
ODELYA
Piping
Project
Materials

Tubing
the
World

odelya.com

ODELYA
ODELYA
ODELYA
FORT DE - SAW - EN
D:1016 mm
E:22,2 mm
L:20,50m
P:11 997 kg
HEAT NO:DA 06718
PIPE NO:P 3 à Pi 8

ABOUT US

Odelya International Steel Industry & Trade Co. supplies a wide range of high quality steel products since its foundation year 2004. Located in Istanbul / Turkey, Odelya beneficially uses its geographical position in order to meet continuously growing demand of the most challenging markets world-wide.

Extensive Opportunities

We specialize in providing first class quality ERW or SAW steel tubes and flat and long steel materials. Odelya® supplies three product lines: '**Tubular Steel Materials**', '**Piping Project Materials**' and '**Rolled Steel Materials**', which are widely used in many applications and industries, such as energy, construction, engineering, automobile, boiler industry, etc.

Odelya® has an opportunity to provide an extensive range of steel products and steel grades, with variety of sizes and surface conditions. Moreover, all required joints, connectors, fittings, valves and other accessories are available to complete the project requirements.

Years of experience in steel industry give us opportunity and confidence to create customized solutions for every specific requirement and application. Consequently, along with standardized products, we are able to use appropriate steel grades, manufacturing process and finishing operations, adjusting product characteristics for very specific customer requirements.

Excellence in Quality of Products and Services

Odelya® Steel products meet strictest quality criteria, as manufacturing process is under continuous control, all required quality tests are performed and all loading and shipment activities are supervised by qualified members of Odelya team.

We are fully aware of the essencials of a 'premium' service. It gives us the responsibility to build strong strategic business partnerships and be faster than ever, in order to care more about the needs of our clients. In this regard, we have developed a global network of reliable business partners and reputable clients around the world.

Success of Odelya Projects

Odelya® has a valuable experience of successfully completing even large piping projects, as we provide better solutions along with expert consultancy. Comprehending the specific requirements of each project and providing the most competitive and reliable solution, our team creates a project management plan with clear deadlines in order to assure safe and on-time delivery. Furthermore, all necessary documentation and shipment procedures can be arranged by our dedicated experts.

Why Choose Odelya?

Odelya is a reliable supplier and partner, as comprehensive services and optimized solutions are fundamental issues of Odelya's vision. Additionally, offered solutions are innovative, flexible and competitive, as the main focus of Odelya is on customer's requirements and excellent quality of products.

ODELYA® STEEL PRODUCTS IN CONSTRUCTION

to build safer and greener structures

Odelya® Steel Products provide fast, reliable and efficient solutions for Construction sector in many applications, including building structures, architectural frameworks, bridge structures, harbors, fencing, scaffolding, plumbing, central heating, drainage, etc.

Odelya®'s three product segments, **'Piping Project Materials', 'Tubular Steel Materials' and 'Rolled Steel Materials'** possess high strength and superior quality. Thus, for every specific project material quality, manufacturing process and surface conditions are selected in compliance with the related standard's specifications and the special requirements of the application. We are ready to share the inspiring ideas to create effective solutions!

Safe Transmission

As an essential part of construction sector, **pipeline infrastructures** projects are supplied with Odelya® **'Piping Project Materials'**, including small and large diameter pipes manufactured by SAW or ERW welding processes. Unchangeable quality, which is ensured by applied quality tests during and after manufacturing, combined with high strength raw materials give excellent performance for Odelya® Steel Pipes used in conveyance of fluids and gases.

Strong and Durable

In upper infrastructure of civil & industrial buildings and engineering structures, Odelya® Tubular, Flat and Long Steel products are used as structural elements. Odelya® Hollow Structural sections in Round, Square, Rectangular and other shapes are ideal parts for many constructional applications. **'Rolled Steel Materials'** with a wide range of products, such as steel sections, beams, bars and flat steel products such as plain / patterned steel sheets/plates, HR/CR steel coils. The stuctures which Odelya's 'Rolled Steel Materials' are used offers cost and energy saving, besides to strength and longevity. Moreover, Odelya® Flat Products are widely used for roofs in construction of building, showing excellent performance in a long time period.

Note: Please contact us for Odelya® **'Rolled Steel Materials'** products segment in which other long steel products (steel bars, angles, sections, beams) and flat steel products (sheets / plates, coils) are included.

Reliable Foundation

Odelya® provides a wide range of tubular sections and H-sections for piling purposes along with its accessories, such as piling sheets and interlocking sections. Odelya® Piling Pipes are widely used to support great weight of structures, where soil retention is required. As Odelya® Steel Products for piling purposes are manufactured according to exact application and environmental conditions, durability and efficiency is provided in long-term operation. As Odelya® Piling Pipes are supplied in variety of sized and lengths, they are mainly used in buildings foundations and in roads, railway or harbor construction.

ODELYA® STEEL PRODUCTS IN ENERGY

Creating Reliable Solutions

As demand in energy sector is continuously growing, Odelya®'s various kinds of steel products play essential role to meet this demand with **'Piping Project Materials'**, **'Tubular Steel Materials'** and **'Rolled Steel Materials'** product lines. Wide range of SAW or ERW small and large diameter tubular products and flat / long steel products create efficient and reliable solutions for variety of energy applications. Odelya® offers high quality steel products as the raw materials are carefully selected and manufacturing process is under continuous control. Therefore, Odelya® Steel Products are strong and durable in every environmental condition, from offshore and onshore wind generation structures to oil rings in deep sea.

Oil and Gas Conveyance

Offshore and Onshore Applications

Odelya® supplies superior quality and high performance steel products for offshore and onshore applications in energy sector in even most challenging markets and environments. International experience in supplying steel pipes for oil and gas conveyance projects gives us confidence to provide optimized, reliable and cost-efficient solutions for every special project.
Odelya® SSAW, LSAW and ERW Steel Pipes and Pre-insulated Pipes are ideal for onshore and offshore gas or petrochemical products transmission. Odelya® specializes in supplying of high quality Large Diameter Pipes with its **'Piping Project Materials'** production line. As only qualified raw materials are used in manufacturing process of Line Pines and Piling Pipes along with precise quality testing, Odelya® Project-Oriented Big Diameter Pipes always show excellent performance in a long-term operation.

In addition, Odelya **'Piping Project Materials'** are supplied with connecting joints and fittings, along with high quality protective coatings, in full compliance with the specific requirements of each project.

Gas and Petrochemical Products Conveyance

Odelya® with its experience in steel industry provides a wide range of tubular steel products for efficient gas and oil conveyance. Superior quality of Odelya® SAW and ERW Steel Tubes is reassured through the strict quality testing, which is conducted using modern technologies and instruments. As piping systems for petrol and gas transmission require special temperature and pressure conditions for safe and long-term exploitation, Odelya® Carbon Steel Line Pipes shines out as an ideal choice for prestigious projects worldwide.

Odelya® Welded Steel Tubes for oil and gas transmission are manufactured according to the international production standards and are delivered as bare, galvanized, pre-painted / painted, oiled and with protective coating or lining. Additionally, Odelya® Oil & Gas Pipes are easy to maintain as pipe end and pipe joint connections can be selected for each application: plain / square end, beveled end, socket / spigot end, threaded, coupled, etc.

Boiler and Heat Exchanger Systems

Boiler and heat exchanger production requires steel tubes with superior quality and ability to withstand high pressure and temperature conditions. Odelya® ERW Boiler and Pressure Tubes offer ideal solutions for boiler industry, as destructive and non-destructive tests are performed to ensure desirable properties. Moreover, using high strength steel grades and qualified welding process during manufacturing of Odelya® ERW Boiler and Pressure Pipes makes these steel products ideal for many pressure applications.

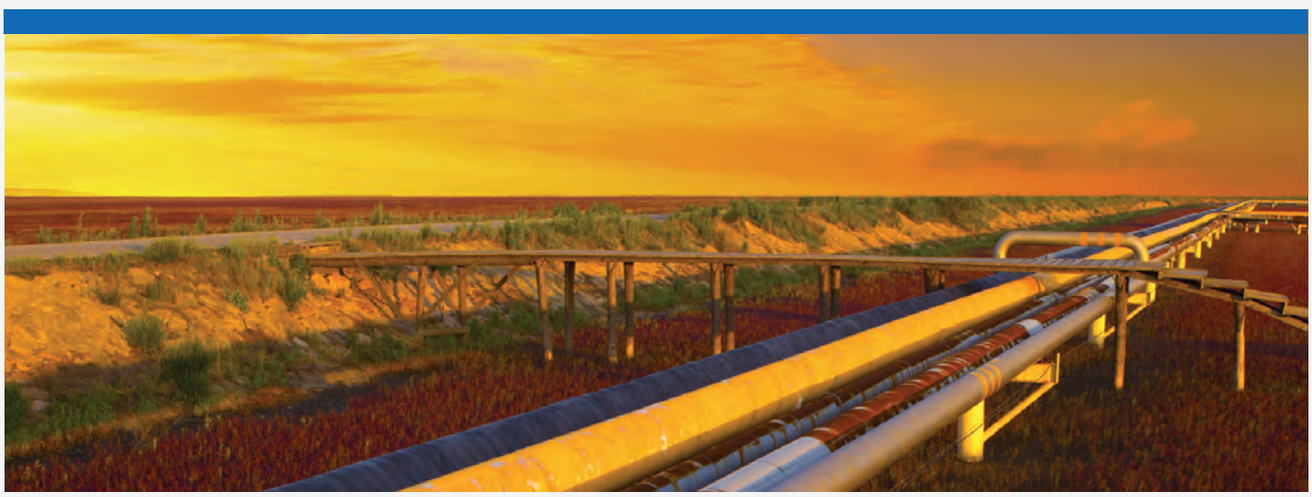
Greener Solutions for Renewable Power Generation

Odelya® with its wide range of steel products, including **'Piping Project Materials'**, **'Tubular Steel Materials'** and **'Rolled Steel Materials'** plays essential role in supplying renewable energy projects. Thus, Odelya® Tubular, Flat and Long Steel Products are widely used in wind generation structures, solar power plants, power generation plants and tide power generation structures.

As Odelya® Steel Products are manufactured of required high strength steel quality, the structures built with Odelya® Steel Products are light, strong and durable for long-term performance, providing energy-efficiency.

Beside Odelya® Large and Small Diameter Pipes and Pre-insulated Pipes, used for conveyance of liquids and gases, Odelya® Long and Flat Steel Products are also widely used for construction purposes:

Note: Please contact us for Odelya® **'Rolled Steel Materials'** products segment in which other long steel products (steel bars, angles, sections, beams) and flat steel products (sheets / plates, coils) are included.



ODELYA® PRODUCTS IN WATER CONVEYANCE

Safe and Durable Tubing Solutions

Odelya **'Piping Project Materials'** and **'Tubular Steel Materials'** product lines include large and small diameter steel pipes for water supply and distribution. Odelya® Water Steel Pipes are generally used for potable water conveyance, drainage, plumbing, distinct or central heating, irrigation, etc.

Odelya® Steel Pipes for water conveyance are manufactured by SSAW, LSAW or ERW welding processes and all required tests are performed to reassure integrity and high quality of welding zone.
As these pipes are used for water conveyance, hydrostatic test and other required by related standards tests are applied for safe and reliable further operation even in high pressure or high temperature conditions. Furthermore, Odelya® Water Pipes are supplied as bare, oiled, galvanized, coated or lined and with insulation layer (pre-insulated pipes).

Additionally, Odelya® Line Pipes for potable water transportation are supplied with protective coating and lining, which provide safe and healthy consumption of water. For each application conditions cost-effective and durable coatings are applied, providing high corrosion protection, adhesion, impact resistance and other significant properties for long-term exploitation.

For easy installation and maintenance of piping systems for water transmission, Odelya® Tubular Products are provided with required, joints, fittings and valves pipe ends: plain/square end, bevelled end, threaded or coupled, flanged, etc.

WHERE STEEL MATTERS™

Odelya® creates new and sustainable solutions for every sphere of life where steel products play essential role. Wide range of high quality products is presented with '**Piping Project Materials**', '**Tubular Steel Materials**' and '**Rolled Steel Materials**' product lines.
Odelya® Hot Rolled and Cold Rolled Steel Products are beneficial and effective, since manufacturing process and quality tests are under precise control from the beginning of production until delivery to the destination point. Moreover, surface conditions of Odelya® Steel Products are available as galvanized, coated, oiled, pre-painted or bare.

Reliable Engineering Solutions

Odelya® offers high strength with superior quality Tubular, Long and Flat steel products for many applications, such as in-building steel structures and applications. Odelya® Structural Hollow Sections, Precision Tubes, Steel Sections, Angles, Sheet, Plates, etc., are manufactured according to international standards and with minimum tolerances, thus, the installation is easy and maximum performance is achieved. Consequently, Odelya® Steel Products are ideal for variety of engineering applications, showing high performance and efficiency.

Innovations for Better Life

Odelya® Tubular, Flat & Long Steel Products with its excellent properties are widely used for furniture, vehicles and bicycles, hardware tools, medical equipment, white goods, electric and electronic industries, etc. Odelya's experience and wide possibilities allow creating new and specialized customized solutions for each specific requirement and application. As raw materials and manufacturing process are selected properly for each product, high strength and lighter weight result in long-term performance.

Safe and Efficient

In automobile industry Odelya® Flat, Long and Tubular Steel Products are presented with variety of sizes and shapes with minimum tolerances, as precise dimensions are essential for final product. Odelya® Precision Tubes are ideal for automobile production and mechanical applications, since the tubes perfectly suit in applied area, guarantying higher performance.
Additionally, Odelya® Steel Products for automobile sector with superior properties and higher yield strength make a car lighter and safer, increasing its speed and reducing fuel consumption. Corrosion and impact resistant coatings, along with hot dip galvanizing and other required treatments, are also applied on Odelya® Steel Products for mechanical applications.

Strength and Outstanding Properties

Machinery engineering requires specialized products with excellent mechanical and technological properties for higher performance in longer life time. Odelya®, with its wide range of tubular, long and flat steel products provides reliable and efficient steel materials used for tool steels, special steels and other products in machinery engineering.

Note: Please contazct us for Odelya® **'Rolled Steel Materials'** products segment in which other long steel products (steel bars, angles, sections, beams) and flat steel products (sheets / plates, coils) are included.

PILING AND CONSTRUCTION PIPES

Odelya® Steel Pile Pipes are used in deep foundations to transfer the loads from the structure to stronger soil layers or rock formations found deep underground. Using piling pipes is preferable if the building structures require great support even in difficult ground conditions.

Steel Piling Pipes can be driven or drilled into the ground using specialized techniques and equipment either open-ended or close-ended. Open bottom end of the pile pipe causes soil to enter the center of the pipe, thus, if required, the soil may be removed with a water jet or auger. In order to prevent entering of the soil to the bottom of the pile, pipe end can be covered with a steel plate, cast steel shoe, rock crusher or conical point. As an option to increase the strength, foundation pile pipes can be filled with concrete during installation.

Odelya® Steel Pipes for piling purposes are manufactured by electrical-resistance (ERW) or submerged arc (SSAW & LSAW) welding processes using high strength steel to provide great load resistance. Odelya offers wide range of dimensions with lengths up to 46 meters, creating reliable and cost-effective customized solutions for all foundation and load conditions. Odelya's complete pipe piling system includes: pile shoes, reinforcement rings, interlocking sections and according to application, variety of coatings may be applied.

Highest technical standards and superior quality are provided with expert consultation on every step of Odelya customer oriented service.

Odelya® Steel Pile Pipes are manufactured according to international steel pipe standards: EN 10219, EN 10210, ASTM A 252 (JIS A-5525, DIN 17120, DIN 1615). Outside diameter for piling pipes is up to 3566 mm (140 inch) and wall thickness is up to 40 mm (1,575 inch).

Application

Odelya® SAW and ERW Steel Pile Pipe foundations with its high load bearing capacity become an essential part for construction of ports, harbors, buildings and for mechanical engineering industry. Odelya® Steel Piling Pipes are widely used as tubes for combined walls, struts for the support of sheet pile walls, foundation piles for building structures, pillars for bridges or dolphins posts on difficult soil conditions near river, lake or ocean shores.

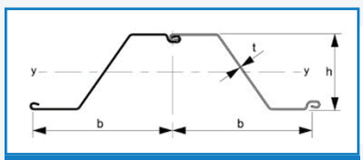
Tubular Combi Walls

A retaining wall structure or combi-wall is an ideal solution, when both vertical and horizontal loading resistance is required. Odelya® Combined Walls consist of a steel pipe as a primary element with a pair of sheet piles (Z or U sections) as a secondary element, connected together by interlocking sections (clutches of E21, E22, L8, PZM and other types). Joint connective clutches are precisely welded to the piling pipes on one alignment.

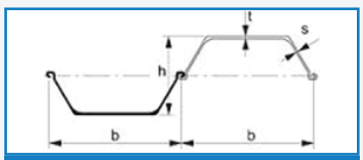
In tubular combi walls, Pile Pipes support vertical loads, carrying most of the load, and intermediate sheet piles, which not only make the wall continuous, but also transfer horizontal loads from soil or water pressure to the pile pipes. Intermediate sheet pile sections are usually shorter than main pipes, minimizing steel usage and time of driving the pipe (generally with open ends) deep into the ground.

Odelya® Combi-Walls are supplied in variable combinations for each environment and application requirements, supported with pile accessories and corrosion protection. Varying piling pipe dimension's parameters, such as outside diameter and wall thickness leads to competitive and optimized solutions for great vertical and horizontal bearing capacity. Odelya® Tube Combined Walls are generally used in harbors for piers and wharves and, if required, in permanent underground foundation or retaining wall structures.

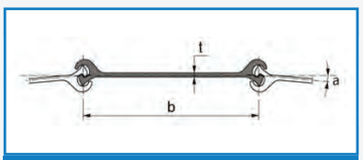
Retaining walls can consist of only sheet piles or steel piling pipes, where pipes are joined together by interlocking sections or connecting clutches welded to the pipes. Odelya® Steel Sheet Piles, used in combined walls, are supplied as Z-type piles, U-type piles, Straight Web type and other types in different combinations with clutches, which are selected according to the application field.



Z-Type Sheet Piling



U-type sheet piling

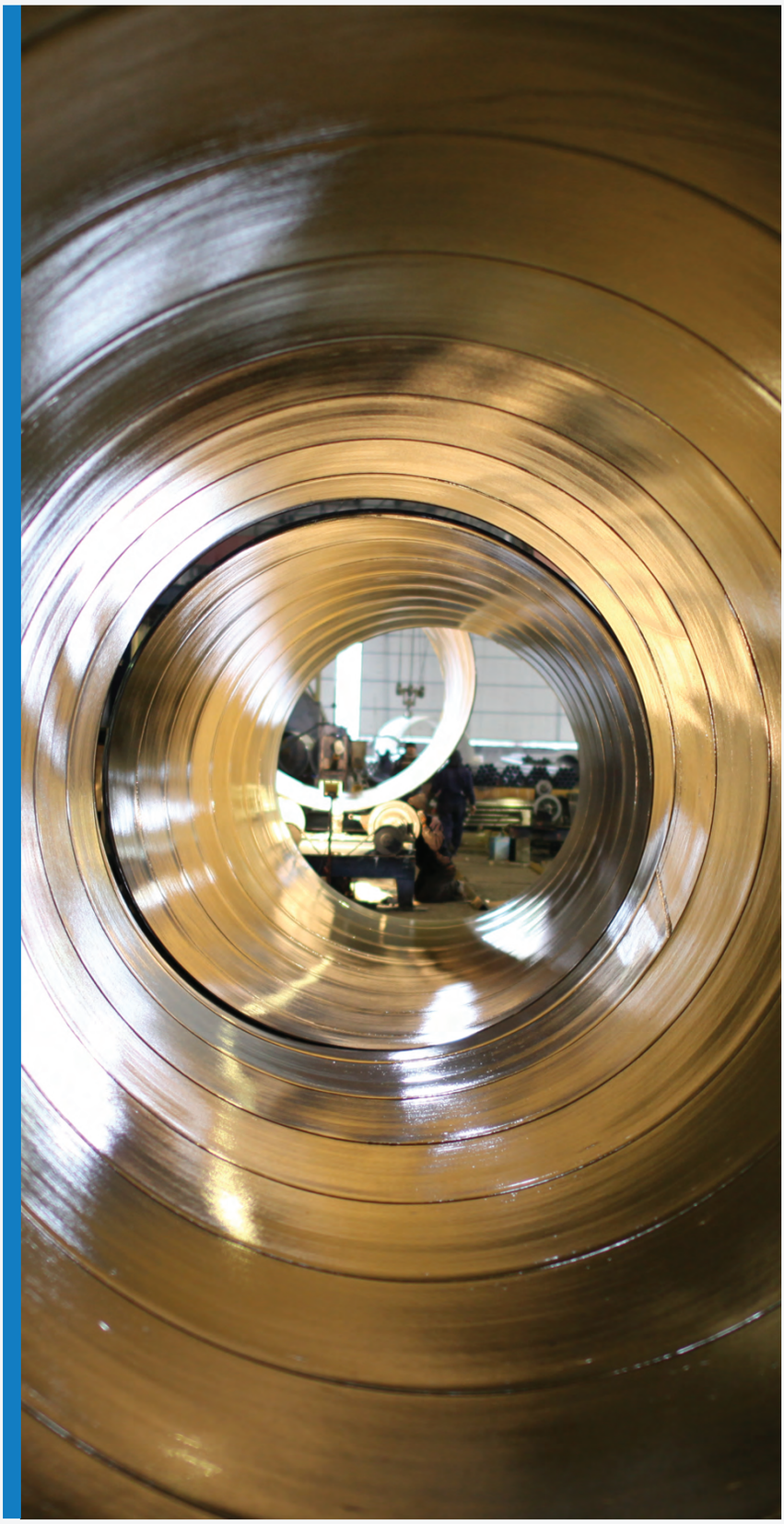


Straight Web Pile

SUBMERGED ARC WELDED (SAW) PIPES

Odelya® Spiral Submerged Arc Welded (SSAW) Carbon Steel Pipes are manufactured from hot rolled coils straightened in a strip, which are then formed in required angle to produce a cylindrical spiral shape of desired diameter. In submerged arc welding process an electric arc is produced in gas environment by applying electric current. The edges of a strip are carefully welded internally and externally by submerged arc welding process using single, tandem or triple techniques with continuously supervision to prevent possible defects. Quality and maximum performance of entire weld are assured by computerized inspection process, applied during and after HSAW welding.

Odelya® Project Oriented Large Diameter Steel tubes are delivered according to API, EN and ASTM standard's specifications, along with customized requirements for further application. Odelya® Carbon Steel Pipes are manufactured by helical submerged arc welding (HSAW) possess excellent mechanical and technological properties, such as strength, ductility, stability, formability, impact resistance and durability for many years in field application. Additionally, SAWH pipes are available in long lengths, due to continuous rolling ability of steel coils as a raw material.



Odelya® Longitudinal Submerged Arc Welded (LSAW) Large Diameter Pipes are produced by longitudinally cold forming of steel plate first into U-shape and then forming into O-shape using specialized mill equipment. Longitudinal edges are connected by ongoing inner and outer seam welding under submerged arc avoiding atmospheric contamination. Final mechanical expansion process achieves tight dimensional tolerances and perfect round shape along with stress reducing of the longitudinal welded steel pipe.

Odelya® LSAW Project-Oriented Line Pipes and Piling Pipes get over the most challenging conditions thanks to their strong mechanical properties. Moreover, integrity and high quality of longitudinal carbon steel tubes make them ideal for application in many industries.

Application

Odelya® SAW Steel Pipes are widely used in various applications, such as pipeline construction for conveyance of natural gas, oil, water and other flammable & nonflammable liquids conveyance and distribution, water supply systems (high temperature water as well), sewage, liquid hydrocarbons conveyance and storage, irrigation, refineries, petrochemical and hydropower plants, crude oil loading terminals, piling purposes, piles industrial pipelines, foundation piles, pressure air pipelines, natural gas (LPG) installations, industrial pipe network, combi-wall construction, and in chemical industry.

Submerged arc welded steel pipes can support great weights and therefore are used in construction of ports, harbors and jetties, pierces, onshore and offshore platforms, bridges, steel structures, advertising billboards and main roof supporters of exhibition halls, stadiums.

Production Range

Outside Diameter: 219,1 – 3566 mm (8,626 - 140 inch)
Wall Thickness: 3 – 40 mm (0,118 – 1,575 inch)
Length: for SSAW pipes 6 – 18 m (as customized solution, up to 46 m),
for LSAW pipes 12 m

Production Standards

Petroleum and Gas Line Pipes (Oil and natural gas pipelines)

API 5L (ISO 3183) PSL 1 & PSL 2
EN 10208-1, EN 10208-2, GOST 20295 Type 1, 2, 3, DIN 2470, DIN 17172

Water Line Pipes

AWWA C 200, EN 10217-1, EN 10224 (BS 534, DIN 2460, UNI 6363, NFA 49-150), DIN 1626

General Purpose Pipes

EN 10217-3, EN 10217-5, EN 10217-6, ASTM A139,
EN 10224 (NFA 49-150, BS 534), EN 10219, BS 3601, DIN 1626

Piling & Construction Pipes

EN 10219, EN 10210, ASTM A 252, JIS A-5525, DIN 17120, DIN 1615

Material Quality

API 5L / ISO 3183 PSL 1	Gr A, Gr B, X 42, X 46, X 52, X 56, X 60, X 65, X 70
API 5L / ISO 3183 PSL 2	Gr B, X42, X46, X52, X56, X60, X65, X70, X80
EN 10208 –1,2	L 245NB, L 290NB, L 360NB, L210GA, L235GA, L245GA,L290GA, L360GA
EN 10025	S235 - S355
DIN 17100	St 37- St 52
ASTM A252	Grade 1, 2, 3
EN 10210	S235, S275, S355, S420, S460
EN 10217-1	P 195 TR1, P 235 TR1, P 265 TR1, P 195 TR2, P 235 TR2, P 265 TR2
EN 10217-3	P275NL1,2, P 355 N, P355NH, P355NL1,2, P460N, P460NH, P460NL1,2
EN 10217-5	P235 GH, P265GH, 16Mo3
EN 10219	S 235, S 275, S 355
EN 10224	L 235, L 275, L 355

PIPE END AND PIPE JOINTS DETAILS

Considering the utilization purpose and dimensions of steel line pipe, the following pipe ends or joint details can be selected (AWWA C 208, BS 534): plain, square cut / bevelled, welded joint, flanged joint, cylindrical socket and spigot joints, spherical (belled) spigot and socked joint plain end for special coupling, butt welded and threaded-end pipe.

