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CHANGSHU LONGTENG SPECIAL STEEL CO., LTD

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 订货单位：**KEPPEL SHIPYARD LIMITED-BENOI YARD**  Purchaser: | | | | | | | 产 品 质 量 证 明 书 | | | | | | | | | | | | | | | | | 质保书编号：**LT\_DNV GL\_2010001**  Certificate No. | | | | | |
| 合同编号：**PO # BD20209158**  Contract No.: | | | | 船级社：**DNV GL**  Classification: | | | QUALITY CERTIFICATE | | | | | | | | | | | | | | | | | 工厂认可证书号：**AMMM00002AH**  Certificate No. of works approval: | | | | | |
| 产品名称：**L型钢**  Product Name: **Inverted Angles** | | | | 产品执行标准：**JIS G3192:2014**  Product Standard: | | | | | | | | 交货状态：**热轧**  Condition of Supply: **As Rolled** | | | | | | 技术规范：**DNV GL规范**  Technical Specification: **DNV GL Rules** | | | | | | 日期：**2020年10月15日**  Date: | | | | | |
| 冶炼炉号  Batch No. | 轧制批号  Roll No. | 钢级  Grade | 产品规格  Dimensions | 长度  Length  (m) | 支数  PCS | 重量  Weight  (t) | | 化 学 成 分（％）  Chemical Composition | | | | | | | | | | | | | | 机 械 性 能  Mechanical Properties | | | | | | | |
| C | Si | Mn | P | | S | Ni | Cr | Cu | V | | Al | Nb | Ceq | 屈服强度  ReH(MPa) | 抗拉强度  Rm (Mpa) | | 伸长率  A5 (%) | V型冲击功 (J, 0℃)  Charpy V-notch Impact | | | |
| 1 | 2 | 3 | Avg |
| D1-1998973 | 2008F2716 | VL A36 | L300×90×11×16 | 9 | 19 | 6.207 | | 0.14 | 0.28 | 1.28 | 0.018 | | 0.021 | 0.03 | 0.04 | 0.04 | 0.001 | | 0.035 | 0.018 | 0.37 | 395 | 545 | | 31 | 148 | 136 | 160 | 148 |
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| 验船师签字:  Surveyor:  DNV GL CONTROL NO.:N1421YD2  ISSUE DATE:2020.10.15 | | | | Total | **19** | **6.207** | | 注：未注明的其它残余元素符合规范要求。 Ceq=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15  Mo％ ≤0.02, Ti％ ≤0.02, 钢坯采用转炉或者电炉冶炼（Steelmark BOC, EAF, CC） | | | | | | | | | | | | | | 质检验负责人：陶晓恒  Chief of Check: Tao Xiaoheng | | | | | | | |
| 兹证明本材料按VL认可的工艺规程制造，符合相应的VL等级的要求。  VL material grades are certified and found to be in compliance with the　requirements to corresponding VL grades。 | | | | | | | | | | | | | | | | | |
| 地址: 江苏省常熟市梅李镇通港工业园华联路118号  Add: No. 118 Hualian Road, Tonggang Industrial Park,  Meili Town, Changshu, Jiangsu Province, CHINA  邮编(PC)： 215511 E-mail：lttg@lttg.cn  电话(Tel)：+86-512-52669226  *www.lttg.cn* | | | | | | | |

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| 订货单位：**江苏新扬子造船有限公司**  Purchaser: | | | | | | | 产 品 质 量 证 明 书 | | | | | | | | | | | | | | | | | 质保书编号：**LT\_DNV GL\_2010002**  Certificate No. | | | | | |
| 合同编号：**A-20-143**  Contract No.: | | | | 船级社：**DNV GL**  Classification: | | | QUALITY CERTIFICATE | | | | | | | | | | | | | | | | | 工厂认可证书号：**AMMM00002AH**  Certificate No. of works approval: | | | | | |
