



**HOWMET  
AEROSPACE**

Howmet Fastening Systems  
Carson Operations  
900 E. Watson Center Road  
Carson, California 90745 U.S.A.

Phone (310) 830-8200  
HFS\_Carson\_Engineering@howmet.com

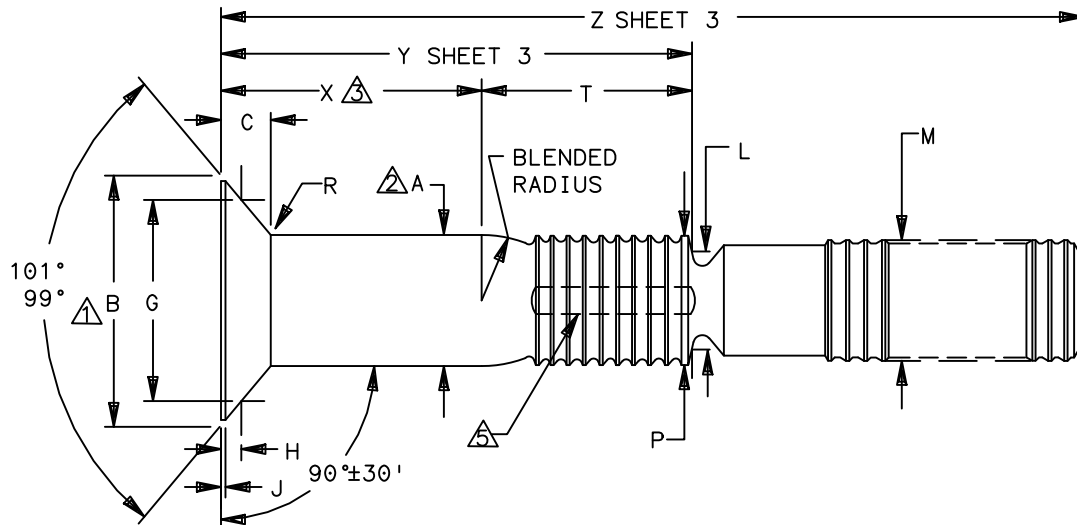
Howmet Fastening Systems  
Us Operations  
Clos D' Asseville BP 30004  
95450 Us Par Vigny France

Phone +33-1-30.27.95.00  
Fax +33-1-34.66.06.00

GP™

**ENGINEERING  
STANDARD**

THIS DRAWING, THE STRUCTURAL DESIGN DISCLOSED THEREIN AND THE TECHNICAL DATA AND ENGINEERING SERVICE REPRESENTED THEREBY ARE THE EXCLUSIVE PROPERTY OF HUCK INTERNATIONAL INCORPORATED.



| GP FAMILY NUMBER    | NOM SIZE | A SHANK DIA +.0005 - .0000 | A SHANK DIA COATED ±.0005 | B THEO INTER DIA MAX | C HEAD HEIGHT MAX | G GAGE DIA ±.0001 | H GAGE HEIGHT |       | J MAX | L DIA REF | M DIA MAX | P DIA MAX | R RAD ±.005 | S $\Delta$ | T REF |
|---------------------|----------|----------------------------|---------------------------|----------------------|-------------------|-------------------|---------------|-------|-------|-----------|-----------|-----------|-------------|------------|-------|
|                     |          |                            |                           |                      |                   |                   | MAX           | MIN   |       |           |           |           |             |            |       |
| GPL8TC-EU05-( ) ( ) | .164     | .1630                      | .1630                     | .333                 | .072              | .2831             | .0202         | .0175 | .011  | .136      | .156      | .156      | .020        | .0045      | .279  |
| GPL8TC-EU06-( ) ( ) | .190     | .1890                      | .1890                     | .384                 | .083              | .3271             | .0230         | .0200 | .013  | .164      | .184      | .184      | .025        | .0045      | .319  |
| GPL8TC-EU08-( ) ( ) | .250     | .2490                      | .2490                     | .511                 | .111              | .4319             | .0322         | .0288 | .017  | .224      | .244      | .244      | .025        | .0045      | .381  |
| GPL8TC-EU10-( ) ( ) | .312     | .3115                      | .3115                     | .638                 | .139              | .5450             | .0378         | .0342 | .020  | .268      | .306      | .306      | .035        | .0045      | .472  |
| GPL8TC-EU12-( ) ( ) | .375     | .3740                      | .3740                     | .766                 | .167              | .6581             | .0439         | .0401 | .023  | .339      | .368      | .370      | .035        | .0060      | .523  |