Surface Condition

Odelya® SAW pipes are delivered as bare (black), coated or lined (3LPE, 3LPP, PU, Epoxy, FBE, etc.).
For coating types and coating tests please refer to "External Coating and Internal Lining" section (page 46)

QUALITY CONTROL

Odelya® Project-oriented line pipes and piling pipes are manufactured under precise quality control, which starts from procurement of raw materials continues during manufacturing and welding process to prevent any flaw. Therefore, third part inspection is an essential part of our business flow. Quality assurance policies of Odelya® ensure high quality of used material, weld, coating and lining, superior mechanical and technological properties. Quality tests are applied to meet strict production standards' specifications and customer requirements for any special project.

Material Chemical Analysis

Spectral analysis of the chemical composition

Non-Destructive Tests

Ultrasonic test: Automatic and manual ultrasonic testing precisely detects flows and monitors weld quality using high frequency sound waves. (Ultrasonic weld seam test, Ultrasonic lamination test).
Radiological Inspection (Radiographic and Radioscopic tests): Evaluating quality and integrity of weld area of the entire pipe.

Visual & Dimensional Inspection

Accurate information about dimensions and quality of tubes is provided using tape, caliper, ultrasonic device, gauge and cord.

Hydrostatic Test

Leak Tightness test evaluates the density and firmness of entire pipe. Testing of leakage in the welded areas by high pressure water applies according to further application and requirements.

Mechanical & Technological Properties

Tensile test: Determining mechanical properties, such as yield strength, tensile strength, Young's module, deformation, elongation, strain hardening behavior, and reduction of sample.
Bending test: Evaluating ductility of the tubes and the welds to resist cracking or other surface irregularities during one continuous bend of the material. (Guided Bend Test)
Impact test: Determining a total energy required to break the test sample by fracturing impact at high velocity (Charpy V Notch Impact Test, Drop Weight test DWTT).

Macrographic and Metallographic Examination

Revealing the structure of metals and their alloys with light optical or scanning electron microscope.

Odelya® Spirally Submerged Arc Welded Steel Pipes

Production Range Table

Outside Diameter		Wall Thickness																								
	inch	0,126	0,142	0,157	0,189	0,205	0,220	0,252	0,28	0,311	0,343	0,374	0,406	0,469	0,5	0,563	0,626	0,689	0,752	0,811	0,874	0,937	1,0	1,181	1,378	1.575
inch	mm	3,2	3,6	4	4,8	5,2	5,6	6,4	7,1	7,9	8,7	9,5	10,3	11,9	12,7	14,3	15,9	17,5	19,1	20,6	22,2	23,8	25,4	30	35	40
8,625	219,1	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
10,75	273,1	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
12,75	323,9	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
14	355,6	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
16	406,4	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
18	457,2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
20	508	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
22	558,8	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
24	609,6	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
26	660,4			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
28	711,2			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
30	762,0			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
32	812,8			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
36	914,4			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
40	1016			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
44	1117,6					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
48	1219,2					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
52	1320,8					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
56	1422,4					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
60	1524							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
64	1625,6							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
68	1727,2								■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
72	1828,8								■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
76	1930,4									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
80	2032									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
84	2133,6										■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
88	2235,2										■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
92	2336,8											■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
100	2540											■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
107	2717,8												■	■	■	■	■	■	■	■	■	■	■	■	■	■
120	3048															■	■	■	■	■	■	■	■	■	■	■

Note: Production range table represents a combination of API 5L, EN 10208, ASTM A252, ASTM A139, EN 10210, EN 10217-1, EN 10217-3, EN 10217-5, EN 10217-6, EN 10219, EN 10224 standards used for Odelya® SAW Spirally Welded Steel Pipes. Please see the next pages to refer to the data sheets of each standard.

Odelya® API 5L Oil and Gas SAW Line Pipes

Odelya® API 5L pipelines are produced according to PSL 1 and PSL 2 levels, where PSL1 has standard quality level and PSL2 pipe has additional specified requirements of chemical composition and mechanical properties. Delivery conditions for Odelya® API 5L PSL 1 pipes are optional or according to the project requirements, for Odelya® API 5L PSL 2 tubes, on the other hand, delivery conditions are according to customer's requirements as specified in steel name. Submerged-arc helical and longitudinal welding processes are used to get superior quality weld for Odelya® Steel line pipes, which are produced from qualified starting material.

According to the agreement, jointers can be furnished as plain end, belled end, plain end for special coupling, or threaded end (for SAWL tubing with max. O.D. 508 mm). Welded jointers are manufactured in relation with this standard's specifications.

Odelya® API 5L Pipes with Regular Plain End

Outside Diameter		Wall Thickness & Mass per Unit Length, kg/m (lb/ft)																		
	inch	0,157	0,189	0,205	0,220	0,252	0,28	0,311	0,343	0,374	0,406	0,469	0,5	0,563	0,626	0,689	0,752	0,811	0,874	0,937
inch	mm	4	4,8	5,2	5,6	6,4	7,1	7,9	8,7	9,5	10,3	11,9	12,7	14,3	15,9	17,5	19,1	20,6	22,2	23,8
8,625	219,1	21,21 (14,25)	25,36 (17,04)	27,43 (18,43)	29,48 (19,81)	33,57 (22,55)	37,11 (24,94)	41,14 (27,64)	45,13 (30,33)											
10,75	273,1	26,54 (17,83)	31,75 (21,33)	34,35 (23,08)	36,93 (24,82)	42,08 (28,28)	46,56 (31,29)	51,65 (34,71)	56,71 (38,11)											
12,75	323,9	31,55 (21,20)	37,77 (25,38)	40,86 (27,46)	43,95 (29,53)	50,10 (33,66)	55,46 (37,26)	61,55 (41,36)	67,61 (45,43)											
14	355,6		41,52 (27,90)	44,93 (30,19)	48,33 (32,48)	55,11 (37,03)	61,02 (41,0)	67,74 (45,51)	74,42 (50,01)	81,08 (54,48)										
16	406,4		47,54 (31,94)	51,45 (34,57)	55,35 (37,19)	63,13 (42,42)	69,91 (46,98)	77,63 (52,16)	85,32 (57,33)	92,98 (62,48)										
18	457,2			57,96 (38,95)	62,36 (41,90)	71,15 (47,81)	78,81 (52,95)	87,53 (58,81)	96,22 (64,65)	104,88 (70,47)	113,51 (76,27)										
20	508			64,48 (43,32)	69,38 (46,62)	79,16 (53,19)	87,70 (58,93)	97,43 (65,46)	107,12 (71,98)	116,78 (78,47)	126,41 (84,94)										
22	558,8			70,99 (47,70)	76,39 (51,33)	87,18 (58,58)	96,59 (64,90)	107,32 (72,11)	118,02 (79,30)	128,68 (86,47)	139,32 (93,61)										
24	609,6				83,41 (56,04)	95,20 (63,97)	105,49 (70,88)	117,22 (78,76)	128,92 (86,62)	140,59 (94,46)	152,22 (102,28)	175,40 (117,85)									
26	660,4					103,22 (69,35)	114,38 (76,86)	127,12 (85,41)	139,82 (93,95)	152,49 (102,46)	165,12 (110,95)	190,30 (127,87)	202,85 (136,30)								
28	711,2						123,28 (82,83)	137,01 (92,06)	150,72 (101,27)	164,39 (110,45)	178,03 (119,62)	205,21 (137,89)	218,76 (146,99)	245,75 (165,13)							
30	762,0						132,17 (88,81)	146,91 (98,71)	161,61 (108,59)	176,29 (118,45)	190,93 (128,29)	220,12 (147,90)	234,67 (157,68)	263,67 (177,16)							
32	812,8							156,81 (105,36)	172,51 (115,91)	188,19 (126,45)	203,83 (136,96)	235,03 (157,92)	250,58 (168,37)	281,58 (189,20)	312,46 (209,95)					
36	914,4							176,60 (118,66)	194,31 (130,56)	211,99 (142,44)	229,64 (154,30)	264,84 (177,95)	282,40 (189,75)	317,41 (213,27)	352,30 (236,71)					
40	1016							196,39 (131,96)	216,11 (145,21)	235,79 (158,43)	255,45 (171,64)	294,66 (197,99)	314,22 (211,13)	353,24 (237,35)	392,13 (263,48)					
44	1117,6							216,19 (145,26)	237,91 (159,85)	259,59 (174,43)	281,25 (188,98)	324,47 (218,02)	346,03 (232,51)	389,07 (261,42)	431,97 (290,25)					
48	1219,2							235,98 (158,56)	259,70 (174,50)	283,40 (190,42)	307,06 (206,32)	354,29 (238,05)	377,85 (253,89)	424,89 (285,49)	471,81 (317,02)					
52	1320,8								281,50 (189,15)	307,20 (206,41)	332,86 (223,66)	384,10 (258,09)	409,67 (275,27)	460,72 (309,57)	511,64 (343,78)	562,44 (377,91)				
56	1422,4								303,30 (203,79)	331,0 (222,41)	358,67 (241,0)	413,92 (278,12)	441,49 (296,65)	496,55 (333,64)	551,48 (370,55)	606,28 (407,37)				
60	1524								325,10 (218,44)	354,80 (238,40)	384,48 (258,34)	443,73 (298,15)	473,31 (318,03)	532,38 (357,71)	591,32 (397,32)	650,13 (436,84)				
64	1625,6									378,60 (254,39)	410,28 (275,68)	473,55 (318,19)	505,13 (339,41)	568,21 (381,79)	631,15 (424,08)	693,98 (466,30)	756,67 (508,42)			
68	1727,2									402,41 (270,38)	436,09 (293,02)	503,36 (338,22)	536,95 (360,79)	604,03 (405,86)	670,99 (450,85)	737,82 (495,76)	804,53 (540,58)			
72	1828,8											533,18 (358,25)	568,77 (382,17)	639,86 (429,94)	710,83 (477,62)	781,67 (525,22)	852,38 (572,73)	918,56 (617,20)	989,03 (664,55)	
76	1930,4											562,99 (378,28)	600,59 (403,55)	675,69 (454,01)	750,66 (504,39)	825,51 (554,68)	900,23 (604,88)	970,17 (651,88)	1044,65 (701,92)	
80	2032												632,41 (424,93)	711,52 (478,08)	790,50 (531,15)	869,36 (584,14)	948,09 (637,04)	1021,78 (868,56)	1100,27 (739,29)	1178,63 (791,94)
84	2133,6												664,23 (446,31)	747,35 (502,16)	830,34 (557,92)	913,20 (613,60)	995,94 (669,19)	1073,40 (721,24)	1155,89 (776,67)	1238,26 (832,01)

Chemical Composition

Odelya® API 5L PSL1 Pipes with Wall Thickness ≤ 25 mm (0,984 inch)

Steel grade / Steel Name	C max, %	Mn max, %	P min, %	P max, %	S max, %
L210 or A	0,22	0,90	-	0,030	0,030
L245 or B	0,26	1,20	-	0,030	0,030
L290 or X42	0,26	1,30	-	0,030	0,030
L320 or X46	0,26	1,40	-	0,030	0,030
L360 or X52	0,26	1,40	-	0,030	0,030
L390 or X56	0,26	1,40	-	0,030	0,030
L415 or X60	0,26	1,40	-	0,030	0,030
L450 or X65	0,26	1,45	-	0,030	0,030
L485 or X70	0,26	1,65	-	0,030	0,030

Note: For pipelines with wall thickness greater than 25 mm, these chemical composition requirements may be applied as well, unless otherwise agreed by purchaser. Other components of steel material are in percentage, specified by API 5L standard.

Odelya® API 5L PSL2 Pipes with Wall Thickness ≤ 25 mm (0,984 inch)

Steel Grade / Steel Name	C max, %	Si max, %	Mn max, %	P max, %	S max, %	V max, %	Nb max, %	Ti max, %	CE_{IIW} (Carbon Equivalent) max, %	CE_{Pcm} (Carbon Equivalent) max, %
L245M or BM	0,22	0,45	1,20	0,025	0,015	0,05	0,05	0,04	0,43	0,25
L290M or X42M	0,22	0,45	1,30	0,025	0,015	0,05	0,05	0,04	0,43	0,25
L320M or X46M	0,22	0,45	1,30	0,025	0,015	0,05	0,05	0,04	0,43	0,25
L360M or X52M	0,22	0,45	1,40	0,025	0,015	[a]	[a]	[a]	0,43	0,25
L390M or X56M	0,22	0,45	1,40	0,025	0,015	[a]	[a]	[a]	0,43	0,25
L415M or X60M	0,12	0,45	1,60	0,025	0,015	[b]	[b]	[b]	0,43	0,25
L450M or X65M	0,12	0,45	1,60	0,025	0,015	[b]	[b]	[b]	-	0,25
L485M or X70M	0,12	0,45	1,70	0,025	0,015	[b]	[b]	[b]	-	0,25
L555M or X80M	0,12	0,45	1,85	0,025	0,015	[b]	[b]	[b]	-	0,25

Note: a – Total content of vanadium, niobium and titanium shall be ≤ 0,15%. b - Total content of vanadium, niobium and titanium shall be ≤ 0,15%, unless otherwise is agreed.
For pipelines with wall thickness greater than 25 mm, these chemical composition requirements may be applied as well, unless otherwise agreed by purchaser.

Mechanical properties

Odelya® API 5L PSL 1 Tensile Tests Requirements

Pipe Grade	Body of SAW Pipes		Weld Seam of SAW Pipes
	Yield Strength $R_{t0,5}$, min, MPa (psi)	Tensile Strength R_m, min, MPa (psi)	Tensile Strength R_m, min, MPa (psi)
L210 or A	210 (30 500)	335 (48 600)	335 (48 600)
L245 or B	245 (35 500)	415 (60 200)	415 (60 200)
L290 or X42	290 (42 100)	415 (60 200)	415 (60 200)
L320 or X46	320 (46 400)	435 (63 100)	435 (63 100)
L360 or X52	360 (52 200)	460 (66 700)	460 (66 700)
L390 or X56	390 (56 600)	490 (71 100)	490 (71 100)
L415 or X60	415 (60 200)	520 (75 400)	520 (75 400)
L450 or X65	450 (65 300)	535 (77 600)	535 (77 600)
L485 or X70	485 (70 300)	570 (82 700)	570 (82 700)

Note: Minimum percentage of elongation is determined using specified equation, as stated in API 5L specifications.

Odelya® API 5L PSL 2 Tensile Tests Requirements

Pipe Grade	Body of SAW Pipes				Weld Seam of SAW Pipes
	Yield Strength $R_{t0,5}$ MPa (psi)		Tensile Strength R_m MPa (psi)		Tensile Strength R_m MPa (psi)
	min	max	min	max	min
L245 or B	245 (35 500)	450 (65 300)	415 (60 200)	760 (110 200)	415 (60 200)
L290 or X42	290 (42 100)	495 (71 800)	415 (60 200)	760 (110 200)	415 (60 200)
L320 or X46	320 (46 400)	525 (76 100)	435 (63 100)	760 (110 200)	435 (63 100)
L360 or X52	360 (52 200)	530 (76 900)	460 (66 700)	760 (110 200)	460 (66 700)
L390 or X56	390 (56 600)	545 (79 000)	490 (71 100)	760 (110 200)	490 (71 100)
L415 or X60	415 (60 200)	565 (81 900)	520 (75 400)	760 (110 200)	520 (75 400)
L450 or X65	450 (65 300)	600 (87 000)	535 (77 600)	760 (110 200)	535 (77 600)
L485 or X70	485 (70 300)	635 (92 100)	570 (82 700)	760 (110 200)	570 (82 700)
L555 or X80	555 (80 500)	705 (102 300)	625 (90 600)	825 (119 700)	625 (90 600)

Odelya® EN 10208 SAW Line Pipes for Combustible Fluids

Odelya® EN 10208 SAW Pipelines are manufactured according to Part 1 and Part 2 technical delivery conditions. EN 10208-1 includes standard quality requirements for pipes of class A, respectively, EN 10208-2 includes more stringent quality and test requirements for pipes of class B.
Odelya® EN 10208 Line Pipes are produced by cold forming or normalizing forming with longitudinal seam (SAWL) or with helical seam (SAWH) through submerged arc welding process. Heat treatment is not applied for SAW line pipes.

Odelya® EN 10208 SAW Line Pipes

Outside Diameter		Wall Thickness & Mass per Unit Length, kg/m																						
	inch	0,126	0,142	0,157	0,177	0,197	0,220	0,248	0,280	0,315	0,347	0,394	0,433	0,492	0,559	0,630	0,689	0,787	0,874	0,984	1,102	1,181	1,260	1,417	1,575
inch	mm	3,2	3,6	4	4,5	5	5,6	6,3	7,1	8	8,8	10	11	12,5	14,2	16	17,5	20	22,2	25	28	30	32	36	40
8,625	219,1	17,04	19,13	21,22	23,81	26,40	29,48	33,06	37,12	41,65	45,64	51,56	56,45	63,68	71,75	80,14	87,00	98,20	107,79	119,66	131,95	139,90	147,64	162,55	176,66
10,75	273		23,92	26,53	29,80	33,04	36,93	41,43	46,56	52,28	57,33	64,86	71,07	80,30	90,62	101,40	110,26	124,78	137,30	152,89	169,17	179,77	190,18	210,40	229,83
12,75	323,9			31,55	35,44	39,32	43,96	49,34	55,47	62,32	68,38	77,41	84,88	95,99	108,45	121,49	132,23	149,88	165,17	184,27	204,31	217,43	230,34	255,59	280,04
14	355,6				38,96	43,23	48,33	54,27	61,02	68,57	75,26	85,22	93,48	105,76	119,55	133,99	145,91	165,52	182,52	203,81	226,20	240,88	255,36	283,73	311,31
16	406,4				44,60	49,49	55,35	62,16	69,91	78,60	86,28	97,75	107,26	121,42	137,34	154,04	167,83	190,57	210,33	235,13	261,28	278,46	295,45	328,83	361,42
18	457					55,73	62,34	70,02	78,77	88,58	97,26	110,23	120,98	137,02	155,06	174,00	189,67	215,53	238,03	266,33	296,22	315,89	355,38	373,75	411,33
20	508						69,38	77,94	87,70	98,64	108,33	122,81	134,82	152,74	172,91	194,12	211,68	240,68	265,95	297,77	331,43	353,62	375,62	419,02	461,64
22	559						76,42	85,87	96,63	108,70	119,40	135,38	148,65	168,46	190,77	214,25	233,68	265,83	293,87	329,21	366,64	391,35	415,87	464,30	511,94
24	610						83,47	93,79	105,56	118,76	130,47	147,96	162,48	184,18	208,63	234,37	255,69	290,99	321,79	360,65	401,86	429,08	456,11	509,57	562,25
26	660							101,56	114,31	128,63	141,32	160,29	176,05	199,59	226,14	254,10	277,27	315,65	349,16	391,48	436,38	466,07	495,57	553,96	611,57
28	711							109,48	123,24	138,69	152,38	172,87	189,88	215,31	244,00	274,22	299,28	340,80	377,08	422,92	471,60	503,80	535,81	599,24	
30	762							117,40	132,17	148,75	163,45	185,44	203,72	231,03	261,86	294,34	321,29	365,95	405,00	454,36	506,81	541,53	576,06	644,51	
32	813							125,33	141,10	158,81	174,52	198,02	217,55	246,75	279,72	314,46	343,30	391,11	432,93	485,80	542,03	579,26	616,30	689,79	
34	864							133,25	150,03	168,87	185,59	210,60	231,38	262,47	297,58	334,59	365,31	416,26	460,85	517,24	577,24	616,99	656,55	735,07	
36	914							141,02	158,79	178,74	196,44	222,93	244,95	277,89	315,08	354,31	386,88	440,92	488,22	548,07	611,77	653,98	696,00	779,45	
40	1016									198,86	218,57	248,08	272,62	309,33	350,80	394,56	430,90	491,23	544,06	610,95	682,19	729,44	776,49	870,00	
42	1067									208,92	229,64	260,66	286,45	325,05	325,05	414,68	452,91	516,38	571,98	642,39	717,41	767,17	816,74	915,28	
44	1118										240,71	273,23	300,28	340,77	386,52	434,81	474,92	541,53	599,90	673,83	752,62	804,90	856,98	960,56	
46	1168										251,56	285,56	313,85	356,18	404,03	454,53	496,50	566,19	627,27	704,66	787,15	841,89	896,44	1004,94	
48	1219										262,62	298,14	327,68	371,90	421,89	474,66	518,51	591,35	655,19	736,10	822,36	879,62	936,69	1050,22	
52	1321										284,76	323,29	355,35	403,35	457,60	514,90	562,53	641,65	711,03	798,98	892,79	955,08	1017,18	1140,77	
56	1422										306,68	348,20	382,75	434,48	492,97	554,75	606,11	691,47	766,32	861,25	962,53	1029,80	1096,88	1230,44	
60	1524										328,81	373,35	410,42	465,92	528,69	595,00	650,13	741,77	822,16	924,13	1032,96	1105,26	1177,37	1320,99	
64	1626										350,95	398,51	438,08	497,36	564,41	635,24	694,15	792,08	878,00	987,02	1103,39	1180,72	1257,86	1411,54	

Chemical Composition

Odelya® EN 10208-1 Steel Line Pipes

Steel Name	Steel Number	C max, %	Si max, %	Mn max, %	P max, %	S max, %
L210GA	1.0319	0,21	0,40	0,90	0,30	0,30
L235GA	1.0458	0,16	0,40	1,20	0,30	0,30
L245GA	1.0459	0,20	0,40	1,15	0,30	0,30
L290GA	1.0483	0,20	0,40	1,40	0,30	0,30
L360GA	1.0499	0,22	0,55	1,45	0,30	0,30

Odelya® EN 10208-2 Line Pipes with wall thickness ≤ 25 mm

Steel Name	Steel Number	C max,%	Si max,%	Mn max,%	P max,%	S max,%	V max,%	Nb max,%	Ti max,%	CEV max
L245NB	1.0457	0,16	0,40	1,10	0,025	0,020	-	-	-	0,42
L290NB	1.0484	0,17	0,40	1,20	0,025	0,020	0,05	0,05	0,04	0,42
L360NB	1.0582	0,20	0,45	1,60	0,025	0,020	0,10	0,05	0,04	0,45
L415NB	1.8972	0,21	0,45	1,60	0,025	0,020	0,15	0,05	0,04	as agreed
L245MB	1.0418	0,16	0,45	1,50	0,025	0,020	0,04	0,04	-	0,40
L290MB	1.0429	0,16	0,45	1,50	0,025	0,020	0,04	0,04	-	0,40
L360MB	1.0578	0,16	0,45	1,60	0,025	0,020	0,05	0,05	0,04	0,41
L415MB	1.8973	0,16	0,45	1,60	0,025	0,020	0,08	0,05	0,06	0,42
L450MB	1.8975	0,16	0,45	1,60	0,025	0,020	0,10	0,05	0,06	0,43
L485MB	1.8977	0,16	0,45	1,70	0,025	0,020	0,10	0,06	0,06	0,43

Note: For pipelines with larger wall thickness up to 40 mm, chemical composition will be agreed.

Mechanical Properties

Odelya® EN 10208-1 Line Pipes Tensile and Bend Test requirements

Steel Grade		Pipe Body			SAW weld seam
Steel Name	Steel Number	Yield Strength, $R_{t0,5}$ (MPa)	Tensile Strength (Body and Seam Weld), R_m (MPa, min.)	Elongation A min, %	Diameter of the Mandrel for Bend test
L210GA	1.0319	210	335 – 475	25	2 T
L235GA	1.0458	235	370 - 510	23	2 T
L245GA	1.0459	245	415 – 555	22	3 T
L290GA	1.0483	290	415 – 555	21	3 T
L360GA	1.0499	360	460 – 620	20	4 T

Odelya® EN 10208-2 Pipes with wall thickness ≤ 25 mm Tensile and Bend Test requirements

Steel Grade		Pipe Body				SAW weld seam
Steel Name	Steel Number	Yield Strength, $R_{t0,5}$ (MPa)	Tensile Strength R_m (MPa, min.)	$R_{t0,5}$ / R_m, max.	Elongation A min, %	Diameter of the Mandrel for Bend test
L245NB	1.0457	245 - 440	415	0,80	22	3 T
L245MB	1.0418	245 – 440	415	0,85	22	3 T
L290NB	1.0484	290 - 440	415	0,85	21	3 T
L290MB	1.0429	290 - 440	415	0,85	21	3 T
L360NB	1.0582	360 - 510	460	0,85	20	4 T
L360MB	1.0578	360 - 510	460	0,85	20	4 T
L415NB	1.8972	415 - 565	520	0,85	18	5 T
L415MB	1.8973	415 - 565	520	0,85	18	5 T
L450MB	1.8975	450 – 570	535	0,87	18	6 T
L485MB	1.8977	485 - 605	570	0,90	18	6 T

Note: For pipelines with larger wall thickness up to 40 mm, chemical composition is upon agreement.

Odelya® EN 10224 SAW Steel Tubes for Water Conveyance

Odelya® EN 10224 SAW Non-Alloy Steel Tubes are manufacturing by submerged arc welded process, longitudinal or helical (spiral). Odelya® EN 10224 Carbon Steel Pipes are supplied as welded, cold formed (cold finished), hot finished.

