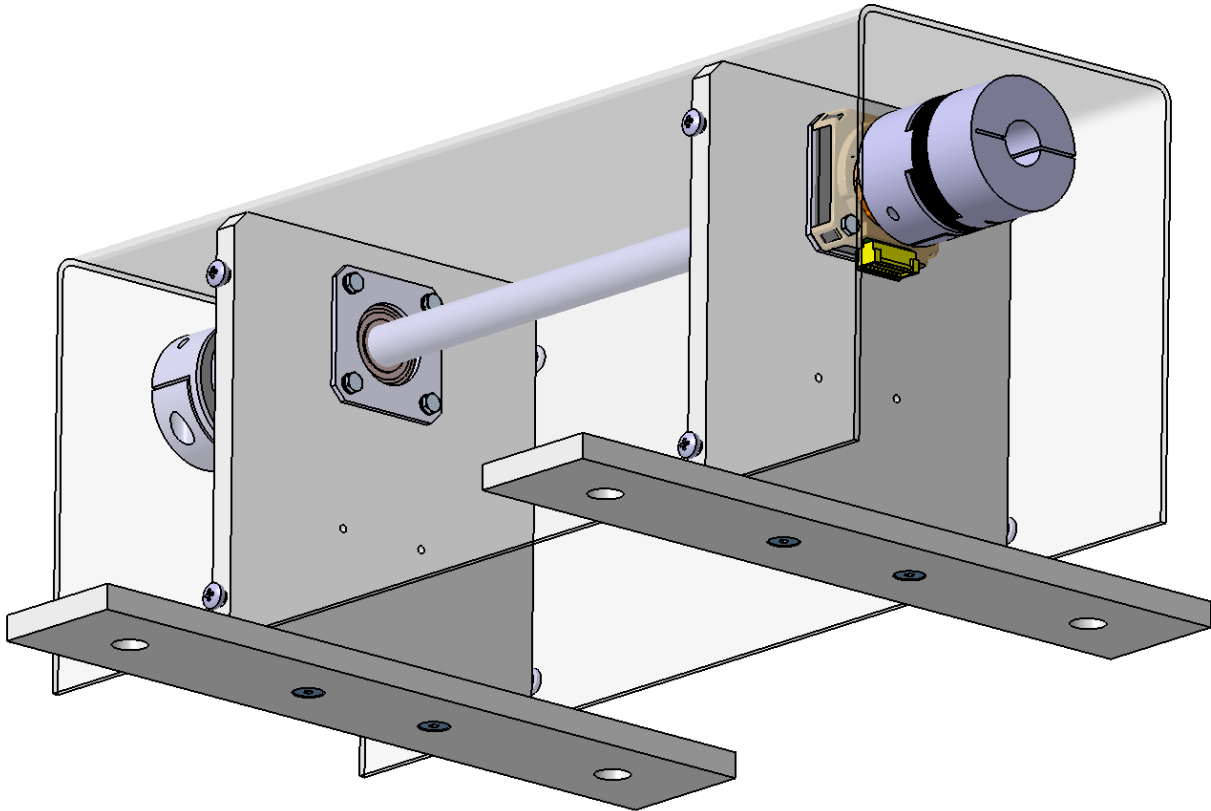


Couplemètre par déformation angulaire



Données

Adaptation sur les bancs d'essai langlois (hauteur d'axe 112 mm, entraxe rails 192 mm)

Couple nominal : 10 N·m, couple maximal 50 N·m

Dimensionnement (vérifications)

Corps d'épreuve : tige aluminium D12,7 mm L 300 mm de chez RS-Online, références

- 559-167 : matériau 2011 (AW-AlCu6BiPb)¹ $R_{p02} \geq 255 \text{ MPa}$; $R_m \geq 295 \text{ MPa}$
- 681-053 : Matériau HE30TF équivalent 6082 T6 (BS1474)² $R_{p02} \geq 255 \text{ MPa}$; $R_m \geq 295 \text{ MPa}$

contrainte nominale $\tau = \frac{16C}{\pi d^3} = \frac{16 \times 10000}{3,1416 \times 12,7^3} = 24,86 \text{ MPa}$ – Critère de Tresca : $\sigma_{eq} = 50 \text{ MPa}$

contrainte max $\tau = \frac{16C}{\pi d^3} = \frac{16 \times 50000}{3,1416 \times 12,7^3} = 124,32 \text{ MPa}$ – Critère de Tresca : $R_e \geq 250 \text{ MPa}$

Au max on passe juste sans coefficient de sécurité. (c'est le prix pour un angle de torsion important)

¹ <https://www.depery-dufour.fr/wp-content/uploads/2018/03/2011.pdf> en supposant un état T3, non précisé chez RS-online, seule la dureté (HB110) est donnée

² <https://www.smithmetal.com/pdf/aluminium/bar/1111.pdf>. RS-online ne fournit pas de fiches matières digne de ce nom.

angle de torsion $\theta = \frac{C}{G \cdot I_0} L$.