| 产品名称：**球扁钢**  Product Name: **Bulb Flats** | | | | 产品执行标准：**GB/T9945-2012**  Product Standard: | | | | | | | | 交货状态：**热轧**  Condition of Supply: **As Rolled** | | | | | | 技术规范：**DNV GL规范**  Technical Specification: **DNV GL Rules** | | | | | | 日期：**2020年10月15日**  Date: | | | | | |
| 冶炼炉号  Batch No. | 轧制批号  Roll No. | 钢级  Grade | 产品规格  Dimensions | 长度  Length  (m) | 支数  PCS | 重量  Weight  (t) | | 化 学 成 分（％）  Chemical Composition | | | | | | | | | | | | | | 机 械 性 能  Mechanical Properties | | | | | | | |
| C | Si | Mn | P | | S | Ni | Cr | Cu | V | | Al | Nb | Ceq | 屈服强度  ReH(MPa) | 抗拉强度  Rm (Mpa) | | 伸长率  A5 (%) | V型冲击功 (J, 0℃)  Charpy V-notch Impact | | | |
| 1 | 2 | 3 | Avg |
| D2-2000649 | 2006B0537 | VL A36 | HP140×9 | 10.5 | 2 | 0.251 | | 0.14 | 0.28 | 1.22 | 0.017 | | 0.006 | 0.02 | 0.05 | 0.03 | 0.031 | | 0.034 | 0.005 | 0.36 | 380 | 520 | | 35 | 104 | 122 | 108 | 111 |
| D2-2001889 | 2008B0095 | VL A36 | HP140×9 | 12 | 1 | 0.143 | | 0.14 | 0.33 | 1.22 | 0.022 | | 0.007 | 0.02 | 0.05 | 0.05 | 0.032 | | 0.024 | 0.004 | 0.36 | 410 | 530 | | 32 | 100 | 108 | 108 | 105 |
| D1-2001877 | 2008B0516 | VL A36 | HP140×9 | 8.5 | 4 | 0.406 | | 0.14 | 0.30 | 1.21 | 0.011 | | 0.006 | 0.02 | 0.05 | 0.06 | 0.032 | | 0.031 | 0.004 | 0.36 | 385 | 550 | | 32 | 124 | 106 | 122 | 117 |
| D1-2001877 | 2008B0516 | VL A36 | HP140×9 | 12 | 11 | 1.577 | | 0.14 | 0.30 | 1.21 | 0.011 | | 0.006 | 0.02 | 0.05 | 0.06 | 0.032 | | 0.031 | 0.004 | 0.36 | 385 | 550 | | 32 | 124 | 106 | 122 | 117 |
| D1-2001875 | 2008B0522 | VL A36 | HP140×9 | 8 | 2 | 0.191 | | 0.14 | 0.31 | 1.21 | 0.016 | | 0.008 | 0.02 | 0.07 | 0.07 | 0.033 | | 0.028 | 0.004 | 0.37 | 420 | 545 | | 32 | 114 | 102 | 126 | 114 |
| D1-2001875 | 2008B0522 | VL A36 | HP140×9 | 10 | 10 | 1.195 | | 0.14 | 0.31 | 1.21 | 0.016 | | 0.008 | 0.02 | 0.07 | 0.07 | 0.033 | | 0.028 | 0.004 | 0.37 | 420 | 545 | | 32 | 114 | 102 | 126 | 114 |
| B1-2008490 | 2009A0156 | VL A36 | HP200×11 | 12 | 10 | 2.605 | | 0.16 | 0.25 | 1.17 | 0.013 | | 0.004 | 0.01 | 0.06 | 0.02 | 0.026 | | 0.026 | 0.002 | 0.38 | 415 | 525 | | 33 | 152 | 144 | 162 | 153 |
| B1-2008490 | 2009A0157 | VL A36 | HP200×11 | 12 | 10 | 2.605 | | 0.16 | 0.25 | 1.17 | 0.013 | | 0.004 | 0.01 | 0.06 | 0.02 | 0.026 | | 0.026 | 0.002 | 0.38 | 395 | 545 | | 33 | 156 | 148 | 144 | 149 |
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| 验船师签字:  Surveyor:  DNV GL CONTROL NO.:N1421YD2  ISSUE DATE:2020.10.15 | | | | Total | **50** | **8.973** | | 注：未注明的其它残余元素符合规范要求。 Ceq=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15  Mo％ ≤0.02, Ti％ ≤0.02, 钢坯采用转炉或者电炉冶炼（Steelmark BOC, EAF, CC） | | | | | | | | | | | | | | 质检验负责人：陶晓恒  Chief of Check: Tao Xiaoheng | | | | | | | |