- $\Delta$  CONCENTRICITY: CONICAL SURFACE OF COUNTERSUNK HEAD TO "A" DIAMETER TO BE WITHIN .005 TIR.
- $\Delta$  SHANK STRAIGHTNESS: WITHIN "S" VALUES TIR PER INCH OF SHANK LENGTH.
- $\Delta$  GRIP LENGTH IS MEASURED FROM THE TOP OF THE HEAD TO THE END OF THE FULL CYLINDRICAL PORTION OF THE SHANK. (SEE DIMENSION "X" SHEET 3)
- 4 DIMENSION B AND C FOR ENGINEERING REFERENCE ONLY, NOT FOR INSPECTION PURPOSES

MATERIAL: A-286 CRES PER AMS 5737.

MINIMUM SHEAR STRENGTH: 95 KSI.

SURFACE TEXTURE: Ra MAX PER ANSI-B46.1 BEFORE COATING. CONICAL SURFACE OF HEAD, HEAD TO SHANK FILLET RADIUS, SHANK AND TRANSITION RADIUS, -32, OTHER SURFACES -125.

DIMENSIONS IN INCHES

PROCUREMENT SPECIFICATION: NAS1413  
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|            |    |  |
|------------|----|--|
| DRAWN BY   | DH | FSCM (Cage Code) 17446 - Carson<br>FSCM (Cage Code) F6167 - France |
| CHECKED BY | HJ |  |

B3

|                |  |  |                                |
|----------------|--|--|--------------------------------|
| B <sub>3</sub> | REVISED COMPANY LOGO & UPDATED TRADEMARK INFORMATION. (REF. ECR2779) |  |                                |
| ISSUED         | 10/22/82   | PIN, GROOVE PROPORTIONED GP™<br>PULL-TYPE, SWAGE LOCKING,<br>TENSION 100° FLUSH HEAD<br>A-286 CRES. (95 KSI SHEAR) | GPL8TC-EU( )-( )<br><br>GPL109 |
| REVISED        | 08/06/21   |  |                                |
| PAGE           | 1 OF 3   |  |                                |



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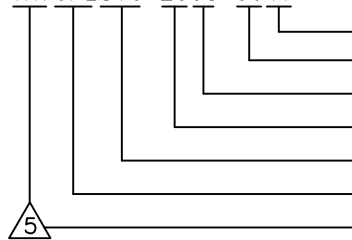
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FINISH: NO LETTER = PASSIVATE PER QQ-P-35 LUBRICATE WITH CETYL ALCOHOL  
 SUFFIX "B" = PASSIVATE PER QQ-P-35 BARE-NO LUBRICATION  
 SUFFIX "C" = CADMIUM PLATE PER QQ-P-416 TYPE II CLASS 2,  
 LUBRICATE WITH CHLORINE FREE CETYL ALCOHOL  
 SUFFIX "CB" = CADMIUM PLATE AS ABOVE, BARE NON-LUBRICATED PIN

HEAD MARKING: HEADS SHALL BE MARKED WITH THE MANUFACTURER'S SYMBOL, BASIC NUMBER (GP8) AND THE LETTER (C) FOR A-286 CRES MATERIAL, DEPRESSED .010 MAX. ARRANGEMENT OPTIONAL. FOR PINS REQUIRING A ESCAPE GROOVE, A DOT (.) MARK WILL ALSO BE INCLUDED ON THE HEAD IDENTIFICATION.

