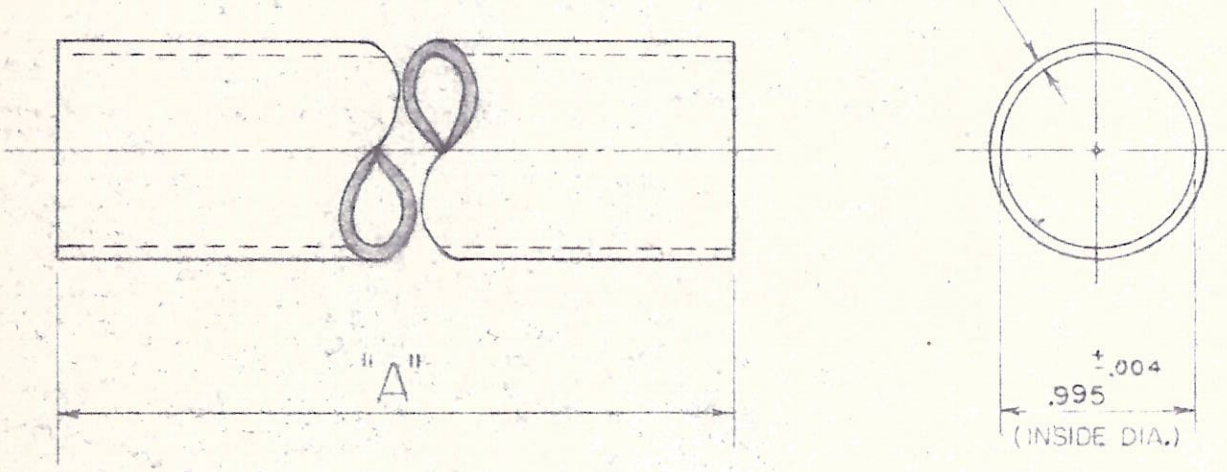
MASTER MECHANIC DEPT. GAS TURBINE DIVISION

A.V. ROE CANADA LIMITED

STD. B4-4

SHEET 1

REFERENCE
WKG. DWG. B4-4-1
WKG. DWG. B4-4-2
STD. A4-1-1
STD. A4-1-2
STD. A4-2-1
STD. A4-2-2



LENGTH "A"	TOOL NUMBER.
4	B4-4-1
6	B4-4-2

THESE HAND-GRIPS STOCKED IN TOOL CRIB

MATERIAL – DILECTO (FIBER)