| 兹证明本材料按VL认可的工艺规程制造，符合相应的VL等级的要求。  VL material grades are certified and found to be in compliance with the　requirements to corresponding VL grades。 | | | | | | | | | | | | | | | | | |
| 地址: 江苏省常熟市梅李镇通港工业园华联路118号  Add: No. 118 Hualian Road, Tonggang Industrial Park,  Meili Town, Changshu, Jiangsu Province, CHINA  邮编(PC)： 215511 E-mail：lttg@lttg.cn  电话(Tel)：+86-512-52669226  *www.lttg.cn* | | | | | | | |

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| 订货单位：**南通源泰金属材料有限公司**  Purchaser: | | | | | | | 产 品 质 量 证 明 书 | | | | | | | | | | | | | | | | | 质保书编号：**LT\_DNV GL\_2010003**  Certificate No. | | | | | |
| 合同编号：**A-20-091**  Contract No.: | | | | 船级社：**DNV GL**  Classification: | | | QUALITY CERTIFICATE | | | | | | | | | | | | | | | | | 工厂认可证书号：**AMMM00002AH**  Certificate No. of works approval: | | | | | |
| 产品名称：**球扁钢**  Product Name: **Bulb Flats** | | | | 产品执行标准：**GB/T9945-2012**  Product Standard: | | | | | | | | 交货状态：**热轧**  Condition of Supply: **As Rolled** | | | | | | 技术规范：**DNV GL规范**  Technical Specification: **DNV GL Rules** | | | | | | 日期：**2020年10月15日**  Date: | | | | | |
| 冶炼炉号  Batch No. | 轧制批号  Roll No. | 钢级  Grade | 产品规格  Dimensions | 长度  Length  (m) | 支数  PCS | 重量  Weight  (t) | | 化 学 成 分（％）  Chemical Composition | | | | | | | | | | | | | | 机 械 性 能  Mechanical Properties | | | | | | | |
| C | Si | Mn | P | | S | Ni | Cr | Cu | V | | Al | Nb | Ceq | 屈服强度  ReH(MPa) | 抗拉强度  Rm (Mpa) | | 伸长率  A5 (%) | V型冲击功 (J, 0℃)  Charpy V-notch Impact | | | |
| 1 | 2 | 3 | Avg |
| D2-1903522 | 2008B0155 | VL A36 | HP120×8 | 12 | 2 | 0.221 | | 0.14 | 0.26 | 1.19 | 0.021 | | 0.007 | 0.01 | 0.05 | 0.03 | 0.027 | | 0.026 | 0.004 | 0.36 | 410 | 550 | | 30 | 118 | 126 | 104 | 116 |
| D1-2001431 | 2009B0001 | VL A | HP120×8 | 12 | 4 | 0.442 | | 0.14 | 0.21 | 0.65 | 0.008 | | 0.010 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.26 | 320 | 445 | | 31 |  |  |  |  |
| D2-2001896 | 2009B0017 | VL A | HP120×8 | 12 | 19 | 2.098 | | 0.14 | 0.19 | 0.63 | 0.021 | | 0.006 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.26 | 300 | 430 | | 34 |  |  |  |  |
| D2-2001712 | 2009B0024 | VL A36 | HP120×8 | 12 | 2 | 0.221 | | 0.14 | 0.28 | 1.21 | 0.010 | | 0.008 | 0.02 | 0.07 | 0.03 | 0.034 | | 0.028 | 0.003 | 0.37 | 400 | 530 | | 29 | 102 | 128 | 102 | 111 |
| D2-2001897 | 2009B0026 | VL A | HP120×8 | 12 | 15 | 1.656 | | 0.15 | 0.24 | 0.65 | 0.020 | | 0.010 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.28 | 305 | 450 | | 31 |  |  |  |  |
| D1-1998415 | 2007E0201 | VL A36 | HP200×10 | 12 | 20 | 4.834 | | 0.14 | 0.28 | 1.23 | 0.011 | | 0.005 | 0.03 | 0.05 | 0.07 | 0.001 | | 0.032 | 0.017 | 0.36 | 395 | 525 | | 31 | 120 | 122 | 110 | 117 |
