

NLMK

HOT-DIP GALVANIZED STEEL

**PRODUCT
CATALOGUE**

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ABOUT NLMK

Russia's No. 1 producer of steel, NLMK Group supplies products to sectors of the economy: from power engineering, petrochemical, pipe making, shipbuilding and construction through to manufacturing of railway transport, mining machinery, trucks, passenger cars, and yellow and white goods.

WHY NLMK

1. Reliability and quality guarantee

Our business model allows us to control the quality of our products at each stage: from the mining of raw materials to finished product manufacturing and servicing. Self-sufficiency in raw material and energy supplies ensures stability of our operations and unfailing delivery of all commitments to our partners.

2. A wide product mix

NLMK Group produces a wide range of steel products: from semi-finished products and standard grades to high-tech electrical steels. We also offer our clients made-to-order customization to match their individual specifications.

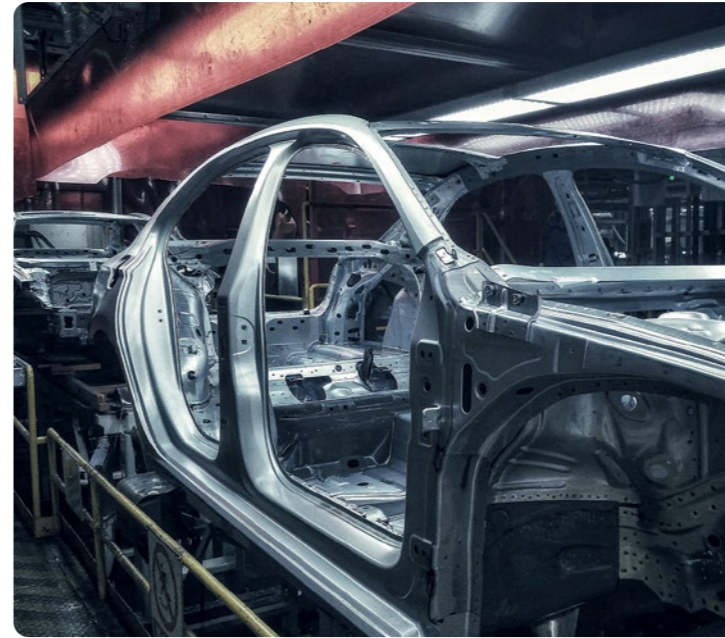
3. Strong team with a customized approach

Our customer service model relies on NLMK Trading House and NLMK.shop, which enables direct engagement with any type of business. We offer a unique proposition in servicing and logistical capabilities, with a guarantee of high and stable product quality.

4. Long-standing expertise in steelmaking

NLMK's success is driven by 90 years' worth of experience in the market and by our continuous efforts in designing new products and deploying digital technologies in production. Our digitalisation projects are widely acclaimed by market experts and recognized with specialised awards.





NLMK manufactures both hot- and cold-rolled base hot-dip galvanized steel. After galvanizing, NLMK's rolled products either undergo further processing (color coating), or go straight to the consumers. A distinctive feature of galvanized steel is high corrosion resistance, so it is mainly used in construction for light steel thin-walled structures, roofing, and sections; or in manufacture of trucks and cars, household appliances, and retail fixtures and equipment.



Applications

- Trucks and cars
- Agricultural machinery
- Roofing and finishing
- Lightweight steel framing
- White goods
- Retail fixtures and equipment
- Railroad machinery

PRODUCT MIX

MAIN PARAMETERS

| | |
|---|-----------------------------------|
| Rolled product thickness | 0.25–4.00 mm |
| Rolled product width | 900–1,820 mm |
| Rolled product width after slitting | 100–850 mm |
| Coil inner diameter | 600 ± 10, 500 ± 10 mm (requested) |
| Coil weight | 5–30 t |
| Weight of sheet bundles | Up to 10 t |
| Sheet length | 1,500–3,500 mm |
| Weight of galvanized coating (both sides) | 80 to 600 g/m ² |
| Coating type | With minimum spangle pattern |

TOLERANCES FOR DIMENSIONS AND SHAPE OF ROLLED PRODUCTS

| Standard for specification | GOST 14918 | TU 14-106-438 | EN 10346 | ASTM A 653M |
|---|------------|--------------------------|----------|-------------|
| Standard for product mix, geometrical dimensions and tolerances | GOST 14918 | GOST 19904 GOST 19851 | EN 10143 | ASTM A 924M |

DESIGNATION OF SURFACE FINISHING

| GOST 14918 | EN 10346 | ASTM A 653M |
|---|---|--------------------------|
| M (minimum spangle pattern) normal quality (without designation of the finishing group) Y (improved quality) B (high quality) | M (without spangle pattern) A (normal quality) B (improved quality) C (high quality) | – (“spangle-free” steel) |

