

PIN PACKAGES INDEX

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PIN PACKAGES INDEX

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RETRACTABLE LOCATING PIN SPECIFICATIONS

General Specification

1. There are two standards: one for the in-line mounting (pin mounted in the ram) and one for the offset mounting (pin is offset from the shaft).
2. Cylinder bore: 63 mm.
3. Cylinder strokes: 25, 50, 75, and 100 mm.
4. Rap, if used, is 2 mm reducing the pin travel by 2 mm.
5. Two mounting brackets are available for outside and two for inside mounting (used in conjunction with NAAMS riser angle brackets):
 - Inside Mount: AHB006 & AHB007
 - Outside Mount: AHB010 & AHB011
6. Mounting pattern in the retractable locating pin housing will be 60 mm x 60 mm (that accommodates 2-M10 dowels and 4-M10 threaded holes).
7. Spacer series ACS6XX accommodates the 60 x 60 mounting of the retractable locating pin units.

In-Line Pin Mounting

1. See the in-line pin illustration for the standard NAAMS mounting dimensions- Pg. P-6 and P-7.
2. "Z" dimension is 75 mm.
3. 40 mm from pin centerline to mounting surface of the unit. (Manufacturer to supply spacer if required.)
4. Shoulder bolt and steel lock nut for pin attachment supplied by unit manufacturer.

Offset (L-Block) Pin Mounting

1. See the offset pin illustration for the standard NAAMS mounting dimensions- Pg. P-5.
2. Pins can be secured to the offset retracting locating pin units by utilizing the NAAMS pin retainers, L-blocks, or non-standard details.
3. Any applicable NAAMS pin may be used that is compatible with the design.
4. "Z" dimension varies per manufacturer.
5. 40 mm from ram centerline to mounting surface of the unit. (Unit mounting surface to L-Block mounting surface varies per manufacturer.)

GLOBAL STANDARD COMPONENTS



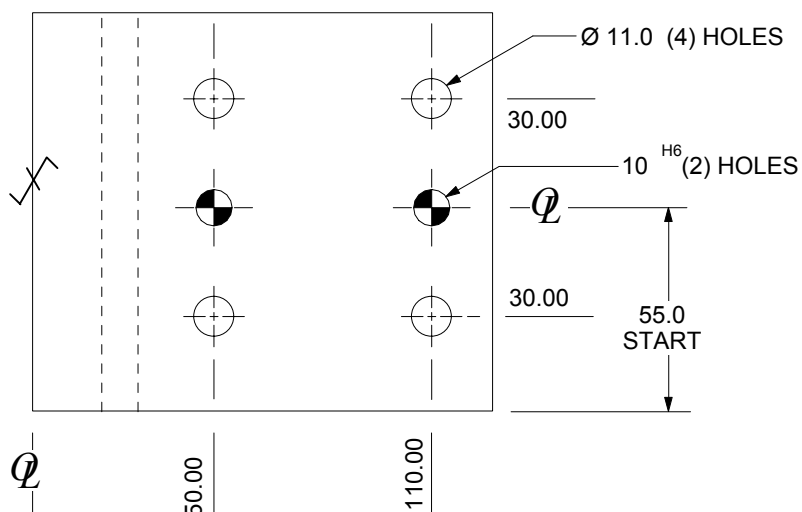
Assembly

08/15/07

Tolerances:

1 PLACE MACHINING ± 0.3
1 PLACE FABRICATION ± 1.5
2 PLACE ± 0.08 BETWEEN MACHINED SURFACES
 ± 0.03 BETWEEN SINGLE DOWEL AND A HEEL SURFACE
 ± 0.03 BETWEEN DOWELS IN THE SAME PLANE
 ± 0.10 BETWEEN DOWELS IN DIFFERENT PLANES
 ± 0.13 TO SCREW HOLES, NON ACCUMULATIVE

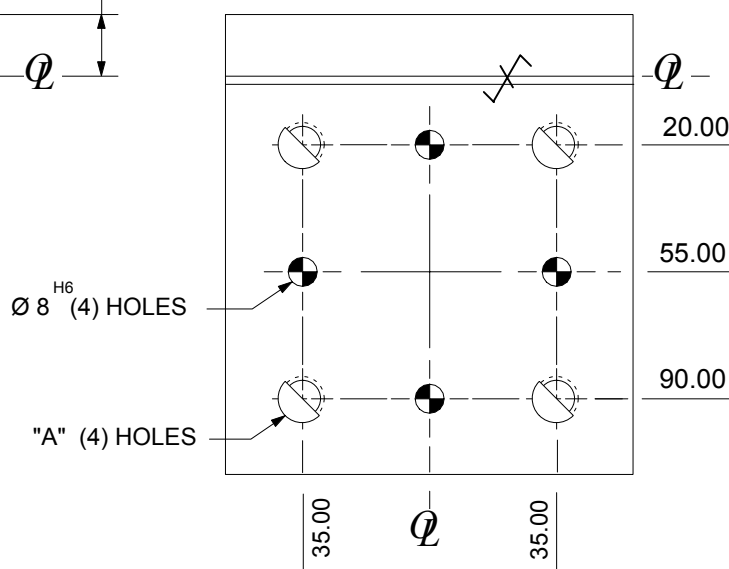
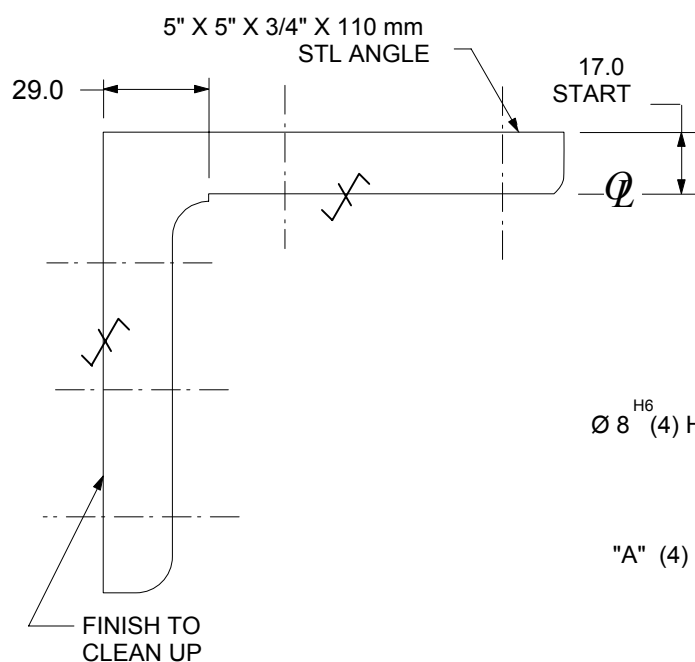
 SURFACES TO BE FLAT, PARALLEL & PERPENDICULAR TO WITHIN 0.015 T.I.R.
 NOTES: ALL DIMENSIONS METRIC UNLESS OTHERWISE NOTED.



NAAMS CODE	A
AHB006	11.0
AHB007	M10 x 1.5

MATERIAL: ASTM A-36
SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART

A



RETRACTABLE LOCATING PIN BRACKET OUTSIDE MOUNT

GLOBAL STANDARD COMPONENTS

TM

NAAMS



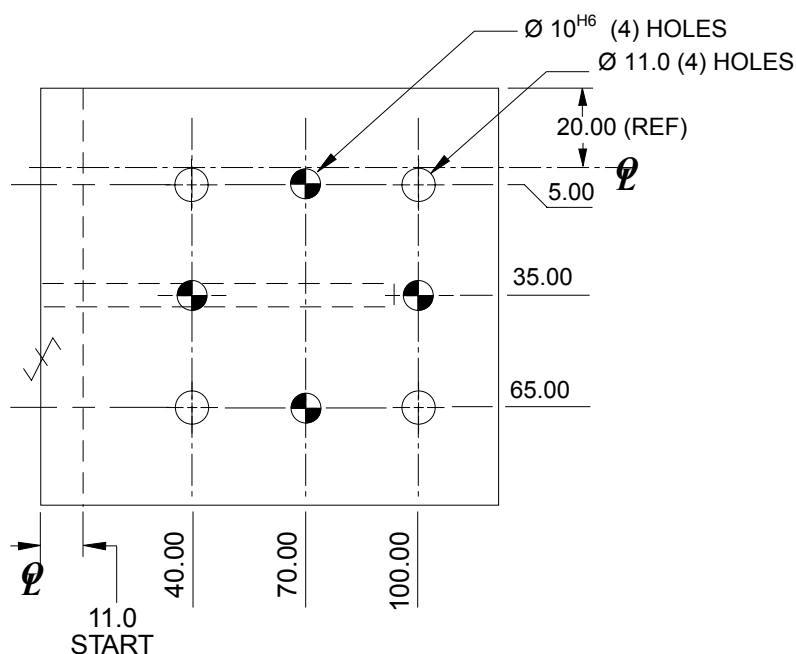
Assembly

08/15/07

Tolerances:

- 1 PLACE MACHINING ± 0.3
- 1 PLACE FABRICATION ± 1.5
- 2 PLACE ± 0.08 BETWEEN MACHINED SURFACES
- ± 0.03 BETWEEN SINGLE DOWEL AND A HEEL SURFACE
- ± 0.03 BETWEEN DOWELS IN THE SAME PLANE
- ± 0.10 BETWEEN DOWELS IN DIFFERENT PLANES
- ± 0.13 TO SCREW HOLES, NON ACCUMULATIVE

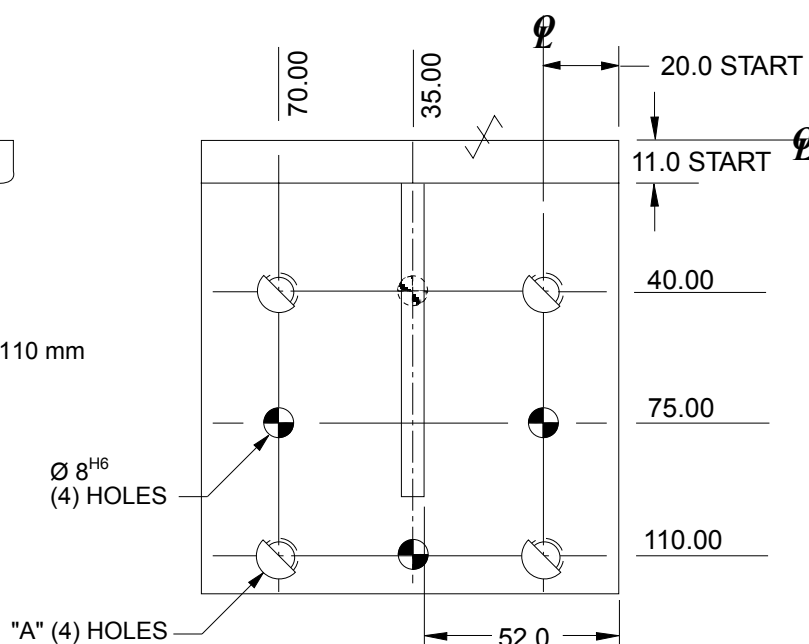
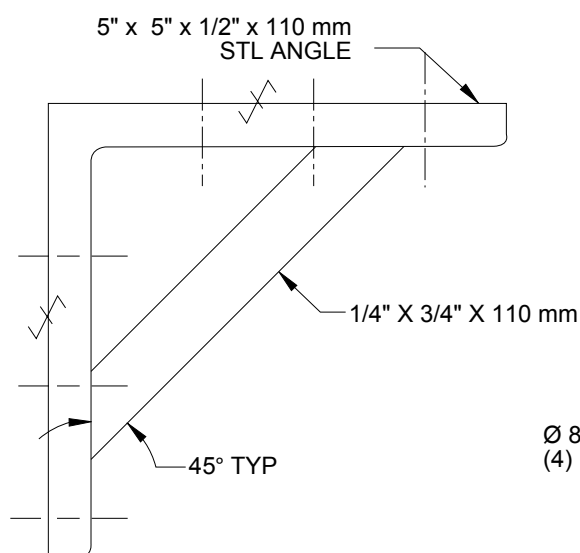
✓ SURFACES TO BE FLAT, PARALLEL & PERPENDICULAR TO WITHIN 0.015 T.I.R.
NOTES: ALL DIMENSIONS METRIC UNLESS OTHERWISE NOTED.



NAAMS CODE	A
AHB010	11.0
AHB011	M10 x 1.5

MATERIAL: STEEL ASTM A-36
SEE PAGE B-1.1 FOR GLOBAL
MATERIALS CHART

A



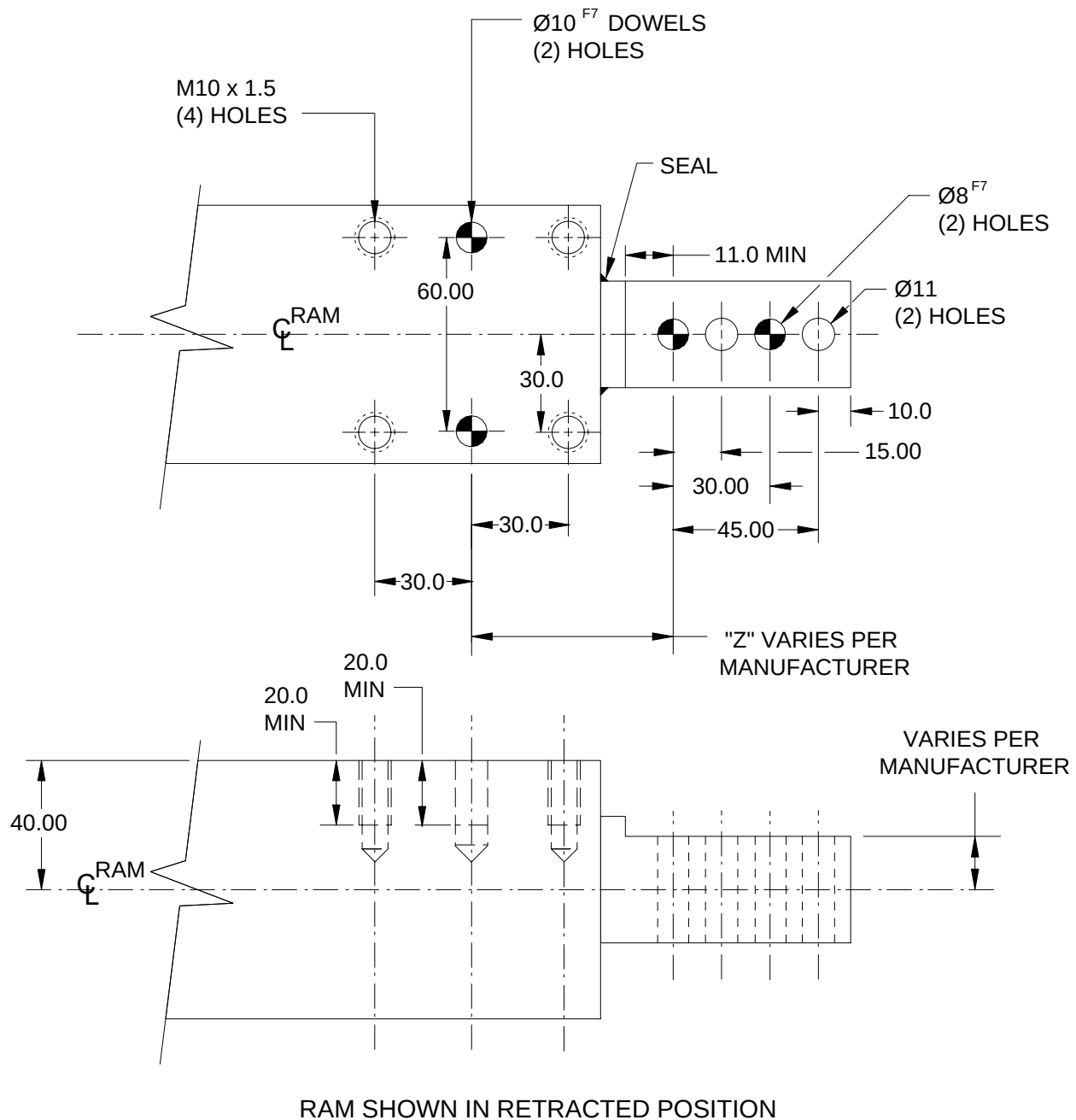
RETRACTABLE LOCATING PIN UNIT MOUNTING L-BLOCK ATTACHED PIN

Tolerances:

- 1 PLACE MACHINING ± 0.3
- 1 PLACE FABRICATION ± 1.5
- 2 PLACE ± 0.08 BETWEEN MACHINED SURFACES
- ± 0.03 BETWEEN SINGLE DOWEL AND A HEEL SURFACE
- ± 0.03 BETWEEN DOWELS IN THE SAME PLANE
- ± 0.10 BETWEEN DOWELS IN DIFFERENT PLANES
- ± 0.13 TO SCREW HOLES, NON ACCUMULATIVE

SURFACES TO BE FLAT, PARALLEL & PERPENDICULAR TO WITHIN 0.015 T.I.R.