Hypothèse :

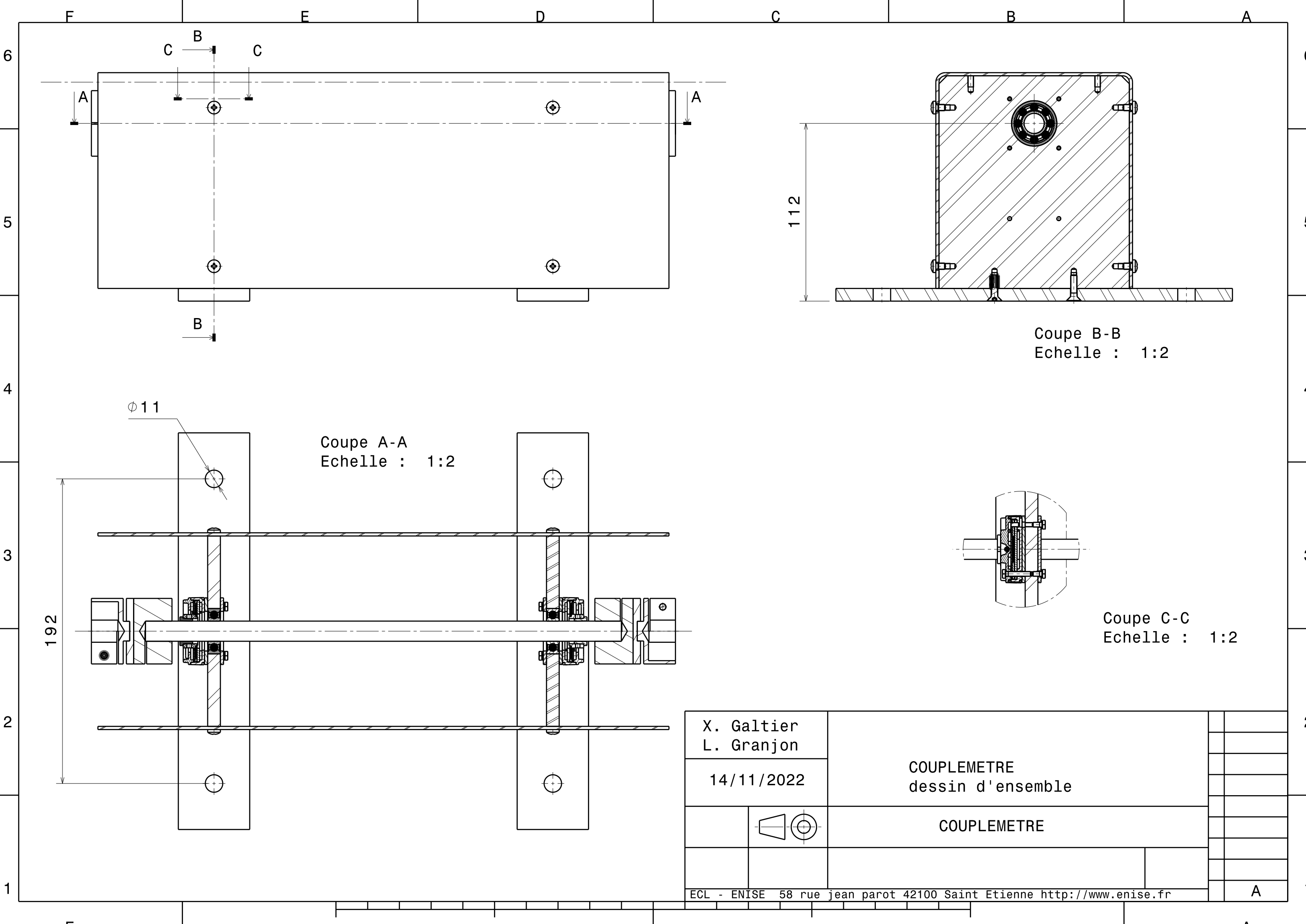
$$E = 70 \text{ GPa}, \nu = 0,34, \text{ soit } G = \frac{70}{2(1+0,34)} = 26,12 \text{ GPa} ;$$

$$I_0 = \pi \frac{d^4}{32} = 2553,96 \text{ mm}^4$$

Angle pour L=300 mm

$$\text{nominal : } \theta = \frac{10000}{26120 \cdot 2554} 300 = 0,04 \text{ rad} = 2,58^\circ$$

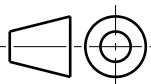
$$\text{maximal } \theta = \frac{50000}{26120 \cdot 2554} 300 = 0,22 \text{ rad} = 12,88^\circ$$