Odelya® EN 10224 SAW Line Pipes

Outside Diameter		Wall Thickness & Weight per Unit Length (kg/m)																			
inch	inch	0,126	0,142	0,157	0,177	0,197	0,213	0,22	0,248	0,280	0,315	0,346	0,394	0,433	0,492	0,559	0,630	0,689	0,787	0,874	0,984
inch	mm	**3,2**	**3,6**	**4**	**4,5**	**5**	**5,4**	**5,6**	**6,3**	**7,1**	**8**	**8,8**	**10**	**11**	**12,5**	**14,2**	**16**	**17,5**	**20**	**22,2**	**25**
8,626	**219,1**	17,04	19,13	21,22	23,81	26,40	28,46	29,48	33,06	37,12	41,65	45,64	51,56	56,45	63,68	71,2	80,14	87,00	98,2	107,79	119,66
9,626	**244,5**	19,04	21,39	23,72	26,63	29,53	31,84	32,99	37,01	41,57	46,66	51,15	57,83	63,34	71,51	80,64	90,16	97,96	110,72	121,70	135,32
10,75	**273**	21,29	23,92	26,53	29,80	33,04	35,63	36,93	41,43	46,56	52,28	57,33	64,86	71,07	80,30	90,62	101,40	110,26	124,78	137,30	152,89
12,75	**323,9**	25,31	28,43	31,55	35,44	39,32	42,41	43,96	49,34	55,47	62,32	68,38	77,41	84,88	95,99	108,45	121,49	132,23	149,88	165,17	184,27
14	**355,6**	27,81	31,25	34,68	38,96	43,23	46,63	48,33	54,27	61,02	68,57	75,26	85,22	93,48	105,76	119,55	133,99	145,91	165,52	182,52	203,81
16	**406,4**	31,82	35,76	39,69	44,60	49,49	53,40	55,35	62,16	69,91	78,60	86,28	97,75	107,26	121,42	137,34	154,04	167,83	190,57	210,33	235,13
17	**457**	31,81	40,25	44,68	50,21	55,73	60,14	62,34	70,02	78,77	88,58	97,26	110,23	120,98	137,02	155,06	174,0	189,67	215,53	238,03	266,33
20	**508**	39,83	44,78	49,71	55,87	62,02	66,93	69,38	77,94	87,70	89,64	108,33	122,81	134,82	152,74	172,91	194,12	205,84	240,68	265,95	297,77
22	**559**	43,86	49,31	54,75	61,53	68,31	73,72	76,42	85,87	96,63	108,70	119,40	135,38	146,65	168,46	190,77	214,25	233,68	265,83	293,87	329,21
22	**610**	47,88	53,83	59,78	67,19	74,60	80,51	83,47	93,79	105,56	118,76	130,47	147,96	162,48	184,18	208,63	234,37	255,69	290,99	321,79	360,65
26	**660**				72,74	80,76	87,17	90,37	101,56	114,31	128,63	141,32	160,29	176,05	199,59	226,14	254,10	277,27	315,65	349,16	391,48
28	**711**				78,40	87,05	93,96	97,41	109,48	123,24	138,69	152,38	172,87	189,88	215,31	244,00	274,22	299,28	340,80	377,08	422,92
30	**762**				84,06	93,34	100,75	104,46	117,40	132,17	148,75	163,45	185,44	203,72	231,03	261,86	294,34	321,29	365,95	405,00	454,36
32	**813**				89,72	99,63	107,54	111,50	125,33	141,10	158,81	174,52	198,02	217,55	247,75	279,72	314,46	343,30	391,11	432,93	485,80
34	**864**				95,38	105,91	114,33	118,54	133,25	150,03	168,87	185,59	210,60	231,38	262,47	297,58	334,59	365,31	416,26	460,85	517,24
36	**914**				100,93	112,08	120,99	125,45	141,02	158,79	178,74	196,44	222,93	244,95	277,89	315,08	354,31	386,88	440,92	488,22	548,07
40	**1016**				112,25	124,66	134,58	139,53	156,86	176,64	198,86	218,57	248,08	272,62	309,33	350,80	394,56	430,90	491,23	544,06	610,95
42	**1067**					130,94	141,37	146,58	164,79	185,57	208,92	229,64	260,66	286,45	325,05	325,05	414,68	452,91	516,38	571,98	642,39
44	**1118**					137,23	148,16	153,62	172,71	194,50	218,98	240,71	273,23	300,28	340,77	386,52	434,81	474,92	541,53	599,90	673,83
46	**1168**					143,40	154,82	160,52	180,48	203,26	228,84	251,56	285,56	313,85	356,18	404,03	454,53	496,50	566,19	627,27	704,66
48	**1219**					149,69	161,61	167,57	188,40	212,19	238,91	262,62	298,14	327,68	371,90	421,89	474,66	518,51	591,35	655,19	736,10
52	**1321**							181,65	204,25	230,05	259,03	284,76	323,29	355,35	403,35	457,60	514,90	562,53	641,65	711,03	798,98
56	**1422**							195,60	219,94	247,73	278,95	306,68	348,20	382,75	434,48	492,97	554,75	606,11	691,47	766,32	861,25
60	**1524**								235,79	265,59	299,08	328,81	373,35	410,42	465,92	528,69	595,00	650,13	741,77	822,16	924,13
64	**1626**								251,63	283,45	319,20	350,95	398,51	438,08	497,36	564,41	635,24	694,15	792,08	878,00	987,02
68	**1727**									301,13	339,12	372,86	423,41	465,48	528,49	599,77	675,09	737,73	841,89	933,30	1049,28
72	**1829**									318,99	359,26	395,00	448,57	493,15	559,94	635,49	715,34	781,75	892,20	989,14	1112,17
76	**1930**										379,17	416,92	473,47	520,55	591,07	670,86	755,19	825,34	942,01	1044,43	1174,43
80	**2032**										399,29	439,05	498,63	548,22	622,51	706,58	795,43	869,36	992,32	1100,27	1237,32
84	**2134**											461,19	523,78	575,88	653,95	742,29	835,68	913,38	1042,62	1156,11	1300,2
88	**2235**											483,10	548,69	603,28	685,09	777,66	875,53	956,96	1092,44	1211,4	1362,47
92	**2337**												573,84	630,95	716,53	813,38	915,77	1000,98	1142,74	1267,24	1425,35
96	**2438**												598,74	658,35	747,66	848,75	955,62	1044,57	1192,56	1322,53	1487,61
100	**2540**													686,02	779,10	884,46	995,87	1088,58	1242,86	1378,37	1550,5
104	**2642**													713,69	810,54	920,18	1036,11	1132,60	1293,17	1434,21	1613,38
108	**2743**													741,08	841,68	955,55	1075,97	1176,19	1342,98	1498,51	1675,65

Chemical Composition

Steel Name	Steel Number	C max,%	Si max,%	Mn max,%	P max,%	S max,%
L235	0252	0,16	0,35	1,20	0,030	0,025
L275	0260	0,20	0,40	1,40	0,030	0,025
L355	0419	0,22	0,55	1,60	0,030	0,025

Mechanical Properties

Steel Name	Tensile Strength (R_m) MPa (N/mm²)	Yield Strength (ReH min.) MPa (N/mm²)		Elongation A min. (%) (L_o=5,65$\sqrt{S_o}$)		Diameter of Mandrel for the Weld Bend Test	For the drift expanding test[c] % increase in d/D[d] ratio	
		T ≤ 16 mm	T > 16 mm	Longitudinal	Transverse		≤ 0,8	0,8 >
L235	360 – 500	235	225	25	-	3T	10	12
L275	430 – 570	275	265	21	40, 28 / 27	4T	8	10
L355	500 – 650	355	345	21	-	4T	6	8

Odelya® EN 10217-1 SAW Steel Pipes for Pressure Purposes

Odelya® EN 10217-1 Non-Alloy Steel Line Pipes with specified room temperature properties are manufactured by submerged-arc welding process with delivery conditions selected according to the further application.

Manufacturing Process	Starting material	Forming operation	Technical Delivery Conditions
Submerged Arc Welded Longitudinal seam (SAWL) or Helical seam (SAWH)	Hot rolled plate or strip	Cold formed (+ welded)	As welded / Normalised weld zone / Full pipe normalized
	Normalising rolled strip or plate		
	Hot rolled or normalising rolled strip or plate	Normalising-formed (+ welded)	As welded / Normalised weld zone / Full pipe normalized

Odelya® EN 10217-1 Steel Pipes

Outside Diameter		Wall Thickness & Weight per Unit Length (kg/m)																						
	inch	0,126	0,142	0,157	0,177	0,197	0,220	0,248	0,280	0,315	0,346	0,394	0,433	0,492	0,559	0,630	0,689	0,787	0,874	0,984	1,102	1,181	1,260	1,417	1,575
inch	mm	3,2	3,6	4	4,5	5	5,6	6,3	7,1	8	8,8	10	11	12,5	14,2	16	17,5	20	22,2	25	28	30	32	36	40
8,626	219,1	17,04	19,13	21,22	23,81	26,40	29,48	33,06	37,12	41,65	45,64	51,56	56,45	63,68											
9,626	244,5	19,04	21,39	23,72	26,63	29,53	32,99	37,01	41,57	46,66	51,15	57,83	63,34	71,51											
10,75	273	21,29	23,92	26,53	29,80	33,04	36,93	41,43	46,56	52,28	57,33	64,86	71,07	80,30											
12,75	323,9	25,31	28,43	31,55	35,44	39,32	43,96	49,34	55,47	62,32	68,38	77,41	84,88	95,99											
14	355,6	27,81	31,25	34,86	38,96	43,23	48,33	54,27	61,02	68,57	75,26	85,22	93,48	105,76											
16	406,4	31,82	35,76	39,69	44,60	49,49	55,35	62,16	69,91	78,60	86,28	97,75	107,26	121,42											
18	457	35,81	40,25	44,68	50,21	55,73	62,34	70,02	78,77	88,58	97,26	110,23	120,98	137,02											
20	508	39,83	44,78	49,71	55,87	62,02	69,38	77,94	87,70	98,64	108,33	122,81	134,82	152,74	172,91	194,12									
22	559	43,86	49,31	54,75	61,53	68,31	76,42	85,87	96,63	108,70	119,40	135,38	148,65	168,46	190,77	214,25	233,68	265,83							
24	610	47,88	53,83	59,78	67,19	74,60	83,47	93,79	105,56	118,76	130,47	147,96	162,48	184,18	208,63	234,37	255,69	290,99	321,79	360,65	401,86				
26	660			64,71	72,74	80,76	90,37	101,56	114,31	128,63	141,32	160,29	176,05	199,59	226,14	254,10	277,27	315,65	349,16	391,48	436,38	429,08			
28	711			69,74	78,40	87,05	97,41	109,48	123,24	138,69	152,38	172,87	189,88	215,31	244,00	274,22	299,28	340,80	377,08	422,92	471,60	466,07	535,81		
30	762			74,77	84,06	93,34	104,46	117,40	132,17	148,75	163,45	185,44	203,72	231,03	261,86	294,34	321,29	365,95	405,00	454,36	506,81	503,80	576,06	644,51	
32	813			79,80	89,72	99,63	111,50	125,33	141,10	158,81	174,52	198,02	217,55	247,75	279,72	314,46	343,30	391,11	432,93	485,80	542,03	541,53	616,30	689,79	762,49
34	864			84,83	95,38	105,91	118,54	133,25	150,03	168,87	185,59	210,60	231,38	262,47	297,58	334,59	365,31	416,26	460,85	517,24	577,24	579,26	656,55	735,07	812,79
36	914			89,76	100,93	112,08	125,45	141,02	158,79	178,74	196,44	222,93	244,95	277,89	315,08	354,31	386,88	440,92	488,22	548,07	611,77	616,99	696,00	779,45	862,11
40	1016			99,82	112,25	124,66	139,53	156,86	176,64	198,86	218,57	248,08	272,62	309,33	350,80	394,56	430,90	491,23	544,06	610,95	682,19	653,98	776,49	870,00	962,73
42	1067					130,94	146,58	164,79	185,57	208,92	229,64	260,66	286,45	325,05	325,05	414,68	452,91	516,38	571,98	642,39	717,41	729,44	816,74	915,28	1013,03
44	1118					137,23	153,62	172,71	194,50	218,98	240,71	273,23	300,28	340,77	386,52	434,81	474,92	541,53	599,90	673,83	752,62	767,17	856,98	960,56	1063,34
46	1168					143,40	160,52	180,48	203,26	228,84	251,56	285,56	313,85	356,18	404,03	454,53	496,50	566,19	627,27	704,66	787,15	804,90	896,44	1004,94	1112,66
48	1219					149,69	167,57	188,40	212,19	238,91	262,62	298,14	327,68	371,90	421,89	474,66	518,51	591,35	655,19	736,10	822,36	841,89	936,69	1050,22	1162,97
52	1321						181,65	204,25	230,05	259,03	284,76	323,29	355,35	403,35	457,60	514,90	562,53	641,65	711,03	798,98	892,79	879,62	1017,18	1140,77	1263,58
56	1422						195,60	219,94	247,73	278,95	306,68	348,20	382,75	434,48	492,97	554,75	606,11	691,47	766,32	861,25	962,53	955,08	1096,88	1230,44	1363,20
60	1524							235,79	265,59	299,08	328,81	373,35	410,42	465,92	528,69	595,00	650,13	741,77	822,16	924,13	1032,96	1029,80	1177,37	1320,99	1463,82
64	1626							251,63	283,45	319,20	350,95	398,51	438,08	497,36	564,41	635,24	694,15	792,08	878,00	987,02	1103,39	1105,26	1257,86	1411,54	1563,43
68	1727								301,13	339,12	372,86	423,41	465,48	528,49	599,77	675,09	737,73	841,89	933,30	1049,28	1173,13	1255,44	1337,56	1501,2	1664,06
72	1829								318,99	359,26	395,00	448,57	493,15	559,94	635,49	715,34	781,75	892,20	989,14	1112,17	1243,55	1330,9	1418,05	1591,75	1764,67
76	1930									379,17	416,92	473,47	520,55	591,07	670,86	755,19	825,34	942,01	1044,43	1174,43	1313,29	1405,62	1497,75	1681,42	1864,30
80	2032									399,29	439,05	498,63	548,22	622,51	706,58	795,43	869,36	992,32	1100,27	1237,32	1383,72	1481,08	1578,24	1771,97	1964,91
84	2134										461,19	523,78	575,88	653,95	742,29	835,68	913,38	1042,62	1156,11	1300,2	1454,15	1556,54	1658,73	1862,52	2065,52
88	2235										483,10	548,69	603,28	685,09	777,66	875,53	956,96	1092,44	1211,4	1362,47	1523,89	1631,26	1738,43	1952,18	2165,15
92	2337											573,84	630,95	716,53	813,38	915,77	1000,98	1142,74	1267,24	1425,35	1594,32	1706,72	1818,92	2042,74	2265,76
96	2438											598,74	658,35	747,66	848,75	955,62	1044,57	1192,56	1322,53	1487,61	1664,06	1781,44	1898,62	2132,40	2365,39
100	2540											623,90	686,02	779,10	884,46	995,87	1088,58	1242,86	1378,37	1550,5	1734,49	1856,9	1979,11	2222,95	2466,0

Chemical Composition

Steel Name	Steel Number	C max,%	Si max,%	Mn max,%	P max,%	S max,%	Cr max,%	Mo max,%	Ni max,%	Al tot min%	Cu max,%	Nb max,%	Ti max,%	V max,%	Cr+Cu+Mo+Ni max,%
P195TR1	1.0107	0,13	0,35	0,7	0,025	0,02	0,3	0,08	0,3	-	0,3	0,01	0,04	0,02	0,7
P195TR2	1.0108	0,13	0,35	0,7	0,025	0,02	0,3	0,08	0,3	0,02	0,3	0,01	0,04	0,02	0,7
P235TR1	1.0254	0,16	0,35	1,2	0,025	0,02	0,3	0,08	0,3	-	0,3	0,01	0,04	0,02	0,7
P235TR2	1.0255	0,16	0,35	1,2	0,025	0,02	0,3	0,08	0,3	0,02	0,3	0,01	0,04	0,02	0,7
P265TR1	1.0258	0,2	0,4	1,4	0,025	0,02	0,3	0,08	0,3	-	0,3	0,01	0,04	0,02	0,7
P265TR2	1.0259	0,2	0,4	1,4	0,025	0,02	0,3	0,08	0,3	0,02	0,3	0,01	0,04	0,02	0,7

Mechanical Properties

Steel Grade	Yield Strength (R_{eH} min.) MPa (N/mm^2)		Tensile Strength (R_m) MPa (N/mm^2)	Elongation A min. (%) Longitudinal / Transverse	Impact Properties Longitudinal 0°C, -10°C / Transverse 0°C
	T ≤ 16 mm	16 < T ≤ 40 mm			
P195TR1	195	185	320 – 440	27 / 25	-
P195TR2	195	185	320 – 440	27 / 25	40, 28 / 27
P235TR1	235	225	360 – 500	25 / 23	-
P235TR2	235	225	360 – 500	25 / 23	40, 28 / 27
P265TR1	265	255	410 – 570	21 / 19	-
P265TR2	265	255	410 – 570	21 / 19	40, 28 / 27

Odelya® EN 10217-3 SAW Steel Tubes for Pressure Purposes

Odelya® EN 10217-3 Submerged Arc Welded (Spiral and Longitudinal) Line Pipes are made of weldable alloy fine grain steel.

Manufacturing Process	Starting Material	Forming Operation	Technical Delivery Condition
Submerged Arc Welded: -Longitudinal seam (LSAW) -Spiral seam (SSAW)	Hot rolled strip or plate	Cold formed (+welded)	Normalised (entire tube)
	Normalising rolled strip or plate	Cold formed (+welded)	Without subsequent heat treatment
	Normalising strip or plate	Cold formed (+welded)	Without subsequent heat treatment
	Hot rolled strip or plate: Normalising or normalising rolled	Normalising formed (+welded)	Without subsequent heat treatment

Odelya® EN 10217-3 SAW Line Pipes

Outside Diameter		Wall Thickness & Weight per Unit Length (kg/m)																					
	inch	0,157	0,177	0,197	0,220	0,248	0,280	0,315	0,346	0,394	0,433	0,492	0,559	0,630	0,689	0,787	0,874	0,984	1,102	1,181	1,260	1,417	1,575
inch	mm	4	4,5	5	5,6	6,3	7,1	8	8,8	10	11	12,5	14,2	16	17,5	20	22,2	25	28	30	32	36	40
16	406,4	39,69	44,60	49,49	55,35	62,16	69,91	78,60	86,28	97,75	107,26												
18	457	44,68	50,21	55,73	62,34	70,02	78,77	88,58	97,26	110,23	120,98												
20	508	49,71	55,87	62,02	69,38	77,94	87,70	98,64	108,33	122,81	134,82	152,74	172,91										
22	559	54,75	61,53	68,31	76,42	85,87	96,63	108,70	119,40	135,38	148,65	168,46	190,77	214,25	233,68								
24	610	59,78	67,19	74,60	83,47	93,79	105,56	118,76	130,47	147,96	162,48	184,18	208,63	234,37	255,69	290,99	321,79	360,65					
26	660	64,71	72,74	80,76	90,37	101,56	114,31	128,63	141,32	160,29	176,05	199,59	226,14	254,10	277,27	315,65	349,16	391,48	436,38				
28	711	69,74	78,40	87,05	97,41	109,48	123,24	138,69	152,38	172,87	189,88	215,31	244,00	274,22	299,28	340,80	377,08	422,92	471,60	466,07			
30	762	74,77	84,06	93,34	104,46	117,40	132,17	148,75	163,45	185,44	203,72	231,03	261,86	294,34	321,29	365,95	405,00	454,36	506,81	503,80	576,06		
32	813	79,80	89,72	99,63	111,50	125,33	141,10	158,81	174,52	198,02	217,55	247,75	279,72	314,46	343,30	391,11	432,93	485,80	542,03	541,53	616,30	689,79	
34	864	84,83	95,38	105,91	118,54	133,25	150,03	168,87	185,59	210,60	231,38	262,47	297,58	334,59	365,31	416,26	460,85	517,24	577,24	579,26	656,55	735,07	812,79
36	914	89,76	100,93	112,08	125,45	141,02	158,79	178,74	196,44	222,93	244,95	277,89	315,08	354,31	386,88	440,92	488,22	548,07	611,77	616,99	696,00	779,45	862,11
40	1016	99,82	112,25	124,66	139,53	156,86	176,64	198,86	218,57	248,08	272,62	309,33	350,80	394,56	430,90	491,23	544,06	610,95	682,19	653,98	776,49	870,00	962,73
42	1067			130,94	146,58	164,79	185,57	208,92	229,64	260,66	286,45	325,05	325,05	414,68	452,91	516,38	571,98	642,39	717,41	729,44	816,74	915,28	1013,03
44	1118			137,23	153,62	172,71	194,50	218,98	240,71	273,23	300,28	340,77	386,52	434,81	474,92	541,53	599,90	673,83	752,62	767,17	856,98	960,56	1063,34
46	1168			143,40	160,52	180,48	203,26	228,84	251,56	285,56	313,85	356,18	404,03	454,53	496,50	566,19	627,27	704,66	787,15	804,90	896,44	1004,94	1112,66
48	1219			149,69	167,57	188,40	212,19	238,91	262,62	298,14	327,68	371,90	421,89	474,66	518,51	591,35	655,19	736,10	822,36	841,89	936,69	1050,22	1162,97
52	1321				181,65	204,25	230,05	259,03	284,76	323,29	355,35	403,35	457,60	514,90	562,53	641,65	711,03	798,98	892,79	879,62	1017,18	1140,77	1263,58
56	1422				195,60	219,94	247,73	278,95	306,68	348,20	382,75	434,48	492,97	554,75	606,11	691,47	766,32	861,25	962,53	955,08	1096,88	230,44	1363,20
60	1524					235,79	265,59	299,08	328,81	373,35	410,42	465,92	528,69	595,00	650,13	741,77	822,16	924,13	1032,96	1029,80	1177,37	1320,99	1463,82
64	1626					251,63	283,45	319,20	350,95	398,51	438,08	497,36	564,41	635,24	694,15	792,08	878,00	987,02	1103,39	1105,26	1257,86	1411,54	1563,43
68	1727						301,13	339,12	372,86	423,41	465,48	528,49	599,77	675,09	737,73	841,89	933,30	1049,28	1173,13	1255,44	1337,56	1501,2	1664,06
72	1829						318,99	359,26	395,00	448,57	493,15	559,94	635,49	715,34	781,75	892,20	989,14	1112,17	1243,55	1330,9	1418,05	1591,75	1764,67
76	1930							379,17	416,92	473,47	520,55	591,07	670,86	755,19	825,34	942,01	1044,43	1174,43	1313,29	1405,62	1497,75	1681,42	1864,30
80	2032							399,29	439,05	498,63	548,22	622,51	706,58	795,43	869,36	992,32	1100,27	1237,32	1383,72	1481,08	1578,24	1771,97	1964,91
84	2134								461,19	523,78	575,88	653,95	742,29	835,68	913,38	1042,62	1156,11	1300,2	1454,15	1556,54	1658,73	1862,52	2065,52
88	2235								483,10	548,69	603,28	685,09	777,66	875,53	956,96	1092,44	1211,4	1362,47	1523,89	1631,26	1738,43	1952,18	2165,15
92	2337									573,84	630,95	716,53	813,38	915,77	1000,98	1142,74	1267,24	1425,35	1594,32	1706,72	1818,92	2042,74	2265,76
96	2438									598,74	658,35	747,66	848,75	955,62	1044,57	1192,56	1322,53	1487,61	1664,06	1781,44	1898,62	2132,40	2365,39
100	2540									623,90	686,02	779,10	884,46	995,87	1088,58	1242,86	1378,37	1550,5	1734,49	1856,9	1979,11	2222,95	2466,0

Chemical Composition

Steel Name	Steel Number	C %	Si max,%	Mn max,%	P max,%	S max,%	Cr max,%	Mo max,%	Ni max,%	Al tot min,%	Cu max,%	N max,%	Nb max,%	Ti max,%	V max,%	Np + Ti + V max,%
P275NL1	1.0488	0,16	0,40	0,50 – 1,50	0,025	0,020	0,30	0,08	0,50	0,020	0,30	0,020	0,05	0,03	0,05	0,05
P275NL2	1.1104	0,16	0,40	0,50 – 1,50	0,025	0,015	0,30	0,08	0,50	0,020	0,30	0,020	0,05	0,03	0,05	0,05
P355N	1.0562	0,20	0,50	0,90 – 1,70	0,025	0,020	0,30	0,08	0,50	0,020	0,30	0,020	0,05	0,03	0,10	0,12
P355NH	1.0565	0,20	0,50	0,90 – 1,70	0,025	0,020	0,30	0,08	0,50	0,020	0,30	0,020	0,05	0,03	0,10	0,12
P355NL1	1.0566	0,18	0,50	0,90 – 1,70	0,025	0,020	0,30	0,08	0,50	0,020	0,30	0,020	0,05	0,03	0,10	0,12
P355NL2	1.1106	0,18	0,50	0,90 – 1,70	0,025	0,015	0,30	0,08	0,50	0,020	0,30	0,020	0,05	0,03	0,10	0,12
P460N	1.8905	0,20	0,60	1,00 – 1,70	0,025	0,020	0,30	0,10	0,80	0,020	0,70	0,020	0,05	0,03	0,20	0,22
P460NH	1.8935	0,20	0,60	1,00 – 1,70	0,025	0,020	0,30	0,10	0,80	0,020	0,70	0,020	0,05	0,03	0,20	0,22
P460NL1	1.8915	0,20	0,60	1,00 – 1,70	0,025	0,020	0,30	0,10	0,80	0,020	0,70	0,020	0,05	0,03	0,20	0,22
P460NL2	1.8918	0,20	0,60	1,00 – 1,70	0,025	0,015	0,30	0,10	0,80	0,020	0,70	0,020	0,05	0,03	0,20	0,22

Mechanical Properties

Steel Name	Steel Number	Yield Strength (R_{eH} or $R_{p0,2}$ min.) for Wall Thickness T in mm MPa (N/mm^2)			Tensile Strength (R_m) for Wall Thickness T in mm MPa (N/mm^2)		Elongation A min. (%)	
		≤ 12	>12 to ≤ 20	>20 to ≤ 40	≤ 20	>20 to ≤ 40	Longitudinal	Transverse
P275NL1	1.0488	275	275	275	390 - 530	390 - 510	24	22
P275NL2	1.1104	275	275	275	390 - 530	390 - 510	24	22
P355N	1.0562	355	355	345	490 - 650	490 - 630	22	20
P355NH	1.0565	355	355	345	490 – 650	490 – 630	22	20
P355NL1	1.0566	355	355	345	490 – 650	490 – 630	22	20
P355NL2	1.1106	355	355	345	490 – 650	490 – 630	22	20
P460N	1.8905	460	450	440	560 - 730	(--)	19	17
P460NH	1.8935	460	450	440	560 - 730	(--)	19	17
P460NL1	1.8915	460	450	440	560 - 730	(--)	19	17
P460NL2	1.8918	460	450	440	560 - 730	(--)	19	17

Odelya® EN 10217-5 SAW Steel Tubes for Pressure Purposes

Odelya® EN 10217-5 Submerged Arc Welded (SAW) Line Pipes with specified elevated temperature properties are manufactured of non-alloy and alloy steel with helical (spiral) or longitudinal seam. Odelya® EN 10217-5 SAWL and SAWH Steel Pipes are suitable for pressure applications and conveyance of liquids in many industries.