NOTES: ALL DIMENSIONS METRIC UNLESS OTHERWISE NOTED.



RETRACTABLE LOCATING PIN UNIT MOUNTING FOR IN-LINE PIN ATTACHMENT

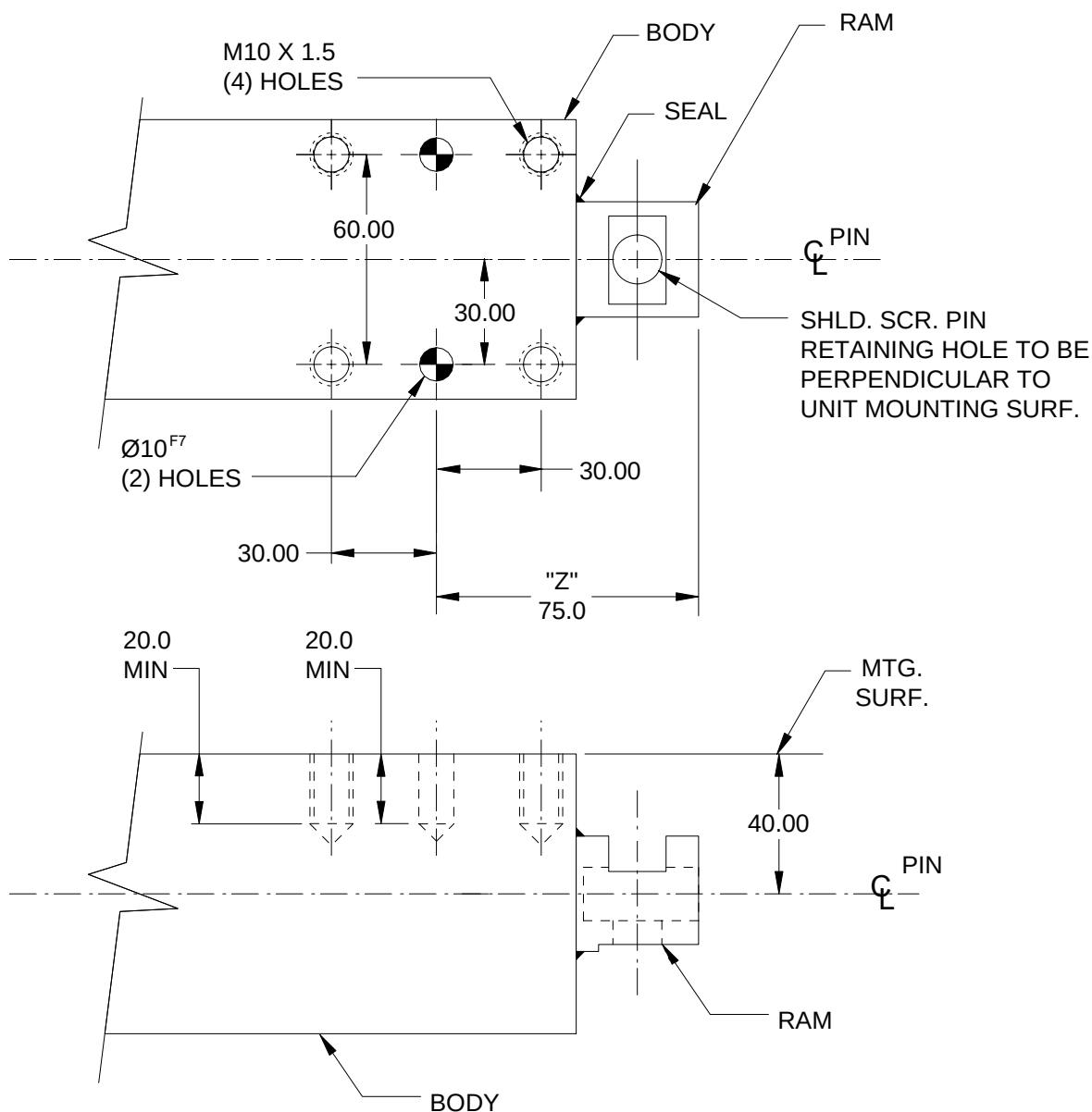
GLOBAL STANDARD COMPONENTS
NAAMS
Assembly 07/01/99

Tolerances:

- 1 PLACE MACHINING ± 0.3
- 1 PLACE FABRICATION ± 1.5
- 2 PLACE ± 0.08 BETWEEN MACHINED SURFACES
- ± 0.03 BETWEEN SINGLE DOWEL AND A HEEL SURFACE
- ± 0.03 BETWEEN DOWELS IN THE SAME PLANE
- ± 0.10 BETWEEN DOWELS IN DIFFERENT PLANES
- ± 0.13 TO SCREW HOLES, NON ACCUMULATIVE

SURFACES TO BE FLAT, PARALLEL & PERPENDICULAR TO WITHIN 0.015 T.I.R.

NOTES: ALL DIMENSIONS METRIC UNLESS OTHERWISE NOTED.



RAM SHOWN IN RETRACTED POSITION

A

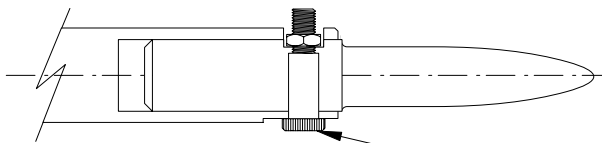
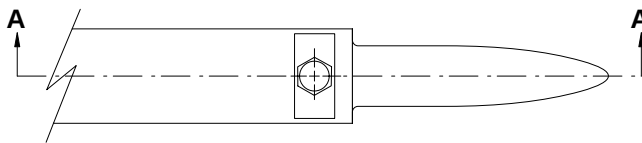
IN-LINE PIN ATTACHMENT

Tolerances:

- 1 PLACE MACHINING ± 0.3
- 1 PLACE FABRICATION ± 1.5
- 2 PLACE ± 0.08 BETWEEN MACHINED SURFACES
- ± 0.03 BETWEEN SINGLE DOWEL AND A HEEL SURFACE
- ± 0.03 BETWEEN DOWELS IN THE SAME PLANE
- ± 0.10 BETWEEN DOWELS IN DIFFERENT PLANES
- ± 0.13 TO SCREW HOLES, NON ACCUMULATIVE

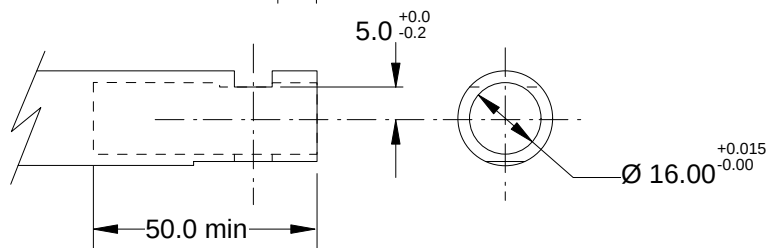
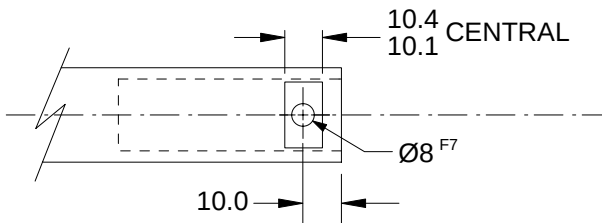
SURFACES TO BE FLAT, PARALLEL & PERPENDICULAR TO WITHIN 0.015 T.I.R.

NOTES: ALL DIMENSIONS METRIC UNLESS OTHERWISE NOTED.



SECTION A-A

SOCKET HD. SHOULDER SCREW
 8MM BODY & M6 THRD. & STL. LOCKNUT
 SUPPLIED BY UNIT MANUFACTURER.



RETRACTABLE LOCATING PIN

6mm THRU 16mm DIAMETER

(FULL METRIC)

GLOBAL STANDARD COMPONENTS

TM **NAAMS** 

Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUM B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

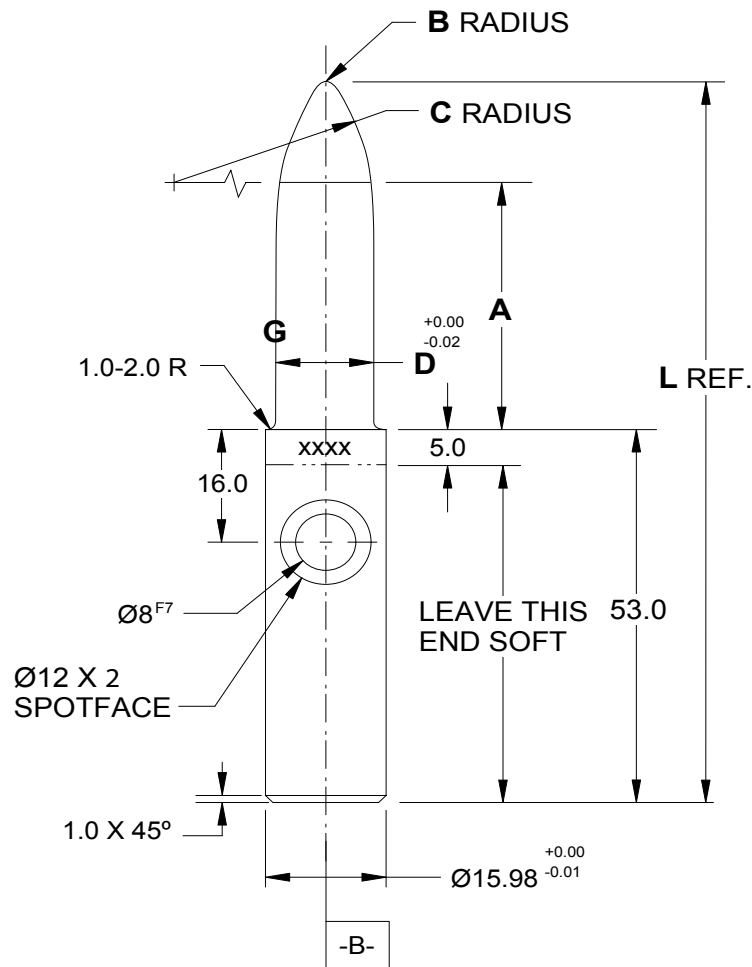
MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm
AFTER GRINDING

NOTE: IDENTIFY WITH NAAMS CODE NUMBER AS
SHOWN **XXXX**

PINS WITH TIN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C AND D. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN
HARDNESS.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

RETRACTABLE LOCATING PIN

6 mm THRU 16 mm DIAMETER

(FULL METRIC)

6 mm Round Hole
B Rad = 1.0
C Rad = 18.0
D = 5.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APS061R	APS061RT	10.0	71.8	0.08
APS062R	APS062RT	15.0	76.8	0.08
APS063R	APS063RT	25.0	86.8	0.08
APS064R	APS064RT	35.0	96.8	0.08
APS065R	APS065RT	45.0	106.8	0.09
APS066R	APS066RT	55.0	116.8	0.09

8 mm Round Hole
B Rad = 1.0
C Rad = 24.0
D = 7.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APS081R	APS081RT	10.0	75.1	0.08
APS082R	APS082RT	15.0	80.1	0.08
APS083R	APS083RT	25.0	90.1	0.09
APS084R	APS084RT	35.0	100.1	0.09
APS085R	APS085RT	45.0	110.1	0.10
APS086R	APS086RT	55.0	120.1	0.10
APS087R	APS087RT	65.0	130.1	0.10
APS088R	APS088RT	75.0	140.1	0.11

10 mm Round Hole
B Rad = 2.0
C Rad = 30.0
D = 9.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APS101R	APS101RT	10.0	77.4	0.09
APS102R	APS102RT	15.0	82.4	0.09
APS103R	APS103RT	25.0	92.4	0.10
APS104R	APS104RT	35.0	102.4	0.10
APS105R	APS105RT	45.0	112.4	0.11
APS106R	APS106RT	55.0	122.4	0.11
APS107R	APS107RT	65.0	132.4	0.12
APS108R	APS108RT	75.0	142.4	0.13
APS109R	APS109RT	85.0	152.4	0.13
APS100R	APS100RT	95.0	162.4	0.14

A

B

13 mm Round Hole
B Rad = 2.0
C Rad = 39.0
D = 12.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APS131R	APS131RT	10.0	82.4	0.10
APS132R	APS132RT	15.0	87.4	0.10
APS133R	APS133RT	25.0	97.4	0.11
APS134R	APS134RT	35.0	107.4	0.12
APS135R	APS135RT	45.0	117.4	0.13
APS136R	APS136RT	55.0	127.4	0.14
APS137R	APS137RT	65.0	137.4	0.15
APS138R	APS138RT	75.0	147.4	0.16
APS139R	APS139RT	85.0	157.4	0.17
APS130R	APS130RT	95.0	167.4	0.18

16 mm Round Hole
B Rad = 2.0
C Rad = 48.0
D = 15.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APS161R	APS161RT	10.0	87.5	0.11
APS162R	APS162RT	15.0	92.5	0.12
APS163R	APS163RT	25.0	102.5	0.14
APS164R	APS164RT	35.0	112.5	0.15
APS165R	APS165RT	45.0	122.5	0.17
APS166R	APS166RT	55.0	132.5	0.18
APS167R	APS167RT	65.0	142.5	0.20
APS168R	APS168RT	75.0	152.5	0.21
APS169R	APS169RT	85.0	162.5	0.23
APS160R	APS160RT	95.0	172.5	0.24