CODING: THE FIRST SET OF LETTERS DESIGNATE THE FAMILY OF GROOVE PROPORTIONED PINS FOR AEROSPACE APPLICATIONS (GPL).  
 THE SECOND SET OF LETTERS & NUMBER 8TC DESIGNATE HEAD SIZE, STYLE, AND LOAD APPLICATION.  
 THE NEXT LETTER "EU", IS THE MATERIAL DESIGNATOR FOR A-286 CRES  
 MIN SHEAR STRENGTH: 95 KSI.  
 THE NUMBERS FOLLOWING THE MATERIAL DESIGNATE THE NOMINAL PIN SHANK DIAMETER IN .0312 INCH INCREMENTS.  
 THE FINAL NUMBER(S) DESIGNATES THE GRIP LENGTH NUMBER OR THE NOMINAL PIN SHANK LENGTH IN .0625 INCH INCREMENTS.

EXAMPLE: (H)GPL8TC-EU08-06()



FINISH SUFFIX, SEE FINISH CODE.  
 GRIP LENGTH IN .0625 INCH INCREMENTS.  
 SHANK DIA IN .0312 INCH INCREMENTS  
 MATERIAL - A-286 CRES  
 LARGE 100° HEAD FOR TENSION APPLICATIONS  
 FAMILY OF GP PINS FOR AEROSPACE APPLICATIONS  
 ADD "H" PREFIX TO PART NUMBER TO INCLUDE SEALANT ESCAPE GROOVE.

| MECHANICAL PROPERTIES |              |                             |                    |  |                         |
|-----------------------|--------------|-----------------------------|--------------------|--|-------------------------|
| GP PIN PART NUMBER    | PIN NOM SIZE | MINIMUM DOUBLE SHEAR POUNDS | COLLAR PART NUMBER | MIN ULTIMATE TENSILE LBS WITH LISTED COLLARS | PIN POSITION SWAGE GAGE |
| GPL8TC-EU05-(( ))     | .164         | 4010                        | 2TC-C05            | 2180   | HG105-05                |
| GPL8TC-EU06-(( ))     | .190         | 5380                        | 2TC-C06            | 2750   | HG105-06                |
| GPL8TC-EU08-(( ))     | .250         | 9300                        | 2TC-C08            | 5000   | HG105-08                |
| GPL8TC-EU10-(( ))     | .312         | 14600                       | 2TC-C10            | 8300   | HG105-10                |
| GPL8TC-EU12-(( ))     | .375         | 21000                       | 2TC-C12            | 12700  | HG105-12                |

DIMENSIONS IN INCHES

B<sub>3</sub>

REVISED COMPANY LOGO & UPDATED TRADEMARK INFORMATION.(REF. ECR2779)

|         |          |
|---------|----------|
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| REVISED | 08/06/21 |
| PAGE    | 2 OF 3   |

PIN, GROOVE PROPORTIONED GP™  
 PULL-TYPE, SWAGE LOCKING,  
 TENSION 100° FLUSH HEAD  
 A-286 CRES. (95 KSI SHEAR)