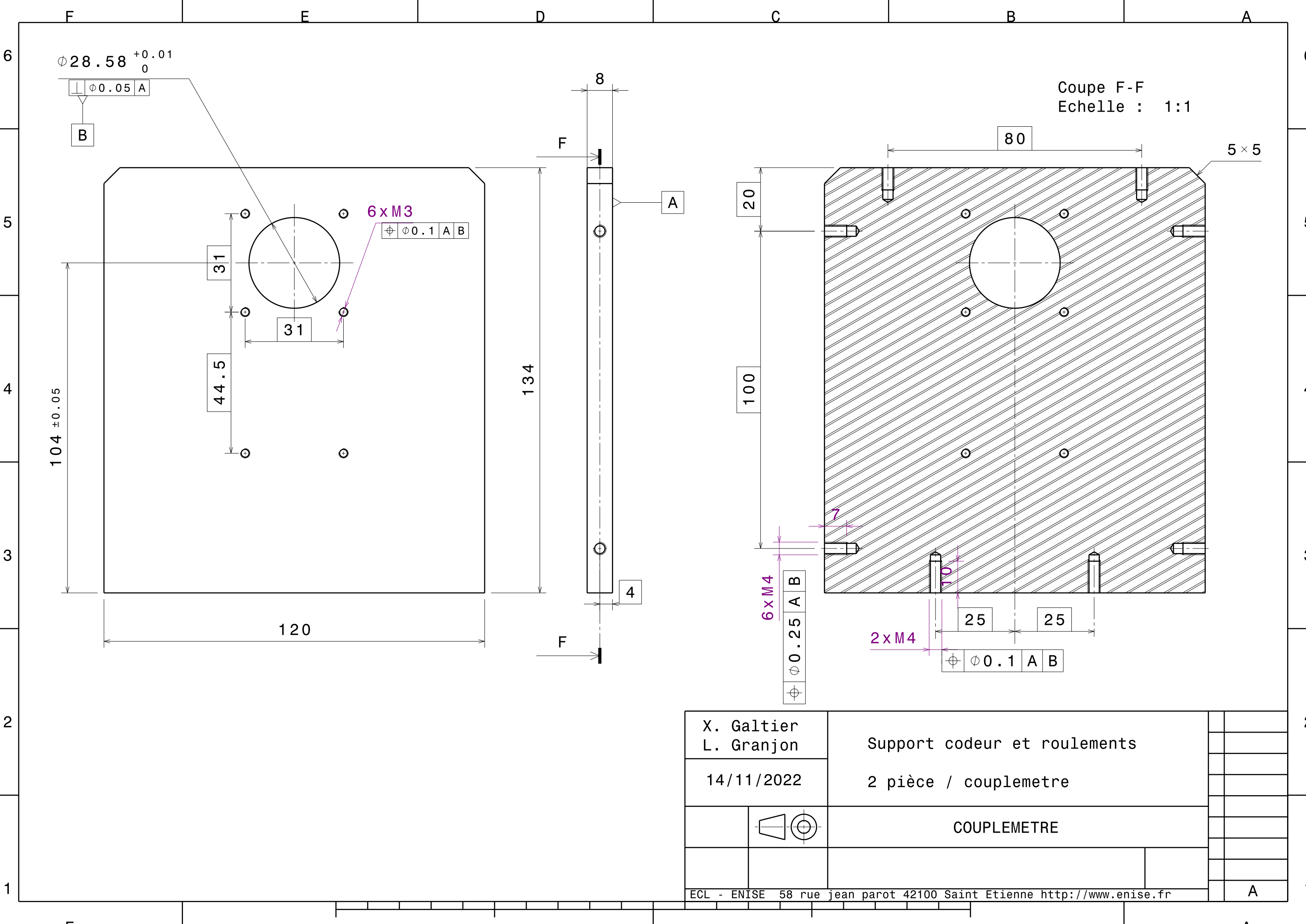


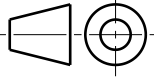
Coupe A-A
Echelle : 1:2

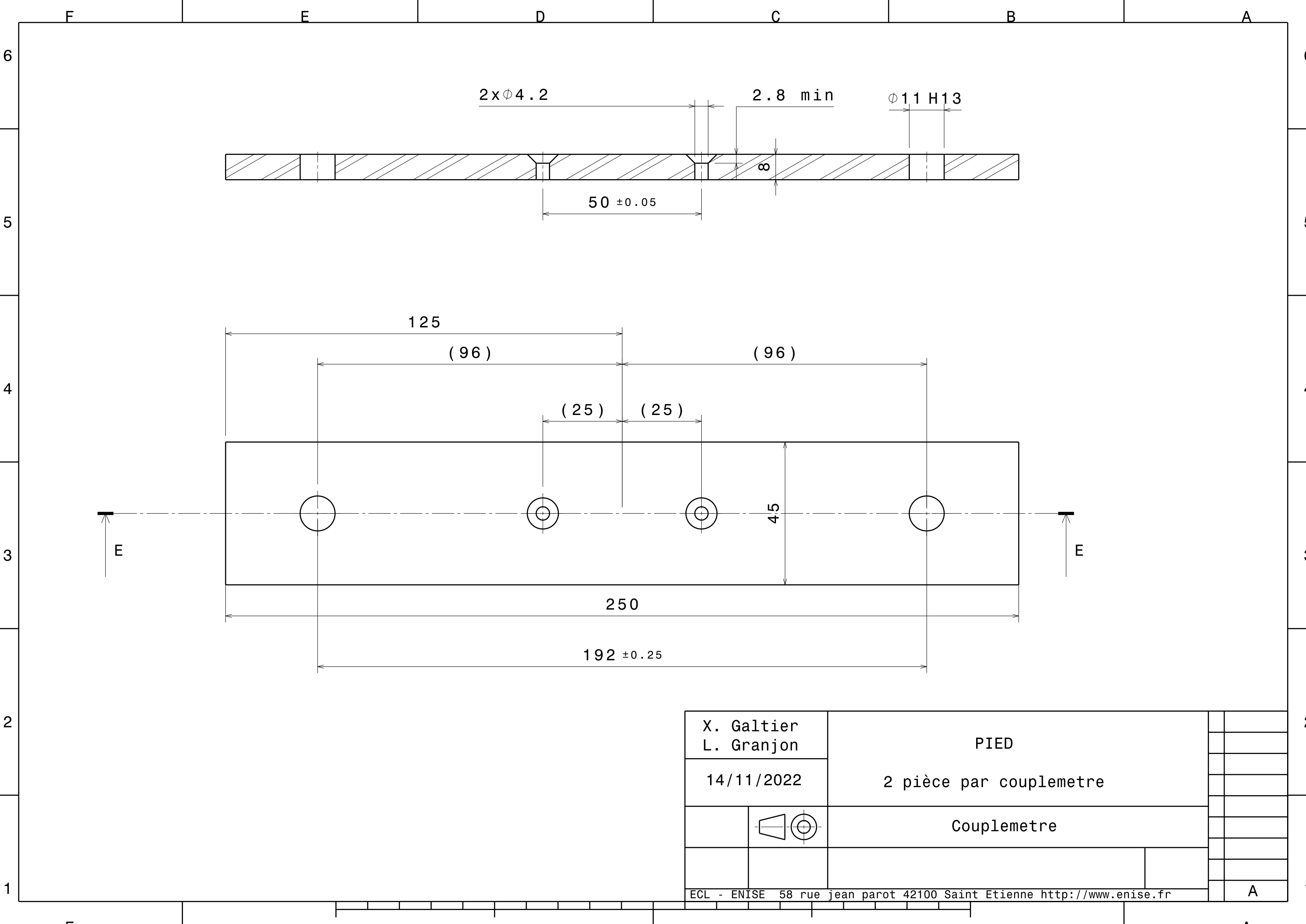
Coupe B-B
Echelle : 1:2

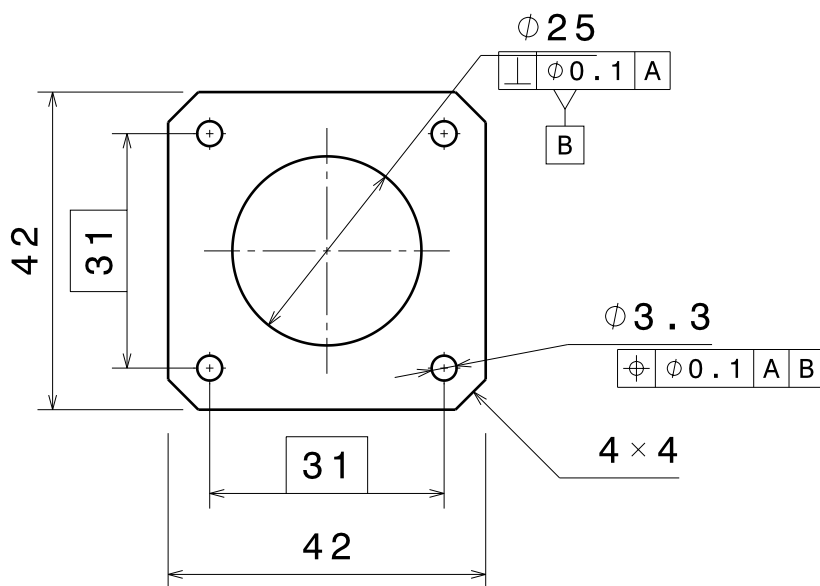
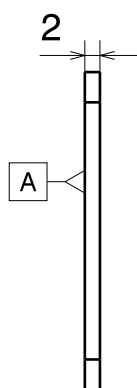
Coupe C-C
Echelle : 1:2

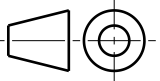
| | | | | | |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------|--|--|---|
| X. Galtier L. Granjon | | COUPLEMETRE dessin d'ensemble | | | |
| 14/11/2022 | | | | | |
| |  | COUPLEMETRE | | | |
| | | | | | |
| ECL - ENISE 58 rue jean parot 42100 Saint Etienne http://www.enise.fr | | | | | A |

