



**INGENIERÍA  
MUÑOZ S.A.**

Hidráulica | Neumática | Lubricación

# CILINDROS HIDRÁULICOS

## LÍNEA 250

CILINDROS HIDRAULICOS DE DOBLE EFECTO  
CONDICIONES DE TRABAJO EXTREMAS  
LARGA VIDA UTIL - SELLOS DE ULTIMA GENERACION  
USO EN SIDERURGIA, PRENSAS, GRUAS, ETC  
PRESION NOMINAL: 250 BAR



- DISEÑO COMPACTO Y ROBUSTO
- FACIL MANTENIMIENTO
- 6 TIPOS DE MONTAJE
- DIAMETROS DE EMBOLO ENTRE 38,1 Y 320 MM
- DIAMETROS DE VASTAGO ENTRE 19,05 Y 215,9 MM





**CODIFICACION / PRESIONES DE TRABAJO**

(12) **P=** con purgadores de aire. Sin purgadores, no identificar.

(13) Otros datos y accesorios.

Ej. 1: **XV= 245 mm**

Ej. 2: para alta temperatura

**EJEMPLOS DE CODIFICACION PARA SU SOLICITUD:**

**IMCD 250 A IMCH50 S 650 B 3"1/4 UNF DV 1 5 P**

**IMCG 250 E IMCH25 N 182 B M28x1,5 U 2 6 GR28 Alta temperatura**

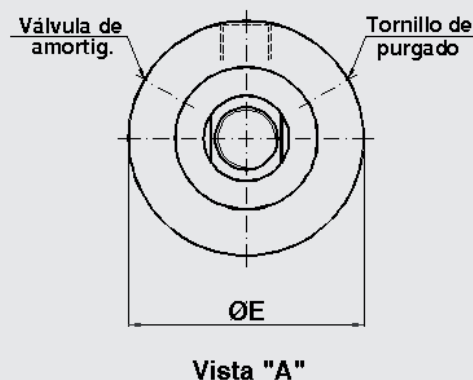
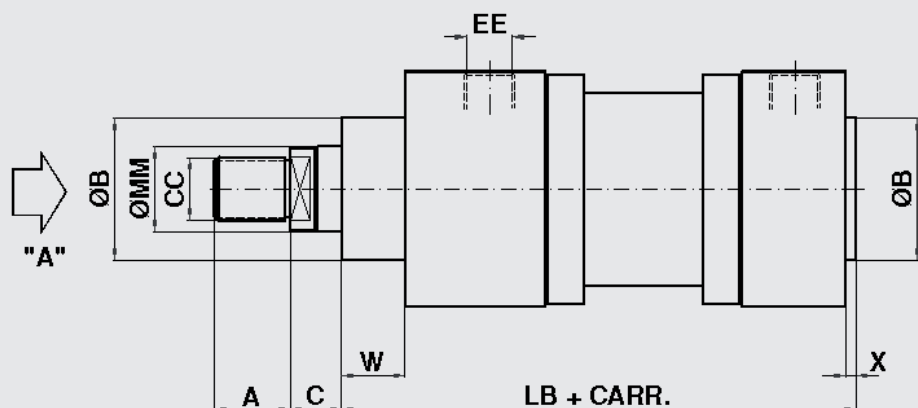
**TABLA 1: PRESIONES MAXIMAS DE TRABAJO EN KG/CM2**

| <b>MODELO<br/>IMCH</b> | <b>Ø<br/>INTERIOR</b> | <b>AREA<br/>cm2</b> | <b>PRESION MAXIMA<br/>DE TRABAJO</b> |
|------------------------|-----------------------|---------------------|--------------------------------------|
| 15                     | 38,1                  | 11,39               | 250                                  |
| 20                     | 50,8                  | 20,26               | 250                                  |
| 25                     | 63,5                  | 31,65               | 250                                  |
| 32                     | 82,5                  | 53,42               | 250                                  |
| 40                     | 101,6                 | 81,03               | 250                                  |
| 50                     | 127                   | 126,60              | 250                                  |
| 55                     | 139,7                 | 153,20              | 250                                  |
| 62                     | 159                   | 198,50              | 250                                  |
| 70                     | 177,8                 | 248,16              | 250                                  |
| 80                     | 203,2                 | 324,10              | 250                                  |
| 85                     | 216                   | 366,20              | 250                                  |
| 100                    | 254                   | 506,40              | 250                                  |
| 110                    | 280                   | 615,40              | 250                                  |
| 125                    | 320                   | 803,80              | 250                                  |