ISSUE	CHANGE	BY	CKD.	DATE

TITLE

HAND – GRIPS

FOR STANDARD O.D. & I.D. BAR GAUGES

DRN. A. PONTING. CKD. W.W. Bailey APPD. DATE 13 OCT. 53

TOOL DESIGN STANDARDS MANUAL

MASTER MECHANIC DEPT. GAS TURBINE DIVISION

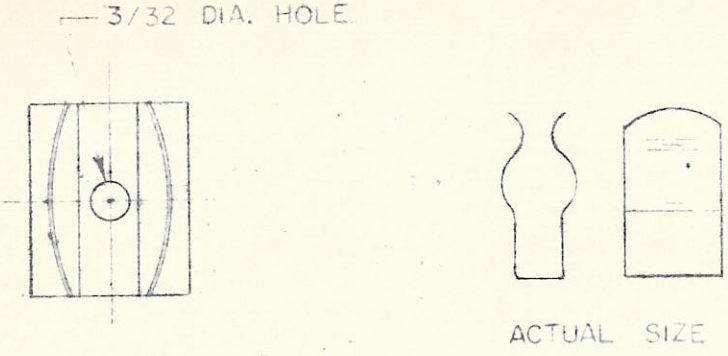
A.V. ROE CANADA LIMITED

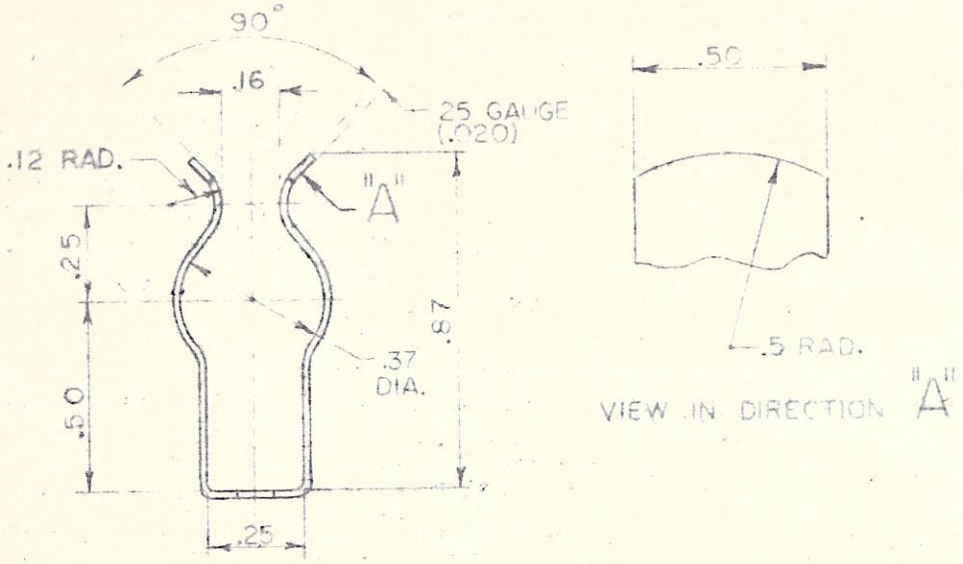
STD. B4 - 6 - 1

SHEET 1

REFERENCE

WKG. DWG. B4 - 6 - 1





THIS SPRING CLIP STOCKED IN TOOL CRIB

MATERIAL — SPRING STEEL

MADE FROM DIE #M-1792

ISSUE	CHANGE	BY	CK'D.	DATE

TITLE: "U" SPRING CLIP - 3/8 DIA.

DRN.	CK'D.	APP'D.	DATE
A. PONTING			26 OCT 53

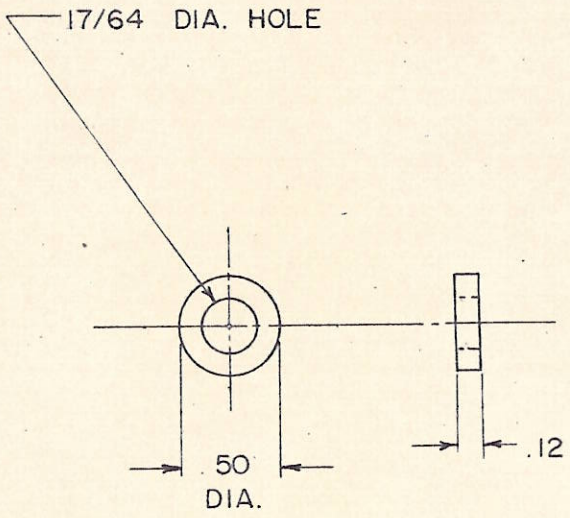
STD. B4-7-1

SHEET 1

REFERENCE

WKG. DWG. B4-7-1

PTD. 670



THIS WASHER STOCKED IN TOOL CRIB
MATERIAL – COLD ROLLED STEEL
NOT HEAT TREATED

ISSUE	CHANGE	BY	CKD.	DATE

TITLE

WASHER
FOR ADJUSTABLE GAUGE ENDS, PTD.670

DRN.	CKD.	APP'D.	DATE
A. PONTING	A.G. Bailey	D.M. Lewis	14 DEC. 53

16th. Oct. 1953.

TEMPORARY
STD. B5

To: Tool Design Personnel - Section #4733
Master Mechanics' Dept. G/T.

Subject: Allen Flat Head Cap Screws

Flat Head cap screws, equipped with a hexigon hole, are now a Mill Supply Item. They are shown in out Mill Supply book on page #2B of section "H"

For information regarding the specifications of these screws, please consult the undersigned.

A.G. Bailey.
Group Leader - Standards.
Master Mechanics' Dept. G/T.

AGB-AP.

DATE 14 May 1954
TO Tool Design Personnel - Master Mechanic Dept., G.T.
FROM A. G. Bailey
SUBJECT FORGINGS FOR TOOLING

For your information we have at our disposal for the manufacture of tools, the forgings listed below.