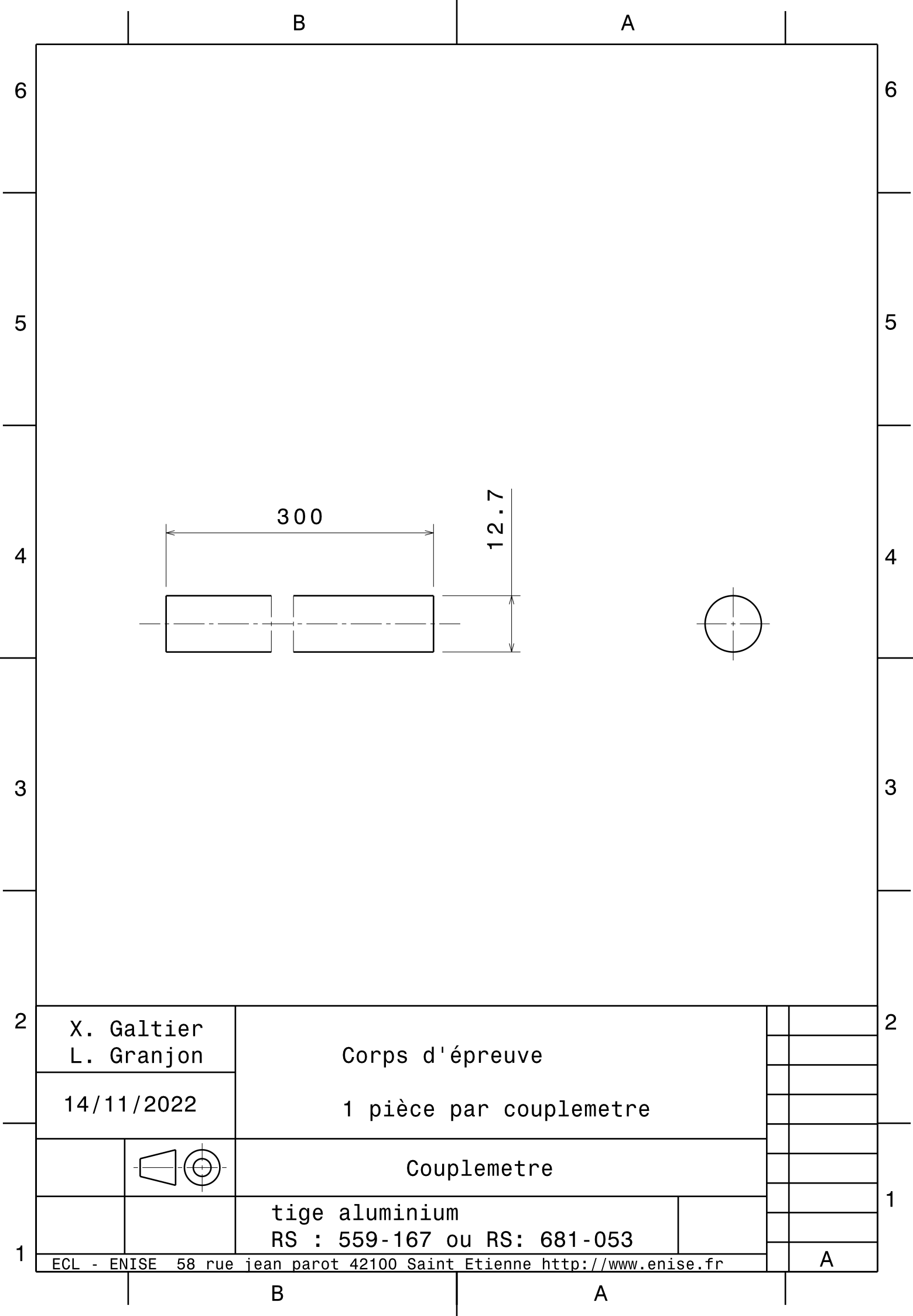


| | | | | | |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------|--|--|---|
| X. Galtier L. Granjon | | Support codeur et roulements | | | |
| 14/11/2022 | | | | | |
| |  | COUPLEMETRE | | | |
| | | | | | |
| ECL - ENISE 58 rue jean parot 42100 Saint Etienne http://www.enise.fr | | | | | A |





| | | | | | | | | |
|---|---------------------------------------------------------------------------------------------------------|--------------------------|--|--|--|--|---|---|
| 2 | X. Galtier L. Granjon | Arret axial | | | | | | 2 |
| | 14/11/2022 | 4 pièces par couplemetre | | | | | | |
| |  | Couplemetre | | | | | | |
| 1 | | | | | | | | |
| | ECL - ENISE 58 rue jean parot 42100 Saint Etienne http://www.enise.fr | | | | | | A | 1 |



Lateral Offset Couplings



General Performance Criteria

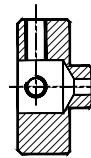
Temperature Range

–20°C to +60°C

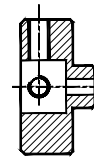
Maximum Rotational Speed

3000 rev/min

- ① **Blind hubs:** Length of parallel bore ± 0.2 . Bores may terminate in 118° incl. angle or flat bottomed.
Thro' hubs: Max permissible hub penetration.



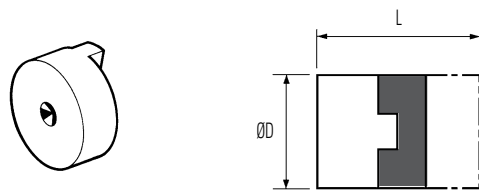
118° Included Angle



Flat Bottomed

- ② **Blind hubs:** Nominal distance between unchamfered shafts bottomed out to L1.
Thro' hubs: Nominal distance between shafts with standard (unbored) disc.
- ③ Maximum recommended tightening torque.
- ④ Values apply to complete couplings with max bores.
- ⑤ **Peak torque.** Select a size where Peak Torque exceeds the application torque x service factor.
- ⑥ Couplings can provide up to $(\text{ØD} \times 0.1)$ radial compensation in extreme cases.
 Observe given values for maximum backlash-free life.
 Axial compensation is set on installation.
 Electrical isolation between shafts > 3kV.
- ⑦ Values apply at 50% peak torque with no misalignment, measured shaft-to-shaft with largest standard bores.
- ⑧ Thro' hubs can be provided with keyways.