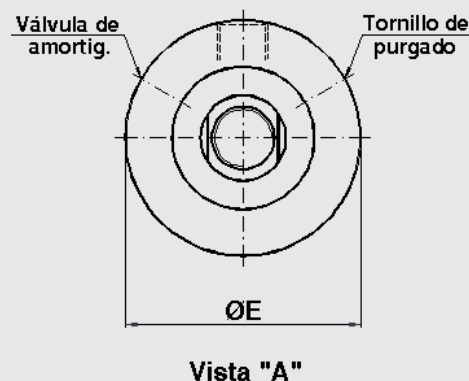
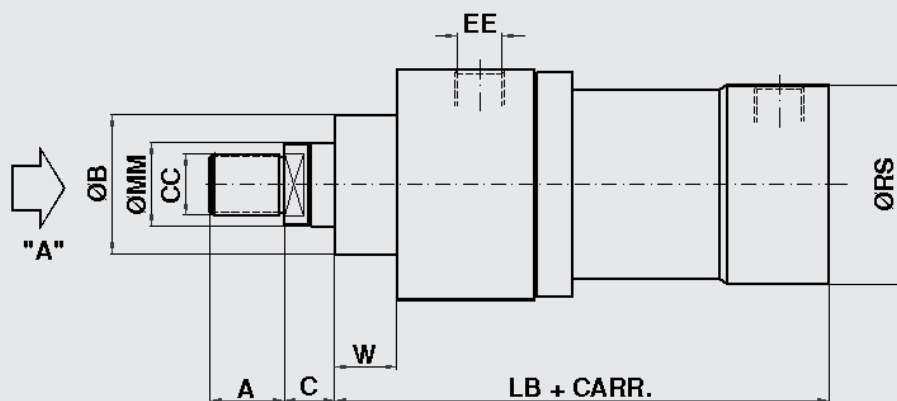