8 Off Ultimo #4 Forgings - 21" O.D. x 3" Thick.

5 Off Ultimo #4 Forgings - 18" O.D. x 12" I.D. x 4" Thick.

3 Off Ultimo #4 Forgings - 26¾" O.D. x 3¾" Thick.

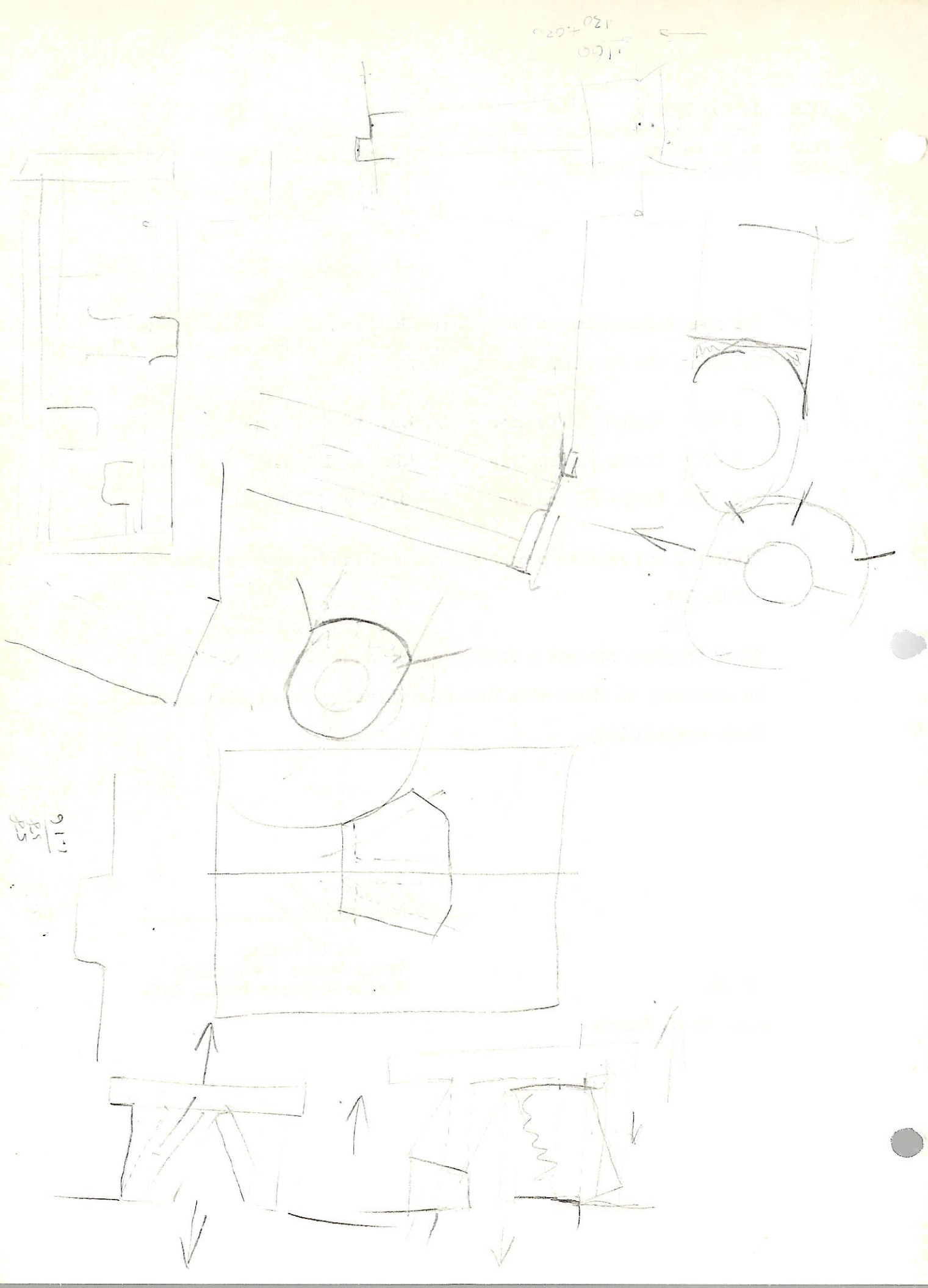
Ultimo #4 has similar properties as, and can be used in place of S.P.S. 245.