Blank hubs



User-adaptable for special needs, e.g. fitting within tubes. Blank hubs are supplied centred with no provision for fastening. External dimensions identical with blind hubs.

| Coupling size | Complete hub ref. | ØD | L |
|---------------|-------------------|------|------|
| 06 | 231.06.00 | 6.4 | 12.7 |
| 09 | 231.09.00 | 9.5 | 12.7 |
| 13 | 231.13.00 | 12.7 | 15.9 |
| 19 | 231.19.00 | 19.1 | 22.0 |
| 25 | 231.25.00 | 25.4 | 28.4 |
| 33 | 231.33.00 | 33.3 | 42.0 |
| 41 | 231.41.00 | 41.3 | 50.8 |

Standard discs (larger sizes are webbed)



- Acetal – High torsional stiffness, good bearing properties, long backlash-free life.
- Nylon 11 – Resilient, isolates noise & vibration. Performance approximately 25% that of acetal disc.

Thro' bored discs

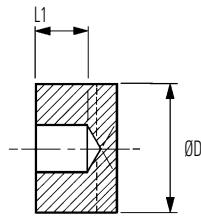


Thro' bored discs allow shafts to near-butt, standard thro' hole diameter = $\text{ØD} \times 0.5$. To order, add suffix 'T' to order code, eg., **236.25T**

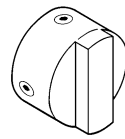
Other thro' hole diameters are manufactured to order. Specify the disc ref. and thro' hole diameter. This should equal the larger shaft diameter + 2 x max radial error.

Note that thro' bored discs reduce torsional stiffness.

Brass / Aluminium Blind Hubs



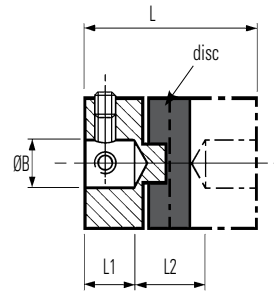
Controlled bore depth L1 provides a register when pre-assembling hubs to shafts



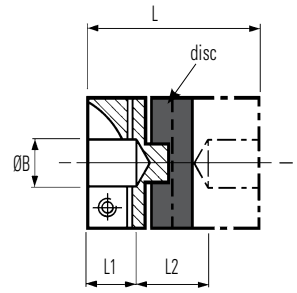
Set screw style



Clamp style



Refs. 232
Set screw style



Refs. 234
Clamp style

DIMENSIONS & ORDER CODES

| Coupling Type and Size | | Hub Ref | | Dimensions | | | | | | | Fasteners | | | Disc Ref | |
|------------------------|----|-----------------|-------------|------------|------|---------|---------|------------|--------------------------------|-----------------|-----------|-------------|-----------|---------------------|--------------------|
| | | Set Screw Style | Clamp Style | ØD mm | L mm | ① L1 mm | ② L2 mm | ØB1 Max mm | ④ Moment of Inertia kgm2 x10-8 | ④ Mass kg x10-3 | Size | ③ Torque Nm | Wrench mm | Acetal (black) Std. | Nylon 11 (Natural) |
| Blind Hubs | 06 | 232.06 | - | 6.4 | 12.7 | 3.8 | 5.1 | 3.18 | 6 | 2.5 | M3 | 0.9 | 1.5 | 236.06 | 238.06 |
| | 09 | 232.09 | - | 9.5 | 12.7 | 3.8 | 5.1 | 5 | 18 | 4 | M3 | 0.9 | 1.5 | 236.09 | 238.09 |
| | 13 | 232.13 | - | 12.7 | 15.9 | 4.3 | 7.3 | 6.35 | 26 | 11 | M3 | 0.9 | 1.5 | 236.13 | 238.13 |
| | 19 | 232.19 | - | 19.1 | 22.0 | 6.3 | 9.4 | 8 | 67 | 12 | M3 | 0.9 | 1.5 | 236.19 | 238.19 |
| | | - | 234.19 | | | | | | | | M2.5 | 1.3 | 2.0 | | |
| | 25 | 232.25 | - | 25.4 | 28.4 | 8.6 | 11.2 | 12 | 252 | 31 | M4 | 2.2 | 2.0 | 236.25 | 238.25 |
| | | - | 234.25 | | | | | | | | M3 | 2.4 | 2.5 | | |
| | 33 | 232.33 | - | 33.3 | 42.0 | 13.0 | 16.0 | 16 | 1074 | 72 | M5 | 4.6 | 1.5 | 836.33 | 838.33 |
| | | - | 234.33 | | | | | | | | M4 | 2.3 | 2.0 | | |
| | 41 | 232.41 | - | 41.3 | 50.8 | 16.7 | 17.4 | 20 | 3327 | 148 | M5 | 4.6 | 2.5 | 236.41 | 238.41 |
| | - | 234.41 | | | | | | | | M4 | 5.6 | 3.0 | | | |

PERFORMANCE (AT 20°C WITH STANDARD ACETAL DISC)

| Coupling Size | ⑤ Peak torque Nm | ⑥ Max compensation @ 3000 rpm | | | ⑦ Torsional | | Static break torque Nm |
|---------------|------------------|-------------------------------|-----------|------------|---------------|--------------------|------------------------|
| | | Angular deg | Radial mm | Axial ± mm | Rate deg / Nm | Stiffness Nm / rad | |
| 06 | 0.06 | 0.5 | 0.1 | 0.05 | 5.7 | 10 | 0.7 |
| 09 | 0.21 | | 0.1 | 0.05 | 1.9 | 30 | 2 |
| 13 | 0.5 | | 0.1 | 0.05 | 0.88 | 65 | 4 |
| 19 | 1.7 | | 0.2 | 0.1 | 0.50 | 115 | 8 |
| 25 | 4 | | 0.2 | 0.1 | 0.28 | 205 | 13 |
| 33 | 9 | | 0.2 | 0.15 | 0.093 | 615 | 53 |
| 41 | 17 | | 0.25 | 0.15 | 0.048 | 1200 | 57 |

