



QUALITY CERTIFICATE

APS P-6855

| MATERIAL SIZE | COLADA HEAT | PROPIEDADES MECANICAS<br>MECHANICAL PROPERTIES |     |        |     |          |       |
|---------------|-------------|--|-----|--------|-----|----------|-------|
|               |             | ReH MPa  |     | Rm MPa |     | A% LO=2" |       |
| #11           | #04         | #17  |     | #12    |     | #13      |       |
| W-18x40       | 101480      | 399  | 391 | 548    | 544 | 26,      | 25,4  |
| W-18x40       | 101482      | 369  | 367 | 549    | 540 | 27,6     | 27,4  |
| W-18x40       | 101483      | 440  | 438 | 544    | 554 | 25,5     | 25,4  |
| W-18x40       | 101494      | 403  | 391 | 543    | 548 | 25,3     | 25,3  |
| W-18x40       | 101495      | 376  | 374 | 543    | 552 | 30,4     | 29,3  |
| W-18x40       | 101496      | 385  | 375 | 546    | 553 | 26,5     | 26,1  |
| W-18x40       | 101497      | 382  | 376 | 546    | 538 | 29,7     | 29,4  |
| W-18x40       | 101498      | 396  | 384 | 547    | 547 | 25,7     | 25,5  |
| W-18x46       | 101438      | 385  | 379 | 550    | 526 | 27,8     | 27,   |
| W-18x46       | 101439      | 386  | 380 | 542    | 552 | 29,      | 28,3  |
| W-18x46       | 101476      | 388  | 373 | 537    | 544 | 28,3     | 27,9  |
| W-18x46       | 101477      | 389  | 385 | 548    | 542 | 27,1     | 26,6  |
| W-18x46       | 101498      | 385  | 381 | 547    | 539 | 25,2     | 25,   |
| W-18x46       | 101499      | 390  | 380 | 550    | 527 | 28,3     | 27,8  |
| W-18x46       | 101500      | 394  | 384 | 545    | 538 | 26,1     | 25,7- |
| W-21x44       | 55536       | 416  | 405 | 535    | 529 | 30,9     | 30,9  |
| W-21x44       | 101487      | 425  | 411 | 541    | 541 | 34,5     | 33,5  |
| W-21x44       | 101490      | 416  | 414 | 545    | 555 | 29,8     | 28,7  |
| W-21x44       | 101499      | 444  | 438 | 543    | 533 | 30,      | 29,2  |
| W-21x44       | 101500      | 440  | 430 | 549    | 530 | 29,7     | 28,9  |
| W-21x44       | 101508      | 388  | 380 | 549    | 543 | 25,9     | 25,3  |
| W-21x44       | 101509      | 387  | 383 | 545    | 541 | 30,4     | 29,8  |
| W-21x44       | 101510      | 379  | 369 | 542    | 537 | 28,6     | 28,4  |
| W-21x44       | 101511      | 435  | 425 | 539    | 560 | 31,9     | 30,9  |
| W-21x44       | 101512      | 424  | 420 | 538    | 546 | 30,      | 29,8  |
| W-21x44       | 101513      | 434  | 432 | 550    | 542 | 29,8     | 29,4  |
| W-21x50       | 56404       | 432  | 424 | 545    | 527 | 32,6     | 31,6  |
| W-21x50       | 56506       | 429  | 429 | 539    | 549 | 29,2     | 29,   |
| W-21x50       | 101501      | 416  | 408 | 548    | 529 | 28,9     | 28,8  |
| W-21x50       | 101502      | 440  | 434 | 539    | 555 | 28,9     | 28,3  |
| W-21x50       | 101503      | 434  | 418 | 539    | 538 | 27,6     | 27,3  |
| W-21x50       | 101507      | 409  | 401 | 546    | 544 | 29,5     | 29,2  |
| W-21x50       | 101522      | 422  | 420 | 539    | 553 | 29,3     | 28,6  |
| W-24x55       | 100210      | 436  | 420 | 542    | 556 | 29,7     | 29,2  |
| W-24x55       | 101441      | 363  | 361 | 550    | 549 | 27,7     | 27,5  |
| W-24x55       | 101442      | 421  | 405 | 532    | 528 | 31,      | 30,8  |
| W-24x55       | 101443      | 421  | 415 | 544    | 528 | 31,3     | 30,6  |
| W-24x55       | 101444      | 419  | 405 | 544    | 530 | 33,8     | 33,7  |
| W-24x55       | 101445      | 371  | 359 | 547    | 541 | 25,7     | 25,4  |
| W-24x55       | 101449      | 412  | 408 | 548    | 539 | 26,9     | 26,5  |
| W-24x55       | 101450      | 396  | 394 | 540    | 542 | 29,5     | 29,1  |
| W-24x55       | 101451      | 395  | 389 | 546    | 543 | 30,2     | 29,3  |
| W-24x55       | 101452      | 414  | 405 | 549    | 547 | 28,4     | 28,1  |
| W-24x55       | 101453      | 380  | 373 | 548    | 546 | 26,6     | 25,9  |
| W-24x55       | 101454      | 422  | 406 | 541    | 521 | 29,2     | 28,8  |
| W-24x55       | 101455      | 415  | 412 | 545    | 523 | 30,1     | 29,7  |
| W-24x55       | 101456      | 373  | 369 | 545    | 545 | 26,8     | 26,8  |
| W-24x62       | 100211      | 405  | 399 | 537    | 517 | 29,8     | 29,4  |