**DIMENSIONES DEL CILINDRO BASICO (esquema):**

**1) Pie del cilindro embreado:**



**2) Pie del cilindro soldado:**





**DIMENSIONES DEL CILINDRO BASICO (en mm):**

**LÍNEA 250**

| Modelo IMCH     | 15       | 20     | 25     | 32     | 40     | 50     | 55     | 62    | 70    | 80    | 85    | 100   | 110   | 125   |       |
|-----------------|----------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>A</b>        | 30       | 35     | 45     | 55     | 75     | 95     | 110    | 120   | 140   | 150   | 160   | 160   | 190   | 200   |       |
| <b>B</b>        | 55       | 68     | 75     | 95     | 115    | 135    | 155    | 180   | 200   | 215   | 245   | 280   | 305   | 340   |       |
| <b>MM</b>       | <b>N</b> | 19,05  | 25,4   | 34,92  | 44,45  | 57,15  | 69,85  | 88,9  | 101,6 | 108   | 124   | 139,7 | 158,8 | 177,8 | 203,2 |
|                 | <b>S</b> | 25,4   | 34,92  | 44,45  | 57,15  | 69,85  | 88,9   | 101,6 | 108   | 124   | 139,7 | 158,8 | 177,8 | 203,2 | 215,9 |
| <b>C</b>        | 17       | 21     | 25     | 26     | 33     | 32     | 33     | 40    | 40    | 40    | 25    | 25    | 35    | 40    |       |
| <b>CC (UNF)</b> | <b>N</b> | 5/8"   | 7/8"   | 1"1/4  | 1"1/2  | 1"3/4  | 2"1/4  | 3"1/4 | 3"3/4 | 3"7/8 | 4"    | 5"1/4 | 5"1/2 | 5"1/2 | 6"    |
|                 | <b>S</b> | 7/8"   | 1"1/4  | 1"1/2  | 1"3/4  | 2"1/4  | 3"1/4  | 3"3/4 | 3"7/8 | 4"    | 5"1/4 | 5"1/2 | 5"1/2 | 6"    | 6"1/2 |
| <b>CC (SI)</b>  | 16x1,5   | 22x1,5 | 28x1,5 | 35x1,5 | 45x1,5 | 58x1,5 | 65x1,5 | 80x2  | 100x2 | 110x2 | 120x3 | 120x3 | 130x3 | -     |       |
| <b>W</b>        | 37       | 37     | 42     | 49     | 52     | 65     | 72     | 80    | 90    | 95    | 130   | 140   | 135   | 155   |       |
| <b>E</b>        | 85       | 106    | 120    | 135    | 165    | 200    | 220    | 265   | 290   | 310   | 355   | 395   | 430   | 490   |       |
| <b>EE (NPT)</b> | 1/2"     | 1/2"   | 3/4"   | 3/4"   | 1"     | 1"1/4  | 1"1/4  | 1"1/2 | 1"1/2 | 1"1/2 | 1"1/2 | 1"1/2 | 1"1/2 | 1"1/2 |       |
| <b>X</b>        | 5        | 5      | 5      | 5      | 5      | 7      | 10     | 10    | 10    | 10    | 10    | 10    | 10    | 10    |       |
| <b>LB</b>       | 212      | 216    | 240    | 255    | 295    | 345    | 387    | 435   | 475   | 495   | 610   | 634   | 709   | 775   |       |
| <b>RS</b>       | 55       | 65     | 100    | 116    | 135    | 160    | 185    | 210   | 240   | 265   | 290   | 325   | 360   | 410   |       |



**SISTEMA DE MONTAJES (ESQUEMA):**

| MONTAJE  | CILINDRO DIFERENCIAL | CILINDRO DOBLE VASTAGO | DIMENSIONES |
|----------|----------------------|------------------------|-------------|
| <b>A</b> |                      |                        |             |
| <b>B</b> |                      |                        |             |
| <b>C</b> |                      |                        |             |
| <b>D</b> |                      |                        |             |
| <b>E</b> |                      |                        |             |
| <b>F</b> |                      |                        |             |