GALVANIZED COATING CLASSES

| Class | Weight of galvanized coating (both sides of specimen), g/m ² | | Reference value of galvanized coating thickness assumes the basis of zinc density of 7.13 g/cm ³ |
|-------|---|------------|---|
| | average of three samples | one sample | |
| Z80 | > 80 | > 68 | It is possible to produce a differentiated zinc coating Z140/100 (other classes – by agreement) |
| Z100 | > 100 | > 85 | |
| Z120 | > 120 | > 100 | |
| Z140 | > 140 | > 120 | |
| Z150 | > 150 | > 130 | |
| Z180 | > 180 | > 150 | |
| Z200 | > 200 | > 170 | |
| Z225 | > 225 | > 195 | |
| Z275 | > 275 | > 235 | |
| Z350 | > 350 | > 300 | |
| Z450 | 450 | 385 | |
| Z600 | 600 | 510 | |

SURFACE PROTECTION AGAINST CORROSION DURING TRANSPORTATION AND STORAGE

- Chemical passivation based on Cr⁶⁺ or Cr³⁺
- Oiling
- Chemical passivation and oiling
- Thin organic coatings
- Without preservation

LOW-CARBON IF STEELS FOR COLD WORKING AND STEELS FOR CONSTRUCTION

MECHANICAL PROPERTIES

| Rolled product grade | Standard | Yield strength, MPa (N/mm ²) | Ultimate strength, MPa (N/mm ²) | Relative elongation, %, min. | R ₉₀ | n ₉₀ | Sampling direction with respect to rolling direction | |
|----------------------|---------------|--|---|------------------------------|-----------------|-----------------|--|--------------|
| DX51D | EN 10346 | – | 270–500 | 22 | – | – | Transverse | |
| DX52D | | 140–300 | 270–420 | 26 | – | – | | |
| DX53D | | 140–260 | 270–380 | 30 | – | – | | |
| DX54D | | 140–220 | 260–350 | 36 | ≥ 1.6 | ≥ 0.18 | | |
| DX56D | | 120–180 | 260–350 | 39 | ≥ 1.9 | ≥ 0.21 | | |
| DX57D | | 120–170 | 260–350 | 41 | ≥ 2.1 | ≥ 0.22 | | |
| S220GD | | ≥ 220 | ≥ 300 | 20 | – | – | | Longitudinal |
| S250GD | | ≥ 250 | ≥ 330 | 19 | – | – | | |
| S280GD | | ≥ 280 | ≥ 360 | 18 | – | – | | |
| S320GD | | ≥ 320 | ≥ 390 | 17 | – | – | | |
| S350GD | ≥ 350 | ≥ 420 | 16 | – | – | | | |
| S390GD | ≥ 390 | ≥ 460 | 15 | – | – | | | |
| S420GD | ≥ 420 | ≥ 480 | 15 | – | – | | | |
| S450GD | ≥ 450 | ≥ 510 | 14 | – | – | | | |
| 01 | GOST 14918 | – | – | – | – | – | Transverse | |
| 02 | | – | 270–500 | 20 | – | – | | |
| 03 | | – | 270–420 | 24 | – | – | | |
| 04 | | ≤ 260 | 270–380 | 28 | – | – | | |
| 05 | | ≤ 220 | 270–350 | 34 | ≥ 1.6 | ≥ 0.18 | | |
| 06 | | ≤ 180 | 270–350 | 35 | ≥ 1.9 | ≥ 0.21 | | |
| 07 | | ≤ 170 | 260–350 | 37 | ≥ 2.1 | ≥ 0.22 | | |
| 220 | | ≥ 220 | ≥ 300 | 18 | – | – | | Longitudinal |
| 250 | | ≥ 250 | ≥ 330 | 17 | – | – | | |
| 280 | | ≥ 280 | ≥ 360 | 16 | – | – | | |
| 320 | ≥ 320 | ≥ 390 | 15 | – | – | | | |
| 350 | ≥ 350 | ≥ 420 | 14 | – | – | | | |
| 390 | ≥ 390 | ≥ 450 | 13 | – | – | | | |
| 420 | ≥ 420 | ≥ 480 | 12 | – | – | | | |
| 450 | ≥ 450 | ≥ 510 | 13 | – | – | | | |
| BГ | TU 14-106-438 | – | 270–410 | 26–28 | – | – | Transverse | |
| CB | | ≤ 205 | 270–380 | 32–34 | – | – | | |
| OCB | | ≤ 195 | 270–350 | 34–36 | ≥ 1.6 | ≥ 0.20 | | |
| BOCB | | ≤ 185 | 270–350 | 38–40 | ≥ 2.0 | ≥ 0.21 | | |
| CS Type A | ASTM A 653M | 170–380 | – | 20 | – | – | Longitudinal | |
| CS Type B | | 205–380 | – | 20 | – | – | | |
| CS Type C | | 170–410 | – | 15 | – | – | | |
| FS Type A, B | | 170–310 | – | 26 | 1.0–1.4 | 0.17–0.21 | | |
| SS 230 | | ≥ 230 | ≥ 310 | 20 | – | – | | Longitudinal |
| SS 255 | | ≥ 255 | ≥ 360 | 18 | – | – | | |
| SS 275 | ≥ 275 | ≥ 380 | 16 | – | – | | | |

For galvanized steel as per GOST 14918 and TU 14-106-438, requirements for relative elongation depend on the rolled product thickness. For galvanized steel as per EN 10346 with thickness < 0.7 mm, relative elongation can be reduced by 2%.