Manufacturing Process	Starting Material	Forming Operation	Technical Delivery Condition
Submerged Arc Welded: -Longitudinal seam (LSAW) -Spiral seam (SSAW)	Hot rolled strip or plate	Cold formed	Normalised (entire tube)
	Normalising rolled strip or plate	Cold formed	Without subsequent heat treatment
	Normalising strip or plate (only for LSAW)	Cold formed	Without subsequent heat treatment
	Hot rolled or normalising or normalising rolled strip or plate	Normalising formed (only for LSAW)	Without subsequent heat treatment

Odelya® EN 10217-5 SAW Steel Pipes

Outside Diameter		Wall Thickness & Weight per Unit Length (kg/m)																					
	inch	0,157	0,177	0,197	0,220	0,248	0,280	0,315	0,346	0,394	0,433	0,492	0,559	0,630	0,689	0,787	0,874	0,984	1,102	1,181	1,260	1,417	1,575
inch	mm	**4**	**4,5**	**5**	**5,6**	**6,3**	**7,1**	**8**	**8,8**	**10**	**11**	**12,5**	**14,2**	**16**	**17,5**	**20**	**22,2**	**25**	**28**	**30**	**32**	**36**	**40**
16	**406,4**	39,69	44,60	49,49	55,35	62,16	69,91	78,60	86,28	97,75	107,26												
18	**457**	44,68	50,21	55,73	62,34	70,02	78,77	88,58	97,26	110,23	120,98												
20	**508**	49,71	55,87	62,02	69,38	77,94	87,70	98,64	108,33	122,81	134,82	152,74	172,91										
22	**559**	54,75	61,53	68,31	76,42	85,87	96,63	108,70	119,40	135,38	148,65	168,46	190,77	214,25	233,68								
24	**610**	59,78	67,19	74,60	83,47	93,79	105,56	118,76	130,47	147,96	162,48	184,18	208,63	234,37	255,69	290,99	321,79	360,65					
26	**660**	64,71	72,74	80,76	90,37	101,56	114,31	128,63	141,32	160,29	176,05	199,59	226,14	254,10	277,27	315,65	349,16	391,48	436,38				
28	**711**	69,74	78,40	87,05	97,41	109,48	123,24	138,69	152,38	172,87	189,88	215,31	244,00	274,22	299,28	340,80	377,08	422,92	471,60	466,07			
30	**762**	74,77	84,06	93,34	104,46	117,40	132,17	148,75	163,45	185,44	203,72	231,03	261,86	294,34	321,29	365,95	405,00	454,36	506,81	503,80	576,06		
32	**813**	79,80	89,72	99,63	111,50	125,33	141,10	158,81	174,52	198,02	217,55	247,75	279,72	314,46	343,30	391,11	432,93	485,80	542,03	541,53	616,30	689,79	
34	**864**	84,83	95,38	105,91	118,54	133,25	150,03	168,87	185,59	210,60	231,38	262,47	297,58	334,59	365,31	416,26	460,85	517,24	577,24	579,26	656,55	735,07	812,79
36	**914**	89,76	100,93	112,08	125,45	141,02	158,79	178,74	196,44	222,93	244,95	277,89	315,08	354,31	386,88	440,92	488,22	548,07	611,77	616,99	696,00	779,45	862,11
40	**1016**	99,82	112,25	124,66	139,53	156,86	176,64	198,86	218,57	248,08	272,62	309,33	350,80	394,56	430,90	491,23	544,06	610,95	682,19	653,98	776,49	870,00	962,73
42	**1067**			130,94	146,58	164,79	185,57	208,92	229,64	260,66	286,45	325,05	325,05	414,68	452,91	516,38	571,98	642,39	717,41	729,44	816,74	915,28	1013,03
44	**1118**			137,23	153,62	172,71	194,50	218,98	240,71	273,23	300,28	340,77	386,52	434,81	474,92	541,53	599,90	673,83	752,62	767,17	856,98	960,56	1063,34
46	**1168**			143,40	160,52	180,48	203,26	228,84	251,56	285,56	313,85	356,18	404,03	454,53	496,50	566,19	627,27	704,66	787,15	804,90	896,44	1004,94	1112,66
48	**1219**			149,69	167,57	188,40	212,19	238,91	262,62	298,14	327,68	371,90	421,89	474,66	518,51	591,35	655,19	736,10	822,36	841,89	936,69	1050,22	1162,97
52	**1321**				181,65	204,25	230,05	259,03	284,76	323,29	355,35	403,35	457,60	514,90	562,53	641,65	711,03	798,98	892,79	879,62	1017,18	1140,77	1263,58
56	**1422**				195,60	219,94	247,73	278,95	306,68	348,20	382,75	434,48	492,97	554,75	606,11	691,47	766,32	861,25	962,53	955,08	1096,88	1230,44	1363,20
60	**1524**					235,79	265,59	299,08	328,81	373,35	410,42	465,92	528,69	595,00	650,13	741,77	822,16	924,13	1032,96	1029,80	1177,37	1320,99	1463,82
64	**1626**					251,63	283,45	319,20	350,95	398,51	438,08	497,36	564,41	635,24	694,15	792,08	878,00	987,02	1103,39	1105,26	1257,86	1411,54	1563,43
68	**1727**						301,13	339,12	372,86	423,41	465,48	528,49	599,77	675,09	737,73	841,89	933,30	1049,28	1173,13	1255,44	1337,56	1501,2	1664,06
72	**1829**						318,99	359,26	395,00	448,57	493,15	559,94	635,49	715,34	781,75	892,20	989,14	1112,17	1243,55	1330,9	1418,05	1591,75	1764,67
76	**1930**							379,17	416,92	473,47	520,55	591,07	670,86	755,19	825,34	942,01	1044,43	1174,43	1313,29	1405,62	1497,75	1681,42	1864,30
80	**2032**							399,29	439,05	498,63	548,22	622,51	706,58	795,43	869,36	992,32	1100,27	1237,32	1383,72	1481,08	1578,24	1771,97	1964,91
84	**2134**								461,19	523,78	575,88	653,95	742,29	835,68	913,38	1042,62	1156,11	1300,2	1454,15	1556,54	1658,73	1862,52	2065,52
88	**2235**								483,10	548,69	603,28	685,09	777,66	875,53	956,96	1092,44	1211,4	1362,47	1523,89	1631,26	1738,43	1952,18	2165,15
92	**2337**									573,84	630,95	716,53	813,38	915,77	1000,98	1142,74	1267,24	1425,35	1594,32	1706,72	1818,92	2042,74	2265,76
96	**2438**									598,74	658,35	747,66	848,75	955,62	1044,57	1192,56	1322,53	1487,61	1664,06	1781,44	1898,62	2132,40	2365,39
100	**2540**									623,90	686,02	779,10	884,46	995,87	1088,58	1242,86	1378,37	1550,5	1734,49	1856,9	1979,11	2222,95	2466,0

Chemical Composition

Steel Name	Steel Number	C %	Si max,%	Mn %	P max,%	S max,%	Cr max,%	Mo %	Ni max,%	Al tot %	Cu max,%	Nb max,%	Ti max,%	V max,%	Cr+Cu+Mo+Ni max,%
P235GH	1.0345	≤ 0,16	0,35	≤ 1,20	0,025	0,020	0,30	≤ 0,08	0,30	≥ 0,02	0,30	0,010	0,03	0,02	0,70
P265GH	1.0425	≤ 0,20	0,40	≤ 1,40	0,025	0,020	0,30	≤ 0,08	0,30	≥ 0,02	0,30	0,010	0,03	0,02	0,70
16Mo3	1.5415	0,12 – 0,20	0,35	0,40 – 0,90	0,025	0,020	0,30	0,25 – 0,35	0,30	≤ 0,04	0,30	-	-	-	-

Odelya® EN 10217-6 SAW Steel Tubes for Pressure Purposes

Odelya® EN 10217-6 Submerged Arc Welded (SAW) Line Pipes with specified low temperature properties are manufactured of non-alloy steel with helical (spiral) or longitudinal seam.

Manufacturing Process	Starting Material	Forming Operation	Technical Delivery Condition
Submerged Arc Welded: -Longitudinal seam (LSAW) -Spiral seam (SSAW)	Hot rolled strip or plate	Cold formed	Normalised (entire tube)
	Normalising rolled strip or plate	Cold formed	Without subsequent heat treatment
	Normalising strip or plate (only for LSAW)	Cold formed	Without subsequent heat treatment
	Hot rolled or normalising or normalising rolled strip or plate	Normalising formed (only for LSAW)	Without subsequent heat treatment

Odelya® EN 10217-6 SAW Line Pipes

Outside Diameter		Wall Thickness & Weight per Unit Length (kg/m)																
	inch	0,157	0,177	0,197	0,220	0,248	0,280	0,315	0,346	0,394	0,433	0,492	0,559	0,630	0,689	0.787	0,874	0,984
inch	mm	**4**	**4,5**	**5**	**5,6**	**6,3**	**7,1**	**8**	**8,8**	**10**	**11**	**12,5**	**14,2**	**16**	**17,5**	**20**	**22,2**	**25**
16	**406,4**	39,69	44,60	49,49	55,35	62,16	69,91	78,60	86,28	97,75	107,26							
18	**457**	44,68	50,21	55,73	62,34	70,02	78,77	88,58	97,26	110,23	120,98							
20	**508**	49,71	55,87	62,02	69,38	77,94	87,70	98,64	108,33	122,81	134,82	152,74	172,91					
22	**559**	54,75	61,53	68,31	76,42	85,87	96,63	108,70	119,40	135,38	148,65	168,46	190,77	214,25	233,68			
24	**610**	59,78	67,19	74,60	83,47	93,79	105,56	118,76	130,47	147,96	162,48	184,18	208,63	234,37	255,69	290,99	321,79	360,65
26	**660**	64,71	72,74	80,76	90,37	101,56	114,31	128,63	141,32	160,29	176,05	199,59	226,14	254,10	277,27	315,65	349,16	391,48
28	**711**	69,74	78,40	87,05	97,41	109,48	123,24	138,69	152,38	172,87	189,88	215,31	244,00	274,22	299,28	340,80	377,08	422,92
30	**762**	74,77	84,06	93,34	104,46	117,40	132,17	148,75	163,45	185,44	203,72	231,03	261,86	294,34	321,29	365,95	405,00	454,36
32	**813**	79,80	89,72	99,63	111,50	125,33	141,10	158,81	174,52	198,02	217,55	247,75	279,72	314,46	343,30	391,11	432,93	485,80
34	**864**	84,83	95,38	105,91	118,54	133,25	150,03	168,87	185,59	210,60	231,38	262,47	297,58	334,59	365,31	416,26	460,85	517,24
36	**914**	89,76	100,93	112,08	125,45	141,02	158,79	178,74	196,44	222,93	244,95	277,89	315,08	354,31	386,88	440,92	488,22	548,07
40	**1016**	99,82	112,25	124,66	139,53	156,86	176,64	198,86	218,57	248,08	272,62	309,33	350,80	394,56	430,90	491,23	544,06	610,95
42	**1067**			130,94	146,58	164,79	185,57	208,92	229,64	260,66	286,45	325,05	325,05	414,68	452,91	516,38	571,98	642,39
44	**1118**			137,23	153,62	172,71	194,50	218,98	240,71	273,23	300,28	340,77	386,52	434,81	474,92	541,53	599,90	673,83
46	**1168**			143,40	160,52	180,48	203,26	228,84	251,56	285,56	313,85	356,18	404,03	454,53	496,50	566,19	627,27	704,66
48	**1219**			149,69	167,57	188,40	212,19	238,91	262,62	298,14	327,68	371,90	421,89	474,66	518,51	591,35	655,19	736,10
52	**1321**				181,65	204,25	230,05	259,03	284,76	323,29	355,35	403,35	457,60	514,90	562,53	641,65	711,03	798,98
56	**1422**				195,60	219,94	247,73	278,95	306,68	348,20	382,75	434,48	492,97	554,75	606,11	691,47	766,32	861,25
60	**1524**					235,79	265,59	299,08	328,81	373,35	410,42	465,92	528,69	595,00	650,13	741,77	822,16	924,13
64	**1626**					251,63	283,45	319,20	350,95	398,51	438,08	497,36	564,41	635,24	694,15	792,08	878,00	987,02
68	**1727**						301,13	339,12	372,86	423,41	465,48	528,49	599,77	675,09	737,73	841,89	933,30	1049,28
72	**1829**						318,99	359,26	395,00	448,57	493,15	559,94	635,49	715,34	781,75	892,20	989,14	1112,17
76	**1930**							379,17	416,92	473,47	520,55	591,07	670,86	755,19	825,34	942,01	1044,43	1174,43
80	**2032**							399,29	439,05	498,63	548,22	622,51	706,58	795,43	869,36	992,32	1100,27	1237,32
84	**2134**								461,19	523,78	575,88	653,95	742,29	835,68	913,38	1042,62	1156,11	1300,2
88	**2235**								483,10	548,69	603,28	685,09	777,66	875,53	956,96	1092,44	1211,4	1362,47
92	**2337**									573,84	630,95	716,53	813,38	915,77	1000,98	1142,74	1267,24	1425,35
96	**2438**									598,74	658,35	747,66	848,75	955,62	1044,57	1192,56	1322,53	1487,61
100	**2540**									623,90	686,02	779,10	884,46	995,87	1088,58	1242,86	1378,37	1550,5

Odelya® AWWA C200 Steel Water Pipes

Odelya® AWWA C200 Spiral Welded Pipelines are manufactured with outside diameter starting from 6 inches (150 mm) and larger for transportation and distribution of water or for applications in other water conveyance systems.

Steel grades, used for Water Pipelines, are equivalent to those used in ASTM A135, ASTM A139, ASTM A53 type F and ASTM A134 (Table 1 in standard specifications). Ends of Odelya® AWWA C200 Pipes sections are specified by purchaser and can be selected as plain end, beveled end, coupled, butt-welded, bell-end-spigot end, flanged end, etc.

Quality requirements of AWWA C200 standard specifications are applied, reassuring high quality of entire steel pipe and its long-term operating in water systems.

Odelya® ASTM A139 Electric-Fusion Arc Welded Steel Pipes

Odelya® ASTM A139 Electric-Fusion Arc-Welded Pipelines are manufactured with straight seam (helical) or spiral seam (longitudinal) in nominal outside diameter (NPS) ranging from 219,1 to 2337 mm (8 to 92 inch) and nominal wall thickness up to 25,5 mm (1,0 inch), inclusive.

Odelya® EN 10219 SAW Circular Structural Hollow Sections

Odelya® EN 10219 Cold Formed Submerged Arc Steel Pipes are manufactured without a subsequent heat treatment, but the weld seam may be "as welded" or "heat treated condition". Technical delivery conditions of these SSAW and LSAW non-alloy and fine grain steel pipes are according to European Standard EN 10219-1; precise tolerances, dimensions and sectional properties are supplied according to EN 10219-2.

Odelya® EN 10219 SAW Round Hollow Sections

Outside Diameter		Wall Thickness & Weight Per Unit Length (kg/m)											
inch	inch	0,157	0,197	0,236	0,248	0,315	0,394	0,472	0,492	0,630	0,787	0,984	1,102
	mm	**4**	**5**	**6**	**6,3**	**8**	**10**	**12**	**12,5**	**16**	**20**	**25**	**30**
8,626	**219,1**	21,2	26,4	31,5	33,1	41,6	51,6	61,3	63,7				
9,626	**244,5**		29,5	35,3	37,0	46,7	57,8	68,8	71,5				
10,748	**273**		33,0	39,5	41,4	52,3	64,9	77,2	80,3				
12,752	**323,9**		39,3	47,0	49,3	62,3	77,4	92,3	96,0				
14	**355,6**		43,2	51,7	54,3	68,6	85,2	102	106	134	166		
16	**406,4**			59,2	62,2	78,6	97,8	117	121	154	191	235	
18	**457**			66,7	70,0	88,6	110	132	137	174	216	266	316
20	**508**			74,3	77,9	98,6	123	147	153	194	241	198	354
24	**610**			89,4	93,8	119	148	177	184	234	291	361	429
28	**711**			104	109	139	173	207	215	274	341	423	504
30	**762**			112	117	149	185	222	231	294	366	454	542
32	**813**					159	198	237	247	314	391	486	579
36	**914**					179	223	267	278	354	441	548	654
40	**1016**					199	248	297	309	395	491	611	729
42	**1067**						261	312	325	415	516	642	767
46	**1168**						286	342	356	455	566	705	
48	**1219**						298	357	372	475	591	736	

Note: Other dimensions up to 2500 mm with wall thickness up to 40 mm are available

Chemical Composition

Odelya® EN 10219 Non-Alloy Quality Steels (wall thickness ≤40mm)

Steel Name	Steel Number	C max, %	Si max, %	Mn max, %	P max, %	S max, %	N
S235JRH	1.0039	0,17	-	1,40	0,040	0,040	0,009
S275J0H	1.0149	0,20	-	1,50	0,035	0,035	0,009
S275J2H	1.0138	0,20	-	1,50	0,030	0,030	-
S355J0H	1.0547	0,22	0,55	1,60	0,035	0,035	0,009
S355J2H	1.0576	0,22	0,55	1,60	0,030	0,030	-
S355K2H	1.0512	0,22	0,55	1,60	0,030	0,030	-

Odelya® EN 10219 Fine Grain Quality Steels (wall thickness ≤40mm)

Steel Name	Steel Number	C max, %	Si max,%	Mn max,%	P max,%	S max,%	Nb	V max,%	Al total min,%	Ti max,%	Cr max,%	Ni max,%	Mo max,%	Cu max,%	N max,%
S275NH	1.0493	0,20	0,40	0,50 - 1,40	0,035	0,030	0,050	0,05	0,020	0,03	0,30	0,30	0,10	0,35	0,015
S275NLH	1.0497	0,20	0,40	0,50 - 1,40	0,030	0,025	0,050	0,05	0,020	0,03	0,30	0,30	0,10	0,35	0,015
S355NH	1.0539	0,20	0,50	0,90 - 1,65	0,035	0,030	0,050	0,12	0,020	0,03	0,30	0,50	0,10	0,35	0,015
S355NLH	1.0549	0,18	0,50	0,90 - 1,65	0,030	0,025	0,050	0,12	0,020	0,03	0,30	0,50	0,10	0,35	0,015
S460NH	1.8953	0,22	0,60	1,0 - 1,70	0,035	0,030	0,050	0,20	0,020	0,03	0,30	0,80	0,10	0,70	0,025
S460NLH	1.8956	0,22	0,60	1,0 - 1,70	0,030	0,025	0,050	0,20	0,020	0,03	0,30	0,80	0,10	0,70	0,025

Mechanical Properties

Odelya® EN 10219 Non-Alloy Quality Steels (wall thickness ≤40mm)

Steel Name	Steel Number	Yield Strength (R_{eH} min.) MPa		Tensile Strength (R_m) MPa		Elongation A min. %	Impact test, energy absorbed KV J		
		Wall Thickness, mm		Wall Thickness, mm		Wall Thickness, mm			
		≤ 16	> 16 ≤ 40	< 3	≥ 3 ≤ 40	≤ 40	-20 C°	0 C°	20 C°
S235JRH	1.0039	235	225	360-510	360-510	24	-	-	27
S275J0H	1.0149	275	265	430-580	410-560	20	-	27	-
S275J2H	1.0138	275	265	430-580	410-560	20	27	-	-
S355J0H	1.0547	355	345	510-680	470-630	20	-	27	-
S355J2H	1.0576	355	345	510-680	470-630	20	27	-	-
S355K2H	1.0512	355	345	510-680	470-630	20	40	-	-

Odelya® EN 10219 Fine Grain Quality Steels (wall thickness ≤40mm)

Steel Name	Steel Number	Yield Strength (R_{eH} min.) MPa		Tensile Strength (R_m) MPa	Elongation A min. %	Impact test, energy absorbed KV J	
		Wall Thickness, mm		Wall Thickness, mm	Wall Thickness, mm		
		≤ 16	> 16 ≤ 40	≤ 40	≤ 40	-50 C°	- 20 C°
S275NH	1.0493	275	265	370-510	24	-	40
S275NLH	1.0497	275	265	370-510	24	27	-
S355NH	1.0539	355	345	470-630	22	-	40
S355NLH	1.0549	355	345	470-630	22	27	-
S460NH	1.8953	460	440	540-720	17	-	40
S460NLH	1.8956	460	440	540-720	17	27	-

Odelya® EN 10210 SAW Hot Finished Steel Tubes

Odelya® EN 10210 Hot Finished Non-Alloy and Fine Grain Steels Structural Pipes are manufactured by a submerged arc welding process with spiral or straight seam.

Technical delivery conditions of Odelya® EN 10210 Submerged Arc Welded Pipes are according to European Standard EN 10210-1; tolerances, dimensions and sectional properties are supplied according to EN 10210-2. Odelya® EN 10210 SAW Pipes of JR, J0, J2 and K2 steel qualities are hot-finished; whereas, the others of N and NHL qualities are normalised.

Odelya® EN 10210 SAW Steel Pipes

Outside Diameter		Wall Thickness & Weight Per Unit Length (kg/m)										
inch	inch	0,197	0,248	0,315	0,394	0,492	0,560	0,630	0,787	0,984	1,102	1,575
	mm	5	6,3	8	10	12,5	14,2	16	20	25	30	40
8,62	**219,1**	26,4	33,1	41,6	51,6	63,7	71,8	80,1	98,2			
9,62	**244,5**	29,5	37,0	46,7	57,8	71,5	80,6	90,2	110,7	135		
10,748	**273**	33,0	41,4	52,3	64,9	80,3	90,6	101	125	153		
12,752	**323,9**	39,3	49,3	62,3	77,4	96,0	108,5	121	150	184		
14	**355,6**		54,3	68,6	85,2	106	120	134	166	204		
16	**406,4**		62,2	78,6	97,8	121	137	154	191	235	278	361
18	**457**		70,0	88,6	110	137	155	174	216	266	316	411
20	**508**		77,9	98,6	123	153	173	194	241	298	354	462
24	**610**		93,8	119	148	184	209	234	291	361	429	562
28	**711**		109	139	173	215	244	274	341	423	504	662
30	**762**		117	149	185	231	262	294	366	454	542	712
32	**813**			159	198	247	280	314	391	486	579	
36	**914**			179	223	278	315	354	441	548	654	
40	**1016**			199	248	309	351	395	491	611	729	
42	**1067**				261	325	369	415	516	642	767	
46	**1168**				286	356	404	455	566	705		
48	**1219**				298	372	422	475	591	736		

Odelya® ASTM A 252 SAW Steel Pile Pipes

Odelya® ASTM A 252 Steel Pipes Piles are manufactured using fusion welding process, with longitudinal seam, helical-butt seam, or helical-lap seam. Odelya® SAW Pipes are manufactured up to 3566 mm (140 in.), for details please contact Odelya sales team.

Odelya® ASTM A252 Steel Piling Pipes

Outside Diameter		Wall Thickness & Weight per Unit Length, lb/ft																							
	inch	0,109	0,120	0,134	0,141	0,150	0,164	0,172	0,179	0,188	0,203	0,219	0,230	0,250	0,277	0,281	0,307	0,312	0,322	0,330	0,344	0,375	0,438	0,469	0,500
inch	mm	2,8	3	3,4	3,6	3,8	4,2	4,4	4,6	4,8	5,2	5,6	5,8	6,4	7	7,1	7,8	8	8,2	8,4	8,8	9,5	11	10	12,7
8 5/8	219,1	9,92			12,79			15,54		16,96	18,28	19,68		22,38	24,72			27,73	28,58		30,45	33,07	38,33		43,43
10	254	11,53	12,67	14,13	14,86	15,79	17,24	18,07	18,79	19,72	21,26	22,90	24,02	26,06											
10 ¾	273	12,40	13,64	15,21	15,99	17,00	18,56	19,45	20,23	21,23	22,89	24,65													
12	304,8			17,00	17,87	19,00	20,75	21,75	22,62	23,74	25,60	27,58	28,94	31,40		35,20		38,98							
12 ¾	323,9	14,73		18,07	19,01	20,20	22,07	23,13	24,05	25,25	27,23	29,34	30,78	33,41		37,46		41,48		43,81	45,62	49,61	57,65		65,48
14	355,6			19,86	20,89	22,21	24,26	25,43	26,45	27,76	29,94	32,26	33,86	36,75		41,21		45,65			50,22	54,62			
16	406,4			22,37	23,90	25,42	27,76	29,10	30,27	30,61	34,28	36,95	38,77	42,09		47,22		52,32			57,57	62,64	72,86	77,87	82,85
18	456				26,92			32,78		35,80		41,63	43,69	47,44		53,23		58,99			64,93	70,65	82,23	87,89	93,54
20	508				29,93			36,46		39,82		46,31		52,78		59,23		65,66			72,28	78,67	91,59	97,92	104,23
22	559							40,13		43,84		50,99		58,13		65,24		72,34				86,69	100,96	107,95	114,92
24	610							43,81		47,86		55,67		63,47		71,25						94,71	110,32	117,98	125,62

Note: Other dimensions are available. 1 lb/ft is equal to 1,49 kg/m

Mechanical properties

	Grade 1	Grade 2	Grade 3
Tensile strength, min, psi (MPa)	50 000 (345)	60 000 (415)	66 000 (455)
Yield strength, min, psi (MPa)	30 000 (205)	35 000 (240)	45 000 (310)
Basic min. elongation for nominal wall thickness 5/16 in (7,9 mm) or more: Elongation in 8 in. (203,2 mm) , min, %	18	14	No requirement
Elongation in 2 in. (50,8 mm), min, %	30	25	20

LINE PIPES

Odelya® Carbon Line Pipes are widely used for conveyance of water, gas, and petro-chemical products meeting strict requirements of international steel production standards as well (API, ASTM, EN, ISO).

Odelya® Line Pipes are manufactured by Electrical-Resistance Welding (ERW) process or by submerged-arc welding (SAW) process. Using High Frequency Induction or Conduction welding in ERW process with modern equipment guarantees high quality longitudinal weld. Line Pipes of Odelya are also manufactured using submerged arc welding process for larger diameter pipes with longitudinal (LSAW) or spiral (SSAW) seams.

Manufacturing process of Odelya® Line Pipes is under continuous precise control in order to prevent or immediately repair defects, ensuring excellent quality and superior properties of the entire pipe with minimum tolerances. Quality control includes mandatory and optional tests during and after produc-tion process ensuring that the steel tube meets all requirements of steel chemical composition, mechani-cal properties and dimensional characteristics. Furthermore, according to the related standards all NDT and destructive tests are performed on weld area and pipe body.