RETRACTABLE LOCATING PIN

19 mm THRU 25 mm DIAMETER

(FULL METRIC)

GLOBAL STANDARD COMPONENTS

NAAMS 

Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUMS A AND B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

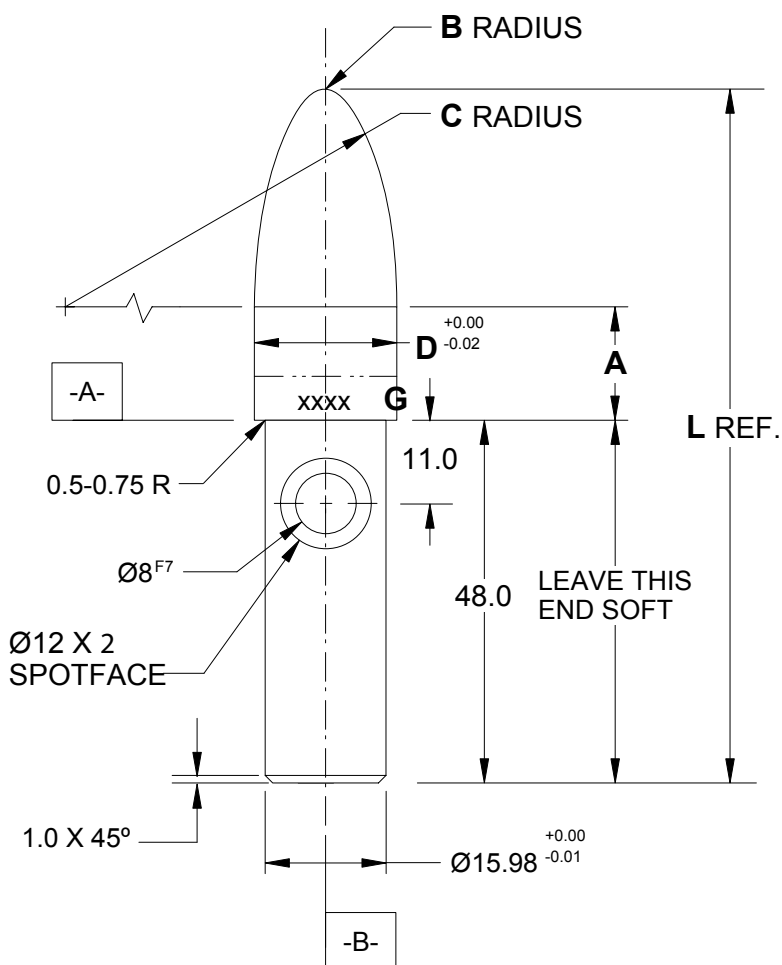
MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm
AFTER GRINDING

NOTE: IDENTIFY WITH NAAMS CODE NUMBER AS
SHOWN **XXXX**

PINS WITH TiN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C AND D. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN
HARDNESS.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

A
C
D
E

B

RETRACTABLE LOCATING PIN 19 mm THRU 25 mm DIAMETER TM (FULL METRIC)

GLOBAL STANDARD COMPONENTS



Assembly

04/30/15

19 mm Round Hole

B Rad = 2.0

C Rad = 38.0

D = 18.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APS191R	APS191RT	15.0	86.8	0.13
APS192R	APS192RT	20.0	91.8	0.14
APS193R	APS193RT	30.0	101.8	0.16
APS194R	APS194RT	40.0	111.8	0.19
APS195R	APS195RT	50.0	121.8	0.21
APS196R	APS196RT	60.0	131.8	0.23
APS197R	APS197RT	70.0	141.8	0.25
APS198R	APS198RT	80.0	151.8	0.27
APS199R	APS199RT	90.0	161.8	0.29
APS190R	APS190RT	100.0	171.8	0.31

25 mm Round Hole

B Rad = 2.0

C Rad = 50.0

D = 24.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APS251R	APS251RT	15.0	94.8	0.19
APS252R	APS252RT	20.0	99.8	0.21
APS253R	APS253RT	30.0	109.8	0.24
APS254R	APS254RT	40.0	119.8	0.28
APS255R	APS255RT	50.0	129.8	0.32
APS256R	APS256RT	60.0	139.8	0.36
APS257R	APS257RT	70.0	149.8	0.39
APS258R	APS258RT	80.0	159.8	0.43
APS259R	APS259RT	90.0	169.8	0.47
APS250R	APS250RT	100.0	179.8	0.51

A

B

RETRACTABLE LOCATING PIN FOR 6 X 12 THRU 13 X 19 SLOTTED HOLES (FULL METRIC)

GLOBAL STANDARD COMPONENTS

NAAMS



Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUMS A AND B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

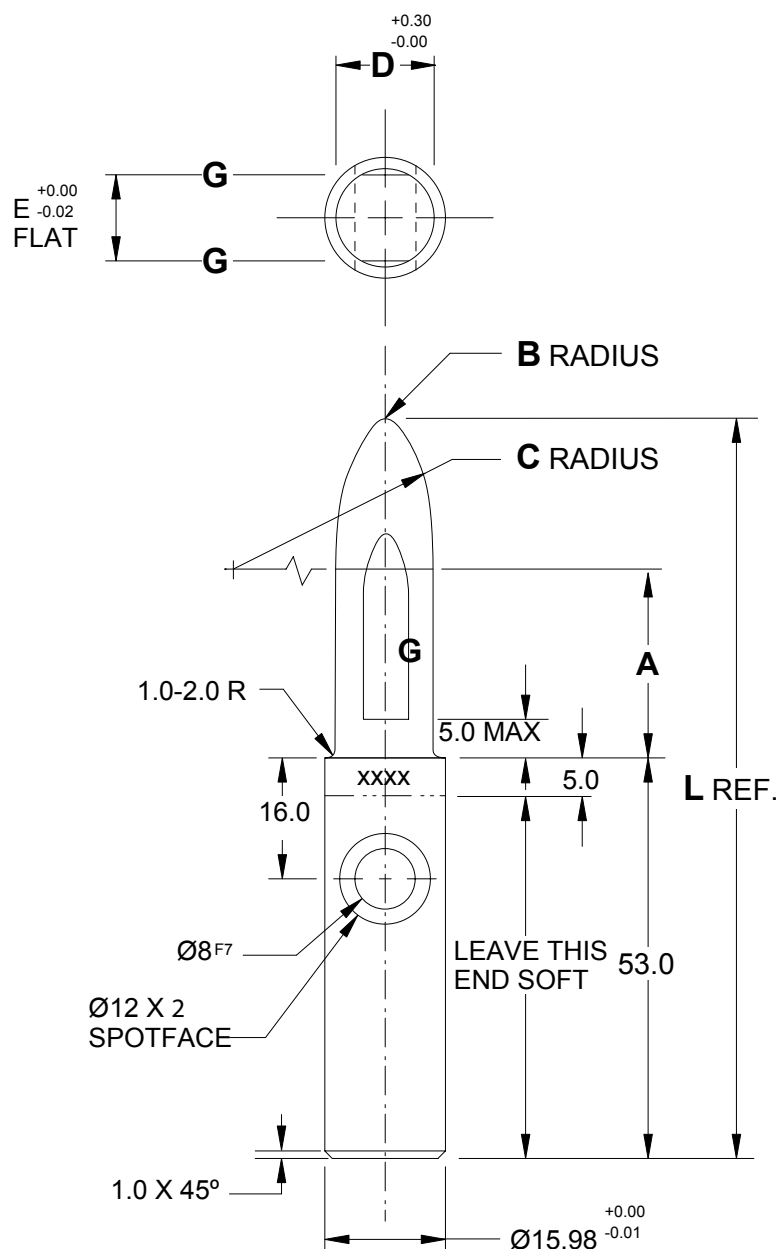
MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm
AFTER GRINDING

NOTE: IDENTIFY WITH NAAMS CODE NUMBER AS
SHOWN **xxx**

PINS WITH TIN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C, D AND E. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN
HARDNESS.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

RETRACTABLE LOCATING PIN FOR 6 x 12 THRU 13 x 19 SLOTTED HOLES (FULL METRIC)

6 x 12 Slotted Hole
B Rad = 1.0
C Rad = 18.0
D = 7.09
E = 5.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE061R	APE061RT	10.0	72.9	0.08
APE062R	APE062RT	15.0	77.9	0.08
APE063R	APE063RT	25.0	87.9	0.09
APE064R	APE064RT	35.0	97.9	0.09
APE065R	APE065RT	45.0	107.9	0.09
APE066R	APE066RT	55.0	117.9	0.09

8 x 14 Slotted Hole
B Rad = 1.0
C Rad = 24.0
D = 8.81
E = 7.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE081R	APE081RT	10.0	76.0	0.08
APE082R	APE082RT	15.0	81.0	0.09
APE083R	APE083RT	25.0	91.0	0.09
APE084R	APE084RT	35.0	101.0	0.10
APE085R	APE085RT	45.0	111.0	0.10
APE086R	APE086RT	55.0	121.0	0.11
APE087R	APE087RT	65.0	131.0	0.11
APE088R	APE088RT	75.0	141.0	0.12

10 x 16 Slotted Hole
B Rad = 2.0
C Rad = 30.0
D = 10.63
E = 9.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE101R	APE101RT	10.0	78.2	0.09
APE102R	APE102RT	15.0	83.2	0.09
APE103R	APE103RT	25.0	93.2	0.10
APE104R	APE104RT	35.0	103.2	0.11
APE105R	APE105RT	45.0	113.2	0.11
APE106R	APE106RT	55.0	123.2	0.12
APE107R	APE107RT	65.0	133.2	0.13
APE108R	APE108RT	75.0	143.2	0.13
APE109R	APE109RT	85.0	153.2	0.14
APE100R	APE100RT	95.0	163.2	0.15

13 x 19 Slotted Hole
B Rad = 2.0
C Rad = 39.0
D = 13.46
E = 12.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE131R	APE131RT	10.0	83.1	0.10
APE132R	APE132RT	15.0	88.1	0.10
APE133R	APE133RT	25.0	98.1	0.12
APE134R	APE134RT	35.0	108.1	0.13
APE135R	APE135RT	45.0	118.1	0.14
APE136R	APE136RT	55.0	128.1	0.15
APE137R	APE137RT	65.0	138.1	0.16
APE138R	APE138RT	75.0	148.1	0.17
APE139R	APE139RT	85.0	158.1	0.18
APE130R	APE130RT	95.0	168.1	0.19

RETRACTABLE LOCATING PIN FOR 16 X 22 THRU 25 X 31 SLOTTED HOLES (FULL METRIC)

GLOBAL STANDARD COMPONENTS

TM **NAAMS**



Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUMS A AND B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

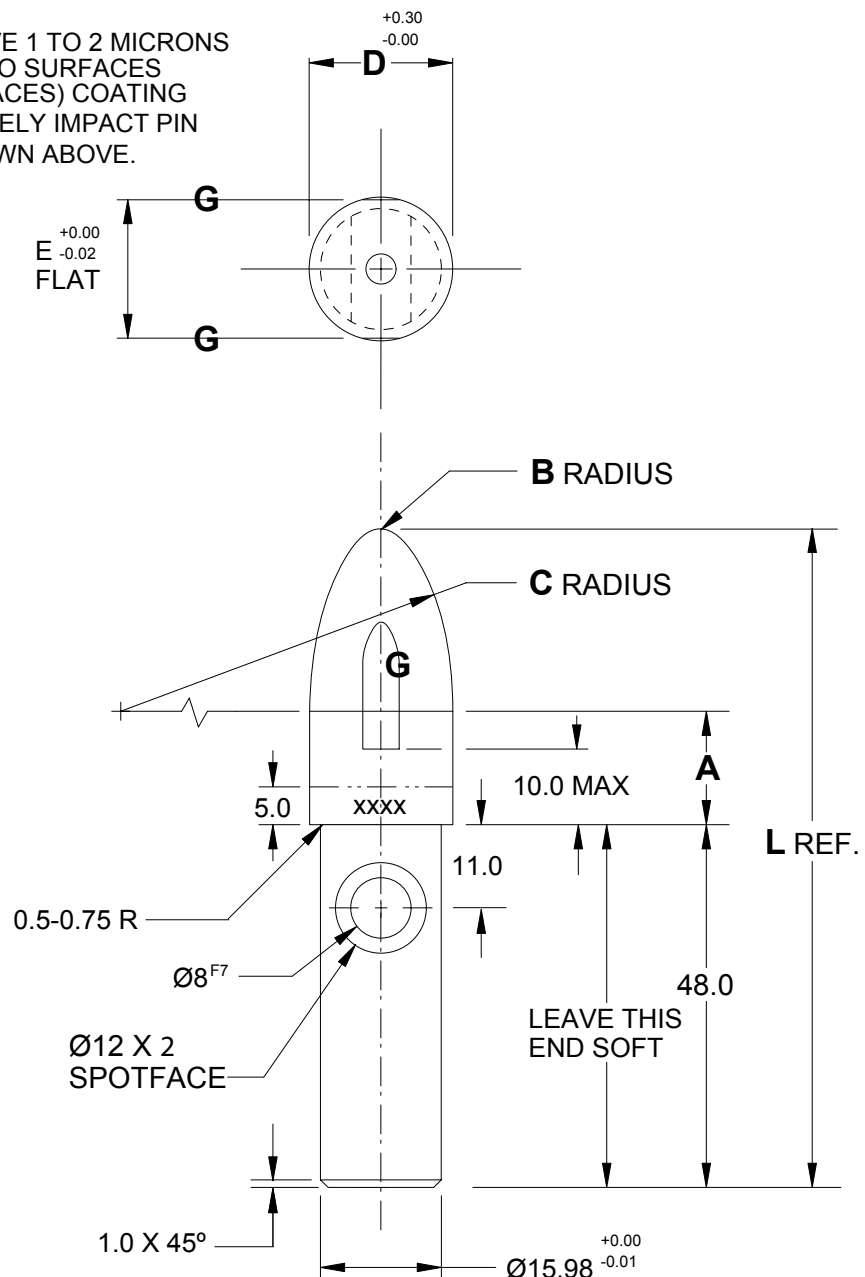
MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm
AFTER GRINDING

NOTE: IDENTIFY WITH NAAMS CODE NUMBER AS
SHOWN **xxx**

PINS WITH TIN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C, D AND E. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN
HARDNESS PARAMETERS SHOWN ABOVE.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



A

C

D

E

B

CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

RETRACTABLE LOCATING PIN FOR 16 x 22 THRU 25 x 31 SLOTTED HOLES (FULL METRIC)

GLOBAL STANDARD COMPONENTS



Assembly

04/30/15

A

B

16 x 22 Slotted Hole

B Rad = 2.0

C Rad = 48.0

D = 16.35

E = 15.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE161R	APE161RT	15.0	88.0	0.12
APE162R	APE162RT	20.0	93.0	0.13
APE163R	APE163RT	30.0	103.0	0.14
APE164R	APE164RT	40.0	113.0	0.16
APE165R	APE165RT	50.0	123.0	0.18
APE166R	APE166RT	60.0	133.0	0.19
APE167R	APE167RT	70.0	143.0	0.21
APE168R	APE168RT	80.0	153.0	0.22
APE169R	APE169RT	90.0	163.0	0.24
APE160R	APE160RT	100.0	173.0	0.26