Mechanical properties of galvanized steel of CS, FS, DDS and EDDS grades are not rated; the table contains the typical range of mechanical properties as per ASTM A 653M.

Yield strength of DX52D grade steel is rated only for skin-passed steel (with “B” and “C” surface finish).

Other specified mechanical properties are available upon request.

APPROXIMATE COMPARISON OF GRADES AND THEIR APPLICATIONS

| Rolled product application as per GOST 14918 | GOST 14918 | TU 14-106-438 | EN 10346 | ASTM A 653M |
|---|------------|---------------|--------------|-------------------|
| Production of flat products by bending | 01 | - | - | - |
| Production of cooking and household wares by bending and lock-joining | 02 | - | DX51D | CS (Type A, B, C) |
| Production of stamped products with special deep drawing quality and complex sections | 03 | BF | DX52D | FS (Type A, B) |
| Production of stamped products of complex drawing quality | 04 | - | DX53D | - |
| | - | CB | - | - |
| Production of stamped products of extra-complex drawing quality | 05 | - | DX54D | - |
| | - | OCB | - | - |
| Production of stamped products of special extra-complex drawing quality | 06, 07 | BOCB | DX56D, DX57D | - |
| Structural rolled steel for shaped products | 220 | - | S220GD | SS 230 |
| | 250 | - | S250GD | SS 255 |
| | 280 | - | S280GD | SS 275 |
| | 320 | - | S320GD | - |
| | 350 | - | S350GD | - |
| | 420 | - | S420GD | - |
| | 450 | - | S450GD | - |

THICKNESS/WIDTH RATIO FOR ROLLED PRODUCTS

● 01, 02, DX51D, CS (Type A, B, C)

| Thickness, mm | Strip width, mm |
|---------------|---|
| | 900 1,000 1,250 1,350 1,440 1,520 1,550 1,620 1,800 |
| 0.25-0.30 | |
| 0.31-0.39 | |
| 0.40-0.41 | |
| 0.42-0.49 | |
| 0.50-0.70 | |
| 0.71-0.90 | |
| 0.91-2.00 | |
| 2.01-2.99 | |
| 3.00-4.00 | |

● 04, 05, DX53D, DX54D, CB, OCB

| Thickness, mm | Strip width, mm |
|---------------|-----------------------------------|
| | 900 1,250 1,600 1,650 1,750 1,800 |
| 0.45-0.59 | |
| 0.60-0.69 | |
| 0.70-0.85 | |
| 0.86-1.00 | |
| 1.01-2.00 | |

● 220, S220GD, SS 230

| Thickness, mm | Strip width, mm |
|---------------|---|
| | 900 1,000 1,250 1,350 1,440 1,500 1,520 1,550 1,620 |
| 0.30-0.39 | |
| 0.40-0.41 | |
| 0.42-0.49 | |
| 0.50-0.80 | |
| 0.81-2.00 | |
| 2.01-2.99 | |
| 3.00-4.00 | |

● 03, DX52D, FS (Type A, B)

| Thickness, mm | Strip width, mm |
|---------------|---|
| | 900 1,000 1,250 1,350 1,440 1,520 1,550 1,620 1,720 |
| 0.30-0.39 | |
| 0.40-0.41 | |
| 0.42-0.49 | |
| 0.50-0.70 | |
| 0.70-1.50 | |
| 1.51-2.00 | |
| 2.01-2.99 | |
| 3.00-4.00 | |

● 05, 06, 07, DX56D, DX57D, BOCB, BOCB-T

| Thickness, mm | Strip width, mm |
|---------------|---|
| | 900 1,250 1,350 1,450 1,600 1,750 1,800 |
| 0.60 | |
| 0.61-0.70 | |
| 0.71-0.85 | |
| 0.86-1.00 | |
| 1.01-2.00 | |

● 250, S250GD, SS 255

| Thickness, mm | Strip width, mm |
|---------------|---|
| | 900 1,250 1,350 1,400 1,500 1,520 1,550 1,600 1,620 |
| 0.30-0.39 | |
| 0.40-0.49 | |
| 0.50-0.54 | |
| 0.55-0.70 | |
| 0.71-0.80 | |
| 0.81-2.00 | |
| 2.00-2.99 | |
| 3.00-3.50 | |
| 3.51-4.00 | |