Production Range for Odelya® Line Pipes

SAW (Spiral or Longitudinal)	Outside Diameter: 219,1 – 3566 mm (8,626 – 140 inch) Wall thickness: 3 – 40 mm (0,118 – 1.575 inch)
ERW (Longitudinal)	Outside Diameter: 17,1 – 610 mm (0,675 – 24 inch) Wall thickness: 1,4 – 12,7 mm (0,055 – 0,500 inch)

Outside diameter and wall thickness of Odelya® Line Pipes are determined by MAOP – maximum operat-ing pressure, which is based on published industry standards and regulations for safe and proper pipeline operation. Additionally, pipe's ultimate diameter is designed according to the required liquid or gas volume to be delivered, as well as the pressure, which the pipe must withstand.

Odelya® SAW and ERW Line pipes are delivered with chosen surface conditions: bare/black, hot-dip galvanized, oiled, painted, uncoated or coated. In accordance with the special requirements of each project and operational conditions, customized solutions for coating and lining systems can be applied to get satisfactory results. Furthermore, using high-strength carbon steel and modern manufacturing and quality control equipment make Odelya® Line Pipes strong, durable, offering safety usage in long-term

Oil and Gas Line Pipes

Odelya® Gas and Oil (petrochemical products) Pipelines are safe and reliable for a long-term operation with its superior quality and high mechanical properties. Odelya® Natural Gas and Petrol Line Pipes are manufactured according to API 5L, EN 10208 and ASTM A 53 standard's specifications with closest tolerances.

For each project, more cost-saving and energy-efficient solutions can be found, as Odelya offers variety of dimensions, reliable joining systems, delivery conditions and protective external and internal coating systems. Note: Please refer to **"External Coating and Internal Lining"** section (page 46) (click).

Line Pipes for Water Conveyance

Odelya® Water Line pipes are suitable for supply and distribution of drinking water, industrial water and wastewater treatments. These pipes for pipelines are manufactured according to strict requirements of used standards: AWWA C 200, EN 10224, EN 10255, EN 10217, ASTM A 53, ISO 65 and other standards for water transmission.

Wide range of steel grades, sizes, delivery conditions, joining techniques proposed by Odelya, create possibility to find most reliable and economical solutions for intended application. Protective coatings and linings to be applied on Odelya® Water Line Pipes can be chosen for high corrosion resistance and impact resistance. Moreover, applied internal linings, which are required for potable water transportation, make it safe for human health.

ERW LINE PIPES

Odelya® ERW High Frequency Welded Steel Pipes for water / gas / oil conveyance are produced from hot rolled steel coils which are then formed cold and welded to connect two strip edges. High frequency current welding process is used along with continuous control in manufacturing of ERW pipelines to obtain high quality weld. Odelya® ERW line pipes have a pure and smooth surface, uniform thickness and high concentricity, meeting special requirements of each project. Furthermore, Odelya® ERW Pipelines can support heavy weights and due to its well mixed metallographic structure of the weld seam, these line pipes have excellent anti-press ability against even the most hostile conditions. Due to high capacity of manufacturing and minimized tolerances, Odelya® ERW project-oriented steel pipes are preferred as tailor-made customized solutions for prestigious piping projects around the world.

Application

Pipelines for construction and maintainance of offshore and onshore oil & gas pipelines, petrochemicals, as well as piping for cooling, heating, ventilation, water conveyance and structural elements along with tubes for general purposes.

Production Range

Outside Diameter: 21,3 – 610 mm (0,839 – 24 inch)

Wall thickness: 2 – 12,7 mm (0,079 – 1/2 inch)

Length: 6 – 18,3 m

Production Standards

API 5 L/ ISO 3183 PSL 1 and PSL 2
EN 10208-1 (DIN 2470-1/ DIN 1628)
EN 10208-2 (DIN 2470-2/ DIN 17172)
ASTM A 53 (BS 3601, DIN 1626/2458)
GOST 20295, GOST 10705 / GOST 10704

Material Quality

API 5L / ISO 3183 **PSL 1**	A 25, Gr A, Gr B, X42, X46, X52, X56, X60, X65, X70
API 5L / ISO 3183 **PSL 2**	Gr B, BM, X42M, X46M, X52M, X56M, X60M, X65M, X70M, X80M, BN, X42N, X46N, X52N, X56N, X60N
EN 10208-1/2	L210GA, L235GA, L245GA,L290GA, L360GA, L245NB, L290NB, L360NB, L415NB, L245MB, L290MB, L360MB, L415MB, L450MB, L485 MB
EN 10025	S235, S275, S355
DIN 17100	St 37, St 44 , St 52
DIN 2470-2 / DIN 17172	StE210.7; StE240.7; StE290.7; StE320.7; StE360.7
GOST 10705 / GOST 10704, GOST 20295	GOST 1050-08SP, 10SP, 20SP

Heat Treatment

Full body annealed for O.D. ranging from 21,3 to 168,3 mm and weld seam annealed for O.D. 114,3 – 610 mm.

Pipe-end & Pipe Joint Details

While the pipes are joined, the weld penetration and its strength are ensured through special furnishing process for plain-end, square-cut or bevelled, welded joint, flanged joint, cylindrical socket and spigot joints, spherical (belled) spigot and socked joint plain end for special coupling, butt welded and threaded-end pipe.

Surface Condition

Odelya ERW Line Pipes are delivered as bare, black/self-colored, oiled, black varnished, galvanised or coated (Epoxy lining and coating, 3-Layer Polyethylene (3LPE) and Polypropylene (3LPP) coating, Polyurethane (PU) coating, etc.).

Please see "External Coating and Internal Lining" section (page 46). (click)

QUALITY CONTROL

Odelya® ERW Line Pipes are manufactured under precise control; all required and specified tests are applied by using computerized technics and modern measurement equipment. Raw material control at the beginning of pipe manufacturing allows to avoid further defects; moreover, quality control during and after manufacturing of steel pipes prevents undesired defects, reassuring superior quality of finished product. Quality control tests may vary according to specifications of production standards and to requirements of further operation conditions.

Hydrostatic Test

Testing of leakage in the welded areas by high pressure water applies according to further application and requirements (Leak Tightness).

Non-Destructive Tests

EN 10208-1, EN 10208-2, U/S (EN 10246-8 Level U3), E/C (EN 10246-3 Level E2)

Eddy Current Test: Detection of the defects on the surface and testing quality of the weld and the material using electromagnetic device

Magnetic Flux Leakage: A powerful magnet is used to assure the absence of any corrosion or damaging on steel tubing by evaluating magnetic field 'leakage'.

Ultrasonic Test –Full Body & Weld-zone Ultrasonic Tests: Automatic ultrasonic rotary plant precisely detects flaws and monitors weld quality using high frequency sound waves. Online ultrasonic inspection ensures 100% flaw detection and its immediate elimination. Offline ultrasonic test, on the other hand, using horizontal and vertical flaw detection as well, evaluates different layers of welding zone and pipe-end.

Grain-size Control: Controlling the rate of metal grain's growing during its heating above recrystallization range.

Visual & Dimensional Inspection

Accurate information about dimensions and quality of tubes is provided using tape, caliper, ultrasonic device, gauge and cord.

Chemical Analysis

Spectral analysis of the chemical composition.

Mechanical & Technological Properties

Tensile test: Determining mechanical properties, such as yield strength, tensile strength, Young's module, deformation, elongation, strain hardening behavior, and reduction of sample.

Flattening test: Quality, strength and ductility of the weld and the tube is evaluated by pressure application.

Bending test: Evaluating ductility of the tubes and the welds to resist cracking or other surface irregularities during one continuous bend of the material.

Drift Expanding: Determining the durability of steel tubes to withstand heavy weights and pressure.

Weld Ductility test: Evaluation of welding zone ability to flatten without cracks or breaks until specified by standard degree.

Fracture Toughness test: Indicating the amount of stress required to cause brittle or ductile crack extension in a sample with preexisting flaw.

Metallographic Examination

Revealing the structure of metals and their alloys with light optical or scanning electron microscope.

Odelya® API 5L ERW Line Pipes for Oil and Gas Conveyance

Odelya® API 5L ERW Line Pipes are produced according to PSL 1 and PSL 2 levels, where PSL1 has standard quality level and PSL2 pipe has additional specified requirements of chemical composition and mechanical properties. Delivery conditions for Odelya® API 5L PSL 1 pipes are optional or according to the project requirements, for Odelya® API 5L PSL 2 tubes, on the other hand, delivery conditions are according to customer's requirements as specified in steel name. High Frequency Electrical Longitudinal Welding process is used to get superior quality weld on Odelya® Steel line pipes, which are produced from qualified raw material.

According to the agreement, jointers can be furnished as plain end, belled end, plain end for special coupling, or threaded end. Welded jointers are manufactured in relation with this standard's specifications.

Odelya® API 5L ERW Pipes with Regular Plain End

Outside Diameter		Wall Thickness & Mass per Unit Length, kg/m																																				
	inch	0,079	0,091	0,102	0,109	0,113	0,118	0,125	0,133	0,141	0,145	0,154	0,157	0,172	0,179	0,189	0,191	0,197	0,2	0,205	0,22	0,237	0,248	0,252	0,258	0,276	0,28	0,307	0,311	0,315	0,322	0,33	0,343	0,348	0,365	0,374	0,394	0,433	0,472
inch	mm	2	2,3	2,6	2,8	2,9	3	3,2	3,4	3,6	3,7	3,9	4	4,4	4,5	4,8	4,9	5	5,1	5,2	5,6	6	6,3	6,4	6,6	7	7,1	7,8	7,9	8	8,2	8,4	8,7	8,8	9,3	9,5	10	11	12
0.840	21,3	0,95	1,08	1,20	1,28	1,32	1,35	1,43	1,50	1,57	1,61	1,67	1,71																											
0.984	25	1,13	1,29	1,44	1,53	1,58	1,63	1,72	1,81	1,90	1,94	2,03	2,07																											
1.050	26,7	1,22	1,38	1,55	1,65	1,70	1,75	1,85	1,95	2,05	2,10	2,19	2,24																											
1.059	26,9	1,23	1,40	1,56	1,66	1,72	1,77	1,87	1,97	2,07	2,12	2,21	2,26																											
1.252	31,8	1,47	1,67	1,87	2,0	2,07	2,13	2,26	2,38	2,50	2,56	2,68	2,74	2,97	3,03	3,20	3,25	3,30	3,36	3,41	3,62	3,82																		
1.315	33,4	1,55	1,76	1,97	2,11	2,18	2,25	2,38	2,52	2,65	2,71	2,84	2,90	3,15	3,21	3,39	3,44	3,50	3,56	3,62	3,84	4,05																		
1.327	33,7		1,78	1,99	2,13	2,20	2,27	2,41	2,54	2,67	2,74	2,87	2,93	3,18	3,24	3,42	3,48	3,54	3,60	3,65	3,88	4,10																		
1.496	38		2,02	2,27	2,43	2,51	2,59	2,75	2,90	3,05	3,13	3,28	3,35	3,65	3,72	3,93	4,00	4,07	4,14	4,21	4,47	4,73																		
1.591	40,4		2,16	2,42	2,60	2,68	2,77	2,94	3,10	3,27	3,35	3,51	3,59	3,91	3,98	4,21	4,29	4,36	4,44	4,51	4,81	5,09																		
1.606	40,8		2,18	2,45	2,62	2,71	2,80	2,97	3,14	3,30	3,39	3,55	3,63	3,95	4,03	4,26	4,34	4,41	4,49	4,57	4,86	5,15																		
1.660	42,2		2,26	2,54	2,72	2,81	2,90	3,08	3,25	3,43	3,51	3,68	3,77	4,10	4,18	4,43	4,51	4,59	4,67	4,74	5,05	5,36	5,58	5,65	5,79	6,08														
1.90	48,3		2,61	2,93	3,14	3,25	3,35	3,56	3,76	3,97	4,07	4,27	4,37	4,76	4,86	5,15	5,24	5,34	5,43	5,53	5,90	6,26	6,53	6,61	6,79	7,13														
2	51			3,10	3,33	3,44	3,55	3,77	3,99	4,21	4,32	4,53	4,64	5,06	5,16	5,47	5,57	5,67	5,77	5,87	6,27	6,66	6,94	7,04	7,23	7,60														
2.244	57			3,49	3,74	3,87	3,99	4,25	4,49	4,74	4,86	5,11	5,23	5,71	5,83	6,18	6,30	6,41	6,53	6,64	7,10	7,55	7,88	7,99	8,20	8,63														
2.375	60,3			3,70	3,97	4,10	4,24	4,51	4,77	5,03	5,16	5,42	5,55	6,07	6,19	6,57	6,69	6,82	6,94	7,07	7,55	8,03	8,39	8,51	8,74	9,20														
2.5	63,5			3,90	4,19	4,33	4,48	4,76	5,04	5,32	5,46	5,73	5,87	6,41	6,55	6,95	7,08	7,21	7,34	7,48	8,0	8,51	8,89	9,01	9,26	9,75														
2.756	70			4,32	4,64	4,80	4,96	5,27	5,58	5,89	6,05	6,36	6,51	7,12	7,27	7,72	7,87	8,01	8,16	8,31	8,89	9,47	9,90	10,04	10,32	10,88														
2.875	73			4,51	4,85	5,01	5,18	5,51	5,84	6,16	6,32	6,65	6,81	7,44	7,60	8,07	8,23	8,38	8,54	8,69	9,31	9,91	10,36	10,51	10,81	11,39														
3	76,1			4,71	5,06	5,23	5,41	5,75	6,10	6,44	6,61	6,94	7,11	7,78	7,95	8,44	8,60	8,77	8,93	9,09	9,74	10,37	10,84	11,0	11,37	11,93														
3.248	82,5			5,12	5,50	5,69	5,88	6,26	6,63	7,00	7,19	7,56	7,74	8,47	8,66	9,20	9,38	9,56	9,73	9,91	10,62	11,32	11,84	12,01	12,35	13,03														
3.5	88,9			5,53	5,95	6,15	6,35	6,76	7,17	7,57	7,77	8,17	8,37	9,17	9,37	9,95	10,15	10,34	10,54	10,73	11,50	12,27	12,83	13,02	13,39	14,14														
4.5	114,3					7,97	8,23	8,77	9,30	9,83	10,09	10,62	10,88	11,92	12,18	12,96	13,22	13,48	13,73	13,99	15,01	16,02	16,78	17,03	17,53	18,52	18,77	20,49	20,73	20,97	21,45	21,94								
5.5	139,7					9,78	10,11	10,77	11,43	12,08	12,41	13,06	13,39	14,68	15,0	15,97	16,29	16,61	16,93	17,25	18,52	19,78	20,72	21,04	21,66	22,91	23,22	25,37	25,68	25,98	26,59	27,20	28,11	28,41						
5.563	141,3					9,90	10,23	10,90	11,56	12,22	12,55	13,21	13,54	14,85	15,18	16,16	16,48	16,81	17,13	17,45	18,74	20,02	20,97	21,29	21,92	23,18	23,50	25,68	25,99	26,30	26,91	27,53	28,45	28,75						
6.260	159					11,16	11,54	12,29	13,05	13,80	14,17	14,92	15,29	16,77	17,14	18,25	18,62	18,99	19,36	19,72	21,18	22,64	23,72	24,08	24,80	26,24	26,60	29,08	29,44	29,79	30,49	31,20	32,25	32,59	34,33	35,02				
6.625	168,3							13,03	13,83	14,62	15,02	15,81	16,21	17,78	18,18	19,35	19,74	20,13	20,53	20,91	22,47	24,01	25,17	25,55	26,32	27,84	28,22	30,87	31,25	31,62	32,37	33,12	34,24	34,61	36,46	37,20				
8.625	219,1							17,04	18,09	19,13	19,65	20,70	21,22	23,30	23,81	25,37	25,88	26,40	26,91	27,43	29,48	31,53	33,06	33,57	34,59	36,61	37,12	40,64	41,14	41,65	42,65	43,65	45,14	45,64	48,12	49,10	51,56	56,45		
10,75	273,1									23,93	24,58	25,89	26,54	29,16	29,81	31,76	32,41	33,06	33,71	34,35	36,94	39,52	41,45	42,09	43,37	45,93	46,57	51,03	51,66	52,30	53,57	54,83	56,72	57,63	60,50	61,75	64,88	71,10	77,26	
12,75	323,9											30,78	31,55	34,67	35,44	37,77	38,55	39,32	40,09	40,87	43,96	47,04	49,34	50,11	51,64	54,70	55,47	60,80	61,56	62,32	63,84	65,35	67,62	68,38	72,15	73,65	77,41	84,88	92,30	
14	355,6											33,82	34,68	38,11	38,96	41,52	42,38	43,23	44,08	44,93	48,33	51,73	54,27	55,11	56,80	60,18	61,02	66,90	67,74	68,57	70,25	71,92	74,42	75,26	79,42	81,08	85,22	93,48	101,68	
16	406,4															47,54	48,51	49,49	50,47	51,45	55,35	59,24	62,16	63,13	65,07	68,94	69,91	76,67	77,63	78,60	80,52	82,44	85,32	86,28	91,07	92,98	97,75	107,26	116,71	
18	457,2																			57,96	62,36	66,76	70,05	71,15	73,34	77,71	78,81	86,44	87,53	88,62	90,79	92,97	96,22	97,31	102,72	104,88	110,28	121,04	131,74	
20	508																			64,48	69,38	74,28	77,94	79,16	81,61	86,48	87,70	96,21	97,43	98,64	101,07	103,49	107,12	108,33	114,37	116,78	122,81	134,82	146,78	
22	558,8																			70,99	76,39	81,79	85,84	87,18	89,87	95,25	96,59	105,98	107,32	108,66	111,34	114,01	118,02	119,35	126,02	128,68	135,33	148,60	161,81	
24	609,6																				83,41	89,31	93,73	95,20	98,14	104,02	105,49	115,76	117,22	118,68	121,61	124,53	128,92	130,38	137,67	140,59	147,86	162,38	176,84	

Chemical Composition

Odelya® API 5L PSL1 Pipes with Wall Thickness ≤ 25 mm (0,984 inch)

Steel Grade / Steel Name	C max, %	Mn max, %	P min, %	P max, %	S max, %
L175 or A25	0,21	0,60	-	0,030	0,030
L175P or A25P	0,21	0,60	0,045	0,080	0,030
L210 or A	0,22	0,90	-	0,030	0,030
L245 or B	0,26	1,20	-	0,030	0,030
L290 or X42	0,26	1,30	-	0,030	0,030
L320 or X46	0,26	1,40	-	0,030	0,030
L360 or X52	0,26	1,40	-	0,030	0,030
L390 or X56	0,26	1,40	-	0,030	0,030
L415 or X60	0,26	1,40	-	0,030	0,030
L450 or X65	0,26	1,45	-	0,030	0,030
L485 or X70	0,26	1,65	-	0,030	0,030

Note: For line pipes of which wall thickness is greater than 25 mm, the above table listing the chemical composition requirements might be applicable, unless otherwise specified by the purchaser. Other components of steel material are in percentage, specified by API 5L standard.

Note: Chemical composition of Odelya® ERW API 5L PSL2 pipes is identical with that of SAW Steel Pipes section, please refer to page 19 and 20 (click)

Mechanical Properties

Odelya® API 5L PSL 1 Tensile Tests Requirements

Pipe Grade	Body of ERW Pipes		Weld Seam of ERW Pipes
	Yield Strength $R_{t0,5}$, min, MPa (psi)	Tensile Strength R_m, min, MPa (psi)	Tensile Strength R_m, min, MPa (psi)
L175 or A25	175 (25 400)	310 (45 000)	310 (45 000)
L175P or A25P	175 (25 400)	310 (45 000)	310 (45 000)
L210 or A	210 (30 500)	335 (48 600)	335 (48 600)
L245 or B	245 (35 500)	415 (60 200)	415 (60 200)
L290 or X42	290 (42 100)	415 (60 200)	415 (60 200)
L320 or X46	320 (46 400)	435 (63 100)	435 (63 100)
L360 or X52	360 (52 200)	460 (66 700)	460 (66 700)
L390 or X56	390 (56 600)	490 (71 100)	490 (71 100)
L415 or X60	415 (60 200)	520 (75 400)	520 (75 400)
L450 or X65	450 (65 300)	535 (77 600)	535 (77 600)
L485 or X70	485 (70 300)	570 (82 700)	570 (82 700)

Note: Minimum percentage of elongation is determined using specified equation, as stated in API 5L specifications.

Note: Mechanical Properties of Odelya API 5L PSL 2 are identical with those of SAW Steel Pipes (page 19). (click)

Odelya® EN 10208 ERW Steel Line Pipes for Combustible Fluids

Odelya® EN 10208 ERW Pipelines are manufactured according to Part 1 and Part 2 technical delivery conditions. EN 10208-1 includes standard quality requirements for pipes of class A, respectively, EN 10208-2 includes more stringent quality and test requirements for pipes of class B. Odelya® EN 10208 Line Pipes are produced by cold forming or hot stretching with subsequent heat treatments, such as normalizing of entire pipe and normalizing, heat treatment or stress relieving of weld area.

Odelya® EN 10208 ERW Line Pipes

Outside Diameter		Wall Thickness & Mass per Unit Length, kg/m															
	inch	0,091	0,102	0,114	0,126	0,142	0,157	0,177	0,197	0,220	0,248	0,280	0,315	0,347	0,394	0,433	0,492
inch	**mm**	**2,3**	**2,6**	**2,9**	**3,2**	**3,6**	**4**	**4,5**	**5**	**5,6**	**6,3**	**7,1**	**8**	**8,8**	**10**	**11**	**12,5**
1,327	**33,7**	1,78	1,99	2,20	2,41	2,67	2,93	3,24	3,54	3,88	4,26	4,66	5,07	5,40	5,84		
1,660	**42,4**	2,27	2,55	2,82	3,09	3,44	3,79	4,21	4,61	5,08	5,61	6,18	6,79	7,29	7,99		
1,900	**48,3**	2,61	2,93	3,25	3,56	3,97	4,37	4,86	5,34	5,90	6,53	7,21	7,95	8,57	9,44	10,12	11,04
2,375	**60,3**	3,29	3,70	4,10	4,51	5,03	5,55	6,19	6,82	7,55	8,39	9,31	10,32	11,18	12,40	13,37	14,73
3,5	**88,9**	4,91	5,53	6,15	6,76	7,57	8,37	9,37	10,34	11,50	12,83	14,32	15,96	17,38	19,46	21,13	23,55
4,5	**114,3**	6,35	7,16	7,97	8,77	9,83	10,88	12,18	13,48	15,01	16,78	18,77	20,97	22,89	25,72	28,02	31,38
6,625	**168,3**			11,83	13,03	14,62	16,21	18,18	20,13	22,47	25,17	28,22	31,62	34,61	39,04	42,67	48,03
8,625	**219,1**				17,04	19,13	21,22	23,81	26,40	29,48	33,06	37,12	41,65	45,64	51,56	56,45	63,68
10,748	**273**					23,92	26,53	29,80	33,04	36,93	41,43	46,56	52,28	57,33	64,86	71,07	80,30
12,75	**323,9**						31,55	35,44	39,32	43,96	49,34	55,47	62,32	68,38	77,41	84,88	95,99
14	**355,6**							38,96	43,23	48,33	54,27	61,02	68,57	75,26	85,22	93,48	105,76
16	**406,4**							44,60	49,49	55,35	62,16	69,91	78,60	86,28	97,75	107,26	121,42
18	**457**								55,73	62,34	70,02	78,77	88,58	97,26	110,23	120,98	137,02
20	**508**									69,38	77,94	87,70	98,64	108,33	122,81	134,82	152,74
22	**559**									76,42	85,87	96,63	108,70	119,40	135,38	148,65	168,46
24	**610**									83,47	93,79	105,56	118,76	130,47	147,96	162,48	184,18

Note: Chemical composition and Mechanical properties of Odelya® EN 10208 Line Pipes are identical with those of SAW Line Pipes, please refere to page 21. (click)

Odelya® ASTM A 53 ERW Steel Pipes for Pipelines

Odelya® ASTM A 53 steel, black and hot-dipped, zinc-coated welded tubes for pipelines are manufactured as furnace-butt welded (Grade A) and electric-resistance welded (Grade A,B). Subsequent heat treatment is applied according to application requirements. Odelya® ASTM A 53 welded steel pipes are used for mechanical and pressure application, as well as for ordinary usage: steam, air, gas and water lines.