19 x 25 Slotted Hole

B Rad = 2.0

C Rad = 38.0

D = 19.27

E = 18.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE191R	APE191RT	15.0	87.2	0.13
APE192R	APE192RT	20.0	92.2	0.15
APE193R	APE193RT	30.0	102.2	0.17
APE194R	APE194RT	40.0	112.2	0.19
APE195R	APE195RT	50.0	122.2	0.21
APE196R	APE196RT	60.0	132.2	0.24
APE197R	APE197RT	70.0	142.2	0.26
APE198R	APE198RT	80.0	152.2	0.28
APE199R	APE199RT	90.0	162.2	0.30
APE190R	APE190RT	100.0	172.2	0.33

25 x 31 Slotted Hole

B Rad = 2.0

C Rad = 50.0

D = 25.17

E = 24.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE251R	APE251RT	15.0	95.1	0.19
APE252R	APE252RT	20.0	100.1	0.21
APE253R	APE253RT	30.0	110.1	0.25
APE254R	APE254RT	40.0	120.1	0.29
APE255R	APE255RT	50.0	130.1	0.33
APE256R	APE256RT	60.0	140.1	0.37
APE257R	APE257RT	70.0	150.1	0.40
APE258R	APE258RT	80.0	160.1	0.44
APE259R	APE259RT	90.0	170.1	0.48
APE250R	APE250RT	100.0	180.1	0.52

RETRACTABLE LOCATING PIN FOR 6 X 12 THRU 13 X 19 SLOTTED HOLES (FULL METRIC)

GLOBAL STANDARD COMPONENTS

NAAMS



Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

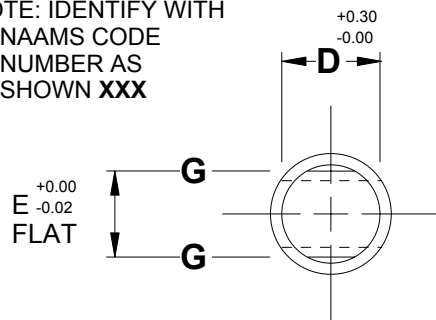
ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUMS A AND B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm

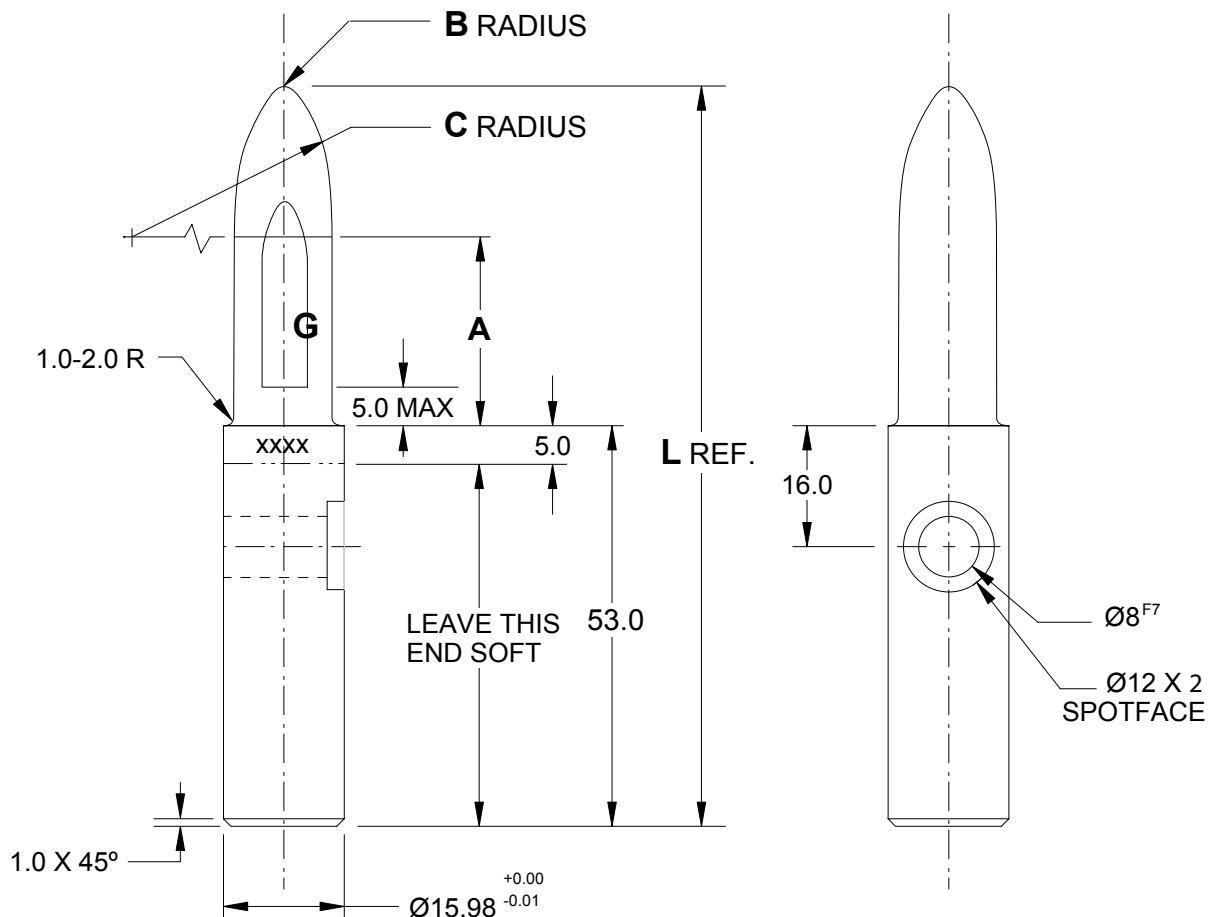
AFTER GRINDING

NOTE: IDENTIFY WITH
NAAMS CODE
NUMBER AS
SHOWN **xxx**



SEE PAGE B-1.1 FOR GLOBAL MATERIALS CHART
PINS WITH TiN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C, D AND E. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN
HARDNESS PARAMETERS SHOWN ABOVE.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

A

C

D

E

B

RETRACTABLE LOCATING PIN FOR 6 x 12 THRU 13 x 19 SLOTTED HOLES (FULL METRIC)

6 x 12 Slotted Hole
B Rad = 1.0
C Rad = 18.0
D = 7.09
E = 5.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE061S	APE061ST	10.0	72.9	0.08
APE062S	APE062ST	15.0	77.9	0.08
APE063S	APE063ST	25.0	87.9	0.09
APE064S	APE064ST	35.0	97.9	0.09
APE065S	APE065ST	45.0	107.9	0.09
APE066S	APE066ST	55.0	117.9	0.09

8 x 14 Slotted Hole
B Rad = 1.0
C Rad = 24.0
D = 8.81
E = 7.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE081S	APE081ST	10.0	76.0	0.08
APE082S	APE082ST	15.0	81.0	0.09
APE083S	APE083ST	25.0	91.0	0.09
APE084S	APE084ST	35.0	101.0	0.10
APE085S	APE085ST	45.0	111.0	0.10
APE086S	APE086ST	55.0	121.0	0.11
APE087S	APE087ST	65.0	131.0	0.11
APE088S	APE088ST	75.0	141.0	0.12

10 x 16 Slotted Hole
B Rad = 2.0
C Rad = 30.0
D = 10.63
E = 9.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE101S	APE101ST	10.0	78.2	0.09
APE102S	APE102ST	15.0	83.2	0.09
APE103S	APE103ST	25.0	93.2	0.10
APE104S	APE104ST	35.0	103.2	0.11
APE105S	APE105ST	45.0	113.2	0.11
APE106S	APE106ST	55.0	123.2	0.12
APE107S	APE107ST	65.0	133.2	0.13
APE108S	APE108ST	75.0	143.2	0.13
APE109S	APE109ST	85.0	153.2	0.14
APE100S	APE100ST	95.0	163.2	0.15

13 x 19 Slotted Hole
B Rad = 2.0
C Rad = 39.0
D = 13.46
E = 12.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE131S	APE131ST	10.0	83.1	0.10
APE132S	APE132ST	15.0	88.1	0.10
APE133S	APE133ST	25.0	98.1	0.12
APE134S	APE134ST	35.0	108.1	0.13
APE135S	APE135ST	45.0	118.1	0.14
APE136S	APE136ST	55.0	128.1	0.15
APE137S	APE137ST	65.0	138.1	0.16
APE138S	APE138ST	75.0	148.1	0.17
APE139S	APE139ST	85.0	158.1	0.18
APE130S	APE130ST	95.0	168.1	0.19

RETRACTABLE LOCATING PIN FOR 16 X 22 THRU 25 X 31 SLOTTED HOLES (FULL METRIC)

GLOBAL STANDARD COMPONENTS

NAAMS



Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

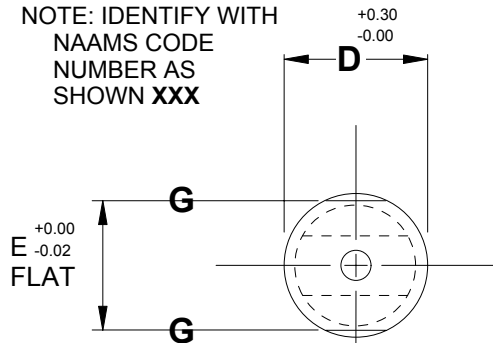
ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUMS A AND B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm

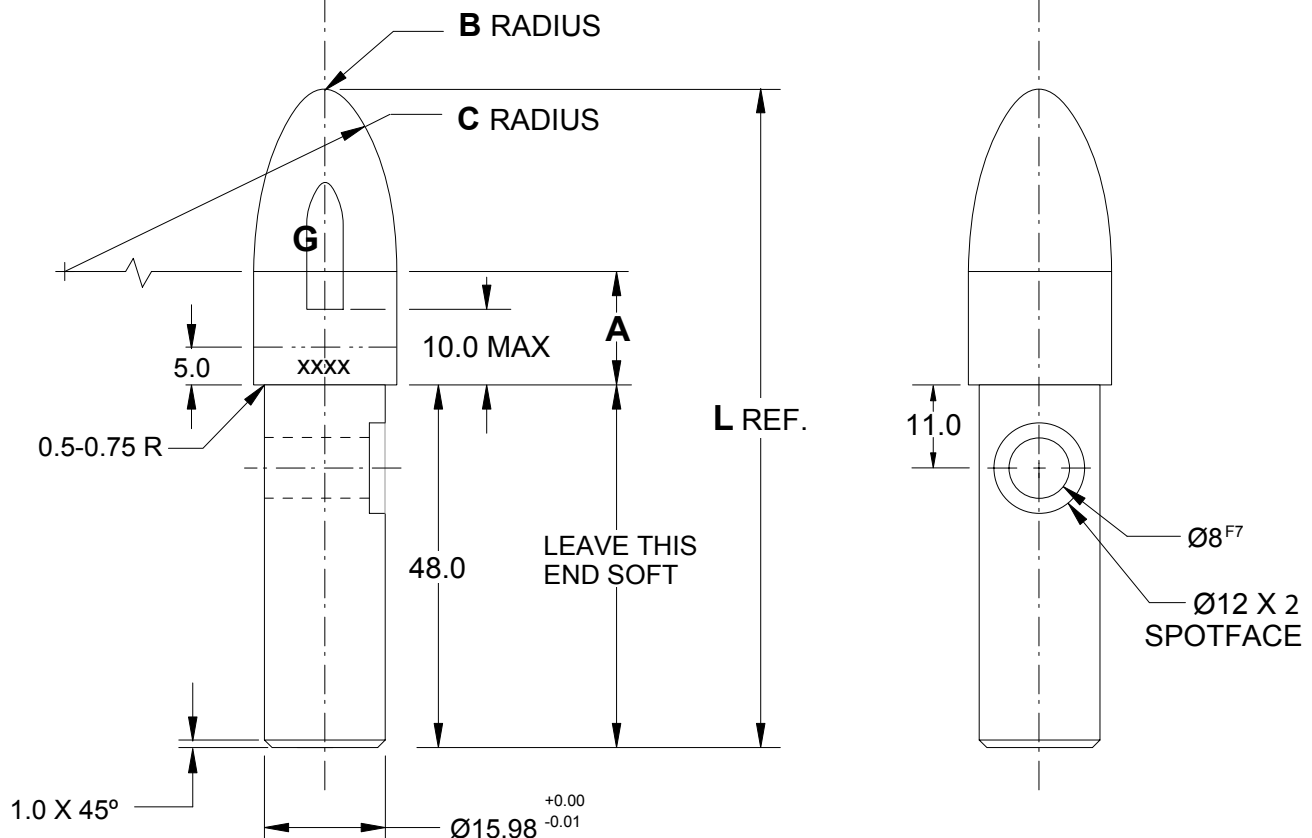
AFTER GRINDING

NOTE: IDENTIFY WITH
NAAMS CODE
NUMBER AS
SHOWN **xxx**



SEE PAGE B-1.1 FOR GLOBAL MATERIALS CHART
PINS WITH TIN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C, D AND E. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN
HARDNESS PARAMETERS SHOWN ABOVE.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

RETRACTABLE LOCATING PIN FOR 16 x 22 THRU 25 x 31 SLOTTED HOLES (FULL METRIC)

16 x 22 Slotted Hole
B Rad = 2.0
C Rad = 48.0
D = 16.35
E = 15.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE161S	APE161ST	15.0	88.0	0.12
APE162S	APE162ST	20.0	93.0	0.13
APE163S	APE163ST	30.0	103.0	0.14
APE164S	APE164ST	40.0	113.0	0.16
APE165S	APE165ST	50.0	123.0	0.18
APE166S	APE166ST	60.0	133.0	0.19
APE167S	APE167ST	70.0	143.0	0.21
APE168S	APE168ST	80.0	153.0	0.22
APE169S	APE169ST	90.0	163.0	0.24
APE160S	APE160ST	100.0	173.0	0.26

19 x 25 Slotted Hole
B Rad = 2.0
C Rad = 38.0
D = 19.27
E = 18.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE191S	APE191ST	15.0	87.2	0.13
APE192S	APE192ST	20.0	92.2	0.15
APE193S	APE193ST	30.0	102.2	0.17
APE194S	APE194ST	40.0	112.2	0.19
APE195S	APE195ST	50.0	122.2	0.21
APE196S	APE196ST	60.0	132.2	0.24
APE197S	APE197ST	70.0	142.2	0.26
APE198S	APE198ST	80.0	152.2	0.28
APE199S	APE199ST	90.0	162.2	0.30
APE190S	APE190ST	100.0	172.2	0.33

25 x 31 Slotted Hole
B Rad = 2.0
C Rad = 50.0
D = 25.17
E = 24.85

NAAMS CODE	TiN CODE	A	L	WT. kg
APE251S	APE251ST	15.0	95.1	0.19
APE252S	APE252ST	20.0	100.1	0.21
APE253S	APE253ST	30.0	110.1	0.25
APE254S	APE254ST	40.0	120.1	0.29
APE255S	APE255ST	50.0	130.1	0.33
APE256S	APE256ST	60.0	140.1	0.37
APE257S	APE257ST	70.0	150.1	0.40
APE258S	APE258ST	80.0	160.1	0.44
APE259S	APE259ST	90.0	170.1	0.48
APE250S	APE250ST	100.0	180.1	0.52