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| COLADA<br>HEAT | COMPOSICION QUIMICA (%)<br>CHEMICAL COMPOSITION (%) |       |      |      |      |      |      |      |      |      |      |      |     | CEV |  |  |  |  |  |  |  |
|----------------|---|-------|------|------|------|------|------|------|------|------|------|------|-----|-----|--|--|--|--|--|--|--|
|                | C   | Mn    | SI   | P    | S    | V    | Cr   | NI   | Mo   | Cu   | Nb   | Sn   |     |     |  |  |  |  |  |  |  |
| 55536          | ,074  | 1,150 | ,240 | ,021 | ,023 | ,040 | ,120 | ,180 | ,007 | ,390 | ,003 | ,040 | ,34 |     |  |  |  |  |  |  |  |
| 56159          | ,109  | 1,100 | ,190 | ,032 | ,024 | ,033 | ,140 | ,140 | ,002 | ,410 | ,003 | ,029 | ,36 |     |  |  |  |  |  |  |  |
| 56404          | ,120  | 1,190 | ,210 | ,016 | ,013 | ,003 | ,160 | ,200 | ,052 | ,440 | ,024 | ,025 | ,40 |     |  |  |  |  |  |  |  |
| 56506          | ,110  | 1,300 | ,170 | ,027 | ,019 | ,003 | ,140 | ,160 | ,027 | ,440 | ,024 | ,016 | ,40 |     |  |  |  |  |  |  |  |
| 56606          | ,070  | 1,110 | ,200 | ,017 | ,022 | ,002 | ,140 | ,240 | ,042 | ,510 | ,022 | ,037 | ,34 |     |  |  |  |  |  |  |  |
| 56629          | ,100  | 1,220 | ,150 | ,018 | ,029 | ,003 | ,120 | ,160 | ,030 | ,520 | ,023 | ,036 | ,38 |     |  |  |  |  |  |  |  |
| 56773          | ,090  | 1,190 | ,190 | ,021 | ,022 | ,003 | ,120 | ,180 | ,042 | ,590 | ,022 | ,041 | ,37 |     |  |  |  |  |  |  |  |
| 56791          | ,110  | 1,300 | ,190 | ,027 | ,021 | ,004 | ,130 | ,190 | ,040 | ,520 | ,022 | ,042 | ,41 |     |  |  |  |  |  |  |  |
| 56793          | ,120  | 1,100 | ,210 | ,025 | ,023 | ,003 | ,110 | ,170 | ,035 | ,570 | ,022 | ,036 | ,38 |     |  |  |  |  |  |  |  |
| 56794          | ,120  | 1,200 | ,220 | ,022 | ,013 | ,003 | ,150 | ,200 | ,043 | ,550 | ,019 | ,031 | ,41 |     |  |  |  |  |  |  |  |
| 100130         | ,090  | 1,240 | ,170 | ,035 | ,021 | ,002 | ,180 | ,150 | ,033 | ,410 | ,021 | ,037 | ,38 |     |  |  |  |  |  |  |  |
| 100131         | ,090  | 1,210 | ,180 | ,033 | ,024 | ,002 | ,170 | ,140 | ,030 | ,420 | ,020 | ,039 | ,37 |     |  |  |  |  |  |  |  |
| 100210         | ,110  | 1,180 | ,220 | ,023 | ,018 | ,002 | ,130 | ,150 | ,031 | ,490 | ,018 | ,041 | ,38 |     |  |  |  |  |  |  |  |
