

List of References.
Equipment for Ultrasonic Examination of Bars and Billets.
Updated: 01.04.2017

| No. | System | Type of System | Customer | Date of Contract | Parameters of the Customer's Line |
|-----|---|----------------|--|------------------|--|
| 1 | EMATEST-BB-70 bars inspection (Volna) | EMAT | OAO «Severstal» Russia | 1997 | Bar diameters: 25 - 65 mm Length: 3,0 - 7,0 m Curvature: up to 5 mm/m Surface: after hot rolling Temperature: -20°C - + 50°C Test speed: 1,0 - 2,5 m/sec Defects to be detected: surface, internal Testing Criteria: DIN EN 10208, API 5L, TY 75-86, SEP 1921, ASNT. GOST 21120, GOST 1050, GOST 4543, GOST 801, GOST 10702 |
| 2 | EMATEST-BB-210 bars and billets inspection (Volna-5-Oskol) | EMAT | OAO «Oskol Electrometallurgical Plant» Russia | 2000 | Bar diameters: 7 - 210 mm Billet: 70 x 70 mm, 125 x 125 mm Length: 6,0 - 12,0 m Curvature: up to 5 mm/m Surface: after hot rolling Temperature: -20°C - + 50°C Test speed: 1,0 - 2,5 m/sec Defects to be detected: surface, internal Testing Criteria: DIN EN 10208, API 5 L, TY 75-86, SEP1921, ASNT, GOST 21120 |
| 3 | EMATEST-BB-210 bars inspection (Volna-7) | EMAT | ZAO «ISTIL-DMZ» Ukraine | 2000 | Bar diameters: 70 - 210 mm Length: 3,0 - 6,5 m Curvature: up to 2 mm/m Surface: after hot rolling and leveling Temperature: -20°C - + 50°C Test speed: 0,2 - 0,5 m/sec Defects to be detected: surface, internal Testing Criteria: DIN EN 10208, API 5L, TY 75-86, SEP 1921, ASNM. GOST 21120 |
| 4 | EMATEST-BB-70 bars inspection (Volna) | EMAT | OAO «Severstal» Russia | 2001 | Bar diameters: 25 - 65 mm Length: 3,0 - 7,0 m Curvature: up to 5 mm/m Surface: after hot rolling |

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| | | | | | Temperature: -20°C - + 50°C Test speed: 1,0 - 2,5 m/sec Defects to be detected: surface, internal Testing Criteria: DIN EN 10208, API 5L, TY 75-86, SEP 1921, ASNT. GOST 21120, GOST 1050, GOST 4543, GOST 801, GOST 10702 |
| 5 | EMATEST-BB-200 bars inspection (Volna-7-Mechel) | EMAT | OAO «MECHEL» Russia | 2002 | Bar diameters: 80 – 190 mm Length: 4,0 - 12,0 m Curvature: 5 mm/m Surface: after hot rolling + loose scale, burrs; grinded bars Temperature: - 40°C - + 40°C Test speed: 0 - 1,5 m/sec Testing Criteria: surface, internal Standards: DIN EN 10208, API 5L, TY 75-86, SEP 1920, ASNT, GOST 21120 |
| 6 | EMATEST- B-160 bars and billets inspection (Volna-7) | EMAT + PHASED ARRAYS | OAO «Byelorussian Metallurgical Plant» Byelorussia | 2004 | Bar diameters: 80 - 155 mm Billet size: 100 - 140 mm Length: 8,0 - 12,0 m Surface: after hot rolling Temperature: +10°C - + 50°C Test speed: up to 1,2 m/sec Defects to be detected: surface, internal Testing Criteria: GOST4543-71, GOST 1050-88, OST 14-21-77, GOST 10702-78, TY 14-1-4492-88, EN10025, EN 10083, EN 10084, BS 970, ASTM A350 |
| 7 | EMATEST-BB-600 bars inspection (Volna-6) | EMAT + PHASED ARRAYS | OAO «DMKD» Ukraine | 2005, commissioning June 2007 | Bar diameters: 90 - 600 mm Length: 4,5 - 12,0 m Curvature: up to 10 mm/m Surface: after hot rolling and leveling Temperature: -20°C - + 200°C Test speed: up to 0,5 m/sec Defects to be detected: surface, internal Testing Criteria: DIN EN 10208, API 5L, TY 75-86, SEP 1921, ASNM. GOST 21120 |