| D2-2001626 | 2009A0015 | VL A36 | HP200×10 | 12 | 10 | 2.417 | | 0.14 | 0.26 | 1.22 | 0.018 | | 0.015 | 0.02 | 0.06 | 0.03 | 0.027 | | 0.041 | 0.004 | 0.36 | 380 | 525 | | 32 | 116 | 124 | 100 | 113 |
| D2-2001626 | 2009A0017 | VL A36 | HP200×10 | 12 | 10 | 2.417 | | 0.14 | 0.26 | 1.22 | 0.018 | | 0.015 | 0.02 | 0.06 | 0.03 | 0.027 | | 0.041 | 0.004 | 0.36 | 390 | 530 | | 33 | 118 | 106 | 102 | 109 |
| D2-2001625 | 2009A0020 | VL A36 | HP200×10 | 12 | 10 | 2.417 | | 0.14 | 0.30 | 1.19 | 0.014 | | 0.006 | 0.02 | 0.05 | 0.03 | 0.026 | | 0.031 | 0.004 | 0.36 | 380 | 520 | | 32 | 106 | 124 | 102 | 111 |
| D1-1998984 | 2009A0022 | VL A36 | HP200×10 | 12 | 10 | 2.417 | | 0.15 | 0.30 | 1.27 | 0.015 | | 0.002 | 0.05 | 0.05 | 0.08 | 0.001 | | 0.026 | 0.018 | 0.38 | 385 | 530 | | 33 | 120 | 104 | 106 | 110 |
| D1-1998984 | 2009A0024 | VL A36 | HP200×10 | 12 | 56 | 13.534 | | 0.15 | 0.30 | 1.27 | 0.015 | | 0.002 | 0.05 | 0.05 | 0.08 | 0.001 | | 0.026 | 0.018 | 0.38 | 385 | 525 | | 30 | 118 | 102 | 112 | 111 |
| D1-1998983 | 2009A0025 | VL A36 | HP200×10 | 12 | 6 | 1.45 | | 0.15 | 0.26 | 1.24 | 0.016 | | 0.006 | 0.02 | 0.03 | 0.05 | 0.001 | | 0.029 | 0.017 | 0.37 | 385 | 520 | | 32 | 106 | 126 | 108 | 113 |
| 验船师签字:  Surveyor:  DNV GL CONTROL NO.:N1421YD2  ISSUE DATE:2020.10.15 | | | | Total | **164** | **34.124** | | 注：未注明的其它残余元素符合规范要求。 Ceq=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15  Mo％ ≤0.02, Ti％ ≤0.02, 钢坯采用转炉或者电炉冶炼（Steelmark BOC, EAF, CC） | | | | | | | | | | | | | | 质检验负责人：陶晓恒  Chief of Check: Tao Xiaoheng | | | | | | | |
| 兹证明本材料按VL认可的工艺规程制造，符合相应的VL等级的要求。  VL material grades are certified and found to be in compliance with the　requirements to corresponding VL grades。 | | | | | | | | | | | | | | | | | |
| 地址: 江苏省常熟市梅李镇通港工业园华联路118号  Add: No. 118 Hualian Road, Tonggang Industrial Park,  Meili Town, Changshu, Jiangsu Province, CHINA  邮编(PC)： 215511 E-mail：lttg@lttg.cn  电话(Tel)：+86-512-52669226  *www.lttg.cn* | | | | | | | |

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| 订货单位：**南通源泰金属材料有限公司**  Purchaser: | | | | | | | 产 品 质 量 证 明 书 | | | | | | | | | | | | | | | | | 质保书编号：**LT\_DNV GL\_2010004**  Certificate No. | | | | | |
| 合同编号：**A-20-091**  Contract No.: | | | | 船级社：**DNV GL**  Classification: | | | QUALITY CERTIFICATE | | | | | | | | | | | | | | | | | 工厂认可证书号：**AMMM00002AH**  Certificate No. of works approval: | | | | | |
| 产品名称：**球扁钢**  Product Name: **Bulb Flats** | | | | 产品执行标准：**GB/T9945-2012**  Product Standard: | | | | | | | | 交货状态：**热轧**  Condition of Supply: **As Rolled** | | | | | | 技术规范：**DNV GL规范**  Technical Specification: **DNV GL Rules** | | | | | | 日期：**2020年10月15日**  Date: | | | | | |