**DIMENSIONES DE MONTAJES (EN MM)**

**LÍNEA 250**

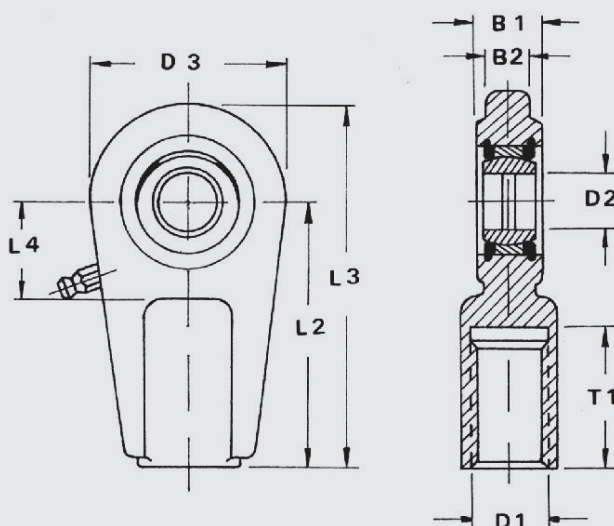
| Modelo IMCH | 15  | 20   | 25  | 32  | 40  | 50  | 55  | 62  | 70  | 80  | 85  | 100 | 110 | 125  |
|-------------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| CB          | 23  | 28   | 30  | 35  | 40  | 50  | 55  | 60  | 65  | 70  | 80  | 80  | 90  | 110  |
| CD          | 25  | 30   | 35  | 40  | 50  | 60  | 70  | 80  | 90  | 100 | 110 | 110 | 120 | 140  |
| C-2         | 28  | 33   | 40  | 50  | 63  | 70  | 82  | 95  | 113 | 125 | 143 | 160 | 180 | 200  |
| D-2         | 20  | 22   | 25  | 28  | 35  | 44  | 49  | 55  | 60  | 70  | 70  | 70  | 85  | 90   |
| E-6         | 95  | 115  | 130 | 145 | 175 | 210 | 230 | 275 | 300 | 320 | 370 | 410 | 450 | 510  |
| F           | 40  | 40   | 45  | 45  | 55  | 65  | 70  | 80  | 90  | 95  | 105 | 105 | 115 | 140  |
| FB          | 9,5 | 11,5 | 14  | 14  | 18  | 22  | 22  | 28  | 30  | 33  | 33  | 39  | 39  | 45   |
| L           | 33  | 38   | 45  | 53  | 60  | 70  | 75  | 85  | 90  | 115 | 125 | 140 | 150 | 175  |
| L-5         | 268 | 278  | 324 | 325 | 405 | 474 | 520 | 585 | 635 | 665 | 780 | 814 | 905 | 1000 |
| L-7         | 55  | 57   | 70  | 55  | 75  | 90  | 105 | 120 | 135 | 145 | 166 | 174 | 165 | 200  |
| LX          | 161 | 163  | 191 | 192 | 232 | 280 | 310 | 345 | 375 | 395 | 470 | 484 | 565 | 610  |
| R           | 90  | 110  | 130 | 145 | 175 | 210 | 230 | 275 | 300 | 320 | 370 | 415 | 450 | 510  |
| SB          | 11  | 11   | 14  | 18  | 22  | 25  | 28  | 31  | 37  | 37  | 45  | 52  | 52  | 62   |
| ST          | 26  | 31   | 37  | 42  | 52  | 60  | 65  | 70  | 80  | 85  | 95  | 110 | 125 | 140  |
| T           | 30  | 35   | 40  | 55  | 65  | 60  | 65  | 75  | 80  | 90  | 94  | 100 | 110 | 120  |
| TA          | 35  | 35   | 40  | 45  | 55  | 65  | 70  | 80  | 95  | 95  | 110 | 125 | 145 | 175  |
| TD          | 30  | 30   | 35  | 40  | 50  | 60  | 65  | 75  | 85  | 90  | 100 | 110 | 130 | 160  |
| TF          | 108 | 130  | 155 | 170 | 205 | 245 | 265 | 325 | 360 | 375 | 430 | 485 | 520 | 600  |
| TL          | 20  | 20   | 20  | 25  | 30  | 40  | 43  | 53  | 55  | 55  | 60  | 65  | 70  | 90   |
| TS          | 110 | 130  | 150 | 170 | 205 | 255 | 280 | 330 | 360 | 385 | 445 | 500 | 530 | 610  |
| T-3         | 135 | 155  | 180 | 210 | 250 | 305 | 340 | 400 | 440 | 465 | 530 | 600 | 630 | 730  |
| UF          | 130 | 160  | 185 | 200 | 245 | 295 | 315 | 385 | 420 | 445 | 490 | 555 | 590 | 680  |
| X           | 5   | 5    | 5   | 5   | 5   | 7   | 10  | 10  | 10  | 10  | 10  | 10  | 10  | 10   |