| 100211         | ,120  | 1,200 | ,220 | ,023 | ,030 | ,003 | ,110 | ,140 | ,027 | ,520 | ,022 | ,032 | ,39 |     |  |  |  |  |  |  |  |
| 100213         | ,090  | 1,220 | ,180 | ,019 | ,019 | ,002 | ,110 | ,200 | ,033 | ,450 | ,018 | ,020 | ,37 |     |  |  |  |  |  |  |  |
| 100214         | ,080  | 1,160 | ,180 | ,027 | ,015 | ,003 | ,170 | ,180 | ,035 | ,450 | ,019 | ,027 | ,36 |     |  |  |  |  |  |  |  |
| 100241         | ,100  | 1,180 | ,200 | ,021 | ,033 | ,003 | ,130 | ,200 | ,036 | ,470 | ,019 | ,029 | ,38 |     |  |  |  |  |  |  |  |
| 101438         | ,110  | 1,190 | ,200 | ,020 | ,018 | ,002 | ,200 | ,210 | ,036 | ,500 | ,020 | ,017 | ,40 |     |  |  |  |  |  |  |  |
| 101439         | ,100  | 1,190 | ,190 | ,027 | ,023 | ,002 | ,200 | ,220 | ,043 | ,510 | ,019 | ,018 | ,40 |     |  |  |  |  |  |  |  |
| 101441         | ,120  | 1,240 | ,200 | ,026 | ,019 | ,003 | ,160 | ,180 | ,032 | ,530 | ,021 | ,018 | ,41 |     |  |  |  |  |  |  |  |
| 101442         | ,100  | 1,270 | ,210 | ,026 | ,025 | ,003 | ,230 | ,190 | ,041 | ,510 | ,020 | ,018 | ,41 |     |  |  |  |  |  |  |  |
| 101443         | ,110  | 1,200 | ,200 | ,030 | ,018 | ,003 | ,150 | ,150 | ,026 | ,420 | ,023 | ,017 | ,38 |     |  |  |  |  |  |  |  |
| 101444         | ,110  | 1,210 | ,170 | ,024 | ,012 | ,003 | ,170 | ,160 | ,025 | ,510 | ,022 | ,021 | ,40 |     |  |  |  |  |  |  |  |
| 101448         | ,090  | 1,360 | ,180 | ,021 | ,020 | ,003 | ,100 | ,170 | ,032 | ,450 | ,021 | ,016 | ,39 |     |  |  |  |  |  |  |  |
| 101449         | ,080  | 1,440 | ,160 | ,021 | ,031 | ,004 | ,120 | ,170 | ,029 | ,480 | ,028 | ,021 | ,39 |     |  |  |  |  |  |  |  |
| 101450         | ,090  | 1,230 | ,220 | ,023 | ,028 | ,003 | ,130 | ,190 | ,039 | ,530 | ,024 | ,019 | ,38 |     |  |  |  |  |  |  |  |
| 101451         | ,100  | 1,240 | ,210 | ,023 | ,025 | ,004 | ,140 | ,190 | ,036 | ,500 | ,021 | ,019 | ,39 |     |  |  |  |  |  |  |  |
| 101452         | ,100  | 1,240 | ,210 | ,021 | ,022 | ,003 | ,130 | ,180 | ,032 | ,510 | ,020 | ,019 | ,39 |     |  |  |  |  |  |  |  |
| 101453         | ,090  | 1,200 | ,220 | ,030 | ,025 | ,002 | ,150 | ,170 | ,028 | ,500 | ,022 | ,016 | ,37 |     |  |  |  |  |  |  |  |

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