GPL8TC-EU(( ))-(( ))  
 GPL109



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| GRIP NUMBER TABULATION   |  |                      |       |  |            |            |                     |            |                     |            |                     |            |                     |            |                     |
|--------------------------|--|----------------------|-------|--|------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|
| △<br>GRIP<br>DASH<br>NO. | MINIMUM<br>PERMIS-<br>SIBLE<br>GRIP<br>OVERLAP | DESIGN GRIP<br>RANGE |       | MAXIMUM<br>PERMIS-<br>SIBLE<br>GRIP<br>OVERLAP | X<br>±.005 | 05         |                     | 06         |                     | 08         |                     | 10         |                     | 12         |                     |
|                          |  | MIN.                 | MAX.  |  |            | Y<br>±.010 | Z<br>+.060<br>-.000 | Y<br>±.010 | Z<br>+.060<br>-.000 | Y<br>±.010 | Z<br>+.060<br>-.000 | Y<br>±.010 | Z<br>+.060<br>-.000 | Y<br>±.010 | Z<br>+.060<br>-.000 |
|                          |  |                      |       |  |            |            |                     |            |                     |            |                     |            |                     |            |                     |
| 02                       | .047   | .063                 | .125  | .141   | .125       | .404       | 1.38                | .444       | 1.42                | .506       | 1.50                | —          | —                   | —          | —                   |
| 03                       | .109   | .126                 | .188  | .203   | .188       | .467       | 1.44                | .507       | 1.48                | .569       | 1.56                | .660       | 1.86                | —          | —                   |
| 04                       | .172   | .189                 | .250  | .266   | .250       | .529       | 1.51                | .569       | 1.55                | .631       | 1.62                | .722       | 1.92                | .773       | 2.13                |
| 05                       | .234   | .251                 | .312  | .328   | .312       | .591       | 1.57                | .631       | 1.61                | .693       | 1.68                | .784       | 1.99                | .835       | 2.20                |
| 06                       | .297   | .313                 | .375  | .391   | .375       | .654       | 1.63                | .694       | 1.67                | .756       | 1.75                | .847       | 2.05                | .898       | 2.26                |
| 07                       | .359   | .376                 | .438  | .453   | .438       | .717       | 1.69                | .757       | 1.73                | .819       | 1.81                | .910       | 2.11                | .961       | 2.32                |
| 08                       | .422   | .439                 | .500  | .516   | .500       | .779       | 1.76                | .819       | 1.80                | .881       | 1.87                | .972       | 2.17                | 1.023      | 2.38                |
| 09                       | .484   | .501                 | .562  | .578   | .562       | .841       | 1.82                | .881       | 1.86                | .943       | 1.93                | 1.034      | 2.24                | 1.085      | 2.44                |
| 10                       | .547   | .563                 | .625  | .641   | .625       | .904       | 1.88                | .944       | 1.92                | 1.006      | 2.00                | 1.097      | 2.30                | 1.148      | 2.51                |
| 11                       | .609   | .626                 | .688  | .703   | .688       | .967       | 1.95                | 1.007      | 1.99                | 1.069      | 2.06                | 1.160      | 2.36                | 1.211      | 2.57                |
| 12                       | .672   | .689                 | .750  | .766   | .750       | 1.029      | 2.01                | 1.069      | 2.05                | 1.131      | 2.12                | 1.222      | 2.42                | 1.273      | 2.63                |
| 13                       | .734   | .751                 | .812  | .828   | .812       | 1.091      | 2.07                | 1.131      | 2.11                | 1.193      | 2.18                | 1.284      | 2.48                | 1.335      | 2.69                |
| 14                       | .797   | .813                 | .875  | .891   | .875       | 1.154      | 2.13                | 1.194      | 2.17                | 1.256      | 2.25                | 1.347      | 2.55                | 1.398      | 2.76                |