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| 8 | EMATEST-B-70 BARS INSPECTION (Volna-7) | EMAT | OAO «Severstal» Russia | 2005, commissioning February 2007 | Bar diameters: 25 – 70 mm Length: 2,5 - 6,5 m Curvature: up to 2 mm/m Surface: after hot rolling and leveling Temperature: -20°C - + 50°C Test speed: up to 2 m/sec Defects to be detected: surface, internal Testing Criteria: API 5L, GOST1050, 4543, 8-1, 10702, 535. 21014, GOST 14959, EN 10221 SEP 1921 |
| 9 | EMATEST-BB-560 bars and billet inspection | PHASED ARRAYS | «SHANXI TAIGANG STAINLESS STEEL CORPORATION (TISCO)» China | 2009 | Bar diameters: 80 - 560 mm Length: 3,5 - 22,0 m Curvature: < 4 mm/m Surface: Hot forge, shot-blast or machined through lathe Temperature: up to + 100°C Test speed: max. 0,3 m/sec Defects to be detected: surface, internal |
| 10 | EMATEST-BB-90 bars inspection | EMAT+ EDDY CURRENT | «HANDAN STEEL CORPORATION» Handan, China | 2010 | Bar diameters: 15 - 90 mm Surface: hot forge, shot-blast or machined through lathe Temperature: up to + 100°C Test speed: max. 2 m/sec Defects to be detected: <ul style="list-style-type: none"> ▪ Internal: FBH 2 .0 mm ▪ Surface: Notch 25 X 0.3 X 0.3 mm Testing Criteria: GB/T 4162-2008 |
| 11 | EMATEST-BB-UT- MFL-220 | EMAT + MAGNETIC FLUX LEAKAGE | «LAIWU STEEL GROUP LTD. » China | 2012 | Bar diameters: 90 - 220 mm Surface: after shot blasting and straightness treatment, black kin Temperature: up to + 100°C Test speed: max. 0,5 m/sec Defects to be detected: <ul style="list-style-type: none"> ▪ Internal: |

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| | | | | | <p>SDH: 0,8 x 15 mm (in center) SDH: 1,0 x 15 mm (3 mm from the surface)</p> <ul style="list-style-type: none"> ▪ Surface: Notch 0,15 (D) x 0,1 (W) x 10 (L) mm <p>Testing Criteria: GB/T 702-2008</p> |
| 12 | EMATEST-BB-30 rolled wire inspection | EMAT | CIE «Automotive ZDANICE S.R.O.» Czech Republic | 2012 | <p>Rolled wire, ferromagnetic grades Diameters: 23 - 27 mm Length: endless from the testing point of view Velocity: 0 - 1 m/s (stop-and-go) Defects to be detected:</p> <ul style="list-style-type: none"> ▪ Internal: SDH: 0.8 x10 mm (in center and 3 mm from the surface); ▪ Surface: Notch 0.1 mm depth and 10 mm width |
| 13 | ALUTEST-BB-110 | PEP | «ALERIS ALUMINIUM DUFFEL BVBA» Belgium | 2014 | <p>Aluminum round bars Diameters: 10 - 110 mm Defects to be detected: FBH 0.8 mm</p> <p>Testing Criteria: AMS-STD-2154, AMS 2630, ASTM B594, EN4050, IGC 04.25.115, BSS7055 (Boeing), BAC 5439-3 (Boeing), ABP 6-5232 (Airbus).</p> |
| 14 | ALUTEST-BB-400 | PEP | «HAMMERER ALUMINIUM INDUSTRIES GMBH» Austria | 2016 | <p>Aluminum round bars Diameters: 127 - 400 mm Defects to be detected:</p> <ul style="list-style-type: none"> ▪ Internal FBH 2 mm ▪ Surface: notch (0.5+R) x 25 mm, where R = roughness |

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| | | | | | Testing Criteria: AMS-STD-2154, BSS7055 (Boeing), EN2004-2, ASTM E2375 – 08 (2013), NADCAP, AMS 2630, BAC 5439-3 (Boeing), IGC 04.25.116, prEN4050, ASTM D857, ASTM B594, ABP 6-5232 (Airbus) |
| 15 | NORDISCAN-BB-120 | PEP | «DONGIL INDUSTRIES Co.,LTD» South Korea | 2017 | Steel round bars Diameters: 25 – 120 mm Defects to be detected: <ul style="list-style-type: none"> ▪ Internal FBH 2 mm ▪ Surface: notch (0.5+R) x 25 mm, where R = roughness |
| 16 | NORDISCAN-RAIL (Test Stand for Rails Examination) | PA | «Voest-Alpine Schienen GmbH & Co Kg» Leoben, Austria | 2017 | Rail of Different Profiles Defects to be detected: <ul style="list-style-type: none"> ▪ Internal FBH 1.6 mm. |
| 17 | NORDISCAN-BB-160 | PEP | «POSCO» Pohang, South Korea | 2017 | Steel Square Billets Section: 160 mm Defects to be detected: <ul style="list-style-type: none"> ▪ Internal FBH 2 mm. |