Materials & Finishes

Hubs sizes 06 to 13 : Brass Cu Zn 21 Si 3P (Lead Free)

Hub sizes 19 to 41: Al Alloy 2014 T6 or 6026 LF

Fasteners: Alloy steel, black oiled

Hub sizes 19 to 41: Irridite NCP finish

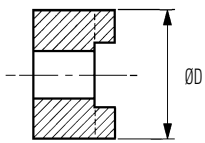
IMPORTANT

Load capacity depends on application conditions:
see page 4 for details

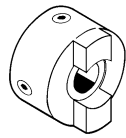
STANDARD BORES FOR ALL TYPES

| Coupling Size | ØB1, ØB2 +0.03mm/-0mm (+0.0012/-0) | | | | | | | | | | | | | | | | | | | | | | | |
|---------------|------------------------------------|----|--------|----|---------|----|----|--------|----|--------|----|----|--------|----|----|--------|----|----|----|--------|----|----|----|----|
| | 2 | 3 | (1/8") | 4 | (3/16") | 5 | 6 | (1/4") | 8 | (3/8") | 10 | 12 | (1/2") | 14 | 15 | (5/8") | 16 | 18 | 19 | (3/4") | 20 | 24 | 25 | 30 |
| 06 | • | • | • | | | | | | | | | | | | | | | | | | | | | |
| 09 | | • | • | • | • | • | | | | | | | | | | | | | | | | | | |
| 13 | | • | • | • | • | • | • | | | | | | | | | | | | | | | | | |
| 19 | | | | • | • | • | • | • | | | | | | | | | | | | | | | | |
| 25 | | | | | | | • | • | • | • | • | • | | | | | | | | | | | | |
| 33 | | | | | | | | | • | • | • | • | • | • | • | • | • | | | | | | | |
| 41 | | | | | | | | | | • | • | • | • | • | • | • | • | • | • | • | • | | | |
| Bore ref. | 11 | 14 | 16 | 18 | 19 | 20 | 22 | 24 | 28 | 31 | 32 | 35 | 36 | 38 | 40 | 41 | 42 | 45 | 46 | 47 | 48 | 51 | 52 | 56 |

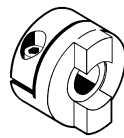
Aluminium Thro' Hubs



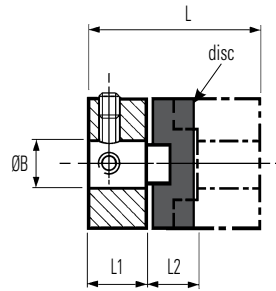
Thro' bores allow disc replacement without disturbing shaft alignment



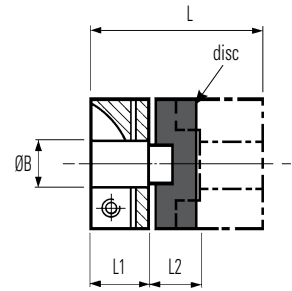
Set screw style



Clamp style



Refs. 450
Set screw style



Refs. 452
Clamp style

DIMENSIONS & ORDER CODES

| Coupling Type and Size | | Hub Ref | | Dimensions | | | | | | | Fasteners | | | Disc Ref | |
|------------------------|--------|-----------------|-------------|------------|------|---------|---------|------------|--------------------------------|-----------------|-----------|-------------|-----------|---------------------|--------------------|
| | | Set Screw Style | Clamp Style | ØD mm | L mm | ① L1 mm | ② L2 mm | ØB1 Max mm | ④ Moment of Inertia kgm2 x10-8 | ④ Mass kg x10-3 | Size | ③ Torque Nm | Wrench mm | Acetal (black) Std. | Nylon 11 (Natural) |
| Thro' Hubs | 13 | 450H13 | - | 12.7 | 15.9 | 5.5 | 1.7 | 6.35 | 20 | 10 | M3 | 0.9 | 1.5 | 236.13 | 238.13 |
| | 19 | 450H19 | - | 19.1 | 26.0 | 9.4 | 7.2 | 8 | 59 | 13 | M4 | 2.2 | 2.0 | 236.19 | 238.19 |
| | | - | 452H19 | | | | | | | | M2.5 | 1.3 | 2.0 | | |
| | 25 | 450H25 | - | 25.4 | 32.4 | 11.6 | 9.2 | 12 | 252 | 31 | M5 | 4.6 | 2.5 | 236.25 | 238.25 |
| | | - | 452H25 | | | | | | | | M3 | 2.4 | 2.5 | | |
| | 33 | 450H33 | - | 33.3 | 42.0 | 15.0 | 12.0 | 16 | 1080 | 67 | M6 | 7.6 | 3.0 | 836.33 | 838.33 |
| | | - | 452H33 | | | | | | | | M4 | 5.6 | 3.0 | | |
| | 41 | 450H41 | - | 41.3 | 50.8 | 17.8 | 15.3 | 20 | 3177 | 142 | M6 | 7.6 | 3.0 | 236.41 | 238.41 |
| | | - | 452H41 | | | | | | | | M4 | 5.6 | 3.0 | | |
| 50 | 450H50 | - | 50.0 | 59.6 | 20.6 | 18.4 | 25.4 | 7550 | 208 | M8 | 18.3 | 4.0 | 236.50 | - | |
| | - | 452H50 | | | | | | | | M5 | 11.4 | 4.0 | | | |
| 57 | 450H57 | - | 57.1 | 78.0 | 28.4 | 21.2 | 30 | 12410 | 361 | M8 | 18.3 | 4.0 | 236.57 | - | |
| | - | 452H57 | | | | | | | | M6 | 19.3 | 5.0 | | | |