| 冶炼炉号  Batch No. | 轧制批号  Roll No. | 钢级  Grade | 产品规格  Dimensions | 长度  Length  (m) | 支数  PCS | 重量  Weight  (t) | | 化 学 成 分（％）  Chemical Composition | | | | | | | | | | | | | | 机 械 性 能  Mechanical Properties | | | | | | | |
| C | Si | Mn | P | | S | Ni | Cr | Cu | V | | Al | Nb | Ceq | 屈服强度  ReH(MPa) | 抗拉强度  Rm (Mpa) | | 伸长率  A5 (%) | V型冲击功 (J, 0℃)  Charpy V-notch Impact | | | |
| 1 | 2 | 3 | Avg |
| D1-1998983 | 2009A0031 | VL A36 | HP200×10 | 12 | 20 | 4.834 | | 0.15 | 0.26 | 1.24 | 0.016 | | 0.006 | 0.02 | 0.03 | 0.05 | 0.001 | | 0.029 | 0.017 | 0.37 | 385 | 540 | | 34 | 114 | 132 | 106 | 117 |
| B1-2007395 | 2009A0113 | VL A36 | HP200×10 | 12 | 40 | 9.668 | | 0.16 | 0.23 | 1.21 | 0.016 | | 0.008 | 0.01 | 0.04 | 0.02 | 0.028 | | 0.023 | 0.003 | 0.38 | 390 | 520 | | 31 | 106 | 120 | 112 | 113 |
| D1-1999127 | 2009A0248 | VL A36 | HP200×10 | 12 | 10 | 2.417 | | 0.14 | 0.26 | 1.24 | 0.017 | | 0.003 | 0.06 | 0.04 | 0.05 | 0.002 | | 0.029 | 0.017 | 0.36 | 405 | 530 | | 32 | 116 | 102 | 116 | 111 |
| D1-1999117 | 2009A0247 | VL A | HP200×11 | 12 | 18 | 4.689 | | 0.16 | 0.20 | 0.67 | 0.026 | | 0.004 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.27 | 320 | 450 | | 36 |  |  |  |  |
| D1-1999115 | 2009A0241 | VL A | HP200×12 | 12 | 4 | 1.118 | | 0.16 | 0.22 | 0.66 | 0.012 | | 0.006 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.27 | 300 | 430 | | 35 |  |  |  |  |
| D1-1999024 | 2009A0062 | VL A | HP200×9 | 12 | 10 | 2.228 | | 0.15 | 0.18 | 0.65 | 0.022 | | 0.005 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.27 | 305 | 440 | | 31 |  |  |  |  |
| D1-1999024 | 2009A0063 | VL A | HP200×9 | 12 | 30 | 6.684 | | 0.15 | 0.18 | 0.65 | 0.022 | | 0.005 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.27 | 300 | 440 | | 31 |  |  |  |  |
| D1-1999025 | 2009A0064 | VL A | HP200×9 | 12 | 10 | 2.228 | | 0.16 | 0.18 | 0.64 | 0.019 | | 0.006 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.27 | 310 | 450 | | 35 |  |  |  |  |
| D1-1999025 | 2009A0065 | VL A | HP200×9 | 12 | 40 | 8.912 | | 0.16 | 0.18 | 0.64 | 0.019 | | 0.006 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.27 | 315 | 450 | | 34 |  |  |  |  |
| D1-1998718 | 2009A0274 | VL A | HP220×10 | 12 | 2 | 0.546 | | 0.15 | 0.18 | 0.65 | 0.022 | | 0.002 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.26 | 315 | 445 | | 32 |  |  |  |  |
| D1-1999165 | 2009A0287 | VL A | HP220×10 | 12 | 19 | 5.192 | | 0.14 | 0.19 | 0.66 | 0.013 | | 0.007 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.25 | 315 | 455 | | 31 |  |  |  |  |
| D1-1998847 | 2009A0332 | VL A36 | HP220×10 | 12 | 4 | 1.093 | | 0.16 | 0.28 | 1.28 | 0.016 | | 0.006 | 0.01 | 0.02 | 0.01 | 0.004 | | 0.033 | 0.018 | 0.38 | 415 | 535 | | 34 | 112 | 118 | 108 | 113 |
