



6600 South Harlem Avenue
Argo, IL 60501-1930

Material Test Report

SUPERIOR SUPPLY & STEEL
318 CITY'S SERVICE HWY
SULPHUR, LA 70663
PO: P0214744 - 01

Quantity Product Heat Code Heat Treatment Info Steel Mill

| | | | | | | | | | | | | | | | | | | | |
|--|---------------------|--------|------------|------------|------|------|------|-------|------|-------|-------|--------|-------|--------|--------|-------|-----|-----|------|
| 3 | 10" XS LR 90° Elbow | 150216 | Hot Formed | Steel Mill | | | | | | | | | | | | | | | |
| C | Mn | P | S | Si | Cu | Ni | Cr | Mo | V | Al | Ti | B | Cb | Tens. | Yield | Elong | ROA | BHN | BHN2 |
| 0.21 | 1.03 | 0.010 | 0.005 | 0.25 | 0.15 | 0.05 | 0.12 | 0.010 | 0.06 | 0.032 | 0.003 | 0.0002 | 0.000 | 84,600 | 39,900 | 34.00 | - | 156 | 168 |
| CE (IHM): 0.432 | | | | | | | | | | | | | | | | | | | |
| CE (PCM): 0.292 | | | | | | | | | | | | | | | | | | | |
| A 234 WPB-13 Dimensional Specification: 816.9 | | | | | | | | | | | | | | | | | | | |
| V & M STAR WPB | | | | | | | | | | | | | | | | | | | |

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|--|--------------------|--------|------------|------------|------|------|------|-------|------|-------|-------|--------|-------|--------|--------|-------|-------|-----|------|
| 36 | 6" XS LR 90° Elbow | IK0197 | Hot Formed | V & M STAR | | | | | | | | | | | | | | | |
| C | Mn | P | S | Si | Cu | Ni | Cr | Mo | V | Al | Ti | B | Cb | Tens. | Yield | Elong | ROA | BHN | BHN2 |
| 0.21 | 1.05 | 0.011 | 0.004 | 0.25 | 0.14 | 0.04 | 0.12 | 0.010 | 0.06 | 0.033 | 0.003 | 0.0003 | 0.000 | 77,000 | 39,900 | 40.40 | 63.50 | 148 | 150 |
| CE (IHM): 0.434 | | | | | | | | | | | | | | | | | | | |
| CE (PCM): 0.292 | | | | | | | | | | | | | | | | | | | |
| A 234 WPB-13 Dimensional Specification: 816.9 | | | | | | | | | | | | | | | | | | | |
| V & M STAR WPB | | | | | | | | | | | | | | | | | | | |

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|--|--------------------|--------|------------|---------------------|------|------|------|-------|------|----|-------|---|----|--------|--------|-------|-----|-----|------|
| 12 | 5" XS LR 90° Elbow | 342725 | Hot Formed | VALLUREC/MANNESMANN | | | | | | | | | | | | | | | |
| C | Mn | P | S | Si | Cu | Ni | Cr | Mo | V | Al | Ti | B | Cb | Tens. | Yield | Elong | ROA | BHN | BHN2 |
| 0.15 | 1.03 | 0.016 | 0.001 | 0.25 | 0.06 | 0.07 | 0.12 | 0.020 | 0.01 | - | 0.010 | - | - | 78,000 | 39,900 | 26.20 | - | 159 | 168 |
| CE (IHM): 0.360 | | | | | | | | | | | | | | | | | | | |
| A 234-10 WPB Dimensional Specification: 816.9 | | | | | | | | | | | | | | | | | | | |
| VALLUREC/MANNESMANN WPB | | | | | | | | | | | | | | | | | | | |

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|--|--------------------|-------|------------|---------------------|------|------|------|-------|------|----|-------|---|--------|--------|--------|-------|-----|-----|------|
| 2 | 2" XS SR 90° Elbow | 48880 | Hot Formed | VALLUREC/MANNESMANN | | | | | | | | | | | | | | | |
| C | Mn | P | S | Si | Cu | Ni | Cr | Mo | V | Al | Ti | B | Cb | Tens. | Yield | Elong | ROA | BHN | BHN2 |
| 0.18 | 0.85 | 0.011 | 0.005 | 0.24 | 0.19 | 0.10 | 0.15 | 0.050 | 0.00 | - | 0.010 | - | <0.002 | 84,475 | 78,551 | 27.10 | - | 169 | 168 |
| CE (IHM): 0.348 | | | | | | | | | | | | | | | | | | | |
| SPT5 WPB 52-04 Dimensional Specification: 816.9 | | | | | | | | | | | | | | | | | | | |
| VALLUREC/MANNESMANN WPB | | | | | | | | | | | | | | | | | | | |

We hereby certify that the material meets the following:

- All fittings and flanges meet NACE MRO-175/ISO 15156-1 latest Revision.
- All fittings and flanges meet NACE MRO-103 - Latest Revision.
- All non high-yield fittings meet the requirements of ASTM A-234 WPB (AND SA-234).
- All fittings are seamless except as noted.
- All non-high yield flanges meet the requirements of ASTM A-105 (AND SA-105)
- Starting Material Seamless Pipe for elbows, tees and reducers.
- Plate for caps and welded fittings.
- Bars, Billets or Blooms for flanges and certain caps and tees.
- Ladle chemistry reported.
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Mark Torres
Quality Assurance Department
3/9/2020



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