These forgings are not a regular stock item. Therefore it will be necessary to check with Tool Room Planning (Local 670) as to their availability.

A. G. Bailey
Group Leader - Standards
Master Mechanic Dept., G.T.

AGBsmh

c.c. G. M. Purvis



STEELS OF EACH CLASS

ISSUE NO.	DATE
1	FEB 24-55
2	JESSOP (CANADA) WAS RED IS NOW RED & WHITE. MAR 14-55

COLOUR CODE
RED
BROWN AND YELLOW
ALUM
BLUE
PINK
BLACK
YELLOW
GREEN
BLUE AND BROWN
BROWN
WHITE
PURPLE

TOOL DESIGN
MANUFACTURING DIVISION
ORENDA ENGINES LIMITED
MALTON ONTARIO

TITLE: STEEL CODE FOR ORENDA TOOL ROOM - PLANT #2

PART NAME

	DATE	SCALE	PART No.	OPER. No.
DESIGNED				
DRAWN		PROJECT No.	TOOL No.	
CHECKED		DWG. SIZE		
APP'D KEN O'NEILL		A	SHEET OF SHEETS	
APP'D				

STEEL CODE FOR ORENDA TOOL ROOM -PLANT #2 & SOME ACCEPTABL

CODE NO.*	ATLAS	VANADIUM	Wm. JESSOP	JESSOP (Canada)
	GREEN	ALUM	BLACK	RED & WHITE
T.1.	SPARTON 7	RED CUT SUPERIOR	TRIUMPH SUPERB	SUPREMUS
T.2.	TROJAN	E.V.M.		SUPREMUS EXTRA
T.15		VASCO SUPREME		
O.1. **	KEEWATIN	COLONIAL #6	SUPERIOR O.H.	TRUFORM
A.2.	CROMOLOY	AIR HARD		
D.3.	N.N.	CROCAR	W.P.S.	CNS-2
D.2.	F.N.S.	OHIO DIE	H-42	CNS-1
S.5.	MONARK 2	SILMAN		
W.1.	COMMERCIAL GRADE DRILL ROD ONLY STOCKED IN THIS CLASS.			
3170		NIKRO "M"		
3140	SPS 245			
3140 HT ***	BRAKE DIE			
4615	IMPACTO (AVRO SPL)			
1020 → SPECIFY EITHER HR. OR C.R.	H.R. STEEL AND C.R. STEEL - CARBON CONTENT .25 MAXIMUM.			

* - FOR FURTHER INFORMATION SEE S.A.E. HANDBOOK.