A

B

RETRACTABLE RESPOT PIN 6 mm THRU 16 mm DIAMETER (FULL METRIC)

G A N D A R S T C O M P O N E N T S

TM **NAAMS**



Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUM B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

MATERIAL: STEEL SAE 8620

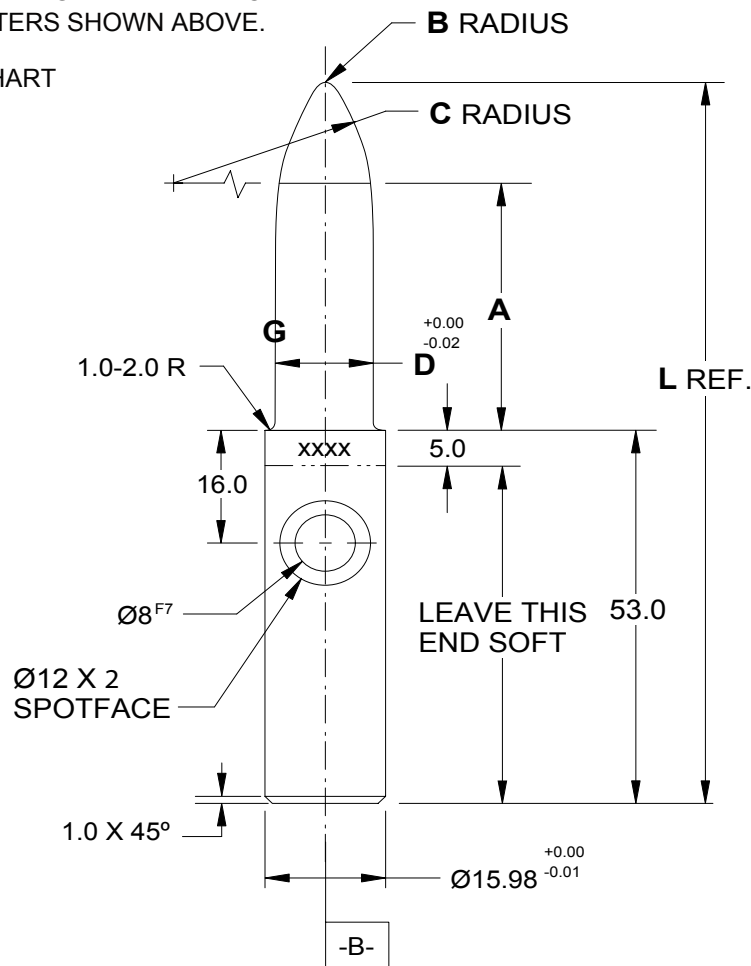
HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm
AFTER GRINDING

NOTE: IDENTIFY WITH NAAMS CODE NUMBER AS
SHOWN **XXXX**

PINS WITH TIN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C AND D. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN

HARDNESS PARAMETERS SHOWN ABOVE.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



A

C

D

E

B

CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

RETRACTABLE LOCATING PIN

6 mm THRU 16 mm DIAMETER

(FULL METRIC)

6 mm Round Hole
B Rad = 1.0
C Rad = 18.0
D = 5.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARP061R	ARP061RT	10.0	71.8	0.08
ARP062R	ARP062RT	15.0	76.8	0.08
ARP063R	ARP063RT	25.0	86.8	0.08
ARP064R	ARP064RT	35.0	96.8	0.08
ARP065R	ARP065RT	45.0	106.8	0.09
ARP066R	ARP066RT	55.0	116.8	0.09

8 mm Round Hole
B Rad = 1.0
C Rad = 24.0
D = 7.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARP081R	ARP081RT	10.0	75.1	0.08
ARP082R	ARP082RT	15.0	80.1	0.08
ARP083R	ARP083RT	25.0	90.1	0.09
ARP084R	ARP084RT	35.0	100.1	0.09
ARP085R	ARP085RT	45.0	110.1	0.09
ARP086R	ARP086RT	55.0	120.1	0.10
ARP087R	ARP087RT	65.0	130.1	0.10
ARP088R	ARP088RT	75.0	140.1	0.11

10 mm Round Hole
B Rad = 2.0
C Rad = 30.0
D = 9.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARP101R	ARP101RT	10.0	77.4	0.09
ARP102R	ARP102RT	15.0	82.4	0.09
ARP103R	ARP103RT	25.0	92.4	0.10
ARP104R	ARP104RT	35.0	102.4	0.10
ARP105R	ARP105RT	45.0	112.4	0.11
ARP106R	ARP106RT	55.0	122.4	0.11
ARP107R	ARP107RT	65.0	132.4	0.12
ARP108R	ARP108RT	75.0	142.4	0.12
ARP109R	ARP109RT	85.0	152.4	0.13
ARP100R	ARP100RT	95.0	162.4	0.14

13 mm Round Hole
B Rad = 2.0
C Rad = 39.0
D = 12.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARP131R	ARP131RT	10.0	82.4	0.10
ARP132R	ARP132RT	15.0	87.4	0.10
ARP133R	ARP133RT	25.0	97.4	0.11
ARP134R	ARP134RT	35.0	107.4	0.12
ARP135R	ARP135RT	45.0	117.4	0.13
ARP136R	ARP136RT	55.0	127.4	0.14
ARP137R	ARP137RT	65.0	137.4	0.15
ARP138R	ARP138RT	75.0	147.4	0.16
ARP139R	ARP139RT	85.0	157.4	0.17
ARP130R	ARP130RT	95.0	167.4	0.18

16 mm Round Hole
B Rad = 2.0
C Rad = 48.0
D = 15.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARP161R	ARP161RT	10.0	87.5	0.11
ARP162R	ARP162RT	15.0	92.5	0.12
ARP163R	ARP163RT	25.0	102.5	0.13
ARP164R	ARP164RT	35.0	112.5	0.15
ARP165R	ARP165RT	45.0	122.5	0.16
ARP166R	ARP166RT	55.0	132.5	0.18
ARP167R	ARP167RT	65.0	142.5	0.19
ARP168R	ARP168RT	75.0	152.5	0.21
ARP169R	ARP169RT	85.0	162.5	0.22
ARP160R	ARP160RT	95.0	172.5	0.24

RETRACTABLE RESPOT PIN 19mm THRU 25mm DIAMETER (FULL METRIC)

GLOBAL STANDARD COMPONENTS

TM

NAAMS



Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUMS A AND B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

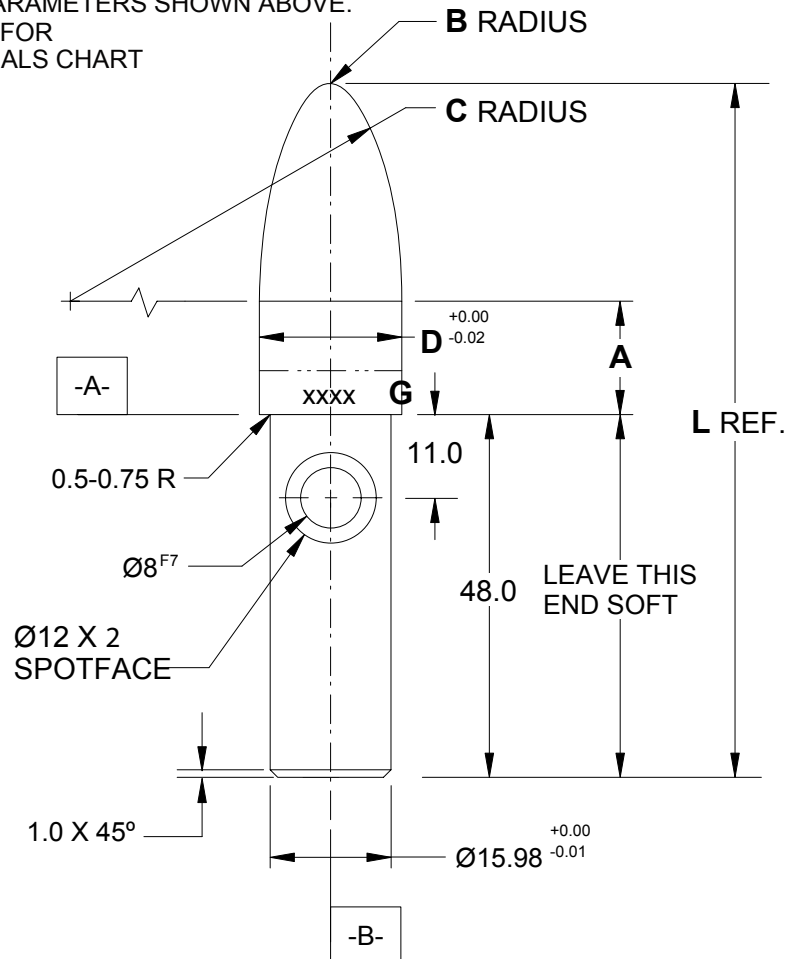
MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm
AFTER GRINDING

NOTE: IDENTIFY WITH NAAMS CODE NUMBER AS
SHOWN **XXXX**

PINS WITH TiN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C AND D. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN
HARDNESS PARAMETERS SHOWN ABOVE.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

RETRACTABLE LOCATING PIN

19 mm THRU 25 mm DIAMETER TM

(FULL METRIC)

GLOBAL STANDARD COMPONENTS



Assembly

04/30/15

19 mm Round Hole

B Rad = 2.0

C Rad = 38.0

D = 18.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARP191R	ARP191RT	15.0	86.8	0.13
ARP192R	ARP192RT	20.0	91.8	0.14
ARP193R	ARP193RT	30.0	101.8	0.16
ARP194R	ARP194RT	40.0	111.8	0.18
ARP195R	ARP195RT	50.0	121.8	0.20
ARP196R	ARP196RT	60.0	131.8	0.23
ARP197R	ARP197RT	70.0	141.8	0.25
ARP198R	ARP198RT	80.0	151.8	0.27
ARP199R	ARP199RT	90.0	161.8	0.29
ARP190R	ARP190RT	100.0	171.8	0.31

25 mm Round Hole

B Rad = 2.0

C Rad = 50.0

D = 24.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARP251R	ARP251RT	15.0	94.8	0.19
ARP252R	ARP252RT	20.0	99.8	0.21
ARP253R	ARP253RT	30.0	109.8	0.24
ARP254R	ARP254RT	40.0	119.8	0.28
ARP255R	ARP255RT	50.0	129.8	0.32
ARP256R	ARP256RT	60.0	139.8	0.35
ARP257R	ARP257RT	70.0	149.8	0.39
ARP258R	ARP258RT	80.0	159.8	0.43
ARP259R	ARP259RT	90.0	169.8	0.47
ARP250R	ARP250RT	100.0	179.8	0.50

A

B

RETRACTABLE RESPOT PIN FOR 6 X 12 THRU 13 X 19 SLOTTED HOLES (FULL METRIC)

GLOBAL STANDARD COMPONENTS

NAAMS



Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUMS A AND B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

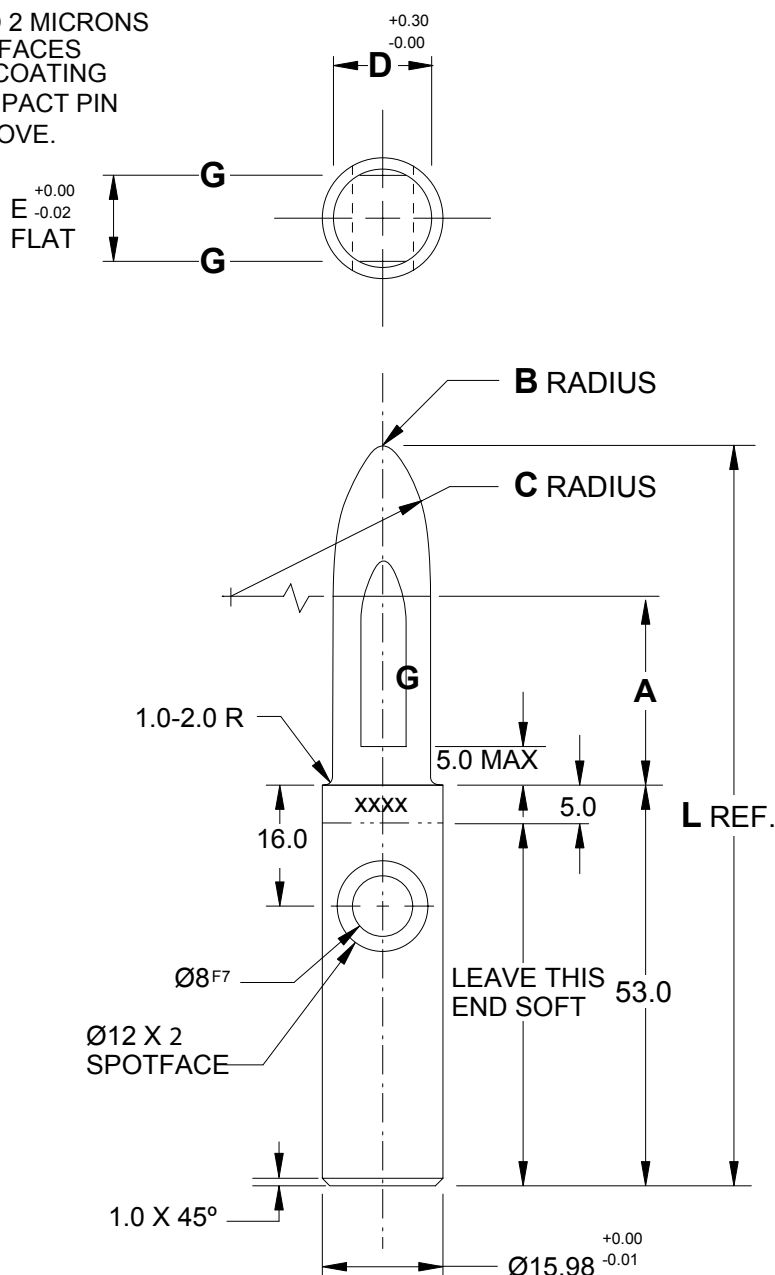
MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm
AFTER GRINDING

NOTE: IDENTIFY WITH NAAMS CODE NUMBER AS
SHOWN **XXXX**

PINS WITH TIN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C, D AND E. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN
HARDNESS PARAMETERS SHOWN ABOVE.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



A

C

D

E

B

CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

RETRACTABLE LOCATING PIN FOR 6 x 12 THRU 13 x 19 SLOTTED HOLES (FULL METRIC)

6 x 12 Slotted Hole
B Rad = 1.0
C Rad = 18.0
D = 7.09
E = 5.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE061R	ARE061RT	10.0	72.9	0.08
ARE062R	ARE062RT	15.0	77.9	0.08
ARE063R	ARE063RT	25.0	87.9	0.09
ARE064R	ARE064RT	35.0	97.9	0.09
ARE065R	ARE065RT	45.0	107.9	0.09
ARE066R	ARE066RT	55.0	117.9	0.09