| 验船师签字:  Surveyor:  DNV GL CONTROL NO.:N1421YD2  ISSUE DATE:2020.10.15 | | | | Total | **207** | **49.609** | | 注：未注明的其它残余元素符合规范要求。 Ceq=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15  Mo％ ≤0.02, Ti％ ≤0.02, 钢坯采用转炉或者电炉冶炼（Steelmark BOC, EAF, CC） | | | | | | | | | | | | | | 质检验负责人：陶晓恒  Chief of Check: Tao Xiaoheng | | | | | | | |
| 兹证明本材料按VL认可的工艺规程制造，符合相应的VL等级的要求。  VL material grades are certified and found to be in compliance with the　requirements to corresponding VL grades。 | | | | | | | | | | | | | | | | | |
| 地址: 江苏省常熟市梅李镇通港工业园华联路118号  Add: No. 118 Hualian Road, Tonggang Industrial Park,  Meili Town, Changshu, Jiangsu Province, CHINA  邮编(PC)： 215511 E-mail：lttg@lttg.cn  电话(Tel)：+86-512-52669226  *www.lttg.cn* | | | | | | | |

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| 订货单位：**南通源泰金属材料有限公司**  Purchaser: | | | | | | | 产 品 质 量 证 明 书 | | | | | | | | | | | | | | | | | 质保书编号：**LT\_DNV GL\_2010005**  Certificate No. | | | | | |
| 合同编号：**A-20-091**  Contract No.: | | | | 船级社：**DNV GL**  Classification: | | | QUALITY CERTIFICATE | | | | | | | | | | | | | | | | | 工厂认可证书号：**AMMM00002AH**  Certificate No. of works approval: | | | | | |
| 产品名称：**球扁钢**  Product Name: **Bulb Flats** | | | | 产品执行标准：**GB/T9945-2012**  Product Standard: | | | | | | | | 交货状态：**热轧**  Condition of Supply: **As Rolled** | | | | | | 技术规范：**DNV GL规范**  Technical Specification: **DNV GL Rules** | | | | | | 日期：**2020年10月15日**  Date: | | | | | |
| 冶炼炉号  Batch No. | 轧制批号  Roll No. | 钢级  Grade | 产品规格  Dimensions | 长度  Length  (m) | 支数  PCS | 重量  Weight  (t) | | 化 学 成 分（％）  Chemical Composition | | | | | | | | | | | | | | 机 械 性 能  Mechanical Properties | | | | | | | |
| C | Si | Mn | P | | S | Ni | Cr | Cu | V | | Al | Nb | Ceq | 屈服强度  ReH(MPa) | 抗拉强度  Rm (Mpa) | | 伸长率  A5 (%) | V型冲击功 (J, 0℃)  Charpy V-notch Impact | | | |
| 1 | 2 | 3 | Avg |
| B1-2007649 | 2009A0413 | VL A36 | HP220×10 | 12 | 4 | 1.093 | | 0.14 | 0.25 | 1.20 | 0.018 | | 0.003 | 0.01 | 0.05 | 0.02 | 0.026 | | 0.026 | 0.002 | 0.35 | 405 | 525 | | 33 | 120 | 110 | 116 | 115 |
| D1-1999273 | 2009A0458 | VL A | HP220×10 | 12 | 23 | 6.285 | | 0.14 | 0.21 | 0.65 | 0.015 | | 0.013 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.25 | 305 | 430 | | 33 |  |  |  |  |
| D1-1999275 | 2009A0464 | VL A | HP220×10 | 12 | 2 | 0.546 | | 0.14 | 0.22 | 0.65 | 0.008 | | 0.013 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.25 | 310 | 440 | | 32 |  |  |  |  |
| D1-1998860 | 2009A0439 | VL A36 | HP220×11 | 12 | 40 | 11.76 | | 0.14 | 0.29 | 1.23 | 0.010 | | 0.002 | 0.03 | 0.04 | 0.08 | 0.001 | | 0.031 | 0.017 | 0.36 | 425 | 540 | | 32 | 142 | 148 | 124 | 138 |