** - GROUND STOCK TO BE SUPPLIED IN THIS CLASS.

*** - HEAT TREATED 3140 STEEL

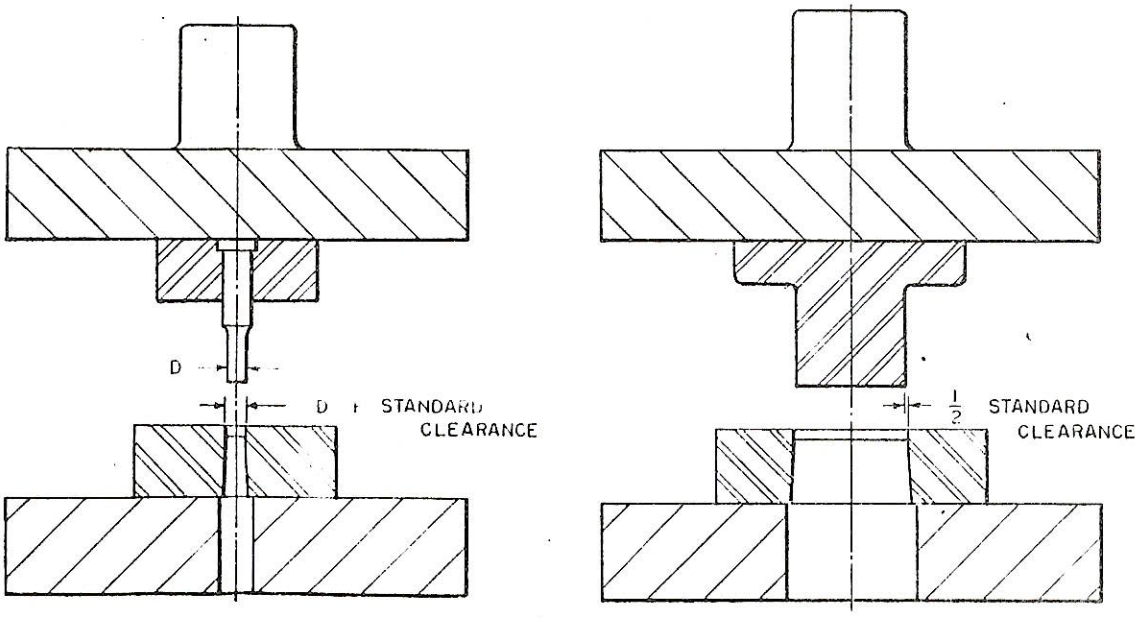
American Machinist REFERENCE BOOK SHEET

STANDARD PUNCH AND DIE CLEARANCES

By J R PAQUIN

STOCK THICKNESS	SOFT STEEL	MEDIUM STEEL	HARD STEEL	STAINLESS STEEL	PHOSPHOR BRONZE	BRASS	COPPER	ALUMINUM
0.010	0.0006	0.0006	0.0007	0.0008	0.0006	0.0005	0.0005	0.001
0.020	0.0011	0.0012	0.0014	0.0016	0.0012	0.001	0.0009	0.002
0.030	0.0017	0.0018	0.0021	0.0024	0.0018	0.0015	0.0014	0.003
0.040	0.0023	0.0025	0.0028	0.0032	0.0025	0.002	0.0019	0.004
0.050	0.0029	0.0031	0.0035	0.004	0.0031	0.0025	0.0023	0.005
0.060	0.0035	0.0037	0.0043	0.0048	0.0037	0.003	0.0028	0.006
0.070	0.0041	0.0043	0.005	0.0056	0.0043	0.0035	0.0033	0.007
0.080	0.0047	0.005	0.0057	0.0064	0.005	0.004	0.0038	0.008
0.090	0.0052	0.0056	0.0064	0.0072	0.0056	0.0045	0.0042	0.009
0.100	0.0058	0.0062	0.0071	0.008	0.0062	0.005	0.0047	0.010
0.110	0.0064	0.0069	0.0078	0.0088	0.0069	0.0055	0.0052	0.011
0.120	0.007	0.0075	0.0085	0.0096	0.0075	0.006	0.0057	0.012
0.130	0.0076	0.0081	0.0093	0.0104	0.0081	0.0065	0.0062	0.0162
0.140	0.0082	0.0087	0.010	0.0112	0.0087	0.007	0.0066	0.0175
0.150	0.0088	0.0093	0.0107	0.012	0.0093	0.0075	0.0071	0.0187
0.160	0.0094	0.010	0.0114	0.0128	0.010	0.008	0.0076	0.020
0.170	0.010	0.0106	0.0121	0.0136	0.0106	0.0085	0.008	0.0212
0.180	0.0105	0.0112	0.0128	0.0144	0.0112	0.009	0.0085	0.0225
0.190	0.0111	0.0118	0.0135	0.0152	0.0118	0.0095	0.009	0.0237
0.200	0.0117	0.0125	0.0142	0.016	0.0125	0.010	0.0095	0.025
0.210	0.0123	0.0131	0.015	0.0168	0.0131	0.0105	0.010	0.0262
0.220	0.0129	0.0137	0.0157	0.0176	0.0137	0.011	0.0104	0.0275
0.230	0.0135	0.0143	0.0164	0.0184	0.0143	0.0115	0.0109	0.0287
0.240	0.0141	0.015	0.0171	0.0192	0.015	0.012	0.0114	0.030
0.250	0.0147	0.0156	0.0178	0.020	0.0156	0.0125	0.0119	0.0312

The values given in this table apply to over all clearances, or diameters. Stock thicknesses are used by industry are in terms of gages or decimal thicknesses. In either case, the clearance can be interpolated by reference to values tabulated above. For clearances "on a side," divide the given values by 2.