8 x 14 Slotted Hole
B Rad = 1.0
C Rad = 24.0
D = 8.81
E = 7.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE081R	ARE081RT	10.0	76.0	0.08
ARE082R	ARE082RT	15.0	81.0	0.09
ARE083R	ARE083RT	25.0	91.0	0.09
ARE084R	ARE084RT	35.0	101.0	0.10
ARE085R	ARE085RT	45.0	111.0	0.10
ARE086R	ARE086RT	55.0	121.0	0.11
ARE087R	ARE087RT	65.0	131.0	0.11
ARE088R	ARE088RT	75.0	141.0	0.12

10 x 16 Slotted Hole
B Rad = 2.0
C Rad = 30.0
D = 10.63
E = 9.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE101R	ARE101RT	10.0	78.2	0.09
ARE102R	ARE102RT	15.0	83.2	0.09
ARE103R	ARE103RT	25.0	93.2	0.10
ARE104R	ARE104RT	35.0	103.2	0.11
ARE105R	ARE105RT	45.0	113.2	0.11
ARE106R	ARE106RT	55.0	123.2	0.12
ARE107R	ARE107RT	65.0	133.2	0.13
ARE108R	ARE108RT	75.0	143.2	0.13
ARE109R	ARE109RT	85.0	153.2	0.14
ARE100R	ARE100RT	95.0	163.2	0.15

13 x 19 Slotted Hole
B Rad = 2.0
C Rad = 39.0
D = 13.46
E = 12.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE131R	ARE131RT	10.0	83.1	0.10
ARE132R	ARE132RT	15.0	88.1	0.10
ARE133R	ARE133RT	25.0	98.1	0.12
ARE134R	ARE134RT	35.0	108.1	0.13
ARE135R	ARE135RT	45.0	118.1	0.14
ARE136R	ARE136RT	55.0	128.1	0.15
ARE137R	ARE137RT	65.0	138.1	0.16
ARE138R	ARE138RT	75.0	148.1	0.17
ARE139R	ARE139RT	85.0	158.1	0.18
ARE130R	ARE130RT	95.0	168.1	0.19

GLOBAL STANDARD COMPONENTS

NAAMS



Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3

2 PLACE ± 0.03

3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUMS A AND B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm

AFTER GRINDING

NOTE: IDENTIFY WITH

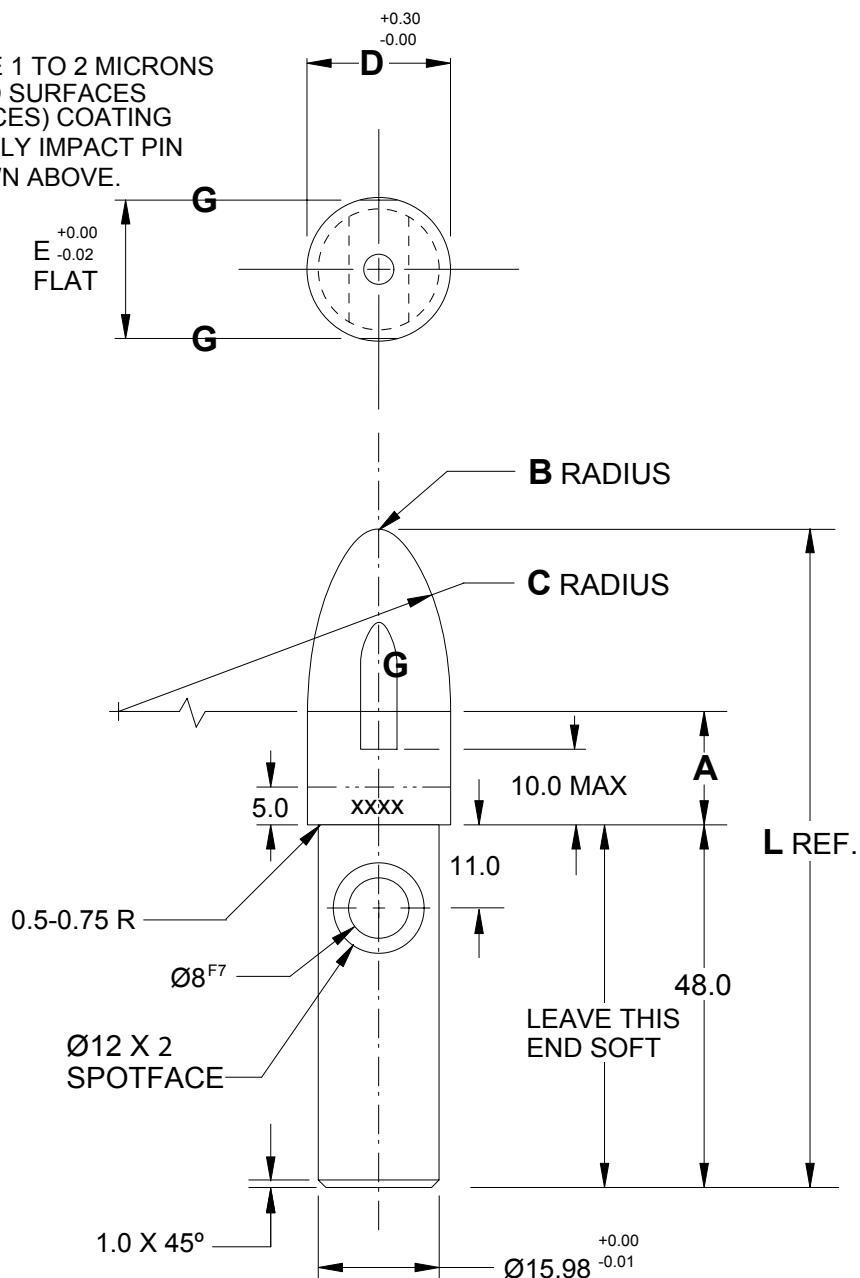
NAAMS CODE

NUMBER AS

SHOWN XXX

PINS WITH TIN CODES SHALL HAVE 1 TO 2 MICRONS OF TITANIUM NITRIDE ADDED TO SURFACES B, C, D AND E. (MINIMUM SURFACES) COATING PROCESS SHALL NOT NEGATIVELY IMPACT PIN HARDNESS PARAMETERS SHOWN ABOVE.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

RETRACTABLE LOCATING PIN FOR 16 x 22 THRU 25 x 31 SLOTTED HOLES (FULL METRIC)

GLOBAL STANDARD COMPONENTS



Assembly

04/30/15

A

B

16 x 22 Slotted Hole

B Rad = 2.0

C Rad = 48.0

D = 16.35

E = 15.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE161R	ARE161RT	15.0	88.0	0.12
ARE162R	ARE162RT	20.0	93.0	0.12
ARE163R	ARE163RT	30.0	103.0	0.14
ARE164R	ARE164RT	40.0	113.0	0.16
ARE165R	ARE165RT	50.0	123.0	0.17
ARE166R	ARE166RT	60.0	133.0	0.19
ARE167R	ARE167RT	70.0	143.0	0.20
ARE168R	ARE168RT	80.0	153.0	0.22
ARE169R	ARE169RT	90.0	163.0	0.24
ARE160R	ARE160RT	100.0	173.0	0.25

19 x 25 Slotted Hole

B Rad = 2.0

C Rad = 38.0

D = 19.27

E = 18.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE191R	ARE191RT	15.0	87.2	0.13
ARE192R	ARE192RT	20.0	92.2	0.14
ARE193R	ARE193RT	30.0	102.2	0.17
ARE194R	ARE194RT	40.0	112.2	0.19
ARE195R	ARE195RT	50.0	122.2	0.21
ARE196R	ARE196RT	60.0	132.2	0.23
ARE197R	ARE197RT	70.0	142.2	0.26
ARE198R	ARE198RT	80.0	152.2	0.28
ARE199R	ARE199RT	90.0	162.2	0.30
ARE190R	ARE190RT	100.0	172.2	0.32

25 x 31 Slotted Hole

B Rad = 2.0

C Rad = 50.0

D = 25.17

E = 24.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE251R	ARE251RT	15.0	95.1	0.19
ARE252R	ARE252RT	20.0	100.1	0.21
ARE253R	ARE253RT	30.0	110.1	0.25
ARE254R	ARE254RT	40.0	120.1	0.29
ARE255R	ARE255RT	50.0	130.1	0.33
ARE256R	ARE256RT	60.0	140.1	0.37
ARE257R	ARE257RT	70.0	150.1	0.40
ARE258R	ARE258RT	80.0	160.1	0.44
ARE259R	ARE259RT	90.0	170.1	0.48
ARE250R	ARE250RT	100.0	180.1	0.52

RETRACTABLE RESPOT PIN FOR 6 X 12 THRU 13 X 19 SLOTTED HOLES (FULL METRIC)

GLOBAL STANDARD COMPONENTS

NAAMS



Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUMS A AND B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

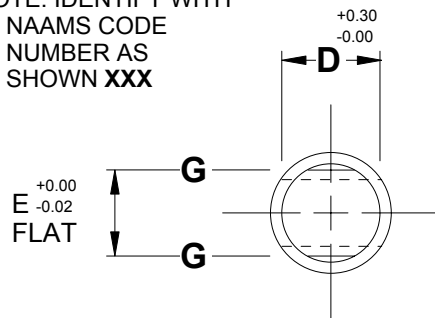
MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm

AFTER GRINDING

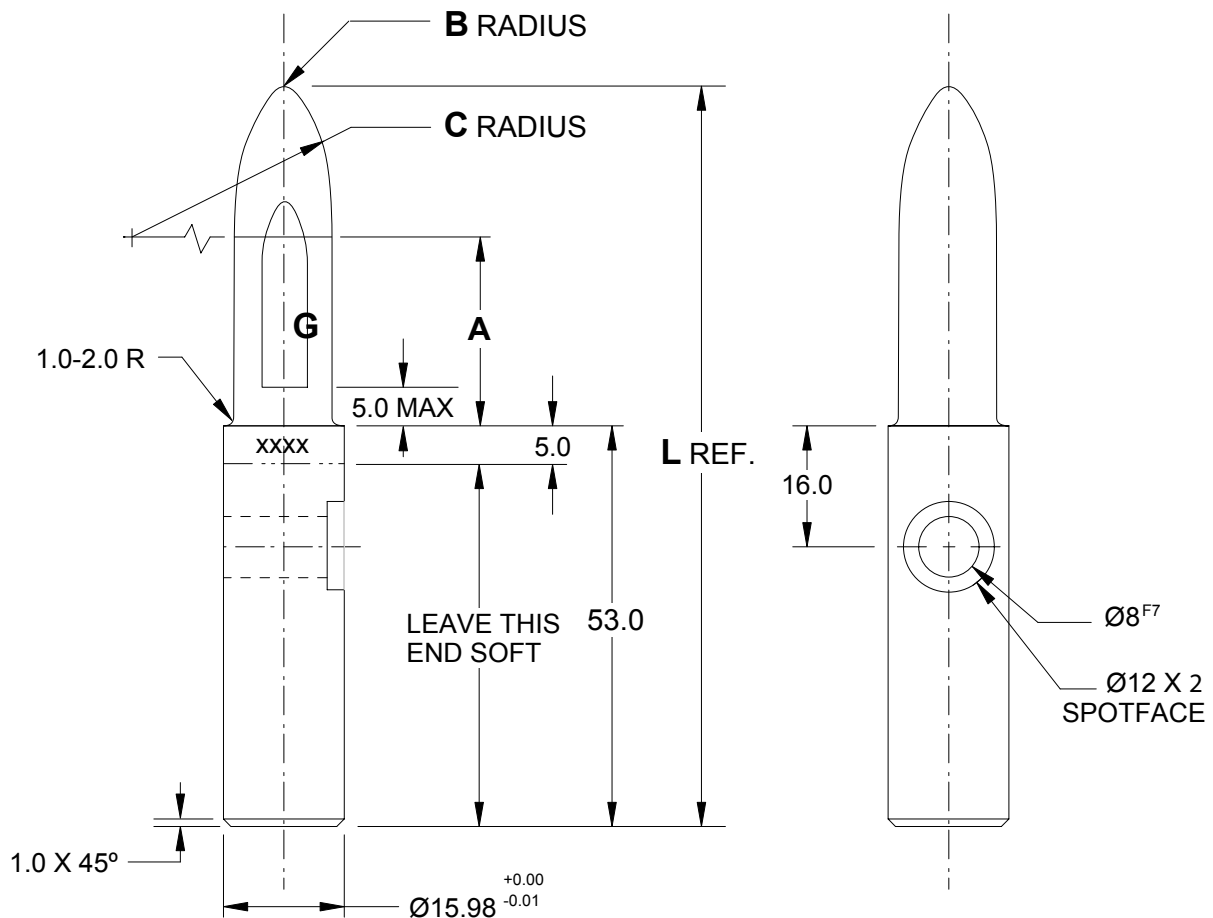
NOTE: IDENTIFY WITH

NAAMS CODE
NUMBER AS
SHOWN **xxx**



SEE PAGE B-1.1 FOR GLOBAL MATERIALS CHART
PINS WITH TIN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C, D AND E. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN
HARDNESS PARAMETERS SHOWN ABOVE.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION

TABULATED INFORMATION ON FOLLOWING PAGE

A

C

D

E

B

RETRACTABLE LOCATING PIN FOR 6 x 12 THRU 13 x 19 SLOTTED HOLES (FULL METRIC)

6 x 12 Slotted Hole
B Rad = 1.0
C Rad = 18.0
D = 7.09
E = 5.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE061S	ARE061ST	10.0	72.9	0.08
ARE062S	ARE062ST	15.0	77.9	0.08
ARE063S	ARE063ST	25.0	87.9	0.09
ARE064S	ARE064ST	35.0	97.9	0.09
ARE065S	ARE065ST	45.0	107.9	0.09
ARE066S	ARE066ST	55.0	117.9	0.09

8 x 14 Slotted Hole
B Rad = 1.0
C Rad = 24.0
D = 8.81
E = 7.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE081S	ARE081ST	10.0	76.0	0.08
ARE082S	ARE082ST	15.0	81.0	0.09
ARE083S	ARE083ST	25.0	91.0	0.09
ARE084S	ARE084ST	35.0	101.0	0.10
ARE085S	ARE085ST	45.0	111.0	0.10
ARE086S	ARE086ST	55.0	121.0	0.11
ARE087S	ARE087ST	65.0	131.0	0.11
ARE088S	ARE088ST	75.0	141.0	0.12

10 x 16 Slotted Hole
B Rad = 2.0
C Rad = 30.0
D = 10.63
E = 9.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE101S	ARE101ST	10.0	78.2	0.09
ARE102S	ARE102ST	15.0	83.2	0.09
ARE103S	ARE103ST	25.0	93.2	0.10
ARE104S	ARE104ST	35.0	103.2	0.11
ARE105S	ARE105ST	45.0	113.2	0.11
ARE106S	ARE106ST	55.0	123.2	0.12
ARE107S	ARE107ST	65.0	133.2	0.13
ARE108S	ARE108ST	75.0	143.2	0.13
ARE109S	ARE109ST	85.0	153.2	0.14
ARE100S	APE100ST	95.0	163.2	0.15