● 280, S280GD, SS 275

| Thickness, mm | Strip width, mm |
|---------------|---|
| | 900 1,250 1,320 1,350 1,420 1,470 1,500 1,520 1,600 |
| 0.30-0.41 | |
| 0.42-0.54 | |
| 0.55-0.80 | |
| 0.81-1.50 | |
| 1.51-1.80 | |
| 1.81-2.00 | |
| 2.01-2.44 | |
| 2.45-3.00 | |
| 3.01-4.00 | |

● 320, 350, S320GD, S350GD

| Thickness, mm | Strip width, mm |
|---------------|---|
| | 900 1,250 1,270 1,300 1,320 1,370 1,505 1,520 1,550 1,600 |
| 0.50-0.80 | |
| 0.81-0.85 | |
| 0.86-0.95 | |
| 0.96-1.80 | |
| 1.81-2.00 | |
| 2.01-2.49 | |
| 2.50-2.99 | |
| 3.00-4.00 | |

● 390, S390GD

| Thickness, mm | Strip width, mm |
|---------------|---|
| | 900 1,250 1,300 1,320 1,370 1,400 1,520 1,550 1,600 |
| 0.80-2.00 | |
| 2.01-2.49 | |
| 2.50-2.99 | |
| 3.00-3.50 | |
| 3.51-4.00 | |

● 420, 450, S420GD, S450GD

| Thickness, mm | Strip width, mm |
|---------------|---|
| | 900 1,078 1,265 1,320 1,370 1,400 1,520 1,550 1,600 |
| 1.50-1.79 | |
| 1.80-2.29 | |
| 2.30-2.99 | |
| 3.00-4.00 | |

LOW-ALLOYED STEELS WITH HIGH YIELD STRENGTH FOR COLD WORKING

MECHANICAL PROPERTIES

| Rolled product grades | Standard | Yield strength, MPa (N/mm ²) | Ultimate strength, MPa (N/mm ²) | Relative elongation, R %, min. | n | Sampling direction with respect to rolling direction | |
|-----------------------|----------|--|---|--------------------------------|-------|--|------------|
| HX180YD | EN 10346 | 180-240 | 330-390 | 34 | ≥ 1.7 | ≥ 0.18 | Transverse |
| HX220YD | | 220-280 | 340-420 | 32 | ≥ 1.5 | ≥ 0.17 | |
| HX260YD | | 260-320 | 380-440 | 30 | ≥ 1.4 | ≥ 0.16 | |
| HX300YD | | 300-380 | 380-480 | 27 | - | - | |
| HX260LAD | | 260-330 | 350-430 | 26 | - | - | |
| HX300LAD | | 300-380 | 380-480 | 23 | - | - | |
| HX340LAD | | 340-420 | 410-510 | 21 | - | - | |
| HX380LAD | | 380-480 | 440-560 | 19 | - | - | |
| HX420LAD | | 420-520 | 470-590 | 17 | - | - | |

THICKNESS/WIDTH RATIO FOR ROLLED PRODUCTS*

HX180YD

| Steel thickness before galvanizing, mm | Strip width, mm | | | | | | |
|--|-----------------|-------|-------|-------|-------|-------|-------|
| | 900 | 1,420 | 1,550 | 1,570 | 1,600 | 1,640 | 1,750 |
| 0.58-0.64 | | | | | | | |
| 0.65-0.77 | | | | | | | |
| 0.78-1.17 | | | | | | | |
| 1.18-1.49 | | | | | | | |
| 1.50-2.00 | | | | | | | |

HX260YD

| Steel thickness before galvanizing, mm | Strip width, mm | | | |
|--|-----------------|-------|-------|-------|
| | 900 | 1,200 | 1,300 | 1,450 |
| 0.68-1.80 | | | | |
| 1.81-1.90 | | | | |
| 1.91-2.00 | | | | |

HX260LAD

| Steel thickness before galvanizing, mm | Strip width, mm | | | | |
|--|-----------------|-------|-------|-------|-------|
| | 900 | 1,390 | 1,520 | 1,570 | 1,660 |
| 0.58-0.80 | | | | | |
| 0.81-1.00 | | | | | |
| 1.01-1.50 | | | | | |
| 1.51-1.90 | | | | | |
| 1.91-2.00 | | | | | |

HX340LAD

| Steel thickness before galvanizing, mm | Strip width, mm | | | | |
|--|-----------------|-------|-------|-------|-------|
| | 900 | 1,320 | 1,420 | 1,510 | 1,550 |
| 0.68-0.89 | | | | | |
| 0.90-0.97 | | | | | |
| 0.98-1.50 | | | | | |
| 1.51-2.00 | | | | | |

HX220YD

| Steel thickness before galvanizing, mm | Strip width, mm | | | | | |
|--|-----------------|-------|-------|-------|-------|-------|
| | 900 | 1,370 | 1,520 | 1,560 | 1,620 | 1,650 |
| 0.63-0.67 | | | | | | |
| 0.68-1.27 | | | | | | |
| 1.28-1.50 | | | | | | |
| 1.51-2.00 | | | | | | |