N. Fenton

ORENDA ENGINES LIMITED

Inter-departmental Memorandum

DATE: 31 August 1955
TO: Tool Design Personnel, Master Mechanic Department
FROM: G. M. Purvis
SUBJECT: CODES FOR TOOL STEELS

Our practice of specifying tool steels on our tool drawings, as a particular trade name, is to be discontinued as of this date.

The new method specifying tool steels will be a system of tool steel codes.

A chart showing these steel codes and the relative trade name steels, has been issued to all draftsman.

Attached herete, is a four page guide for the application of this new steel code.

George M. Purvis

G. M. Purvis
Chief Tool Designer
Master Mechanic Department

GMP:mh
attach.

JULY 11 - 1933

A GUIDE
FOR THE APPLICATION OF
ORENDA TOOL ROOM STEEL CODE.

CODE - O.1 - STEEL

AN OIL HARDENING TOOL STEEL USED PRIMARILY FOR FIXTURES, PRESS TOOLS AND COLLETS OF SIMPLE SHAPE WHERE STRENGTH OR ABRASION RESISTANCE IS NOT THE PRIME REQUISITE. THIS IS THE LEAST EXPENSIVE GENERAL PURPOSE TOOL STEEL.
HARDNESS WORK RANGE -56-62 ROCK.C. *

CODE A 2 STEEL

AN AIR HARDENING TOOL STEEL OF THE SAME LIMITATIONS AS O1, BUT AS THIS TYPE IS ONLY SLIGHTLY MORE DIFFICULT TO WORK - IT SHOULD BE CONSIDERED IN EVERY CASE WHERE THE INTRICACY OF THE PART MAKES HEAT TREATING HAZARDOUS.
HARDNESS WORK RANGE - 56-62 ROCK.C.*

CODE - D.2 - STEEL

AN AIR HARDENING TOOL STEEL USED ONLY ON THOSE APPLICATIONS WHERE MAXIMUM WEAR ABRASION RESISTANCE IS REQUIRED, AND WHEN THE SHOCK FACTOR IS AT A MINIMUM. IDEALLY SUITED FOR LONG RUN BLANKING DIES, DIES FOR ABRASIVE MATERIAL AND SOME GAUGE APPLICATIONS FOR LIKE MATERIAL. AS THIS IS OUR MOST EXPENSIVE TOOL STEEL, AND THE MOST DIFFICULT TO MACHINE; DISCRETION SHOULD BE EXERCISED IN ITS USE.
HARDNESS WORKING RANGE - 56-62 ROCK.C.

CODE - D.3 - STEEL

AN OIL HARDENING TOOL STEEL WITH THE SAME GENERAL QUALIFICATIONS AND LIMITATIONS AS D.2.
HARDNESS WORKING RANGE - 58-64 ROCK.C.

CODE - S.5. - STEEL

A SHOCK RESISTANT STEEL DESIGNED PRIMARILY FOR THE MANUFACTURE OF HAND TOOLS, CHISELS, PUNCHES ETC. MAY ALSO BE USED TO ADVANTAGE FOR SMALL COLLETS AND PUNCHES FOR PRESS TOOLS OF SIMPLE DESIGN.
HARDNESS WORK RANGE - 40-60 ROCK.C.

CODE - 3140 - STEEL

A HIGH STRENGTH MACHINERY STEEL SUITED FOR THOSE DETAILS WHICH SUFFER CONSIDERABLE WEAR AND ABUSE - CHUCK JAWS, TOGGLE PARTS, PINIONS AND TOOL HOLDERS ETC.

HARDNESS WORK RANGE 24-50 ROCK.C.*

CODE - 3140 H.T. - STEEL

3140 HEAT TREATED TO APP. 25 ROCK. C WITH A TENSILE OF 140.000 P.S.I SPECIFICALLY SUPPLIED FOR, BRAKE DIES, BENDING DIES OR ANY OTHER DETAILS WHERE A COMBINATION OF TOUGHNESS, DUCTILITY AND GOOD WEAR RESISTANCE IS REQUIRED WITH THE MATERIAL IN A MACHINABLE CONDITION.