13 x 19 Slotted Hole
B Rad = 2.0
C Rad = 39.0
D = 13.46
E = 12.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE131S	ARE131ST	10.0	83.1	0.10
ARE132S	ARE132ST	15.0	88.1	0.10
ARE133S	ARE133ST	25.0	98.1	0.12
ARE134S	ARE134ST	35.0	108.1	0.13
ARE135S	ARE135ST	45.0	118.1	0.14
ARE136S	ARE136ST	55.0	128.1	0.15
ARE137S	ARE137ST	65.0	138.1	0.16
ARE138S	ARE138ST	75.0	148.1	0.17
ARE139S	ARE139ST	85.0	158.1	0.18
ARE130S	ARE130ST	95.0	168.1	0.19

RETRACTABLE RESPOT PIN FOR 16 X 22 THRU 25 X 31 SLOTTED HOLES (FULL METRIC)

GLOBAL STANDARD COMPONENTS

NAAMS



Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUMS A AND B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

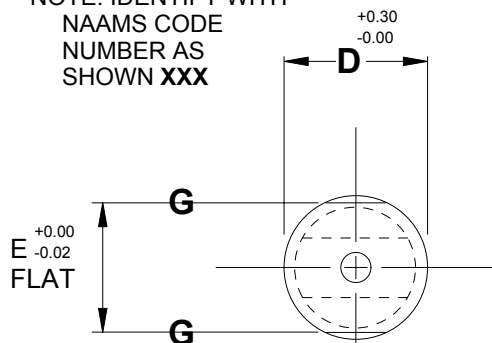
MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm

AFTER GRINDING

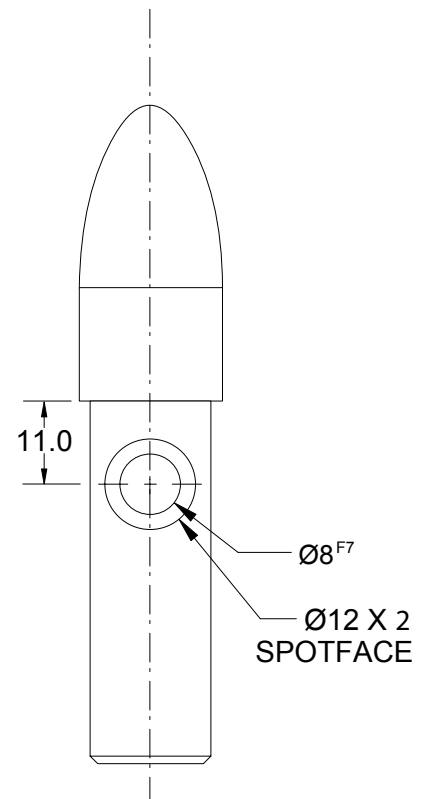
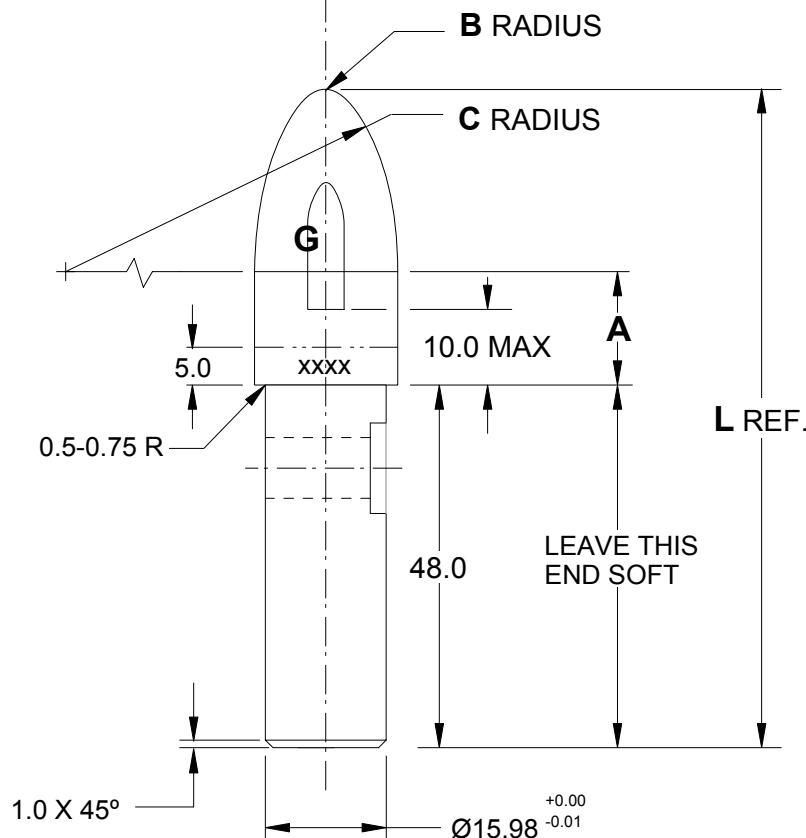
NOTE: IDENTIFY WITH

NAAMS CODE
NUMBER AS
SHOWN **xxx**



SEE PAGE B-1.1 FOR GLOBAL MATERIALS CHART
PINS WITH TIN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C, D AND E. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN
HARDNESS PARAMETERS SHOWN ABOVE.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

A

C

D

E

B

RETRACTABLE LOCATING PIN FOR 16 x 22 THRU 25 x 31 SLOTTED HOLES (FULL METRIC)

GLOBAL STANDARD COMPONENTS



Assembly

04/30/15

A

B

16 x 22 Slotted Hole

B Rad = 2.0

C Rad = 48.0

D = 16.35

E = 15.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE161S	ARE161ST	15.0	88.0	0.12
ARE162S	ARE162ST	20.0	93.0	0.12
ARE163S	ARE163ST	30.0	103.0	0.14
ARE164S	ARE164ST	40.0	113.0	0.16
ARE165S	ARE165ST	50.0	123.0	0.17
ARE166S	ARE166ST	60.0	133.0	0.19
ARE167S	ARE167ST	70.0	143.0	0.20
ARE168S	ARE168ST	80.0	153.0	0.22
ARE169S	ARE169ST	90.0	163.0	0.24
ARE160S	ARE160ST	100.0	173.0	0.25

19 x 25 Slotted Hole

B Rad = 2.0

C Rad = 38.0

D = 19.27

E = 18.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE191S	ARE191ST	15.0	87.2	0.13
ARE192S	ARE192ST	20.0	92.2	0.14
ARE193S	ARE193ST	30.0	102.2	0.17
ARE194S	ARE194ST	40.0	112.2	0.19
ARE195S	ARE195ST	50.0	122.2	0.21
ARE196S	ARE196ST	60.0	132.2	0.23
ARE197S	ARE197ST	70.0	142.2	0.26
ARE198S	ARE198ST	80.0	152.2	0.28
ARE199S	ARE199ST	90.0	162.2	0.30
ARE190S	ARE190ST	100.0	172.2	0.32

25 x 31 Slotted Hole

B Rad = 2.0

C Rad = 50.0

D = 25.17

E = 24.72

NAAMS CODE	TiN CODE	A	L	WT. kg
ARE251S	ARE251ST	15.0	95.1	0.19
ARE252S	ARE252ST	20.0	100.1	0.21
ARE253S	ARE253ST	30.0	110.1	0.25
ARE254S	ARE254ST	40.0	120.1	0.29
ARE255S	ARE255ST	50.0	130.1	0.33
ARE256S	ARE256ST	60.0	140.1	0.37
ARE257S	ARE257ST	70.0	150.1	0.40
ARE258S	ARE258ST	80.0	160.1	0.44
ARE259S	ARE259ST	90.0	170.1	0.48
ARE250S	ARE250ST	100.0	180.1	0.52

GLOBAL STANDARD COMPONENTS



Assembly

04/30/15

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUM B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

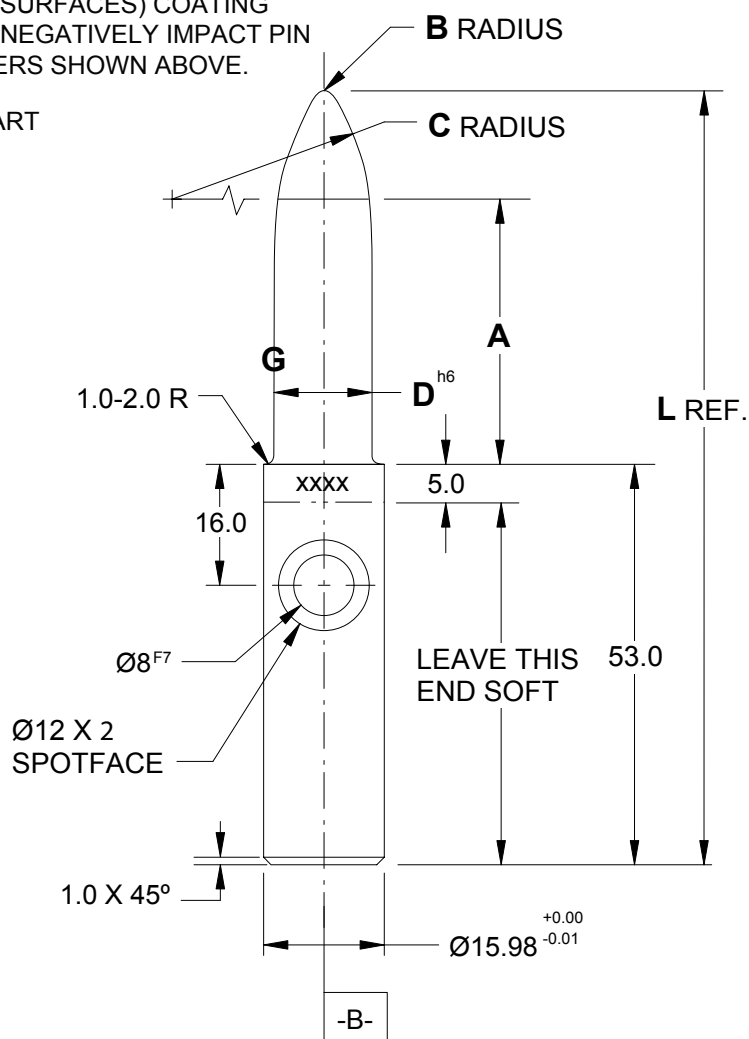
MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm
AFTER GRINDING

NOTE: IDENTIFY WITH NAAMS CODE NUMBER AS SHOWN **XXXX**

PINS WITH TIN CODES SHALL HAVE 1 TO 2 MICRONS OF TITANIUM NITRIDE ADDED TO SURFACES B, C AND D. (MINIMUM SURFACES) COATING PROCESS SHALL NOT NEGATIVELY IMPACT PIN HARDNESS PARAMETERS SHOWN ABOVE.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

RETRACTABLE LOCATING PIN

8 mm THRU 13 mm DIAMETER

(FULL METRIC)

8 mm Round Hole
B Rad = 1.0
C Rad = 24.0
D = 8^{h6}

NAAMS CODE	TiN CODE	A	L	WT. kg
APQ081R	APQ081RT	10.0	75.4	0.08
APQ082R	APQ082RT	15.0	80.4	0.08
APQ083R	APQ083RT	25.0	90.4	0.09
APQ084R	APQ084RT	35.0	100.4	0.09
APQ085R	APQ085RT	45.0	110.4	0.10
APQ086R	APQ086RT	55.0	120.4	0.10
APQ087R	APQ087RT	65.0	130.4	0.10
APQ088R	APQ088RT	75.0	140.4	0.11

10 mm Round Hole
B Rad = 2.0
C Rad = 30.0
D = 10^{h6}

NAAMS CODE	TiN CODE	A	L	WT. kg
APQ101R	APQ101RT	10.0	77.6	0.09
APQ102R	APQ102RT	15.0	82.6	0.09
APQ103R	APQ103RT	25.0	92.6	0.10
APQ104R	APQ104RT	35.0	102.6	0.10
APQ105R	APQ105RT	45.0	112.6	0.11
APQ106R	APQ106RT	55.0	122.6	0.11
APQ107R	APQ107RT	65.0	132.6	0.12
APQ108R	APQ108RT	75.0	142.6	0.13

A

B

13 mm Round Hole
B Rad = 2.0
C Rad = 39.0
D = 13^{h6}

NAAMS CODE	TiN CODE	A	L	WT. kg
APQ131R	APQ131RT	10.0	82.7	0.10
APQ132R	APQ132RT	15.0	87.7	0.10
APQ133R	APQ133RT	25.0	97.7	0.11
APQ134R	APQ134RT	35.0	107.7	0.12
APQ135R	APQ135RT	45.0	117.7	0.13
APQ136R	APQ136RT	55.0	127.7	0.14
APQ137R	APQ137RT	65.0	137.7	0.15
APQ138R	APQ138RT	75.0	147.7	0.16

RETRACTABLE LOCATING PIN 16 mm THRU 40 mm DIAMETERTM (FULL METRIC)

GLOBAL STANDARD COMPONENTS

NAAMS



Assembly

04/30/15

A

B

D

E

C

Tolerances: 1 PLACE ± 0.3
2 PLACE ± 0.03
3 PLACE ± 0.015

ALL MACHINED SURFACES TO BE FLAT,
PARALLEL AND PERPENDICULAR TO WITHIN
0.015 T.I.R. TO DATUMS A AND B AND
CONCENTRIC TO WITHIN 0.03 T.I.R.

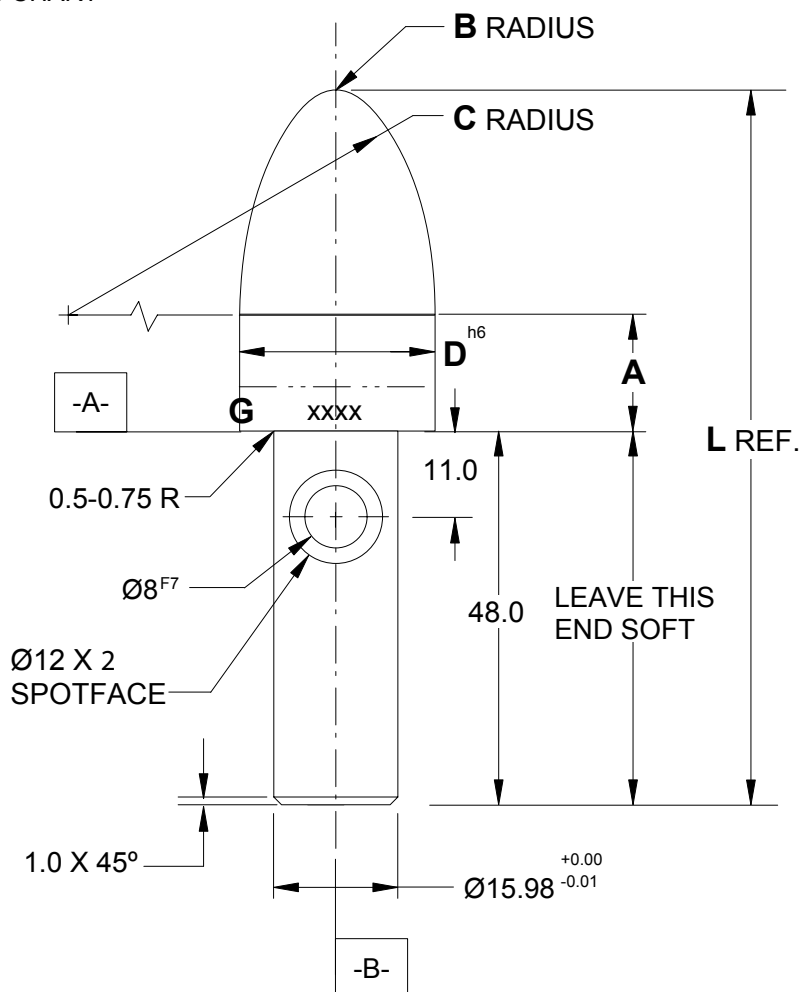
MATERIAL: STEEL SAE 8620

HARDNESS: 58 – 62 Rc TO A DEPTH OF 0.5 – 0.7 mm
AFTER GRINDING

NOTE: IDENTIFY WITH NAAMS CODE NUMBER AS
SHOWN **XXXX**

PINS WITH TIN CODES SHALL HAVE 1 TO 2 MICRONS
OF TITANIUM NITRIDE ADDED TO SURFACES
B, C AND D. (MINIMUM SURFACES) COATING
PROCESS SHALL NOT NEGATIVELY IMPACT PIN
HARDNESS PARAMETERS SHOWN ABOVE.