| 15                       | .859   | .876                 | .938  | .953   | .938       | 1.217      | 2.20                | 1.257      | 2.24                | 1.319      | 2.31                | 1.410      | 2.61                | 1.461      | 2.82                |
| 16                       | .922   | .939                 | 1.000 | 1.016  | 1.000      | 1.279      | 2.26                | 1.319      | 2.30                | 1.381      | 2.37                | 1.472      | 2.67                | 1.523      | 2.88                |
| 17                       | .984   | 1.001                | 1.062 | 1.078  | 1.062      | 1.341      | 2.32                | 1.381      | 2.36                | 1.443      | 2.43                | 1.534      | 2.73                | 1.585      | 2.95                |
| 18                       | 1.047  | 1.063                | 1.125 | 1.141  | 1.125      | 1.404      | 2.38                | 1.444      | 2.42                | 1.506      | 2.50                | 1.597      | 2.80                | 1.648      | 3.01                |
| 19                       | 1.109  | 1.126                | 1.188 | 1.203  | 1.188      | 1.467      | 2.44                | 1.507      | 2.48                | 1.569      | 2.56                | 1.660      | 2.86                | 1.711      | 3.07                |
| 20                       | 1.172  | 1.189                | 1.250 | 1.266  | 1.250      | 1.529      | 2.51                | 1.569      | 2.55                | 1.631      | 2.62                | 1.722      | 2.92                | 1.773      | 3.13                |
| 21                       | 1.234  | 1.251                | 1.312 | 1.328  | 1.312      | 1.591      | 2.57                | 1.631      | 2.61                | 1.693      | 2.68                | 1.784      | 2.99                | 1.835      | 3.20                |
| 22                       | 1.297  | 1.313                | 1.375 | 1.391  | 1.375      | 1.654      | 2.63                | 1.694      | 2.67                | 1.756      | 2.75                | 1.874      | 3.05                | 1.898      | 3.26                |
| 23                       | 1.359  | 1.376                | 1.438 | 1.453  | 1.438      | 1.717      | 2.69                | 1.757      | 2.73                | 1.819      | 2.81                | 1.910      | 3.11                | 1.961      | 3.32                |
| 24                       | 1.422  | 1.439                | 1.500 | 1.516  | 1.500      | 1.779      | 2.76                | 1.819      | 2.80                | 1.881      | 2.87                | 1.972      | 3.17                | 2.023      | 3.38                |
| 25                       | 1.484  | 1.501                | 1.562 | 1.578  | 1.562      | 1.841      | 2.82                | 1.881      | 2.86                | 1.943      | 2.93                | 2.034      | 3.24                | 2.085      | 3.44                |
| 26                       | 1.547  | 1.563                | 1.625 | 1.641  | 1.625      | 1.904      | 2.88                | 1.944      | 2.92                | 2.006      | 3.00                | 2.097      | 3.30                | 2.148      | 3.51                |
| 27                       | 1.609  | 1.626                | 1.688 | 1.703  | 1.688      | 1.967      | 2.95                | 2.007      | 2.99                | 2.069      | 3.06                | 2.160      | 3.36                | 2.211      | 3.57                |
| 28                       | 1.672  | 1.689                | 1.750 | 1.766  | 1.750      | 2.029      | 3.01                | 2.069      | 3.05                | 2.131      | 3.12                | 2.222      | 3.42                | 2.273      | 3.63                |
| 29                       | 1.734  | 1.751                | 1.812 | 1.828  | 1.812      | 2.091      | 3.07                | 2.131      | 3.11                | 2.193      | 3.18                | 2.284      | 3.48                | 2.335      | 3.69                |
| 30                       | 1.797  | 1.813                | 1.875 | 1.891  | 1.875      | 2.154      | 3.13                | 2.194      | 3.17                | 2.256      | 3.25                | 2.347      | 3.55                | 2.398      | 3.76                |
| 31                       | 1.859  | 1.876                | 1.938 | 1.953  | 1.938      | 2.217      | 3.20                | 2.257      | 3.24                | 2.319      | 3.31                | 2.410      | 3.61                | 2.461      | 3.82                |
| 32                       | 1.922  | 1.939                | 2.000 | 2.016  | 2.000      | 2.279      | 3.26                | 2.319      | 3.30                | 2.381      | 3.37                | 2.472      | 3.67                | 2.523      | 3.88                |

DIMENSIONS IN INCHES

B<sub>3</sub>

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TENSION 100° FLUSH HEAD  
A-286 CRES. (95 KSI SHEAR)

GPL8TC-EU( )-( ) ( )

GPL109