Odelya® ASTM A 53 Plain End and Threaded & Coupled Pipes

Nominal Bore (NB / NPS) Nominal Dia. (DN)		Outside Diameter (D)		Wall Thickness		Nominal Weight per Unit Length				Weight Class	Sch No	Test Pressure psi (MPa)			
						Plain End		Treaded & Coupled				Plain End		Treaded & Coupled	
inch	mm	inch	mm	inch	mm	lb/ft	kg/m	lb/ft	kg/m			Gr. A	Gr. B	Gr. A	Gr. B
1/2	15	0,840	**21,3**	0,109	**2,77**	0,85	1,27	0,86	1,27	STD	40	700(4800)	700(4800)	700(4800)	700(4800)
				0,147	**3,73**	1,09	1,62	1,09	1,62	XS	80	850(5900)	850(5900)	850(5900)	850(5900)
				0,188	**4,78**	1,31	1,95				160	900(6200)	900(6200)		
3/4	20	1,050	**26,7**	0,113	**2,87**	1,13	1,69	1,14	1,69	STD	40	700(4800)	700(4800)	700(4800)	700(4800)
				0,154	**3,91**	1,48	2,20	1,48	2,21	XS	80	850(5900)	850(5900)	850(5900)	850(5900)
1	25	1,315	**33,4**	0,133	**3,38**	1,68	2,50	1,69	2,50	SDT	40	700(4800)	700(4800)	700(4800)	700(4800)
				0,179	**4,55**	2,17	3,24	2,19	3,25	XS	80	850(5900)	850(5900)	850(5900)	850(5900)
				0,250	**6,35**	2,85	4,24				160	950(6500)	950(6500)		
1 1/4	32	1,660	**42,2**	0,140	**3,56**	2,27	3,39	2,28	3,40	STD	40	1200(8300)	1300(9000)	1000(6900)	1100(7600)
				0,191	**4,85**	3,00	4,47	3,03	4,49	XS	80	1800(12400)	1900(13100)	1500(10300)	1600(11000)
				0,250	**6,35**	3,77	5,61				160	1900(13100)	2000(13800)		
1 1/2	40	1,900	**48,3**	0,145	**3,68**	2,72	4,05	2,74	4,04	STD	40	1200(8300)	1300(9000)	1000(6900)	1100(7600)
				0,200	**5,08**	3,63	5,41	3,65	5,39	XS	80	1800(12400)	1900(13100)	1500(10300)	1600(11000)
2	50	2,375	**60,3**	0,154	**3,91**	3,66	5,44	3,68	5,46	STD	40	2300(15900)	2500(17200)	2300(15900	2500(17200)
				0,218	**5,54**	5,03	7,48	5,08	7,55	XS	80	2500(17200)	2500(17200)	2500(17200	2500(17200)
2 1/2	65	2,875	**73,0**	0,203	**5,16**	5,80	8,63	5,85	8,67	STD	40	2500(17200)	2500(17200)	2500(17200	2500(17200)
				0,276	**7,01**	7,67	11,41	7,75	11,52	XS	80	2500(17200)	2500(17200)	2500(17200	2500(17200)
3	80	3,500	**88,9**	0,125	**3,18**	4,51	6,72					1290(8900)	1500(1000)		
				0,156	**3,96**	5,58	8,29					1600(11000)	1870(12900)		
				0,188	**4,78**	6,66	9,92					1930(13330)	2260(16600)		
				0,216	**5,49**	7,58	11,29	7,68	11,35	STD	40	2220(15300)	2500(17200)	2200(15200	2500(17200)
				0,250	**6,35**	8,69	12,93					2500(17200)	2500(17200)		
				0,281	**7,14**	9,67	14,40					2500(17200)	2500(17200)		
				0,300	**7,62**	10,26	15,27	10,35	15,39	XS	80	2500(17200)	2500(17200)	2500(17200	2500(17200)
3 1/2	90	4,000	**101,6**	0,125	**3,18**	5,18	7,72					1120(7700)	1310(19000)		
				0,156	**3,96**	6,41	9,53					1400(6700)	1640(11300)		
				0,188	**4,78**	7,66	11,41					1690(11700)	1970(13600)		
				0,226	**5,74**	9,12	13,57	9,27	13,71	STD	40	2030(14000)	2370(16300)	2000(13800	2400(16500)
				0,250	**6,35**	10,02	14,92					2250(15500)	2500(17200)		
				0,281	**7,14**	11,17	16,63					2500(17200)	2500(17200)		
				0,318	**8,08**	12,52	18,63	12,67	18,82	XS	80	2800(19300)	2800(19300)	2800(19300	2800(19300)
4	100	4,500	**114,3**	0,125	**3,18**	5,85	8,71					1000(6900)	1170(8100)		
				0,156	**3,96**	7,24	10,78					1250(8600)	1460(10100)		
				0,188	**4,78**	8,67	12,91					1500(10300)	1750(12100)		
				0,219	**5,56**	10,02	14,91					1750(12100)	2040(14100)		
				0,237	**6,02**	10,80	16,07	10,92	16,23	STD	40	1900(13100)	2210(15200)	1900(13100)	2200(15200)
				0,250	**6,35**	11,36	16,90					2000(13800)	2330(16100)		
				0,281	**7,14**	12,67	18,87					2250(15100)	2620(18100)		
				0,312	**7,92**	13,97	20,78					2500(17200)	2800(19300)		
				0,337	**8,56**	15,00	22,32	15,20	22,60	XS	80	2700(18600)	2800(19300)		
5	125	5,563	**141,3**	0,156	**3,96**	9,02	13,41					1010(700)	1180(8100)		
				0,188	**4,78**	10,80	16,09					1220(8400)	1420(9800)		
				0,219	**5,56**	12,51	18,61					1420(9800)	1650(11400)		
				0,258	**6,55**	14,63	21,77	14,90	22,07	STD	40	1670(11500)	1950(13400)	1700(11700)	1900(13100)
				0,281	**7,14**	15,85	23,62					1820(12500)	2120(14600)		
				0,312	**7,92**	17,51	26,05					2020(13900)	2360(16300)		
				0,344	**8,74**	19,19	28,57					2230(15400)	2600(17900)		
				0,375	**9,52**	20,80	30,94	21,04	31,42	XS	80	2430(16800)	2800(19300)	2400(16500	2800(19300)
6	150	6,625	**168,3**	0,188	**4,78**	12,94	19,27					1020(7000)	1190(8200		
				0,219	**5,56**	15,00	22,31					1190(8200)	1390(9600)		
				0,250	**6,35**	17,04	25,36					1360(9400)	1580(10900)		
				0,280	**7,11**	18,99	28,26	19,34	28,58	STD	40	1520(10500)	1780(12300)	1500(10300)	1800(12400)
				0,312	**7,92**	21,06	31,32					1700(11700)	1980(13700)		
				0,344	**8,74**	23,10	34,39					1870(12900)	2180(15000)		
				0,375	**9,52**	25,05	37,28					2040(14100)	2380(16400)		

(To be continued. Please see the next page)

Odelya® ASTM A 53 Plain End and Threaded & Coupled Pipes) (continued)

Nominal Bore (NB / NPS) / Nominal Dia. (DN)		Outside Diameter (D)		Wall Thickness		Nominal Weight per Unit Length				Weight Class	Sch No	Test Pressure psi (MPa)			
						Plain End		Treaded & Coupled				Plain End		Treaded & Coupled	
inch	mm	inch	mm	inch	mm	lb/ft	kg/m	lb/ft	kg/m			Gr. A	Gr. B	Gr. A	Gr. B
				0,432	**10,97**	28,60	42,56	28,88	43,05	XS	80	2350(16200)	2740(18900)	2300(15900	2700(18600)
8	200	8,625	**219,1**	0,188	**4,78**	16,96	25,26					7800(5400)	920(6300)		
				0,203	**5,16**	18,28	27,22					850(5900)	1000(6900)		
				0,219	**5,56**	19,68	29,28					910(6300)	1070(7400)		
				0,250	**6,35**	22,38	33,31				20	1040(7200)	1220(8400)		
				0,277	**7,04**	24,72	36,31	25,53	38,07		30	1160(7800)	1350(9300)	1200(8300)	1300(9000)
				0,312	**7,92**	27,73	41,24					1300(9000)	1520(10500)		
				0,322	**8,18**	28,58	42,55	29,35	43,73	STD	40	1340(9200)	1570(10800)	1300(9000)	1600(11000)
				0,344	**8,74**	30,45	45,34					1440(9900)	1680(11600)		
				0,375	**9,52**	33,07	49,20					1570(10800)	1830(12600)		
				0,406	**10,31**	35,67	53,08				60	1700(11700)	2000(13800)		
				0,438	**11,13**	38,33	57,08					1830(12600)	2130(14700)		
				0,500	**12,70**	43,43	64,64	44,00	65,41	XS	80	2090(14400)	2430(16800)	2100(14500)	2400(16500)
10	250	10,750	**273,0**	0,188	**4,78**	21,23	31,62					630(4300)	730(5000)		
				0,203	**5,16**	22,89	34,08					680(4700)	800(5500)		
				0,219	**5,56**	24,65	36,67					730(5000)	860(5900)		
				0,250	**6,35**	28,06	41,75				20	840(5800)	980(6800)		
				0,279	**7,09**	31,23	46,49	32,33	48,80			930(6400)	1090(7500)	950(6500)	1100(7600)
				0,307	**7,80**	34,27	51,01	35,33	53,27		30	1030(7100)	1200(8300)	1000(6900)	1200(8300)
				0,344	**8,74**	38,27	56,96					1150(7900)	1340(9200)		
				0,365	**9,27**	40,52	60,29	41,49	63,36	STD	40	1220(8400)	1430(9900)	1200(8300)	1400(9700)
				0,438	**11,13**	48,28	71,87					1470(10100)	1710(11800)		
				0,500	**12,70**	54,79	81,52	55,55	83,17	XS	60	1670(11500)	1950(13400)	1700(11700)	2000(13800)
12	300	12,750	**323,8**	0,203	**5,16**	27,23	40,55					570(3900)	670(4600)		
				0,219	**5,56**	29,34	43,63					620(4300)	720(5000)		
				0,250	**6,35**	33,41	49,71				20	710(4900)	820(5700)		
				0,281	**7,14**	37,46	55,75					790(5400)	930(6400)		
				0,312	**7,92**	41,48	61,69					880(6100)	1030(7100)		
				0,330	**8,38**	43,81	65,18	45,47	67,72		30	930(6400)	1090(7500)	950(6500)	1100(7600)
				0,344	**8,74**	45,62	67,90					970(6700)	1130(7800)		
				0,375	**9,52**	49,61	73,78	51,28	76,21	STD		1060(7300)	1240(8500)	1100(7600)	1200(8300)
				0,406	**10,31**	53,57	79,70				40	1150(7900)	1240(8500)		
				0,438	**11,13**	57,65	85,82					1240(85009	1440(9900)		
				0,500	**12,70**	65,48	97,43	66,91	99,40	XS		1410(9700)	1650(11400)	1400(9700)	1600(11000)
14	350	14,000	**355,6**	0,210	**5,33**	30,96	46,04					540(3700)	630(4300)		
				0,219	**5,56**	32,26	47,99					560(3900)	660(4500)		
				0,250	**6,35**	36,75	54,69				10	640(4400)	750(5200)		
				0,281	**7,14**	41,21	61,35					720(5000)	940(6500)		
				0,312	**7,92**	45,65	67,90				20	800(5500)	940(6500)		
				0,344	**8,74**	50,22	74,76					880(6100)	1030(7100)		
				0,375	**9,52**	54,62	81,25			STD	30	960(6600)	1120(7700)		
				0,438	**11,13**	63,50	94,55				40	1130(7800)	1310(9000)		
				0,469	**11,91**	67,84	100,94					1210(8300)	1410(9700)		
				0,500	**12,70**	72,16	107,39			XS		1290(8900)	1500(10300)		
16	400	16,000	**406,4**	0,219	**5,56**	36,95	54,96					490(3400)	570(3900)		
				0,250	**6,35**	42,09	62,64				10	560(3900)	660(4500)		
				0,281	**7,14**	47,22	70,30					630(4300)	740(5100)		
				0,312	**7,92**	52,32	77,83				20	700(4800)	820(5700)		
				0,344	**8,74**	57,57	85,71					770(5300)	900(6200)		
				0,375	**9,52**	62,64	93,17			STD	30	840(5800)	980(6800)		
				0,438	**11,13**	72,86	108,49					990(6800)	1150(7900)		
				0,469	**11,91**	77,87	115,86					1060(7300)	1230(8500)		
				0,500	**12,70**	82,85	123,30			XS	40	1120(7700)	1310(9000)		
18	450	18,000	**457**	0,250	**6,35**	47,44	70,60				10	500(3400)	580(4000)		
				0,281	**7,14**	53,23	79,24					560(3900)	660(4500)		
				0,312	**7,92**	58,99	87,75				20	620(4300)	730(5000)		
				0,344	**8,74**	64,93	96,66					690(4800)	800(5500)		
				0,375	**9,52**	70,65	105,10			STD		750(5200)	880(6100)		
				0,406	**10,31**	76,36	113,62					810(5600)	950(6500)		
				0,469	**11,91**	87,89	130,78					940(6500)	1090(7500)		
				0,500	**12,70**	93,54	139,20			XS		1000(6900)	1170(8100)		
20	500	20,000	**508**	0,250	**6,35**	52,78	78,55				10	450(3100)	520(3600)		
				0,281	**7,14**	59,23	88,19					510(3500)	590(4100)		
				0,312	**7,92**	65,66	97,67					560(3900)	660(4500)		
				0,344	**8,74**	72,28	107,60					620(4300)	720(5000)		
				0,375	**9,52**	78,67	117,02			STD	20	680(4700)	790(5400)		
				0,406	**10,31**	84,04	126,53					730(5000)	850(5900)		
				0,438	**11,13**	91,59	136,37					790(5400)	920(6300)		
				0,469	**11,91**	97,92	145,70					850(5900)	950(6500)		
				0,500	**12,70**	104,23	155,12			XS	30	900(6200)	1050(7200)		
24	600	24,000	**610**	0,250	**6,35**	63,47	94,46				10	380(2600)	440(3000)		
				0,281	**7,14**	71,25	106,08					420(2900)	490(3400)		
				0,312	**7,92**	79,01	117,51					470(3200)	550(3800)		
				0,344	**8,74**	86,99	129,50					520(3600)	600(4100)		
				0,375	**9,52**	94,71	140,88			STD	20	560(3900)	660(4500)		
				0,406	**10,31**	102,40	152,37					610(4200)	710(4900)		
				0,438	**11,13**	110,32	164,26					660(4500)	770(5300)		
				0,469	**11,91**	117,98	175,54					700(4800)	820(5700)		
				0,500	**12,70**	125,61	186,94			XS		750(5200)	880(6100)		

Chemical Composition

Steel Name	Carbon max,%	Manganese max,%	Phosphorus max,%	Sulfur max,%	Copper[A] max,%	Nickel[A] max,%	Cromium[A] max,%	Molybdenum[A] max,%	Vanadium[A] max,%
Type E (electric resistance welded pipe)									
Grade A	0,25	0,95	0,05	0,045	0,50	0,40	0,40	0,15	0,08
Grade B	0,30	1,20	0,05	0,045	0,50	0,40	0,40	0,15	0,08
Type F (furnace butt welded pipe)									
Grade A	0,30	1,20	0,05	0,045	0,40	0,40	0,40	0,15	0,08

[A] The total composition of those five elements should not be more than 1%.

Mechanical Properties

Steel Grade	Yield Strength, min psi (Mpa)	Tensile Strength, min psi (Mpa)	Elongation A min. (%) Longitudinal / Transverse
Grade A	30 000 (205)	48 000 (330)	27 / 25
Grade B	35 000 (240)	60 000 (415)	21 / 19

Note: The minimum elongation should be determined for each combination of tension test sample and specified minimum tensile strength.

EXTERNAL COATING & INTERNAL LINING

Some environmental factors, such as air, soil, water and chemical substances may affect steel tubing adversely during its long-term operation, and as a result, corrosion and other defects may be caused. Odelya® offers a wide range of high performance coating and lining protection systems to protect our steel pipes from external corrosive agents and to exclude mechanical and chemical interactions with its surfaces.
Furthermore, Odelya® Line Pipes for potable water are internally coated with safe for human consump-tion lining materials.
Odelya® Coating Systems can be customized specially for the require-ments of project, providing cost-effective and durable solutions. All coating quality tests are applied accord-ing to the requirements of relating standards and pipe application, thus, Odelya® Steel Pipes have longer lifetime and higher performance.

SURFACE PREPARATION

Before coating application, the surface of Odelya® Pipes must be perfectly clean of impurities. External and internal surfaces of Odelya® Welded Steel Tube are shot-blasted according required standard degree of clearness and roughness level, and according to subsequent coating type.
ISO 8501-1, ISO 8502-3, ISO 8503-1, SA 2, SA 2 ½, SA 3 (SIS 55900, ISO 8501, DIN 55928).

3 Layer Polyethylene External Coating (3LPE): AWWA C215, EN ISO 21809-1, DIN 30670 (UNI 9099), CSA Z 245-20, TS 5139, NF A 49-710

First layer of high performance fusion bonded epoxy (FBE) is applied on shot blasted and heated steel pipe by extrusion / electrostatic process for proper cathodic bonding. Extruded copolymer adhesive layer is further applied by wrapping on the surface of rotating pipe and pressed by a roller, making proper adhesion between primer and outer layer. Finally, the last layer of polyethylene is applied on rotating tube by extrusion method in preferred thickness according to pipeline application.

PE Coating is a perfect solution for underground line pipes, as density of the PE layer may be chosen from low density (operating temperature up to 60°C) to high density (operating temperature between -60 °C and 80 °C).
Odelya® 3LPE coated petroleum, gas and water line pipes have a long lifetime with excellent corrosion protection due to its aging, impact and cathodic disbondment resistance. 3 Layer Polyethylene Coaling is a very effective type of coating with superior adhesion to the steel as it guarantees 100% protection of welding zone, high mechanical strength, good flexibility and inability to water penetration.

3 Layer Polypropylene External Coating (3LPP): AWWA C 215, EN ISO 21809-1, DIN 30678, NF A 49-711

3 Layer Polypropylene Coating is applied by the similar process as 3 Layer Polyethylene Coating using proper fusion-bonded powder epoxy as a primer layer and wrapped with protective polypropylene layer, bonded together with copolymer adhesive.

Odelya® 3LPP coated line pipes have superior mechanical properties with excellent integrity of the coating system for corrosion and impact protection even in high temperature operating conditions.
3-LPP coating can be applied with various thicknesses for unique project specifications and application's requirements.

EPOXY COATING: API RP5L2 (NFA 49-709), API RP 5L7

Odelya® Liquid and Fusion Bonded Epoxy has a wide usage due to its mechanical and chemical properties, which provides long-term corrosion protection and cathodic protection. Epoxy coating provides a smooth surface, comparing to the other coating systems, this capability makes epoxy coatings ideal and safe for usage in potable water conveyance line pipes with high flow velocity. Furthermore, Odelya® epoxy is resistant to corrosive environment and has excellent flexibility with impact resistance.

Fusion Bonded Epoxy (FBE) Coating: AWWA C213, CSA Z 245-20, NACE RP 0394

Fusion-bond epoxy powder coating is applied by electrostatic process by proper bonding of epoxy powder to shot blasted and then heated steel tube. FBE coating process is widely used due to its economic application to all sizes of line pipes and excellent cathodic disbondment for higher and longer corrosion protection. Fusion bonded epoxy coating is a reasonable solution for oil and gas pipes, especially for underground pipelines, where corrosion is inevitable.

Dual Layer Abrasion Resistant Fusion-Bonded Epoxy (FBE) External Coating:
AWWA C213, CSA Z245-20, NACE RP 0394
Dual Layer FBE coating provides excellent physical properties with impact and abrasion resistance of oil, gas and waterworks pipelines during transportation, installation and utilization. Furthermore, Odelya® Dual Layer FBE coated pipes enhance higher operating temperature capabilities (up to 110°C).

LIQUID EPOXY: AWWA C210, EN 10289, BS 5493 (ISO 14713, ISO 12944)

Liquid Epoxy Coating is made by mixing a resin with the hardener. Liquid epoxy coated line pipes have superior properties against cathodic disbondance damage and water penetration. Surface preparation is an important stage of epoxy coating, proper clearness and roughness is obtained by shot blasting. Internal or external epoxy coatings are applied hot or cold by airless-spray method according to related standards or further application.

Liquid Internal Epoxy Coatings: AWWA C210, EN 10339

Liquid epoxy linings are mainly used in conveyance of water, sewage, chemical and petrochemical products and for every specific application there is a possibility to choose the grades of coating and its thickness. Odelya® Liquid ID Coated pipelines are flexible, chemically stable and are resistant to gases and abrasion.

Flow Efficiency Internal Epoxy Coating: API RP 5L2

Flow Efficiency Internal Epoxy Coating is a worldwide preferred type of liquid solvent-based coating for high-pressure gas transportation used to reduce roughness of the pipe wall to improve gas flow capacity with less compressor power consumption. Thin flow efficiency coating layer gives not only corrosion protection of the tube, but also gives economic advantages, decreasing outside diameter in the design stage to reach the same flow capacity.

Solvent Free Internal Epoxy Coating: AWWA C 210

Solvent Free Internal Epoxy Coating assures high corrosion protection for drinking and fresh water line pipes. Therefore, using solvent free epoxy resins for potable line pipes is safe for human health.

Liquid External Epoxy Coatings: AWWA C210, EN 10289

Liquid External Epoxy Coatings are perfect for many applications and for line pipes operating in high temperatures and in aggressive external atmosphere conditions. Liquid epoxy coated line pipes are adequately protected from soil and sea water corrosion due to its excellent mechanical properties and flexibility.

Glass Flake Epoxy

Odelya® Glass Flake Epoxy is reinforced, abrasion and impact-resistant, and provides high solids epoxy mastic coating, which can be applied in high film thickness. Furthermore, Odelya Glass Flake Epoxy gives excellent corrosion protection both in salt and fresh water, and therefore, it is widely used for piling pipes operating with contact of sea water.

Coal Tar Epoxy Coating

Odelya® Coal Tar Epoxy Coating has a coal tar pitch added to epoxy resin and may be applied in one coat at high film thickness. Coal-tar Epoxy coating is used for chemical waste, sewage underground pipes and tanks, for marine structures, irrigation pipes, etc. This type of coating has excellent chemical, alkali solutions, acids and water resistance, combined with higher strength and flexibility if compared to regular epoxies.

Cement Mortar Lining: AWWA C 205 (DIN 2614), EN 10298 (DIN 2880), NFA 49-701

Cement Mortar Internal Coating is perfectly suitable for corrosion protection of potable water supply line pipes, as well as for sewage systems. Chemical composition of natural raw materials (cement and silica sand) contacting with drinkable water doesn't have any negative effect on human health.
Cement Mortar Coating is applied on shot blasted inner surface of rotating with a high centrifugal force pipe by spraying method. Cement Lining is widely used due to its high adhesion to the steel, surface smoothness and economical environmentally friendly technology. Additionally, cement mortar lining is resistant to cathodic disbondment and abrasion, therefore the flow rate is high for any fluids.

Bitumen and Coal Tar Enamel Coatings: EN 10300 (BS 4147), ISO 5256, DIN 30673, AWWA C 210, AWWA C 203, BS 4164

Odelya® Bitumen (Asphalt) Enamel and Coal-Tar Enamel Coatings are made of petroleum asphalt or coal tar pitch, and are available for inner or outer surfaces of all sizes of tubes. While internal bituminous and coal tar enamels are applied by centrifugal method, external coatings, on the other hand, are applied by wrapping method. Fiber-glass felt is soaked in bituminous or coal tar mixture and is wrapped on blasted and primed painted surface, which provides a perfect adhesion between the pipe surface and the layer of coating.

Polyurethane Coating: AWWA C222, BS EN 10290, BS 5493 (ISO 12944)

Polyurethane based paint is applied hot directly on prepared surface of the line pipe using airless spraying equipment. Polyurethane external coating is used for line pipes laying underground or in seawater environment, as well as for steel tubes exposed to the atmosphere conditions. Polyurethane coated steel pipes possess high mechanical properties with permanent elasticity; impact, cathodic disbondment and corrosion resistance.

Concrete Weight Coating: DVGW GW 340

Odelya® Concrete Weight Coating is using for providing negative buoyancy and superior mechanical protection for line pipes in seawater, river and other wet environments. Additionally, Concrete weight coating (CWC) is applied for offshore pipelines, pipelines in river and road crossing applications. Concrete coating is applied on bare tube or on protective coating layer of the small or large size pipe by impinging process for proper and strong bonding. According to specified requirements of further application, thickness and densities of concrete coating can be chosen for better protection and long-term operating performance.

LINING AND COATING QUALITY CONTROL

Odelya® Coated Pipes show high performance in a long-term operation, selected coating systems are specifically applied for every application field. Moreover, superior quality is provided as the coating process is under precise control, which starts from materials tests and continues until all required tests are done on applied coating. For every coating type of Odelya® Carbon Steel Pipes there are mandatory and optional quality tests, applied according to the coating type, related standard and further application conditions.

Quality control tests of Odelya® Coated Pipes include surface preparation tests, qualification of applied coating materials and final tests on applied and hardened coating film or layer.

Surface Quality and Cleanliness Test

Surface Roughness

Dust Contamination Test

Sieve Analysis

Density Test of Adhesive

Polyolefin Resin and Epoxy Powder Testing

Chemicals and Hot Water Immersion (soak) Test

Water Vapor Transmission

Penetration Resistance

Impact Resistance

Chemical Strength Test

Electrical Insulation Resistance (dielectric strength)

Adhesive and Polyolefin Melt Flow Rate Test

Gel Time Determination

Bending Test

Methyl Ethyl Ketone (MEK) Rasping Test

Compressive and Flexural Strength Test of Cement Mortar

Thermal Analysis of Epoxy and Cured Epoxy Coating Film (DSC)

UV Ageing Test and Thermal Ageing (stability) Test

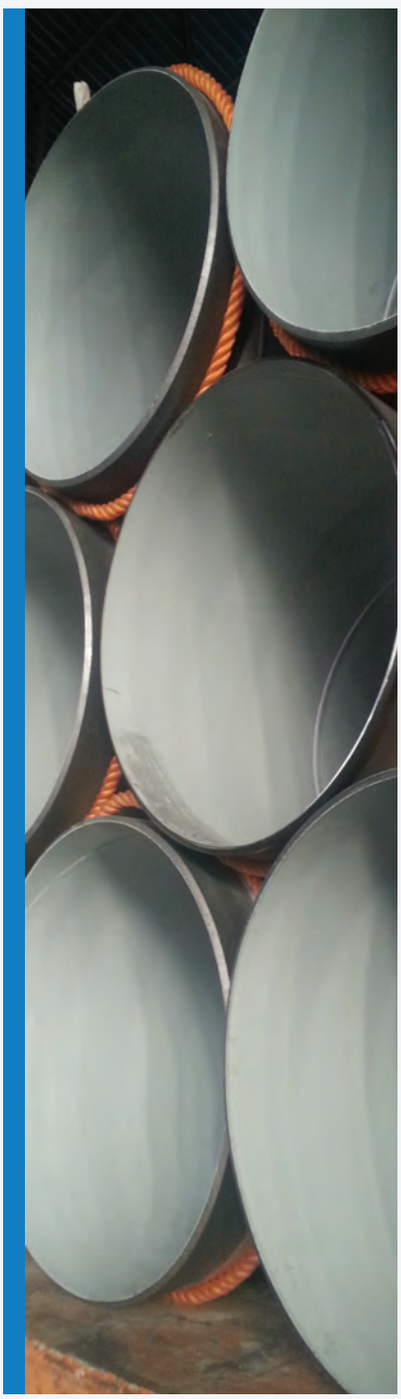
Sand / Cement and Water/
Cement Ratio Test and pH Test of Fresh Mortar Material

Indentation Hardness Test

Impact Strength Test

Flexibility Test

Elongation Percentage Test of Polyolefin Resin



Coating Appearance: Coated steel pipes are visually inspected to detect flaws, such as bubbles, cracks, wrinkles, voids, blisters, pinholes and any contamination.

Coating Thickness Measuring: The thickness of applied coating film is measured for compliance with related standard requirements and for compliance with required thickness, specified by purchaser.

Electrical Inspection for Continuity – Holiday Test: Coating is tested using electrical holiday detection equipment to detect any discontinuities (holidays), such as thin spots, voids, pinholes, foreign inclusions and any flaws, which are not mainly visible.