HX300YD

| Steel thickness before galvanizing, mm | Strip width, mm | | |
|--|-----------------|-------|-------|
| | 900 | 1,050 | 1,280 |
| 0.98-1.00 | | | |
| 0.81-1.00 | | | |

HX300LAD

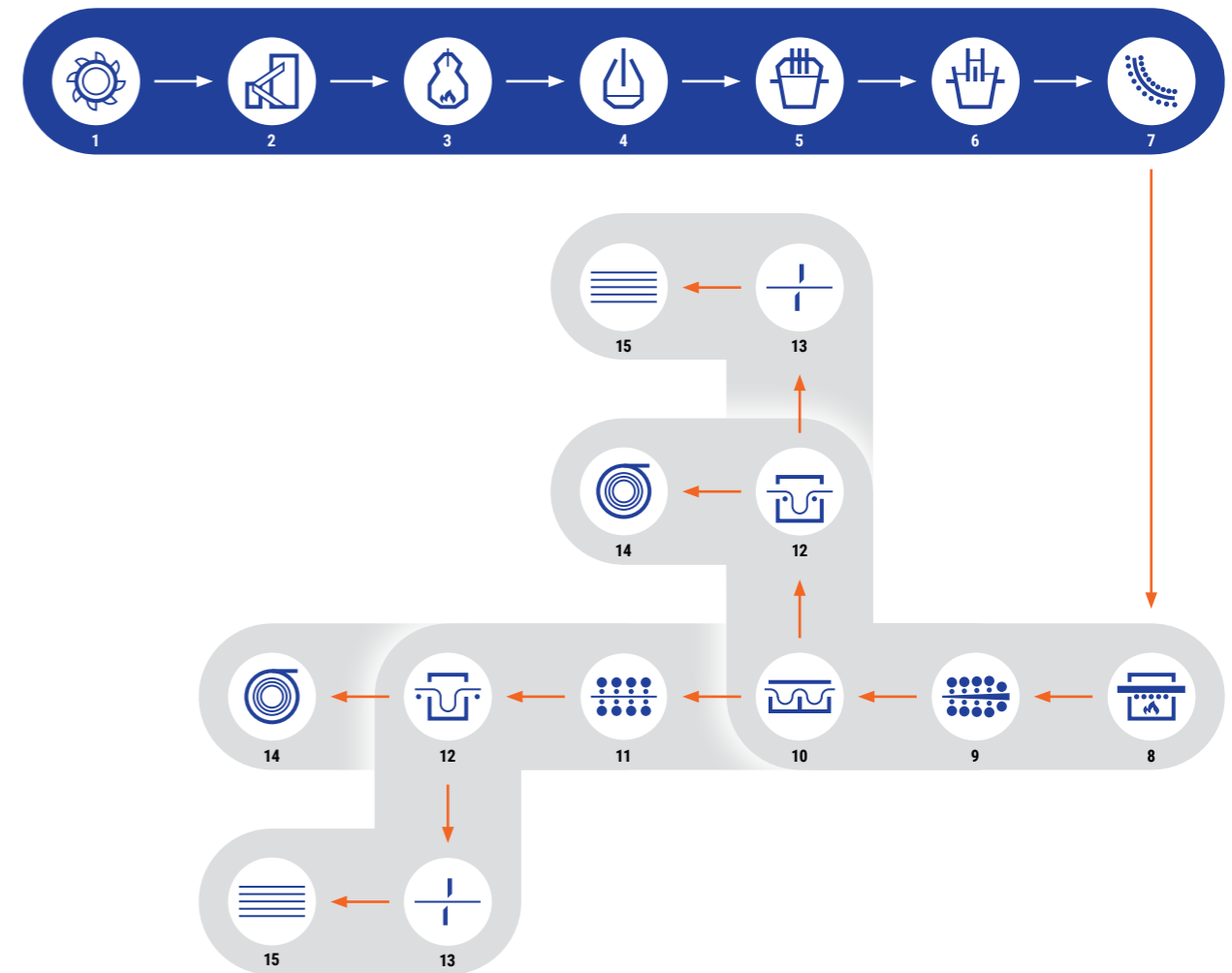
| Steel thickness before galvanizing, mm | Strip width, mm | | | | | |
|--|-----------------|-------|-------|-------|-------|-------|
| | 900 | 1,320 | 1,455 | 1,460 | 1,580 | 1,600 |
| 0.58-0.67 | | | | | | |
| 0.68-0.89 | | | | | | |
| 0.90-1.43 | | | | | | |
| 1.44-2.00 | | | | | | |

HX380LAD

| Steel thickness before galvanizing, mm | Strip width, mm | | | | | |
|--|-----------------|-------|-------|-------|-------|-------|
| | 900 | 1,270 | 1,320 | 1,370 | 1,520 | 1,550 |
| 0.68-0.69 | | | | | | |
| 0.70-0.89 | | | | | | |
| 0.90-0.97 | | | | | | |
| 0.98-1.09 | | | | | | |
| 1.10-2.00 | | | | | | |