| D1-1998860 | 2009A0440 | VL A36 | HP220×11 | 12 | 40 | 11.76 | | 0.14 | 0.29 | 1.23 | 0.010 | | 0.002 | 0.03 | 0.04 | 0.08 | 0.001 | | 0.031 | 0.017 | 0.36 | 380 | 520 | | 34 | 148 | 152 | 158 | 153 |
| D1-1998859 | 2009A0441 | VL A36 | HP220×11 | 12 | 10 | 2.94 | | 0.13 | 0.30 | 1.20 | 0.008 | | 0.001 | 0.04 | 0.04 | 0.07 | 0.001 | | 0.030 | 0.017 | 0.35 | 390 | 530 | | 33 | 140 | 154 | 152 | 149 |
| D1-1998859 | 2009A0442 | VL A36 | HP220×11 | 12 | 50 | 14.7 | | 0.13 | 0.30 | 1.20 | 0.008 | | 0.001 | 0.04 | 0.04 | 0.07 | 0.001 | | 0.030 | 0.017 | 0.35 | 415 | 545 | | 33 | 162 | 156 | 158 | 159 |
| D1-1998859 | 2009A0443 | VL A36 | HP220×11 | 12 | 8 | 2.352 | | 0.13 | 0.30 | 1.20 | 0.008 | | 0.001 | 0.04 | 0.04 | 0.07 | 0.001 | | 0.030 | 0.017 | 0.35 | 390 | 530 | | 33 | 160 | 160 | 156 | 159 |
| D1-1998858 | 2009A0446 | VL A36 | HP220×11 | 12 | 2 | 0.588 | | 0.14 | 0.28 | 1.28 | 0.018 | | 0.021 | 0.03 | 0.04 | 0.08 | 0.001 | | 0.032 | 0.019 | 0.37 | 425 | 540 | | 35 | 158 | 128 | 152 | 146 |
| D1-1998627 | 2007A0407 | VL A36 | HP240×10 | 12 | 10 | 3.06 | | 0.15 | 0.27 | 1.22 | 0.011 | | 0.002 | 0.02 | 0.04 | 0.05 | 0.001 | | 0.031 | 0.015 | 0.37 | 400 | 535 | | 32 | 122 | 124 | 124 | 123 |
| D1-1998627 | 2007A0408 | VL A36 | HP240×10 | 12 | 10 | 3.06 | | 0.15 | 0.27 | 1.22 | 0.011 | | 0.002 | 0.02 | 0.04 | 0.05 | 0.001 | | 0.031 | 0.015 | 0.37 | 400 | 525 | | 33 | 126 | 116 | 108 | 117 |
| D1-1998631 | 2007A0449 | VL A36 | HP240×10 | 12 | 30 | 9.18 | | 0.14 | 0.26 | 1.23 | 0.012 | | 0.009 | 0.02 | 0.04 | 0.06 | 0.002 | | 0.037 | 0.017 | 0.36 | 405 | 545 | | 33 | 108 | 114 | 122 | 115 |
| 验船师签字:  Surveyor:  DNV GL CONTROL NO.:N1421YD2  ISSUE DATE:2020.10.15 | | | | Total | **229** | **67.324** | | 注：未注明的其它残余元素符合规范要求。 Ceq=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15  Mo％ ≤0.02, Ti％ ≤0.02, 钢坯采用转炉或者电炉冶炼（Steelmark BOC, EAF, CC） | | | | | | | | | | | | | | 质检验负责人：陶晓恒  Chief of Check: Tao Xiaoheng | | | | | | | |
| 兹证明本材料按VL认可的工艺规程制造，符合相应的VL等级的要求。  VL material grades are certified and found to be in compliance with the　requirements to corresponding VL grades。 | | | | | | | | | | | | | | | | | |
| 地址: 江苏省常熟市梅李镇通港工业园华联路118号  Add: No. 118 Hualian Road, Tonggang Industrial Park,  Meili Town, Changshu, Jiangsu Province, CHINA  邮编(PC)： 215511 E-mail：lttg@lttg.cn  电话(Tel)：+86-512-52669226  *www.lttg.cn* | | | | | | | |

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| 订货单位：**南通源泰金属材料有限公司**  Purchaser: | | | | | | | 产 品 质 量 证 明 书 | | | | | | | | | | | | | | | | | 质保书编号：**LT\_DNV GL\_2010006**  Certificate No. | | | | | |
| 合同编号：**A-20-091**  Contract No.: | | | | 船级社：**DNV GL**  Classification: | | | QUALITY CERTIFICATE | | | | | | | | | | | | | | | | | 工厂认可证书号：**AMMM00002AH**  Certificate No. of works approval: | | | | | |