CODE - 3170 - STEEL

THIS MATERIAL HAS ALL THE ATTRIBUTES OF 3140 AND IN ADDITION IS CAPABLE OF BEING TREATED TO A HIGHER HARDNESS VALUE, WHICH MAKES IT IDEALLY SUITED FOR THOSE APPLICATIONS WHERE SOME TOUGHNESS CAN BE SACRIFICED FOR HARDNESS WITH THE RESULTANT INCREASE IN WEAR RESISTANCE AND STRENGTH. RECOMMENDED FOR BROACH ANVILS, BLADE CLAMPS, WORK HOLDERS, TEMPLATES SUBJECT TO EXTREME PRESSURES, ETC. COSTWISE, THIS STEEL IS COMPARABLE TO THE PRICE OF O.1. IT IS CONSIDERABLY MORE EXPENSIVE THAN 3140, AND SHOULD ONLY BE USED WHEN THE LATTER WILL NOT GIVE SUFFICIENT HARDNESS.

HARDNESS WORK RANGE 40-60 ROCKWELL.C.*

4615

OIL HARDENING - CARBURIZING STEEL WHICH GIVES AN EXCELLENT SURFACE HARDNESS WITH A TOUGH DUCTILE CORE. SUITED FOR ARBORS, SHAFTS, GEARS AND TOOLHOLDERS. RECOMMENDED FOR THOSE FIXTURE PARTS WHICH REQUIRE A HARD SURFACE AND A TOUGH BUT MACHINABLE CORE. SHOULD NOT BE USED WHERE PARTS ARE SUBJECT TO EXTREME GALLING PRESSURES.

SURFACE HARDNESS - 58-60 ROCK.C.*

CORE HARDNESS - 25- ROCK.C.*

CODE - 1020 - STEEL

SUPPLIED IN HOT ROLLED OR COLD ROLLED STOCK. SUITED FOR ANY OF THE NON - FUNCTIONAL PARTS OF FIXTURES, WELDED FABRICATIONS, MOUNTING BLOCKS ETC. WHERE A TENSILE OF 55.000 P.S.I. IS SUFFICIENT.

AS THIS STEEL MUST BE CARBURIZED AND WATER QUENCHED TO HARDEN, IT SHOULD ONLY BE USED FOR HARDENED PARTS WHEN THE SHAPE IS SIMPLE AND COST OF MATERIAL A MAJOR CONSIDERATION.

SURFACE HARDNESS - 58-60 ROCK.C.

CODE - W. 1. - STEEL

WATER HARDENING TOOL STOCKED ONLY AS DRILL ROD. CONSIDERABLE RISK INVOLVED IN HEAT TREATING AND SHOULD ONLY BE USED WHERE A MINIMUM AMOUNT OF MACHINING IS REQUIRED.

WORKING RANGE 58-63 ROCK.C.

*TYPICAL OF A 1 INCH SECTION.

K. O'NEILL

JULY [illegible]TH, 1952

INTERIM STANDARD PRACTICE BULLETIN

G/T PRODUCTION TOOL DESIGN (SECTION 4733)

SUBJECT: BRAKE DIE STEEL

IN FUTURE, ATLAS BRAKE DIE IS NOT TO BE SPECIFIED FOR ANY APPLICATION REQUIRING A HARDNESS GREATER THAN ROCKWELL C-24.

A. G. BAILEY
GROUP LEADER - STANDARDS
TOOL & GAUGE DESIGN SECT.,
MASTER MECHANIC DEPT., G. T.

AGB:VG

C.C. MESSRS. A. BASSETT
L. CHAPMAN
E. C. BUSBY
T. PALONKA
E. TAYLOR
W. C. YOWART
K. O'NEILL

STD. C3

26th February 1953

STANDARD PRACTICE BULLETIN
TOOL DESIGN SECTION - #4733

TOOL DESIGN STANDARDS

SUBJECT: SPECIFICATION FOR ALUMINUM CASTINGS

Effective immediately, all tool drawings calling for aluminum castings are to specify the Canadian Standards Association Specification and note regarding heat treatment, as follows:

"C.S.A. Spec. MA. 9.125"

"Stress relieve at 540°F and cool slowly, before finish M/C."

The above stress relieve should give a tensile strength of 20,000 P.S.I. which is similar to the result obtained with our previously used Aluminum Company of Canada Specification A.C. 125 after applying this same stress relieve.