* In agreement with the consumer, the delivery of rolled products of other sizes is possible

PRODUCTION FLOW



| Production stage |
|--------------------------------|
| 1 Iron ore mining |
| 2 Sintering |
| 3 Blast furnace |
| 4 Basic-oxygen converter |
| 5 Ladle furnace |
| 6 Vacuum degasser |
| 7 Continuous casting machine |
| 8 Reheating furnace |
| 9 Mill 2000 |
| 10 Continuous pickling line |
| 11 Cold-rolling mill |
| 12 Hot-dip galvanizing line |
| 13 Cutting machines |
| 14 Finished products in coils |
| 15 Finished products in sheets |



PACKING CHARTS

Chart No. 05-1

| No. | Description |
|-------|-----------------------------------|
| 1.2 | Polyester packing strap |
| 1.3 | Steel baling strap |
| 2 | Strapping seal |
| 5 | Multilayer anticorrosive material |
| 10.3 | Protective sheet |
| 13 | Protective steel angle |
| 15 | Protective angle for pack corners |
| 16 | Standard timber pallet |
| 16.4* | Double pallet for forklift |
| 19 | Label (shipping) |

* Not visualized.

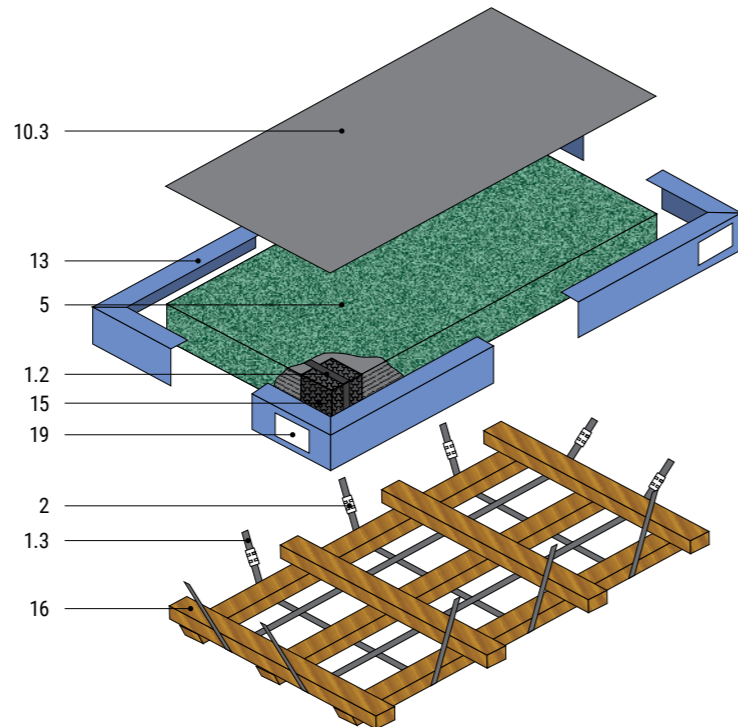


Chart No. 07

| No. | Description |
|-------|-----------------------------------|
| 1.1 | Steel baling strap |
| 1.2 | Polyester packing strap |
| 2 | Steel strapping seal |
| 3 | Adhesive tape 50 mm |
| 5 | Multilayer anticorrosive material |
| 6 | Polyethylene film |
| 10.3 | Protective steel sheet |
| 13 | Protective steel angle |
| 16.1 | International timber pallet |
| 16.4* | Double pallet for forklift |
| 19 | Label (shipping) |

* Not visualized.