**LINEAS 250**

DIMENSIONES

| Modelo IMCH | Cojinete Modelo | B1  | B2 | D1       | D2 (j6) | D3  | L2  | L3  | L4  | T1  |
|-------------|-----------------|-----|----|----------|---------|-----|-----|-----|-----|-----|
| 15          | GR 16           | 23  | 20 | M 16x1,5 | 25      | 60  | 50  | 80  | 25  | 17  |
| 20          | GR 22           | 28  | 22 | M 22x1,5 | 30      | 65  | 60  | 94  | 30  | 23  |
| 25          | GR 28           | 30  | 25 | M 28x1,5 | 35      | 80  | 70  | 112 | 40  | 29  |
| 32          | GR 35           | 35  | 28 | M 35x1,5 | 40      | 95  | 85  | 135 | 45  | 36  |
| 40          | GR 45           | 40  | 35 | M 45x1,5 | 50      | 118 | 105 | 168 | 55  | 46  |
| 50          | GR 58           | 50  | 44 | M 58x1,5 | 60      | 132 | 130 | 200 | 65  | 59  |
| 55          | GR 65           | 55  | 49 | M 65x1,5 | 70      | 158 | 150 | 232 | 75  | 66  |
| 62          | GR 80           | 60  | 55 | M 80x2   | 80      | 180 | 170 | 265 | 80  | 81  |
| 70          | GR 100          | 65  | 60 | M 100x2  | 90      | 206 | 210 | 323 | 90  | 101 |
| 80          | GR 110          | 80  | 70 | M 110x2  | 100     | 230 | 235 | 360 | 105 | 111 |
| 85          | GR 120          | 80  | 70 | M 120x3  | 110     | 267 | 265 | 408 | 115 | 125 |
| 100         | GR 120          | 80  | 70 | M 120x3  | 110     | 267 | 265 | 408 | 115 | 125 |
| 110         | GR 130          | 90  | 85 | M 130x3  | 120     | 345 | 310 | 490 | 140 | 135 |
| 125         | GR 150          | 100 | 90 | M 150x3  | 140     |     |     |     |     |     |



MODELO GR





## VERIFICACION AL PANDEO:

Esta verificación debe realizarse siempre, principalmente cuando las cargas y las carreras son importantes. Puede calcularse mediante la expresión de Euler, en la cual se considera al vástago como una barra esbelta.

$$F = \frac{K}{s} = \frac{\pi^2 \times E \times J}{s \times S_K^2}$$

**Donde:**

F: máxima carga de servicio [ kp ]

K: carga de pandeo [ kp ]

s: factor de seguridad = 3,5.

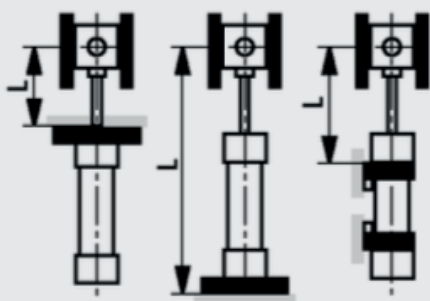
E: módulo de elasticidad del acero = 210000 N/mm<sup>2</sup>

J: momento de inercia del vástago [ mm<sup>4</sup> ]

J = 0,0491 × d<sup>4</sup>: diámetro del vástago en mm )

S<sub>K</sub> = longitud libre de pandeo [ mm ]

La longitud libre de pandeo depende del tipo de montaje. Ver los siguientes gráficos:

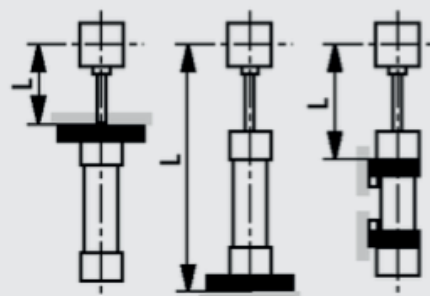


**Caso 1:** Un extremo articulado y un extremo fijo

$$S_K = 0,7 \times L$$

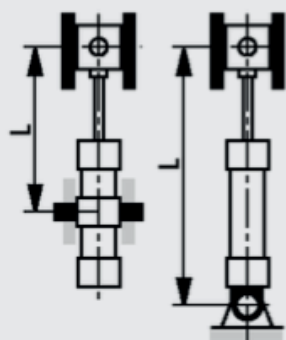
**Caso 2:** Dos extremos articulados

$$S_K = L$$



**Caso 3:** Un extremo libre y un extremo fijo

$$S_K = 2 \times L$$





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