A.C. Bailey

AGH:vs

A.C. Bailey
Group Leader - Standards
Master Mechanic Dept., G.T.

UNITED STATES STANDARD GAUGE

RECOGNIZED STANDARD FOR STEEL AND IRON SHEET
USED IN MANUFACTURE OF TOOLING

GAUGE NO.	DECIMAL EQUIV.	GAUGE NO.	DECIMAL EQUIV.	GAUGE NO.	DECIMAL EQUIV.
7/0	.5	11	.1196	28	.0149
6/0	.46875	12	.1046	29	.0135
5/0	.4375	13	.0897	30	.0120
4/0	.40625	14	.0747	31	.01094
3/0	.375	15	.0673	32	.01016
2/0	.34375	16	.0598	33	.00938
0	.3125	17	.0538	34	.00859
1	.28125	18	.0478	35	.00781
2	.26562	19	.0418	36	.00703
3	.2391	20	.0359	37	.00664
4	.2242	21	.0329	38	.00625
5	.2092	22	.0299		
6	.1943	23	.0269		
7	.1793	24	.0239		
8	.1644	25	.0209		
9	.1495	26	.0179		
10	.1345	27	.0164		

ISSUE	CHANGE	BY	CKD.	DATE

TITLE
STANDARD THICKNESS GAUGE
FOR
STEEL AND IRON SHEET

DRN.	CKD.	APPD.	DATE
A. FONTING			15 OCT. 53

BIRMINGHAM WIRE GAUGE

RECOGNIZED STANDARD FOR ALL TUBING
USED IN MANUFACTURE OF TOOLING

GAUGE NO.	DECIMAL EQUIV.	GAUGE NO.	DECIMAL EQUIV.	GAUGE NO.	DECIMAL EQUIV.
4/0	.454	14	.083	31	.010
3/0	.425	15	.072	32	.009
2/0	.380	16	.065	33	.008
0	.340	17	.058	34	.007
1	.300	18	.049	35	.005
2	.284	19	.042	36	.004
3	.259	20	.035		
4	.238	21	.032		
5	.220	22	.028		
6	.203	23	.025		
7	.180	24	.022		
8	.165	25	.020		
9	.148	26	.018		
10	.134	27	.016		
11	.120	28	.014		
12	.109	29	.013		
13	.095	30	.012		

ISSUE	CHANGE	BY	CKD.	DATE

TITLE: STANDARD THICKNESS GAUGE FOR ALL TUBING

DRN.	CKD.	APPD.	DATE
A. PONTING			15 OCT. 53

BROWN & SHARPE GAUGE

RECOGNIZED STANDARD FOR ALUMINUM SHEET
USED IN MANUFACTURE OF TOOLING

GAUGE NO.	DECIMAL EQUIV.	GAUGE NO.	DECIMAL EQUIV.	GAUGE NO.	DECIMAL EQUIV.
6/0	.5800	12	.08081	29	.01126
5/0	.5165	13	.07196	30	.01003
4/0	.4600	14	.06408	31	.008928
3/0	.4096	15	.05707	32	.007950
2/0	.3648	16	.05082	33	.007080
0	.3249	17	.04526	34	.006305
1	.2893	18	.04030	35	.005615
2	.2576	19	.03589	36	.005
3	.2294	20	.03196	37	.004453
4	.2043	21	.02846	38	.003965
5	.1819	22	.02535		
6	.1620	23	.02257		
7	.1443	24	.02010		
8	.1285	25	.01790		
9	.1144	26	.01594		
10	.1019	27	.01420		
11	.09074	28	.01264		

ISSUE	CHANGE	BY	CKD.	DATE

TITLE: STANDARD THICKNESS GAUGE FOR ALUMINUM SHEET

DRN. A. PONTING | CKD. A. Bailey | APPD. [illegible] | DATE 15 OCT. 53

RECOGNIZED STANDARD FOR ALL WIRE
USED IN MANUFACTURE OF TOOLING

SPECIFY DIAMETERS IN DECIMALS ONLY

ISSUE	CHANGE	BY	CKD.	DATE

TITLE: STANDARD THICKNESS GAUGE FOR WIRE

DRN. A. PONTING | CKD. [signature] | APPD. [signature] | DATE 15 OCT. 59