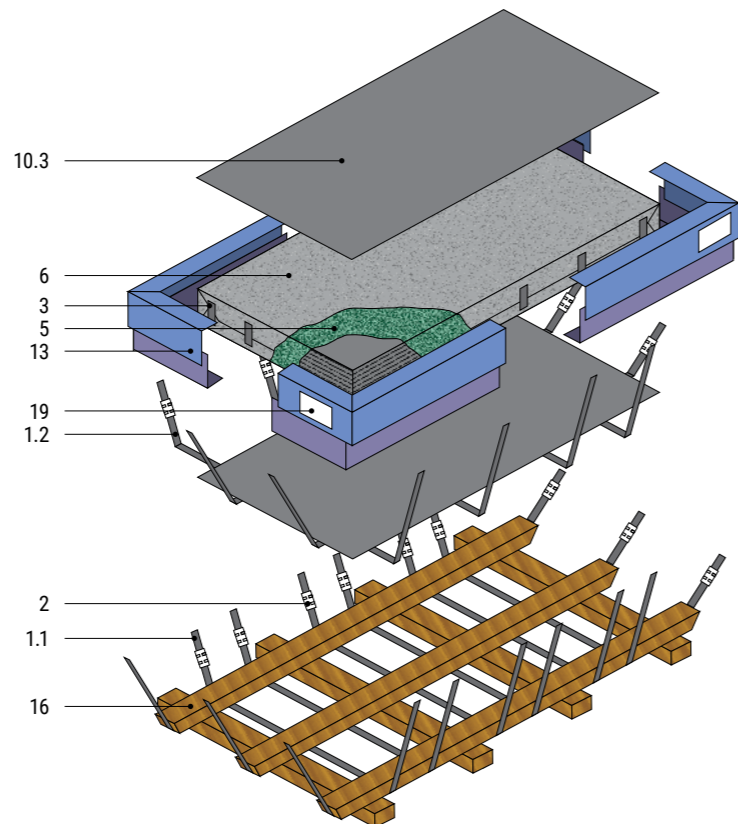


Chart No. 10, No. 10-1

| No. | Description |
|------|-----------------------------------|
| 1 | Polyester packing strap |
| 1.4 | Steel baling strap |
| 3 | Adhesive tape 50 mm |
| 5 | Multilayer anticorrosive material |
| 6 | Polyethylene film |
| 7 | Protective cardboard angle |
| 8 | Plastic insert |
| 8.1 | Plastic shell |
| 9* | Cardboard sleeve |
| 10 | External packing sheet |
| 10.1 | Internal packing sheet |
| 11 | End cover |
| 12 | External corrugated angle |
| 12.1 | Internal corrugated angle |
| 19 | Label (shipping) |

* For Packing Chart No. 10-1.

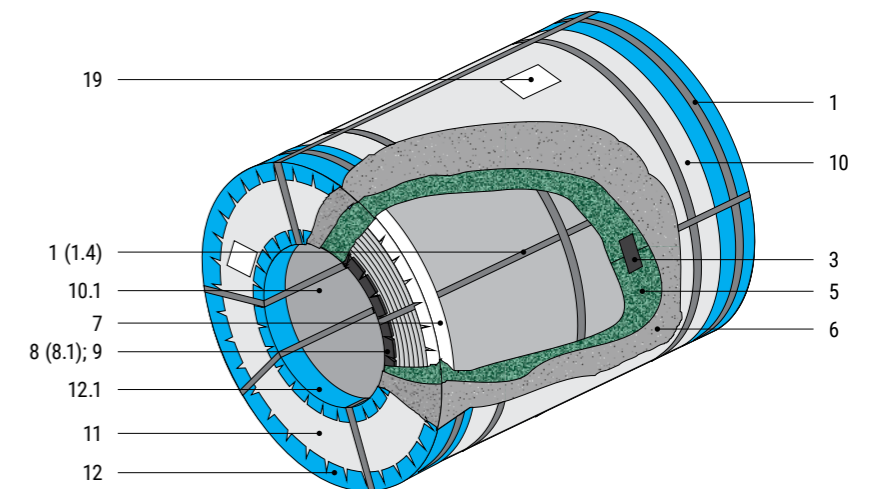


Chart No. 11, No. 11-1

| No. | Description |
|------|------------------------------------|
| 1 | Polyester packing strap |
| 1.4 | Steel baling strap |
| 3 | Adhesive tape 50 mm |
| 3.1 | Adhesive tape 100 mm |
| 5 | Multilayer anticorrosive material |
| 6 | Polyethylene film |
| 7 | Protective angle 60 x 60 mm |
| 7.1* | Protective angle 120 x 80 mm |
| 8 | Plastic insert |
| 8.1 | Plastic shell |
| 9** | Cardboard sleeve |
| 10 | External packing sheet |
| 10.1 | Internal packing sheet |
| 10.5 | Protective sheet for strap bundles |
| 11 | End cover |
| 12 | External corrugated angle |
| 12.1 | Internal corrugated angle |
| 19 | Label (shipping) |

* To be installed if steel end covers are used.