SEE PAGE B-1.1 FOR
GLOBAL MATERIALS CHART



CHECK PINS FOR LOAD AND UNLOAD CLEARANCE WITH THE PIN IN THE RETRACT POSITION
TABULATED INFORMATION ON FOLLOWING PAGE

RETRACTABLE LOCATING PIN

16 mm THRU 40 mm DIAMETER TM

(FULL METRIC)

GLOBAL STANDARD COMPONENTS



Assembly

04/30/15

16 mm Round Hole

B Rad = 2.0

C Rad = 48.0

D = 16 ^{h6}

NAAMS CODE	TiN CODE	A	L	WT. kg
APQ161R	APQ161RT	10.0	82.7	0.11
APQ162R	APQ162RT	15.0	87.7	0.12
APQ163R	APQ163RT	25.0	97.7	0.13
APQ164R	APQ164RT	35.0	107.7	0.15
APQ165R	APQ165RT	45.0	117.7	0.16
APQ166R	APQ166RT	55.0	127.7	0.18
APQ167R	APQ167RT	65.0	137.7	0.19
APQ168R	APQ168RT	75.0	147.7	0.21

18 mm Round Hole

B Rad = 2.0

C Rad = 38.0

D = 18 ^{h6}

NAAMS CODE	TiN CODE	A	L	WT. kg
APQ181R	APQ181RT	10.0	81.3	0.12
APQ182R	APQ182RT	15.0	86.3	0.13
APQ183R	APQ183RT	25.0	96.3	0.15
APQ184R	APQ184RT	35.0	106.3	0.17
APQ185R	APQ185RT	45.0	116.3	0.18
APQ186R	APQ186RT	55.0	126.3	0.20
APQ187R	APQ187RT	65.0	136.3	0.22
APQ188R	APQ188RT	75.0	146.3	0.24

20 mm Round Hole

B Rad = 2.0

C Rad = 38.0

D = 20 ^{h6}

NAAMS CODE	TiN CODE	A	L	WT. kg
APQ201R	APQ201RT	10.0	82.6	0.13
APQ202R	APQ202RT	15.0	87.6	0.14
APQ203R	APQ203RT	25.0	97.6	0.16
APQ204R	APQ204RT	35.0	107.6	0.19
APQ205R	APQ205RT	45.0	117.6	0.21
APQ206R	APQ206RT	55.0	127.6	0.24
APQ207R	APQ207RT	65.0	137.6	0.26
APQ208R	APQ208RT	75.0	147.6	0.29

25 mm Round Hole

B Rad = 2.0

C Rad = 50.0

D = 25 ^{h6}

NAAMS CODE	TiN CODE	A	L	WT. kg
APQ251R	APQ251RT	10.0	90.0	0.17
APQ252R	APQ252RT	15.0	95.0	0.19
APQ253R	APQ253RT	25.0	105.0	0.23
APQ254R	APQ254RT	35.0	115.0	0.27
APQ255R	APQ255RT	45.0	125.0	0.30
APQ256R	APQ256RT	55.0	135.0	0.34
APQ257R	APQ257RT	65.0	145.0	0.38
APQ258R	APQ258RT	75.0	155.0	0.42

30 mm Round Hole

B Rad = 2.0

C Rad = 50.0

D = 30 ^{h6}

NAAMS CODE	TiN CODE	A	L	WT. kg
APQ301R	APQ301RT	10.0	92.8	0.22
APQ302R	APQ302RT	15.0	97.8	0.25
APQ303R	APQ303RT	25.0	107.8	0.30
APQ304R	APQ304RT	35.0	117.8	0.36
APQ305R	APQ305RT	45.0	127.8	0.41
APQ306R	APQ306RT	55.0	137.8	0.47
APQ307R	APQ307RT	65.0	147.8	0.52
APQ308R	APQ308RT	75.0	157.8	0.58

35 mm Round Hole

B Rad = 2.0

C Rad = 50.0

D = 35 ^{h6}

NAAMS CODE	TiN CODE	A	L	WT. kg
APQ351R	APQ351RT	10.0	95.3	0.28
APQ352R	APQ352RT	15.0	100.3	0.32
APQ353R	APQ353RT	25.0	110.3	0.40
APQ354R	APQ354RT	35.0	120.3	0.47
APQ355R	APQ355RT	45.0	130.3	0.54
APQ356R	APQ356RT	55.0	140.3	0.62
APQ357R	APQ357RT	65.0	150.3	0.69
APQ358R	APQ358RT	75.0	160.3	0.77

40 mm Round Hole

B Rad = 2.0

C Rad = 50.0

D = 40 ^{h6}

NAAMS CODE	TiN CODE	A	L	WT. kg
APQ401R	APQ401RT	10.0	97.5	0.36
APQ402R	APQ402RT	15.0	102.5	0.41
APQ403R	APQ403RT	25.0	112.5	0.50
APQ404R	APQ404RT	35.0	122.5	0.60
APQ405R	APQ405RT	45.0	132.5	0.70
APQ406R	APQ406RT	55.0	142.5	0.80
APQ407R	APQ407RT	65.0	152.5	0.89
APQ408R	APQ408RT	75.0	162.5	0.99

LOCATING HOLD-DOWN PIN ASSEMBLY INTRODUCTION

GLOBAL STANDARD COMPONENTS

TM

NAAMS



Assembly

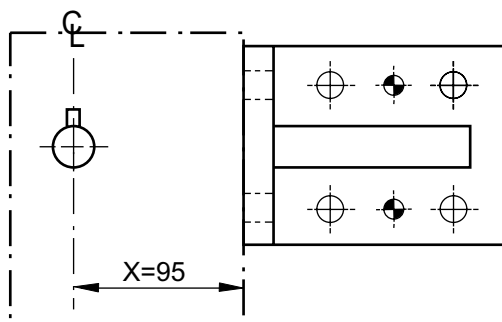
04/30/15

The Standard mounting locations for the Locating Hold-Down Pin Assemblies were created to promote interchangeability among manufacturers.

- Full interchangeability among manufacturers is not feasible due to variations in design envelopes, but the 3 way shimming and specified pin location are highly desirable.
- Some tool builders may opt for Z-direction shimming only with precision location of the riser to attain X and Y location.
- The standards specify X, Y & Z pin locations relative to a NAAMS 70 X 70 mounting hole pattern.
- The X, Y & Z pin locations are shown with 5.0 mm spacer adjustment per coordinate direction.
- The X, Y & Z dimensions will change by 5.0 mm if the final customer requires 10 mm of nominal spacer/shims for adjustment per coordinate direction.
- Suppliers shall offer the option to purchase the unit and brackets in a kit form with a call-out number.

A

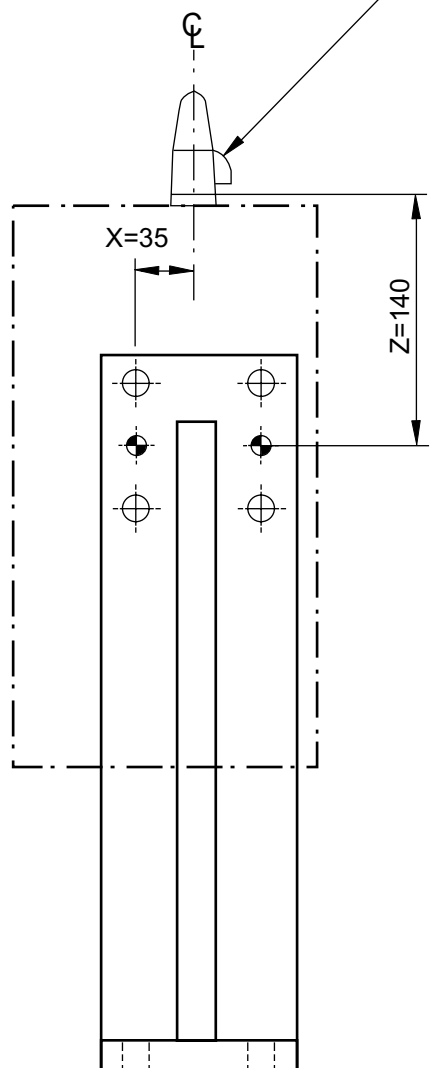
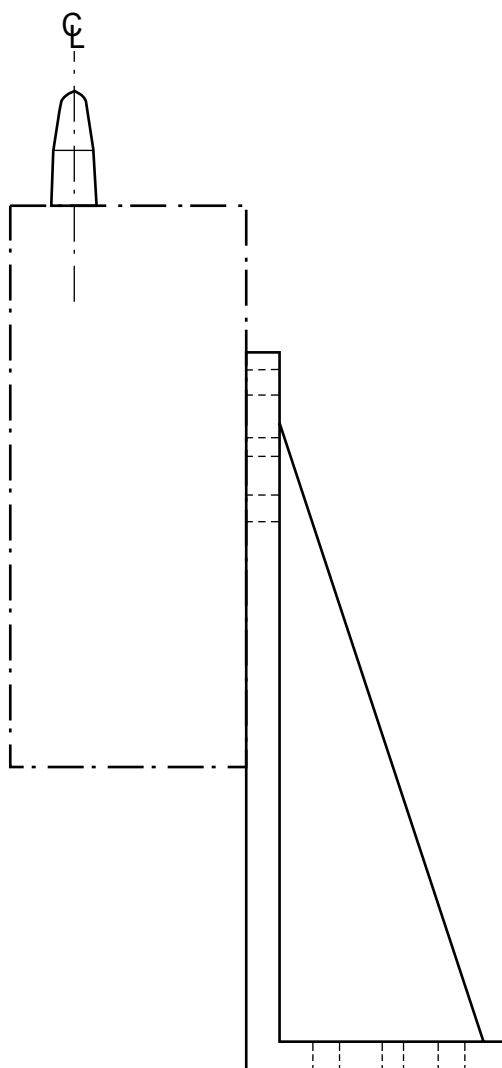
LOCATING HOLD-DOWN PIN ASSEMBLY, INSIDE MOUNT



X=95 Y=35 Z=140

Z DIMENSION IS TO THE BOTTOM
OF THE SHEET METAL

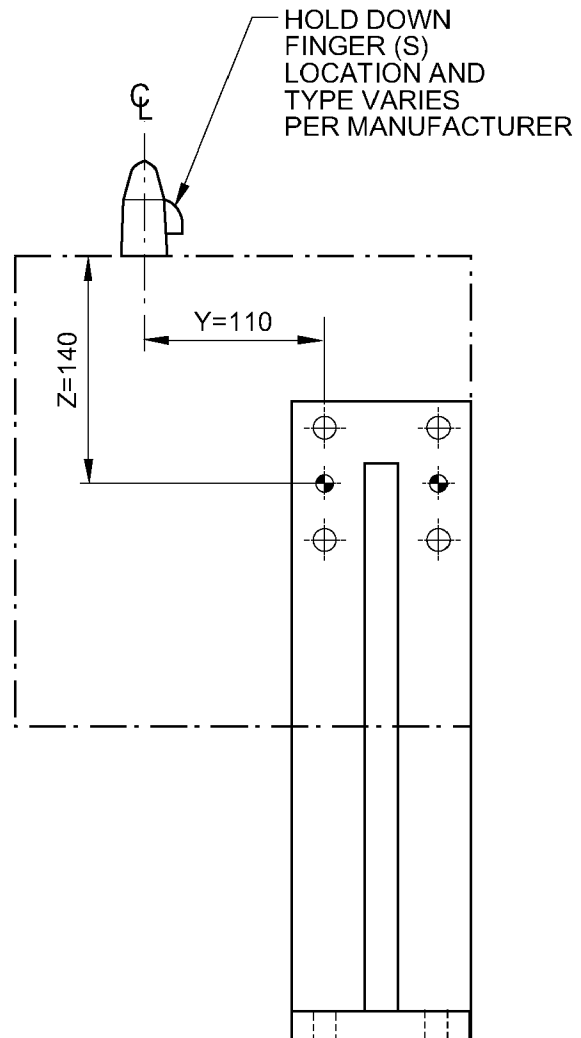
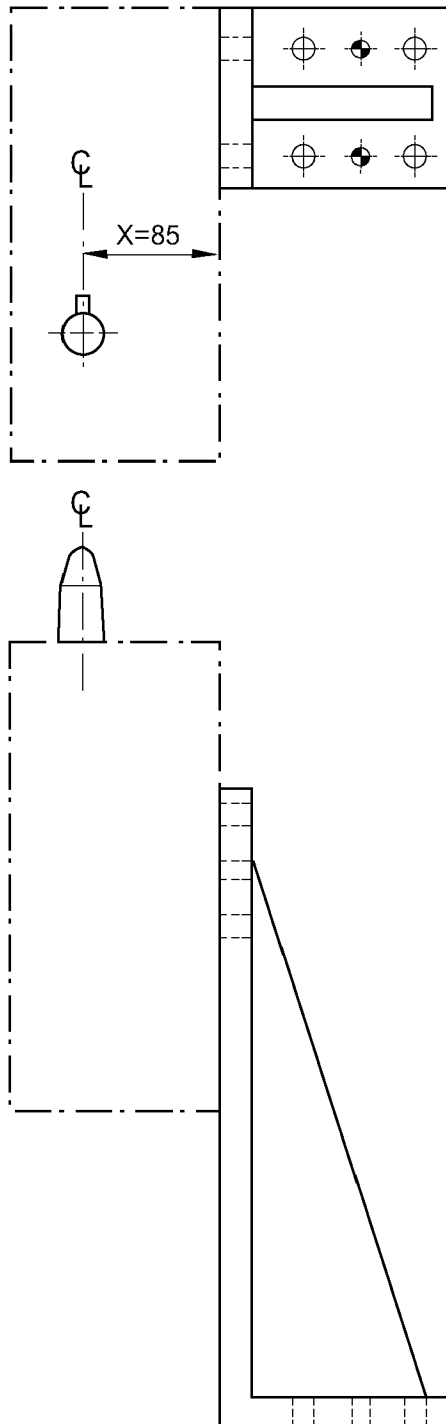
HOLD DOWN FINGER (S)
LOCATION AND TYPE
VARIES PER MANUFACTURER



LOCATING HOLD-DOWN PIN ASSEMBLY, OUTSIDE MOUNT

X=85 Y=110 Z=140

Z DIMENSION IS TO THE BOTTOM
OF THE SHEET METAL



A