| 产品名称：**球扁钢**  Product Name: **Bulb Flats** | | | | 产品执行标准：**GB/T9945-2012**  Product Standard: | | | | | | | | 交货状态：**热轧**  Condition of Supply: **As Rolled** | | | | | | 技术规范：**DNV GL规范**  Technical Specification: **DNV GL Rules** | | | | | | 日期：**2020年10月15日**  Date: | | | | | |
| 冶炼炉号  Batch No. | 轧制批号  Roll No. | 钢级  Grade | 产品规格  Dimensions | 长度  Length  (m) | 支数  PCS | 重量  Weight  (t) | | 化 学 成 分（％）  Chemical Composition | | | | | | | | | | | | | | 机 械 性 能  Mechanical Properties | | | | | | | |
| C | Si | Mn | P | | S | Ni | Cr | Cu | V | | Al | Nb | Ceq | 屈服强度  ReH(MPa) | 抗拉强度  Rm (Mpa) | | 伸长率  A5 (%) | V型冲击功 (J, 0℃)  Charpy V-notch Impact | | | |
| 1 | 2 | 3 | Avg |
| D1-1998632 | 2007A0453 | VL A36 | HP240×10 | 12 | 10 | 3.06 | | 0.15 | 0.28 | 1.24 | 0.013 | | 0.010 | 0.02 | 0.04 | 0.04 | 0.002 | | 0.030 | 0.016 | 0.37 | 425 | 555 | | 30 | 112 | 118 | 112 | 114 |
| D1-1999332 | 2010A0016 | VL A | HP240×10 | 12 | 13 | 3.978 | | 0.16 | 0.21 | 0.67 | 0.022 | | 0.008 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.27 | 325 | 445 | | 33 |  |  |  |  |
| D1-1998631 | 2007A0444 | VL A36 | HP240×11 | 12 | 10 | 3.287 | | 0.14 | 0.26 | 1.23 | 0.012 | | 0.009 | 0.02 | 0.04 | 0.06 | 0.002 | | 0.037 | 0.017 | 0.36 | 405 | 520 | | 35 | 162 | 144 | 136 | 147 |
| D1-1998633 | 2007A0458 | VL A36 | HP240×11 | 12 | 10 | 3.287 | | 0.14 | 0.27 | 1.24 | 0.017 | | 0.004 | 0.04 | 0.06 | 0.07 | 0.003 | | 0.025 | 0.020 | 0.37 | 420 | 530 | | 32 | 136 | 146 | 156 | 146 |
| D1-1998638 | 2007A0515 | VL A36 | HP240×11 | 12 | 18 | 5.916 | | 0.13 | 0.28 | 1.26 | 0.012 | | 0.004 | 0.03 | 0.03 | 0.04 | 0.002 | | 0.039 | 0.017 | 0.36 | 400 | 530 | | 33 | 124 | 162 | 154 | 147 |
| D1-1998638 | 2007A0516 | VL A36 | HP240×11 | 12 | 6 | 1.972 | | 0.13 | 0.28 | 1.26 | 0.012 | | 0.004 | 0.03 | 0.03 | 0.04 | 0.002 | | 0.039 | 0.017 | 0.36 | 395 | 530 | | 32 | 162 | 160 | 142 | 155 |
| D1-2001109 | 2008F0318 | VL A | HP260×12 | 12 | 4 | 1.557 | | 0.15 | 0.20 | 0.64 | 0.016 | | 0.013 | ≤0.02 | ≤0.02 | ≤0.02 | ≤0.02 | | ≤0.02 | ≤0.02 | 0.27 | 300 | 440 | | 33 |  |  |  |  |
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| 验船师签字:  Surveyor:  DNV GL CONTROL NO.:N1421YD2  ISSUE DATE:2020.10.15 | | | | Total | **71** | **23.057** | | 注：未注明的其它残余元素符合规范要求。 Ceq=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15  Mo％ ≤0.02, Ti％ ≤0.02, 钢坯采用转炉或者电炉冶炼（Steelmark BOC, EAF, CC） | | | | | | | | | | | | | | 质检验负责人：陶晓恒  Chief of Check: Tao Xiaoheng | | | | | | | |
| 兹证明本材料按VL认可的工艺规程制造，符合相应的VL等级的要求。  VL material grades are certified and found to be in compliance with the　requirements to corresponding VL grades。 | | | | | | | | | | | | | | | | | |
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