Adhesion Test – Coating Bond Strength Test: Protective coating system is tested to assure proper bonding (adhesion) of a coating layer to the steel surface according to the standards and application environment. The adhesion test measures required tensile force to make a flaw on coating sample (resistance to removal method), and, using pull - off method, bending procedure allows inspecting whether coating film peeled or flacked off the pipe surface. (X - Cut Bond Strength Test, V - Cut Bond Strength Test)

Cathodic Disbondment Resissance Test: Cathodic disbondment occurs as a loss of coating adhesion, which seals the coating system with the pipe surface. Cathodic disbondment test is evaluating the coating's long-term performance and ability to protect the steel pipe of corrosion even under harsh environmental conditions (underground, underwater).

PRE-INSULATED PIPES

Odelya provides wide range of high quality Pre-insulated Piping Systems, which are used to prevent heat transmission between transported product and surrounding environment. As geothermal pipes consist of three main components, steel pipe, polyurethane foam and outer layer of high density polyethylene (HDPE), excellent mechanical properties and protection of piping system is reassured.
There are many advantages of using pipeline with heat insulation in district heating or cooling systems, solar energy industries, biomass, geothermal heating, etc., even in the hardest environmental conditions. Thus, Odelya® Pre-insulated tubing creates economical and modern solutions for each project and its environment, meeting requirements of coldest or hottest operating conditions.

Odelya® Pre-insulated Steel Tubes are carefully manufactured according to the strict requirements of production standard's specifications, thus, long-term operation life is assured (min 30 years for some temperatures). Moreover, Polyurethane Foam (PUF), which is used in Odelya® geothermal piping systems, is an optimum insulation material. Due to its porosity and consistency, PUF minimizes heat loses.

Furthermore, reduced cost of maintenance and using compensators, make Odelya® Distinct Heating / Cooling systems cost-efficient and reliable in many aspects. As HDPE outer layer creates water-proof protection, the line pipe is protected against corrosion, cathodic disbondance, impact, chemical reactions and other environmental factors. In addition, high quality of Odelya® Pre-insulated pipes and fittings provide equally distributed and optimal heat isolation at every point of piping network.

Application

Odelya® Pipes in Pipe Insulation have operating temperature from -200°C to +315°C and are used in many industrial, commercial and domestic applications. Due to their cost-efficient and energy saving properties, Odelya® Pre-insulated pipes are ideal for district heating / cooling systems, greenhouse heating, cogeneration or cooling plants, potable water conveyance, drainage or waste water systems, corrosive chemical pipes, geothermal water pipes, agricultural applications, chilled water mains and oil, steam, gas and marine industries, etc.

District Heating or Cooling Networks

Odelya® Local Heating and Cooling Systems create modern, reliable and safe solutions, which are economical and easy-to-install even in the most difficult local conditions. Regional transportation of variable hot or cold liquids is efficient as used pre-insulated pipes are flexible and can be maintained quickly and easily around corners and obstacles of building structures. Odelya's practical solutions in distinct heating and cooling networks are ideal in hotel complexes, swimming pools, private houses, multi storage buildings and industrial facilities, as the liquid temperature inside the pipeline remains stable.

Marine industry

Odelya® Pre-insulated Pipes are widely used in marine industry, as its protective properties and temperature stabilization are ideal solution in the environment, where steel tubes are exposed to air, wind, seawater and changing outside temperatures. Consequently, Odelya® pre-insulated steel pipes for carrying gas or fluids in marine industry are specially designed according to each application and environmental conditions.

Industry

For industrial applications Odelya® Pre-insulated Pipes basically consist of four materials. Besides to the bearing steel pipe, polyurethane foam (PUF) and HDPE layer, there is also a middle isolation layer of glass wool to provide better performance in industrial projects. Operating temperature: -120°C to +350°C.

Petrol and Gas

Odelya® Pre-insulated Pipes for petrol and gas projects are carefully selected in terms of raw materials and applied quality tests as generally there are severe conditions in terms of temperature (up to -200°C) and pressure. Therefore, Odelya® pre-insulated tubes are efficient, durable and easy to maintain in pipe systems for conveyance crude oil and liquefied gases (LHG, LEG, LPG, etc.).

Pre-Insulated Bonded Pipes

Production Standard: EN 253

Nominal Diameter (service pipe): 15 - 1200 mm

Length: 6 m standard, can be supplied 8 - 12 m

TS EN 448 Pre-insulated Bonded fittings

Pre-Insulated T-Fittings: straight T-pieces, Parallel T-pieces and T-pieces of 45°branch

Production Standard: EN 448

Nominal Diameter (service pipe): 20 – 1200 mm

Length: L1 1000 – 2500 mm; L2 1000 – 2000 mm

Pre-Insulated Elbows 45°and 90°

Production Standard: EN 448

Nominal Diameter (service pipe): 25 – 1200 mm

Length: 1000 – 2000 mm (other lengths up on request)

Pre-insulated Reducers

Production Standard: EN 448

Nominal Diameter (service pipe): 25 – 1200 mm

Length: 1500 mm

Pre-insulated Anchors

Production Standard: EN 448

Nominal Diameter (service pipe): 20 – 1200 mm

Length: 2000 – 2500 mm

Pre-insulated Expansion Joints

Nominal Diameter (service pipe): 40 – 800 mm

Related Products

Compensators: 30-60-90-120 mm expansion

Pre-insulated Bonded valves (EN 488)

Joint Assembly for Pre-insulated Bonded Pipes (EN 489)

Main Components

Carrying Pipe (Service Pipe/Main Pipe)

The inner carrying pipe or "service pipe" of Odelya® Pre-insulated Pipes is generally a welded steel pipe (ERW or SAW, SSAW), which is manufactured according to further application conditions, operation temperatures and the product to be transferred. Moreover, Odelya® service pipes are produced according to the related international standards, such as ASTM A 53, ASTM A 106, API 5L and as a requirement for pre-insulated tubing, the bearing tubes must be in accordance to EN 253 quality standard. Respectively, steel tubes produced for Odelya® Pre-insulated Pipes are mainly in steel grade St 37 with wall thicknesses: standard weight, schedule 40 or extra strong.

Glass / Mineral Wool

In industrial usage of Odelya® Pre-insulated Pipes as a middle isolation layer between carrying pipe and polyurethane foam glass or mineral wool layer is used. This isolation layer is used for excellent performance of industrial type of pre-insulated pipes, which is aluminum foiled and fire resistance with density of 110 – 140 kg/m^3.

Polyurethane Foam (PUF)

The middle layer of Odelya® Pre-insulated pipes is an isolation material - Polyurethane foam with porous structure, which prevents heat loss and, on the other hand, maintains temperatures in cold environments, preventing freezing. Due to its good flow ability, adhesion, strength and flexibility, PUR isolation foam perfectly fills the gap between bearing pipe and extruded HDPE casing, with minimum percentage of bubbles or voids.
For industrial or standard application of Odelya® Pre-insulated Pipes, rigid plastic insulation (polyurethane) is used with density > 60 kg/m^3. Furthermore, Odelya® Pre-insulated Tubes are available at three insulation types: low temperature (LT) -200°C to +120°C, normal temperature (NT) -60°C to +140°C and high temperature (HT) +140°C to +315°C.

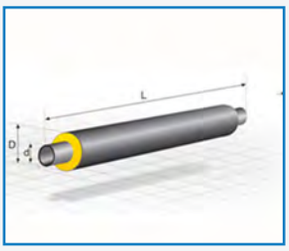
High Density Polyethylene Casing Pipe (HDPE)

High Density Polyethylene outer covering pipe is an ideal protective layer of Odelya® Pre-insulated Pipes, which is impact resistant, water resistant, salt and chemical resistant. Additionally, extruded HDPE black or white casing is UV resistant with high strength for long-term field operation. Odelya® Standard and Industrial Pre-insulated Pipes are covered with extruded polyethylene resin of high density > 940 kg/m^3, protecting the insulation layer from environmental conditions.

Odelya® Pre-Insulated Pipes Dimensions Tables

Odelya® EN 253 Standard (Straight) Pre-insulated Pipe

Steel Service Pipe				Casing Pipe	PUF	Pipe Length
Nominal Diameter		Outside Diameter d	Wall Thickness min	Outside Diameter D	Thickness	L
DN	inch	mm	mm	mm	mm	meter
15	½	21,3	2,0	75	24,65	6
20	¾	26,9	2,0	90	29,35	6
25	1	33,7	2,3	90	25,95	6
32	1 ¼	42,4	2,6	110	31,30	6
40	1 ½	48,3	2,6	110	28,35	6
50	2	60,3	2,9	125	29,85	6
65	2 ½	76,1	2,9	140	28,95	6 - 8
80	3	88,9	3,2	160	32,55	6 - 8
100	4	114,3	3,6	200	39,65	6 - 8 - 12
125	5	139,7	3,6	225	39,15	6 - 8 - 12
150	6	168,3	4,0	250	38,55	6 - 8 - 12
200	8	219,1	4,5	315	43,05	6 - 8 - 12
250	10	273	5,0	400	57,20	6 - 8 - 12
300	12	323,9	5,6	450	56,05	6 - 8 - 12
350	14	355,6	5,6	500	64,40	6 - 8 - 12
400	16	406,4	6,3	560	68,00	6 - 8 - 12
450	18	457,2	6,3	630	76,60	6 - 8 - 12
500	20	508	6,3	710	89,90	6 - 8 - 12
550	22	559	6,3	710	64,40	6 - 8 - 12
600	24	610	7,1	800	82,50	6 - 8 - 12
700	28	711	8,8	900	80,50	6 - 8 - 12
800	32	813	8,8	1000	77,50	6 - 8 - 12
900	36	914	10,0	1200	125,00	6 - 8 - 12
1000	40	1106	10,0	1200	74,00	6 - 8 - 12
1100	44	1118	10,0	1400	106,70	6 - 8 - 12
1200	48	1219	12,5	1400	56,20	6 - 8 - 12



Odelya® EN 448 Pre-insulated T-Pieces

Service Pipe	Nominal Diameter	DN	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200
		inch	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48
	Outside Diameter, d	mm	**26,9**	**33,7**	**42,4**	**48,3**	**60,3**	**76,1**	**88,9**	**114,3**	**139,7**	**168,3**	**219,1**	**273**	**323,9**	**355,6**	**406,4**	**457,2**	**508**	**610**	**711**	**813**	**914**	**1016**	**1118**	**1219**
Casing Pipe	Outside Diameter, D	mm	**90**	**90**	**110**	**110**	**125**	**140**	**160**	**200**	**225**	**250**	**315**	**400**	**450**	**500**	**560**	**630**	**710**	**800**	**900**	**1000**	**1200**	**1200**	**1400**	**1400**
Length L_1, mm			1000	1000	1000	1000	1000	1000	1000	1000	1000	1200	1200	1200	1400	1800	2000	2000	2000	2000	2000	2500	2500	2500	2500	2500

Service Pipe			Casing Pipe	Length L_2, mm																								
Nominal Diameter, D		O.D.	O.D.																									
DN	inch	mm	mm																									
20	¾	**26,9**	**90**	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000															
25	1	**33,7**	**90**		1000	1000	1000	1000	1000	1000	1000	1000	1000	1000														
32	1 ¼	**42,4**	**110**			1000	1000	1000	1000	1000	1000	1000	1000	1000	1000													
40	1 ½	**48,3**	**110**				1000	1000	1000	1000	1000	1000	1000	1000	1000	1000												
50	2	**60,3**	**125**					1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000								
65	2 ½	**76,1**	**140**						1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000							
80	3	**88,9**	**160**							1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000						
100	4	**114,3**	**200**								1000	1000	1000	1000	1000	1000	1000	1000	1200	1200	1200	1200	1200					
125	5	**139,7**	**225**									1000	1000	1000	1000	1000	1000	1200	1200	1200	1200	1200	1200	1200				
150	6	**168,3**	**250**										1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200			
200	8	**219,1**	**315**											1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500		
250	10	**273**	**400**												1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	
300	12	**323,9**	**450**													1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
350	14	**355,6**	**500**														1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
400	16	**406,4**	**560**															1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
450	18	**457,2**	**630**																1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
500	20	**508**	**710**																	1600	1600	1600	1600	1600	1600	1600	1600	1600
600	24	**610**	**800**																		1600	1600	1600	1600	1600	1600	1600	1600
700	28	**711**	**900**																			1800	1800	1800	1800	1800	1800	1800
800	32	**813**	**1000**																				1800	1800	1800	1800	1800	1800
900	36	**914**	**1200**																					2000	2000	2000	2000	2000
1000	40	**1016**	**1200**																						2000	2000	2000	2000
1100	44	**1118**	**1400**																							2000	2000	2000
1200	48	**1219**	**1400**																									2000

Odelya® EN 448 Pre-insulated T-Pieces-Branch-Off at 45°

Service Pipe	Nominal Diameter	DN	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200
		inch	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48
	Outside Diameter, d	mm	**26,9**	**33,7**	**42,4**	**48,3**	**60,3**	**76,1**	**88,9**	**114,3**	**139,7**	**168,3**	**219,1**	**273**	**323,9**	**355,6**	**406,4**	**457,2**	**508**	**610**	**711**	**813**	**914**	**1016**	**1118**	**1219**
Casing Pipe	Outside Diameter, D	mm	**90**	**90**	**110**	**110**	**125**	**140**	**160**	**200**	**225**	**250**	**315**	**400**	**450**	**500**	**560**	**630**	**710**	**800**	**900**	**1000**	**1200**	**1200**	**1400**	**1400**
Length L_1, mm			1000	1000	1000	1000	1000	1000	1000	1000	1000	1200	1200	1200	1400	1800	2000	2000	2000	2000	2000	2500	2500	2500	2500	2500

Service Pipe			Casing Pipe	Length L_2, mm
Nominal Diameter		O.D.	O.D.	
DN	inch	mm	mm	
20	¾	**26,9**	**90**	1000 1000 1000 1000 1000 1000 1000 1000 1000 1000
25	1	**33,7**	**90**	1000 1000 1000 1000 1000 1000 1000 1000 1000 1000
32	1 ¼	**42,4**	**110**	1000 1000 1000 1000 1000 1000 1000 1000 1000 1000
40	1 ½	**48,3**	**110**	1000 1000 1000 1000 1000 1000 1000 1000 1000 1000
50	2	**60,3**	**125**	1000 1000 1000 1000 1000 1000 1000 1000 1000 1000
65	2 ½	**76,1**	**140**	1000 1000 1000 1000 1000 1000 1000 1000 1000 1000
80	3	**88,9**	**160**	1000 1000 1000 1000 1000 1000 1000 1000 1000 1000
100	4	**114,3**	**200**	1000 1000 1000 1000 1000 1000 1200 1200 1200 1200
125	5	**139,7**	**225**	1000 1000 1000 1000 1000 1000 1200 1200 1200 1200
150	6	**168,3**	**250**	1200 1200 1200 1200 1200 1200 1200 1200 1200 1200
200	8	**219,1**	**315**	1500 1500 1500 1500 1500 1500 1500 1500 1500 1500
250	10	**273**	**400**	1500 1500 1500 1500 1500 1500 1500 1500 1500 1500
300	12	**323,9**	**450**	1500 1500 1500 1500 1500 1500 1500 1500 1500 1500
350	14	**355,6**	**500**	1500 1500 1500 1500 1500 1500 1500 1500 1500 1500
400	16	**406,4**	**560**	1500 1500 1500 1500 1500 1500 1500 1500 1500 1500
450	18	**457,2**	**630**	1600 1600 1600 1600 1600 1600 1600 1600 1600
500	20	**508**	**710**	1600 1600 1600 1600 1600 1600 1600 1600
600	24	**610**	**800**	1600 1600 1600 1600 1600 1600 1600 1600
700	28	**711**	**900**	1800 1800 1800 1800 1800 1800 1800
800	32	**813**	**1000**	1800 1800 1800 1800 1800
900	36	**914**	**1200**	2000 2000 2000 2000
1000	40	**1016**	**1200**	2000 2000 2000
1100	44	**1118**	**1400**	2000 2000
1200	48	**1219**	**1400**	2000

Odelya® EN 448 Pre-insulated Parallel T-Pieces

Service Pipe	Nominal Diameter	DN	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200
		inch	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48
	Outside Diameter, d	mm	**26,9**	**33,7**	**42,4**	**48,3**	**60,3**	**76,1**	**88,9**	**114,3**	**139,7**	**168,3**	**219,1**	**273**	**323,9**	**355,6**	**406,4**	**457,2**	**508**	**610**	**711**	**813**	**914**	**1016**	**1118**	**1219**
Casing Pipe	Outside Diameter, D	mm	**90**	**90**	**110**	**110**	**125**	**140**	**160**	**200**	**225**	**250**	**315**	**400**	**450**	**500**	**560**	**630**	**710**	**800**	**900**	**1000**	**1200**	**1200**	**1400**	**1400**
Length L_1, mm			1000	1000	1000	1000	1000	1000	1000	1000	1000	1200	1200	1200	1400	1800	2000	2000	2000	2500	2500	2500	2500	2500	2500	2500

Service Pipe			Casing Pipe	Length L_2, mm
Nominal Diameter		O.D.	O.D.	
DN	inch	mm	mm	
20	¾	**26,9**	**90**	500 500 500 500 500 500 500 500 500 500
25	1	**33,7**	**90**	500 500 500 500 500 500 500 500 500 500
32	1 ¼	**42,4**	**110**	500 500 500 500 500 500 500 500 500 500
40	1 ½	**48,3**	**110**	500 500 500 500 500 500 500 500 500 500
50	2	**60,3**	**125**	600 600 600 600 600 600 600 600 600 600 600 600 600 600
65	2 ½	**76,1**	**140**	600 600 600 600 600 600 600 600 600 600 600 600 600 600 700
80	3	**88,9**	**160**	600 600 600 600 600 600 600 600 600 600 600 600 600 700 700
100	4	**114,3**	**200**	600 600 600 600 600 600 600 600 600 600 600 600 600 750 750 750
125	5	**139,7**	**225**	600 600 600 600 600 600 600 600 600 600 600 600 600 750 750 750 750
150	6	**168,3**	**250**	700 700 700 700 700 700 700 700 750 800 800 800 800
200	8	**219,1**	**315**	700 700 700 700 700 700 700 800 800 800 800 800 800
250	10	**273**	**400**	800 800 800 800 800 800 800 900 900 900 900 900 900
300	12	**323,9**	**450**	800 800 800 800 800 900 900 900 900 900 900 900
350	14	**355,6**	**500**	900 900 900 900 900 1100 1100 1100 1100 1100 1100
400	16	**406,4**	**560**	1000 1000 1000 1100 1100 1100 1100 1100 1100 1100
450	18	**457,2**	**630**	1000 1000 1100 1100 1100 1100 1100 1200 1100
500	20	**508**	**710**	1000 1200 1200 1200 1200 1200 1200 1200
600	24	**610**	**800**	1200 1200 1200 1200 1200 1500 1200
700	28	**711**	**900**	1500 1500 1500 1500 1500 1500
800	32	**813**	**1000**	1500 1500 1500 1750 1500
900	36	**914**	**1200**	1750 1750 1750 1750
1000	40	**1016**	**1200**	1750 1750 1750
1100	44	**1118**	**1400**	2000 2000
1200	48	**1219**	**1400**	2000

Odelya® EN 448 Pre-insulated Elbows 90°

Service Pipe	Nominal Diameter	DN	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200
		inch	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48
	Outside Diameter, d	mm	**33,7**	**42,4**	**48,3**	**60,3**	**76,1**	**88,9**	**114,3**	**139,7**	**168,3**	**219,1**	**273**	**323,9**	**355,6**	**406,4**	**457,2**	**508**	**610**	**711**	**813**	**914**	**1016**	**1118**	**1219**
Casing Pipe	Outside Diameter, D	mm	**90**	**110**	**110**	**125**	**140**	**160**	**200**	**225**	**250**	**315**	**400**	**450**	**500**	**560**	**630**	**710**	**800**	**900**	**1000**	**1200**	**1200**	**1400**	**1400**
Length L_1, mm			1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1200	1500	1500	1500	1800	1800	1800	1800	2000	2000	2000

Odelya® EN 448 Pre-insulated Elbows 45°

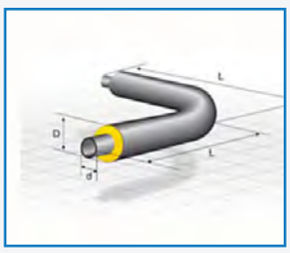
Service Pipe	Nominal Diameter	DN	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200
		inch	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48
	Outside Diameter, d	mm	**33,7**	**42,4**	**48,3**	**60,3**	**76,1**	**88,9**	**114,3**	**139,7**	**168,3**	**219,1**	**273**	**323,9**	**355,6**	**406,4**	**457,2**	**508**	**610**	**711**	**813**	**914**	**1016**	**1118**	**1219**
Casing Pipe	Outside Diameter, D	mm	**90**	**110**	**110**	**125**	**140**	**160**	**200**	**225**	**250**	**315**	**400**	**450**	**500**	**560**	**630**	**710**	**800**	**900**	**1000**	**1200**	**1200**	**1400**	**1400**
Length L_1, mm			1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1200	1500	1500	1500	1500	1500	1500	1800	1800	1800	1800

Odelya® EN 448 Pre-insulated Anchors

Service Pipe	Nominal Diameter	DN	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200
		inch	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48
	Outside Diameter, d	mm	**26,9**	**33,7**	**42,4**	**48,3**	**60,3**	**76,1**	**88,9**	**114,3**	**139,7**	**168,3**	**219,1**	**273**	**323,9**	**355,6**	**406,4**	**457,2**	**508**	**610**	**711**	**813**	**914**	**1016**	**1118**	**1219**
Casing Pipe	Outside Diameter, D	mm	**90**	**90**	**110**	**110**	**125**	**140**	**160**	**200**	**225**	**250**	**315**	**400**	**450**	**500**	**560**	**630**	**710**	**800**	**900**	**1000**	**1200**	**1200**	**1400**	**1400**
Disc Diameter D_1, mm			215	215	215	215	215	240	260	300	300	350	415	500	550	600	660	730	810	900	1000	1100	1300	1300	1500	1500
Length L_1, mm			1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Length L, mm			2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500

Odelya® EN 448 Pre-insulated Expansion Joints

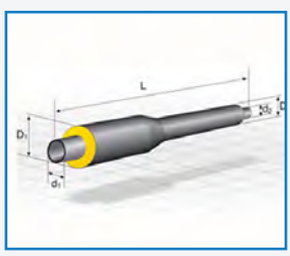
Service Pipe	Nominal Diameter	DN	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800
		inch	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24	28	32
	Outside Diameter, d	mm	**48,3**	**60,3**	**76,1**	**88,9**	**114,3**	**139,7**	**168,3**	**219,1**	**273**	**323,9**	**355,6**	**406,4**	**457,2**	**508**	**610**	**711**	**813**
Casing Pipe	Outside Diameter, D	mm	**110**	**125**	**140**	**160**	**200**	**225**	**250**	**315**	**400**	**450**	**500**	**560**	**630**	**710**	**800**	**900**	**1000**
	Outside Diameter, K	mm	**140**	**160**	**180**	**200**	**250**	**280**	**315**	**400**	**450**	**500**	**560**	**630**	**710**	**800**	**900**	**1000**	**1100**
Total Length L, mm			1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000



Odelya® EN 448 Pre-insulated Reducers

Service Pipe	Nominal Diameter	DN	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200
		inch	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48
	Outside Diameter, d	mm	**33,7**	**42,4**	**48,3**	**60,3**	**76,1**	**88,9**	**114,3**	**139,7**	**168,3**	**219,1**	**273**	**323,9**	**355,6**	**406,4**	**457,2**	**508**	**610**	**711**	**813**	**914**	**1016**	**1118**	**1219**
Casing Pipe	Outside Diameter, D	mm	**90**	**110**	**110**	**125**	**140**	**160**	**200**	**225**	**250**	**315**	**400**	**450**	**500**	**560**	**630**	**710**	**800**	**900**	**1000**	**1200**	**1200**	**1400**	**1400**
Length L_1, mm			1500	1500	1500	1500	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500

Service Pipe			Casing Pipe	Length L_2, mm
Nominal Diameter		O.D.	O.D.	
DN	inch	mm	mm	
20	¾	**26,9**	**90**	X X X X X X X X
25	1	**33,7**	**90**	X X X X X X X X X
32	1 ¼	**42,4**	**110**	X X X X X X X X X X
40	1 ½	**48,3**	**110**	X X X X X X X X X X X
50	2	**60,3**	**125**	X X X X X X X X X X X X
65	2 ½	**76,1**	**140**	X X X X X X X X X X X X X
80	3	**88,9**	**160**	X X X X X X X X X X X X X X
100	4	**114,3**	**200**	X X X X X X X X X X X X X X X
125	5	**139,7**	**225**	X X X X X X X X X X X X X X X X
150	6	**168,3**	**250**	X X X X X X X X X X X X X X X X X
200	8	**219,1**	**315**	X X X X X X X X X X X X X X X X X X
250	10	**273**	**400**	X X X X X X X X X X X X X X X X X X X
300	12	**323,9**	**450**	X X X X X X X X X X X X X X X X X X X X
350	14	**355,6**	**500**	X X X X X X X X X X X X X X X X X X X X X
400	16	**406,4**	**560**	X X X X X X X X X X X X X X X X X X X X X
450	18	**457,2**	**630**	X X X X X X X X X X X X X X X X X X X X X X
500	20	**508**	**710**	X X X X X X X X X X X X X X X X X X X X X X
600	24	**610**	**800**	X X X X X X X X X X X X X X X X X X X X X X
700	28	**711**	**900**	X X X X X X X X X X X X X X X X X X X X X X
800	32	**813**	**1000**	X X X X X X X X X X X X X X X X X X X X X X
900	36	**914**	**1200**	X X X X X X X X X X X X X X X X X X X X X X
1000	40	**1016**	**1200**	X X X X X X X X X X X X X X X X X X X X X X
1100	44	**1118**	**1400**	X X X X X X X X X X X X X X X X X X X X X X



PIPE FITTINGS

Odelya® Butt Welding Fittings are mechanically joined to the piping system and are used for changing flow direction, branching or changing the diameter of pipe. As Odelya® BW Fittings are welded to the main pipe; entity and high strength of piping system are assured. Furthermore, due to smooth inner surface and gradually changing of flow direction, turbulence and pressure losses are minimized.

Odelya® Butt Welded Fittings, offering the availabiliy of wide range of dimensions, are manufactured from high quality raw materials, which are specified according to the requirements of the project and environmental conditions. Selective properties, close tolerances, and customization availability make Odelya® Fittings suitable in wide range of applications.