** For Packing Chart No. 11-1.

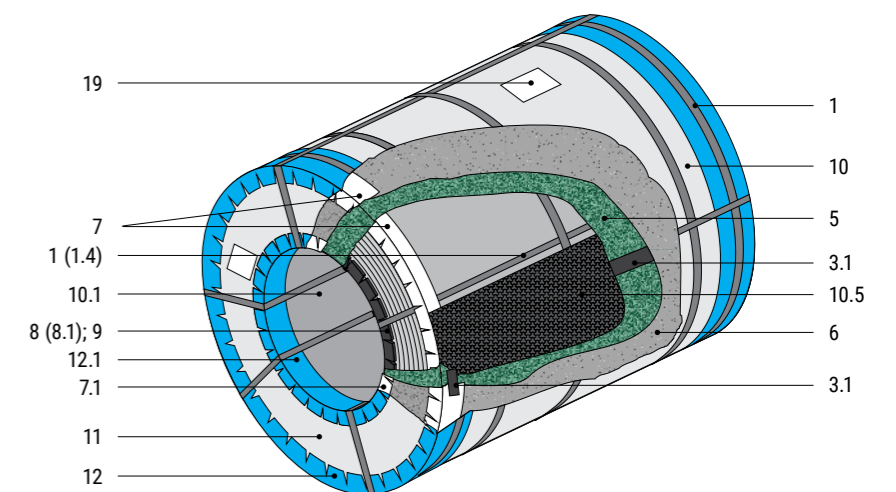


Chart No. 11K, No.11-1K

| No. | Description |
|------|-----------------------------------|
| 1 | Polyester packing strap |
| 1.4 | Steel baling strap |
| 3 | Adhesive tape 50 mm |
| 5 | Multilayer anticorrosive material |
| 8 | Plastic insert |
| 8.1 | Plastic shell |
| 9* | Cardboard sleeve |
| 10 | External packing sheet |
| 10.1 | Internal packing sheet |
| 11 | End cover |
| 12 | External corrugated angle |
| 12.1 | Internal corrugated angle |
| 19 | Label (shipping) |

* For Packing Chart No. 11-1K.

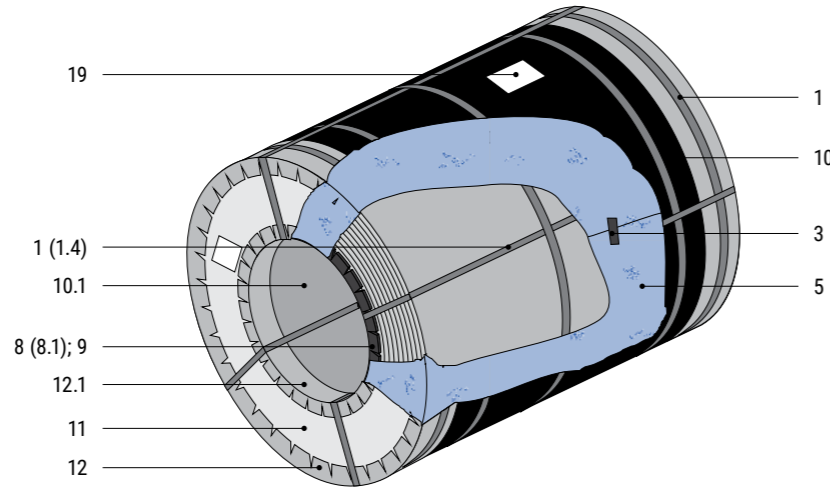
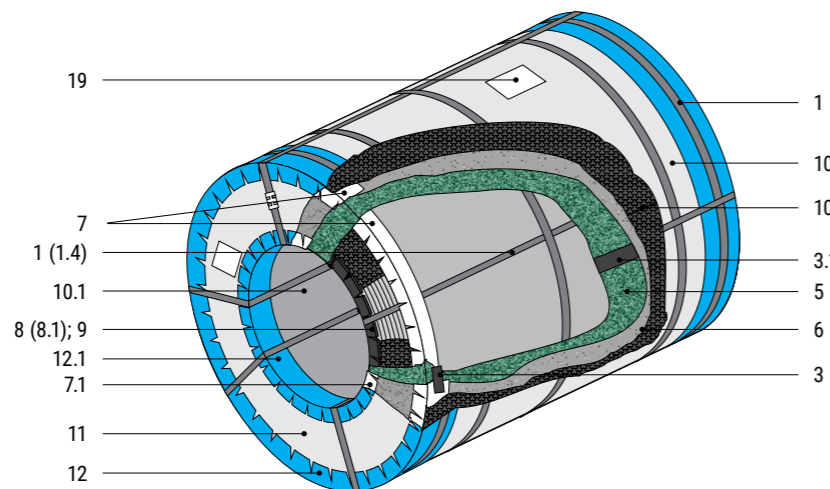


Chart No. 12, No. 12-1

| No. | Description |
|------|-----------------------------------|
| 1 | Polyester packing strap |
| 1.4 | Steel baling strap |
| 3 | Adhesive tape 50 mm |
| 3.1 | Adhesive tape 100 mm |
| 5 | Multilayer anticorrosive material |
| 6 | Polyethylene film |
| 7 | Protective angle 60 x 60 mm |
| 7.1 | Protective angle 120 x 80 mm |
| 8 | Plastic insert |
| 9* | Cardboard sleeve |
| 10 | External packing sheet |
| 10.1 | Internal packing sheet |
| 11 | End cover |
| 12 | External corrugated angle |
| 12.1 | Internal corrugated angle |
| 19 | Label (shipping) |

* For Packing Chart No. 12-1.



CERTIFICATION OF NLMK GROUP'S MANAGEMENT SYSTEM

| Certification authority | International standard | System's name |
|-------------------------|------------------------|---|
| TÜV AUSTRIA CERT GMBH | ISO 9001:2015 | Quality Management System |
| TÜV AUSTRIA CERT GMBH | ISO 14001:2015 | Environment Quality Management System |
| TÜV AUSTRIA CERT GMBH | ISO 45001:2018 | Labour Protection & Industrial Safety Management System |
| TÜV AUSTRIA CERT GMBH | ISO 50001:2018 | Energy Management System |



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