PERFORMANCE (AT 20°C WITH STANDARD ACETAL DISC)

| Coupling Size | ⑤ Peak torque Nm | ⑥ Max compensation @ 3000 rpm | | | ⑦ Torsional | | Static break torque Nm |
|---------------|------------------|-------------------------------|-----------|------------|---------------|--------------------|------------------------|
| | | Angular deg | Radial mm | Axial ± mm | Rate deg / Nm | Stiffness Nm / rad | |
| 13 | 0.5 | 0.5 | 0.1 | 0.05 | 0.88 | 65 | 4 |
| 19 | 1.7 | | 0.2 | 0.1 | 0.50 | 115 | 8 |
| 25 | 4 | | 0.2 | 0.1 | 0.28 | 205 | 13 |
| 33 | 9 | | 0.2 | 0.15 | 0.093 | 615 | 53 |
| 41 | 17 | | 0.25 | 0.15 | 0.048 | 1200 | 57 |
| 50 | 30 | | 0.25 | 0.2 | 0.042 | 1375 | 95 |
| 57 | 44 | | 0.25 | 0.2 | 0.022 | 2610 | 150 |

Materials Finishes

Hub sizes 13 to 57 : Al Alloy 2014A T6 or 6026 LF

Fasteners: Alloy steel, black oiled

Hubs: Clear anodised finish

IMPORTANT

Load capacity depends on application conditions:
see page 4 for details

STANDARD BORES® FOR ALL TYPES

| Coupling | ØB1, ØB2 +0.03mm/-0mm (+0.0012/-0) | | | | | | | | | | | | | | | | | | | |
|-----------|------------------------------------|----|--------|----|---------|----|----|--------|----|--------|----|----|--------|----|----|--------|----|----|----|--------|
| Size | 2 | 3 | (1/8") | 4 | (3/16") | 5 | 6 | (1/4") | 8 | (3/8") | 10 | 12 | (1/2") | 14 | 15 | (5/8") | 16 | 18 | 19 | (3/4") |
| 13 | | • | • | • | • | • | • | • | | | | | | | | | | | | |
| 19 | | | | • | • | • | • | • | | | | | | | | | | | | |
| 25 | | | | | | | • | • | • | • | • | • | | | | | | | | |
| 33 | | | | | | | | | • | • | • | • | • | • | • | • | • | | | |
| 41 | | | | | | | | | | • | • | • | • | • | • | • | • | • | • | • |
| 50 | | | | | | | | | | • | • | • | • | • | • | • | • | • | • | • |
| 57 | | | | | | | | | | | • | • | • | • | • | • | • | • | • | • |
| Bore ref. | 11 | 14 | 16 | 18 | 19 | 20 | 22 | 24 | 28 | 31 | 32 | 35 | 36 | 38 | 40 | 41 | 42 | 45 | 46 | 47 |

Datasheet

RS Pro 2011i Aluminium Rod, 1/2in x 24in

RS Stock No: **559-167**



Product Details

RS Pro 2011i aluminium rod measures 1/2 Inch x 24 Inch and has a hardness of 110 HB. It is suitable for application that requires good machinability and high strength.

Features and Benefits

- Good machinability
- High strength
- 110 HB hardness



ENGLISH

Specifications:

| | |
|----------------------|-------------------------------------------------------------------|
| Form | Rod |
| Hardness | 110 HB |
| Material | 2011i Aluminium |
| Suitability | Automotive Parts, Fasteners, Fittings, Repetition Machining Parts |
| Density | 2.82 g/cm ³ |
| Length | 24 in |
| Rod Diameter | 1/2 in |
| Thermal Conductivity | 138 W/mK |
| Standards Met | RoHS Compliant |

Datasheet

RS Pro HE30TF Aluminium Rod, 1/2in x 24in

RS Stock No: **681-053**



Product Details

RS Pro HE30TF aluminium rod measures 1/2 Inch x 24 Inch and has a hardness of 95 HB. It is made of medium strength alloy with good corrosion resistance.

Features and Benefits

- Suitable for highly stressed applications
- 95 HB hardness
- Corrosion-resistant



ENGLISH

Specifications:

| | |
|----------------------|--------------------------------------------------------------------------------|
| Form | Rod |
| Hardness | 95 HB |
| Material | HE30TF Aluminium |
| Suitability | Bridges, Cranes, Highly Stressed Applications, Transport Applications, Trusses |
| Density | 2.7 g/cm ³ |
| Length | 24 in |
| Rod Diameter | 1/2 in |
| Thermal Conductivity | 180 W/mK |
| Standards Met | BS 1474 HE30 TF (1987); BS EN 754-5 608 2T6; RoHS Compliant |