Production Standards: ASME B 16.9, ASME B 16.28 (for SR Elbows), ASTM A-234, MSS SP 75, DIN EN 10253-2, ISO 7005-1, DIN 2609
Dimensions and Tolerances: ANSI B 16.9 / MSS SP 75 and special drawings.
Carbon Steel: ASTM A 234 WPB – ASTM A 234 WPC – ASTM A 420 WPL6 – WPHY 42/70
Alloy Steel: ASTM A 234 WP1 – WP11 – WP12 – WP22 – WP5 – WP9 – WP91 – WP92

Stainless Steel: ASTM A 403 WP 304 / 304 L / 304 H, ASTM A 403 WP 321 / 321 H, ASTM A 403 WP 347 / 347 H, ASTM A 312 WP 316 / 316 L / 316 H

Special Alloy Steel: Duplex – Super Duplex – Inconel – Incoloy – Monel – Hasteloy – Titanium / Ti-Gr2

Material Quality (DIN EN norm):
St37.0, St37.8-I, St35.8-I, St35.8-III, P235GH-TC1, P265GH-TC2
St 52.0, St52.3, St52.4
L290NB, L360NB, L360QB, L415NB, L415QB
16Mo3, 13CrMo4-5, 10CrMo9-10, X10CrMoVNb91

45° - 90° - 180° Long and Short Radius Elbows

Odelya® LR/SR Elbows are used to change direction of flow in a piping system. Long or short radius or "center to face" of an elbow defines the distance over which the flow direction is changed. Additionally, Odelya® Butt Welded Elbows are available in special radius degrees: 30°, 40° and 120°. High quality induction elbows and bends for pipelines are also supplied by Odelya®.

Production Standard: ANSI B 16.9 / MSS SP 75, ANSI B16.28 (for SR Elbows), DIN 2605-1
Dimensions: From ½" up to 48", ANSI B 16.9 / MSS SP 75 and special drawings

Reducers

Odelya® Reducers are used for changing of pipe diameter in one direction. For vertical pipelines, concentric reducer is generally preferred, for horizontal pipelines, on the other hand, the eccentric reducer is used.
Production Standards: ANSI B 16.9 / MSS SP 75 DIN 2616 part 1 and 2
Dimensions: From ¾" up to 48" x 40"

Equal and Reducing (Unequal) Tees

Odelya® Equal (Straight) and Reducing Tees are used to make a 90° branch from the main run in piping system, or for connecting pipes of different diameters. The straight tee is used to make a branch of the same diameter as the main pipe. Accordingly, the reducing tee has smaller diameter than the main pipe. Morover, Odelya® proposes Reducing Outlet Tees along with Reducing Outlet Crosses.
Production Standards: ANSI B 16.9 / MSS SP 75, ASTM A 234, DIN EN 10253-2, DIN 2615 part 1 and 2.
STD, XS, SCH 40, SCH 80
Dimensions
Equal Tees: From 1/2" up to 48" | Reducing Tees: From 1/2" x 3/8" up to 48" x 22"

Caps

Odelya® Butt Welded Caps are used to shut down the end of a pipe and prevent leakages with protection from dirt or dust. High quality and wide range of Odelya® Caps create many possibilities of effective usage.
Production Standards: ANSI B 16.9, ASTM A 234, MSS SP 75, DIN 2617 | Size: From 1/2" up to 48"

FORGED WELDED FITTINGS

Forged Threaded and Socket Weld Fittings: Elbows, Tees (Straight and Reducing), Reducers (male – female), Caps, Weldolets, Sockolets, Threadolets, Flangolets, Elbolets, Nippolets, Latrolets, Couplings, Half Couplings, Hexagonal head plug, Round and Square head plug, Hexagonal Nipple, Union, Welding Boss, Threaded Plugs, Bushings, etc.

Furthermore, fitting's ends are available as "plain both end" PBE, "threaded both end" TBE, "plain large end" PLE, "threaded small end" TSE, "beveled large end" BLE and other combinations. Odelya® Forged Steel Fittings are precisely manufactured in pressure classes 2000, 3000, 6000 and 9000, of which sizes range from 1/8" to 4".

VALVES

Odelya® Valves are fundamental components of a pipeline system for conveyance of liquids, gases, steams, etc. Thus, Odelya® Valves are used for regulating of flow: stopping and starting, reducing and increasing, managing direction of flow and controlling of pressure level. Odelya® provides a variety of types and models of valves with different functions for many applications. In addition, Odelya® Valves are manufactured of high quality materials selected for each application's requirements to assure safe and reliable long-term operation. Odelya® Flanged Valves, threaded or with welding end valves are produced in accordance with related production standard and required class pressure ratings (150lb – 1500lb).

Gate Valves (Resilient Seal Gate Valves (Short Type and Long Type), Metal Seated Gate Valves)

Odelya® Gate Valves are mainly used to start or stop a flow or fluid and are generally fully open or fully closed. This type of Gate Valves are suitable for a wide range of liquids, as the valves with strong shutoff features can be used in both directions and pressure loss is minimized.

Production Standards: ANSI / ASME B16.34, ISO 5996, DIN 3204, DIN 3216, DIN 3225, DIN 3352

Pressure Class: 150LB, 300LB, 600LB, 900LB, 1500LB

Globe Valves

Odelya® Globe Valves are widely used to start, stop and regulate product flow. The design and superior quality of Odelya® Globe Valves make them reliable and safe in operation, as these valves have good shutoff and throttling capabilities.

Production Standard: ANSI / ASME B16.34

Pressure Class: 150LB, 300LB, 600LB, 900LB, 1500LB; PN16, PN25, PN40

Check Valves

Odelya® Check Valves automatically are opening with forward flow, passing through the piping system, and closing with reverse flow. Odelya® Check Valves are supplied in variety of types: Swing, Lift (Ball and Piston), Butterfly and Disk type, moreover, other types and combinations are also available.

Swing Check Valve

Odelya® Swing Check Valves are safe in any case within operation, as the flow can be stopped by valve's own weight or a weight of its mechanism. Thus, direction of a liquid is properly controlled and reverse direction is immediately stopped.

Lift Check Valve (Piston and Ball)

Odelya® Lift-Check Valves are usually in the form of ball or piston, similar to globe valve, and are suitable for high pressure applications with high velocity of flow. These valves are applied for upward flow in vertical or horizontal pipeline systems.

Nominal Diameter: 15 – 200 mm

Pressure Class: 150LB, 300LB, 600LB; PN16, PN25, PN40

Ball Valves

Odelya® Ball Valves are designed to stop or start the flow using ball-shaped disk. Thus, Odelya® Ball Valves are functional and reliable in operation, as a quarter turn on-off operation is quick and tight sealing is assured with low torque. Furthermore, Odelya® Flanged and Threaded Ball Valves are available as full port, reduced port and venturi port and are used in hot and cold water installations, liquid fuel, steam and gas pipeline systems.

Production Standards: DIN 558-1, TS 3148

Dimensions: DIN 3202/2 F4, DIN 3357/6-1, TS 3148/17

Nominal Diameter: 15 - 300 mm

Pressure Class: 150lb, 300lb, 600lb; PN6, PN10, PN16, PN40

Flange Dimensions: DIN EN 1092-2, ISO 7005-2, DIN 2501

Full Bore Ball Valve: 2 pieces, 3 pieces and threaded 3 pieces

Dimensions: TS 3148

Nominal Diameter: 15 -300 mm

Nominal Pressure: PN16, PN25, PN40

Flange Dimensions: ISO 7005-2

Operating Temperature: -10 - 120°C

Gas Ball Valve: 2 piece, 3 piece and threaded 3 pieces

Dimensions: EN 331 / TS 9809

Nominal Diameter: 15 – 200 mm

Nominal Pressure: PN16, PN25, PN40, MOP5-20

Flange Dimensions: ISO 7005-2

Operating Temperature: -10 - 120°C

Compact Ball Valves: Lug and Wafer

Nominal Diameter: 40 – 200 mm

Nominal Pressure: PN16

Operating Temperature: -10 - 120°C

Butterfly Valves

Odelya® Butterfly Valves are easy to close or to open due to its 90° rotation movement, and are used to stop, start or regulate the flow of pipeline. Usually to simplify the operation, butterfly valves are equipped with a gear box (actuator).

Odelya® Butterfly Valves are provided in two types: Wafer and Lug, in addition, butterfly valves with vulcanizes seats and with grooved end are available. These valves have many advantages over other types of valves, as Butterfly Valves are light, easy and cheap to maintain, especially in large valve applications.

Production Standards: EN 593, API 609
Nominal Diameter: 32 – 1200 mm
Nominal Pressure: PN6, PN10, PN16, PN25; Class 150LB

Strainers: T and Y type

Odelya® Strainers are widely used in steam, fluid or liquid conveyance systems to separate various foreign substances, which may contaminate transmitted product. During exploitation Odelya® Strainers can be cleaned by removing its drain cock. Odelya® Compact Strainers are manufactured as wafer or lug type and flanged or theaded.

Dimensions: DIN 3202/ 2-F1 TS 11494
Nominal Diameter: 50 – 100 mm
Nominal Pressure: PN10, PN16, PN25, PN40; Class 150
Flange Dimensions: DIN 2501, TS ISO 7005-2

Air Valves: Single and Double Air Valves

Odelya® Single and Double Air Valves are used to control and ensure that the air will be automatically evacuated when the pipe will be filled with water to prevent back pressure. Furthermore, Odelya® Air Valves are required to enter air and prevent vacuum, while water from the line pipe is drained.

Nominal Diameter: 50 – 100 mm
Nominal pressure: PN10, PN16, PN25
Flange dimensions: DIN 2501, ISO 7005-2

Plug Valves

Odelya® Plug Valves are quarter-turn rotational motion valves, similar to Ball Valves in operation, using to stop or start the flow in piping system. These valves are smaller than most types of valves, easy open or close and create minimum resistance to the flow. Furthermore, Odelya® Plug Valves are available as lubricated or non-lubricated.

Dimensions: ANSI B 16.10, API 6D, ANSI B 16.5
Size: 1" - 2"
Pressure Class: 150LB, 300LB, 600LB

Safety Valve

Nominal pressure: PN 16, PN25, PN40, PN 64, PN 100, PN160

Cast Steel Valves

Pressure Class: 150LB, 300LB, 600LB, 900LB, 1500LB

Dual Plate Check Valves

Dimensions: API 594, ANSI B 16.5; mountable between pipe flanges in vertical or horizontal positions

Size: 2" – 48"

Pressure Class: 150LB, 300LB, 600LB

Through Conduit Gate Valves

Dimensions: API 6D, ANSI B 16.5., ASME B 16.34, ANSI B 16.10; Rising Stem

Size: 2" – 24"

Pressure Class: 150LB, 300LB, 600LB, 900LB, 1500LB

Operation: Handwheel, gear or actuator

Diaphragm Valves "

Nominal Diameter: up to 500 mm (½" to 20")

Pressure Class: 125LB, 150LB; PN10, PN16

Flange Dimensions: ANSI B 16.1, ANSI B 16.5, DIN 2501

High Pressure Needle Valves

Male or female thread, screwed bonnet.

Size: 1/8" – 1"

Operating: Max 6000 psi, temp. 240°C, Max pressure 400 bar

Cast Bronze Valves

Gate Valves: ½" to 2". Non rising stem, or rising stem, screwed or union bonnet. Body – bonnet mat.

Globe valves: ½" to 2", ASTM B62, rising stem, screwed or union bonnet. Body – bonnet mat

.

Check Valves: ½" to 2", screwed or union bonnet. Body – bonnet mat. ASTM B62, Y-pattern

Pressure Class: 150LB, 200LB, 300LB

FLANGES

Odelya® Welded or Screwed Flanges are used to form piping system by connecting pipes, pumps, valves and other equipment. Moreover, Odelya® Flanges provide access for further modification, cleaning and control of piping system.

Generally Odelya® Flanges are manufactured of the same material as the pipe, thus, it can be forged carbon steel, alloy or non-alloy steel, stainless steel, cast iron, ductile iron, brass, etc. In addition, Odelya® Flanges are manufactured with selected facing types, such as Raised Face, Flat Face, Spigot, Tongue-and-Groove, Recess, O-ring Groove and O-ring Spigot.

Odelya® Forged Steel Flanges are provided in many pressure classes or ratings, indicating the amount of pressure these flanges can handle. Additionally, each starting material for flanges can have different pressure capabilities. Variety of combinations of Odelya® Flanged Joints, combined with high quality manufacturing process and material quality, create reliable customized solutions for many industries, such as petroleum, natural gas, water conveyance, electric power generation and chemical industries.

ODELYA® FLANGE TYPES

Flat Flanges, Welding Neck Flanges, Blind Flanges, Socket Weld Flanges, Threaded Flanges

Special Flanges
Along with the most used types of flanges, Odelya® provides wide range of special types of flanges of high quality with close tolerances:
Orifice Flanges (slip-on and welding neck), Long Welding Neck Flanges, Weldoflanges / Nipoflanges, Expander Flangse, Reducing Flanges, Nippo Flanges, Weldo Flanges, Loose Flanges, Special Nozzle Flanges, Line Spades and Spacer, Supported Flanges, Spectacle Blind Flanges, Gear Flanges, Special Drawing Flanges, Stub Bolts for Flanges, etc.

Production Standards: ANSI B 16.5, ANSI B 16.47 / MSS SP 44 (22" – 48"), ANSI/API 590, ANSI B 16.48, EN 1092-1, ISO 7005-1

ANSI pressure classes: 150LB (PN20), 300LB (PN50), 400LB (PN68), 600LB (PN100), 900LB, 1500LB, 2500LB

Dimensions: ½" – 24", 22" – 48"

Carbon Steel: ASTM A 105; ASTM A 350: LF2; ASTM A 694: F42, F52, F60, F65, F70;
St 37.2; St 44.3; C22.8; 15 Mo 3; 13 CrMo 44, 10 CrMo 9 – 10, 16Mo3 / 13CrMo4-5

Alloy Steel: ASTM A 182 - F1, F11, F12, F22, F5, F9, F91

Stainless steel: ASTM A 182 F 304 / 304 L / 304 H, ASTM A 182 F 321 / 321H, ASTM A 182 F 347 / 347 H, ASTM A 182 F 316 / 316 L / 316 H

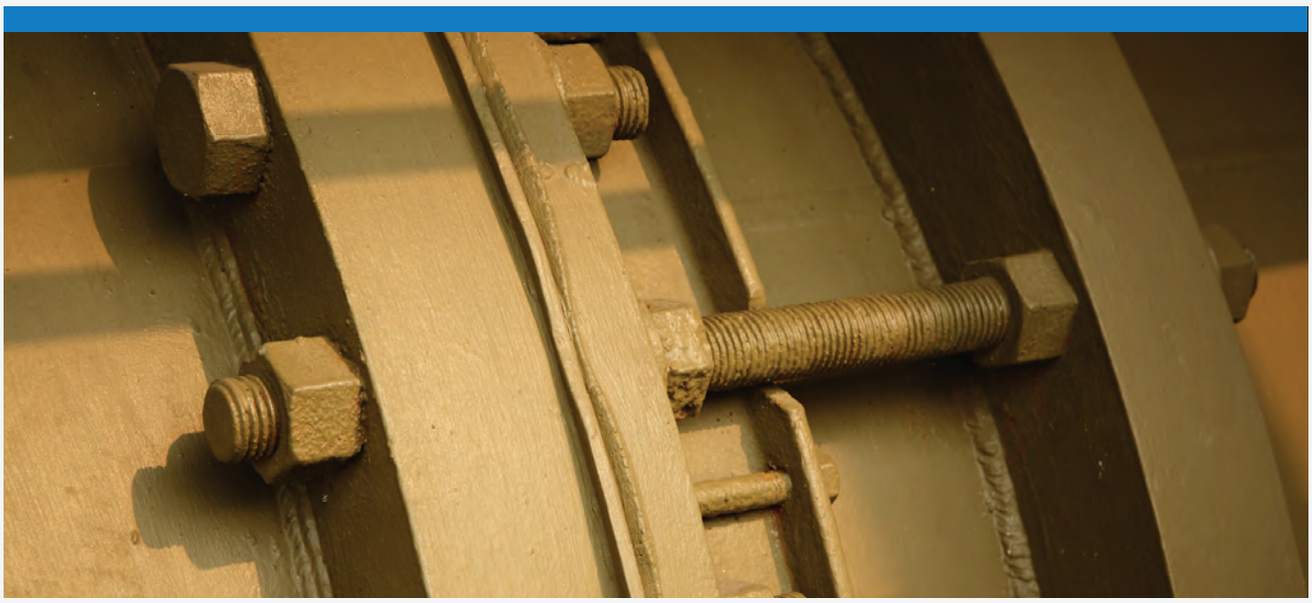
Special Alloy Steel: Duplex - Super Duplex - Inconel - Incoloy - Monel - Hastelloy - Titanium / Ti-Gr2

Flat Flanges

Odelya® Flat Flanges are flanges with flat face, so a gasket surface is at the same line with bolting circle face. This type of flanges is mainly used with casing mating flange or flange fitting.

Production Standards: ANSI B 16.5; MSS SP 44; EN 1092-1; ISO 7005-1. PN6, PN10, PN16, PN25, PN40, PN64, PN100

Dimensions: ½" - 48"



Welding Neck Flanges

Odelya® Welding Neck Flanges have a long tapered hub or neck, which is gradually connect the flange with the pipeline or fitting, providing the same wall thickness in the butt welding area. Moreover, due to smooth transition of wall thickness from the neck base to the pipe or fitting, the weld neck flanges are provided with important reinforcement, matching bore of the mating line pipe as well.

Odelya® Welding Neck (WN) Flanges are used in high stress applications involving sub-zero or elevated temperatures and high pressure, as the neck or hub provides stress distribution of the piping system and excellent strong connection. Additionally, design of Odelya® WN Flanges provides reduction of corrosion, turbulence at joints and welding area can be easily examinated by radiography.

Production Standards: ANSI B 16.5, MSS SP 44; pressure classes: 150LB (PN20), 300LB (PN50), 400LB(PN68), 600LB (PN100), 900LB, 1500LB, 2500LB.
ISO 7005-1, DIN 2631 PN6, DIN 2632 PN10, DIN 2633 PN16, DIN 2634 PN25, DIN 2635 PN40, DIN 2636 PN64, DIN 2637 PN100, DIN 2638 PN160.

Dimensions: ½" - 24", 22" – 48"

Slip-On Flanges

Odelya® Slip on Flanges are designed to slip over the outside diameter of the pipe and then fillet welded outside at the hub and inside of the flange at the end of pipe. These flanges are reliable and durable, thus, easy-to-use in fabricated applications.

Production Standard: ANSI B 16.5, MSS SP 44; Pressure Class 150 (PN20), 300 (PN50), 400(PN68), 600 (PN100), 900, 1500.

Dimensions: ½" – 24", 26" – 60" (BS 3293)

Blind Flanges

Odelya® Blind Flanges are designed without a bore and are used to close the ends of pipes, valves and pumps. According to the application, Odelya® Blind Flanges can be manufactured with or without a nub (neck). Odelya® Blank Flanges are ideal for high pressure applications, as this type of flange without a bore and generally in larger sizes can withstand more stress and pressure that other types of flanges.

Production Standard: ANSI B 16.5, MSS SP 44; Pressure Class 150 (PN20), 300 (PN50), 400(PN68), 600 (PN100), 900, 1500, 2500. ISO 7005-1, DIN 2527 PN6, PN10, PN16, PN25, PN40, PN64, PN100

Dimensions: ½" – 48"

Socket Weld Flanges

Odelya® Socket Weld Flanges are generally used for small diameter line pipes in high pressure applications. This type of flanges is designed with bore of which inside diameter is equal to the outside diameter of the pipe. Moreover, from the hub side there is a counterbore, which is larger than outside diameter of matching pipe and therefore provides the socket to insert the pipe. The connection of Odelya® Socket Weld Flange with the pipe is done by one outside filled weld, but the expansion gap (space) between the pipe end and the flange should be left for reducing residual stress and increasing flow quality.

Production Standard: ANSI B 16.5, Pressure Class 150 (PN20), 300 (PN50), 400(PN68), 600 (PN100), 900, 1500.

Dimensions: ½" – 3"

Threaded Flanges (Screwed)

Odelya® Threaded Flanges are mainly used for small diameter pipe sizes with wall thickness suitable for threading. The main advantage of this type of screwed flanges is that welding is not required, but in some cases a sealing weld may be used along with threaded connection.

Production Standard: ANSI B 16.5, Pressure Class 150LB (PN20), 300LB (PN50), 400LB(PN68), 600LB (PN100), 900LB, 1500LB, 2500LB.

ISO 7005-1, nominal pressure: PN10, PN16, PN25, PN40; DIN 2566

Dimensions: ½" – 24"

Special Flanges

Along with the most used types of flanges, Odelya® provides wide range of special types of flanges of high quality with close tolerances:
Orifice Flanges (slip-on and welding neck), Flat Flanges, Long Welding Neck Flanges, Weldoflanges / Nipoflanges, Expander Flangse, Reducing Flanges, Nippo Flanges, Weldo Flanges, Loose Flanges, Special Nozzle Flanges, Line Spades and Spacer, Supported Flanges, Spectacle Blind Flanges, Gear Flanges, Special Drawing Flanges, Stub Bolts for Flanges, etc.

QUALITY ASSURANCE

Our quality assurance policies are a harmonious combination of our experience in global market and strict dedication to our sophisticated quality management, which ensures accurate and reproductive results.

Odelya® Quality Assurance plan includes the most appropriate production plan, strict agreement with our manufacturer partners about production quality and quality tests applied, and loading and shipment procedure's details. As a result, all the risks are carefully estimated at the beginning of the supply project.

Inspection Test Plan & Quality Plan

Before starting the production, reaching to a multilateral agreement is required for a smooth production and loading. Therefore, each single details of the production and testing phases, from raw material inlet point to the loading to the transportation vehicles is negotiated by the parties. The production doesn't start unless the all parties are fully satisfied with the stipulated inspection test plan. Thanks to our experience in various projects and technical knowledge in the area of steel pipe technologies, we are so ready to puzzle over the whole strategic plan and offer the most proper solutions.
All required and negotiated tests are applied during and after manufacturing process and all documentation is carried according to strict specifications of related production standard.

Third Party Inspection (TPI)

Premium quality of Odelya® Piping Projects is assured by appointing independent "third party inspection" (TPI) organizations for coordinating the inspection plan of piping project. As we appoint worldwide-known independent inspection companies, inspection of material quality, production process and loading steps are under precise and continuous control.

Customized Approach

With accordance to application of piping project, required tests, such as hydrostatic and ultrasonic are applied with more strict requirements for safer and longer exploitation. Moreover, applied coating and lining systems, selected for each exact application, guarantee corrosion and impact protection of Odelya® Steel Pipes.

Chemical Analysis

Spectral analysis of the chemical composition

Hydrostatic Test

Testing of leakage in the welded areas by high pressure water applies according to further application and requirements (Leak Tightness).

Non-Destructive Tests

Eddy Current Test: Detection of the defects on the surface and testing quality of the weld and the material using electromagnetic device.

Ultrasonic test – Full Body & Weld-zone Ultrasonic Test: Automatic ultrasonic rotary plant precisely detects flows and monitors weld quality using high frequency sound waves. Ultrasonic inspection ensures 100% flaw detection and its immediate elimination. (Ultrasonic weld seam test, Ultrasonic lamination test)

Magnetic Flux Leakage: A powerful magnet is used to assure the absence of any corrosion or damaging on steel tubing by evaluating magnetic field "leakage".

Radiological Inspection (Radiographic and Radioscopic tests): evaluating quality and integrity of weld area of the entire pipe.

Grain Size Control: Controlling the rate of metal grain's growing during its heating above recrystallization range.

Mechanical & Technological Properties

Tensile test: Determining mechanical properties, such as yield strength, tensile strength, Young's module, deformation, elongation, strain hardening behavior, and reduction of sample.

Flattening test: Quality, strength and ductility of the weld and the tube is evaluated by pressure application.

Bending test: Evaluating ductility of the tubes and the welds to resist cracking or other surface irregularities during one continuous bend of the material.

Impact test: Determining a total energy required to break the test sample by fracturing impact at high velocity (Charpy, Izod, Drop Weight tests).

Expansion test: Determining the durability of steel tubes to withstand heavy weights and pressure.

Fracture toughness test: Indicating the amount of stress required to cause brittle or ductile crack extension in a sample with preexisting flaw.

Weld ductility test: Evaluation of welding zone ability to flatten without cracks or breaks until specified standard degree.

Visual & Dimensional Inspections

Accurate information about dimensions and quality of tubes is provided using tape, caliper, ultrasonic device, gauge and cord.

Macrographic and Metallographic Examination

Revealing the structure of metals and their alloys with light optical or scanning electron microscope...

WELL-ORGANIZED SHIPMENTS

We know the importance of a safe journey of our steel pipes, so, Odelya® Steel Tubes are transported to the customer by truck, vessel or rail under precise control in order to prevent damages and to expect an on-time delivery. Odelya® Steel Pipes are marked, secured and loaded/unloaded according to the strict production standard's specifications, customer's requirements and according to type of pipe and its surface condition (coated, painted, etc.).

Our international experience gives us the confidence of handling well-organized and timely shipments for any types of loadings, such as container-loadings, truck-loading, bulk-shipments etc. In our warehouses, at ports, at the final destination, we will be just near our products to supervise the loading operation.

The loading operations of Odelya® Steel Tubes are under supervision and instructions of our experienced operation staff. In addition, the loading process is always completed with accordance to the tube type, its size, volume, customer's requirements and production standard's specifications. For safe and on-time loading/unloading processes of Odelya® Steel Tubing, suitable loading and lifting equipment is used.

We beneficially use the geographical position and different port opportunities creating the most optimized and cost-saving solutions of transporting steel pipes to the destination port.

Marking, Securing, Loading

Odelya® Steel Pipes, secured with suitable lashing materials with utmost care, are on time delivered to their destination in safe condition. Moreover, Odelya® provides continuous control of quality and reliability during shipment.

Odelya® Coated Pipes are secured in a way, which perfectly protects the coating layer from damages occurred by abrasion or impact.

Odelya® Pipe Fittings are carefully packed in metal boxes, carton boxes on wooden palette or timber boxes or in containers according to the fitting type and size. Additionally, Odelya® Pipe Fittings' threaded connections are capped or plugged for higher protection.

Furthermore, Odelya® Steel Pipes are marked with our brand Odelya® and also in a way providing clear and easy identification and traceability of the product. The marking is applied according to the standard and customer requirements, so for each type of pipe, the marking may vary to make our pipes easily recognizable.


SAFETY FIRST

Tubing
the
World

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